4.0 PROGRESS OF WORK

The contractor shall proceed with the work under the contract with due expedition and without delay. The EIC may direct in what order and at what time, the various stages or parts of the work under the contract shall be performed. Contractor has to regularly submit daily progress reports, weekly progress reports, graphs with utilities, testing reports, material consumption and inventory reports, deviation statements, completion schedule etc.

5.0 APPROVALS & PERMISSIONS FOR PIPELINE LAYING

Contractor has to obtain permissions from statutory bodies for laying of pipelines. Statutory bodies in this case are Municipal Corporation of State, PWD, NHAI, CPWD, AAI, Indian railways and any other government agencies who maintain the public lands and accord permissions for laying of the utilities. The contractor shall obtain demand note (road restoration charges) from these statutory bodies. Contractor shall ensure that the road restoration charges are to the minimum against the work to be carried out. CLIENT may return back the demand note, if the charges are not found reasonable and contractor shall not be liable for any liaison charges against the same.

However, CLIENT will pay the road restoration / Departmental charges / security deposit/ Bank guarantees for getting the clearances from statutory bodies. It is the contractor's responsibility to inform and co-ordinate the concerned local authorities and also other utility agencies before and after the commencement of work at site. To ensure smooth execution of the work on a day-do-day basis, the contractor has to liaison with respective authorities. The contractor shall plan and ensure that work taken up under a single permission shall be completed within the stipulated time period and revalidation process is avoided. No separate liaison charges are liable to CLIENT for revalidation cases.

It is the responsibility of the contractor to obtain "No Objection Certificate" (NOC) from land owing agencies/ Statutory bodies after completion of the restoration to their satisfaction and getting released the security deposit/ bank guarantees submitted by CLIENT for obtaining permissions on production of documentary evidence. Separate payment in running meters will be made on account of approvals/permissions as per specified in SOR, based on total applied length, where the rates are inclusive of liaison rates. In case of any deviation/ change in the route/ additional laying, CLIENT shall pay the additional Road Restoration Charges only after receiving of revised estimate and further to written confirmation from the concerned Owner site-in-charge.

On behalf of the Owner, contractor shall prepare in advance and submit the proposed route plan complete in all respect and well ahead of time so that the actual construction work is not delayed because of approval/inspection/permission by concerned authorities. Further, the contractor shall also coordinate with the relevant authorities for necessary approvals of these proposed pipeline route drawings/certificates. The inspection of work by statutory authorities shall be the responsibility of the contractor without any extra cost to CLIENT.

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In case contractor delays laying of pipeline work under a single permission, the work or part of work may be offloaded to some other contractor on his risk and cost. Any change / addition required to made to meet the requirements of the statutory authorities shall be carried out by the contractor without any extra cost to CLIENT. The inspection and acceptance of the work by statutory authorities shall however, not absolve the contract from any of his responsibilities under this contract.

6.0 REFERENCE SPECIFICATION, CODES AND STANDARD

The contractor shall carry out the work in accordance with the requirement of latest relevant applicable standards, this specification, Owner's Engineering Standards; relevant Oil Indian Safety Directorate (OISD) norms, PNGRB Regulations, ASME B31.8-Gas Transmission and Distribution Piping Systems; Australian Standard 3723-Installation and Maintenance of Plastics Pipe Systems for Gas; and the American Gas Association Document - Purging Principles and Practice. IS0-4437/JS: 14885 for underground polyethylene pipes and OWNER's approved procedures.

Should the contractor find any discrepancy, ambiguity or conflict in or between any of the standards and the contract documents, then this should be promptly referred to the Engineer-In-Charge (EIC) for his decision, which shall be considered binding on the contractor.

7.0 QUALITY OF WORK

All works carried out under this contract shall confirm to applicable standards, codes of practice, construction procedures and other technical requirements as defined in the technical specifications.

The manpower deployed on the respective activities shall be adequately trained & shall have necessary skills to execute / supervise the work. However, the assessment on the qualification of the personnel shall be at the discretion of EIC.

Fusion operators and other skilled personnel shall be approved by Owner/ Owner's representative and identification cards duly signed by EIC shall be issued to them. Only those personnel who are approved by shall be allowed to execute the critical activities like electro fusion jointing of MDPE pipes & fittings. CLIENT may provide training and certification on chargeable basis where the cost shall be borne by
contractor.

8.0 SAFETY

The Contractor shall conform to the safety requirements outlined elsewhere in the tender document. In addition, the Contractor shall observe safe working practices in the storage and handling of cleaning fluids, flammable fluids, etc., and ensure smoking or naked flames are not permitted in the vicinity when these materials are being used.

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Trench walls shall be battered with sufficient slope in order to minimize a trench collapse. Where there is a danger of an earth slide or collapse, the trench shall remain open for the minimum time possible with proper barricading. The Contractor is to ensure that no person enters a trench, which is of a depth of 1.5 meters or greater, unless the trench has adequate shoring or the sides are battered to such an extent as to prevent a trench collapse.

The Contractor shall also protect all work sites with warning signs, barricades and night lighting. The Contractor shall inspect all fenced excavations daily, and maintain them in good order.

The trenches/ pits shall not be kept open in night times. However in case the same is essential the same shall be properly barricaded with proper lighting arrangements &manned.

The Contractor shall provide PPE's like helmets, safety shoes, etc. to the labour which are necessary for safe working practice.

Any accident causing injury to any person or damage to property or equipment shall be reported to the EIC and the cost of repair / replacement of the damage equipment shall be borne by the contractor. Where the EIC determines that the work is being performed by the Contractor in an unsafe manner, he may suspend the Work until corrective action is taken by the Contractor.

PPE, Continuous Barricades and caution tapes along the trenches as per approved drawing in tender, Use of Safety Boots, Hand gloves, Reflective jackets, Hard hats(helmets), Safety shoes, eye and ear safety equipment, Fire extinguishers and as per the detailed scope of work in tender specifications.
measurement sheet of laying should also include length of barricading. Refer drawing number no. VPC-STD-PP-2008. For further details Refer "Special Terms and conditions of Contract" & SOR.

9.0 ROUTE SURVEY

Planning, detailing the size, route survey drawings, identification of underground utilities, foreign pipelines, crossings, and location of valve chamber, FRS, DRS, MRS as well as service line location is in scope of contractor.

9.1 Mainlines

The final alignment of mainlines will be worked out at site in consultations with the Owner/Owner's representatives after route survey and trial pits, at contractor cost. Any change in routing from the issued drawings due to site constraint will be notified to EIC & his specific written approval shall be obtained before carrying out the job.

9.2 Service lines

Consultant/Third Party Inspection Agency and the contractor will conduct a joint survey at each probable premise/ housing colony/pockets/area to be supplied with gas. The survey

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record will note customer's detailed potential gas supply points, proposed regulator positions and estimates of material quantities. The contractor's representatives will make sketch of the agreed pipe routes.

The contractor will be responsible for contacting the customer and making the necessary arrangements for access and appointments to carry out the work. Contractor shall maintain job card and complaint books at site. Owner will not be responsible for time lost due to failed appointments or disputes with customers.

10.0 ORGANISATION STRUCTURE

Contractor shall designate Project Manager / Coordinator who will be responsible to interact with EIC/Consultant/TPIA and authorized to attend review meetings, receive material, authorized to sign documents, claims and receive payments etc. Contractor shall employ a Project Manager Coordinator on company roll. Project manager / coordinator & Site Engineers on company roll. The Project Manager/ Coordinator must have qualification of BE Mech. /Diploma in Mech. Engg. with min. 2-5 years & Site Engineer must have minimum Diploma in Mechanical Engineering with 3 years of work experience in gas pipe line job. He shall be single point of contact for all the works and must represent company in the review meetings.

All construction work will be carried out as per direction of EIC, and this will be the primary point of contact between the contractor and Owner on site. All work will be issued and sanctioned through the EIC and site control exercised by Site Engineers. The contractor shall ensure that technical quality standards are maintained, that construction is carried out cost effectively and that a good customer and public image is maintained for Owner.

The contractor will deploy his own supervisors as directed by site engineers/EIC. These personnel will be reporting to the Site Engineer for monitoring construction standards and for ensuring that all technical requirements are met for the job being carried out. The contractor's supervisor(s) will have day-to-day liaison with the Site Engineer, and will provide the Site Engineer with technical reports and audits, and other management information as is required on work progress and construction quality standards.

The contractor's supervisor shall have mobile telephones to ensure that they can be contacted at all times. The contractor will also nominate one person who can be contacted if necessary in odd hours, for the duration of the works. The contractor's supervisor will have access to transport at all times to allow them to visit sites and attend meetings with Owner. Supervisor shall attend to normal day-to-day issue of work instructions, communication between Owner and the contractor's supervisor and the Site Engineer.

Contractor shall maintain a Customer Care Centre, Project Site Office, and Material Store in their allotted site with following facilities:

- Telephone, Mobile Phones, Fax machines, Printers/Scanning/Xerox machines, Computers with internet facility.

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- One Nos. - Four wheeler with driver, he shall be well equipped with tools and tackles for attending any emergency complaints and ongoing execution work.
- On award of the contract, the contractor shall establish and submit documentary evidence for above, which will be verified by the owner before award of the work order.

11.0 STRUCTURES, SERVICES AND OTHER PROPERTY

11.1 Location of Underground Utilities

The contractor shall locate all buried utility pipes, underground cables, water mains and other obstructions intersecting or adjacent to the Works, and shall make available the necessary labour to expose and record the depth of cover over all obstructions in advance of excavation. This shall be done far enough in advance of excavation to facilitate gradual change in grade or position found necessary to clear any obstructions.

In addition, the contractor shall excavate trial pits as necessary to determine the pipe route. The number of trial pits will be agreed with the Site Engineer in advance of any excavation. In any event, trial pits shall be made at intervals of a maximum of 30 meters. Restoration of the abandoned trial pits and trenches shall be the contractor's responsibility. No payments shall be made for such type of jobs. The trial pits shall be excavated to minimum depth of 1.5 meters so as to locate any utilities present in the trench.

It is contractor's responsibility to interact with other utility agencies regarding their existing utilities and finalize the route along with these agencies and Owner/ Owner's representative.

There will be no additional payments in respect of abandoned trenches incurred because of insufficient or inadequate trial pits, or any associated loss of time or delays.

Contractor must ensure that before starting the execution of lying of pipeline, the intimation/information must cascade to all utilities agencies seeking the information about the existing utility in the proposed route.

11.2 Protection of Structures and Utilities

The Contractor shall at his own cost support and protect all buildings, walls, fences or other structures and all utilities e.g. Electrical cables, Telephone Cables, Water pipelines, Sewer pipelines etc., and property which may be damaged as a result of the execution of the works. He shall also comply with the requirements in the specification relating to protective measures applicable to particular operations or kind of work. Special care shall be taken while laying of pipelines near the trees.

11.3 Interference with Traffic, Street Drainage and General Public

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The Work shall be executed in such a manner so as to cause a minimum inconvenience to persons using public or private roads, lanes, thoroughfares, walkways, rights-of use or passages through which the Works are to be executed. The trench shall be back filled; compacted, leveled and extra soil shall be removed immediately after laying of pipeline to avoid public inconvenience. Closure of roads, etc., shall not be permitted without the approval of the EIC.

The Contractor shall comply with all local Authorities requirements to traffic and keep roads open to traffic and maintain access to and within any private property.

Wherever the pipe route crosses driveways, access tracks or entrances to private properties the Contractor shall give the owner, occupier or relevant authority at least 24 hours prior notice of intended commencement of excavation and shall be restricted to pass through.

The Contractor shall not use a private driveway, access track or entrance without the prior approval of the EIC in any circumstance.

The Contractor shall provide suitable access wherever necessary in the form of temporary bridges, culverts, flumes, etc., of a size and type approved by the EIC.

The Contractor shall comply with all relevant road Laws. Where limits and/or speed limits have been placed in the vicinity of the Works, the Contractor shall provide for the necessary movement of plant and equipment in accordance with the requirements of the relevant authority.

The Contractor shall not obstruct any drainage pipes or channels in any road but shall divert them wherever necessary and use all proper measures to provide for the free passage of water.

The Contractor shall handover the completed works after proper cleaning of the site.
The contractor shall conduct his operation at all times, with a view to minimize as far as practicable noise and other objectionable nuisances (e.g. oil leakage, spillage, debris etc.)

12.0 TRENCHING

The schematic drawing with the details of trench is enclosed in the tender as per drawing No. VPC-STD-PP-2001

The Contractor shall perform the excavation works so as to enable the pipe to be laid in conformity with the levels, depths, slopes, curves, dimensions and instructions shown in the Drawings, Specifications or as otherwise directed by the EIC.

Contractor shall excavate and maintain the pipeline trench on staked center line as per approved drawing taking into account the horizontal curves of the pipelines.

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While trenching, care shall be taken to ensure that all underground structures and utilities are disturbed to the minimum. Suitable crossing shall be provided and maintained over the ROU wherever necessary to permit general public, property owners or his tenants to cross or move stock or equipment from side of the trench or another.

Trenching shall be made with sufficient slopes on sides in order to minimize collapsing of the trench. On slopes wherever there is danger of landslides, the pipeline trench shall be maintained open only for the time strictly necessary. Owner may require excavation by hand, local route and detouring and limiting the period of executing of the works. Before trench cuts through water table, proper drainage shall be ensured, both near the ditch and ROU in order to guarantee the soil stability.

The Contractor shall ensure that trench bottom is maintained in the square form as far as possible, with equipment, so as to avoid/minimize the hand grading at the bottom of the trench. The Contractor shall do all such handwork in the trench as required to free the bottom of trench from loose rock, pebbles and to trim protruding roots the bottom and sidewalls of the trench.

12.1 Depth of Trench

The minimum depth of cover shall be measured from top of pipe to the top of undisturbed surface of the soil or top of the graded working strip or top of road or top of rail, whichever is lower.

In case of crossing of water bodies the minimum depth shall be measured from the top of the pipe to the bottom of Scour level.
The depth of the trench will be such as to provide minimum cover as stipulated below:

For Distribution and service lines:

Minor Water Crossing/Canal	1.5 Meter
Uncased/Cased Road Crossing	1.2 Meter
Rail/Road Cased Crossing	1.7 Meter
Normal Areas	1.0 Meter

The minimum depth may be greater than as mentioned above as may be required by Government/Public authorities under jurisdictions. The Contractor shall perform such work without extra compensation, according to the requirement of concerned authorities.

Also, in case of Drains/Culverts/Utilities crossing through open cut where excavation cut is more than 1.5m, the extra excavation is inclusive in the laying rates. No separate payment is chargeable for extra excavation and includes backfilling as well.

In case, the depth could not be achieved due to practical problems and the same is demonstrated, EIC after examining thoroughly and considering the codes and standards

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may allow the contractor to provide suitable protection by way of concrete casing pipes or slabs.

12.2 Width of Trench

The width of the trench shall be wide enough to provide bedding around the pipe as specified and to prevent damage to the pipe inside the trench. Unless otherwise directed by the EIC and where ground conditions permit, the minimum distance from the inside edge of the trench wall to the outside of the pipe shall be as per the Drawing no.:
VPC-STD-PP-2001

12.3 Trench Base

The trench bottom shall be cut or trimmed to provide a uniform bedding for the pipe and shall be free from stones, metal, wood, vegetation, clods of earth or other debris before placement of the pipe.

In case trenching is done in rocky terrain, a bedding of soft soil or sand shall be provided in the trench base at no extra cost to the satisfaction of EIC.

12.4 Hard Rock:

Hard rock is defined as trench material with a single piece of rock, dimension exceeding 1.0 m in any direction, which requires cutting only by use of chisel/pneumatic chisel/drill or sledge hammer or removal of the same by additional excavation technique approved by EIC. Additional rates shall be payable for hard rock excavation over and above the pipe -line laying rates. Excavation through soil mixed with small boulders that have been used for a road base will not be considered as hard rock for the purpose of payment.

12.5 Morrum

Morrum shall be defined as the type of soil, whose excavation is not possible manually, but it can be excavated mechanical means such as sludge hammer, excavator, pneumatic breaker hammer etc. This item shall be applicable only after recommendation from PMC and prior approval from EIC. These rates will be over and above pipeline rates.

12.6 Boulder

It is a rock with grain size of usually not less than 300mm (12 inches) diameter. Additional rates shall be payable for Boulders excavation as per the SOR over and above the pipeline laying rates.

12.7 Clearances

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Unless otherwise approved, the following clearances shall be maintained between the external wall of the gas pipe and the external surface of other underground assets/utilities in the vicinity of the Works.

- 150 - 300 mm where the gas pipe crosses other assets/utilities, etc., for electric cables, the clearance shall be 300mm minimum or special protection shall be provided as per approval of EIC.
- 300mm where the gas pipe is on a similar alignment to the other assets/utilities.

Where the above clearances cannot be achieved, or in other special circumstances, the EIC may approve/specify protection with concrete/ MS coated pipe, etc. The protective material shall be supplied and installed by the Contractor at his cost subject to discretion of EIC.

12.8 Under Ground Interferences

The Contractor shall locate and expose manually all underground facilities if any during trenching. Safety barriers shall be erected along the trench to prevent any damages or accident. On locations where pipeline is laid under the existing facilities and near the approaches of the crossing, the trench shall be gradually deepened to avoid sharp bends.

All sewers, drains, ditches and other natural waterways encountered while trenching shall be maintained open and functional by providing proper temporary installations if required. Suitable dewatering pumps shall be deployed to dewater, if required.

Whenever it is permitted by Authorities and/or Owner to open cut paved road crossing, or where the line is routed within the road pavement, the Contractor shall remove the paving in accordance with the restrictions and requirements of the authorities having jurisdiction thereof as directed by Owner. After laying the pipeline, backfilling shall be immediately performed and all the areas affected connected with the excavation works shall be temporarily restored.

In case of damage to any of above referred structures/utilities the Contractor shall be responsible for repairs/replacement at his own cost, which shall be carried out to the satisfaction of concerned authorities, resident and Owner.

12.9 Others

Throughout the period of execution of such work, the Contractor shall provide and use warning signs, traffic lights or lanterns, barricades, fencing, watchman etc. As required by the local authorities' jurisdiction and/or Owner.

For all roads, paths, walkways etc. which are open-cut, the Contractor shall provide temporary diversions properly constructed to allow the passage of normal traffic with the minimum inconvenience and interruptions.

The paving shall be resorted to its original condition after the pipeline is installed.

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The Contractor shall excavate to additional depth at all the points where the contour of the earth may require extra depth, or where deep trench is required at the approaches to crossings of roadways, railroads, rivers, streams, drainage and ditches without any extra cost implication to Owner.

The Contractor shall excavate all such aforesaid depths as may be required at no extra cost to Owner. The trench shall be cut to a grade that will provide a firm, uniform and continuous support for the pipe.

The Contractor shall take conducive measures to ensure the protection of underground utilities as per the instructions of Owner or relevant authorities.

Where the pipeline crosses underground utilities/structures, Contractor shall first manually excavate to a depth and in such a manner that the utilities/structures are located, then proceed with the conventional methods.

The locations, where the pipeline has to be laid more or less parallel to an existing pipeline cable and/or other utilities in the Right-of-way the Contractor shall perform the work to the satisfaction of the Owner of the existing pipeline/cable/utility. In such locations, the Contractor shall perform work in such a way that even under the worst weather and flooding conditions, the existing pipeline/utilities remain stable and shall neither become undermined nor have the tendency to slide towards the trench.

12.10 Bedding

The Contractor shall ensure that the pipe when placed in the trench is supported and surrounded by a bed of screened excavated soil, which shall be stone free and have a maximum grit size of 5mm, in order to ensure no damage occurs to the pipe. However, in case of rocky soil the bedding shall be done with approved good quality packing sand subject to the approval of the Site Engineer. The packing sand shall be placed to a minimum thickness of 150mm around the pipe in case of rocky terrain.

Unless directed by the EIC the quantity of bedding and surrounding sand shall confirm specifications. There shall be no void space in the packing sand around the pipe.

13.0 LAYING

13.1 Main line

Laying of MDPE pipelines shall be commenced only after ensuring proper dimensions and clean surface of the trench. The trench bottom shall be free from the presence of cuts, stones, roots, debris, stakes, rock projections up to 150mm below underside of pipe and any other material, which could lead of perforation/tearing of the pipe wall. After ensuring above, the MDPE pipe coil shall be uncoiled smoothly through proper equipment's/care before laying pipe inside the trench ensuring no damage to pipe.

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The contractor must ensure that Pipe caps are provided before lowering of Pipeline. The trench after this can be released for back filling leaving adequate lengths open at the ends for jointing.

Contractors shall ensure open ends of pipe placed in the trench shall be securely capped or plugged to prevent the ingress of water or other matter. The Contractor is to ensure that nothing enters inside the pipe during the laying process as this could cause a future blockage or regulator malfunction due to dust, etc.

In case of open cuts and moiling, where two pipes are to be laid parallel in same trench or same pits, 30% of the respective SOR of the lower size pipe for the laid length shall be paid extra.

Valves shall be installed at locations shown in the Design Plan or as directed by the EIC and joined with PE pipes by electro fusion techniques. The valves shall be placed on a concrete square block at the bottom to achieve equivalent support of the incoming and outgoing pipe.

Laying graphs/As-graphs with details of depth, length, offsets from minimum three (03) fixed different references, other utility crossings, fittings, sizes of the casing pipe used for the pipeline shall be prepared on daily basis and to be submitted to CLIENT representative/ EIC for approval. These details will further be incorporated in to As-Built Drawings.

Pipe may pass through an open drain or nallah with prior approval from EIC. Where this is permitted, the PE pipe shall be installed inside a concrete or steel sleeve for protection with no cost implications to the owner. The sleeve material shall be procured and laid by the Contractor with prior inspection and approval of the EIC for the quality of material. In general, the GI Sleeve material specification shall be confirming to IS 1239 (Heavy Duty) specification of reputed make; cost of GI sleeve shall be paid to contractor as extra item.

In case of service line laying, where the excavated pit for mainline is used for laying of service line, the length of service pipe laid in the same pit and vertical pipe which rises out of the ground with transition fittings shall be paid as per SOR
The contractor shall excavate a minimum pit of size 0.5 meter x 0.5 meter (L X W) on any kind of surface along the wall at the customer premises for the service pipe which rises out of the ground with transition fittings through GI pipe sleeve/Half Round Concrete sleeve. This excavation along with other work necessary to break through the walls of the obstruction, insertion of MDPE pipe, sealing of the annulus between the pipe and the sleeve, sleeve and the wall, installation of sleeve, making of pedestal as per provided drawing , min. Size 300 x 150 x 150 mm for GI Sleeve, min. Size 550 x 230 x 150 mm for Half Round Concrete Sleeve Drawing No.: VPC-STD-PP-2016 and simultaneous restoration of these pits shall be deemed included in the laying rates of pipes respectively. No separate payment of GI Sleeve / Half round concrete sleeve shall be charged to the owner. The material shall be inspected by TPIA / Consultant before installation. Also, the material test certificates, inspection reports approved by TPI/Consultant shall be

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submitted at the time of submission of bill. Any installation without inspection & approval may lead to penalties as per Special Conditions of Contract.

In case of service lines, EIC shall decide either half round concrete sleeve or GI pipe sleeve shall be installed at any particular site depending upon site condition. The half round concrete sleeve shall be preferred over GI Sleeve, however in case where the installation of half round Concrete Sleeve is not possible due to technical feasibility and site conditions, GI sleeves shall be installed only after written approval from EIC. The rate of GI Sleeve / half round concrete sleeve shall be included in laying of 20/32 mm dia. As per respective SOR, depending upon surface condition.

13.2 GI Sleeve

The contractor shall supply the minimum dia. Size of 2.5" & 3", 300 mm in length, GI sleeves (Heavy Duty reputed make) respectively for domestic & commercial / industrial installations. The material shall be inspected by TPIA / Consultant before installation. The material test certificates/ inspection reports shall be submitted at the time of submission of bill.

The installation of GI sleeve for service lines shall be done by sealing the annulus between pipe and sleeve, firm fixing of the GI sleeves by concrete mix pedestal, clamping, sand filling, etc.

The vertical portion of the sleeves shall be fixed to the wall of the premises in a secure manner. The Service lines shall be installed in accordance with the drawing enclosed in the tender.

13.3 Half Round Concrete Sleeve

The installation of Half Round Concrete sleeve for service lines shall be done by sealing the annulus between pipe and sleeve, firm fixing of the Concrete sleeves by concrete mix pedestal, clamping, sand filling, etc. Half round concrete sleeve shall be made as per attached drawing no.VPC-STD-PP-2016. As per instructions of EIC. The dimensions shown are tentative and may vary depending upon the site conditions. The material shall be inspected by TPIA / Consultant at the fabrication stage & prior to final dispatch at site for installation. The material test certificates/ inspection reports shall be submitted at the time of submission of bill.

13.4 Crush Guard/ half Round Concrete Sleeve: - (For O&M and Project)

The installation of pre-cast RCC crush guard over Half Round Concrete Sleeve/ Pedestal shall be done by installing it resting on wall of building by fixing it with grouting nut and bolts in wall that may be detached during the event of leakage/testing. The material shall be inspected by TPIA / Consultant at the fabrication stage & prior to final dispatch at site

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for installation. The material test certificates/ inspection reports shall be submitted at the time of submission of bill.

The Crush Guard shall be installed in accordance with the standard drawing, enclosed in the tender as per instruction of EIC.

13.5 LAYING OF SERVICE LINE IN PROJECT AND O&M AREA:

O&M area shall be defined as those areas where PE line is already charged and handed over to owner.

Laying of pipeline (for 20 & 32mm) in all type of surface i.e. all kinds including Kutcha, metal, concrete (PCC/RCC), bituminous, tiled, brick lined etc. after racking up of hard surface of any type by any methodology. Roads, Pavement, Footpaths etc. shall be made motor able once the pipeline is laid. Supply & installation of GI Sleeve / Half round Concrete sleeve shall be included in laying rates. The rate includes liasoning with statutory bodies and no separate rates are payable. Wherever service lines are to be laid after dismantling nallah / drain, additional cost for dismantling and repairing shall be payable under respective SOR item no.

All service lines left out initially during mainline laying and laid by same contractor within six months of gas charging of that particular area shall be paid as per respective SOR item no.

All service lines left out initially during mainline laying and laid by same contractor after six months of gas charging of that particular area shall be paid as per respective SOR item no.

All service lines left out initially during mainline laying and laid by other contractor after gas charging shall be paid as per respective SOR

13.6 MDPE PIPE LINE LAYING (20MM / 32 MM / 63MM) IN ALREADY EXCAVATED TRENCH IN BUILDER SEGMENT

Scope includes laying of MDPE pipeline in already excavated trench with or without casing ; insertion of the carrier pipe in casing pipe (on case to case basis) laying of warning mat electro-fusion of joints and re-installation of pre-cast slabs as per specification after instruction of EIC / Site Engineer of Owner.

14.0 JOINTING OF POLYETHYLENE PIPE

The procedure for jointing of PE pipe and fittings machines is attached as Annexure #2 and as per Specification for ELECTROFUSION FOR PE PIPES AND FITTINGS. Only Bar coded into electro-fusion machine (Automatically Readable) that can read the bar code of the fittings automatically shall be used for joining of the MDPE pipes/fittings. Manual feeding Electro-fusion machines are not acceptable for jointing purpose. The contractor has to submit the certificate of calibration of Fusion machine at the time of start of work and at fixed intervals as per the instructions of Owner. Contractor shall ensure that the machines are always available at site. No stoppage of work due to the non-availability of machines shall be allowed.

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The contractor shall flush the Pipeline with air to remove dust, water, mud etc. before fusing the joints. Before jointing, the Contractor shall place packing sand under the pipes on both sides of the joint to keep the pipes in line and at the correct alignment during the jointing process. The jointing process shall start only after Alignment clamps with the correct size are aligned with the pipe and coupler during the electro-fusion cycle.

The Contractor shall ensure that polyethylene pipe is only cut with an approved plastic pipe-cutting tool (Rotary Cutter up to 63mm/Guillotine Cutter for 63mm and above). Before fusion is attempted, the contractor shall remove the oxidized surface of the pipe using Universal Scrapper up to 63mm/Rotary Peeler for 63 mm and above before inserting into the electro-fusion coupler. The tool must remove a layer of 0.1mm to 0.4mm from the outer surface of the polyethylene pipe. No fusion will be allowed without clamping device and the approved cutting tools (Hack saw shall not be allowed for cutting the pipe).

The contractor has to supply all the consumables required for carrying fusion of the joints (like tissue paper, napkin, acetone etc.).

If, upon inspection, the EIC determines a joint is defective, Contractor shall remove the joint by an approved method. The cost of replacing joint shall be borne by the Contractor including the cost of pipe and fittings removed.

For electro-fusion joining, the contractor must bring own tools, tackles and equipment's. Only, approved Jointers shall carry out fusion of all joints. Contractors shall provide the list of jointers to be used on the job and make arrangements for Qualification Testing of the jointers in presence of Owner / Owner's representative as per the standard procedures. All approved Jointers shall bear identity cards signed by Owner / Owner's representative during fusion job and shall furnish the same on demand by Owner / Owner's representative. Applicable penalties shall be levied, in case; it is found that fusion is being carried by non-qualified jointers as per the provisions made in Special Conditions of the Contract.

Contractor shall arrange generator along with voltage stabilizer for power supply to fusion machine. Taking power connection form electric poles, connections without written permission from the concerned authorities or residential premises is strictly not permitted.

15.0 BACKFILLING

Backfilling shall be done after ensuring that appurtenance have been properly fitted and the pipe is following the trench profile at the required depth that will provide the required cover and has a bed which is free of extraneous material and which allows the pipe to rest smoothly and evenly. Dewatering shall be carried out prior to backfilling. No backfilling shall be allowed if the trench is not completely dewatered.

Prior to backfilling it should be ensured that the post padding of compacted thickness 150 mm is put over and around the pipe immediately after lowering where required.

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Backfilling shall be carried out immediately after the post padding where required has been completed in the trench, inspected and approved by Owner/ Owner's representative, so as to provide a natural anchorage for the pipe avoiding sliding down of trench sides and pipe moment in the trench. If immediate backfilling is not possible, a padding of at least 300mm of earth, free of rock and hard lumps shall be placed over and around the pipe and coating.

The backfill material shall contain no extraneous material and/or hard lumps of soil, which could damage the pipe and/or coating or leave voids in the backfilled trench. In case, it is required and directed by EIC screening of the backfill material shall be carried out with specified equipment before backfilling the trench.

The surplus material shall be neatly crowned directly over the trench and the adjacent excavated areas on both sides of the trench to such a height which will, in Owner/Owner's representative opinion of provide adequately for future settlement of the trench backfill during the maintenance period and thereafter. The down shall be high enough to prevent the formation of the depression in the soil when backfill has settled into its permanent position should depression occur after backfill, Contractor shall be responsible for remedial work at no extra cost to Company. Surplus material, including rock left from this operation shall be disposed off to the satisfaction of landowner or authority having jurisdiction at no extra cost to Owner.

Where rock, gravel, lumps of hard soil or like materials are encountered at the time of trench excavation, sufficient earth, sand or select backfill materials shall be placed around and over the pipe to form a protective cushion extending at least to a height of 150 mm above the top of the pipe. Select backfill materials for padding that area acceptable shall be soil, sand, clay or other material containing no gravel, required selected backfill material has been placed, provided the rock or lumps of hard soil. The padding earth shall not contain any stones, i.e. the earth shall be screened for sand padding of the Pipeline in order to avoid damage to the pipeline. Contractor shall carry out all these works at no extra cost to Owner. Loose rock may be returned to the trench after the required selected backfill material has been placed, provided the rock placed in the ditch will not interfere with the use of the land by landowner, or tenant.

In case where hard rock is encountered or as desired by EIC / site engineer sand padding is to be provided up to height of 150 mm around the pipe.

When the trench has been dug through driveways or roads, all backfilling shall be executed with sand/suitable material in layers as approved by Owner /Owner's representative and shall be thoroughly compacted. Special compaction methods as specified may be adopted. All costs incurred there upon shall be borne by the Contractor. Trenches excavated in dikes which are the properties of railways or which are parts of main roads shall be graded and backfilled in their original profile and condition. If necessary, new and/or special backfill materials shall be supplied and worked-up to.

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PE Warning Grid/Mat shall be placed on distribution main and service line inside premises, after backfill of the trench up to a height of 300mm on the top of the carrier pipes. The warning grid is to be unrolled centrally over the pipe section and thereafter further backfilling will commence.

Backfilling activity shall include proper compaction by jumping jack compactor, wherever required and as per instruction of EIC, and watering in layers of 150mm above the warning mat. Proper crowning of not more than 150mm shall be done. All the excavated material that could be used during the Restoration process shall be stacked and kept separately and properly. Wherever Road cutting/Tiles removal/PCC cutting has been done during excavation for laying, the area shall be back filled and compacted immediately so that no inconvenience is caused to the general public.

Electro-fusion of joints is to be undertaken immediately after lowering and the activity shall not be kept pending for lack of Electro-fusion jointing. The backfilling shall be considered complete only after the jointing of pipes.

Debris and other surplus material shall be removed immediately after the back filling.

The contractor shall not be entitled for payment as defined in commercial on laying and backfilling till the above activities are completed.

16.0 MOLING

The Manual Moling shall be carried out as per the requirement specified by Owner / Owner's representative and approved procedures. The contractor has to carry out survey of the underground utilities before going for the Moling to avoid any damage to other utilities. No extra payment will be made for any trial/abandoned pits made during the survey. The supply of all equipment required for carrying out moling work is in contractor's scope. The type of moling to be carried out i.e. with or without casing shall be at the discretion of Owner and prior approval is to be taken before starting the Moling.

For Moling the contractor shall ensure that the size of the hole shall not be more than 20% of the size of the casing/carrier pipes whichever is applicable. After completion of Moling the hole shall be properly compacted / filled with soil by watering and by approved procedures.

The moling rates are payable as per the SOR and the moling rates are common for MDPE pipe laying with or without casing pipe through the hole. The length of the Hole (excluding the sizes of the pits on both ends) shall be considered for the measurement of Moling length. However, the extra length of casing shall be considered for material consumption purpose only. In case of moling, where partial laying is carried out in casing and rest without casing, the SOR Shall be applicable for both. Further, the payment for the pipeline laying in the excavated pits for Moling purpose will be made as per the SOR for normal laying.

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Any damage occurred to other utilities during the moling operation shall be immediately, notified and rectified by the contractor without any cost implication to owner.

17.0 HORIZONTAL DIRECTIONAL DRILLING (HDD)

HDD is required to be carried out by the Contractor where conventional Trenching/Moling is not possible viz. Railways, major waterways, highways, roads, congested areas etc. The Contractor shall obtain details of such crossings and the Contractor in consultation with Owner shall prepare construction drawings. Execution of the work shall be based on the Owner / Owner's representative approved drawings. The contractor has to do the thorough survey of the underground utilities before commencement of HDD to avoid the damage to the other utilities. No other extra payment will be made for any trail/abandoned pits made during the survey. The supply of all equipment required for carrying out the HDD is in contractor's scope. The HDD operation shall be carried out in accordance with API-1102. The type and availability of machines is sole responsibility of the contractor and as per the site conditions & requirements to entire satisfaction of EIC.

Once the work is allotted, any delay in mobilizing / non-availability of HDD machines as per site requirement and conditions shall result in levying of penalties on daily basis as per SCC. However, in such cases, owner shall mobilize HDD machines and carry out execution of work on the contractor's risk and cost and as per SCC.

The type of HDD to be carried out with or without casing shall be at the discretion of Owner and prior approval is to be taken before starting the HDD.

The rates for HDD, as indicated in SOR, are payable as per the size of the carrier pipe and inclusive of excavation of pits, jointing, pilot boring, bentonite cleaning, reaming, inse -rtion of carrier pipe backfilling, compaction, etc.

As per the specification, HDD to be carried out with or without casing pipe depends on the type of crossing as per instruction of Owner/ Consultant.

Any damages occurred to other utilities during the HDD operation shall be immediately notified and rectified by the contractor without any cost implication to OWNER.

The measurement for the payment shall be measured as per the span for which the beacon/sensing source which is attached to the reamer at the time of pulling carrier pipe for HDD. HDD profiles should be properly marked in the as built drawing in scale.

18.0 CASING PIPE

The tentative sizes of the HDPE casing pipe for Moling/ Horizontal Directional Drilling shall be as follows:

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S.No.	MDPE Carrier Pipe Dia. size (mm)	Min. Dia. of HDPE Casing Pipe (mm)	Max. Dia. of HDPE Casing Pipe (mm)
1	20	40	80
2	32	50	90
3	63	125	160
4	125	200	250
5	180	250	315

However, the size of the casing pipe may vary according to the length of the carrier pipe and requirement of laying of HDPE duct & OFC cable, if required. Also, the higher size of HDPE casing pipe shall be preferred over lower size casing pipe without any extra cost to the Owner.

19.0 RESTORATION

Wherever the restoration to the original surface condition is in the scope of Owner or as directed by EIC, all roads, footpaths (including roads and footpaths inside colonies) shall be restored to its original condition and the same shall be done as per CPWD/IRC norms and to the satisfaction of the concerned local Authority/Third Party Agencies designated by Owner. To retard curing of the installed concrete, wet sackcloth is to be placed on the finished surface and kept damp for a period of 7 days.

Where slabs and blocks are to be restored, the level of the compacted sub-base is to be adjusted according to the slab/block thickness. The slabs or blocks should be laid on moist bedding material, which should be graded sand, mortar or mortar mix. The slabs or blocks should be tapped into position to ensure they do not rock after lying.

The restored slabs or blocks should match the surrounding surface levels. Joint widths should match the existing conditions, and be filled with a dry or wet mix of mortar.

The procedure for restoration of Road/Footpath is just indicative. However, the restoration shall be done in accordance with the norms of the concerned Land owning agencies.

Turf shall be replaced in highly developed grassed area. In lesser-developed grassed areas top soil should be replaced during the restoration process.

Where permanent surface restoration cannot be completed immediately, the Contractor shall provide and maintain a suitable temporary running surface for vehicular traffic and pedestrians. The Contractor will be responsible for the maintenance of all restoration carried out, for the duration of the Contract guarantee period.

The Contractor is to ensure the restoration work is properly supervised and that the material used is suitable for the purpose and properly compacted. Where the required standards are not achieved, the Contractor will be required to restore the defective work.

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Payment to the restoration shall be paid as per SOR , Further, the rate of restoration includes WBM, Asphalted /Bituminous, concrete pavement, Agra Stone/ Kota stone/ Tiles (Chequered/ any other type of tiles), interlocking paver blocks, Dry brick pavements etc. and payable under one SOR.

Note that payment for restoration will be released only after satisfactory completion and certification by Third party/Consultant.

Contractor has to obtain the No Objection Certificate (NOC) from the concerned local authorities/RWA after completion of the restoration work. The restoration specification specified in the tender is only a typical specification and the contractor has to carry out restoration as per the latest version CPWD/IRC/ MUNICIPAL CORPORATION OF STATE specification to its original condition and also to the entire satisfaction of landowner (Private/Public).

The expenditure incurred towards testing of the material used for restoration, as per the applicable standards, shall be borne by contractor.

20.0 TESTING

Pressure testing will be carried out with compressed air (free from oil and greases). Compressed air will be provided by Contractor for testing purposes and is to be included in the laying rates.

For main pipeline laying, the Contractor shall perform progressive pressure testing to ensure no leaks in long lengths of pipe. The test pressure shall be 6.0 bar (g), and there shall be no unaccountable pressure loss during the test period.

Overall scheme drawing for pressure testing shall be prepared by the contractor and get approval from Owner/Owner representative.

For main line the test duration shall be 24 Hrs. with these tests, the pressure should be allowed to stabilize for a period of 30 minutes after pressurization. The holding period may then commence and continue for 24 hours. Measuring instruments shall have been calibrated and their accuracy and sensitivity confirmed. For testing of Network, calibrated pressure gauges of suitable range shall be supplied by the contractor. The pressure gauges shall be calibrated from time to time as desired by EIC. All testing shall be witnessed and approved by the EIC or his delegated representative. Tie-in joints may be tested at working pressure following commissioning. In special cases, where the mainline length is less than 500 mtrs, holding period for testing may be reduced to 4 hrs.

For service lines up to a length of 15 mtrs testing will be carried out independently of the testing of the mains (if service line is laid separately after commissioning of mainline) for which the test duration may be reduced to 30 minutes at 6 bar (g) pressure. The service line testing in this case will be performed after the service line installation is complete but

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before the service line tee has been tapped. Also in some cases the tapping of the service tee will be delayed pending the completion and purging of the main pipelines.

21.0 PURGING

Purging shall be carried out in accordance with the principles defined in the American Gas Association publication "Purging Principles and Practice".

The Contractor shall also provide nitrogen required for purging as per the direction of Site In-charge. Nitrogen shall be supplied in labeled, tested and certified cylinders and completed with all necessary regulators, hoses and connections, which will be in good and working condition. No separate payment shall be paid for supplying Nitrogen cylinders for purging and is included in the laying rates. Before purging cylinder should be checked for containing Nitrogen only.

In addition, the Contractor shall submit purging plan and get approval from Owner / Owner representative before commencing any purging work. The Plan shall include, but not be limited to the provision of the following materials and equipment: Personal Safety Equipment, Fire Extinguisher, Purging Adaptor, Purge stack with flame trap and gas sampling point, Gas sampling equipment (may be gas leak detector), squash-off tool, Polyethylene connecting pipe.

The Plan shall also include the purging process along with detail on the sequence of events. The process is to also specifically mention the need to lay a wet cloth over the PE main and in contact with the ground, to disperse static electricity during the purging work.

A purge stack with flame trap shall be used when purging services. Care shall be taken to ensure that the purge outlet is so located that vent gas cannot drift into buildings.

22.0 VALVE PITS

Valve pits (RCC/ Brick Wall) shall be constructed as per enclosed drawing no. VPC-STD-PP-2003, 2004, 2005, 2006 in the document.

Payment for the valve pit construction shall be paid as per SOR item The construction of the valve chambers shall be taken up immediately after installation of valve.

22.1 Material for Valve Pit

RCC Pre-cast Slab shall conform to IS: 456. Heavy Duty RCC Manhole Cover shall be used. It shall be with raised with Lifting hooks. The RCC manhole cover shall have a clear opening as per the Construction Drawings issued to the contractor.

22.2 Workmanship

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The excavation work shall be done at a location given by Engineer-in-Charge. All care shall be taken not to damage existing facilities and surface of construction shall be restored to its original state.

Sand bags to be placed below pipeline without disturbing the laid pipe. Gunny bags and Sand should be of approved quality.

PCC to be placed below the pipe as indicated. Once PCC is set sand is to be filled and properly rammed so that pipe and pre-cast concrete blocks are firmly place.

Valve will be supplied without the operating stem. Approved quality sand is to be placed in between area. The supply of sand is included in the rates.

Surrounding area to be properly cleared and PCC to be placed around the location where pre-cast slab with RCC Manhole cover is placed. The RCC pre-cast slab to be laid in level and finished smooth.

23.0 CONSTRUCTION OF TRENCHES AND OTHER SCOPE OF WORK IN BUILDER SEGMENT-

23.1 Construction of dedicated trench (as per approved drawing)

Trench Dimension- 0.6m x 0.66m x 1.0m (d x w x l)

Scope includes excavation of trench in any type of surface, construction of brick wall, waterproofing of trench(If required), removal of surplus malba, plastering of walls, watering and curing including supply & installation of precast RCC slab covers Site cleaning and restoration of all damaged surfaces during construction activity. Contractor should submit NOC through concerned RWA/Builder/Authority. For other details please refer drawing no. VPC-STD-PP-2017

23.2 Construction of dedicated trench (as per approved drawing)

Trench Dimension- 0.375m x 0.66m x 1.0m (d x w x l)

Scope includes excavation of trench in any type of surface, construction of brick wall, waterproofing of trench(If required), removal of surplus malba, plastering of walls, watering and curing including supply & installation of precast RCC slab covers Site cleaning and restoration of all damaged surfaces during construction activity. Contractor should submit NOC through concerned RWA/Builder/Authority. For other details please refer drawing no.- VPC-STD-PP-2018

23.3 Excavation of trench and installation of casing pipe by any method (Open /Moling)

Scope includes excavation of trench/moiling in any type of surface and installation of 6" GI Pipe C Class as casing pipe, restoration for road crossing up-to 7.0 m inside society and obtaining NOC through concerned RWA/Builder/Authority.

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23.4 Sand Filling in any type of trenches in builder segment only;

Scope includes supply and filling of coarse sand (Size 0.6 To 2.0mm) as per IS 383 free from impurity like clay, mica and soft flaky pieces in the trench as per instruction of EIC/Owners representatives.

Note- In all of the above items 10% amount shall be withheld till availability of NOC from concerned authority.

24.0 ROUTE MARKERS

Route Markers shall be fabricated, supplied and installed on the ROU at regular intervals as per the instructions of the EIC immediately after laying of the Pipeline. The installation of the type of the Permanent Marker shall be decided by the EIC depending on the site condition. The contractor shall also ensure that a sample of all type of markers shall be inspected and approved by Owner / Owner representative before shipment of the lot at site and prior to installation at the site. The inspection of all types of markers shall be carried out lot wise.

The Stone Markers shall be painted before installation as per the approved procedure. Whereas the Pole marker (Markers with foundation) and plate marker are to be supplied with powder coated Golden Yellow paint the supply of the paint as per drawing no.VPC-STD -PP-2014 and application. The supply of paint and application as per the specification is in contractor's scope. Payment shall be paid as per relevant SOR
Contractor shall obtain the approval lot wise & before installation at site from the Consultant / TPIA.

25.0 GUIDELINES:

- The installation of these markers shall be such that in between two pole markers two Stone markers are installed with spacing of 50 mtrs on either side. However, Pole markers shall be installed at all the Tapping /Branching points in the mainline.
- Interval between any two Stone Route markers for mainline (180mm to 63mm) shall not be more than 50m.
- A Pole marker shall be installed near to valve chambers on Mainline & inside the pockets respectively for indication.
- Pole markers with foundations (As per the Drawings in Tender document) shall be installed after two Stone markers.
- The entry and exit pits for laying of pipeline by HDD / Moling for Road crossings shall be marked by Pole markers or Stone markers depending upon the site conditions.

In addition to above, Pole markers with foundation (As per drawings in Tender document) shall be installed outside of individual societies/areas as per the instructions of the Owner

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representative.

- For the distribution network 32mm & 20mm pipe, Stone / plate markers shall be installed as per the site conditions and directions of the Site-in-Charge.
- The artwork is typical for all the markers, with Owner's logo on it. The contractor must take prior approval for the artwork from EIC before installation of Markers. The lot wise approval shall be attached with bills.

26.0 ASSISTANCE IN COMMISSIONING

Contractor shall provide the required personnel, Vehicles, labour, supervision, tools, equipment, instruments and technical assistance for performance tests and commissioning activities as per requirement/ satisfaction of Owner /Owner's representative.

27.0 STANDARD OF WORK

All work carried out under this contract shall be to standards, codes of practice construction procedures and other technical requirements as defined in the technical specifications. The manpower deployed on the respective work shall be adequately trained and shall have necessary skills to execute/supervise the work. However, the assessment on the qualification of the personal shall be at the discretion of EIC.

Fusion Operators and other skilled personnel like plumbers, conversion techniques shall be approved by Consultant/ Owner. Simultaneously Identification Cards duly signed by Consultant/ Owner shall be issued to them. The contractor shall maintain proper record for the identification cards issued to their workers.

28.0 RECORDING (AS-BUILT DRAWINGS)

- The following points shall be taken care to the preparation of as built drawings.
- The as built drawings should be in the scale of 1:200 and shall be submitted in an A-0 sheet. The drawings shall be in layers according the AUTOCAD features category.
- Pipeline feature shall be shown as a continuous line, breaks only at joints, fittings, valves, tee point, etc. Diameter, Pipe material, length, and location of pipeline whether on the road or footpath, should be clearly indicated.
- Minimum three (03) offsets of every joint, from permanent structure shall be recorded on As Built.
- Distance of pipeline from permanent property/structure should be provided at least every 20 mtrs. If there is any change in alignment / orientation and offset distances etc. Of the pipeline in between the above said 20 mtrs, the same shall be dearly mentioned in the as laid. Gas objects (off valves, tees, elbows, couplers, transition

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fittings etc.,) shall be shown as block objects (which form a single node to connect) with respect to Owner symbols / legend. The As laid drawings shall be as per the approved legends provided by EIC.

- Details & offset distances from other utilities present (e.g. MTNL, Electricity Board of State, Water/ Sewage Board of State, etc.) should be given in as laid drawing. If there is any change in depth of the pipeline, the same shall be clearly marked with details in the as laid drawings. The details (material, size & Length) of additional protection provided to pipeline shall also be clearly indicated.
- Details of the PE stop off valves &. Other fittings used (i.e. tees, elbows, couplers, transition fittings, etc.) should be shown with adequate information orientation &. Offsets from permanent structures in the immediate vicinity.
- Technical deviations (if any) should be provided with reference to the buildings permanent structures around, and the same should be cited clearly with all the relevant details, including separate sketches/Blowups / sectioned drawings / exploded view.
- Total as laid-length (size wise), bill of materials should be mentioned in each sheet.
- Complete details of nallah crossings should be shown in a separate sketch.
- Names of roads, major landmarks and buildings should be mentioned appropriately for reference.
- Proper chainage shall be mentioned on all the drawings to be referred with continuation reference.
- Direction of gas flow shall be indicated in each of the drawings.
- Text on the as laid drawing should be clearly visible.
- Land base features shown on the drawing shall match the exact distance as they were on real ground with respect to scale (1:200).
- As built drawings shall be duly signed & stamped by area TPIA / Consultant.
- The details shall be prepared in standard format using MAP INFO/ AUTOCAD MAP and submitted CD RAM. Contractor shall also make the item wise material consumption report for the respective areas in a soft copy and to be submitted along with the as-built drawings.

29.0 CIVIL WORKS

The contractor has to supply the adequate materials and skilled manpower for the completion of all the civil works. The contractor shall also ensure that the work is carried out as per the details mentioned in the Schedule of rates.

Special cares shall be taken at the time of labours working in depths/lifting of the skids by

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hydras/ cranes considering all the safety guidelines.

The contractor has to ensure that sample of the all the materials shall be inspected and approved by EIC before carrying out installation or erection work. The contractor has to submit the test certificates for all the materials to be used at the site. The construction shall be carried out strictly as per the drawings provided by the CLIENT/Consultant. The contractor shall ensure extra / surplus materials/ malba shall be immediately removed from the site after completion of the job. Separate payments shall be made as per the SOR

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ANNEXURE # 1

TOOLS & EQUIPMENTS TO BE PROVIDED BY THE CONTRACTOR FOR PRE LAYING

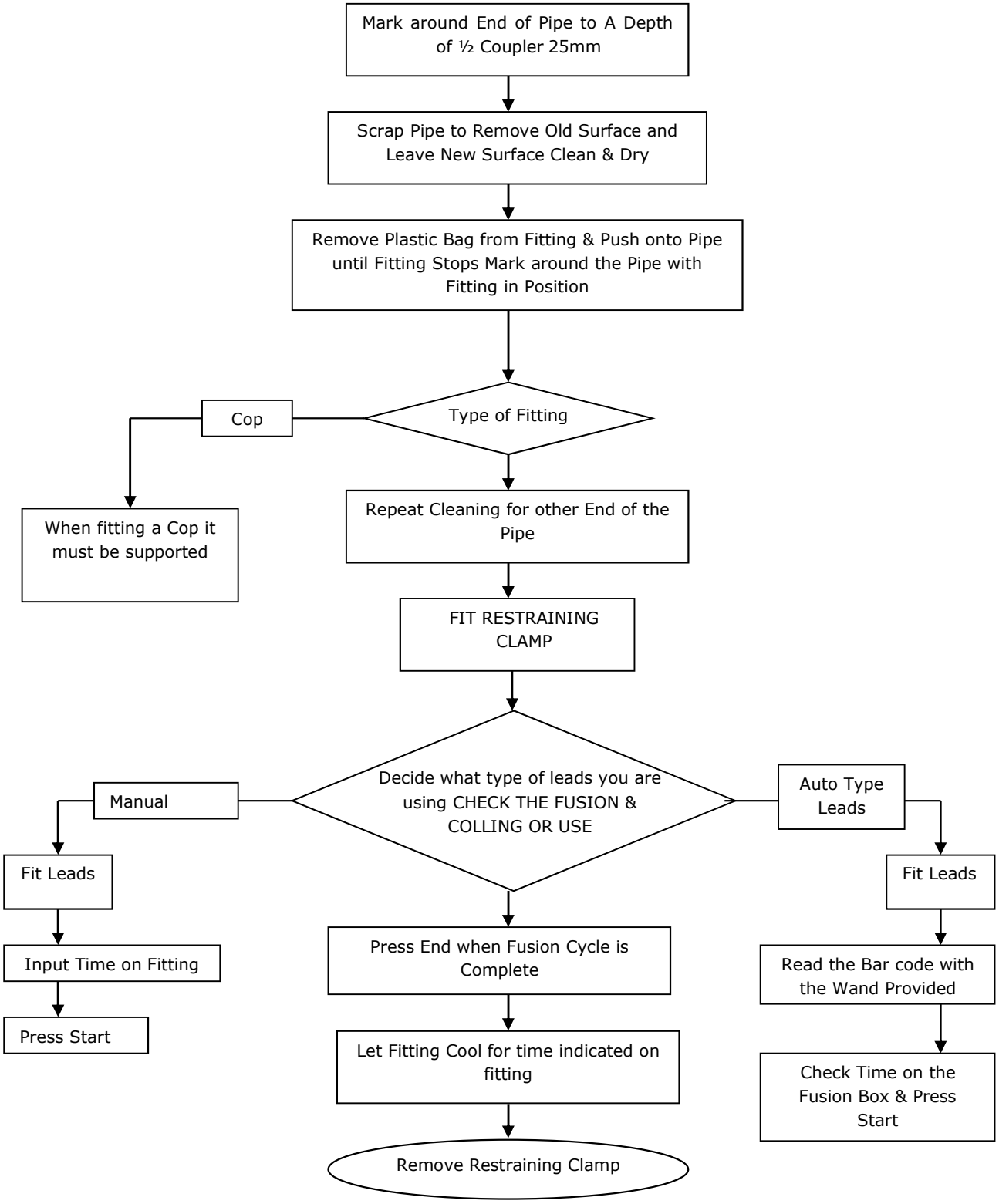
Sl. No.	Equipment Details	Minimum Requirement (In Nos.)
1	Electro Fusion Box (Automatically readable)	2
2	Voltage Stabilizer	1
3	Generator (5.5 KVA)	2
4	Moiling Equipment (for all sizes)	As and when required
5	HDD Machines & Equipment (for all types & sizes)	As and when required
6	Squeeze Tools (Manual) up to 63 mm	2
7	Squeeze Tools (Hydraulic) from 63 mm up to 180 mm	2
8	Rotary Peelers	2
9	Universal Scrapers	3
10	Tapping Tools/Allen Keys	Two sets of all sizes
11	Pipe Cutter (Round)	2
12	Pipe Cutter (Guillotine)	1
13	Pipe Cutter (ratchet type)	2
14	Gas Detection Unit	As and when required
15	Cable and Pipe Locator	As and when required
16	Test Ends	One set of all sizes
17	Pipe Alignment Clamps	As and when required
18	Joining Clamps for Coupler (All sizes)	2
19	Joining Clamps for Saddle (All sizes)	2
20	Pipe Straightness	As and when required
21	Re-rounding Tools (All sizes)	As and when required
22	Jumping Jack Compactor	As and when required
23	Roller for Asphalting	As and when required
24	Calibrated Pressure Gauges (0-6 Bar)	6
25	Water Tankers	As and when required
26	Automatic Thread cutting machine	As and when required
27	GI Pipe cutter	As and when required
28	Heating Element for HDPE Butt joint along with clamping, roller and other accessories	As and when required

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ANNEXURE # 2

FUSION COUPLERS FROM 20MM TO 180MM



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ANNEXURE # 3

RESTORATION PROCEDURE/GUIDELINES FOR ROAD CUTS OF MUNICIPAL CORPORATION OF STATE AND OTHER LANDOWNING AGENCIES

PURPOSE AND OBJECTIVE

The main purpose and objective of this document is to ensure that all the work are carried out with proper specifications and standards with high quality and timely accomplishment, and the restoration of infrastructure is according to standards Aimed at achieving the original condition of the road infrastructure.

DOCUMENTS/FILES TO BE MAINTAINED:

The following documents shall be maintained during execution of the job and shall be handed over to OWNER/ Consultant/ TPI after completion of the job;

- Copy of permission letter obtained from Municipal Corporation of State.
- Drawing/ Sketch showing the details of stretch to be cut, highlighting the type of surfaces and its chainage/ length (area)
- Stage wise Photographs of the stretch.
- Test Certificates of the Construction materials to be used.
- Routine Test Certificates for construction materials during progress of job.

30.0 RESTORATION OF TRENCHES/PITS:

After laying pipeline, backfill material without containing extraneous material or hard lumps of soil or stones shall be filled and watered in layers of 150mm. Warning mats shall be placed as per specification. Earth shall be filled watered and compacted in layers with the help of earth compactor (Jumping jack compactor where ever space is available). After backfilling, the crown of the earth shall be between 50mm and 100mm above road surface and shall be free from sharp-edge stone and boulders.

After consolidation of backfill, the surplus earth shall be removed and disposed at place directed by OWNER (at suitable locations, as per direction of Municipal Corporation of State)

Further, depending upon the Surface types of following specification shall be adopted:

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Sl. No.	Surface Types	Specification Recommended
1	Cement Concrete Surface	Top Surface – PCC 1:2:4, 100 mm Thick Compacted with Plate Vibrator shall be laid over base course. Base Course – PCC 1:5:10, 75 mm Thick laid over compacted backfilled earth.
2	Brick Soiling	Top Surface – Brick Soiling (as per original type) shall be laid over base course. Base Course – PCC 1:5:10, 75 mm Thick laid over compacted backfilled earth.
3	Interlocking CC Paver Block	Top Surface – Interlocking CC Paver Blocks (as per original type) shall be laid over compacted fine sand 50 mm Thick over base course. Base Course – PCC 1:5:10, 75 mm Thick laid over compacted backfilled earth.
4	Chequered Cement Concrete Tiles/Pre-cast CC Tiles/Kota Stone Floor/Red Stone Floor	Top Surface – Tiles/Floor (as per original type) shall be laid over Cement Sand Mortar 1:6, 20mm Thick over base course, Joints shall be pointed/finished to match colour. Base Course – PCC 1:5:10, 75 mm Thick laid over compacted backfilled earth.
5	Bituminous Surface (for Category D Roads i.e.; Roads less than 13.70 M width)	Top Surface – 40mm Thick Bituminous Concrete (as per original type) shall be laid over PCC 1:2:4, 100 mm Thick over base course. Base Course – PCC 1:5:10, 75 mm Thick laid over compacted backfilled earth.
6	Bituminous Surface (for Category C Roads i.e.; Roads less than 18 M width but greater than 13.70 M width.)	Top Surface – 40mm Thick Bituminous Concrete (as per original type) shall be laid over PCC 1:2:4, 150mm Thick over base course. Base Course – PCC 1:5:10, 150 mm Thick laid over compacted backfilled earth.

The specification mentioned above may be modified in line with relevant Municipal Corporation of State/ CPWD/ IRC specifications. Contractor has to follow the changes as informed to them time and again.

NOTE:

Wherever the Bituminous portion is cut in small patches or isolated location where area of Bituminous portion is very less due to constraints like other utilities, the

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surface shall be restored, same as specified for the cement concrete surface, with prior approval of EIC/TPI.

31.0 TESTING OF CONSTRUCTION MATERIALS

For the different construction materials proposed to be used the following tests are required to be carried out for approval:

Sl.No.	Material	Test	Method of Testing	Frequency of Test
1	Cement	Setting time, soundness, compressive strength and fineness	As per IS: 4031	Once for each consignment or as and when required/directed
2	Bricks	Compressive strength, water absorption and efflorescence	As per IS: 3495	Minimum five samples or as per IS: 5454
3	Coarse Aggregates	Sieve analysis, flakiness index, estimation of deleterious materials, organic impurities, moisture contents and specific gravity	As per IS: 2386	One test per source of supply and routine test regularly as directed
4	Fine Aggregates	Sieve analysis, clay silt and moisture contents and specific gravity	As per IS: 2386	One test per source of supply and routine test regularly as directed

In addition to the above construction materials such as inter locking paver blocks, chequered cement concrete tiles, Pre-cast CC tiles, Kota/Red Stones Flooring samples shall be arranged for approval before use and if required testing shall be arranged.

For Cement concrete works the minimum frequency of sampling of concrete (CC cubes) shall be as follows:

Sl.No.	Quantity of concrete in Cu.M	No. of Samples
1	1 – 5	1
2	6 – 15	2
3	16 – 30	3
4	31 – 50	4
5	51 and above	4 + 1 additional sample for each additional 50 Cu. M and part thereof.

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The cement concrete cubes shall be tested for 7 & 28 days as per relevant IS code.

33.0 INSPECTION BY THIRD PARTY INSPECTION (TPI) AGENCIES NOMINATED BY LAND OWNING AGENCIES

It is the responsibility of the contractor to give inspection call, at least one week in advance to OWNER, to arrange for inspection by TPI nominated by land owning agencies along with the file containing all documents mentioned in Clause No. 2 of this document. Before inspection by TPI nominated by land owning agencies, contractor has to arrange for the inspection of the restored area by OWNER/Consultant/TPI and get the work certified. Contractor has to arrange for all necessary equipment, tools & tackles, labour for carrying out the inspection of the restored area. It is the responsibility of the contractor to obtain "No Objection Certificate" (NOC) from the TPI nominated by the land owning agencies and further NOC from Land Owning Agencies and to get the securities/Bank Guarantees paid to them, for obtaining the permissions.

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ENERGISING QUALITY

VCS PROJECT CONSULTANTS PVT. LTD.

STANDARD SPECIFICATION - INSTALLATION OF ABOVE GROUD GI/COPPER PIPING & FITTINGS IN LOW RISE DOMESTIC CONNECTIONS

VPC – SS – PE - 0003

REV	DATE	Purpose	Prepared By	Checked By	Approved By
00	18.06.18	ISSUED AS STANDARD	BS	MVK	AD

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CONTENTS

1.0 GENERAL INFORMATION 3

2.0 DEFINITIONS 3

3.0 SCOPE OF WORK 3

4.0 MATERIAL, MANPOWER EQUIPMENT AND MACHINERY 6

5.0 ISSUE OF WORK INSTRUCTIONS 9

6.0 PROGRESS OF WORK 10

7.0 WORK SHEETS 10

8.0 PERMISSIONS / APPROVALS 10

9.0 REFERENCE SPECIFICATION, CODES AND STANDARDS 11

10.0 RIGHT-OF-USE SERVEY AND MARKING 11

11.0 PROTECTION OF STRUCTURES AND UTILITIES 12

12.0 POWDER COATED GI AND COPPER ABOVE GROUND SERVICE PIPE 12

14.0 INSPECTION 17

15.0 PURGING & COMMISSIONING 17

16.0 CONVERSION OF DOMESTIC APPLIANCES 18

17.0 RESTORATION 18

18.0 SUBMISSION OF FINAL RECORDS 19

19.0 COMPLIANCE TO HEALTH, SAFETY & ENVIRONMENT (HSE) FOR LOW RISE GI: 19

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1.0 GENERAL INFORMATION

The main scope of this contract comprises the installation of above ground pipes from the outlet of 'PE/ GI transition fitting' up to the domestic/ commercial Customers 'Appliance/ stove/ oven valve' as per the Distribution schedule placed in enclosed drawing No: VPC-STD-PP-2026 in New was well as in Existing Gas charged areas.

The scope includes installation & procurement of above ground GI/Cu pipes and associated fittings for commercial/domestic consumers. However, the piping may have to be carried out up to Appliance Valve, in case of some commercial/ domestic customers required.

Except domestic meter, regulator, Isolation and appliance valve, Contractor shall procure the each material (GI fittings, GI Pipes, Cu Pipes, Cu/ Brass fittings, etc.) which is required from the out of PE/ GI transition fitting up to the Domestic/ Commercial Customers "Appliance/ stove/ oven valve".

This technical specification defines the basic guidelines to develop an acceptable design and suitable construction methodology for carrying out different activities listed out in the schedule of rates of this tender.

Compliance with these specifications and/or approval of any of the Contractor's documents shall in no case relive the contractor of his contractual obligations.

2.0 DEFINITIONS

PMC	VCS Quality Services Pvt. Ltd. (VCSQSPL)
SS	Present <<Standard Specification>> and its entire appendix, if any
TPIA	Third Party Inspection Agency to be appointed by CLIENT
EIC	Engineer-in-charge
CUMULATIVE LENGTH	The riser length (excluding lateral tapping) shall be considered and averaged out among all the households, whereas the lateral piping shall be included only for one particular connection
REGULATOR PIECE	The GI pipe from transition fittings to Regulator

3.0 SCOPE OF WORK

Generally the following shall constitute the Contractor's scope of work but not limited to:

- Plan and prepare a schedule for execution and work implementation as per QA/QC plans to be issued by Owner/ Owner's representative. Contractor has to submit the Construction/ Execution procedures before commencement of work to Owner/ Owner's representative for approval.
- Contractor shall submit the QCT/procedure/drawing etc. of all the material to be

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procured by him for approval before procuring the items. If, QCT/ procedure/ drawing etc. are not approved from client/consultant then owner has the authority to refuse /reject the same lot material.

- Receipt of regulators, domestic meters, Isolation and Appliance Valve as a free issue items from Owner's stores, loading, transportation, unloads at project site. Proper storing, stacking, identification, providing security and insurance during and before installation and commissioning of pipelines. Obtaining the approval for optimum route and permission for work from the concerned authority and EIC.
- Selection of route with the EIC/ Consultant and marking the same on walls/floors between 'transition fitting' to 'cooking oven/ stove/ appliance', making openings and making provisions for fixing clamps. Making temporary but stable platforms scaffolding/ rope ladder etc., required for installation of pipes/fittings at all heights/multi storied flats and locations.
- Contractor shall procure all material except free issue items for installation at the outlet of PE/ GI transition fitting up to the Domestic customers "Appliance/ stove/ oven for satisfactory completion to the owner/owner's representative.
- Supply and Installation of powder coated GI pipes of ½", ¾" dia. between transition fittings to customers kitchen appliances including NPT threading of GI pipes, supply of proper seal outs for threads to join fittings such as elbows, tees, connectors, regulators, meters, appliances & isolation valves etc., as per laid procedures and specifications including clamping and sealing etc. The powder coated GI pipe shall be painted after the testing of the GI installation wherever touching is required to eliminate any coating defects during installation. Where all GI fittings shall be fully painted after testing as per defined Specification.
- Supply & Installation of Copper pipes including supply of lead free solder wire and flux to join fittings such as elbows, tees, connectors, meters, valves etc., complete as per procedures and specifications including clamping and sealing etc.
- Supply of clamps for fixing pipes, Meters wherever required, painting of pipes and fittings. Providing consumables grout material, repair/restoration of walls/floors changes for the pipes including the materials required for conversions and tools and tackles etc. shall be completed as per specification.
- Conversion of all types of LPG kitchen appliances to NG based appliances & to take Sign on RFC card& Joint Meter Records (JMRs) of customer.
- To demonstrate the Customer regarding use, safety and maintenance related aspects to

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NG based appliances and installations.

- Cleaning, flushing, pneumatic testing and commissioning to the GI/Cu pipe & fittings, meters, valves etc. as per specification and hand over the same to Owner/Customer to the entire satisfaction of EIC/CONSULTANT.
- Dismantling of scaffolding/temporary structures and cleaning of site & restore the site as per its original condition.
- Restoration of walls, flooring and other damages while executing the above ground installation up to satisfaction of properly owner.
- Preparation and submission of above ground installation card for each house indicating the laid GI/ Cu pipe including fittings, mentioned the reasons, if connecting, testing, etc. is not provided to the customers and deviation statements on completion /commissioning of work.
- Any other activities not mentioned/covered explicitly above, but otherwise required for satisfactory completion/operation/safety/statutory/maintenance of the works in new & existing gas charged areas shall also be covered under the Scope of work and has to be completed by the Contractor within specified schedule at no extra cost to Owner.
- Following activities are also in Contractor's Scope:
  - Receive Customer’s request and complaints logged on CLIENT's portal/Offline.
  - Carry out joint technical feasibility survey for requests received.
  - Attend and resolve customer complaints within defined TAT (Turn Around Time).
  - Maintain and update the request and complaint status in CLIENT's portal.
- Maintain new connection tracking on CLIENT's portal. Providing adequate manpower, minimum 2 no’s each such as data entry operator, customer care executive etc. for data logging like new connection request & GI tracking, attending complaints, day to day interaction with customers and residents so that work can be executed within defined time period (TAT) Turn Around Time.
- Providing adequate manpower for carrying out laying for PNG installation for emergency cases as and when required. The TAT period for carrying out such emergency cases are defined in tender document.
- Printable material i.e. RFC book, sticker & safety Guidelines shall be provided by owner. All other printable materials like feasibility report etc. shall be in contractor’s scope.
- All size of GI pipes shall be powder coated before installation and it is in the scope of contractors. Contractor shall submit powder coating procedure to EIC/ Consultants before powder coating of pipes.

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4.0 MATERIAL, MANPOWER EQUIPMENT AND MACHINERY

4.1 Material to be supplied as a free issue material

Domestic meter, Regulator, Isolation and Appliance valve shall be supplied as a free issue material to the contractor. The contractor shall not use any other material from any other source of supply other than owner's supplied material without any written approval from EIC.

4.2 Material/Equipment & machinery to be supplied by contractor

Contractor shall procure/ purchase GI Pipe & fittings, Brass fittings, Cu pipe & fittings, and Reinforced rubber hose with other material which is required to satisfactory completion/safety/statutory of the works as per tender at no extra cost to Owner. The CLIENT logo shall be marked on the material supplied by contractor. The contractor shall take approval from owner/owner representative for marking on the material to be procured by contractor before placement of order.
The Contractor shall provide labour, tools (such as Hammer Drill, Piston Drill, Pipe Cutters, Dies for threading, Pipe wrenches, spanners, conversion kits, solder torch, copper tube Cutters, tube benders, lacquering, thinner etc.) in specified numbers, all types of clamps, Plant and equipment necessary for the proper execution of the work. This will include but not limited to list of specialized tools and tackles indicated in Annexure #1.

Special tools shall be required at site for carrying out drilling work in walls other than Brick or RCC (Ex. Granite, Marble, Wooden, Glass Cutting etc.)

The contractor has to ensure the availability of DG sets for continuous power supply. In case the power supply is availed at the site from societies, individual residents, contractor shall settle the claims raised by the electricity providers without any cost implication to OWNER. In case contractor doesn't settle the claims for using the electricity from societies/individual residents, on demand by the providers, OWNER will settle the claims and the same will be deducted from the contractor's bills. The progress of work shall not hamper due to non-availability of power supply.

The contractor has to submit the valid calibration certificate for Pressure gauges.

Contractor shall submit the manufacturer test certificate slab test certificate for all items procured by him for approval before commencing the execution.

No hiring of equipment’s, tools and tackles by the contractors is allowed at the site. In case any contractor is found not in possession of enlisted required tools and tackles,

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penalty will be levied as per the SCC which shall be deducted from the running bills.

4.3 Plant and Equipment

All vehicular type machinery shall be in good working condition and shall not cause spillage of oil or grease. To avoid damage to paved surfaces, the contractor will provide pads of timber or thick rubber under the hydraulic feet or outriggers of machinery.

4.4 Sealant, Grout

The contractor shall be responsible to arrange the supply of any consumable sealant or ready mix grout material required for restoration of holes. The sealant/grout supplied by the contractor shall be compatible with the area to be restored/ rectified. No separate payment for the supply of sealant and grout shall be made to the contractor.

4.5 Clamps, Rawal Plugs, Screws and Nozzles etc.

The Clamps, Brackets for meter, Rawal Plugs, SS-304 Screws (2" length), Nozzles, etc. shall be approved lot wise by EIC prior to installation. Re-drilling of existing appliance (burners) nozzles is strictly not permitted. The quality of materials procured will be got approved and will be as directed by EIC.

The indicative sketch of the Brackets for Meter, and GI/Copper Pipe Clamps is enclosed with the tender. No separate payment for the supply of Meter Brackets and GI/Copper clamps shall be made to the contractor.

4.6 Consumable Items

- Special Consumables such as Teflon Tapes, solder wire, flux, lacquer, thinner shall be supplied by the contractor and are included in installation rates.

- These consumables shall be of reputed make companies and required grades/class

4.7 Other Materials

The contractor shall supply the following items where required:

4.7.1 All materials required for work, NPT threading, copper pipe jointing, testing etc.

4.7.2 All signs, barricades, lights and protective equipment.

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4.7.3 All material required for working at higher floor levels (i.e., scaffolding, Ladder, Safety Belts, Self-Locking Safety Harness Belts etc.).

4.7.4 Special consumable such as grease for maintenance of domestic appliances, all paints for painting of GI Pipes, Consumables such as Teflon Tapes, Solder- wire, Flux, Lacquer, Thinner, Petrol, Diesel, Fuels and Oils required are to be supplied by the contractor and are included for within the rates.

4.7.5 All minor items not expressly mentioned in the contract but which are necessary for the satisfactory completion and performance of the work under this contract.

4.8 Acquisition, Receipt and Storage of Materials

The Contractor shall collect Domestic meter, Regulators, Isolation and Appliance Valve from Owner's designated stores in between the hours to be advised by the EIC.

The contractor shall carry out assessment of material required for GI/Copper installation in allocated area. After approval from Owner, contractor shall place order for purchasing of GI Pipes & fittings, Copper pipes & fittings, Brass Fittings, and Reinforced Rubber hose (Technical specifications attached in the tender document) to anyone of approved vendors as per the list attached in the tender document. The contractor shall also ensure that the QCT for these materials shall be approved before the start of production activity. Once QCT is approved, contractor shall forward inspection call to the Owner depending upon the material requirement at the site. The inspection of these materials shall be carried out by Owner appointed third party inspection agency. It is contractor's responsibility for document submission, arranging dispatch clearance, handling, loading, transportation and unloading of these materials at their own respective store.

Any other activity not mentioned/covered, explicitly, but otherwise required for satisfactory completion/operation/safety/statutory/maintenance of works shall also be covered under scope of work and has to be completed by contractor within specified schedule at no extra cost to Owner. The Contractor shall carry free issue material in such a manner as to preclude damage using transportation and handling.

The Contractor shall physically examine all materials at the time of acceptance the material in store and notify the EIC immediately of any damage or defect noticed by the Contractor. The CLIENT representative shall duly note any damage or defect in a site instruction book and both parties shall counter sign the entry.

Any damage not so recorded will be deemed not to have existed at the time of acceptance of material in store by the Contractor and the cost of repair or replacement or rectification shall be borne by the Contractor.

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All materials shall be stored in contractor's stores near site in such a manner so as to prevent any damage to the materials from scratching, gouging, indentation, excessive heat or by contact with any sharp objects or chemicals.

The Contractor shall be required to submit inventory details of materials every month.

The Contractor shall maintain log book at their respective stores stating issue and availability of free issue material at a given day. Further, it is mandatory that the contractor is required to undertake and submit inventory details of free issue and purchased materials on monthly basis to Owner/ Owner's representative as per the approved format of the owner. The inventory details shall be in correlation with the Daily progress chart and material reconciliation sheet.

Material reconciliation indicating issue of material, consumptions and defective material shall be submitted on every three months basis.

5.0 ISSUE OF WORK INSTRUCTIONS

- The contractor will be required to carry out GI installation in the areas where MDPE laying is under progress. However, testing of GI installation shall be done in conjunction with laying of MDPE Service Lines to respective premises. A general scheme of distribution to domestic consumer is indicated in enclosed drawing No: VPC-STD-PP-2026 for reference. It may vary in case of individual and multi storied flats.

- All skilled personnel like jointers, conversion technicians will be approved and certified by EIC. The technicians who will carry out joining of copper material and conversions will undergo a test by Owner. Those who clear the test will be issued identity cards duly signed by EIC. These technicians shall be only authorized to take up respective jobs. In case it is found that contractor personnel other than authorized are carrying out these works, applicable penalty will be levied to the contractor as per contract.

- The rates to be quoted by contractor shall be inclusive of all preparatory/bye works, platform materials, labour, supervision, tools, taxes, duties, levies, salaries, wages, overheads, profits, escalations, fluctuations in exchange rates and no change in the rates shall be admissible during tenancy of the contract.

- The schedule of items of GI/Cu installations have been described in brief and shall be held to be completed in all respect including safety requirements as per Standard Specification of HSE, tests, inspection, QA/QC works, enabling and sundry works. The payment shall be made against completed and measured works only. No extra works

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whatsoever shall be considered in execution of these items.

6.0 PROGRESS OF WORK

The contractor shall proceed with the work under the contract with due expedition and without delay. Contractor shall assess the material requirement of the allotted area and submit the schedule plan for execution & purchasing before start of actual work.

The EIC may direct in what order and at what time the various stages or parts of the work under the contract shall be performed. Weekly progress reports shall be submitted in the formats approved by Owner, indicating broadly the laying, testing, RFC, conversions and extra piping.

7.0 WORK SHEETS

- The quantities of GI/Cu pipe and other details will be checked by Owner's site engineer and the same shall be incorporated in RFC cards, signed & dated as certified, on site. The cards will then be approved by the EIC.

- Measurement sheets shall be prepared based on the RFC cards and checked and certified by the site engineers for billing purpose.

- If measurement sheets submitted are illegible, incomplete or incorrectly booked they will be returned to the contractor.

8.0 PERMISSIONS / APPROVALS

- Contractor shall be responsible for obtaining permissions from society management, RWA, individual residents and any other concerned authority, if required, for completion of the work. Contractor must take the prior appointment from the residents for carrying out the work.
- The prospective bidder shall work in close consultation/coordination with the EIC.
- The prospective bidder shall not sign/execute any agreement and/or undertaking on any such documents which amounts to be under taken by Owner. The same shall only be signed and executed by Owner; however, the prospective bidder shall also liaison and coordinates for the same.
- The necessary coordination, liaison and arrangements for inspection and approval shall be the contractor's responsibility. Inspection and acceptance of the work by authority shall not relieve the contractor from any of these responsibilities under this contract. The contractor shall plan the execution of work in such a manner so that all the registered customers are attended in phased manner. However, it is the contractor's responsibility to fix a firm appointment with the consumer for carrying out the work.

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- A log book/job card for such appointments with Consumer/any other agencies shall be maintained and the schedule/appointment once taken shall be adhered to by the contractor. PMC/ElC shall review the records every week. The contractor shall submit the detailed list of RFC/Conversions and balance work on Registrations at least once a week as per approved format.
- The contractor is also required to obtain a "Labour License" from the Assistant Labour Commissioner of respective Administration/Central Govt.
- It will be the contractor's responsibility to familiarize himself and comply with, any other local rules, regulations or statutory requirements applicable to the work.
- The contractor has to take responsibility of the action of supervisors, plumbers and helpers provided by him.

9.0 REFERENCE SPECIFICATION, CODES AND STANDARDS

The contractor shall carry out the work in accordance with this specification, Owner's Engineering Standards: ASME B31.8 - Gas Transmission and Distribution Piping Systems; Oil Indian Safety Directorate Norms(OISD), the American Gas Association Document - Purging Principles and Practice and PNGRB Guidelines.

If the contractor find any discrepancy, ambiguity or conflict in between any of the Standards and the contract documents, then this should be promptly referred to the Engineer -in-Charge (EIC) for his decision, which shall be considered binding on the contractor.

10.0 RIGHT-OF-USE SERVEY AND MARKING

The route of the pipeline to be installed shall be decided with consent of the consumer and Site Engineer/EIC. Contractor must ensure that the persons/workers/supervisors/ working at site shall have proper identity cards prior to entering the premises of the consumer.

No temporary or permanent deposit of any kind of material resulting from the work shall be permitted in the approach or any other position, which might hinder the passage and/ or natural water drainage, or any area where there is objection from consumer.

The contractor shall obtain necessary permissions from land Owners and tenants and shall be responsible for all damages caused by the construction and use of such approaches, pavements, gardens, rooms, walls, roof etc., at no extra cost to Owner.

Owner/Consultant and the contractor at each premises or housing colony to be supplied with gas will conduct a joint survey. The survey record will note Customer details, the potential gas supply points and proposed meter positions and estimates of material quantities. The contractor's representatives will make as sketch of the agreed pipe routes, if necessary.

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The contractor will be responsible for contacting the Customer and making the necessary arrangements for access and appointments to carry out the work. Owner will not be responsible for any time lost due to failed appointments or disputes with Customer.

The contractor shall confine its operations within limits of the Right in use. The contractor shall restore any damage to property outside ROU.

The contractor shall also carry-out all necessary preparatory work if needed to permit the passage of men and equipment. Lights, Curbs, signs shall be provided wherever and/or required by the Owner necessary to protect the public.

11.0 PROTECTION OF STRUCTURES AND UTILITIES

The contractor shall at his own cost, support and protect all buildings, walls, fences or other structures and all utilities and property which may, unless so protected, be damaged as a result of the execution of the works. He shall also comply with the requirements in the specification relating to protective measures applicable to particular operations or kind of work.

While painting, contractor must take care of the consumer premises while carrying out the job such as spillage on floor, walls, ceilings, sun shades etc. If the same does occur, the contractor has to immediately make things to original.

12.0 POWDER COATED GI AND COPPER ABOVE GROUND SERVICE PIPE

The powder coated GI service pipe installation work includes all work necessary to connect from the PE/GI transition fitting on the down-stream of the PE service, to the Customers appliance, including the installation of regulator, valves, fittings, meters, clamps etc. The contractor shall be required to provide all equipment, tools and materials necessary to execute the work in an efficient and effective manner. Along with ladders, scaffolding pipe, dies, tripods, vices, fittings and Teflon tape, drills for concrete and other masonry, drills for timber, Granite, Marble Stones and laminated surfaces inside Customers property, bending tools, clamps, sleeves to facilitate the pipe passing through floors and walls, paint for marking etc.

All powder coated GI risers at the outside of buildings shall be fully supported to carry the weight of piping. A flanged foot or similar device, capable of supporting the total weight of the riser, shall support risers. The riser shall be installed in a vertical line from its point of support to its highest point with a minimum of changes in direction. The threading of GI pipe shall be NPT and conforming to ANSI B l 20.1

Contractor has to supply different types/sizes of approved powder coated clamps (Mild Steel) for fixing GI pipes suiting to the site conditions. The contractor shall get approval from EIC for every fresh lot of the clamps, brackets, regulator boxes and other consumables, prior to start of installation. The detailed cross sectional of Gl Pipe Clamps/Meter brackets are as per Drawing No. VPC-STD-PP-2051

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All riser and lateral pipe shall be clamped to the building at intervals not exceeding 1.5 mtrs. Maximum distance between clamps shall be 1.0 - 1.5m when pipe goes to the straight, if any tee or fittings lies in between the pipe then clamp shall be placed 150 mm far away from center line of fittings at every sides. However, the same may be changed as per site conditions/as directed by EIC. Minimum gap between pipe & wall shall be 25 mm. The joints/ fittings of the GI installation shall be painted only after carrying out testing of the installation.

Where pipe passes through the balcony and the surface is slightly elevated around the service pipe or its surrounding sleeve to prevent the accumulation of water at that point. Where a short piece of sleeve is used around the gas pipe, the sleeve should be embedded in the concrete with a mix of mortar and the void between the pipe and sleeve filled with a suitable sealant. The sealant should be beveled such as to prevent an accumulation of water. Supply of clamps for all sizes of the GI pipes is in contractor's scope. Contractor has to take prior approval for design/types of clamps, paintings etc. Pipe shall preferably be entered into building above ground and remain in a ventilated location. The location for entry shall be such that it can be easily routed to the usage points by the shortest practicable route.

12.1 NON LMC

Non LMC GI Pipe shall be defined as the GI pipe installed from transition fitting to lateral isolation valves.

Regulator piece: Regulator Piece: Powder coated GI pipe of 1/2'' dia installed of length 1.5m from transition fitting up to inlet of regulator. Its length may very as per site situation subject to prior approval from Site In-Charge or as per instruction of EIC. The Laying of GI Pipe from the transition fittings to regulators shall be payable in the numbers as per SOR item no.11a

- **Riser for Bungalow /Apartments having floors up to G+3:** Powder coated GI riser pipe of ½'' dia shall be installed from regulator isolation valve to lateral isolation valve for G+3 Apt and Individual kothi /Bungalow. Refer Drawing No. VPC-STD-PP-2027, 2029
- **Riser for Bunglow/Apartments having floors more than G+3:** Powder coated GI riser pipe of ¾'' dia shall be installed from regular isolation valve to lateral isolation valve for Apt and Individual Kothi/Bungalow having floors more than G+3. Drawing No. VPC-STD-PP-2028.

12.2 LMC

LMC GI/CU pipe shall be defined as the GI pipe installed from lateral isolation valve to appliance valve.

- **PNG CONNECTIONS IN PROJECT AREA**

Supply and installations from riser (lateral isolation valve)-.The cumulative length of ½'' dia powder coated GI pipe with in 2m & Cu pipe within 2m or (GI+CU) within 4m after

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lateral isolation valve up to appliance valve up to appliance valve along with installation of meter, supply of steel reinforced rubber hose with clamps and conversion of burner. Additional quantity above 4 meter (GI+CU) shall be payable only in case , if cumulative length exceeds 4 m .payment against additional length of (GI/Cu) shall be against SOR.

- **PNG CONNECTIONS IN O&M AREA (ON EXISTING RISER)**

Supply and installations from existing riser- The cumulative length of ½'' dia. powder coated GI Pipe within 2 m & Cu pipe within 2m or (GI+CU) within 4 m after lateral isolation valve up to appliance along with installation of meter , supply of steel reinforced rubber hose with clamps and conversion of burner. Additional quantity above 4 meter (GI+CU) shall be payable only in case if cumulative length exceeds 4 m. Payment against additional length of (GI/CU) shall be against SOR. This SOR is applicable only if the riser is commissioned by other contractor or riser is commissioned by same contractor six month ago.

The GI/Cu/brass fittings shall not be counted separately & shall be measured along with GI & Cu pipe.

Except Meter, Regulator, Isolation and appliance valve, Contractor shall procure all other materials (i.e. Pipe, fittings, clamps etc.) as per attached specification for installation and to the entire satisfaction of EIC/consultant.

The contractor shall also ensure that gas supply shall not be provided to the customer in any Concealed Piping

The Copper service pipe installation work includes all work necessary to connect downstream of the meter to the Customers appliances. The contractor shall be required to provide all equipment, tools and materials necessary to execute the work in an efficient and effective manner. Along with these, he will be required to provide ladders, scaffolding pipe, drills for concrete and other masonry, special drills for timber, Granite, Marble Stones and laminated surfaces inside Customers property, bending tools, sleeves to facilitate the pipe passing through floors and walls, etc. Copper pipes & fittings shall be provided by Contractor.

During installation the Copper pipe is to be cut to proper length with tube Cutter, the burrs removed with a file, cleaning of outside surface of pipe & inside surface of fitting, applying flux to the tube and fitting around the outer/inner ends, inserting the tube in to the fitting, applying heat to the assembled joints using conventional blow torch to melt solder wire. Contractor shall submit the joining procedure of Cu pipe & Fitting to the approval or as per the instructions of EIC.

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Contractor has to supply different types/sizes of approved clamps (PE 80/PVC) for fixing Copper pipes suiting to the site conditions Contractor has to take prior approval of EIC for quality of the clamps, solder, flux, lacquer, thinner etc. The approval shall be taken for every fresh lot of clamps from EIC before installation at site.

All copper piping shall be clamped to the walls at intervals not exceeding 500 mm. The solder wire shall be of reputed company of diameter size 3.25mm, Lead free as per BS 29453:1994 (Soft solder alloys) and supplied in coils. The detail specification is attached in tender for reference. Solders for use with copper tube & fittings generally melt within the temperature range 180°C- 250°C. The contractor has to furnish the certificate of confirmation of standards before start of work.

- **Installation of Meter**

Installation of domestic meters with associated inlet and outlet connections (GI/Brass fittings), on the wall with approved powder coated meter brackets and angles in new & existing gas charged areas ensure a clear gap between meter and wall.

The contractor shall supply approved powder coated meter brackets and angle brackets. A sketch of the brackets is referred from the enclosed drawing for reference. It is required that one sample of each type of bracket is approved before the work is started.

Firmly secure the meters on the wall with good quality Rawal Plugs, screws etc. In case the Rawal Plugs are not holding then wooden blocks or other fixing arrangements like cement etc. to be used for proper grouting.

The Meter installation will be preferred in open/ventilated space so as to prevent Gas accumulation and easy dispensation of gas to atmosphere in case of any smell/leakage of gas. The Meter installations will not be provided in any fixed enclosures, cabinets (below or above the slab) or confined space in the customer premises.

The Contractor shall ensure that GI installations and rubber hoses shall not be exposed to direct heat of Gas burners. The installation should have minimum clearance of about 1 meter from electric point mains& switches. Minimum distance between Appliance Valve & Gas Burners shall be 0.3 Meters. The isolation valve shall be installed after entering the customer premises/kitchen but before the meter installation.

The above activities along with restoration of the area to original shall be carried out to the complete satisfaction of consumer and EIC.

Powder Coating /Painting of GI Pipes

The entire lengths of the pipeline along with fittings are to be painted / powder coated after proper surface preparation as follows:

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(a) **Painted (for scratched powder coated pipes and fitting only)**:

- One coat of Primer Application (Appropriate Zinc based primer)
- Two coats of synthetic enamel paint- canary yellow of minimum of 30 microns per coat of reputed make like Asian, Berger, and Nerolac. (No other make shall be used for painting).

All painting materials including primers and thinners brought to site by contractor for application shall be procured directly from manufacturers/dealers as per specifications and shall be accompanied by manufacturer's test certificates. The contractor shall ensure that smooth finish is attained after carrying out painting.

Engineer-in-Charge at his discretion may call for test for paint formulations. Contractor shall arrange to have such tests performed including batch wise test of wet paints for physical and chemical analysis. All costs there shall be borne by the contractor.

The painting work shall be subject to inspection and certification by Engineer-in-Charge at all times. Painting of GI pipe shall be paid with installation of GI pipes.

(b) Powder coating (refer attached Specification for powder coating)

Contractor will be required to install powder coated GI pipes shall submit detailed procedure of powder coating for approval to Consultant prior to supply of Gl pipes. After installation of the entire piping system, final touching shall be done to the satisfaction of EIC.

13.0 TESTING OF GI / COPPER INSTALLATION

- The installation from PE/GI transition fitting up to regulator shall be tested at the pressure of 6.0bar (g).
- The testing of Gl riser pipe up to regulator shall be done with the isolation valve in open condition and open end plugged.
- The GI/Copper installation from regulator outlet to appliance valve (except meter) shall be tested at a pressure of 2.0 bar (g) for a holding period of 2 hour with no pressure drop. All the joints in the installation shall be checked with soap solution.
- The meter shall be removed while carrying out the testing at 2 bar (g) and joints of the meter shall be tested on line with soap solution after completion of the work. For testing proper test ends shall be made along with gauges and subsequently approved by EIC. For the installation to be tested by manometer or diaphragm gauge the meter shall not be dismantled/removed and testing shall be carried out at 100 m bar with holding period of 15 min with no pressure drop.

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- The contractor shall supply the Calibrated Pressure Gauges/ Manometer/Diaphragm Gauges of suitable range for testing of GI/Copper Installations ranging from 0-4 bars/0-150 m bar/0-250 m bar respectively. The calibration certificate shall be submitted before the start of the execution work.
- The pressure gauges shall be calibrated from time-to-time as desired by EIC but positively once in every six months.
- The details of testing shall be properly recorded in the GI/Copper cards.
- The ends/joints shall be painted only after carrying out testing of the installation. Powder coating to GI pipes shall be carried out in factory/ shop, and repair/ touching shall be carried out at site.

14.0 INSPECTION

The contractor to the entire satisfaction of EIC before proceeding further shall rectify any defect noticed during the various stages of inspection. Irrespective of the inspection, repair and approval at intermediate stages of work, contractor shall be responsible for making good any defects found during final inspection/guarantee period/defect liability period as defined in general condition of contract.

15.0 PURGING & COMMISSIONING

The rate for purging & commissioning shall be included in the GI/Cu installations.

Care shall be taken to ensure that the outlet is so located that vent gas cannot drift into buildings.

The commissioning of the Gl installation should be performed as follows:

- Ensure the method of purging is such that no pockets of air are left in any part of the Customer's piping.
- Ensure that all appliance connections are gas tight, all appliance gas valves are turned off and there are no open ends.
- Where possible, select an appliance with an open burner at which to commence the purge i.e., a hotplate burner.
- Ensure the area is well ventilated, and free from ignition sources.
- Ensure branches that do not have an appliance connected are fitted with a plug or cap.
- Turn on one burner control valve until the presence of gas is detected. A change in the audible tone and smell is a good indication that gas is at the burner. Let the gas flow for a few seconds longer, then turn off and allow sufficient time for any accumulated

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gas to disperse.

- Tum on one gas control valve again and keep a continuous flame at the burner until the gas is a light and the flame is stable.
- Continue to purge until gas is available at other appliances.

16.0 CONVERSION OF DOMESTIC APPLIANCES

The work in this section includes:

- The changing of nozzles and associated controls in accordance with manufacturer's instructions for both domestic and imported burners/ovens/grills/hotplate.
- The changing of old appliance connection Reinforced rubber hoses and nozzles and re-greasing taps as necessary.
- ThecontractorshallsupplytheReinforcedrubberhosesatthetimeofconversions.
- The contractor has to supply all types of nozzles/jets required for all types of appliances including imported burners, Grills, Ovens.
- Cleaning and performing minor maintenance of appliances.
- Testing for gas escapes, soundness and performance of appliances.
- Instructing the Customer for safe use of natural gas and for fixing of safety and conversion labels.
- Contractor must attend the complaints regarding appliances, leakage, fire etc. till the total area is handed over to Owner's operation and maintenance.
- All consumables (Nozzles, greases etc.) Are in contractor's scope.
- Changing or repairing of any items damaged during conversion.

It may be noted that the rates as per SOR will apply to conversion of all type of domestic appliances under the rates, the contractor will have to provide both Pin gauges and standard sized nozzles. The payment shall be released only after submission of necessary documents (i.e. JMR Card and its updation in online portal) of the individual house to owner.

NG of the connection is mandatory after RFC of the installation. However in case of reasons not attributable to the contractor, a minimum amount of 10% of connection rates will be withheld in RA bill against all such non covered cases. This amount shall be released once the contractor converts the connection on NG.

If the connection is not converted till closure of purchase order, due to reason not attributable to contractor, the withheld amount will be released after deduction of 5% amount of respective connection rates.

17.0 RESTORATION

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Contractor has to restore the area wherever he has carried out drilling, clamping etc. to its original condition to the satisfaction of the consumer and to ensure no passage to the premises and seepage. If the work was carried out in Govt. Flats (CPWD/NDMC/Institutional areas), contractor has to restore the area according to CPWD specifications and obtain a NOC/Clearance certificate from the concerned authorities maintaining the flats, after completion of the work.

The restored slabs or brickwork should match the surrounding surface levels. Joint widths should match the existing conditions and be filled with a dry or wet mix of mortar.

Wherever any items of the consumer is damaged/broken during working, the same will be made good or replace to the total satisfaction of the consumer.

The contractor will be responsible for the maintenance of all restoration carried out, for the duration of the contract guarantee period.

The contractor is to ensure the restoration work is properly supervised, and that the material used is suitable for the purpose. Wherever the required standards are not achieved the contractor will be required to replace the defective reinstatement work.

Note that Payment for GI/Copper installation will be released only after satisfactory restoration and clearing of the sites of all surplus materials etc.

18.0 SUBMISSION OF FINAL RECORDS

Contractor shall submit three sets each of the following documents in hard & soft copy:

- Total list of houses in the area allotted to him giving details of connections provided & reasons where connection could not be given completed.
- The details recorded in RFC cards of every domestic house.
- Details of houses where piping done along with materials used.
- Total material consumption report.
- Material reconciliation with respect to the materials issued.
- Test reports & calibration certificates of gauges etc.
- Any other documents/records required.
- Extra Piping details

19.0 COMPLIANCE TO HEALTH, SAFETY & ENVIRONMENT (HSE) FOR LOW RISE GI:

Scope include use of Fall arrestor, Ascenders/ descenders, PPE, Barricades/ Warning Boards (03 No's) connected with warning board & Caution tapes (Refer drawing no. VPC-STD-PP-2009, 2015) in areas where piping work is in progress, Use of Safety shoes,

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Walky talky, Hand gloves, Reflective jackets, Hard hats (helmets), eye and ear safety equipment, Fire extinguishers and as per the detailed scope of work in tender specifications. Contractor shall also prepare and submit duly certified Safety check list signed by TPIA/PMC. In case of non-compliance, penalty shall be applicable as per SCC clause.

This set-up is applicable up to 4th (G+4) floor and full body safety harness with accessories shall be of KARAM or equivalent make.

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20.0 ANNEXURE-1

TOOLS & EQUIPMENT TO BE PROVIDED BY CONTRACTOR FOR GI/COPPER WORK

S. No.	Hand Tools Description	Per Technician	Per Team
1	Pipe Wrench 250 mm	1	4
2	Pipe Wrench 350 mm	1	4
3	Pipe Wrench 450 mm	-	2
4	Adjustable Spanner 50 mm	-	4
5	Adjustable Spanner 150 mm	1	2
6	Adjustable Spanner 250 mm	1	2
7	Set of combination spanner 3/16"- 11/4"AF	1	1
8	Set of combination spanners 5mm-30mm	1	1
9	Large tool boxes	1	2
10	Set flat – headed screw drivers	1	2
11	Set Philips screw drivers	1	2
12	Small hammer	1	2
13	Combination pliers/mole grips	1	2
14	Set of files	1	2
15	Drill bits for 1"pipe	-	2
16	Stocks and dies for NPT threading ½", ¾", GI pipe	-	3
17	Blowtorch	-	1
18	Soldering Iron	-	2
19	Copper Pipe Bending Machine	-	2
20	Hand drill 3/8"chuck	-	2
21	Portable electric drill 240v, heavy duty	-	2
22	Spare blades	4	4
23	Batter Powered torches	2	2
24	Measuring Tape 30m	1	2
25	Wire Brush	1	2
26	Portable Pipe vice & tripod	-	2
27	Set steel twist drills 0.5-2.0mm (for appliance conversion)	-	1
28	Set steel twist drill 1mm-10mm	-	2
29	Set masonry drills 1mm-10mm	1	2
30	Graphite based grease	As required	As required
31	Lubricating Oil	As required	As required
32	Hand Cleaner	As required	As required
33	Copper pipe cutter 12mm	-	4
34	GI Pipe Cutters ½" Gas Detection Equipment Power Generator 2.5 KVA Pressure Gauge (0-10 bar) Pressure Gauge (0-4 bar) Diaphragm Gauge (0-400m bar) Manometer (0-150m bar)	- As required As required 2 2 1 1	2 - - 4 8 2 1
35	Automatic Thread Cutting Machine	-	As required
36	GI Pipe Cutter	-	2

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ENERGISING QUALITY

VCS PROJECT CONSULTANTS PVT. LTD.

STANDARD SPECIFICATION FOR WELDED RISER & GI/COPPER INSTALLATIONS FOR PNG CONNECTIONS IN HIGN RISE BUILDINGS

VPC-SS-PE-0004

REV. No	DATE	Purpose	Prepared By	Checked By	Approved By
00	18.06.18	ISSUED AS STANDARD	BS	MVK	AD

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CONTENTS

1.0 INTRODUCTION 3
2.0 DEFINITIONS 3
3.0 SCOPE OF WORK 3
4.0 MATERIAL, MANPOWER, EQUIPMENT AND MACHINERY 7
5.0 ISSUE OF WORK INSTRUCTIONS 10
6.0 PROGRESS OF WORK 11
7.0 WORK SHEETS 11
8.0 PERMISSIONS / APPROVALS 11
9.0 REFERENCE SPECIFICATION, CODES AND STANDARDS 12
10.0 RIGHT-OF-USE SURVEY AND MARKING 12
11.0 PROTECTION OF STRUCTURES AND UTILITIES: 13
12.0 GI AND COPPER ABOVE GROUND SERVICE PIPE 13
13.0 TESTING OF GI/ COPPER INSTALLATION 21
14.0 INSPECTION 21
15.0 PURGING & COMMISSIONING 21
16.0 CONVERSION OF DOMESTIC APPLIANCES 22
17.0 RESTORATION 23
18.0 SUBMISSION OF FINAL RECORDS 23
19.0 COMPLIANCE TO HEALTH, SAFETY & ENVIRONMENT (HSE) HIGH RISE: 24
20.0 ANNEXURE # 1 25

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1.0 INTRODUCTION

The main scope of this contract comprises the installation of above ground pipes from the outlet of 'PE/ GI transition fitting' up to the domestic/commercial Customers 'Appliance/stove/oven valve' as per the Distribution schedule placed in enclosed drawing no. VPC-STD-PP-2026.

The scope includes installation & procurement of above ground GI/Cu pipes and associated fittings for Domestic Customers in High Rise Buildings above fourteen floors.

Except service regulator, domestic meter, meter regulator, Isolation and appliance valve, Contractor shall procure each material (GI fittings, GI pipes, Wrought steel fittings (forged fittings), Cu pipe, Cu/Brass fittings, MS/PVC clamps using SS304/brass screws, super hold nylon raw plug anchor etc.) which is required from the outlet of PE / GI transition fitting up to the Domestic customers "Appliance / stove /oven").

This technical specification defines the basic guidelines to develop an acceptable design and suitable construction methodology for carrying out different activities listed out in the schedule of rates of this tender.

Compliance with these specifications and/or approval of any of the Contractor's documents shall in no case relieve the Contractor of his contractual obligations.

2.0 DEFINITIONS

OWNER	
PMC	VCS QUALITY SERVICES PVT. LTD. (VCSQSPL)
TPIA	Third Party Inspection Agency to be appointed by Client.
EIC	Engineer–In–Charge
CUMULATIVE LENGTH	The riser length (excluding lateral tapping) shall be considered and averaged out among all the households, whereas the lateral piping shall be included only for one particular connection

3.0 SCOPE OF WORK

Generally the following shall constitute the Contractor's scope of work but not limited to:

- Plan and prepare a schedule for execution and work implementation as per QA/QC plans to be issued by Owner / Owner's representative. Contractor has to submit the Construction/Execution procedures before commencement of work to Owner / Owner's representative for approval.

- Contractor shall submit the ITP/procedure/drawing etc. of all the material to be

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procured by him for approval before procuring the items. If, ITP/procedure/drawing etc are not approved from client/consultant then owner has the authority to refuse /reject the material.

- Receipt of Service Regulators, Domestic Meters, Meter Regulators, Isolation and Appliance Valve as a free issue items from Owner's stores, loading, transportation, unloading at project site. Proper storing, stacking, identification, providing security and insurance during and before installation and commissioning of pipelines. Obtaining the approval for optimum route and permission for work from the concerned authority and EIC.

- Selection of route with the EIC /Consultant and marking the same on walls/floors between 'transition fitting' to 'cooking oven/stove/appliance' with preparation of isometric drawings, making openings and making provisions for fixing clamps. Making temporary but stable platforms/scaffolding/rope ladder etc., required for installation of pipes / fittings at all heights / multi storied flats and locations.

- Contractor shall procure all material except free issue items for installation at the outlet of PE/ GI transition fitting up to the Domestic customers "Appliance /stove / oven for satisfactory completion to the owner/owner's representative.

- Installation of Service Regulators as per attached drawing no.: VPC-STD-PP-2042.

- Supply and Installation of Regulator Box including fabrication as per drawing no. VPC-STD-PP-2051.

- Supply and Installation of ¾" to 2" Welded Riser from Transition Fittings (installed by PE Contractor) to last floor : Assessment of material requirement for installation of riser & header at site, Procurement of GI Pipes (heavy duty) as per IS-1239 Part-I duly powder coated & wrought steel fittings(forged fittings) conforming to IS-1239 Part-II from any of the approved vendors of Client.

Scheduling, Planning of material & forwarding inspection call, Getting Dispatch clearance from Client/PMC, Handling, loading, transportation and unloading of these materials at contractor's store / site.

Preparation and approval of sketches, schedules, execution procedures & WPS as per technical specification. All consumables e.g. electrodes, flux etc. for welding pipes and fittings are under contractor's scope. Finalizing optimum route in consent to Client

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representative from transition fitting to last floor of building including lateral piece with isolation valve as per Drawing No.VPC-STD-PP-2026.

Erection, Fabrication, Socket Welding, Testing & Installation of welded GI Pipes & Fittings etc., including NPT threading as per technical specification.

Supply & fixing of MS angle clamps, Ceiling clamps & dowel plugs with screws, grout material, suitable thread sealant i.e. Teflon Tape / lock tight, Supply and fixing of studs & bolts of various sizes ranging from ½" to 2" and 3/4" to 2", Jointing of transition fittings to above ground GI pipes, purging, testing and commissioning of the complete installation.

Welded riser shall be installed after successful testing at ground level. Riser shall be then pulled with pulley for vertical installation. Pneumatic testing shall be carried out for entire riser length after installation of riser as per technical specification. All the safety equipment's, tools and tackles required for satisfactory execution of welding/installation work are under contractor's scope.

Any other material & activities not mentioned/covered above, but otherwise required for satisfactory completion/safety of work as defined in tender has to be supplied / done by contractor within specified schedule at no extra cost to owner.

Supply and Installation of Powder Coated GI pipes of ½" to 2" dia. from welded riser tapping TEE (Isolation Valve) to customer's kitchen appliances including NPT threading of GI pipes, supply of proper seal outs for threads to join fittings such as elbows, tees, connectors, regulators, meters, appliance & isolation valves etc., as per laid procedures and specification including clamping and sealing etc. The Powder Coated GI pipe shall be finally touched up (painted) where the powder coating vanished and fitting joints after the testing of the GI installation.

- Supply & Installation of Copper pipes including supply of solder wire and flux to join fittings such as elbows, tees, connectors, meters, valves etc., complete as per procedures and specifications including clamping and sealing etc.

- Supply of clamps for fixing pipes, Meters wherever required, painting of pipes and fittings. Providing consumables grout material, repair/restoration of walls/floors changes for the pipes including the materials required for conversions and tools and tackles etc. shall be completed as per specification.

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Cleaning, flushing, pneumatic testing and commissioning to the GI/Cu pipe & fittings, meters, valves etc as per specification and hand over the same to Owner/Customer to the entire satisfaction of EIC/ CONSULTANT.

- Conversion of all types of LPG kitchen appliances to NG based appliances. & to take Sign on RFC card & Joint Meter Records (JMRs) of customer.

- To demonstrate the Customer regarding use, safety and maintenance related aspects of NG based appliances and installations.

- Dismantling of scaffolding/temporary structures and cleaning of site & restore the site as per its original condition.

- Restoration of walls, flooring and other damages while executing the above ground installation.

- Preparation and submission of above ground installation card for each house indicating the laid GI/Cu pipe including fittings. Reason for not providing the connection to the customers and deviation statements/ consent form on completion/ commissioning of work in a particular society/ block.

- Any other activities not mentioned/covered explicitly above, but otherwise required for satisfactory completion/operation/safety/statutory/maintenance of the works shall also be covered under the Scope of work and has to be completed by the Contractor with in specified schedule at no extra cost to Owner.

- Following activities are also in Contractor's Scope:
  a. Receive Customer's request and complaints logged on Client's portal / Offline.
  b. Carry out joint technical feasibility survey for requests received.
  c. Attend and resolve customer complaints.

  d. Maintain and update the request and complaint status in Client's portal.
  e. Maintain new connection tracking on Client's portal.
- Providing adequate manpower, minimum 2 nos. such as data entry operator, customer care executive etc. for data logging like new connection request & GI tracking, attending complaints, day to day interaction with customers and residents so that work can be executed within defined time period (TAT) Turn Around Time.

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- Providing adequate manpower for carrying out laying for PNG installation for emergency cases as and when required. The TAT period for carrying out such emergency cases are defined in tender document.

4.0 MATERIAL, MANPOWER, EQUIPMENT AND MACHINERY

- **Material to be supplied as a free issue material**

Service Regulators, Domestic Meters, Meter Regulators, Isolation and Appliance valves shall be supplied as a free issue material to the contractor. The contractor shall not use any other material from any other source of supply other than owner's supplied material without any written approval from EIC.

- **Material / Equipment & machinery to be supplied by contractor**

Contractor shall procure / purchase GI Pipe & fittings, Wrought Steel Fittings (Forged Fittings), Brass fittings, Cu pipe & fittings and Reinforced rubber hose with other material which is required for satisfactory completion / safety / statutory of the works as per tender at no extra cost to Owner. Client shall be marked on the material supplied by contractor. The contractor shall take approval from owner / owner representative for marking on the material to be procured by contractor before placement of order.

The Contractor shall provide labour, tools (such as Hammer Drill, Piston Drill, Pipe Cutters, Dies for threading, Pipe wrenches, spanners, conversion kits, solder torch, copper tube Cutters, tube benders, lacquering, thinner etc.) in specified numbers, all types of clamps, Plant and equipment necessary for the proper execution of the work. This will include but not limited to list of specialized tools and tackles indicated in Annexure # 1.

Special tools shall be required at site for carrying out drilling work in walls other than Brick or RCC (Ex. Granite, Marble, Wooden, Glass Cutting etc.)

The contractor has to ensure the availability of DG sets for continuous power supply. In case the power supply is availed at the site from societies, individual residents, contractor shall settle the claims raised by the electricity providers without any cost implication to OWNER. In case contractor doesn't settle the claims for using the electricity from societies/individual residents, on demand by the providers, OWNER will

settle the claims and the same will be deducted from the contractor's bills. The progress of work shall not hamper due to non-availability of power supply.
The contractor has to submit the valid calibration certificate for Pressure gauges.

Contractor shall submit the manufacturer test certificate / lab test certificate for all items procured by him for approval before commencing the execution.

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No hiring of equipments, tools and tackles by the contractors is allowed at the site. In case, any contractor is found not in possession of enlisted required tools and tackles, penalty will be levied as per SCC which shall be deducted from the running bill.

- **Plant and Equipment**

  All vehicular type machinery shall be in good working condition and shall not cause spillage of oil or grease. To avoid damage to paved surfaces, the contractor will provide pads of timber or thick rubber under the hydraulic feet or outriggers of machinery.

- **Sealant, Grout**

  The contractor shall be responsible to arrange the supply of any consumable sealant or ready mix grout material required for restoration of holes. The sealant/grout supplied by the contractor shall be compatible with the area to be restored / rectified. No separate payment for the supply of sealant and grout shall be made to the contractor.

- **Clamps, Rawal Plugs, Screws and Nozzles etc.**

  The Clamps, Brackets for meter, Nylon Rawal Plugs, SS/Brass Screws, Nozzles, etc. shall be approved lot wise by EIC prior to installation. Re-drilling of existing appliance (burners) nozzles is strictly not permitted. The quality of materials procured will be approved by Owner/Owner's representative or as directed by EIC.

  The indicative sketch of the Brackets for Meter, Regulator Boxes and GI/Copper Pipe Clamps is enclosed with the tender. No separate payment for the supply of Meter Brackets and GI/Copper clamps shall be made to the contractor.

- **Consumables Items**

  - Consumables such as Electrodes, Teflon Tapes, solder wire, flux, lacquer; thinner shall be supplied by the contractor and are included in installation rates.
  - These consumables shall be of reputed make companies and required grades/ class.

- **Other Materials**

  The contractor shall supply the following items wherever required:

  - All materials required for work, NPT threading, copper pipe jointing, testing etc.
  - All signs, barricades, lights and protective equipment.

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- All material required for working at height (i.e. scaffolding, Ladder, Safety Belts).
- Self-Locking Safety Harness Belts PETZL make as mentioned in safety procedure are mandatory.). Contractor shall provide but not limited to ascender, descended and pulley system essentially to carry out work at height.
- Motorized suspended platform with skilled operator shall be preferred for installation above 25th storey building.
- Special consumable such as grease for maintenance of domestic appliances, all paints for painting of GI Pipes, Regulator Boxes, Consumables such as Teflon Tapes, Solder-wire, Flux, Lacquer, Thinner, Petrol, Diesel, Fuels and Oils required are to be supplied by the contractor and are included within the rates.
- All minor items not expressly mentioned in the contract but which are necessary for the satisfactory completion and performance of the work under this contract.

- **Acquisition, Receipt and Storage of Materials**

The Contractor shall collect Service Regulators, Domestic Meter, Meter Regulators, Isolation and Appliance Valve estimated for maximum one month from Owner's designated stores in between the hours to be advised by the EIC.

The Contractor shall carry out assessment of material required for GI/Copper installation in allocated area. After approval from Owner, contractor shall place order for purchasing of GI Pipes & fittings, Wrought Steel Fittings (Forged Fittings), Copper pipes & fittings, Brass Fittings and Reinforced Rubber hose (Technical specifications attached in the tender document), MS/PVC clamps using SS304/brass screws, super hold nylon rawl plug anchor to any of the approved vendors as per the list attached in the tender document. The contractor shall also ensure that the ITP for these materials shall be approved before the start of production activity. Once ITP is approved, contractor shall forward inspection call to the Owner depending upon the material requirement at the site. The inspection of these materials shall be carried out by Owner appointed third party inspection agency. It is contractor's responsibility to submit documents, arranging dispatch clearance, handling, loading, transportation and unloading of these materials at their own respective stores. In case of any defective material found shall be returned to Client store within one month of issue.

Any other activity not mentioned / covered, explicitly, but otherwise required for satisfactory completion / operation / safety / statutory / maintenance of works shall also be covered under scope of work and has to be completed by contractor within

specified schedule at no extra cost to Owner. The Contractor shall carry free issue material in such a manner as to preclude damage during transportation and handling.

The Contractor shall physically examine all free issue materials at the time of acceptance of the material in Client' store.

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Any damage not so recorded will be deemed not to have existed at the time of acceptance of material in store by the Contractor and the cost of repair or replacement or rectification shall be borne by the Contractor.
All materials shall be stored in contractor's stores near site in such a manner so as to prevent any damage to the materials from scratching, gouging, indentation, excessive heat or by contact with any sharp objects or chemicals.

The Contractor shall be required to submit material reconciliation statement every month/ before issuing any free issue material from Clients tore duly certified by Client representative.

The Contractor shall maintain stock register at their respective stores stating issue and availability of free issue material at a given day. Further, it is mandatory that the contractor is required to undertake and submit inventory details of free issue and purchased materials on monthly basis to Owner/ Owner's representative as per the approved format of the owner. The inventory details shall be in correlation with the Daily progress chart and material reconciliation sheet.

Material reconciliation indicating issue of material, consumptions and defective material shall be submitted on monthly basis.

5.0 ISSUE OF WORK INSTRUCTIONS

- The contractor will be required to carry out GI installation as per instructions of EIC.

- All skilled personnel like welders, jointers, conversion technicians will be approved and certified by Owner/Owner's Representative. The technicians who will carry out welding of Risers, joining of copper material and conversions will undergo a test by Owner. Those who clear the test will be issued identity cards duly signed by Owner/Owner's representative. Approved technicians shall be only authorized to take up respective jobs. In case it is found that contractor personnel other than authorized are carrying out these works, applicable penalty will be levied to the contractor as per contract.

- The rates to be quoted by contractor shall be inclusive of all preparatory/bye works, platform materials, labour , supervision, tools, taxes, duties, levies, salaries, wages, overheads, profits, escalations, fluctuations in exchange rates and no change in the rates shall be admissible during tenancy of the contract.

- The schedule of items of GI/Cu installations have been described in brief and shall be

  held to be completed in all respect including safety requirements as per Technical specification of HSE, tests, inspection, QA/QC works, enabling and sundry works. The payment shall be made against completed and measured works only. No extra works

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whatsoever shall be considered in execution of these items.

6.0 PROGRESS OF WORK

The contractor shall proceed with the work under the contract with due expedition and without delay.

Contractor shall assess the material requirement of the allotted area and submit the schedule plan for execution & purchasing before start of actual work.

The EIC may direct in what order and at what time the various stages or parts of the work under the contract shall be performed. Daily and Weekly progress reports shall be submitted in the formats approved by Owner, indicating broadly the laying, testing, RFC, conversions and extra piping.

The penalty and incentives will be calculated and applied on basis of monthly target as per SCC of Tender.

7.0 WORK SHEETS

- The quantities of GI/Cu pipe and other details will be checked by Owner's site engineer and the same shall be incorporated in RFC cards, signed & dated as certified, on site. The cards will then be approved by the Owner/Owner's Representative.

- Measurement sheets shall be prepared based on the RFC cards and checked and certified by the site engineers for billing purpose.

- If measurement sheets submitted are illegible, incomplete or incorrectly booked, it will be returned to the contractor.

8.0 PERMISSIONS / APPROVALS

- Contractor shall be responsible for obtaining permissions from society management, RWA, individual residents and any other concerned authority, if required, for completion of the work. Contractor must take the prior appointment from the residents for carrying out the work.

- The Contractor shall work in close consultation/ co-ordination with the Owner/ Owner's Representative.

- The Contractor shall not sign/execute any agreement and/or undertaking on any such

  documents which amounts to be undertaken by Owner. The same shall only be signed and executed by Owner; however, the prospective bidders shall also liaison and

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coordinate for the same.

- The necessary coordination, liaison and arrangements for inspection and approval shall be the contractor's responsibility. Inspection and acceptance of the work by authority shall not relieve the contractor from any of these responsibilities under this contract. The contractor shall plan the execution of work in such a manner so that all the registered customers are attended in phased manner. However, it is the contractor's responsibility to fix a firm appointment with the consumer for carrying out the work.

A log book/job card for such appointments with Consumer/any other agencies shall be maintained and the schedule/appointment once taken shall be adhered to by the contractor. Owner/Owner's Representative shall review the records every week. The contractor shall submit the detailed list of RFC/Conversions and balance work on Registrations at least once a week as per approved format.

- The contractor is also required to obtain a "Labour License" and BOCW registration from the Assistant Labour Commissioner of respective Administration/Central Govt.

- It will be the contractor's responsibility to familiarise himself and comply with, any other local rules, regulations or statutory requirements applicable to the work.

- The contractor has to take responsibility of the actions of supervisors, plumbers and helpers provided by him.

9.0 REFERENCE SPECIFICATION, CODES AND STANDARDS

The contractor shall carry out the work in accordance with this specification, Owner's Engineering Standards: ASME B31.8 – Gas Transmission and Distribution Piping Systems; Oil Indian Safety Directorate Norms (OISD), the American Gas Association Document – Purging Principles and Practice and PNGRB Guidelines.

If the contractor find any discrepancy, ambiguity or conflict in between any of the Standards and the contract documents, then this should be promptly referred to the Engineer-in-Charge (EIC) for his decision, which shall be considered binding on the contractor.

10.0 RIGHT-OF-USE SURVEY AND MARKING

The route of the pipeline to be installed shall be decided with consent of the consumer and Owner/Owner's Representative. Contractor must ensure that the persons/workers/supervisors/ working at site shall have proper identity cards prior to entering the premises of the consumer.

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No temporary or permanent deposit of any kind of material resulting from the work shall be permitted in the approach or any other position, which might hinder the passage and / or natural water drainage, or any area where there is objection from consumer.

The contractor shall obtain necessary permissions from land Owners and tenants and shall be responsible for all damages caused by the construction and use of such approaches, pavements, gardens, rooms, walls, roof etc., at no extra cost to Owner.

Owner/Owner's Representative and the contractor will conduct a joint survey at each premises or housing colony to be supplied with gas. The survey record will note Customer details, the potential gas supply points and proposed meter positions and estimates of material quantities. The Contractor will make a sketch of the agreed pipe routes.

The Contractor will be responsible for contacting the Customer and making the necessary arrangements for access and appointments to carry out the work. Owner will not be responsible for any time lost due to failed appointments or disputes with Customer.

The Contractor shall confine its operations within limits of the Right in use. The contractor shall restore any damage to property.

The Contractor shall also carry out all necessary preparatory work if needed to permit the passage of men and equipment. Lights, Curbs, signs shall be provided wherever and/or required by the Owner necessary to protect the public.

11.0 PROTECTION OF STRUCTURES AND UTILITIES:

The contractor shall at his own cost, support and protect all buildings, walls, fences or other structures and all utilities and property which may, unless so protected, be damaged as a result of the execution of the works. He shall also comply with the requirements in the specification relating to protective measures applicable to particular operations or kind of work.
During painting, contractor must take care of the consumer premises while carrying out the job such as spillage on floor, walls, ceilings, such shades etc. If the same does occur, the contractor has to immediately make things to original.

12.0 GI AND COPPER ABOVE GROUND SERVICE PIPE

- **Definitions:**

a. High Rise Buildings – A building having fourteen or more storey's above ground level. (i.e. of G + 14 orientation)

b. Riser - A riser is the vertical section of a service pipe laid up a building which supplies a number of laterals.

c. Lateral-A lateral is a horizontal off-take from a riser, which supplies a single

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customer/dwelling.

d. Service Regulator (SR) – Service Regulator is a regulator installed on a gas service line to control the pressure from 4 bar to100 mbar that, in an emergency automatically assumes control of the pressure downstream of the station, in case that pressure exceeds a set maximum.

e. Meter Regulator (MR) – Meter regulator is a pressure regulator installed in series with another pressure regulator which reduces the pressure from 100 mbar to 21mbar.

f. Riser Isolation Valve (RIV) - Riser Isolation valve is fitted at the bottom of the riser to isolate the riser from the underground gas supply network.

g. Lateral Isolation Valve (LIV) – Lateral Isolation Valve is fitted on horizontal riser (lateral) after TEE to facilitate online Tapping's and other maintenance works.

h. Meter Control Valve (MCV) - A Meter Control Valve is fitted immediately upstream of the meter to enable the internal pipe work inside the property to be isolated from the upstream gas supply network. It must be fitted in a manner that the consumer can easily operate the valve handle.

- **Specification For Welding**

The requirements stated herein shall be followed for the fabrication of fillet type of welded joints of GI (IS 1239 heavy class) piping systems connected with pipe line and related facilities.
The welded pipe joints shall include the followings:

a. All line pipe joints of the Circumferential fillet welded type
b. Attachments of fitting and other supports pipes

Welding Consumables:

The Welding electrodes shall confirm to the class AWS E 6013. All electrodes shall be purchased in sealed containers stored properly to prevent deterioration. The electrodes shall be handled with care to avoid damage.

Welding Process:

Welding of GI material under this specification shall be carried out using Shielded Metal Arc Welding Process (SMAW).

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Welding

Root pass and final pass shall be done with 2.5 mm dia. Electrode. Welding to be carried out in line with PQR / WPS approved by Client/PMC .Welding to be done by qualified welders only.

- **Planning and Design of GI Welded Riser**

a. Risers and laterals must be designed to run through the optimal possible route approved by Client representatives, taking into consideration potential meter positions, design regulations and access for future maintenance.

b. The riser and associated laterals must be constructed in the most economical manner using the minimum no. of fittings, minimum pipe and considering future maintenance requirements.

c. For buildings above 14 floors - for ease in construction and maintenance the preferred method will be welded pipe –work laid in a purpose designed and built ventilated utilities shaft.

d. Risers and laterals must be laid a minimum of 300 mm from any electrical equipment or installations. On occasions where the pipe has to cross over a cable, this has to be done at right angles and a minimum gap of 25 mm must be maintained between the pipe and cable. Consideration may be given to wrapping the pipe with electrical insulation tape for protection against electrical short circuiting.

e. Provision for access to the riser for future maintenance must be made at the design stage & involved undertaking a risk assessment for undertaking future maintenance work.

f. The GI service pipe installation work includes all work necessary to connect from the PE/GI transition fitting on the down-stream of the PE service, to the Customers appliance, including the installation of service regulator, meter regulator, valves, fittings, meters, clamps etc. The contractor shall be required to provide all equipment, tools and materials necessary to execute the work in an efficient and effective manner. Along with ladders, scaffolding pipe, dies, tripods, vices, fittings and Teflon tape, drills for concrete and other masonry, drills for timber, Granite, Marble Stones and laminated surfaces inside Customers property, bending tools, clamps, sleeves to facilitate the pipe passing through floors and walls, paint for marking etc.

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g. All Welded GI risers at the outside of buildings shall be fully supported to carry the weight of piping. A flanged foot or similar device, capable of supporting the total

weight of the riser, shall support risers. The riser shall be installed in a vertical line from its point of support to its highest point with a minimum of changes in direction. The threading of GI pipe shall be NPT and conforming to ANSI B1 20.1

h. Contractor has to supply different types/sizes of approved powder coated clamps (Mild Steel) for fixing GI pipes suiting to the site conditions. The contractor shall get approval from Owner/Owner's Representative for every fresh lot of the clamps, brackets, regulator boxes and other consumables, prior to start of installation.

i. All riser and lateral pipe shall be clamped to the building at intervals not exceeding 1.5 mtrs. Maximum distance between clamps shall be 1.0 - 1.5 m when pipe goes to the straight, if any tee or fittings lies in between the pipe then clamp shall be placed 150 mm far away from center line of fittings at every sides. However, the same may be changed as per site conditions/as directed by EIC. Minimum gap between pipe & wall shall be 25 mm. The joints/ fittings of the GI installation shall be painted only after carrying out testing of the installation.

j. Where pipe passes through the balcony and the surface is slightly elevated around the service pipe or its surrounding, sleeves to be provided to prevent the accumulation of water at that point. Where a short piece of sleeve is used around the gas pipe, the sleeve should be embedded in the concrete with a mix of mortar and the void between the pipe and sleeve filled with a suitable sealant. The sealant should be beveled such as to prevent an accumulation of water. Supply of clamps for all sizes of the GI pipes is in contractor's scope. Contractor has to take prior approval for design/types of clamps, paintings etc.

k. Pipe shall preferably be entered into building above ground and remain in a ventilated location. The location for entry shall be such that it can be easily routed to the usage points by the shortest practicable route.

l. For welded riser, riser length (excluding lateral tapping) shall be considered and averaged out among all the households, whereas the lateral piping shall be included only for one particular connection. The payment shall be done through running meter rates as per SOR

m. The rates of GI Pipe and Copper pipe including installation of valves and fitting etc. from Lateral isolation valve till home appliances are payable as per SOR

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n. Installation of Meter and Meter Regulators with associated inlet and outlet connections/fittings shall be connected with meter and the payment shall be done as per SOR The rate also includes testing of joints till commissioning.

o. Installation of Service Regulator with support and supply and installation of regulator boxes having locking arrangement with base frame, including fabrication as per attached drawing no. VPC-STD-PP-2046, 2047, 2048, 2049, 2050. The paym -ent shall be done as per SOR.

p. Foundation works for service regulators includes providing and laying of Plain Cement Concrete (PCC– 1:2:4) as per attached drawing no. VPC-STD-PP-2046, 2047 the payment shall be done as per SOR

q. Except Service Regulator, Meter, Meter Regulator, Isolation and appliance valve, Contractor shall procure all other materials (i.e. Pipe, fittings, clamps, SS screws etc.) as per attached specification for installation and to the entire satisfaction of Owner/ Owner's Representative.

r. The contractor shall also ensure that gas supply shall not be provided to the customer in any Concealed Piping.

s. The Copper service pipe installation work includes all work necessary to connect downstream of the meter (inside the kitchen) to the Customers appliances. The contractor shall be required to provide all equipment, tools and materials necessary to execute the work in an efficient and effective manner. Along with these, he will be required to provide ladders, scaffolding pipe, drills for concrete and other masonry, special drills for timber, Granite, Marble Stones and laminated surfaces, provisions for cutting glass of window inside Customers property, bending tools, sleeves to facilitate the pipe passing through floors and walls, etc. Copper pipes & fittings shall be provided by Contractor.

t. During installation the Copper pipe is to be cut to proper length with tube Cutter, the burrs removed with a file, cleaning of outside surface of pipe & inside surface of fitting, applying flux to the tube and fitting around the outer/inner ends, inserting the tube in to the fitting, applying heat to the assembled joints using conventional blow torch to melt solder wire. Contractor shall submit the joining procedure of Cu pipe & Fitting for approval or as per the instructions of EIC.

u. Contractor has to supply different types/sizes of approved clamps (PE 80/PVC) for fixing Copper pipes suiting to the site conditions. Contractor has to take prior approval of EIC for quality of the clamps, solder, flux, lacquer, thinner etc. The

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approval shall be taken for every fresh lot of clamps from EIC before installation at site.

v. All copper piping shall be clamped to the walls at intervals not exceeding 500 mm. The solder wire shall be of reputed company of diameter size 3.25mm, Lead free as per BS 29453:1994 (Soft solder alloys) and supplied in coils. The detail

specification is attached in tender for reference. Solders for use with copper tube & fittings generally melt within the temperature range 180°C - 250°C. The contractor has to furnish the certificate of confirmation of standards before start of work.

- **Riser and Laterals Fabrication, Installation and Testing:-**

Heavy class Galvanized Iron (GI) pipes, conforming to IS 1239- Part 1 duly Polyester powder Coated with 70 microns thickness and Wrought Steel fittings(Forged fittings) conforming to IS-1239 Part 2 shall be used for welded riser.

Powder and Galvanized (Zinc) coating shall be removed by light duty grinder or by any other suitable tool at both ends of riser pipe at about 25mm in length where welding is to be performed.

Pipe and required fittings shall be first coupled with threaded (NPT) joints. The threaded joints to be made using male tapered thread and female parallel thread fittings. Teflon/ PTFE Tape or any other joining compound shall not be used in threaded joints for welded riser. Alternatively plain ended pipes and fitting can also be used for welding in welded riser.

The entire riser assembly shall be fabricated with socket welds both for threaded riser assembly and plain ended pipes. Threaded joints are permitted after first isolation valve on laterals where riser is not approachable from balcony and in case if riser is in approach of balcony within 300 mm gap from balcony laterals may be threaded with tee of welded riser on account of workability and future maintenance considerations.

The Welding electrodes shall confirm to the class AWS E 6013 of reputed make such as Advani, Lincoln, ESAB or equivalent.

Welding to be carried out in line with PQR / WPS approved by Client/PMC. Welding to be done by qualified welders approved by Client / PMC only.

A riser must not be constructed so that the laterals face directly into the wall from the riser. All laterals must extend a minimum of 400 mm from the riser.

Ventilation is provided to prevent gas leaks from causing the atmosphere to become unsafe. Ventilation shall be natural. It is not permitted to use mechanical ventilation to achieve the required ventilation levels. Special Safety Harness and Protective

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equipment's of PETZL make are mandatory for riser installation. Details would be as per approved Safety Job Procedure. Ensure that all equipment's and safety devices used are inspected, certified by competent authority valid & suitable for use. Plumber deployed for riser installation for high rise buildings shall be certified and prequalified with medical tests as per Safety Job Procedure.

- **Meter & Meter Regulator Positions**

  Meters will normally be located inside the property at approachable location. The kitchen / utility balcony is the preferred place to install the meter – thereby minimizing the length of the outlet pipe work.

  The Meter installation will be preferred in open/ventilated space so as to prevent Gas accumulation and easy dispensation of gas to atmosphere in case of any smell/leakage of gas. The Meter installations will not be provided in any fixed enclosures, cabinets (below or above the slab) or confined space in the customer premises.

  Meter Regulators will be installed as per enclosed drawing no.: VPC-STD-PP-2046, 2047

  Only pretested riser shall be erected using pulley. Pretesting shall be done with compressed air @ 2 bar (g) for minimum duration of 30 minutes.

  Risers and laterals up to Isolation Valves shall be Leak tested with compressed air @ 2 bar (g) for minimum 2 hrs after vertical installation.

  Once testing is satisfactorily completed, uncoated portion (weldment) of risers and laterals shall be painted as per painting procedure.

  For the laterals beyond eighth floor, shall be used in compliance to the material specification of SS316, fittings shall be used with brass connections conforming to IS 319, in order to account for the temperature induced stresses.

- **Installation of Meter**

  Installation of domestic meters with associated inlet and outlet connections (GI/Brass fittings), on the wall with approved powder coated meter brackets and angles in new & existing gas charged areas.

  The contractor shall supply approved powder coated meter brackets and angle brackets. A sketch of the brackets is referred from the enclosed drawing for reference. It is required that one sample of each type of bracket is approved before the work is started.

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Firmly secure the meters on the wall with good quality super hold nylon anchor Rawl Plugs, SS 304/brass screws etc. In case the Rawl Plugs are not holding then wooden blocks or other fixing arrangements like cement etc. to be used for proper grouting.

The Meter installation will be preferred in open/ventilated space so as to prevent Gas accumulation and easy dispensation of gas to atmosphere in case of any smell/leakage of gas. The Meter installations will not be provided in any fixed enclosures, cabinets (below or above the slab) or confined space in the customer premises.

The contractor shall ensure that GI installations and rubber hoses shall not be exposed to direct heat of Gas burners & chimney vents. The installation should have minimum clearance of about 1 meter from electric point mains & switches. Minimum distance between Appliance Valve & Gas Burners shall be 0.3 Meters. The isolation valves shall be installed after entering the customer premises/kitchen but before the meter installation.

The above activities along with restoration of the area to original shall be carried out to the complete satisfaction of consumer and EIC.

- **Laterals**

The lateral extending from the riser at right- angles must extend a minimum of 400 mm from the riser before passing through a wall.

- **Ventilation**

Ventilation is provided to prevent gas leaks from causing the atmosphere to become unsafe. Ventilation shall be natural. It is not permitted to use mechanical ventilation to achieve the required ventilation levels.

- **Pipes Passing Through Walls**

Where risers or laterals pass through walls the following requirements must be observed:

a. The pipe must be sleeved in a continuous non corrosive sleeve. Joints or any other part of a joint shall not be enclosed within the sleeve.

b. Pre-sleeved wall pieces are the preferred method for passing through walls and floors.

- **Painting of GI Pipes**

Contractor shall install powder coated GI pipes in consultation with EIC. Contractor

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shall submit detailed procedure of powder coating for approval to PMC prior to supply of GI pipes.

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13.0 TESTING OF GI/ COPPER INSTALLATION

- Only pretested riser shall be erected using pulley arrangement. Pretesting shall be done with compressed air at 2 bar (g) for minimum duration of 30minutes.
- Risers and laterals shall be Leak tested with compressed air at 2bar (g) for minimum 2hrs after vertical installation.
- Once testing is satisfactorily completed, uncoated portion (welded) of risers and laterals shall be painted as per painting procedure.
- The GI/Copper installation from lateral valve to appliance valve shall be tested at a pressure of 200 mbar (g) for a holding period of 30 minutes with no pressure drop. All the joints in the installation shall be checked with soap solution.
- The contractor shall supply the Calibrated Pressure Gauges / Manometer / Diaphragm Gauges of suitable range for testing of GI/Copper Installations ranging from 0-4bars / 0-500mbar respectively. The calibration certificate shall be submitted before the start of the execution work.
- The pressure gauges shall be calibrated from time-to-time as desired by EIC but positively once in every six months.
- The details of testing shall be properly recorded in the GI/Copper cards.

14.0 INSPECTION

The contractor to the entire satisfaction of EIC before proceeding further shall rectify any defect noticed during the various stages of inspection. Irrespective of the inspection, repair and approval at intermediate stages of work, contractor shall be responsible for making good any defects found during final inspection/guarantee period/defect liability period as defined in general condition of contract.

15.0 PURGING & COMMISSIONING

The rate for purging & commissioning shall be included in the GI/Cu installations.

Care shall be taken to ensure that the outlet is so located that vent gas cannot drift into buildings. The commissioning of the GI installation should be performed as follows:

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- Ensure the method of purging is such that no pockets of air are left in any part of the Customer's piping.
- Ensure that all appliance connections are gas tight, all appliance gas valves are turned off and there are no open ends.
- Where possible, select an appliance with an open burner at which to commence the purge i.e., a hotplate burner.
- Ensure the area is well ventilated and free from ignition sources.
- Ensure branches that do not have an appliance connected are fitted with a plug or cap.

- Turn on one burner control valve until the presence of gas is detected. A change in the audible tone and smell is a good indication that gas is at the burner. Let the gas flow for a few seconds longer, then turn off and allow sufficient time for any accumulated gas to disperse.
- Turn on one gas control valve again and keep a continuous flame at the burner until the gas is a light and the flame is stable.
- Continue to purge until gas is available at other appliances.

16.0 CONVERSION OF DOMESTIC APPLIANCES

The work in this section includes:

- The changing of nozzles and associated controls in accordance with manufactures instructions for both domestic and imported burners/ovens/grills/hotplate.
- The changing and handing over old appliance connection Reinforced rubber hoses and nozzles to Customers and re-greasing taps as necessary.
- The contractor shall supply the Reinforced rubber hoses at the time of conversions.
- The contractor has to supply all types of nozzles/jets required for all types of appliances including imported burners, Grills, Ovens.
- Cleaning and performing minor maintenance of appliances.
- Testing for gas escapes, soundness and performance of appliances.
- Instructing the Customer for safe use of natural gas and for fixing of safety and conversion labels.
- Contractor must attend the complaints regarding appliances, leakage, fire etc. till the

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total area is handed over to Owner's operation and maintenance.

- All consumables (Nozzles, greases etc.) are in contractor's scope.
- Changing or repairing of any items damaged during conversion are in Contractor's scope.
- In case at the time of RFC if the customer is not getting the NG conversion done then the contractor shall obtain written consent about the same from customer and submit the same to Client.

17.0 RESTORATION

Contractor has to restore the area wherever he has carried out drilling, clamping etc. to its original condition to the satisfaction of the consumer and to ensure no passage to the

premises and seepage. If the work was carried out in Govt. Flats (CPWD/ Municipal Corporation of State/ Institutional areas), contractor has to restore the area according to CPWD specifications and obtain a NOC/ Clearance certificate from the concerned authorities/RWA maintaining the flats, after completion of the work.

The restored slabs or brickwork should match the surrounding surface levels. Joint widths should match the existing conditions and be filled with a dry or wet mix of mortar.

Wherever any items of the consumer is damaged/ broken during working, the same will be made good or replace to the total satisfaction of the consumer.

The contractor will be responsible for the maintenance of all restoration carried out, for the duration of the contract guarantee period.

The contractor is to ensure the restoration work is properly supervised, and that the material used is suitable for the purpose. Wherever the required standards are not achieved the contractor will be required to replace the defective reinstatement work.

Note that Payment for GI/Copper installation will be released only after satisfactory restoration and clearing of the sites of all surplus materials etc.

18.0 SUBMISSION OF FINAL RECORDS

Contractor shall submit three sets each of the following documents in hard & soft copy:

- Total list of houses in the area allotted to him giving details of connections provided & reasons where connection could not be given /completed.
- The details recorded in RFC cards of every domestic house.
- Details of houses where piping done along with materials used.

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- Total material consumption report.
- Material reconciliation with respect to the materials issued.
- Test reports & calibration certificates of gauges etc.
- Any other documents/records required.
- Extra Piping details

19.0 Compliance to Health, Safety & Environment (HSE) High Rise:

Scope includes use of fall arrestor, Ascenders / descended, PPE, Barricades/ Warning Boards (03 No's) connected with warning board/Caution tapes (Refer drawing no. VPC-STD-PP-2009, 2015) in areas where piping work is in progress, Use of Safety shoes, Wacky talky, Hand gloves, Reflective jackets, Hard hats (helmets), eye and ear safety equipment, Fire extinguishers and as per the detailed scope of work in tender specifications. Contractor shall also prepare and submit duly certified Safety

check list signed by TPIA/PMC. In case of non-compliance, penalty shall be applicable as per SCC clause.

This set-up is applicable for more than 5^{th} (G+5) and above including high rise. Above 4th floor full body safety harness & accessories of PETZL make is compulsory.

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20.0 ANNEXURE # 1

TOOLS & EQUIPMENT TO BE PROVIDED BY CONTRACTOR FOR GI/COPPER WORK

S.N0.	HAND TOOLS DESCRIPTION	PER TECHNICIAN	PER TEAM
1	Pipe wrench 250 mm	1	4
2	Pipe wrench 350 mm	1	4
3	Pipe wrench 450 mm	-	2
4	Adjustable spanner 50 mm	-	4
5	Adjustable spanner 150 mm	1	2
6	Adjustable spanner 250 mm	1	2
7	Set of combination spanner 3/16”-11/4” AF	1	1
8	Set of combination spanners 5mm - 30mm	1	1
9	Large tool boxes	1	2
10	Set flat-headed screw drivers	1	2
11	Set Philips screw drivers	1	2
12	Small hammer	1	2
13	Combination pliers/mole grips	1	2
14	Set of files	1	2
15	Drill bits for 1” pipe	-	2
16	Stocks and dies for NPT threading ½”, ¾”, GI Pipe	-	3
17	Blowtorch	-	1
18	Soldering iron	-	2
19	Copper Pipe Bending Machine	-	2
20	Hand drill 3/8” chuck	-	2
21	Portable electric drill 240V, heavy duty	-	2
22	Spare blades	4	4
23	Battery powered torches	2	2
24	Measuring tape 30 m	1	2
25	Wire brush	1	2
26	Portable pipe vice & tripod	-	2
27	Set steel twist drills 0.5-2.0 mm (for appliance conversion)	-	1
28	Set steel twist drills 1mm-10mm	-	2
29	Set masonry drills 1mm-10mm	1	2
30	Graphite based grease	As required	As required

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31	Lubricating oil	As required	As required
32	Hand cleaner	As required	As required
33	Copper pipe Cutter 12mm	-	4
34	GI Pipe Cutters ½" Gas Detection Equipment Power Generator 2.5 KVA Pressure Gauge (0-10 bar) Pressure Gauge (0-4 bar) Diaphragm Gauge (0-400 m bar) Manometer (0-150 m bar)	- As required 1 2 2 1 1	2 - - 4 8 2 1
35	Automatic Thread cutting machine	-	2
36	GI Pipe Cutter	-	2
37	Welding Equipment	01 set per site	01 set per site
38	Full Body Safety Harness like PETZL or Equivalent	03 set per site	03 set per site
39	Motorized Suspended Platform	As required	As required

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ENERGISING QUALITY

VCS PROJECT CONSULTANTS PVT.LTD.

STANDARD SPECIFICATION ELECTRO FUSION FOR PE PIPES & FITTINGS

VPC – SS – PE - 0002

REV.	DATE	Purpose	Prepared By	Checked By	Approved By
00	19.06.18	ISSUED AS STANDARD	BS	MVK	AD

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CONTENTS

1.0 ELECTRO FUSION FOR PE PIPE 3
1.1 ELECTRO FUSION FITTING JOINTING 3
1.2 ELECTRO FUSION JOINTING METHOD / PROCEDURE 4
1.3 RECORDS 5
1.4 TRAINING 5
1.5 ELECTRO FUSION SADDLE JOINTING 6
1.6 ELECTRO FUSION SADDLE JOINTING METHOD/ PROCEDURE 6
1.7 RECORDS 8
1.8 TRAINING 8
1.9 STOPPING THE GAS FLOW 8
1.10 SQUEEZE-OFF 8
1.11 BENDING-BACK 9

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1.0 ELECTRO FUSION FOR PE PIPE

1.1 ELECTRO FUSION FITTING JOINTING

1.1.1 For electro fusion fitting jointing, an electrical resistance element is incorporated in the socket of the fitting which, when connected to an appropriate power supply, melts and fuses the materials of the pipe and fitting together.

1.1.2 The effectiveness of this technique depends on attention to the preparation of the jointing surfaces, in particular the removal of the oxidized surface of the pipe over the socket depth and ensuring the jointing surfaces area clean. Also, the pipe should be checked for ovality. If ovality causes a gap between concentrically located pipe and the fitting to exceed l% of the pipe OD, the pipe must be re-rounded to ensure correct welding. If the gap still exceeds 1% of the pipe OD after re-rounding then a check should be made of the pipe OD dimensions to determine if it meets specification.

Max gap 1% of pipe OD



Concentrically Located

Max gap 2% of pipe OD



Eccentrically Located

1.1.3 The maximum gap between eccentrically located pipe and fitting i.e. Pipe touching fitting at one point, must not exceed 2% of the pipe OD.

1.1.4 Sometimes coiled pipes may be too oval to fit into couplers, or the end of the pipe may make the alignment of the ends impossible. In such circumstances the use of a mechanical pipe straightener or rounding tool is necessary.

1.1.5 The equipment and procedures following relate to fittings with center stops. If fittings without center stops are used, the maximum insertion depth must be clearly marked on the pipe ends prior to joining (felt tip pen).

Equipment

- The control box input supply to be from a nominal 240V generator, which is normally of approximately 5kVA capacity. The nominal output of the generator is to be 240V +15%, I 0% between no load and full load. Control boxes are to include safety devices to prevent excessive voltages being present at the control box output. The safety device shall operate in less than 0.5s.

Note that extension leads are not to be used on the control box outlet connections.

WARNING: Control boxes are not intrinsically safe and must therefore not be taken into the trench.

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- A mechanical pipe surface preparation tool is to be used before fusion is attempted. The tool is to be capable of removing the oxidized surface of the pipe in excess of the insertion depth. The tool is to remove a layer of surface material0.20.4 mm thick from the outer surface of the pipe preferably in a continuous strip of swarf over that length and round of the pipe.

- Pipe clamps for restraining, aligning and re-rounding the pipes in the fusion process are to be used.

- Pipe cutters with saw and saw guide.

- Protection against adverse weather conditions.

1.2 ELECTRO FUSION JOINTING METHOD / PROCEDURE

Preparation

- Ensure there is sufficient space to permit access to the jointing area. In a trench, a minimum clearance of 150 mm is required.

- Check that the pipe ends to be jointed are cut square to the axis of the pipe and any burrs removed.

- Wipe pipe ends using clean lint-free material to remove traces of dirt or mud, etc...

- Mark the area over which the oxidized pipe surface is to be removed, i.e. In excess of the insertion depth, on each pipe to be joined by placing the socket of the bagged fitting alongside the pipe end. Trace a line round the circumference at the appropriate distance from the end of the pipe using a felt tip pen or similar.

Note that the fitting should not to be removed from the packaging at this stage.

- Connect the electro fusion control box input leads to the generator.
- Check that the reset stop button, if fitted on the control box, is in the correct mode.
- Using the pipe end preparation tool, remove the entire surface of the pipe uniformly, preferably in continuous swarf over the area identified, i.e. In excess of the insertion depth.
- A mechanical scraper could be used however; there is a considerable risk that the end preparation will not be adequate with the use of such a tool.

Note that the prepared pipe surface should not be touched by hand.

- Remove the fitting from its packing and clean the scraped area of the pipe surface and the bore of the fitting with a disposable wipe impregnated with Iso-propanol *I* Acetone. Ensure the prepared surfaces are completely dry before proceeding.

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Note that while Iso-propanol is a suitable cleaner, its use is subject to local Health and Safety Regulations.

- Check that the pipe clamps are of the correct size for the pipes to be jointed.
- Insert the pipe ends into the fitting so that they are in contact with the center stop.
- Using the pipe clamps, secure the pipes so that they cannot move during the fusion cycle. Check that the pipe ends and the fitting are correctly aligned.
- Check that there is sufficient fuel for the generator to finish the joint. Start the generator and check that it is functioning correctly.
- Switch on the control box.
- Connect the control box output leads to the fitting terminals and check that they have been fully inserted.

If required by the control box enter the fusion jointing time into the control box timer. The jointing time is indicated on the fitting. Check the correct time is shown on the control box display.

Note 1: Automatic control boxes are available which obviate the need to enter the fusion time.

Note 2: Gloves and goggles should be worn during the Fusion process.

- Press the start button on the control box and check that the heating cycle is proceeding as indicated on the display.
- On completion of the heating cycle, the melt indicators should have risen. If there is no apparent move in the melt indicators, the joint should be cut out and a fresh joint made (See note 3below).
- If a satisfactory joint has been made, the joint is to be left in the clamps for the cooling time specified on the fitting or the automatic control box.

Note 3: If the fusion cycle terminates before completion of the countdown, check for faults as indicated by the control box warning lights and check that there is adequate fuel in the generator. DO NOT attempt a second fusion cycle within one hour *I* cooling of joint at Ambient Temperature of the first attempt.

1.3 RECORDS

Records of appropriate servicing and calibration shall be kept.

1.4 TRAINING

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It is necessary that operators, inspection and supervisory personnel acquire the skills of electro fusion fitting fusion. The necessary training should be carried out by a qualified instructor with the objective of enabling participants to;

- Understand the principles of electro fusion fitting jointing.
- Identify pipe and appropriate fitting markings.
- Carry out pre-jointing machine and equipment checks.
- Make satisfactory electro fusion fitting joints from pipes and fittings of different sizes.
- Inspect for and identify joints of acceptable quality.

Note that some form of assessment and certification should be associated with the training. The certificate should detail the pipe and fitting size range. And the equipment used. A register of successful participants should be kept.

1.5 ELECTRO FUSION SADDLE JOINTING

- With electro fusion saddle jointing, an electrical resistance element is incorporated in the base of the saddle which, when connected to the appropriate power supply, melts and fuses the material of the fitting and the pipe together.
- The success of the technique depends on effective preparation of the jointing surfaces, in particular the removal of the oxidized surface of the pipe over the area equivalent to the area of the saddle base, and cleaning of the pipe surfaces.
- Methods of holding the tapping tee saddle during the fusion cycle are used namely, top loading and under clamping. The general parameters are similar. In some cases, if the manufacturer's procedure for holding the fitting is provided, then the same should be followed during the fusion cycle.

1.6 ELECTRO FUSION SADDLE JOINTING METHOD/ PROCEDURE

- Expose the pipe onto which the tapping tee is to be assembled, ensuring there is sufficient clear space around the pipe. In a trench, a minimum clearance of 150 mm is required.
- Clean the pipe over the general area on which the saddle is to be assembled using clean, disposable lint-free material.
- Without removing the fitting from its packaging, place it over the required position on the main. Mark the pipe surface all around and clear of the saddle base area using a felt tip pen or similar.
- Remove the surface of the pipe to a depth of 0.2 to 0.4 mm over the full area marked using a suitable tool. Remove the swarf.

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- Connect the electro fusion control box input leads to the generator.

Check that the reset stop button, if fitted on the control box, is in the correct mode.

- Remove the two halves of fitting from its packing and clean the scraped area of the pipe surface and the bore of the fitting with a disposable wipe impregnated with Iso-propanol / Acetone. Ensure the prepared surfaces are completely dry before proceeding.

Note again that while Iso-propanol is a suitable cleaner, its use is subject to local Health and Safety Regulations.

- Position the fitting base onto the prepared pipe surface, and bring the lower saddle into position then gradually and evenly tighten the nuts until the upper saddle makes firm contact with the scraped pipe.

- Check that there is sufficient fuel for the generator to complete the joint. Start the generator and check that it is functioning correctly.

- Switch on the control box if applicable.

- Connect the control box output leads to the fitting terminals and check that they have been fully inserted.

- If required by the control box, enter the fusion jointing time into the control box timer. The jointing time is indicated on the fitting. Check the correct time is shown on the control box display.

Note 1: Automatic control boxes are available which obviate the need to enter the fusion time.
Note 2: Gloves and goggles should be worn during the jointing process.

- Press the start button on the control box and check that the heating cycle is proceeding as indicated on the display.

- On completion of the heating cycle, the melt indicators, where incorporated should have risen. If there is no apparent move in the melt indicators, a new saddle joint should be made. Cut the tee of the faulty joint from its base.

- If a satisfactory joint has been made, the joint is to be left in the clamps for the cooling time specified on the fitting label or by the automatic control box.

Note 3: If the fusion cycle terminates before completion of the countdown, check for faults as indicated by the control box warning lights and check that there is adequate fuel in the generator. DO NOT attempt a second fusion cycle within one hour of the first

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attempt.

Note 4: The connection of the service pipe to the fitting outlet should be carried out in accordance with the procedure of the appropriate section of this Item.

Note 5: DO NOT attempt to tap the main with the integral cutter for at least I0 minutes after completion of the cooling cycle.

1.7 RECORDS

Records of appropriate servicing and calibration of Electro Fusion machines/ joints shall be kept.

1.8 TRAINING

AS PER 1.6
Note that some form of assessment and certification should be associated with the training. The certificate should detail the pipe and fitting size range and the equipment used. A register of successful participants should be kept.

1.9 STOPPING THE GAS FLOW

In the operation of a distribution system there is a periodic need to stop the gas flow for either routine or emergency maintenance. The flow may be stopped through the use of installed fittings such as valves. Where installed fittings are not available or the use of such would cause significant supply disruption, then one of the following methods may be employed.

1.10 SQUEEZE-OFF

- To control the gas flow a special tool may be used to squeeze the pipe walls together. Hydraulic jacks are used to supply the necessary force to compress the pipe walls for sizes 90 mm and above.

- It will be seen the squeeze-off equipment comprises two bars to apply pressure to the outside of the pipe. The bars are brought together, either manually or hydraulically, squeezing the pipe material together until a seal is formed where the upper and lower walls meet.

- The hydraulic machines should have a spring return for the jack and locking to prevent accidental release of pressure during operation. All squeeze-off machines should be fitted with check plate or stops to avoid over compression of the pipe.

- Where the pipe walls are compressed the polyethylene pipe will be severely deformed in the regions of maximum compression. The pipe will eventually regain its original shall after squeezing but there will be some reduction in the pressure bearing properties.

- A complete stop may not always be obtainable because of wrinkling of the inside of

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the pipe. If a complete stop is required then a second squeeze can be used, with an intermediate vent to remove the gas which passes the first squeeze from say the trench area. A second squeeze-off procedure should be a minimum of three pipe diameters and right angles to the initial squeeze.

- While not essential it would be good practice to fit a reinforcing stainless steel band do not squeeze again adhesive tape around the pipe upon the completion of a squeezing operation.

1.11 BENDING-BACK

Bending back of the pipe may be performed where the pipe has been severed damaged and stopping the gas flow is imperative. Its application is of a temporary nature, and will provide relief until a permanent repair can be affected. The section of pipe, which has been bent back, will have to be replaced because of the damage caused by the severe ness of the bend back operation. The need for any bend back operation is most likely to occur as a consequence of damage caused to a PE service pipe.

While it is not the prime function of a saddle tee, controlling the flow in a service may be achieved by opening up on an installed saddle tee and winding down the internal tapping tool to shut off the flow into the service pipe.

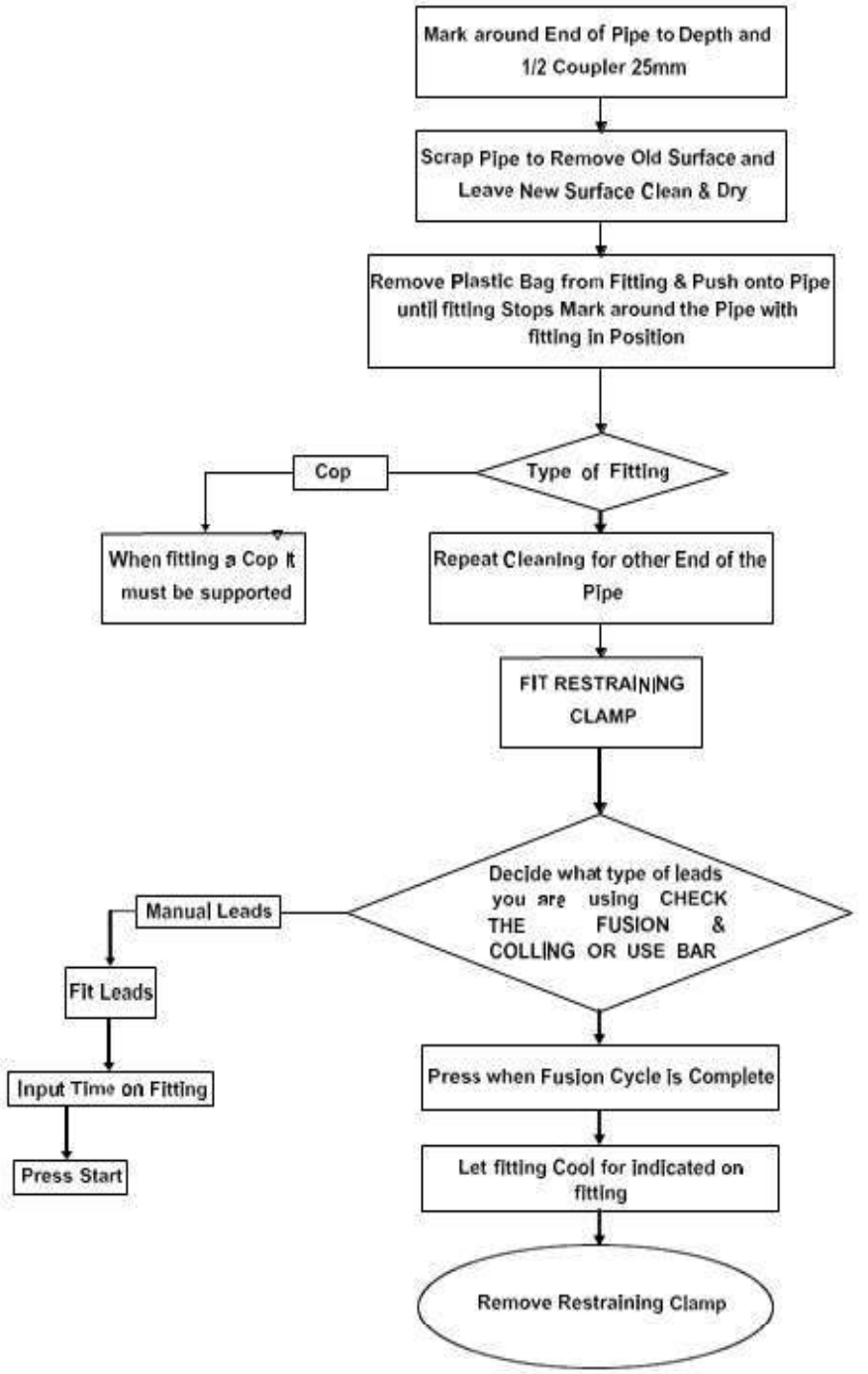
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PTS- ELECTRO FUSION
FOR PE PIPES & FITTINGS

ANNEXURE # 1

FUSION COUPLERS FORM 20MM TO 180MM



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ENERGISING QUALITY

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STANDARD SPECIFICATION - GI PIPES

VPC – SS – PE - 0005

REV. No	DATE	Purpose	Prepared By	Checked By	Approved By
00	20.06.18	ISSUED AS STANDARD	BS	MVK	AD

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CONTENTS

1.0 INTRODUCTION AND SCOPE 3
2.0 DEFINITIONS 3
3.0 MATERIAL 3
4.0 DIMENSIONS, THICKNESS & DIMENSIONALTOLERANCES 3
5.0 END CONNECTION OF PIPE 3
6.0 FREEDOM FROM DEFECTS 4
7.0 GALVANIZING 4
9.0 MARKING 5
10.0 INSPECTION / DOCUMENTS 5
11.0 PACKAGING 6

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1.0 INTRODUCTION AND SCOPE

CLIENT/ OWNER plans to augment PNG network. It supplies natural gas to domestic & commercial consumers in the GA.

This present document covers the technical specification for the procurement of GI Pipes used in high pressure natural gas transportation and distribution systems. It describes the general requirements, controls, tests, QA/QC examination and final acceptance criteria which need to be fulfilled.

This specification covers the requirements for GI pipes of heavy steel tube. Unless modified by this specification, requirements of IS 1239 (Part-I): 2004 (Latest edition) shall be valid.

2.0 DEFINITIONS

Owner	
Manufacturer	Means the Manufacturer of the GI pipe.
SS	Means the present <<Standard Specification>> and all its appendix, if any.
Third Party Inspection Agency	Means the Inspection Agency to be appointed by CLIENT.
GTS	Means the present <<General Technical Specification>> and its entire appendix, if any.

3.0 MATERIAL

The material used for the manufacturing of GI pipes confirming to IS 1239 (Part -1): 2004 (Latest edition).

4.0 DIMENSIONS, THICKNESS & DIMENSIONALTOLERANCES

The dimensions & nominal mass of tubes shall be in accordance with Table 5 subject to the tolerances permitted in CL.8.1 & 9 of IS 1239 (Part-I) : 2004 (Latest edition). Length of each pipe shall be 6 mtrs with + 6, - 0 mm tolerance. However, pipe length shall be considered 6 m. only for measurement / payment purpose.

Nominal Diameter DN	15 mm	20 mm
Grade	Heavy	Heavy
Outer Dia. (Max. / Min.)	21.8 mm / 21.0 mm	27.3 mm / 26.5 mm
Thickness (mm)	3.2	3.2
Nominal weight (Kg / m)	1.44	1.87

5.0 END CONNECTION OF PIPE

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GI Pipes shall be supplied with plain end.

6.0 FREEDOM FROM DEFECTS

On visual examination the outside & inside surfaces of pipes shall be smooth & free from defects such as cracks etc.

7.0 GALVANIZING

- Pipes shall be galvanized to meet the requirement of IS: 4736 – 1986 with latest amendment.
- Zinc conforming to any grade specified in IS: 13229- 1991 with latest amendment shall be used for the purpose of galvanizing.
- Galvanizing bath: The molten metal in the galvanizing bath shall contain not less than 98.5% by mass of zinc.
- Mass of zinc coating: Minimum mass of zinc coating determined as per IS: 6745 shall be 360gms/m^2.
- Uniformity of galvanized coating: The galvanized coating when determined on a 100 mm long test piece in accordance with IS 2633: 1986 with latest amendment shall withstand 5 one – minute dips.
- Freedom from defect: The zinc coating on internal & external surfaces shall be uniform adhered, reasonably smooth & free from such imperfections as flux, ash & drop inclusions, bare patches, black spots, pimples, lumpiness runs, rust stains, bulky white deposits & blisters. Rejection & acceptance for these defects shall be as per Appendix - A of IS 2629: 1985 with latest amendments.
- **Samplings**

  a) All materials of the same type in coating bath having uniform coating characteristics shall be grouped together to continue a lot. Each lot shall be tested separately for the various requirements of the specification. The number of units to be selected from each lot for this purpose shall be IS: 4711 1995 with latest amendment.

  b) The sample selected according to Clause 6.1 & 6.2 of IS: 4736 – latest edition.

  c) The sample found conforming to above requirements shall then be tested for mass of zinc coating in accordance with Clause 5.1 of IS: 4736 – 1986 with latest amendment.

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d) Criteria for conformity: As per IS: 4736 – 1986 with latest amendments.

8.0 PRESSURE TEST

Hydrostatic pressure test shall be carried out at a pressure of 5 Mpa for the duration of at least 3 second and shall not show any leakage in the pipe. Vendor to submit the internal pressure test certificate for the same. Owner Representative or Third party Inspection Agency appointed by Owner shall witness finish goods testing as per the sample procedure specified in IS: 1239 (Part-1) – latest edition.

9.0 MARKING

Each pipe shall be embossed with CLIENT's logo, manufacturer's name or trademark, size designation, class of pipe at the interval of not more than 1 meters.

Each packing containing pipes shall carry the following embossed, stamped or written by indelible ink.

- Manufacturers name or trademark.
- Class of pipe –Heavy.
- Indian standard mark (ISI).
- Lot number / Batch no. of production.

Each pipe conforming to this standard shall also be marked with BIS standard mark.

10.0 INSPECTION / DOCUMENTS

Inspection shall be carried out as per Owner Technical Specification.

Owner Representative or Third Party Inspection Agency appointed by Owner shall carry out stage wise inspection during manufacturing / final inspection.

The manufacturer shall have a valid license to use ISI monogram for manufacturing of pipe in accordance with the requirement of IS: 1239.

Vendor shall furnish all the material test certificates, proof of approval / license from specified authority as per specified standard, if relevant, internal test / inspection reports as per Owner Tech. Spec. & specified code for 100% material, at the time of final inspection of each supply lot of material.

For any control, test or examination required under the supervision of TPIA/Owner/Owner's representative, latter shall be informed in writing one (1) week in advance by vendor about inspection date and place along with production schedule.

Even after third party inspection, Owner reserves the right to select a sample of pipes randomly from each manufacturing batch & have these independently tested. Should the

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results of these tests fall outside the limits specified in Owner technical specification, then Owner reserves the right to reject all production supplied from the batch.

11.0 PACKAGING

Packing size to be mentioned to ensure uniformity in delivery conditions of the material being procured. Bidder shall submit the packaging details during QAP and also complied with at the time of delivery.

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ENERGISING QUALITY

VCS PROJECT CONSULTANTS PVT. LTD.

STANDARD SPECIFICATION -GI FITTINGS

VPC-SS-PE-0006

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CONTENTS

1.0 SCOPE 3
2.0 DEFINATIONS 3
3.0 MATERIAL 3
4.0 DIMENSIONS THICKNESS & DIMENSIONAL TOLERANCES 3
5.0 WEIGHT 3
6.0 THREADS 3
7.0 FREEDOM FROM DEFECTS 4
8.0 GALVANIZING 4
9.0 PRESSURE TEST 4
10.0 COMPRESSION TEST 5
11.0 SAMPLING 5
12.0 MARKING 5
13.0 PACKAGING 5
14.0 INSPECTION / DOCUMENTS 5

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1.0 SCOPE

CLIENT/OWNER plans to augment PNG network. It supplies natural gas to domestic & commercial consumers in the GA.

This present document covers the technical specification for the procurement of GI fittings used in high pressure natural gas transportation and distribution systems. It describes the general requirements, controls, tests, QA/ QC examination and final acceptance criteria which need to be fulfilled.

This specification covers the requirements for Malleable Cast Iron Fittings unless modified by this specification, requirements of IS 1879 – latest edition shall be valid.

2.0 DEFINATIONS

Owner	
Manufacturer	Means the Manufacturer of the GI fittings.
SS	Means the present <<Standard Specification>>and its appendix, if any.
Third Party Inspection Agency	Means the Inspection Agency to be appointed by CLIENT.

3.0 MATERIAL

The material used for the manufacturing of GI fittings shall conform to ISI 14329 – 1995 with latest amendments Grade BM 300.

4.0 DIMENSIONS THICKNESS & DIMENSIONAL TOLERANCES

- Dimensions of various types of fittings shall be as specified in sections 2 to 10 of IS 1879 – 1987 with latest amendments, as applicable.
- Wall thickness of fittings and tolerances on them shall be as given in Table 1.2 of S 1879 – 1987 with latest amendments,
- In case of reducing fittings, the dimensions at each outlet shall be those appropriate to the nominal size of the outlet.
- Elbows, Tees, Sockets and caps shall be of reinforced type.

5.0 WEIGHT

Weights of various types of fittings shall be as specified in sections 2 to 10 of S 1879 – 1987 with latest amendments, as applicable.

6.0 THREADS

- Threads shall be NPT type and conforming to ASME B1.20.1.
- Outlets of fittings shall be threaded to dimensions & the tolerances as specified in ASME B1.20.1.
- All internal & external threads shall be tapered.

- For checking conformity of threads gauging practice in accordance with ASME B1.20.1 shall be followed.

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- Chamfering: The outlet of fittings shall have chamfer.

7.0 FREEDOM FROM DEFECTS

On visual examination, the outside & inside surfaces of fittings shall be smooth & free from any defects such as cracks, injurious flaws, fine sand depth etc.

8.0 GALVANIZING

- Fittings shall be galvanized to meet the requirement of IS: 4759–1996with latest amendments.

- Zinc conforming to any grade specified in IS: 13229-1991 with latest amendments shall be used for the purpose of galvanizing.

- Galvanizing bath: The molten metal in the galvanizing bath shall contain not less than 98.5% by mass of zinc.

- Coating requirements: Mass of coating shall be 610 - 700gms/m2.

- Freedom from defect: The zinc coating shall be uniform adhered, reasonably smooth & free from such imperfections as flux, ash bare patches, black spots, pimples, lumpiness runs, rust stains, bulky white deposits &blisters.

- Samplings

    a. All materials of the same type in coating bath having uniform coating characteristics shall be grouped together to continue a lot. Each lot shall be tested separately for the various requirements of the specification. The number of units to be selected from each lot for this purpose shall be given in Table 2 of IS 4759 – latest edition.

    b. The sample selected according to Column 1 & 2 of Table 2, IS: 4759 – latest edition shall be tested for visual requirements as per Clause 6.2 of IS:4759 – latest edition

    c. The sample found conforming to above requirements shall then be tested for mass of zinc coating in accordance with Clause 9.2 of IS: 4759 – latest edition.

    d. Criteria for conformity: As per Clause 8.3 of IS: 4759-latestedition.

    e. Test procedure shall be as per Clause 9 of IS: 4759-latestedition.

9.0 PRESSURE TEST

Vendor shall carry out pneumatic pressure test as per Clause 11.1b of 1879 – 1987 with latest amendments on each &every fittings. Vendor to submit the Internal Quality control certificate for the same. Owner shall witness pneumatic testing as per the sampling procedure specified in 1879 – 1987 with latest amendments.

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10.0 COMPRESSION TEST

This test shall be conducted to judge the malleability of the pipe fittings & shall be carried out as per Clause 12 of 1879 – 1987 with latest amendments.

11.0 SAMPLING

Owner Representative of Third Party Inspection Agency appointed by Owner shall witness the tests as per clause 14 of 1879 – 1987 with latest amendments. However, vendor to perform 100% inspection of visual, dimensional & pressure test. Vendor shall furnish Internal test certificates at the time of final inspection to the Owner.

12.0 MARKING

Each fitting shall be embossed with CLIENT's logo, manufacturer's name or trademark and the size designation.

Each packing containing fittings shall carry the following embossed, stamped or written by indelible ink.

- Manufacturer's name or trademark.
- Designation of fittings.
- Lot number.

Each fitting conforming to this standard shall also be marked with BIS standard mark.

13.0 PACKAGING

Packing size to be mentioned to ensure uniformity in delivery conditions of the material being procured. Packing size shall be approved by owner / owner's representative before packing the material. The vendor shall submit the packaging details during QAP and also complied with at the time of delivery.

14.0 INSPECTION / DOCUMENTS

- Inspection shall be carried out as per Owner Technical Specification.
- Owner Representative or Third Party Inspection Agency appointed by Owner shall carry out stage wise inspection during manufacturing / final inspection.
- Vendor shall furnish all the material test certificates, proof of approval / license from specified authority as per specified standard, if relevant, internal test / Inspection reports as per Owner Tech Spec. & specified code for 100% material, at the time of final inspection of each supply lot of material.

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ENERGISING QUALITY

VCS PROJECT CONSULTANTS PVT. LTD.

STANDARD SPECIFICATION - COPPER FITTINGS

VPC –SS-PE-0007

REV. No	DATE	Purpose	Prepared By	Checked By	Approved By
00	18.06.18	ISSUED AS STANDARD	BS	MVK	AD

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CONTENTS

1.0 SCOPE 3
2.0 MATERIAL 3
3.0 DIMENSIONAL TOLERANCES 3
4.0 MANUFACTURE 3
5.0 FREEDOM FROM DEFECTS 3
6.0 HYDROSTATIC TEST 4
7.0 DRIFT EXPANDING TEST 4
8.0 CARBON FILM TEST 4
9.0 CARBON CONTENT TEST 4
10.0 MARKING 4
11.0 PACKAGING 4
12.0 INSPECTION/ DOCUMENTS 4

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1.0 SCOPE

This specification covers the requirements for 12 mm OD X 0.6 mm wall thickness Copper tube, Half Hard. Unless modified by this specification, requirement of BS EN 1057 (latest), Half Hard, shall be valid, with the recommended changes in physical properties to suit wrinkle free bend ability.

2.0 MATERIAL

The material used for the manufacturer of Copper tube shall confirm to BS EN 1057(latest), Grade Cu - DHP or CW024A.

- **Mechanical Properties**:

  a. Ultimate Tensile Strength–250N/sq.mm(min)

  b. Elongation – 30% (min)

  c. Hardness - 75 to 100 on HV scale.

- **Chemical Properties:**

  In Each heat one no. of the copper tube will be tested for chemical properties to confirm to non-arsenical Cu - DHP / CW024A as per BS EN 1057 to have the following chemical composition:

Copper Percentage including silver	:	Min 99.9%
Phosphorus Percentage	:	0.015 to 0.040%

3.0 DIMENSIONAL TOLERANCES

The mean outside Diameter of the tube shall not vary from the specified outside diameter by more than the amount of tolerances specified in table 4 of BS EN 1057. The tolerance on the wall thickness shall be as specified in table 5 of BS EN 1057.

The length of the tube shall be 3 m. Allowable tolerance shall be (-0, +0.5 mm).

4.0 MANUFACTURE

The tubes shall be solid drawn by the process of melting, extrusion and thereafter Bright annealing. The ends shall be cut clean & square with the axis of the tube in no case shall tubes be redrawn from old or used tubes.

5.0 FREEDOM FROM DEFECTS

- The tubes shall be free from internal & external fins, flaws, skin defects, blow holes etc. or other irregularities which might restrict the free flow of fluid and shall be so designed that resistance to the flow of fluid through the tubes is minimized.
- All tubes will be supplied 100% Eddy Current tested as per ASTM E243 and BS EN 1057. Eddy Current testing is a computer aided test, wherein the tube passes through a probe & an electromagnetic field is created around the peripheral of the tube to detect

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any flaw or blow hole which may not be visible to the naked eye. The manufacturer must have in-house Eddy Current testing facilities to supply to Client. Client reserves the right to witness the Eddy Current facility at the manufacturer's factory premises.

6.0 HYDROSTATIC TEST

Hydrostatic test shall be carried out minimum 35 bar pressure for a period of 10 second as per EN 1057 (latest).

7.0 DRIFT EXPANDING TEST

Drift expanding test shall be carried out as per EN 1057. The O.D. of the tube end shall be expanded by 30% using a conical mandrel (at angle 45º) with no wrinkles, cracks, break or any form of defect should occur on the tube during & after the test.

8.0 CARBON FILM TEST

Copper tubes to be tested for carbon film test & the manufacturer will certify that the tubes meet the requirement of clause 8.5 of BS EN 1057.

9.0 CARBON CONTENT TEST

Copper tubes to be tested for carbon content test to ensure a carbon level to avoid the formation of carbon film during installation. Max. Carbon level shall be permitted as per clause 6.5 of BS EN1057.

10.0 MARKING

Each tube shall be permanently marked every meter with Client's Logo, manufactures name & size and specification of the tube.

Each packing containing tubes shall carry the following, stamped or written in indelible ink.

- Manufacturers name or trademark
- Designation of tubes (OD x wall thk)
- Lot number.
- No. of the standard (EN1057)

11.0 PACKAGING

Packing size to be mentioned to ensure uniformity in delivery conditions of the material being procured. Packing size shall be approved by owner / owner's representative before packing the material. The vendor shall submit the packaging details during QAP and also complied with at the time of delivery.

12.0 INSPECTION/ DOCUMENTS

- Inspection shall be carried out as per Client Technical Specifications, relevant codes/standard and Inspection Plan/ QAP. Vendor to prepare detailed QAP and submit the same for approval of Client / Client's Authorized Representative.
- Client representative or third party inspection agency appointed by Client shall carry out

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stage wise inspection during manufacturing/ final inspection.

- Vendor shall furnish all the material test certificates, proof of approval/ license from specified authority as per specified standard, if relevant, internal test/ inspection reports as per Client Technical Specification and specified code for 100% material, at the time of final inspection of each supply lot of material.

- Even after third party inspection, Client reserves the right to select a sample of tube randomly from each manufacturing batch and have these independently tested. Should the results of these tests fall outside the limits specified in Client Technical specification, then Client reserves the rights to reject all production supplied from the batch.

- For any control test or examination required under the supervision of TPIA/owner/owner's representative, latter shall be informed in writing one (1) week in advance by vendor about inspection date & place along with production schedule.

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STANDARD SPECIFICATION - COPPER TUBE

VPC –SS-PE-0008

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CONTENTS

1.0 SCOPE 3
2.0 MATERIAL 3
3.0 DIMENSIONAL TOLERANCES 3
4.0 MANUFACTURE 3
5.0 FREEDOM FROM DEFECTS 3
6.0 HYDROSTATIC TEST 4
7.0 DRIFT EXPANDING TEST 4
8.0 CARBON FILM TEST 4
9.0 CARBON CONTENT TEST 4
10.0 MARKING 4
11.0 PACKAGING 4
12.0 INSPECTION/ DOCUMENTS 4

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1.0 SCOPE

This specification covers the requirements for 12 mm OD X 0.6 mm wall thickness Copper tube, Half Hard. Unless modified by this specification, requirement of BS EN 1057 (latest), Half Hard, shall be valid, with the recommended changes in physical properties to suit wrinkle free bend ability.

2.0 MATERIAL

The material used for the manufacturer of Copper tube shall confirm to BS EN 1057(latest), Grade Cu - DHP or CW024A.

- **Mechanical Properties**:

  a. Ultimate Tensile Strength–250N/ sq.mm(min)

  b. Elongation – 30% (min)

  c. Hardness - 75 to 100 on HV scale.

- **Chemical Properties:**

  In Each heat one no. of the copper tube will be tested for chemical properties to confirm to non-arsenical Cu - DHP / CW024A as per BS EN 1057 to have the following chemical composition:

Copper Percentage including silver	:	Min 99.9%
Phosphorus Percentage	:	0.015 to 0.040%

3.0 DIMENSIONAL TOLERANCES

The mean outside Diameter of the tube shall not vary from the specified outside diameter by more than the amount of tolerances specified in table 4 of BS EN 1057. The tolerance on the wall thickness shall be as specified in table 5 of BS EN 1057.

The length of the tube shall be 3 m. Allowable tolerance shall be (-0, +0.5 mm).

4.0 MANUFACTURE

The tubes shall be solid drawn by the process of melting, extrusion and thereafter Bright annealing. The ends shall be cut clean & square with the axis of the tube in no case shall tubes be redrawn from old or used tubes.

5.0 FREEDOM FROM DEFECTS

- The tubes shall be free from internal & external fins, flaws, skin defects, blow holes etc. or other irregularities which might restrict the free flow of fluid and shall be so designed that resistance to the flow of fluid through the tubes is minimized.
- All tubes will be supplied 100% Eddy Current tested as per ASTM E243 and BS EN 1057. Eddy Current testing is a computer aided test, wherein the tube passes through a probe & an electromagnetic field is created around the peripheral of the tube to detect

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any flaw or blow hole which may not be visible to the naked eye. The manufacturer must have in-house Eddy Current testing facilities to supply to CLIENT. CLIENT reserves the right to witness the Eddy Current facility at the manufacturer's factory premises.

6.0 HYDROSTATIC TEST

Hydrostatic test shall be carried out minimum 35 bar pressure for a period of 10 second as per EN 1057 (latest).

7.0 DRIFT EXPANDING TEST

Drift expanding test shall be carried out as per EN 1057. The O.D. of the tube end shall be expanded by 30% using a conical mandrel (at angle 45º) with no wrinkles, cracks, break or any form of defect should occur on the tube during & after the test.

8.0 CARBON FILM TEST

Copper tubes to be tested for carbon film test & the manufacturer will certify that the tubes meet the requirement of clause 8.5 of BS EN 1057.

9.0 CARBON CONTENT TEST

Copper tubes to be tested for carbon content test to ensure a carbon level to avoid the formation of carbon film during installation. Max. Carbon level shall be permitted as per clause 6.5 of BS EN1057.

10.0 MARKING

Each tube shall be permanently marked every meter with CLIENT's Logo, manufactures name & size and specification of the tube.

Each packing containing tubes shall carry the following, stamped or written in indelible ink.

- Manufacturers name or trademark
- Designation of tubes (OD x wall thk)
- Lot number.
- No. of the standard (EN1057)

11.0 PACKAGING

Packing size to be mentioned to ensure uniformity in delivery conditions of the material being procured. Packing size shall be approved by owner / owner's representative before packing the material. The vendor shall submit the packaging details during QAP and also complied with at the time of delivery.

12.0 INSPECTION/ DOCUMENTS

- Inspection shall be carried out as per CLIENT Technical Specifications, relevant codes/standard and Inspection Plan/ QAP. Vendor to prepare detailed QAP and submit the same for approval of CLIENT / CLIENT's Authorized Representative.
- CLIENT representative or third party inspection agency appointed by CLIENT shall carry

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out stage wise inspection during manufacturing/ final inspection.

- Vendor shall furnish all the material test certificates, proof of approval/ license from specified authority as per specified standard, if relevant, internal test/ inspection reports as per CLIENT Technical Specification and specified code for 100% material, at the time of final inspection of each supply lot of material.

- Even after third party inspection, CLIENT reserves the right to select a sample of tube randomly from each manufacturing batch and have these independently tested. Should the results of these tests fall outside the limits specified in CLIENT Technical specification, then CLIENT reserves the rights to reject all production supplied from the batch.

- For any control test or examination required under the supervision of TPIA/owner/owner's representative, latter shall be informed in writing one (1) week in advance by vendor about inspection date & place along with production schedule.

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VCS PROJECT CONSULTANTS PVT. LTD.

STANDARD SPECIFICATION - BRASS FITTINGS

VPC–SS-PE-0009

REV	DATE	Purpose	Prepared By	Checked By	Approved By
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CONTENTS

1.0 SCOPE 3
2.0 MATERIAL 3
3.0 DIMENSIONAL TOLERANCES 3
4.0 END CONNECTION 3
5.0 CHEMICAL PROPERTIES 3
6.0 CARBON IN BORE 4
7.0 RESISTANCE TO DEZINCIFICATION 4
8.0 STRESS CORROSION RESISTANCE TEST 4
9.0 FREEDOM FROM DEFECT 4
10.0 HYDROSTATIC PRESSURE TEST 4
11.0 PNEUMATIC PRESSURE TEST 4
12.0 MARKING 4
13.0 PACKAGING 4
14.0 INSPECTION/ DOCUMENTS 4

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1.0 SCOPE

This specification covers the requirements for Brass Capillary fittings (End feed fittings). Unless modified by this specification, requirement of BS 864 / EN 1254 Part 1 shall be valid.

2.0 MATERIAL

- The material used for the manufacturer of Brass Capillary Fittings shall conform to EN 1254-1 (latest), Half Hard.

- Material used for the solder should conform to BS EN 29453 and should be lead free. Solder material shall be generally melting within the temperature range 180 ° C to 250 °C.

- Threading on the Brass fittings shall be done as per BS21.

3.0 DIMENSIONAL TOLERANCES

Dimensions tolerances of various types of brass capillary fittings (End feed fittings). shall be as per EN 1254 Part 1.

The tolerances at the end shall be as per EN 1254 Part I in nominal diameter which is as follows (Ref. table 2)

Diameter	Tolerance on the mean diameter with respect to the nominal diameter		Resulting Diametrical difference	
D	Outside Dia. of Male end (mm)	Inside Dia of socket (mm)	Max (mm)	Min (mm)
12 mm	+.0.04 -.0.05	+ 0.15 +0.06	0.20	0.02

The minimum wall thickness of a fitting shall be in accordance as given below (Ref Table 3 of EN 1254 Part 1)

Nominal Dia mm D	Minimum Wall thickness (mm) Brass
12	1.1

4.0 END CONNECTION

End connection of the fitting must be capable of end feeding to the NPT x 12 mm. Internal solder ring type fitting is not acceptable.

5.0 CHEMICAL PROPERTIES

Chemical composition of Brass shall be as mentioned in EN 1254 PART I. Dezincification-resistant brass material CuZn36Pb2As or CW602N.

Cu	61.0-63.0 %
Pb	01.7-02.8 %
As	0.02 -0.15%

Remaining is zinc.

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6.0 CARBON IN BORE

The internal surface of brass capillary fittings for soldering or brazing shall not contain any detrimental film nor present a carbon level high enough to allow the formation of such a film during installation. The maximum total carbon level on internal surfaces shall not exceed 1.0 mg/dm^2 when tested in accordance with the specification. This test shall be carried out as per clause no. 5.4 of EN 1254 -1.

7.0 RESISTANCE TO DEZINCIFICATION

The fittings shall be manufactured from alloys containing more than 10% Zinc. So fittings shall be required to be resistant to dezincification. It shall be carried out as per Cl. 5.5 of EN 1254 -1.

8.0 STRESS CORROSION RESISTANCE TEST

A stress corrosion resistance is to be carried out as per method defined in ISO 6957 using test solution of pH9.5 but without pickling.

9.0 FREEDOM FROM DEFECT

The fittings shall be free from internal fins, blow holes, skin defects etc. or other irregularities which might restrict the free flow of fluid, and shall be designed that resistance to the flow of fluid through the fittings is minimized.

10.0 HYDROSTATIC PRESSURE TEST

All fittings shall be leak tightness tested at 1.5x25 bars for a period of 15 minutes and no leakage is permitted. This test shall be performed on each size of the fittings.

11.0 PNEUMATIC PRESSURE TEST

All fittings shall be leak tested at 6 bars for a period of 10 seconds and no leakage is permitted.

12.0 MARKING

Each fittings shall be embossed with CLIENT' s logo, manufacturers name and trade mark BS 864 / EN 1254 Part– I and designation of fittings.

Each packing containing fittings shall carry the following stamped or written in indelible ink.

13.0 PACKAGING

Packing size to be mentioned to ensure uniformity in delivery conditions of the material being procured. Bidder shall submit the packaging details during QAP and also complied with at the time of delivery.

14.0 INSPECTION/ DOCUMENTS

- Inspection shall be carried out as per design codes/standards, CLIENT Technical Specification and Inspection Plan/ Vendor's detailed QAP duly approved by

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owner/owner's representative.

- CLIENT representative or third party inspection agency appointed by CLIENT shall carry out random inspection during manufacturing/ final inspection.

- Vendor shall furnish all the material test certificates, proof of approval/ license from specified authority as per specified standard, if relevant, internal test/ inspection reports as per CLIENT Technical Specification, at the time of final inspection of each supply lot of material.

- Even after third party inspection, CLIENT reserves the right to select a sample of tube randomly from each manufacturing batch and have these independently tested. If the results of these tests fall outside the limits specified in CLIENT Technical specification, then CLIENT reserves the rights to reject all production supplied from the batch.

- Vendor shall prepare and submit the detail drawings of required brass fitting for approval by CLIENT/VCSQSPL before starting production.

- For any control test or examination required under the supervision of TPIA/owner/owner's representative, latter shall be informed in writing one (1) week in advance by vender about inspection date & place along with production schedule.

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ENERGISING QUALITY

VCS PROJECT CONSULTANTS PVT. LTD.

STANDARD SPECIFICATION FOR STEEL REINFORCED RUBBER HOSE

VPC-SS-PE-0010

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00	17.12.18	ISSUED AS STANDARD	BS	MVK	AD

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CONTENTS

1.0 SCOPE 3
2.0 SPECIFICATION FOR POWDER COATING 3
3.0 MATERIAL 3
4.0 DIMENSIONS & TOLERANCES 3
5.0 FEATURES 4
6.0 MARKING 5
7.0 PACKAGING 5
8.0 INSPECTION/ DOCUMENTS 5

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1.0 SCOPE

Owner/ Client plans to augment PNG network. It supplies natural gas to domestic & commercial consumers in the GA.

This present document covers the technical specification for the procurement of steel reinforced rubber hose, Type 4 used in distribution systems. It describes the general requirements, controls, tests, QA/QC examination and final acceptance criteria which need to be fulfilled.

This specification covers the requirements for steel reinforced rubber hose unless modified by this specification, requirements of IS: 9573 shall be valid.

2.0 SPECIFICATION FOR POWDER COATING

Owner	
Manufacturer	Means the Manufacturer of the Steel Reinforced Rubber Hose.
PTS	Means the present <<Particular Technical Specification>> and its appendix, if any.
Third Party Inspection Agency	Means the Inspection Agency to be appointed by Client.
Type 4	Wire Reinforced hose for domestic / commercial installations

3.0 MATERIAL

- Lining: - It shall be nitrile – butadiene rubber (NBR) or chloroprene rubber (CR) compound. It shall be smooth in bore, uniform in thickness and free from air blisters, porosity and splits.

- Reinforcement material: - It shall have wire reinforcement in braided form in between the lining & cover.

- Cover:- It shall be manufactured out of synthetic rubber compound resistant to abrasion, weather and natural gas. The cover color shall be YELLOW.

- The whole shall be consolidated by wrapping or any other suitable method and uniformly vulcanized to give good adhesion between reinforcement plies and the rubber lining of the cover.

4.0 DIMENSIONS & TOLERANCES

- Bore size

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Nominal base (mm)	Minimum base diameter(mm)	Minimum bend radius(mm)
8mm	7.9	95

The Nominal bore size of the hose shall be accordance to table # 1 of IS 9573: 1998 shall be as given above table. It shall be tested/ checked as method defined in IS 4143.

- The Minimum thickness so lining & cover shall be 2 mm & 1 mm respectively.

- Length of hose shall be as defined in M.R. & the tolerances on length shall be permitted ±1%.

5.0 FEATURES

- **Mechanical properties**

  Tensile Strength (Lining & Cover) at break - 10 MPa (minimum)

  Elongation (Lining & Cover) in at break (%) - 200 & 250 respectively (minimum)

- **Resistance of Lining to n-pentane**

  The n-pentane absorbed and the n-pentane extractable matter as determined Clause no. 5.4.3.2 of IS 9573: 1998 shall not exceed 10% & 5% respectively to the initial mass of lining.

- **Adhesion**

  The minimum adhesion between rubber lining & reinforcement, between layers of reinforcement and between reinforcement & cover shall be 2KN/m.

- **Low temperature flexibility**

  Flexible hose is conditioned at - 40 ° C for at least 5 hrs. and then bent at 180° around a mandrel with a diameter 12 times the nominal bore diameter of the hose, no cracks or breaks shall be shown.

- **Flexibility of Hose**

  The hose shall be capable of being bent empty to the radius 95 mm without flattening and suffering structural damages.

- **Ozone resistance**

  It shall be carried out as per clause no. 5.5.of IS 9573: 1978

- **Hydro static test**

  All hoses shall be leak tightness tested at 2 MPa for a period of 1 minutes and no leakage is permitted. This test shall be performed on each size of the hoses as per clause no. 5.5.5.1 of IS 9573: 1978.

- **Bursting pressure**

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It shall be carried out as per Clause 5.5.2 of IS 9573. The minimum burst pressure shall be 5 Mpa.

- **Grip strength test**

  The hose shall comply to the requirement of Clause no. 5.5.7 of IS 9573.

- **Burning behavior**

  The burning test shall be carried out on hose as per clause no. 5.5.8 of IS9573. The hose at least shall not burn till 45second.

6.0 MARKING

Each hose shall be indelibly marked as follows:

- Manufacturer's name or trade mark., if any
- Nominal bore
- Batch no. / Lot no.
- Month and year of manufacturer
- Type of hose i.e. Type 4
- BIS marking

7.0 PACKAGING

Packing size to be mentioned to ensure uniformity in delivery conditions of the material being procured. Bidder shall submit the packaging details during offer and also complied with at the time of delivery.

8.0 INSPECTION/ DOCUMENTS

- Inspection shall be carried out as per design codes/standards, Client Technical Specification and Inspection Plan/ Vendor's detailed QAP duly approved by owner/owner's representative.
- For all tests purposes, the minimum time between vulcanization & testing shall be 16h.
- Client representative or third party inspection agency appointed by Client shall carry out random inspection during manufacturing/ final inspection.
- Vendor shall furnish all the material test certificates, proof of approval/ license from

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specified authority as per specified standard, if relevant, internal test/ inspection reports as per Client Technical Specification, at the time of final inspection of each supply lot of material.

- Even after third party inspection, Client reserves the right to select a sample of hose randomly from each manufacturing batch and have these independently tested. If the results of these tests fall outside the limits specified in Client Technical specification, then Client reserves the rights to reject all production supplied from the batch.

- Vendor shall prepare and submit the detail drawings of required steel reinforced rubber hose for approval by Client /VCSQSPL before starting production.

- For any control test or examination required under the supervision of TPIA/owner/owner's representative, latter shall be informed in writing one (1) week in advance by vender about inspection date & place along with production schedule.

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ENERGISING QUALITY

VCS PROJECT CONSULTANTS PVT. LTD.

STANDARD SPECIFICATION FOR PURE POLYSTER POWDER COATING

VPC –SS-PE-0011

REV	DATE	Purpose	Prepared By	Checked By	Approved By
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CONTENTS

1.0 SCOPE 3
2.0 SPECIFICATION FOR POWDER COATING 3
3.0 TESTING 3
4.0 MARKING 3
5.0 INSPECTION/ DOCUMENTS 4

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1.0 SCOPE

This Specification specifies the requirements for powder coating (Pure Polyester) of GI Pipes & fitting suitable to use for carrying Natural Gas directly expose to sunlight.

2.0 SPECIFICATION FOR POWDER COATING

Powder Material	:	Pure Polyester.
Application	:	Electrostatic Spraying (40 — 90 KV Manual/ Automatic)
Backing Schedule	:	180^0C to 200^0C for 10 mm (Metal Temperature)
Coating Thickness	:	50-60Microns

3.0 TESTING

Film Type	:	Glossy/Satin 86
Gloss60^0	:	95%
Cross Hatch Adhesion (ASTM D-5870)	:	GT = 0/100
Cylindrical bending Test (ASTM D -522) 5mm Rod dia	:	Passes
Enrichsen cupping (min)	:	8 Passes
Pencil Hardness(mm)	:	2H
Scratch Resistance (Kg. Mm)	:	3
Impact Resistance Kg. Min(ASTM D- 2794)	:	Direct 150 Indirect 150
Salt Spray Resistance (ASTM B-117)	:	1000 Hrs (min)
Porosity (DIN 53161)	:	Passes
Humidity Resistance	:	1000 Hrs(min)

4.0 MARKING

Each fitting shall be embossed with manufacture's name or trademark and the size designation. Each packing containing fittings shall carry the following stamped or written by indelible ink.

- Manufacturers name or trademark.
- Designation of fitting.
- Lot number.

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Each fitting conforming to this standard shall also be marked with BIS standard mark.

5.0 INSPECTION/ DOCUMENTS

- Inspection shall be carried out as per OWNER Technical Specification.
- OWNER representative or Third Party Inspection Agency appointed by OWNER shall carry out stage wise inspection during manufacturing/final inspection.
- Vendor shall furnish all the material test certificates, proof of approval/ license from specified authority as per specified standard, if relevant, internal test inspection reports as per OWNER Tech Spec. &- specified code for 100% material, at the time of final inspection of each supply lot of material.
- Even after third party inspection, OWNER/ OWNER REPRESENTATIVE reserves the rights to select a sample of fittings randomly from each manufacturing batch & have these independently tested. Should the results of these tests fall outside the limits specified in OWNER technical specification, then OWNER/ OWNER REPRESENTATIVE Reserves the rights to reject all production supplied from the batch. (ASTM D- 2247)

Weathering (sun test with water immersion, Xenon 150K.lux)	: 60-70% Gloss retention after 1000Hrs.
Colour	: Light colour as approved by OWNER/CONSULTANT

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ENERGISING QUALITY

VCS PROJECT CONSULTANTS PVT. LTD.

STANDARD SPECIFICATION – FORGED FITTINGS (WROUGHT STEEL FITTINGS) FOR USE AT PRESSURE UP TO 100 MBAR (G)

VPC-SS-PE-0012

REV	DATE	Purpose	Prepared By	Checked By	Approved By
00	18.06.18	ISSUED AS STANDARD	BS	MVK	AD

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CONTENTS

1.0 SCOPE 3
2.0 SPECIFICATION FOR POWDER COATING 3
3.0 MATERIAL 3
4.0 DIMENSIONS & TOLERANCES 3
5.0 THREADS 3
6.0 FREEDOM FROM DEFECTS 4
7.0 GALVANIZING 4
8.0 PRESSURE TEST 4
9.0 COMPRESSION TEST 5
10.0 SAMPLING 5
11.0 MARKING 5
12.0 PACKAGING 5
13.0 INSPECTION/ DOCUMENTS 5

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1.0 SCOPE

Owner/ Client plans to augment PNG network. It supplies natural gas to domestic & commercial consumers in the GA.

This specification covers the requirements for Wrought Steel Fittings for Natural Gas for use at pressures up to 100 mbar (g). Unless modified by this specification, all the requirements of IS 1239 Part 2: 1992 and the latest editions of the standards mentioned herein this specification, including all revisions, shall apply.

2.0 SPECIFICATION FOR POWDER COATING

Owner	
Manufacturer	Means the Manufacturer of the Steel Reinforced Rubber Hose.
SS	Means the present <<Standard Specification>> and its appendix, if any.
Third Party Inspection Agency	Means the Inspection Agency to be appointed by Client.

3.0 MATERIAL

The material used for the manufacturing of wrought steel fittings shall confirm to IS 1387: 1967 generally, and IS 1239 Part 2: 1992

4.0 DIMENSIONS & TOLERANCES

- Dimensions of various types of fittings shall be as specified in the table 1 to 31 of IS 1239 Part 2: 1992.
- Wall thickness on fittings & tolerances on them shall be as given in table 1 to 31 of IS 1239 Part 2: 1992.
- In case of reducing fittings, the dimensions at each outlet shall be those appropriate to the nominal size of the outlet.

5.0 THREADS

- Outlet of fittings shall be threaded to dimensions & the tolerances as specified in IS 554: 1999.
- All internal & external threads shall be tapered.
- After threading, the pipe body may be hot dip galvanized as per normal practice followed by cold galvanizing (spraying) of the threaded portions. The threaded portions shall be protected using end caps, etc.
- For checking conformity of threads gauging practice in accordance with IS 8999: 2003 shall be followed.

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- Chamfering: The outlet of fittings shall have chamfer. The chamfer shall have an included angle of 900 ± 50 for internal threads & 700 ± 100 for external threads.

6.0 FREEDOM FROM DEFECTS

On visual examination the outside & inside surfaces of fittings shall be smooth & free from defects such as cracks, injurious flows, fine sand depth, etc. Other workmanship shall be as per Clause 14 of IS 1239 Part 2: 1992.

7.0 GALVANIZING

- Fittings shall be galvanized to meet the requirements of IS 4759: 1996.
- Zinc conforming to any grade specified in IS 209: 1992 or IS 13229: 1991 shall be used for the purpose of galvanizing.
- **Galvanized Bath:** The molten metal in the galvanizing bath shall contain not less than 98.5% by mass of zinc.
- **Coating requirements:** Mass of coating shall be 610 gms/ m2. In case of pipe nipples (manufactured in accordance with the requirements of IS 1239 Part 1: 2004), the mass of coating of 400 gms/m2 shall also be acceptable.
- **Freedom from defects:** The zinc coating shall be uniformly adhered, reasonably smooth & free from such imperfections as flux, ash bare patches, black spots, pimples, lumpiness runs, rust strains, bulky white deposits & blisters; otherwise the pipes shall be liable for rejection.
- **Sampling Plan for galvanizing**

  a) All materials of the same type in a coating bath having uniform coating characteristics shall be grouped together to constitute a lot. Each lot shall be tested separately for the various requirements of the specification. The number of units to be selected from each lot for this purpose shall be as given in Table 2 of IS 4759: 1996.

  b) The sample selected according to Column 1 & 2 of Table 2, IS 4759: 1996 shall be tested for visual requirements as per Para 8 of IS 4759: 1996. Vendor shall have appropriate correspondence between galvanizing lot number and pipe manufacturing lot number for identification / traceability.

  c) The sample found conforming to above requirements shall then be tested for mass of zinc coating in accordance with Clause 9.2 of IS 4759: 1996.

  d) Criteria for conformity: As per Clause 8.3 of IS 4759: 1996.

  e) Test procedure shall be as per Clause 9 of IS 4759: 1996. All galvanizing test results shall be included in the Manufacturer's Test Certificate.

8.0 PRESSURE TEST

Pneumatic pressure test shall be carried out on each & every fittings as per procedure given in IS 1239 Part 2: 1992.

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9.0 COMPRESSION TEST

As per IS 1239 Part 2: 1992.

10.0 SAMPLING

Owner Representative of Third Party Inspection Agency appointed by Owner shall witness the tests as per procedure for sampling plan given in IS 4711: 1974. However, vendor to perform 100% inspection of visual, dimensional & pressure test. Vendor shall furnish Internal test certificates at the time of final inspection to the Owner.

11.0 MARKING

Each fitting shall be embossed with Client's logo, manufacturer's name or trademark and the size designation.

Each packing containing fittings shall carry the following embossed, stamped or written by indelible ink.

- Manufacturer's name or trade mark.
- Designation of fittings.
- Lot number.

Each fitting conforming to this standard shall also be marked with BIS standard mark.

12.0 PACKAGING

Packing size to be mentioned to ensure uniformity in delivery conditions of the material being procured. Packing size shall be approved by owner / owner's representative before packing the material. The vendor shall submit the packaging details during QAP and also complied with at the time of delivery.

13.0 INSPECTION/ DOCUMENTS

- Inspection shall be carried out as per Owner Technical Specification.

- Owner Representative or Third Party Inspection Agency appointed by Owner shall carry out stage wise inspection during manufacturing / final inspection.

- Vendor shall furnish all the material test certificates, proof of approval / license from specified authority as per specified standard, if relevant, internal test / Inspection reports as per Owner Tech Spec. & specified code for 100% material, at the time of final inspection of each supply lot of material.

- Even after third party inspection, Owner reserves the rights to select a sample of fittings randomly from each manufacturing batch & have these independently tested. Should the results of these tests fall outside the limits specified in Owner technical specification, then Owner reserves the rights to reject all production supplied from the batch.

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ENERGISING QUALITY

VCS PROJECT CONSULTANTS PVT. LTD.

STANDARD SPECIFICATION – WARNING MAT

VPC –SS-PE-0013

REV. No	DATE	Purpose	Prepared By	Checked By	Approved By
00	17.12.18	ISSUED AS STANDARD	BS	MVK	AD

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CONTENTS

1.0 SCOPE 3
2.0 DEFINATIONS 3
3.0 REFERENCE CODE 3
4.0 FEATURES 3
5.0 QUALITY ASSURANCE (QA) 4
6.0 DEFECT LIABILITY 4
7.0 APPENDIX - I 4

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1.0 SCOPE

CLIENT/ OWNER plans to augment the PNG Network. It supplies natural gas to domestic & commercial consumers in the GA.
The present document covers the technical specifications for the procurement of Warning Mat. Warning mats shall be laid in the ground above the gas main line in order to indicate their presence.

2.0 DEFINATIONS

Manufacturer	Means the Manufacturer of the Steel Reinforced Rubber Hose.
SS	Means the present <<Standard Specification>> and its appendix, if any.
Third Party Inspection Agency	Means the Inspection Agency to be appointed by Client.

3.0 REFERENCE CODE

IS 10889	High Density Polyethylene Films
ASTM D - 638	Standard test method for tensile properties of plastics.

4.0 FEATURES

- **Material**

  Raw material of the warning mat shall be Virgin material.

  The material grade of Warning Mat shall be HDPE with warning sticker / stamp.

  a. Mechanical properties
  b. Tensile strength at break (Machine direction) - 300 Kgf /cm^2(minimum)
  c. Elongation in machine & Transverse direction (%)- 300 (minimum)

- **Colour**

  The Mat shall be of bright golden yellow colour. This colour must not take any appreciable alteration in the course of time.

- **Dimensions**

  Warning Mat shall have following dimensions:
  Width 300 mm ± 5 mm
  Thickness 1 mm (Minimum)
  Negative tolerance on thickness is not allowed.

- **Marking**

  a. Marking on the Mat shall be approved by owner. The warning Mat shall be provided with Chainage marking and the warning mat must be engraved with "Caution: High pressure gas pipeline below" in both English and Hindi along with Client's Logo at a frequency of every meter.
  b. Vendor shall submit proposed Artwork to be marked on the Mat for the approval from Owner / Owner's representative.

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- **Tests**

  a. Colour- Fast test

  Test specimen 100 mm to 150 mm wide shall be immersed in a 20% solution of ammonium sulphide at 15 to 20 ºC temperature for 15 days. The colour fastness shall be evaluated by comparing the test specimen with a sample specimen. The comparison shall be made by placing the two specimens on a white back ground in day light, but without exposing them directly to sun light. Test shall be accepted satisfactory, if the colour of the strip remains intact.

  b. Other tests shall be carried out as per relevant national / international standard enclosed in QAP.

- **Packing**

  The warning mat shall be delivered in rolls of 50meters. Packing size to be mentioned to ensure uniformity in delivery conditions of the materials being procured. Bidder shall submit the packing details during offer and also compiled with at the time of delivery.

5.0 QUALITY ASSURANCE (QA)

Manufacturer shall prepare detailed QAP and submit for the approval from Owner / Owner's representative.

6.0 DEFECT LIABILITY

Defect liability period shall be as per the commercial volume I of II

7.0 APPENDIX - I

Vendor to submit the following Data along with BID.

SR.NO.	DESCRIPTION	UNIT	DATA	REMARKS
01.	Average gravimetric Thickness	mm		
02.	Tensile strength at Break (in machine direction)	Kg / cm^2		
03.	Tensile strength at Break (in Transverse direction)	Kg / cm^2		
04.	Elongation at Break (in Transverse direction)	%		
05.	Elongation at Break (in Transverse direction)	%		
06.	Color bleeding	-		
07.	Dimensional stability	% change		

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SS- MEDIUM DENSITY POLYETHLENE BALL VALVE

Rev	Date	Description	Author	Checked	Approved
0	25.04.17	ISSUED FOR TENDER	GS	AD	GSJ

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TABLE OF CONTENTS

1. SCOPE
2. APPLICABLE CODES, SPECIFICATIONS AND STANDARDS
3. ABBREVIATION AND TERMINOLOGY
4. TECHNICAL REQUIREMENT
5. MATERIAL
6. DESIGN
7. DIMENSIONS AND TOLERANCE
8. DOCUMENT REQUIREMENT
9. QUALITY ASSURANCE PLAN
10. MARKING
11. PACKAGING

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1.0 **SCOPE:**

This technical specification along with datasheet specifies the minimum requirements for design, selection, manufacture, inspection, testing and supply of MDPE Ball Valves and its component made from extruded or injected moulded polyethylene (PE).

This specification elaborates the requirement of MDPE Ball Valve for natural gas distribution systems at operating pressure and operating temperature 4 barg and 25^0C respectively.

This specification is limited to valves with a nominal diameter (de/do) up to and including 180 mm.

Material of grade shall be PE 80 & SDR 11.

2.0 **APPLICABLE CODES, SPECIFICATIONS AND STANDARDS:**

EN 1555-1: Plastics piping systems for the supply of gaseous fuels- Polyethylene (PE) - part 1: General

EN 1555-2 / ISO 4437-2 / IS-14885: Plastics piping systems for the supply of gaseous fuels- Polyethylene (PE)

EN 1555-3: Plastics piping systems for the supply of gaseous fuels- Polyethylene (PE) - part 3: Fittings

EN 1555-4: Plastics piping systems for the supply of gaseous fuels- Polyethylene (PE) - part 4: Valves

EN 1555-5: Plastics piping systems for the supply of gaseous fuels- Polyethylene (PE) - part 5: Fitness for purpose of the system

EN 1555-7: Plastics piping systems for the supply of gaseous fuels- Polyethylene (PE) - part 7: Guidance for assessment of conformity

ISO TR 13950:1997 or latest edition: Plastics pipes and fittings - Automatic recognition systems for Electro fusions

ISO/IEC 16390:1999 or latest edition: Information technology – Automatic identification and data capture techniques – Bar code symbology specification- Interleaved 2 of 5

ISO 12176-4: Plastics pipes and fittings - Equipment for fusion jointing polyethylene system - part 4: Traceability coding

ISO 17778: Plastics piping systems- Fittings, valves and ancillaries - Determination of gaseous flow rate/pressure drop relationships.

EN ISO 1133, Plastics — Determination of the melt mass-flow rate (MFR) and the melt volume-flow rate (MVR) of thermoplastics

ISO 3126: Plastics piping systems -- Plastics piping systems — Plastics piping components — Measurement and determination of dimensions

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PNGRB and other referrals in the above applicable codes.

3.0 ABBREVIATIONS & TERMINOLOGY:

d_n / d_o	: Nominal Outside Diameter
e_n	: Nominal Wall Thickness
SDR	: Standard Dimension Ratio = d_n / e_n
LTHS	: Long Term Hydrostatic Strength (at 20°C for 50yrs)
LCL	: Lower Confidence Limit – Stress value (MPa) of mean LTHS
MRS	: Minimum Required Strength – min. value (in MPa) for LTHS of material
C	: Design Co-efficient – As per ISO: 12162 Table-2
σ_s	: Design Stress (= MRS/C)
MFR	: Melt Mass Flow rate – Value related to viscosity of the molten material at a specified temp. and rate of shear. (expressed in g/10min.)
D_f	: De-rating Co-efficient (Refer Table A.1, Annex A – EN 1555-5)
MOP	: Maximum Operating Pressure = (20 x MRS) / {(SDR-1) x C x D_f}
EF	: Electrofusion

4.0 TECHNICAL REQUIREMENT:

4.1 Design of valve shall be as per European Standards EN 1555-4 and the complementary particular requirement.

4.2 Valves shall be leak proof and it is intended to be use in gas distribution networks made of PE pipes and accessories.

4.3 The valves are laid and to be welded by means of electrofusion method.

4.4 The internal and external surfaces of valves shall be smooth, clean and free from scoring, cavities or other surface defects to an extent that would prevent conformity to EN 1555-4.

4.5 No component of valve shall show any damage, scratches, pitting, bubbles, blisters, inclusions or crack.

4.6 Mechanical characteristics of assembled valves:

a) Valve shall have mechanical characteristics conforming to the requirements given in Table-1 of standard EN 1555-4.
b) Unless otherwise specified by the applicable test method, the test pieces shall be conditioned at (23 ± 2) °C before testing.
c) Testing of valve shall be in accordance with the test methods as specified in Table-1 of standard EN 1555-4 using the indicated parameters.
d) Hydrostatic test pressure and minimum test period shall be as per Table-2 of EN 1555-4.

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4.7 Physical characteristics of assembled valves:

a) Valve shall have physical characteristics conforming to the requirements given in Table-3 of standard EN 1555-4.
b) Thermal stability test shall be done at 200 deg. C by means of differential scanning calorimetry (DSC), considering oxygen induction time (OIT) ≥ 20 min.
c) Melt mass flow rate shall be calculated at 190 deg. C by applying 5 Kg of load on test specimen. It shall be expressed in g/ 10min.
d) Unless otherwise specified by the applicable test method, the test pieces shall be conditioned at (23 ± 2) °C before testing.
e) Testing of valve shall be in accordance with the test methods as specified in Table-3 of standard EN 1555-4 using the indicated parameters.

4.8 Performance requirements:

When valves are assembled to each other or to components conforming to other parts of EN 1555, the joints shall conform to EN 1555-5.

4.9 Allowable pressure drop shall be as per the standard ISO 17778.

4.10 Color of valve shall be black.

5.0 MATERIAL:

5.1 The PE compound from which the valve body with electrofusion socket is made shall conform to EN 1555-1.

5.2 The PE compound of the valve shall be made only from virgin material conforming to EN 1555-1. PE compound shall be cadmium free pigment compound.

5.3 All parts of the valve in contact with the gas stream shall be resistant to the gas, its condensates and other occurring substances such as dust.

5.4 The PE valves bodies made from below listed material are forbidden:
a) Use of recycled materials
b) Mixture of different materials
c) Addition of complementary materials

5.5 The material and constituent elements used in marking of valve (including elastomers, greases and any metallic part, if used) shall be resistant to the external and internal corrosion and shall have life expectancy under following conditions at least equal to the PE pipes with which they are intended to be used.
a) During storage
b) Under the effect of the gas conveyed
c) With respect to the services environment and operating conditions

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5.6 The seals shall be homogeneous without any inner cracks, inclusion or impurities. It can not contain any component that can alter the properties of the materials they are in contact with.

a) The nitrile rubber ring shall comply with standard EN 682.
b) Other seals shall comply with the relevant standard and be suitable for gas service.

5.7 Operating key or extension spindle shall me made of PVC and non-corrosive.

6.0 **DESIGN**

6.1 Valve will be designed for a maximum operating pressure (MOP) equal to 10 barg.

6.2 The wall thickness of the PE valve body shall be equal or greater than the minimum wall thickness of the corresponding SDR 11 series pipes.

6.3 Valve shall be bi-directional.

6.4 Specified End to End dimension in the Data-Sheet is minimum requirement.

6.5 The design of valve shall be such that, when assembling the valve into the pipe or other components, the electrical coil and/ or seals or any other ancillary parts are not displaced.

6.6 Valve ends shall have extended pipes at both plain ends. Pressure rating and thickness of extended pipes shall be compatible with the pipe in the network.

6.7 Valve ends shall be welded to pipes or fittings by means of electrofusion jointing using coupler.

6.8 Electrofusion socket shall have sufficient fusion compatibility to the pipe to which it is fused to meet the requirement of standard EN 1555-4 and EN1555-5.

6.9 PE valves bodies and their PE electrofusion socket / ends shall have a pressure rating of at least that of the pipe to which they are assembled.

6.10 Valve body and valve ends shall not be bolted and screwed and shall also designed that it cannot be dismantled.

6.11 Operating Cap/ Head of valve shall be “non-blow out” type. Size of operating cap shall be 50 mm square socket and 40 mm height as per EN 1555-4.

6.12 The running torque of valve shall be as per standard EN 1555-4. Valve shall be designed in such a way that it cannot be easily operated by hand.

6.13 Operating Key or Extension spindle shall be provided for valve operation as per client requirement. Operating key or extended spindle shall be compatible with operating cap.

6.14 The valve should be equipped with a base plate. In order to achieve this, the valve body will be designed with a flat base or with an attached base plate or an integrated one.

6.15 The operating mechanism and the stop wedges will be protected against water intrusion.

6.16 The valve body is completely sealed except a passage for the spindle mechanism.

7.0 **DIMENSIONS & TOLERANCE:**

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7.1 The dimensions will be in conformity with the standard EN 1555-3 and EN 1555-4.

7.2 Dimensions shall be measured in accordance with ISO 3126 at (23 ± 2) ^{O}C, after being conditioned for at least 4 hrs. The measurement shall not be made less than 24 hrs after manufacture.

7.3 Each valve shall be characterized by its dimensions and associated end connections.

7.4 Technical data given by the manufacture shall include at least following information:

a) the dimensional characteristics, by working drawings
b) the assembly instruction

7.5 The dimensions of electrofusion socket shall conform to EN 1555-3, Table-1.

7.6 Pressure rating or thickness of ends shall confirm to interconnecting pipes specification.

7.7 Tolerance for operating cap of valve shall be (50+0.5) mm square for socket and (40 ± 2) mm for height.

8.0 DOCUMENT REQUIREMENT:

8.1 TO BE SUBMITTED ALONG WITH BID

All relevant documents like detailed technical catalogue, technical deviations list (if any) along with quoted price.

8.2 TECHNICAL FILE

The manufactures of the valves-shall deliver for each type of valve a technical file which includes:

a) Raw material used.
b) Drawings, dimensions and tolerances, including for the accessories.
c) Application range (temperature and pressure limits).
d) Running torque and initiating torque.
e) Pressure drop and flow diagram.
f) Test results and Data proving the conformity of the valve in accordance with ENl555-4 and ENl555-7.
g) The pipe elements used during valves testing.
h) The assembly pipes/valves realized during testing shall be in conformity with the manufactures instructions and the extreme installation conditions.
i) For the test assembly due consideration should be taken regarding the fabrication tolerances and the variation of the outside ambient temperature.

9.0 QUALITY ASSURANCE PLAN:

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The Quality Assurance Plan (QAP). Inspection shall be carried out as per **Annexure –II** and the vendor is to submit the plan accordingly. Vendor to submit their own QAP along with offer based on indicative QAP enclosed in this tender for approval to the Owner / Owner's representative.

10.0 **MARKING:**

Following information shall be embossed upto height of 0.15 mm onto the valve and also in the form of bar code:

a) Owner's name as Client.
b) Manufacturer's name and/or trademark
c) Material and Designation
d) Design application series
e) Nominal diameter
f) Internal fluid gas
g) Direction of flow
h) Traceability code (valve and component) as per standard ISO 12176-4.
i) Number of the system standard. This information can be printed/formed directly on the valve or on a label associated with the valve or on an individual bag
j) Production period, year and month

The marking shall stay legible during normal manipulation, storage and installation.

The marking shall not adversely influence the performance of the valve and prevent the nonconformity of the valve.

11.0 **PACKAGING:**

The valve and its accessories shall be packaged individually in plastic bags in order to prevent them from deterioration. The valves ends shall be protected with external caps.

The cartons and/or individual bags shall bear at least one label with the manufacturer's name, type and dimensions of the part number, number of units in the box and, any special storage conditions and storage time limits.

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SUPPLY OF ISOLATION AND APPLIANCE VALVES

SS - ISOLATION VALVE

0	16.05.2018	Issued for Client's Comments	ADE	RNR	AD
Rev.	Date	Subject of revision	Author	Checked	Approved

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Date: 2025.03.13 12:56:46 IST

TABLE OF CONTENTS

Sr. No. Description Page No.

1.0 INTENT OF SPECIFICATION 3
2.0 SCOPE OF WORKS 3
3.0 DEFINITIONS 3
4.0 MATERIAL SPECIFICATION FOR ISOLATION VALVES 3
5.0 DATA SHEET OF ISOLATION VALVE 5

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1.0 INTENT OF SPECIFICATION

The intent of this specification is to establish minimum requirements to manufacture and supply of Isolation Ball Valves used for supply of natural gas to domestic & commercial connections.

2.0 SCOPE OF WORKS

The scope of the tenderer will include manufacture/ supply, inspection/ testing/ marking/ packaging/ handling and despatch of Isolation Ball Valves, as indicated in the Material Requisition & Schedule of Rates, meeting all the requirements as laid down in manufacturing standard EN331 (latest edition).

2.1. All codes and standard for manufacture, testing, inspection etc. shall be of latest edition.

2.2. Owner/ Owner's Representative reserves the right to delete or order additional quantities during execution of order, based on unit rates and other terms & conditions in the original order.

3.0 DEFINITIONS

Manufacturer	Means the Manufacturer of the isolation ball valves
SS	Means the present <<Standard Specification>> and all its appendix, if any.
Third Party Inspection Agency	Means the Inspection Agency to be appointed by Client.

4.0 MATERIAL SPECIFICATION FOR ISOLATION VALVES

Please Refer Data Sheet

4.1.1. Markings

Markings shall be provided & shall include:

i) Manufacturer's name or trade mark, Model designation.

ii) Rate working pressure in Barg.

iii) Embossing on valves shall be "**EN 331**" only.

4.1.2. Packaging

Packing size to be mentioned to ensure uniformity in delivery conditions of the material being procured. Packing size shall be approved by owner / owner's representive before packing the material. Bidder shall submit the packaging details during offer and also complied with at the time of delivery.

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4.1.3. Gas Tightness

Valves shall be leak tightness tested in closed position and shall not leak to atmosphere in open and closed position when subjected progressively to internal air pressure of first 0.006 barg and then to at least 1.5 times the maximum operating pressure (MOP) of the valve. This test shall be performed as per EN331 (latest edition).

4.1.4. Temperature resistance test

This test shall be carried out as per EN331 (latest edition).

4.1.5. Mechanical Strength

i) The body of the valves shall be capable of withstanding, without deformation or leakage, a min. torque as per EN331 (latest edition) as applied to a pipe being connected to the valve.

ii) Valve shall be capable of withstanding, without deformation or leakage, a min. bending moment as per EN331 (latest edition) as applied to a pipe being connected to the valve.

iii) The valves shall be capable of withstanding impact without breakage or leakage as per EN331 (latest edition).

iv) Vendor shall submit Model Number along with catalogues in English language along with un-priced bids.

v) Maximum turning torque to operate the valve as per EN331 (latest edition).

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5.0 DATA SHEET OF ISOLATION VALVE

S.NO	DESCRIPTION	DATA	
1.00	**PROCESS DATA**		
1.01	Fluid	Natural Gas	
2.00	**Operating condition**		
2.01	Pressure	4 bar (g)	
2.02	Temperature (^{0}C)	0 - 45	
3.00	**Design condition**		
3.01	Pressure	6 bar (g)	
3.02	Temperature (^{0}C)	-5 to 60	
4.00	**VALVE DATA**		
4.01	Size	½" , ¾" & 1"	1 ½" & 2"
4.02	Type	Isolation Ball Valve, Full Bore with NPT (Confirming to ANSI B1.20.1) Female Threaded Ends (both inlet & outlet) for natural gas application with operating knob and locking arrangement, sealing wire and lead seal (without Key). Valve full open/close position shall be at 90^0. The material is required for Domestic Natural Gas Service.	
4.03	Pressure Rating	*	
4.04	End connection	End connection should be NPT Female (conforming to ANSI B1.20.1).	
4.05	Body material	Total body shall be of Forged Brass (ASTM B 283, Alloy UNSC37700) with hard Nickel / Chrome Plated. UTS – Min. 345 Mpa & Elongation 25 %	
4.06	Ball material	Hard Chrome / Nickel Plated (*), Forged Brass (ASTM B 283, Alloy UNSC37700) with Teflon Seat. UTS – Min. 345 Mpa & Elongation 25 %	
4.07	Stem	*	
4.08	Seat & seal	*	
4.09	Fire safe	*	
4.10	Anti blow out	*	
4.11	Antistatic	*	
4.12	Extension stem	NA	
4.13	Operator	Knob and locking arrangement with Butterfly type Handle	Knob and locking arrangement with Lever type Handle
5.00	**PAINTING**		
5.01	Surface preparation	*	
5.02	Primer	*	
5.03	Finish	*	
5.04	Insulation	*	
6.00	**TEST**		
6.01	Hydrostatic Shell Test		
	Test Pressure	7.8 bar(g)	
	Test Medium	*	
6.02	Hydrostatic Seat Test		
	Test Pressure	*	
	Test medium	*	

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6.03	Functional / Pneumatic Test	
	Test Pressure	7.8 bar(g)
	Test medium	Air
6.04	Tensile Strength Test	As per EN331 (latest edition)
6.05	Bending Test	As per EN331 (latest edition)
6.06	Torque Test	As per EN331 (latest edition)
6.07	Turning Torque Test	As per EN331 (latest edition)
6.08	Antistatic Test	*
6.09	Fire Test	*
6.10	Visual and dimensional examination	As per QAP
Note	Unless otherwise stated all tests will be witnessed by the purchaser	
7.00	**QUALITY CONTROL**	
7.01	Material certificates	EN-10204, 3.2 Certificate
7.02	All testing certificates	*
8.00	**NICKEL-CHROME PLATING**	
8.01	Body, Ball etc.	* (Note-3)

NOTE:

1. All Tests shall be carried out as per EN-331 (Latest Edition).
2. Data / Information as marked " * " shall be provided by Vendor / Manufacturer for review and approval by Client / PMC.
3. Nickel-Chrome Plating thickness shall be 10 micron ± 2 micron on valve body and ball.

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SUPPLY OF ISOLATION AND APPLIANCE VALVES

SS - APPLIANCE VALVE

0	16.05.2018	Issued for Client's Comments	ADE	RNR	AD
Rev.	Date	Subject of Revision	Author	Checked	Approved

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TABLE OF CONTENTS

Sr.No.	Description	Page No.
1.0	INTENT OF SPECIFICATION	3
2.0	SCOPE OF WORKS	3
3.0	DEFINITIONS	3
4.0	MATERIAL SPECIFICATION	3
5.0	DATA SHEET	5

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1.0 INTENT OF SPECIFICATION

The intent of this specification is to establish minimum requirements to manufacture and supply of Appliance Ball Valves used for supply of domestic natural gas.

2.0 SCOPE OF WORKS

2.1. The scope of the tenderer will include manufacture/ supply, inspection/ testing/ marking/ packaging/ handling and despatch of Appliance Ball Valves, as indicated in the Material Requisition & Schedule of Rates, meeting all the requirements as laid down in manufacturing standard EN331 (latest edition).

2.2. All codes and standard for manufacture, testing, inspection etc. shall be of latest edition.

2.3. Owner/ Owner's Representative reserves the right to delete or order additional quantities during execution of order, based on unit rates and other terms & conditions in the original order.

3.0 DEFINITIONS

Manufacturer	Means the Manufacturer of the Appliance Ball Valves
PTS	Means the present <<Standard Specification>> and all its appendix, if any.
Third Party Inspection Agency	Means the Inspection Agency to be appointed by Client.

4.0 MATERIAL SPECIFICATION

Please refer Data sheet.

4.1.1. Markings

Markings shall be provided & shall include:

i) Manufacturer's name or trade mark Model designation

ii) Rate working pressure in Bar.

iii) Embossing on valves shall be "**EN 331**" only.

4.1.2. Packaging

Packing size to be mentioned to ensure uniformity in delivery conditions of the material being procured. Packing size shall be approved by owner / owner's representive before packing the material. Bidder shall submit the packaging details during offer and also complied with at the time of delivery.

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4.1.3. Gas Tightness

Valves shall be leak tightness tested in closed position and shall not leak to atmosphere in open and closed position when subjected progressively to internal air pressure of first 0.006 barg and then to at least 1.5 times the maximum operating pressure (MOP) of the valve. This test shall be performed as per EN331 (latest edition).

4.1.4. Temperature resistance test

This test shall be carried out as per EN331 (latest edition).

4.1.5. Mechanical Strength

i) The body of the valves shall be capable of withstanding, without deformation or leakage, a min. torque as per EN331 (latest edition) as applied to a pipe being connected to the valve.

ii) Valve shall be capable of withstanding, without deformation or leakage, a min. bending moment as per EN331 (latest edition) as applied to a pipe being connected to the valve.

iii) The valves shall be capable of withstanding impact without breakage or leakage as per EN331 (latest edition).

iv) Vendor shall submit Model Number along with catalogues in English language along with un-priced bids.

v) Maximum turning torque to operate the valve as per EN331 (latest edition).

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5.0 DATA SHEET OF APPLIANCE VALVE

S.NO	DESCRIPTION	DATA
1.00	**PROCESS DATA**	
1.01	Fluid	Natural Gas
2.00	**Operating condition**	
2.01	pressure	4 bar (g)
2.02	Temperature (^{0}C)	0 - 45
3.00	**Design condition**	
3.01	pressure	6 bar (g)
3.02	Temperature (^{0}C)	-5 to 60
4.00	**VALVE DATA**	
4.01	Size	1/4”
4.02	Type	Appliance Ball Valve, Full Bore with NPT (Confirming to ANSI B1.20.1) Female Threaded End as an inlet and the outlet shall be having Ni/Cr plated brass or stainless steel nozzle (Serrated to suit 1/4” rubber tubing / hose connection and with a metallic operating knob for full open/close at 90^0 position. The material is required for Domestic Natural Gas Service.
4.03	Pressure Rating	*
4.04	End connection	End connection at the inlet should be NPT Female (conforming to ANSI B1.20.1) and the outlet shall be having Ni/Cr plated brass or stainless steel nozzle
4.05	Body material	Total body including the nozzle shall be of Forged Brass (ASTM B 283, Alloy UNSC37700) with hard Nickel / Chrome Plated. UTS – Min. 345 Mpa & Elongation 25 %
4.06	Ball material	Hard Chrome / Nickel Plated (*), Forged Brass (ASTM B 283, Alloy UNSC37700) with Teflon Seat. UTS – Min. 345 Mpa & Elongation 25 %
4.07	Stem	*
4.08	Seat & seal	*
4.09	Fire safe	*
4.10	Anti blow out	*
4.11	Antistatic	*
4.12	Extension stem	NA
4.13	Operator	Knob with Butterfly type Handle and without locking arrangement
5.00	**PAINTING**	
5.01	Surface preparation	*
5.02	Primer	*
5.03	Finish	*
5.04	Insulation	*
6.00	**TEST**	
6.01	Hydrostatic Shell Test	
	Test Pressure	7.8 bar(g)
	Test Medium	*
6.02	Hydrostatic Seat Test	*
	Test Pressure	*
	Test medium	*

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6.03	Functional / Pneumatic Test	
	Test Pressure	7.8 bar(g)
	Test Medium	Air
6.04	Tensile Strength Test	As per EN331 (latest edition)
6.05	Bending Test	As per EN331 (latest edition)
6.06	Torque Test	As per EN331 (latest edition)
6.07	Turning Torque Test	As per EN331 (latest edition)
6.08	Antistatic Test	*
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6.10	Visual and dimensional examination	As per QAP
Note	Unless otherwise stated all tests will be witnessed by the purchaser	
7.00	**QUALITY CONTROL**	
7.01	Material certificates	EN-10204, 3.2 Certificate
7.02	All testing certificates	*
8.00	**NICKEL-CHROME PLATING**	
8.01	Body, Ball etc.	* (Note-3)

NOTE:

1. All Tests shall be carried out as per EN-331 as per EN331 (latest edition).
2. Data / Information as marked " * " shall be provided by Vendor / Manufacturer for review and approval by Client / PMC.
3. Nickel-Chrome Plating thickness shall be 10 micron ± 2 micron on valve body and ball.

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SS – PLB HDPE DUCT

0	03.03.2017	ISSUED FOR APPROVAL	GS	AD	GSJ
Rev.	Date	Description	Author	Checked	Approved

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Date: 2025.03.13 12:56:46 IST

TABLE OF CONTENTS

1.0 INTRODUCTION 3

2.0 SCOPE 3

3.0 REFERENCE DOCUMENTS 3

4.0 PLB HDPE DUCT SPECIFICATIONS 4

5.0 INSPECTION AND ACCEPTANCE TESTS: 5

6.0 IDENTIFICATION MARKINGS 7

7.0 INSTRUCTION OF TENDERER 8

8.0 TYPE APPROVAL AND ACCEPTANCE TEST: 8

9.0 PACKAGE AND DELIVERY 9

10.0 QUALITY ASSURANCE PLAN 9

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Date: 2025.03.13 12:56:46 IST

1.0 INTRODUCTION

An Optical Fibre (OFC) system for the Telecommunication requirements has been most suitable for City Gas Distribution pipeline project.

For operation and maintenance of the OFC network, it is desired to purchase double layered permanently lubricated (PLB) HDPE duct for use as underground Optical FibreCable conduits. The HDPE duct shall be either laid in a trench at a depth of 1.65meters or shall be laid through HDD (Horizontal direction drilling) and Optical Fibre cable shall be installed using blowing techniques.

2.0 SCOPE

Objective of this specification is to establish minimum requirements to manufacture and supply of HDPE pipes used for laying OFC.This specification covers the minimum generic requirement of permanently self-lubricated high Density Polyethylene ducts (PLB HDPE ducts) for use as underground conduits for optical fibre cables, suitable for installation of OFC by blowing technique.

The scope of the tender willinclude manufacture/ supply, Inspection / testing / marking / packing / handling and despatch of HDPE pipes as per following specification: per the specification/ requirements given in this document.

Material Grade	50/42, PLB duct as per TEC specifications No. GR/CDS-08/02 Nov 04 or Latest

However Optical Fibre Cable shall be laid in a permanently lubricated HDPE pipe using blowing technique.

All codes and standards for manufacture, testing, inspection etc. shall be of latest edition.

3.0 REFERENCE DOCUMENTS

Unless otherwise specified, this document requires to the latest standards of the following:

TEC/GR/TX/CDS-008/03/MAR-11	Permanently lubricated HDPE telecom Ducts for use as underground optical fibre cable conduits
IS 2530	Method for test for Polyethylene Molding Material and Polyethylene compounds
IS 4984	High Density Polyethylene Pipes for water supply
IS 7328	High Density Polyethylene materials for molding and extrusion
IS 9938	Recommended colours for PVC insulation for LF wires and cables
IS 12235 (Part – 9)	Methods of test for un-plasticized PVC pipes for potable water supplies – Impact strength at 0°C
IS 14151 (Part – 1)	Polyethylene pipes for sprinkler irrigation systems (Part – I Pipes)
ASTMD 1693	Test method for environmental stress cracking of ethylene plastics.

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4.0 PLB HDPE DUCTSPECIFICATIONS

The PLB HDPE duct shall consist of two concentric layers, the outer layer being HDPE, co-extruded with an inner layer of solid permanent lubricant, to reduce the internal coefficient of Friction (ICF). The lubricant shall be of a solid layer of uniform thickness so formulated to provide a permanent, low friction boundary layer between the inner surface of the duct and Optical Fibre cable. The lubricant layer shall be clearly visible in cross section, concentric with the outer layer.

Alternatively, the duct can be of a homogenous construction (without a separate inner layer) meting all the requirements of this specification.

The PLB HDPE Ducts shall be supplied in coil form, suitable for shipping and handling purposes.

4.1 Construction

Outer Layer

The base HDPE rein used for the outer layer of the PLB HDPE duct shall conform to any designation of IS – 7328 or to any equivalent standard meeting the following requirements, when tested as per IS – 2530. However, the manufacturers shall furnish the designation for the HDPE resin as permanently IS – 7328 as applicable.

Density	0.940 to o.958g/cc at 27ºc, when tested as per IS: 2530 or IS: 7328
Melt Flow Rate	0.2 to 1.1 g/10 minute at 190ºc &5 kg load, when tested as per IS:2530

Inner Layer

The inner lubrication material shall be of friction reducing, polymeric material which shall be integral with HDPE layer. The lubricant materials shall have no toxic or dermatic hazards for safe handling. In the finished PLB HDPE duct, the co-extruded layer of solid permanent lubricant shall be integral part with HDPE and shall be white in colour and clearly visible in cross-section of duct.

The density of inner layer material shall be whitein colour & clearly visible in cross- section of duct. The density of inner layer material shall bebetween 0.940 and 0.958g/cc at 27ºc.

The inner layer of solid permanent lubricant shall be continuous all through and shall not come out during storage, usage and throughout the life of the duct.

4.2 Raw Material

The raw material (s) used for the duct shall meet the following requirements:

- The anti-oxidants used shall be physically harmless.
- None of the additives shall be used separately or together in quantities as to impair long term physical and chemical properties of the duct.

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- Single pass rework material of the same composition produced from the manufacturer's own production shall be used and it shall not exceed 10% in any case.
- The raw material used for extrusion shall be dried the moisture content to less than 0.1%.
- Suitable UV stabilizers shall be used for manufacturer of the duct to protect against ultra violet degradation, when stored in open for a minimum period of 8 months.
- The raw material used in the manufacturer of the duct shall be such that the service life of the duct can be expected to be more than 50 years including the life of permanent lubricant.

5.0 INSPECTION ANDACCEPTANCE TESTS:

Bidder shall submit Quality Assurance Plan (QAP) immediately after receipt oforder for client's approval. The test and inspection shall be carried out as per the QAP in accordance with the codes and standards outlined in the specification.Following test shall be conducted as a minimum as per the codes and standardsindicated in this document in the manufacturers premises. Test results mustcomply with specifications as per TEC GR Nos. TEC/GR/TX/CDS-008/03/MAR-11, including all the other requirements, which are necessary

Client reserves the right to carry out inspection at vendor place, as per approved QAP, By Client representative or representative of the any third party agency nominated by Client. Notice for inspection shall be given to Engineer-in-charge at least one week in advance.

5.1 Visual Inspection

The ducts shall be checked visually for ensuring good workmanship that the ducts shall be free from blisters, shirks hole, flaking, chips, scratches, roughness, break and other defects. the ducts shall be smooth, clean, round. The ends shall be cleanly cut and shall be square with axis of the duct.

The colour of the duct shall be green and uniform throughout. Each duct shall contain 4 approximately equi-spaced continuous longitudinal stripes of width 3-mm minimum in white colour. These stripes shall be co-extruded during manufacturing. The material of the stripes shall be same as that of base compound for the duct.

In the case of two-layer construction the inner layer (Soil Lubricant) shall be white in colour.

The colours of the duct, stripe and inner layer (in the case of two-layer construction) shall be identifiable under normal lighting conditions and generally conform to IS-9938.

5.2 Dimension of Ducts

Please refer Technical data sheet

5.3 Tensile Strength and Elongation

Test shall be carried out as per ASTM F 2160 (using type IV specimens of ASTM D 638)

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5.4 Reversion Test

The test shall be carried out as per IS-4984. For this purpose, a duct length of 200 mm shall be placed horizontally in an air-oven or a suitable liquid bath on a support at 110 ± 2°C for 60 ± 1 minutes so that the dimensional change in duct section are not impeded. After cooling to room temperature, the dimensional change of the duct section shall be measured in the longitudinal direction and the deviation from the initial length shall be calculated and stated in percentage. The dimensions shall not change by more than 3% in the longitudinal direction.

5.5 Environmental Stress Crack Resistance Test

The specimen cut from the PLB HDPE ducts shall meet the environmental stress cracking as described in ASTM D-1693.

5.6 Impact Strength Test

The test has to be carried as per IS-12235 (Part – 9). A sample duct 150 mm in length shall be placed on heavy rigid block whose faces are at an angle of 120°. A striker with a hemispherical nose of 13 mm radius and loaded to a total weight of 10 kg shall be allowed to fall freely in a suitable vertical guide through a height of 1.5 m before striking the duct. The line of fall of the striker shall coincide with the diameter of the duct. The duct shall not crack or split.

5.7 Crush Resistance Test

Samples of duct of 150 mm ± 2 mm in length shall be subjected to a dead load of not less than 50 kg for one minute and shall be allowed to recover for 5 minutes. The deflection with load on and after recovery period shall not exceed 10% and 2% respectively.

5.8 Mandrel Test

A 150-mm long mandrel of diameter, 3 mm less than the internal diameter of the duct shall be passed through a 5-meter length of duct, freely throughout the length, when the duct is bent to a radius of 5 meters.

5.9 Ovality Test

Ovality is the difference between maximum outside diameter and the minimum outside diameter at the same cross-section of the duct, at 300 mm away from the end.

5.10 Coil Set Test:

The PLB HDPE duct shall unroll of the drums without snaking or waving having zero coil set. Thus, the duct shall lay straight into the trench without re-coiling. For this purpose, when a minimum length of 50 meters' duct taken from the coil and laid on the ground, it shall be straight without any bends or kinks and without deformation, except 5 meters from each end.

5.11 Oxidation Induction Test:

The induction time in oxygen when tested with a copper pan as per method specified in Annexure-I of Latest TEC GR and, shall not be less than 30 minutes.

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5.12 Hydraulic Characteristics:

The duct shall be tested for internal pressure creep rupture test as per IS-4984. For this purpose, a sample length of 10 times the outside diameter of the duct shall be taken. At the end of the test, the sample shall not show signs of localised swelling or leakage and shall not burst during the test duration. The test showing failure within a distance equivalent to the length of end cap from the end shall be disregarded and the test repeated.

5.13 Internal Co-efficient of Friction:

The internal Co-efficient of Friction when tested as permanently method, shall not exceed 0.06 when tested with respect to Nylon jacketed unarmoured Optical Fibre Cable i.e., 48 F Fibre as required.

5.14 Optical Fibre Cable Blowing Test:

For this test an Optical Fibre Cable of a diameter nearest to the diameter indicated in this specification, relevant to the size of duct under test shall be installed by blowing of the cable in a length of 1 km of the duct. The duct shall be laid with bends in the horizontal and vertical planes and a raise in the middle. The 1 km section shall include two couplings at suitable locations.

The OFC shall then be blown out. It shall be inspected for any visual damage. The OFC shall then be blown in again.

It shall be possible to blow in the Optical Fibre Cable through the 1 km duct, each time in not more than 30 minutes. There shall be no visible damage to OFC. The test will be conducted on two samples out of the five submitted for Type Approval.

6.0 IDENTIFICATION MARKINGS

The duct shall be prominently marked with indelible link, with the following information at intervals every meter to enable identification of the pipe. The size of ink markings shall be distinct, clearly and easily visible.

- Client Name
- Client Logo
- Manufacturer’s Name
- Name of the duct with size
- Designation of the Pipe
- Date of manufacturing
- Sequential length marking at every meter.

Marking shall be done in continuous length of pipe as per TEC .In addition to the above the pipe shall be marked as “Client” in continuous lengths at interval of 1 m.

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7.0 INSTRUCTION OF TENDERER

7.1 Length of Pipe:

Length of the Pipes and their supply will be as per following: -

DN 50mm- 500 ± 100 mtr.

7.2 Protection:

The ends shall be protected by proper end caps to prevent from shocks and ingress of the foreign body.

7.3 Documents to be submitted

- The successful bidder shall submit following for approval of Purchaser/ Consultant after placement of order
- The quality Assurance Plan (QAP & Sampling Plan)
- Material Test report as per TEC
- Performance Requirements (TEC)
- Type Test (as per TEC)

7.4 Bidder shall submit following documents at the time of bidding,

a) BIS Certification

b) List of current orders in hand for similar items with full details such as specification, name of purchaser etc.

c) Details of the largest supply executed

d) Name and address of proposed test laboratories along with their credentials / past records for carrying out all required tests.

8.0 TYPE APPROVAL AND ACCEPTANCE TEST:

All the tests mentioned in this document shall be carried out on the 5 standard lengths of ducts and the samples must pass these tests before according the type approval. The supplier shall furnish 5 standard length for carrying out these tests for according type approval. Bulk manufacturer and supply shall start only after issue of type approval. The type approval certificate shall clearly be indicated the type/ grade/ source of high-density polyethylene raw material, the size of the duct and the construction of the duct i.e., Two layer of Homogenous.

8.1 Acceptance Test

The acceptance tests shall be carried out on samples from the lot for Dimensional and Visual requirements. The requirements for Tensile Strength & Elongation, Reversion Test, Environmental Stress Crack resistance, Impact Strength, Crush resistance, Oxidation Induction Test, Hydraulic Characteristics and internal Coefficient of Friction shall be carried out.

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9.0 PACKAGE AND DELIVERY

The store shall be supplied in coils of suitable size for delivery in such a manner that they arrive at their distribution in a safe and undamaged condition and will permit the loading, unloading and handing the stores using standard moving equipment. The minimum inner bending diameter of technical coiled duct shall be 25 times the outer diameter of the cut. The material used for packaging wrapping sealing, moisture, resistant, corrosion prevents etc. as per applicable shall be of recognized brands and shall conform to best standards for packaging. The packing shall protect the material from impact vibration rough handling rain, dust, damp, insects, rodents etc., Each packing should have packing slip and test dispatch clearance documents.

10.0 QUALITY ASSURANCE PLAN

1. Vendor shall submit the details for Quality Assurance Plan followed by them, beginning with raw materials, fabricated components, assemblies, etc., to finished product (As Applicable).
2. The Owner reserves the right to inspect and test duct at all stages of production and testing. The inspection and testing shall include but not be limited to materials, subassemblies, prototypes, produced units, guaranteed, performance specifications etc.
3. For factory inspection and testing, vendor shall arrange all the requirement e.g., quality assurance personnel spaces, test gear etc., for successful carrying out of the job by the Owner's respectively at vendor's cost at the vendor's/ Manufacturer 's works
4. Vendor shall invite the Owner, at least 30 days in advance, of the date on which material shall be ready for inspection and testing. All relevant documents and manuals approved engineering drawings, etc. shall be provided to the Owner well in advance of the start of inspection and Testing.
5. Owner shall, after completion of inspection and testing to their satisfactory, issues factory acceptance certificate to release duct for shipment. No Duct shall be shipped under any circumstances unless a factory acceptance certificate has been issued for it, unless agreed otherwise by Owner.
6. The observation and test results obtained during various tests conducted shall be complied and documented to produce test reports by vendor. The test reports shall be given for each equipment / items and system as a whole.

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	STANDARD SPECIFICATION FOR MDPE LINE PIPE			
			Total Sheets	09
DOCUMENT NO	VPC	SS	PL	0025

STANDARD SPECIFICATION

FOR

MEDIUM DENSITY POLYETHYLENE (MDPE)

LINE PIPE

0	10.10.2017	ISSUED AS STANDARD SPECIFICATION	MD	SM	AD
Rev.	**DATE**	**DESCRIPTION**	**PREP**	**CHK**	**APPR**

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TABLE OF CONTENTS

1.0 DEFINITIONS 3

2.0 TERMINOLOGY 3

3.0 DESIGN CODES/ STANDARDS REFERENCES 3

4.0 RAW MATERIAL GRADE AND PROPERTIES 4

5.0 APPROVED MANUFACTURER FOR RAW MATERIAL (PE-80) 5

6.0 PIPE SIZE/ DIMENSION 5

7.0 TOLERANCE 6

8.0 COLOR 6

9.0 MARKING 6

10.0 QUALITY ASSURANCE PLAN (QAP) 7

11.0 TYPE TEST CERTIFICATE 7

12.0 FINISH / DEFECT LIABILITY 7

13.0 FIRST LOT / FIRST CONSIGNMENT LIABILITY 7

14.0 SUPPLY, PACKAGING, HANDLING TRANSPORTATION AND STORAGE OF PE-80 PIPES 7

15.0 DOCUMENTS TO BE SUBMITTED ALONG WITH BID 7

REFERENCES: AMENDMENTS TO THE CLAUSES OF IS-14885:2001 7

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1.0 DEFINITIONS

Where used in this document, the following terms shall have the meanings indicated below, unless clearly indicated by the context to this order

OWNER	:	
CONSULTANT	:	VCS Quality Services Private Limited (VCSQSPL) the party to act for and on behalf of OWNER for the PMC Services.
MANUFACTURER	:	The party, which manufactures and supplies equipment and services to the OWNER or to CONTRACTOR
MR	:	Material Requisition.

2.0 TERMINOLOGY

- Maximum Allowable Operating Pressure (MAOP): The maximum effective pressure of gas in a piping system, expressed in bars, which is allowed in continuous use. It takes in account physical & mechanical characteristics of the components of piping system.

  The equation for MAOP = 20 x MRS/C X (S D R- 1)

- Minimum Required Strength (MRS) — Minimum value in MPa, for long-term hydrostatic strength (LTHS) of the material.

- Nominal Outside Diameter (d_n): A convenient round number (in millimetres) for reference purposes which is common to all components in all thermoplastic systems, except for flanges and components which are designated by thread size.

- Out of roundness (Ovality): The absolute out of roundness is the difference between the measured maximum outside diameter and the measured minimum outside diameter in the cross - section of pipe.

- Nominal Wall Thickness(e_n): The wall thickness in millimetre
  Corresponding to minimum wall thickness at any point around circumference of the pipe
- Resin: A material (solid or semi-solid) which has a high molecular weight and is a product of polymerization.

- Melt Flow Rate (MFR): is a value relating to the viscosity of the molten material at a specified temperature and a rate of shear.

- Standard Dimension Ratio (SDR). The ratio of nominal outside diameter of a pipe to its nominal thickness.

For any other terminology, IS-14885-2001 (latest) and/ or other applicable National International codes/Standard can be referred.

3.0 DESIGN CODES/ STANDARDS REFERENCES

The following National & international codes/ standards/ references (Latest edition) shall be applicable for PE-80 material as well as Polyethylene pipe.

IS0-14885	Polyethylene pipes for supply of Gaseous Fuels
ISO-4437	Buried Polyethylene pipe for supply of Gaseous fuels – metric Series- Specification
IS-2530	Methods of test for PE moulding materials and PE compound

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ISO-11830	Plastic: Methods for determining the density of non-cellular plastic
IS0-1872-28	Plastic: polyethylene (PE) moulding and extrusion material.
ISO-527	Plastics: Determination of tensile properties.
IS0-1133	Plastics - determination of the melt-mass flow rate (MFR) and melt volume flow rate (MVR) of thermoplastic.
EN 1555-7	Gaseous fuels supply polyethylene (PE)

4.0 RAW MATERIAL GRADE AND PROPERTIES

- Raw material grade classification shall conform to Cl.4.2.1 of IS-14885: 2001.
- The raw material of polyethylene pipes shall be PE-80.
- The properties of PE-80 shall conform to the table 2 of IS-14885: 2001.
- Other materials /additives such as, anti-oxidant, UV stabilizer, pigment dispersion etc. shall conform to IS-14885: 2001.
- Raw material of polyethylene pipes shall be of virgin quality. PE compound shall be Cadmium free pigment compound.
- Anti-oxidant & UV stabilised used in PE resin shall not exceed 0.3 and 0.5 % by mass of Finished resin respectively.
- Raw material supplier to supply the certificate for percentage use of U.V. stabilizer in the raw materials (PE compound).

➢ Properties of PE-80

Property	Unit	Test Method	PE-80
Conventional Density	Kg/m3	IS-7328: 1992	≥ 928.4 at 23°C ≥ 930.0 at 27°C
Tensile Yield strength	MPa	IS-14885: 2001	15, minimum
Elongation at break	%	IS-14885: 2001	350, minimum
Melt-mass Flow Rate	g /10 min.	IS-2530: 1963 IS-14885: 2001	+/- 20% of value nominated by compound producer@ 190°C/ 5.0kg (load)
Thermal stability	Minute	Annexure-D of IS-14885-2001	≥ 20@ 200°C

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Oxidation Induction time	Minute	IS-14885: 2001	≥ 20
Volatile Matter Content	(mg/kg)	IS-14885: 2001	≤ 350
Pigment Dispersion		IS-14885: 2001	≤ 3
Resistance to gas constituents	h	IS-14885: 2001	>=20@ 80°C

The above requirements are also same for the final product.

- PE compound quality evaluation shall be as per IS-14885: 2001.

5.0 APPROVED MANUFACTURER FOR RAW MATERIAL (PE-80)

1. INEOS
2. BOREALIS
3. TOTAL PETROCHEMICALS
4. DOW
5. BASELL
6. BOROUGE

6.0 PIPE SIZE/ DIMENSION

- Wall Thickness

SL. NO.	NOMINAL DIA.	MINIMUM WALL THICKNESS,(e) mm	SDR	OVALITY
1	20	3.0	11	IS-14885: 2001
2	32	3.0	11	IS-14885: 2001
3	63	5.8	11	IS-14885: 2001
4	125	11.4	11	IS-14885: 2001

- Length of Pipes

The required minimum length of straight pipes and coils I reels shall be as Follows:

Nominal Diameter (mm)	Packing Length (m)	Straight Length (m)
20	200,Roll	-
32	150,Roll	-

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Date: 2025.03.13 12:56:46 IST

63	100,Roll	-
125	50,Roll	-

- Method of Measurement

The method of measurement of outside diameter, wall thickness, length, ovality etc. of pipe shall conform to IS-14885: 2001 or equivalent code/standards.

7.0 TOLERANCE

❖ Tolerances for Random Length of Pipes

- Tolerances for each rolled pipes - 0/+0.5m
- Tolerances for each straight pipes - 0/+0.05m

❖ Tolerances on Nominal wall thickness at any points of pipe shall be in accordance with IS-14885: 2001 or equivalent codes / standards.

8.0 COLOR

The pipe shall be of YELLOW colour, when the pipe shall be manufactured from PE-80 grade of raw material.

9.0 MARKING

❖ Owner's name as Client to be marked on each pipe.

- All pipes shall be permanently and legibly marked along their length with a legend, which shall be impressed to a depth of not more than 0.15 mm.
- Marking details shall be formed in such a way that marking does not initiate cracks or other type of failure and in such a way that with normal storage weathering and processing and permissible method of installation use legibility shall be maintained for the pipe

❖ The embossing for yellow pipe shall have black base. Height of character shall be uniform and at least as given below:

a) 3 mm for pipe less than 90 mm nominal size.

b) 5 mm for pipe greater than 90 mm nominal size.

❖ Legend shall be repeated at intervals of 1 m and shall consist of following Information's:

a) Manufacturer's identity name or trade name,

b) Material and designation

c) Batch no. or lot no

d) Internal fluid

e) SDR

f) Reference of standard

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10.0 QUALITY ASSURANCE PLAN (QAP)

Vendor to submit their own QAP along with offer based on indicative QAP enclosed in this tender. However, the same QAP shall be submitted for approval to the Owner/ Owner's representative.

11.0 TYPE TEST CERTIFICATE

Vendor to submit Type Test Certificates as per IS-14885: 2001 along with the offer.

12.0 FINISH / DEFECT LIABILITY

The internal and external surfaces of the pipes shall generally be smooth, clean and free from cavities and other surface defects, which may affect pipe performance. The pipe ends shall be cut cleanly and square to the axis of the pipe and shall be within the tolerances of ends. Defect liability period shall be 24 months from last date of delivery of pipes.

13.0 FIRST LOT / FIRST CONSIGNMENT LIABILITY

Vendor shall supply 1st Lot / 1st Consignment from their Warehouse / Store subject to following tests of at least one sample from that lot / consignment duly witnessed by Client / PMC's Representative:

- Hydrostatic Strength at 80°C for at least 165 hr. as per Cl. 8.1, IS-14885.
- Elongation at break 350 percent (Min.), as per Cl. 8.7, IS-14885.

14.0 SUPPLY, PACKAGING, HANDLING TRANSPORTATION AND STORAGE OF PE-80 PIPES

Packaging shall be done in Hessian cloth (Jute) with polyethylene sheet wrapped around the pipe to avoid direct sunlight and facilitate out-door storage. Packing size to be mentioned to ensure uniformity in delivery conditions of the pipe being procured Bidder shall submit the packaging details during offer and also complied with at the time of delivery. Manufacturer shall make an arrangement for unloading of pipes at Owner's premises.

15.0 DOCUMENTS TO BE SUBMITTED ALONG WITH BID

All Relevant Documents like BIS Certification, Catalogue Etc. to be Submitted Along With the Bid.

REFERENCES: AMENDMENTS TO THE CLAUSES OF IS-14885:2001

1. TERMINOLOGY

1.1 Lot of Batch of Compound

By lot of batch of compound is meant a homogeneous quantity of PE compound of same origin of particular brand.
The lot must be registered under a single identification number (lot No.) which leaves no doubt as to the origin, identity & date of manufacture of the compound.

2. MATERIAL

2.1 Polyethylene Compound

Polyethylene compound used in manufacture of pipes shall not contain following:-

Recycled Materials

Mixture of different material

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Date: 2025.03.13 12:56:46 IST

3. Other Materials

Addition of complementary materials and I or mixture of different materials by the pipe manufacturer is forbidden.

4. PERFORMANCE REQUIREMENTS

4.1 THERMAL STABILITY TO OXIDATION

The Maximum admissible decrease in the oxidation induction time measured on a pipe sample compared to that measured on the raw material shall not exceed 20% of the latter.

5. SAMPLING, FREQUENCY OF TEST AND CRITERIA FOR CONFORMITY

5.1 Acceptance Tests

5.1.1 LOT

All pipes of the same size, same pressure rating and also manufactured essentially under similar conditions of manufacture i.e. made in a continuous process by the same extrusion machine and from the same Lot of batch of compound shall constitute a lot.

6. ANNEXURE – K, (CLAUSE – 11 OF IS-14885): SUPPLY, PACKAGING, HANDLING AND TRANSPORTATION OF POLYETHYLENE PIPES FOR GAS TRANSMISSION

K.1 SUPPLY

Prior to execution of the order, the manufacturer must submit to the company the seals which it intends to use for all the types of pipes ordered. The seals shall preferably be made of PE or material which does not adulterate polyethylene. Metal and PVC seals are not permitted. The seals must be able to withstand storage terms as guaranteed in Clause K6: STORING (of MDPE Pipe) of this Annexure-K and also to withstand handling during installation. They must not be brittle or sharp and the materials, shapes and dimensions thereof most are such that they cannot fully penetrate inside the pipes. They are of the internal plug type for all pipes supplied in straight lengths, and or pipes rolled in coils or on reels, the seals may be caps.

All seals are fitted with valve to prevent pressurization or depressurization of the pipes, depending on climatologically temperature cycles. In theory, they are placed on the pipes immediately after completion of the manufacturing tests, but before storage of the pipes. In the event of acceptance, the pipe plugs are removed and replaced by the supplier. The seals cannot be recycled after the pipes have been installed. Their removal on site should not require the use of special tools.
PE can be delivered in straight length or coils, transported and stored. Care should be taken to maintain the coil diameter at or above the specified minimum to prevent deformation. Coiled pipe should be contained on a dispensing reel. The pipe should be wrapped with non- transparent PE films of 100 mm gauge to protect from ultra violet rays.

K.2 HANDLING

PE pipe is relatively light and flexible however, it is susceptible to damage from sharp objects and stones. It should not be dragged, dropped or subjected to rough handling during loading or unloading, transport, storage or actual installation.

K.3 TRANSPORTATION

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When being transported, care should be taken to ensure pipes are not restrained in such a manner as to cause damage to them. Sharp sections bearing against the pipes should be avoided so as to minimize the chance of indentation or scoring of the pipe wall.

Pipes with end treatment should be stacked or supported in such a way that the ends are free from loading. Pipe ends, particularly ends cut for jointing, should be given special attention at all times to ensure they are free from damage.

K.4 STORAGE

Pipes should be stored in such a manner as to prevent damage from elevated temperatures, direct sunlight and contact with chemicals.

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STANDARD SPECIFICATION FOR MEDIUM DENSITY

POLYETHLENE FITTTINGS

0	26.11.2018	ISSUED AS STANDARD	PK	MD	AD
Rev.	Date	Description	Author	Checked	Approved

Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST

TABLE OF CONTENTS

1. SCOPE
2. APPLICABLE CODES, SPECIFICATIONS AND STANDARDS
3. ABBREVIATIONS AND TERMINOLOGY
4. TECHNICAL REQUIREMENTS
5. MATERIALS
6. DESIGN
7. DIMENSIONS AND TOLERANCES
8. DOCUMENT REQUIREMENT
9. QUALITY ASSURANCE PLAN
10. MARKING
11. PACKAGING

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Date: 2025.03.13 12:56:46 IST

1.0 SCOPE

This specification along with applicable codes and standards describes the minimum requirements for design, selection, manufacture, inspection/ testing and supply of "MDPE FITTINGS".

This specification elaborates the requirements for Electrofusion fittings in the nominal size range 16 mm to 180 mm made from PE compound used with PE pipes for supply of natural gas and to be used at operating pressure 4.0 bar(g) & operating temperature 25°C.

The material grades shall be PE80 and SDR 11.

2.0 APPLICABLE CODES, SPECIFICATIONS AND STANDARDS

EN 1555-1: Plastics piping systems for the supply of gaseous fuels- Polyethylene (PE) - part 1: General

EN 1555-2 / ISO 4437-2 / IS-14885: Plastics piping systems for the supply of gaseous fuels- Polyethylene (PE)

EN 1555-3: Plastics piping systems for the supply of gaseous fuels- Polyethylene (PE) - part 3: Fittings

EN 1555-5, Plastics piping systems for the supply of gaseous fuels -Polyethylene (PE)- Part 5: Fitness for purpose of the system

EN 1555-7: Plastics piping systems for the supply of gaseous fuels- Polyethylene (PE) - part 7: Guidance for assessment of conformity

EN 1716, Plastics piping systems — Polyethylene (PE) tapping tees — Test method for impact resistance of an assembled tapping tee

ISO TR 13950:1997 or latest edition: Plastics pipes and fittings - Automatic recognition systems for Electro fusions

ISO/IEC 16390:1999 or latest edition: Information technology – Automatic identification and data capture techniques – Bar code symbology specification- Interleaved 2 of 5

EN ISO 17778, Plastics piping systems — Fittings, valves and ancillaries' — Determination of gaseous flow rate/pressure drop relationships

EN ISO 1133, Plastics — Determination of the melt mass-flow rate (MFR) and the melt volume-flow rate (MVR) of thermoplastics

EN ISO 3126, Plastics piping systems — Plastics piping components — Measurement and determination of dimensions

ISO 228-1, Pipe threads where pressure-tight joints are not made on the threads — Part 1: Dimensions, tolerances and designation

Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST

PNGRB and other referrals in the above applicable codes.

3.0 ABBREVIATIONS & TERMINOLOGY

d_n / d_o	: Nominal Outside Diameter
e_n	: Nominal Wall Thickness
SDR	: Standard Dimension Ratio = d_n / e_n
LTHS	: Long Term Hydrostatic Strength (at 20°C for 50yrs)
LCL	: Lower Confidence Limit – Stress value (MPa) of mean LTHS
MRS	: Minimum Required Strength – min. value (in MPa) for LTHS of material
C	: Design Co-efficient – As per ISO: 12162 Table-2
σ_s	: Design Stress (= MRS/C)
MFR	: Melt Mass Flow rate – Value related to viscosity of the molten material at a specified temp. and rate of shear. (expressed in g/10min.)
D_f	: De-rating Co-efficient (Refer Table A.1, Annex A – EN 1555-5)
MOP	: Maximum Operating Pressure = (20 x MRS) / {(SDR-1) x C x D_f}
EF	: Electrofusion

4.0 TECHNICAL REQUIREMENTS

4.1 The design of fittings shall be as per European Standards EN 1555-3 and the complementary particular requirement.

4.2 The fittings are intended to be use in gas distribution networks made of PE and Steel/GI pipes.

4.3 No component of the fitting shall show any signs of damage, scratches, pitting, bubbles, blisters, inclusions or cracks to an extent that would prevent conformity of the fittings to the requirements of this standard.

4.4 Color of the PE parts of fittings shall be black as per PNGRB.

4.5 Allowable pressure drop shall be as per the standard ISO 17778.

4.6 Any melt exudation shall not cause wire movement in electrofusion fittings such that it leads to short-circuiting, when jointed in accordance with the manufacturer's instructions. There shall be no excessive creasing of the internal surfaces of the adjoining pipes.

4.7 Fittings joints shall conform to EN 1555-5 and shall be leak proof.

4.8 Electrical characteristics

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Date: 2025.03.13 12:56:46 IST

a) For voltages greater than 25 V, direct human contact with energized parts shall not be possible when the fitting is in the fusion cycle during assembly in accordance with the instructions of the manufacturers of the fittings and of the assembly equipment, as applicable.

b) The manufacturer shall state the tolerance on the electrical resistance of the fitting at 23 °C. The resistance shall not exceed the following value: [nom. value ± 10 %] + 0.1 Ω.
Note: 0.1 Ω is the assumed value of the contact resistance.
The operating voltage of the fittings shall remain 40 +_ 0.5 V.

c) The surface finish of the terminal pins shall allow a minimum contact resistance in order to satisfy the resistance tolerance requirements. Electrofusion terminal connections shall be as per Annex A of EN 1555-3.

4.9 Mechanical characteristics

a) Fittings shall have mechanical characteristics conforming to the requirements given in Table 4 of standard EN 1555-3.

a) The technical descriptions of the manufacturer shall include the following information:
   a) field of application:
      – pipe and fitting temperature limits;
      – pipe series or SDRs;
      – ovality;
   b) assembly instructions;
   c) fusion instructions:
      – fusion parameters with limits;
   d) data for saddles and tapping tees:
      – the means of attachment (tools and/or under clamp);
      – Need to maintain the under clamp in position in order to ensure the performances of the assembly.

b) Unless otherwise specified by the applicable test method, the test pieces shall be conditioned at (23 ± 2) °C before testing.

c) Testing of fitting shall be in accordance with the test methods as specified in Table 4 of standard EN 1555-3 using the indicated parameters.

d) Hydrostatic test pressure and minimum test period shall be as per Table-5 of EN 1555-3.

4.10 Physical characteristics

a) Fittings shall have physical characteristics conforming to the requirements given in Table 7 of standard EN 1555-3.

b) Thermal stability test shall be done at 200 deg. C by means of differential scanning calorimetry (DSC), considering oxygen induction time (OIT) ≥ 20 min.

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Date: 2025.03.13 12:56:46 IST

c) Melt mass flow rate shall be calculated at 190 deg. C by applying 5 Kg of load on test specimen. It shall be expressed in g/ 10min.

d) Unless otherwise specified by the applicable test method, the test pieces shall be conditioned at (23 ± 2) °C before testing.

e) Testing of fitting shall be in accordance with the test methods as specified in Table 7 of standard EN 1555-3 using the indicated parameters.

4.11 Performance requirements

When fittings are assembled to each other or to components conforming to other parts of EN 1555, the joints shall conform to EN 1555-5.

In case of wall thickness design different from that according to Table-2 of EN 1555-3, fittings and associated joints shall additionally meet the performance requirement listed in Table-6, EN 1555-3.

4.12 Electro Fusion Fitting Jointing

a) For Electro Fusion fitting jointing an electrical resistance element is incorporated in the socket of fitting which when connected to an appropriate power supply, melts and fuses the materials of the pipe and fitting together.

b) The effectiveness of this technique depends on attention to the preparation of the jointing surfaces, in particular the removal of the oxidized surface of the pipe over the socket depth and ensuring the jointing surface are clean. If ovality causes gap between concentrically located pipe and the fitting to exceed 1% of the pipe OD after re-rounding to ensure correct welding. If the gap still exceeds 1% of the pipe OD after re-rounding then a check should be made of the pipe OD dimensions to determine if it meets specification.

c) The maximum gap between eccentrically located pipe and fitting i.e. pipe touching fitting at one point must not exceed 2% of the pipe OD.

d) Sometimes coiled pipes may be too oval to fit into couplers, or the end of the pipe may make the alignment of the ends impossible. In such circumstances the use of a mechanical pipe straightener or rounding tool is necessary.

4.13 Electro-Fusion Saddle Jointing

a) For Electro Fusion fitting jointing an electrical resistance element is incorporated in the socket of fitting which when connected to an appropriate power supply, melts and fuses the materials of the pipe and fitting together.

b) The effectiveness of this technique depends on attention to the preparation of the jointing surfaces, in particular the removal of the oxidized surface of the pipe over the socket depth and ensuring the jointing surface are clean.

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Date: 2025.03.13 12:56:46 IST

c) Method of holding the tapping tee saddle during the fusion cycle are used namely top loading and under clamping space around the pipe. In a trench a minimum clearance of 150 mm is required.

4.14 Conditioning Period

Refer below table (Table-1 of ISO 11413) for minimum conditioning required for joints.

Nominal wall thickness, e_n Mm	**Minimum conditioning period** H
$e_n < 3$	1
$3 \le e_n < 8$	3
$8 \le e_n < 16$	6
$16 \le e_n < 32$	10
$32 \le e_n$	16

5.0 MATERIALS

5.1 The PE compound from which the fittings with electrofusion socket are made shall conform to EN 1555-1.

5.2 The PE compound of the fittings shall be made only from virgin material conforming to EN 1555-1. PE compound shall be cadmium free pigment compound.

5.3 All parts of the fittings in contact with the gas stream shall be resistant to the gas, its condensates and other occurring substances such as dust.

5.4 The PE fittings made from below listed material are forbidden:

a) Use of recycled materials
b) Mixture of different materials
c) Addition of complementary materials

5.5 The material and constituent elements used in marking of fittings (including elastomers, greases and any metallic part, if used) shall be resistant to the external and internal corrosion and shall have life expectancy under following conditions at least equal to the PE pipes with which they are intended to be used.

a) During storage
b) Under the effect of the gas conveyed
c) With respect to the services environment and operating conditions
d) Fittings material in contact with the PE pipe shall not adversely affect pipe performance or initiate stress cracking.

5.6 All metal parts susceptible to corrosion shall be adequately protected.

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Date: 2025.03.13 12:56:46 IST

5.7 When dissimilar metallic materials are used which can be in contact with moisture, steps shall be taken to avoid the possibility of galvanic corrosion.

5.8 Greases or lubricants shall not exude onto fusion areas, and shall not affect the long-term performance of fitting materials. Other materials conforming to 4.2.1 of EN 1555-3 may be used provided that it is proven that the fittings conform to this standard.

6.0 DESIGN

Fittings shall be designed for system operation at the pressures given in below table.

Material	M.R.S. MPa	LCL (200C, 50Yrs 97.5%) MPa	Maximum Allowable Operating Pressure	Operating Voltage
PE 80	8.0	10.00 < LCL< 11.19	7.0 bar	40 +_ 0.5V

Fittings shall be free from cracks, voids, blisters, distortion, dent or other defects.

Fittings shall be capable of being fusion jointed to pipes using control boxes. The fittings shall exhibit the strengths and fusion compatibility with pipes of respective sizes.

Each fitting shall be bar coded which shall conform to ISO/TR 13950:1997 & ISO/IEC 16390:1999 or latest edition's and shall have a permanent fusion indicator.

Heating coil design shall be such that it should not be damaged during assembly leading to short circuit of heating coil.

Electrofusion Jointing:

PE pipes, fittings and valves intended to be used for jointing by electrofusion shall be prepared and assembled in accordance with ISO 11413. The conditions for the preparation of the joints are given in clause 4.2.3 of EN 1555-5 for the assessment of fitness for purpose of electrofusion joints.

For joints with electrofusion saddle fittings, the electrofusion saddle fitting shall be fused to the pipe, while it is pneumatically pressurized to the allowable maximum operating pressure. The pipe shall be cut immediately after the manufacturer prescribed cooling time has elapsed.

These joints with electrofusion saddle fitting should be prepared taking into consideration national safety regulations.

For straight equal electrofusion socket fittings (couplers) test joints on selected diameters out of the product range shall be prepared with a gap of $0.05d_n$ between the pipe end and the maximum theoretical depth of penetration of the fitting, where for diameters greater than 225 mm the adjoining pipes shall be arranged to provide the maximum angular deflection possible for the fitting, limited to 1.5°.

Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST

6.1 Electrofusion Socket Fittings

Electrofusion Socket Fittings shall incorporate a method of controlling pipe penetration within each socket. The inner cold zone of each socket shall not be less than (0.1 d + 5) mm for sizes upto 125 mm & 0.1 d for sizes greater than 125 mm.

Depth of penetration (L1) and Fusion zone length (L2) shall be as per figure-1 & Table-1 (Clause 7.1) of SS.

a) Elbow/Bends: Both ends of Elbow/Bends shall be electrofusion type with integral stop.
b) Coupler: Both ends of coupler shall be electrofusion type with integral stop.
c) Reducer: Reducer ends shall be electrofusion type with integral stop.
d) Cap: Caps shall be electrofusion end type for leak proof termination of line.
e) Equal Tee: Main/Header ends of tee shall be electrofusion type. Branch end shall be plain.

6.2 Tapping Tees & Saddles

Tapping Tees and Saddle shall be Wrap Around type for branch connection for ensuring proper alignment and better fusion process.

The tapping tees shall provide a means of cutting through the pressurized main pipe and allowing the gas flow into the outlet pipe. Internal cutter shall be of SS material.

Branch End shall be plain.

Dimensions H, H1, H2 and L shown in figure 2 of SS shall be as per manufacturer standard.

6.3 Transition Fittings

Transition fitting shall be seal tight, pull out resistant and have greater tensile value than that of PE part.

Ends for transition fittings other than electrofusion shall be as per below requirement:

Table – A1

Transition	Size	PE End	Steel / GI End Connection	Min. Length (mm) End to End	Min. Reqd. Steel Length for BE
PE to SS	20mm x 1/2”	EF	Threaded End	80	-
PE to GI	32mm x 3/4”	EF	Threaded End	80	-
PE to CS	32mm x 1”	EF	Threaded End	80	-
PE to CS	63mm x 2”	Plain End	Bevel End	470	400
PE to CS	125mm x 4”	Plain End	Bevel End	570	480
PE to CS	180mm x 6”	Plain End	Bevel End	590	485

6.3.1 PE Pipes to Bevel Ends

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Date: 2025.03.13 12:56:46 IST

To make connection between steel pipe and MDPE pipe, specially fabricated transition pieces consisting of Steel and MDPE pipes should conform to the following requirements:

a) MDPE pipe with one end plain should conform to the specification (EN 1555-2 / ISO 4437-2 / IS-14885/ SDR 11).

b) MDPE end shall be compatible (thickness/ nominal size) to the interconnecting PE pipes of the network.

c) Steel end (CS/SS) shall be compatible (grade of material/ thickness/ nominal size) to the interconnecting steel pipes of the network.

d) Steel end of the fitting should be beveled for welding. Angle of bevel should be 30° + 5°.

e) Steel and MDPE pipes should be so jointed in the factory so as to have a monolithic joint which is leak free and should be mechanically as strong as or stronger than the PE Pipe.

f) Minimum required length of steel for transition fitting is specified in Table A1. Vendor to provide adequate length so that the PE part of the fitting / pipe will not get effected during welding at site.

g) Joint between metallic and non-metallic part of transition fitting shall be leak-proof.

6.3.2 PE Pipes to Threaded Ends

a) Transition fitting for jointing of MDPE Pipes conforming to specification SDR 11, IS: 14855/ ISO: 4437/ EN1555-2.

b) The transition fittings shall be electrofusion type for PE connection, NPT Female threading conforming to ANSI B 1.20.1.

c) Steel end (CS/SS) / GI shall be compatible (grade of material/ thickness/ nominal size) to the interconnecting pipes of the network.

d) Joint between metallic and non-metallic part of transition fitting shall be leak-proof.

7.0 DIMENSIONS AND TOLERANCES

Dimensions shall be measured in accordance with EN ISO 3126 at (23 ± 2) °C, after being conditioned for atleast 4 h. The measurement shall not be made less than 24 h after manufacture.

7.1 For Electro Fusion Socket Fittings

For electrofusion sockets (see Figure 1) having a nominal diameter given in Table-1, the socket diameter and lengths shall be given by the manufacturer and shall conform to Table 1 with the following conditions:

a) $L_3 \geq 5$ mm;

b) $D_2 \geq d_n - 2e_{min}$

Where,

e_{min} is the minimum wall thickness specified for the corresponding pipe conforming to EN 1555-2;

D_1 is the mean inside diameter in the fusion zone measured in a plane parallel to the plane of the mouth at a distance of $L_3 + 0.5L_2$ from that face;

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Date: 2025.03.13 12:56:46 IST

D_2 is the bore, which is the minimum diameter of the flow channel through the body of the fitting;

L_1 is the depth of penetration of the pipe or male end of a spigot fitting. In case of a coupling without stop, it is not greater than half the total length of the fitting;

L_2 is the heated length within a socket as declared by the manufacturer to be the nominal length of the fusion zone;

L_3 is the distance between the mouth of the fitting and the start of the fusion zone as declared by the manufacturer to be the nominal unheated entrance length of the fitting.

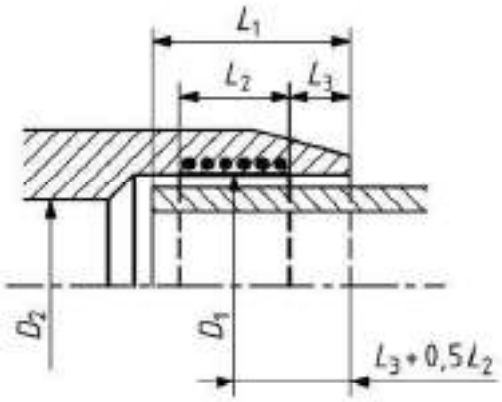


Figure 1 — Dimensions of electrofusion socket fittings

The mean inside diameter of the fitting in the middle of the fusion zone (see L_1 in Figure 1) shall be not less than d_n.

Table - 1

Nominal Diameter d_n (mm)	**Depth of Penetration** L_1, min.		L_1, max.	**Fusion Zone** L_2, min.
	Intensity Regulation	Voltage Regulation		
16	20	25	41	10
20	20	25	41	10
25	20	25	41	10
32	20	25	44	10
40	20	25	49	10
50	20	28	55	10
63	23	31	63	11
75	25	35	70	12
90	20	25	41	10
110	32	53	82	15
125	35	58	87	16
140	38	62	92	18
160	42	68	98	20
180	46	74	105	21

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Date: 2025.03.13 12:56:46 IST

The manufacturer shall declare the actual minimum and maximum values of D_1 to allow the end-user to determine their suitability for clamping and joint assembly and fitness for purpose testing in accordance with EN 1555-5.
In the case of a fitting having sockets of differing nominal diameters, each one shall conform to the requirements for the nominal diameter of the corresponding component.

7.1.1 Wall Thicknesses

In order to prevent stress concentrations, any changes in wall thickness of the fitting body shall be gradual.

a) The wall thickness of the body of the fitting at any point, E, shall be greater than or equal to e_{min} for the corresponding pipe at any part of the fitting located at a distance beyond a maximum of $2L_1/3$ from all entrance faces if the fitting and the corresponding pipe are made from a polyethylene having the same MRS.

   If the fitting is produced from a polyethylene having an MRS that is different from that of the corresponding pipe, the relationship between the wall thickness of the fitting, E, and the pipe, e_{min}, shall be in accordance with Table 2.

Table 2 — Relation between fitting and pipe wall thicknesses

Pipe and fitting material		Relation between fitting wall thickness, E, and pipe wall thickness, e_n
Pipe	Fitting	
PE 80	PE 100	$E \geq 0{,}8e_n$
PE 100	PE 80	$E \geq e_n/0{,}8$

b) In the case of a wall thickness design different from that according to a), fittings and associated fusion joints shall additionally meet the performance requirement given in Table6 of EN 1555-3.

c) When a fitting leaves the site of the manufacturer, the out-of-roundness of the bore of a fitting at any point shall not exceed $0.015d_n$.

d) The dimensional characteristics appropriate to each manufacturer such as the overall dimensions or mounting dimensions shall be specified in a technical file.

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7.2 For Electro Fusion Saddle Tapping Fittings

Outlets from tapping tees and branch saddles shall have an electrofusion socket conforming to Clause 7.1 of SS.

The manufacturer shall specify the overall dimensions of the fitting in a technical file. These dimensions shall include the maximum height of the saddle, H, and for tapping tees the height of the service pipe, H_1 or H_2 (see Figure 2).

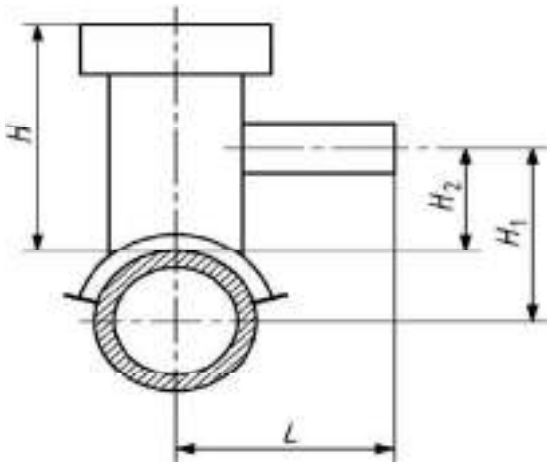


Figure 2 — Dimensions of electrofusion saddle fittings

Where,

H	height of the saddle, which comprises the distance from the top of the main pipe to the top of the tapping tee or saddle
H_1	height of service pipe, which comprises the distance from the axis of the main pipe to the axis of the service pipe
H_2	height of service pipe, which comprises the distance from the top of the main pipe to the axis of the service pipe
L	width of the tapping tee, which comprises the distance between the axis of the pipe and the plane of the mouth of the service tee

7.3 Dimensional Stability:

Couplers (including all forms of socket fittings):

All coupler dimensions shall conform to their specified value when the fitting has been stored for a period of 12 months at a temperature of 30 ± 2°C.

Tapping Tees and Branch Saddle:

All tapping tee and branch saddle dimensions shall conform to their specified agreed values when the fitting has been stored for a period of 12 months at a temperature of 30 ± 2°C.

8.0 **DOCUMENT REQUIREMENT:**

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8.1 To Be Submitted Along with Bid

All relevant documents like detailed technical catalogue, technical deviations list (if any) along with quoted price.

8.2 Technical File:

The manufacturer of the fittings shall make availability of a technical file (generally confidential) with all relevant data to prove the conformity of the fittings to this specification. It shall include all results of the type testing and shall conform to the specification relevant technical brochure (e.g. ISO 12093 for electro fusion fittings).

The technical description of the manufacturer shall include the following information:

a) Field of appliance (pipe and fitting temperature limits SDR's and out of roundness).
b) Assembly instructions.
c) Fusion instruction (fusion parameters with limits).
d) For saddles and tapping tee
    1. The means of attachment (tools and/ or under clamp).
    2. The need to maintain the under clamp in position in order to ensure the performances of the assembly.

For electrofusion fitting, the format of the technical brochure shall conform to ISO DIS 12093.
In the event of modification of the fusion parameters, the manufacturer shall ensure that the joint conforms to this standard.

9.0 QUALITY ASSURANCE PLAN

The Quality Assurance Plan (QAP). Inspection shall be carried out as per **Annexure – I** and the vendor is to submit the plan accordingly. Vendor to submit their own QAP along with offer based on indicative QAP enclosed in this tender for approval to the Owner / Owner's representative.

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10.0 **MARKING:**

Following information shall be embossed upto height of 0.15 mm onto the fitting and also in the form of bar code:

a) Owner name as Client.
b) Manufacturer's name and/or trademark
c) Material and Designation
d) Design application series
e) The size of the fitting in mm
f) Fusion time in seconds
g) Cooling time in minutes
h) Fusion parameters in BAR code
i) Traceability code (fittings) as per standard ISO 12176-4.
j) Number of the system standard. This information can be printed/formed directly on the fitting or on a label associated with the fitting or on an individual bag
k) Production period, year and month

The marking shall stay legible during normal manipulation, storage and installation.

The marking shall not adversely influence the performance of the fitting and prevent the nonconformity of the fitting.

11.0 **PACKAGING:**

The fittings shall be packaged in bulk or individually protected where necessary in order to prevent deterioration. Whenever possible, they shall be placed in airtight plastic bags in card board boxes or cartons.

The cartons and/or individual bags shall bear at least one label with the manufacturer's name, date of manufacturer, type and dimensions of the part, number of units in the box, and any special storage conditions and storage.

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VCS PROJECT CONSULTANTS PVT. LTD.

STANDARD SPECIFICATION

FOR

HEALTH, SAFETY & ENVIRONMENT

VPC – SS – PL - 0021

REV. No	DATE	Purpose	Prepared By	Checked By	Approved By
00	20.06.2018	ISSUED AS STANDARD	PK	MVK	AD

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Contents

1. SCOPE 3
2. APPLICABLE SYSTEMS AND PROCEDURES 3
3. REFERENCES 4
4. RESPONSIBILITY & ORGANISATION 4
5. GENERAL REQUIREMENT 4
6. TRAINING 5
7. TOOL BOX TALKS 5
8. INCIDENT/ACCIDENT AND NEAR-MISS REPORTING, INVESTIGATION AND FOLLOW UP 5
9. HAZARD IDENTIFICATION AND RISK ASSESSMENT SYSTEM (HIRA) 6
10. SITE HSE INSPECTION/AUDIT 6
11. FIRST AID FACILITY 7
12. FITNESS TO WORK 8
13. PERSONNEL PROTECTIVE EQUIPMENTS 9
14. EQUIPMENT LIST AND INSPECTION CERTIFICATE 11
15. HSE REQUIREMENTS AT SITE 11

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1. SCOPE

This specification establishes the Health, safety and Environment (HSE) aspects to be complied with by the contractor during construction at site.

2. APPLICABLE SYSTEMS AND PROCEDURES

The reference standard for setting Quality, Health, Safety and Environment Systems and procedures will be as linked below –

- Guidelines issued by PNGRB.
- ISO 9001 – 2008 - For Quality System.
- ISO 14001 – 2004 - For Environmental Management System
- (OSHAS) 18001-2007 -For occupational health and safety management Systems.

The Occupational Health & Safety Assurance Standard (OHSAS) 18001-2007 gives requirements for an occupational health and safety (OH&S) management system. It enables an organization to control its OH&S risks and improve its performance. It provides a basis for an organization to specify its OH&S performance criteria and design the management system.

OHSAS 18001 is compatible with the ISO 9001 (Quality) and ISO 14001 (Environmental) management systems standards. This facilitates integration of quality, environmental and occupational health and safety management systems by an organization.

Organization structure of the proposed CGD project includes a position for developing, installing and maintaining (with assistance by a specialist entity) Quality Assurance (QA) and Health, Safety and Environment (HSE) systems in line with ISO 9001-2008, OHSAS 18001-2007 and ISO 14001- 2004 Standards.

Documented Standard Operating Procedures (SOP) will be prepared by the Owner/Owner's representative for CGD entity for QA and HSE, for application across the organization. Development of the SOPs and implementation of the same at construction sites, control rooms, regional and corporate offices will be followed by an internal audit to verify conformance.

The CGD Network operating entity will thereafter regularly monitor, through periodic internal and mandatory external audits, effective implementation of the SOPs at the construction sites, control rooms regional and corporate offices as per systems and procedures.

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3. REFERENCES

This document should be read in conjunction with following.

- General Condition of Contract (GCC)
- Special Condition of Contract (SCC)
- Job Specifications
- Relevant IS codes, OSHAS standard
- Reporting Formats

4. RESPONSIBILITY & ORGANISATION

Health, Safety and Environment activities at site shall be under Contractor's scope. Contractor shall be responsible for implementation of HSE provisions. The nominated or designated safety engineer/ officer shall assist and perform day to day HSE work as per his advice.

5. GENERAL REQUIREMENT

5.1. The contractor should follow HSE policy of owner as applicable to construction site.

5.2. The contractor shall ensure that HSE requirements are clearly understood & faithfully implemented at all level, at each site.

5.3. The contractor shall organize safety awareness programs regularly.

5.4. The contractor shall ensure his participation in every HSE meeting called by owner/owner representative.

5.5. The contractor shall conduct daily tool box talk.

5.6. Contractor shall ensure that their safety supervisor must always be present at site.

5.7. Contractor shall take sufficient care in moving his plants, equipment's and materials from one place to another place so that they do not cause any damage to any person or the property of the owner or any third party.

5.8. Working after sunset is strictly prohibited.

5.9. Hygiene requirement must be met on site by providing fresh drinking water at each site

5.10. The contractor shall submit Monthly HSE reports (Form attached in ANNEXURES).

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5.11. The contractor shall provide one four wheeler at site during working hour to meet any contingency.

5.12. The contractor shall adhere consistently to all provisions of HSE .In case of non- compliance or continuous failure the owner/ owner representative may impose stoppage of work for the serious HSE violation. All works shall be carried out in presence of Owner/Owner's Representative only.

6. TRAINING

The Contractor duties shall include conducting HSE training for all activities and personnel involved.
The Contractor shall ensure that their Personnel have been given the necessary HSE and work-related skills training in compliance with regulatory requirements prior to engaging the personnel for the work.

7. TOOL BOX TALKS

Contractor's Site Supervisor for specific work location shall conduct a tool box at the commencement of work on daily basis. If different team is working in different area, separate tool box talk covering location and hazard involved shall be carried out.

Each toolbox meeting shall cover the following agenda:

- Discuss safety issues of previous day
- Brief description of activities planned for the day &associated hazard
- Information & resources required to put controls in place
- Location specific hazard and instructions.
- Requirements Open

It is the responsibility of supervisor to convey PPE requirement to all workers and ensure compliance of the same and shall be checked during tool box talk before embarking on work.

Tool box talk report shall be prepared and kept at site within one hour of talk and it must be signed by all attendee to ensure participation of all in the talk. Tool box report shall be submitted to CONSULTANT/ OWNER

8. INCIDENT/ACCIDENT AND NEAR-MISS REPORTING, INVESTIGATION AND FOLLOW UP

8.1. Incident/Accident and Near-Misreporting
All incidents/accidents must be reported immediately. A report should be prepared by the Supervisor and submitted to the Site Manager within 12 hours of the occurrence and shall serve as a source for education of employee to prevent reoccurrence of similar

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incident/accident.

Contractor shall submit the Initial report of all Accidents/Incidents within 12 hrs.to Owner / Consultant and detail report within 24 hrs. For serious incidents and near misses, with the potential for fatality, serious injury or significant environmental or material damage, Contractor shall notify Owner/Consultant without delay and within twenty four (24) hours.

8.2. Incident/Accident Investigation

All incidents/accidents must be reviewed and analyzed to establish root causes and type of injury, trends and practices.

Investigation shall begin promptly after the occurrence of the incidents/accidents. The completed incidents/accidents investigation report shall be submitted to the Contractor Site Manager within 7 days of the occurrence. A copy shall be submitted to Owner/Consultant.

8.3. Follow-up

All incidents/accidents, including investigation results and recommendations, shall be discussed in the Site HSE meeting and shall be brought to the notice of employees in toolbox meetings.

Key Risks Identification and Management Risks

Working at height is a critical activity. Following hazards are associated with Working at height:

- Person Fall from height
- Material falling From height
- Slips, trips and falls
- Concealed utilities (i.e. electric cable Telephone cable, water line, Drainage line}
- Electric shock

9. HAZARD IDENTIFICATION AND RISK ASSESSMENT SYSTEM (HIRA)

The Contractor shall prepare and implement comprehensive HIRA as part of the HSE Management Plan prior to Commencement of the work or services and during the execution of the work also.

10. SITE HSE INSPECTION/AUDIT

All Site HSE checklists/Inspection reports shall incorporate a follow–up procedure to ensure that any recorded HSE violations have been promptly attended to in a satisfactory manner.

The Site HSE Inspections/Audit shall be planned by the Contractor.

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11. FIRST AID FACILITY

The contractor shall provide the first aid box at all the sites. The content of the first aid box shall include the following items:

- Twenty-four small sterilized dressings.
- Twelve medium size sterilized dressings.
- Twelve large size sterilized dressings.
- Twelve large size sterilized burn dressings.
- Twelve (15 gin) packets of sterilized cottonwood.
- One (200 ml) bottle of certified solution (1 per cent) or a suitable antiseptic solution.
- One (200 ml) bottle of mercurochrome (2 per cent) solution in water. (viii) One (200 ml) bottle of salt-volatile having the dose and mode of administration indicated on the label.
- One pair of scissors
- One roll of adhesive plaster (6 cm x 1in).
- Two rolls of adhesive plaster (2 cm. x 1in).
- Twelve pieces of sterilized eye pads in separate sealed packets.
- One polythene wash bottle (500 cc) for washing eyes.
- Twelve roller bandages 10 cm wide.
- Twelve roller bandages 5 cowhide.
- Six triangular bandages.
- One tourniquet.
- A supply of suitable splints.
- Two packets of safety pins.
- Kidney tray.
- One copy of first-aid leaflet issued by the Directorate General of Factory Advice Service and Labor Institutes, Government of India, Bombay.

All the content shall be kept in clearly marked and easy to remove cartons stored in such a manner that there is no rattling or spilling over even when the container is being moved Whenever applicable the cartons shall bear instructions for use, dosage etc.

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12. FITNESS TO WORK

The objective of Medical Assessment for Fitness to Work (FTW) is to assess health of employees in relation to their specific jobs such as working at height, to ensure they could perform required task without risk to health and safety.

The Contractors workers (as per the above category) shall under go through FTW prior to start work at site. It will be the responsibility of the Contractor to ensure compliance to this requirement.

12.1. Medical Examination requirement for working at height

Below specific requirements are must for Medical examination of Contractors employees working at height:

- History of Epilepsy.
- Blood Pressure.
- ECG+ any History of any Seizures.
- Vision Check.
- Blood Sugar (fasting &PP).
- And other general tests.
- Physical Examination- to confirm the person is physically fit.
- Blood Group (One time Test).
- General check about fear of Heights.

12.2. Other Requirements:

- Contractor to ensure that persons involved in working at height are trained, certified and having Valid I Card.
- Carry out tool box talk before starting of the work.
- Carry out site specific risk assessment and identify risk control measures for specific site work. (Ref doc).
- Ensure that persons are physically & mentally fit for working at height.
- Ensure that equipment shall be used as per approved standard for working at height.
- Ensure that equipment shall have facility of emergency rescue operation.
- Ensure person involved in working at height are trained in emergency rescue

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operation.

- Ensure that all equipment and safety devices used are inspected, certified by competent authority & valid & suitable for use.
- Quality conformance shall be carried out prior to start of work for working at height equipment's.
- Life cycle of equipment shall be checked
- In case of any part of equipment is found damaged or defective, it will be destroyed. "Working at height equipment's shall never being repaired". The Records, showing reasons for all the defective and damaged material shall be available and shall be stored separately at Contractor's yards.
- Ensure that Personnel Protective Equipment are inspected & in good condition
- Ensure that equipment used is within Safe working load mentioned on equipment.
- Ensure all tools are secured or kept in Tool kit / bag and there are no loose objects or tools.

13. PERSONNEL PROTECTIVE EQUIPMENTS

The contractors shall provide sufficient numbers of following personnel protective equipment's (PPE's) to workmen and supervisors/engineers to use them properly at work site.
Following five numbers of Personnel protective equipment's are identified as MANDATORY for all.

- Safety Helmet
- Coverall
- Safety shoes/footwear
- Safety Glasses
- Hand Gloves (as per job requirement) Other PPEs shall be as per job requirement like Work at height- Full body harness (PETZL or equivalent make), Life line, Safety Net Arc Welding – Welding face shield Grinding – Grinding face shield Height work – Full Body harness (above 2 meters) Contractor to ensure proper use and selection of protective clothing / equipment for specialized jobs.

PPE's to be used shall be as per following Specification:

IS : 2925 – 1984 : Industrial Safety Helmets.

IS : 4770 – 1968 : Rubber gloves for electrical purposes

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IS : 6994 – 1973	
(Part – I)	: Industrial Safety Gloves (Leather& Cotton)
IS : 1989 – 1986	
(Part – I &	: Leather safety boots and shoes
IS : 3738 – 1975	: Rubber knee boots
IS : 5557 – 1969	: Industrial and Safety rubber knee boots
IS : 6519 – 1971	: Code of practice for selection, care and repair of Safety footwear
IS : 11226 – 1985	: Leather Safety footwear having direct molding sole
IS : 5983 – 1978	: Eye protectors
IS : 9167 – 1979	: Ear protectors.
IS : 3521 – 1983	: Industrial Safety belts and harness

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Technical Standard for working at height equipment's shall be as per following standard:

Quality Standards

Sr. No.	Name of equipment's	EN Standard
1	Energy absorbers	365
2	Slings	566
3	Retractable type fall arresters	360
4	Guide Type fall arresters on a rigid	353-1
5	Connectors	362
6	Dynamic mountaineering rope	892
7	Descended device	341
8	Anchor device Type-A/B	795
9	Fall arrester harness	361
10	Sit harness	813
11	Lanyards	354
12	Pulleys	12278
13	Fall arrester system	363
14	Work positioning belt	358

14. EQUIPMENT LIST AND INSPECTION CERTIFICATE

Equipment list must be made available and must be certified for safety as per the requirement of Factory Act. Tools and Tackles should be calibrated from the approved agency only.

List of Tools and Tackles

Item	Inspection/Calibration Date
Full body harness	Once in six Month
Rope Grab fall arrestor	Once in six Month
First Aid Box	Once in Month
Fire Extinguisher (10 Kg.)	Once in a Year
Extension board(without cable Joint with Socket) with Circuit Breaker	Monthly
Nylon tie line for tools	Once in a day

15. HSE REQUIREMENTS AT SITE

Contractor may conduct survey to assess the requirement of GI riser for high rise building.

For Work at Height: Contractor shall provide PETZL or equivalent system/metallic

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scaffolding as a working platform and full body harness with self-locking arrangement. Full body harness with self-locking arrangement shall be used for ascending/descending/work rest.

PETZL system or equivalent system/metallic scaffold should comply with relevant IS/EN/BS standard.

Only certified trained plumber undergone practical training on work at height shall be deployed.

15.1. Any working at height related activities has to be carried out with Permit system.

Work at Height

Working at Height is performing work at height where workers can fall 1.8m or more from where they stand or sit to perform work. This includes gaining access to working at height if there is a risk of falling 1.8m or more.

Examples of Working at Height are:

- Working on temporary platform more than 1.8mhigh
- Working on top of vehicles/tankers or building more than 1.8 m high Risk of Working at Height
- Fall from height
- Falling objects

Safety net, fall arrest system and two lanyard full body harness when working at height
While working at height, all loose tools shall be kept inside a container and good housekeeping shall be maintained.

All Working at Height shall comply with Working at Height Procedures Safety Net System.

"Safety net systems" Safety net systems and their use shall comply with the following provisions.

Safety nets shall be installed as close as practicable under the walking/working surface on which workers are working, but in no case more than 30 feet (9.1 m) below such level. When nets are used on bridges or similar kind, the potential fall area from the walking/working surface to the net shall be un obstructed.

Vertical distance from working level to horizontal plan of net	Minimum required horizontal distance of outer edge of net from the edge of the working surface
Up to 5 feet	8 feet
More than 5 feet up to 10 feet	10 feet.
More than 10 feet	13 feet

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- Safety nets shall be installed with sufficient clearance under them to prevent contact with the surface or structures below when subjected to an impact force.
- Safety nets and safety net installations shall be drop-tested at the jobsite after initial installation and before being used as a fall protection system, whenever relocated, after major repair, and at 6-month intervals if left in one place. If drop test not possible designated competent person shall certify that the net and net installation is in compliance with the requirement by preparing a certification record prior to the net being used as a fall protection system. The certification record must include an identification.
- Determined that the identified net and net installation were in compliance and the signature of the person making the determination and certification. The most recent certification record for each net and net installation shall be available at the jobsite for inspection.
- Defective nets shall not be used. Safety nets shall be inspected at least once a week for wear, damage, and other deterioration. Defective components shall be removed from service. Safety nets shall also be inspected after any occurrence which could affect the integrity of the safety net system.
- Materials, scrap pieces, equipment, and tools which have fallen into the safety net shall be removed as soon as possible from the net and at least before the next work shift.
- The maximum size of each safety net mesh opening shall not exceed 36 square inches (230 cm) nor be longer than 6 inches (15 cm) on any side, and the opening, measured center-to-center of mesh ropes or webbing, shall not be longer than 6 inches (15 cm). All mesh crossings shall be secured to prevent enlargement of the mesh opening.
- Each safety net (or section of it) shall have a border rope for webbing with a minimum breaking strength of 5,000 pounds (22.2kN).
- Connections between safety net panels shall be as strong as integral net components and shall be spaced not more than 6 inches (15 cm) apart.

15.6.1 Lifeline

- Horizontal or vertical life line shall be used while working on suspended platform or similar type of platform or working at thereof/edge
- Horizontal/Vertical lifelines shall be designed, installed, and used, under the supervision of a qualified person, as part of a complete personal fall arrest system, which maintains safety factor of at least two.

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- Lanyards and vertical life line shall have a minimum breaking strength of 5,000 pounds (22.2kN).
- When vertical lifelines are used, each worker shall be attached to a separate lifeline.

15.6.2 Full Body Harness

- Ensure that the full body harness must be inspected prior tousle.
- Ensure that full body harness must be worn by the workmen while working at height.
- Full body harness lanyard must be anchored with a strong member.
- While climbing up or climbing down, one of the hooks of lanyard must be locked alternatively all the time.

15.6.3 Working Platform

Every working platform more than 1.8 mtr. High from which a person is likely to fall shall be of steel plates/planks/cage and shall be:

- Closely boarded, planked or plated.
- At least 700 mm wide if the platform is used as a footing only and not for the deposit/ keeping of materials.
- At least 900 mm wide if the platform is used for the deposit of materials.
- At least 1100 mm wide if the platform is used for the support of higher platform.
- Two metal/planks shall not have 25 mm gap between them the distance between two consecutive transoms or other supports on which a platform rests shall be fixed with due regards to the anticipated load and the nature of platform flooring. As a general rule such transoms shall not be placed more than 1.0 mtr. apart.

15.6.4 Scaffold

Scaffold Inspector (Project Field Officer)

This is the competent individual who shall inspect scaffolding prior to each use and perform full inspections as per the Inspection procedure. He will accept the Scaffold after ensuring the followings;

- The scaffold erected complies with legislation.
- The permissible loads per deck and the working distance between the

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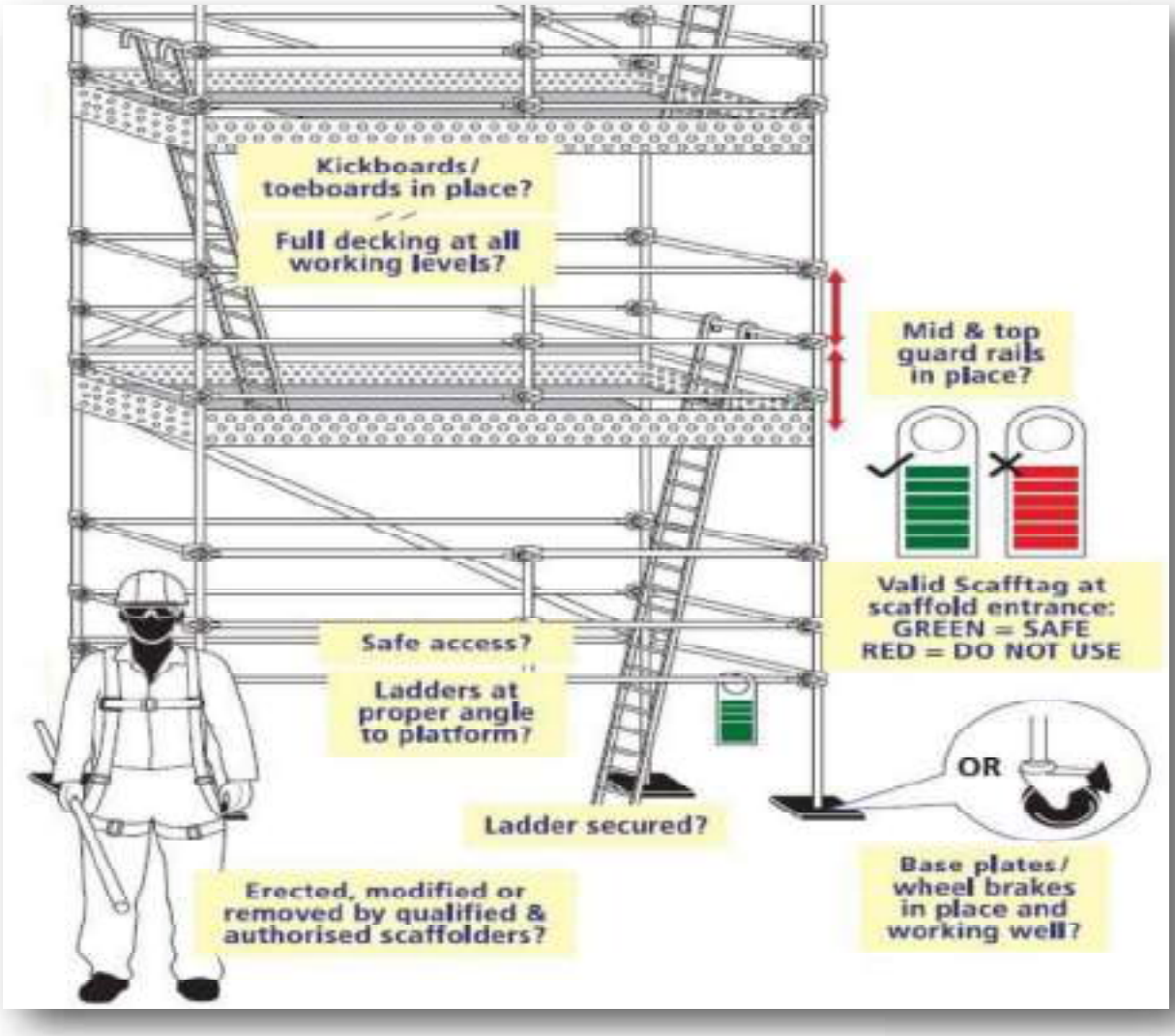
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scaffold and the work surface are examined.

- Materials used for the scaffold are in a proper condition and in throughout the time it is in place.
- Existence and proper installation of collective protective equipment and means of access.
- Clear display of details of permissible loads on the scaffold.
- Acceptance is carried out prior to the scaffold being made available for the first time and is repeated after any alterations.
- Inspection is repeated at the frequency of 7 days. Issues scaffold tag (Green Tag) before its first use.

Scaffold Contractor

This refers to the company involved in the installation (erection, dismantling and alteration) and/or design of the scaffolding on behalf of CONTRACTOR.



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- The erection contractor shall ensure that the scaffolding is erected in compliance with the OHSAS/IS standards. Worksite specifications and considerations shall be incorporated into any such plan.
- Ensure availability of competent staff and certified material all the time.
- Scaffolding may be erected, dismantled or altered only under the supervision of a competent individual who has received adequate specific training for the intended operations, specifically including the following:
- Understanding the erection, dismantling and alteration plans for the scaffolding
- Ensure PPEs and Safety at work during erection ,dismantling and alteration of the scaffolding.
- Measures designed to prevent the risk of falling person's and objects.
- Safety measures applicable in the event of a change in weather conditions.
- Permissible structural load criteria.
- Any other risk that may be entailed by erection, dismantling and alteration operations.
- Scaffold material: Safe handling, and storage.

Scaffold User

- The User shall ensure that acceptance of the scaffold has been properly carried out; green Tag is issued and provide notification of any alterations. Work from tagged scaffolds only. Comply with special conditions/additional controls noted on the access tag.
- It shall observe all restrictions on use (particularly permissible loads). Its requirements should be taken into consideration in the specifications during erection.
- Use scaffolds only for their intended purpose.
- Do not use unstable objects or makeshift devices to increase the working height of the scaffolds.
- Use portable ladders as a means of increasing the working height only after the competent person has determined that the stability of the structure has not been compromised, and adequate fall protection is in place.

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- Do not straddles, stand on, or work outside of the guardrail.
- Use designed access means to descend or ascend a scaffold (stairs, attached ladder, or specially designed end frames). Do not uses cross bracing or side rail
- Keep only the tools and materials on the platform that are necessary to perform the task. Control all slipping and tripping hazards by removing or securing the tools/materials.
- Do not modify or remove a scaffold system/component or status tag.
- Notify supervision immediately if a scaffold is damaged, weakened, or otherwise deficient.
- Scaffold users/ Scaffold erectors shall use IS and EN standard double lanyard safety harness with absorbent.

Inspection Points

To ensure the integrity and proper installation of scaffolding, a certain number of points shall be inspected. Inspection of these points ensures a basic level of safety. Following fundamental inspection points are as follows:

- Environment and location
- Supports and soleplates
- Structure and posts
- Decks
- Scaffold Capacity Standards
- Working levels
- Access
- Signs and signage

Mobile Scaffolding

- Mobile scaffolds are identical in design to fixed scaffolds, except that their tubular structure is lighter and in terms of support, the wheels do not offer the same load-bearing area as footplates on fixed scaffolds.
- Erection is simple and shall be carried out using personal protective equipment. Lastly, during erection, dismantling and use, the brakes shall also be applied. Care should be taken to ensure that mobile scaffolds are installed on flat surfaces.

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- Mobile scaffolds are highly practical for short jobs at relatively low heights.
- Acceptance is carried out after erection has been completed.
- They are moved as the work being carried out progresses. No fresh acceptance is required after each move, but the workstation shall be verified (working distance, brakes applied)
- A freestanding scaffold shall be considered safe when the total height is equal to or less than four times the minimum or least base dimension.
- Rules for use
- Do not extend the base to increase the height.
- Brace each frame level as per the manufacturer's instructions.
- Do not raise work surfaces by placing decks on rails or midribs.
- Do not climb on the guardrails or other structural components.
- Observe the manufacturer's guidelines governing the installation of brackets, material hoists etc.
- Stay clear of power lines and observe safety distances. (If any)

Scaffold safety

The following safety tips are as guidelines in avoiding job-site situations that could prove dangerous to scaffold workmen.

- The Scaffold to the Building: Scaffolding should be tied to the structure using heavy wire or tie-in devices. The first vertical tie should be at the maximum height of 4 times the narrowest base dimension. Additional ties are not to exceed 26 feet vertically. Maximum horizontal distance between ties is not to exceed 30feet.
- Don't Overload Scaffolding: Follow the safe load capacities as given by the scaffold manufacturer. There's a limit even to what steel can support. A4-to-1-safety factor must be figured on scaffolding.
- Use Metal Catwalks, Platforms; where available. If wood plank is used, it must be scaffold grade or better. Inspect thoroughly before every job to make sure it is free from breaks, knots, and cracks or warp age. Decking should be full width.
- All working platform must be constructed with the specific requirement of job.
- If the working platform is not permanent then safety belt must be used.
- There shall be firm foundation for all scaffoldings. All scaffolding shall be made of sound material.

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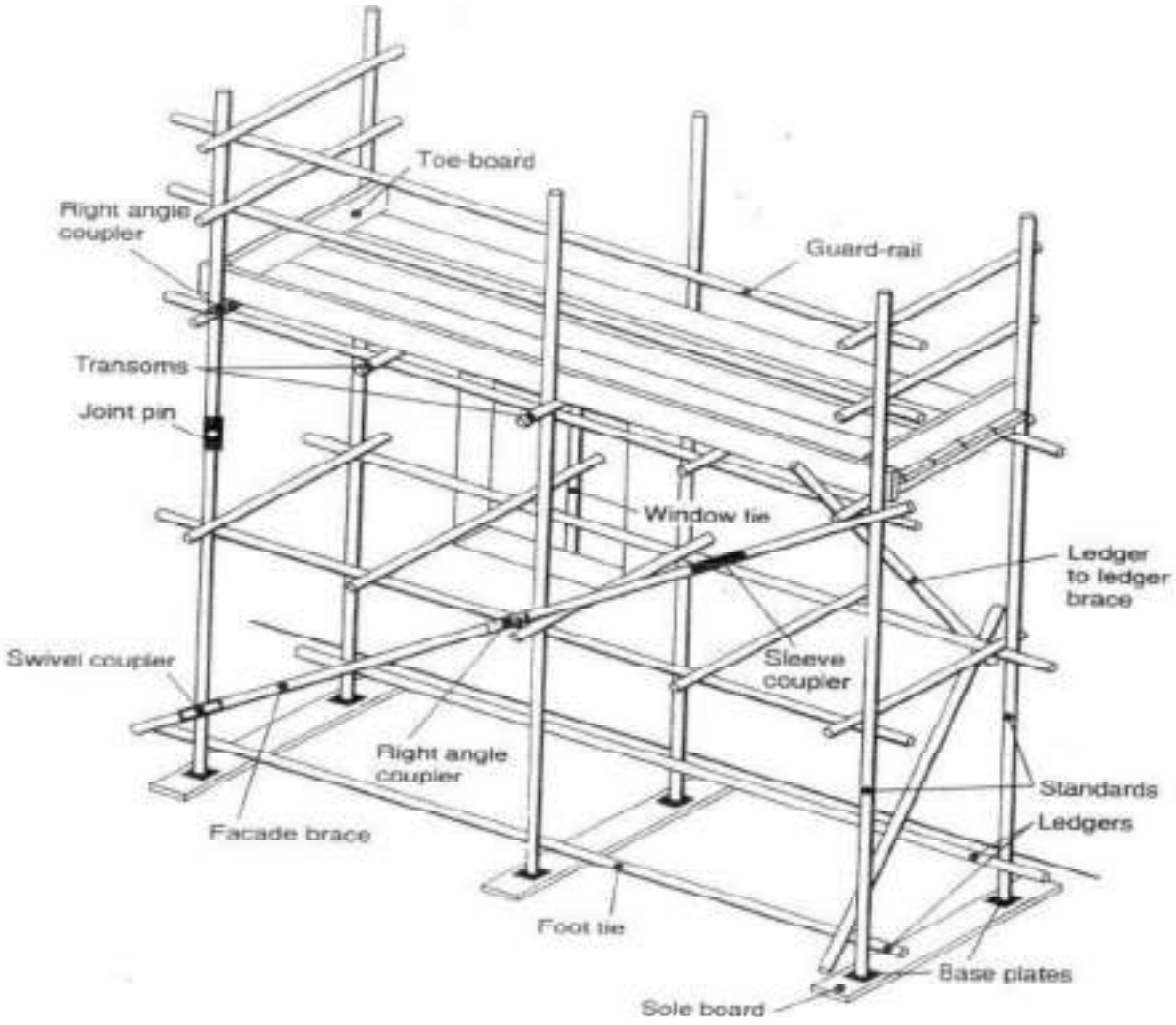
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- Scaffolding material shall be inspected and used, only if found in good condition.
- Provide metal base plate is used under all upright or standard scaffoldings. Correct type of couplers shall be used for all connections.
- Plumb and level scaffoldings as erection proceeds, so that braces will fit without forcing.
- Fasten all braces securely.
- Working platforms shall be provided with guards. This should consist of top rail, mid rail, and toe board. The toe board shall be of minimum height 100 mm, while the mid rail and top rail shall be at heights of 600 mm and 1200 mm respectively.
- Do not use ladders or makeshift devices on top of scaffoldings to increase the height.
- Shall be placed at least 75 deg. to the floor.
- Fall arrestor to be used where ever applicable.
- The following safety tips are as guidelines in avoiding job-site situations that could prove dangerous to scaffold workmen.
- Don't Ride Moving Scaffold; and remember scaffold units are limited in height to 4* times
- Their narrowest base dimension (unless base is widened by outriggers or more end frames; or tied into building.) Always keep casters locked. (except tore-spot)
- Don't Climb Braces: Use the steps provided on most steel scaffolds to climb up to or down from work levels. Use scaffold climbing ladders where required.
- Protect Working Levels: Use overhead canopies to protect workers on lower work levels when work is being done overhead. Rope off un safe areas underneath scaffold or provide wire mesh around work area.
- Use Double Guard Rails; and toe board so exposed side sat platform heights of 1.8 meter or more.

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Illustration of a Sample Independent Scaffold



15.6.5 Ladders

- Fall protection is not needed when climbing up or down ladders less than 20 feet/6.1 meters, using 3 points of contacts.
- Portable ladders, steps and trestles should only be used for light duties of short duration. Otherwise, properly constructed means of access should be provided.
- Aluminum ladders can generate sparks when struck against rusty iron, so it must be used in Hazardous Areas with special care.
- Aluminum ladders must not be used in areas where they might be splashed with acids or alkalis ; e.g. Utilities Area

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- Ladders with metal reinforced, Damaged or rotten stiles, Missed footing on ladder rungs must not be used.
- Over-reaching and over-balancing is not allowed.
- Every time before use, the user will carry out inspection of ladder.
- If the work to be done necessitates the use of both hands, a safety belt must be used.
- Tools and materials must not be hand carried by persons ascending or descending ladders. Where applicable light tools should be carried in pockets, tool belts or shoulder bags, provided they do not impair movement and are held securely.
- Rungs, stiles, or treads to be checked for bending, twisting or signs of abuse or undue wear.
- Feet to be fitted with various types of bases and in good order. Synthetic non-slip, wooden or metal.
- Non-slip stair treads mats of stepladders, should be fitted and in good condition.
- In case of moving ladders fitted with wheels, Hinges and locking devices to be secure and in good working order.
- All portable ladders must be in good condition as per the site norms.
- Ladder shall extend 3' to 4' above the point of Landing and topmost 3 rungs shall not be used.
- Ladder is checked visually for defects before every use.
- Ladders shall not be used in a horizontal position as runways or scaffoldings.
- Ladders shall not be placed in front of a door that opens toward the ladder unless the door is locked, blocked or guarded.

15.6.6 User Ladder Safety Checklist

The following check list specifies the main points to remember when using ladders:

- Do not erect:
- On sloping ground
- On top of movable objects
- In high wind
- In front of a door which may be opened
- Against a slippery or unstable surface

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- At a shallow angle, or use horizontally as a plank or bridge
- Leaning to onside

15.6.7 Donor

- Drop things from ladder.
- Straddle from the ladder to a nearby foothold..
- Allow more than one person up a ladder at time.
- Use a ladder which is too short.
- Use a makeshift or 'home-made' ladder.
- Over-reach (generally always keep hips within the stiles).
- Slide down ladder.
- No ladder should be used if it has: A missing, loose or defective rung or tread.
- A defective stile side member.
- A defective rope or associated fitting (rope operated extension ladders).
- Any sign of warping.
- Missing fastenings or rivets, guide or latching hooks.
- Always Return ladders to store as soon as they are finished with.
- Inspect a ladder immediately after any fall or overload.

15.6.8 Activities Allowed on Ladder

- A ladder is considered to be suitable for access of personnel to an elevated area only. No significant works may be carried out from a ladder. In particular, activities such as those below may not be carried out on ladder:
- Carrying tools (other than those which might clip onto a tool belt) up to an elevated level.
- Activities involving heavy manual labour.
- Activities requiring reaching or stretching such that the body is no longer centered over the ladder.
- For these types of jobs, a work platform such as a scaffold is required. The safe working position from a ladder is to have both thighs and hips within the styles.

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15.6.9 Color code and inspection

- Color code of the year shall be painted on one style only and equal to one rung spacing.

15.2. Roof work

- All roof-work operations should be pre-planned and properly supervised.
- Roof work should only be undertaken by workers who are physically and psychologically fit and have the necessary knowledge and experience for such work.
- Work on roofs shouldn't be carried on in weather condition that threaten the safety of workers.
- Crawling boards, walkways and roof ladders should be securely fastened to a firm structure.
- Roofing brackets should fit the slope of the roof and be securely supported. Where it is necessary for a person to kneel or crouch near the edge of the roof, necessary precautions should be taken.
- On a large roof where work have to be carried out at or near the edge, a simple barrier consisting of crossed scaffold tubes supporting a tubing guardrail may be provided.
- All covers for openings in roofs should be of substantial construction and be secured imposition.
- Roofs with a pitch of more than 10 should be treated as sloping.
- When work is being carried out on sloping roofs, sufficient and suitable crawling boards or roof ladders should be provided and firmly secured imposition.
- During extensive work on the roof, strong barriers or guardrails and toe-boards should be provided to stop a person from falling off thereof.
- Where workers are required to work on or near roofs or other places covered with fragile material, through which they are liable to fall, they should be provided with suitable roof ladders or crawling boards strong enough and
- When spanning across the supports for the roof covering to support those workers.
- A minimum of two boards should be provided so that it is not necessary for a person to stand on a fragile roof to move a board or a ladder, or for any other reason.

15.3. Electrical Safety

- Only authorized electrical engineer / electricians are permitted to do the electrical work.

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- Do not use extension cords or electric hand tools with exposed wires.
- To switch-off electrical supply in case of an emergency must be enabled at all times.
- All temporary electrical installations carried out on the site must be in accordance with the local regulations and specifications.
- The installations must be inspected regularly by a competent person (e.g. electrical engineer/supervisor) to ensure that they are in safe condition and working faultlessly.
- Each electrical power tools and electrical equipment must be under protection of earth leakage/residual current protective device(ELCB/RCCB).
- Portable power tools used on site must have protective insulation ("double insulation").
- All electrical machines, tools and appliances must be inspected by a competent person (e.g. electrician) to ensure that all equipment's are in safe condition and working faultlessly. To confirm that the inspection was conducted the equipment must be labeled or marked clearly and registered. The documentation must be submitted to TE for records.
- Assume that all circuits are live until they have been thoroughly checked and proven dead. Never work on a live circuit.
- When using electrical equipment in an environment with electrical conductivity (e.g. in confined spaces like case pipes, containers, towers) the voltage used may at maximum be 24 Volt AC. (fed from a safety low voltage transformer)
- Never use a fuse heavier than the capacity of the circuit. Also never attempt to bridge abuse.
- Never tamper with any electrical wiring or apparatus.
- Do the cable laying as per standard specifications and requirement; do not lay down power cables adjacent to secondary cables of welding machine.
- Assess overhead power line hazard and keep safe distance from it.
- All electrical equipment's, motors, transformers, welding machines, etc. to be provided with earth connections.

15.4. Power & Hand Tool Operation

- All portable tools are to be connected through control bus with ELCB.
- All contractors should ensure proper Earthling of all electrical equipment's used by

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them. Suitable earthling pits must be made if required.

- Examine electric cable for defects before use.
- Do not ever insert free ends of wires into sockets and hold them in place with matchsticks / other means. Always use industrial three pin plugs.
- Check the RPM rating of grinding wheels. The RPM rating must be greater than or same to that of the driver. Wheel guard should be used in proper position before grinding. Also proper PPEs must be ensured (goggles &hand gloves).
- Do not tie electric cords to metal rods or nails.
- No cable should run under the ground. It must run overhead at a 2 m height to avoid pinch point and creating trip hazard
- All tools and Tackles must be examined daily before commencing work and record to be maintained.
- Defective tools are to return to store.
- All electrical tools must be inspected at regular intervals by an authorized electrical person and record to be maintained.
- The weight, size & type of tool should be selected to suit the job carried out.
- The handles of tools should be intact and properly tightened. Split handles should be replaced. To avoid slippage, grease and oil should be wiped off.
- Insulated and non-conducting tools shall be tested for electrical resistance.
- Wrenches should not be pushed but pulled. Chisels struck by others should be held by tongs and not by hands.
- Chipping should always be done away from self.
- Hand tools should not be allowed to lie down on benches, scaffoldings etc. from where they can fall. They should be properly stored.

15.5. Welding

The metal frames and cases of mains-powered welding rectifiers, transformers and voltage regulators and of engine driven welding machines must be positively earthed locally throughout the work.

- Welding leads and return leads must be protected against physical damage.
- Insulated electrode holders and cable lugs / protectors must be used.
- The return lead must be attached to the work place as close as reasonably practicable to the welding point.
- If mains power is used, the work piece must be positively earthed using a well-

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protected earth wire connected at both ends by bolted lugs or secure screw clamps.

- Bolted joints in pipelines and structures must not be relied upon to provide adequate electrical continuity for welding currents.
- Electric arc welding should not be carried out on equipment suspended from a crane because of the risk of damage to lifting wires from uncontrolled stray currents.
- Welders must not wear metal rings, bracelets or necklaces during the work as induced currents from the welding equipment might heat these.
- Dry, non-conductive gloves should be worn.
- The welder must always disconnect the electrode holder from the supply before attempting to replace an electrode.
- The welder should not lean against an earthed conductor whilst manipulating live electrodes.
- Welders working with electrodes fed from different phases of a three-phase supply should not work in close proximity to one another.
- Ensure that welding machine is in order and approved by site engineer.
- Ensure that welding cables are in order.
- Remove all combustible material from welding area to avoid fire.
- Place a fire extinguisher nearby welding premises.
- Ensure welding holder, cable and its lugs in good condition and use only industrial power socket and plugs (3 Pin) to avoid electricity risk.
- Make sure that welding machine is provided with ON/OFF switch and is earthed/grounding.
- Do not over load electrical appliances and cable, shocked pined.

15.6. Gas Cutting

- Gas cylinders must be secured in the vertical position to prevent them being knocked or pulled over.
- Long lengths of hose should be avoided, but;-
- Cylinders must be kept far enough away from the welding or cutting operations to prevent contact with sparks, flames and metals platter.

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- Cylinders must be placed where they are unlikely to be damaged by stray electric currents or falling objects.
- Cylinders must not be taken into confined spaces.
- The torch must always be lit from a lighter provided for the purpose. There should be no attempt to light it from hot metal.
- Check the cylinder and its valve or leakage and move out any leaking cylinder immediately.
- Ensure that flash back arresters are installed with torch and NRV (Non return valve) on the gas cylinders side.
- Ensure cylinder is far away from fall of sparks and hot metal.
- Check the regulator and torches that they are inspected prior to every use.
- Check for leaks around regulators, hoses/fittings & nozzle with soap solution.
- Check the entire hose length if it is cracked or worn out cut that length of hose or replace the hose.
- Check that flash back arrester used for the purpose is of approved make/specification only.
- Place a fire extinguisher nearby welding premises.

15.6.1. Gas Cylinders

The handling of gas cylinders must comply with local legislation and TE's regulations as per particulars given below:

- Gas cylinders must be stored protected from excessive heat, fire, dangerous corrosion, mechanical damage or access by unauthorized.
- Gas cylinders must not be stored together with flammable materials.
- Gas cylinders must be secured to prevent them from falling over.
- Gas cylinders must be capped and operated upright.
- Use cylinder trolley / cage for the transportation of gas cylinders at site.
- Never use oil or grease on the regulator of a cylinder valve.
- Store gas cylinders in ventilated area.
- Don’t keep LPG cylinder in confine/below ground area.
- Gas stores must not be set up in critical areas such as stairways, corridors,

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emergency routes, garages or passages for person's or vehicles.

- Never transport by rolling them on the ground or use them as rollers or supports.
- Never attempt to repair cylinder.
- Leaking regulators, cylinder valves, hose pipes or other equipment should be taken out of service.

15.7. Grinding Operation

- Grinding wheels should be stored in dry place.
- After expiry date, grinding wheel must be condemned, broken in to pieces.
- Power supply cable of adequate current carrying capacity shall be used and it should be in good workable condition without abrasions, cuts or puncture in outer insulation.
- Socket pin provided at supply end and On/off switch in working condition.
- Proper earthling of the body in case of metallic body.
- Wheel guard properly fitted imposition.
- Machine body without any damage like cricket.
- Moving part (wheel) must be properly fixed to the machine with the help of spanner.
- Grinding wheel must be of suitable size as per the speed of grinding machine.
- Grinding wheel without manufacturer's stickers having size, speed and expiry date must be condemned.
- Don't use portable grinding machine as bench grinder.
- Don't fit over size wheel than recommended size by machine/wheel manufacturer.
- Don't grind small, unstable object without fixing it in the vice.
- Don't over press the grinding wheel against the job for fast removal of metal.
- Put OFF the main switch, while machine is not in use (tea breakneck.).
- Don't chip off grinding/cutting wheel for achieving fast cutting rate.

PPEs:

- Use of helmet, face shield or safety goggles (where face shield is not possible.) and hand gloves.

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15.8. Use of Power Tools and Cables

- All electrical equipment and tools used by the contractors and their employees shall be properly checked by contractor's supervisor before use.
- All power tools must have proper guard at all-time.
- Leads /cables must be placed so that they do not create a trippig hazard.

15.9. Pressure / Leak Testing

Hydrostatic and Pneumatic Test

Access to the test area shall be limited to essential personnel only. before the test commences compliance is required with the following points:

- Persons supervising pressure or leak tests must have sufficient knowledge and experience of testing to fully understand the hazards of the activity and the precaution, which must be taken.
- Effective communication, including formal procedures, must be established between sites whenever the test envelope extends beyond one site, for example, pipelines.
- The area shall be cordoned off (using tape, shields or barriers, etc.) at an adequate distance from the equipment to be tested, as specified on the Permit to Work
- Warning signs shall be posted at access ways, at other strategic positions, and on the equipment to be tested (including the doors of test workshops or other designated areas.
- Pressuring equipment shall be provided with suitably calibrated pressure control/regulator devices
- Pressuring equipment shall not be left unattended at any time during the test.
- Pressuring equipment shall be isolated from the equipment under test and where practicable disconnected, when the test pressure has been reached.
- Care must be taken to ensure that materials of construction have the required ductility at the test temperature to prevent brittle fracture.
- A safety valve should be fitted to the equipment/system being tested, set to relieve at a pressure that will prevent over pressurization.
- Sufficient venting / draining points shall be provided in order to prevent trapping of pressurizing medium behind non-return valves, check valves, between isolation

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valves, or within dead legs of the pressure envelope.

- The equipment/plant to be pressure tested must be subjected to thorough examination prior to testing. It may be necessary to 100% inspect all welds using visual, radio graphic or other NDT techniques.
- The gas supply must be isolated when test pressure has been achieved.
- The pressure envelope must contain sufficient vents, to a safe location.
- De-pressurization after pneumatic testing must be gradual.

15.10. Barricades and Warning Signs

- Area where work is being carried out above man height or below 1' ground depth must be barricaded. Linked barrier with link chains must be provided by the contractor for cordoning the area at ground level, during GI work.
- Follow the instruction of all types of warning signs like "NO SMOKING" "NOENTRY" "DANGER" "Work at height", "Inconvenience to member of public regretted/work in progress","
- Name of the Contractor and contact details"

15.11. Basic Safety Rules For The Construction Site

- The construction site shall be considered a restricted area and unauthorized entry into the site is strictly prohibited. Anyone found trespassing should be asked to leave the site immediately.
- All persons of CLIENT/Consultant/Contractor shall be responsible for their own safety in plant or work sites.
- Nobody authorized to touch any valve, switch, or interfere with plant/site activities.
- Children below 18 years are not allowed inside plant / worksite.
- Never walk on the pipes, equipment, structure etc.
- Always use stairs, handrails & walkover platforms.
- Never carry sharp or pointed tools in pockets.
- Alcoholic beverages will not be consumed, brought into, or manufactured on the work sites or inside the plant.
- Drugs/intoxicant substances will not be used, brought into, or manufacture don't he site or plant.

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- Cigarette, beedi smoking is not allowed except in the designated smoking booths.
- Firearms, explosives, knives or other types of weapons will not be allowed on the site.
- Gambling or any other form of betting games is prohibited.
- Discrimination on the basis of race, sex or national origin is prohibited.
- Horseplay, Fight, Practical jokes, Aggressive or abnormal behavior is prohibited.
- Individuals under the influence of alcohol or drugs will not be permitted entry to the site.
- Safety helmet, safety shoes, ear plug or ear muff, hand gloves, safety goggles, safety harness &clothing for body protection are mandatory in the plant or work site.
- Use other personal protective equipment as displayed in plan/site.
- It is strictly not allowed to use non-intrinsically safe equipment or instruments in the operational area of site.
- All vehicles for use on the site shall conform to the requirements of the Vehicle Entry Permit. Maximum Speed limit inside complex is 10km/Hr.
- In case of Emergency dial appropriate agency like Fire, Hospital, Security etc. as displayed.

Violation of the Rules and Regulations might result in removing the person(s) concerned from the premises and denying the person(s) concerned from any future access to the site. The site in-charge will judge whether permanent removal of the individual from the premises is justified depending on the seriousness of the violation(s). All Indian laws shall be complied with at all the time.

15.12. Site Emergency Preparedness and Response

The CONTRACTOR shall establish, what are the arrangements in the event of an emergency.

The CONTRACTOR shall ensure that their Personnel are familiar with the essential emergency equipment, the use of which shall be demonstrated and practiced in drills.

The CONTRACTOR shall check the emergency procedures and the location and condition of the emergency equipment.

The CONTRACTOR personnel will be instructed of the actions to take in the event of serious personal injury, gas or toxic release, fire, explosion, heavy rains, wind storms, chemical spillage, land slide, scaffolding or structure collapse, critical damage to operating equipment, etc. and other emergency situations during the induction training and other

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ongoing training sessions.

These situations may demand adequate rescue and relief measure to handle such events quickly and effectively.

In an emergency, or on hearing the alarm, every supervisor shall ensure the following;

- All work is stopped atone.
- All equipment vehicles and tools are shut down (all sources of ignition).
- All men are evacuated to a pre-determined Muster point.
- A roll call is taken and every man is accounted for.
- No one is permitted to return to work until notification has been received from the CONTRACTOR representative that it is safe to dose.

15.12.1. Emergency Preparedness

The basic and essential features of any emergency Preparedness are to analyses and plan for the potential risk. This includes;

- Establishing and maintaining effective communications.
- Liaison with local emergency services and authorities.
- Action Procedure (evacuation routes and assembly pointed.).
- Appointment of key personnel and specifying their duties and responsibility.
- Emergency Response Drills

15.12.2. Emergency Response Drills

Effectiveness and comprehensiveness of Emergency Response Plan must be tested on a regular basis. Drills which reflect the conditions induced from the more likely emergency occurrences must be conducted. CONTRACTOR should conduct such drill on periodic basis. All emergency drills, exercises and responses to actual incidents shall be fully documented and followed by a complete review and when necessary, procedure revision process.

Initiate any required procedural changes, and initiate the dissemination of any lessons learned through the Site HSE communication system.

15.13. Road Safety Norms

- For roadside working site to be barricaded..
- Only eligible driver can drive required vehicle inside site
- Speed limit norms of site must be followed
- No riding or travelling on the back of open end vehicle, fork lift or trailers should be done.

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15.14. Environment

The CONTRACTOR shall pay due regard to the environment by preserving air, water, soil, animal and plant life from adverse effects of the CONTRACTOR's activities and minimizing any nuisance which may arise from such operations.

All waste generated by the CONTRACTOR shall be contained and disposed of in accordance with the legal requirement on waste management.

15.15. Labor Welfare &Legal Requirement

- All mandatory provisions with regard to safety as prescribed under contract Labor (Abolition & Regulation) Act 1970 and Rules made there under are applicable.
- Workmen compensation insurance and registration under ESI should be maintained.
- Time to time, all rules and regulations suggested by safety committee of site must be followed and implemented

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ANNEXURES

ANNEXURE – A

RELEVANT IS-CODES FOR PERSONNEL PROTECTION

IS : 2925 – 1984	:Industrial Safety Helmets
IS : 4770 – 1968	:Rubber gloves for electrical purposes
IS : 6994 – 1973 (Part – I)	:Industrial Safety Gloves (Leather & Cotton)
IS : 1989–1986 (Part – I & III)	:Leather safety boots and shoes
IS : 3738 – 1975	:Rubber knee boots
IS : 6519 – 1971	:Code of practice for selection, care and repair of Safety footwear
IS : 11226 – 1985	:Leather Safety footwear having direct molding sole
IS : 5983 – 1978	:Eye protectors
IS : 9167 – 1979	:Ear protectors.
IS : 3521 – 1983	:Industrial Safety belts and harness

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ANNEXURE – B

FORMAT - 1.0

1.0 : HEALTHY, SAFETY & ENVIRONMENT (HSE) PLAN

Project : ----------

Contractor:----------

Date : ----------

Owner: ……

(To be prepared & submitted by each Construction Agency)

Activity Description	Procedure/ W.I./ Guidelines	Code of Conformance	Performing Function			Audit Function
			Performance	Checker	Approver	Customer Review/ Audit Requirements

PREPARED BY REVIEWED BY APPROVED BY

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MONTHLY CHECKLIST CUM COMPLIANCE REPORT REGARDING HSE (1/6)

Project: _____ Contractor: _____

Date: _____ Owner: _____

Inspection By:

_____

Note: write 'NC' (Not Concern) wherever any of the items are not applicable

Item	Yes	No	Remarks	Action
HOUSEKEEPING				
Waste containers provided and used				
Sanitary facilities adequate and Clean				
Passageways and Walkways Clear				
General neatness of working areas				
Proper Material Storage				
Wooden Boards properly stacked and nails removed				
Cords, leads out of walk and traffic ways				
Scraps removed from the work site				
Other				
PERSONNEL PROTECTIVE EQUIPMENT				
Goggles : Shields				
Face protection				
Hearing protection				
Safety Shoes provided				
Hand protection				
Respiratory Masks etc.				
Safety Belts				
Safety Helmets				
Other				
EXCAVATIONS / OPENINGS				
Excavation permit				
Excavated earth kept away from edge				
Dewatering pump kept away from edge				
Safe access into excavated area				
Opening properly covered or barricaded				
Excavations shored				
Excavations barricaded				
Overnight lighting provided				
Other				

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MONTHLY CHECKLIST CUM COMPLIANCE REPORT REGARDING HSE (2/6)

Item	Yes	No	Remark	Action
Welding Cutting				
Valid not work permit				
Flashback arrester provided for cylinders				
Power cable not crossing the welding cable				
Adequate earthing provided				
No combustible materials kept near welding & cutting works				
Gas cylinder chained upright & kept in trolleys				
Cables and hoses not obstructing				
Screens or shields used				
Flammable materials protected				
Fire extinguisher (s) accessible				
Other				
SCAFFOLDING				
Fully decked platform				
Guard and intermediate rails in place				
Toe boards in place & tied properly				
Adequate shoring				
Adequate access				
Other				
LADDERS				
Extension side rails I m above				
Top of landing				
Properly secured at top & bottom				
Angle $\pm$ 70° from horizontal				
Other				

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MONTHLY CHECKLIST CUM COMPLIANCE REPORT REGARDING HSE (3/6)

Item	Yes	No	Remark	Action
HOISTS, CRANES AND DERRICKS				
Condition of cables and sheaves OK				
Condition of slings, chains, hooks and eyes OK				
Inspection and maintenance logs maintained				
Outriggers used				
Singh/ barricades provided				
Signals observed and understood				
Qualified operators				
Other				
MACHINERY, TOOLS AND EQUIPMENT				
Proper instruction				
Safety devices				
Proper cords				
Inspections and maintenance				
Other				
VEHICLE AND TRAFFIC				
Rules and regulations observed				
Inspection and maintenance				
Licensed drivers				
Others				

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MONTHLY CHECKLIST CUM COMPLIANCE REPORT REGARDING HSE (4/6)

Item	Yes	No	Remark	Action
TEMPORARY FACILITIES				
Emergency instruction posted				
Fire extinguishers provided				
Fire-aid equipment				
Secured against storm damage				
General nemeses				
In accordance with electrical requirements				
Other				
Fire Prevention				
Personnel instructed				
Fire extinguishers checked				
No smoking in prohibited areas				
Hydrants clear				
Other				
ELECTRICAL				
Proper wiring &earthing				
ELCB’s provided				
Ground fault circuit interrupters				
Protection against damage				
Prevention of tripping hazards				
Proper electrical cable joints				
Light poles secured				
Clear way to power distribution board				
Proper rating of fuses				

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MONTHLY CHECKLIST CUM COMPLIANCE REPORT REGARDING HSE (5/6)

Item	Yes	No	Remark	Action
HANDLING AND STORAGE OF MATERIALS				
Properly stored or stacked				
Passageways clear				
Other				
FLAMMABLE GASES AND LIQUIDS				
Containers clearly identified				
Proper storage				
Fire extinguishers nearby				
Other				
WORKING AT HEIGHT				
Erection plan				
Safety nets				
Safety belts tied properly				
Illumination				
No loose material at height				
No body under working area				
All openings covered				
Other				
ENVIRONMENT				
Chemical and other Effluents properly disposed				
Cleaning liquid of pipes disposed-off properly				
Seawater used for hydrotesting disposed off as per agreed proceeding				
Lubricant Waste/ Engine oils properly disposed				
Waster from Canteen office, sanitation etc. disposed properly				
Disposal of surplus earth stripping materials, Oily rags and combustible materials done properly				
Green belt protection.				

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MONTHLY CHECKLIST CUM COMPLIANCE REPORT REGARDING HSE (6/6)

Item	Yes	No	Remark	Action
HEALTH CHECK				
Hygienic conditions at labour camps OL				
Availability of First Aid facilities				
Proper sanitation at site, office and labour camps				
Arrangements of medical facility				
Measures for dealing with illness				
Availability of potable drinking waters for workmen & staff				
Provision of creches for children				
ERECTION				
Slings/ D shackle checked				
Signal Man				
Tag line for guiding the load				
Protecting the slings from sharp edges				
No loose materials at height				
Ladder & platform welding inspected				
No one under the suspended load				
Stay rope				
SWL				

Signature Of Resident Engineer with Seal

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Monthly Health, Safety & Environmental (HSE) Report
(To be submitted by each Contractor)

Actual work start date : _____for the month of:_____

Project:_____Report No : _____

Name of the Contractor:_____Status as on:_____

Name of work:_____

Name of safety officer_____

Item	This Month	Cumulative
Total strength (Staff – Workmen)		
Number of HSE meeting organized at site		
Number of HSE awareness programs conducted at site		
Whether workmen compensation policy taken	Y/N	
Whether workmen compensation policy valid	Y/N	
Whether workmen registered under ESI Act	Y/N	
Number of Fatal Accident		
Number of Loss Time Accident (Other than Fatal)		
Other accident (non loss time)		
Total No. of accident		
Total man-hours worked		
Man-hour loss due to fire and accident		
Compensation cases raised with insurance		
Compensation cases resolved and paid to workmen		

Remark

Date:_____/_____/_____ Safety Officer/RCM

(Signature and Name)

To: OWNER…… 1 COPY
RCM/SITE-IN-CHARGE 1 COPY

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SUPPLEMENTARY ACCIDENT, INCIDENT&NEAR MISS REPORT

Project:_____Supplementary to report No._____

Site : _____Date:_____

Contractor: _____

NAME OF THE INJURED.....

FATHER'S NAME.....

SUB-CONTRACTOR M/S.....

DATE & TIME OF ACCIDENT.....

LOCATION.....

BRIEF DESCRIPTION & CAUSE OF A ACCIDENT

NATURE OF INJURY / DAMAGE

COMMENTS FROM MEDICAL PRACTITIONER WHO ATTENDED THE VICITIM/INJURED

SUGGESTED IMPROVEMENT IN THE WORKING CONDITION IF ANY

LOSS OF MANHOURS AND IMPACT ON SITE WORKS

ANY OTHER COMMENT BY SAFETY OFFICER

Date:_____/_____/_____ SIGNATURE OF CONTRACTOR WITH SEAL

To : OWNER.....1 COPY

: RCM/SITE-IN-CHARGE.....1 COPY

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ENERGISING QUALITY

ACCIDENT REPORT

(To be submitted by Contractor after every accident within 2 hours of accident)

Report No._____ Date:___
Name of Site:_____ COTRACTOR_____

NAME OF THE INJURED……..
FATHER'S NAME……
SUB-CONTRACTOR M/S…….
DATE & TIME OF ACCIDENT……
LOCATION…….

BRIEF DESCRIPTION OF ACCIDENT

CAUSE OF ACCIDENT

NATURE OF INJURY / DAMAGE

MEDICAL AID PROVIDED / ACTIONS TAKEN

INTIMATION TO LOCAL AUTHORITIES

Date :_____/_____/_____ SIGNATURE OF CONTRACTOR WITH SEAL

To : OWNER…… 1 COPY
: RCM/SITE-IN-CHARGE 1 COPY

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Date: 2025.03.13 12:56:46 IST

QUALITY ASSURANCE PLAN

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Date: 2025.03.13 12:56:46 IST

VCS QUALITY SERVICES PVT. LTD.

INSPECTION AND TEST PLAN
FOR
FLANGES & SPECTACLE BLINDS
VCS – ITP – PP – 2003

Rev. No	Date	Prepared By	Checked By	Approved By	Authorized By
01	19/12/2021	SR	MC	HK	GW

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Date: 2025.03.13 12:56:46 IST

REVISION RECORD

Rev.	Revision Date	Prepared by	Checked by	Approved by	Authorized by	Revision Description
00	22/04/2020					
		MB	MC	AD	SK	
01	19/12/2021					Revised as Marked
		SR	MC	HK	GW	

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ABBREVIATIONS:			
CE	Carbon Equivalent	NDT	Non-Destructive Testing
DCN	Dispatch Clearance Note	PO	Purchase Order
HT	Heat Treatment	PR	Purchase Requisition
IC	Inspection Certificate	RT	Radiography Testing
IR	Inspection Report	TC	Test Certificate
IRC	Inspection Release Certificate	TPI or TPIA	Third Party Inspection Agency
ITP	Inspection and Test Plan	UT	Ultrasonic Testing
MPT/MT	Magnetic Particle Testing	VDR	Vendor Data Requirement
MTC	Material Test Certificate		

LEGENDS:
H - Hold (Do not proceed without approval)
W - Witness (Give due notice, work may proceed after scheduled date)
P - Perform
R - Review
RW - Random Witness [As specified or 10% (min.1 no. of each size and type of Bulk items)]

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Date: 2025.03.13 12:56:46 IST

1.0 SCOPE:

This Inspection and Test Plan covers the minimum testing requirements of Flanges, Spectacle Blinds & Drip Rings.

2.0 REFERENCE DOCUMENTS:

PO / PR / Standards referred there in / Job specifications / Approved documents.

3.0 INSPECTION AND TEST REQUIREMENTS:

SL.NO.	STAGE/ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB VENDOR	VENDOR	TPIA
1.0	**Procedure**						
1.1	Heat Treatment, NDT and Other Procedures	Documented Procedures	100%	Procedure Documents	-	H	R
2.0	**Material Inspection**						
2.1.	Raw Material Inspection	Chemical, Mechanical, Properties	100%	Test Certificates	-	H	R
3.0	**In Process Inspection**						

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SL.NO.	STAGE/ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB VENDOR	VENDOR	TPIA
3.1	Heat Treatment	Stress Relieving, Normalising, Tempering, Solution Annealing, Stabilization Heat Treatment etc. as applicable	100%	HT Chart	-	H	R
3.2	Identification of Test Samples	Product Chemical, Mechanical, Impact and Other test as applicable	One/Heat/Lot	Test Report	-	H	H
3.4	Product Analysis (As applicable)	Chemical Composition	As per PR/Purchase Specification	Test Reports	-	H	R
3.5	Destructive Testing	Mechanical, Impact and Other test as applicable	One/Heat/Lot	Test Reports	-	H	H
3.6	MPI	Surface & Internal Imperfections	As per PR/Purchase Specification	NDT Reports	-	H	R
4.0	**Final Inspection**						
4.1	Final Inspection	1. Visual 2 Dimensions 3. Hardness 4. Marking etc	100%	Inspection Report	-	H	W

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SL.NO.	STAGE/ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB VENDOR	VENDOR	TPIA
4.2	PMI Check	Chemical	As per Spec.	Inspection Report	-	H	RW
4.3	Final Stamping	Stamping Of Accepted Flanges & Spectacle Blinds	Stamping of Valves which are witnessed by TPIA.	Inspection Report	-	H	H
5.0	**Painting**						
5.1	Rust Preventive Coating & Colour Coding	Visual & Colour Coding as applicable	100%	Inspection Report	-	H	-
6.0	**Documentation & IC**						
6.1	Documentation & Inspection Certificate (IC)	Review of Stage Inspection Reports / Test Reports & Issue of IC	100%	Vendor TC & IC	-	H	H
7.0	**Final Documentation & Submission of Reports**	Compilation of IR/IRC/DCN/MTC/DRGS. /VDR	100%	Compliance Certificate (Note-1)	-	H	-

NOTES (As applicable):

1. If the certification is specified as EN 10204 Type 3.1 in Datasheet / Material Requisition, then '**W**' may be replaced with '**R**' with Material Traceability.
2. ITP shall be submitted including but not limited to the item/activity covered above. Any item/activity identified and required for the completeness shall also be covered in the ITP submitted by the manufacturers.

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VCS QUALITY SERVICES PVT. LTD.

INSPECTION AND TEST PLAN
FOR
LONG RADIUS BENDS FOR ONSHORE PIPELINES
VCS –ITP –PP –2004

Rev. No	Date	Prepared By	Checked By	Approved By	Authorized By
02	19/12/2021	SR	MC	HK	GW

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REVISION RECORD

Rev.	Revision Date	Prepared by	Checked by	Approved by	Authorized by	Revision Description
00	05/06/2017					Issued as Standard ITP
		GS	ADE	AD	SK	
01	22/04/2020					Document formatting, Doc numbering updated from VCS-PL-ITP-004 to VCS-ITP-PP-2004 other detail update as marked
		MB	MC	AD	SK	
02	19/12/2021					Revised as Marked
		SR	MC	HK	GW	

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ABBREVIATIONS:			
CE	Carbon Equivalent	PR	Purchase Requisition
IC	Inspection Certificate	RT	Radiography Testing
ITP	Inspection and Test Plan	TC	Test Certificate
MPT/MT	Magnetic Particle Testing	TPI or TPIA	Third Party Inspection Agency
MTC	Material Test Certificate	UT	Ultrasonic Testing
NDT	Non-Destructive Testing	VDR	Vendor Data Requirement
PO	Purchase Order		

LEGENDS:
H - Hold (Do not proceed without approval)
W - Witness (Give due notice, work may proceed after scheduled date)
P - Perform
R - Review
RW - Random Witness [As specified or 10% (min.1 no. of each size and type of Bulk items)]

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1.0 SCOPE:

This Inspection and Test Plan covers the minimum testing requirements of long radius Bends for onshore Pipelines.

2.0 REFERENCE DOCUMENTS:

PO / PR / Standards referred there in / Job specifications / Approved documents.

3.0 INSPECTION AND TEST REQUIREMENTS:

SL.NO.	STAGE/ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB VENDOR	VENDOR	TPIA
1.0	**Procedure**						
1.1	Hydro Test, NDT, Bend Manufacturing, Heat treatment and Other Procedures	Documented Procedures	100%	Procedure Documents	-	H	R
2.0	**Material Inspection**						
2.1	Raw Material Inspection	Chemical, mechanical properties, method of manufacturing, Heat Treatment Condition, etc	100%	Mill Test Certificates (EN 10204 Type 3.2 certificate)	H	R	R

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SL.NO.	STAGE/ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB VENDOR	VENDOR	TPIA
3.0	**In Process Inspection**						
3.1	Material Identification (In case of EN 10204 Type 3.1 certificate)	Review of Test Certificates, Markings, Visual and Dimensional inspection, identity co-relation & Transfer of identification marks	One/Heat	Material Clearance Record (3.2 certificate or check test [mechanical, chemical, impact, hardness])	-	H	H
3.2	Bend Manufacturing Procedure Qualification	Bend forming parameters, Mechanical, Impact, Micro and Hardness	100%	Test Report	-	H	H
3.3	Induction Bending (Production bends)	Bending temp Bending rate Power input As per qualified procedure of test bend	100%	Inspection Report	-	H	M

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SL.NO.	STAGE/ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB VENDOR	VENDOR	TPIA
3.4	Heat Treatment (If Applicable)	Time / temp record	100%	HT Graph	-	H	R
4.0	**Final Inspection**						
4.1	NDT-RT, UT & MPT as applicable	Defects	100%	Films/Test Reports	-	H	R
4.2	Hydrostatic Test	Soundness / Leak check	100%	Test Report	-	H	W
4.3	Final visual and dimension	Visual and Dimension	100%	Inspection Report	-	H	W
4.4	Gauging Pig Passing (95% of ID)	Verification of ID / Profile	100%	Inspection Report	-	H	W
5.0	**Documentation & IC**						
5.1	Documentation & Inspection Certificate (IC)	Review of Stage Inspection Reports / Test Reports & Issue of IC	100%	Vendor TC & IC	-	H	H

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SL.NO.	STAGE/ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB VENDOR	VENDOR	TPIA
5.2	Final documents as applicable	Verification & compilation of inspection & test records for submission to customer	100%	Final dossier	-	H	H

NOTES (As applicable):

1. ITP shall be submitted including but not limited to the item/activity covered above. Any item/activity identified and required for the completeness shall also be covered in the ITP submitted by the manufacturers.

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VCS QUALITY SERVICES PVT. LTD.

INSPECTION AND TEST PLAN
FOR
FORGED, SEAMLESS & WELDED FITTINGS (16” NB & BELOW)
VCS – ITP – PP – 2005

Rev. No	Date	Prepared By	Checked By	Approved By	Authorized By
01	19/12/2021	SR	MC	HK	GW

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REVISION RECORD

Rev.	Revision Date	Prepared by	Checked by	Approved by	Authorized by	Revision Description
00	22/04/2020					
		MB	MC	AD	SK	
01	19/12/2021					Revised as Marked
		SR	MC	HK	GW	

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ABBREVIATIONS:			
CE	Carbon Equivalent	PMI	Positive Material Identification
DCN	Dispatch Clearance Note	PO	Purchase Order
DFT	Dry Film Thickness	PQR	Procedure Qualification Record
DPT	Dye Penetrant Testing	PR	Purchase Requisition
HT	Heat Treatment	RT	Radiography Testing
IC	Inspection Certificate	TC	Test Certificate
IR	Inspection Report	TPI or TPIA	Third Party Inspection Agency
IRC	Inspection Release Certificate	UT	Ultrasonic Testing
ITP	Inspection and Test Plan	VDR	Vendor Data Requirement
MPT/MT	Magnetic Particle Testing	WPQ	Welders Performance Qualification
MTC	Material Test Certificate	WPS	Welding Procedure Specification
NDT	Non-Destructive Testing		

LEGENDS:
H- Hold (Do not proceed without approval)
W-Witness (Give due notice, work may proceed after scheduled date)
P-Perform
R-Review
RW-Random Witness [As specified or 10% (min. 1 no. of each size and type of Bulk item)]

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1.0 SCOPE:

This Inspection and Test Plan covers the minimum testing requirements of Forged, Seamless & Welded Fittings.

2.0 REFERENCE DOCUMENTS:

PO / PR / Standards referred there in / Job specifications / Approved documents.

3.0 INSPECTION AND TEST REQUIREMENTS:

SL.NO.	STAGE/ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB VENDOR	VENDOR	TPIA
1.0	**Procedure**						
1.1	Heat Treatment / NDT	Documented Procedures	100%	Procedure Documents	-	H	R
1.2	WPS, PQR & WPQ	Welding Parameters & Qualification Record	100%	WPS, PQR & WPQ	-	H	W- New R- Existing
2.0	**Material Inspection**						
2.1	Raw Material Identification (Billets, Rounds, Pipes, Coil, Plates, etc.)	Chemical and Mechanical Properties, Size & Steel making practice etc	100%	Mill test certificate, Vendor's Inspection Report	-	H	R

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SL.NO.	STAGE/ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB VENDOR	VENDOR	TPIA
3.0	**In Process Inspection**						
3.1	Welding	Welding Parameters as per WPS / PQR	100%	Inspection Reports	-	H	-
3.2	Heat Treatment	Stress Relieving, Normalising, Tempering, Solution Annealing, Stabilization Heat Treatment etc. as applicable	100%	HT chart	-	H	R
3.3	RT For Fittings As Applicable	Weld defects	PR / Purchase Specification	RT films & Reports	-	H	R (RT film review)
3.4	Identification of Test Samples	Product Chemical, Mechanical, Impact, Hardness and other test as applicable	One/Heat/Lot	Test Reports	-	H	H

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SL.NO.	STAGE/ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB VENDOR	VENDOR	TPIA
3.5	Product Analysis	Chemical Composition	PR/ Purchase Specification	Test Reports	-	H	R
3.6	Destructive Testing	Mechanical, Impact, Hardness and Other test as applicable	One/Heat/Lot	Test Reports	-	H	H
3.7	MPT/LPT	Surface & Internal Imperfections	PR/ Purchase Specification	NDT Reports	-	H	R
4.0	**Final Inspection**						
4.1	Visual and Dimensional Inspection (VDI)	Surface finish, Dimensions, Marking etc	100%	Inspection report	-	H	RW
4.2	PMI Check	Chemical Check	As Per Spec./Code	Inspection report	-	H	RW

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SL.NO.	STAGE/ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB VENDOR	VENDOR	TPIA
4.3	Final Stamping	Stamping of accepted Items	100%	Inspection report	-	H	H
5.0	**Painting**						
5.1	Rust Preventive Coating & Colour Coding	Visual Inspection & Colour Coding	100%	Inspection report	-	H	-
6.0	**Documentation & IC**						
6.1	Documentation & Inspection Certificate (IC)	Review of Stage Inspection Reports / Test Reports & Issue of IC	100%	Vendor TC & IC	-	H	H
7.0	**Final Documentation and Submission of Reports**	Compilation of IR/IRC/DCN/MTC/DRGS. /VDR	100%	Compliance Certificate (Note-1)	-	H	-

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NOTES (As applicable):

1. If the certification is specified as EN 10204 Type 3.1 in Datasheet / Material Requisition, then '**W**' may be replaced with '**R**' with Material Traceability.

2. ITP shall be submitted including but not limited to the item/activity covered above. Any item/activity identified and required for the completeness shall also be covered in the ITP submitted by the manufacturers.

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INSPECTION AND TEST PLAN
FOR
INSULATING JOINTS
VCS – ITP – PP – 2006

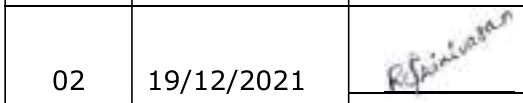
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02	19/12/2021	SR	MC	HK	GW

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REVISION RECORD

Rev.	Revision Date	Prepared by	Checked by	Approved by	Authorized by	Revision Description
00	06/06/2017					Issued as Standard
		GS	ADE	AD	SK	
01	22/04/2020					Document formatting, numbering updated from VCS-SD-ITP-006 to VCS-ITP-PP-2006 .
		MB	MC	AD	SK	
02	19/12/2021					Revised as Marked
		SR	MC	HK	GW	

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ABBREVIATIONS:			
CE	Carbon Equivalent	PO	Purchase Order
DFT	Dry Film Thickness	PQR	Procedure Qualification Record
DPT	Dye Penetrant Testing	PR	Purchase Requisition
HT	Heat Treatment	RT	Radiography Testing
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ITP	Inspection and Test Plan	TPI or TPIA	Third Party Inspection Agency
MPT/MT	Magnetic Particle Testing	UT	Ultrasonic Testing
MTC	Material Test Certificate	VDR	Vendor Data Requirement
NDT	Non-Destructive Testing	WPQ	Welders Performance Qualification
PMI	Positive Material Identification	WPS	Welding Procedure Specification

LEGENDS:
H - Hold (Do not proceed without approval)
W - Witness (Give due notice, work may proceed after scheduled date)
P - Perform
R - Review
RW - Random Witness [As specified or 10% (min.1 no. of each size and type of Bulk items)]

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1.0 SCOPE:

This Inspection and Test Plan covers the minimum testing requirements of Insulating Joints.

2.0 REFERENCE DOCUMENTS:

PO / PR / Standards referred there in / Job specifications / Approved documents.

3.0 INSPECTION AND TEST REQUIREMENTS:

SL.NO.	STAGE/ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB VENDOR	VENDOR	TPIA
1.0	**Procedure**						
1.1	Hydrostatic Test, NDT and other procedures	Documented Procedures	100%	Procedure Documents	-	H	R
1.2	WPS/ PQR /WPQ	Documented procedures	100%	Procedure Documents	-	H	R-Existing W-New
2.0	**Material Inspection**						

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SL.NO.	STAGE/ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB VENDOR	VENDOR	TPIA
2.1	1) Forging 2) Pup Piece	Chemical / Mechanical Properties, NDT, HT and other requirement as per purchase specification.	100%	MTC & Inspection Record	H	W	W
2.2	Gasket, Insulating Ring, Filling Material, etc.	As per material spec./code	100%	MTC & Inspection Record	H	H	R
3.0	**In Process Inspection**						
3.1	Welding	Welding Parameters, NDT (as applicable)	100%	NDT Records/RT films	-	W	R
4.0	**Final Inspection**						
4.1	Hydro Testing, Air Leak test, Vacuum test (As applicable)	Leak Check	100%	Test Report	-	H	H

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SL.NO.	STAGE/ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB VENDOR	VENDOR	TPIA
4.2	Visual and Dimension Check	Visual and Dimension Check	100%	Inspection Report	-	H	RW
4.3	Dielectric Test	Insulating Resistance	100%	Inspection Report	-	W	W
5.0	**Painting**						
5.1	Final painting (as applicable)	Paint Scheme, Visual & Paint thickness check	100%	Inspection Report	-	H	R
6.0	**Documentation & IC**						
6.1	Stamping and review of inspection documents, issue of IC	Review of documents for compliance as per PR.	100%	IC	-	-	H

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SL.NO.	STAGE/ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB VENDOR	VENDOR	TPIA
7.0	**Review of final documentation**	Compilation of documents as per VDR attached with PR records for submission to customer	100%	Dossier/Completion Certificate (EN 10204 Type 3.2)	-	H	H

NOTES (As applicable):

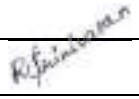
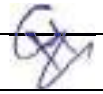
1. Items shall be EN 10204 Type 3.2 Certified.

2. ITP shall be submitted including but not limited to the item/activity covered above. Any item/activity identified and required for the completeness shall also be covered in the ITP submitted by the manufacturers.

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VCS QUALITY SERVICES PVT. LTD.

INSPECTION AND TEST PLAN
FOR
BALL VALVE
VCS – ITP – PP – 2007

					
04	27/05/2022	SR	MC	HK	GW
Rev. No	**Date**	**Prepared By**	**Checked By**	**Approved By**	**Authorized By**

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REVISION RECORD						
Rev.	**Revision Date**	**Prepared by**	**Checked by**	**Approved by**	**Authorized by**	**Revision Description**
00	16/06/2017					
		GS	ADE	AD	SK	
01	20/01/2020					Formatting update, Doc Numbering change from VCS-SD-ITP-007 to VCS-ITP-PP-2007
		AG	MC	AD	SK	
02	19/05/2020					Revised as Marked
		AG	MC	AD	SK	
03	19/12/2021					Revised as Marked
		SR	MC	HK	HK	
04	27/05/2022					Revised as Marked
		SR	MC	HK	HK	

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ABBREVIATIONS:			
CE	Carbon Equivalent	NDT	Non-Destructive Testing
DCN	Dispatch Clearance Note	PO	Purchase Order
DFT	Dry Film Thickness	PQR	Procedure Qualification Record
DPT	Dye Penetrant Testing	PR	Purchase Requisition
HT	Heat Treatment	RT	Radiography Testing
ITP	Inspection and Test Plan	TC	Test Certificate
IC	Inspection Certificate	TPI or TPIA	Third Party Inspection Agency
IGC	Inter Granular Corrosion	UT	Ultrasonic Testing
IR	Inspection Report	VDR	Vendor Data Requirement
IRC	Inspection Release Certificate	WPQ	Welders Performance Qualification
MPT / MT	Magnetic Particle Testing	WPS	Welding Procedure Specification
MTC	Material Test Certificate		

LEGENDS:
H - Hold (Do not proceed without approval)
W – Witness (Give due notice, work may proceed after scheduled date)
P - Perform
R - Review
RW - Random Witness [As specified or 10% (min.1 no. of each size and type of Bulk items)]

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1.0 SCOPE:

This Inspection and Test Plan covers the minimum testing requirements of Ball Valves.

2.0 REFERENCE DOCUMENTS:

PO / PR / Standards referred there in / Job specifications / Approved documents.

3.0 INSPECTION AND TEST REQUIREMENTS:

SL. NO.	COMPONENT & OPERATION	CHARACTERISTICS / METHOD OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT & ACCEPTENCE CRITERIA	FORMAT OF RECORD	SCOPE OF INSPECTION		
						SUB VENDOR	VENDOR	TPIA
1.0	**PROCEDURES**							
1.1	Hydrostatic Test, NDT and Other Procedures	Documented Procedures	100%		Procedure Documents	-	H	R
1.2	WPS,PQR & WPQ	Welding Parameters & Qualification Record	100%		WPS ,PQR & WPQ	-	H	W- New R- Existing
1.3	Pre-Qualification Tests	Fire safe, Cryogenic & Other Test as applicable	As per PR/Purchase Specification		Acceptance Report	-	H	H (If new)
2.0	**RAW MATERIAL**							
2.1	Forging / Casting: 1) Body 2) End Piece 3) Ball 4) Seat Ring 5) Pup Piece (as applicable)	Visual & Dimension	100%	Material & Technical Specification	Inspection Report	H	H	-
		Chemical: Chemical Analysis IGC (For SS component)	All Heats	Material & Technical Specification	Vendor Test Certificate	H	R	R
		Mechanical: Mechanical Test	All Heats	Material & Technical Specification	Vendor Test Certificate	H	R	W (Note-1)

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SL. NO.	COMPONENT & OPERATION	CHARACTERISTICS / METHOD OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT & ACCEPTENCE CRITERIA	FORMAT OF RECORD	SCOPE OF INSPECTION		
						SUB VENDOR	VENDOR	TPIA
		Impact Test (@ - 29°C): for CS Impact Test (@ - 45°C): for LTCS	All Heats	Material & Technical Specification / ASME B 16.34	Test Report	H	R	W (Note-1)
		Non-Destructive Examination (NDT): Radiography (100% Critical Area)	100%	Material & Technical Specification /ASME B 16.34	RT Report	H	R (RT-Film review)	R (RT-Film review)
		Non-Destructive Examination (NDT): Magnetic Particle Examination (100% exterior & accessible interior)	100%	Material & Technical Specification /ASME B 16.34	MPI Report	H	R	R
		ENP (For Ball): Visual, Thickness & Hardness	100%	25 microns (min) & 50 HRC (min)	Vendor Test Certificate	H	R	R
3.0	**INCOMING / BOF ITEMS**							
3.1	Stem	Chemical: Chemical Analysis	All Heats	Material & Technical Specification	Vendor Test Certificate	H	R	R
		Mechanical: Mechanical Test	All Heats	Material & Technical Specification	Vendor Test Certificate	H	R	R
3.2	Fasteners	Chemical: Chemical Analysis	All Heats	Material & Technical Specification	Vendor Test Certificate	H	R	R
		Mechanical: Mechanical Test	All Heats	Material & Technical Specification	Vendor Test Certificate	H	R	R
		Impact Test (@ - 29°C): for CS Impact Test (@ - 45°C): for LTCS	All Heats	Material & Technical Specification /ASME B 16.34	Test Report	H	R	R
3.3	Gaskets, Gear units, Gland, Packings, etc.	Physical / Chemical Properties	100%	Material & Technical Specification	Test Certificates& Lab Report	H	R	R

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SL. NO.	COMPONENT & OPERATION	CHARACTERISTICS / METHOD OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT & ACCEPTENCE CRITERIA	FORMAT OF RECORD	SCOPE OF INSPECTION		
						SUB VENDOR	VENDOR	TPIA
4.0	**MACHINED COMPONENTS**							
4.1	Body, Connector, Ball & Seat Ring	Surface examination & Dimension Inspection: Visual & Measurement	100%	Manufacturer's Drawing	Inspection Reports	100%	R	R
5.0	**IN-PROCESS**							
5.1	Body & Connector joint welding	Non-Destructive Examination (NDT): Magnetic Particle Examination (MPI)	100%	ASME Sec VIII - Appendix V & VI	MPI Report	100%	R	R
5.2	Valve & Pup Piece Bevel Ends joint welding	Non-Destructive Examination (NDT): Radiography (100% on weld joint)	100%	ASME B16.34	RT Report	100%	R (RT-Film review)	R (RT-Film review)
6.0	**FINAL INSPECTION**							
6.1	Finished Valve Assembly: Pressure Test & Final Inspection	Shell Test: Hydrostatic	100%	Testing Procedure as per Code	Test Record	-	H	RW
6.2		Seat Test: Hydrostatic				-	H	RW
6.3		Seat Test: Pneumatic				-	H	RW
6.4		Functional Test - Actuated Valve @ Atm. Pressure & Max. Diff. Pressure: Operation- Open / Close				-	H	RW
6.5		Double Block & Bleed: Hydrostatic				-	H	RW
6.6		Final Inspection: Visual, Dimension, TC Verification, Special Requirements & Marking as per sale order	100%	Approved GA Drawing (if applicable)	Test Report	-	H	RW
6.7		Anti-Static Test	100%	API 6D & Technical Specification	Test Record	-	H	RW

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SL. NO.	COMPONENT & OPERATION	CHARACTERISTICS / METHOD OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT & ACCEPTENCE CRITERIA	FORMAT OF RECORD	SCOPE OF INSPECTION		
						SUB VENDOR	VENDOR	TPIA
6.8		Fire Safe Test	100%	API-6FA / ISO-10497	Fire safe type test report	-	H	R
6.9	Final Stamping	Stamping Of Accepted Valves	Stamping of Valves which are witnessed by VCS/TPIA	As per Tender Specification	Inspection Report	-	H	H
6.10	Strip Test	Component integrity, PMI of BOM	One per size per rating	-	Test report	H	H	H
7.0	**PAINTING & PACKING**	Surface examination & DFT Inspection: Visual & Measurement	100%	As per Tender Specification	Painting Record	-	H	R
8.0	**DOCUMENTATION & INSPECTION CERTIFICATE(IC)**	Review of Stage Inspection Reports / Test Reports & Issue of IC	100%	As per Tender Specification	Vendor TC & IC	-	H	H
9.0	**FINAL DOCUMENTATION & SUBMISSION OF REPORTS**	Compilation of IR/IRC/DCN/MTC/DRGS./VDR	100%	EN 10204 type 3.2/3.1 certification as specified in valve datasheet (Note-1)	Compliance Certificate	-	H	-

NOTES (As applicable):

1. If the certification is specified as EN 10204 Type 3.1 in Data sheet / Material Requisition, then '**W**' may be replaced with '**R**' with Material Traceability.

2. ITP shall be submitted including but not limited to the item/activity covered above. Any item/activity identified and required for the completeness shall also be covered in the ITP submitted by the manufacturers.

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VCS QUALITY SERVICES PVT. LTD.

INSPECTION AND TEST PLAN
FOR
PLUG VALVES
VCS – ITP – PP – 2009

Rev. No	Date	Prepared By	Checked By	Approved By	Authorized By
00	27/04/2022	SR	MC	HK	GW

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REVISION RECORD

Rev.	Revision Date	Prepared by	Checked by	Approved by	Authorized by	Revision Description
00	27/04/2022	SR	MC	HK	GW	Issued as standard ITP

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ABBREVIATIONS:			
CE	Carbon Equivalent	NDT	Non-Destructive Testing
DCN	Dispatch Clearance Note	PO	Purchase Order
DFT	Dry Film Thickness	PQR	Procedure Qualification Record
DPT	Dye Penetrant Testing	PR	Purchase Requisition
HT	Heat Treatment	RT	Radiography Testing
IC	Inspection Certificate	TC	Test Certificate
IR	Inspection Report	TPI or TPIA	Third Party Inspection Agency
IRC	Inspection Release Certificate	UT	Ultrasonic Testing
ITP	Inspection and Test Plan	VDR	Vendor Data Requirement
MPT/MT	Magnetic Particle Testing	WPQ	Welders Performance Qualification
MTC	Material Test Certificate	WPS	Welding Procedure Specification

LEGENDS:
H - Hold (Do not proceed without approval)
W - Witness (Give due notice, work may proceed after scheduled date)
P - Perform
R - Review
RW - Random Witness [As specified or 10% (min.1 no. of each size and type of Bulk items)]

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1.0 SCOPE:

This Inspection and Test Plan covers the minimum testing requirements of Valves.

2.0 REFERENCE DOCUMENTS:

PO / PR / Standards referred there in / Job specifications / Approved documents.

3.0 INSPECTION AND TEST REQUIREMENTS:

SL.NO.	STAGE/ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB VENDOR	VENDOR	TPIA
1.0	**Procedure**						
1.1	Hydrostatic Test, NDT and Other Procedures	Documented Procedures	100%	Procedure Documents	-	H	R
1.2	WPS, PQR & WPQ	Welding Parameters & Qualification Record	100%	WPS, PQR & WPQ	-	H	W- New R- Existing

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SL.NO.	STAGE/ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB VENDOR	VENDOR	TPIA
2.0	**Material Inspection**						
2.1	Castings & Forgings (Body, Cover, Plug, Stem)	Chemical, Mechanical, Heat Treatment, NDT & Other Properties as applicable	100%	Test Certificates	H	R	W (Note-1)
2.2	Castings & Forgings (Body, Cover, Plug, Stem)	Visual & Dimension	100%	Inspection Report	H	H	-
2.3	Body, Cover and Plug Castings	Radiography Examination	As per PR / Purchase Specification	Films and report	H	R (RT-Film review)	R (RT-Film review) (Note-1)
2.4	Bars for Trim material	Chemical Analysis	Each Heat	Test Certificates& Lab Report	H	R	R
2.5	Gaskets, Gear units, Fasteners, Gland, Packings, etc.	Physical / Chemical Properties	100%	Test Certificates& Lab Report	H	R	R

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SL.NO.	STAGE/ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB VENDOR	VENDOR	TPIA
2.6	Actuators as applicable	Performance, Statutory Certificates as applicable	100%	Test Certificates& Lab Report	H	H	R
3.0	**In Process Inspection**						
3.1	Welding	Welding Parameters as per WPS / PQR	100%	Inspection Reports	-	H	R
3.2	Machining of components	Visual / Dimension	100%	Inspection Reports	-	H	-
4.0	**Final Inspection**						
4.1	Hydrostatic / Pneumatic Test	Hydrostatic Test – Shell Pneumatic Test – Seat	As per PR / Purchase Specification	Test Report	-	H	RW
4.2	Visual / Dimension	Surface & Dimension Check	100%	Test Report	-	H	RW
4.3	Final Stamping	Stamping Of Accepted Valves	Stamping of Valves which are witnessed by TPIA.	Inspection Report	-	H	H

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SL.NO.	STAGE/ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB VENDOR	VENDOR	TPIA
4.4	Strip Test	Component integrity, PMI of BOM	One per size per rating	Test report	H	H	H
5.0	**Painting**						
5.1	Painting and Colour coding as applicable	Visual / DFT Check	100%	Inspection Report	-	H	R
6.0	**Documentation & IC**						
6.1	Documentation & Inspection Certificate (IC)	Review of Stage Inspection Reports / Test Reports & Issue of IC	100%	Vendor TC & IC	-	H	H
7.0	**Final Documentation & Submission of Reports**	Compilation of IR/IRC/DCN/MTC/DRGS./VDR	100%	Compliance Certificate (Note-1)	-	H	-

NOTES (As applicable):

1. If the certification is specified as EN 10204 Type 3.1 in Data sheet / Material Requisition, then '**W**' may be replaced with '**R**' with Material Traceability.

2. ITP shall be submitted including but not limited to the item/activity covered above. Any item/activity identified and required for the completeness shall also be covered in the ITP submitted by the manufacturers.

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VCS QUALITY SERVICES PVT. LTD.

INSPECTION AND TEST PLAN
FOR
SEAMLESS LINE PIPES UP TO 16”

VCS – ITP – PP – 2015

Rev. No	Date	Prepared By	Checked By	Approved By	Authorized By
03	19/12/2021	SR	MC	HK	GW

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REVISION RECORD

Rev.	Revision Date	Prepared by	Checked by	Approved by	Authorized by	Revision Description
0	14.05.2019					Issued as Standard
		BS	MV	AD	SK	
1	19.11.2019					Re-Issued as Standard
		SS	MC	AD	SK	
2	15.05.2020					Document formatting, Doc numbering updated from VPC-PL-ITP-025 to VCS-ITP-PP-2015 other detail update as marked
		SS	MC	AD	SK	
3	19.12.2021					Revised as Marked
		SR	MC	HK	HK	

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ABBREVIATIONS:			
CE	Carbon Equivalent	MTC	Material Test Certificate
HT	Heat Treatment	NDT	Non-Destructive Testing
IC	Inspection Certificate	PO	Purchase Order
IGC	Inter Granular Corrosion	PMI	Positive Material Identification
ITP	Inspection and Test Plan	TC	Test Certificate
MPT/MT	Magnetic Particle Testing	TPI or TPIA	Third Party Inspection Agency
MPS	Manufacturing Process Specification	UT	Ultrasonic Testing
MR	Material Requisition	VDR	Vendor Data Requirement

LEGENDS:
H - Hold (Do not proceed without approval)
W - Witness (Give due notice, work may proceed after scheduled date)
P - Perform
R - Review
RW - Random Witness (As specified or 10% [min.1 no. of each size and type of Bulk item])

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1.0 SCOPE:

This Inspection and Test Plan covers the minimum testing requirements of Seamless Pipes up to 16" (Including 16")

2.0 REFERENCE DOCUMENTS:

PO/PR/ Standards referred there in/ Job specifications /Approved documents.

3.0 INSPECTION AND TEST REQUIREMENTS:

SL. NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB VENDOR	VENDOR	TPIA
1.0	**Procedure**						
1.1	MPS	Documented Procedures	100%	Procedure Documents	-	H	R
2.0	**Raw Material Procurement**						
2.1	Raw Material Inspection	Chemical & Mechanical Properties, Method of manufacturing, Heat Treatment Condition etc.	100%	Mill Test Certificates (EN 10204-3.2)	H	H (Note-3)	R (Note-3)

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SL. NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB VENDOR	VENDOR	TPIA
3.0	**In Process Inspection**						
3.1	First Day Production test	All testing requirement as per PR/ MPS	As per PR/ MPS	Test Report	-	H	H
3.2	Raw material Inspection	Marking & Correlations with Test Certificates	100%	Inspection Reports	-	H	-
3.3	Heat Treatment	Heat Treatment time and temperature	100%	HT Graph / Record	-	H	R
4.0	**Final Inspection**						
4.1	Hydrostatic Testing	Leak & pressure Drop, Calibration of Gauges/ Recorder	100%	Inspection Report	-	H	RW (Min.5%)

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SL. NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB VENDOR	VENDOR	TPIA
4.2	Calibration of UT system	Run with calibration pipe	1) Beginning of each shift 2) After Breakdown /Maintenance	Inspection Report	-	H	W
4.3	Pipe UT	Lamination & other defects	100%	Inspection Report	-	H	RW (Min.5%)
4.4	Pipe End UT MPT as applicable	Lamination & other defects	100%	Inspection Report	-	W	RW (Min.1%)
4.5	Final visual and dimension	1. Visual Examination 2. Dimensional Check Surface Condition, Straightness, End Finish, Bevel Angle, Root Face, Outer Dia., Thickness, Length, End Finish, Marking etc.	100%	Inspection Report	-	H	RW (Min.5%)
4.6	Lot Testing	1. Chemical Analysis 2. Tensile Tests 3. Macro & Hardness Tests 4. Impact Tests and other applicable test	As per MPS/API 5L/Spec.	Inspection Report	-	H	W

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SL. NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB VENDOR	VENDOR	TPIA
4.7	Non-conforming product/stage	Repair / Retest /Reject	100%	Inspection Report	-	H	W
4.8	Marking/Stencilling	Pipe No, Acceptance No., Heat. No., Size, Weight, Grade, Thickness, Colour Code etc as per MPS	100%	Inspection Report	-	H	RW (Min.5%)
5.0	**PAINTING**						
5.1	Rust Preventive Coating & Colour Coding	Visual & Colour Coding as applicable	100%	Inspection Report	-	H	-
6.0	**Documentation & IC**						
6.1	Documentation & Inspection Certificate (IC)	Review of Stage Inspection Reports / Test Reports & Issue of IC	100%	Manufacturer TC & IC (Note-4)	-	H	H

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SL. NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB VENDOR	VENDOR	TPIA
6.2	Final documents as per PR/MR	Verification & compilation of inspection & test records for submission to customer	100%	Final dossier (Note-4)	-	H	H

NOTES (As applicable):

1. ITP shall be submitted including but not limited to the item/activity covered above. Any item/activity identified and required for the completeness shall also be covered in the ITP submitted by the manufacturers.
2. Acceptance Norms for all the activities shall be as per PO/PR/STANDARDS referred there in /Job Specification /Approved Documents.
3. Raw Material shall be inspected at Mills (Sub vendors works) by TPIA appointed by Vendor.
4. Items shall be EN 10204 Type 3.2 Certified based on this ITP/MR/PR for the Pipe (Final product).

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VCS QUALITY SERVICES PVT. LTD.

INSPECTION AND TEST PLAN
FOR
ASSORTED PIPES

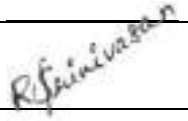
VCS – ITP – PP – 2021

Rev. No	Date	Prepared By	Checked By	Approved By	Authorized By
01	19/12/2021	SR	MC	HK	GW

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REVISION RECORD						
Rev.	**Revision Date**	**Prepared by**	**Checked by**	**Approved by**	**Authorized by**	**Revision Description**
00	22/04/2020					
		MB	MC	AD	SK	
01	19/12/2021					Revised as Marked
		SR	MC	HK	GW	

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ABBREVIATIONS:			
CE	Carbon Equivalent	NDT	Non-Destructive Testing
HT	Heat Treatment	PO	Purchase Order
DCN	Dispatch Clearance Note	PMI	Positive Material Identification
IC	Inspection Certificate	PR	Purchase Requisition
IR	Inspection Report	TC	Test Certificate
IRC	Inspection Release Certificate	TPI or TPIA	Third Party Inspection Agency
ITP	Inspection and Test Plan	VDR	Vendor Data Requirement
MPT / MT	Magnetic Particle Testing		
LEGENDS:			
H- Hold (Do not proceed without approval)			
W-Witness (Give due notice, work may proceed after scheduled date).			
P-Perform			
R-Review			
RW - Random Witness (As specified or 10% (min.1 no. of each size and type of Bulk item))			

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1. SCOPE

This Inspection and Test Plan covers the minimum testing requirements of small sizes and Assorted length Pipes.

2. REFERENCE DOCUMENTS:

PO/PR/ Standards referred there in/ Job specifications /Approved documents.

3. INSPECTION AND TEST REQUIREMENTS:

SL. NO.	STAGE/ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB VENDOR	VENDOR	TPIA
1.0	**Pipe Inspection**						
1.1	Pipe Inspection	Chemical & Mechanical Properties	100%	Test Certificates and marking on pipe (EN 10204 Type 3.2)	-	H	R
2.0	**Final Inspection (In case of non-availability of 3.2 Certificate)**						
2.1	Hydrostatic Testing	Leak Check	100%	Test Report	-	H	R
2.2	1) Visual 2) Dimension 3) Marking w.r.t MTC	Surface Condition, Straightness, End Finish, Bevel Angle, Root Face, Outer Dia., Thickness, Length, End Finish, Marking etc	100%	Inspection Report	-	H	RW

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SL. NO.	STAGE/ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB VENDOR	VENDOR	TPIA
2.3	PMI Check	Chemical Check	As Per Spec.	Inspection Report	-	H	RW
2.4	Identification of Test Samples	Product Chemical, Mechanical, Impact and Other test as applicable	As Per Spec. / Code	Test Reports	-	H	H
2.5	Product Analysis	Chemical Composition	As Per Spec. / Code	Test Reports	-	H	R
2.6	Destructive Testing	Mechanical, Impact, and Other test as applicable	As Per Spec. / Code	Test Reports	-	H	H
2.7	PMI Check	Chemical Check	As Per Spec. / Code	Inspection Report	-	H	RW
2.8	Final Stamping	Stamping Of Accepted Pipes	Stamping of Pipes	Inspection Report	-	H	H

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SL. NO.	STAGE/ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB VENDOR	VENDOR	TPIA
3.0	**Painting**						
3.1	Rust Preventive Coating & Colour Coding	Visual Inspection & Colour Coding	100%	Inspection Report	-	H	-
4.0	**Documentation & IC**						
4.1	Documentation & Inspection Certificate (IC)	Review of Stage Inspection Reports / Test Reports & Issue of IC	100%	Vendor TC/IR/IRC/DCN/DRGS. /VDR (Note-1)	-	H	-

NOTES (As applicable):

1. Items shall be accepted based on EN 10204 type 3.2/3.1 certification as specified in material requisition.

2. ITP shall be submitted including but not limited to the item/activity covered above. Any item/activity identified and required for the completeness shall also be covered in the ITP submitted by the manufacturers.

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VCS PROJECTS CONSULTANTS PVT. LTD.

INSPECTION AND TEST PLAN
FOR
USE OF STOCK SMALL SIZES AND ASSORTED LENGTH PIPES

VCS – ITP – PP – 2025

Rev. No	Date	Prepared By	Checked By	Approved By	Authorized By
00	04/01/2022	SR	MC	HK	GW

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REVISION RECORD						
Rev.	**Revision Date**	**Prepared by**	**Checked by**	**Approved by**	**Authorized by**	**Revision Description**
00	04/01/2022	SR	MC	HK	GW	

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Abbreviations:

CE	Carbon Equivalent	NPSH	Net Positive Suction Head
DFT	Dry Film Thickness	PO	Purchase Order
DPT	Dye Penetrant Testing	PESO	Petroleum Explosive Safety Organization
DHT	De-hydrogen Heat Treatment	PQR	Procedure Qualification Record
ERTL	Electronics Regional Test Laboratory	PR	Purchase Requisition
FCRI	Fluid Control Research Institute	PMI	Positive Material Identification
HT	Heat Treatment	RT	Radiography Testing
HIC	Hydrogen Induced Cracking	SSCC	Sulphide Stress Corrosion Cracking
ITP	Inspection and Test Plan	TC	Test Certificate
IP	Ingress Protection	TPI or TPIA	Third Party Inspection Agency
IHT	Intermediate Heat Treatment	UT	Ultrasonic Testing
IC	Inspection Certificate	VDR	Vendor Data Requirement
IGC	Inter Granular Corrosion	WPS	Welding Procedure Specification
MRT	Mechanical Run Test	WPQ	Welders Performance Qualification
NDT	Non-Destructive Testing	MPT / MT	Magnetic Particle Testing

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1. SCOPE

This Inspection and Test Plan covers the minimum testing requirements of use of stock small sizes and assorted length pipes.

2. REFERENCE DOCUMENTS:

PO/ PR/ Standards referred there in/ Job specifications/ Approved documents.

3. INSPECTION AND TEST REQUIREMENTS:

S. No.	ACTIVITY	REFERENCE STANDARD	MIN. NO. OF TEST	PROCEDURE/ ACCEPTANCE CRITERIA	DOCUMENT TYPE	THIRD PARTY INSPECTION AGENCY
1.0	**Visual Examination (For both identified & unidentified pipes)**					
1.1	Pipe shall be cleaned from inside and outside.	ASTM A 106 & ASTM A 530	All Pipes	Air/ water cleaned	Inspection Report	R
2.0	**Surface Defects**					
2.1	Gouges/ Notches	ASTM A 106 & ASTM A 530	All Pipes	> Repair of pipe by grinding shall not reduce the wall thickness at any point to a thickness less than 90% of the nominal wall thickness. > Less than 90%-0% acceptable and shall be cut and balance pipe to be used	Inspection Report	W

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S. No.	ACTIVITY	REFERENCE STANDARD	MIN. NO. OF TEST	PROCEDURE/ ACCEPTANCE CRITERIA	DOCUMENT TYPE	THIRD PARTY INSPECTION AGENCY
2.2	Grooves	-	All Pipes	0% acceptable and shall be cut and removed.	Inspection Report	W
3.0	**Dent**					
3.1	Dent that contains a stress concentrator such as a scratch, gouge, groove, or arc burn with scratch, groove etc.	-	All Pipes	Removed by cutting out the damaged portion of the pipe as a cylinder	Inspection Report	W
3.2	Dent affect the curvature of pipe	-	All Pipes	(i) Maximum depth of 1/4 in. (6 mm) in pipe NPS 12 (DN 300) is allowed and smaller. (ii) 2 % of the nominal pipe diameter in all pipe is allowed in size greater than NPS 12 (DN 300) Dents are removed, the damaged portion of the pipe shall be cut out as cylinder	Inspection Report	W
3.3	Dent in length	-	All Pipes	Length of the dent in any direction shall not exceed one-half the diameter pipe.	Inspection Report	R

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S. No.	ACTIVITY	REFERENCE STANDARD	MIN. NO. OF TEST	PROCEDURE/ ACCEPTANCE CRITERIA	DOCUMENT TYPE	THIRD PARTY INSPECTION AGENCY
4.0	**Other**					
4.1	Corrosion	-	All Pipes	Wall thickness to check after removal of corrosion. Less than 90% of nominal wall thickness not acceptable nominal wall thickness.	Inspection Report	W
4.2	Pitting	-	All Pipes	Depth of pitting wall thickness to be checked. Thickness shall be more than 90% of nominal wall thickness Less than 90% shall be cut and removed.	Inspection Report	W
4.3	Wall thickness	ASTM A 106 & ASTM A 530	If the lot of pipe is known to be of uniform grade, size, and nominal thickness. 10% of the individual lengths, but not less than 10 lengths.	Measuring the thickness at quarter points on one end of each piece of pipe. The nominal wall thickness shall be considered as below the average of all the measurements taken, but in no case greater than 1.14 times the least measured thickness for all pipe smaller than NPS 20 (DN 500), and no greater than 1.11 times the least measured thickness for all pipe NPS 20 (DN 500) and larger.	Inspection Report	W

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S. No.	ACTIVITY	REFERENCE STANDARD	MIN. NO. OF TEST	PROCEDURE/ ACCEPTANCE CRITERIA	DOCUMENT TYPE	THIRD PARTY INSPECTION AGENCY
			Thickness of the other lengths may be verified by applying a gauge set to the min. thickness.			

Legends: W - Witness, R – Review

Notes:

1. Hydrotest is not required if thickness is more than 90% of nominal wall thickness. If metal loss pattern is observed having metal thickness less than 90% of nominal wall thickness, ASME B31G (modified) may be used for determination of residual strength of corroded pipe for suitability or hydrotest at site.
2. Gouges or grooves may be removed by grinding to a smooth contour, provided that the resulting wall thickness is not less than the minimum prescribed by this Code for the conditions of usage.
3. Certification requirements to comply with EN-10204, type-3.2 to be issued by TPIA appointed by manufacturer.
4. Pipe shall be retested hydrostatically either length by length in a mill type test or in the field after installation before being placed in service.

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Energising Quality	**QUALITY ASSURANCE PLAN FOR HDPE DUCT**	**CLIENT:**
		CONSULTANT: VCS Quality Services Pvt. Ltd.
		QAP No.: VPC-QAP-PE-004
		Rev 0

INSTRUCTIONS FOR FILLING UP:

1. QAP shall be submitted for each equipment separately with breakup of assembly / sub-assembly & part/component or for group of equipment having same specification.
2. Use numerical codes as indicated for extent of inspection & tests and submission of test certificates & documents. Additional codes & description for extent of inspection & test may be added as applicable for the plant and equipment.
3. Separate identification number with quantity for equipment shall be indicated wherever equipment having same specifications belonging to different facilities are grouped together.
4. Weight in kilogram must be indicated under column 5 for each item. Estimated weights may be indicated wherever actual weights are not available.

ABBREVIATION USED :

CONTR : CONTRACTOR
MFR : MANUFACTURER
TPI : THIRD PARTY INSPECTION

CODES FOR EXTENT OF INSPECTION, TESTS, TEST CERTIFICATES & DOCUMENTS:

Code	Description
1.	Visual
2.	Dimensional
3.	fitment & alignment
4.	Physical Test (Sample)
5.	Chemical test(Sample)
6.	Ultrasonic test
7.	Magnetic particle test(MPT)
8.	Radiography test
9.	Dye Penetrant test
10.	Measurement of IR value
a)	Before HV test
b)	After HV test
11.	High voltage test/Dielectric test
12.	Routine test as per relevant IS other standard
13.	Type test as per relevant IS/ other standard
14.	Impulse Test
15.	Partial Discharge Test
16.	Heat run risc test/temper
17.	Enclosure protection test
18.	Calibration
19.	Noise & Vibration
20.	Test certificate of bought out components
21.	Tank pressure test
22.	Paint shed vibration
23.	Short time rating
24.	Operational & functional test
25.	Over speed test
26.	Flame proof Test
27.	Clearance and creepage distance
28.	Acceptance test
29	Honing Test
30	Hydro test/ Shell leak test
31	Pneumatic Seat leak test
32	Impact test
D1.	Approved GA drawing.
D2.	Approved single line/ schematic diagram
D3.	Test certificates
D4.	Approved Bill of materials
D5.	Un-priced P.O. copy
D6.	Calibration certificates of all measuring instrument and gauges.

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Energising Quality	**QUALITY ASSURANCE PLAN FOR HDPE DUCT**	**CLIENT:**
		CONSULTANT: VCS Quality Services Pvt. Ltd.
		QAP No.: VPC-QAP-PE-004
		Rev 0

Sl. No	Components & Operations	Description of Test.	Category	Extent of Check	Ref. Doc. & Cl. No.	Acceptance Criteria	Format of Records	INSPECTION		Remarks
								Manufacturer	TPIA	
HDPE Duct										
1	HDPE Duct	Dimension of Duct	Dimensional	ST	ADS	ADS	IF	P	RW	Minimum 5% to be randomly witnessed by TPIA
		Tensile Strength and Elongation	Physical	ST	ADS	IS-14151 (Part – I)	IF	P	RW	Minimum 5% to be randomly witnessed by TPIA
		Reversion Test	Physical	AT	ADS	IS-4984	IF	P	R	
		Environmental Stress Crack Resistance Test	Physical	AT	ADS	ASTM D-1693	IF	P	R	
		Impact Strength Test	Physical	AT	ADS	IS-12235 (Part – 9)	IF	P	R	
		Crush Resistance Test	Physical	AT	ADS	ADS	IF	P	R	
		Mandrel Test	Physical	AT	ADS	ADS	IF	P	R	

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		Ovality Test	Physical	AT	ADS	ADS	IF	P	R	
		Coil Set Test	Physical	AT	ADS	ADS	IF	P	R	
		Oxidation Induction Test	Physical	AT	ADS	ADS	IF	P	R	
		Internal pressure creep rupture test	Physical	AT	ADS	IS-4984	IF	P	R	
		Internal Co-efficient of Friction	Test	AT	ADS	ADS	IF	P	R	
2	Optical Fibre Cable Blowing Test	Visual damage	Physical	AT	ADS	ADS	IF	P	RW	Minimum 5% to be randomly witnessed by TPIA

LEGENDS: R – Review, W – Witness, P – Perform, RW – Random Witness, TPIA – Third Party Inspection Agency, AT-All to be tested, ST- Sample test (5%), ATS-Approved Technical Specifications, MTR- Material Test Report, IF-Inspection Format, ADS-Approved Data Sheets

,

Notes:

1. The above-mentioned testing and acceptance criteria are minimum requirements; however, supplier shall ensure that the product also comply with additional requirements as per standard specification and Data Sheet.
2. The supplier shall submit their own detailed ITP prepared on the basis of the above for approval of Owner / Owner's representative and TPIA.
3. TPIA shall have right to inspect minimum 5% of all manufacturing activities on each day or as specified above.
4. TPIA along with Owner / Owner's representative shall review / approve all the documents related to QCT / Quality Manuals Drawings etc, submitted by supplier.
5. TPIA shall also review the test certificates submitted by the manufacturer.

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6. Supplier shall in coordination with sub-vendor issue detailed production and inspection schedule indicating the dates and the locations to facilitate Owner / Owner's representative to organize inspection.
7. Supplier shall submit their own Detailed ITP and regulator tag / nameplate format Duly Signed and Stamped.
8. TPIA shall review all the reports 100 %.

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Energising Quality	**QUALITY ASSURANCE PLAN FOR MDPE PIPE**	Client :	
		Consultant : VCS Quality Services Pvt. Ltd.	
		QAP. No. : VPC-SS-PE-0029	
		Consultant : VCS Quality Services Pvt. Ltd.	
		Rev. No.: 0	
		Date : 18.02.2017	

S.No.	Activity	Quantum of Check	Acceptance Criteria (IS-14885:2001 or and SS-71127/D/31/0398)	Format of Record	Vendor	TPIA	Remarks
1	**Raw Material Inspection**						
	Test result of PE compound	Per Lot of Batch of Compound	PE - 80 Cl. No. 5 of IS & SS	MTC of manufacturer	R	R	Witness may be done by CA to insure use of compound material
2	**Type approval test for long term hydrostatic strength & Others**	-	@ 80 ° C for 1000 hours @ 20 ° C for more than100 hours As per Table 7 of IS	TPIA approved certificate	R	R	
3	**In-Progress Inspection**						
3.1	**Raw Material Identification at the time of pouring the bags in Hopper.**	Each Bag	PE - 80 Cl. No. 5 of IS & SS	Consumption Report	P	H	TPI to verify MTC of each batch for consumption
4	**Final Inspection**						
4.1	Visual Apperance						
	a) Smoothness & Cleanliness	One out of 10 Pipes	Smooth & clean or as specified in CL no. 7 of IS 14885	--	P	W	
	b) Surface Defects		Free from grooves, scoring etc. or as specified in CL no. 7 of IS 14885	--	P	W	
	c) Cuttings		Cleanly cut ends & square to axis or as specified in CL no. 7 of IS 14885	--	P	W	
4.2	Dimension						
	a) Outside diameter	One out of 10 Pipes	Cl no. 6 /Table 4 of IS	Inspection Report	P	W	
	b) WallThickness		Cl no. 6 /Table 4 of IS	Inspection Report	P	W	
	c) Ovality		Cl no. 6 /Table 3 of IS	Inspection Report	P	W	
	d) Length		Cl. No. 7.2 & 8 of SS	Inspection Report	P	W	
4.3	Hydraulic Characterstics						
	80^{O}C for 165 hrs	Table 9	Cl 8.1, Annexure A & B & Table 7 of IS	Hydrotest Report	P	W	Preferably random witness by CA
4.4	Heat reversion test	Table 11	CL 8.2, Annexure C of IS / Not more than 3%	Inspection Report	P	W	
4.5	Density (matl. From pipe)		@ 23 ° C $\geq$ 928.4 kg/m3 & '@ 27 ° C $\geq$ 930 kg/m3	Inspection Report	P	W	
4.6	Melt Flow Rate - Pipe		Cl 5.3 of SS	Inspection Report	P	W	
4.7	Thermal Stability to Oxidation		Cl 8.5, Annexure D of IS / OIT $\geq$ 20 minutes	Inspection Report	P	W	

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S.No.	Activity	Quantum of Check	Acceptance Criteria (IS-14885:2001 or and SS-71127/D/31/0398)	Format of Record	Vendor	TPIA	Remarks
4.8	Volatile Matter Content Test	-	Cl 8.6, Annexure H of IS / ≤ 350 mg/kg	Inspection Report	P	W	
4.9	Tensile Test & Elongation at break	Table 11	Cl 8.7& Annexure J of IS / Tensile Yield Strength = 15 Mpa (min.), Elongation = 350% (Min.)	Inspection Report	P	W	Preferably random witness by CA
4.10	Resistance to weathering	-	Cl 8.8 & Annexure F of IS	Inspection Report	P	R	
4.11	Squeeze Off Test	-	Cl 8.9 & Annexure G of IS	Inspection Report	P	W	
5	**Marking Information**						
	1. Legibility	Table 10	Visual / Should be legible	Inspection Report	P	R	
	2. Depth	Table 10	As per Cl 10 of SS, Depth < 0.15 mm	Inspection Report	P	RW	
	3. Marking Strip	Table 10	Cl 10 of IS, Single Strip for Pipes with Nominal Size <=32mm & two strips on opposite side of pipe for other pipes.	Inspection Report	P	RW	
	4. Colour or Marking	Table 10	As per Cl 10 of SS, Black colour	Inspection Report	P	RW	
	5. Height of Character	Table 10	As per Cl 10 of SS, Min.3 mm for < 90mm pipe sizes & Min. 5 mm for > 90mm pipe sizes.	Inspection Report	P	RW	
	6. Legends	Table 10	As per Cl 10 of SS, At interval of 1 mtrs. And should contain information as specified in SS	Inspection Report	P	RW	
6	Final Documentation	-	P.O. / SS	Compliance Certificate	p	H	

LEGENDS: R - Review, W - Witness, RW - Random Witness, H - Hold, P - Perform, TPIA - Third Party Inspection Agency , CA - Control Authority (Owner / owner's representative) , P.O. - Purchase order

Notes: -

1. The Above Testing and acceptance critera are minimum requirements, however, manufacturer shall ensure that the product shall also comply to the additional requirements as per Standard Specification (SS)
2. The supplier shall submit their own detailed QAP prepared on the basis of above / Technical specification for approval of Owner/Owner's representative.
3. Owner/Owner representative shall review/approve all the documents related to QAP/Quality manuals/Drawings etc.submitted by supplier.
4. Contractor shall in coordination with Supplier/Sub vendor shall issue detailed Production and Inspection schedule indicating the dates and the locations to facilitate Owner/Owner's representative and TPIA to organise Inspection.
5. Special manufacturing procedures have to be specially approved or only previously approved procedures have to be used, in case of conflict between specifications more stringent condition shall be applicable.
6. Owner / Owner's representative including TPIA will have the right to inspect any activity of manufacturing at any time.
7. All reference Codes/ Standards, Documents, P.O. Copies shall be arranged by vendor / supplier for reference of TPIA / Client at the time of Inspection
9. At the time of deleivery of materail in stores, vendor will submit copy of all related document of inspection along with release note & MTC.

Prepared by	Reviewed / Checked by	Approved by
(Name / Signature / Date / Stamp)	(Name / Signature / Date / Stamp)	(Name / Signature / Date / Stamp)

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Energising Quality	**QUALITY ASSURANCE PLAN**	**VPC-QAP-PE-002**

ANNEXURE-I

QUALITY ASSUARANCE PLAN

Item: Electrofusion Fittings PE 80- Coupler, Reducer, Elbow 90^0, Elbow 45^0, End Caps, Saddle, Equal tee & Transition Fittings

Sr. No.	Test Description	Type Of Check	Quantum Of Check	Ref. Document	Acceptance Norms	Documentation	Inspection		Remarks
							Mfg.	C/ TPIA	
1	Dimension Check	Geometrical Characteristics	01 No. from Lot	Mfg. Drawing	EN 1555-3 / Mfg. Drawing	Mfg. test certificate	P	W	
2	Melt mass flow rate	Physical Characteristics	01 No. from Lot	ISO 1133	MFR 190°/5kg. 0.20 – 1.20 gm./10 min.	Mfg. test certificate	P	R	
3	Density	Physical Characteristics	01 No. from Lot	ISO 1183	0.926 to 0.94 g/cm^3	Mfg. test certificate	P	R	
4	OIT (Thermal Stability)	Physical Characteristics	01 No. from Lot	ISO 11357-6/ EN 728	Oxidation Induction Time ≥ 20 min/200° C	Mfg. test certificate	P	R	
5	Appearance, Color	General Characteristics	01 No. from Lot	EN 1555- 3	Mfg. Spec.	Mfg. test certificate	P	W	
6	Hydrostatic Strength (PE100)	Mechanical Characteristics		EN 1555- 3 & ISO 1167-1-4	Case I- 165h/80°C/(5.5MPa)	Hydrotest Report	P	W	
					Case II- 100h/20°C/(12 MPa)				
					Case II- 100h/20°C/(10 MPa)				
8	Peel Decohension Test for Electrofusion socket fitting	Mechanical Characteristics		ISO 13954	EN 1555-3	Inspection Report	P	W	
9	Crush Decohension Test for Electrofusion socket fitting	Mechanical Characteristics		ISO 13955	EN 1555-3	Inspection Report	P	W	

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10	Decohension Test (tear test) for Electrofusion saddle fittings	Mechanical Characteristics		ISO 13956	EN 1555-3	Inspection Report	P	W	
11	Impact Resistance for Electrofusion saddle fittings	Mechanical Characteristics		EN 1716	EN 1555-3	Inspection Report	P	W	
12	Pressure Drop.	Mechanical Characteristics	01 No. from Lot	ISO 17778	EN 1555-3	Inspection Report	P	R	
13	Electrical Resistance	Electrical Characteristics	01 No. from Lot	EN 1555-3	EN 1555-3	Inspection Report	P	R	

Note:

1. The above testing and acceptance criteria are minimum requirements, however, manufacturer shall ensure that the product shall also comply to the additional requirements as per Standard specifications(SS).
2. The supplier shall submit their own detailed QAP prepared on the basis of above / technical specification for approval of Owner/Owner's representative.
3. Owner/Owner representative shall review/approve all the documents related to QAP/Quality manuals/Drawings etc. submitted by supplier.
4. Contractor shall in coordination with Supplier/Sub vendor shall issue detailed Production and Inspection schedule indicating the dates and the locations to facilitate Owner/Owner's representative and TPIA to organize Inspection.
5. Special manufacturing procedures have to be specially approved or only previously approved procedures have to be used, in case of conflict between specifications more stringent condition shall be applicable.
6. Owner / Owner's representative including TPIA will have the right to inspect any activity of manufacturing at any time.
7. All reference Codes/ Standards, Documents, P.O. Copies shall be arranged by vendor / supplier for reference of TPIA/ Client at the time of Inspection
8. At the time of delivery of material in stores, vendor will submit copy of all related document of inspection along with release note & MTC.

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Date: 2025.03.13 12:56:46 IST

Energising Quality	**QUALITY ASSURANCE PLAN**	**VPC-QAP-PE-002**

LEGENDS:

M – Monitor **R –** Review **H –** Hold **TPIA –** Third Party Inspection Agency

P – Perform **W –** Witness **C**- Customer **V –** Verification of Mfg. Test Certificate

Prepared by	Reviewed / Checked by	Approved by
(Name / Signature / Date / Stamp)	**(Name / Signature / Date / Stamp)**	**(Name / Signature / Date / Stamp)**

Rev 0

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Date: 2025.03.13 12:56:46 IST

		QUALITY ASSURANCE PLAN ISOLATION VALVE				QAP NO : 1007-CD-MC-QAP-001		Rev. 0
						Date : 13.04.17		
						Prepared by: MD		
						Checked by: ADE		Approved by: AD
SR. NO.	**INSPECTION AND TESTING**	**QUANTUM OF CHECK / TEST**	**PROCEDURE**	**ACCEPTANCE CRITERIA AND CERTIFICATE**	**FORMAT OF RECORD**	**INSPECTION BY**		**REMARKS**
						Manufacturer	**TPIA**	
1.0	Raw Material							
1.1	Metallic Parts (Chemical / Physical Requirement)	One in each heat	As per ASTM B 283 (ALLOY UNS C37700) / EN 331	As per ASTM B 283 (ALLOY UNS C37700) / EN 331	MATERIAL TEST CERTIFICATE	P	R	
1.2	Seat & Stem Seal	One in each heat	As per EN 331 / Manufacturer's Standard	As per EN 331 / Manufacturer's Standard	MATERIAL TEST CERTIFICATE	P	R	
2.0	Final Product :							
2.1	Gas Tightness Test	100%	As per EN 331	As per EN 331	TEST REPORT	P	W = Ten nos. per size per Lot	
2.2	Bending Test	One no. per Heat per Size	As per EN 331	As per EN 331	TEST REPORT	P	W = One no. per size per Lot	
2.3	Turning Torque Test	One no. per Heat per Size	As per EN 331	As per EN 331	TEST REPORT	P	W = One no. per size per Lot	
2.4	Temperature Resistance Test	One no. per Heat per Size	As per EN 331	As per EN 331	TEST REPORT	P	W = One no. per size per Lot	
2.5	Flow Capacity Test	One no. per Heat per Size	As per EN 331	As per EN 331	TEST REPORT	P	W = One no. per size per Lot	
3.0	Visual Inspection (Free from defects)	100%	As per EN 331	As per EN 331	INSPECTION REPORT	P	W = Ten nos. per size per Lot	
4.0	Dimension Tolerances (Min. length of engagement , OD , wall thk.)	100%	As per Approved Drawing	As per Approved Drawing	INSPECTION REPORT	P	W = Ten nos. per size per Lot	
5.0	Marking	100%	As per EN 331	As per EN 331	INSPECTION REPORT	P	W = Ten nos. per size per Lot	
6.0	Final Documentation		As per P.O. / SS	As per P.O. / SS	EN 10204 3.2 CERTIFICATE	P	H	

LEGEND: R - Review, W - Witness, H - Hold, P - Perform, TPIA - Third Party Inspection Agency, CA - Control Authority (Owner / Owner's representative)

Notes: -

1. The Above Testing and acceptance criteria are minimum requirements, however, manufacturer shall ensure that the product shall also comply to the additional requirements as per Standard Specification (SS)
2. The supplier shall submit their own detailed QAP prepared on the basis of above / Standard specification for approval of Owner/Owner's representative.
3. Owner/Owner representative shall review/approve all the documents related to QAP/Quality manuals/Drawings etc. submitted by supplier.
4. Contractor shall in coordination with Supplier/Sub vendor shall issue detailed Production and Inspection schedule indicating the dates and the locations to facilitate Owner/Owner's representative and TPIA to organize Inspection.
5. Special manufacturing procedures have to be specially approved or only previously approved procedures have to be used, in case of conflict between specifications more stringent condition shall be applicable.
6. Owner / Owner's representative including TPIA will have the right to inspect any activity of manufacturing at any time
7. All reference Codes/ Standards, Documents, P.O. Copies shall be arranged by vendor / supplier for reference of TPIA / Client Consortium at the time of Inspection
8. At the time of delivery of material in stores, vendor will submit copy of all related document of inspection along with release note & MTC.
9. All Tests shall be carried out as per EN-331 (Latest Edition).

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Energising Quality	**QUALITY ASSURANCE PLAN**	**VPC-QAP-PE-003**

ANNEXURE-II
QUALITY ASSUARANCE PLAN
Item: MDPE Ball Valve – PE 80 (Without Stem)

Sr. No.	Test Description	Type Of Check	Quantum Of Check	Ref. Document	Acceptance Norms	Documentation	Inspection		Remarks
							Mfg.	C/TPIA	
1	Dimension Check	Geometrical Characteristics	01 No. from Lot	Mfg. Drawing	EN 1555-3 / EN 1555-4 / Mfg. Drawing	Mfg. test certificate	P	W	
2	Melt mass flow rate	Physical Characteristics	01 No. from Lot	ISO 1133	MFR 190°/5kg. 0.20 – 1.20 gm./10 min.	Mfg. test certificate	P	R	
3	Density	Physical Characteristics	01 No. from Lot	ISO 1183	0.926 to 0.94 g/cm^3	Mfg. test certificate	P	R	
4	OIT (Thermal Stability)	Physical Characteristics	01 No. from Lot	ISO 11357-6/ EN 728	Oxidation Induction Time ≥ 20 min/200° C	Mfg. test certificate	P	R	
5	Volatile Content	Physical Characteristics	01 No. from Lot	EN 12099	≤ 350 mg/kg	Mfg. test certificate	P	R	
6	Carbon Black Content	Physical Characteristics	01 No. from Lot	ISO 6964	2.50 ± 0.5%	Mfg. test certificate	P	R	
7	Appearance, Color	General Characteristics	01 No. from Lot	EN 1555- 4	Mfg. Spec.	Mfg. test certificate	P	W	
8	Hydrostatic Strength	Mechanical Characteristics	01 No. from Lot	EN 1555- 4 & ISO 1167-1/4	Case I- 165h/80°C/(5.5MPa) Case II- 100h/20°C/(12 MPa)	Hydrotest Report	P	W	
9	Operating Torque	Mechanical Characteristics	01 No. from Lot	EN 1555- 4	Ø≤63 35Nm Ø63- Ø 125 ≤70Nm Ø125- Ø315 ≤150Nm	Mfg. test certificate	P	R	
10	Leak Tightness	Mechanical Characteristics	01 No. from Lot	EN 1555- 4	Table-1, EN 1555-4	Mfg. test certificate	P	R	
11	Pressure Drop.	Mechanical Characteristics		ISO 17778	EN 1555-3	Approval Certificate	P	R	

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Date: 2025.03.13 12:56:46 IST

Energising Quality	**QUALITY ASSURANCE PLAN**	**VPC-QAP-PE-003**

Note:

1. The above testing and acceptance criteria are minimum requirements, however, manufacturer shall ensure that the product shall also comply to the additional requirements as per Standard Specification (SS).
2. The supplier shall submit their own detailed QAP prepared on the basis of above / technical specification for approval of Owner/Owner's representative.
3. Owner/Owner representative shall review/approve all the documents related to QAP/Quality manuals/Drawings etc. submitted by supplier.
4. Contractor shall in coordination with Supplier/Sub vendor shall issue detailed Production and Inspection schedule indicating the dates and the locations to facilitate Owner/Owner's representative and TPIA to organize Inspection.
5. Special manufacturing procedures have to be specially approved or only previously approved procedures have to be used, in case of conflict between specifications more stringent condition shall be applicable.
6. Owner / Owner's representative including TPIA will have the right to inspect any activity of manufacturing at any time.
7. All reference Codes/ Standards, Documents, P.O. Copies shall be arranged by vendor / supplier for reference of TPIA / Client Consortium at the time of Inspection
8. At the time of delivery of material in stores, vendor will submit copy of all related document of inspection along with release note & MTC.

LEGENDS:

M – Monitor	**R –** Review	**H –** Hold	**TPIA –** Third Party Inspection Agency
P – Perform	**W –** Witness	**C**- Customer	**V –** Verification of Mfg. Test Certificate

Prepared by	Reviewed / Checked by	Approved by
(Name / Signature / Date / Stamp)	**(Name / Signature / Date / Stamp)**	**(Name / Signature / Date / Stamp)**

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Date: 2025.03.13 12:56:46 IST

		QUALITY ASSURANCE PLAN **APPLIANCE VALVE**				QAP NO : 1007-CD-MC-QAP-002		Rev. 0
						Date : 13.04.17		
						Prepared by: MD		
						Checked by: ADE		Approved by: AD
SR. NO.	**INSPECTION AND TESTING**	**QUANTUM OF CHECK / TEST**	**PROCEDURE**	**ACCEPTANCE CRITERIA AND CERTIFICATE**	**FORMAT OF RECORD**	**INSPECTION BY**		**REMARKS**
						Manufacturer	**TPIA**	
1.0	**Raw Material**							
1.1	Metallic Parts (Chemical / Physical Requirement)	One in each heat	As per ASTM B 283 (ALLOY UNS C37700) / EN 331	As per ASTM B 283 (ALLOY UNS C37700) / EN 331	MATERIAL TEST CERTIFICATE	P	R	
1.2	Seat & Stem Seal	One in each heat	As per EN 331 / Manufacturer's Standard	As per EN 331 / Manufacturer's Standard	MATERIAL TEST CERTIFICATE	P	R	
2.0	**Final Product**							
2.1	Gas Leak Tightness Test	100%	As per EN 331	As per EN 331	TEST REPORT	P	W = Ten nos. per size per Lot	
2.2	Bending & Torque Test	One no. per Heat per Size	As per EN 331	As per EN 331	TEST REPORT	P	W = One no. per size per Lot	
2.3	Operating Torque Test	One no. per Heat per Size	As per EN 331	As per EN 331	TEST REPORT	P	W = One no. per size per Lot	
2.4	Temperature Resistance Test	One no. per Heat per Size	As per EN 331	As per EN 331	TEST REPORT	P	W = One no. per size per Lot	
2.5	Flow Capacity Test	One no. per Heat per Size	As per EN 331	As per EN 331	TEST REPORT	P	W = One no. per size per Lot	
3.0	Visual Inspection (Free from defects)	100%	As per EN 331	As per EN 331	INSPECTION REPORT	P	W = Ten nos. per size per Lot	
4.0	Dimension Tolerances (Min. length of engagement , OD , wall thk.)	100%	As per Approved Drawing	As per Approved Drawing	INSPECTION REPORT	P	W = Ten nos. per size per Lot	
5.0	Marking	100%	As per EN 331	As per EN 331	INSPECTION REPORT	P	W = Ten nos. per size per Lot	
6.0	Final Documentation		As per P.O. / SS	As per P.O. / SS	EN 10204 3.2 CERTIFICATE	P	H	

LEGEND: R - Review, W - Witness, H - Hold, P - Perform, TPIA - Third Party Inspection Agency, CA - Control Authority (Owner / Owner's representative)

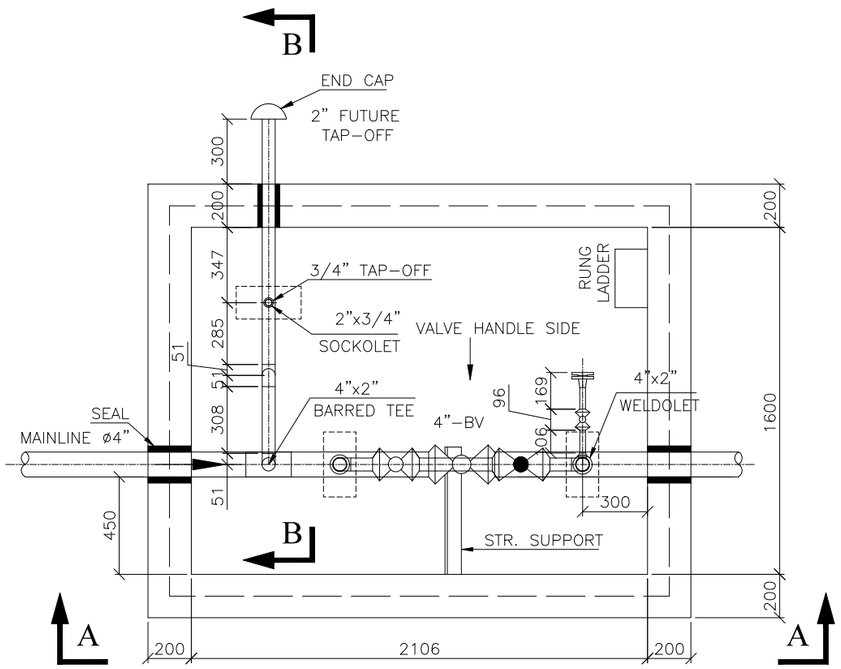
Notes: -

1. The Above Testing and acceptance criteria are minimum requirements, however, manufacturer shall ensure that the product shall also comply to the additional requirements as per standard Specification (SS)
2. The supplier shall submit their own detailed QAP prepared on the basis of above / Technical specification for approval of Owner/Owner's representative.
3. Owner/Owner representative shall review/approve all the documents related to QAP/Quality manuals/Drawings etc. submitted by supplier.
4. Contractor shall in coordination with Supplier/Sub vendor shall issue detailed Production and Inspection schedule indicating the dates and the locations to facilitate Owner/Owner's representative and TPIA to organize Inspection.
5. Special manufacturing procedures have to be specially approved or only previously approved procedures have to be used, in case of conflict between specifications more stringent condition shall be applicable.
6. Owner / Owner's representative including TPIA will have the right to inspect any activity of manufacturing at any time
7. All reference Codes/ Standards, Documents, P.O. Copies shall be arranged by vendor / supplier for reference of TPIA / Client Consortium at the time of Inspection
8. At the time of delivery of material in stores, vendor will submit copy of all related document of inspection along with release note & MTC.
9. All Tests shall be carried out as per EN-331. However, other additional tests, which are not covered in EN-331, shall be carried out as per ASME B16.33.

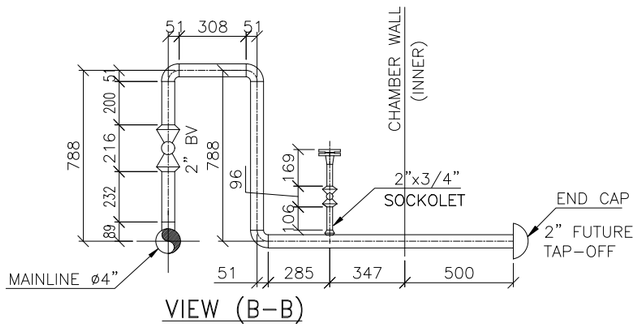
Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST

STANDARD DRAWINGS

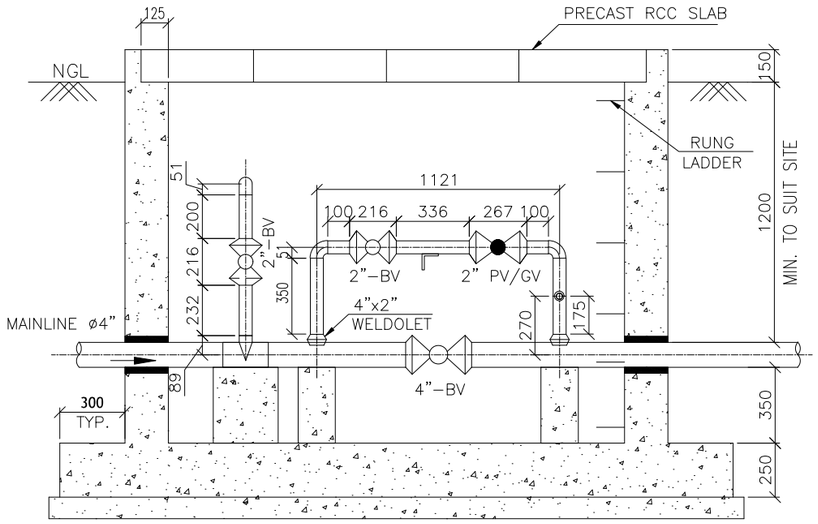
Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST



TOP VIEW



VIEW (B-B)



FRONT VIEW (A-A)

REFERENCE DRAWINGS / DOCUMENTS

S.NO.	TITLE	NO.
1		

NOTES:-

1. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN M UNLESS OTHERWISE MENTIONED.
2. APPROVED SEALANT TO BE PROVIDED IN VALVE PIT ENTRY & EXIT OF PIPELINE TO RESTRICT WATER INTO PIT.
3. FOR VALVE CHAMBER CONSTRUCTION, REFER RESPECTIVE DRAWING FOR CIVIL WORK. CHAMBER SLEEPERS MAY BE FABRICATED AS SHOWN IN THIS DRAWING FOR EASY LIFTING DURING O&M.
4. ORIENTATION OF 2" VALVES INSTALLED IN TAP-OFF TO BE SUCH THAT VALVE LEVER/HANDLE MOVEMENT IS NOT RESTRICTED BY ADJACENT WALL OF A CHAMBER.
5. VALVE CHAMBER PROJECTION ABOVE FGL SHALL BE 150MM-300MM SUITED AS PER SITE CONDITIONS.

LEGEND:-

- BUTT WELD BALL VALVE (B.V.)
- FLANGED BALL VALVE
- BUTT WELD GLOBE VALVE (G.V.)
- FLANGED GLOBE VALVE
- THREAD END BALL VALVE

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
C1	04.01.2025	ISSUED AS STANDARD	ST	BD	MK

CLIENT

CITY GAS DISTRIBUTION PROJECT AT HYDERABAD GA

PMC

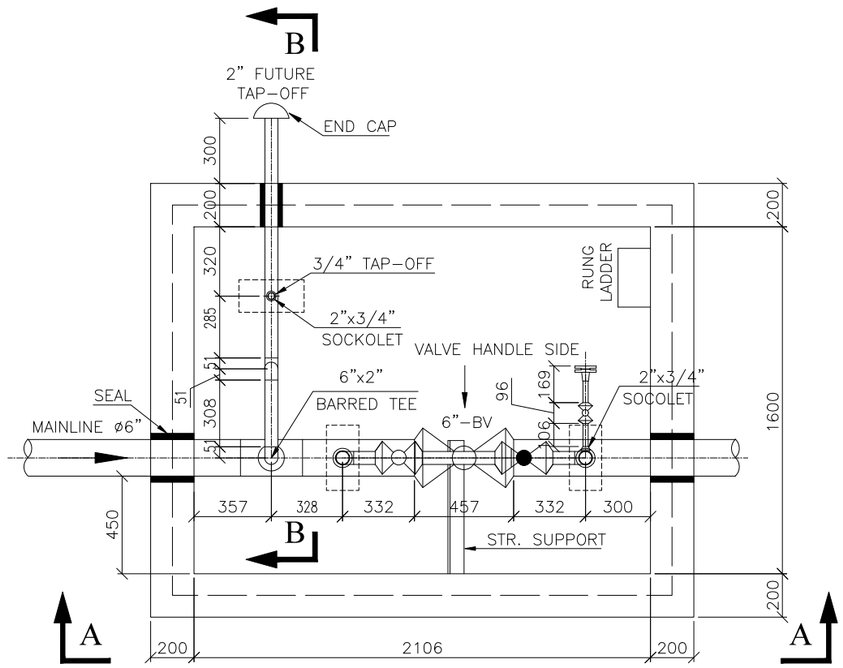
VCS QUALITY SERVICES PVT. LTD.

TITLE

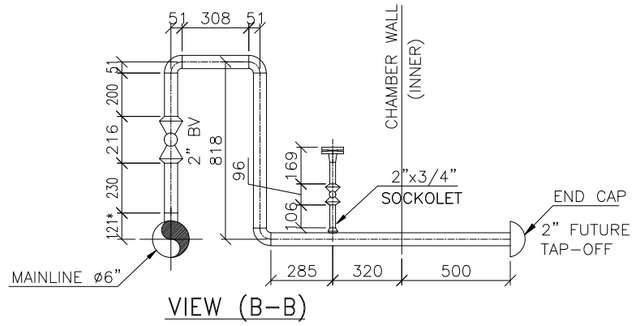
TYPICAL ARRANGEMENT DRAWING FOR 4" SV STATION WITH 2" FUTURE TAP-OFF (TYPICAL)

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A3	C251155	1010-000-PL-GAD-1001	1 OF 4	C1

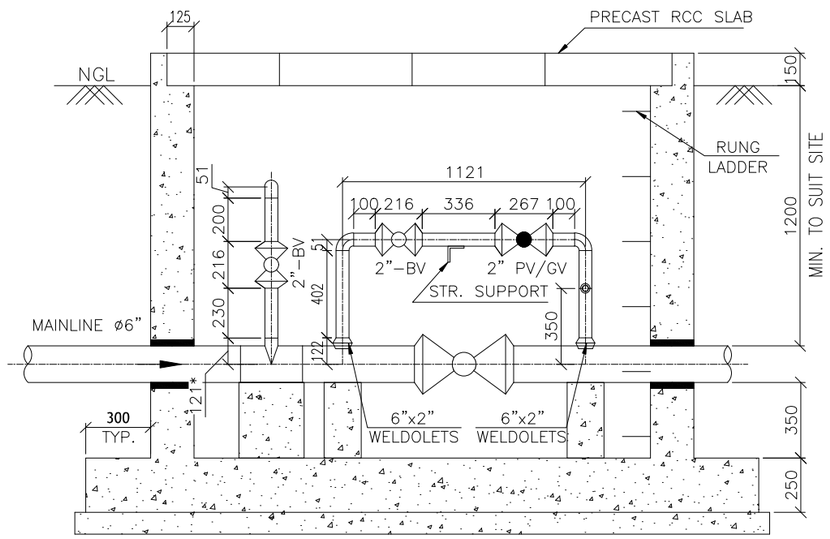
Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST



TOP VIEW



VIEW (B-B)



FRONT VIEW (A-A)

REFERENCE DRAWINGS / DOCUMENTS

S.NO.	TITLE	NO.
1		

NOTES:-

1. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN M UNLESS OTHERWISE MENTIONED.
2. APPROVED SEALANT TO BE PROVIDED IN VALVE PIT ENTRY & EXIT OF PIPELINE TO RESTRICT WATER INTO PIT.
3. FOR VALVE CHAMBER CONSTRUCTION, REFER RESPECTIVE DRAWING FOR CIVIL WORK. CHAMBER SLEEPERS MAY BE FABRICATED AS SHOWN IN THIS DRAWING FOR EASY LIFTING DURING O&M.
4. ORIENTATION OF 2" VALVES INSTALLED IN TAP-OFF TO BE SUCH THAT VALVE LEVER/HANDLE MOVEMENT IS NOT RESTRICTED BY ADJACENT WALL OF A CHAMBER.
5. VALVE CHAMBER PROJECTION ABOVE FGL SHALL BE 150MM-300MM SUITED AS PER SITE CONDITIONS.

LEGEND:-

- BUTT WELD BALL VALVE (B.V.)
- FLANGED BALL VALVE
- BUTT WELD GLOBE VALVE (G.V.)
- FLANGED GLOBE VALVE
- THREAD END BALL VALVE

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
C1	04.01.2025	ISSUED AS STANDARD	ST	BD	MK

CLIENT

CITY GAS DISTRIBUTION PROJECT AT HYDERABAD GA

PMC

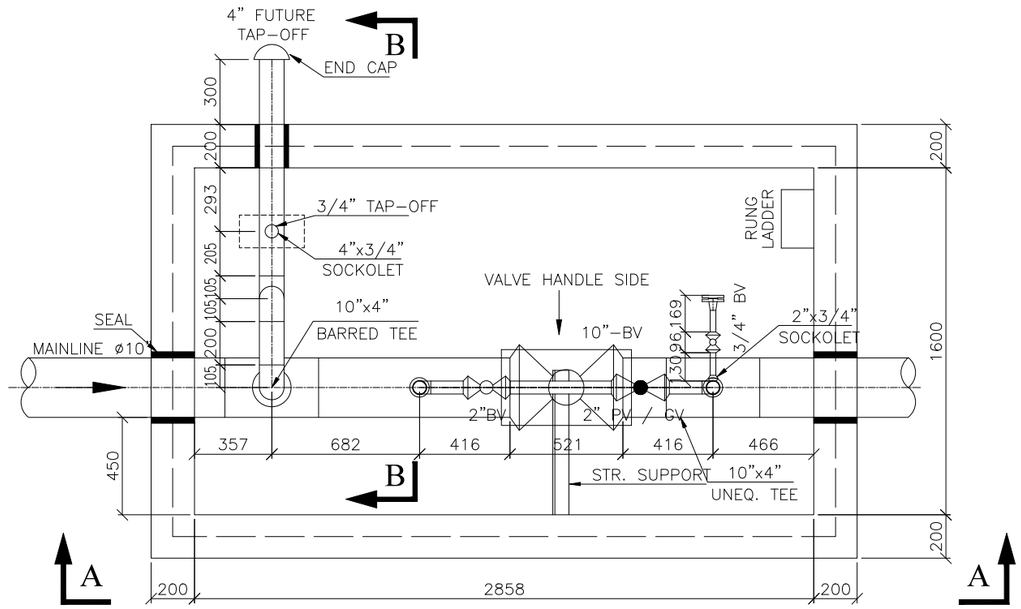
VCS QUALITY SERVICES PVT. LTD.

TITLE

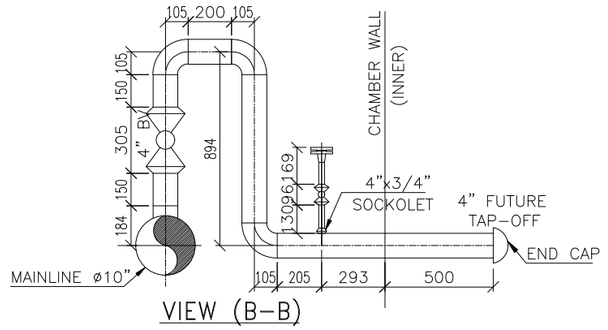
TYPICAL ARRANGEMENT DRAWING FOR 6" SV STATION WITH 2" FUTURE TAP-OFF

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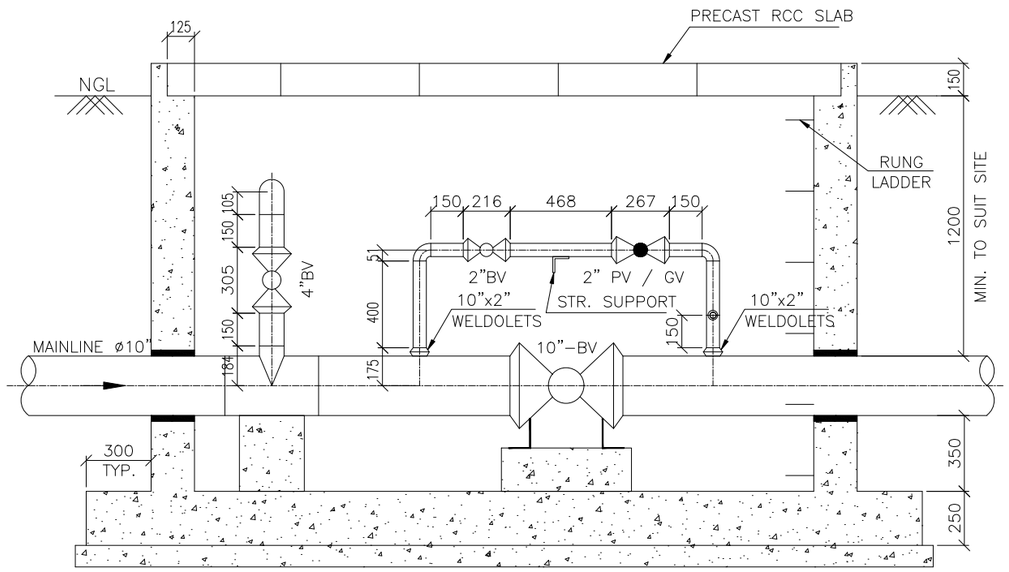
Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST



TOP VIEW



VIEW (B-B)



FRONT VIEW (A-A)

REFERENCE DRAWINGS / DOCUMENTS

S.NO.	TITLE	NO.
1		

NOTES:-

1. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN M UNLESS OTHERWISE MENTIONED.
2. APPROVED SEALANT TO BE PROVIDED IN VALVE PIT ENTRY & EXIT OF PIPELINE TO RESTRICT WATER INTO PIT.
3. FOR VALVE CHAMBER CONSTRUCTION, REFER RESPECTIVE DRAWING FOR CIVIL WORK. CHAMBER SLEEPERS MAY BE FABRICATED AS SHOWN IN THIS DRAWING FOR EASY LIFTING DURING O&M.
4. ORIENTATION OF 2" VALVES INSTALLED IN TAP-OFF TO BE SUCH THAT VALVE LEVER/HANDLE MOVEMENT IS NOT RESTRICTED BY ADJACENT WALL OF A CHAMBER.
5. VALVE CHAMBER PROJECTION ABOVE FGL SHALL BE 150MM-300MM SUITED AS PER SITE CONDITIONS.

LEGEND:-

- BUTT WELD BALL VALVE (B.V.)
- FLANGED BALL VALVE
- BUTT WELD GLOBE VALVE (G.V.)
- FLANGED GLOBE VALVE
- THREAD END BALL VALVE

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
C1	04.01.2025	ISSUED AS STANDARD	ST	BD	MK

CLIENT

CITY GAS DISTRIBUTION PROJECT AT HYDERABAD GA

PMC

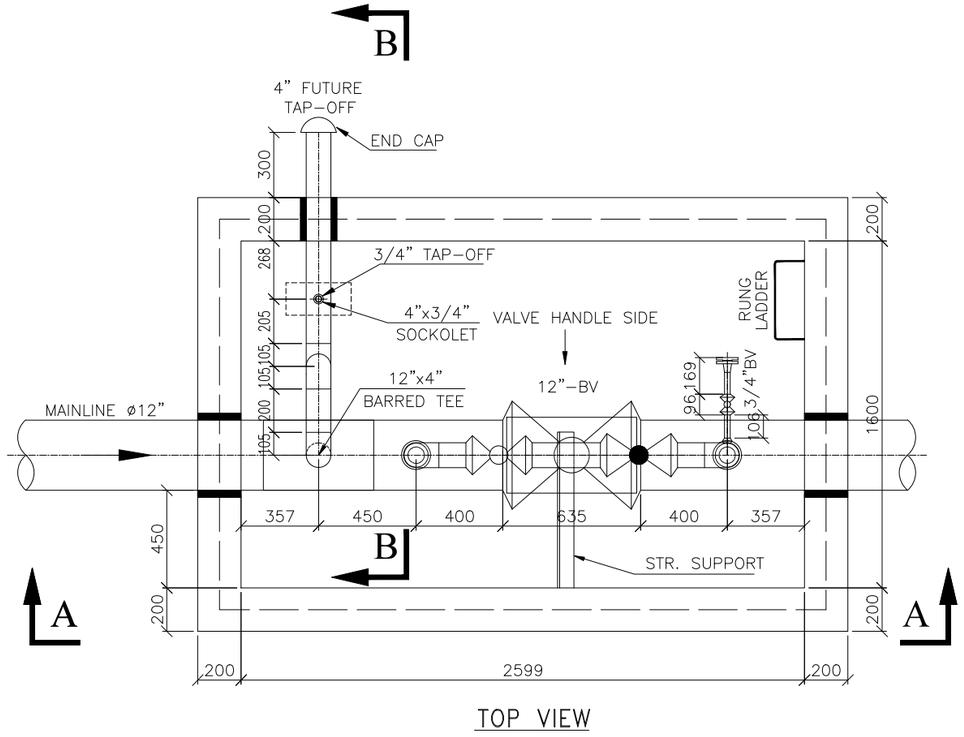
VCS QUALITY SERVICES PVT. LTD.

TITLE

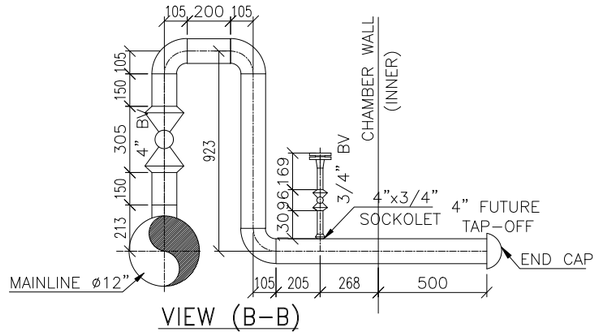
TYPICAL ARRANGEMENT DRAWING FOR 10" SV STATION WITH 4" FUTURE TAP-OFF

SIZE	JOB NO.	DRAWING NUMBER	SHEET	REV.
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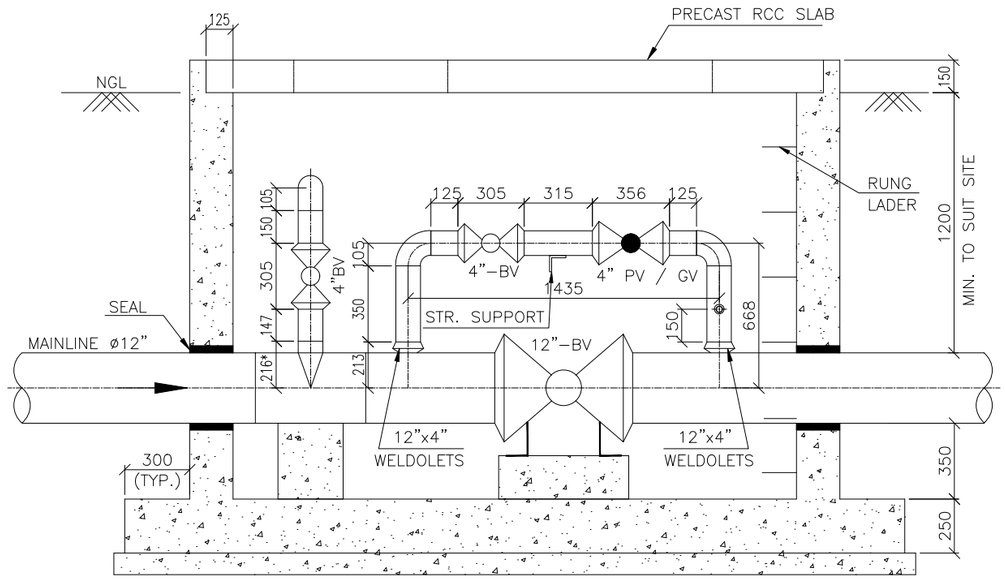
Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST



TOP VIEW



VIEW (B-B)



FRONT VIEW (A-A)

REFERENCE DRAWINGS / DOCUMENTS

S.NO.	TITLE	NO.
1		

NOTES:-

1. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN M UNLESS OTHERWISE MENTIONED.
2. APPROVED SEALANT TO BE PROVIDED IN VALVE PIT ENTRY & EXIT OF PIPELINE TO RESTRICT WATER INTO PIT.
3. FOR VALVE CHAMBER CONSTRUCTION, REFER RESPECTIVE DRAWING FOR CIVIL WORK. CHAMBER SLEEPERS MAY BE FABRICATED AS SHOWN IN THIS DRAWING FOR EASY LIFTING DURING O&M.
4. ORIENTATION OF 2" VALVES INSTALLED IN TAP-OFF TO BE SUCH THAT VALVE LEVER/HANDLE MOVEMENT IS NOT RESTRICTED BY ADJACENT WALL OF A CHAMBER.
5. VALVE CHAMBER PROJECTION ABOVE FGL SHALL BE 150MM-300MM SUITED AS PER SITE CONDITIONS.

LEGEND:-

- BUTT WELD BALL VALVE (B.V.)
- FLANGED BALL VALVE
- BUTT WELD GLOBE VALVE (G.V.)
- FLANGED GLOBE VALVE
- THREAD END BALL VALVE

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
C1	04.01.2025	ISSUED AS STANDARD	ST	BD	MK

CLIENT

CITY GAS DISTRIBUTION PROJECT AT HYDERABAD GA

PMC

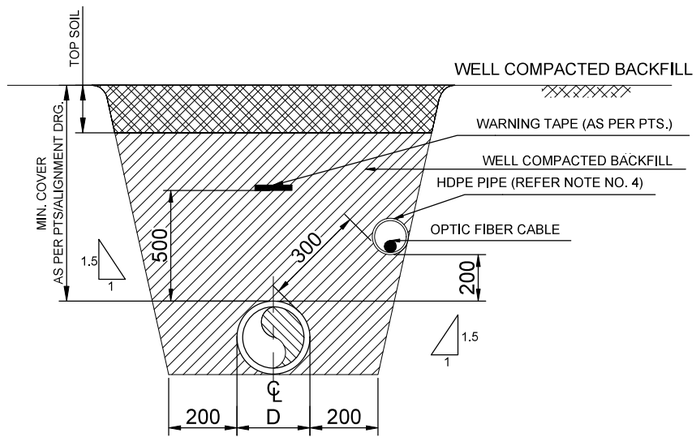
VCS QUALITY SERVICES PVT. LTD.

TITLE

TYPICAL ARRANGEMENT DRAWING FOR 12" SV STATION WITH 4" FUTURE TAP-OFF

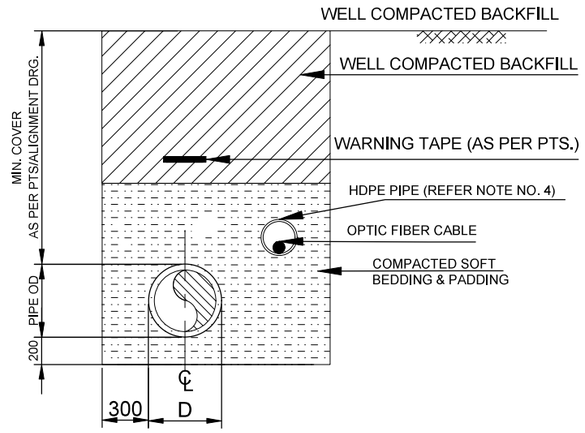
SIZE	JOB NO.	DRAWING NUMBER	SHEET	REV.
A3	C251155	1010-000-PL-GAD-1001	4 OF 4	C1

Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST



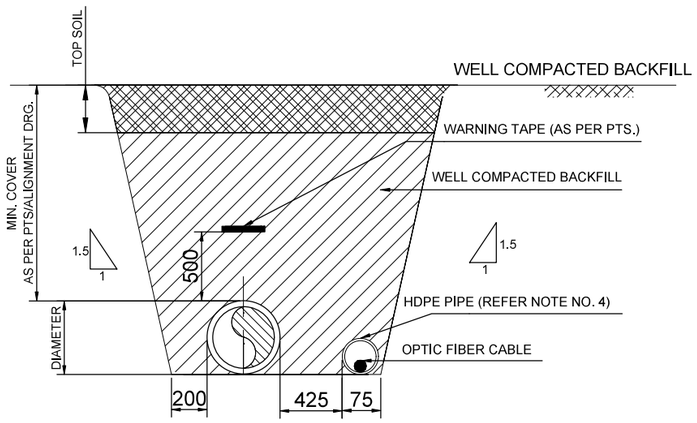
TYPICAL TRENCH DETAILS IN NORMAL SOIL

TYPE - 1



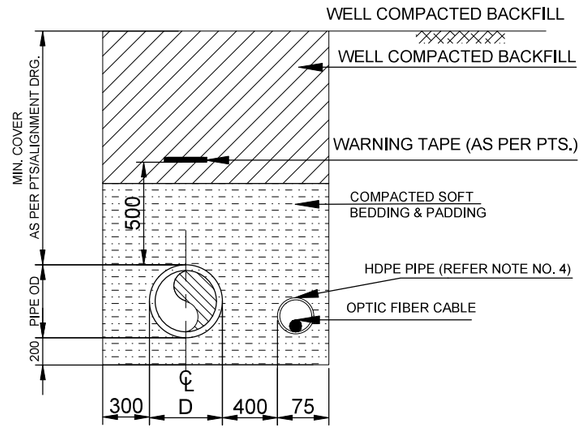
TYPICAL TRENCH DETAILS IN ROCK AREA

TYPE - 3



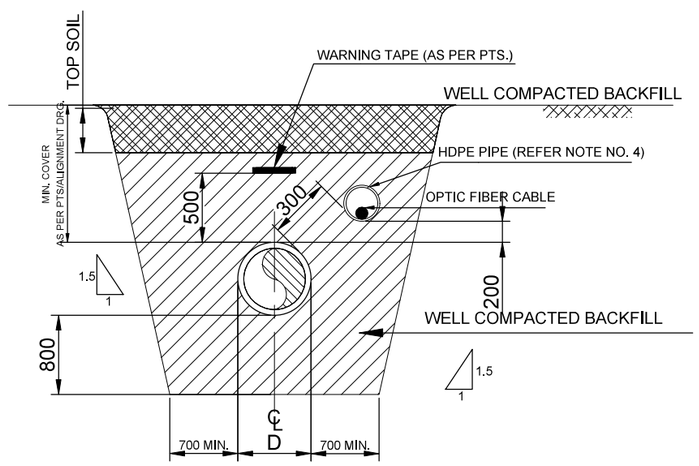
TYPICAL TRENCH DETAILS IN NORMAL SOIL

TYPE - 2



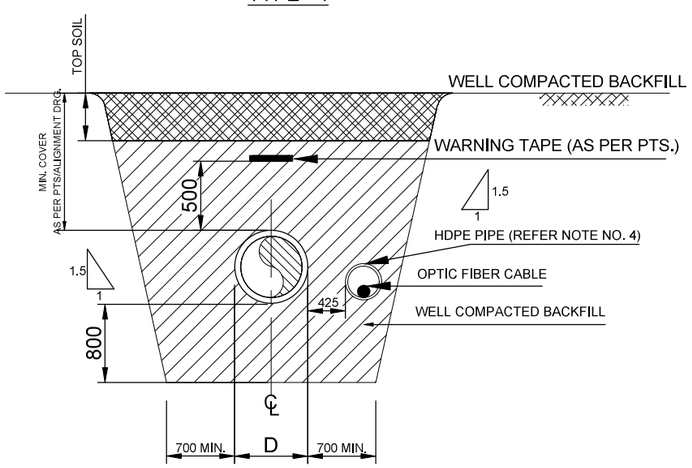
TYPICAL TRENCH DETAILS IN ROCK AREA

TYPE - 4



TYPICAL TRENCH DETAILS FOR SEISMIC FAULT (IN NORMAL SOIL) AREA

TYPE - 5



TYPICAL TRENCH DETAILS FOR SEISMIC FAULT (IN ROCK) AREA

TYPE - 6

NOTES :

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. MINIMUM COVER OVER LINEPIPE SHALL BE AS PER PTS AND REQUIREMENT OF CONCERNED AUTHORITY.
3. THIS SKETCH IS INDICATIVE ONLY.
4. IF, AS PER SPECIFICATION, ARMOURED OFC IS TO BE PROVIDED, IT WILL BE LAID ALONGWITH LINEPIPE AS PER THE APPROVED PROCEDURE.
5. TYPE OF TRENCHING TO BE USED SHALL BE AS PER PTS AND APPROVED PROCEDURE.
6. ALL TYPICAL CROSS SECTIONS MUST BE VIEWED LOOKING IN THE DIRECTION OF FLOW.
7. PARTICULAR TECHNICAL SPECIFICATION (PTS) INCLUDES DESIGN BASIS SCOPE OF WORK/ SOR , SPECIFICATION. IN CASE OF CONFLICT/ STRINGENT DEPTH OF COVES SHALL BE FOLLOWED.
8. PIPELINE SHALL BE LAID WITH IN ONE METER OF ROW.

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
00	13.02.23	ISSUED AS STANDARD DRAWING	PSS	MC	HK

PMC:

VCS QUALITY SERVICES PVT. LTD.

TITLE:

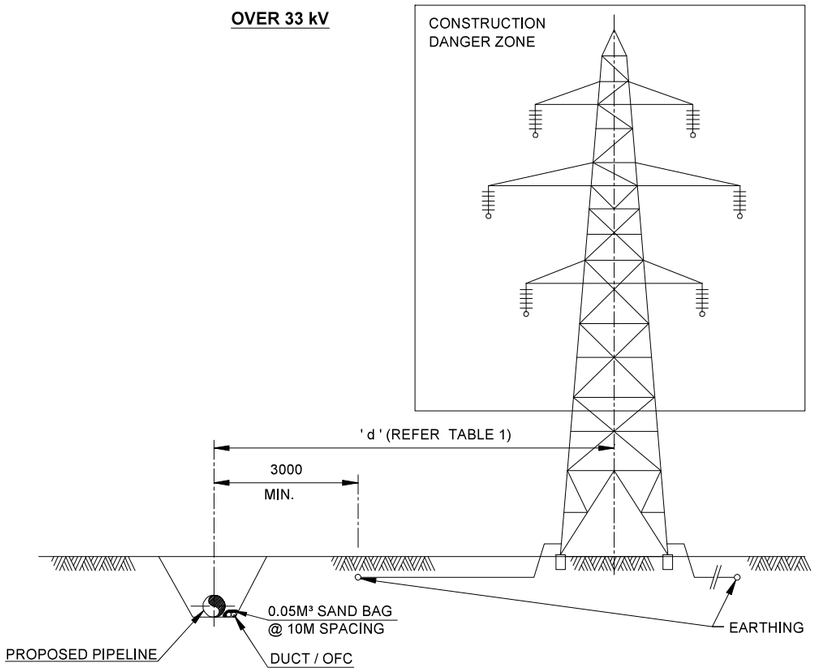
TYPICAL TRENCH DETAILS

SCALE:	N.T.S.	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	--------	VCS-00-PP-SD-2001	00

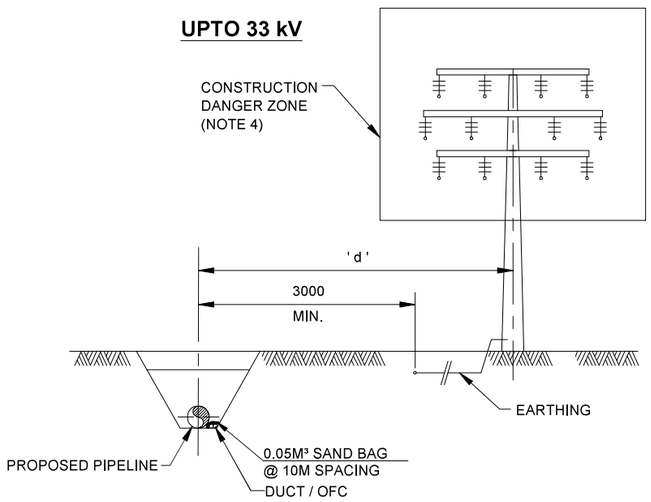
Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST

PARALLELISM TO HIGH VOLTAGE TRANSMISSION LINES

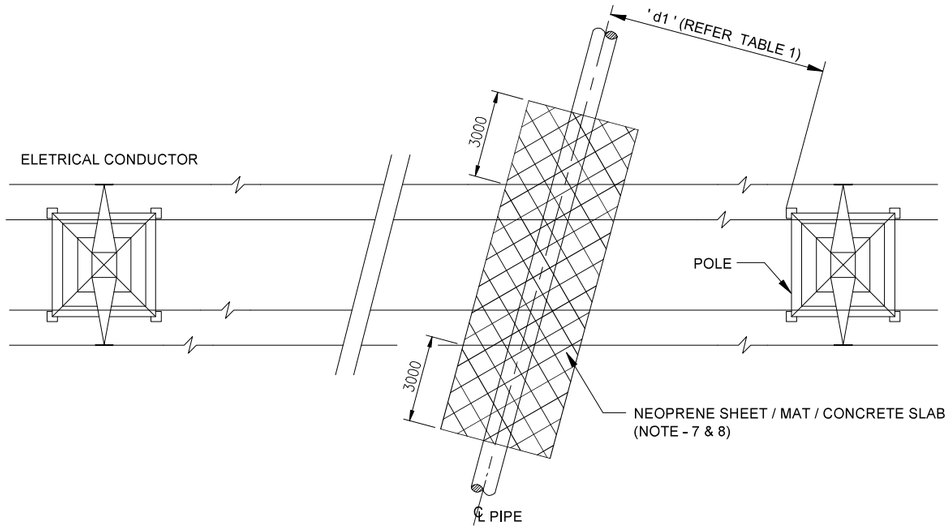
OVER 33 kV



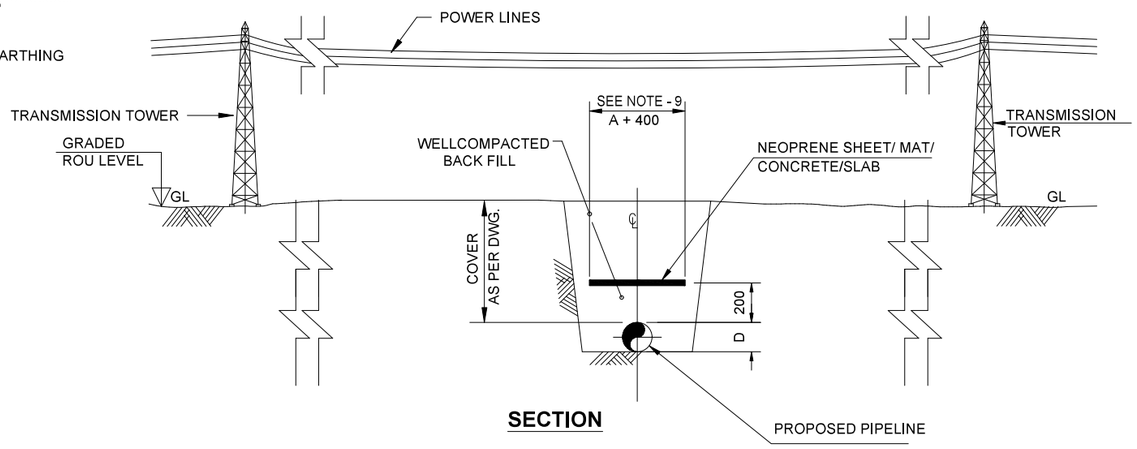
UPTO 33 kV



CROSSING OF HIGH VOLTAGE TRANSMISSION LINES



PLAN VIEW



SECTION

TABLE 1

MINIMUM DISTANCE FROM CENTERLINE OF
PIPELINE TO POWER TRANSMISSION STRUCTURES

	PARALLELISM	CROSSING
ELETRICAL SYSTEM	ELETRICAL SYSTEM TO THE LINE AXIS ' d '	MINIMUM DISTANCE TO THE POLE ' d1 ' (NEAREST FOOTING) / EARTHING
UP TO 33 kV	5000	4000
OVER 33 kV	10000	4000

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Date: 2025.03.13 12:56:46 IST

REFERENCE DRAWINGS / DOCUMENTS

S.NO.	TITLE	NO.

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED.
2. IN CASE THE MINIMUM DISTANCE IS NOT MET, THE LOCAL ELECTRICAL COMPANY HAS TO BE CONTACTED FOR APPROVAL.
3. STABILITY OF TIMBER POLE TO BE GUARANTEED DURING CONSTRUCTION.
4. CONSIDERATION SHOULD BE GIVEN TO LIGHTNING FAULT, CURRENT PROTECTION OF PIPELINE & SAFETY OF PERSONNEL.
5. IN CASE OF CROSSING OF HIGH VOLTAGE TRANSMISSION LINES, MIN. DISTANCE OF 3000 SHALL BE MAINTAINED FROM EARTHING.
6. SUITABLE MEASURE SHALL BE TAKEN FOR THE PROTECTION OF THE LINE.
7. CONCRETE SLAB/ NEOPRENE / MAT SHALL BE PROVIDED FOR OHL CROSSINGS FOR 33 KV AND ABOVE.
8. CONCRETE SLAB SHALL BE AS PER DRAWING, C221070-00-PP-SD-2017 OR NEOPRENE SHEET SHALL BE 8MM THK.
9. DIMENSION 'A' SHALL BE CALCULATED AS FOLLOWS: A=(D1+D2+....Dn)+(n-1)X500, WHERE D1,D2....Dn IS THE OUTSIDE DIAMETER (INCLUDING COATING) OF PIPELINES IN MM IN THE SAME TRENCH AND 'n' IS NO. OF PIPELINES, IN CASE OFC/DUCT IS ALSO PRESENT DIMENSION 'A' SHALL BE INCREASED BY 200MM. OFC/DUCT SHALL BE LAID AT A DISTANCE OF 200MM FROM EXTREME PIPE AS PER TRENCH SECTION DRAWING.
10. FOR PIPELINE CROSSING OR LAYING PARALLEL TO H.T. LINE OF 420 KV SPECIAL PROVISION LIKE MITIGATOR SHALL BE USE AS PER CP DESIGN.

CROSSING DETAIL

Sr.No.	CROSSING	PIPELINE ROUTE	WIDTH (M)	CONSTRUCTION METHOD

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
00	16,01,23	ISSUED AS STD. DRAWING	PSS	MC	HK

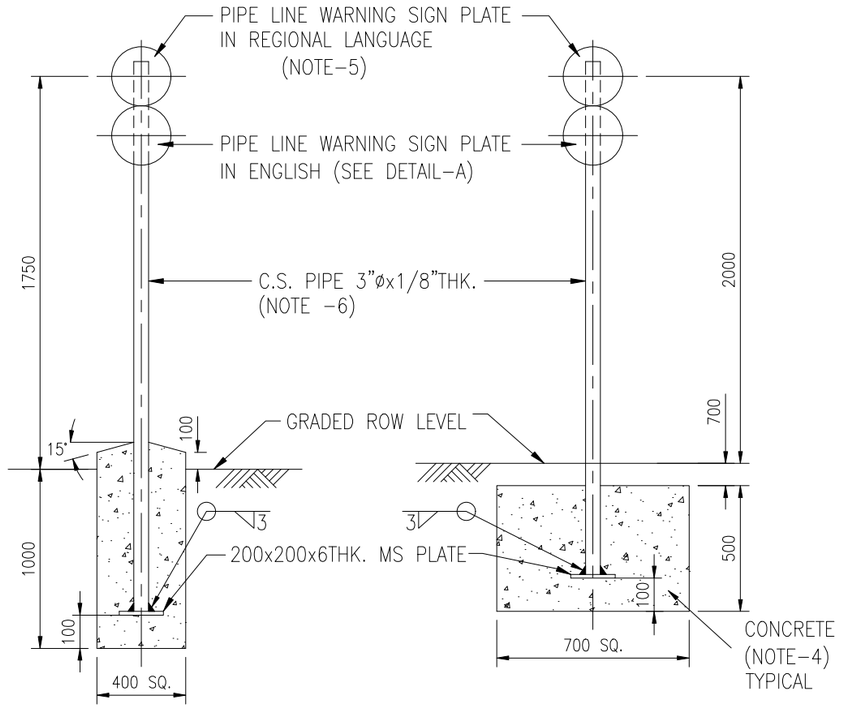
PMC:

VCS QUALITY SERVICES PVT. LTD.

TITLE:

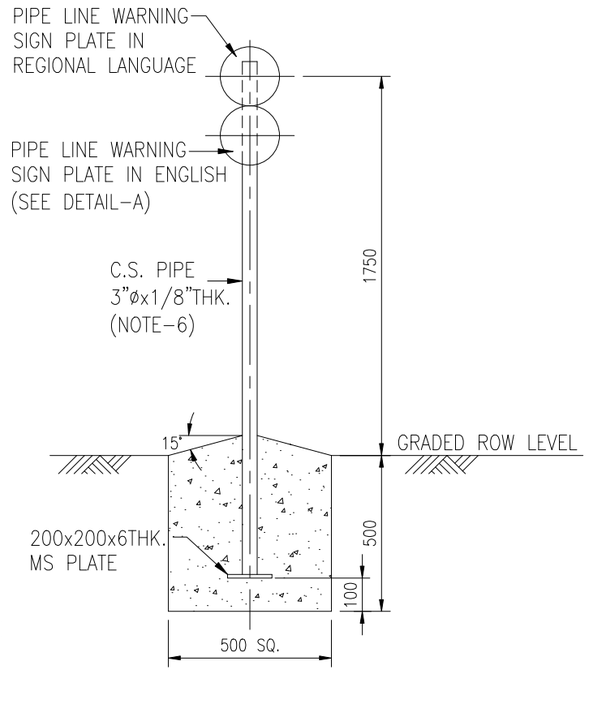
TYPICAL DRAWING FOR OVERHEAD POWER LINE CROSSING

SCALE:	N.T.S.	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
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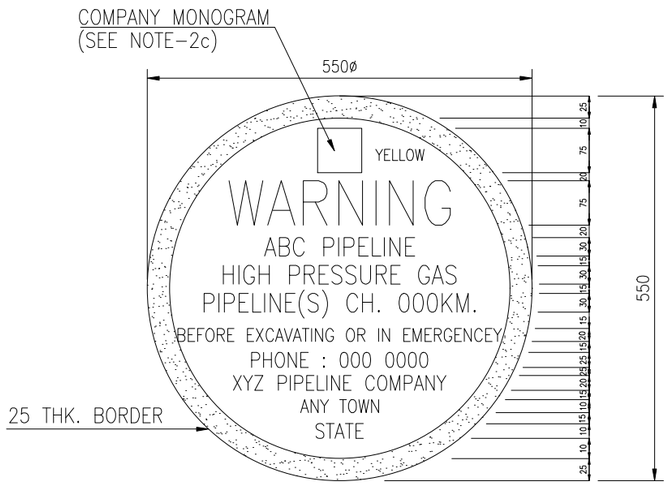


TYPE-I
FOR NORMAL SOIL

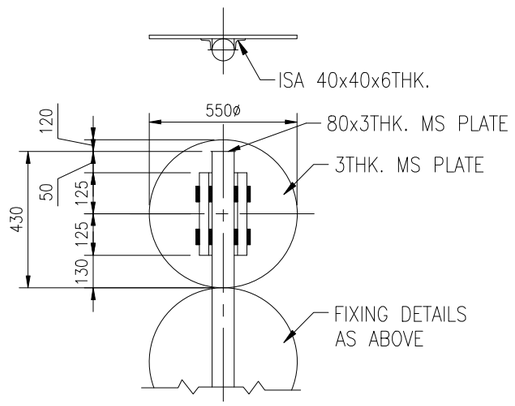
TYPE-II
FOR DRIFTING SAND AREAS
(NOTE-7)



TYPE-III
FOR ROCKY AREAS



DETAIL-A



WARNING SIGN PLATE
FIXING DETAILS

REFERENCE DRAWINGS / DOCUMENTS

S.NO.	TITLE	NO.

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED.
2. SCHEME OF PAINTING & COLOURING.
   (a) UNDERGROUND STEEL STRUCTURE (EXCEPT THAT EMBEDDED IN CONCRETE), : COAL TAR EPOXY MIN. 300 MICRON THK.
   (b) OVER GROUND STEEL STRUCTURE : ONE COAT OF PRIMER & TWO COATS SPECIFIED COLOUR PAINT.
   (c) COLOUR SCHEME FOR ABC PIPELINE CO. MONOGRAM SHALL BE AS DIRECTED BY OWNER,
   (d) ALL LETTERS SHALL BE PAINTED BLACK EXCEPT 'WARNING' WHICH SHALL BE PAINTED RED.
   (e) POST SHALL BE PAINTED WITH 250 WIDE ALTERNATE BANDS OF BLACK AND WHITE PAINT.
   (f) ALL OTHER ABOVEGROUND STEEL SHALL BE PAINTED YELLOW.
3. LOCATION:
   (a) THE PIPE LINE WARNING SIGN SHALL BE INSTALLED IN ACCORDANCE WITH CONTRACT REQUIREMENTS AND AS DIRECTED BY OWNER IT SHALL BE INSTALLED TO THE LEFT OF THE PIPE CENTER LINE, VIEWING IN THE DIRECTION OF FLOW AT 1000MM FROM PIPELINE O.D. AND THE WARNING SIGN PLATE SHALL FACE THE UTILITY BEING CROSSED.
   (b) THE WARNING SIGN PLATE MAY BE MOUNTED ON VENT PIPES OR KM POST WHERE EVER POSSIBLE.
4. THE FOUNDATION SHALL BE MADE OF CONCRETE M20.
5. SIGN PLATE IN REGIONAL LANGUAGE SHALL BE PREPARED BY CONTRACTOR ON SIMILAR LINES AND APPROVED BY THE OWNER.
6. THE MATERIAL FOR MARKERS SHALL BE AS FOLLOWING:
   PLATE - IS2062, Gr. A
   PIPE - IS - 1239
7. INTALLATION OF MARKERS ON SLOPE OF SAND DUNE SHALL BE AVOIDED. IN SUCH CASES, SAME SHALL BE INSTALLED EITHER BEFORE OR AFTER THE SAND DUNE SLOPE.

CROSSING DETAIL

Sr.No.	CROSSING	PIPELINE ROUTE	WIDTH (M)	CONSTRUCTION METHOD

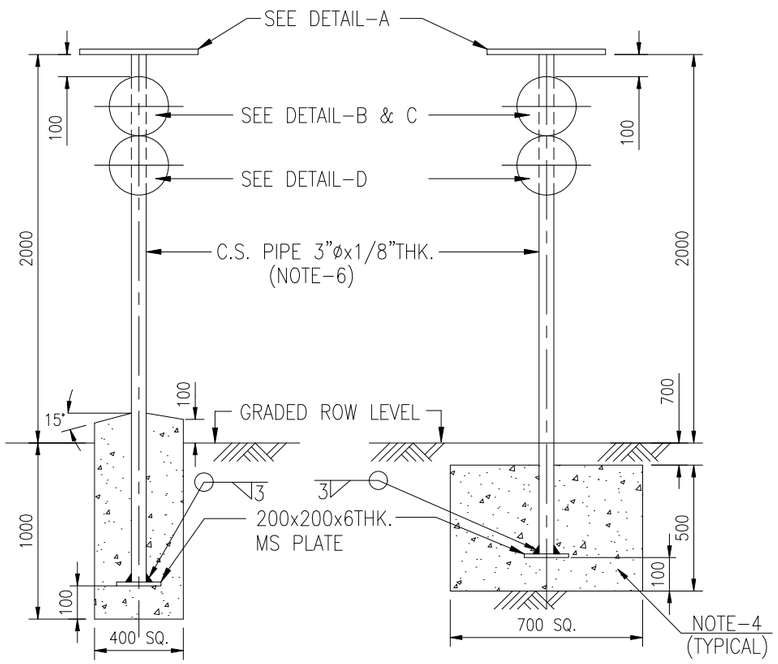
REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
00	16,01,23	ISSUED AS STD. DRAWING	PSS	MC	HK

PMC: VCS QUALITY SERVICES PVT. LTD.

TITLE: TYPICAL DRAWING FOR PIPELINE WARNING SIGN

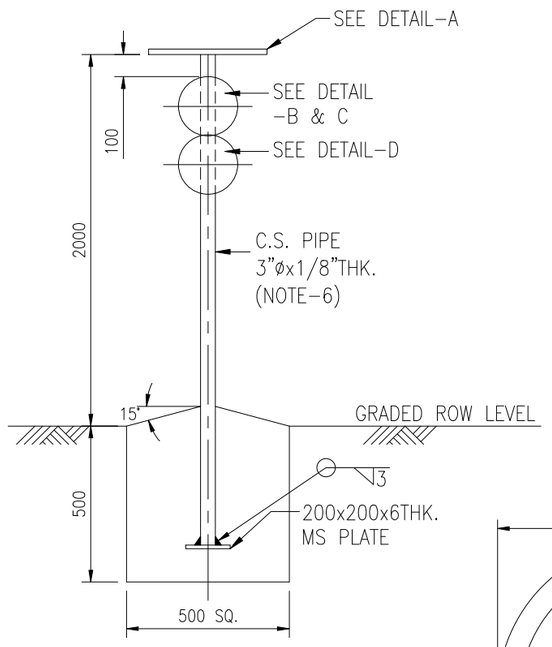
SCALE: N.T.S.	TOTAL NO. OF SHTS: 1 OF 1		
SIZE	JOB NO.	DRAWING NUMBER	REV.
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Date: 2025.03.13 12:56:46 IST

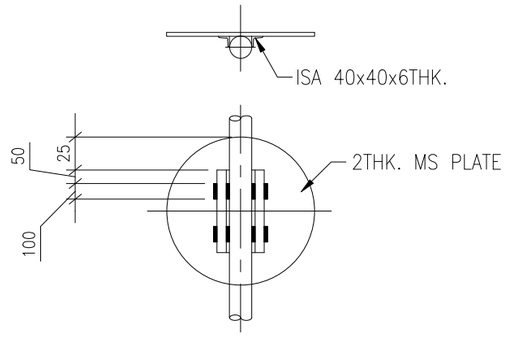


TYPE-I
FOR NORMAL SOIL

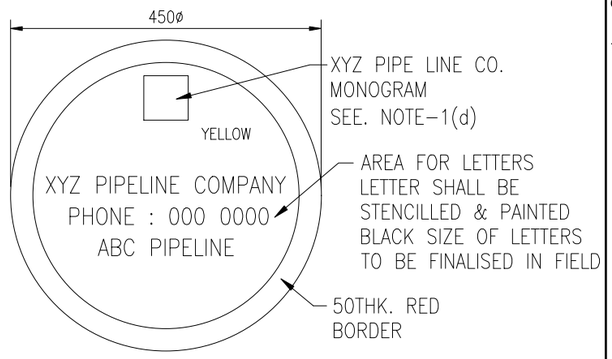
TYPE-II
FOR DRIFTING
SAND AREAS
(NOTE-7)



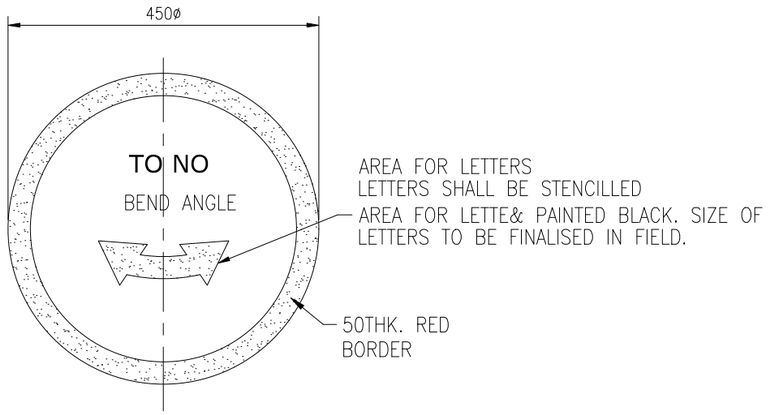
TYPE-III
FOR ROCKY AREAS



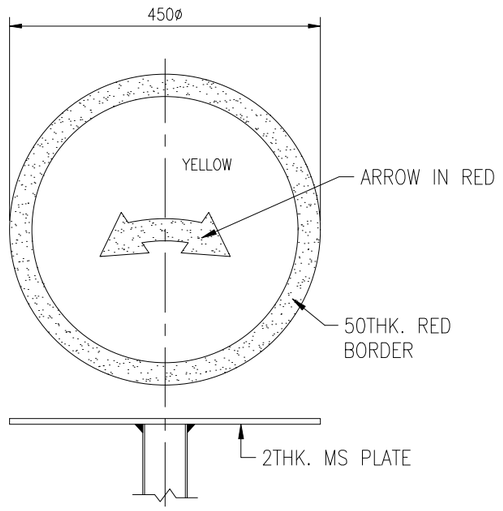
DETAIL - B



DETAIL-C



DETAIL-D



DETAIL-A

REFERENCE DRAWINGS / DOCUMENTS

S.NO.	TITLE	NO.

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED.
2. SCHEME OF PAINTING & COLOURING:-
   (a) UNDERGROUND STEEL STRUCTURE (EXCEPT THAT EMBEDDED IN CONCRETE) COAL TAR EPOXY MIN. 300 MICRON THK.
   (b) OVERGROUND STEEL STRUCTURE : ONE COAT OF PRIMER & TWO COATS SPECIFIED COLOUR PAINT.
   (c) FIGURES SHALL BE STENCILED ON BOTH SIDES OF THE POSTS IN BLACK.
   (d) COLOUR SCHEME FOR XYZ PIPELINE CO. MONOGRAM SHALL BE AS DIRECTED BY OWNER.
   (e) POST SHALL BE PAINTED WITH 250 WIDE ALTERNATE BANDS OF BLACK AND WHITE PAINT.
   (f) ALL OTHER ABOVEGROUND STEEL SHALL BE PAINTED YELLOW.
3. LOCATION:
   (a) DIRECTION MARKER SHALL BE INSTALLED AS PER SPECIFICATIONS AS DIRECTED IN APPROVED DRAWINGS AND AS DIRECTED BY OWNER.
   (b) OWNER NAME PLATE SHALL FACE THE PIPELINE.
   (c) DIRECTION MARKER SHALL BE INSTALLED 1000MM TO LEFT OF THE PIPE CENTER LINE/VIEWING TOWARDS THE DIRECTION OF FLOW AND AS INDICATED IN LOCATION SKETCH.
4. THE FOUNDATION SHALL BE MADE OF CONCRETE M20.
5. THE HEIGHT OF THE POST MAY BE VARIED TO SUIT THE FIELD REQUIREMENTS.
6. THE MATERIAL FOR MARKERS SHALL BE AS FOLLOWING:
   PLATE - IS-2062, Gr. A
   PIPE - IS - 1239
7. INSTALLATIION OF MARKERS ON SLOPE OF SAND DUNE SHALL BE AVOIDED. IN SUCH CASES, SAME SHALL BE INSTALLED EITHER BEFORE OR AFTER THE SAND DUNE SLOPE.

CROSSING DETAIL

Sr.No.	CROSSING	PIPELINE ROUTE	WIDTH (M)	CONSTRUCTION METHOD

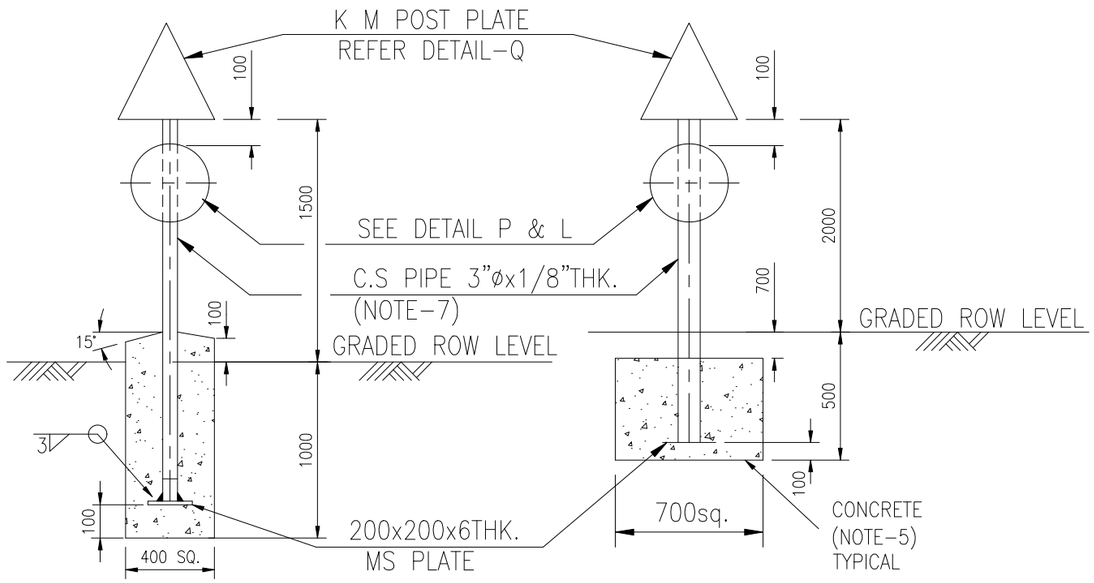
REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
00	16.01.23	ISSUED AS STD. DRAWING	PSS	MC	HK

PMC: VCS QUALITY SERVICES PVT. LTD.

TITLE: TYPICAL DRAWING FOR DIRECTION MARKER

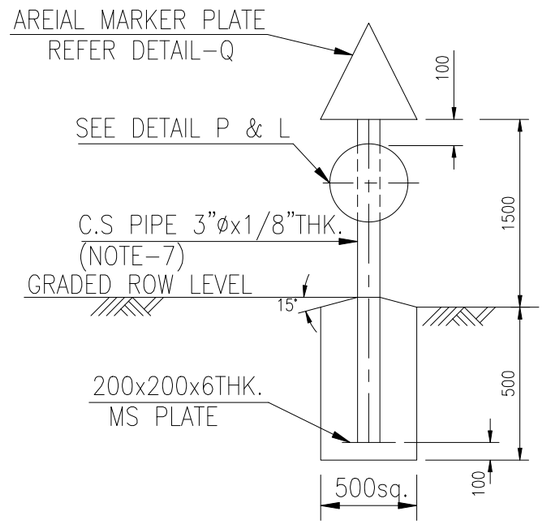
SCALE: N.T.S.	TOTAL NO. OF SHTS: 1 OF 1	
SIZE	JOB NO.	DRAWING NUMBER / REV.
A3	-------	VCS-00-PP-SD-2005 / 00

Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST

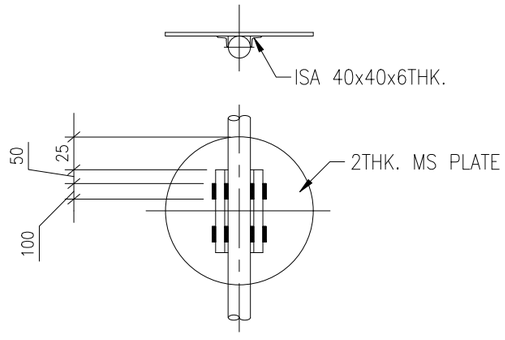


TYPE-I
FOR NORMAL SOIL

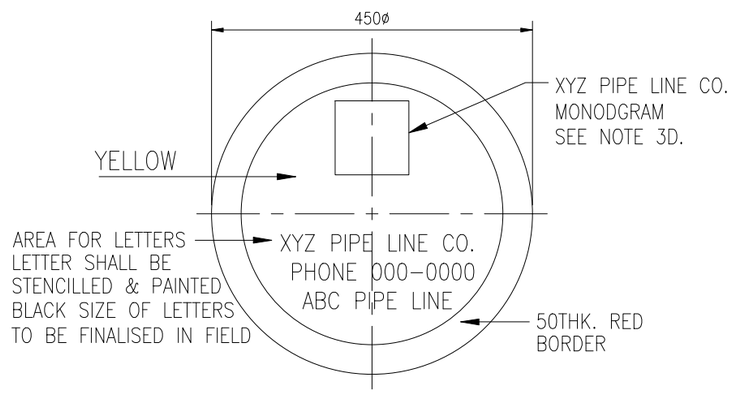
TYPE-II
FOR DRIFTING SAND AREAS
(NOTE-8)



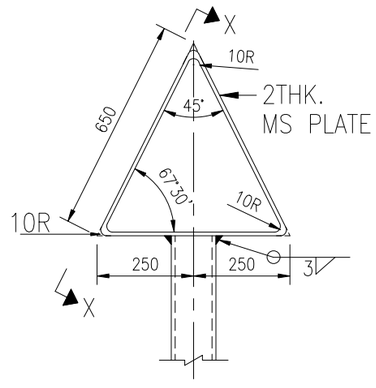
TYPE-III
FOR ROCKEY AREAS



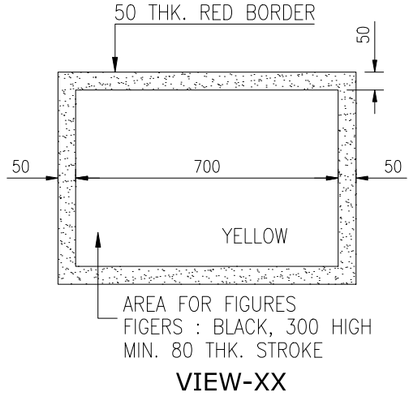
DETAIL-P



DETAIL-L



DETAIL-Q



VIEW-XX

REFERENCE DRAWINGS / DOCUMENTS

S.NO.	TITLE	NO.

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE INDICATED.
2. SCHEME OF PAINTING & COLOURING:-
3. (a) UNDERGROUND STEEL STRUCTURE (EXCEPT THAT EMBEDDED IN CONCRETE) COAL TER EPOXY MIN.300 MICRON THIK.)
   (b) OVER GROUND STEEL STRUCTURE : ONE COAT OF PRIMER & TWO COATS SPECIFIED COLOUR PAINT.
   (c) FIGURES SHALL BE STENCILED ON BOTH SIDES OF THE POSTS IN BLACK.
   (d) COLOUR SCHEME FOR XYZ PIPELINE CO. MONOGRAM SHALL BE AS DIRECTED BY OWNER.
   (e) POST SHALL BE PAINTED WITH 250 WIDE ALTERNATE BANDS OF BLACK AND WHITE PAINT.
   (f) ALL OTHER ABOVEGROUND STEEL SHALL BE PAINTED YELLOW.
4. LOCATION:
   (a) K.M. POST SHALL BE INSTALLED AT EVERY KILOMETERS AS PER REQUIREMENTS OF CONTRACT AND AS DIRECTED BY OWNER.
   (b) OWNER NAME PLATE SHALL FACE THE PIPELINE.
   (c) K.M. POST SHALL BE 1000MM TO THE LEFT OF THE PIPE CENTER LINE VIEWING TOWARDS THE DIRECTION OF FLOW AND AS INDICATED IN SKETCH.
5. THE FOUNDATION SHALL BE MADE OF CONRETE M20.
6. THE HEIGHT OF THE K.M. POST MAY BE VARIED TO SUIT FIELD REQUIREMENTS.
7. THE MATERIAL FOR MARKERS SHALL BE AS FOLLOWING:
   PLATE - IS-2062, Gr. A
   PIPE - IS - 1239
8. INSTALLATION OF MARKERS ON SLOPE OF SAND DUNE SHALL BE AVOIDED. IN SUCH CASES, SAME SHALL BE INSTALLED EITHER BEFORE OR AFTER THE SAND DUNE.

CROSSING DETAIL

Sr.No.	CROSSING	PIPELINE ROUTE	WIDTH (M)	CONSTRUCTION METHOD

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
00	16.01.23	ISSUED AS STD. DRAWING	PSS	MC	HK

PMC:

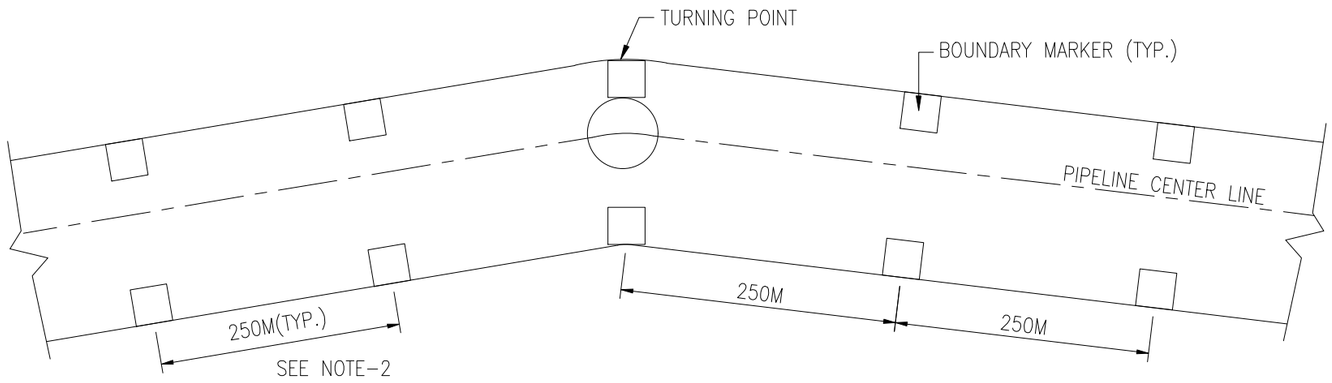
VCS QUALITY SERVICES PVT. LTD.

TITLE:

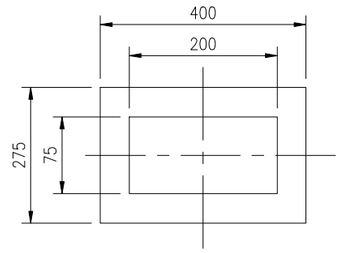
TYPICAL DRAWING FOR
TYPICAL K.M. POST MARKER

SCALE:	N.T.S.	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	--------	VCS-00-PP-SD-2006	00

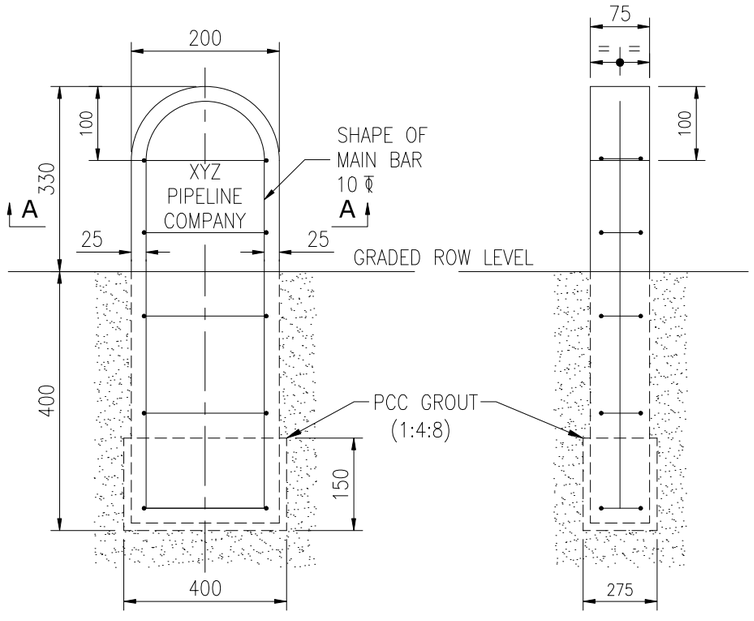
Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST



LOCATION PLAN OF BOUNDARY MARKER

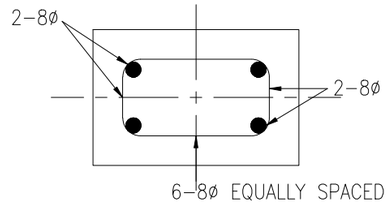


PLAN



ELEVATION

SIDE VIEW



SECTION A-A

REFERENCE DRAWINGS / DOCUMENTS

S.NO.	TITLE	NO.

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED.
2. BOUNDARY MARKERS SHALL BE INSTALLED AT THE ROW LIMITS ON EITHER SIDE AT 250M CENTERS AND ALSO AT ALL TURNING POINTS AS PER SPECIFICATIONS AND AS DIRECTED BY OWNER. BOUNDARY MARKERS SHALL PREFERABLY BE PLACED ON FIELD BUNDS/UNCULTIVABLE AREAS.
3. ALL BOUNDARY MARKERS SHALL BE PRECAST AND INSCRIPTIONS SHALL BE ENGRAVED CENTRALLY IN THE MOULD ON THE FACE.
4. LETTERS SHALL BE 60MM HIGH AND 5MM DEEP.
5. INSCRIPTIONS SHALL FACE THE PIPE LINE.
6. CONCRETE FOR BOUNDARY MARKERS SHALL BE M20.
7. ABOVE GROUND PART OF BOUNDARY MARKERS SHALL BE PAINTED YELLOW WITH MIN. THREE COATS OF COMPANY APPROVED PROOF CEMENT PAINT AS PER IS-5410. INSCRIPTIONS SHALL BE PAINTED BLACK.

CROSSING DETAIL

Sr.No.	CROSSING	PIPELINE ROUTE	WIDTH (M)	CONSTRUCTION METHOD

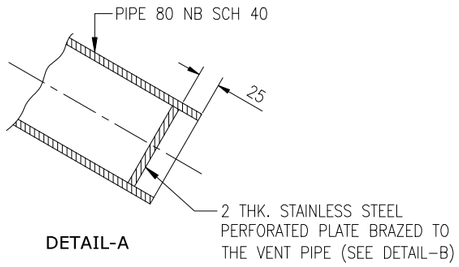
REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
00	16.01.23	ISSUED AS STD. DRAWING	PSS	MC	HK

PMC: VCS QUALITY SERVICES PVT. LTD.

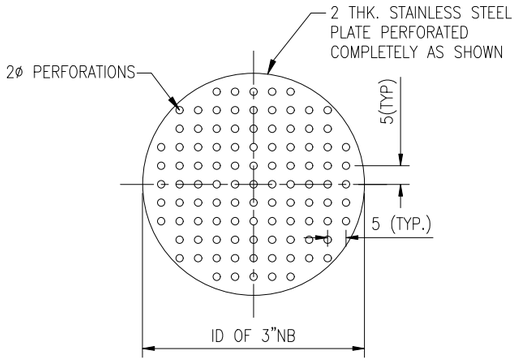
TITLE: TYPICAL DRAWING FOR ROW BOUNDRY MARKER

SCALE: N.T.S.	TOTAL NO. OF SHTS: 1 OF 1	
SIZE	JOB NO.	DRAWING NUMBER / REV.
A3	------	VCS-00-PP-SD-2008 / 00

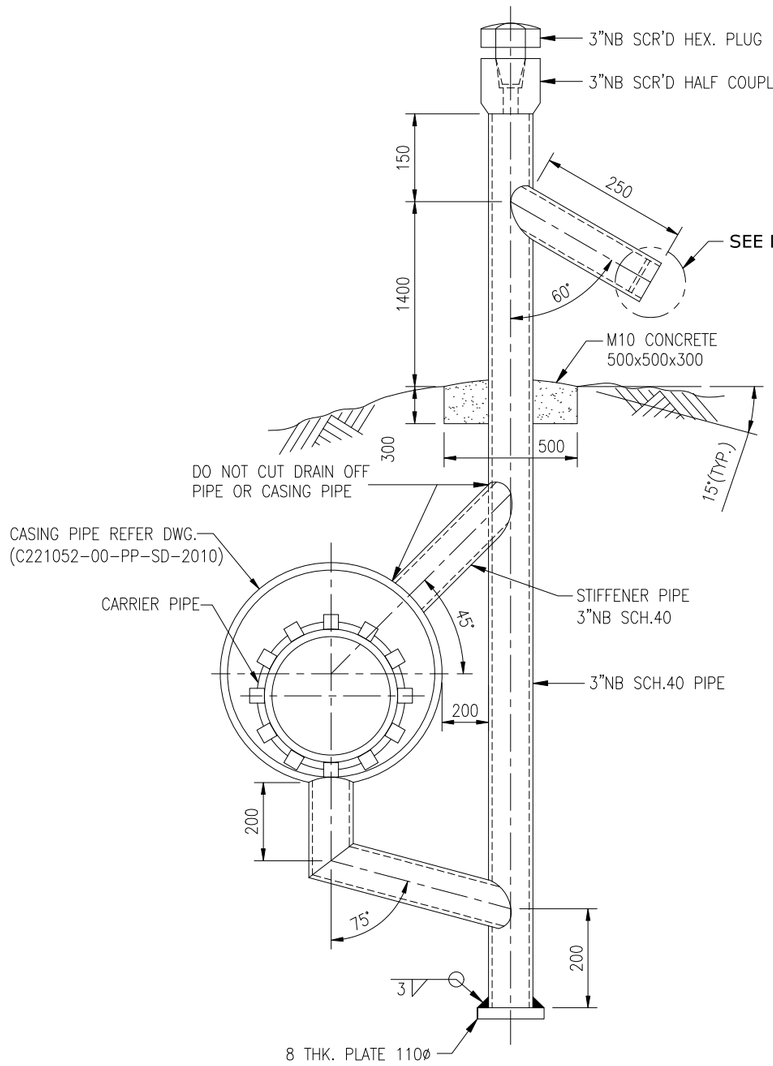
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Date: 2025.03.13 12:56:46 IST



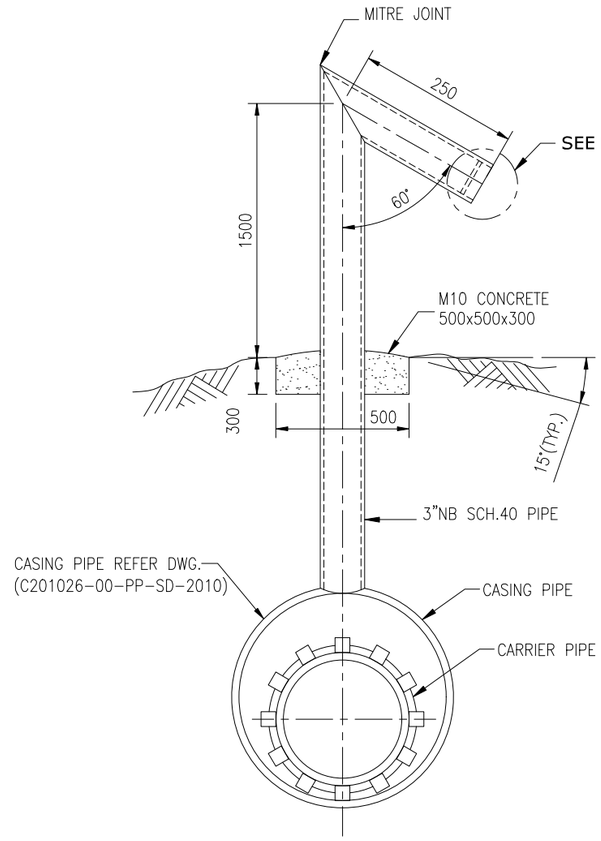
DETAIL-A



DETAIL-B



DRAIN OFF



VENT

REFERENCE DRAWINGS / DOCUMENTS

S.NO.	TITLE	NO.

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED.
2. VENT AND DRAIN OFF TO FACE LEFT WHEN LOOKING IN DIRECTION OF CONSTRUCTION AND SHALL BE PARALLEL TO CROSSING.
3. VENT AND DRAIN OFF PIPE SHALL BE API 5L Gr. B, SCH.40 OR IS-1239.
4. PORTION OF VENT AND DRAIN OFF PIPES WHICH ARE UNDER GROUND OR WHICH MAY BE UNDER WATER ARE TO COATED WITH LIQUID EPOXY OF 500 MICRON THK. OF APPROVED QUALITY ABOVE GROUND PORTION SHALL BE AS PER PAINTING SPECIFICATION.

LEGENDS:-

OFC	OPTICAL FIBRE CABLE
D	OUTSIDE DIAMETER OF PIPE

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
00	16.01.23	ISSUED AS STD. DRAWING	PSS	MC	HK

CROSSING DETAIL

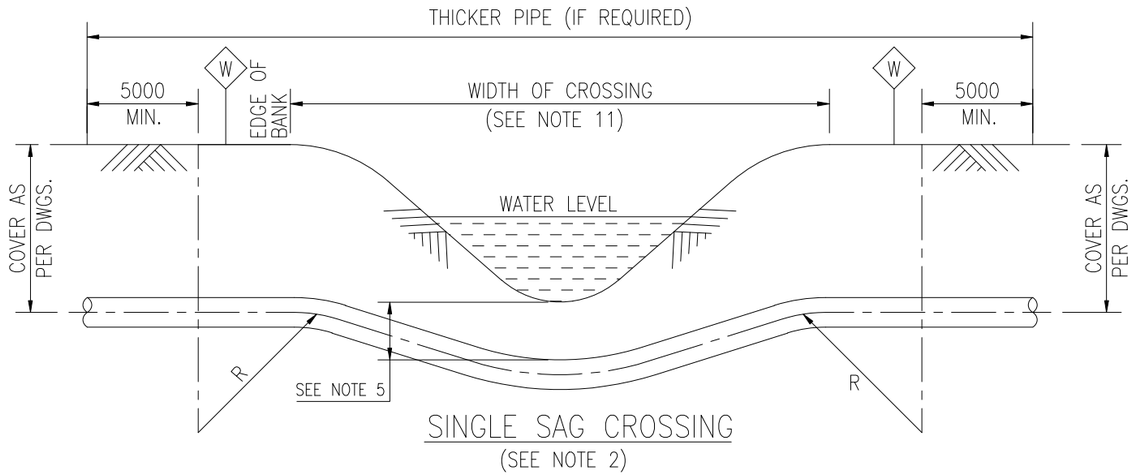
Sr.No.	CROSSING	PIPELINE ROUTE	WIDTH (M)	CONSTRUCTION METHOD

PMC: VCS QUALITY SERVICES PVT. LTD.

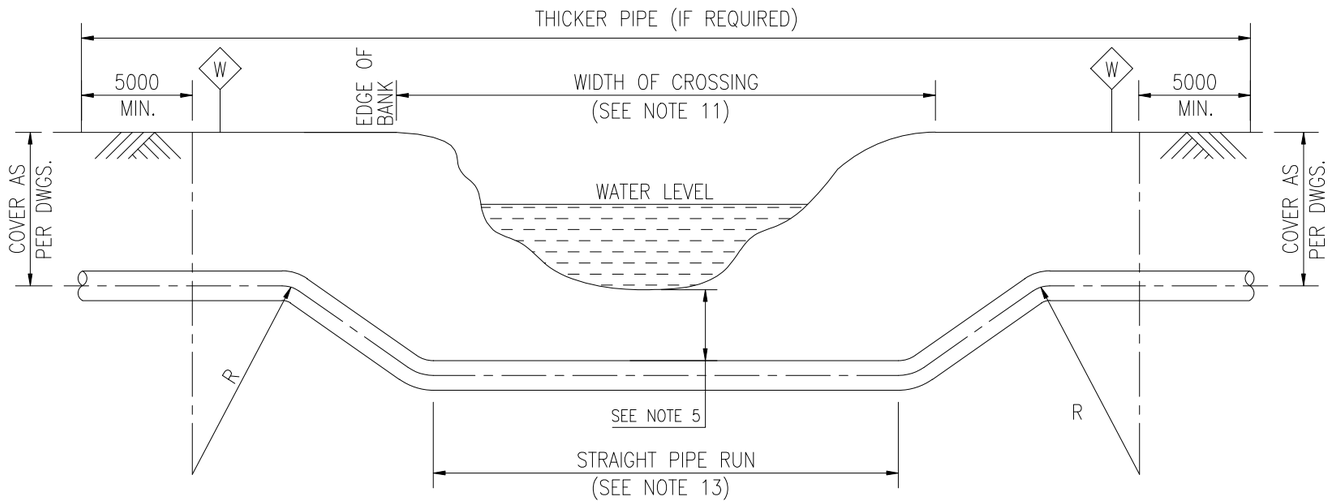
TITLE: TYPICAL DRAWING FOR DETAIL OF CASING VENT AND DRAIN

SCALE:	N.T.S.	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	--------	VCS-00-PP-SD-2009	00

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Date: 2025.03.13 12:56:46 IST



SINGLE SAG CROSSING
(SEE NOTE 2)



DOUBLE SAG CROSSING
(SEE NOTE 3)

REFERENCE DRAWINGS / DOCUMENTS

S.NO.	TITLE	NO.

NOTES:-

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE SPECIFIED.
2. SINGLE SAG CROSSING SHALL NORMALLY BE USED WHERE THERE IS NO EVIDENCE OF EROSION OF BANKS AND SCOURING OR SHIFTING OF STREAM BOTTOM AND WHERE BED WIDTH DOES NOT PROHIBIT ITS USE.
3. DOUBLE SAG CROSSING SHALL BE USED WHERE THERE IS EVIDENCE OF EROSION OF BANKS. SCOURING OR SHIFTING OF STREAM BOTTOM.
4. IN DOUBLE SAG CROSSING, GENERALLY COLD FIELD BENDS SHALL BE USED. USE OF FACTORY MADE R=6D BEND SHALL BE MINIMIZED. R=6D BEND SHALL BE USED ONLY WITH PRIOR APPROVAL OF COMPANY.
5. UNLESS OTHERWISE SPECIFIED,THE MINIMUM COVER OVER THE PIPE MEASURED BELOW THE LOWEST BED LEVEL SHALL BE 1500MM.
6. THE TYPE AND EXTENT OF BUOYANCY CONTROL MEASURES SHALL BE AS PER SPECIFICATION AND AS DIRECTED BY COMPANY FOR INDIVIDUAL CROSSING AND SHALL BE SHOWN ON THE ALIGNMENT SHEETS.
7. THE FILL AT THE BANKS SHALL BE COMPACTED FIRMLY AND REINFORCED WITH SACKED EARTH, LEAN CONCRETE, RIP RAP OR BY OTHER MEANS AS DIRECTED BY COMPANY. ADDITIONAL BANK PROTECTION MEASURES AS PER SPECIFICATIONS SHALL BE ADOPTED WHEN THERE IS EVIDENCE OF EROSION AND SLUMPING OF BANKS OR WHEN THE BANKS ARE STEEP.
8. THE LOCATION OF CROSSING SHALL BE IN A LONG STRAIGHT STRETCH OF THE STREAM IF POSSIBLE.
9. EXACT POSITION AND ANGLE OF COLD BENDS SHALL BE DETERMINED IN FIELD.
10. AFTER INSTALLATION OF THE CROSSING, THE WATER COURSE SHALL BE RESTORED TO ITS ORIGINAL CONDITION TO THE ENTIRE SATISFACTION OF THE AUTHORITIES JURISDICTION OVER THE SAME. WHERE THE EXCAVATED MATERIAL IS UNSUITABLE , TRENCH SHALL BE BACKFILLED WITH MATERIAL APPROVED BY COMPANY.
11. WIDTH OF CROSSING SHALL BE THAT CORRESPONDING TO THE HIGHEST WATER LEVEL. THE HIGHEST WATER LAVEL SHALL BE DETERMINED BASED ON THE FOLLOWING:
    I) HISTORICAL RECORDS (TO THE EXTENT AVAILABLE)
    II) BANK CONDITION VIS-A-VIS EROSION, ETC.
    III) EVIDENCE OF EXTINCTION OF VEGETATION ALONG BANKS.
    IV) DISCUSSIONS WITH LOCAL PEOPLE.
12. THE NUMBER OF WARNING SIGNS SHALL BE:-
    (a) 1 (ONE) FOR CROSSINGS LESS THAN 15 M WIDTH AT UP STREAM BANK.
    (b) 2 (TWO) FOR CROSSINGS ABOVE 15 M WIDTH.
13. STRAIGHT LENGTH OF PIPE SHALL BE USED AT LEAST FOR THE ENTIRE WIDTH OF CROSSING.
14. CONTRACTOR SHALL VERIFY THE ACTUAL DIMENSIONS WITH RESPECT TO SURVEY DETAILS FOR EACH CROSSING AS AND WHEN DIRECTED BY COMPANY. CONTRACTOR SHALL PREPARE DETAILED DRAWINGS FOR INDIVIDUAL CROSSINGS FOR COMPANY APPROVAL BEFORE COMMITMENT OF CONSTRUCTION.

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
00	16,01,23	ISSUED AS STD. DRAWING	PSS	MC	HK

CROSSING DETAIL

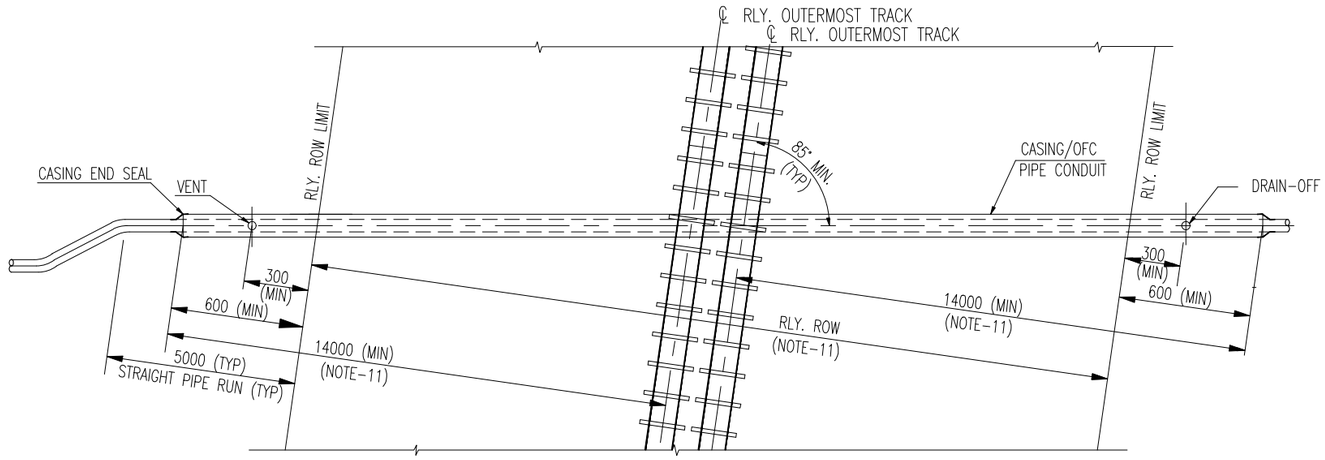
Sr.No.	CROSSING	PIPELINE ROUTE	WIDTH (M)	CONSTRUCTION METHOD

PMC: VCS QUALITY SERVICES PVT. LTD.

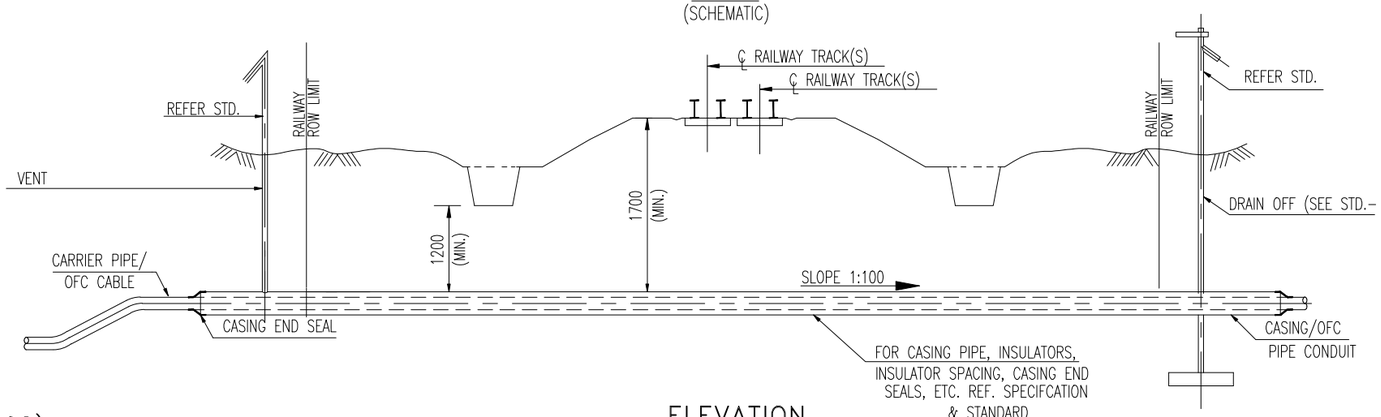
TITLE: TYPICAL STREAM CROSSING

SCALE: N.T.S.	TOTAL NO. OF SHTS: 1 OF 1		
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	--------	VCS-00-PP-SD-2010	00

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Date: 2025.03.13 12:56:46 IST



PLAN
(SCHEMATIC)



ELEVATION
(SCHEMATIC)

TABLE 1 (AS PER 1102)

CARRIER PIPE O.D. IN mm (Inch)	CASING PIPE O.D. IN mm (Inch)	CASING PIPE WT IN mm	CASING PIPE MATERIAL
168.3 (6.625")	323.9 (12.75")	6.35	API 5L Gr B/ IS 1239/IS 3589 SEAMLESS/ ERW
219.1 (8.625")	355.6 (14")	6.35	
273.1 (10.75")	406.4 (16")	7.14	API 5L Gr B/ IS 1239/IS 3589 FE410 LSAW/ HSAW/ EFSW
323.9 (12.75")	457 (18")	7.92	
355.6 (14")	508 (20")	8.74	
406.4 (16")	559 (22")	8.74	
457 (18")	610 (24")	9.53	
508 (20")	660 (26")	10.31	
559 (22")	711 (28")	11.13	
610 (24")	762 (30")	11.91	
660 (26")	813 (32")	12.70	
711 (28")	864 (34")	14.27	
762 (30")	914 (36")	14.27	
813 (32")	965 (38")	14.27	
864 (34")	1016 (40")	15.88	
914 (36")	1067 (42")	15.88	
1016 (40")	1168 (46")	17.48	
1067 (42")	1219 (48")	17.48	

THE CASING PIPE O.D. & WALL THICKNESS SHALL GENERALLY BE AS PER TABLE ABOVE EXCEPT WHEN SPECIFICALLY DIRECTED BY CONCERNED RAILWAY AUTHORITIES.

REFERENCE DRAWINGS / DOCUMENTS

S.NO.	TITLE	NO.

NOTES:-

1. ALL DIMENSIONS ARE IN mm UNLESS SPECIFIED OTHERWISE.
2. CATHODIC PROTECTION TEST LEADS TERMINAL BOX MAY BE MOUNTED ON THE VENT PIPE. FOR CP LEAD TERMINAL BOX DETAILS REFER RELEVANT STD./SPECIFICATION.
3. AT EACH CROSSING, A PIPELINE WARNING SIGN SHALL BE INSTALLED ON EITHER SIDE OF CROSSING. WARNING SIGN PLATE MAY BE MOUNTED ON THE VENT PIPE.
4. REFER API RP 1102 FOR OTHER DESIGN AND INSTALLATION REQUIREMENTS.
5. ELECTRICAL INSULATION BETWEEN CASING AND CARRIER PIPES SHALL BE CHECKED WITH SUITABLE MEGGER.
6. AFTER INSTALLATION OF CASING AND CARRIER PIPES, THE AREA SHALL BE RESTORED TO THE SATISFACTION OF THE CONCERNED AUTHORITIES/COMPANY.
7. FOR CASING PIPE DETAILS, REFER TABLE-1.
8. CONTRACTOR SHALL VERIFY THE ACTUAL DIMENSIONS WITH RESPECT TO SURVEY DETAILS FOR EACH CROSSING AND PREPARE DETAILED DRAWINGS FOR COMPANY'S / CONCERNED AUTHORITY'S APPROVAL BEFORE COMMENCEMENT OF CONSTRUCTION.
9. PIPELINE SECTION SHALL BE PRE-TESTED HYDROSTATICALLY, SEPARATELY FROM THE MAIN LINE TESTING WHEN REQUIRED BY THE AUTHORITIES CONCERNED AND/OR AS DIRECTED BY THE COMPANY.
10. ANGLE OF INTERSECTION BETWEEN PIPELINE AND RAILWAY SHALL BE AS CLOSE TO 90° AS POSSIBLE BUT IN NO CASE LESS THAN 85°.
11. CASING PIPE SHALL BE EXTENDED FOR A DISTANCE OF UPTO 14.00m FROM CENTER LINE OF OUTERMOST RAILWAY TRACK OR 0.6m BEYOND RAILWAY ROW LIMITS ON EITHER SIDE, WHICHEVER IS MORE. ROW LIMIT SHALL BE DEFINED BY THE RAILWAY AUTHORITIES .
12. JACKING / BORE THRU' TECHNIQUE SHALL BE USED FOR THE CROSSING.
13. SEPARATE C.S. CONDUIT FOR OFC SHALL BE INSTALLED AT MINIMUM DISTANCE FROM CASING FOR CARRIER PIPE. IF SPECIFIED.
14. ALL CARRIER PIPE JOINTS SHALL BE 100% RADIOGRAPHED.
15. COATING OF CASING PIPE SHALL BE AS PER REQUIREMENT OF AUTHORITIES.
16. CASING PIPE THICKNESS SHOWN IN TABLE -1 IS CONSIDERING THAT CASING PIPE IS NOT COATED & NOT CP PROTECTED.

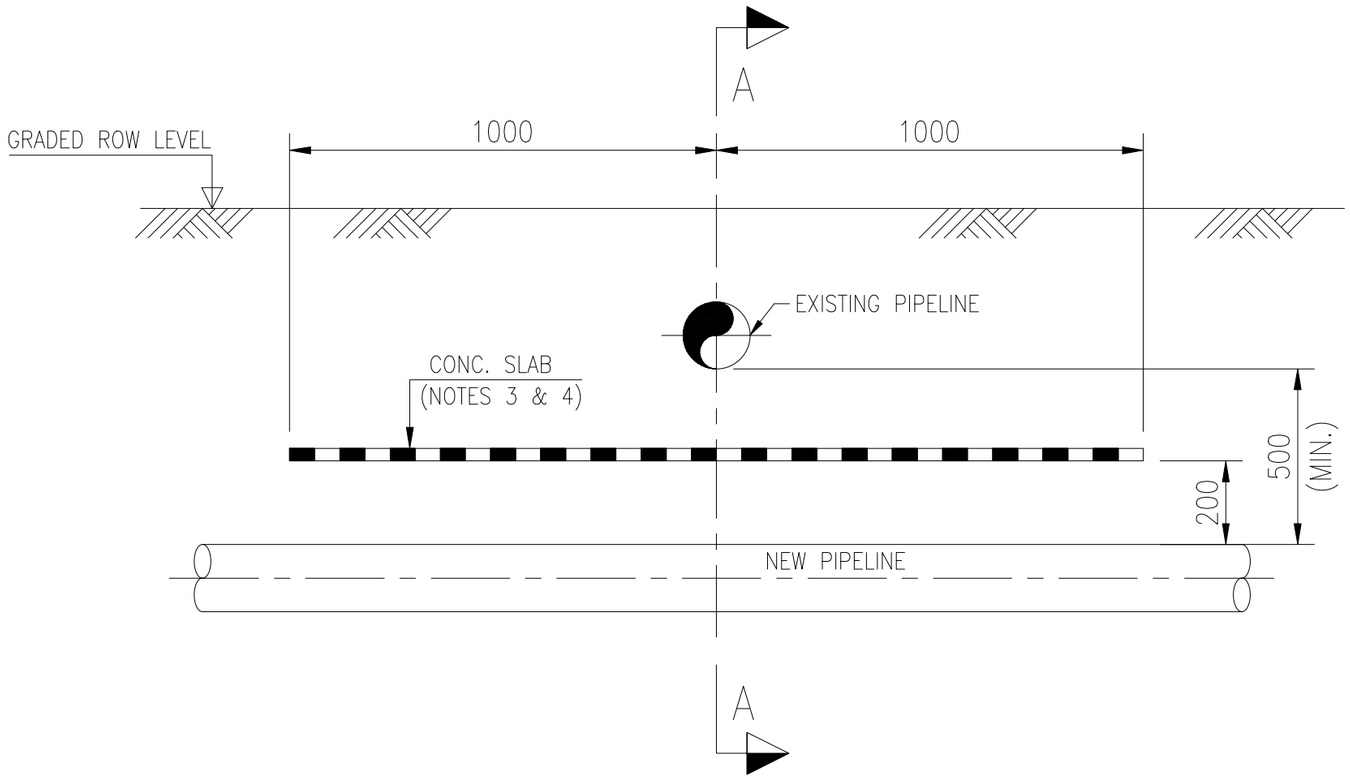
REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
00	16.01.23	ISSUED AS STD. DRAWING	PSS	MC	HK

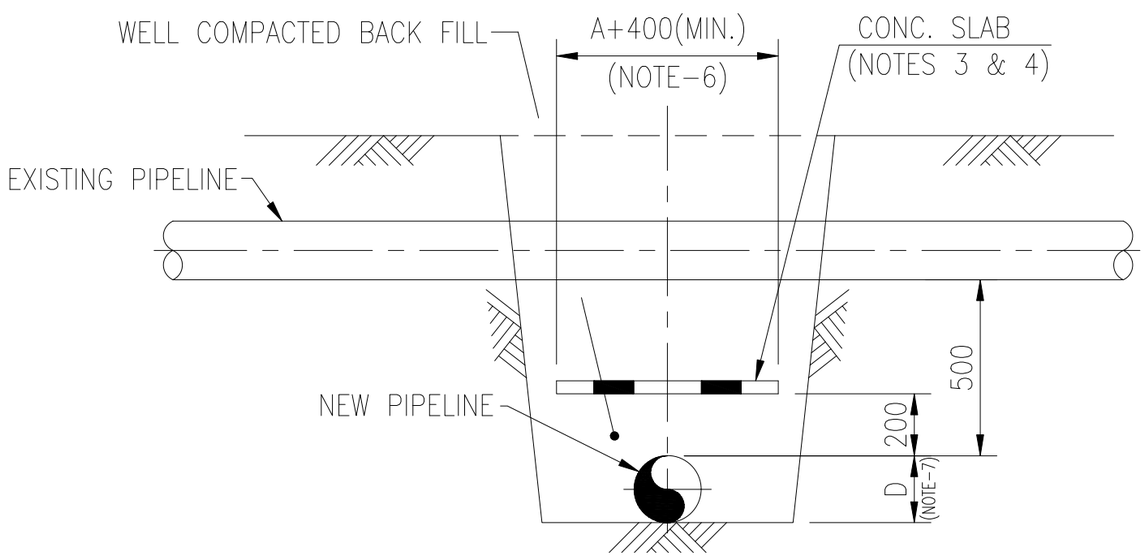
PMC: VCS QUALITY SERVICES PVT. LTD.

TITLE: TYPICAL DETAILS OF RAILWAY CROSSINGS

SCALE: N.T.S.	TOTAL NO. OF SHTS: 1 OF 1	
SIZE	JOB NO.	DRAWING NUMBER / REV.
A3	--------	VCS-00-PP-SD-2011 / 00

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Date: 2025.03.13 12:56:46 IST





SECTION A-A

REFERENCE DRAWINGS / DOCUMENTS

S.NO.	TITLE	NO.

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE.
2. A MODIFIED PIPELINE WARNING SIGN SHALL BE INSTALLED WHERE THE PIPELINE CROSSES AN EXISTING PIPELINE CARRYING HAZARDOUS FLUID.
3. CONCRETE SLAB SHALL BE AS PER VCS-00-PP-SD-2017.
4. CONC. SLAB NEED NOT TO BE PROVIDED BETWEEN AN EXISTING PIPELINE AND A NEW CASED PIPELINE.
5. SUITABLE CATHODIC PROTECTION BONDING SHALL BE PROVIDED BETWEEN CROSSING PIPELINES. IN SOME CASES THE NEW PIPELINE MAY REQUIRE ELECTRICAL ISOLATION. C.P. DETAILS ARE COVERED SEPARATELY.
6. DIMENSION `A' SHALL BE CALCULATED USING FORMULA A=(D1+D2+....Dn) + (n-1) x 500 WHERE D1, D2,.... Dn ARE THE DIAMETERS. OF PIPELINES IN mm IN THE SAME TRENCH AND 'n' IS NO. OF PIPELINES IN SAME TRENCH.
7. DIMENSIONS 'D' SHALL BE THE LARGEST DIAMETER OF THE PIPELINES LAID IN SAME TRENCH.
8. TRENCH DIMENSIONS SHALL BE IN ACCORDANCE WITH RELEVENT STANDARDS/SPECIFICATIONS.
9. APPROVAL OF THE CROSSING SHALL BE OBTAINED FROM CONCERNED AUTHORITIES.

CROSSING DETAIL

Sr.No.	CROSSING	PIPELINE ROUTE	WIDTH (M)	CONSTRUCTION METHOD

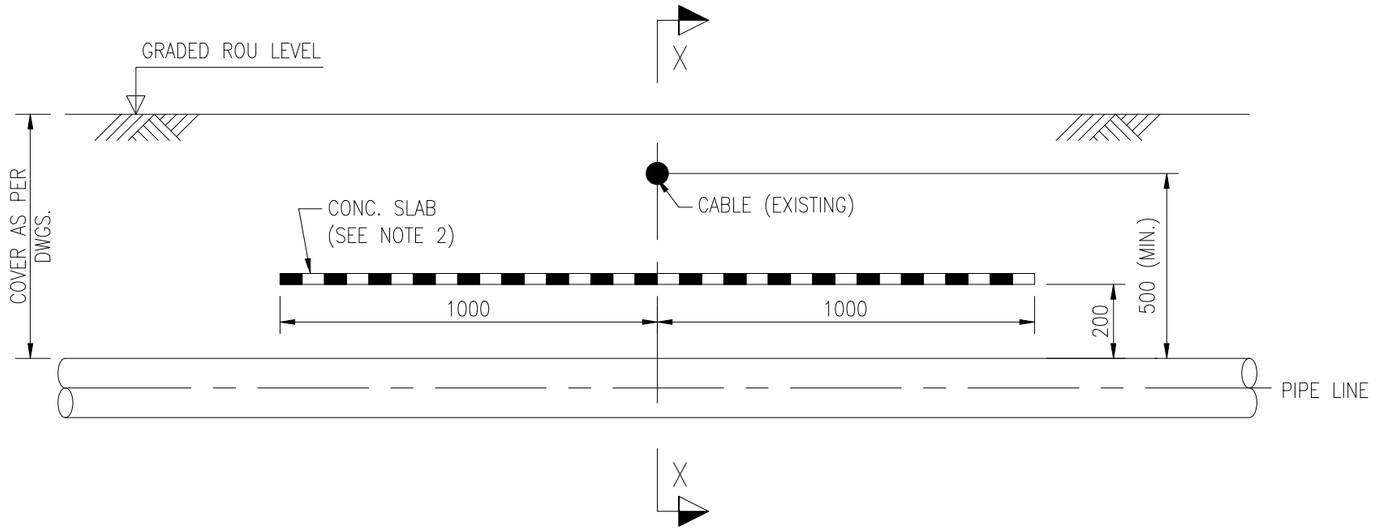
REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
00	16.01.23	ISSUED AS STD. DRAWING	PSS	MC	HK

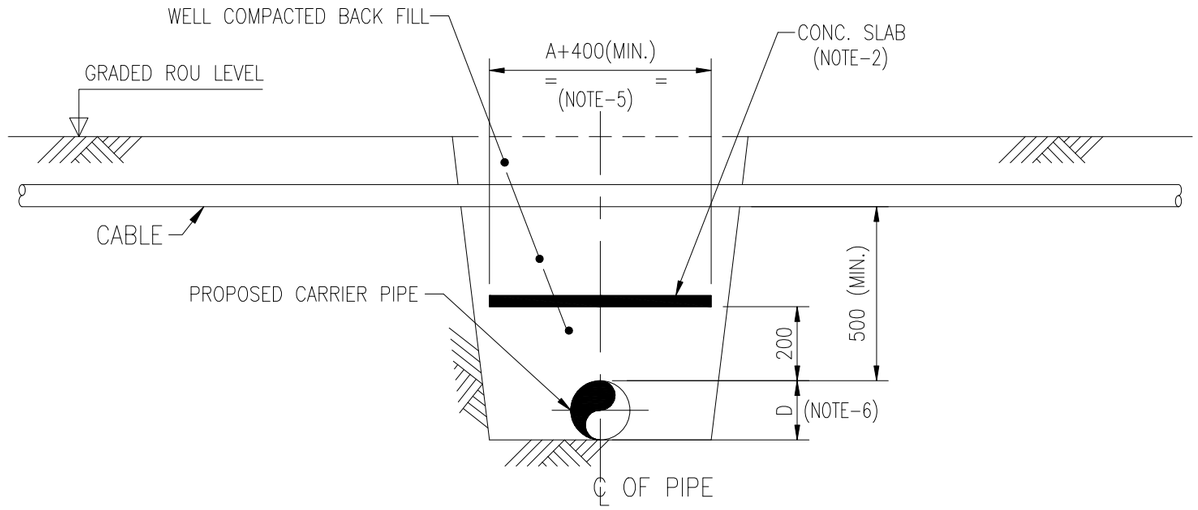
PMC: VCS QUALITY SERVICES PVT. LTD.

TITLE: TYPICAL DRAWING FOR EXISTING UNDERGROUND PIPE CROSSING

SCALE:	N.T.S.	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	--------	VCS-00-PP-SD-2012	00

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Date: 2025.03.13 12:56:46 IST





SECTION X-X

REFERENCE DRAWINGS / DOCUMENTS

S.NO.	TITLE	NO.
1.	TYPICAL DRAWING FOR CONCRETE SLAB	C221070-00-PP-SD-2017

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED.
2. REFER VCS-00-PP-SD-2017 FOR PRECAST RCC CONCRETE SLAB.
3. A MODIFIED PIPELINE WARNING SIGN SHALL BE INSTALLED CLOSE TO THE CROSSING.
4. IN CASE OF ARMOURED AC CABLE, C.P. BONDING IS TO BE PROVIDED BETWEEN PIPELINE AND CABLE ARMOUR. IN CASE OF UNARMOURED CABLE, ARRANGEMENT FOR SHIELDING (BY PROVIDING CASING ON EITHER SIDE OF THE PIPELINE OR CABLE) SHALL BE CONSIDERED.
5. DIMENSION `A' SHALL BE CALCULATED USING FORMULA A=(D1+D2+....Dn) + (n-1) x 500 WHERE D1, D2,.... Dn ARE THE DIAMETERS OF PIPELINES IN mm IN THE SAME TRENCH AND 'n' IS NO. OF PIPELINES IN SAME TRENCH.
6. DIMENSIONS 'D' SHALL BE THE LARGEST DIAMETER OF THE PIPELINES LAID IN SAME TRENCH.
7. TRENCH DIMENSIONS SHALL BE IN ACCORDANCE WITH RELEVENT STANDARDS/SPECIFICATIONS.
8. APPROVAL OF THE CROSSING SHALL BE OBTAINED FROM CONCERNED AUTHORITIES.

CROSSING DETAIL

Sr.No.	CROSSING	PIPELINE ROUTE	WIDTH (M)	CONSTRUCTION METHOD

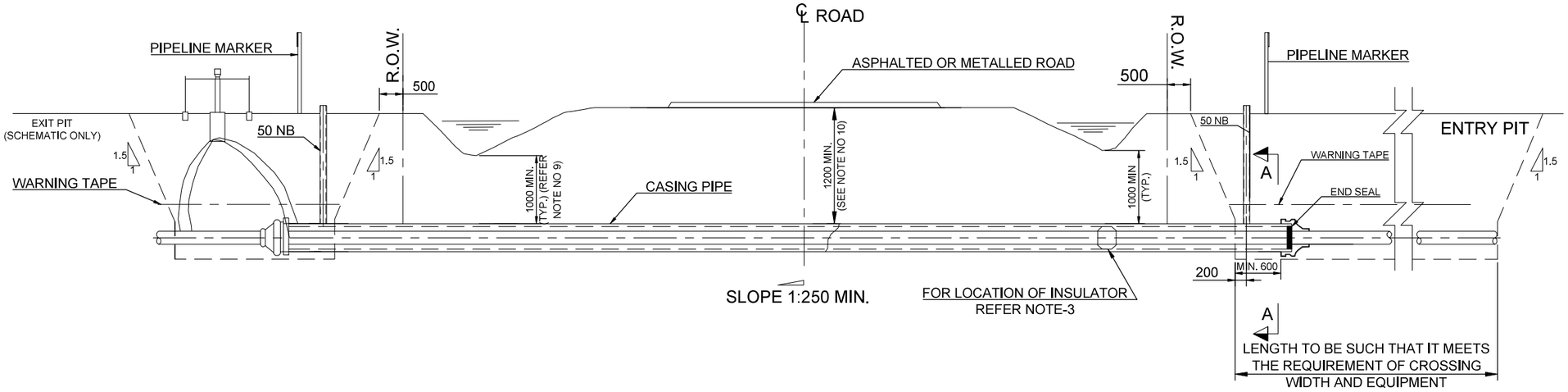
REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
00	16.01.23	ISSUED AS STD. DRAWING	PSS	MC	HK

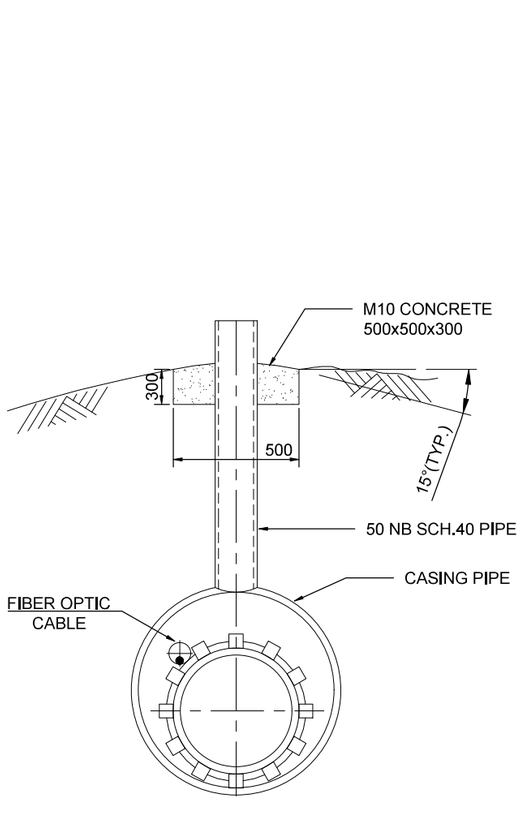
PMC: VCS QUALITY SERVICES PVT. LTD.

TITLE: TYPICAL DRAWING FOR UNDERGROUND CABLE CROSSING

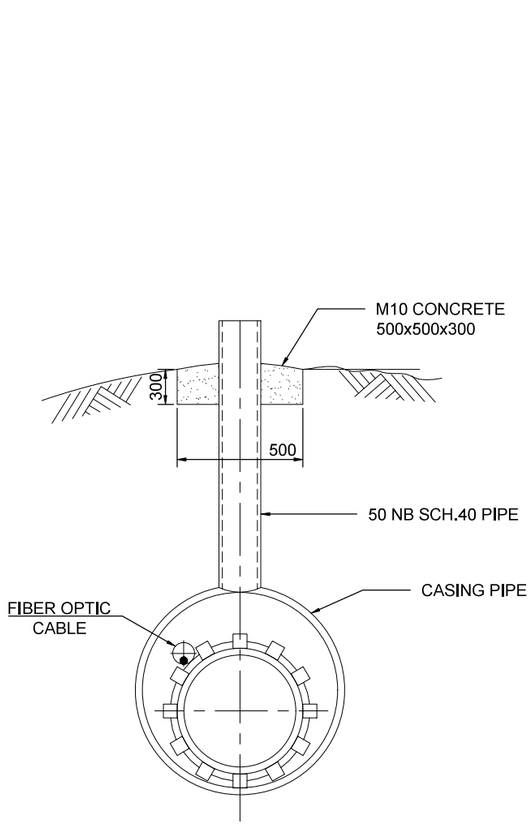
SCALE:	N.T.S.	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	--------	VCS-00-PP-SD-2013	00

Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST

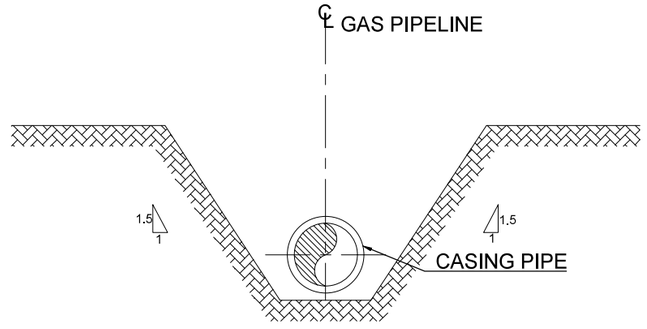




BENTONITE FILLING POINT



VENT



SECTION A-A
TYPICAL BORE PIT EXCAVATION

NOTES :

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. THE CROSSING WORKS SHALL BE EXECUTED IN ACCORDANCE WITH API RECOMMENDED PRACTICE 1102 LATEST EDITION.
3. 500mm AWAY FROM BOTH ENDS, TWO NOS. INSULATORS SHALL BE PLACED. IN BALANCE LENGTH MAX. SPACING OF INSULATORS SHALL BE 2000mm.
4. ELECTRICAL INSULATION BETWEEN THE CASING AND CARRIER PIPE SHALL BE CHECKED WITH A SUITABLE MEGGER.
5. MATERIAL OF THE CASING INSULATORS SHALL BE HDPE. END SEALS SHALL BE HEAT SHRINKABLE TYPE (MAKERAYCHEM OR EQUIVALENT), CONTRACTOR SHOULD TAKE PRIOR APPROVAL FOR MATERIAL OF CONSTRUCTION FOR END SEAL & SHALL SUBMIT MATERIAL CERTIFICATES TO OWNER / CONSULTANT FOR APPROVAL.
6. 1:250 SLOPE TO BE PROVIDED FOR DRAINING DURING INSTALLATION OF CASING PIPE.
7. CASING PIPE SHOULD EXTEND MIN. 600mm BEYOND THE BOTTOM OF THE DRAINAGE DITCH, WHICHEVER IS MORE.
8. CONTRACTOR SHOULD SUBMIT DETAILED WORK PROCEDURE ALONG WITH SKETCHED AND MATERIAL TEST CERTIFICATES FOR APPROVAL.
9. THE CROSSING SHALL BE DONE ACCORDING TO THE GOVERNING DIMENSION OUT OF THESE DEFINED DIMENSIONS, AS THESE ARE ONLY GUIDING DIMENSIONS.
10. BENTONITE FILLING PROCEDURE SHALL BE DONE AS PER OWNER / CONSULTANTS INSTRUCTIONS.
11. CROSSING MAY BE CARRIED OUT PRIOR TO MAINLINE ACTIVITIES ADDITIONAL ROU, IF REQUIRED, FOR APPROCH TO CROSSING, PIPELINE STRING, HYDROTESTING WORKING PIT FOR CROSSING TO AVOID CAVING OF SOIL SHALL BE PROCURED BY CONTRACTOR WITHOUT ANY COST IMPLICATION.
12. CATHODIC PROTECTED :- ALL CASING PIPES FOR CROSSING SHALL BE C.P. PROTECTED.
13. TEST STATION ON BOTH SIDE OF CROSSING.
14. THE LOCATION OF ENTRY AND EXIT PIT SHALL BE DECIDED AT SITE TO SUIT THE SITE REQUIREMENT.
15. AT EACH CROSSING, PIPELINE CROSSING WARNING SIGN SHALL BE INSTALLED ON EITHER SIDE OF CROSSING. THE WARNING PLATE MAY BE MOUNTED ON THE VENT / DRAIN OFF PIPE.
16. ALL CARRIER PIPELINE JOINTS SHALL BE RADIO GRAPHED.
17. PIPELINE SECTION SHALL BE PRETESTED HYDROSTATICALLY SEPARATELY FROM THE MAIN LINE TESTING WHEN REQUIRED BY CONCERNED AUTHORITIES OR AS DIRECTED BY CLIENT.

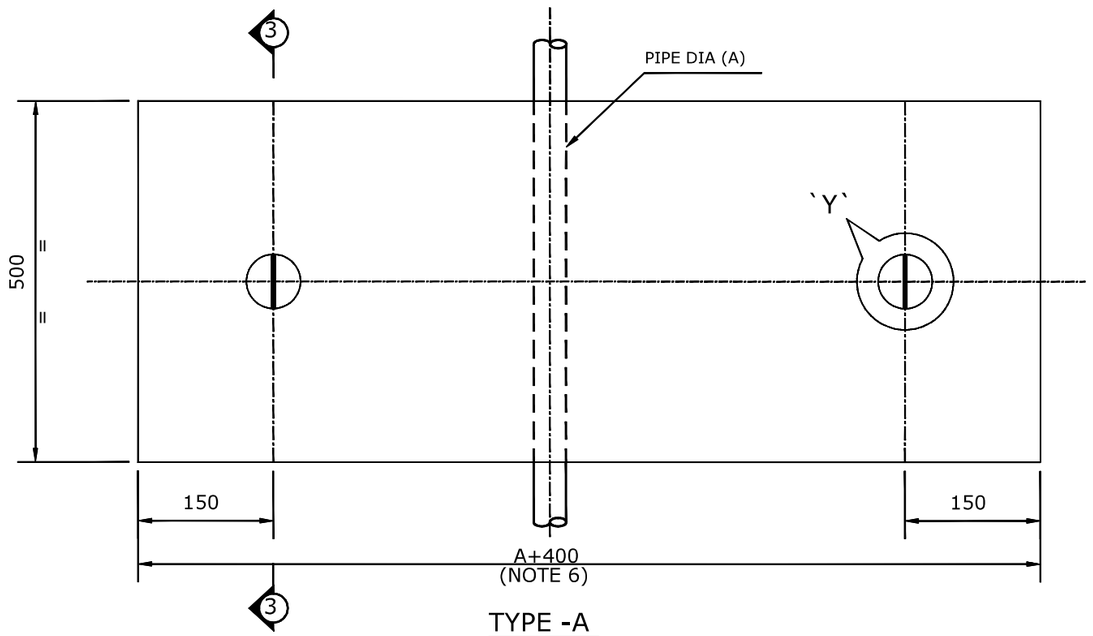
REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
00	13.02.23	ISSUED AS STANDARD DRAWING	PSS	MC	HK

PMC: VCS QUALITY SERVICES PVT. LTD.

TITLE: TYPICAL ROAD CASED CROSSING (B+C)

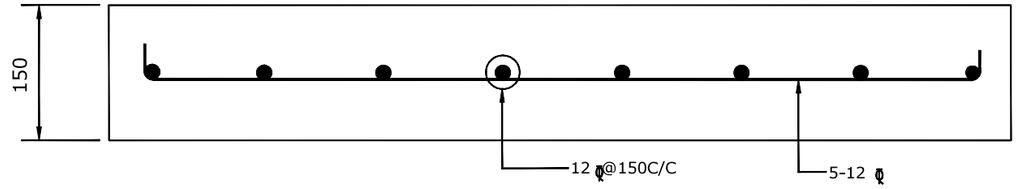
SCALE: N.T.S.	TOTAL NO. OF SHTS: 1 OF 1	
SIZE	JOB NO.	DRAWING NUMBER / REV.
A3	--------	VCS-00-PP-SD-2014 / 00

Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST

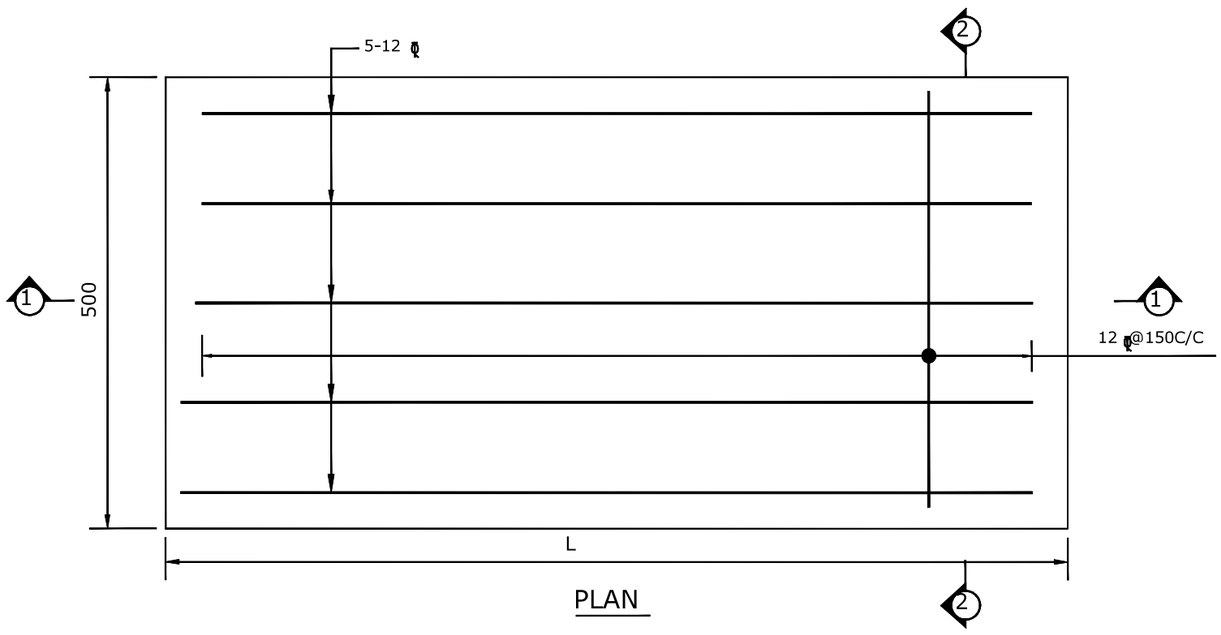


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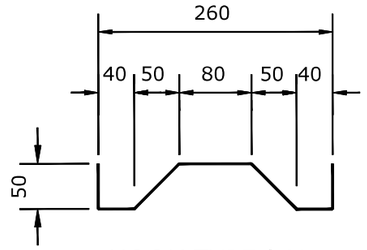
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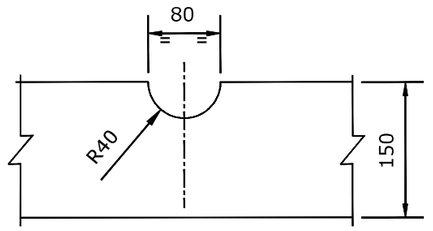
SECTION 1-1



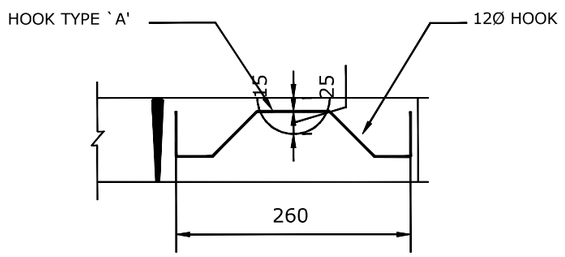
PLAN



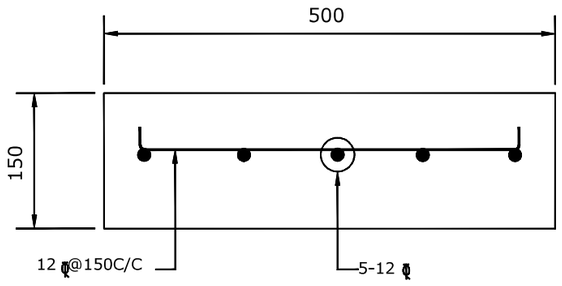
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DETAIL- `Y`
(TYP.)



SECTION 3-3



SECTION 2-2

CROSSING DETAIL

Sr.No.	CROSSING	PIPELINE ROUTE	WIDTH (M)	CONSTRUCTION METHOD

REFERENCE DRAWINGS / DOCUMENTS

S.NO.	TITLE	NO.

NOTES:-

1. ALL DIMENSIONS ARE IN MILLIMETERS & LEVELS ARE IN METRES.
2. GRADE OF CONC MIX SHALL BE M-25 CONFORMING TO IS-456.
3. REINF SHALL BE HYSD BARS OF GRADE Fe 500 CONFORMING TO IS- 1786.
4. THIS STANDARD SHALL NOT BE USED FOR VEHICULAR MOVEMENT AREAS
5. TOTAL PROTECTION LENGTH ALONG THE PROPOSED PIPELINE SHALL BE AS PER SCOPE OF CONTRACT.
6. DIMENSION "A" SHALL BE CALCULATED USING FORMULA A=(D1+D2Dn)+(n-1)X 500 WHERE D1,D2, DIAMETERS OF PIPELINES IN mm AND "n" IS NO. OF PIPELINES IN THE SAME TRENCH.

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
00	16,01,23	ISSUED AS STD. DRAWING	PSS	MC	HK

PMC: VCS QUALITY SERVICES PVT. LTD.

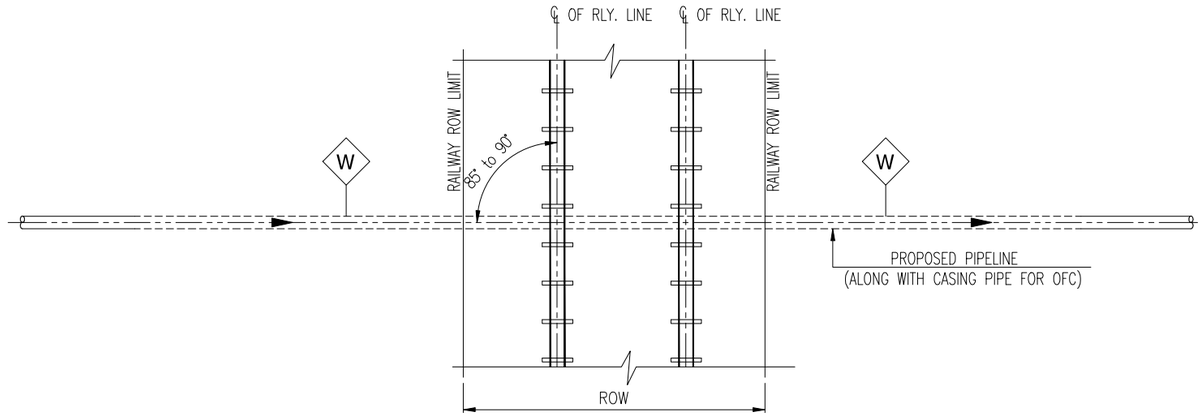
TITLE: TYPICAL DRAWING FOR CONCRETE SLAB

SCALE:	N.T.S.	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	--------	VCS-00-PP-SD-2017	00

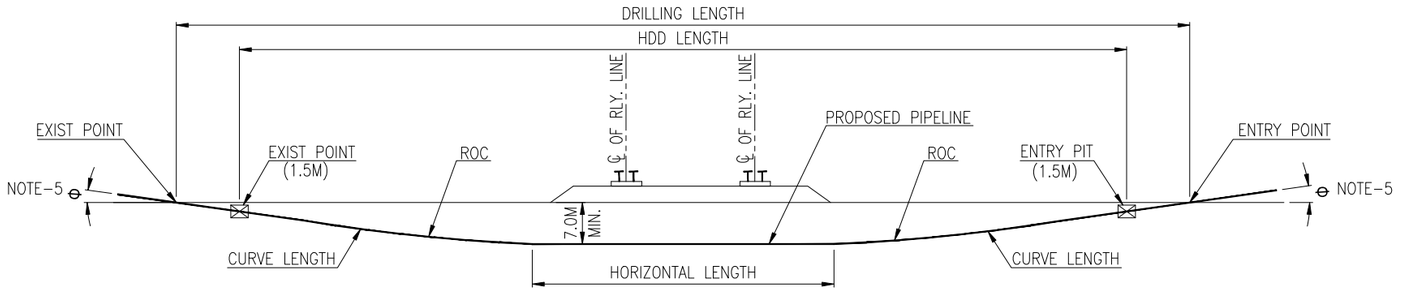
Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST

RAILWAY CROSSING DRAWING

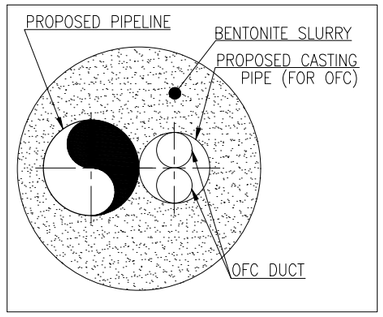
(BY HDD – TRENCHLESS TECHNIQUE)



PLAN



ELEVATION



REFERENCE DRAWINGS / DOCUMENTS

S.NO.	TITLE	NO.

NOTES:-

1. ALL DIMENSION ARE IN METERS.
2. ENTRY / EXIT SIDE SHALL DEPEND ON SITE CONDITIONS.
3. MINIMUM DEPTH OF COVER SHALL BE 7.0M IN RAILWAY ROW.
4. HDD WITH BUNDLE PULLING.
5. ENTRY & EXIST ANGLE TO BE DECIDED AS PER SITE CONDITION.
6. THE NUMBER OF WARNING MARKER SHALL BE 2 NOS. FOR ALL RAILWAY CROSSING.
7. REFER API RP 1102 FOR OTHER DESIGN AND INSTALLATION REQUIREMENTS.
8. CONTRACTOR SHALL VERIFY THE ACTUAL DIMENSION WITH RESPECT TO SURVEY DETAIL FOR INDIVIDUAL CROSSING ENGINEER IN CHARGE APPROVAL BEFORE COMMENCEMENT OF CONSTRUCTION.
9. ALL PIPELINE JOINTS SHALL BE RADIOGRAPHED.
10. PIPELINE SECTION SHALL BE RADIOGRAPHED HYDROSTATICALLY SEPARATELY FROM THE MAIN LINE TESTING AS PER THE DIRECTION OF CLIENT.

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
00	16.01.23	ISSUED AS STD. DRAWING	PSS	MC	HK

PMC:

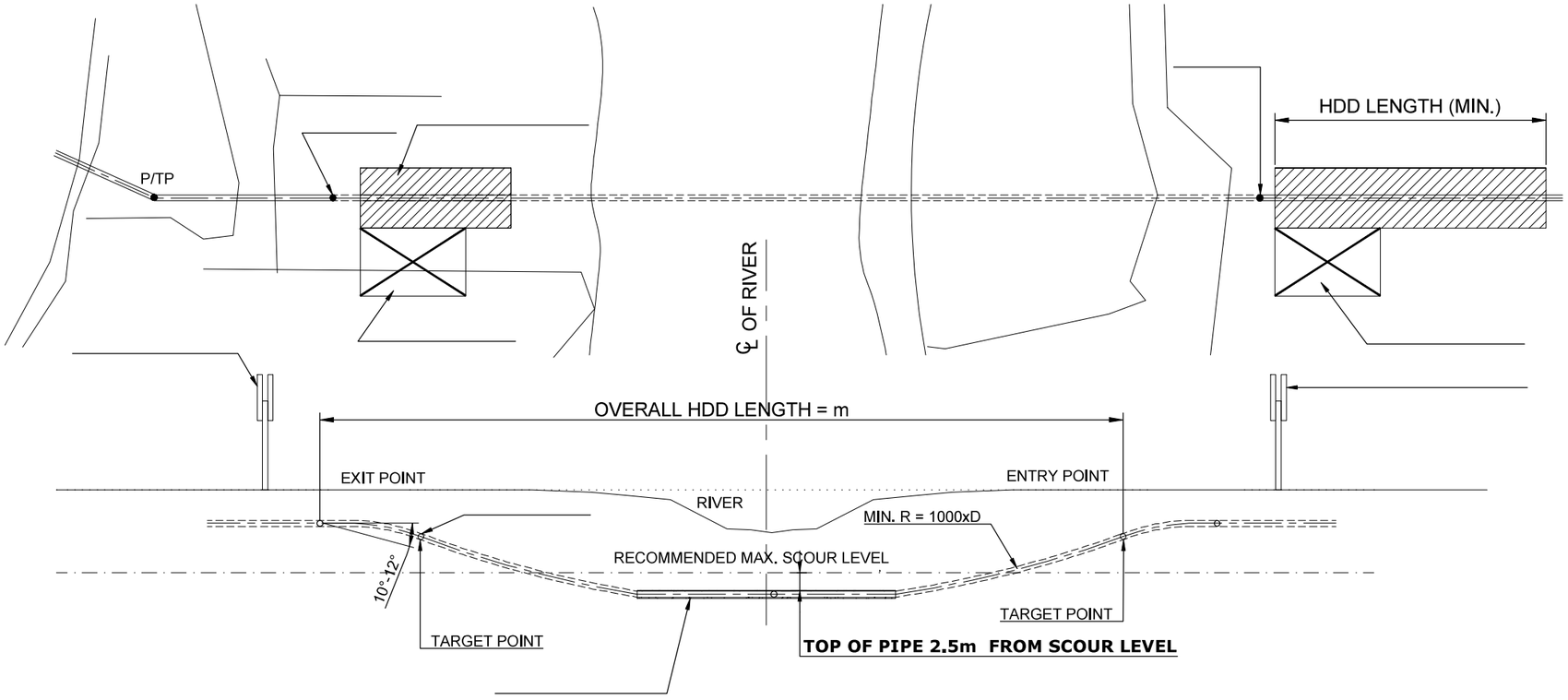
VCS QUALITY SERVICES PVT. LTD.

TITLE:

TYPICAL DETAILS OF RAILWAY CROSSINGS
BY HDD METHOD

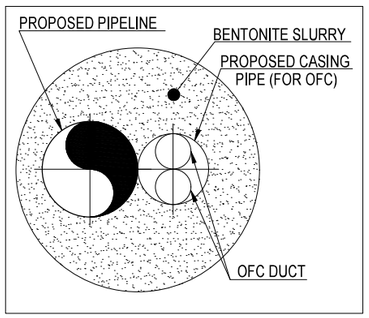
SCALE:	N.T.S.	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	--------	VCS-00-PP-SD-2019	00

Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST



NOTES :

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. THE MINIMUM TEMPORARY WORKING SPACE ALLOCATED TO CONTRACTOR BY THE OWNER SHALL BE 75Mx75M AT THE DRILLING SITE & 50Mx50M AT THE OPPOSITE SIDE.
3. IF THE DRILLING POINTS (ENTRY/EXIT) ARE LOCATED BELOW THE HIGHEST WATER LEVEL THE CONTRACTOR SHALL PROTECT THE DRILLING POINTS BY CREATING A DYKE 50M MINIMUM ABOVE THE HIGHEST RECORDED WATER LEVEL. FOR PIPELINE WITH NB >500mm THE CONTRACTOR SHALL SPECIFY THE BALLASTING METHOD HE INTENDS TO USE TO LIMIT THE FRICTION DRILLING PULL BACK.
4. PRIOR TO HDD THE PROFILE/DESIGN SHALL BE SENT TO OWNER/OWNER'S REPRESENTATIVE FOR THERE APPROVAL.
5. ADDITIONAL ROU, IF REQUIRED, FOR WORKING AND EXCAVATION OF CROSSING TO AVOID CAVING OF SOIL SHALL BE PROCURED BY CONTRACTOR WITHOUT ANY COST IMPLICATION.



REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
00	13.02.23	ISSUED AS STANDARD DRAWING	PSS	MC	HK

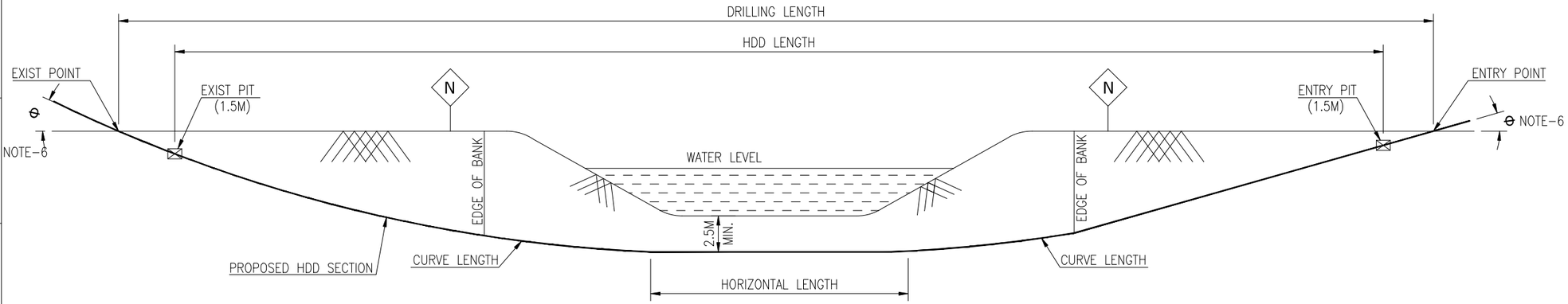
PMC: VCS QUALITY SERVICES PVT. LTD.

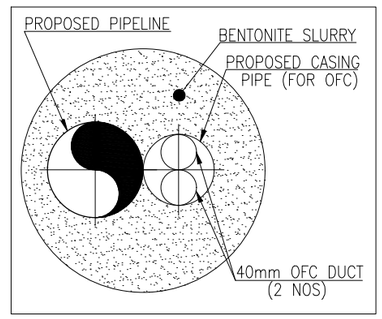
TITLE: "TYPICAL HDD RIVER CROSSING SHOWING MAX. SCOUR LEVEL & MIN. COVER FOR PIPE

SCALE: N.T.S.		TOTAL NO. OF SHTS: 1 OF 1	
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	--------	VCS-00-PP-SD-2020	00

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Date: 2025.03.13 12:56:46 IST

TYPICAL DETAIL FOR RIVER CROSSING BY HDD METHOD





REFERENCE DRAWINGS / DOCUMENTS

S.NO.	TITLE	NO.

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. THE MINIMUM COVER OVER SHALL BE USED ONLY WITH PRIOR APPROVAL OF COMPANY.
   (a) DEPTH OF COVER SHALL BE MINIMUM 2.5 M FROM SCOUR LEVEL
3. THE LOCATION OF CROSSING SHALL BE IN A LONG STRAIGHT STRETCH OF THE STREAM IF POSSIBLE.
4. WIDTH OF CROSSING SHALL BE THAT CORRESPONDING TO THE HIGHEST WATER LEVEL. THE HIGHEST WATER LEVEL SHALL BE DETERMIND BY CONTRACTOR BASED ON THE FOLLOWING.
   (a) BANK CONDITION VIS-A-VIS EROSION ETC.
   (b) EVIDENCE OF EXTIRINCTION OF VEGETATION ALONG BANKS.
   (c) DISCUSSIONS WITH LOCAL PEOPLE.
   (D) HISTORICAL RECORDS (TO THE EXEUNT AVAILABLE).
5. THE NUMBER OF WARNING MARKER SHALL BE
   (a) 1(ONE) FOR CROSSING LESS THAN 15M WIDTH AT UPSTREAM BANK.
   (b) 2(TWO) FOR CROSSING ABOVE 15M WIDTH.
6. ENTRY & EXIST ANGLE TO BE DECIDED AS PER SITE CONDITION.
7. PIPELINE SECTION SHALL BE RADIOGRAPHED HYDROSTATICALLY SEPARATELY FROM THE MAIN LINE TESTING AS PER THE DIRECTION OF CLIENT.
8. ALL PIPELINE JOINTS SHALL BE RADIOGRAPHED.

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
00	16,01,23	ISSUED AS STD. DRAWING	PSS	MC	HK

PMC:

VCS QUALITY SERVICES PVT. LTD.

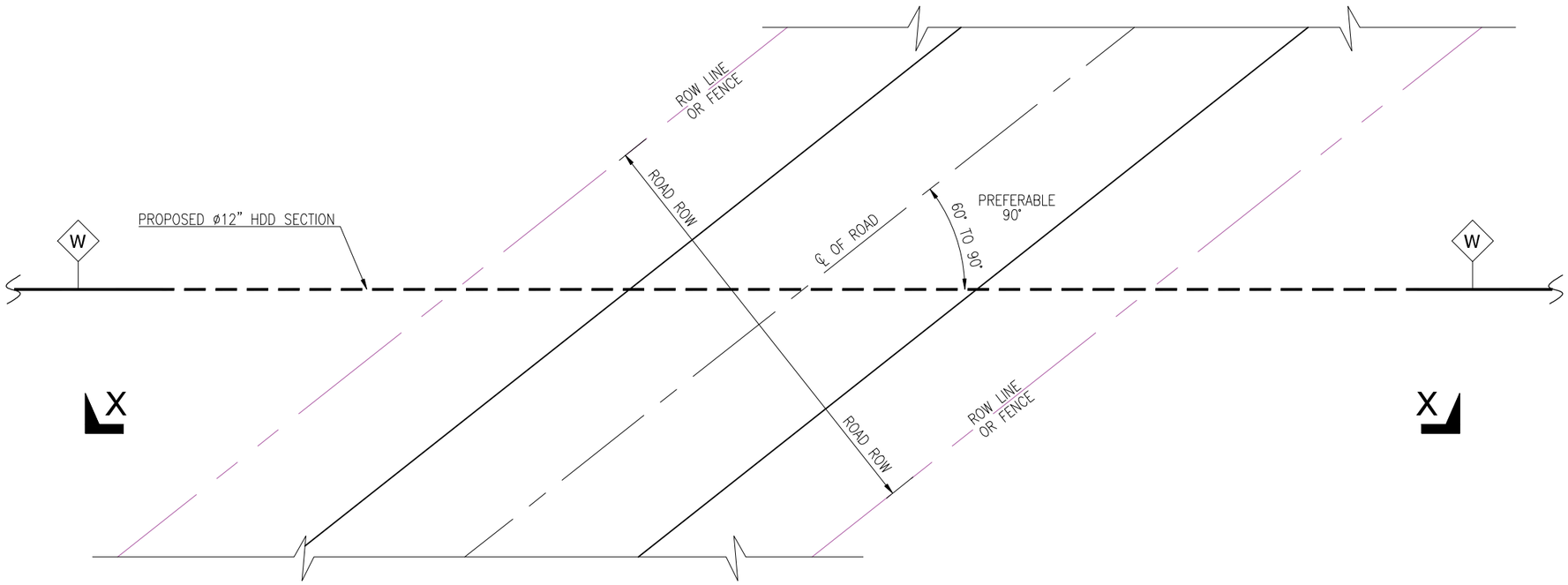
TITLE:

TYPICAL DETAIL FOR RIVER CROSSING BY HDD METHOD

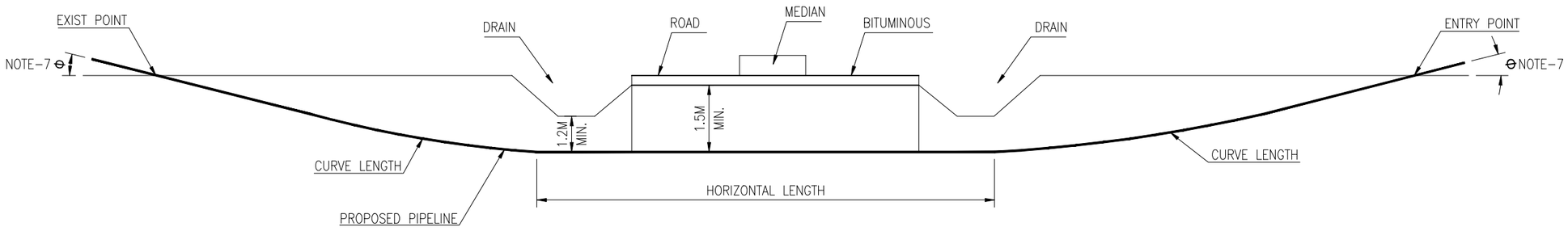
SCALE:	N.T.S.	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	--------	VCS-00-PP-SD-2020	00

Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST

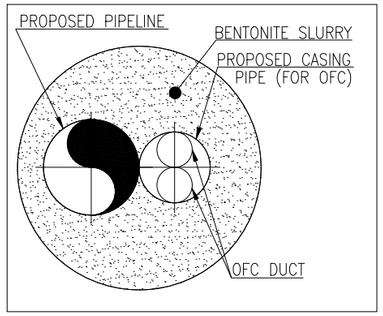
TYPICAL PIPELINE ROAD AND HIGHWAY CROSSING BY HDD METHOD



PLAN



VIEW X-X



REFERENCE DRAWINGS / DOCUMENTS

S.NO.	TITLE	NO.

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. ROAD HIGHWAY CROSSING SHALL BE RESTORED TO ORIGINAL CONDITION TO THE ENTIRE SATISFACTION OF OWNER AND CONCERNED AUTHORITIES HAVING JURISDICTION.
3. REFER API RP 1102 FOR OTHER DESIGN AND INSTALLATION REQUIREMENTS.
4. ANGLE OF INTERSECTION BETWEEN PIPELINE AND THE ROAD / HIGHWAY SHALL BE AS CLOSE TO 90° AS POSSIBLE.
5. CONTRACTOR SHALL VERIFY THE ACTUAL DIMENSION WITH RESPECT TO SURVEY DETAIL FOR INDIVIDUAL CROSSING ENGINEER IN CHARGE APPROVAL BEFORE COMMENCEMENT OF CONSTRUCTION.
6. ALL PIPELINE JOINTS SHALL BE RADIOGRAPHED.
7. ENTRY & EXIST ANGLE TO BE DECIDED AS PER SITE CONDITION.
9. PIPELINE SECTION SHALL BE RADIOGRAPHED HYDROSTATICALLY SEPARATELY FROM THE MAIN LINE TESTING AS PER THE DIRECTION OF CLIENT.
10. THE NUMBER OF WARNING MARKER SHALL BE 2 NOS. FOR NATIONAL HIGHWAY AND 1 NO FOR OTHER ROAD.

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
00	16.01.23	ISSUED AS STD. DRAWING	PSS	MC	HK

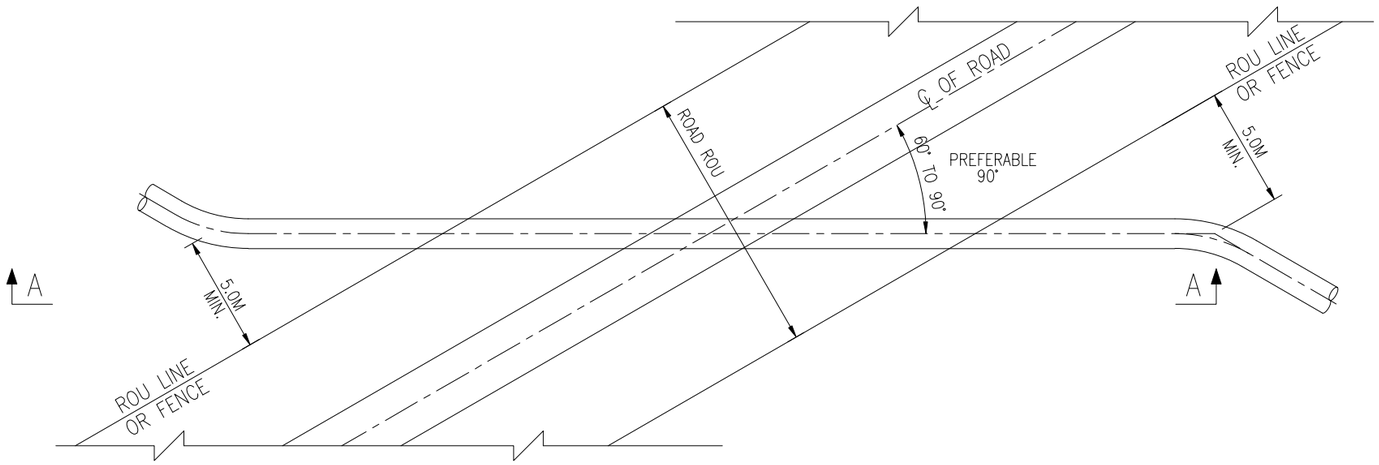
PMC: VCS QUALITY SERVICES PVT. LTD.

TITLE: TYPICAL DETAIL FOR PIPELINE ROAD AND HIGHWAY CROSSING BY HDD METHOD

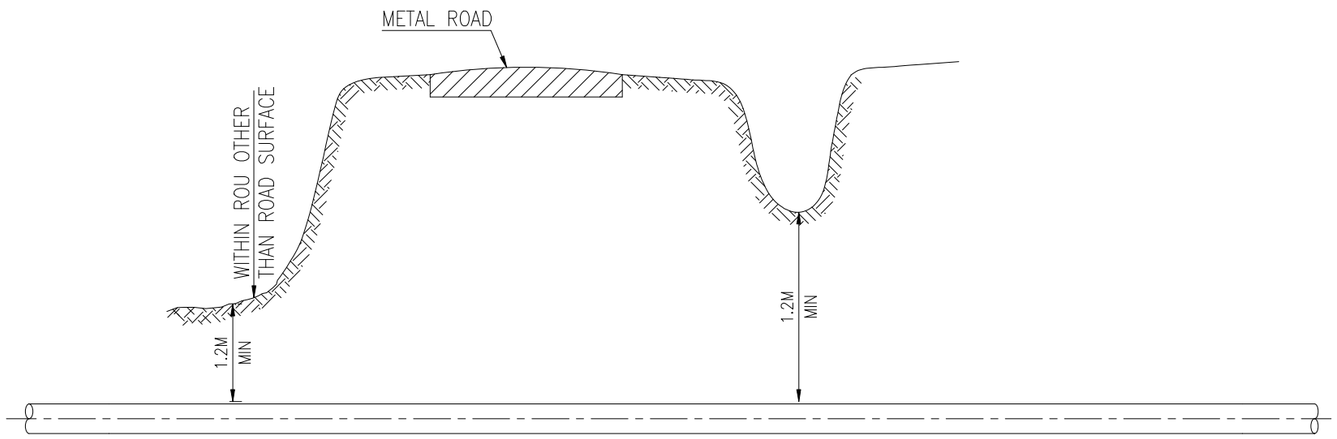
SCALE:	N.T.S.	TOTAL NO. OF SHTS:	1 OF 1	
SIZE	JOB NO.	DRAWING NUMBER		REV.
A3	--------	VCS-00-PP-SD-2021		00

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Date: 2025.03.13 12:56:46 IST

TYPICAL DETAIL FOR MINOR ROAD
PIPELINE CROSSING BY OPEN CUT METHOD



PLAN



VIEW B-B

REFERENCE DRAWINGS / DOCUMENTS

S.NO.	TITLE	NO.

NOTES:-

1. ALL DIMENSIONS ARE IN MM, UNLESS OTHERWISE SPECIFIED.
2. ROAD CROSSING SHALL BE RESTORED TO ORIGINAL CONDITION TO THE ENTIRE SATISFACTION OF COMPANY AND CONCERNED AUTHORITES HAVING JURISDICTION.
3. ANGLE OF INTERSECTION BETWEEN PIPELINE AND THE ROAD/HIGHWAY SHALL BE AS CLOSE TO 90° AS POSSIBLE BUT IN NO CASE < 60°.
4. AT EACH CROSSING, PIPELINE CROSSING WARNING SIGN SHALL BE INSTALLED.
5. CONTRACTOR SHALL VERIFY THE ACTUAL DIMENSIONS WITH RESPECT TO SURVEY DETAILS OF EACH CROSSING AND PREPARE DETAILED DRAWINGS FOR INDIVIDUAL CROSSING FOR COMPANY/CONCERNED AUTHORITIES' APPROVAL BEFORE COMMENCEMENT OF CONSTRUCTION.

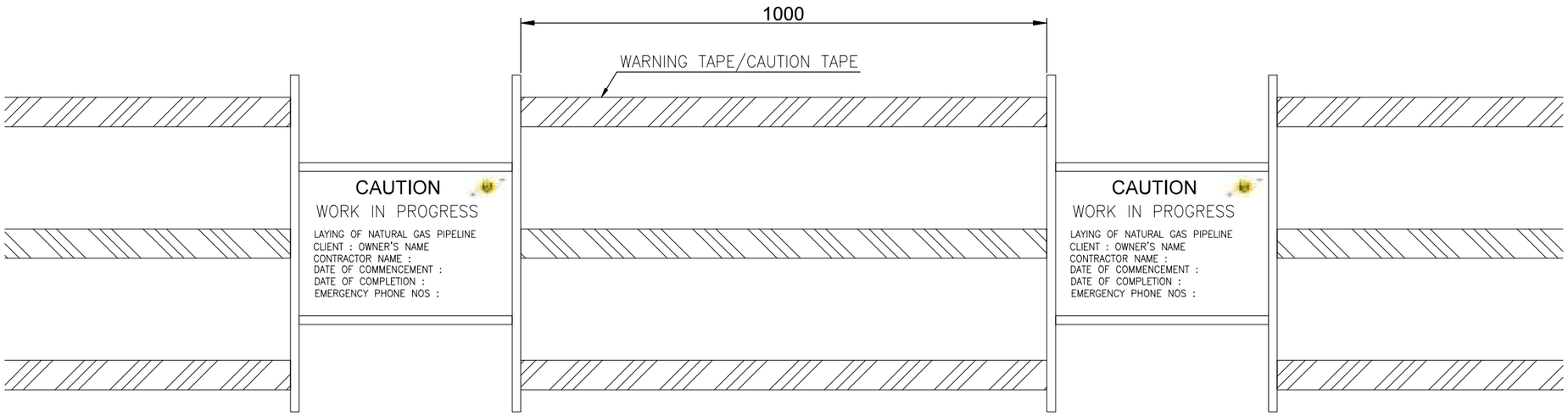
REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
00	16.01.23	ISSUED AS STD. DRAWING	PSS	MC	HK

PMC: VCS QUALITY SERVICES PVT. LTD.

TITLE: TYPICAL DETAIL FOR MINOR ROAD PIPELINE CROSSING BY OPEN CUT METHOD

SCALE:	N.T.S.	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	--------	VCS-00-PP-SD-2022	00

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Date: 2025.03.13 12:56:46 IST



SCHEMATIC LAYOUT OF CAUTION BOARDS AND BARRICADDING

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. TO THE CAUTION BOARDS REFER DRAWING NO. VCS-00-PP-SD-2026.

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
00	13.02.23	ISSUED AS STANDARD DRAWING	PSS	MC	HK

PMC:

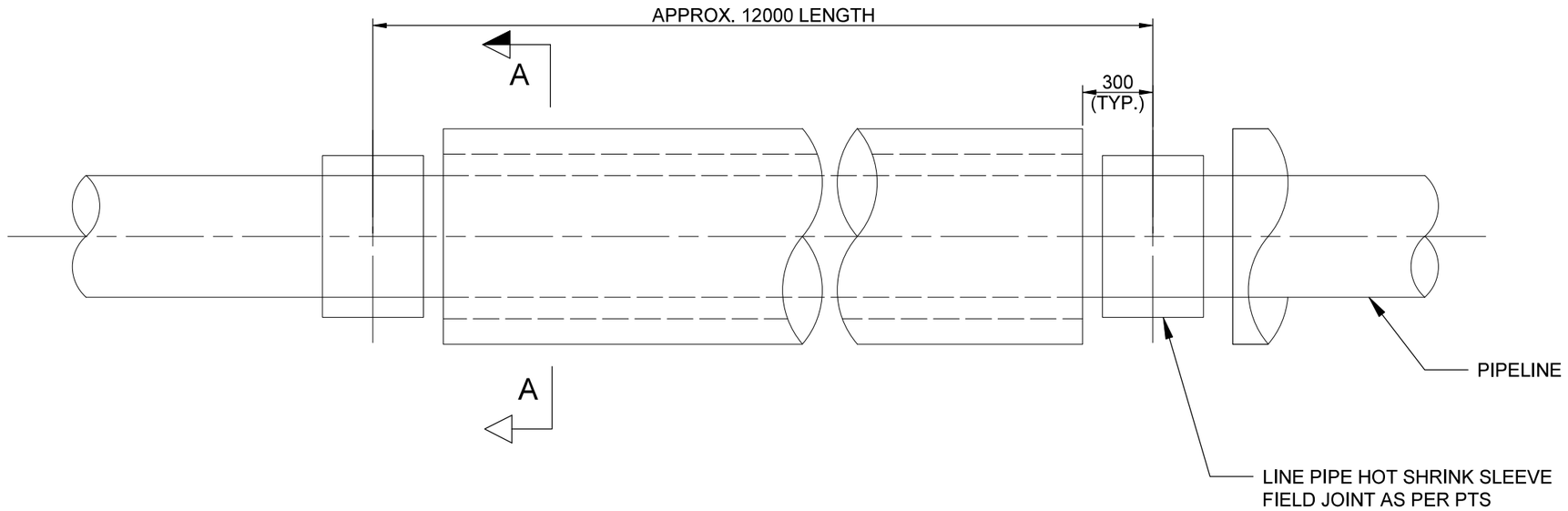
VCS QUALITY SERVICES PVT. LTD.

TITLE:

TYPICAL DETAIL FOR BARRICADING

SCALE: N.T.S.	TOTAL NO. OF SHTS: 1 OF 1	
SIZE	JOB NO.	DRAWING NUMBER / REV.
A3	--------	VCS-00-PP-SD-2023 / 00

Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST

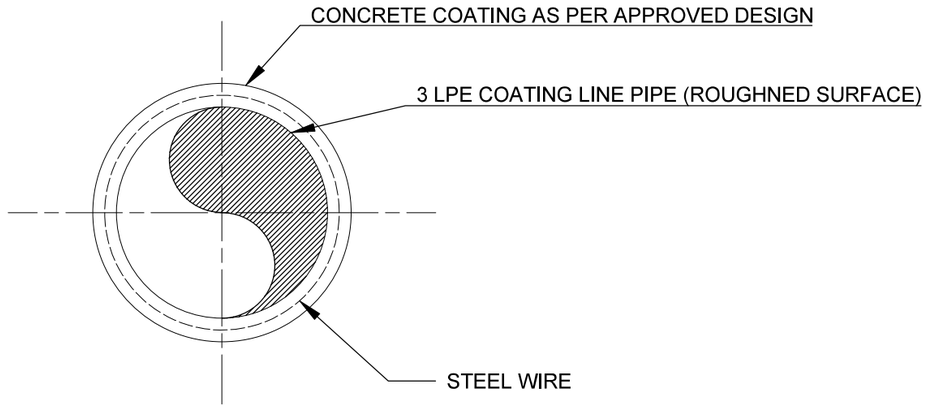


NOTES :

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. REINFORCEMENT SHALL CONSIST OF WELDED STEEL WIRE FABRIC MANUFACTURED IN SLOT SHEETS OR IN ROLLS (RIBBON MESH) AND SHALL CONFORM TO ASTM A-135. WIRESH SHALL CONFORM TO ASTM A-82.
3. GALVANIZING OF STEEL WIRE SHALL BE AS PER ASTM.
4. THICKNESS OF STEEL WIRE SIZE SHALL BE 2.4mm AND SPACING OF WIRE SHALL BE 50mm x 100mm.
5. ANTIBUOYANCY CALCULATION BE SUBMITTED FOR APPROVAL.
6. MINIMUM THICKNESS OF CONCRETE COATING SHALL BE 75mm.
7. CONCRETE COATING SHALL BE M20 USED.

DETAILS OF PIPELINE WITH CONCRETE COATING

REFER TO ALIGNMENT SHEET FOR LOCATION AND LENGTH OF CONC. COATED PIPE



SECTION A-A

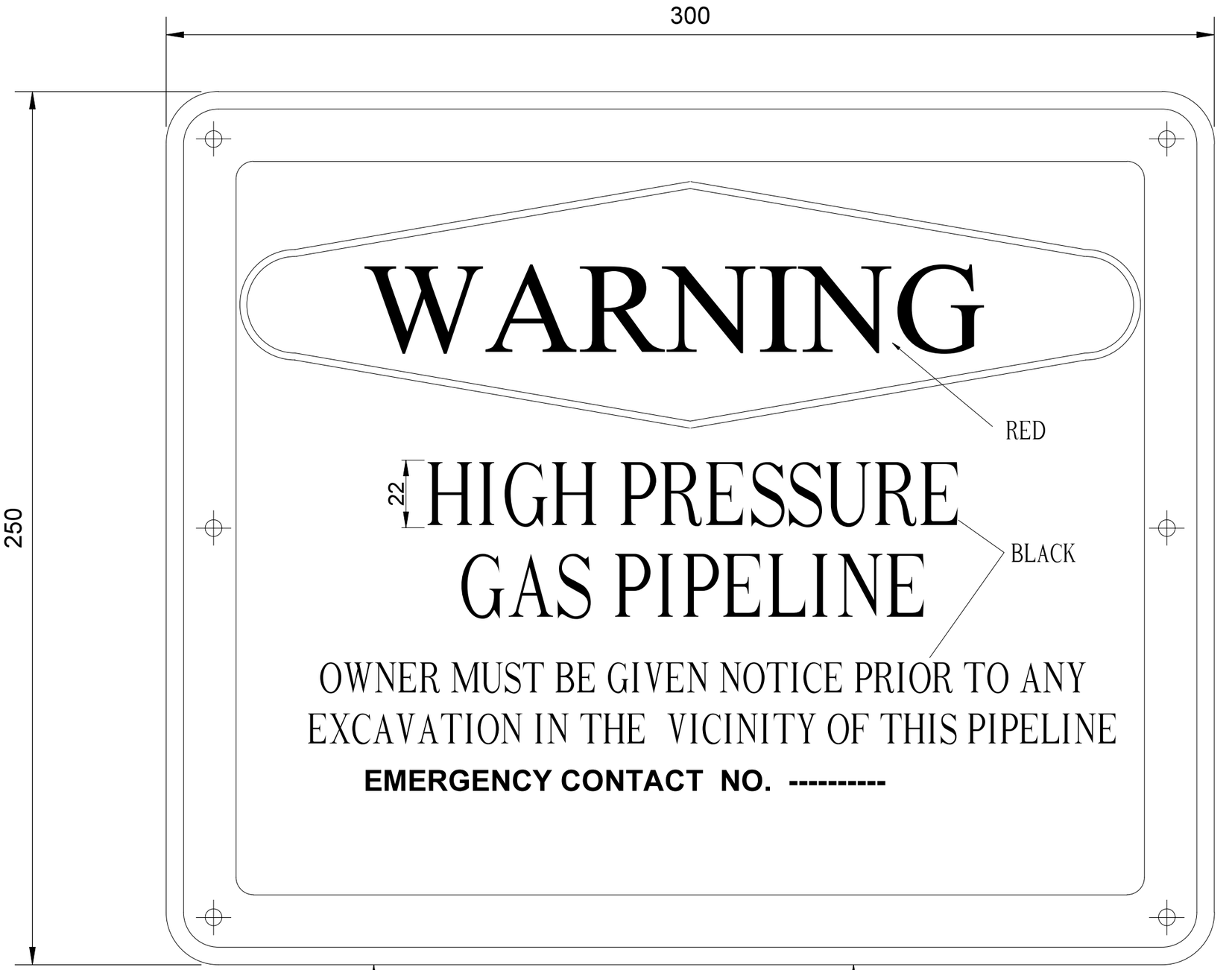
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Date: 2025.03.13 12:56:46 IST

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
00	13.02.23	ISSUED AS STANDARD DRAWING	PSS	MC	HK

PMC: VCS QUALITY SERVICES PVT. LTD.

TITLE: TYPICAL CONCRETE COATED FOR MECHANICAL PROTECTION

SCALE: N.T.S.	TOTAL NO. OF SHTS: 1 OF 1	
SIZE	JOB NO.	DRAWING NUMBER / REV.
A3	--------	VCS-00-PP-SD-2024 / 00



NOTES:

1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED.
2. FOLLOW WRITTEN DIMENSIONS ONLY. DO NOT SCALE THE DRAWING.

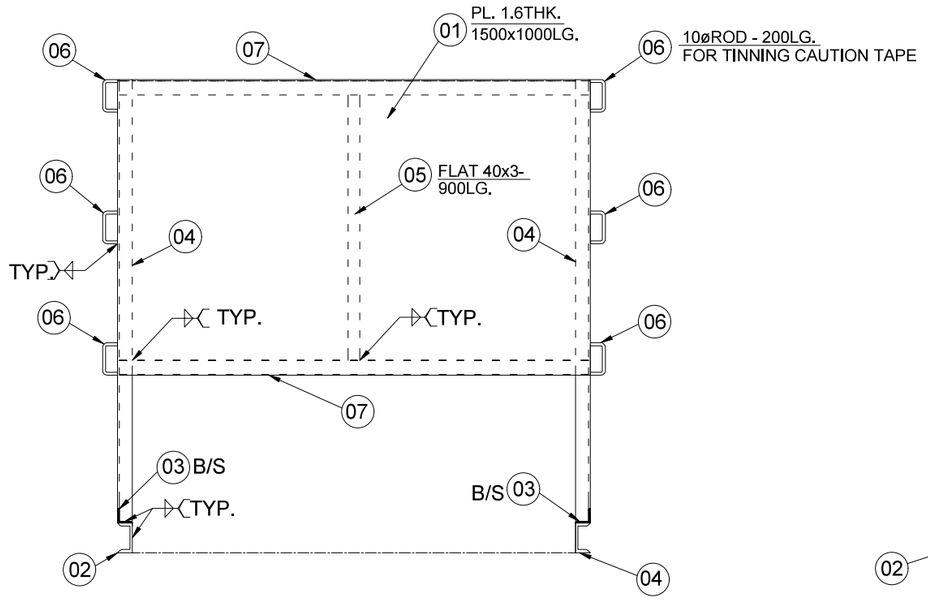
REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
00	13.02.23	ISSUED AS STANDARD DRAWING	PSS	MC	HK

PMC: VCS QUALITY SERVICES PVT. LTD.

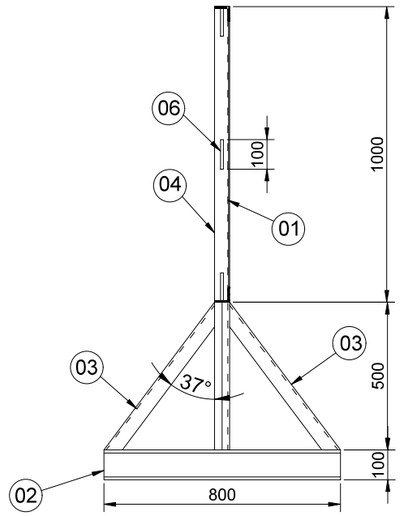
TITLE: TYPICAL DETAIL FOR PLATE MARKER

SCALE:	N.T.S.	TOTAL NO. OF SHTS:	1 OF 1	
SIZE	JOB NO.	DRAWING NUMBER		REV.
A3	--------	VCS-00-PP-SD-2025		00

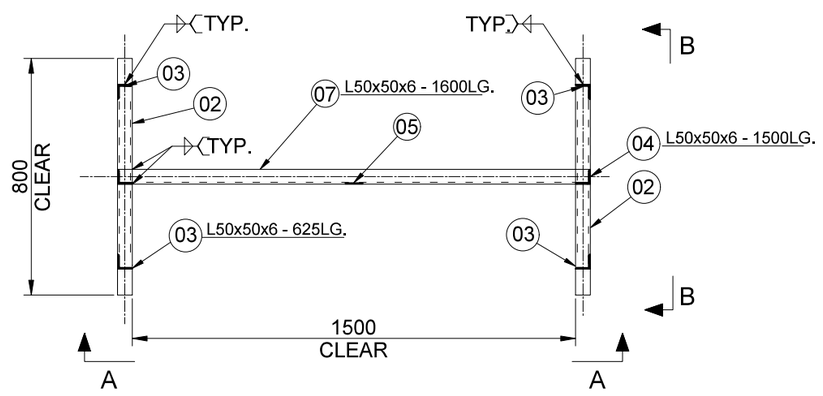
Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST



ELEVATION A-A



ELEVATION B-B



PLAN VIEW

CAUTION

TO BE PRINTED ON ITEM NO. 01

NOTES :

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. FOLLOW WRITTEN DIMENSIONS ONLY. DO NOT SCALE THE DRAWING.

BILL OF MATERIAL

ITEM Mkd.	SECTION	Width	Length	Item Qty.	Weight	Total Weight
				(All Marks)	Kgs./M,M2	In Kgs.
1.	PL. 1.6 THK.	1600	1000	1	12.56	20.10
2.	ISMC 100	--	800	2	9.20	14.72
3.	L50x50x6	--	625	4	4.50	11.25
4.	L50x50x6	--	1500	2	4.50	13.50
5.	Flat 3 Thk.	900	40	1	0.94	0.03
6.	10ø Rod	--	20	6	0.62	0.74
7.	L50x50x6	--	1600	2	4.50	14.40
				Grand Total (KG)		74.74

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
00	13.02.23	ISSUED AS STANDARD DRAWING	PSS	MC	HK

PMC:

VCS QUALITY SERVICES PVT. LTD.

TITLE:

TYPICAL DETAIL FOR CAUTION BOARD

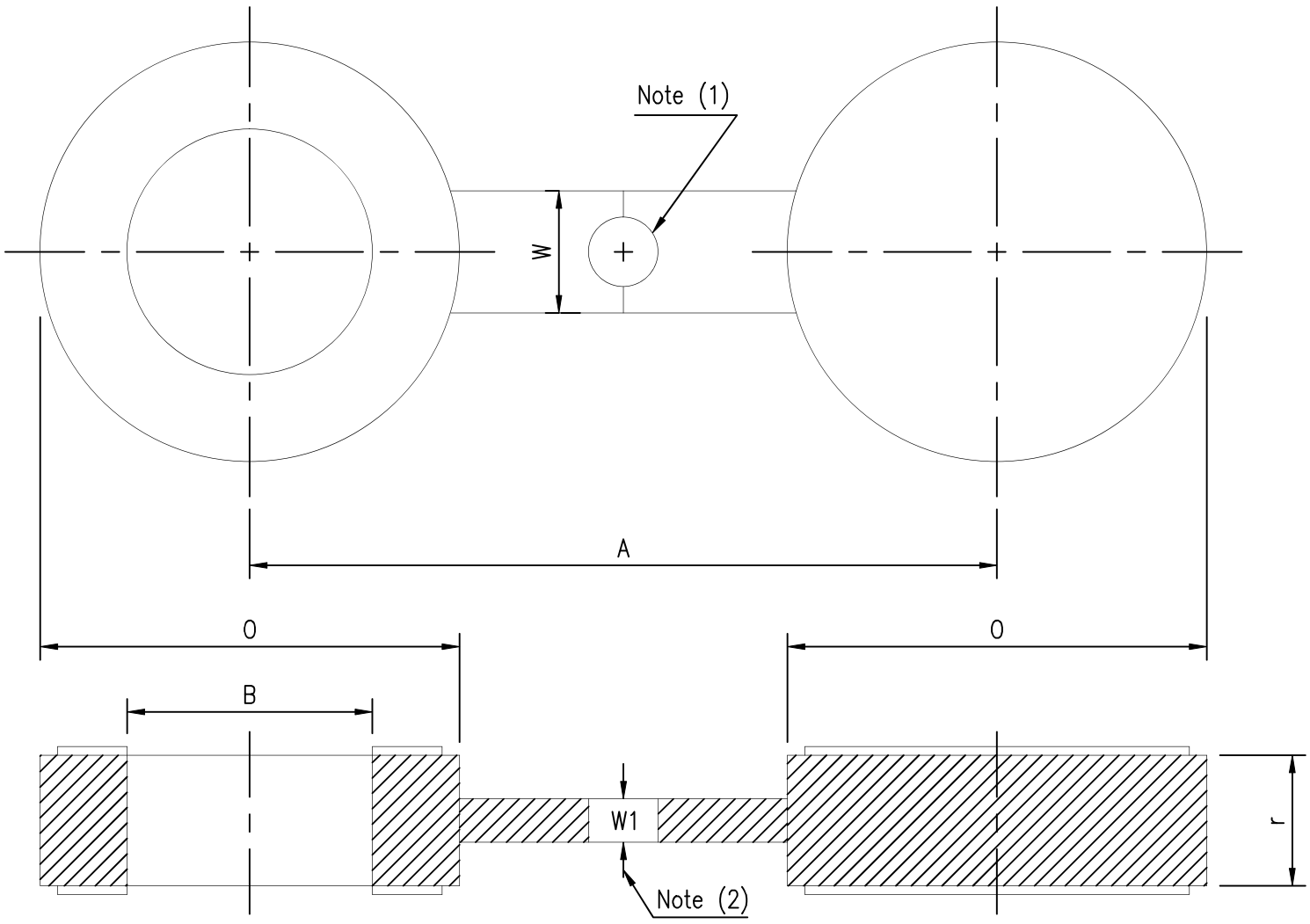
SCALE: N.T.S.	TOTAL NO. OF SHTS: 1 OF 1	
SIZE	JOB NO.	DRAWING NUMBER / REV.
A3	--------	VCS-00-PP-SD-2026 / 00

Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST

STANDARD DRAWINGS

Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST

M/s. VCS QUALITY SERVICES PVT. LTD.	SPECTACLE BLIND FLANGE	DRAWING NO. SD–PI–001
		SHEET NO. 1 OF 1



TABLE–4 DIMENSIONS OF CLASS 600 RAISED FACE FIGURE 8 BLANKS

NPS	INSIDE DIAMETER B, in.	OUTSIDE DIAMETER O, in.	CENTERLINE DIMENSION A, In.	THICKNESS r, in.	WEB WIDTH W, In.
1/2	0.62	2.00	2.62	0.25	1.50
3/4	0.82	2.50	3.25	0.25	1.50
1	1.05	2.75	3.50	0.25	2.25
1¼	1.44	3.12	3.98	0.38	2.25
1½	1.68	3.62	4.50	0.38	2.62
2	2.16	4.25	5.00	0.38	2.25
2½	2.64	5.00	5.88	0.50	2.62
3	3.26	5.75	6.62	0.50	2.62
3½	3.76	6.25	7.25	0.62	3.00
4	4.26	7.50	8.50	0.62	3.00
5	5.30	9.38	10.50	0.75	3.38
6	6.36	10.38	11.50	0.88	3.38
8	8.33	12.50	13.75	1.12	3.75
10	10.42	15.62	17.00	1.38	4.12
12	12.39	17.88	19.25	1.62	4.12
14	13.62	19.25	20.75	1.75	4.50
16	16.62	22.12	23.75	2.00	4.88
18	17.62	24.00	25.75	2.12	5.25
20	19.58	26.75	28.50	2.50	5.25
24	23.50	31.00	33.00	2.88	6.00

NOTES:

(1) Hole size (where required due to bolt spacing) shall be the same as the flange bolt hole. and located such that it will not interfere with bolting between two flanges.

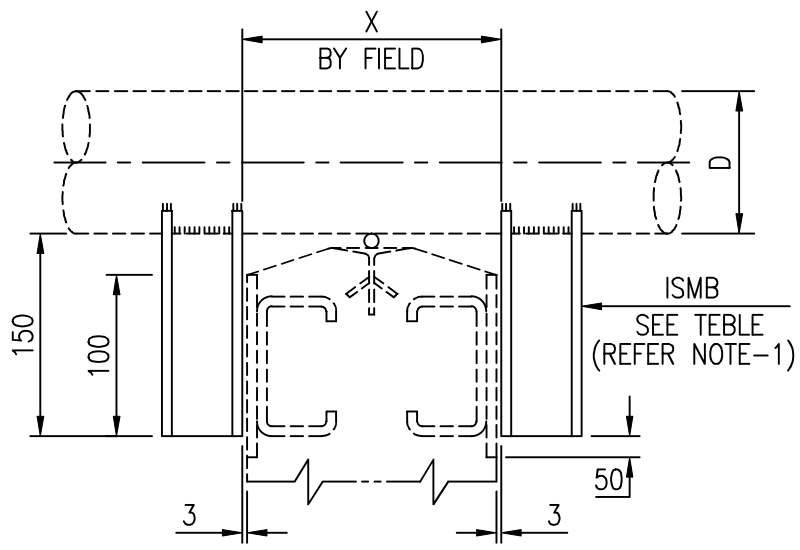
(2) The thickness of the web (or tie bar) dimension W1 shall be 0.25 in. minimum.

REV. NO.	DATE	SUBJECT OF REVISION	PREP	CHKD	APPD
0	10.05.17	ISSUED WITH TENDER	US	DK	AD

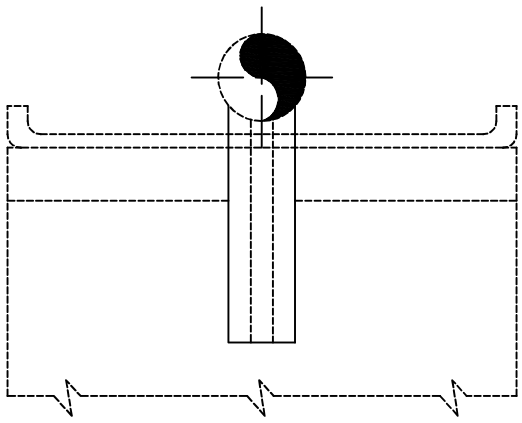
Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST

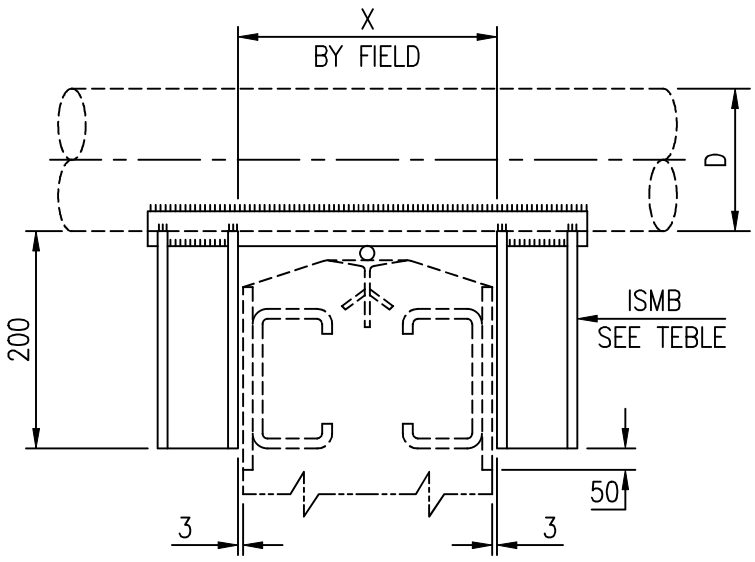
M/s. VCS QUALITY SERVICES PVT. LTD.	ANCHOR FOR BARE PIPE SIZE 2" THRU 24" TYPE–G5 (FOR OFFSITE)	DRAWING NO. SD–PI–002 SHEET NO. 1 OF 1

D	8	10	12	14	16	18	20	24
I BEAM	150				200		250	

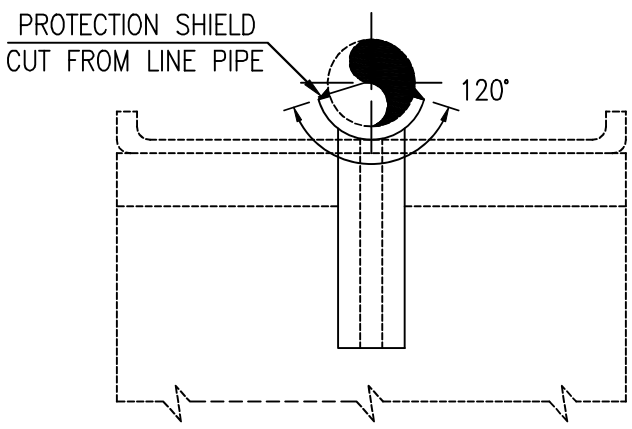


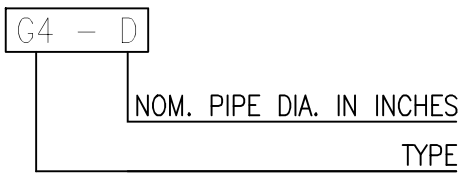
FOR PIPE 2" THRU 12"





FOR PIPE 14" THRU 24"





SYMBOL

NOTE:–

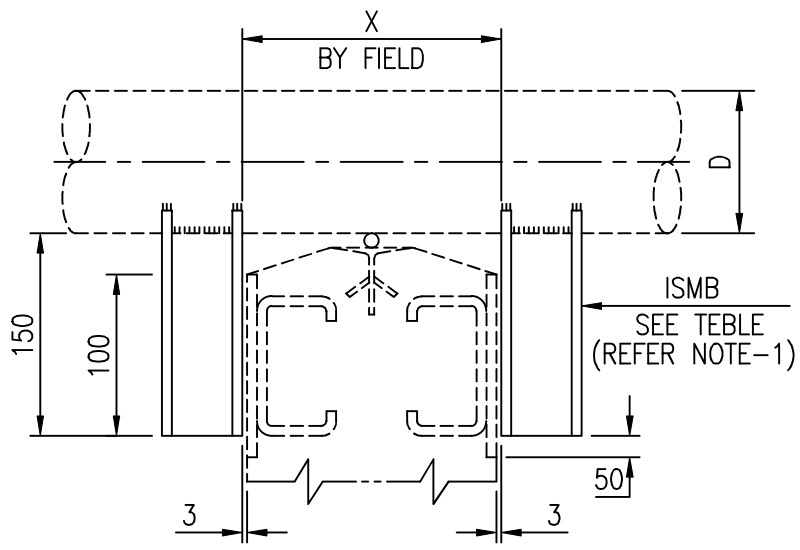
1. FOR SUPPORTING DETAILS FOR PIPE SIZE 2" THRU 6", REFER STD. 00004–PL–PI–STD–009

REV. NO.	DATE	SUBJECT OF REVISION	PREP	CHKD	APPD
0	10.05.17	ISSUED WITH TENDER	US	DK	AD

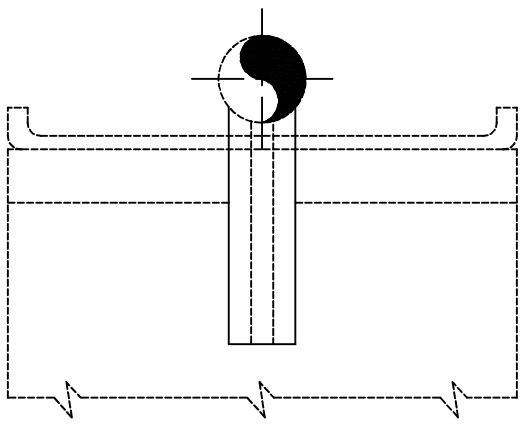
Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST

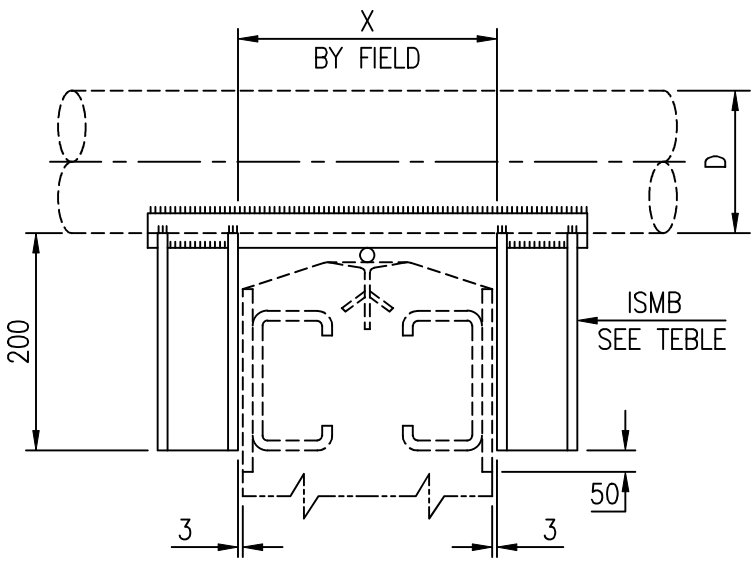
M/s. VCS QUALITY SERVICES PVT. LTD.	CROSS GUIDE FOR BARE PIPE SIZE 2" THRU 24" TYPE–G4 (OFFSITE)	DRAWING NO. SD–PI–003
		SHEET NO. 1 OF 1

D	8	10	12	14	16	18	20	24
I BEAM	150				200		250	

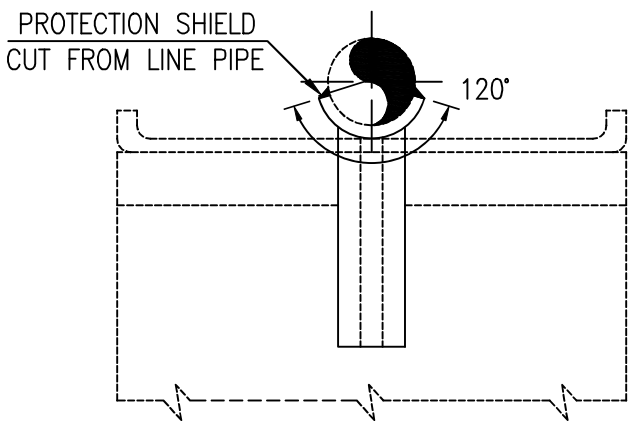


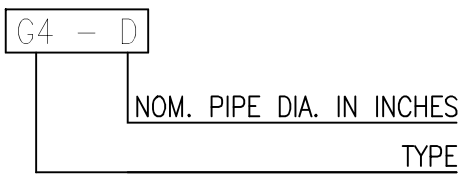
FOR PIPE 2" THRU 12"





FOR PIPE 14" THRU 24"





SYMBOL

NOTE:–

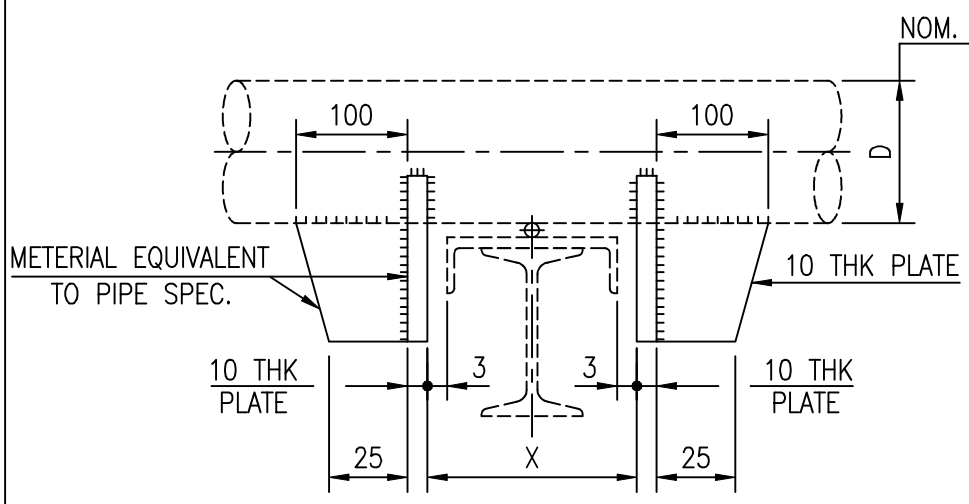
1. FOR SUPPORTING DETAILS FOR PIPE SIZE 2" THRU 6", REFER STD. STD.00004–PL–PI–STD–009

REV. NO.	DATE	SUBJECT OF REVISION	PREP	CHKD	APPD
0	10.05.17	ISSUED WITH TENDER	US	DK	AD

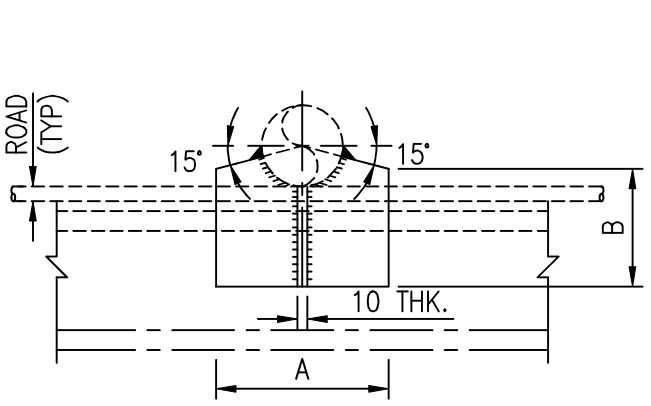
Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST

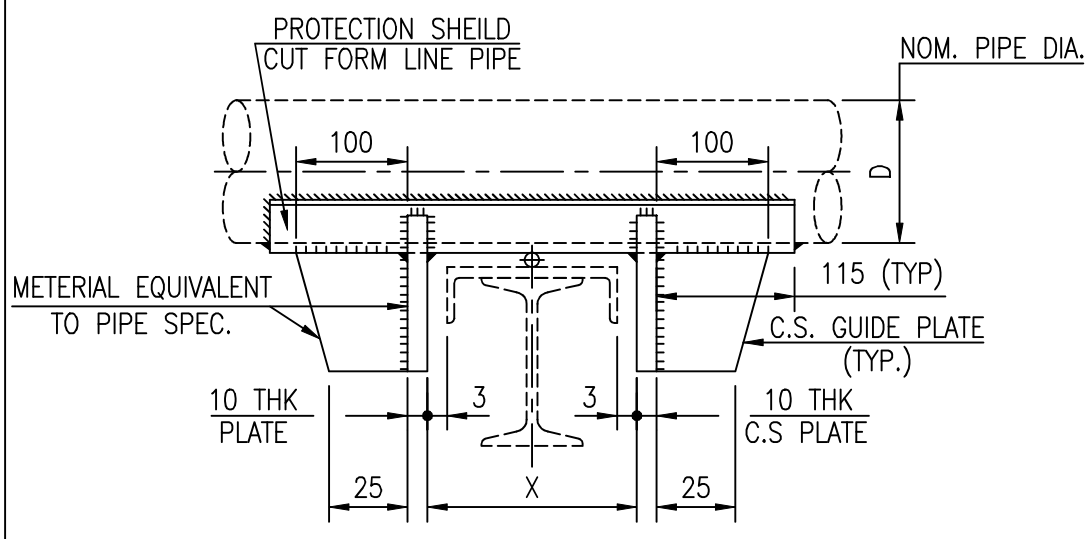
M/s. VCS QUALITY SERVICES PVT. LTD.	CROSS GUIDE FOR BARE PIPE SIZE 2" THRU 24" TYPE–G3	DRAWING NO. SD–PI–004 SHEET NO. 1 OF 1

CROSS GUIDE													
D	2"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	22"	24"
A	100	130	154	208	280	314	364	396	446	498	548	598	650
B	67	78	86	106	131	145	163	175	193	212	231	248	268

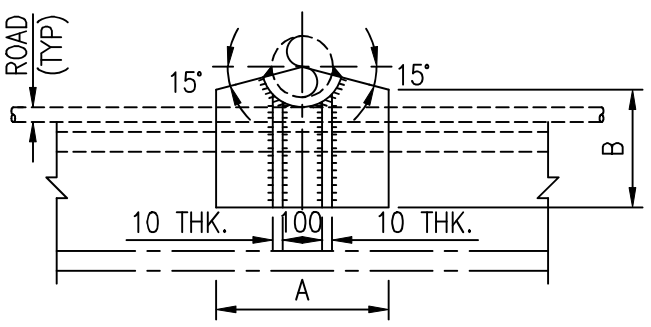


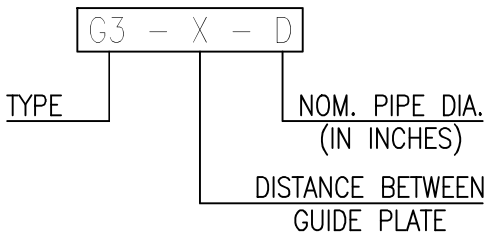
CROSS GUIDE 2" THRU 12"





CROSS GUIDE 14" THRU 24"





SYMBOL

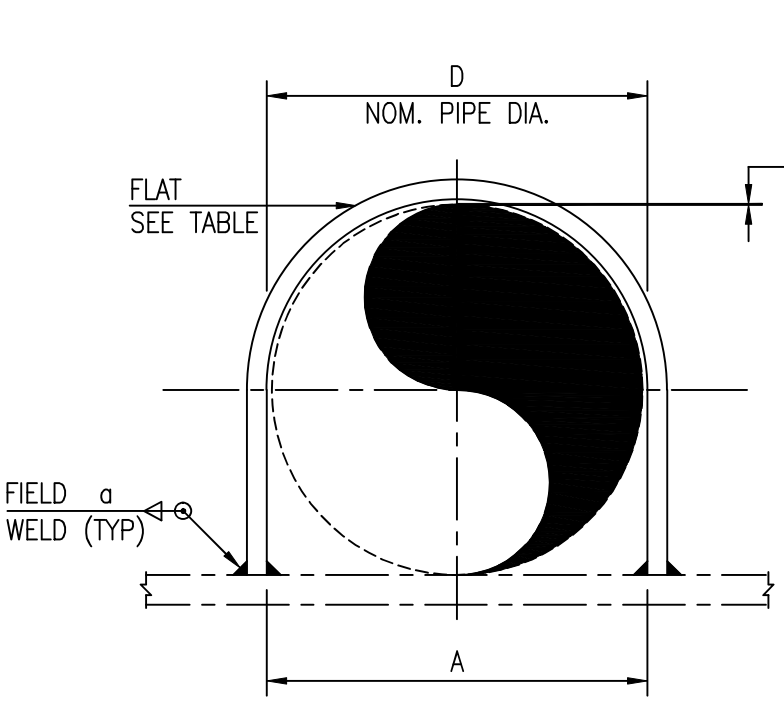
NOTE:–

1. PROTECTION SHIELD SHALL BE CUT FROM LINE PIPE.

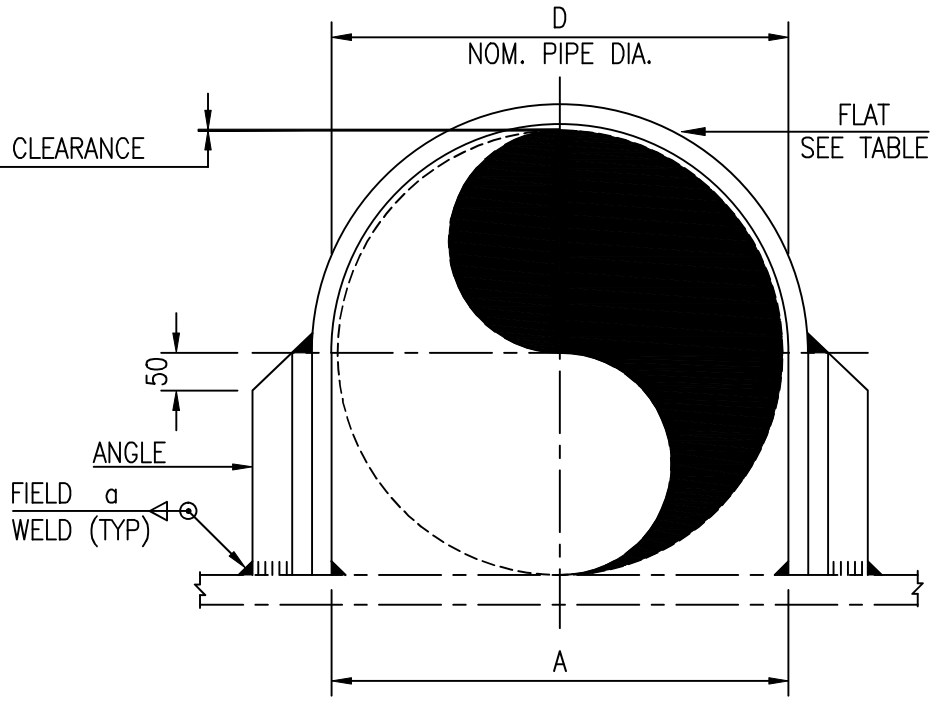
REV. NO.	DATE	SUBJECT OF REVISION	PREP	CHKD	APPD
0	10.05.17	ISSUED WITH TENDER	US	DK	AD

Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST

M/s. VCS QUALITY SERVICES PVT. LTD.	GUIDE SUPPORT FOR BARE PIPE SIZE 1/2" THRU 24" TYPE-G1	DRAWING NO. SD-PI-005
		SHEET NO. 1 OF 1

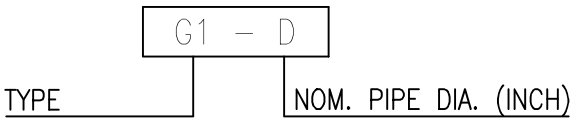


FOR SIZE UPTO 10"



FOR SIZE 12" THRU 24"

D	A	a	FLAT SIZE	ANGLE SIZE
1/2"	26	6	40 x 6	–
3/4"	33			
1"	40			
1 1/4"	48			
1 1/2"	55			
2"	65			
2 1/2"	80			
3"	95			
3 1/2"	107	10	50 x 10	–
4"	120			
5"	146			
6"	174			
8"	225			
10"	278			
12"	328	10	65 x 12	75x75x10
14"	362			
16"	412			
18"	463	10	75 x 12	90x90x10
20"	515			
24"	616			

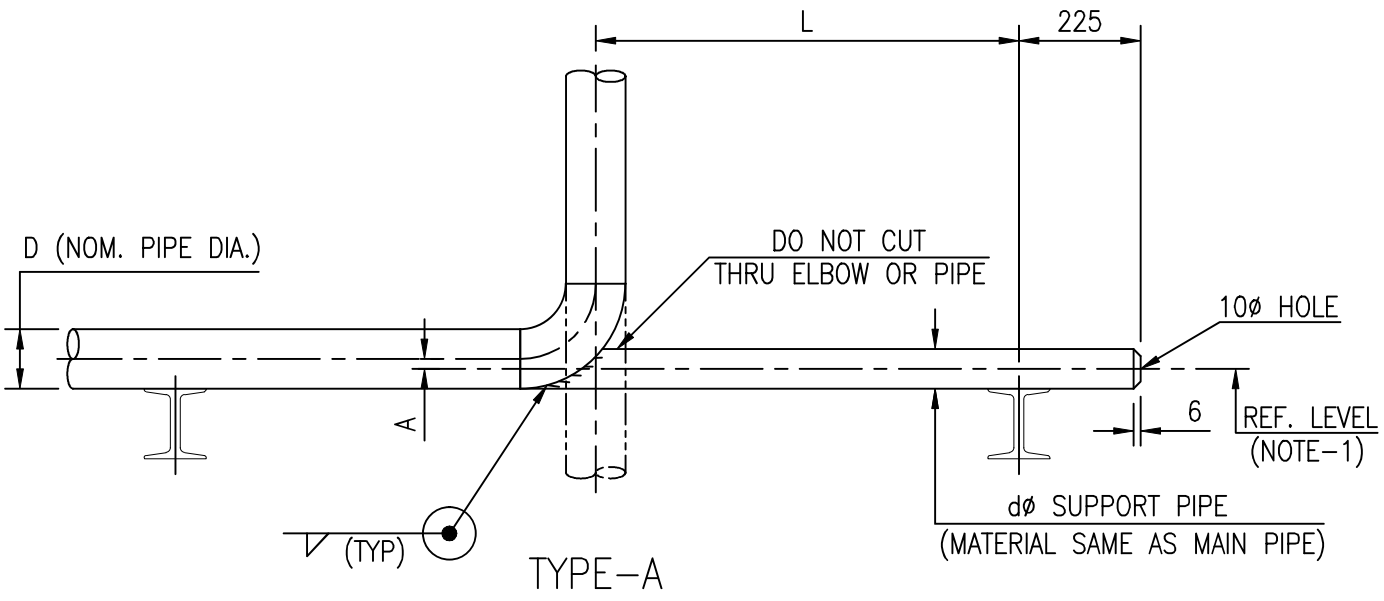


SYMBOL

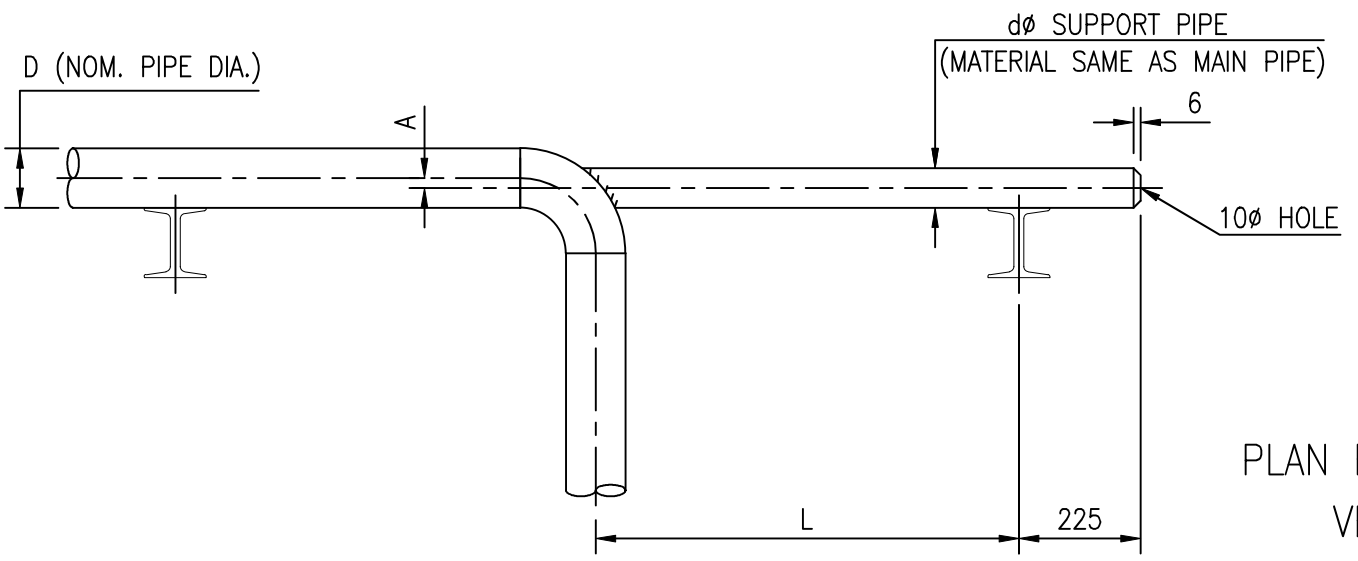
REV. NO.	DATE	SUBJECT OF REVISION	PREP	CHKD	APPD
0	10.05.17	ISSUED WITH TENDER	US	DK	AD

Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST

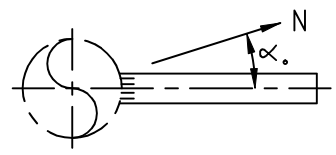
M/s. VCS QUALITY SERVICES PVT. LTD.	DUMMY PIPE SUPPORT FOR BARE PIPE SIZE 2" THRU 24" TYPE–B–39	DRAWING NO. SD–PI–006
		SHEET NO. 1 OF 1



TYPE–A



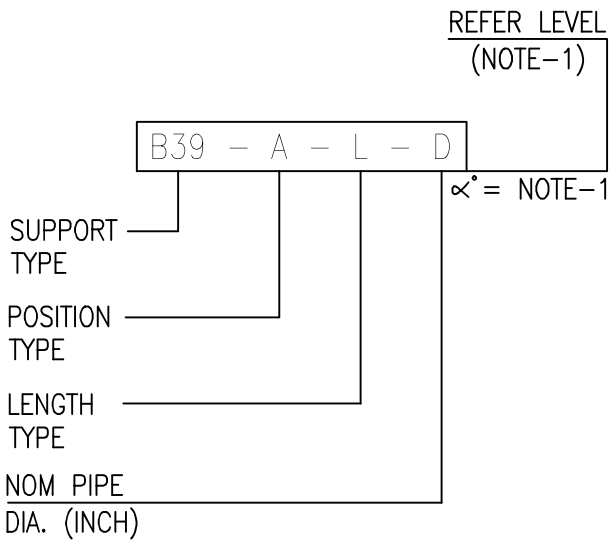
TYPE–B



PLAN FOR SUPPORT ON VERTICAL PIPE

FOR L, 1500 OR LESS		
D	d (NOTE 2)	A
2"	2"–SCH.40	–
3"	2"–SCH.40	15
4"	3"–SCH.40	13
6"	3"–SCH.40	40
8"	4"–SCH.40	52
10"	6"–SCH.40	52
12"	6"–SCH.40	78
14"	8"–SCH.40	68
16"	8"–SCH.40	94
18"	8"–SCH.40	119
20"	10"–SCH.40	118
24"	10"–SCH.40	168

FOR L, OVER 1500		
D	d (NOTE 2)	A
2"	2"–SCH.40	–
3"	2"–SCH.40	15
4"	3"–SCH.40	13
6"	4"–SCH.40	27
8"	6"–SCH.40	25
10"	8"–SCH.40	27
12"	8"–SCH.40	52
14"	10"–SCH.40	41
16"	10"–SCH.40	67
18"	10"–SCH.40	92
20"	12"–SCH.40	92
24"	12"–SCH.40	143



SYMBOL

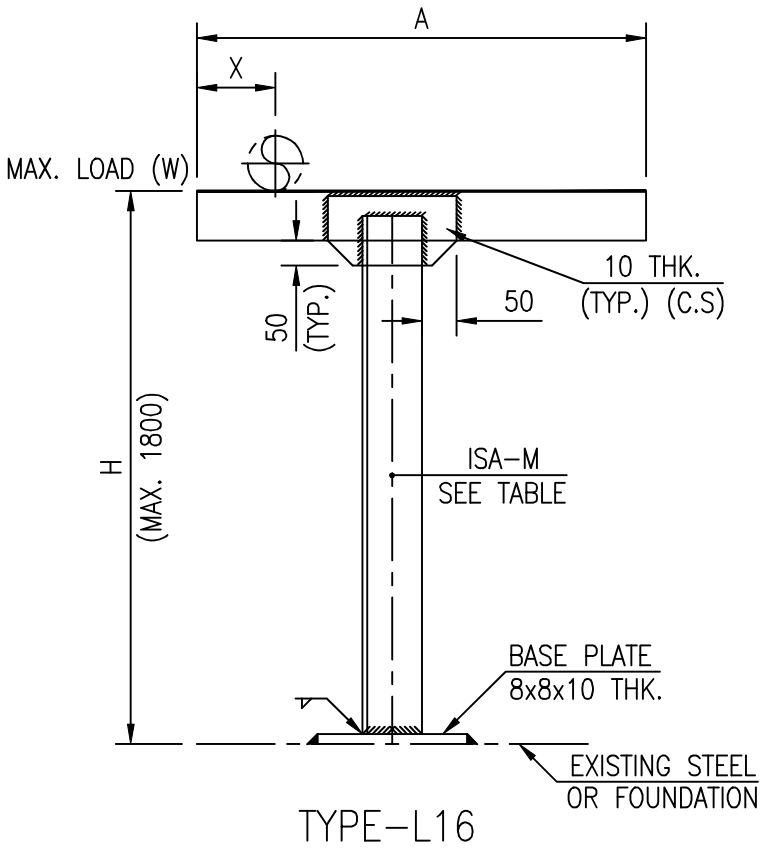
NOTES:–

1. REF. LEVEL & ∝. TO BE GIVEN IN CASE SUPPORT IS WELDED TO VERTICAL PIPE.
2. IN CASE SIZE AND/OR SCH. OF SUPPORT PIPE (d) LISTED IN THE TABLE IS NOT AVAILABLE USE NEXT HIGHER SIZE AND/OR NEAREST EQUIVALENT THICKNESS AVAILABLE.

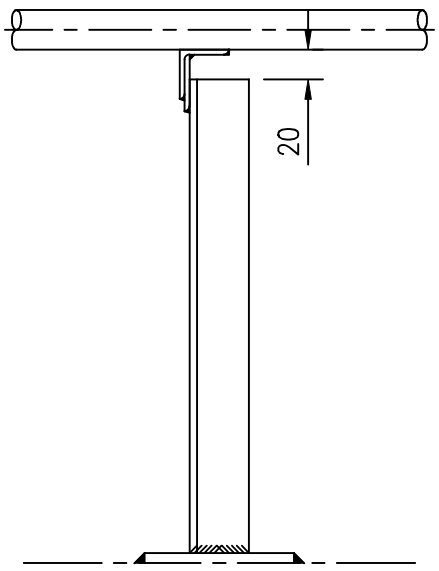
REV. NO.	DATE	SUBJECT OF REVISION	PREP	CHKD	APPD
0	10.05.17	ISSUED WITH TENDER	US	DK	AD

Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST

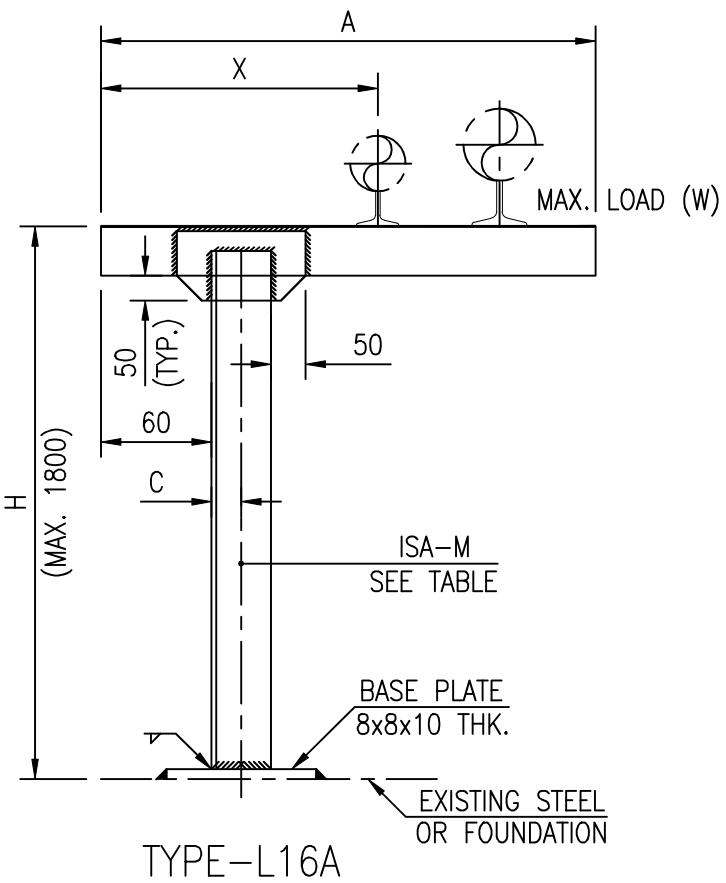
M/s. VCS QUALITY SERVICES PVT. LTD.	LOW SUPPORT STANCHION TYPE–L16 AND L–16A	DRAWING NO. SD–PI–007
		SHEET NO. 1 OF 1



TYPE–L16



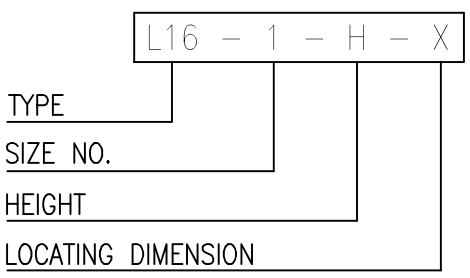
SIDE VIEW



TYPE–L16A

NOTE:–

1. DO NOT USE FOR ANCHORING THE PIPE.



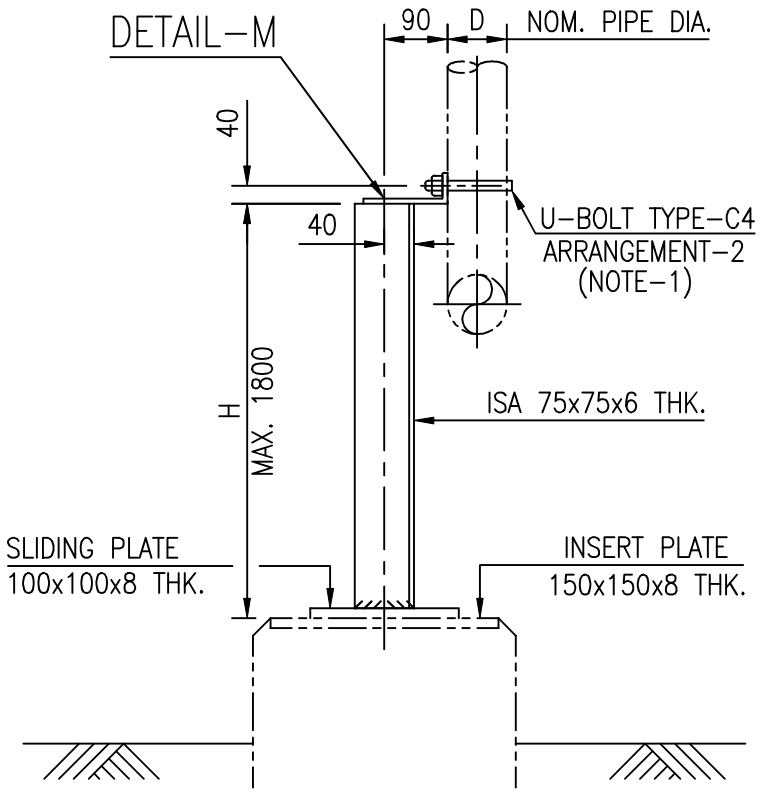
SYMBOL

SIZE NO.	MAX. LOAD (W) Kg.	M	A	B	C
1	500	ISA 80x80x8	600	150	45
2	800	ISA 100x100x10	700	150	60
3	1500	ISA 130x130x12	800	150	80

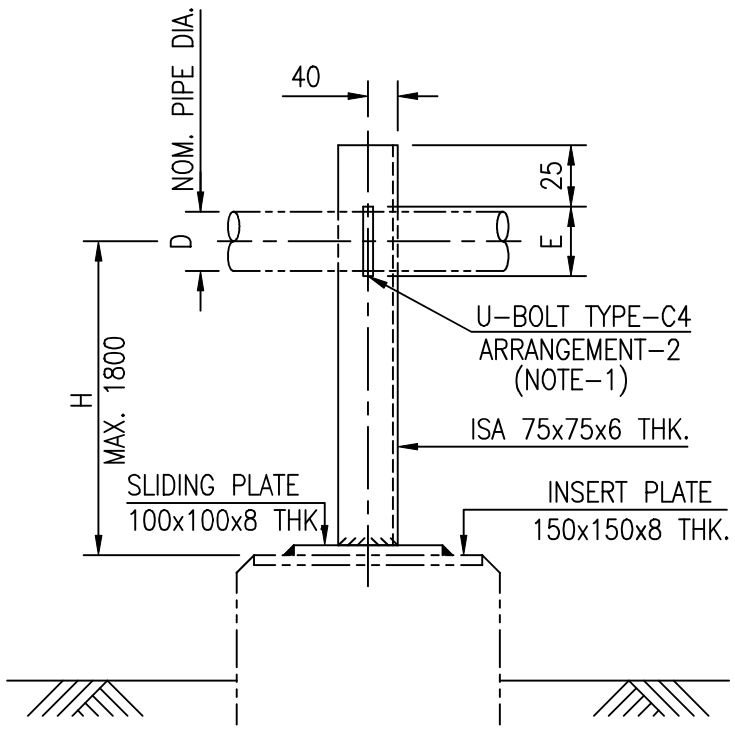
REV. NO.	DATE	SUBJECT OF REVISION	PREP	CHKD	APPD
0	10.05.17	ISSUED WITH TENDER	US	DK	AD

Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST

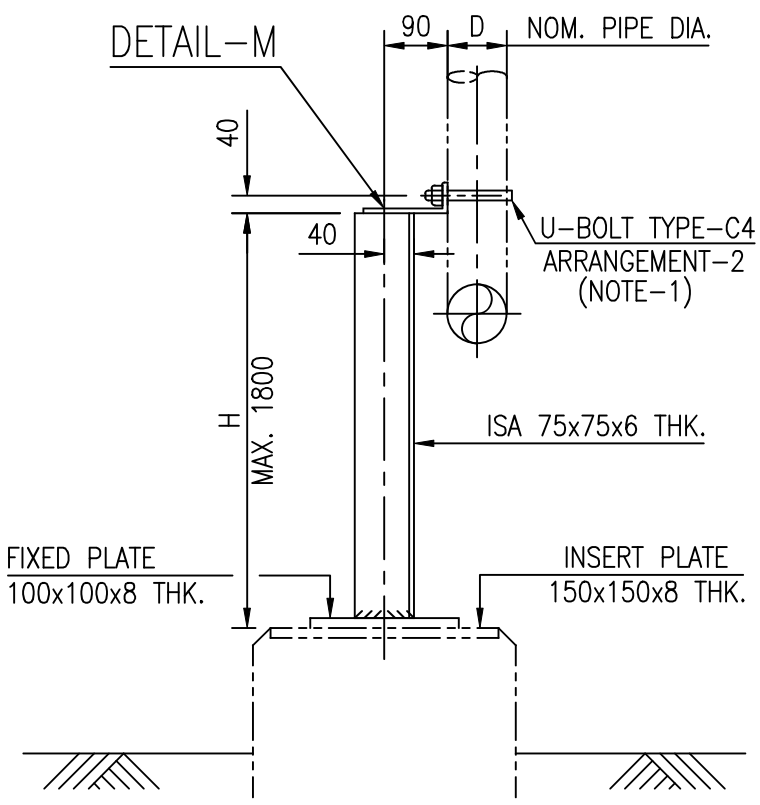
M/s. VCS QUALITY SERVICES PVT. LTD.	LOW SUPPORT SLIDING AND FIXED FOR PIPE SIZE 3/4" THRU 1.1/2"TYPE L-15	DRAWING NO. SD-PI-008
		SHEET NO. 1 OF 1



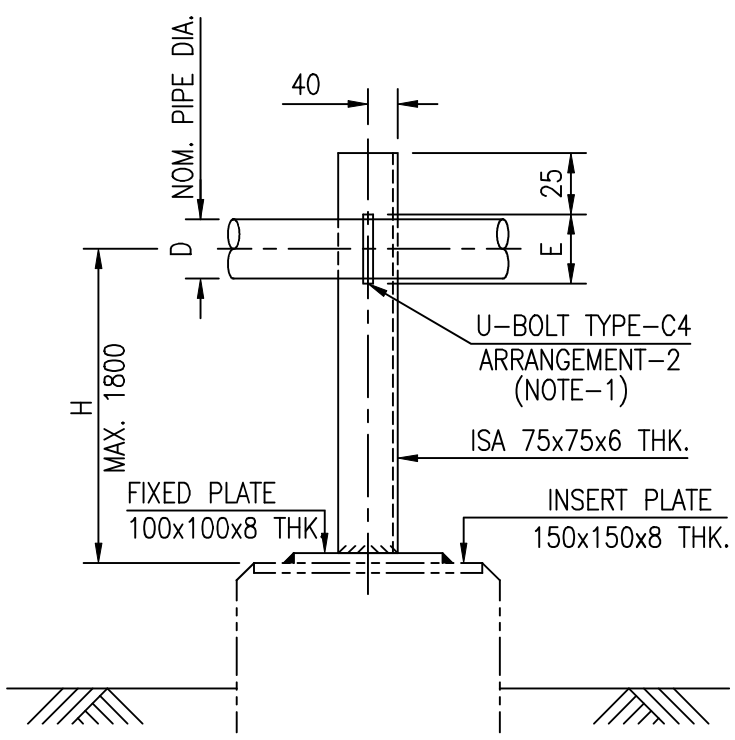
ARRANGEMENT TYPE-1
(SLIDING)



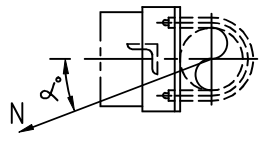
ARRANGEMENT TYPE-2
(SLIDING)



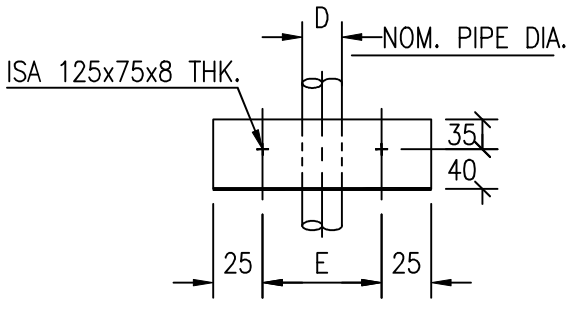
ARRANGEMENT TYPE-3
(FIXED)



ARRANGEMENT TYPE-4
(FIXED)



(FIXED)
(FOR TYPE-1 & 3)



DETAIL-M

D	E
3/4"	36
1"	45
1 1/2"	60

∝°= (FOR TYPE 1 & 3) L15 - 1 - H - D

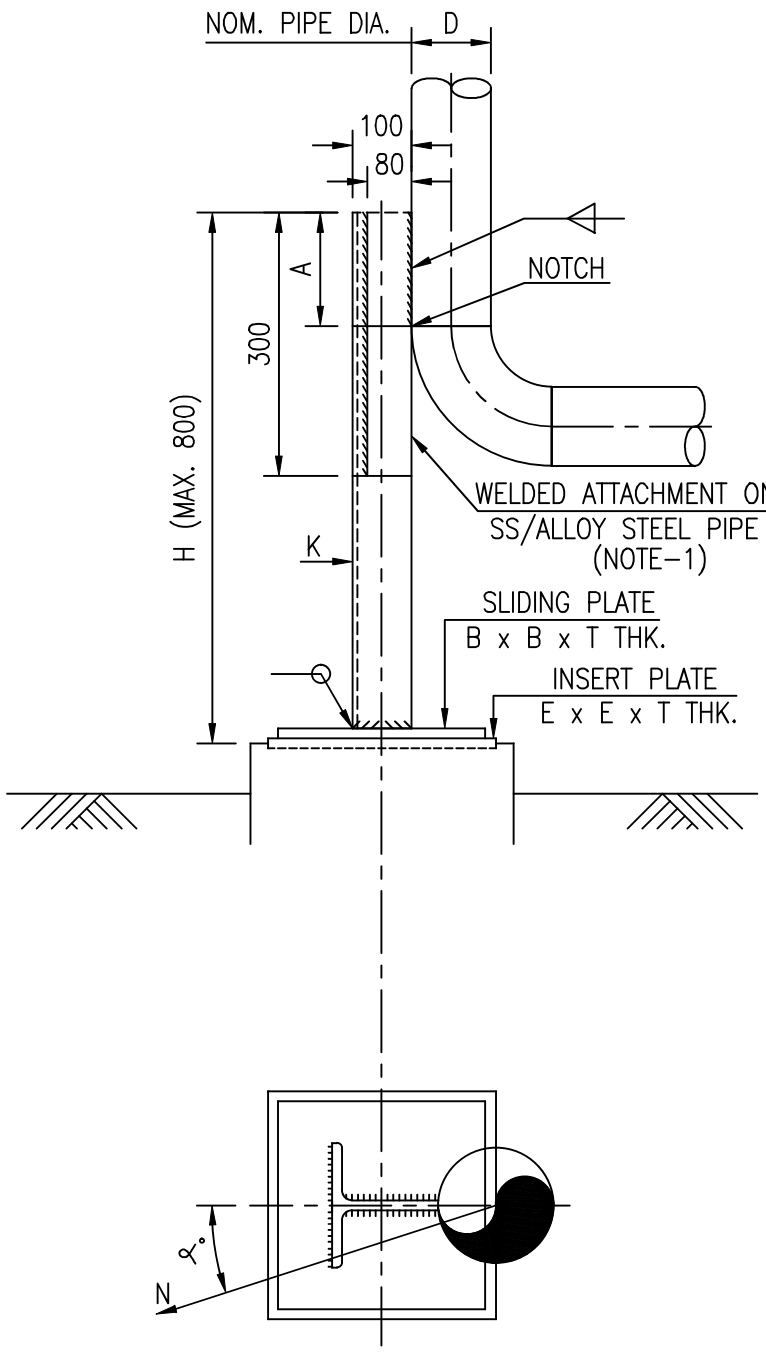
- TYPE
- ARRANGEMENT TYPE
- HEIGHT
- NOM. PIPE DIA. (INCH)

SYMBOL

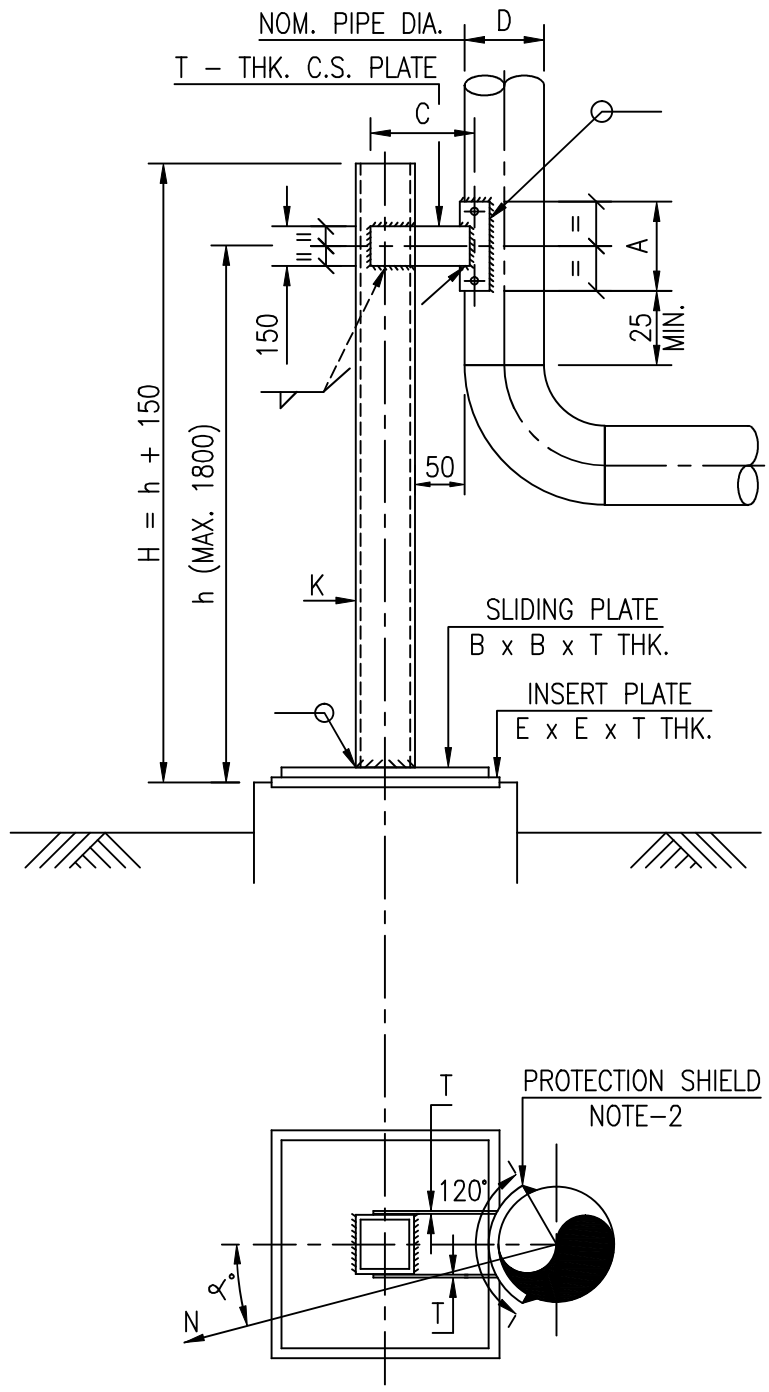
REV. NO.	DATE	SUBJECT OF REVISION	PREP	CHKD	APPD
0	10.05.17	ISSUED WITH TENDER	US	DK	AD

Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST

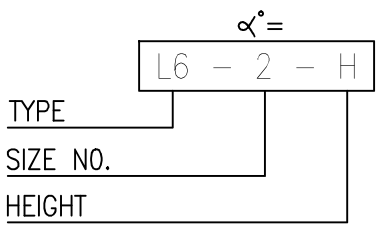
M/s. VCS QUALITY SERVICES PVT. LTD.	LOW SUPPORT SLIDING FOR BARE & INSULATED PIPE SIZE 2" THRU 24" TYPE-L6	DRAWING NO. SD-PI-009
		SHEET NO. 1 OF 1



FOR PIPE SIZES 2" THRU 4"



FOR PIPE SIZES 6" THRU 24"



SYMBOL

NOTES:-

1. MATERIAL FOR WELDED ATTACHMENT SHALL BE EQUIVALENT TO PIPE MATERIAL.
2. PROTECTION SHIELD IS TO BE CUT FROM LINE PIPE.

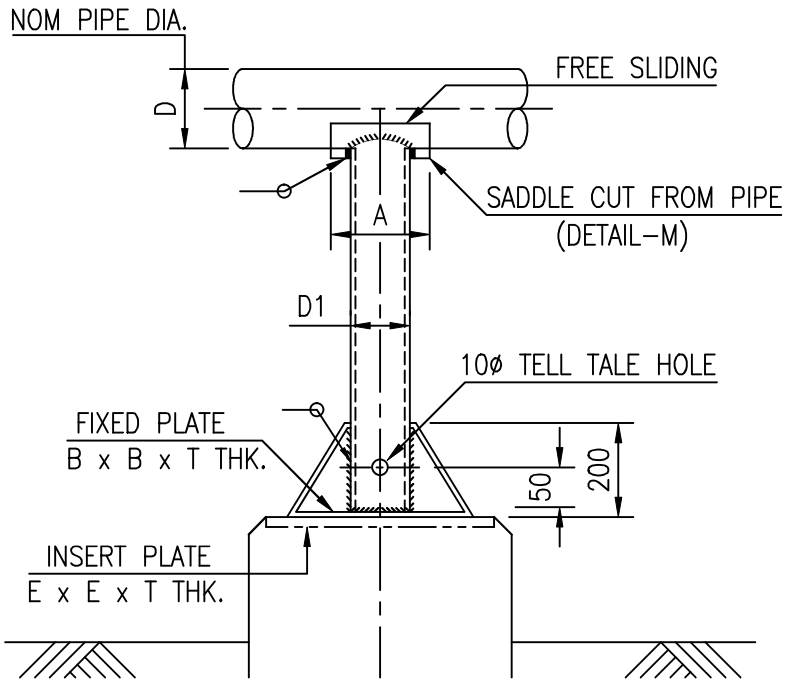
SIZE NO.	D	K	A	T	C	E	B
1	2" TO 4"	CUT FROM ISMB 200	200	10	-	250	150
2	6" TO 10"	ISMC-125 2 NOS.	200	12	150	300	200
3	12" TO 24"	ISMC-225 2 NOS.	300	12	230	400	300

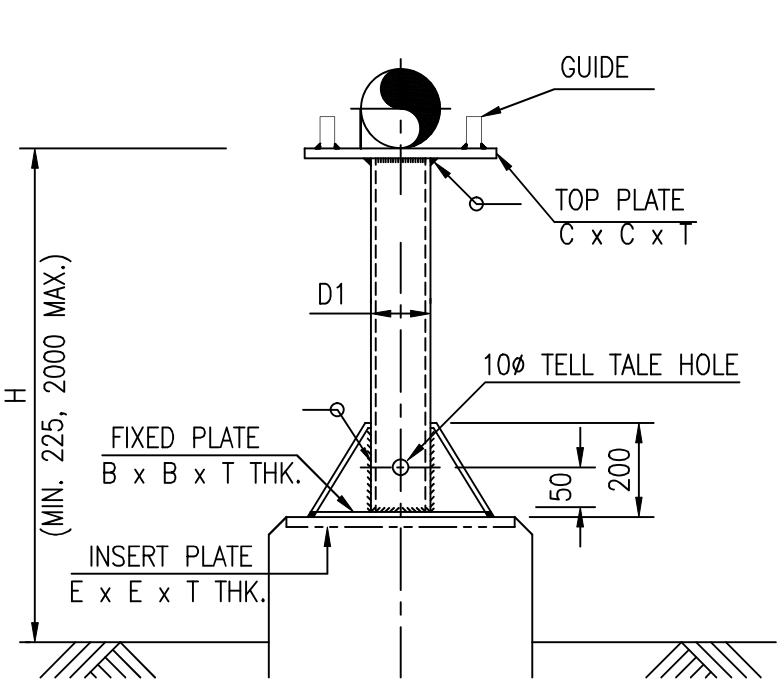
FOR TEMP. UP TO 400 °C ONLY

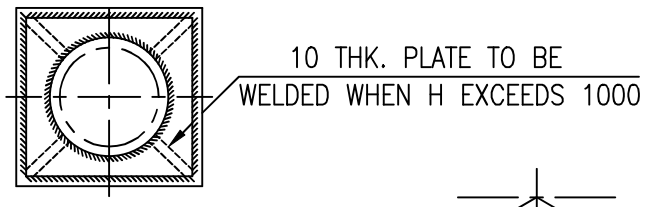
REV. NO.	DATE	SUBJECT OF REVISION	PREP	CHKD	APPD
0	10.05.17	ISSUED WITH TENDER	US	DK	AD

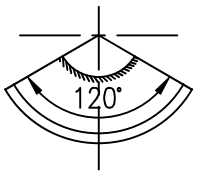
Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST

M/s. VCS QUALITY SERVICES PVT. LTD.	LOW SUPPORT SLIDING FOR BARE PIPE SIZE 3/4" THRU 36" TYPE–L5 & L5A	DRAWING NO. SD–PI–010
		SHEET NO. 1 OF 1

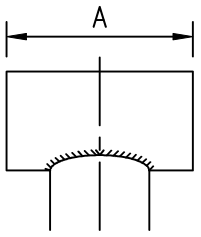


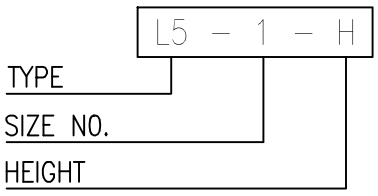




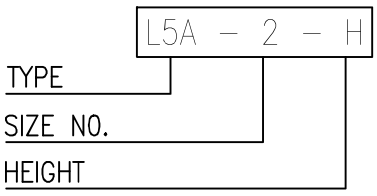


DETAIL–M





SYMBOL



SYMBOL

SIZE NO.	D	A	D1 (NOTE–1)	C	B	E	T
1	3/4"	2" NB x 100 Lg.	2" HEAVY IS :1239	150	150	200	12
	1"						
	1.1/2"	3" NB x 100 Lg.		200			
	2"						
2	3"	6" NB x 150 Lg.	2" HEAVY IS :1239	200	150	200	12
	4"						
3	6"	10" NB x 250 Lg.	3" HEAVY IS :1239	300	200	250	16
	8"						
4	10"	14" NB x 350 Lg.	4" HEAVY IS :1239	350	200	250	16
	12"						
5	14"	18" NB x 350 Lg.	6" HEAVY IS :1239	400	250	300	20
	16"						
6	18"	20" NB x 350 Lg.	8" SCH. 40	400	300	350	20
7	20"	24" NB x 350 Lg.	10" SCH. 40	450	350	400	20
	24"						
8	26"	30" NB x 350 Lg.	12" SCH. 40	550	400	500	20
	30"						
	36"	36" NB x 400 Lg.					

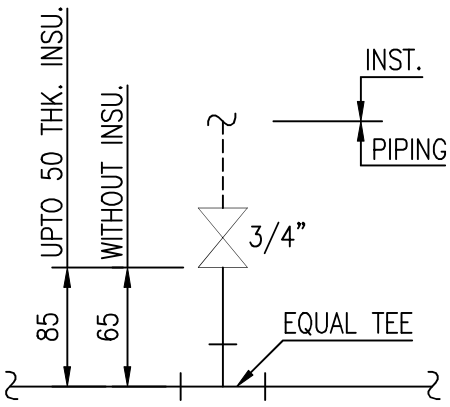
NOTES:–

1. IN CASE SIZE AND/OR SCH. OF SUPPORT PIPE (D) LISTED IN THE TABLE IS NOT AVAILABLE, USE NEXT HIGHER SIZE AND/OR NEAREST EQUIVALENT THICKNESS AVAILABLE.
2. MATERIAL FOR SUPPORT PIPE & PLATE SHALL BE CARBON STEEL.

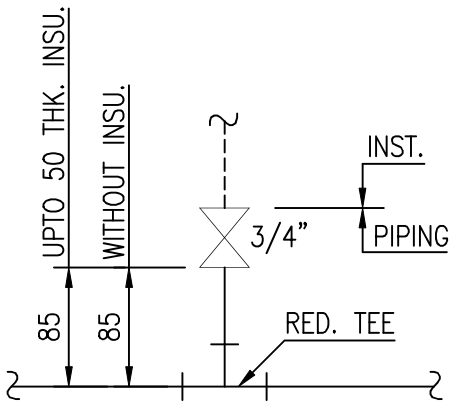
REV. NO.	DATE	SUBJECT OF REVISION	PREP	CHKD	APPD
0	10.05.17	ISSUED WITH TENDER	US	DK	AD

Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST

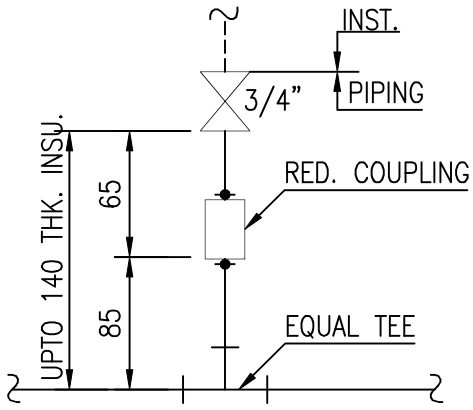
M/s. VCS QUALITY SERVICES PVT. LTD.	PRESSURE TAPPINGS (PA, PG, PC, PT, PIC ETC.)	DRAWING NO. SD–PI–011
		SHEET NO. 1 OF 1



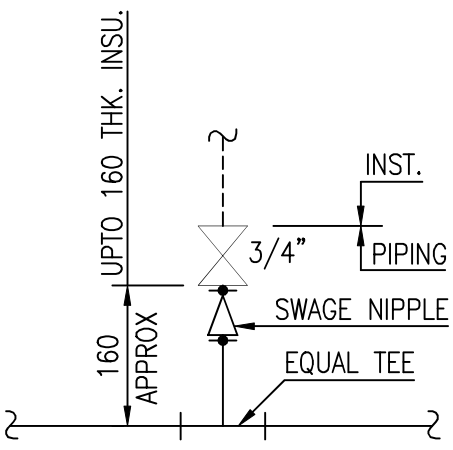
PC–1 ON LINE 3/4"



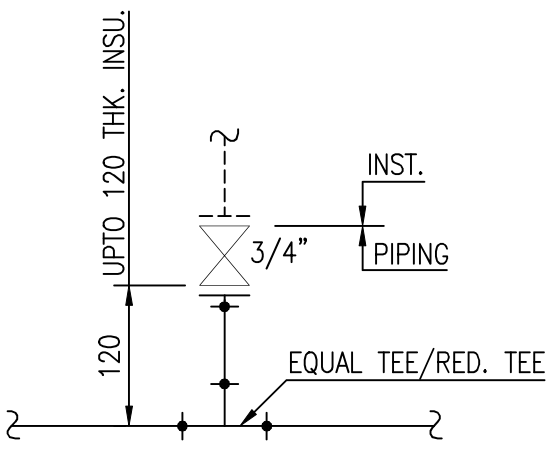
PC–2 ON LINE 1"–1 1/2"



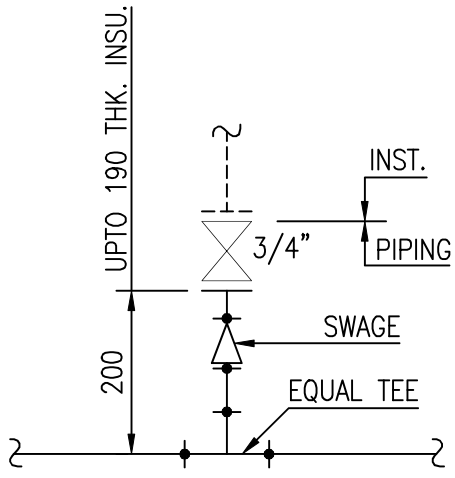
PC–3 ON LINE 1"–1 1/2"



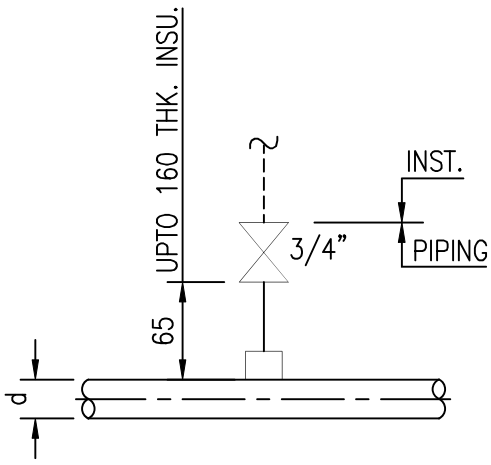
PC–4 ON LINE 1"–1 1/2"



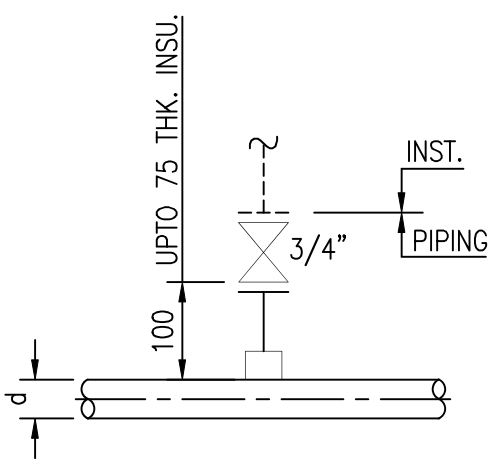
PC–5 ON LINE 3/4"–1 1/2"



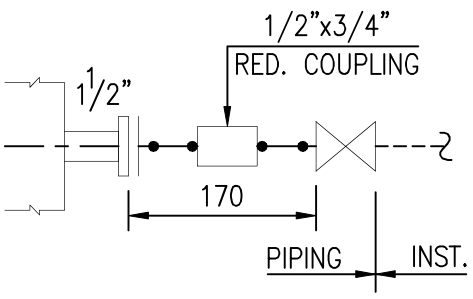
PC–6 ON LINE 1"–1 1/2"



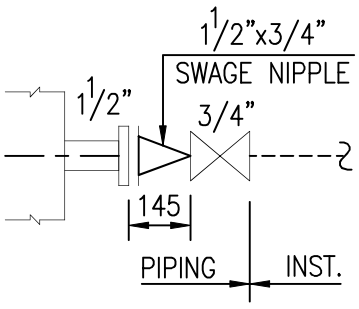
PC–10 ON LINE 2" & ABOVE



PC–11 ON LINE 2" & ABOVE

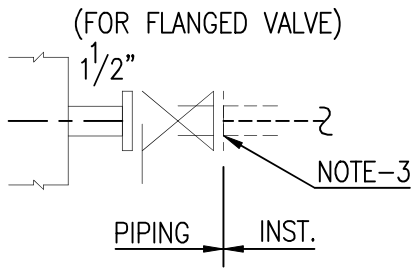


PC–12



PC–13

ON VESSELS / COLUMNS



PC–14

PC–15

WITH 2" NO 220 E & 2" VALVE

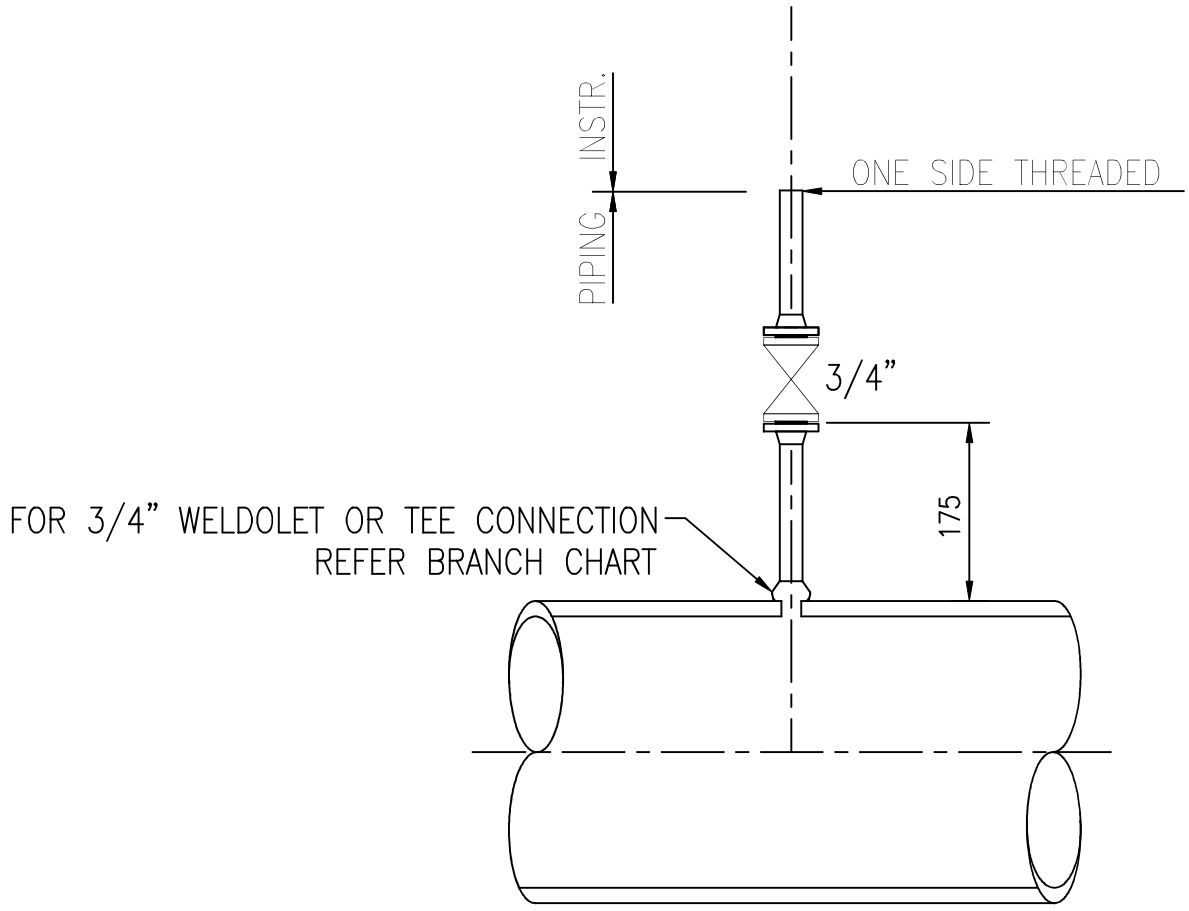
NOTES:–

1. THE INDICATED DIMENSIONS ARE MINIMUM WHICH ALSO COVER INSULATION TO THE EXTENT SHOWN ABOVE IN HIGHER THICKNESS OF INSULATION THAN INDICATED, THE DIFFERENCE SHALL BE ADDED IN THE DIMENSIONS SHOWN ABOVE ACCORDINGLY.
2. PRESSURE TAPPING SHALL BE PROVIDED WITH GATE, GLOBE OR PLUG VALVE (FLGD. SW. OR SCR'D) WITH TEE (EQ. OR RED.) HALF COUPLING (.W. OR SCR'D) OR STUB–IN AS PER PIPING SPECIFICATION.
3. IN CASE OF FLGD. VALVES BOLTING & GASKET ON BOTH SIDES OF VALVE SHALL BE IN PIPING SCOPE.
4. IN CASE OF TAPPING PROVIDED OTHER THAN INDICATED IN THIS STD FOR LAYOUT REASONS DETAILED DIMENSIONS WILL BE CALLED FOR OR CARRIED OUT.

REV. NO.	DATE	SUBJECT OF REVISION	PREP	CHKD	APPD
0	10.05.17	ISSUED WITH TENDER	US	DK	AD

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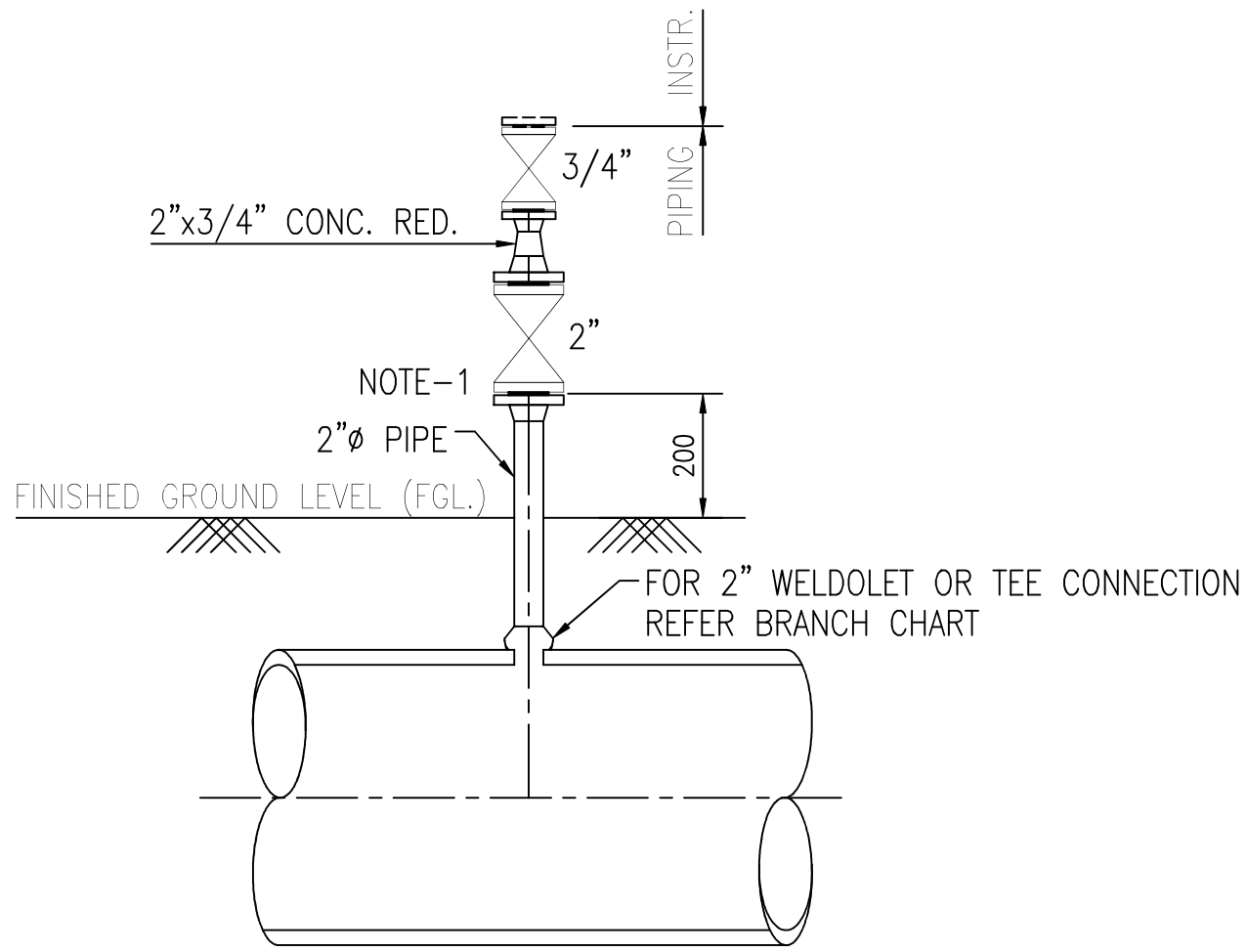
M/s. VCS QUALITY SERVICES PVT. LTD.	DETAIL OF PRESSURE CONNECTIONS ABOVE GROUND PIPE	DRAWING NO.
		SD–PI–012
		SHEET NO. 1 OF 1



REV. NO.	DATE	SUBJECT OF REVISION	PREP	CHKD	APPD
0	10.05.17	ISSUED WITH TENDER	US	DK	AD

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Date: 2025.03.13 12:56:46 IST

M/s. VCS QUALITY SERVICES PVT. LTD.	DETAIL OF PRESSURE CONNECTIONS UNDER GROUND PIPE	DRAWING NO. SD–PI–013 SHEET NO. 1 OF 1



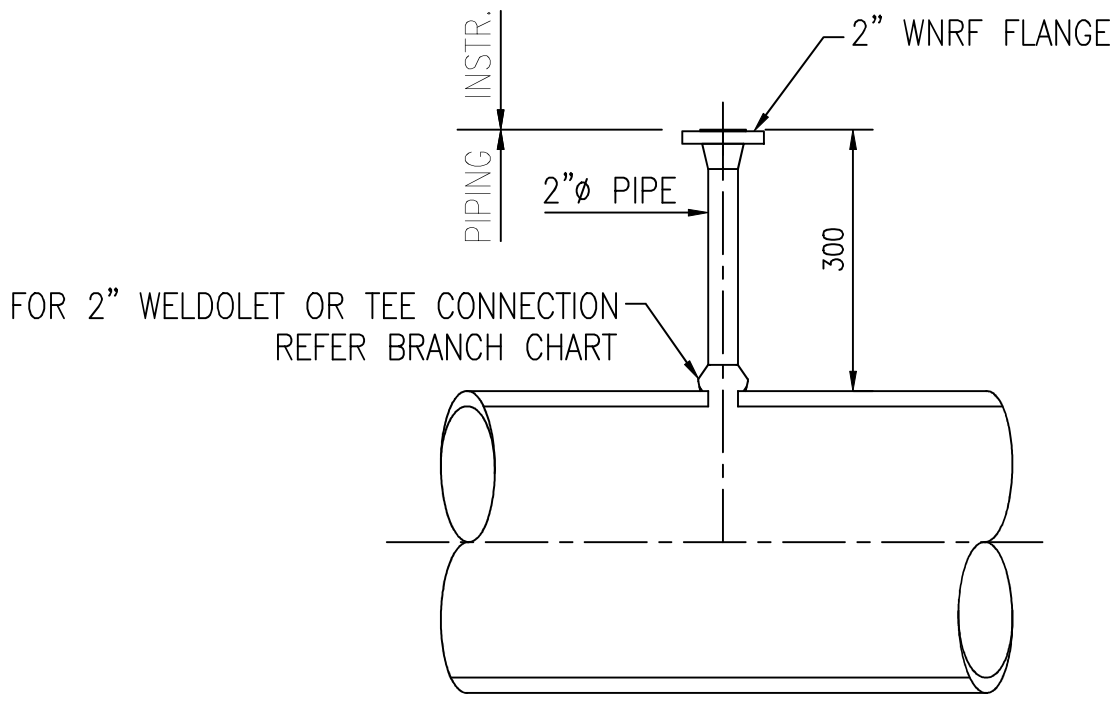
NOTE:

1 INSULATION GASKET SHALL BE INSTALLED.

REV. NO.	DATE	SUBJECT OF REVISION	PREP	CHKD	APPD
0	10.05.17	ISSUED WITH TENDER	US	DK	AD

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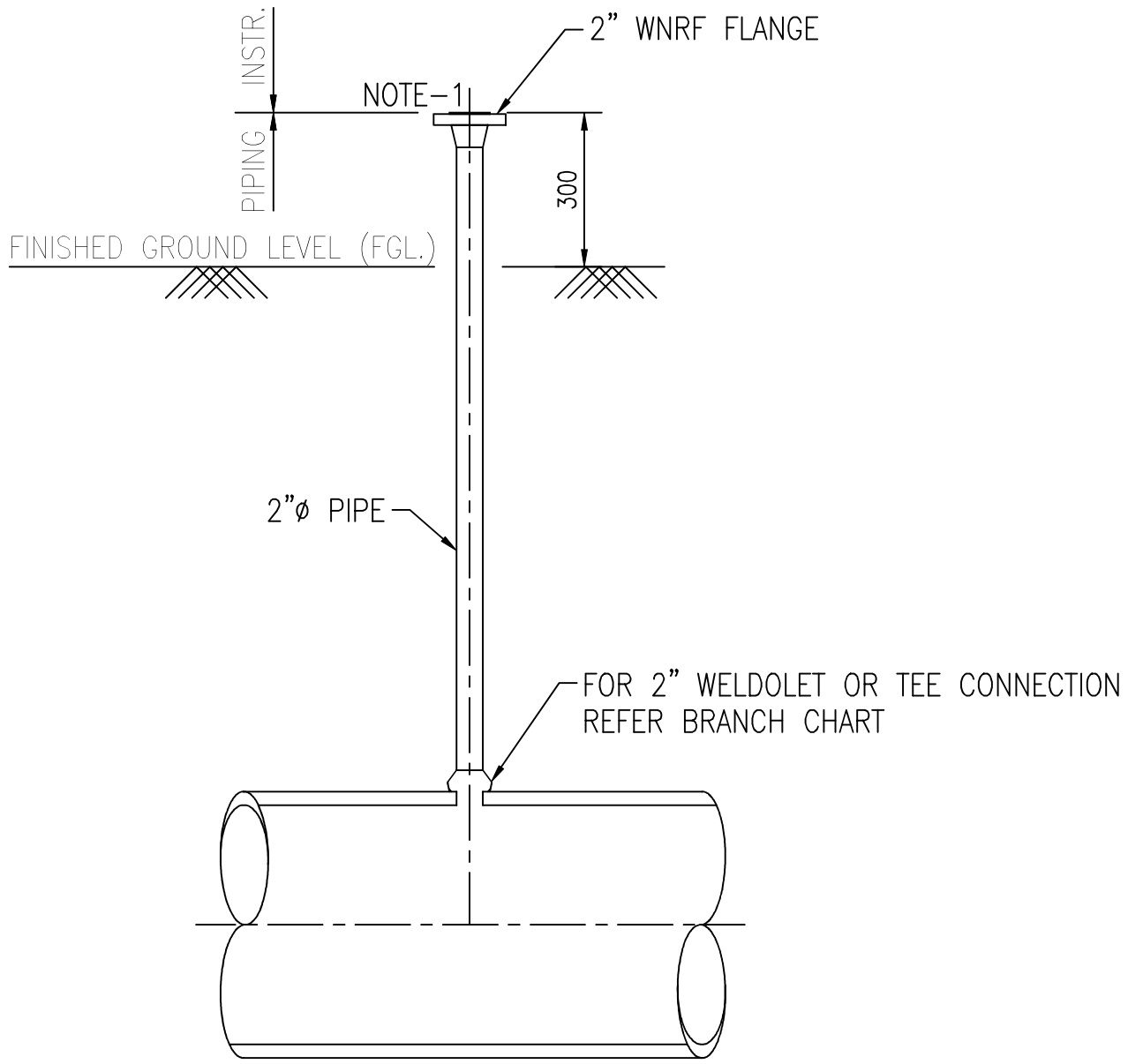
M/s. VCS QUALITY SERVICES PVT. LTD.	DETAIL OF TEMPERATURE CONNECTIONS ABOVE GROUND PIPE	DRAWING NO. SD-PI-014	SHEET NO. 1 OF 1



REV. NO.	DATE	SUBJECT OF REVISION	PREP	CHKD	APPD
0	10.05.17	ISSUED WITH TENDER	US	DK	AD

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Date: 2025.03.13 12:56:46 IST

M/s. VCS QUALITY SERVICES PVT. LTD.	DETAIL OF TEMPERATURE CONNECTIONS UNDER GROUND PIPE	DRAWING NO. SD–PI–015 SHEET NO. 1 OF 1



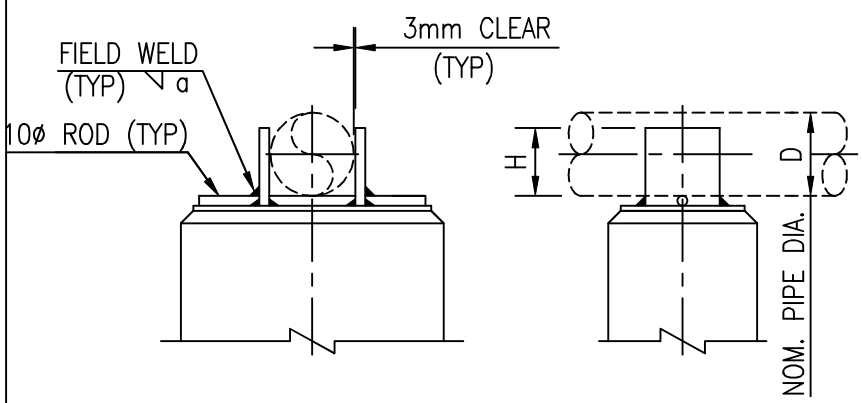
NOTE:

1 INSULATION GASKET SHALL BE INSTALLED.

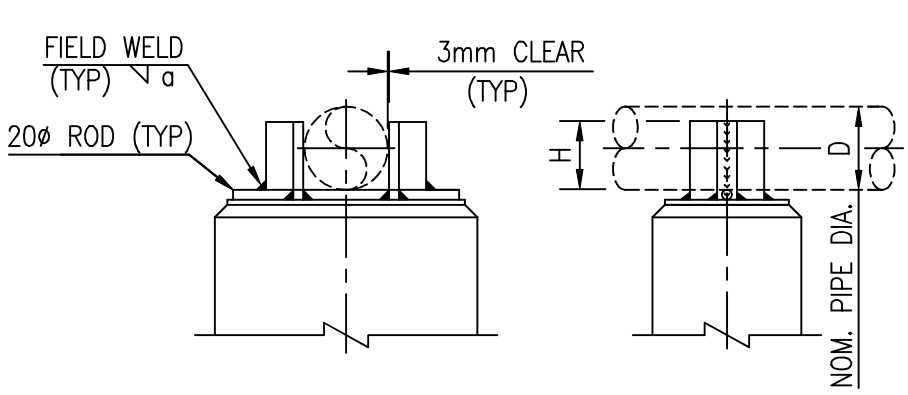
REV. NO.	DATE	SUBJECT OF REVISION	PREP	CHKD	APPD
0	10.05.17	ISSUED WITH TENDER	US	DK	AD

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Date: 2025.03.13 12:56:46 IST

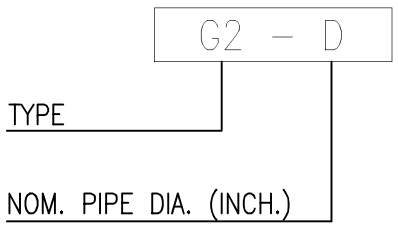
M/s. VCS QUALITY SERVICES PVT. LTD.	GUIDE SUPPORT FOR BARE PIPE (SIZE 1/2" TO 24") TYPE G2	DRAWING NO. SD-PI-016 SHEET NO. 1 OF 1



FOR SIZES UPTO 4"



FOR SIZES 6" THRU 24"



SYMBOL

D	H	a	METERIAL
2" & SMALLER	40	6	FLAT 60 x 10
3" TO 4"	70	6	FLAT 75 x 10
6" TO 8"	130	6	2 NOS. ISA 50 x 50 x 6
10" TO 18"	230	10	2 NOS. ISA 75 x 75 x 10
20" TO 24"	350	10	2 NOS. ISA 90 x 90 x 10

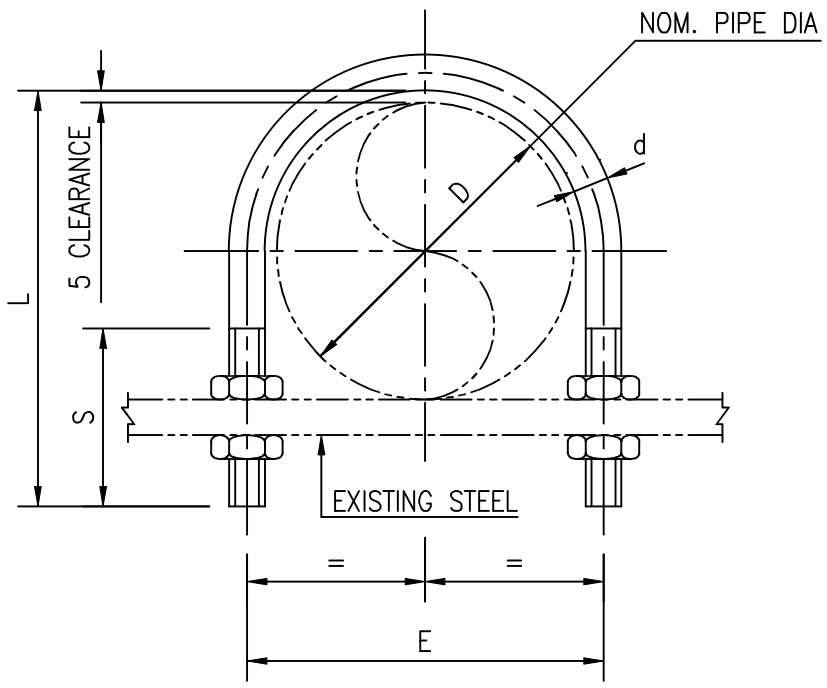
NOTES:-

GUIDE ANGLES SHOULD BE SUITABLY TRIMMED WHEREVER THESE OBSTRUCT ADJOINING GUIDE ANGLES.

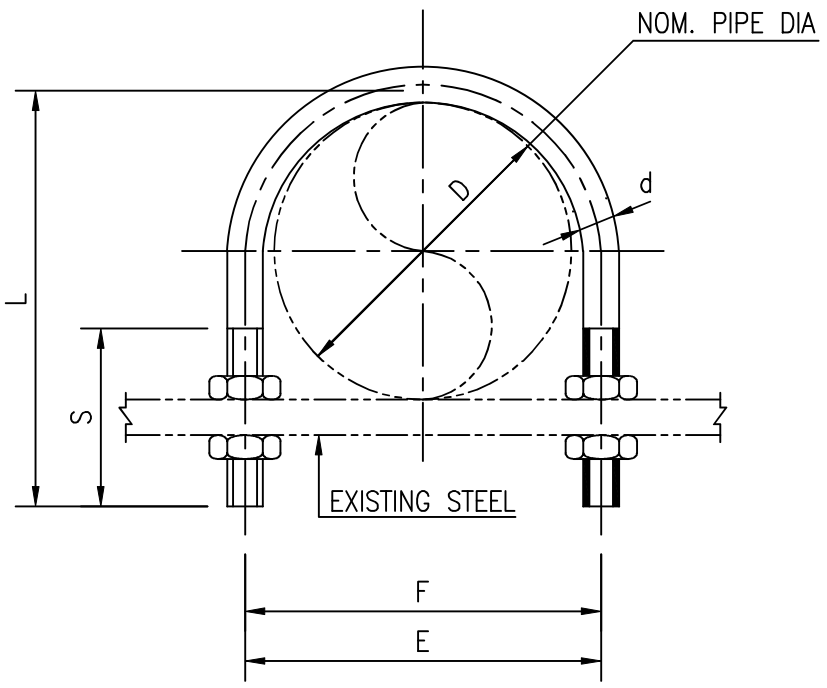
REV. NO.	DATE	SUBJECT OF REVISION	PREP	CHKD	APPD
0	10.05.17	ISSUED WITH TENDER	US	DK	AD

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Date: 2025.03.13 12:56:46 IST

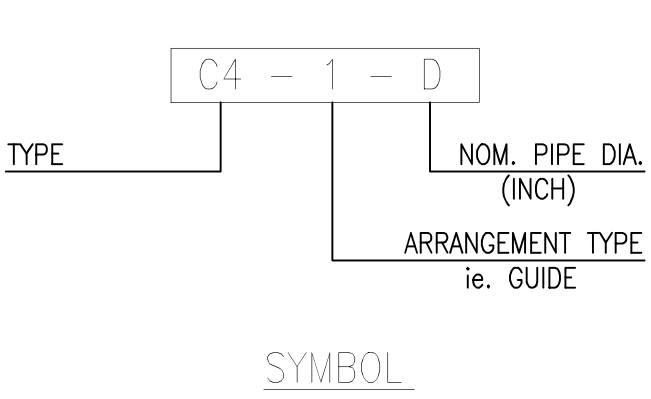
M/s. VCS QUALITY SERVICES PVT. LTD.	U-BOLT FOR BARE PIPE (SIZE 1/2" TO 24")	DRAWING NO. SD-PI-017
		SHEET NO. 1 OF 1



GUIDE
ARRANGEMENT TYPE-1
(1/2" TO 24")



FIXED
ARRANGEMENT TYPE-2
(1/2" TO 1 1/2")



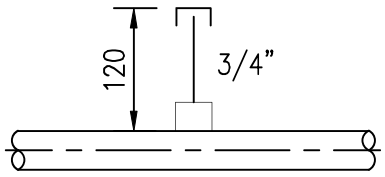
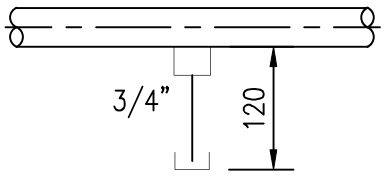
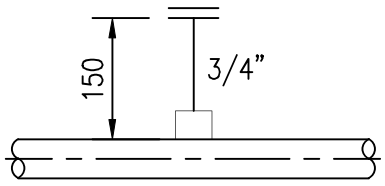
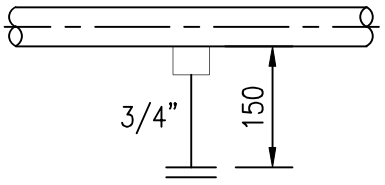
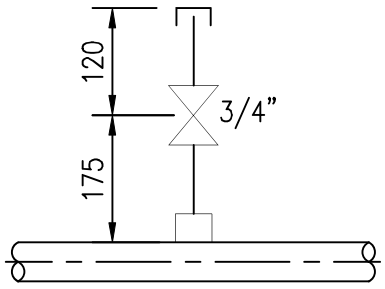
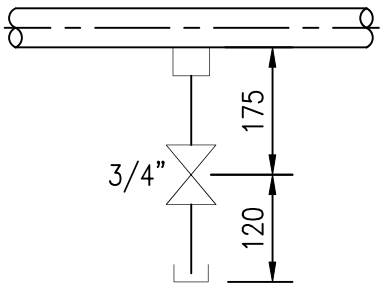
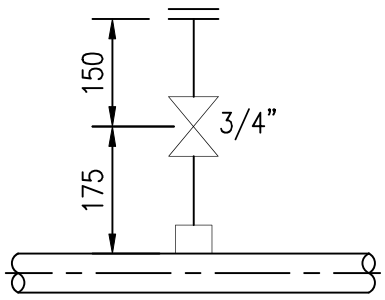
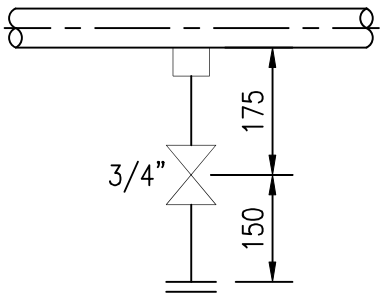
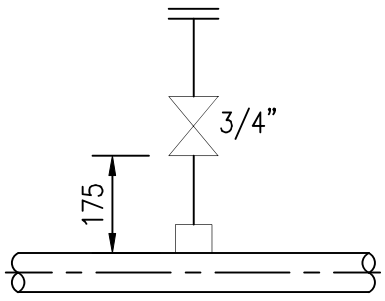
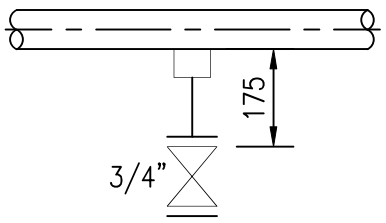
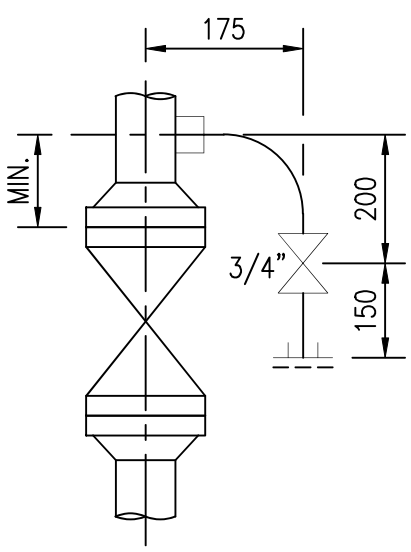
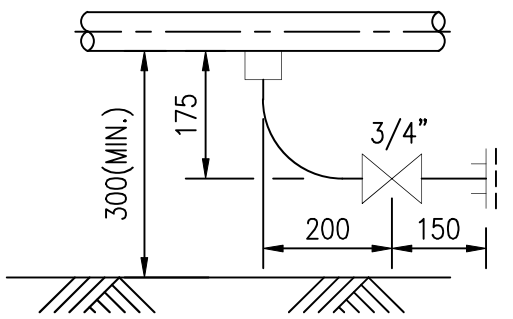
SYMBOL

D	O.D. (mm)	'U' CLAMP				
		L	E	S	d	F
1/2"	21	65	30	50	6	24
3/4"	27	70	36	50	6	30
1"	33	75	45	55	8	37
1 1/2"	48	90	60	55	8	52
2"	60	105	72	60	8	64
3"	89	145	106	80	12	94
4"	114	170	130	80	12	119
6"	168	240	190	100	16	173
8"	219	290	242	100	16	226
10"	273	345	296	100	16	280
12"	324	420	351	130	20	331
14"	356	450	382	130	20	362
16"	408	500	435	130	20	414
18"	457	565	490	140	24	465
20"	508	620	540	140	24	515
24"	610	720	645	140	24	620

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M/s. VCS QUALITY SERVICES PVT. LTD.	VENTS AND DRAINS (ON LINES 2" AND ABOVE)	DRAWING NO. SD-PI-018
		SHEET NO. 1 OF 1

TYPE	VENT	DRAIN	TYPE
VP1 V1C			
			D1 D1C
V2F			
			D2F
V3 V3C			
			D3 D3C
V4F			
			D4F
V5F			
			D5F
		DC9 DF9	
			DC10 DF10

NOTES:-

1. DELETED.
2. VENTS & DRAINS SHALL BE PROVIDED WITH GATE, GLOBE OR PLUG VALVE (FLG'D.) WITH HALF COUPLING. OR STUB IN, WITH CAP OR FLANGE & BLIND FLANGE AS PER PIPING SPECIFICATIONS.
3. DELETED.
4. LEGEND : V = VENT; D = DRAIN; C = CAP; F = FLANGE; P = PLUG.

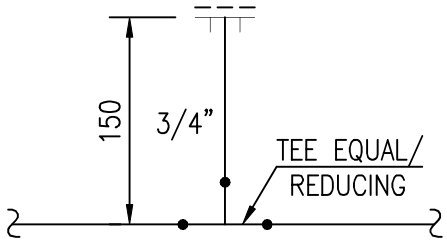
REV. NO.	DATE	SUBJECT OF REVISION	PREP	CHKD	APPD
0	10.05.17	ISSUED WITH TENDER	US	DK	AD

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M/s. VCS QUALITY SERVICES PVT. LTD.	VENTS AND DRAINS (ON LINES 1 1/2" AND BELOW)	DRAWING NO. SD-PI-019
		SHEET NO. 1 OF 1

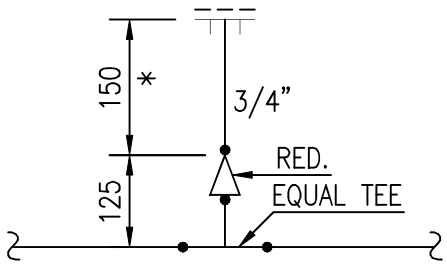
TYPE

VC1
VF1
VP1

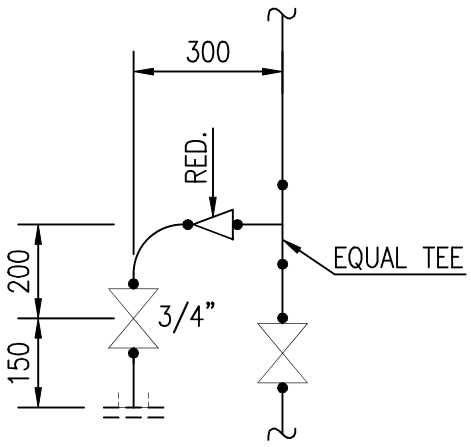


ON LINE 3/4"–1 1/2"

VC2
VF2
VP2

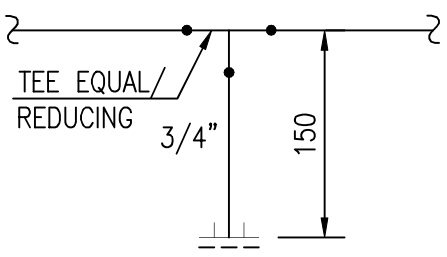


ON LINE 1"–1 1/2"



ON LINE 1"–1 1/2"

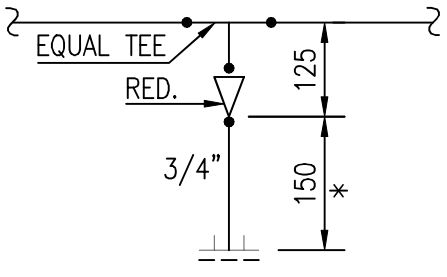
DC7
DF7
DP7



TYPE

DC1
DF1
DP1

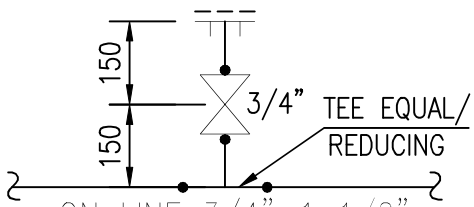
ON LINE 3/4"–1 1/2"



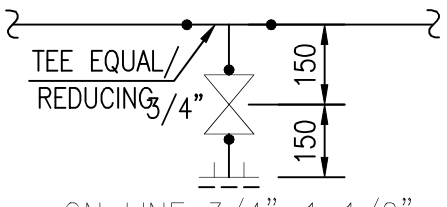
DC2
DF2
DP2

ON LINE 3/4"–1 1/2"

VC3
VF3
VP3



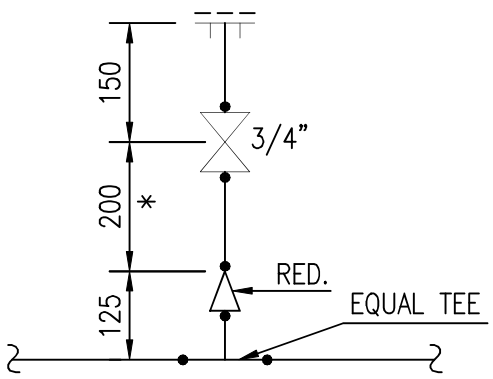
ON LINE 3/4"–1 1/2"



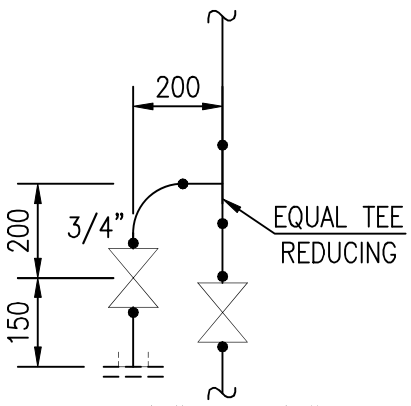
DC3
DF3
DP3

ON LINE 3/4"–1 1/2"

VC4
VF4
VP4

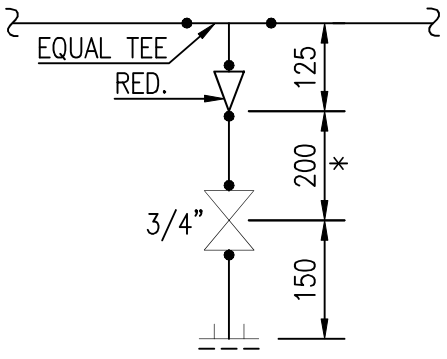


ON LINE 1"–1 1/2"



ON LINE 3/4"–1 1/2"

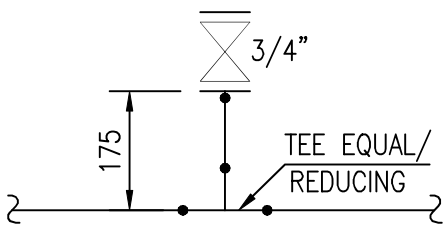
DC8
DF8
DP8



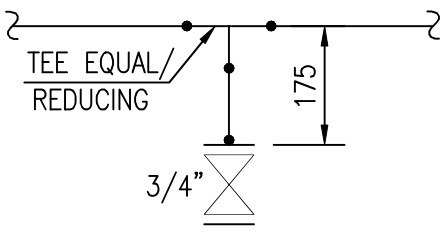
DC4
DF4
DP4

ON LINE 1"–1 1/2"

VF5
VP5



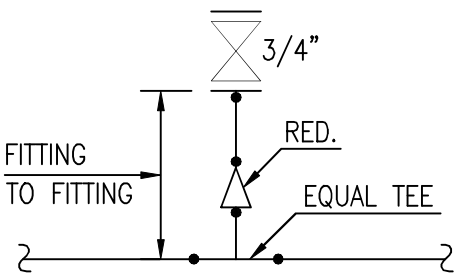
ON LINE 3/4"–1 1/2"



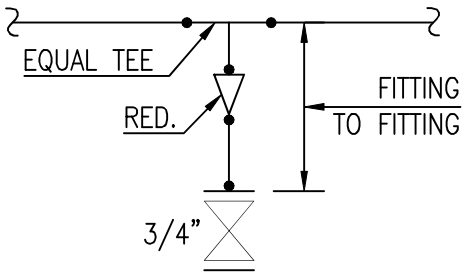
DC5
DF5

ON LINE 3/4"–1 1/2"

VF6
VP6



VENT ON LINE 1"–1 1/2"



DC6
DF6

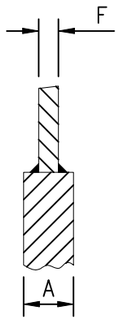
VENT ON LINE 1"–1 1/2"

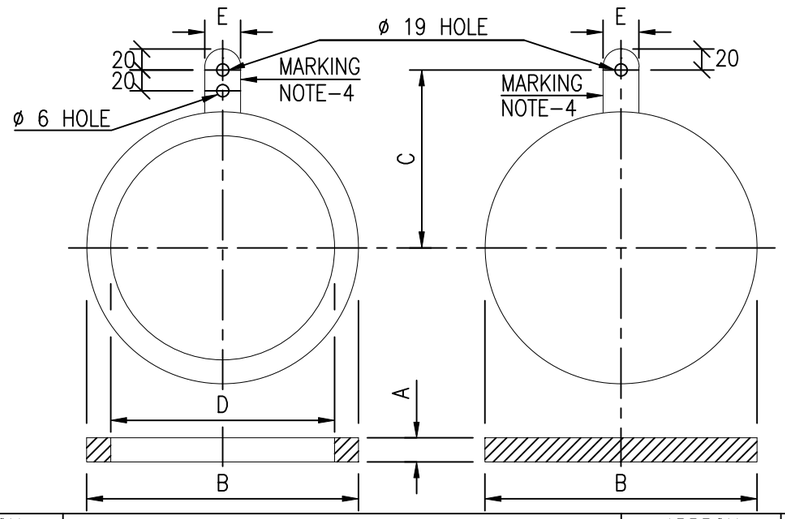
NOTES:–

1. DIMENSIONS ARE VALID FOR 50mm(MAX) INSULATION THICKNESS, INCREASE DIMENSIONS AS REQUIRED, DIMENSIONS MARKED '*' ARE MAXIMUM AND MAY BE REDUCED TO SUIT.
2. VENTS & DRAINS SHALL BE PROVIDED WITH GATE, GLOBE OR PLUG VALVE (FLGD.) WITH TEE (EQUAL OR REDUCING), HALF COUPLING OR STUB IN, CAP OR PLUG FLANGE AND BLIND FLANGE AS PER PIPING SPECIFICATION.
   LEGEND : V = VENT; D = DRAIN; C = CAP; F = FLANGE; RED. = REDUCER, COUPLING OR SOCKET; P = PLUG.

REV. NO.	DATE	SUBJECT OF REVISION	PREP	CHKD	APPD
0	10.05.17	ISSUED WITH TENDER	US	DK	AD

Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST





NOTES:-

1. PROVIDE CONCENTRIC SERRATED FINISH ON BOTH SIDES WITH GROOVES 0.8 mm APART AND DEPTH APPROX 0.4 mm.
2. DIMENSIONS ARE FOR FLANGES TO ANSI B16.5 FOR SIZE UP TO 24" & MSS-SP-44 FOR SIZE ABOVE 24" FOR FLANGES TO API 605 CALCULATE DIMN.
3. THE DIA METER RATING AND MATERIAL SPECIFICATION SHALL BE MARKED ON WELDED FIXED PLATE.
4. MATERIAL AS PER PIPE CLASS.

PIPE SIZE INCH	150# FF							APPROX WT KGS		300# FF							APPROX WT KGS		600# FF							APPROX WT KGS		PIPE SIZE INCH
	A	B	C	D	E	F		BLIND	SPECER	A	B	C	D	E	F		BLIND	SPECER	A	B	C	D	E	F		BLIND	SPECER	
1"	5	62	105	29	25	4		0.2	0.1	5	70	115	29	25	4		0.2	0.1	5	70	125	29	25	4		0.28	0.15	1"
1 1/2"	5	82	115	43	25	4		0.3	0.2	5	92	125	43	25	4		0.4	0.3	7	92	125	43	25	4		0.5	0.35	1 1/2"
2"	7	102	125	55	25	4		0.4	0.3	7	108	130	55	25	4		0.6	0.4	10	108	130	55	25	4		0.75	0.5	2"
2 1/2"	7	121	140	65	25	4		0.8	0.6	10	127	150	65	25	6		1.1	0.7	15	127	150	65	25	6		1.2	0.9	2 1/2"
3"	7	134	150	80	40	4		0.9	0.7	10	146	155	80	40	6		1.7	1.0	15	146	155	80	40	6		2.0	1.2	3"
4"	8	170	165	106	40	6		1.8	1.0	13	178	180	106	40	6		2.1	1.2	18	190	180	106	40	6		3.7	2.4	4"
6"	11	218	190	157	40	6		3.7	1.5	18	248	210	157	40	6		7.2	3.8	24	263	225	157	40	8		11.0	6.2	6"
8"	15	275	220	207	40	6		7.5	2.7	21	305	240	207	40	8		13.5	6.3	30	314	260	207	40	10		19.5	10.0	8"
10"	18	335	250	260	40	8		13.0	4.3	26	358	270	260	40	10		22.5	8.8	37	397	300	260	40	10		37.0	19.0	10"
12"	19	405	290	312	40	8		22.0	8.0	30	418	310	312	40	10		35.0	13.8	43	454	325	312	40	15		57.0	27.5	12"
14"	22	445	320	342	40	10		28.0	12.5	34	480	340	342	40	15		52.0	23.5	48	448	350	342	40	15		71.0	33.0	14"
16"	26	510	350	393	40	10		42.0	15.0	38	536	375	393	40	15		70.0	30.0	54	560	390	393	40	20		110	55	16"
18"	29	545	370	445	40	10		53.0	17.0	43	592	400	445	40	20		100	42.0	62	608	415	445	40	20		140	65	18"
20"	30	600	400	496	40	15		70.0	20.0	48	650	440	496	40	20		128	49.0	67	678	450	496	40	20		190	83	20"
24"	37	710	450	597	50	15		120	52.0	57	772	510	597	50	20		210	74.0	81	785	515	597	50	25		307	125	24"
TOLERANCE	± 0.3	± 0.5		± 0.5	± 1.0					± 0.3	± 0.5		± 0.5	± 1.0					± 0.3	± 0.5		± 0.5	± 1.0					TOLERANCE

M/s. VCS QUALITY SERVICES PVT. LTD.

DWG. NO.	REF. DRAWING

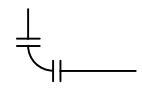
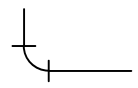
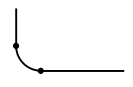
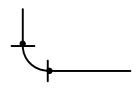
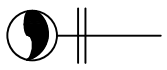
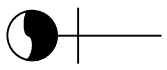
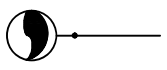
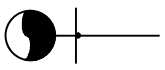
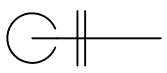
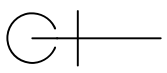
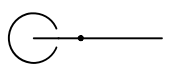
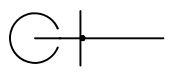
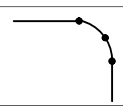
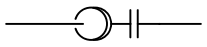
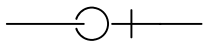
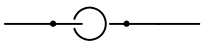
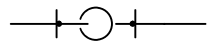
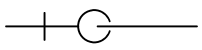
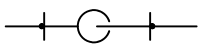
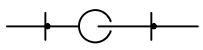
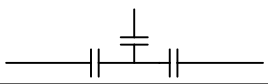
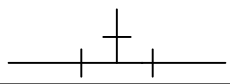
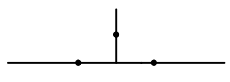
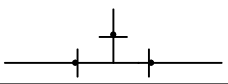
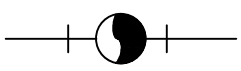
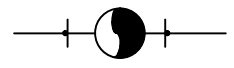
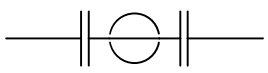
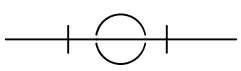
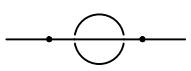
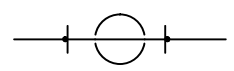
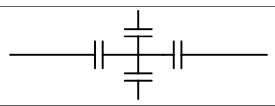
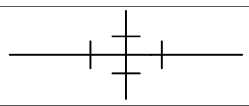
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0	10.05.17	ISSUED WITH TENDER	US	DK	AD

SPACERS BLINDS
150#,300# & 600# FF

DRAWING NO.	REV.
SD-PI-021	0

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Date: 2025.03.13 12:56:46 IST

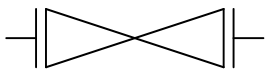
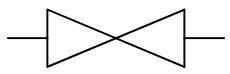
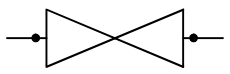
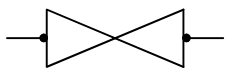
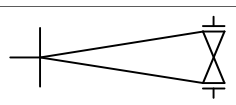
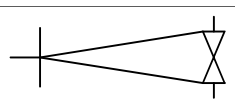
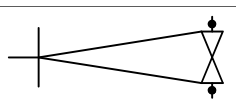
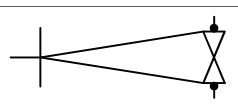
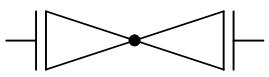
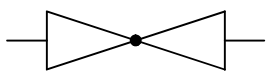
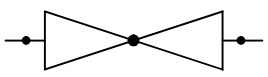
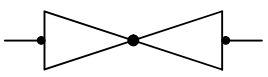
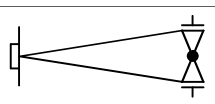
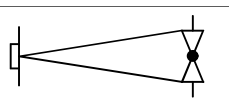
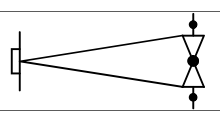
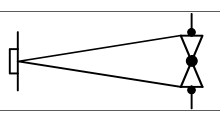
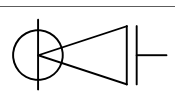
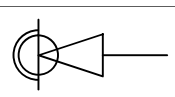
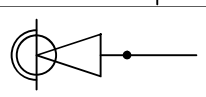
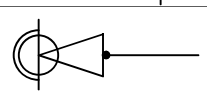
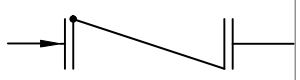
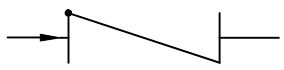
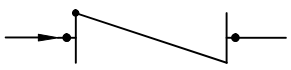
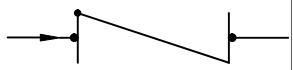
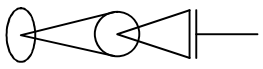
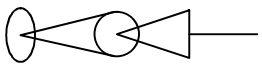
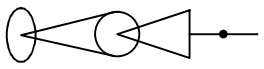
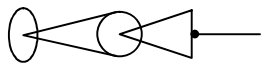
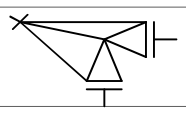
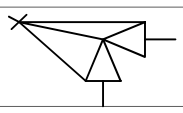
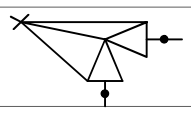
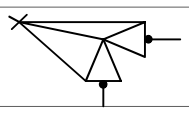
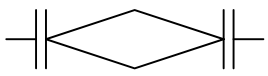
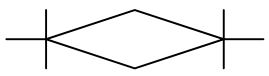
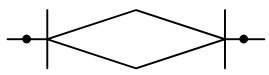
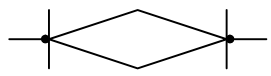
M/s. VCS QUALITY SERVICES PVT. LTD.	SYMBOLS OF PIPING ELEMENTS ON DRAWINGS	DRAWING NO. SD–PI–023
		SHEET NO. 1 OF 4

DESCRIPTION	FLANGED	SCREWED	WELDED (NOTE–1)	SOCKET WELD
90° ELBOW				
ELBOW (TURNED UP)				
ELBOW (TURNED DOWN)				
MITERED BEND 90°				
MITERED BEND 45°				
45° ELBOW				
45° ELBOW (TURNED UP)				
45° ELBOW (TURNED DOWN)				
TEE EQUAL/UNEQUAL				
TEE (OUTLET UP)				
TEE (OUTLET DOWN)				
CROSS				
CONCENTRIC REDUCER				
ECCENTRIC REDUCER				
DEAD END				
LATERAL				
SIGHT GLASS				
UNION				
HALF COUPLING				
FULL COUPLING				
HOSE COUPLING				

REV. NO.	DATE	SUBJECT OF REVISION	PREP	CHKD	APPD
0	10.05.17	ISSUED WITH TENDER	US	DK	AD

Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST

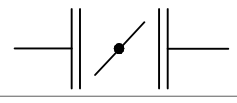
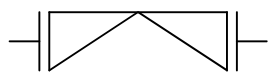
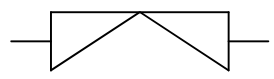
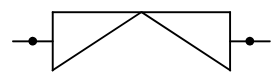
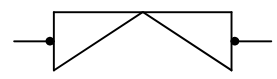
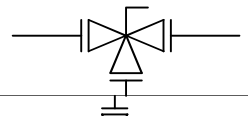
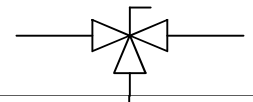
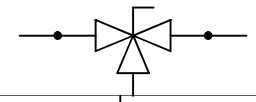
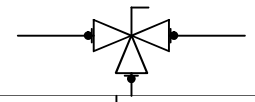
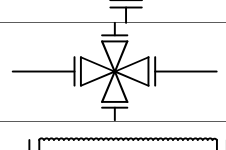
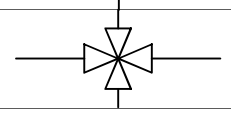
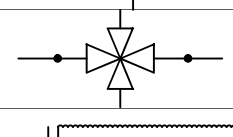
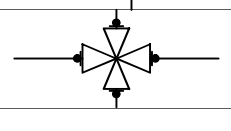
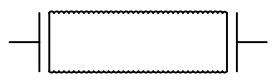
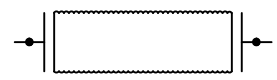
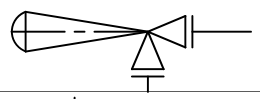
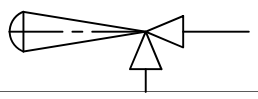
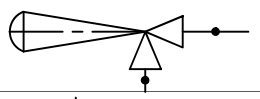
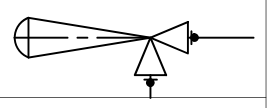
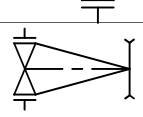
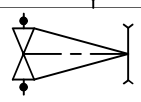
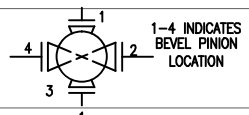
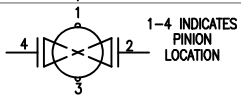
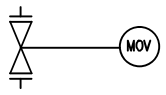
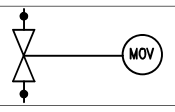
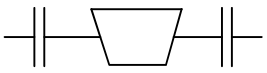
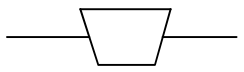
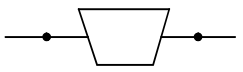
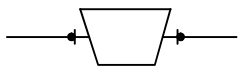
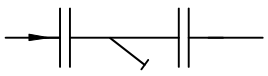
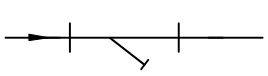
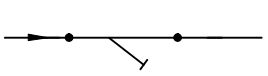
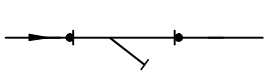
M/s. VCS QUALITY SERVICES PVT. LTD.	SYMBOLS OF PIPING ELEMENTS ON DRAWINGS	DRAWING NO. SD–PI–023
		SHEET NO. 2 OF 4

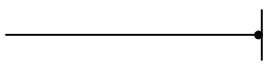
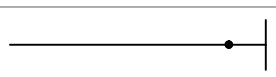
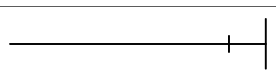
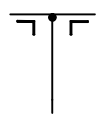
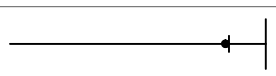
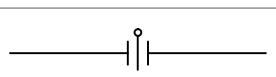
DESCRIPTION	FLANGED	SCREWED	WELDED (NOTE–1)	SOCKET WELD
GATE VALVE (PLAN)				
GATE VALVE (ELEVATION)				
GLOBE VALVE (PLAN)				
GLOBE VALVE (ELEVATION)				
ANGLE VALVE (PLAN)				
ANGLE VALVE (ELEVATION)				
CHECK VALVE (PLAN OR ELEVATION)				
ANGLE STOP CHECK VALVE (PLAN)				
ANGLE STOP CHECK VALVE (ELEVATION)				
PLUG VALVE (PLAN)				
PLUG VALVE (ELEVATION)				
BALL VALVE (PLAN)				
BALL VALVE (ELEVATION)				
NEEDLE VALVE (PLAN OR ELEVATION)				
RELIEF VALVE (PLAN)				
RELIEF VALVE (ELEVATION)				
CONTROL VALVE GLOBE TYPE(PLAN)				
CONTROL VALVE GLOBE TYPE(ELEVATION)				
CONTROL VALVE BUTTERFLY TYPE(PLAN)				
CONTROL VALVE BUTTERFLY TYPE(ELEV.)				
SOLENOID OPERATED VALVE(PLAN OR ELEV.)				

REV. NO.	DATE	SUBJECT OF REVISION	PREP	CHKD	APPD
0	10.05.17	ISSUED WITH TENDER	US	DK	AD

Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST

M/s. VCS QUALITY SERVICES PVT. LTD.	SYMBOLS OF PIPING ELEMENTS ON DRAWINGS	DRAWING NO. SD–PI–023
		SHEET NO. 3 OF 4

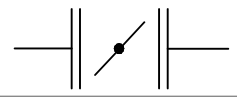
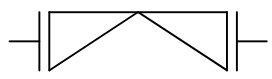
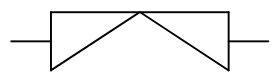
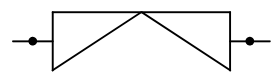
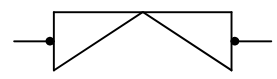
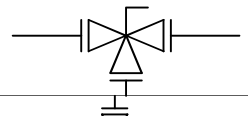
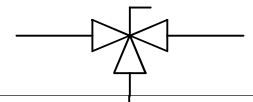
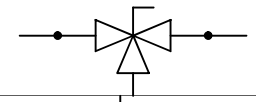
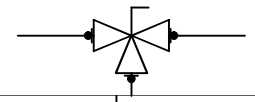
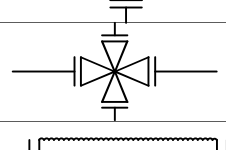
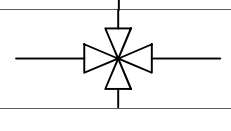
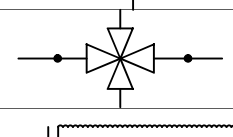
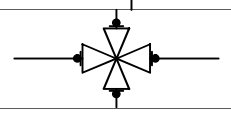
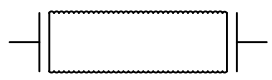
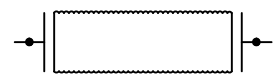
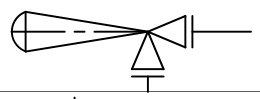
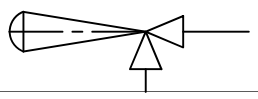
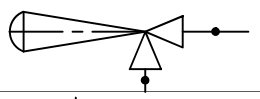
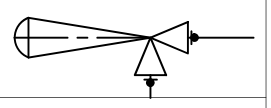
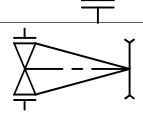
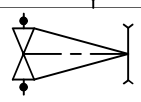
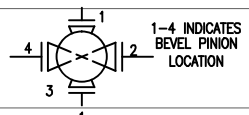
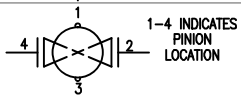
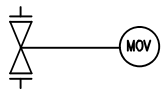
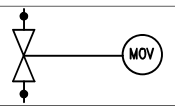
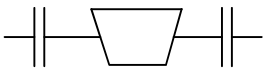
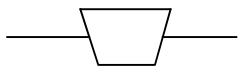
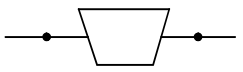
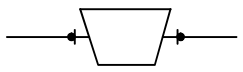
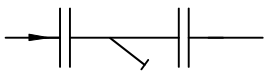
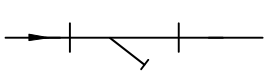
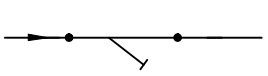
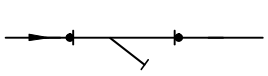
DESCRIPTION	FLANGED	SCREWED	WELDED (NOTE–1)	SOCKET WELD
BUTTERFLY VALVE (PLAN OR ELEVATION)				
DIAPHRAGM VALVE (PLAN OR ELEVATION)				
3–WAY PLUG VALVE (PLAN OR ELEVATION)				
4–WAY PLUG VALVE (PLAN OR ELEVATION)				
EXPANSION JOINT				
ANGLE CONTROL VALVE				
CHAIN OPERATING VALVE				
GEAR OPERATED VALVE (BEVEL GEAR)PLAN				
GEAR OPERATED VALVE (SPUR GEAR)PLAN				
MOTOR OPERATING VALVE				
STEAM TRAP				
Y–STRAINER				

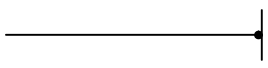
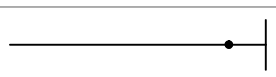
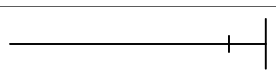
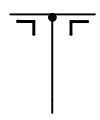
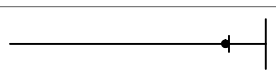
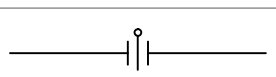
DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL
SLIP ON FLANGE		STUB – IN (WITH OR WITHOUT RENIF)	
WELDNECK FLANGE			
SCREWED FLANGE		STUB – IN (SADDLE RENIF)	
SOCKET WELD FLANGE			
SPACER		STUB – IN WITH RENIF (IN PLAN)	
SPACER BLIND			
SPECTALE FIG. 8 (BLIND)		INSULATED (LINES 12" AND BELOW)	
SPECTALE FIG. 8 (OPEN)			

REV. NO.	DATE	SUBJECT OF REVISION	PREP	CHKD	APPD
0	10.05.17	ISSUED WITH TENDER	US	DK	AD

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M/s. VCS QUALITY SERVICES PVT. LTD.	SYMBOLS OF PIPING ELEMENTS ON DRAWINGS	DRAWING NO. SD–PI–023
		SHEET NO. 3 OF 4

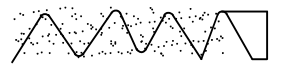
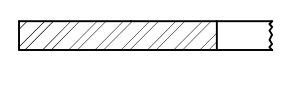
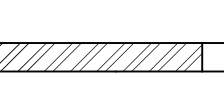
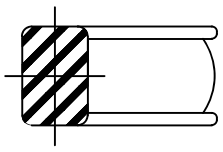
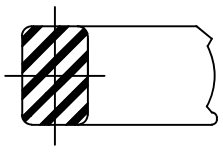
DESCRIPTION	FLANGED	SCREWED	WELDED (NOTE–1)	SOCKET WELD
BUTTERFLY VALVE (PLAN OR ELEVATION)				
DIAPHRAGM VALVE (PLAN OR ELEVATION)				
3–WAY PLUG VALVE (PLAN OR ELEVATION)				
4–WAY PLUG VALVE (PLAN OR ELEVATION)				
EXPANSION JOINT				
ANGLE CONTROL VALVE				
CHAIN OPERATING VALVE				
GEAR OPERATED VALVE (BEVEL GEAR)PLAN				
GEAR OPERATED VALVE (SPUR GEAR)PLAN				
MOTOR OPERATING VALVE				
STEAM TRAP				
Y–STRAINER				

DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL
SLIP ON FLANGE		STUB – IN (WITH OR WITHOUT RENIF)	
WELDNECK FLANGE			
SCREWED FLANGE		STUB – IN (SADDLE RENIF)	
SOCKET WELD FLANGE			
SPACER		STUB – IN WITH RENIF (IN PLAN)	
SPACER BLIND			
SPECTALE FIG. 8 (BLIND)		INSULATED (LINES 12" AND BELOW)	
SPECTALE FIG. 8 (OPEN)			

REV. NO.	DATE	SUBJECT OF REVISION	PREP	CHKD	APPD
0	10.05.17	ISSUED WITH TENDER	US	DK	AD

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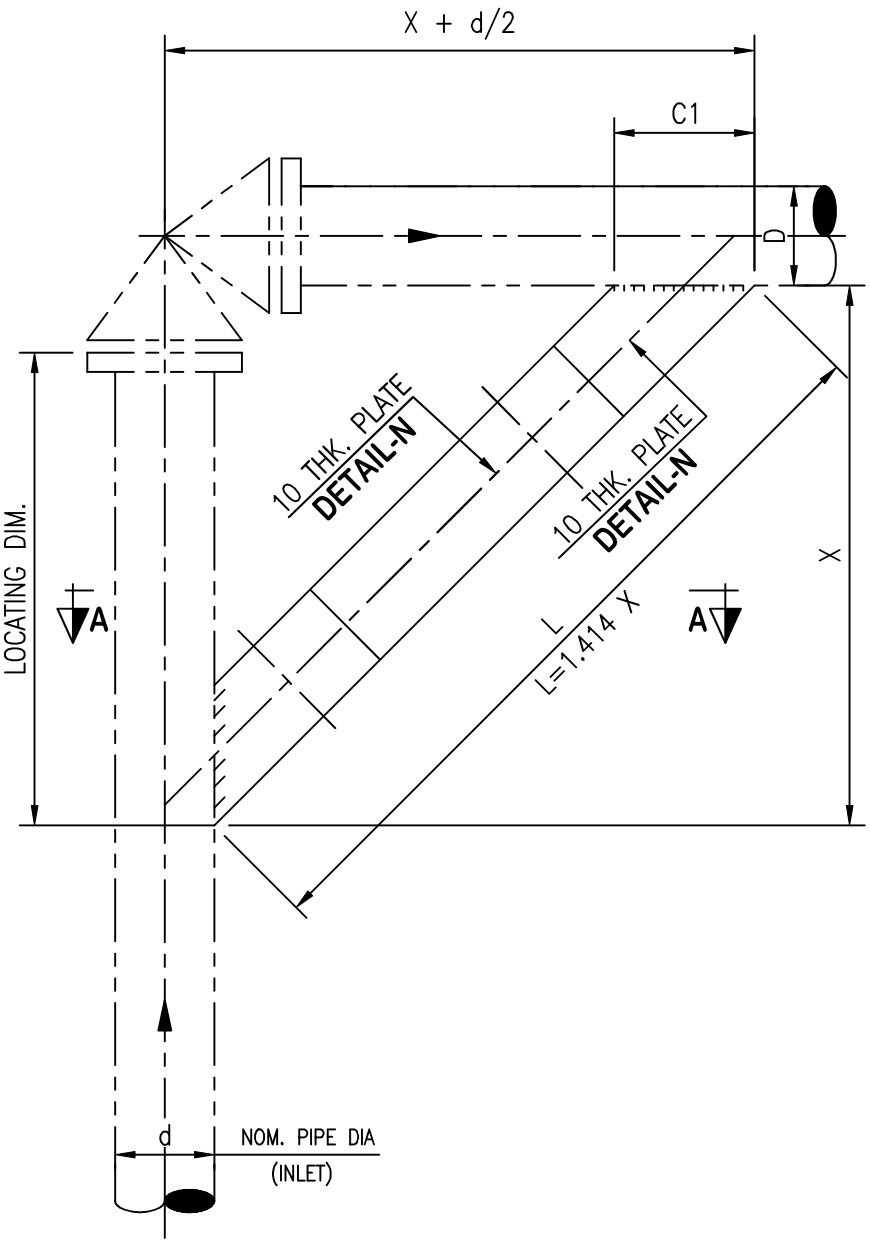
M/s. VCS QUALITY SERVICES PVT. LTD.	GASKET THICKNESS	DRAWING NO.
		SD–PI–024
		SHEET NO. 1 OF 1

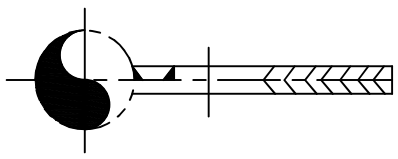
TYPICAL CROSS SECTION	DESCRIPTION		THICKNESS OF GASKET	COMPRESSED THICKNESS (NOTE –1)
	FLAT RING FOR RAISED FACE FLANGE	COMPRESSED ASBESTOS FOR SYNTHETIC RUBBER	2.0	2.0
	FULL FACE FOR FLAT FACE FLANGES			
	SPIRAL WOUND METAL FLAT RING GASKET, NON METALLIC FILTER, AND A STEEL SOLID RING TYPE CENTERING DEVICE– FOR RAISED FACE FLANGES.		4.4	3.0
	FLAT METAL JACKETED GASKET, NON METALLIC FILTER COMPLETELY ENCLOSED WITHIN A FULLY ANNEALED DOUBLE METAL JACKET–FORRAISED FACE FLANGES		3.0	2.0
	CORRUGATED METAL JACKETED GASKET, NON METALLIC FILTER, COMPLETELY ENCLOSED WITHIN A FULLY ANNEALED DOUBLE METAL CORRUGATED JACKET– FOR RAISED FACE FLANGES.		3.2	1.0
	CORRUGATED METAL GASKET–FULLY ANNEALED CORRUGATED METAL WITH FILTER MATERIAL CEMENTED TO THE CORRUGATIONS ON BOTH FACES –FOR RAISED FACE FLANGES		3.2	1.0
	SOLID METAL FLAT RING FOR SMALL TONGUE AND GROOVE FLANGES.		AS SPECIFIED	
	SOLID METAL FLAT RING FOR LARGE TONGUE AND GROOVE FLANGES.		AS SPECIFIED	
	SOLID METAL OCTAGONAL RING FOR R.T.J FLANGES		DIMENSIONS SHALL BE AS PER ASME B 16.20(NOTE–2)	
	SOLID METAL OVAL RING FOR R.T.J FLANGES		DIMENSIONS SHALL BE AS PER ASME B 16.20(NOTE–2)	
	FULLY ANEALED CORRUGATED METAL FOR RAISED FACE FLANGES.		3.2	1.0

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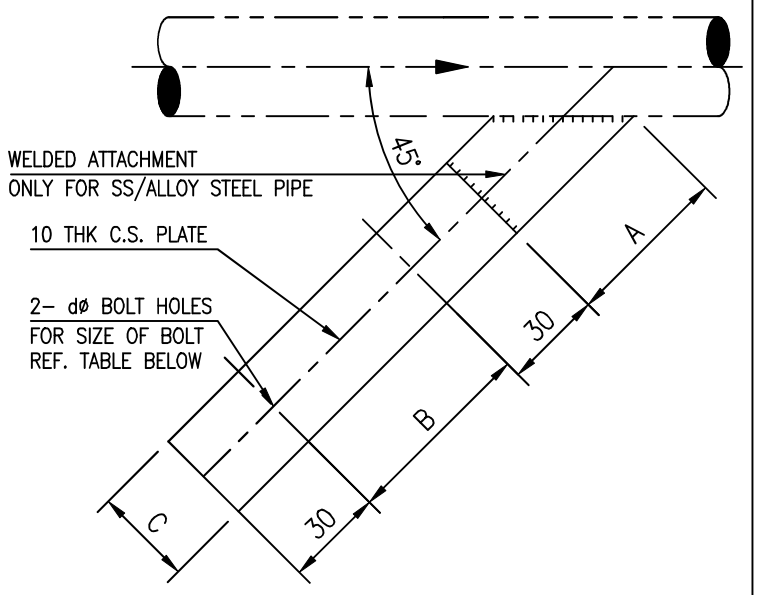
Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST

M/s. VCS QUALITY SERVICES PVT. LTD.	SUPPORTING ARRANGEMENT FOR ANGLE AND RELIEF VALVES TYPE–SP2	DRAWING NO. SD–PI–025 SHEET NO. 1 OF 1

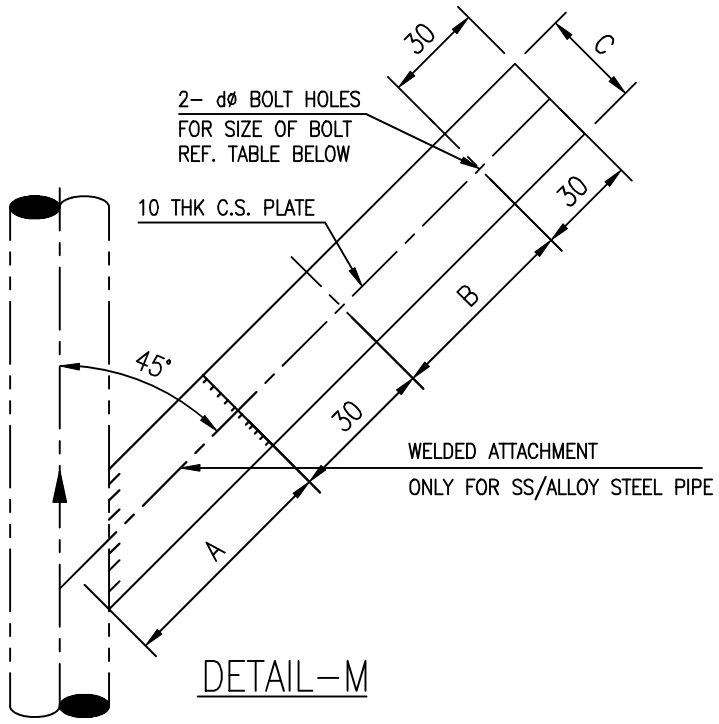




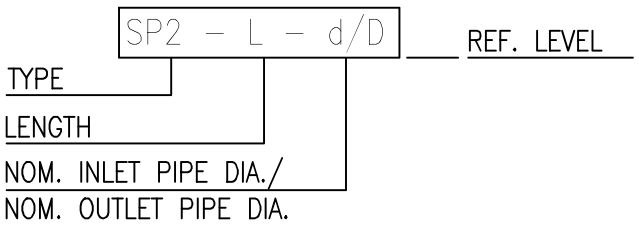
SECTION A–A



DETAIL–N



DETAIL–M



SYMBOL

NOTES:–

1. MATERIAL FOR WELDED ATTACHMENT SHALL BE EQUIVALENT TO PIPE MATERIAL.

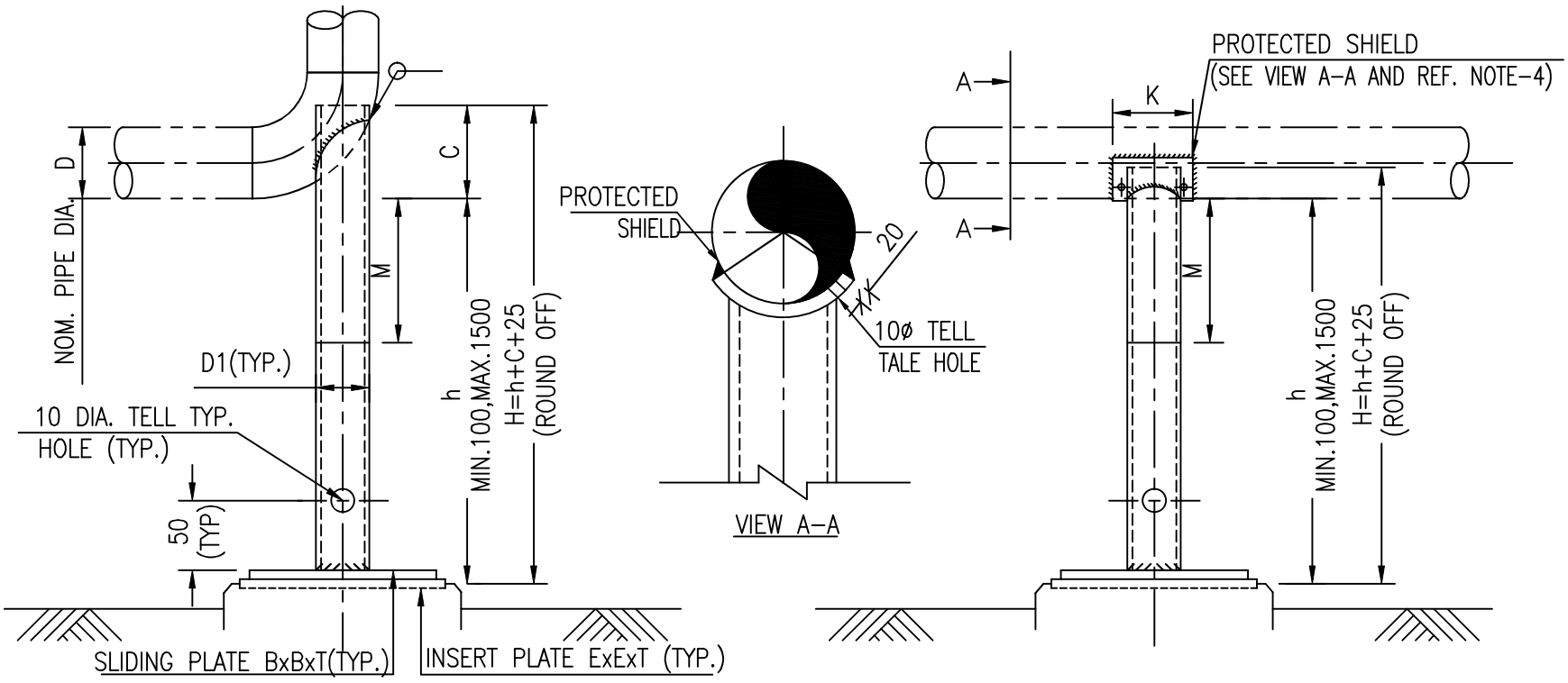
D	BOLT SIZE dø	A	C	B MIN.	C1	D1
1" TO 4"	M12 X 50	75	50	150	71	14
6" TO 12"	M16 X 50	100	75	200	106	18

FOR TEMP. UP TO 400 °C ONLY

REV. NO.	DATE	SUBJECT OF REVISION	PREP	CHKD	APPD
0	10.05.17	ISSUED WITH TENDER	US	DK	AD

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Date: 2025.03.13 12:56:46 IST

M/s. VCS QUALITY SERVICES PVT. LTD.	LOW SUPPORT SLIDING FOR BARE & INSULATED PIPE SIZE 2" THRU 36" TYPE–L1 AND L1A	DRAWING NO. SD–PI–026
		SHEET NO. 1 OF 1



L1 – 1 – H/M

TYPE
SIZE NO.
HEIGHT
LOCATION OF MATERIAL TRANSITION (NOTE–2)

SYMBOL

L1A – 2 – H/M

TYPE
SIZE NO.
HEIGHT
LOCATION OF MATERIAL TRANSITION (NOTE–2)

SYMBOL

SIZE NO.	D	D1 (NOTE–3)	B	T	C (NOTE–5)	E	K (NOTE–4)
1	2"	2" S40/10S	150	10	70	250	160
	3"				115		
2	4"	3" S40/10S	200	10	137	300	190
	6"				174		
3	8"	4" S40/10S	200	12	205	300	215
	10"				262		
	12"				287		
4	14"	6" S40/10S	250	12	388	350	270
	16"				418		
5	18"	8" S40/10S	300	12	454	400	320
6	20"	10" S40/10S	350	12	554	450	375
	24"				615		
7	26"	12" S40/10S	400	16	675	500	425
	30"				800		
	36"				950		

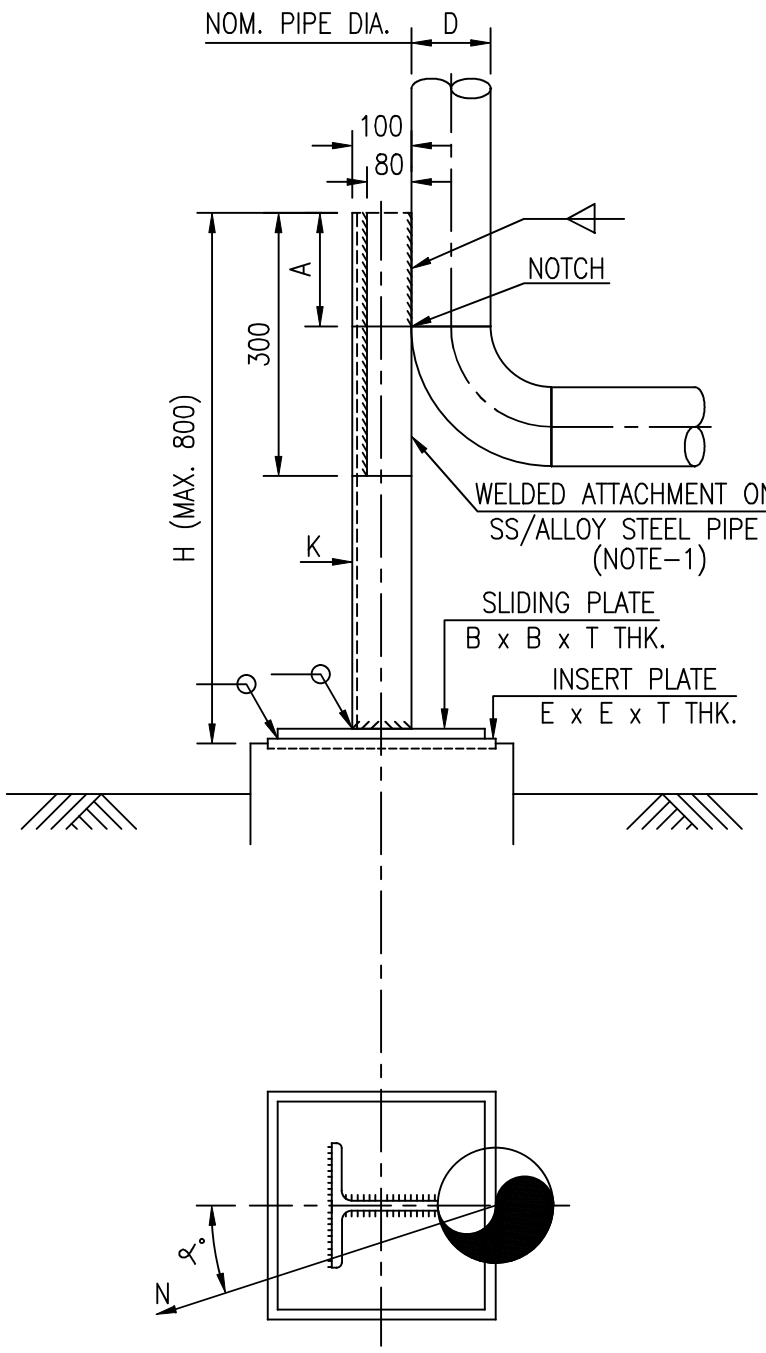
NOTES:–

1. INSERT AND SLIDING PLATE MATERIAL SHALL BE CARBON STEEL WHERE DESIGN TEMP. IS >345°C WITH h < 200MM, SLIDING PLATE MATERIAL SHALL BE EUIVALENT TO PIPE MATERIAL.
2. DIMENSION "M" LOCATES THE POINT OF MATERIAL TRANSITION ON THE SUPPORT. THE STUB MATERIAL SHALL BE EQUIVALENT TO THAT OF LINE PIPE AND THE LOWER SUPPORT PIPE SHALL BE CARBON STEEL. MINIMUM VALUE OF M SHALL BE "INSULATION THICKNESS+25MM".
   A. FOR CARBON STEEL(CS) LINE PIPE, THE ENTIRE SUPPORT PIPE SHALL BE CS, THAT IS M=0.
   B. FOR ALLOY STEEL(AS) OR STAINLESS STEEL(SS) LINE –PIPE, SUPPORT PIPE SHALL CONSIST OF THE FOLLOWING–
      –FOR h LESS THAN OR EQUAL TO 500MM, ENTIRE SUPPORT PIPE MATERIAL SHALL BE EQUIVALENT TIO THAT OF LINE PIPE, THAT IS M=h.
      –FOR h GREATER THAN 500MM,SUPPORT PIPE SHALL BE COMPOSITE WITH M=INSULATION THK.+25MM OR 100MM, WHICHEVER IS GREATER.
3. IN CASE SIZE AND/OR SCH. OF SUPPORT PIPE (D1) LISTED IN THE TABLE IS NOT AVAILABE USE NEXT HIGHER SIZE AND/OR NEAREST HIGHER THICKNESS AVAILABLE.
4. PROTECTION SHIELD (LENGTH=KMM) CUT FROM LINE–PIPE OR EQUIVALANT PLATE SHALL BE PROVIDED ON HORIZONTAL LINE AS FOLLOWS–
   A. FOR 150# AND 300# CLASS PIPEING
      CS AND AS LINES – 10" AND ABOVE
      SS LINES – 2" AND ABOVE
   B. FOR 600# AND HIGHER CLASS PIPING
      CS, AS AND SS LINES – 10" AND ABOVE
5. DIMENSION "C" IS TO BE MODIFIED IF OTHER THAN 1.5 D RADIUS ELBOWS ARE USED.
6. IN CASE CALCULATED h EXCEEDS THE MAX. VALUE, PEDESTAL SHALL BE RAISED ACCORDINGLY.

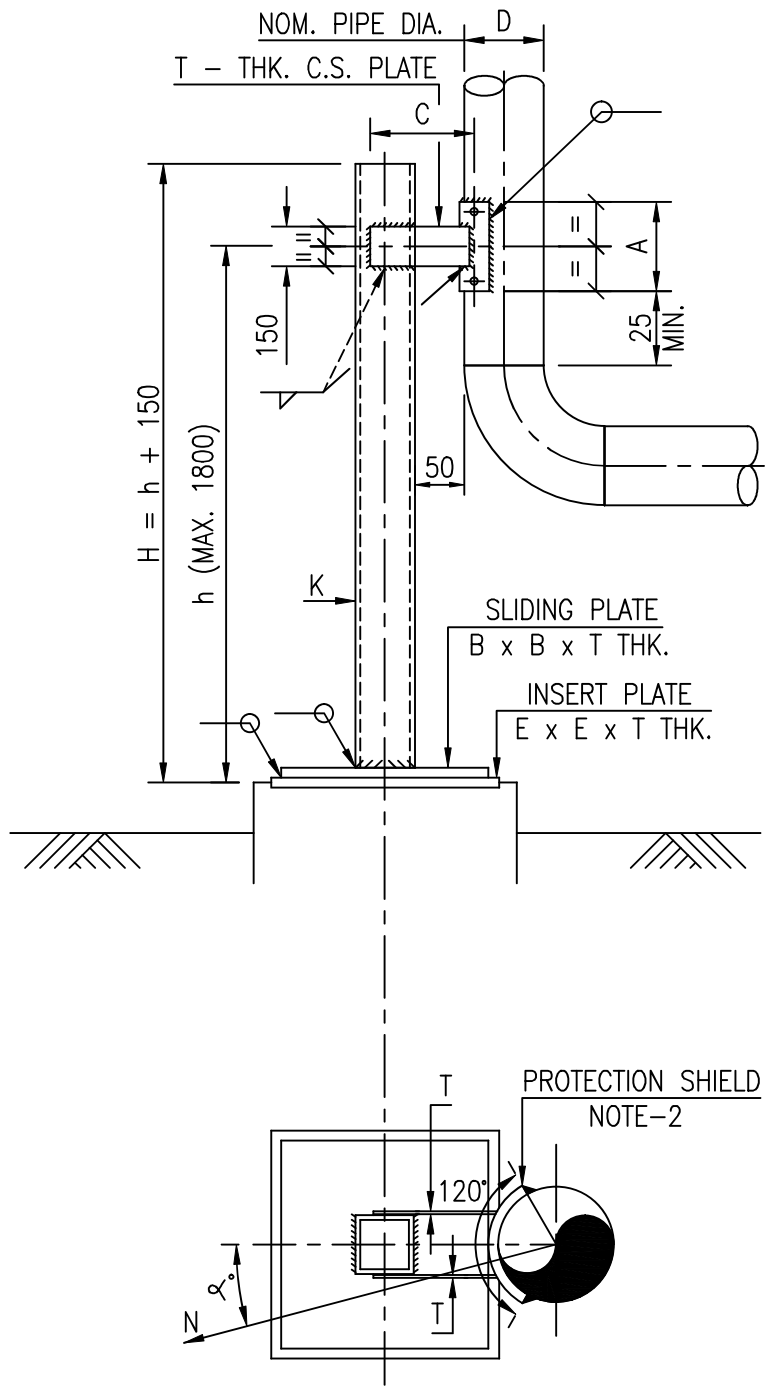
REV. NO.	DATE	SUBJECT OF REVISION	PREP	CHKD	APPD
0	10.05.17	ISSUED WITH TENDER	US	DK	AD

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Date: 2025.03.13 12:56:46 IST

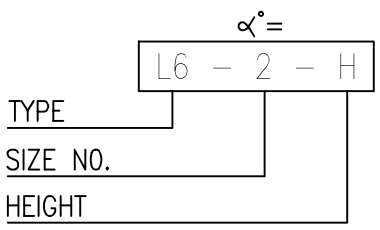
M/s. VCS QUALITY SERVICES PVT. LTD.	LOW SUPPORT FIXED FOR BARE & INSULATED PIPE SIZE 2" THRU 24"TYPE–L6	DRAWING NO. SD–PI–027
		SHEET NO. 1 OF 1



FOR PIPE SIZES 2" THRU 4"



FOR PIPE SIZES 6" THRU 24"



SYMBOL

NOTES:–

1. MATERIAL FOR WELDED ATTACHMENT SHALL BE EQUIVALENT TO PIPE MATERIAL.
2. PROTECTION SHIELD IS TO BE CUT FROM LINE PIPE.

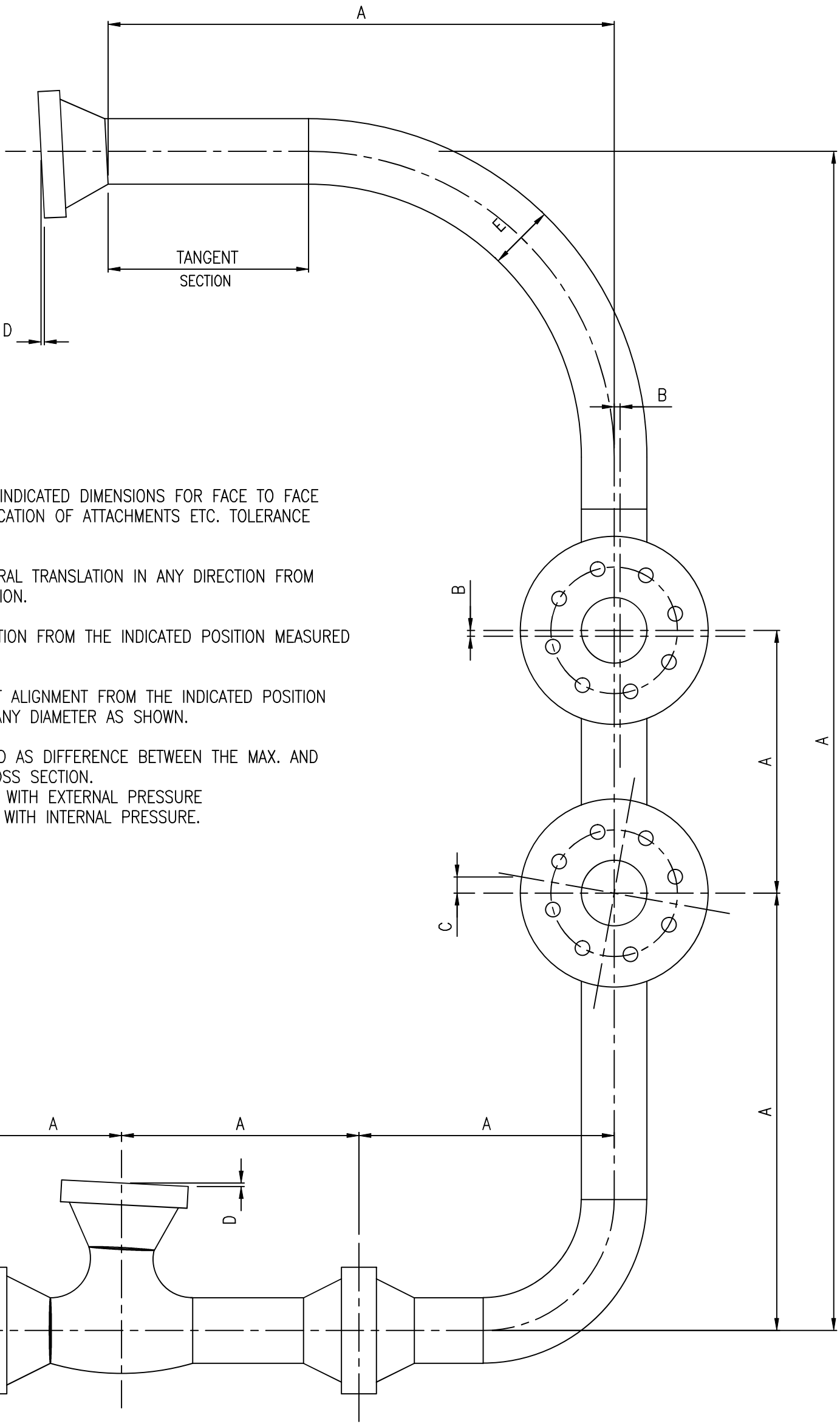
SIZE NO.	D	K	A	T	C	E	B
1	2" TO 4"	CUT FROM ISMB 200	200	10	–	250	150
2	6" TO 10"	ISMC–125 2 NOS.	200	12	150	300	200
3	12" TO 24"	ISMC–225 2 NOS.	300	12	230	400	300

FOR TEMP. UP TO 400 °C ONLY

REV. NO.	DATE	SUBJECT OF REVISION	PREP	CHKD	APPD
0	10.05.17	ISSUED WITH TENDER	US	DK	AD

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M/s. VCS QUALITY SERVICES PVT. LTD.	TOLERANCES FOR FABRICATION	DRAWING NO.
		SD–PI–028
		SHEET NO. 1 OF 1



A ±3 MM. MAX. FROM INDICATED DIMENSIONS FOR FACE TO FACE CENTRE TO FACE LOCATION OF ATTACHMENTS ETC. TOLERANCE CAN NOT BE ADDED.

B ±1.5 MM. MAX. LATERAL TRANSLATION IN ANY DIRECTION FROM THE INDICATED POSITION.

C ±1.5 MM. MAX ROTATION FROM THE INDICATED POSITION MEASURED AS SHOWN.

D ±1 MM MAX. OUT OF ALIGNMENT FROM THE INDICATED POSITION MEASURED ACROSS ANY DIAMETER AS SHOWN.

E FLATTENING MEASURED AS DIFFERENCE BETWEEN THE MAX. AND MIN. OD AT ANY CROSS SECTION.
−3% MAX. FOR PIPE WITH EXTERNAL PRESSURE
8% MAX. FOR PIPE WITH INTERNAL PRESSURE.

REV. NO.	DATE	SUBJECT OF REVISION	PREP	CHKD	APPD
0	10.05.17	ISSUED FOR STANDARD	US	DK	AD

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Date: 2025.03.13 12:56:46 IST

M/s. VCS QUALITY SERVICES PVT. LTD.	ABBREVIATIONS	DRAWING NO. SD–PI–029 SHEET NO. 1 OF 1

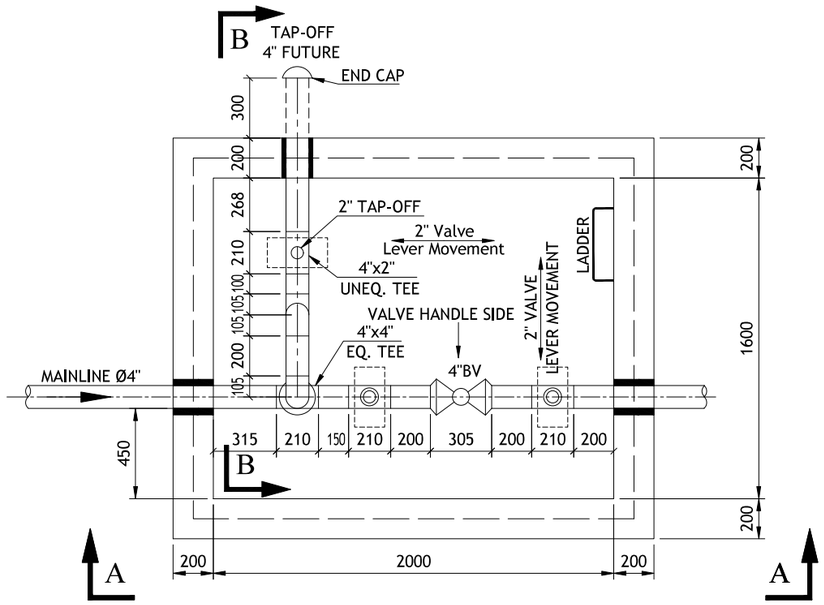
M&F	MALE & FEMALE	SO	SLIP ON
MI	MALLEABLE IRON	SOL	SOCKOLET
MOLY OR MO	MOLYBDENUM	SP. GR	SPECIFIC GRAVITY
MR	MATERIAL REQUISITION	SR	SHORT RADIUS
MTO	MATERIAL TAKE OFF	SS	STAINLESS STEEL
MS	MILD STEEL	ST	STEAM TRAP
MSS	MANUFACTURER'S STANDARD SOCIETY	STN	STATION
MH	MAN HLOE	STM	STEAM
NPT	NATIONAL PIPE THREAD	STD	STANDARD
NPSH	NET POSITIVE SUCTION HEAD	SW	SOCKET WELD
NIP	NIPPLE	SWG	SWAGE NIPPLE / STD WIRE GAGE
OD	OUTSIDE DIAMETER	STA	STEAM TRAP ASSEMBLY
PC.MK	PIECE MARK	TOG	TOP OF GRATING
PE	PLAIN END	TEMP.	TEMPERATURE
PL	PLATE	TOL	THREADOLET
PLTF	PLATFORM	T&C	THREADED & COUPLED
P.S	PIPE SUPPORT	THRD	THREADED
PSE	PLAIN SMALL END	T&G	TONGUE & GROOVE
PRESS.	PRESSURE	TBE	THREADED BOTH ENDS
PSI	POUNDS PER SQUARE INCH	TLE	THREADED LARGE END
POE	PLAIN ONE END	TSE	THREADED SMALL END
PSIG	POUNDS PER SQUARE INCH GAUGE	TOS	TOP OF STEEL
RAD OR R	RADIUS	TOE	THREADED ONE END
RED.	REDUCER	TYP	TYPICAL
RF	RAISED FACE	VC	VENT CONNECTION
R/L	RANDOM LENGTH	VERT.	VERTICAL
REF.	REFERENCE	WP	WORKING PRESSURE, WORKING POINT
RPM	REVOLUTIONS PER MINUTE	⍜	INVERT LEVEL OF PIPE
RTJ	RING TYPE JOINT	▽	BOTTOM LEVEL OF THE PIPE
SH	SPRING HANGER	▼	CENTRELINE ELEVATION OF PIPE
SHT	SHEET	WN	WELD NECK
SCH	SCHEDULE	WT	WEIGHT
SCRD	SCREWED	WOL	WELDOLET
S	SAMPLE CONNECTION	WLD	WELD
SG	SIGHT GLASS	XS	EXTRA STRONG
SC	SAMPLE COOLER	XXS	DOUBLE EXTRA STRONG
SMLS	SEAMLESS		

NOTE:

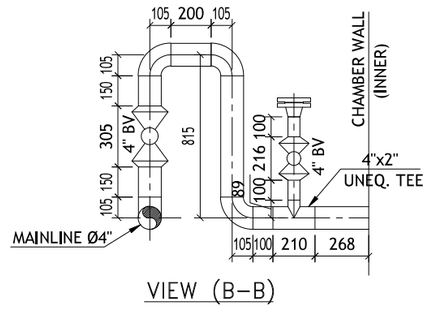
1. FOR ABBREVIATIONS RELATED TO CIVIL ENGINEERING/UNDERGROUND PIPING WORK, REFER CIVIL ENGINEERING STANDARD.

REV. NO.	DATE	SUBJECT OF REVISION	PREP	CHKD	APPD
0	10.05.17	ISSUED WITH TENDER	US	DK	AD

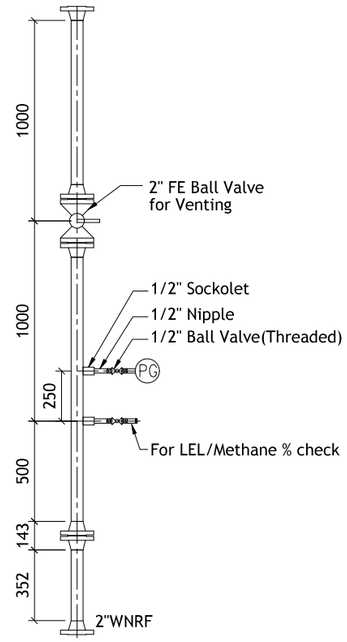
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Date: 2025.03.13 12:56:46 IST



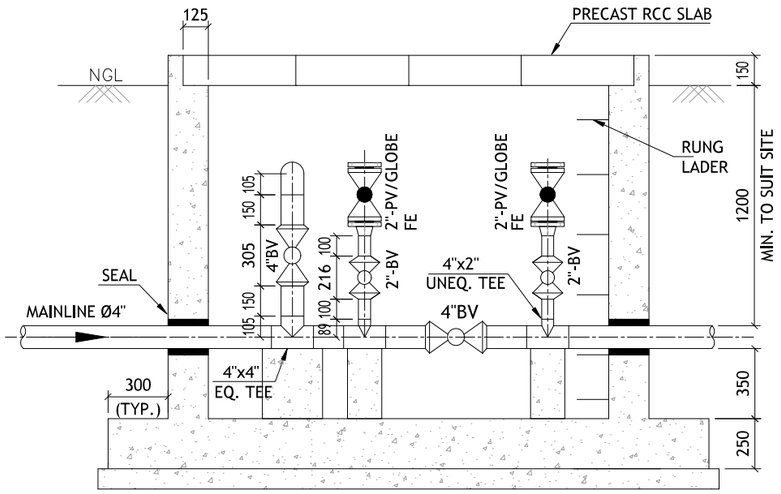
TOP VIEW



VIEW (B–B)



COMMON VENT PIPE FOR ALL SECTIONALIZING VALVES
(NOT TO BE FABRICATED FOR ALL SVs)



FRONT VIEW (A–A)

REFERENCE DRAWINGS / DOCUMENTS

S.NO.	TITLE	NO.

NOTES:-

1. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN M UNLESS OTHERWISE MENTIONED.
2. APPROVED SEALANT TO BE PROVIDED IN VALVE PIT ENTRY & EXIT OF PIPELINE TO RESTRICT WATER INTO PIT.
3. COMMON VENT NOT TO BE FABRICATED FOR EACH SV, MINIMUM TWO SUCH VENTS TO BE FABRICATED FOR GAS COMMISSIONING AND THEN TO BE KEPT IN ERV FOR O&M PURPOSE.
4. FIRST SECTIONALIZING VALVE OF MAINLINE TO BE PROVIDED WITH PERMANENT BY-PASS & VENT. THEREAFTER SVs MAY BE PROVIDED WITH PERMANENT BY-PASS & WITHOUT PERMANENT BY-PASS LINE ALTERNATIVELY.
5. FOR VALVE CHAMBER CONSTRUCTION, REFER RESPECTIVE DRAWING FOR CIVIL WORK. CHAMBER SLEEPERS MAY BE FABRICATED AS SHOWN IN THIS DRAWING FOR EASY LIFTING DURING O&M.
6. ORIENTATION OF 2" VALVES INSTALLED IN BY-PASS/TAP-OFF TO BE SUCH THAT VALVE LEVER/HANDLE MOVEMENT IS NOT RESTRICTED BY ADJACENT WALL OF A CHAMBER.
7. VALVE CHAMBER PROJECTION ABOVE FGL SHALL BE 150MM-300MM SUITED AS PER SITE CONDITIONS.

LEGEND:-

- BUTT WELD BALL VALVE (B.V.)
- FLANGED BALL VALVE
- BUTT WELD GLOBE VALVE (G.V.)
- FLANGED GLOBE VALVE
- THREAD END BALL VALVE

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	02.05.2023	ISSUED AS STANDARD	AK	MN	HK

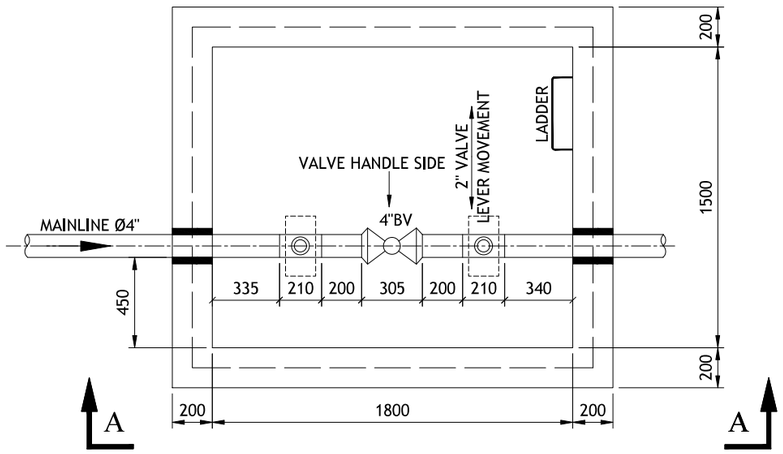
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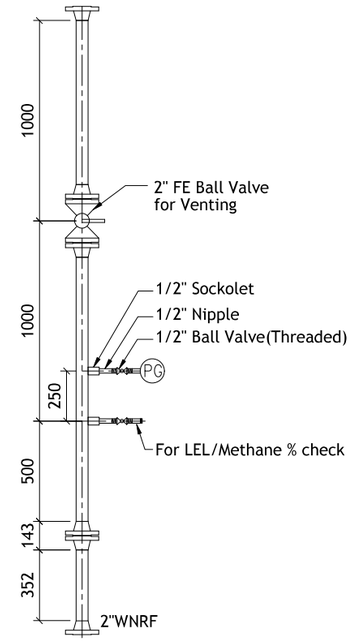
TITLE GENERAL ARRANGEMENT DRAWING FOR SECTIONALISING VALVE OF 4" SIZE WITH 4" FUTURE TAP-OFF & WITH FLEXIBLE BY-PASS PROVISION AND VENT (TYPE-4MV-1)

SIZE	JOB NO.	DRAWING NUMBER	SHEET	REV.
A3	XXXX	VPC-STD-PP-2025	1 OF 5	0

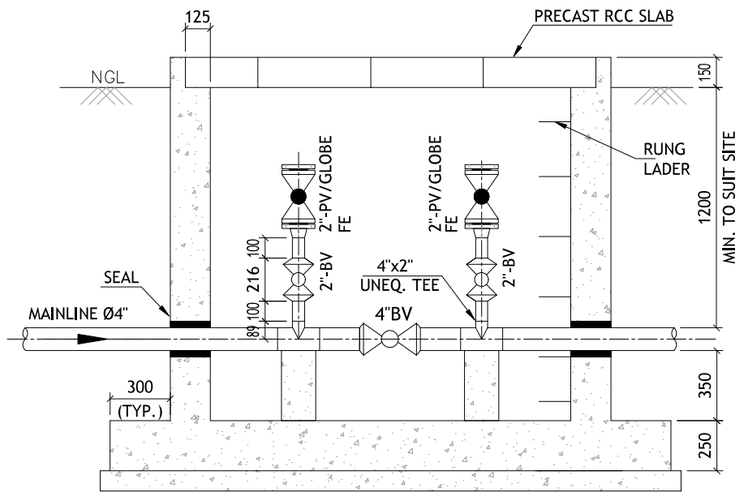
Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST



TOP VIEW



COMMON VENT PIPE FOR ALL SECTIONALIZING VALVES
(NOT TO BE FABRICATED FOR ALL SVs)



FRONT VIEW (A–A)

REFERENCE DRAWINGS / DOCUMENTS

S.NO.	TITLE	NO.

NOTES:-

1. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN M UNLESS OTHERWISE MENTIONED.
2. APPROVED SEALANT TO BE PROVIDED IN VALVE PIT ENTRY & EXIT OF PIPELINE TO RESTRICT WATER INTO PIT.
3. COMMON VENT NOT TO BE FABRICATED FOR EACH SV. MINIMUM TWO SUCH VENTS TO BE FABRICATED FOR GAS COMMISSIONING AND THEN TO BE KEPT IN ERV FOR O&M PURPOSE.
4. FIRST SECTIONALIZING VALVE OF MAINLINE TO BE PROVIDED WITH PERMANENT BY-PASS & VENT. THEREAFTER SVs MAY BE PROVIDED WITH PERMANENT BY-PASS & WITHOUT PERMANENT BY-PASS LINE ALTERNATIVELY.
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7. VALVE CHAMBER PROJECTION ABOVE FGL SHALL BE 150MM-300MM SUITED AS PER SITE CONDITIONS.

LEGEND:-

- BUTT WELD BALL VALVE (B.V.)
- FLANGED BALL VALVE
- BUTT WELD GLOBE VALVE (G.V.)
- FLANGED GLOBE VALVE
- THREAD END BALL VALVE

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	02.05.2023	ISSUED AS STANDARD	AK	MN	HK

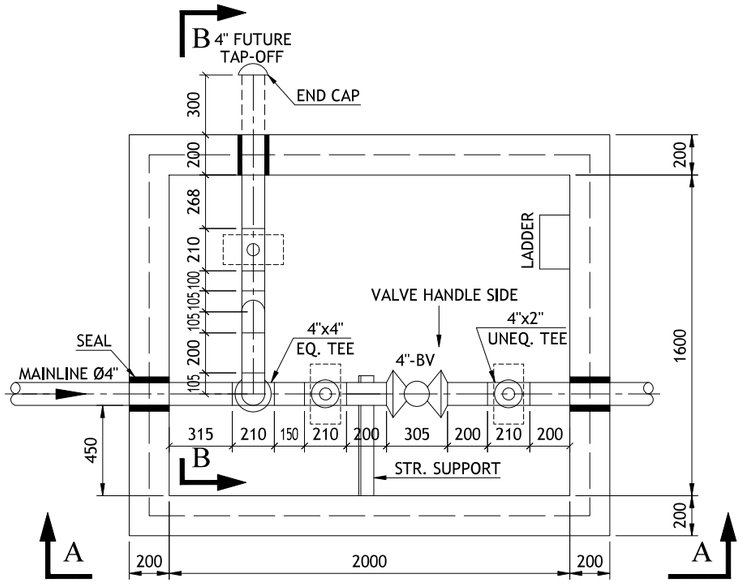
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VCS QUALITY SERVICES PVT. LTD.

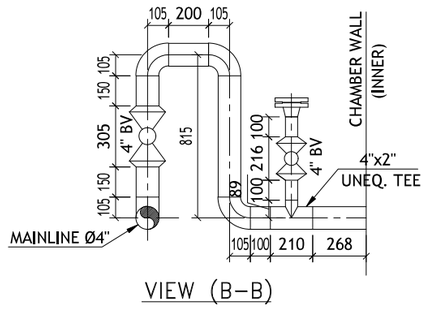
TITLE GENERAL ARRANGEMENT DRAWING FOR SECTIONALISING VALVE OF 4" SIZE WITH FLEXIBLE BY-PASS PROVISION AND VENT (TYPE-4MV-2)

SIZE	JOB NO.	DRAWING NUMBER	SHEET	REV.
A3	XXXX	VPC-STD-PP-2025	2 OF 5	0

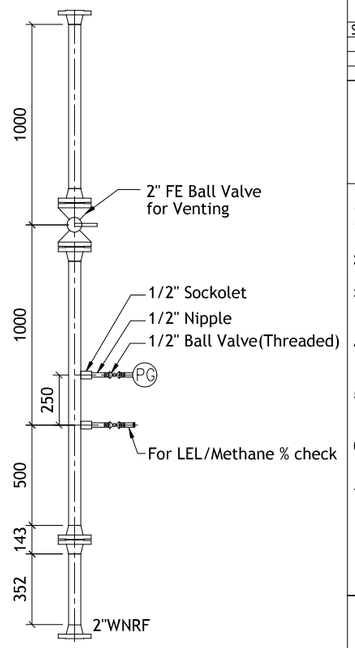
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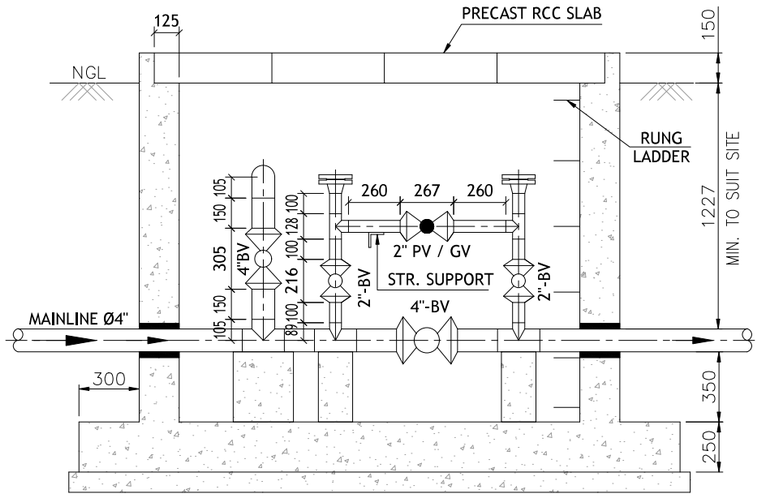
TOP VIEW



VIEW (B–B)



COMMON VENT PIPE FOR ALL SECTIONALIZING VALVES
(NOT TO BE FABRICATED FOR ALL SVs)



FRONT VIEW (A–A)

REFERENCE DRAWINGS / DOCUMENTS

S.NO.	TITLE	NO.

NOTES:-

1. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN M UNLESS OTHERWISE MENTIONED.
2. APPROVED SEALANT TO BE PROVIDED IN VALVE PIT ENTRY & EXIT OF PIPELINE TO RESTRICT WATER INTO PIT.
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6. ORIENTATION OF 2" VALVES INSTALLED IN BY-PASS/TAP-OFF TO BE SUCH THAT VALVE LEVER/HANDLE MOVEMENT IS NOT RESTRICTED BY ADJACENT WALL OF A CHAMBER.
7. VALVE CHAMBER PROJECTION ABOVE FGL SHALL BE 150MM-300MM SUITED AS PER SITE CONDITIONS.

LEGEND:-

- BUTT WELD BALL VALVE (B.V.)
- FLANGED BALL VALVE
- BUTT WELD GLOBE VALVE (G.V.)
- FLANGED GLOBE VALVE
- THREAD END BALL VALVE

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	02.05.2023	ISSUED AS STANDARD	AK	MN	HK

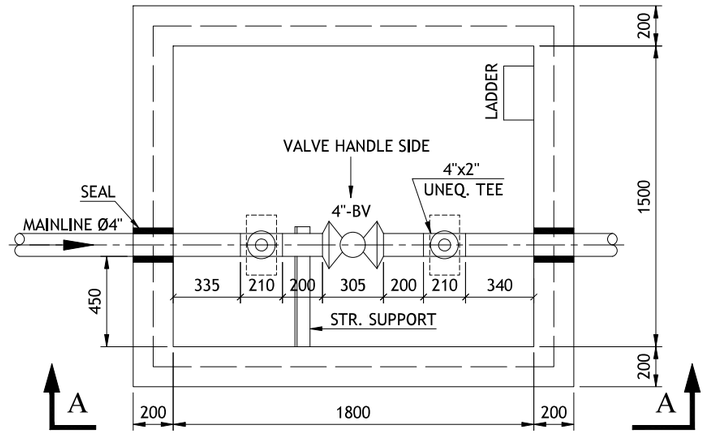
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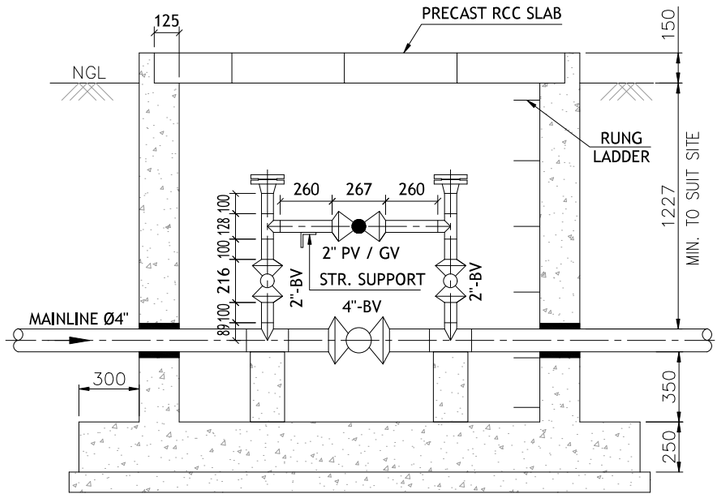
TITLE: GENERAL ARRANGEMENT DRAWING FOR SECTIONALISING VALVE OF 4" SIZE WITH 4" FUTURE TAP-OFF & WITH PERMANENT BY-PASS LINE AND VENT (TYPE-4MV-3)

SIZE	JOB NO.	DRAWING NUMBER	SHEET	REV.
A3	XXXX	VPC-STD-PP-2025	3 OF 5	0

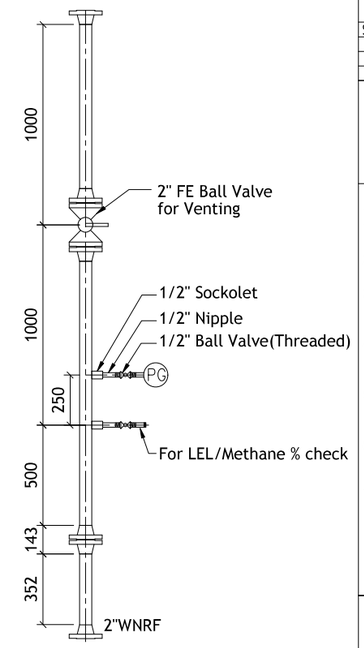
Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST



TOP VIEW



FRONT VIEW (A–A)



COMMON VENT PIPE FOR ALL SECTIONALIZING VALVES
(NOT TO BE FABRICATED FOR ALL SVs)

REFERENCE DRAWINGS / DOCUMENTS

S.NO.	TITLE	NO.

NOTES:-

1. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN M UNLESS OTHERWISE MENTIONED.
2. APPROVED SEALANT TO BE PROVIDED IN VALVE PIT ENTRY & EXIT OF PIPELINE TO RESTRICT WATER INTO PIT.
3. COMMON VENT NOT TO BE FABRICATED FOR EACH SV. MINIMUM TWO SUCH VENTS TO BE FABRICATED FOR GAS COMMISSIONING AND THEN TO BE KEPT IN ERV FOR O&M PURPOSE.
4. FIRST SECTIONALIZING VALVE OF MAINLINE TO BE PROVIDED WITH PERMANENT BY-PASS & VENT. THEREAFTER SVs MAY BE PROVIDED WITH PERMANENT BY-PASS & WITHOUT PERMANENT BY-PASS LINE ALTERNATIVELY.
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7. VALVE CHAMBER PROJECTION ABOVE FGL SHALL BE 150MM-300MM SUITED AS PER SITE CONDITIONS.

LEGEND:-

- BUTT WELD BALL VALVE (B.V.)
- FLANGED BALL VALVE
- BUTT WELD GLOBE VALVE (G.V.)
- FLANGED GLOBE VALVE
- THREAD END BALL VALVE

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	02.05.2023	ISSUED AS STANDARD	AK	MN	HK

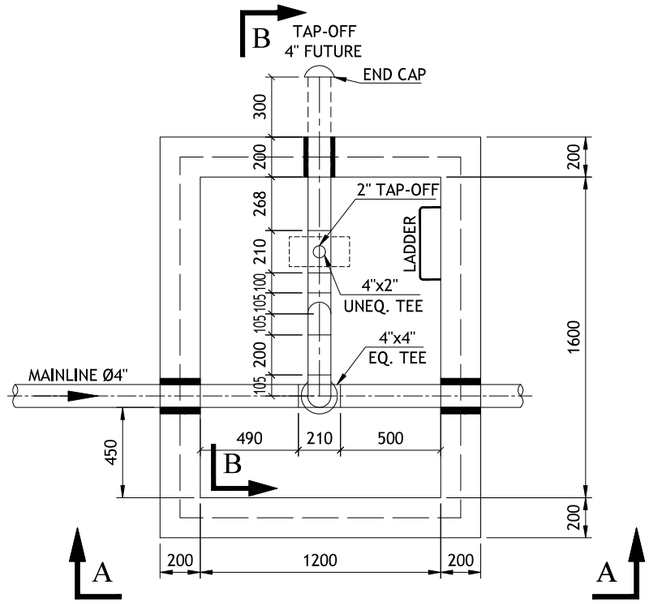
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VCS QUALITY SERVICES PVT. LTD.

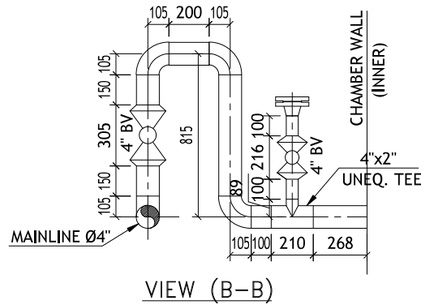
TITLE: GENERAL ARRANGEMENT DRAWING FOR SECTIONALISING VALVE OF 4" SIZE WITH PERMANENT BY-PASS LINE AND VENT (TYPE-4MV-4)

SIZE	JOB NO.	DRAWING NUMBER	SHEET	REV.
A3	XXXX	VPC-STD-PP-2025	4 OF 5	0

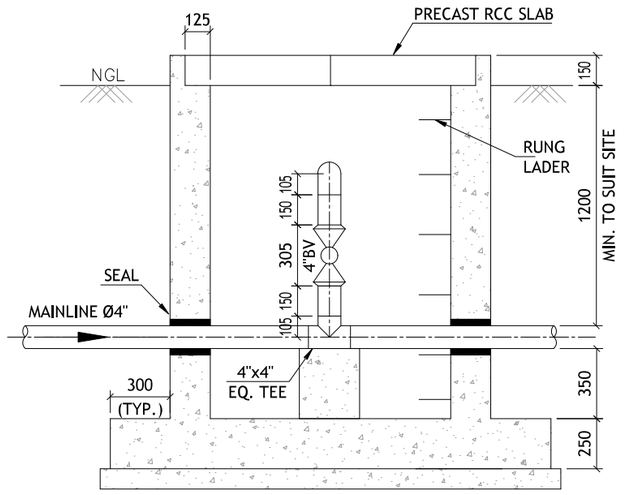
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Date: 2025.03.13 12:56:46 IST



TOP VIEW



VIEW (B–B)



FRONT VIEW (A–A)

REFERENCE DRAWINGS / DOCUMENTS

S.NO.	TITLE	NO.

NOTES:-

1. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN M UNLESS OTHERWISE MENTIONED.
2. APPROVED SEALANT TO BE PROVIDED IN VALVE PIT ENTRY & EXIT OF PIPELINE TO RESTRICT WATER INTO PIT.
3. FOR VALVE CHAMBER CONSTRUCTION, REFER RESPECTIVE DRAWING FOR CIVIL WORK. CHAMBER SLEEPERS MAY BE FABRICATED AS SHOWN IN THIS DRAWING FOR EASY LIFTING DURING O&M.
4. ORIENTATION OF 2" VALVES INSTALLED IN TAP-OFF TO BE SUCH THAT VALVE LEVER/HANDLE MOVEMENT IS NOT RESTRICTED BY ADJACENT WALL OF A CHAMBER.
5. VALVE CHAMBER PROJECTION ABOVE FGL SHALL BE 150MM-300MM SUITED AS PER SITE CONDITIONS.

LEGEND:-

- BUTT WELD BALL VALVE (B.V.)
- FLANGED BALL VALVE
- BUTT WELD GLOBE VALVE (G.V.)
- FLANGED GLOBE VALVE
- THREAD END BALL VALVE

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	02.05.2023	ISSUED AS STANDARD	AK	MN	HK

PMC

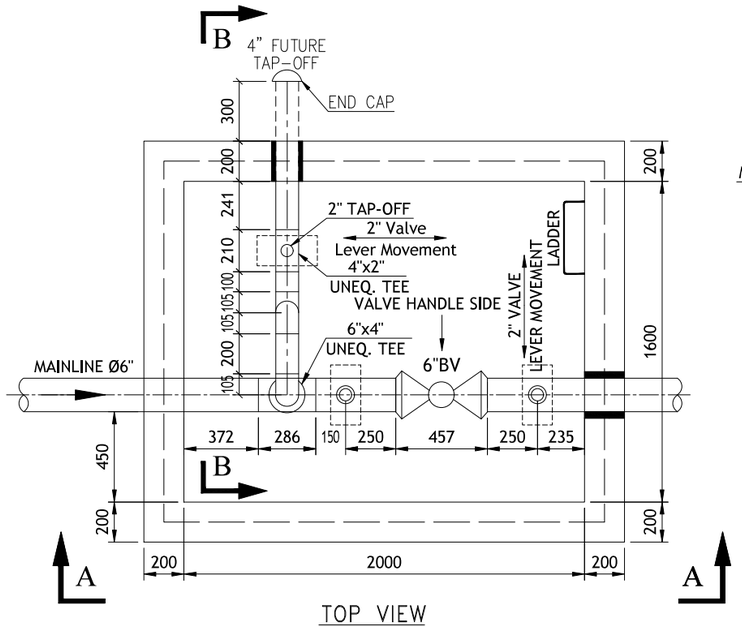
VCS QUALITY SERVICES PVT. LTD.

TITLE

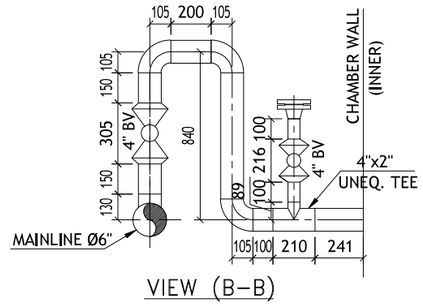
GENERAL ARRANGEMENT DRAWING FOR
4" SIZE WITH 4" FUTURE TAP-OFF

SIZE	JOB NO.	DRAWING NUMBER	SHEET	REV.
A3	XXXX	VPC-STD-PP-2025	5 OF 5	0

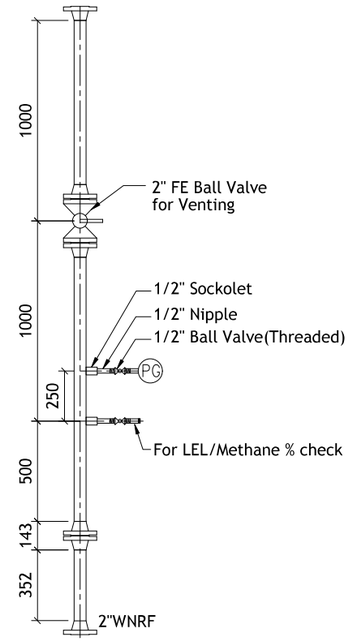
Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST



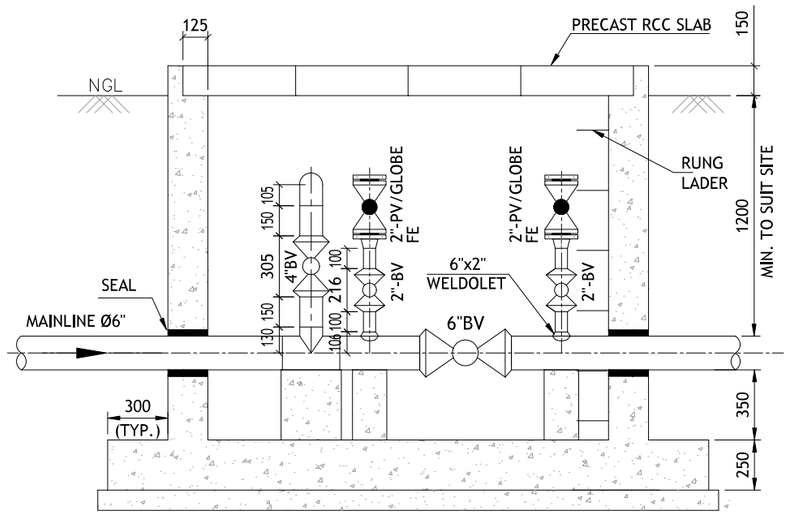
TOP VIEW



VIEW (B–B)



COMMON VENT PIPE FOR ALL SECTIONALIZING VALVES
(NOT TO BE FABRICATED FOR ALL SVs)



FRONT VIEW (A–A)

REFERENCE DRAWINGS / DOCUMENTS

S.NO.	TITLE	NO.

NOTES:-

1. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN M UNLESS OTHERWISE MENTIONED.
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REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	02.05.2023	ISSUED AS STANDARD	AK	MN	HK

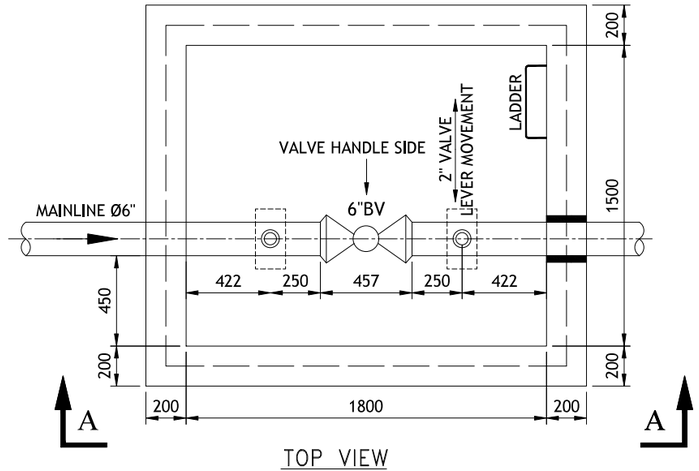
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VCS QUALITY SERVICES PVT. LTD.

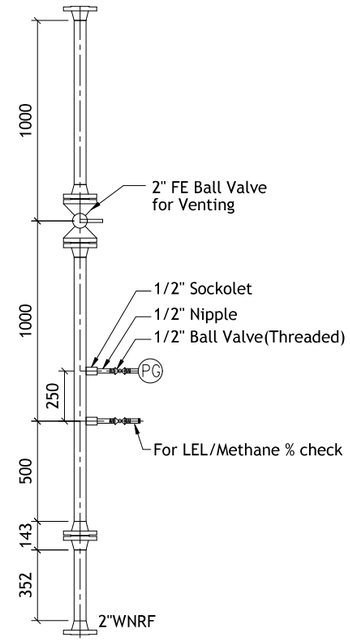
TITLE: GENERAL ARRANGEMENT DRAWING FOR SECTIONALISING VALVE OF 6" SIZE WITH 4" FUTURE TAP-OFF & WITH FLEXIBLE BY-PASS PROVISION AND VENT (TYPE-6MV-1)

SIZE	JOB NO.	DRAWING NUMBER	SHEET	REV.
A3	XXXX	VPC-STD-PP-2026	1 OF 5	0

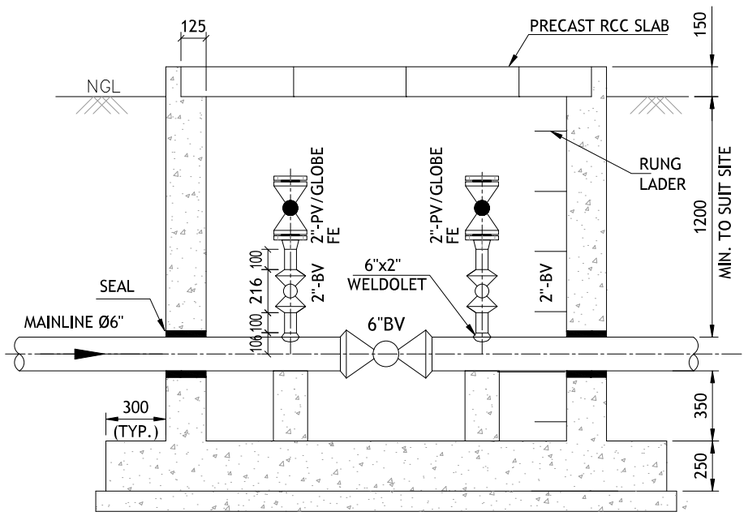
Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST



TOP VIEW



COMMON VENT PIPE FOR ALL SECTIONALIZING VALVES
(NOT TO BE FABRICATED FOR ALL SVs)



FRONT VIEW (A–A)

REFERENCE DRAWINGS / DOCUMENTS

S.NO.	TITLE	NO.

NOTES:-

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- FLANGED BALL VALVE
- BUTT WELD GLOBE VALVE (G.V.)
- FLANGED GLOBE VALVE
- THREAD END BALL VALVE

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	02.05.2023	ISSUED AS STANDARD	AK	MN	HK

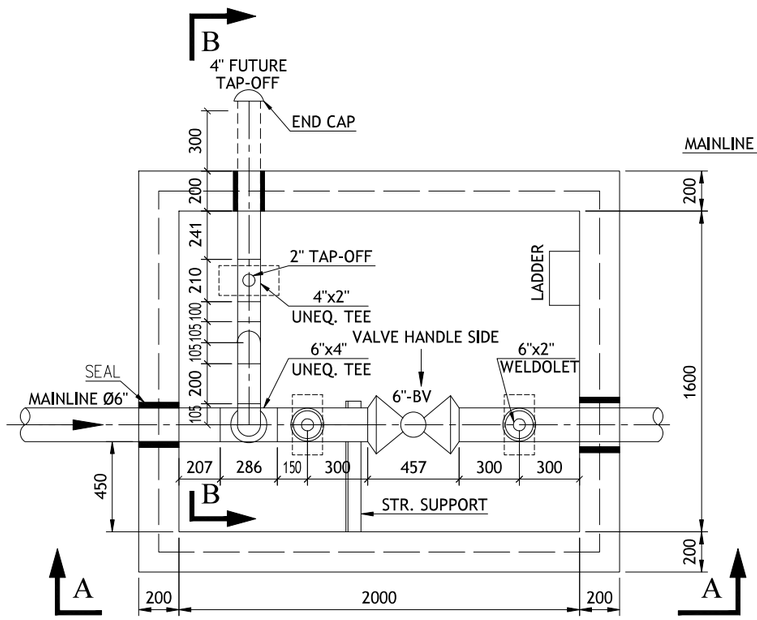
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VCS QUALITY SERVICES PVT. LTD.

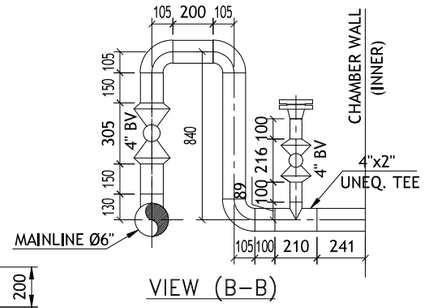
TITLE: GENERAL ARRANGEMENT DRAWING FOR SECTIONALISING VALVE OF 6" SIZE WITH FLEXIBLE BY-PASS PROVISION AND VENT (TYPE-6MV-2)

SIZE	JOB NO.	DRAWING NUMBER	SHEET	REV.
A3	XXXX	VPC-STD-PP-2026	2 OF 5	0

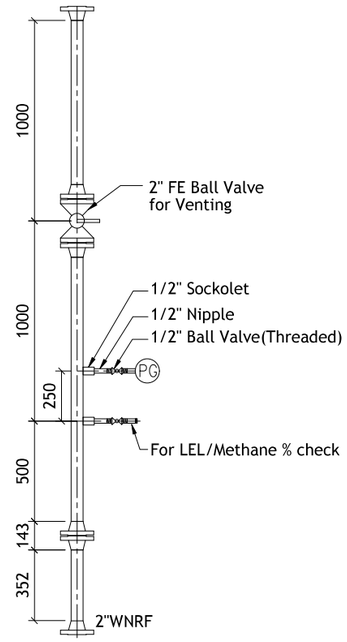
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Date: 2025.03.13 12:56:46 IST



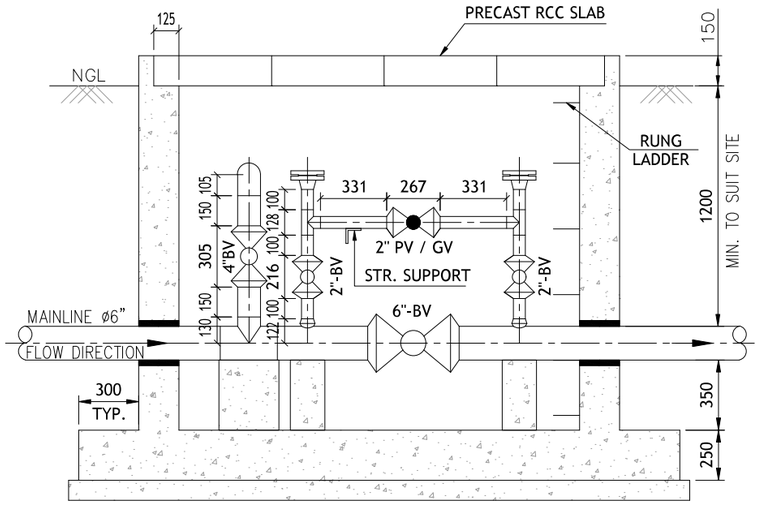
TOP VIEW



VIEW (B–B)



COMMON VENT PIPE FOR ALL SECTIONALIZING VALVES
(NOT TO BE FABRICATED FOR ALL SVs)



FRONT VIEW (A–A)

REFERENCE DRAWINGS / DOCUMENTS

S.NO.	TITLE	NO.

NOTES:-

1. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN M UNLESS OTHERWISE MENTIONED.
2. APPROVED SEALANT TO BE PROVIDED IN VALVE PIT ENTRY & EXIT OF PIPELINE TO RESTRICT WATER INTO PIT.
3. COMMON VENT NOT TO BE FABRICATED FOR EACH SV. MINIMUM TWO SUCH VENTS TO BE FABRICATED FOR GAS COMMISSIONING AND THEN TO BE KEPT IN ERV FOR O&M PURPOSE.
4. FIRST SECTIONALIZING VALVE OF MAINLINE TO BE PROVIDED WITH PERMANENT BY-PASS & VENT. THEREAFTER SVs MAY BE PROVIDED WITH PERMANENT BY-PASS & WITHOUT PERMANENT BY-PASS LINE ALTERNATIVELY.
5. FOR VALVE CHAMBER CONSTRUCTION, REFER RESPECTIVE DRAWING FOR CIVIL WORK. CHAMBER SLEEPERS MAY BE FABRICATED AS SHOWN IN THIS DRAWING FOR EASY LIFTING DURING O&M.
6. ORIENTATION OF 2" VALVES INSTALLED IN BY-PASS/TAP-OFF TO BE SUCH THAT VALVE LEVER/HANDLE MOVEMENT IS NOT RESTRICTED BY ADJACENT WALL OF A CHAMBER.
7. VALVE CHAMBER PROJECTION ABOVE FGL SHALL BE 150MM-300MM SUITED AS PER SITE CONDITIONS.

LEGEND:-

- BUTT WELD BALL VALVE (B.V.)
- FLANGED BALL VALVE
- BUTT WELD GLOBE VALVE (G.V.)
- FLANGED GLOBE VALVE
- THREAD END BALL VALVE

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	02.05.2023	ISSUED AS STANDARD	AK	MN	HK

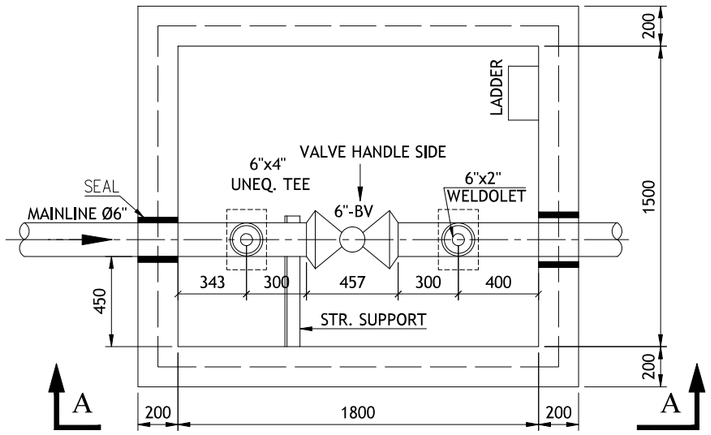
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VCS QUALITY SERVICES PVT. LTD.

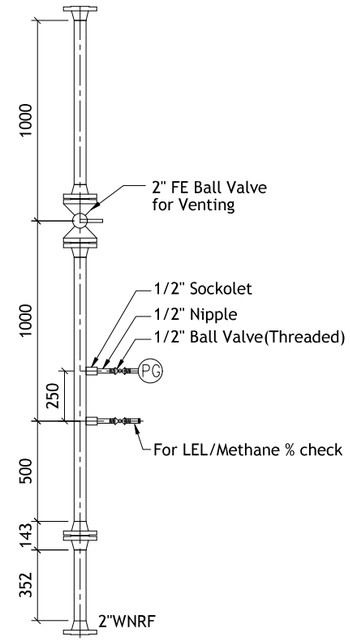
TITLE GENERAL ARRANGEMENT DRAWING FOR SECTIONALISING VALVE OF 6" SIZE WITH 4" FUTURE TAP-OFF & WITH PERMANENT BY-PASS LINE AND VENT (TYPE-6MV-3)

SIZE	JOB NO.	DRAWING NUMBER	SHEET	REV.
A3	XXXX	VPC-STD-PP-2026	3 OF 5	0

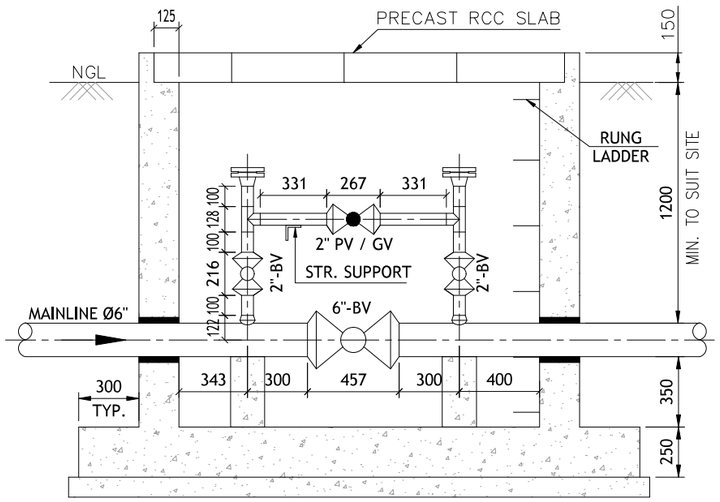
Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST



TOP VIEW



COMMON VENT PIPE FOR ALL SECTIONALIZING VALVES
(NOT TO BE FABRICATED FOR ALL SVs)



FRONT VIEW (A–A)

REFERENCE DRAWINGS / DOCUMENTS

S.NO.	TITLE	NO.

NOTES:-

1. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN M UNLESS OTHERWISE MENTIONED.
2. APPROVED SEALANT TO BE PROVIDED IN VALVE PIT ENTRY & EXIT OF PIPELINE TO RESTRICT WATER INTO PIT.
3. COMMON VENT NOT TO BE FABRICATED FOR EACH SV. MINIMUM TWO SUCH VENTS TO BE FABRICATED FOR GAS COMMISSIONING AND THEN TO BE KEPT IN ERV FOR O&M PURPOSE.
4. FIRST SECTIONALIZING VALVE OF MAINLINE TO BE PROVIDED WITH PERMANENT BY-PASS & VENT. THEREAFTER SVs MAY BE PROVIDED WITH PERMANENT BY-PASS & WITHOUT PERMANENT BY-PASS LINE ALTERNATIVELY.
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7. VALVE CHAMBER PROJECTION ABOVE FGL SHALL BE 150MM-300MM SUITED AS PER SITE CONDITIONS.

LEGEND:-

- BUTT WELD BALL VALVE (B.V.)
- FLANGED BALL VALVE
- BUTT WELD GLOBE VALVE (G.V.)
- FLANGED GLOBE VALVE
- THREAD END BALL VALVE

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	02.05.2023	ISSUED AS STANDARD	AK	MN	HK

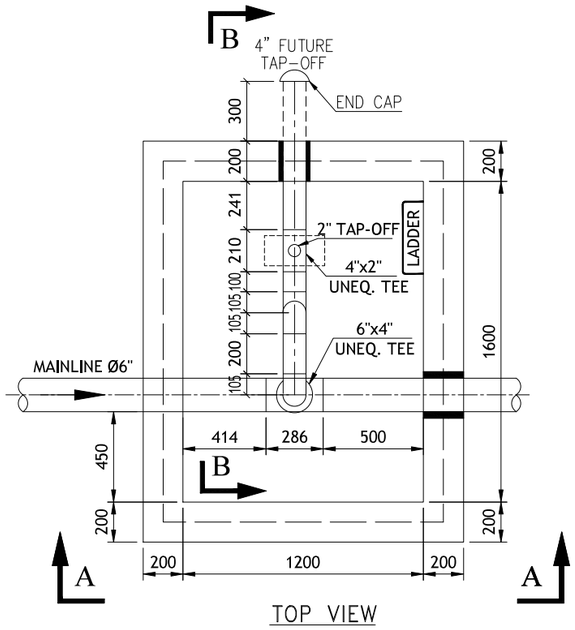
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VCS QUALITY SERVICES PVT. LTD.

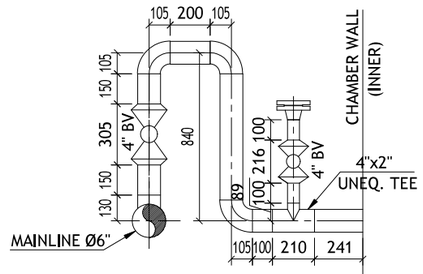
TITLE: GENERAL ARRANGEMENT DRAWING FOR SECTIONALISING VALVE OF 6" SIZE WITH PERMANENT BY-PASS LINE AND VENT (TYPE-6MV-4)

SIZE	JOB NO.	DRAWING NUMBER	SHEET	REV.
A3	XXXX	VPC-STD-PP-2026	4 OF 5	0

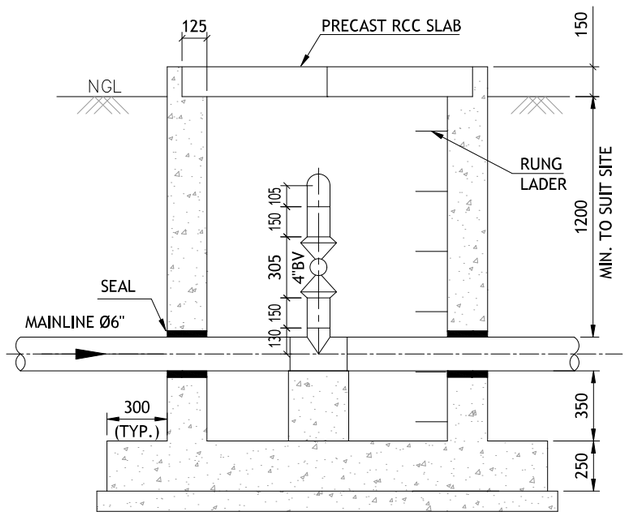
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Date: 2025.03.13 12:56:46 IST



TOP VIEW



VIEW (B–B)



FRONT VIEW (A–A)

REFERENCE DRAWINGS / DOCUMENTS

S.NO.	TITLE	NO.

NOTES:-

1. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN M UNLESS OTHERWISE MENTIONED.
2. APPROVED SEALANT TO BE PROVIDED IN VALVE PIT ENTRY & EXIT OF PIPELINE TO RESTRICT WATER INTO PIT.
3. FOR VALVE CHAMBER CONSTRUCTION, REFER RESPECTIVE DRAWING FOR CIVIL WORK. CHAMBER SLEEPERS MAY BE FABRICATED AS SHOWN IN THIS DRAWING FOR EASY LIFTING DURING O&M.
4. ORIENTATION OF 2" VALVES INSTALLED IN TAP-OFF TO BE SUCH THAT VALVE LEVER/HANDLE MOVEMENT IS NOT RESTRICTED BY ADJACENT WALL OF A CHAMBER.
5. VALVE CHAMBER PROJECTION ABOVE FGL SHALL BE 150MM-300MM SUITED AS PER SITE CONDITIONS.

LEGEND:-

- BUTT WELD BALL VALVE (B.V.)
- FLANGED BALL VALVE
- BUTT WELD GLOBE VALVE (G.V.)
- FLANGED GLOBE VALVE
- THREAD END BALL VALVE

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	02.05.2023	ISSUED AS STANDARD	AK	MN	HK

PMC

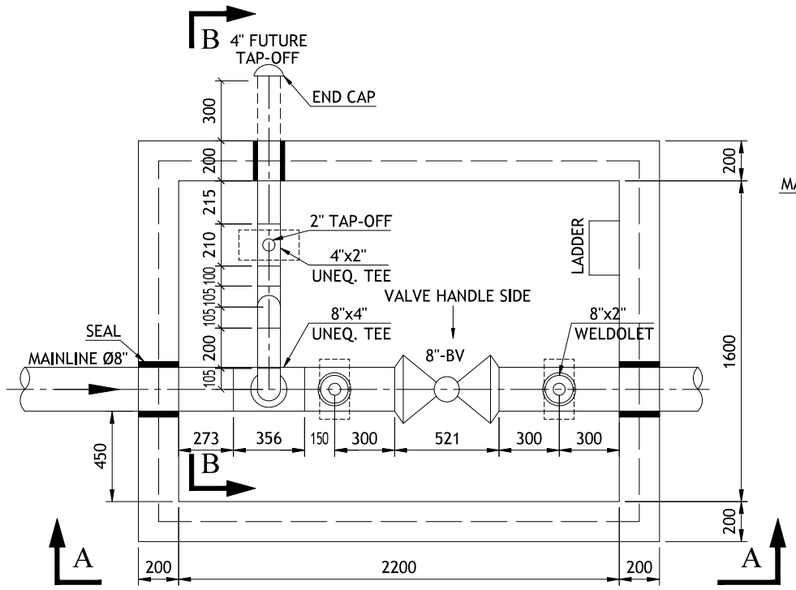
VCS QUALITY SERVICES PVT. LTD.

TITLE

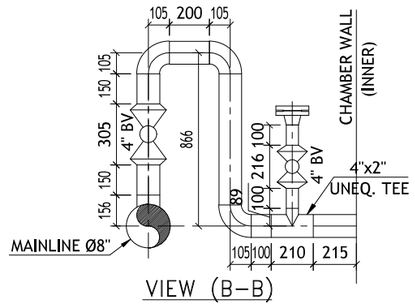
GENERAL ARRANGEMENT DRAWING FOR
6" SIZE WITH 4" FUTURE TAP-OFF

SIZE	JOB NO.	DRAWING NUMBER	SHEET	REV.
A3	XXXX	VPC-STD-PP-2026	5 OF 5	0

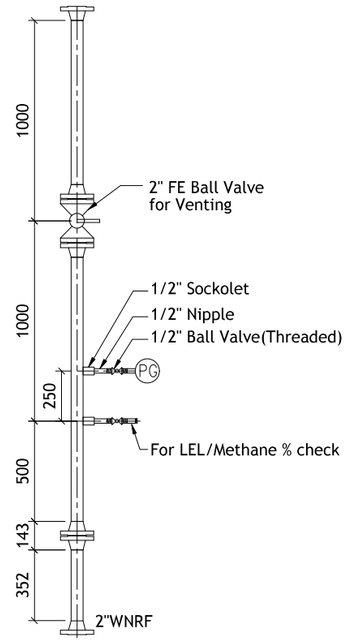
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Date: 2025.03.13 12:56:46 IST



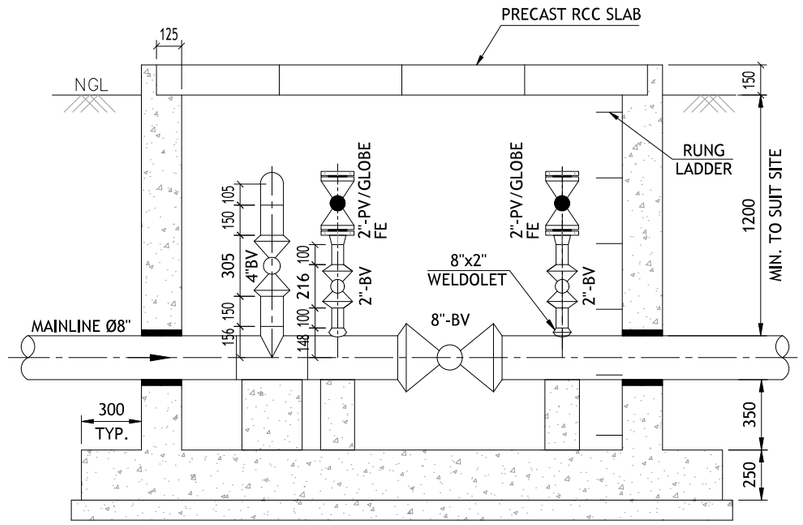
TOP VIEW



VIEW (B–B)



COMMON VENT PIPE FOR ALL SECTIONALIZING VALVES
(NOT TO BE FABRICATED FOR ALL SVs)



FRONT VIEW (A–A)

REFERENCE DRAWINGS / DOCUMENTS

S.NO.	TITLE	NO.

NOTES:-

1. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN M UNLESS OTHERWISE MENTIONED.
2. APPROVED SEALANT TO BE PROVIDED IN VALVE PIT ENTRY & EXIT OF PIPELINE TO RESTRICT WATER INTO PIT.
3. COMMON VENT NOT TO BE FABRICATED FOR EACH SV. MINIMUM TWO SUCH VENTS TO BE FABRICATED FOR GAS COMMISSIONING AND THEN TO BE KEPT IN ERV FOR O&M PURPOSE.
4. FIRST SECTIONALIZING VALVE OF MAINLINE TO BE PROVIDED WITH PERMANENT BY-PASS & VENT. THEREAFTER SVs MAY BE PROVIDED WITH PERMANENT BY-PASS & WITHOUT PERMANENT BY-PASS LINE ALTERNATIVELY.
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7. VALVE CHAMBER PROJECTION ABOVE FGL SHALL BE 150MM-300MM SUITED AS PER SITE CONDITIONS.

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- FLANGED BALL VALVE
- BUTT WELD GLOBE VALVE (G.V.)
- FLANGED GLOBE VALVE
- THREAD END BALL VALVE

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	02.05.2023	ISSUED AS STANDARD	AK	MN	HK

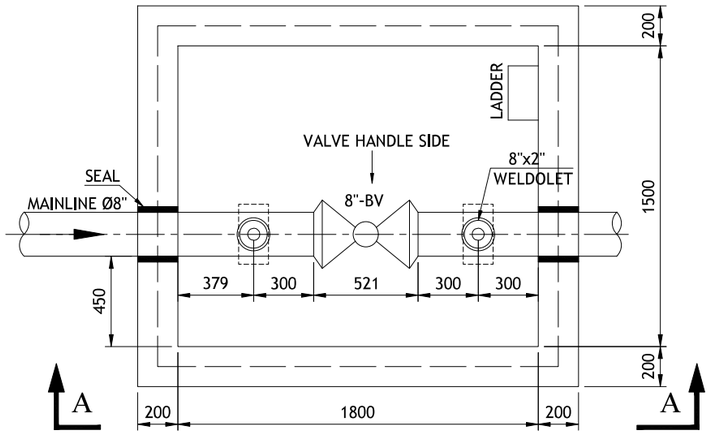
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VCS QUALITY SERVICES PVT. LTD.

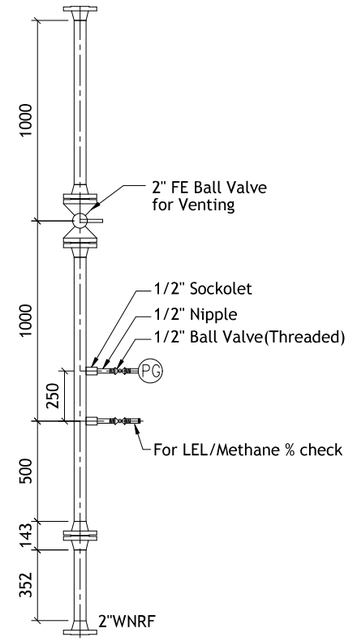
TITLE GENERAL ARRANGEMENT DRAWING FOR SECTIONALISING VALVE OF 8" SIZE WITH 4" FUTURE TAP-OFF & WITH FLEXIBLE BY-PASS PROVISION AND VENT (TYPE-8MV-1)

SIZE	JOB NO.	DRAWING NUMBER	SHEET	REV.
A3	XXXX	VPC-STD-PP-2027	1 OF 5	0

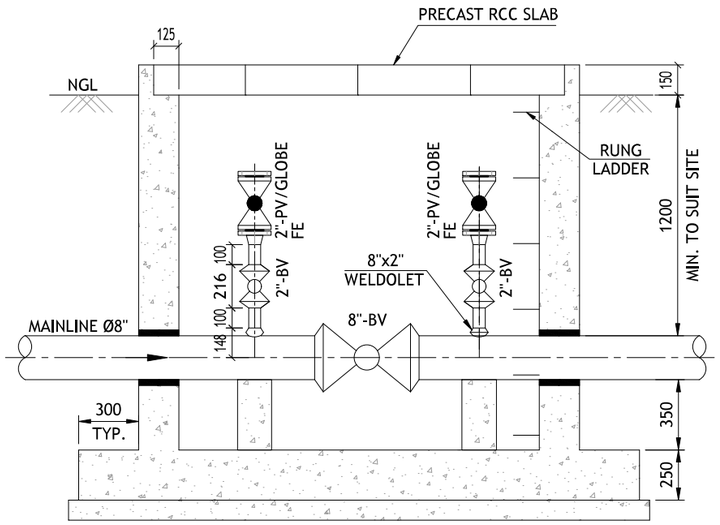
Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST



TOP VIEW



COMMON VENT PIPE FOR ALL SECTIONALIZING VALVES
(NOT TO BE FABRICATED FOR ALL SVs)



FRONT VIEW (A–A)

REFERENCE DRAWINGS / DOCUMENTS

S.NO.	TITLE	NO.

NOTES:-

1. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN M UNLESS OTHERWISE MENTIONED.
2. APPROVED SEALANT TO BE PROVIDED IN VALVE PIT ENTRY & EXIT OF PIPELINE TO RESTRICT WATER INTO PIT.
3. COMMON VENT NOT TO BE FABRICATED FOR EACH SV. MINIMUM TWO SUCH VENTS TO BE FABRICATED FOR GAS COMMISSIONING AND THEN TO BE KEPT IN ERV FOR O&M PURPOSE.
4. FIRST SECTIONALIZING VALVE OF MAINLINE TO BE PROVIDED WITH PERMANENT BY-PASS & VENT. THEREAFTER SVs MAY BE PROVIDED WITH PERMANENT BY-PASS & WITHOUT PERMANENT BY-PASS LINE ALTERNATIVELY.
5. FOR VALVE CHAMBER CONSTRUCTION, REFER RESPECTIVE DRAWING FOR CIVIL WORK. CHAMBER SLEEPERS MAY BE FABRICATED AS SHOWN IN THIS DRAWING FOR EASY LIFTING DURING O&M.
6. ORIENTATION OF 2" VALVES INSTALLED IN BY-PASS/TAP-OFF TO BE SUCH THAT VALVE LEVER/HANDLE MOVEMENT IS NOT RESTRICTED BY ADJACENT WALL OF A CHAMBER.
7. VALVE CHAMBER PROJECTION ABOVE FGL SHALL BE 150MM-300MM SUITED AS PER SITE CONDITIONS.

LEGEND:-

- BUTT WELD BALL VALVE (B.V.)
- FLANGED BALL VALVE
- BUTT WELD GLOBE VALVE (G.V.)
- FLANGED GLOBE VALVE
- THREAD END BALL VALVE

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	02.05.2023	ISSUED AS STANDARD	AK	MN	HK

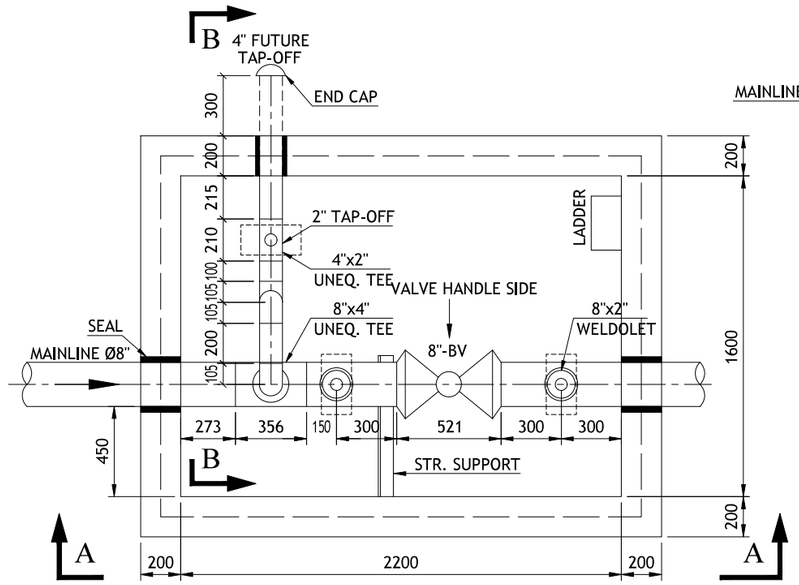
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VCS QUALITY SERVICES PVT. LTD.

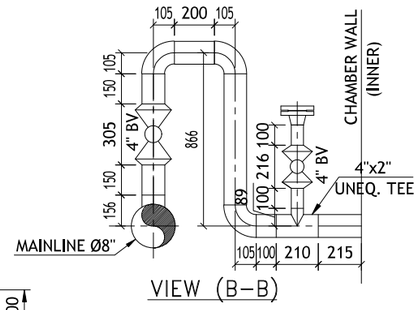
TITLE GENERAL ARRANGEMENT DRAWING FOR SECTIONALISING VALVE OF 8" SIZE WITH FLEXIBLE BY-PASS PROVISION AND VENT (TYPE-8MV-2)

SIZE	JOB NO.	DRAWING NUMBER	SHEET	REV.
A3	XXXX	VPC-STD-PP-2027	2 OF 5	0

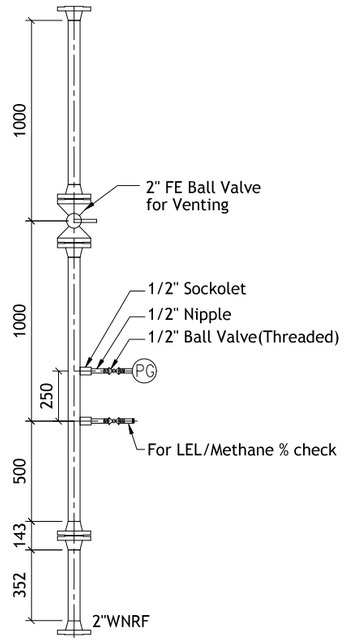
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Date: 2025.03.13 12:56:46 IST



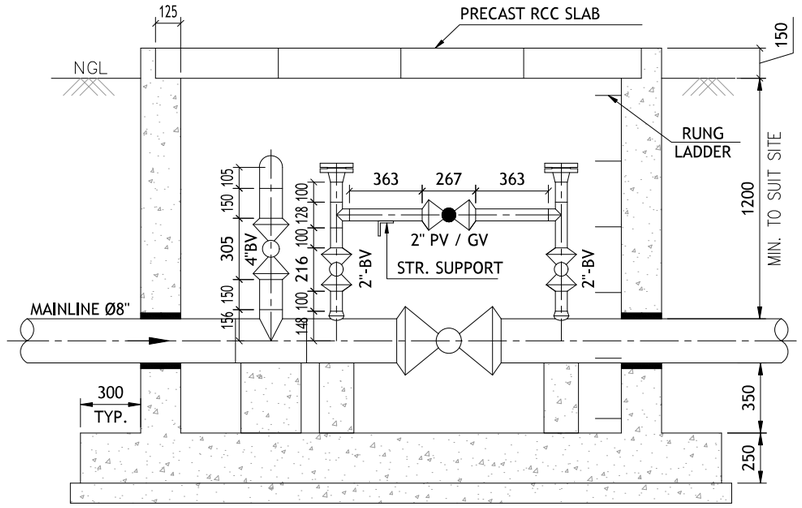
TOP VIEW



VIEW (B–B)



COMMON VENT PIPE FOR ALL SECTIONALIZING VALVES
(NOT TO BE FABRICATED FOR ALL SVs)



FRONT VIEW (A–A)

REFERENCE DRAWINGS / DOCUMENTS

S.NO.	TITLE	NO.

NOTES:-

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LEGEND:-

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- FLANGED BALL VALVE
- BUTT WELD GLOBE VALVE (G.V.)
- FLANGED GLOBE VALVE
- THREAD END BALL VALVE

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	02.05.2023	ISSUED AS STANDARD	AK	MN	HK

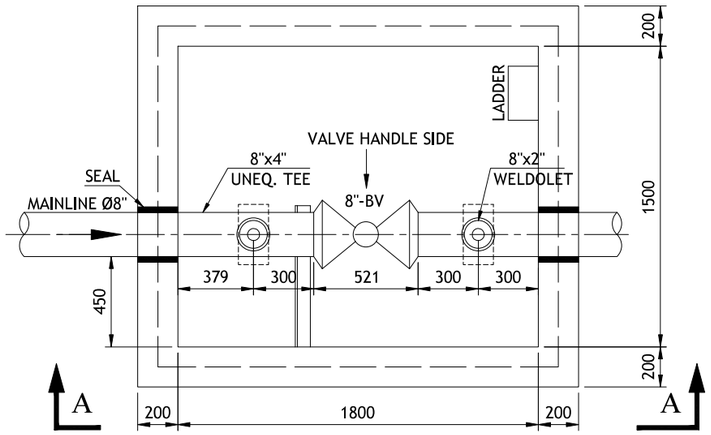
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VCS QUALITY SERVICES PVT. LTD.

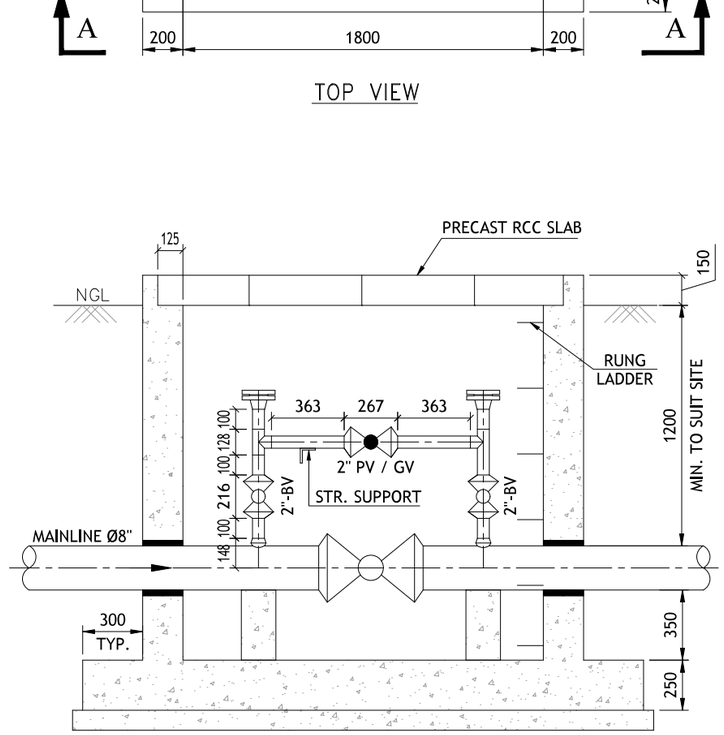
TITLE: GENERAL ARRANGEMENT DRAWING FOR SECTIONALISING VALVE OF 8" SIZE WITH 4" FUTURE TAP-OFF & WITH PERMANENT BY-PASS LINE AND VENT (TYPE-8MV-3)

SIZE	JOB NO.	DRAWING NUMBER	SHEET	REV.
A3	XXXX	VPC-STD-PP-2027	3 OF 5	0

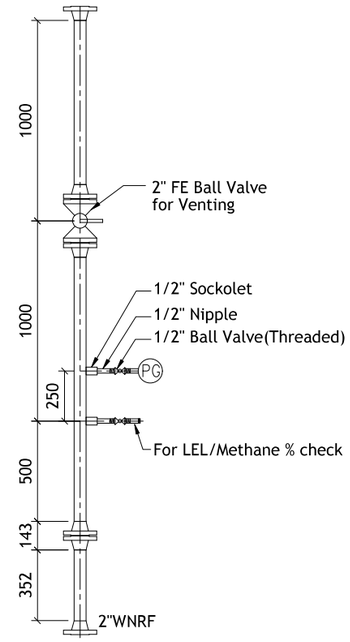
Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST



TOP VIEW



FRONT VIEW (A–A)



COMMON VENT PIPE FOR ALL SECTIONALIZING VALVES
(NOT TO BE FABRICATED FOR ALL SVs)

REFERENCE DRAWINGS / DOCUMENTS

S.NO.	TITLE	NO.

NOTES:-

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- FLANGED BALL VALVE
- BUTT WELD GLOBE VALVE (G.V.)
- FLANGED GLOBE VALVE
- THREAD END BALL VALVE

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	02.05.2023	ISSUED AS STANDARD	AK	MN	HK

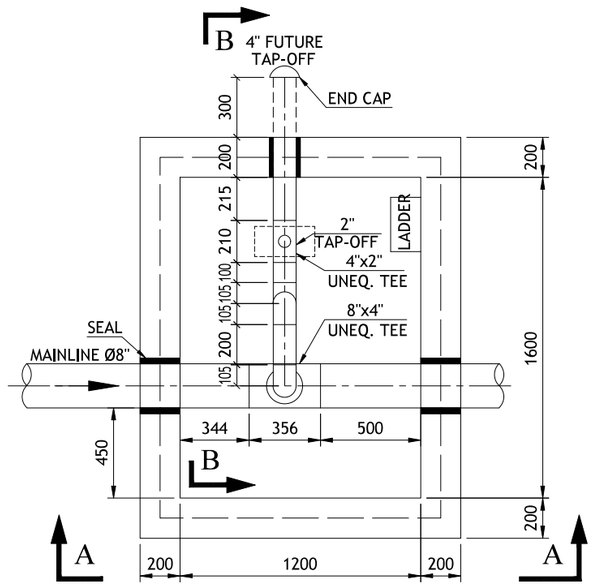
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VCS QUALITY SERVICES PVT. LTD.

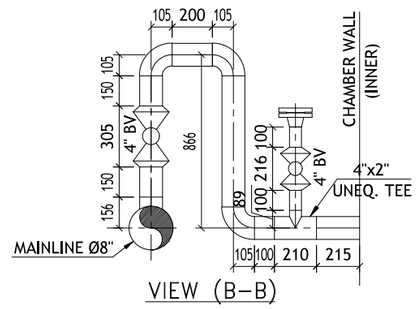
TITLE: GENERAL ARRANGEMENT DRAWING FOR SECTIONALISING VALVE OF 8" SIZE WITH PERMANENT BY-PASS LINE AND VENT (TYPE-8MV-4)

SIZE	JOB NO.	DRAWING NUMBER	SHEET	REV.
A3	XXXX	VPC-STD-PP-2027	4 OF 5	0

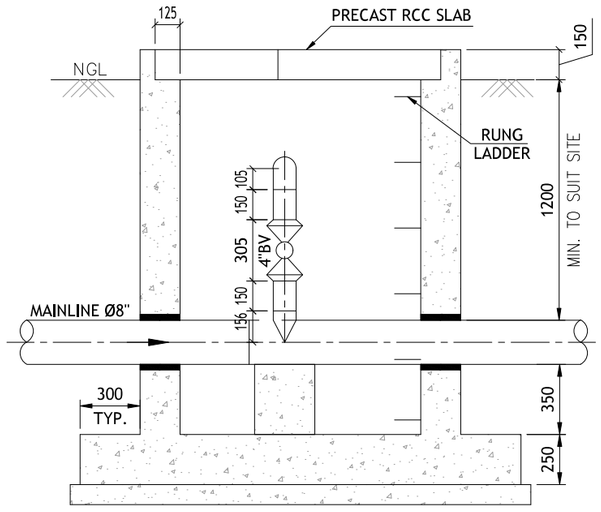
Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST



TOP VIEW



VIEW (B–B)



FRONT VIEW (A–A)

REFERENCE DRAWINGS / DOCUMENTS

S.NO.	TITLE	NO.

NOTES:-

1. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN M UNLESS OTHERWISE MENTIONED.
2. APPROVED SEALANT TO BE PROVIDED IN VALVE PIT ENTRY & EXIT OF PIPELINE TO RESTRICT WATER INTO PIT.
3. FOR VALVE CHAMBER CONSTRUCTION, REFER RESPECTIVE DRAWING FOR CIVIL WORK. CHAMBER SLEEPERS MAY BE FABRICATED AS SHOWN IN THIS DRAWING FOR EASY LIFTING DURING O&M.
4. ORIENTATION OF 2" VALVES INSTALLED IN TAP-OFF TO BE SUCH THAT VALVE LEVER/HANDLE MOVEMENT IS NOT RESTRICTED BY ADJACENT WALL OF A CHAMBER.
5. VALVE CHAMBER PROJECTION ABOVE FGL SHALL BE 150MM-300MM SUITED AS PER SITE CONDITIONS.

LEGEND:-

- BUTT WELD BALL VALVE (B.V.)
- FLANGED BALL VALVE
- BUTT WELD GLOBE VALVE (G.V.)
- FLANGED GLOBE VALVE
- THREAD END BALL VALVE

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	02.05.2023	ISSUED AS STANDARD	AK	MN	HK

PMC

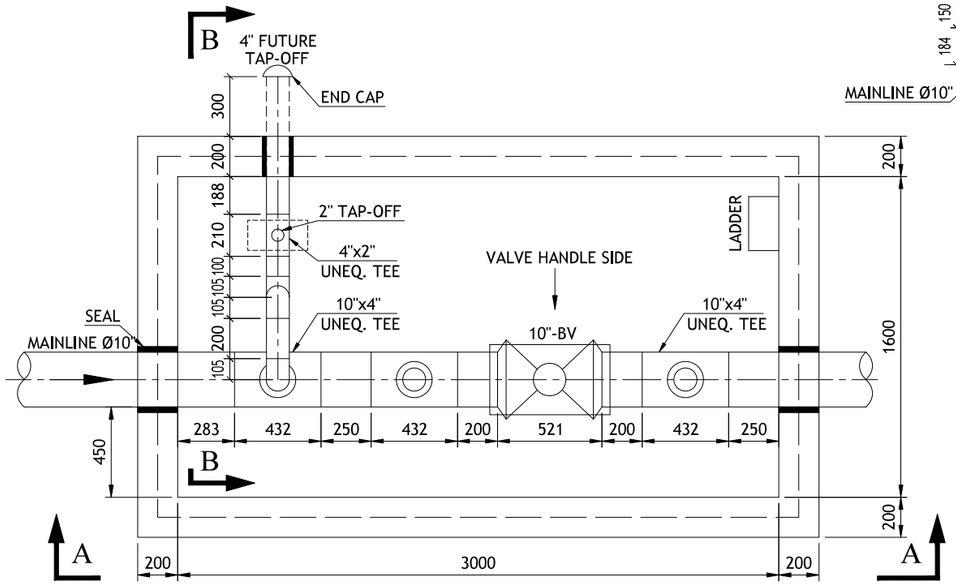
VCS QUALITY SERVICES PVT. LTD.

TITLE

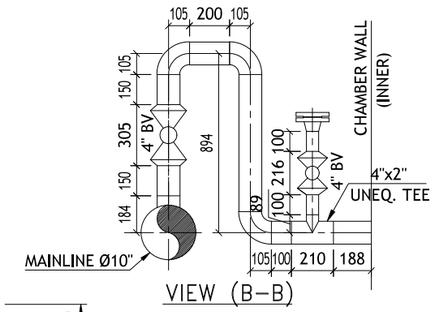
GENERAL ARRANGEMENT DRAWING FOR
8" SIZE WITH 4" FUTURE TAP-OFF

SIZE	JOB NO.	DRAWING NUMBER	SHEET	REV.
A3	XXXX	VPC-STD-PP-2027	4 OF 5	0

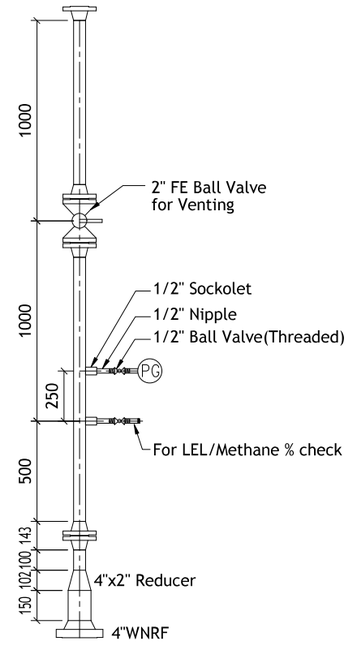
Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST



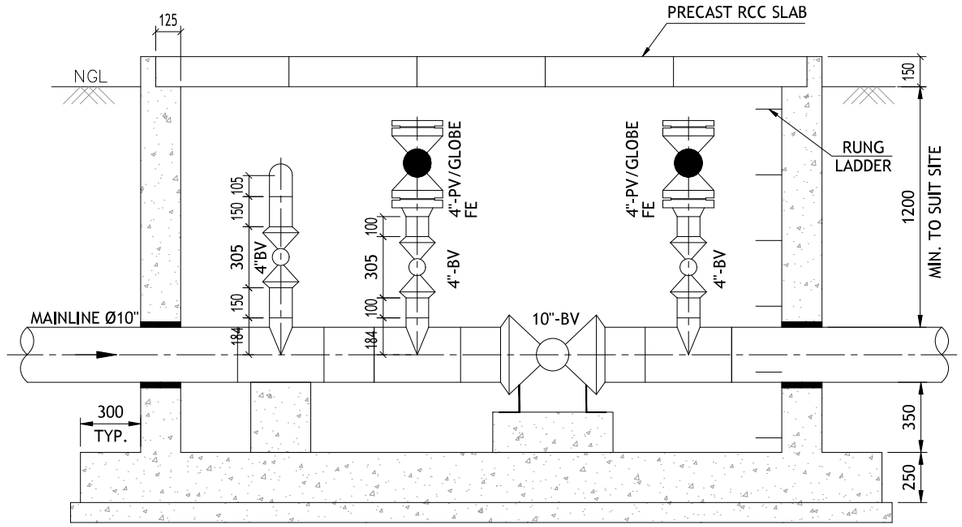
TOP VIEW



VIEW (B–B)



COMMON VENT PIPE FOR ALL SECTIONALIZING VALVES
(NOT TO BE FABRICATED FOR ALL SVs)



FRONT VIEW (A–A)

REFERENCE DRAWINGS / DOCUMENTS

S.NO.	TITLE	NO.

NOTES:-

1. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN M UNLESS OTHERWISE MENTIONED.
2. APPROVED SEALANT TO BE PROVIDED IN VALVE PIT ENTRY & EXIT OF PIPELINE TO RESTRICT WATER INTO PIT.
3. COMMON VENT NOT TO BE FABRICATED FOR EACH SV, MINIMUM TWO SUCH VENTS TO BE FABRICATED FOR GAS COMMISSIONING AND THEN TO BE KEPT IN ERV FOR O&M PURPOSE.
4. FIRST SECTIONALIZING VALVE OF MAINLINE TO BE PROVIDED WITH PERMANENT BY-PASS & VENT. THEREAFTER SVs MAY BE PROVIDED WITH PERMANENT BY-PASS & WITHOUT PERMANENT BY-PASS LINE ALTERNATIVELY.
5. FOR VALVE CHAMBER CONSTRUCTION, REFER RESPECTIVE DRAWING FOR CIVIL WORK. CHAMBER SLEEPERS MAY BE FABRICATED AS SHOWN IN THIS DRAWING FOR EASY LIFTING DURING O&M.
6. ORIENTATION OF 2" VALVES INSTALLED IN BY-PASS/TAP-OFF TO BE SUCH THAT VALVE LEVER/HANDLE MOVEMENT IS NOT RESTRICTED BY ADJACENT WALL OF A CHAMBER.
7. VALVE CHAMBER PROJECTION ABOVE FGL SHALL BE 150MM-300MM SUITED AS PER SITE CONDITIONS.

LEGEND:-

- BUTT WELD BALL VALVE (B.V.)
- FLANGED BALL VALVE
- BUTT WELD GLOBE VALVE (G.V.)
- FLANGED GLOBE VALVE
- THREAD END BALL VALVE

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	02.05.2023	ISSUED AS STANDARD	AK	MN	HK

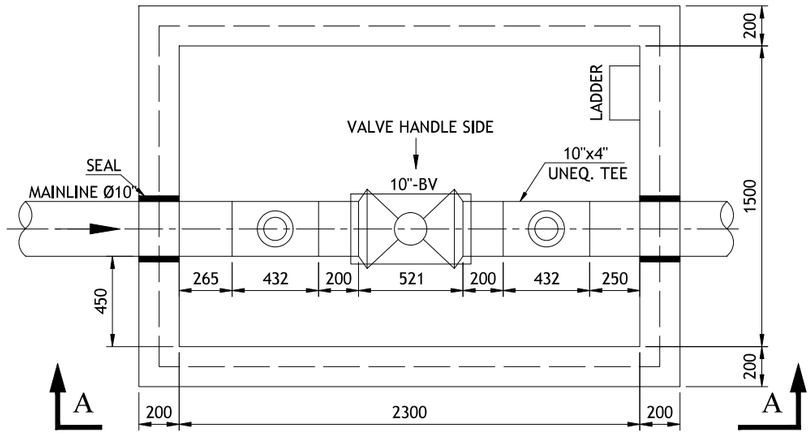
PMC

VCS QUALITY SERVICES PVT. LTD.

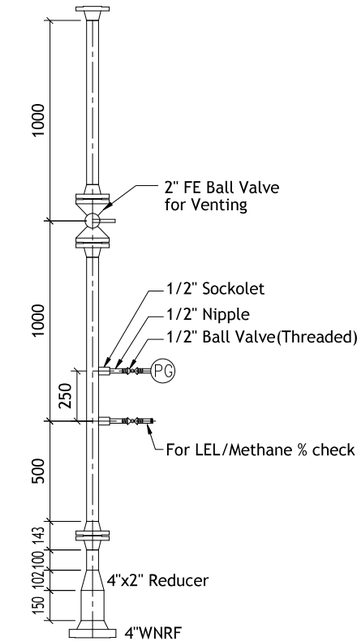
TITLE GENERAL ARRANGEMENT DRAWING FOR SECTIONALISING VALVE OF 10" SIZE WITH 4" FUTURE TAP-OFF & WITH FLEXIBLE BY-PASS PROVISION AND VENT (TYPE-10MV-1)

SIZE	JOB NO.	DRAWING NUMBER	SHEET	REV.
A3	XXXX	VPC-STD-PP-2028	1 OF 5	0

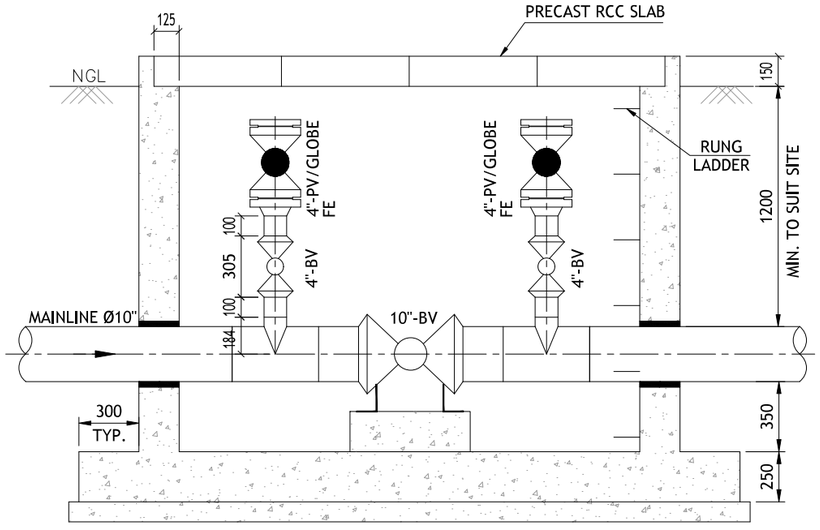
Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST



TOP VIEW



COMMON VENT PIPE FOR ALL SECTIONALIZING VALVES
(NOT TO BE FABRICATED FOR ALL SVs)



FRONT VIEW (A–A)

REFERENCE DRAWINGS / DOCUMENTS

S.NO.	TITLE	NO.

NOTES:-

1. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN M UNLESS OTHERWISE MENTIONED.
2. APPROVED SEALANT TO BE PROVIDED IN VALVE PIT ENTRY & EXIT OF PIPELINE TO RESTRICT WATER INTO PIT.
3. COMMON VENT NOT TO BE FABRICATED FOR EACH SV, MINIMUM TWO SUCH VENTS TO BE FABRICATED FOR GAS COMMISSIONING AND THEN TO BE KEPT IN ERV FOR O&M PURPOSE.
4. FIRST SECTIONALIZING VALVE OF MAINLINE TO BE PROVIDED WITH PERMANENT BY-PASS & VENT. THEREAFTER SVs MAY BE PROVIDED WITH PERMANENT BY-PASS & WITHOUT PERMANENT BY-PASS LINE ALTERNATIVELY.
5. FOR VALVE CHAMBER CONSTRUCTION, REFER RESPECTIVE DRAWING FOR CIVIL WORK. CHAMBER SLEEPERS MAY BE FABRICATED AS SHOWN IN THIS DRAWING FOR EASY LIFTING DURING O&M.
6. ORIENTATION OF 2" VALVES INSTALLED IN BY-PASS/TAP-OFF TO BE SUCH THAT VALVE LEVER/HANDLE MOVEMENT IS NOT RESTRICTED BY ADJACENT WALL OF A CHAMBER.
7. VALVE CHAMBER PROJECTION ABOVE FGL SHALL BE 150MM-300MM SUITED AS PER SITE CONDITIONS.

LEGEND:-

- BUTT WELD BALL VALVE (B.V.)
- FLANGED BALL VALVE
- BUTT WELD GLOBE VALVE (G.V.)
- FLANGED GLOBE VALVE
- THREAD END BALL VALVE

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	02.05.2023	ISSUED AS STANDARD	AK	MN	HK

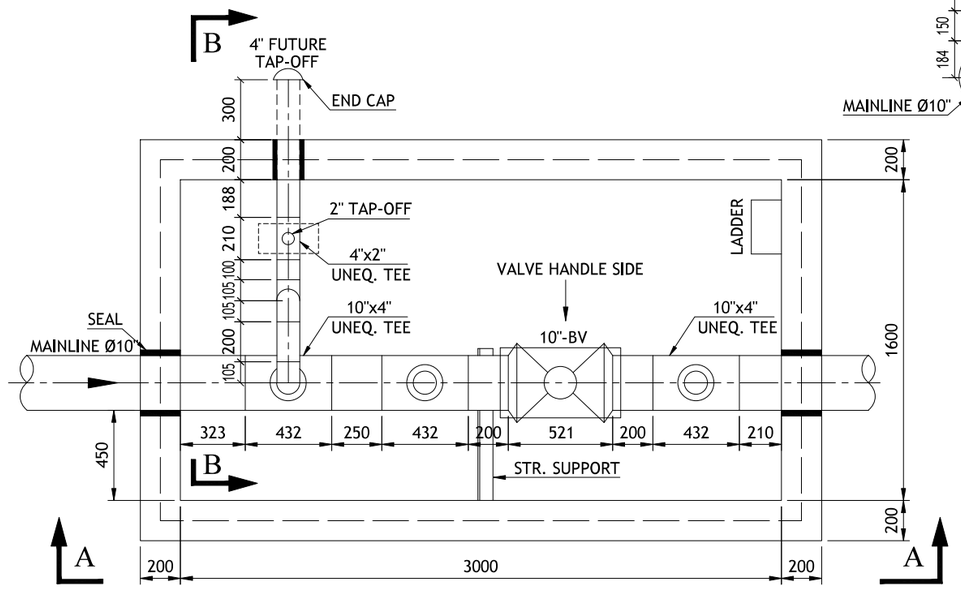
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VCS QUALITY SERVICES PVT. LTD.

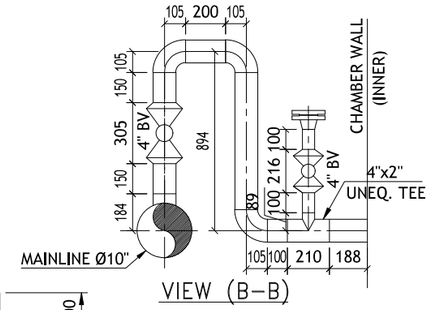
TITLE: GENERAL ARRANGEMENT DRAWING FOR SECTIONALISING VALVE OF 10" SIZE WITH FLEXIBLE BY-PASS PROVISION AND VENT (TYPE-10MV-2)

SIZE	JOB NO.	DRAWING NUMBER	SHEET	REV.
A3	XXXX	VPC-STD-PP-2028	2 OF 5	0

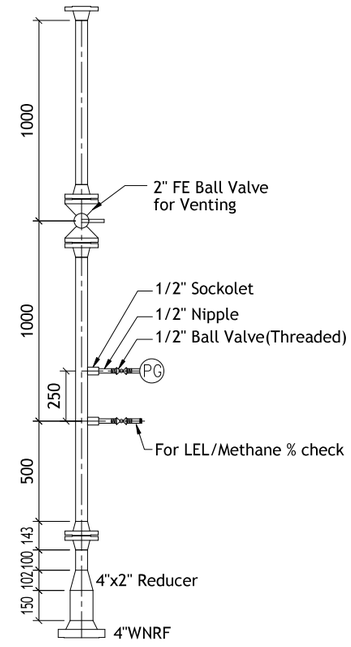
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Date: 2025.03.13 12:56:46 IST



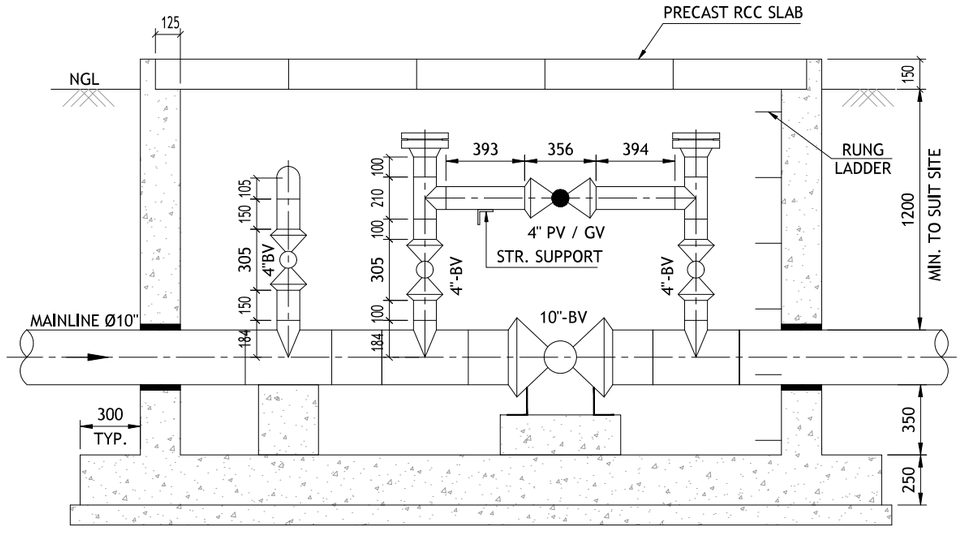
TOP VIEW



VIEW (B–B)



COMMON VENT PIPE FOR ALL SECTIONALIZING VALVES
(NOT TO BE FABRICATED FOR ALL SVs)



FRONT VIEW (A–A)

REFERENCE DRAWINGS / DOCUMENTS

S.NO.	TITLE	NO.

NOTES:-

1. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN M UNLESS OTHERWISE MENTIONED.
2. APPROVED SEALANT TO BE PROVIDED IN VALVE PIT ENTRY & EXIT OF PIPELINE TO RESTRICT WATER INTO PIT.
3. COMMON VENT NOT TO BE FABRICATED FOR EACH SV. MINIMUM TWO SUCH VENTS TO BE FABRICATED FOR GAS COMMISSIONING AND THEN TO BE KEPT IN ERV FOR O&M PURPOSE.
4. FIRST SECTIONALIZING VALVE OF MAINLINE TO BE PROVIDED WITH PERMANENT BY-PASS & VENT. THEREAFTER SVs MAY BE PROVIDED WITH PERMANENT BY-PASS & WITHOUT PERMANENT BY-PASS LINE ALTERNATIVELY.
5. FOR VALVE CHAMBER CONSTRUCTION, REFER RESPECTIVE DRAWING FOR CIVIL WORK. CHAMBER SLEEPERS MAY BE FABRICATED AS SHOWN IN THIS DRAWING FOR EASY LIFTING DURING O&M.
6. ORIENTATION OF 2" VALVES INSTALLED IN BY-PASS/TAP-OFF TO BE SUCH THAT VALVE LEVER/HANDLE MOVEMENT IS NOT RESTRICTED BY ADJACENT WALL OF A CHAMBER.
7. VALVE CHAMBER PROJECTION ABOVE FGL SHALL BE 150MM-300MM SUITED AS PER SITE CONDITIONS.

LEGEND:-

- BUTT WELD BALL VALVE (B.V.)
- FLANGED BALL VALVE
- BUTT WELD GLOBE VALVE (G.V.)
- FLANGED GLOBE VALVE
- THREAD END BALL VALVE

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	02.05.2023	ISSUED AS STANDARD	AK	MN	HK

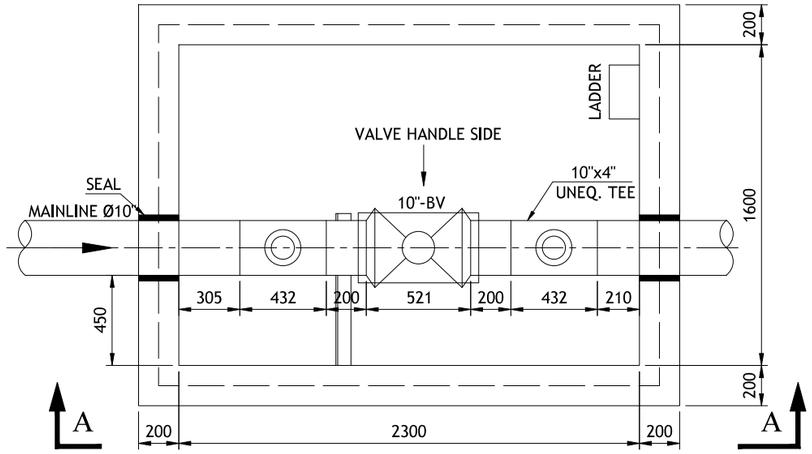
PMC

VCS QUALITY SERVICES PVT. LTD.

TITLE GENERAL ARRANGEMENT DRAWING FOR SECTIONALISING VALVE OF 10" SIZE WITH 4" FUTURE TAP-OFF & WITH PERMANENT BY-PASS LINE AND VENT (TYPE-10MV-3)

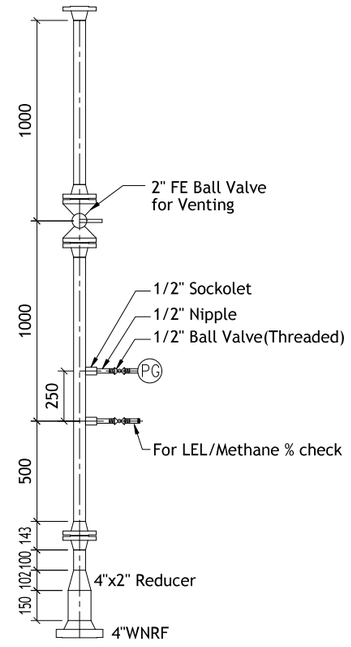
SIZE	JOB NO.	DRAWING NUMBER	SHEET	REV.
A3	XXXX	VPC-STD-PP-2028	3 OF 5	0

Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST



TOP VIEW

FRONT VIEW (A–A)



COMMON VENT PIPE FOR ALL SECTIONALIZING VALVES
(NOT TO BE FABRICATED FOR ALL SVs)

REFERENCE DRAWINGS / DOCUMENTS

S.NO.	TITLE	NO.

NOTES:-

1. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN M UNLESS OTHERWISE MENTIONED.
2. APPROVED SEALANT TO BE PROVIDED IN VALVE PIT ENTRY & EXIT OF PIPELINE TO RESTRICT WATER INTO PIT.
3. COMMON VENT NOT TO BE FABRICATED FOR EACH SV. MINIMUM TWO SUCH VENTS TO BE FABRICATED FOR GAS COMMISSIONING AND THEN TO BE KEPT IN ERV FOR O&M PURPOSE.
4. FIRST SECTIONALIZING VALVE OF MAINLINE TO BE PROVIDED WITH PERMANENT BY-PASS & VENT. THEREAFTER SVs MAY BE PROVIDED WITH PERMANENT BY-PASS & WITHOUT PERMANENT BY-PASS LINE ALTERNATIVELY.
5. FOR VALVE CHAMBER CONSTRUCTION, REFER RESPECTIVE DRAWING FOR CIVIL WORK. CHAMBER SLEEPERS MAY BE FABRICATED AS SHOWN IN THIS DRAWING FOR EASY LIFTING DURING O&M.
6. ORIENTATION OF 2" VALVES INSTALLED IN BY-PASS/TAP-OFF TO BE SUCH THAT VALVE LEVER/HANDLE MOVEMENT IS NOT RESTRICTED BY ADJACENT WALL OF A CHAMBER.
7. VALVE CHAMBER PROJECTION ABOVE FGL SHALL BE 150MM-300MM SUITED AS PER SITE CONDITIONS.

LEGEND:-

- BUTT WELD BALL VALVE (B.V.)
- FLANGED BALL VALVE
- BUTT WELD GLOBE VALVE (G.V.)
- FLANGED GLOBE VALVE
- THREAD END BALL VALVE

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	02.05.2023	ISSUED AS STANDARD	AK	MN	HK

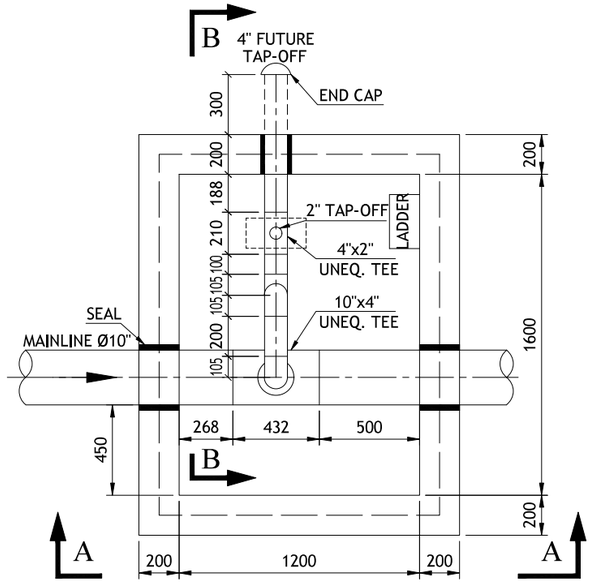
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VCS QUALITY SERVICES PVT. LTD.

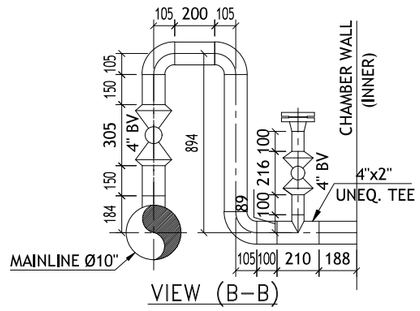
TITLE GENERAL ARRANGEMENT DRAWING FOR SECTIONALISING VALVE OF 10" SIZE WITH PERMANENT BY-PASS LINE AND VENT (TYPE-10MV-4)

SIZE	JOB NO.	DRAWING NUMBER	SHEET	REV.
A3	XXXX	VPC-STD-PP-2028	4 OF 5	0

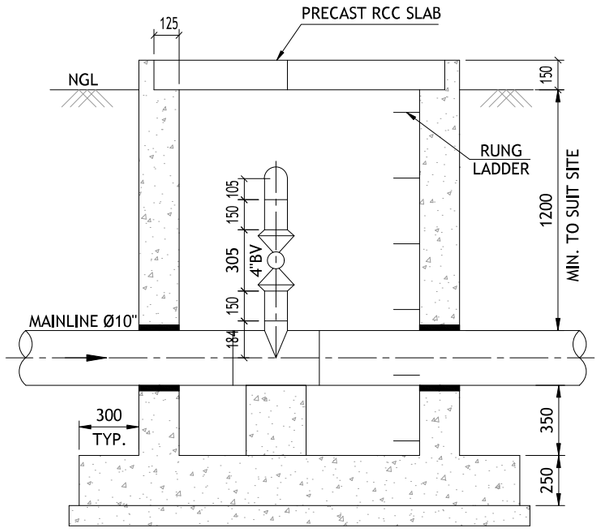
Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST



TOP VIEW



VIEW (B–B)



FRONT VIEW (A–A)

REFERENCE DRAWINGS / DOCUMENTS

S.NO.	TITLE	NO.

NOTES:-

1. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN M UNLESS OTHERWISE MENTIONED.
2. APPROVED SEALANT TO BE PROVIDED IN VALVE PIT ENTRY & EXIT OF PIPELINE TO RESTRICT WATER INTO PIT.
3. FOR VALVE CHAMBER CONSTRUCTION, REFER RESPECTIVE DRAWING FOR CIVIL WORK. CHAMBER SLEEPERS MAY BE FABRICATED AS SHOWN IN THIS DRAWING FOR EASY LIFTING DURING O&M.
4. ORIENTATION OF 2" VALVES INSTALLED IN TAP-OFF TO BE SUCH THAT VALVE LEVER/HANDLE MOVEMENT IS NOT RESTRICTED BY ADJACENT WALL OF A CHAMBER.
5. VALVE CHAMBER PROJECTION ABOVE FGL SHALL BE 150MM-300MM SUITED AS PER SITE CONDITIONS.

LEGEND:-

- BUTT WELD BALL VALVE (B.V.)
- FLANGED BALL VALVE
- BUTT WELD GLOBE VALVE (G.V.)
- FLANGED GLOBE VALVE
- THREAD END BALL VALVE

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	02.05.2023	ISSUED AS STANDARD	AK	MN	HK

PMC

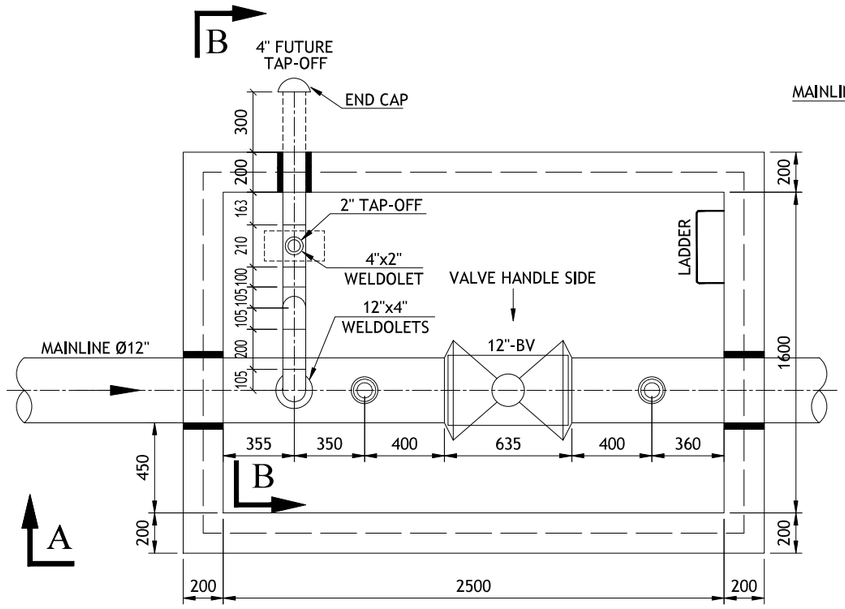
VCS QUALITY SERVICES PVT. LTD.

TITLE

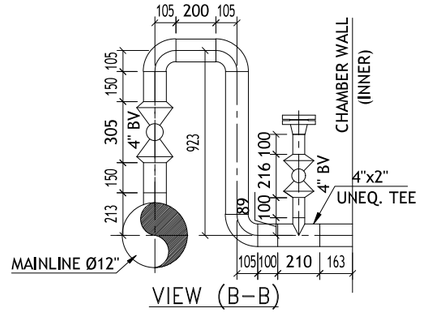
GENERAL ARRANGEMENT DRAWING FOR
10" SIZE WITH 4" FUTURE TAP-OFF

SIZE	JOB NO.	DRAWING NUMBER	SHEET	REV.
A3	XXXX	VPC-STD-PP-2028	5 OF 5	0

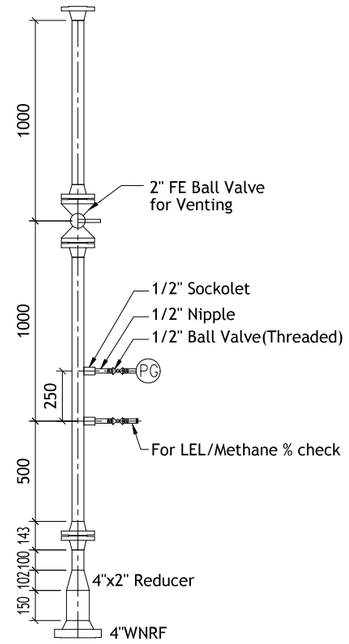
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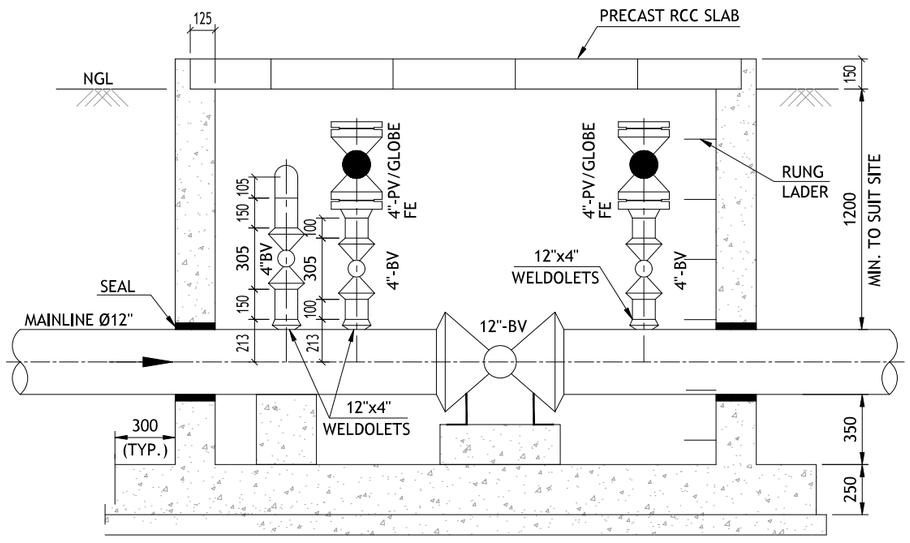
TOP VIEW



VIEW (B–B)



COMMON VENT PIPE FOR ALL SECTIONALIZING VALVES
(NOT TO BE FABRICATED FOR ALL SVs)



FRONT VIEW (A–A)

REFERENCE DRAWINGS / DOCUMENTS

S.NO.	TITLE	NO.

NOTES:-

1. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN M UNLESS OTHERWISE MENTIONED.
2. APPROVED SEALANT TO BE PROVIDED IN VALVE PIT ENTRY & EXIT OF PIPELINE TO RESTRICT WATER INTO PIT.
3. COMMON VENT NOT TO BE FABRICATED FOR EACH SV, MINIMUM TWO SUCH VENTS TO BE FABRICATED FOR GAS COMMISSIONING AND THEN TO BE KEPT IN ERV FOR O&M PURPOSE.
4. FIRST SECTIONALIZING VALVE OF MAINLINE TO BE PROVIDED WITH PERMANENT BY-PASS & VENT. THEREAFTER SVs MAY BE PROVIDED WITH PERMANENT BY-PASS & WITHOUT PERMANENT BY-PASS LINE ALTERNATIVELY.
5. FOR VALVE CHAMBER CONSTRUCTION, REFER RESPECTIVE DRAWING FOR CIVIL WORK. CHAMBER SLEEPERS MAY BE FABRICATED AS SHOWN IN THIS DRAWING FOR EASY LIFTING DURING O&M.
6. ORIENTATION OF 2" VALVES INSTALLED IN BY-PASS/TAP-OFF TO BE SUCH THAT VALVE LEVER/HANDLE MOVEMENT IS NOT RESTRICTED BY ADJACENT WALL OF A CHAMBER.
7. VALVE CHAMBER PROJECTION ABOVE FGL SHALL BE 150MM-300MM SUITED AS PER SITE CONDITIONS.

LEGEND:-

- BUTT WELD BALL VALVE (B.V.)
- FLANGED BALL VALVE
- BUTT WELD GLOBE VALVE (G.V.)
- FLANGED GLOBE VALVE
- THREAD END BALL VALVE

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	02.05.2023	ISSUED AS STANDARD	AK	MN	HK

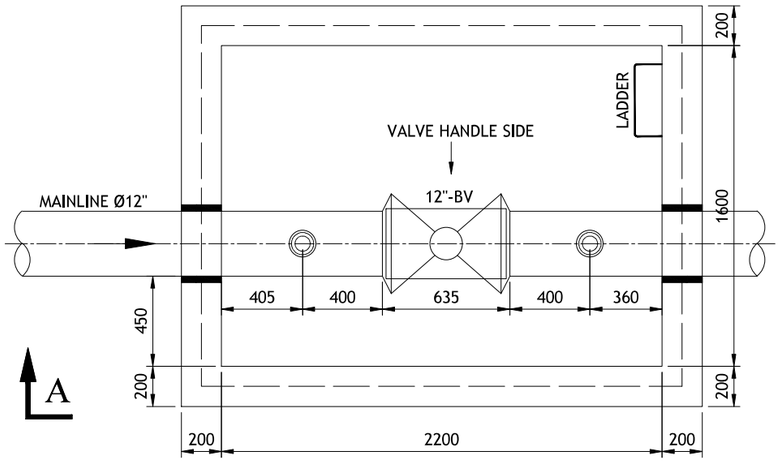
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VCS QUALITY SERVICES PVT. LTD.

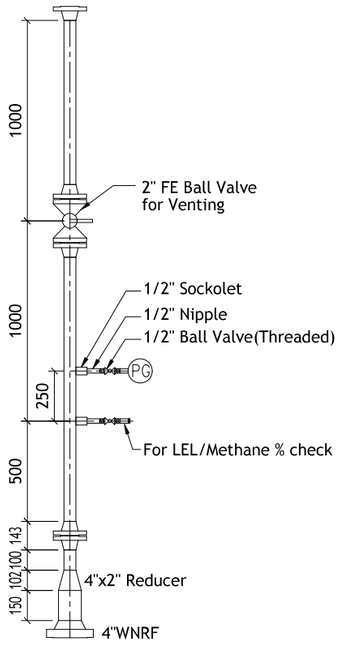
TITLE: GENERAL ARRANGEMENT DRAWING FOR SECTIONALISING VALVE OF 12" SIZE WITH 4" FUTURE TAP-OFF & WITH FLEXIBLE BY-PASS PROVISION AND VENT (TYPE-12MV-1)

SIZE	JOB NO.	DRAWING NUMBER	SHEET	REV.
A3	XXXX	VPC-STD-PP-2029	1 OF 5	0

Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST

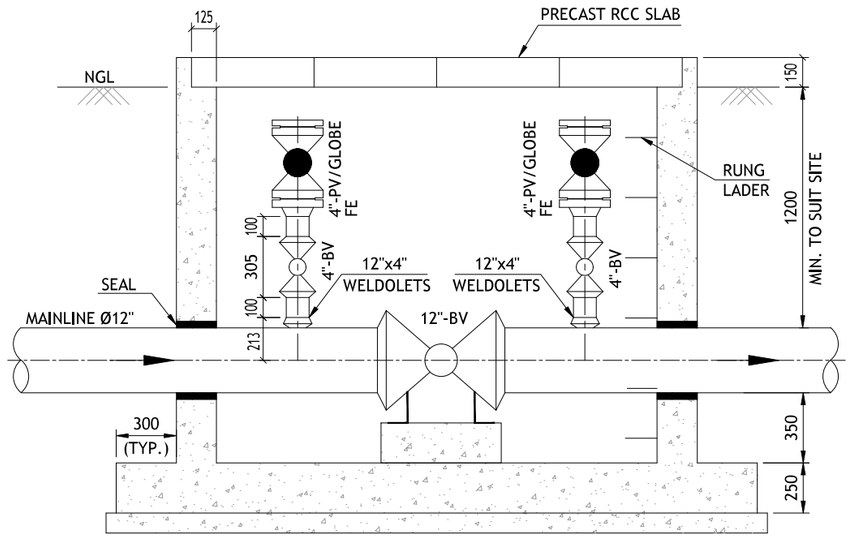


TOP VIEW



A

COMMON VENT PIPE FOR ALL SECTIONALIZING VALVES
(NOT TO BE FABRICATED FOR ALL SVs)



FRONT VIEW (A–A)

REFERENCE DRAWINGS / DOCUMENTS

S.NO.	TITLE	NO.

NOTES:-

1. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN M UNLESS OTHERWISE MENTIONED.
2. APPROVED SEALANT TO BE PROVIDED IN VALVE PIT ENTRY & EXIT OF PIPELINE TO RESTRICT WATER INTO PIT.
3. COMMON VENT NOT TO BE FABRICATED FOR EACH SV, MINIMUM TWO SUCH VENTS TO BE FABRICATED FOR GAS COMMISSIONING AND THEN TO BE KEPT IN ERV FOR O&M PURPOSE.
4. FIRST SECTIONALIZING VALVE OF MAINLINE TO BE PROVIDED WITH PERMANENT BY-PASS & VENT. THEREAFTER SVs MAY BE PROVIDED WITH PERMANENT BY-PASS & WITHOUT PERMANENT BY-PASS LINE ALTERNATIVELY.
5. FOR VALVE CHAMBER CONSTRUCTION, REFER RESPECTIVE DRAWING FOR CIVIL WORK. CHAMBER SLEEPERS MAY BE FABRICATED AS SHOWN IN THIS DRAWING FOR EASY LIFTING DURING O&M.
6. ORIENTATION OF 2" VALVES INSTALLED IN BY-PASS/TAP-OFF TO BE SUCH THAT VALVE LEVER/HANDLE MOVEMENT IS NOT RESTRICTED BY ADJACENT WALL OF A CHAMBER.
7. VALVE CHAMBER PROJECTION ABOVE FGL SHALL BE 150MM-300MM SUITED AS PER SITE CONDITIONS.

LEGEND:-

- BUTT WELD BALL VALVE (B.V.)
- FLANGED BALL VALVE
- BUTT WELD GLOBE VALVE (G.V.)
- FLANGED GLOBE VALVE
- THREAD END BALL VALVE

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	02.05.2023	ISSUED AS STANDARD	AK	MN	HK

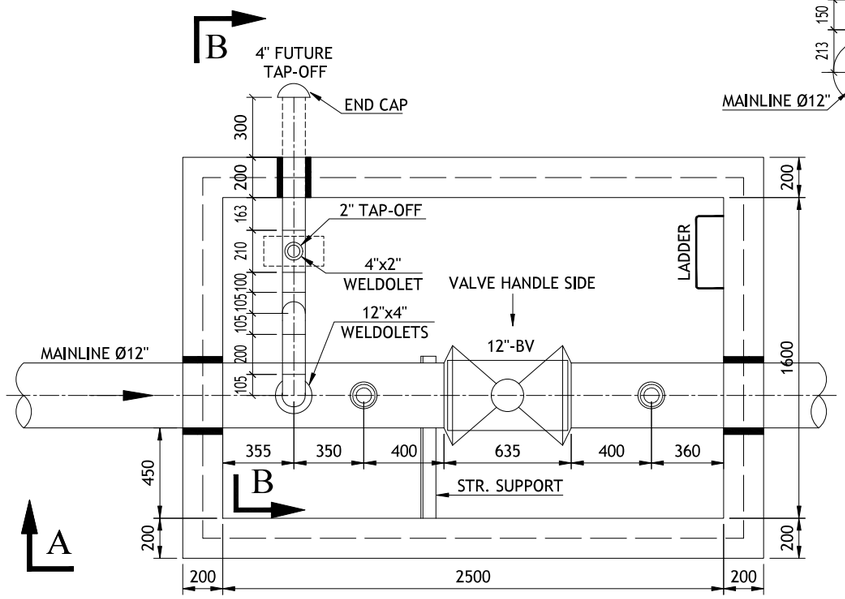
PMC

VCS QUALITY SERVICES PVT. LTD.

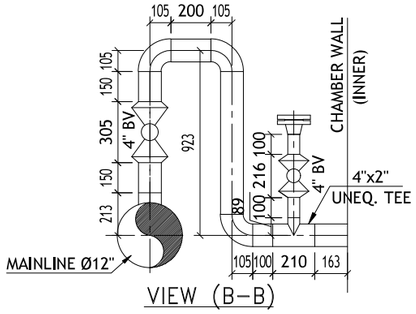
TITLE: GENERAL ARRANGEMENT DRAWING FOR SECTIONALISING VALVE OF 12" SIZE WITH FLEXIBLE BY-PASS PROVISION AND VENT (TYPE-12MV-2)

SIZE	JOB NO.	DRAWING NUMBER	SHEET	REV.
A3	XXXX	VPC-STD-PP-2029	2 OF 5	0

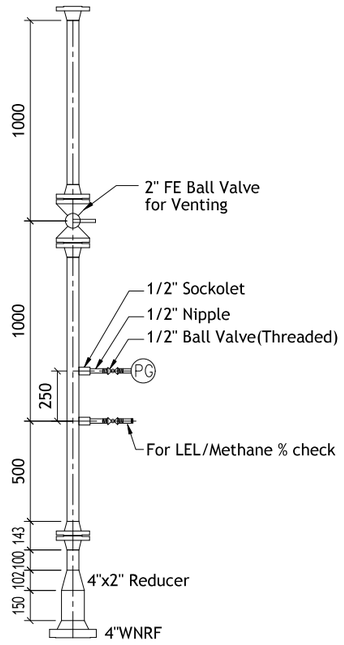
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Date: 2025.03.13 12:56:46 IST



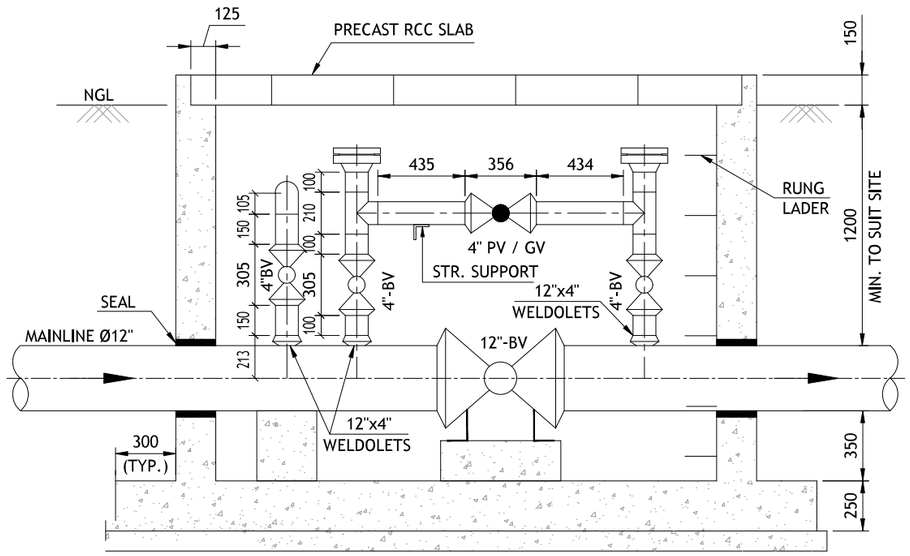
TOP VIEW



VIEW (B–B)



COMMON VENT PIPE FOR ALL SECTIONALIZING VALVES
(NOT TO BE FABRICATED FOR ALL SVs)



FRONT VIEW (A–A)

REFERENCE DRAWINGS / DOCUMENTS

S.NO.	TITLE	NO.

NOTES:-

1. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN M UNLESS OTHERWISE MENTIONED.
2. APPROVED SEALANT TO BE PROVIDED IN VALVE PIT ENTRY & EXIT OF PIPELINE TO RESTRICT WATER INTO PIT.
3. COMMON VENT NOT TO BE FABRICATED FOR EACH SV. MINIMUM TWO SUCH VENTS TO BE FABRICATED FOR GAS COMMISSIONING AND THEN TO BE KEPT IN ERV FOR O&M PURPOSE.
4. FIRST SECTIONALIZING VALVE OF MAINLINE TO BE PROVIDED WITH PERMANENT BY-PASS & VENT. THEREAFTER SVs MAY BE PROVIDED WITH PERMANENT BY-PASS & WITHOUT PERMANENT BY-PASS LINE ALTERNATIVELY.
5. FOR VALVE CHAMBER CONSTRUCTION, REFER RESPECTIVE DRAWING FOR CIVIL WORK. CHAMBER SLEEPERS MAY BE FABRICATED AS SHOWN IN THIS DRAWING FOR EASY LIFTING DURING O&M.
6. ORIENTATION OF 2" VALVES INSTALLED IN BY-PASS/TAP-OFF TO BE SUCH THAT VALVE LEVER/HANDLE MOVEMENT IS NOT RESTRICTED BY ADJACENT WALL OF A CHAMBER.
7. VALVE CHAMBER PROJECTION ABOVE FGL SHALL BE 150MM-300MM SUITED AS PER SITE CONDITIONS.

LEGEND:-

- BUTT WELD BALL VALVE (B.V.)
- FLANGED BALL VALVE
- BUTT WELD GLOBE VALVE (G.V.)
- FLANGED GLOBE VALVE
- THREAD END BALL VALVE

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	02.05.2023	ISSUED AS STANDARD	AK	MN	HK

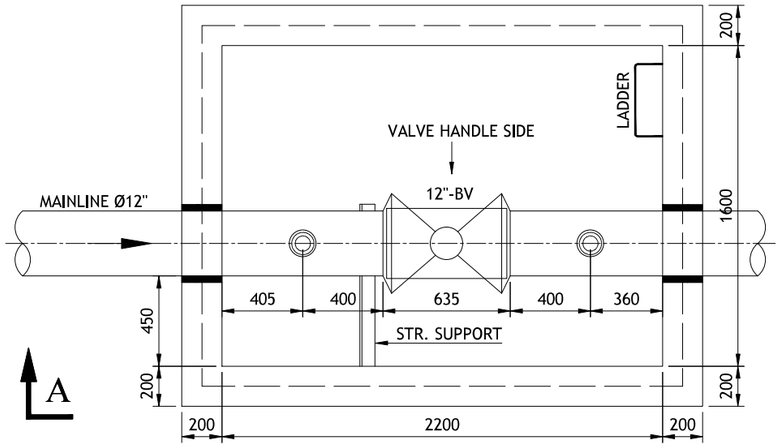
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VCS QUALITY SERVICES PVT. LTD.

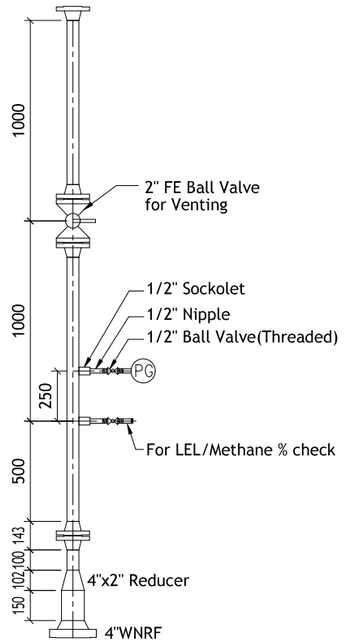
TITLE: GENERAL ARRANGEMENT DRAWING FOR SECTIONALISING VALVE OF 12" SIZE WITH 4" FUTURE TAP-OFF & WITH PERMANENT BY-PASS LINE AND VENT (TYPE-12MV-3)

SIZE	JOB NO.	DRAWING NUMBER	SHEET	REV.
A3	XXXX	VPC-STD-PP-2029	3 OF 5	0

Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST

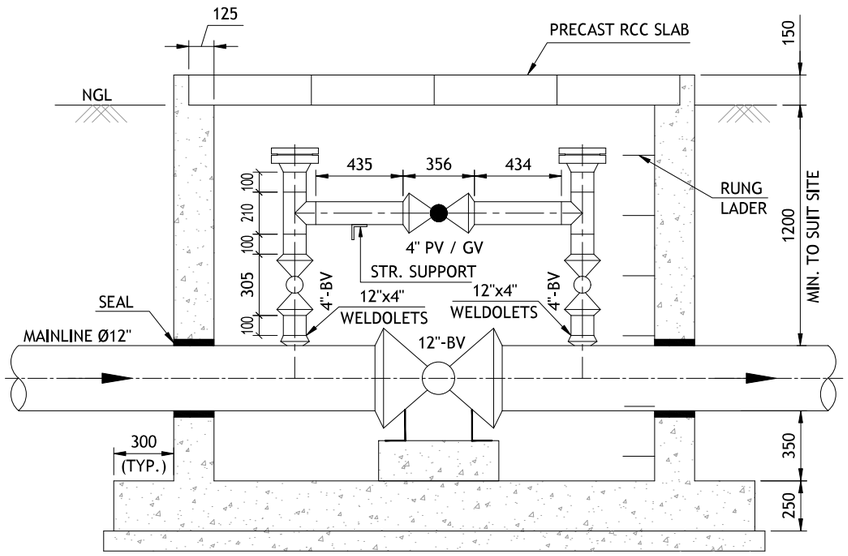


TOP VIEW



COMMON VENT PIPE FOR ALL SECTIONALIZING VALVES
(NOT TO BE FABRICATED FOR ALL SVs)

A



FRONT VIEW (A–A)

REFERENCE DRAWINGS / DOCUMENTS

S.NO.	TITLE	NO.

NOTES:-

1. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN M UNLESS OTHERWISE MENTIONED.
2. APPROVED SEALANT TO BE PROVIDED IN VALVE PIT ENTRY & EXIT OF PIPELINE TO RESTRICT WATER INTO PIT.
3. COMMON VENT NOT TO BE FABRICATED FOR EACH SV. MINIMUM TWO SUCH VENTS TO BE FABRICATED FOR GAS COMMISSIONING AND THEN TO BE KEPT IN ERV FOR O&M PURPOSE.
4. FIRST SECTIONALIZING VALVE OF MAINLINE TO BE PROVIDED WITH PERMANENT BY-PASS & VENT. THEREAFTER SVs MAY BE PROVIDED WITH PERMANENT BY-PASS & WITHOUT PERMANENT BY-PASS LINE ALTERNATIVELY.
5. FOR VALVE CHAMBER CONSTRUCTION, REFER RESPECTIVE DRAWING FOR CIVIL WORK. CHAMBER SLEEPERS MAY BE FABRICATED AS SHOWN IN THIS DRAWING FOR EASY LIFTING DURING O&M.
6. ORIENTATION OF 2" VALVES INSTALLED IN BY-PASS/TAP-OFF TO BE SUCH THAT VALVE LEVER/HANDLE MOVEMENT IS NOT RESTRICTED BY ADJACENT WALL OF A CHAMBER.
7. VALVE CHAMBER PROJECTION ABOVE FGL SHALL BE 150MM-300MM SUITED AS PER SITE CONDITIONS.

LEGEND:-

- BUTT WELD BALL VALVE (B.V.)
- FLANGED BALL VALVE
- BUTT WELD GLOBE VALVE (G.V.)
- FLANGED GLOBE VALVE
- THREAD END BALL VALVE

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	02.05.2023	ISSUED AS STANDARD	AK	MN	HK

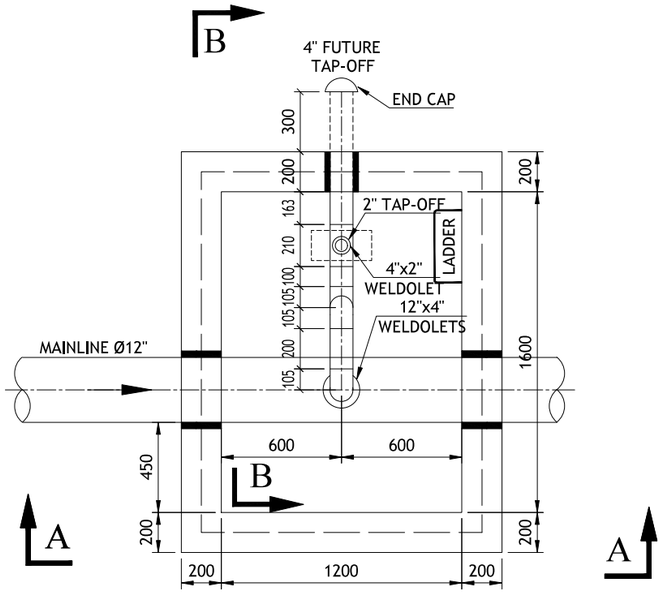
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VCS QUALITY SERVICES PVT. LTD.

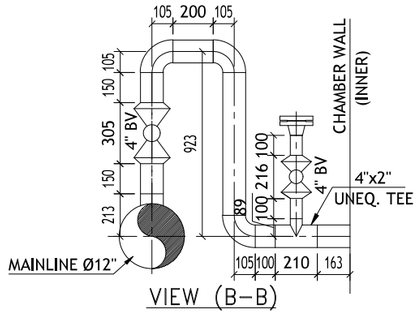
TITLE: GENERAL ARRANGEMENT DRAWING FOR SECTIONALISING VALVE OF 12" SIZE WITH PERMANENT BY-PASS LINE AND VENT (TYPE-12MV-4)

SIZE	JOB NO.	DRAWING NUMBER	SHEET	REV.
A3	XXXX	VPC-STD-PP-2029	4 OF 5	0

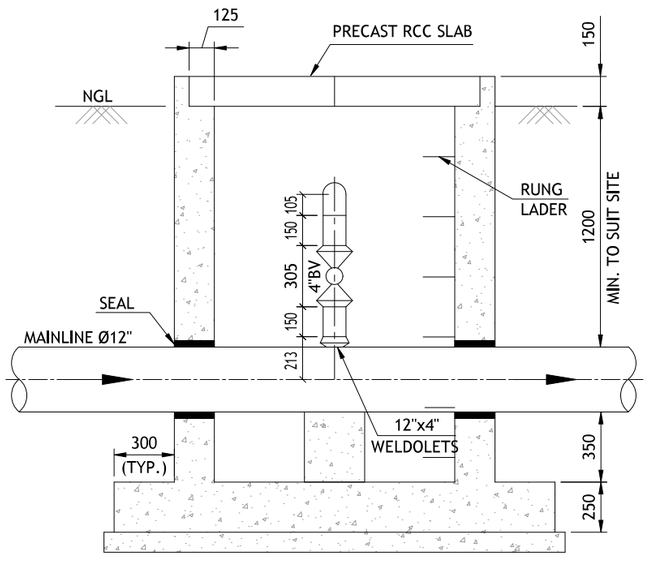
Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST



TOP VIEW



VIEW (B–B)



FRONT VIEW (A–A)

REFERENCE DRAWINGS / DOCUMENTS

S.NO.	TITLE	NO.

NOTES:-

1. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN M UNLESS OTHERWISE MENTIONED.
2. APPROVED SEALANT TO BE PROVIDED IN VALVE PIT ENTRY & EXIT OF PIPELINE TO RESTRICT WATER INTO PIT.
3. FOR VALVE CHAMBER CONSTRUCTION, REFER RESPECTIVE DRAWING FOR CIVIL WORK. CHAMBER SLEEPERS MAY BE FABRICATED AS SHOWN IN THIS DRAWING FOR EASY LIFTING DURING O&M.
4. ORIENTATION OF 2" VALVES INSTALLED IN TAP-OFF TO BE SUCH THAT VALVE LEVER/HANDLE MOVEMENT IS NOT RESTRICTED BY ADJACENT WALL OF A CHAMBER.
5. VALVE CHAMBER PROJECTION ABOVE FGL SHALL BE 150MM-300MM SUITED AS PER SITE CONDITIONS.

LEGEND:-

- BUTT WELD BALL VALVE (B.V.)
- FLANGED BALL VALVE
- BUTT WELD GLOBE VALVE (G.V.)
- FLANGED GLOBE VALVE
- THREAD END BALL VALVE

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	02.05.2023	ISSUED AS STANDARD	AK	MN	HK

PMC

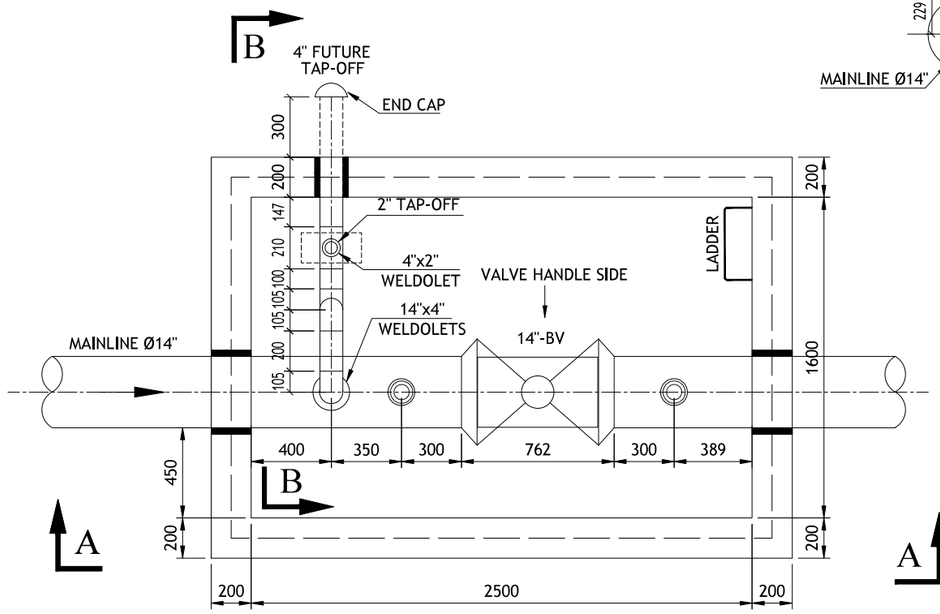
VCS QUALITY SERVICES PVT. LTD.

TITLE

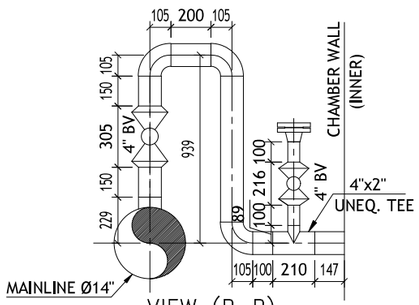
GENERAL ARRANGEMENT DRAWING FOR
12" SIZE WITH 4" FUTURE TAP-OFF

SIZE	JOB NO.	DRAWING NUMBER	SHEET	REV.
A3	XXXX	VPC-STD-PP-2029	5 OF 5	0

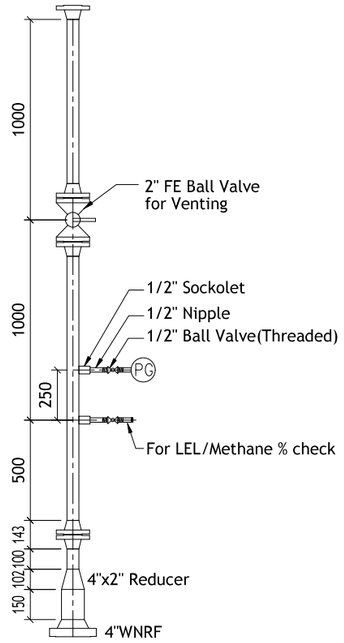
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Date: 2025.03.13 12:56:46 IST



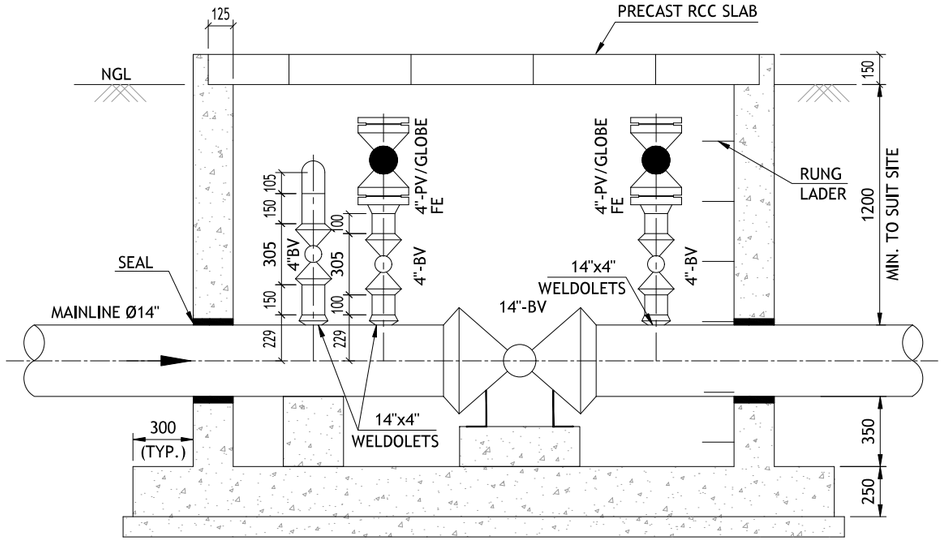
TOP VIEW



VIEW (B–B)



COMMON VENT PIPE FOR ALL SECTIONALIZING VALVES
(NOT TO BE FABRICATED FOR ALL SVs)



FRONT VIEW (A–A)

REFERENCE DRAWINGS / DOCUMENTS

S.NO.	TITLE	NO.

NOTES:-

1. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN M UNLESS OTHERWISE MENTIONED.
2. APPROVED SEALANT TO BE PROVIDED IN VALVE PIT ENTRY & EXIT OF PIPELINE TO RESTRICT WATER INTO PIT.
3. COMMON VENT NOT TO BE FABRICATED FOR EACH SV, MINIMUM TWO SUCH VENTS TO BE FABRICATED FOR GAS COMMISSIONING AND THEN TO BE KEPT IN ERV FOR O&M PURPOSE.
4. FIRST SECTIONALIZING VALVE OF MAINLINE TO BE PROVIDED WITH PERMANENT BY-PASS & VENT. THEREAFTER SVs MAY BE PROVIDED WITH PERMANENT BY-PASS & WITHOUT PERMANENT BY-PASS LINE ALTERNATIVELY.
5. FOR VALVE CHAMBER CONSTRUCTION, REFER RESPECTIVE DRAWING FOR CIVIL WORK. CHAMBER SLEEPERS MAY BE FABRICATED AS SHOWN IN THIS DRAWING FOR EASY LIFTING DURING O&M.
6. ORIENTATION OF 2" VALVES INSTALLED IN BY-PASS/TAP-OFF TO BE SUCH THAT VALVE LEVER/HANDLE MOVEMENT IS NOT RESTRICTED BY ADJACENT WALL OF A CHAMBER.
7. VALVE CHAMBER PROJECTION ABOVE FGL SHALL BE 150MM-300MM SUITED AS PER SITE CONDITIONS.

LEGEND:-

- BUTT WELD BALL VALVE (B.V.)
- FLANGED BALL VALVE
- BUTT WELD GLOBE VALVE (G.V.)
- FLANGED GLOBE VALVE
- THREAD END BALL VALVE

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	02.05.2023	ISSUED AS STANDARD	AK	MN	HK

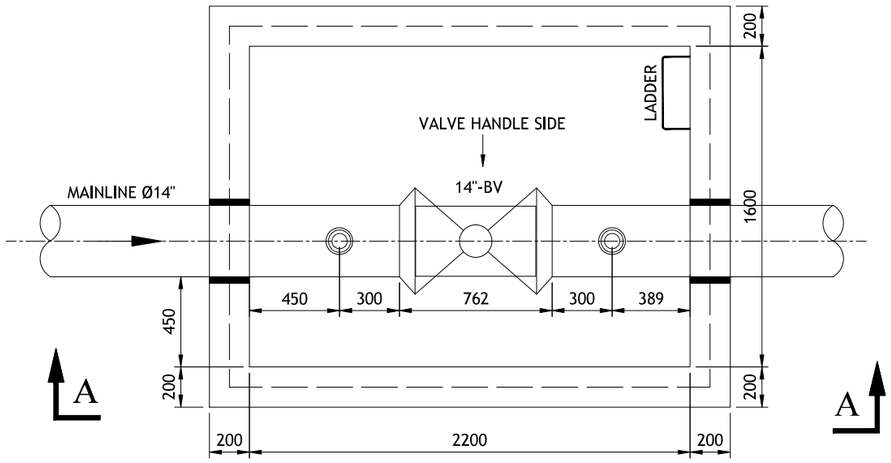
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VCS QUALITY SERVICES PVT. LTD.

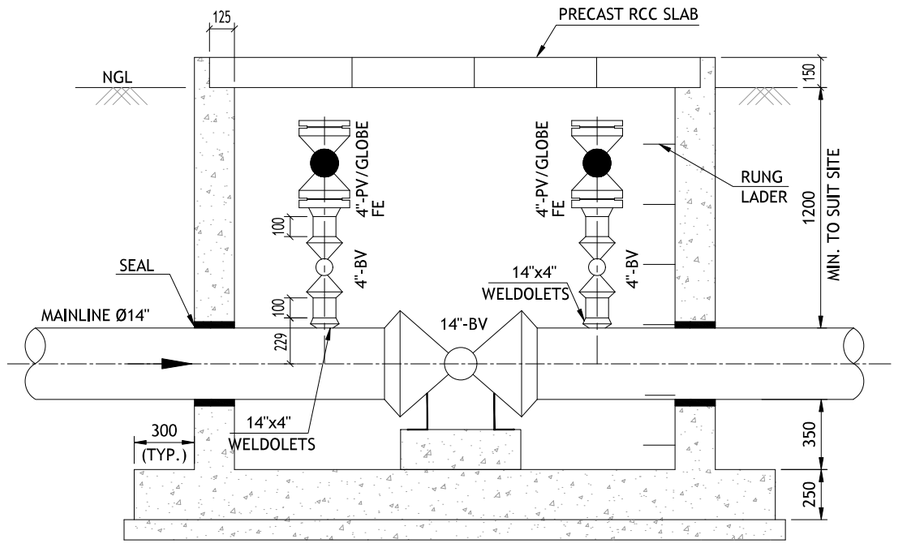
TITLE: GENERAL ARRANGEMENT DRAWING FOR SECTIONALISING VALVE OF 14" SIZE WITH 4" FUTURE TAP-OFF & WITH FLEXIBLE BY-PASS PROVISION AND VENT (TYPE-14MV-1)

SIZE	JOB NO.	DRAWING NUMBER	SHEET	REV.
A3	XXXX	VPC-STD-PP-2030	1 OF 5	0

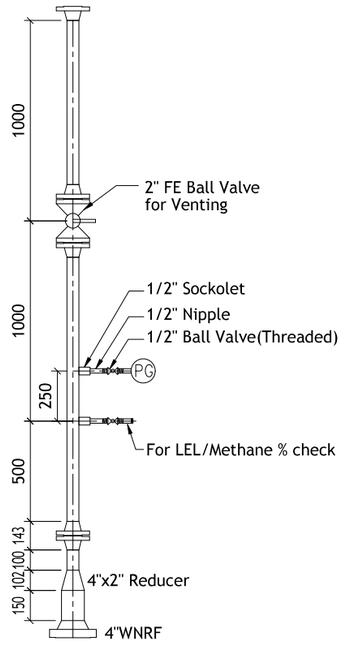
Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST



TOP VIEW



FRONT VIEW (A–A)



COMMON VENT PIPE FOR ALL SECTIONALIZING VALVES
(NOT TO BE FABRICATED FOR ALL SVs)

REFERENCE DRAWINGS / DOCUMENTS

S.NO.	TITLE	NO.

NOTES:-

1. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN M UNLESS OTHERWISE MENTIONED.
2. APPROVED SEALANT TO BE PROVIDED IN VALVE PIT ENTRY & EXIT OF PIPELINE TO RESTRICT WATER INTO PIT.
3. COMMON VENT NOT TO BE FABRICATED FOR EACH SV. MINIMUM TWO SUCH VENTS TO BE FABRICATED FOR GAS COMMISSIONING AND THEN TO BE KEPT IN ERV FOR O&M PURPOSE.
4. FIRST SECTIONALIZING VALVE OF MAINLINE TO BE PROVIDED WITH PERMANENT BY-PASS & VENT. THEREAFTER SVs MAY BE PROVIDED WITH PERMANENT BY-PASS & WITHOUT PERMANENT BY-PASS LINE ALTERNATIVELY.
5. FOR VALVE CHAMBER CONSTRUCTION, REFER RESPECTIVE DRAWING FOR CIVIL WORK. CHAMBER SLEEPERS MAY BE FABRICATED AS SHOWN IN THIS DRAWING FOR EASY LIFTING DURING O&M.
6. ORIENTATION OF 2" VALVES INSTALLED IN BY-PASS/TAP-OFF TO BE SUCH THAT VALVE LEVER/HANDLE MOVEMENT IS NOT RESTRICTED BY ADJACENT WALL OF A CHAMBER.
7. VALVE CHAMBER PROJECTION ABOVE FGL SHALL BE 150MM-300MM SUITED AS PER SITE CONDITIONS.

LEGEND:-

- BUTT WELD BALL VALVE (B.V.)
- FLANGED BALL VALVE
- BUTT WELD GLOBE VALVE (G.V.)
- FLANGED GLOBE VALVE
- THREAD END BALL VALVE

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	02.05.2023	ISSUED AS STANDARD	AK	MN	HK

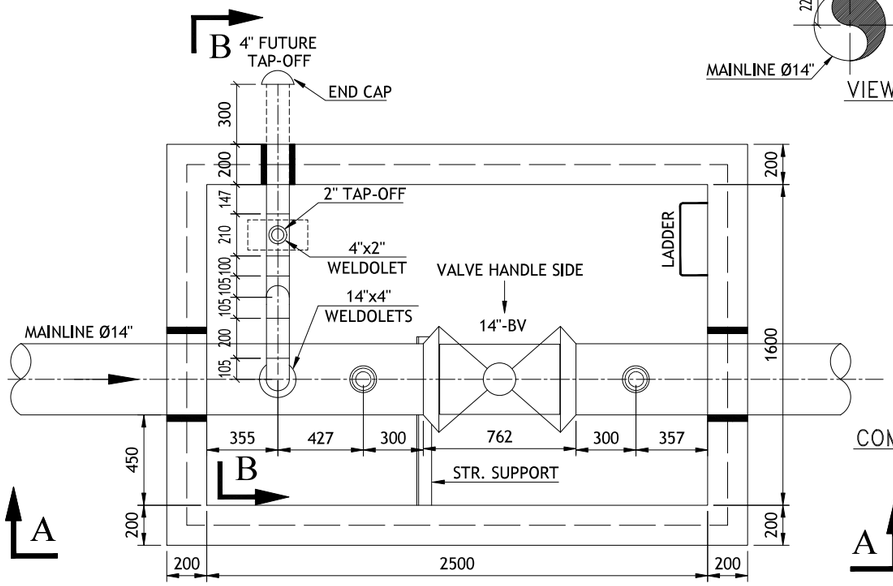
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VCS QUALITY SERVICES PVT. LTD.

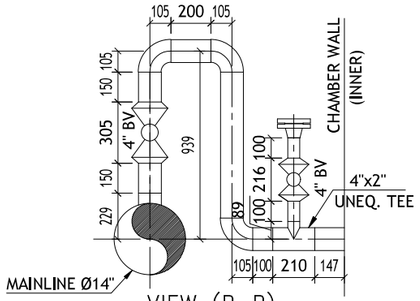
TITLE: GENERAL ARRANGEMENT DRAWING FOR SECTIONALISING VALVE OF 14" SIZE WITH FLEXIBLE BY-PASS PROVISION AND VENT (TYPE-14MV-2)

SIZE	JOB NO.	DRAWING NUMBER	SHEET	REV.
A3	XXXX	VPC-STD-PP-2030	2 OF 5	0

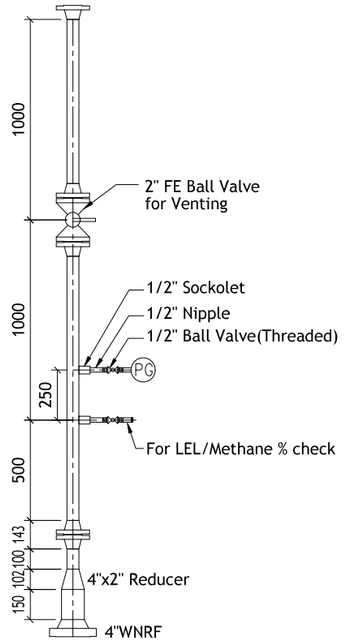
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Date: 2025.03.13 12:56:46 IST



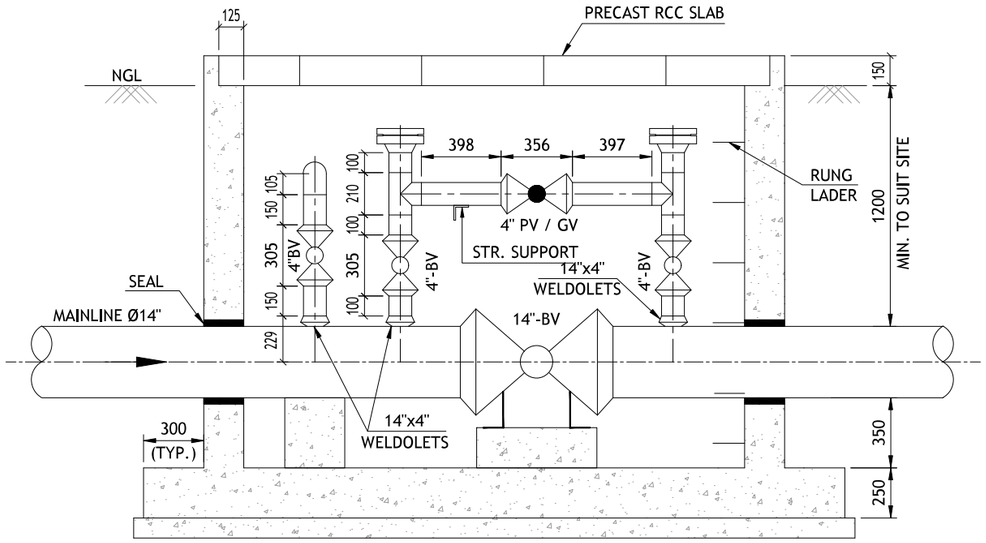
TOP VIEW



VIEW (B–B)



COMMON VENT PIPE FOR ALL SECTIONALIZING VALVES
(NOT TO BE FABRICATED FOR ALL SVs)



FRONT VIEW (A–A)

REFERENCE DRAWINGS / DOCUMENTS

S.NO.	TITLE	NO.

NOTES:-

1. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN M UNLESS OTHERWISE MENTIONED.
2. APPROVED SEALANT TO BE PROVIDED IN VALVE PIT ENTRY & EXIT OF PIPELINE TO RESTRICT WATER INTO PIT.
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7. VALVE CHAMBER PROJECTION ABOVE FGL SHALL BE 150MM-300MM SUITED AS PER SITE CONDITIONS.

LEGEND:-

- BUTT WELD BALL VALVE (B.V.)
- FLANGED BALL VALVE
- BUTT WELD GLOBE VALVE (G.V.)
- FLANGED GLOBE VALVE
- THREAD END BALL VALVE

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	02.05.2023	ISSUED AS STANDARD	AK	MN	HK

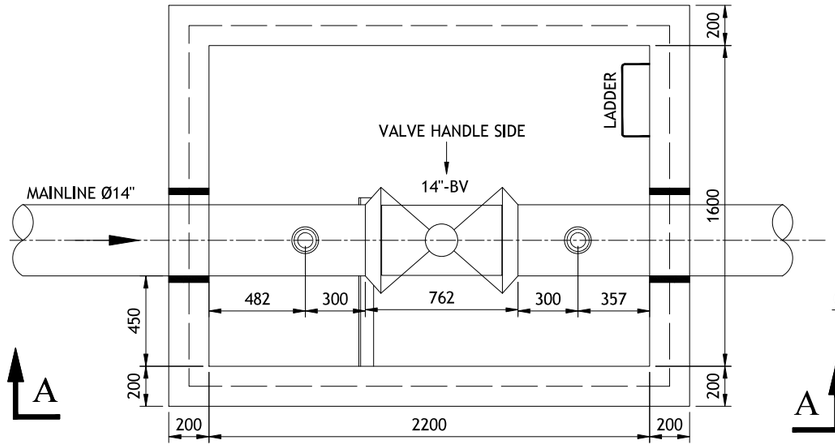
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VCS QUALITY SERVICES PVT. LTD.

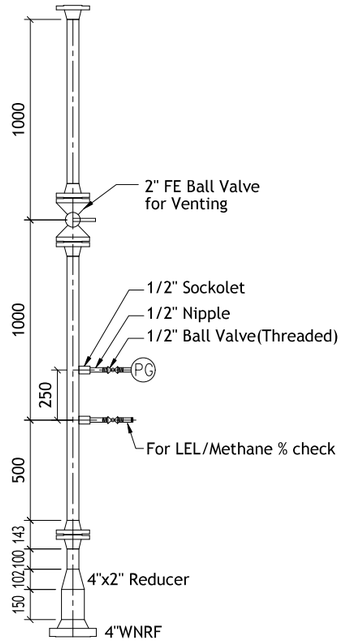
TITLE: GENERAL ARRANGEMENT DRAWING FOR SECTIONALISING VALVE OF 14" SIZE WITH 4" FUTURE TAP-OFF & WITH PERMANENT BY-PASS LINE AND VENT (TYPE-14MV-3)

SIZE	JOB NO.	DRAWING NUMBER	SHEET	REV.
A3	XXXX	VPC-STD-PP-2030	3 OF 5	0

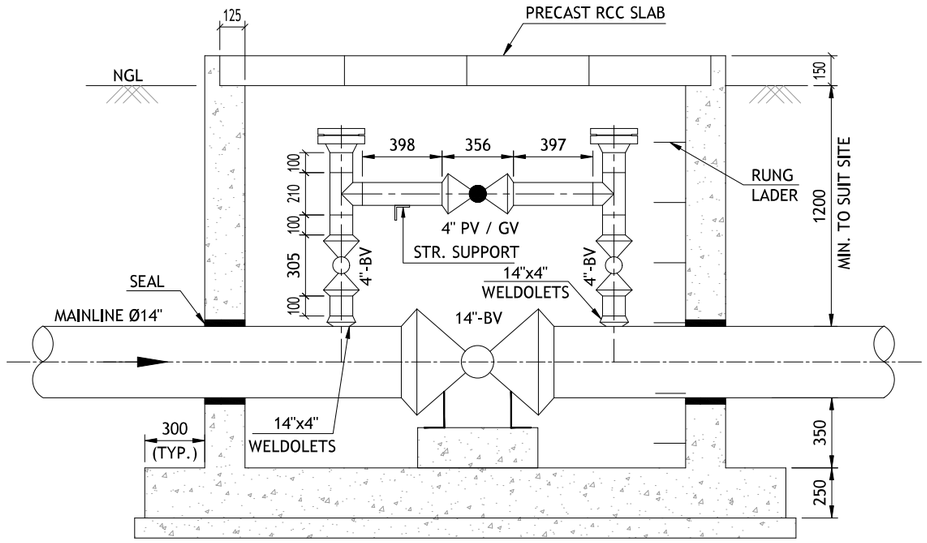
Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST



TOP VIEW



COMMON VENT PIPE FOR ALL SECTIONALIZING VALVES
(NOT TO BE FABRICATED FOR ALL SVs)



FRONT VIEW (A–A)

REFERENCE DRAWINGS / DOCUMENTS

S.NO.	TITLE	NO.

NOTES:-

1. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN M UNLESS OTHERWISE MENTIONED.
2. APPROVED SEALANT TO BE PROVIDED IN VALVE PIT ENTRY & EXIT OF PIPELINE TO RESTRICT WATER INTO PIT.
3. COMMON VENT NOT TO BE FABRICATED FOR EACH SV. MINIMUM TWO SUCH VENTS TO BE FABRICATED FOR GAS COMMISSIONING AND THEN TO BE KEPT IN ERV FOR O&M PURPOSE.
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7. VALVE CHAMBER PROJECTION ABOVE FGL SHALL BE 150MM-300MM SUITED AS PER SITE CONDITIONS.

LEGEND:-

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- FLANGED BALL VALVE
- BUTT WELD GLOBE VALVE (G.V.)
- FLANGED GLOBE VALVE
- THREAD END BALL VALVE

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	02.05.2023	ISSUED AS STANDARD	AK	MN	HK

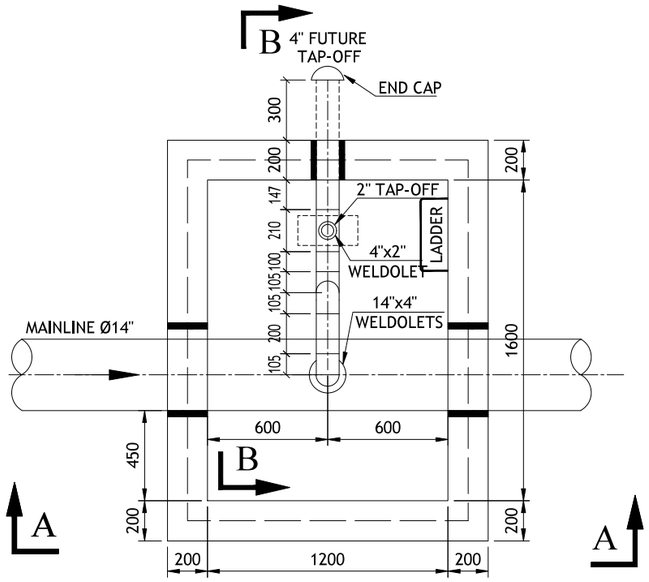
PMC

VCS QUALITY SERVICES PVT. LTD.

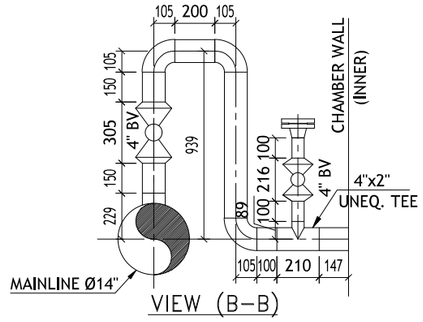
TITLE: GENERAL ARRANGEMENT DRAWING FOR SECTIONALISING VALVE OF 14" SIZE WITH PERMANENT BY-PASS LINE AND VENT (TYPE-14MV-4)

SIZE	JOB NO.	DRAWING NUMBER	SHEET	REV.
A3	XXXX	VPC-STD-PP-2030	4 OF 5	0

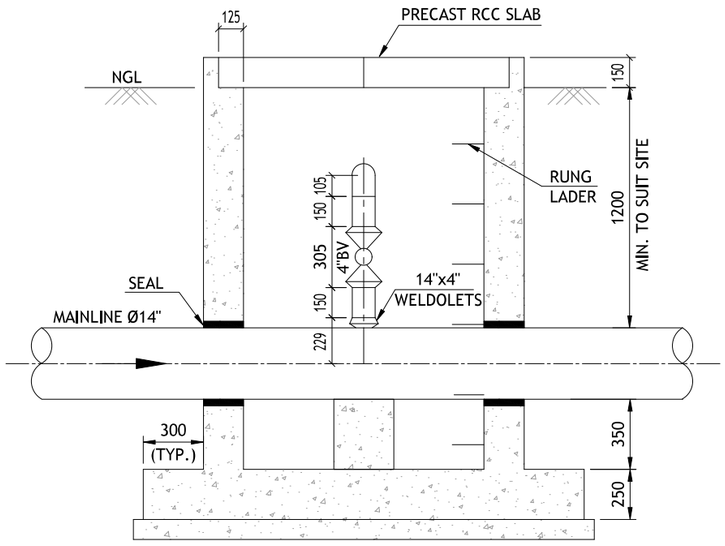
Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST



TOP VIEW



VIEW (B–B)



FRONT VIEW (A–A)

REFERENCE DRAWINGS / DOCUMENTS

S.NO.	TITLE	NO.

NOTES:-

1. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN M UNLESS OTHERWISE MENTIONED.
2. APPROVED SEALANT TO BE PROVIDED IN VALVE PIT ENTRY & EXIT OF PIPELINE TO RESTRICT WATER INTO PIT.
3. FOR VALVE CHAMBER CONSTRUCTION, REFER RESPECTIVE DRAWING FOR CIVIL WORK. CHAMBER SLEEPERS MAY BE FABRICATED AS SHOWN IN THIS DRAWING FOR EASY LIFTING DURING O&M.
4. ORIENTATION OF 2" VALVES INSTALLED IN TAP-OFF TO BE SUCH THAT VALVE LEVER/HANDLE MOVEMENT IS NOT RESTRICTED BY ADJACENT WALL OF A CHAMBER.
5. VALVE CHAMBER PROJECTION ABOVE FGL SHALL BE 150MM-300MM SUITED AS PER SITE CONDITIONS.

LEGEND:-

- BUTT WELD BALL VALVE (B.V.)
- FLANGED BALL VALVE
- BUTT WELD GLOBE VALVE (G.V.)
- FLANGED GLOBE VALVE
- THREAD END BALL VALVE

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	02.05.2023	ISSUED AS STANDARD	AK	MN	HK

PMC

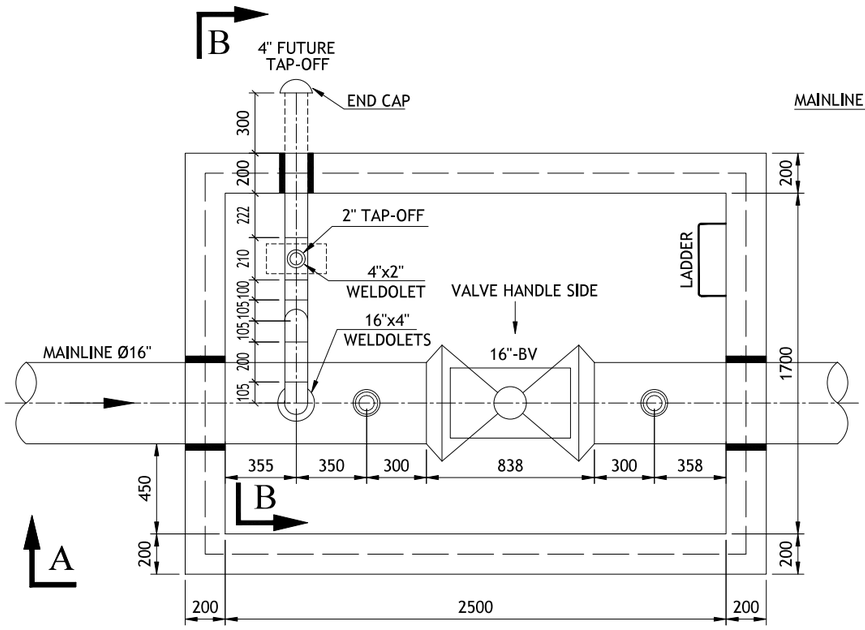
VCS QUALITY SERVICES PVT. LTD.

TITLE

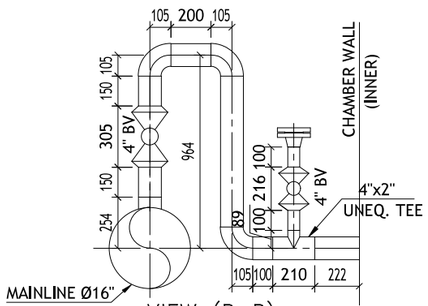
GENERAL ARRANGEMENT DRAWING FOR
14" SIZE WITH 4" FUTURE TAP-OFF

SIZE	JOB NO.	DRAWING NUMBER	SHEET	REV.
A3	XXXX	VPC-STD-PP-2030	5 OF 5	0

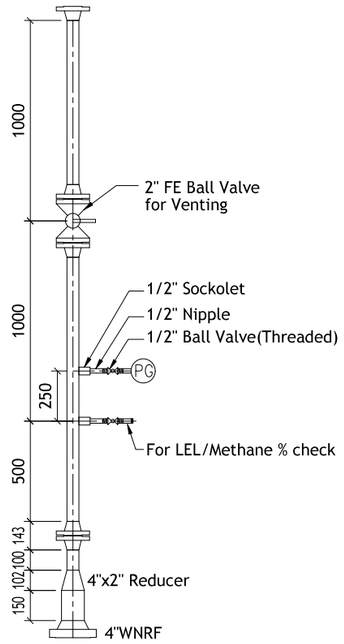
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Date: 2025.03.13 12:56:46 IST



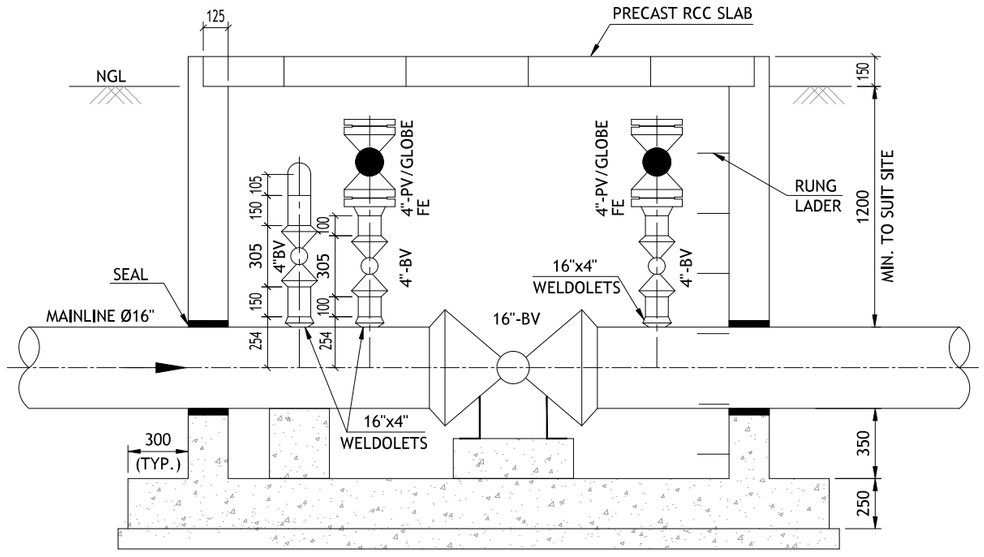
TOP VIEW



VIEW (B–B)



COMMON VENT PIPE FOR ALL SECTIONALIZING VALVES
(NOT TO BE FABRICATED FOR ALL SVs)



FRONT VIEW (A–A)

REFERENCE DRAWINGS / DOCUMENTS

S.NO.	TITLE	NO.

NOTES:-

1. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN M UNLESS OTHERWISE MENTIONED.
2. APPROVED SEALANT TO BE PROVIDED IN VALVE PIT ENTRY & EXIT OF PIPELINE TO RESTRICT WATER INTO PIT.
3. COMMON VENT NOT TO BE FABRICATED FOR EACH SV, MINIMUM TWO SUCH VENTS TO BE FABRICATED FOR GAS COMMISSIONING AND THEN TO BE KEPT IN ERV FOR O&M PURPOSE.
4. FIRST SECTIONALIZING VALVE OF MAINLINE TO BE PROVIDED WITH PERMANENT BY-PASS & VENT. THEREAFTER SVs MAY BE PROVIDED WITH PERMANENT BY-PASS & WITHOUT PERMANENT BY-PASS LINE ALTERNATIVELY.
5. FOR VALVE CHAMBER CONSTRUCTION, REFER RESPECTIVE DRAWING FOR CIVIL WORK. CHAMBER SLEEPERS MAY BE FABRICATED AS SHOWN IN THIS DRAWING FOR EASY LIFTING DURING O&M.
6. ORIENTATION OF 2" VALVES INSTALLED IN BY-PASS/TAP-OFF TO BE SUCH THAT VALVE LEVER/HANDLE MOVEMENT IS NOT RESTRICTED BY ADJACENT WALL OF A CHAMBER.
7. VALVE CHAMBER PROJECTION ABOVE FGL SHALL BE 150MM-300MM SUITED AS PER SITE CONDITIONS.

LEGEND:-

- BUTT WELD BALL VALVE (B.V.)
- FLANGED BALL VALVE
- BUTT WELD GLOBE VALVE (G.V.)
- FLANGED GLOBE VALVE
- THREAD END BALL VALVE

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	02.05.2023	ISSUED AS STANDARD	AK	MN	HK

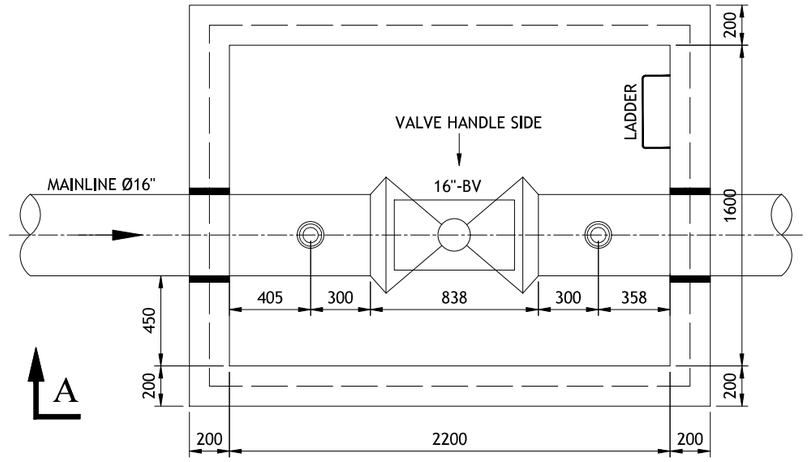
PMC

VCS QUALITY SERVICES PVT. LTD.

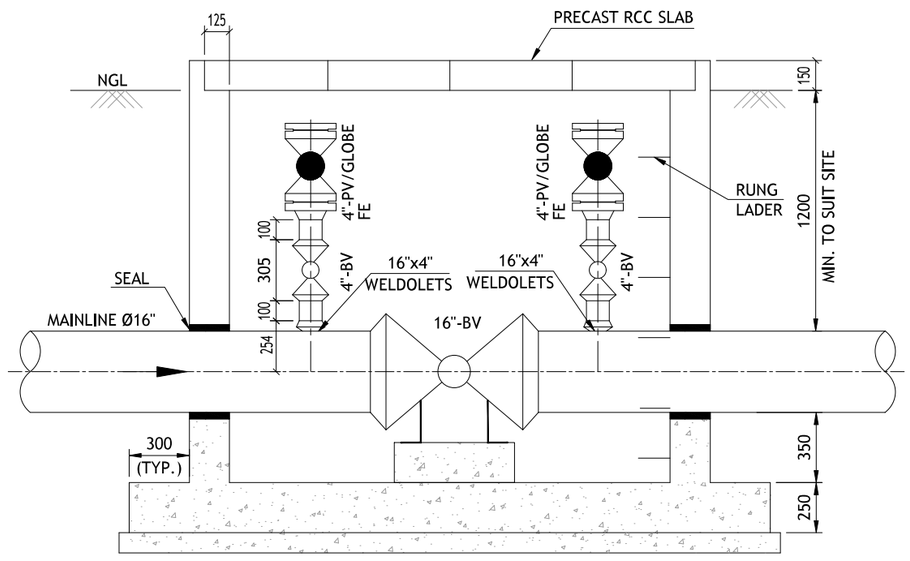
TITLE GENERAL ARRANGEMENT DRAWING FOR SECTIONALISING VALVE OF 16" SIZE WITH 4" FUTURE TAP-OFF & WITH FLEXIBLE BY-PASS PROVISION AND VENT (TYPE-16MV-1)

SIZE	JOB NO.	DRAWING NUMBER	SHEET	REV.
A3	XXXX	VPC-STD-PP-2031	1 OF 5	0

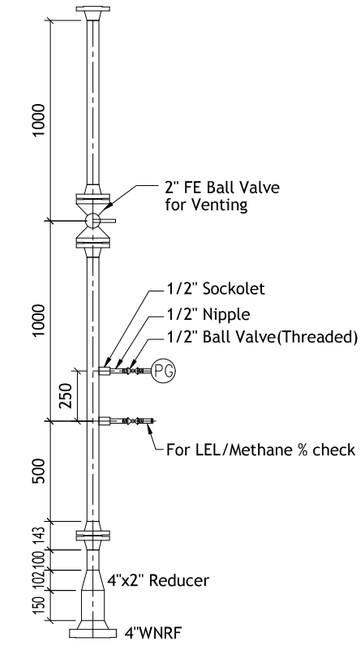
Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST



TOP VIEW



FRONT VIEW (A–A)



COMMON VENT PIPE FOR ALL SECTIONALIZING VALVES (NOT TO BE FABRICATED FOR ALL SVs)

REFERENCE DRAWINGS / DOCUMENTS

S.NO.	TITLE	NO.

NOTES:-

1. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN M UNLESS OTHERWISE MENTIONED.
2. APPROVED SEALANT TO BE PROVIDED IN VALVE PIT ENTRY & EXIT OF PIPELINE TO RESTRICT WATER INTO PIT.
3. COMMON VENT NOT TO BE FABRICATED FOR EACH SV. MINIMUM TWO SUCH VENTS TO BE FABRICATED FOR GAS COMMISSIONING AND THEN TO BE KEPT IN ERV FOR O&M PURPOSE.
4. FIRST SECTIONALIZING VALVE OF MAINLINE TO BE PROVIDED WITH PERMANENT BY-PASS & VENT. THEREAFTER SVs MAY BE PROVIDED WITH PERMANENT BY-PASS & WITHOUT PERMANENT BY-PASS LINE ALTERNATIVELY.
5. FOR VALVE CHAMBER CONSTRUCTION, REFER RESPECTIVE DRAWING FOR CIVIL WORK. CHAMBER SLEEPERS MAY BE FABRICATED AS SHOWN IN THIS DRAWING FOR EASY LIFTING DURING O&M.
6. ORIENTATION OF 2" VALVES INSTALLED IN BY-PASS/TAP-OFF TO BE SUCH THAT VALVE LEVER/HANDLE MOVEMENT IS NOT RESTRICTED BY ADJACENT WALL OF A CHAMBER.
7. VALVE CHAMBER PROJECTION ABOVE FGL SHALL BE 150MM-300MM SUITED AS PER SITE CONDITIONS.

LEGEND:-

- BUTT WELD BALL VALVE (B.V.)
- FLANGED BALL VALVE
- BUTT WELD GLOBE VALVE (G.V.)
- FLANGED GLOBE VALVE
- THREAD END BALL VALVE

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	02.05.2023	ISSUED AS STANDARD	AK	MN	HK

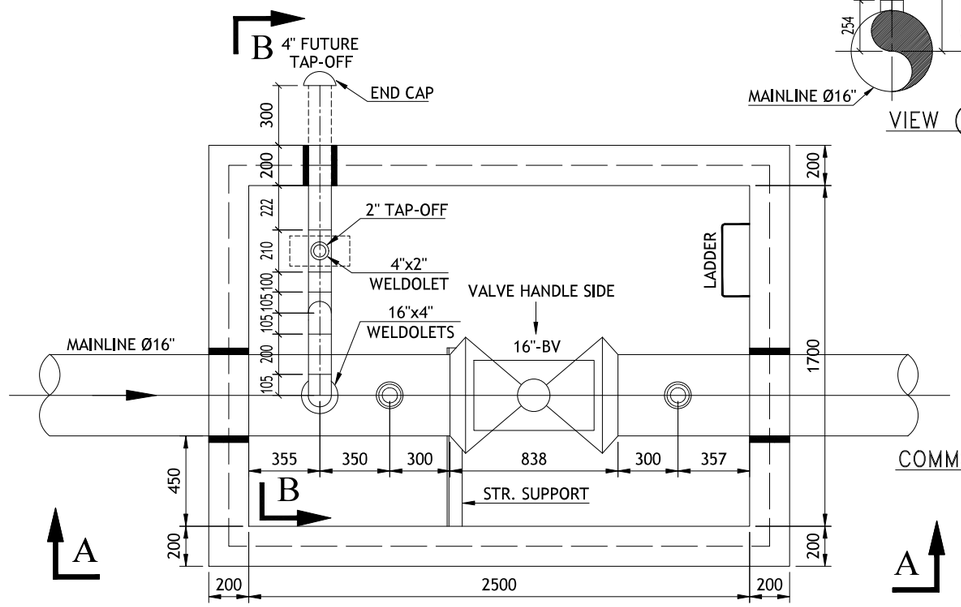
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VCS QUALITY SERVICES PVT. LTD.

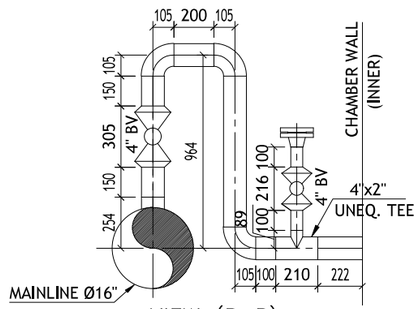
TITLE GENERAL ARRANGEMENT DRAWING FOR SECTIONALISING VALVE OF 16" SIZE WITH FLEXIBLE BY-PASS PROVISION AND VENT (TYPE-16MV-2)

SIZE	JOB NO.	DRAWING NUMBER	SHEET	REV.
A3	XXXX	VPC-STD-PP-2031	2 OF 5	0

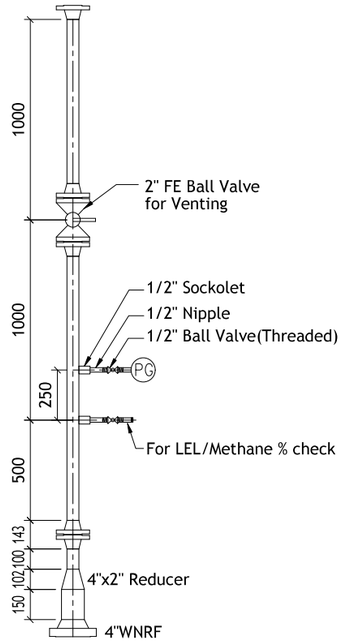
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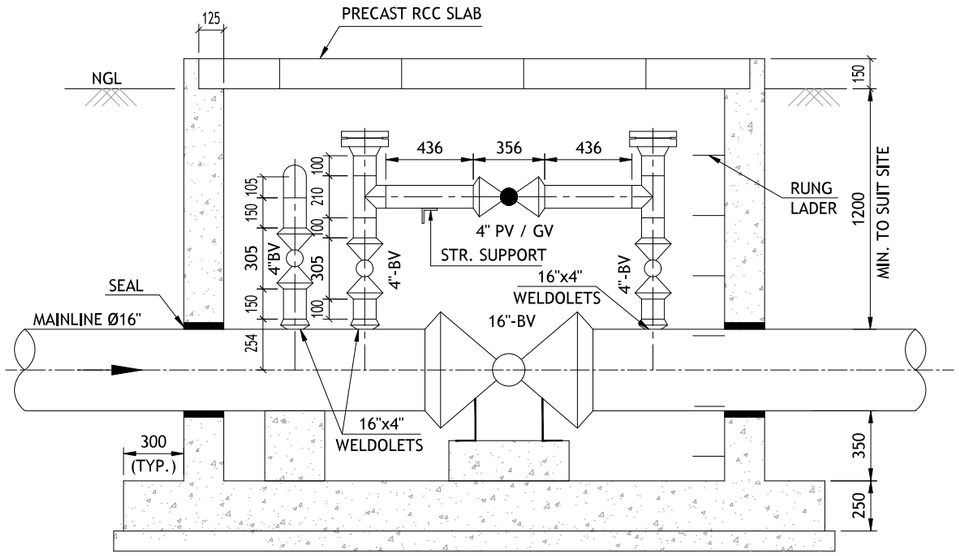
TOP VIEW



VIEW (B–B)



COMMON VENT PIPE FOR ALL SECTIONALIZING VALVES
(NOT TO BE FABRICATED FOR ALL SVs)



FRONT VIEW (A–A)

REFERENCE DRAWINGS / DOCUMENTS

S.NO.	TITLE	NO.

NOTES:-

1. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN M UNLESS OTHERWISE MENTIONED.
2. APPROVED SEALANT TO BE PROVIDED IN VALVE PIT ENTRY & EXIT OF PIPELINE TO RESTRICT WATER INTO PIT.
3. COMMON VENT NOT TO BE FABRICATED FOR EACH SV, MINIMUM TWO SUCH VENTS TO BE FABRICATED FOR GAS COMMISSIONING AND THEN TO BE KEPT IN ERV FOR O&M PURPOSE.
4. FIRST SECTIONALIZING VALVE OF MAINLINE TO BE PROVIDED WITH PERMANENT BY-PASS & VENT. THEREAFTER SVs MAY BE PROVIDED WITH PERMANENT BY-PASS & WITHOUT PERMANENT BY-PASS LINE ALTERNATIVELY.
5. FOR VALVE CHAMBER CONSTRUCTION, REFER RESPECTIVE DRAWING FOR CIVIL WORK. CHAMBER SLEEPERS MAY BE FABRICATED AS SHOWN IN THIS DRAWING FOR EASY LIFTING DURING O&M.
6. ORIENTATION OF 2" VALVES INSTALLED IN BY-PASS/TAP-OFF TO BE SUCH THAT VALVE LEVER/HANDLE MOVEMENT IS NOT RESTRICTED BY ADJACENT WALL OF A CHAMBER.
7. VALVE CHAMBER PROJECTION ABOVE FGL SHALL BE 150MM-300MM SUITED AS PER SITE CONDITIONS.

LEGEND:-

- BUTT WELD BALL VALVE (B.V.)
- FLANGED BALL VALVE
- BUTT WELD GLOBE VALVE (G.V.)
- FLANGED GLOBE VALVE
- THREAD END BALL VALVE

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	02.05.2023	ISSUED AS STANDARD	AK	MN	HK

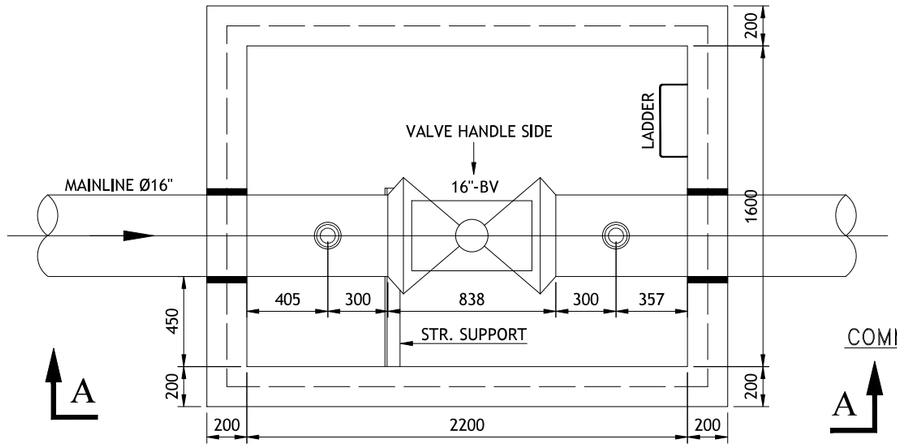
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VCS QUALITY SERVICES PVT. LTD.

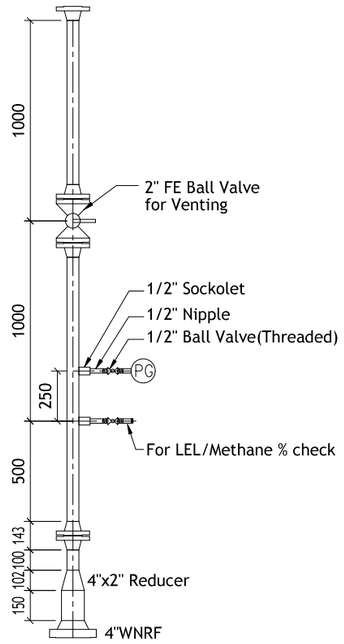
TITLE: GENERAL ARRANGEMENT DRAWING FOR SECTIONALISING VALVE OF 16" SIZE WITH 4" FUTURE TAP-OFF & WITH PERMANENT BY-PASS LINE AND VENT (TYPE-16MV-3)

SIZE	JOB NO.	DRAWING NUMBER	SHEET	REV.
A3	XXXX	VPC-STD-PP-2031	3 OF 5	0

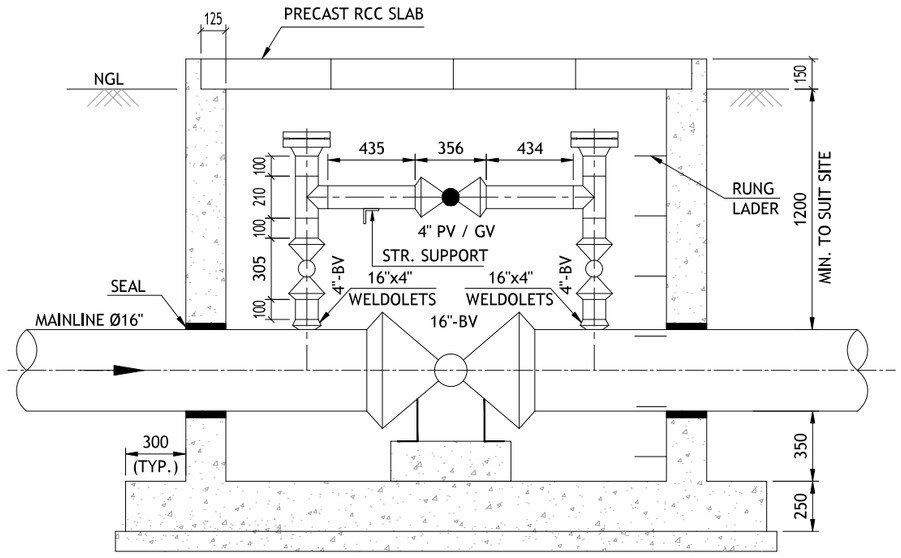
Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST



TOP VIEW



COMMON VENT PIPE FOR ALL SECTIONALIZING VALVES
(NOT TO BE FABRICATED FOR ALL SVs)



FRONT VIEW (A–A)

REFERENCE DRAWINGS / DOCUMENTS

S.NO.	TITLE	NO.

NOTES:-

1. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN M UNLESS OTHERWISE MENTIONED.
2. APPROVED SEALANT TO BE PROVIDED IN VALVE PIT ENTRY & EXIT OF PIPELINE TO RESTRICT WATER INTO PIT.
3. COMMON VENT NOT TO BE FABRICATED FOR EACH SV. MINIMUM TWO SUCH VENTS TO BE FABRICATED FOR GAS COMMISSIONING AND THEN TO BE KEPT IN ERV FOR O&M PURPOSE.
4. FIRST SECTIONALIZING VALVE OF MAINLINE TO BE PROVIDED WITH PERMANENT BY-PASS & VENT. THEREAFTER SVs MAY BE PROVIDED WITH PERMANENT BY-PASS & WITHOUT PERMANENT BY-PASS LINE ALTERNATIVELY.
5. FOR VALVE CHAMBER CONSTRUCTION, REFER RESPECTIVE DRAWING FOR CIVIL WORK. CHAMBER SLEEPERS MAY BE FABRICATED AS SHOWN IN THIS DRAWING FOR EASY LIFTING DURING O&M.
6. ORIENTATION OF 2" VALVES INSTALLED IN BY-PASS/TAP-OFF TO BE SUCH THAT VALVE LEVER/HANDLE MOVEMENT IS NOT RESTRICTED BY ADJACENT WALL OF A CHAMBER.
7. VALVE CHAMBER PROJECTION ABOVE FGL SHALL BE 150MM-300MM SUITED AS PER SITE CONDITIONS.

LEGEND:-

- BUTT WELD BALL VALVE (B.V.)
- FLANGED BALL VALVE
- BUTT WELD GLOBE VALVE (G.V.)
- FLANGED GLOBE VALVE
- THREAD END BALL VALVE

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	02.05.2023	ISSUED AS STANDARD	AK	MN	HK

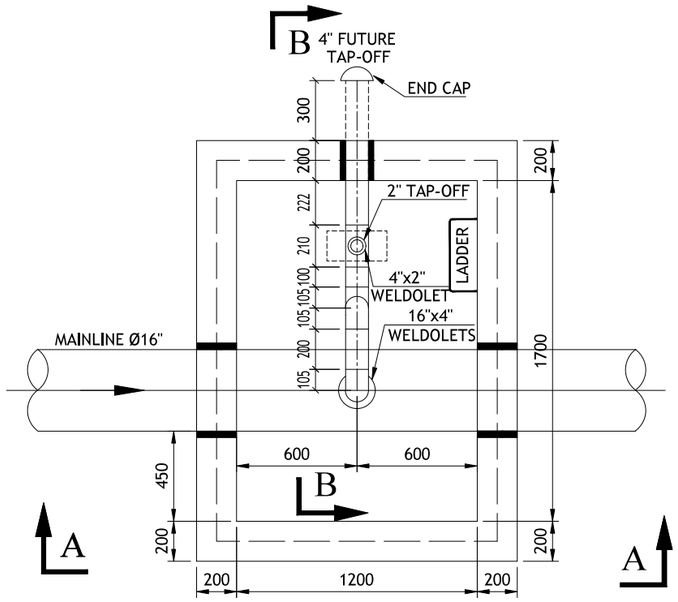
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VCS QUALITY SERVICES PVT. LTD.

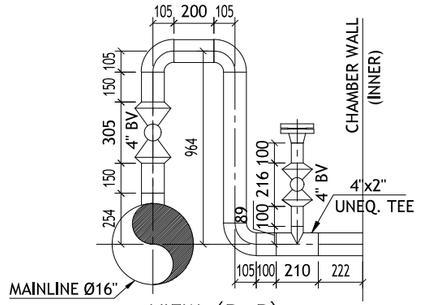
TITLE: GENERAL ARRANGEMENT DRAWING FOR SECTIONALISING VALVE OF 16" SIZE WITH PERMANENT BY-PASS LINE AND VENT (TYPE-16MV-4)

SIZE	JOB NO.	DRAWING NUMBER	SHEET	REV.
A3	XXXX	VPC-STD-PP-2031	4 OF 5	0

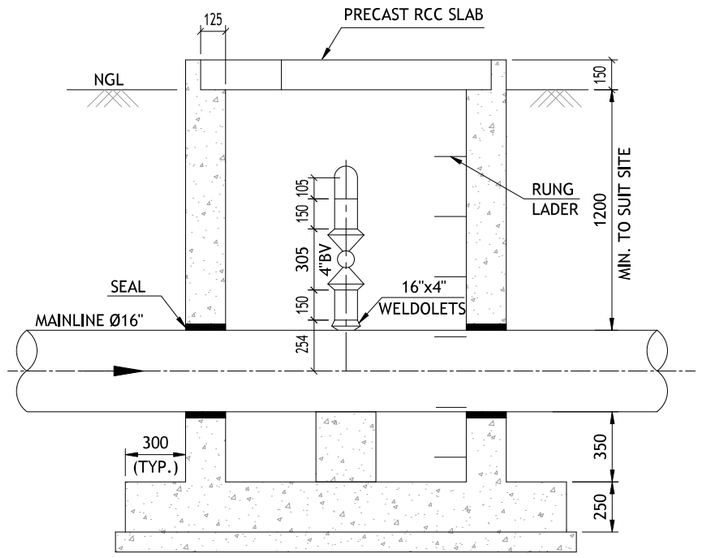
Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST



TOP VIEW



VIEW (B–B)



FRONT VIEW (A–A)

REFERENCE DRAWINGS / DOCUMENTS

S.NO.	TITLE	NO.

NOTES:-

1. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN M UNLESS OTHERWISE MENTIONED.
2. APPROVED SEALANT TO BE PROVIDED IN VALVE PIT ENTRY & EXIT OF PIPELINE TO RESTRICT WATER INTO PIT.
3. FOR VALVE CHAMBER CONSTRUCTION, REFER RESPECTIVE DRAWING FOR CIVIL WORK. CHAMBER SLEEPERS MAY BE FABRICATED AS SHOWN IN THIS DRAWING FOR EASY LIFTING DURING O&M.
4. ORIENTATION OF 2" VALVES INSTALLED IN TAP-OFF TO BE SUCH THAT VALVE LEVER/HANDLE MOVEMENT IS NOT RESTRICTED BY ADJACENT WALL OF A CHAMBER.
5. VALVE CHAMBER PROJECTION ABOVE FGL SHALL BE 150MM-300MM SUITED AS PER SITE CONDITIONS.

LEGEND:-

- BUTT WELD BALL VALVE (B.V.)
- FLANGED BALL VALVE
- BUTT WELD GLOBE VALVE (G.V.)
- FLANGED GLOBE VALVE
- THREAD END BALL VALVE

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	02.05.2023	ISSUED AS STANDARD	AK	MN	HK

PMC

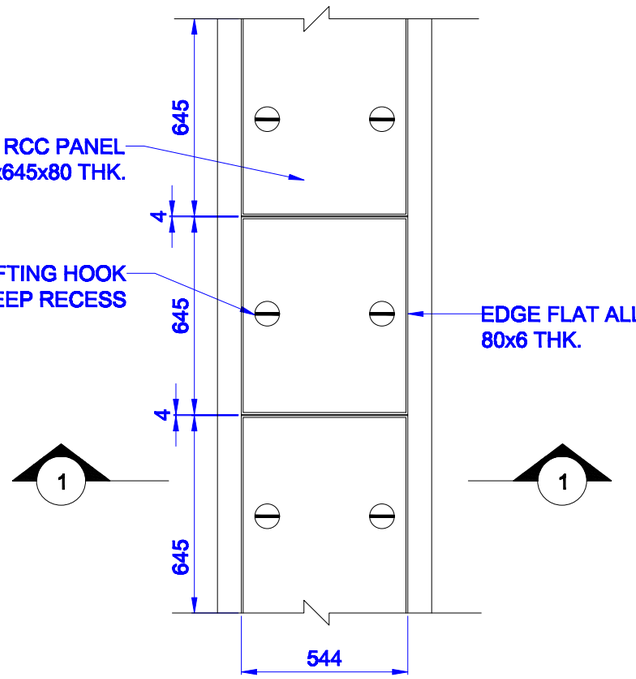
VCS QUALITY SERVICES PVT. LTD.

TITLE

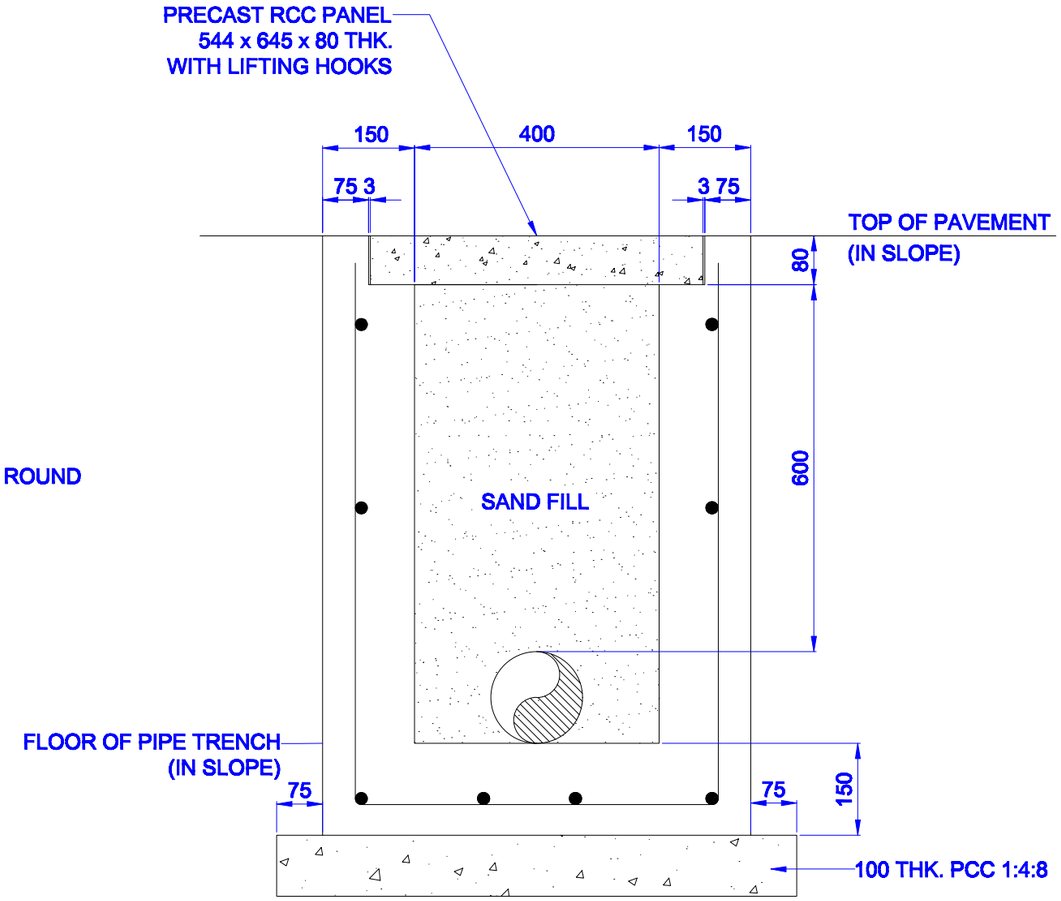
GENERAL ARRANGEMENT DRAWING FOR
16" SIZE WITH 4" FUTURE TAP-OFF

SIZE	JOB NO.	DRAWING NUMBER	SHEET	REV.
A3	XXXX	VPC-STD-PP-2031	5 OF 5	0

Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST



G.A. PLAN OF COVER SLAB



SECTION 1-1 THRU PIPE TRENCH
(PIPE TRENCH BY OTHERS)
SCALE 1:10

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. FOLLOW WRITTEN DIMENSIONS ONLY. DO NOTE SCALE THE DRAWING.

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	22.06.23	IFC / IFE / TENDER	ARV.	A.K	SKN

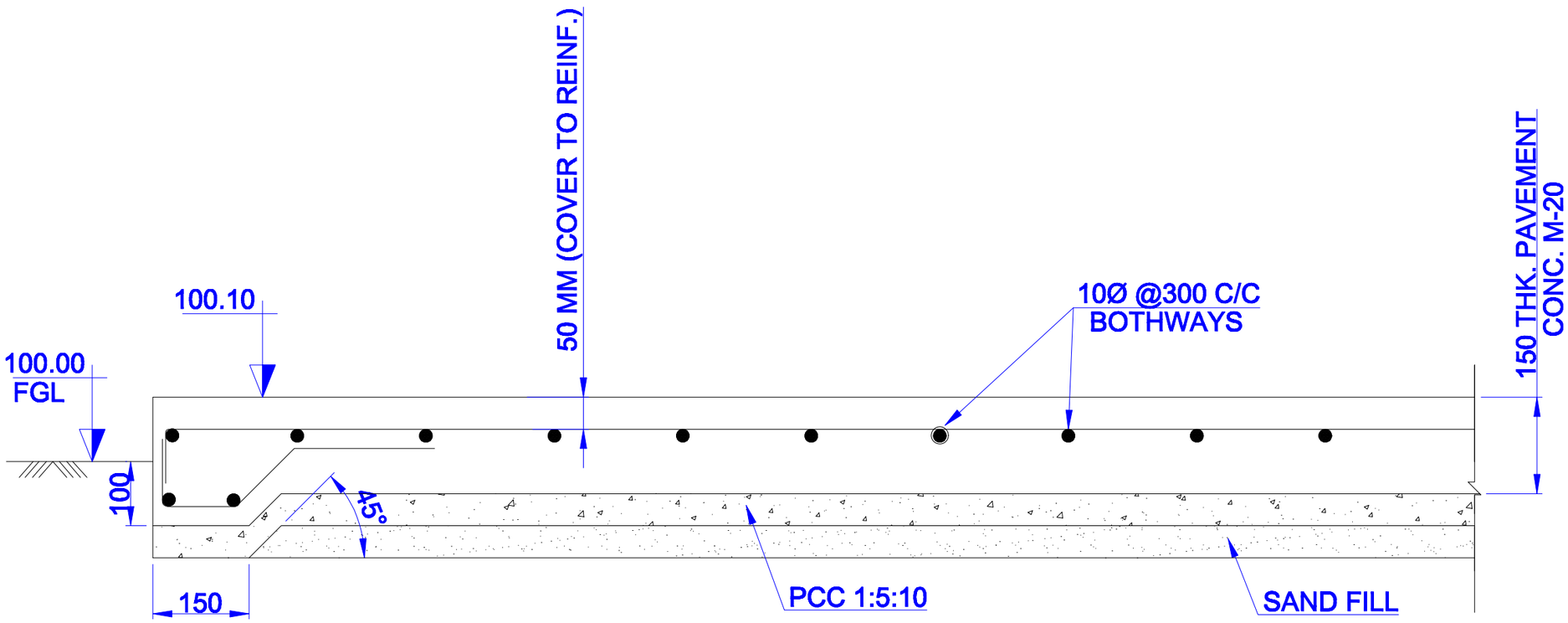
PMC: VCS QUALITY SERVICES PVT. LTD.

PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: DETAILS OF PIPE TRENCH

SCALE:	SCALE	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VPC-STD-PP-2001	0

Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST



RCC PAVEMENT DETAIL

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. FOLLOW WRITTEN DIMENSIONS ONLY. DO NOTE SCALE THE DRAWING.

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	22.06.23	IFC / IFE / TENDER	ARV.	A.K	SKN

PMC: VCS QUALITY SERVICES PVT. LTD.

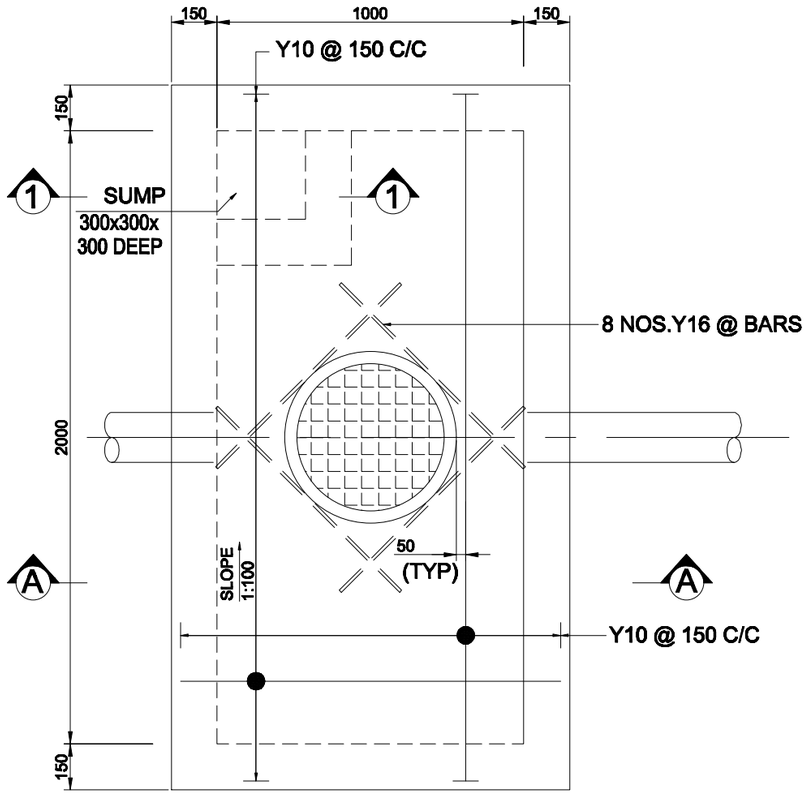
PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: STANDARD DETAILS OF RCC PAVEMENT

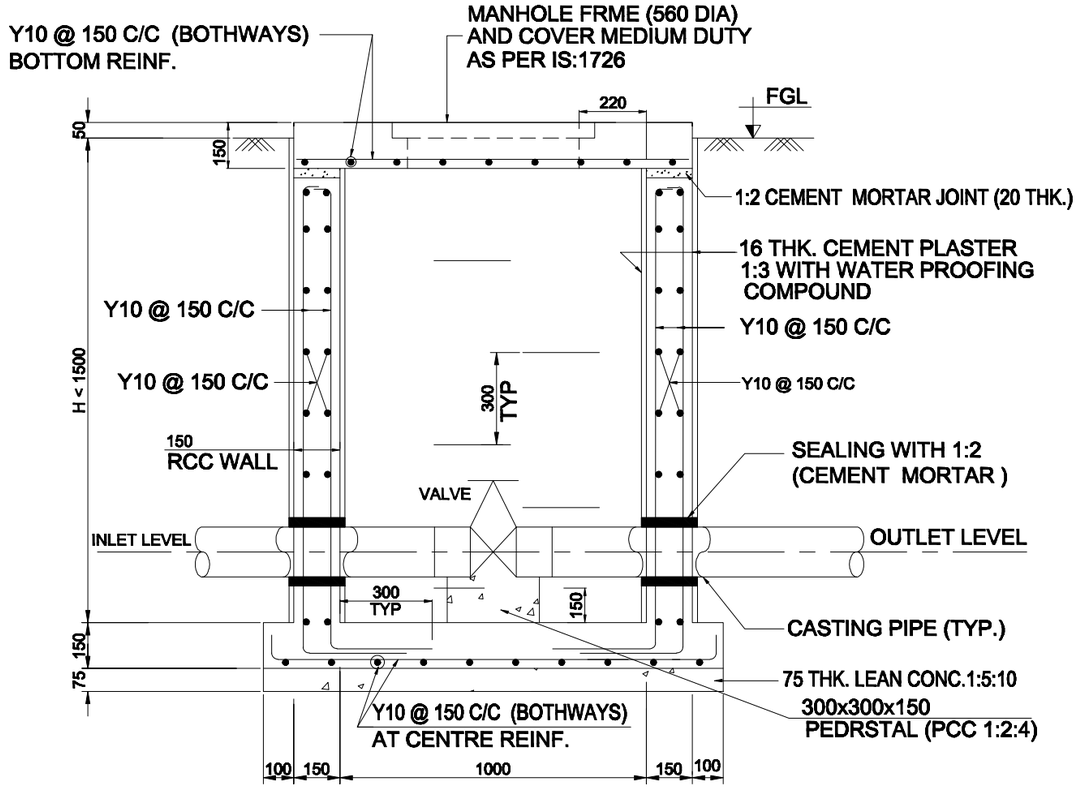
SCALE:	NTS	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VPC-STD-PP-2002	0

Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST

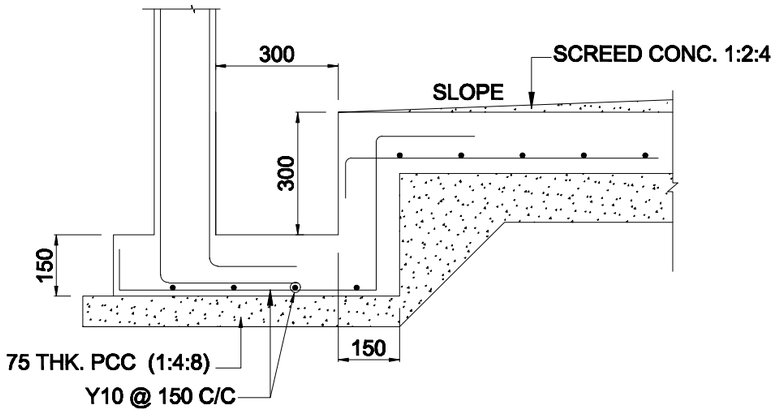
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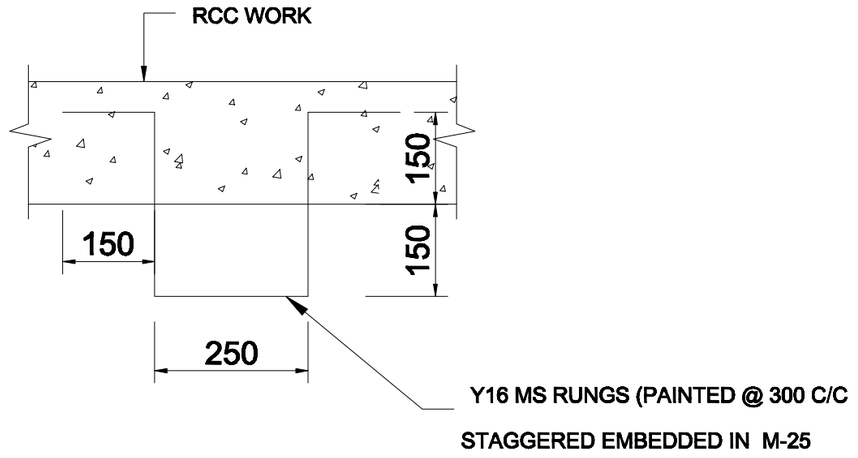
VALVE PIT PLAN
(SCALE 1:20)



SECTION A-A
(SCALE 1:20)



SECTION 1-1
(SCALE 1:15)



TYPICAL DETAILS OF MS RUNGS
(SCALE 1:10)

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. FOLLOW WRITTEN DIMENSIONS ONLY. DO NOT SCALE THE DRAW ING
3. CLEAR COVER TO MAIN REINFORCEMENT SHALL BE (a) SLAB 20 mm
4. GRADE OF CONCRETE USED SHALL BE M-25 CONFORMING.
5. REINFORCEMENT SHALL BE HYSD BARS OF (GRADE Fe 415) CON FORMING TO IS:1786.

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	22.06.23	IFC / IFE / TENDER	ARV.	A.K	SKN

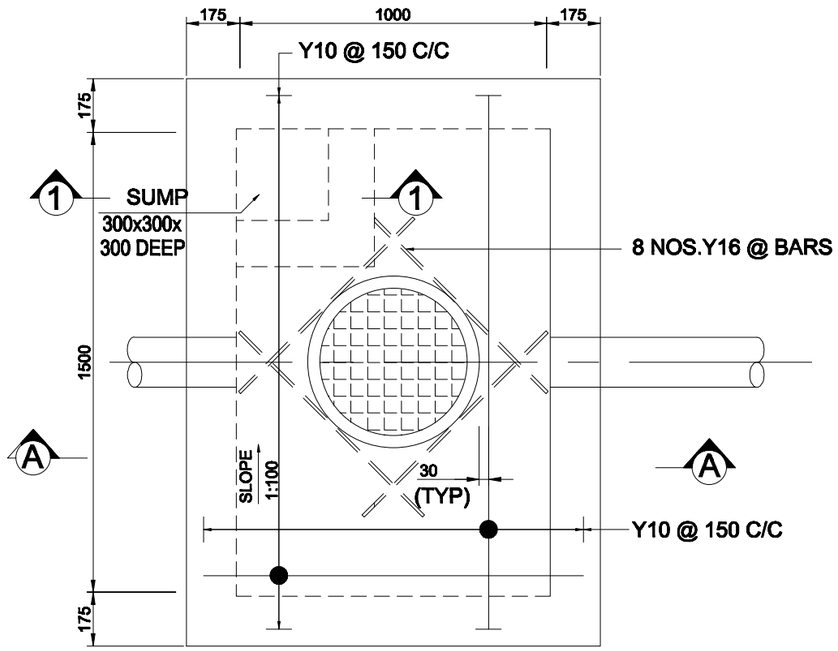
PMC: VCS QUALITY SERVICES PVT. LTD.

PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

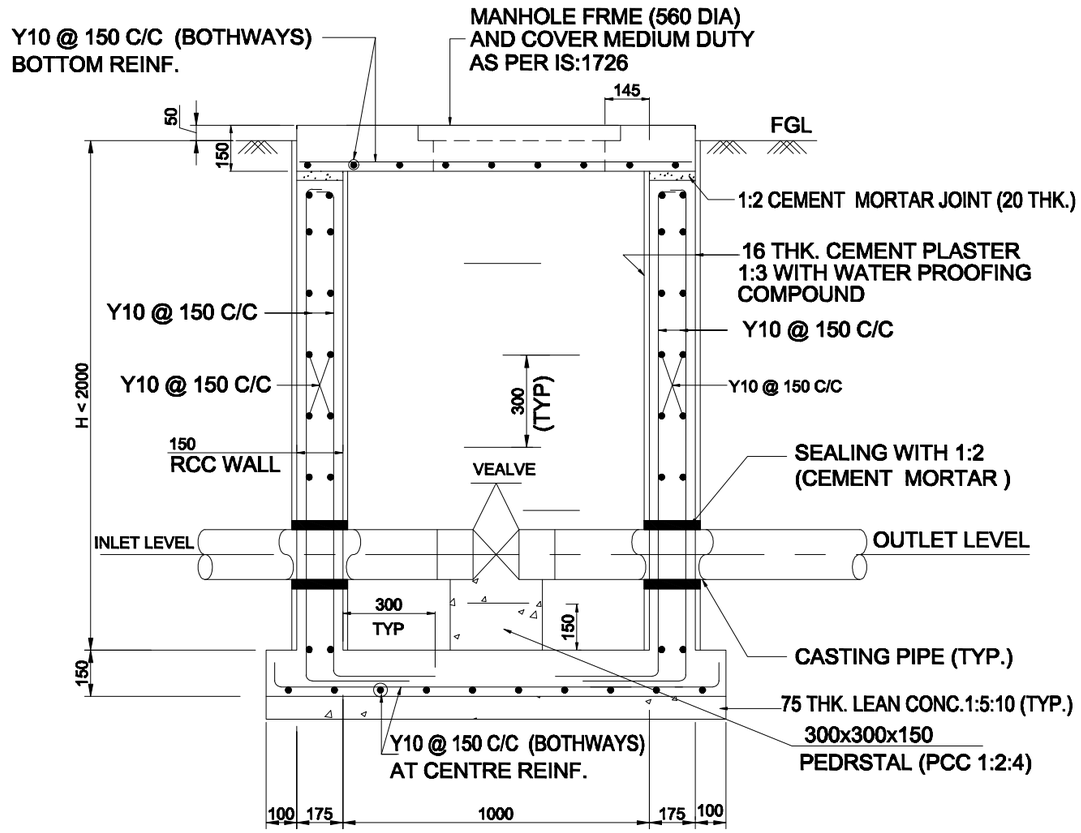
TITLE: STANDARD DETAIL OF RCC VALVE CHAMBER (TYPE-1)

SCALE:	NTS	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	------	VPC-STD-PP-2003	0

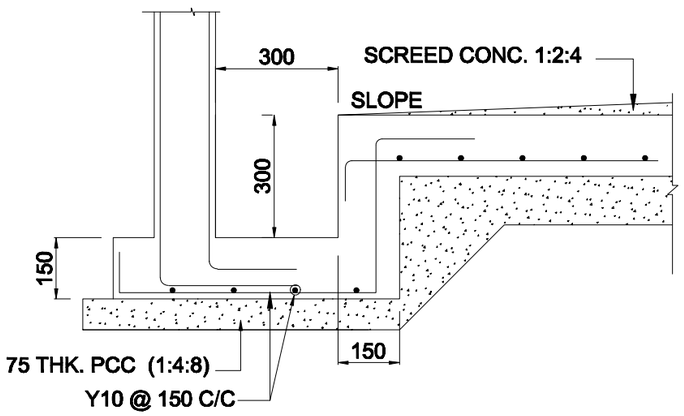
Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST



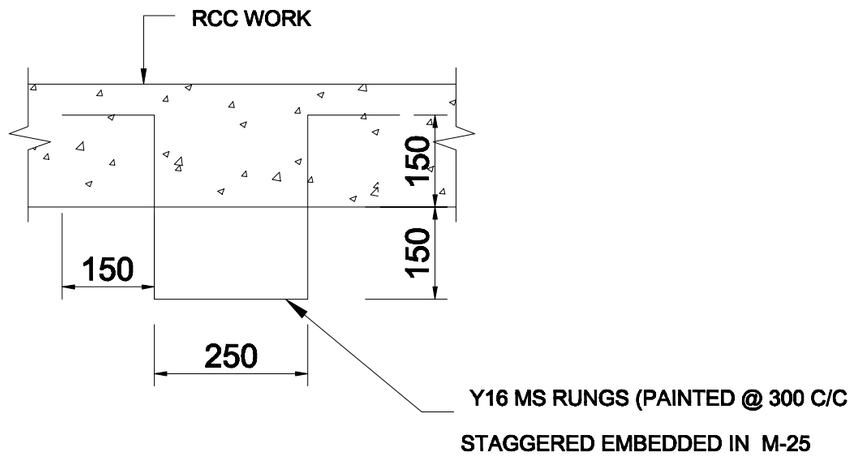
VALVE PIT PLAN
(SCALE 1:20)



SECTION A-A
(SCALE 1:20)



SECTION 1-1
(SCALE 1:15)



TYPICAL DETAILS OF MS RUNGS
(SCALE 1:10)

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. FOLLOW WRITTEN DIMENSIONS ONLY. DO NOT SCALE THE DRAW ING
3. CLEAR COVER TO MAIN REINFORCEMENT SHALL BE (a) SLAB 20 mm
4. GRADE OF CONCRETE USED SHALL BE M-25 CONFORMING.
5. REINFORCEMENT SHALL BE HYSD BARS OF (GRADE Fe 415) CON FORMING TO IS:1786.

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	22.06.23	IFC / IFE / TENDER	ARV.	A.K	SKN

CLIENT:

PMC: VCS QUALITY SERVICES PVT. LTD.

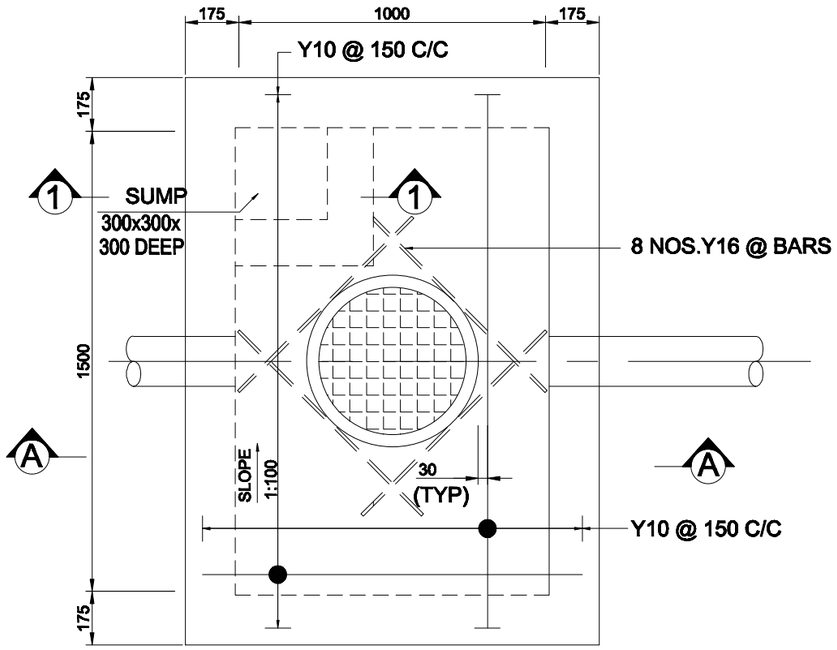
PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: STANDARD DETAIL OF RCC VALVE CHAMBER (TYPE-2)

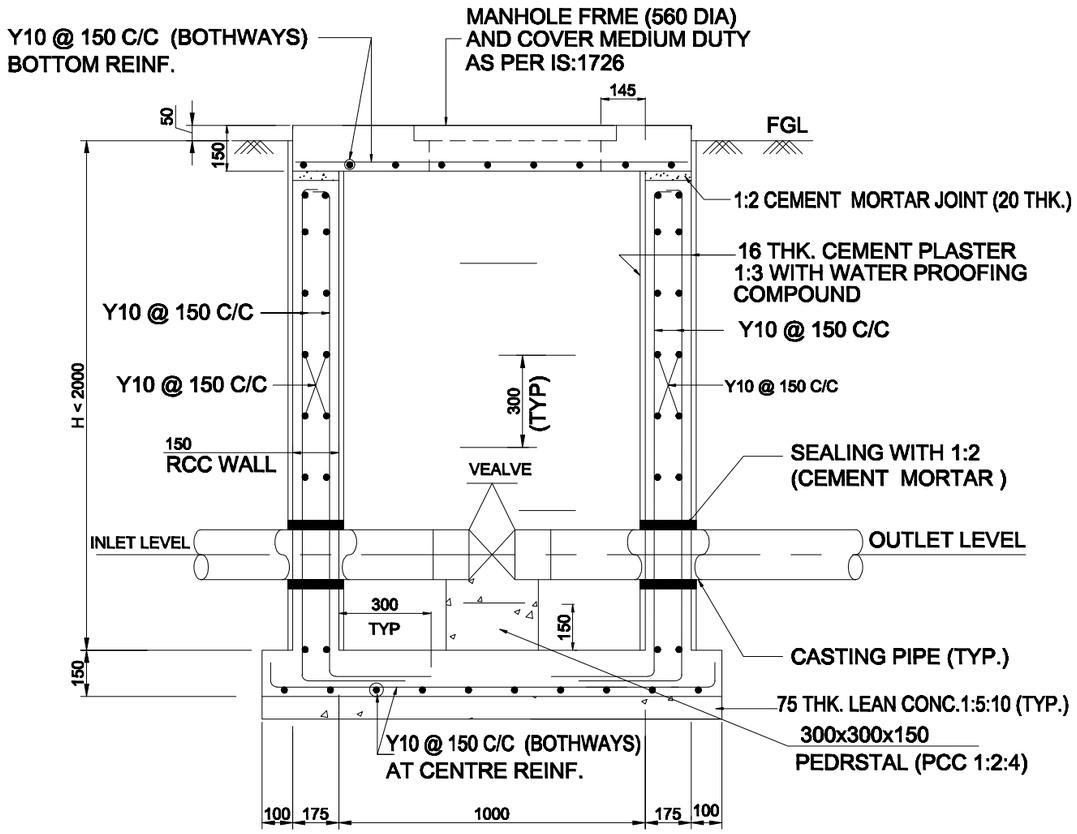
SCALE: NTS	TOTAL NO. OF SHTS: 1 OF 1	
SIZE	JOB NO.	DRAWING NUMBER / REV.
A3	-----	VPC-STD-PP-2004 / 0

Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST

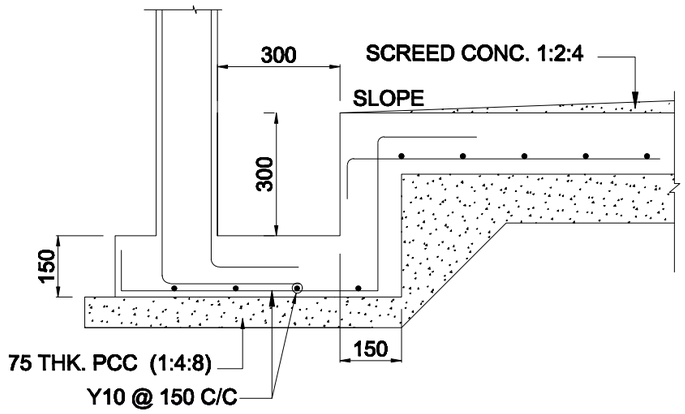
FORMAT NO C211050-FMT-005_00



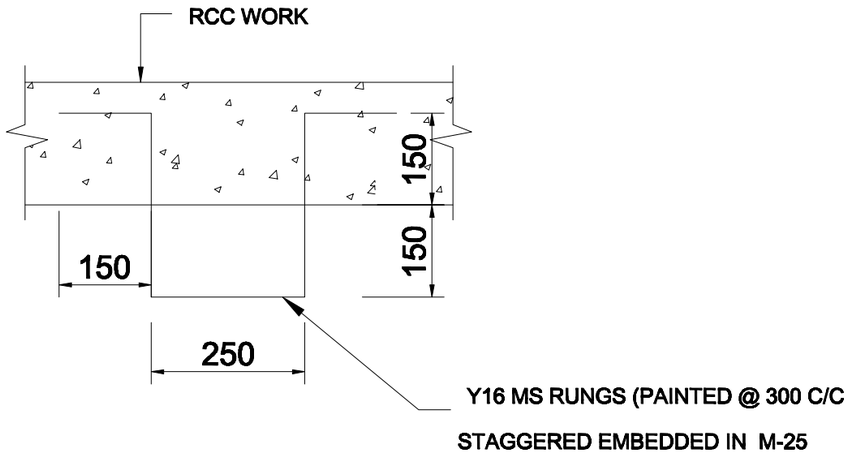
VALVE PIT PLAN
(SCALE 1:20)



SECTION A-A
(SCALE 1:20)



SECTION 1-1
(SCALE 1:15)



TYPICAL DETAILS OF MS RUNGS
(SCALE 1:10)

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. FOLLOW WRITTEN DIMENSIONS ONLY. DO NOT SCALE THE DRAW ING
3. CLEAR COVER TO MAIN REINFORCEMENT SHALL BE (a) SLAB 20 mm
4. GRADE OF CONCRETE USED SHALL BE M-25 CONFORMING.
5. REINFORCEMENT SHALL BE HYSD BARS OF (GRADE Fe 415) CON FORMING TO IS:1786.

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	22.06.23	IFC / IFE / TENDER	ARV.	A.K	SKN

PMC: VCS QUALITY SERVICES PVT. LTD.

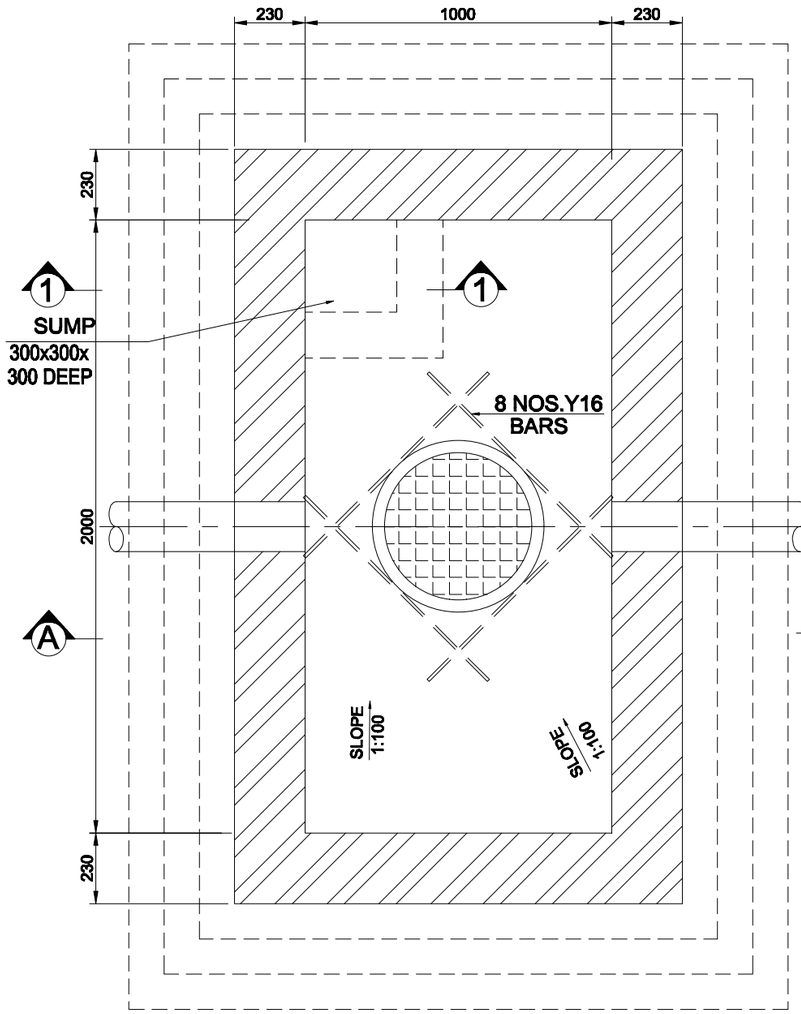
PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: STANDARD DETAIL OF BRICK VALVE CHAMBER (TYPE-1)

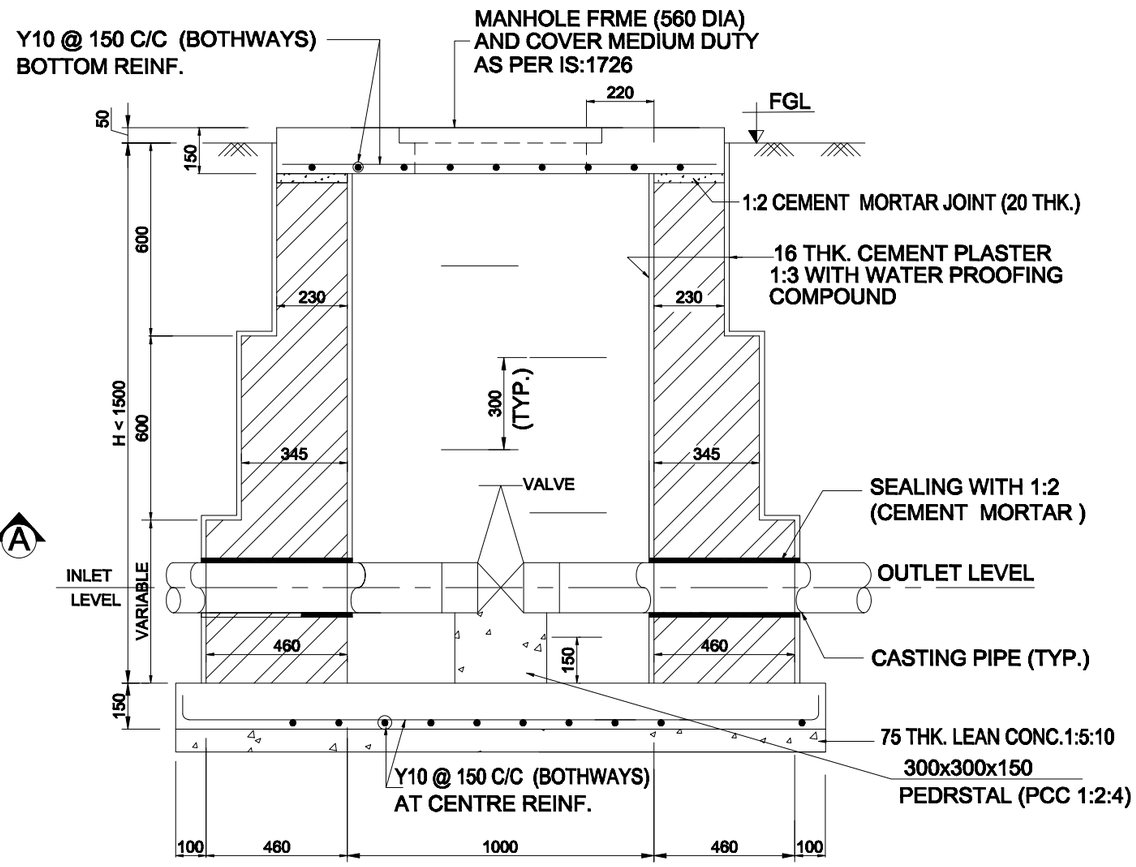
SCALE:	NTS	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VPC-STD-PP-2005	0

Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST

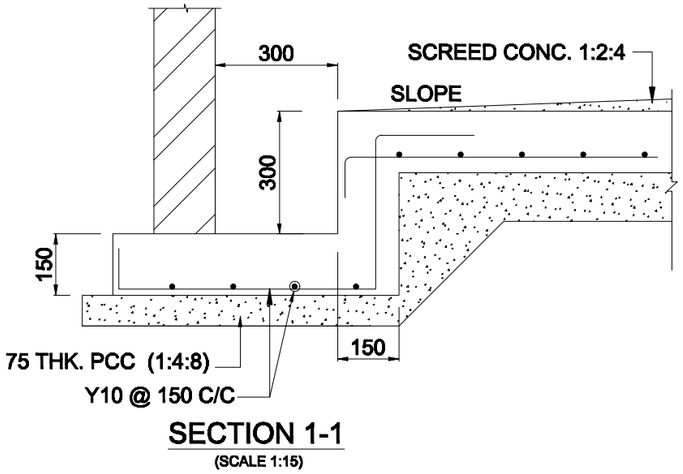
FORMAT NO C211050-FMT-005_00



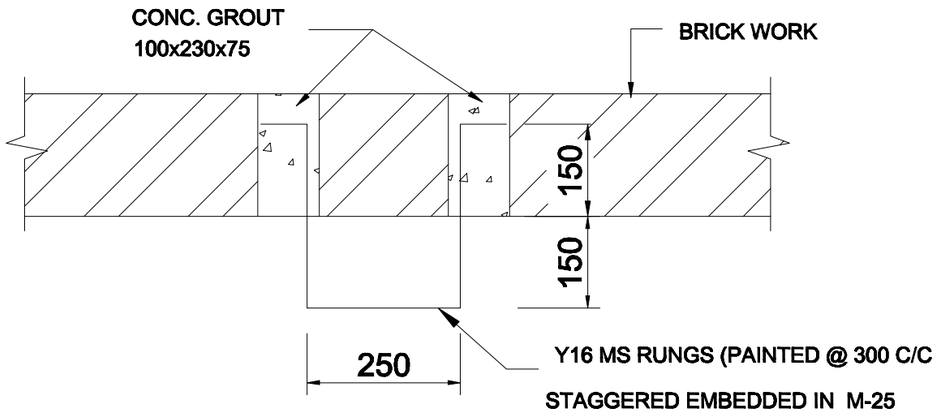
VALVE PIT PLAN
(SCALE 1:20)



SECTION A-A
(SCALE 1:20)



SECTION 1-1
(SCALE 1:15)



TYPICAL DETAILS OF MS RUNGS
(SCALE 1:10)

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. FOLLOW WRITTEN DIMENSIONS ONLY. DO NOT SCALE THE DRAWING
3. CLEAR COVER TO MAIN REINFORCEMENT SHALL BE (a) SLAB 20mm
4. GRADE OF CONCRETE USED SHALL BE M-25 CONFORMING.
5. REINFORCEMENT SHALL BE HYSD BARS OF (GRADE Fe 415) CONFORMING TO IS:1786.

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	22.06.23	IFC / IFE / TENDER	ARV.	A.K	SKN

PMC: VCS QUALITY SERVICES PVT. LTD.

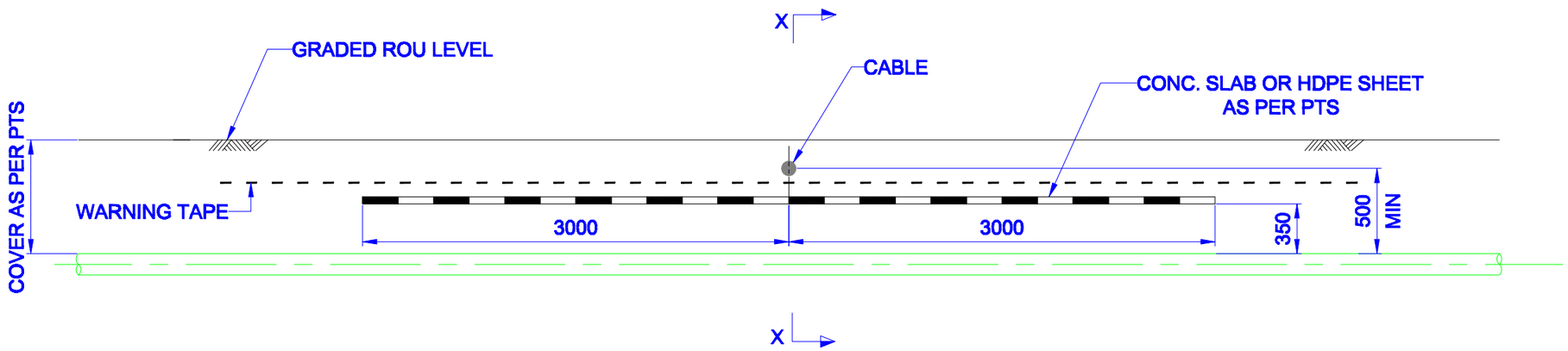
PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

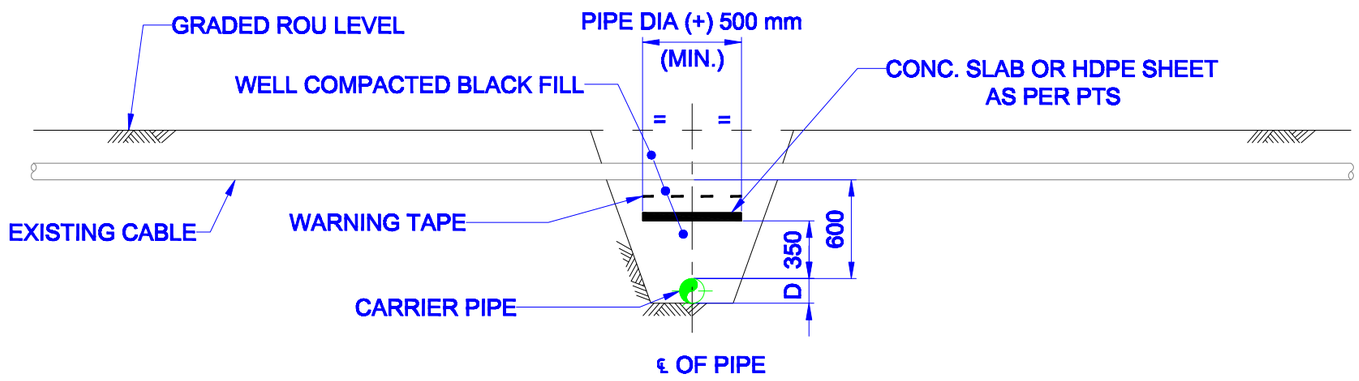
TITLE: STANDARD DETAIL OF BRICK VALVE CHAMBER (TYPE-2)

SCALE:	SCALE	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VPC-STD-PP-2006	0

Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST

FORMAT NO C211050-FMT-005_00





SECTION X-X

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. FOLLOW WRITTEN DIMENSIONS ONLY. DO NOT SCALE THE DRAWINGS.
3. A MODIFIED PIPELINE WARNING SIGN SHALL BE INSTALLED CLOSE TO THE CROSSING.
4. IN CASE OF ARMOURED OFC CABLE, C.P. BONDING IS TO BE PROVIDED BETWEEN PIPELINE AND CABLE ARMOUR. IN CASE OF UNARMOURED CABLE, ARRANGEMENT FOR SHIELDING (BY PROVIDING CASING ON EITHER SIDE OF THE PIPELINE OR CABLE) SHALL BE CONSIDERED.
5. APPROVAL OF THE CROSSING SHALL BE OBTAINED FROM CONCERNED AUTHORITIES.

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	22.06.23	IFC / IFE / TENDER	ARV.	A.K	SKN

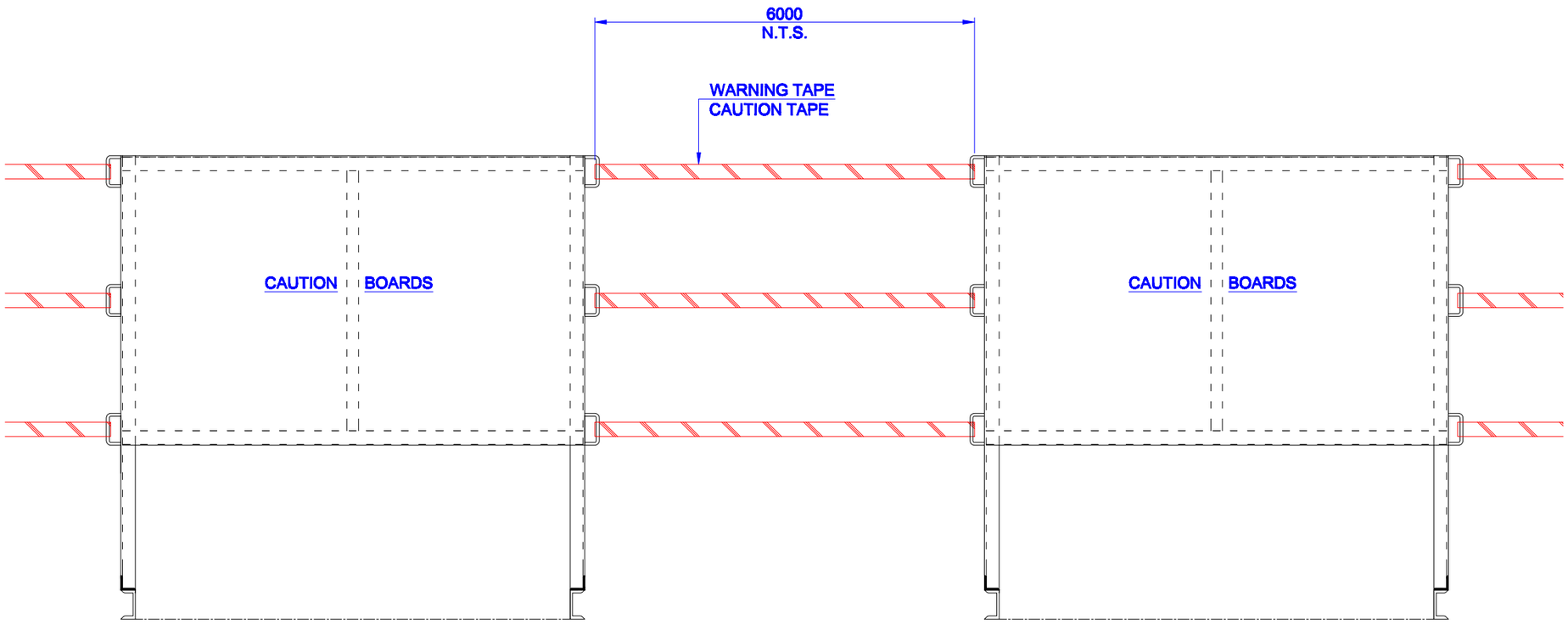
PMC: VCS QUALITY SERVICES PVT. LTD.

PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: TIYPCAL UNDERGROUND CABLE CROSSING DETAILS

SCALE: NTS	TOTAL NO. OF SHTS: 1 OF 1	
SIZE	JOB NO.	DRAWING NUMBER / REV.
A3	-----	VPC-STD-PP-2007 / 0

Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST



SCHEMATIC LAYOUT OF CAUTION BOARDS AND BARRICADING

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. FOLLOW WRITTEN DIMENSIONS ONLY. DO NOTE SCALE THE DRAWING.

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	22.06.23	IFC / IFE / TENDER	ARV.	A.K	SKN

PMC: VCS QUALITY SERVICES PVT. LTD.

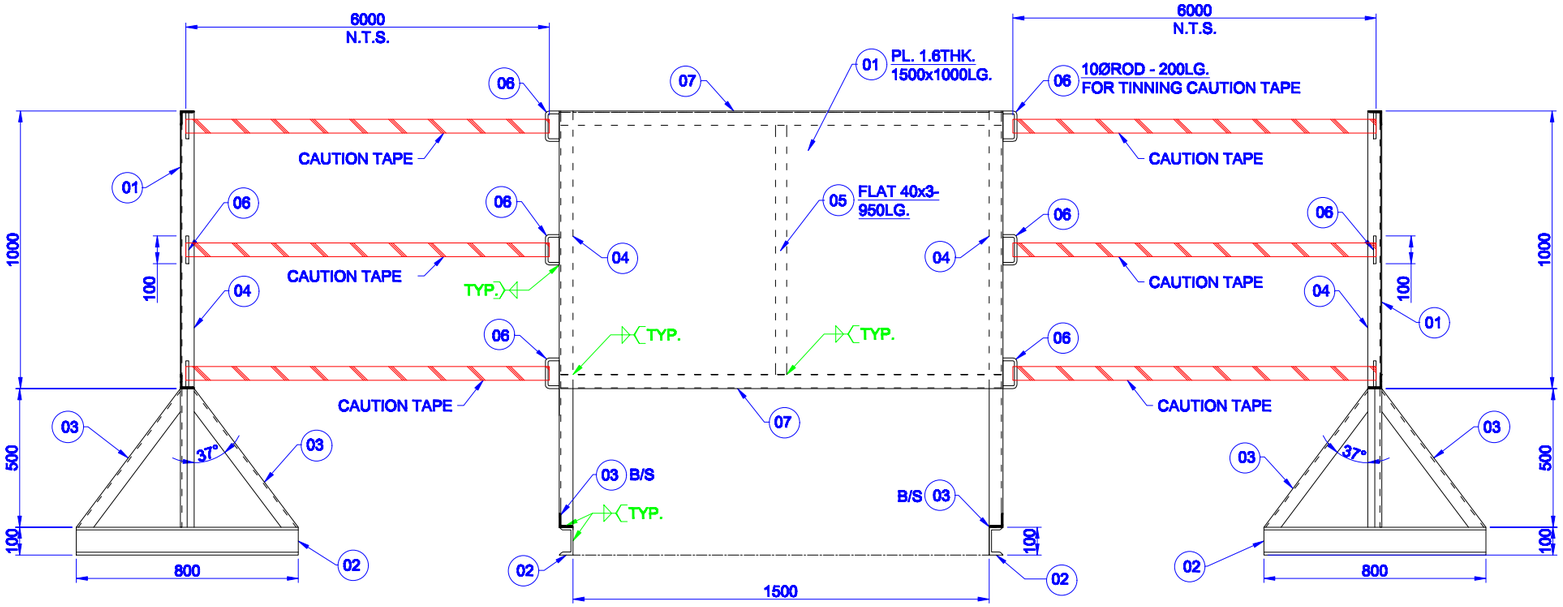
PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: BARRICADING

SCALE:	NTS	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VPC-STD-PP-2008	0

Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST

FORMAT NO C211050-FMT-005_00



IN RED → **CAUTION**

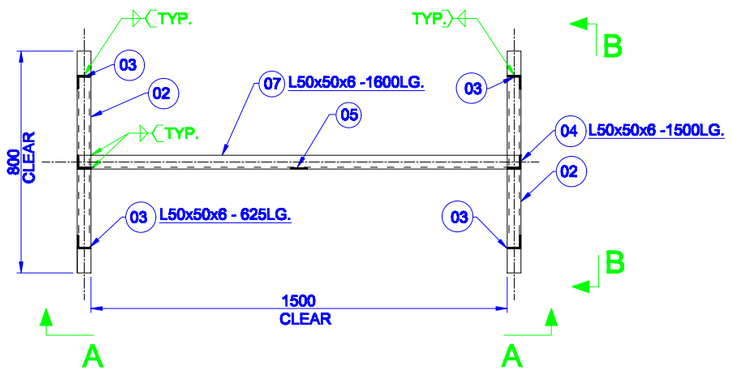
WORK IN PROGRESS

IN BLACK

LAYING OF NATURAL GAS PIPELINE
CLIENT : OWNER'S NAME
CONTRACTOR NAME:
DATE OF COMMENCEMENT:
DATE OF COMPLETION:
EMERGENCY PHONE NOS.:

← CLIENT LOGO

TO BE PRINTED ON ITEM NO. 01



PLAN VIEW

Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. FOLLOW WRITTEN DIMENSIONS ONLY. DO NOTE SCALE THE DRAWING.

BILL OF MATERIAL

Item Mkd.	Section	Width	Length	Item Qty. (All Marks)	Weight Kgs./M,M2	Total Weight In Kgs.
1.	PL. 1.6 THK.	1600	1000	1	12.56	20.10
2.	ISMC 100	–	800	2	9.20	14.72
3.	L50x50x6	–	625	4	4.50	11.25
4.	L50x50x6	–	1500	2	4.50	13.50
5.	Flat 3Thk.	900	40	1	0.94	0.03
6.	10Ø Rod	–	200	6	0.62	0.74
7.	L50x50x6	–	1600	2	4.50	14.40
				Grand Total (Kg)		74.74

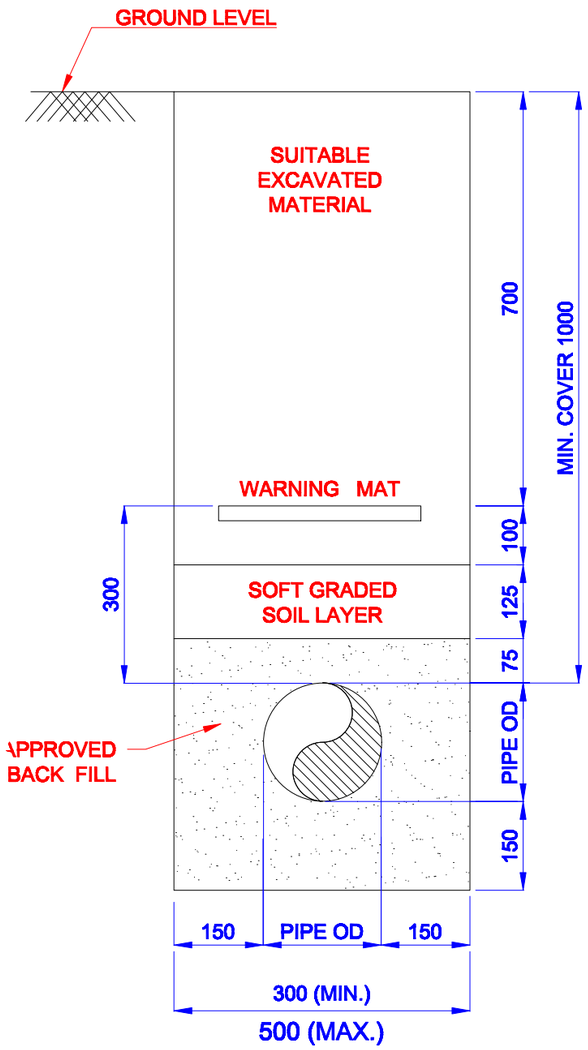
REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	22.06.23	IFC / IFE / TENDER	ARV.	A.K	SKN

PMC: VCS QUALITY SERVICES PVT. LTD.

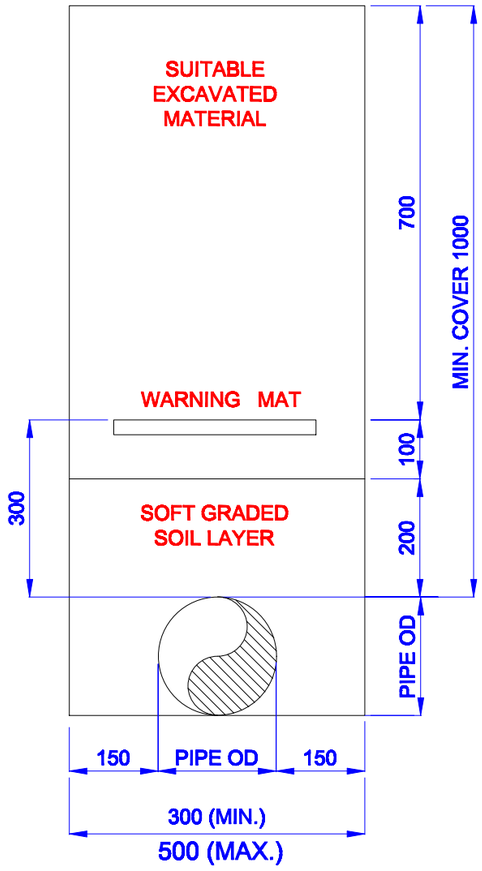
PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: CAUTION BOARD & TAPE ARRANGEMENT IN G.I / RISER INSTALLATION

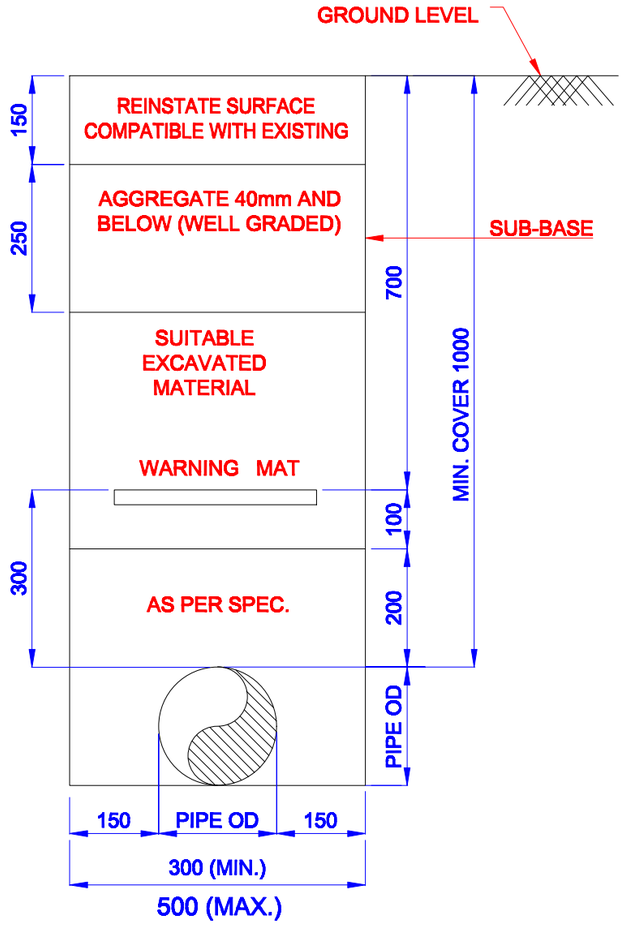
SCALE:	NTS	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VPC-STD-PP-2009	0



TRENCH IN ROCKY STRATA
TYPICAL SECTION



TRENCH IN NORMAL SOIL
TYPICAL SECTION



TRENCH RESTORATION DETAIL
TYPICAL SECTION

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. FOLLOW WRITTEN DIMENSIONS ONLY. DO NOT SCALE THE DRAWING.
3. FOR ALL PIPELINE TO BE CONSTRUCTED IN THE LAND UNDER JURISDICTION OF GOVT. OF INDIA, THE MIN COVER TO BE ADOPTED SHALL BE 1000MM IN ACCORDANCE WITH GOVT. OF INDIA PETROLEUM PIPELINE (ACQUISITION OF RIGHT OF USER IN LAND) ACT NO. 50, 1962 AND AMENDMENT ACT NO. 13 OF 1977. ANY EXTRA COVER REQUIREMENT SHALL BE IN ACCORDANCE WITH SPECIFICATIONS.
4. MIN. COVER REQUIREMENT SHALL BE SUBJECT TO APPROVAL OF CONCERNED AUTHORITIES WHEREVER REQUIRED.
5. EXTRA COVER REQUIREMENT SHALL BE ESTABLISHED AT ALL OVER BE NOS AND HORIZONTAL BE NOS WHEREVER NECESSARY.
6. FOR MINIMUM COVER REQUIREMENT AT PIPELINE CROSSING ROADS, RAILWAY TRACKS, RIVER MARSHY AREAS, ETC., REFER RELEVANT STANDARDS.

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	22.06.23	IFC / IFE / TENDER	ARV.	A.K	SKN

PMC: VCS QUALITY SERVICES PVT. LTD.

PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: TYPICAL TRENCH DIMENSIONS FOR PIPELINE

SCALE:	NTS	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VPC-STD-PP-2010	0

Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST



REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED.
2. FOLLOW WRITTEN DIMENSIONS ONLY DO NOT SCALE.

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	22.06.23	IFC / IFE / TENDER	ARV.	A.K	SKN

PMC: VCS QUALITY SERVICES PVT. LTD.

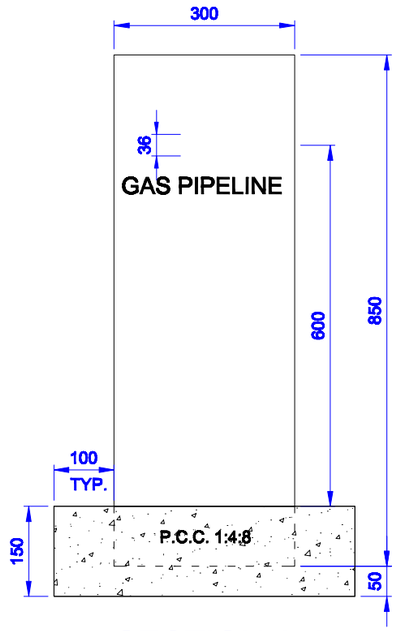
PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: PLATE MARKER

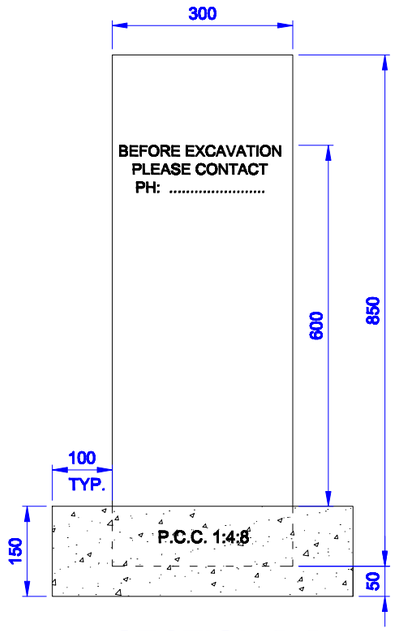
SCALE:	SCALE	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	------	VPC-STD-PP-2011	0

Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST

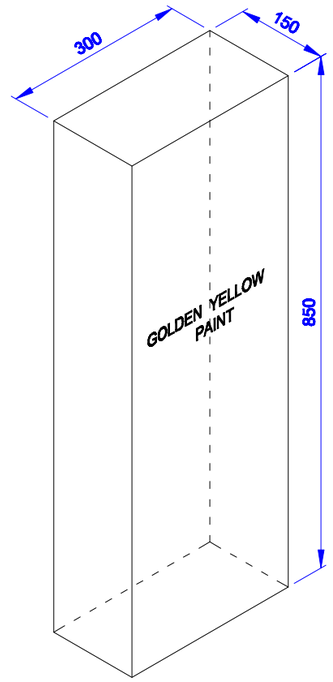
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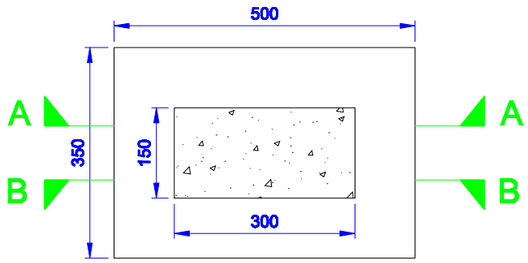
SECTION A-A



SECTION B-B



ISOMETRIC VIEW



PLAIN VIEW

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE
2. FOLLOW WRITTEN DIMENSIONS ONLY. DO NOT SCALE THE DRAWING.
3. ALL TEXT SHOULD BE WRITTEN IN BLACK COLOR.

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	22.06.23	IFC / IFE / TENDER	ARV.	A.K	SKN

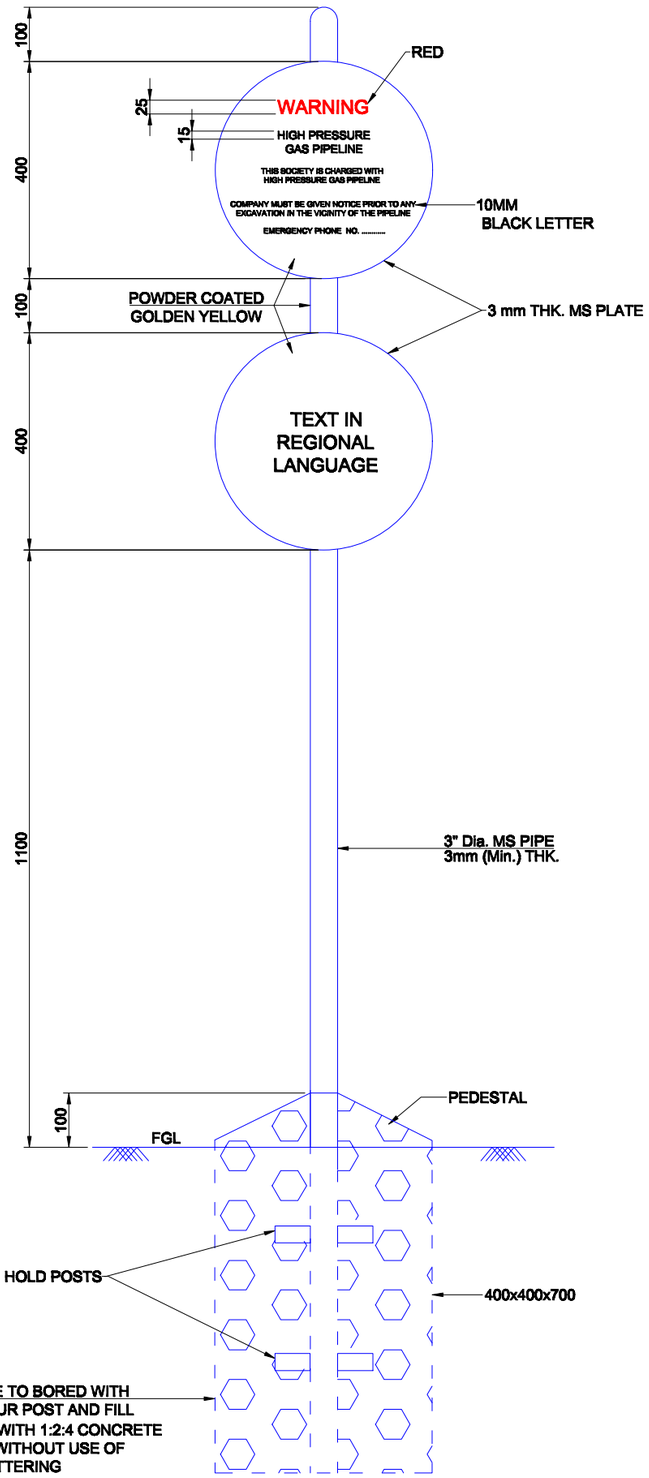
PMC: VCS QUALITY SERVICES PVT. LTD.

PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

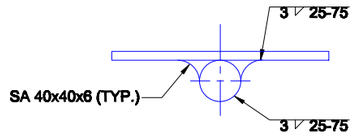
TITLE: SKETCH FOR STONE MARKER

SCALE:	NTS	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	------	VPC-STD-PP-2012	0

Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST



FIXING DETAILS



REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. WARNING TEXT AND MARKER SIZES ARE INDICATIVE AND ARE SUBJECT TO THE APPROVAL BY OWNER / OWNER'S REPRESENTATIVE BEFORE FABRICATION.
3. SCHEME FOR POWDER COATING AND COLORING : ONE COAT OF PRIMER & TWO COATS OF SPECIFIED PAINTS. ALL LETTERS EXCEPT 'WARNING' TO BE PAINTED BLACK.
4. APPROVAL OF WARNING MARKER DESIGN SHALL BE OBTAINED BEFORE THE COMMENCEMENT OF WORK.

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	22.06.23	IFC / IFE / TENDER	ARV.	A.K	SKN

PMC: VCS QUALITY SERVICES PVT. LTD.

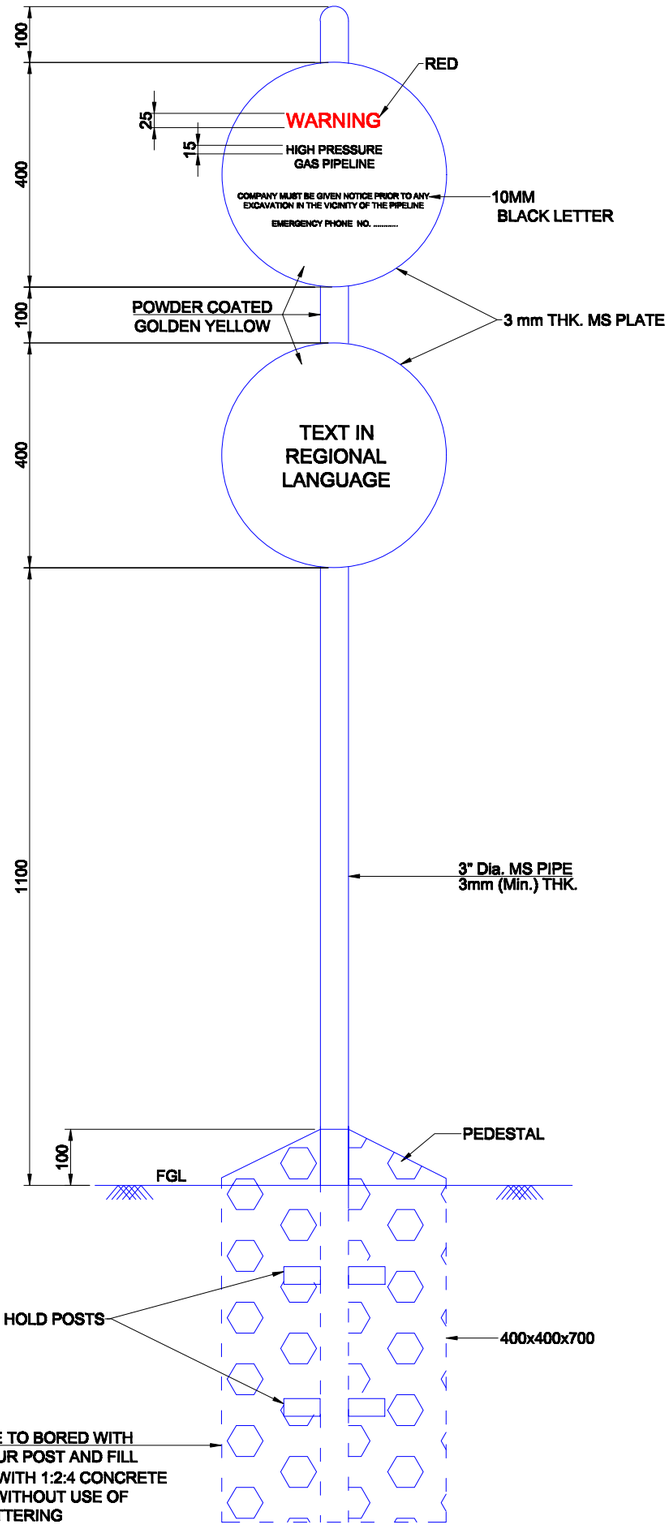
PROJECT: POLE MARKER WITH FOUNDATION (INDIVIDUAL SOCIETIES / AREAS)

TITLE: POLE MARKER WITH FOUNDATION INDIVIDUAL SOCIETIES/ AREA

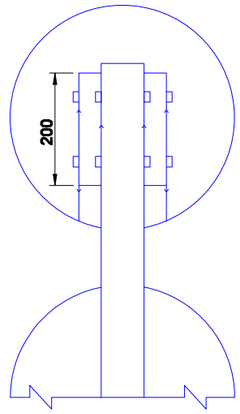
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SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VPC-STD-PP-2013	0

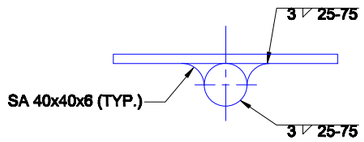
Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST

FORMAT NO C211050-FMT-005_00



FIXING DETAILS





REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. WARNING TEXT AND MARKER SIZES ARE INDICATIVE AND ARE SUBJECT TO THE APPROVAL BY OWNER / OWNER'S REPRESENTATIVE BEFORE FABRICATION.
3. SCHEME FOR POWDER COATING AND COLORING : ONE COAT OF PRIMER & TWO COATS OF SPECIFIED PAINTS. ALL LETTERS EXCEPT 'WARNING' TO BE PAINTED BLACK.
4. APPROVAL OF WARNING MARKER DESIGN SHALL BE OBTAINED BEFORE THE COMMENCEMENT OF WORK.

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	22.06.23	IFC / IFE / TENDER	ARV.	A.K	SKN

PMC: VCS QUALITY SERVICES PVT. LTD.

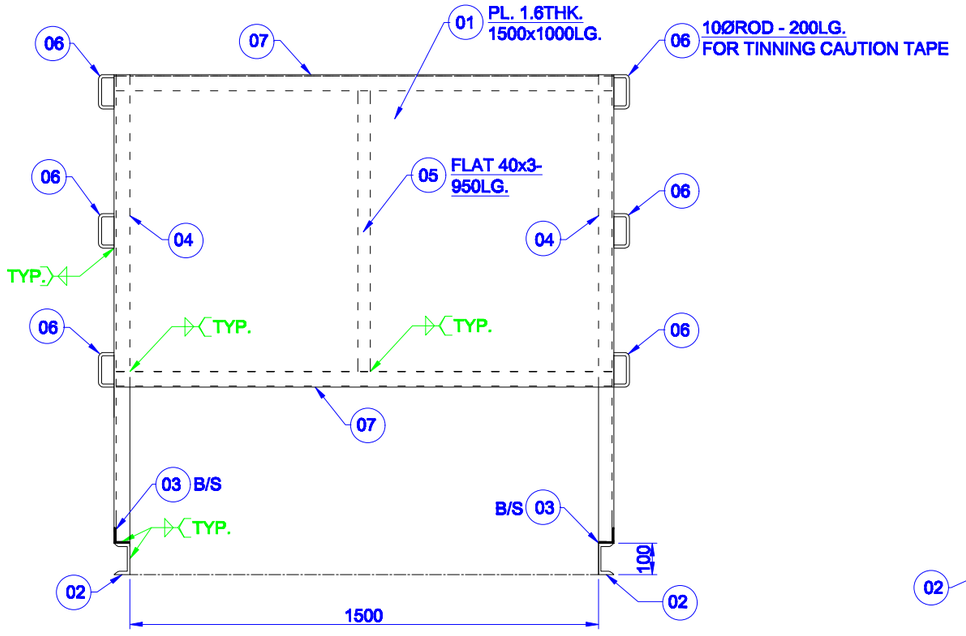
PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: POLE MARKER WITH FOUNDATION

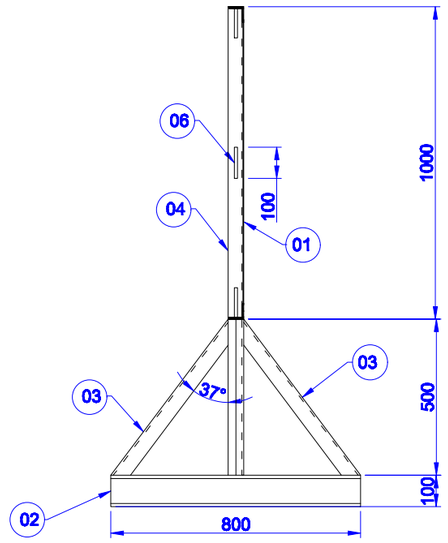
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SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VPC-STD-PP-2014	0

Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST

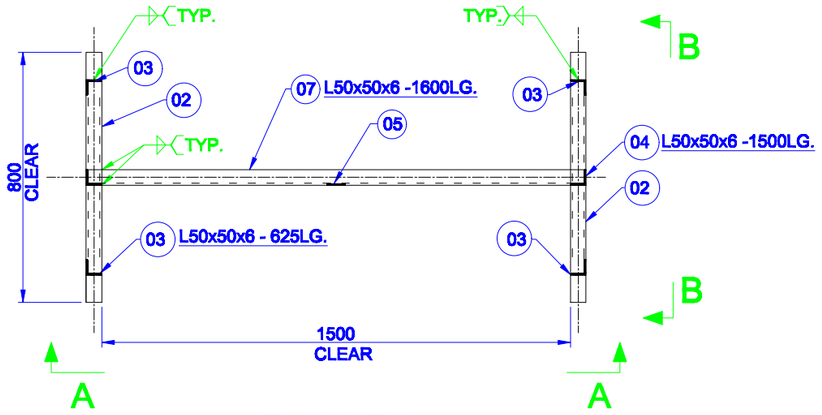
FORMAT NO C211050-FMT-005_00



ELEVATION A-A



ELEVATION B-B



PLAN VIEW

IN RED → **CAUTION** ← CLIENT LOGO

WORK IN PROGRESS

IN BLACK

LAYING OF NATURAL GAS PIPELINE
CLIENT : OWNER'S NAME
CONTRACTOR NAME:
DATE OF COMMENCEMENT:
DATE OF COMPLETION:
EMERGENCY PHONE NOS.:

TO BE PRINTED ON ITEM NO. 01

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

BILL OF MATERIAL

Item Mkd.	Section	Width	Length	Item Qty. (All Marks)	Weight Kgs./M,M2	Total Weight in Kgs.
1.	PL. 1.6 THK.	1600	1000	1	12.56	20.10
2.	ISMC 100	--	800	2	9.20	14.72
3.	L50x50x6	--	625	4	4.50	11.25
4.	L50x50x6	--	1500	2	4.50	13.50
5.	Flat 3Thk.	900	40	1	0.94	0.03
6.	10Ø Rod	--	200	6	0.62	0.74
7.	L50x50x6	--	1600	2	4.50	14.40
				Grand Total (Kg)		74.74

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	22.06.23	IFC / IFE / TENDER	ARV.	A.K	SKN

PMC: VCS QUALITY SERVICES PVT. LTD.

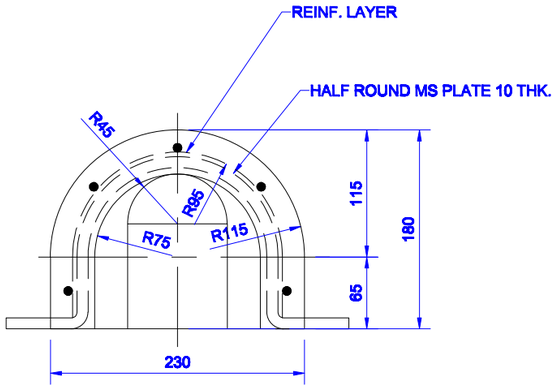
PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

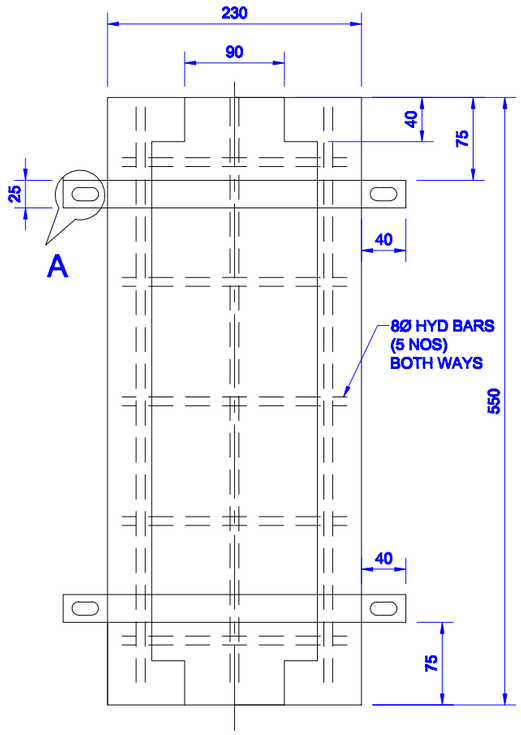
TITLE: CAUTION BOARD

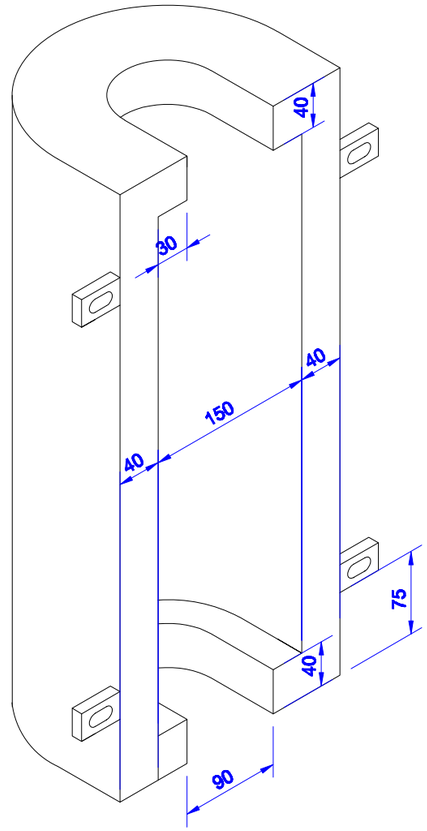
SCALE: NTS	TOTAL NO. OF SHTS: 1 OF 1	
SIZE	JOB NO.	DRAWING NUMBER / REV.
A3	-----	VPC-STD-PP-2015 / 0

Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST

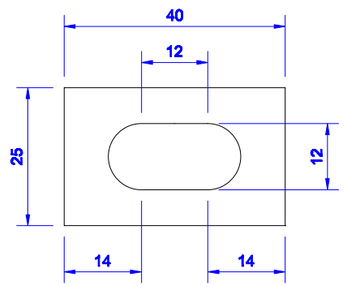
FORMAT NO C211050-FMT-005_00







ISOMETRIC VIEW



DETAIL-A
SCALE 1:1

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. FOLLOW WRITTEN DIMENSIONS ONLY. DO NOT SCALE THE DRAWING.
3. GRADE OF CONCRETE SHALL BE M25.
4. REINFORCEMENT IS HYD. TO IS:1786.
5. CONCRETE SLEEVE TO BE CLAMPED TO WALL WITH 10Ø ANCHOR BOLTS.

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	22.06.23	IFC / IFE / TENDER	ARV.	A.K	SKN

PMC: VCS QUALITY SERVICES PVT. LTD.

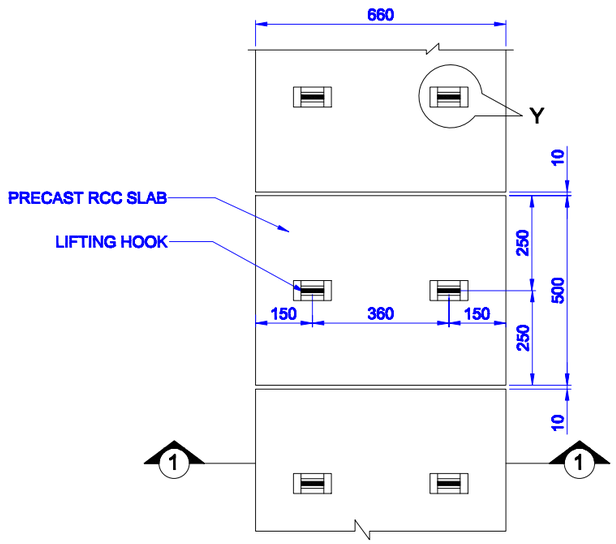
PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: HALF ROUND CONCRETE SELEEVE

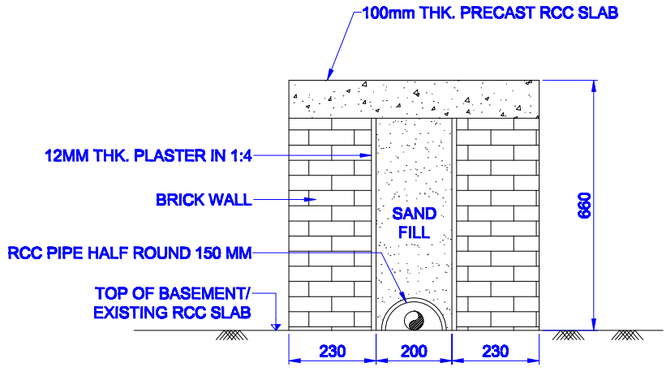
SCALE:	SCALE	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VPC-STD-PP-2016	0

Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST

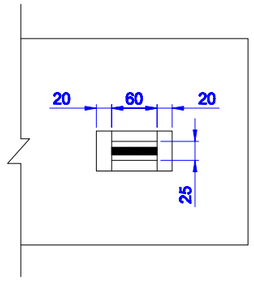
FORMAT NO C211050-FMT-005_00



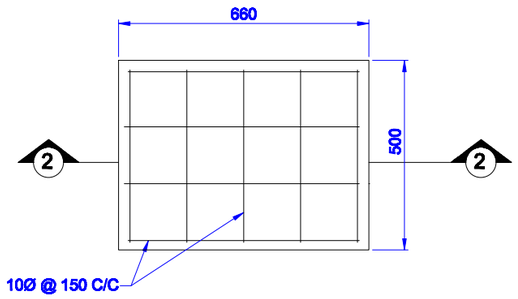
G.A PLAN OF COVER SLAB



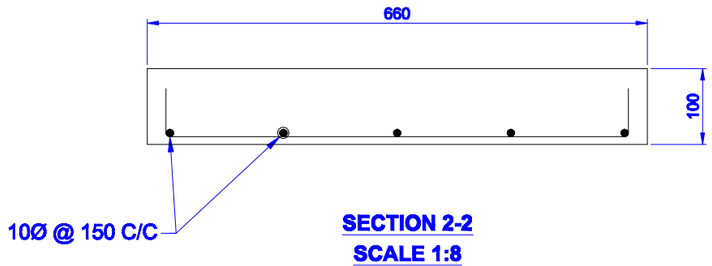
SECTION 1-1 THRU PIPE TRENCH



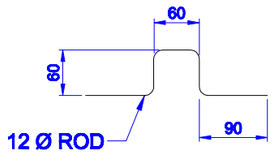
DETAIL - Y
SCALE 1:8



PRECAST RCC SLAB



SECTION 2-2
SCALE 1:8



LIFTING HOOK
SCALE 1:8

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. FOLLOW WRITTEN DIMENSIONS ONLY. DO NOT SCALE THE DRAWING.

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	23.06.23	IFC / IFE / TENDER	P.S.S	D.G	S.K.N

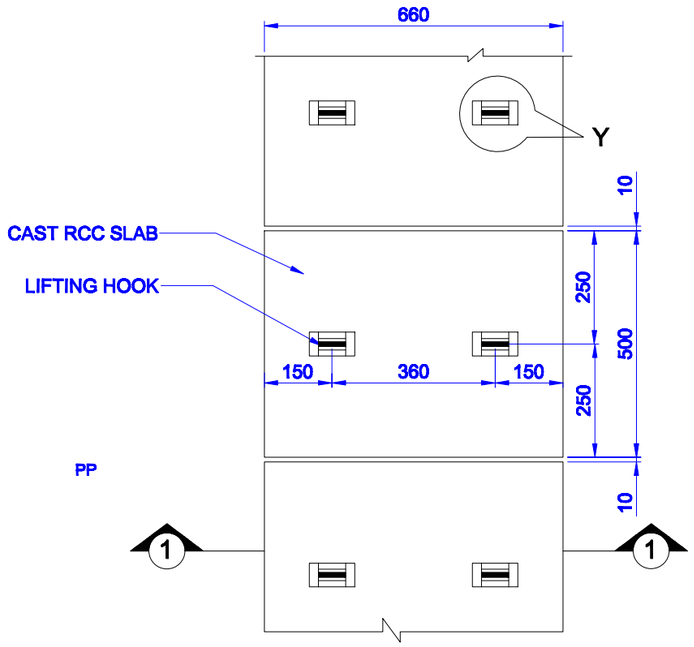
PMC: VCS QUALITY SERVICES PVT. LTD.

PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

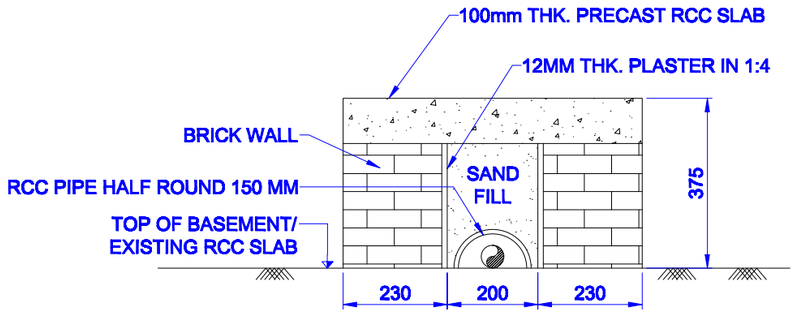
TITLE: TYPICAL BRICKWALL TRENCH (0.66 X 0.66 X 1.0)

SCALE:	SCALE	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VPC-STD-PP-2017	0

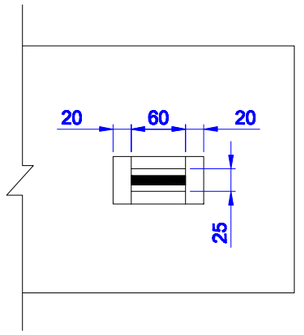
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Date: 2025.03.13 12:56:46 IST



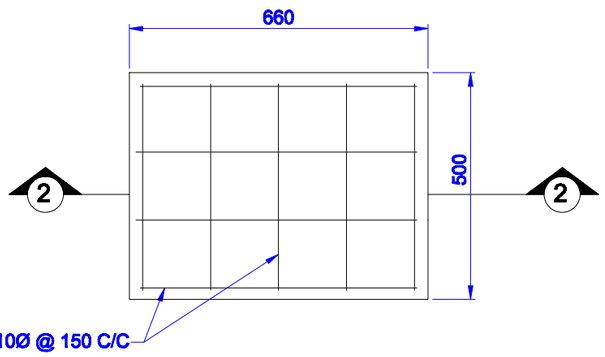
G.A PLAN OF COVER SLAB



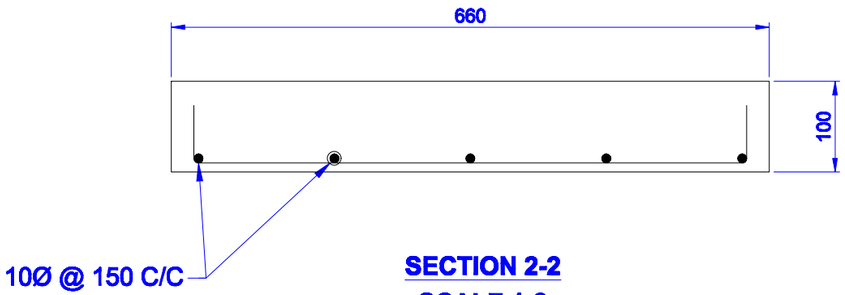
SECTION 1-1 THRU PIPE TRENCH



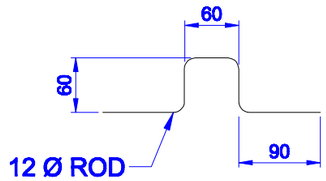
DETAIL - Y
SCALE 1:8



PRECAST RCC SLAB



SECTION 2-2
SCALE 1:8



LIFTING HOOK
SCALE 1:8

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. FOLLOW WRITTEN DIMENSIONS ONLY. DO NOT SCALE THE DRAWING.

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	23.06.23	IFC / IFE / TENDER	P.S.S	D.G	S.K.N

PMC: VCS QUALITY SERVICES PVT. LTD.

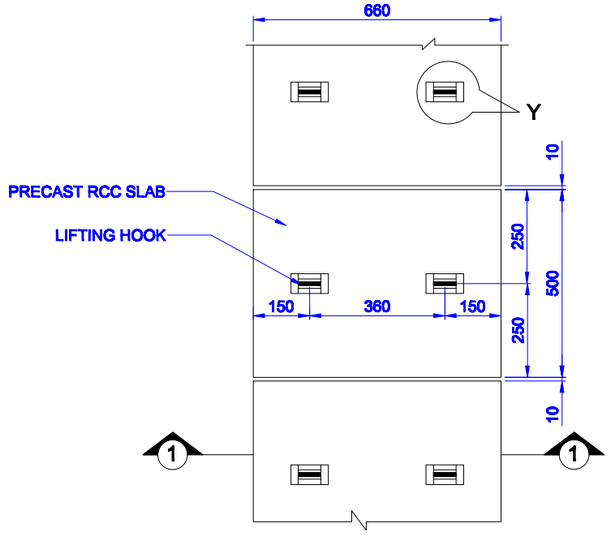
PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: TYPICAL BRICKWALL TRENCH (0.375 X 0.66 X 1.0)

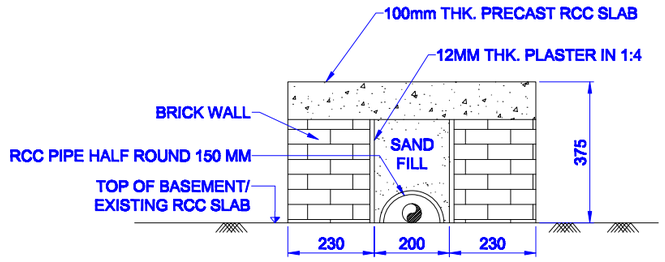
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SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VPC-STD-PP-2018	0

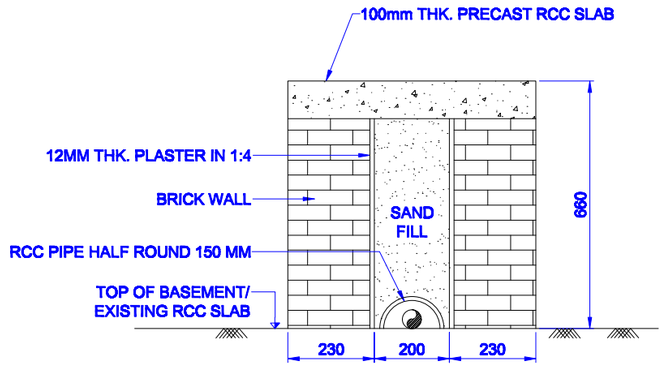
Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST



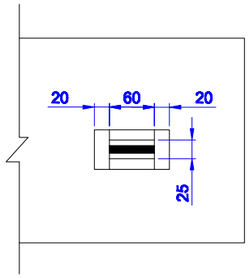
G.A PLAN OF COVER SLAB



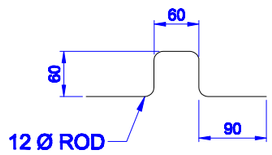
SECTION 1-1 THRU PIPE TRENCH



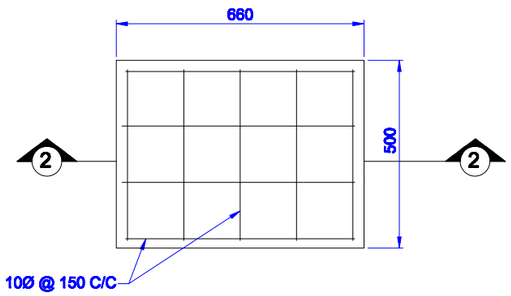
SECTION 1-1 THRU PIPE TRENCH



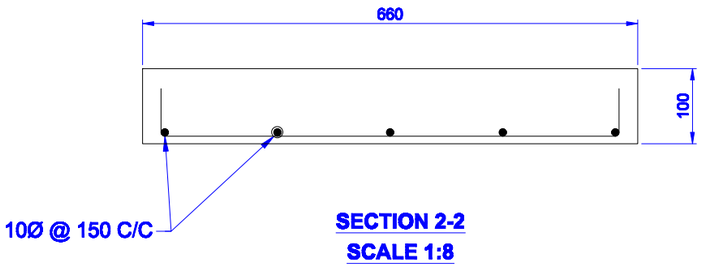
DETAIL - Y
SCALE 1:8



LIFTING HOOK
SCALE 1:8



PRECAST RCC SLAB



SECTION 2-2
SCALE 1:8

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. FOLLOW WRITTEN DIMENSIONS ONLY. DO NOT SCALE THE DRAWING.

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	23.06.23	IFC / IFE / TENDER	P.S.S	D.G	S.K.N

PMC: VCS QUALITY SERVICES PVT. LTD.

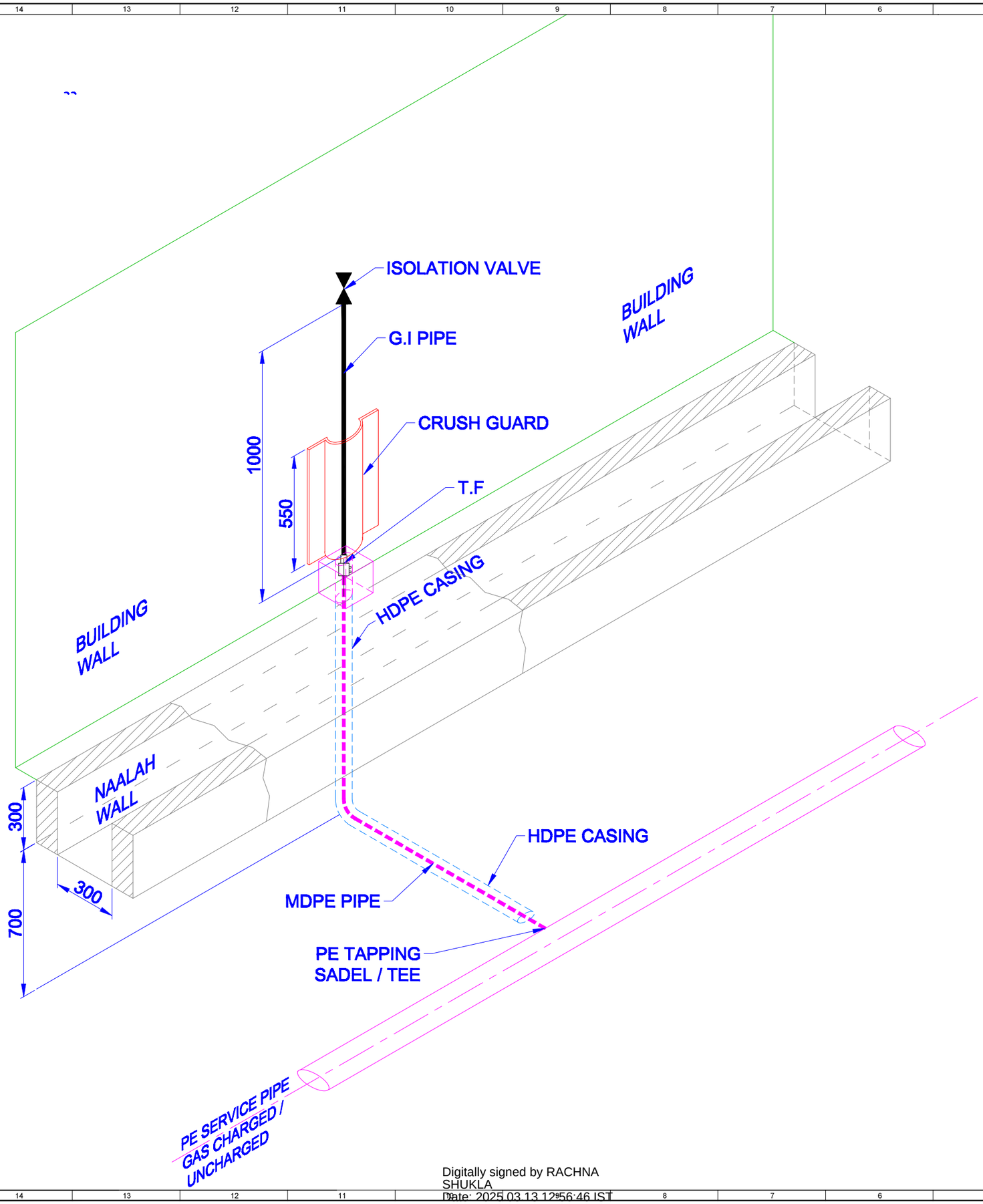
PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: TYPICAL BRICKWALL TRENCH UPTO 7M ROAD CROSSING INSIDE SOCIETY

SCALE:	SCALE	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VPC-STD-PP-2019	0

Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST

FORMAT NO C211050-FMT-005_00



REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	23.06.23	IFC / IFE / TENDER	P.S.S	D.G	S.K.N

PMC: VCS QUALITY SERVICES PVT. LTD.

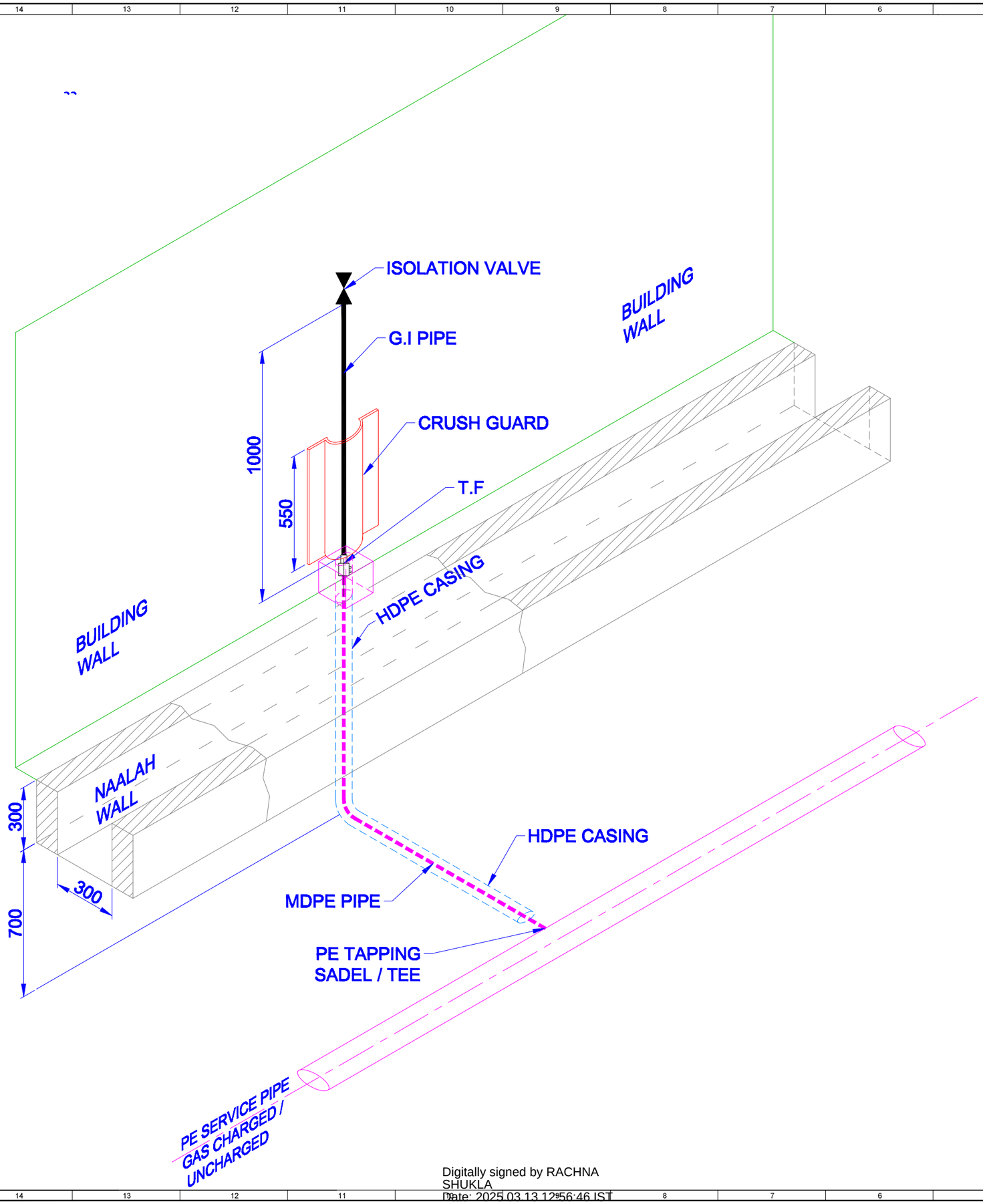
PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: DRAIN CROSSING FOR LAYING OF SERVICE LINES WHERE PEDESTAL IS POSSIBLE

SCALE:	SCALE	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	------	VPC-STD-PP-2020	0

Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST

FORMAT NO C211050-FMT-005_00



REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	23.06.23	IFC / IFE / TENDER	P.S.S	D.G	S.K.N

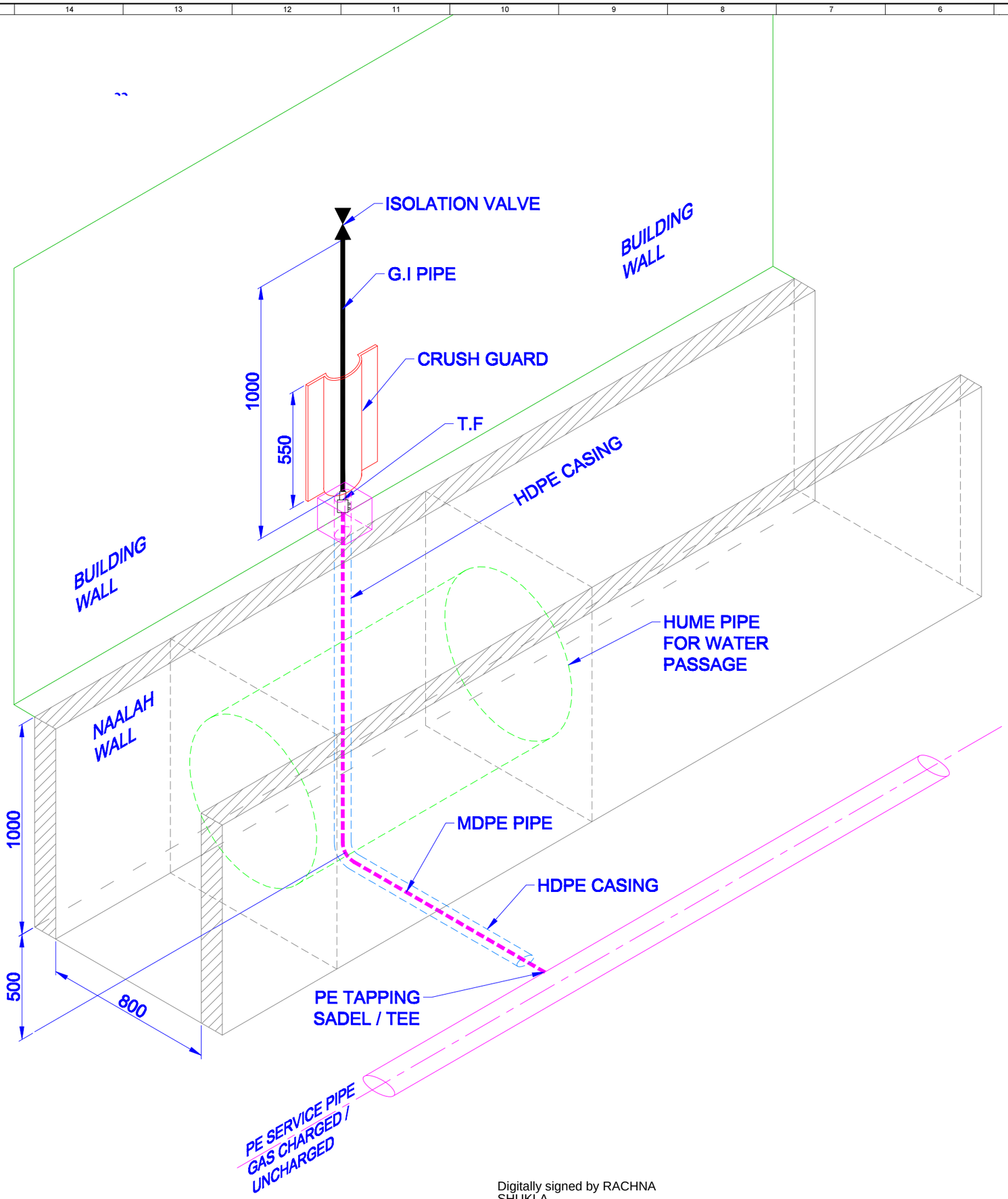
PMC: VCS QUALITY SERVICES PVT. LTD.

PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: DRAIN CROSSING FOR LAYING OF SERVICE LINES WHERE PEDESTAL IS NOT POSSIBLE

SCALE:	SCALE	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	------	VPC-STD-PP-2021	0

Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST



REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	23.06.23	IFC / IFE / TENDER	P.S.S	D.G	S.K.N

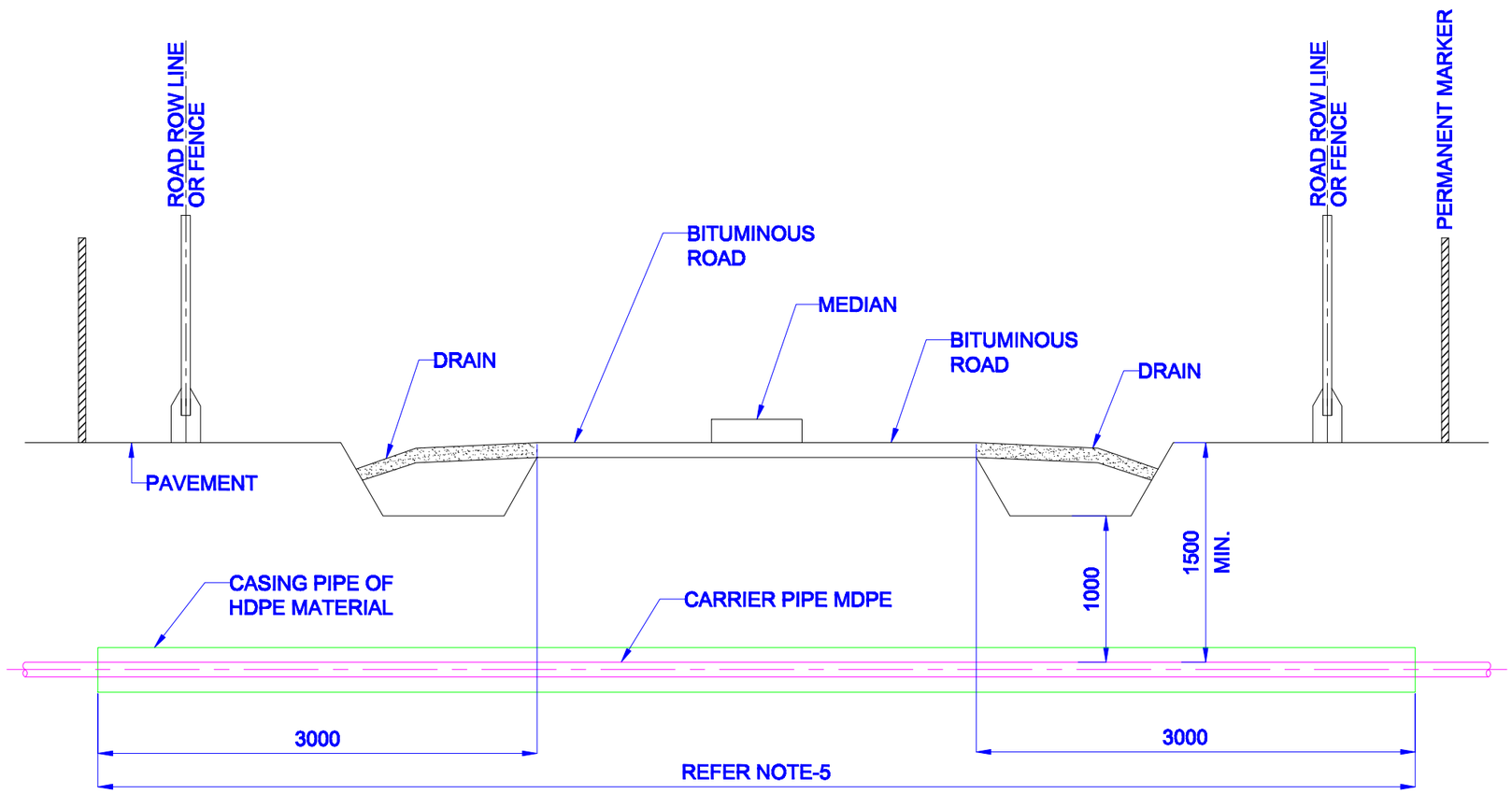
PMC: VCS QUALITY SERVICES PVT. LTD.

PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: NALLAH CROSSING FOR LAYING OF SERVICE LINES

SCALE: SCALE	TOTAL NO. OF SHTS: 1 OF 1	
SIZE	JOB NO.	DRAWING NUMBER / REV.
A3	-----	VPC-STD-PP-2022 / 0

Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST



TYPICAL SECTION

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES.

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. FOLLOW WRITTEN DIMENSIONS ONLY. DO NOT SCALE THE DRAWINGS.
3. ROAD / HIGHWAY CROSSING SHALL BE RESTORED TO ORIGINAL CONDITION TO THE ENTIRE SATISFACTION OF OWNER AND CONCERNED AUTHORITIES HAVING JURISDICTION.
4. REFER API RP 1102 FOR OTHER DESIGN AND INSTALLATION REQUIREMENTS.
5. ANGLE OF INTERSECTION BETWEEN PIPELINE AND THE ROAD / HIGHWAY SHALL BE AS CLOSE TO 90° AS POSSIBLE BUT IN NO CASE LESS THAN 30°.
6. CONTRACTOR SHALL VERIFY THE ACTUAL DIMENSION WITH RESPECT TO SURVEY DETAILS OF EACH ROAD / HIGHWAY CROSSING AND PREPARE DETAILED DRAWINGS FOR INDIVIDUAL CROSSING TAKE ENGINEER-IN-C

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	23.06.23	IFC / IFE / TENDER	P.S.S	D.G	S.K.N

PMC: VCS QUALITY SERVICES PVT. LTD.

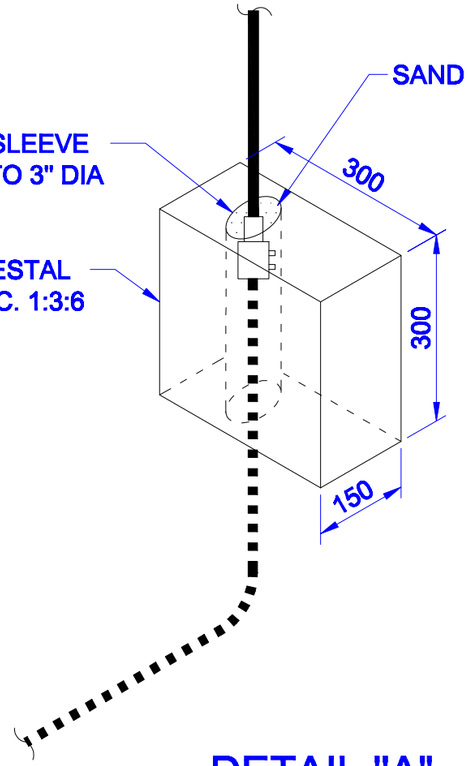
PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: ROAD/ HIGHWAY CASED CROSSING FOR MDPE PIPE

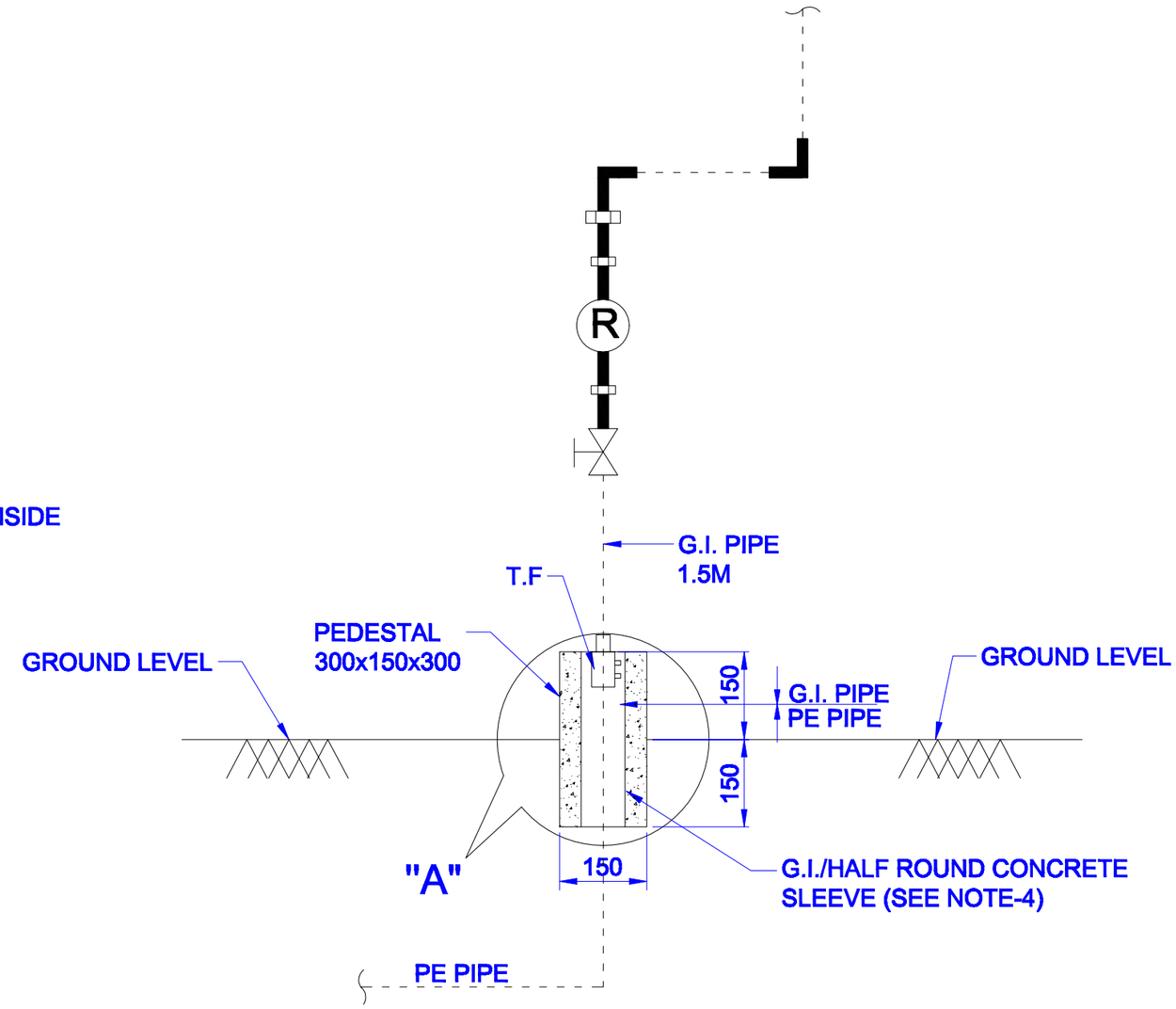
SCALE:	SCALE	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VPC-STD-PP-2023	0

Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST

FORMAT NO C211050-FMT-005_00



DETAIL "A"



PEDESTAL

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. FOLLOW WRITTEN DIMENSIONS ONLY. DO NOT SCALE THE DRAWINGS.
3. THE SIZES SHOWN IN THE DRAWING ARE TENTATIVE AND SHALL BE DECIDED WHILE DETAIL ENGINEERING.
4. G.I. INSTALLATION / METER INSTALLATION SHALL BE DECIDED BY OWNER / OWNERS REPRESENTATIVE AS PER SITE CONDITION.

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	23.06.23	IFC / IFE / TENDER	P.S.S	D.G	S.K.N

PMC: VCS QUALITY SERVICES PVT. LTD.

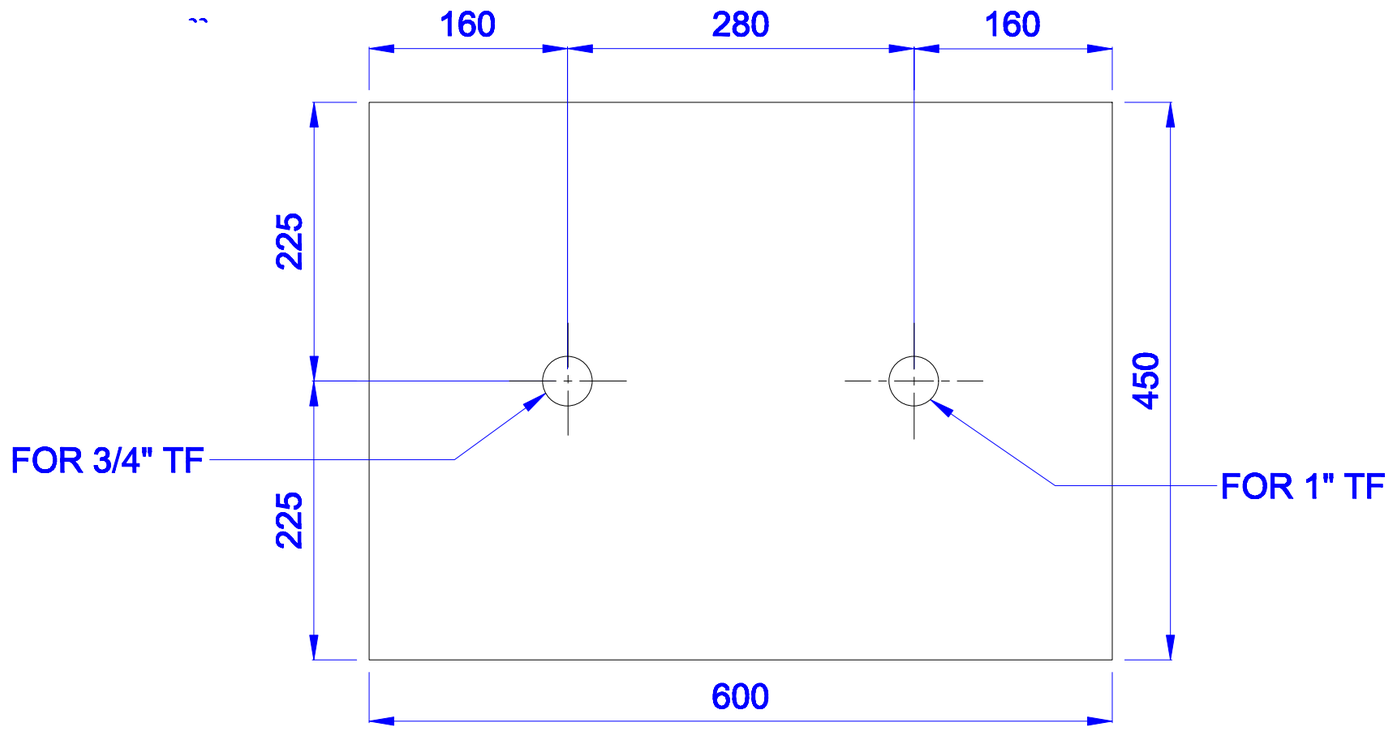
PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

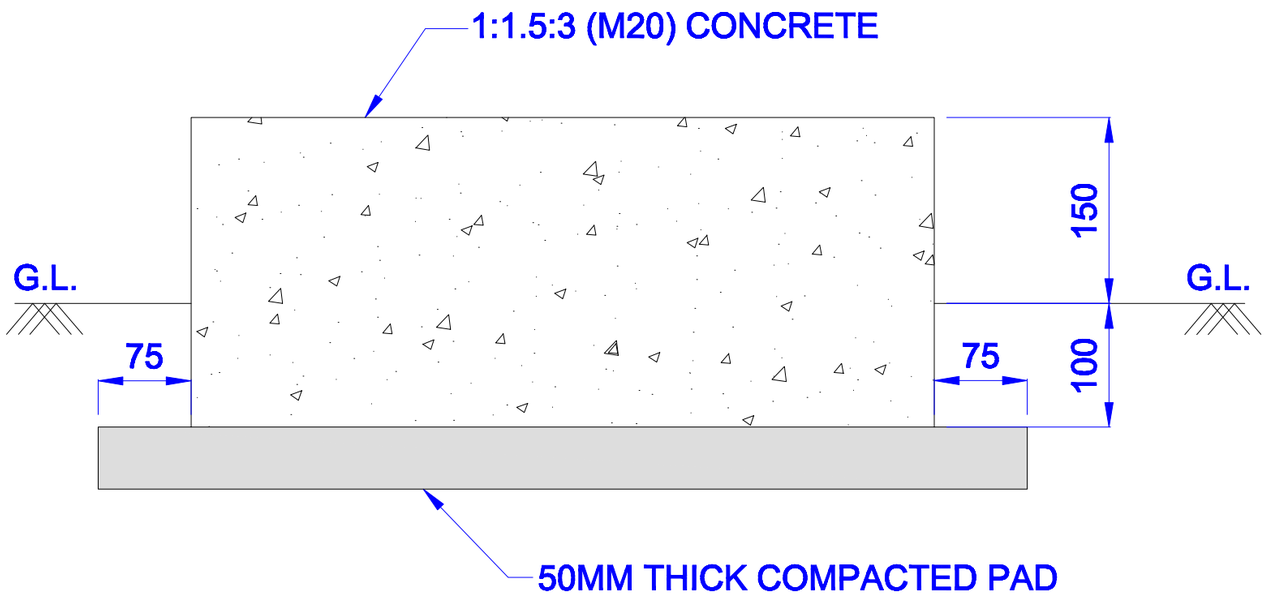
TITLE: G.I PIPE SLEEVE

SCALE:	SCALE	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VPC-STD-PP-2024	0

Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST

FORMAT NO C211050-FMT-005_00





REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. FOLLOW WRITTEN DIMENSIONS ONLY. DO NOT SCALE THE DRAWING.

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	23.06.23	IFC / IFE / TENDER	P.S.S	D.G	S.K.N

PMC: VCS QUALITY SERVICES PVT. LTD.

PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: SCHEMATIC DIAGRAM OF FOUNDATION FOR SINGLE STREAM SERVICE REGULATOR

SCALE: SCALE	TOTAL NO. OF SHTS:	1 OF 1

SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VPC-STD-PP-2025	0

Digitally signed by RACHNA SHUKLA
Date: 2025.03.13 12:56:46 IST