

Name of work :- Providing, supplying, lowering, Laying and Jointing of 110 mm Dia PVC Pipeline at Navapura (Sundhiya) Village Under Dharoi Regional Water Supply Scheme. Ta.-Vadnagar & Dist.-Mehsana.

DETAILED SPECIFICATION

Item No. 1

**Providing and supplying in standard length ISI mark rigid unplasticised PVC pipes suitable for potable water with ringfit joint including cost of rings, as per IS specification No. 4985/1988 including all local and central taxes, transportation, freight charges, octroi, inspection charges, loading, unloading, conveyance to the departmental stores and including cost of jointing material etc. complete. Test Pressure 6 Kg/Cm²
110 mm Dia**

For Indian manufacturers a valid license issued by the Bureau of Indian Standards for marking the PVC pipes with ISI mark is a mandatory requirement both for PVC pipes & rings
Standards

- The UPVC Pipes to be manufactured, supplied and delivered under the scope of this contract shall be manufactured in accordance and confirming to IS:4985-2000 or its latest revision or amendments or other authoritative standard that ensure at least a substantially equal quality to the IS:4985-2000 or its latest revision or amendments
 - Elastomeric sealing ring shall be as per specification of IS – 5382-1985, and ISO: 4633-1996 or it shall be EPDM rubber ring.
 - The dimensions, material compositions, tests etc. shall be as per IS:4985-2000 or with its latest revision or amendments.
 - The minimum wall thickness weight shall be as per Appendix I of the tender.
 - The colour of pipes shall be as per IS 4985-2000
 - Bureau of Indian Specifications (BIS) / Indian Standard (IS) shall mean the Latest version issued by BIS.
- The material from which the pipes are made shall consist substantially of unplasticised polyvinyl chloride conforming to IS: 10151, to which may be added only those additives that are absolutely needed to facilitate the manufacture of the polymer, and the production of sound, durable pipes of good surface, finish, mechanical strength and opacity.

The bulk density of the UPVC compound shall be 0.50 to 0.53 and the density of UPVC pipe shall be 1.40 to 1.46 g / cm³.

The additional of the manufactures own rework material shall comply to clause 4.2 of IS: 4985.

PVC resin of suspension grade K-66/K-67 shall be used for extrusion of UPVC pipe.

Quality Assurance

The manufacturer shall have a laid down Quality Assurance Plan for the manufacture of the products offered which shall be submitted along with the tenders.

Unit weight and minimum wall thickness of unplasticizes ring fit type PVC pipes are as per IS 4985-2000.

Inspection:

Inspection of pipe will be carried out at factory site by inspecting agency to be fixed and authorized by GWSSB.

Pipes supplied must be purchased from the latest vendors approved by GWSSB at the time of purchase of pipes.

PAYMENT

Payment shall be made as Per RMT Basis

Item No.2

Providing and supplying ISI mark G. I. pipes with Couplings of following class and diameter including all taxes, insurance, transportation, freight charges, octroi, inspection charges, loading, unloading, conveyance to departmental stores, stacking etc. complete. (IS-1239) (Not for well/tube well column pipe (a) Medium Duty ,100 mm Dia

The work shall be carried out as per the description of the item in Schedule-B.

The pipe shall be jointed properly as directed by Engineer in charge hydraulic test shall be rejected or rectified by contractor at his own cost.

The rates shall be paid for running MT the rate including cost of pipe and all jointing for materials pipes.

Galvanized M.S. tubes with coupling shall be applied by contractor necessary tees, bends, elbow, reducer coupling shall be supplied by contractor without any extra cost.

The G.I. pipe of "B" class including fixing necessary bend, elbow, tees, reducer etc.

PAYMENT

Payment shall be made on Rmt. basis.

Item No.3

Excavation for pipe line trenches for water supply, sewerage line, manhole etc. all with shoring and strutting if required as per required gradient and line including safety provisions using site rails and stacking excavated stuff including up to all required lead cleaning the site etc. complete for all lifts and strata as specified. Upto 1.50 mt depth

a) In allsorts ofsoil and soft murrum

110 mm Dia

GENERAL

1.1 The excavation for trenches will generally, refer to open excavation for trenches in wet / dry conditions for pipe laying work.

CLEARING OF SITES:

The site on which the pipelines are to be laid and shown on plan and the area required for setting out and other operations shall be cleared and all obstruction loose stones and materials, rubbish of all kinds, stumps, brushwood as trees shall be removed as directed the roots shall be entirely grubbed up.

The products of the clearing to restocked in such a place and in such a manner, as directed by the engineer in charge.

In jungle clearings, all trees not specially marked for preservation, bamboo's jungle wood and brushwood shall be cut down their roots grubbed up. All wood and materials from the clearing shall be the property of the Board shall be arranged as directed by the Board Engineer or his authorized agent, the material pronounced as useful by the Engineer will be conveyed and properly stacked as directed within the specified limit. Unless materials will be burnt or otherwise disposed off as directed.

All holes or hollows whether originally existing or produced by digging up roots, shall be carefully filled up with earth, well earth, well rammed leveled off, as may be directed.

3.0 SETTING OUT:

The center lines of all pipe trenches etc. shall be given by the Engineer-in-charge and it will be the responsibility of the contractor to install substantial reference marks, bench marks, etc. and maintain them as long as required true to line, level curve and slopes. The contractor shall assure full responsibility for alignment, and dimension of trench.

The labor materials etc. required for setting out and establishing benchmarks and other reference marks shall be arranged by the contractor at his own cost.

4 EXCAVATION

The excavation incl. Bailing out of water for the pipe trenches shall also incl. Removal of all materials of whatever nature and whether wet or dry condition necessary for laying of pipelines exactly in accordance with alignment, levels grades and curves shown on the plans or as directed by the Engineer-in-charge. Trenches shall be excavated to the exact width and depth according to the size of pipe and the sides shall be left vertical as far as possible or according to the angle of repose of various soils. Unless there is a specific extra provision in the contract for shoring and strutting or for cutting side slopes the contractor shall at his own cost do the necessary shoring and strutting or cutting of slopes to a safe of repose or both approved by the Engineer-in-charge. As per Site condition if Extra width or depth require then prior permission of concern chief engineer is require. The contractor shall notify the Engineer before starting excavation to enable him to take cross sectional levels for purpose of measurements before the ground is disturbed. The bottom of the trenches shall be leveled both longitudinally and transversely or slopped as directed by the Engineer. The contractor shall at his own cost to remove such portions of boulders or rocks, as are rectified to make the bottom of the trench level. No filling shall be allowed to bring the trench to level. If by contractor's mistake excavation is made deeper than shown on the plans and if ordered by the Engineer the extra depth shall have to be made with selected excavated stuff only with watering, remedying etc. as directed, by the Engineer and at the cost of the contractor. Other hard excavation shall be cleared of all sorts and loose materials and cut to firm surface, either level, stepped as directed by the Engineer. The Engineer may order such charges in the dimensions and alignment of pipe trench as may be deemed necessary to secure satisfactory cover over pipeline. The contractor shall, at his own expense, make provision for bailing out of draining water and the trenches shall be kept free of water, during laying work.

After each excavation is completed, the contractor shall notify the Engineer to that effect and no laying of pipeline will be allowed to laid until Engineer has approved the depth and dimensions of trenches level and measurements.

The minimum width of trench should be 25 CM on each side of the pipe the rate includes cost of dewatering, blasting if required and as per detailed specification etc complete.

5.0 SHORING AND STRUTTING:

Shoring & strutting and dewatering if required shall have to be carried out by the contractor, for which any extra charge will not be paid During excavation if water connections, sewage connections, telephone lines khalkuva (soak pits) etc. are damaged by the contractor, the same shall have to be restored by the contractor without any extra payment.

6.0 PROTECTION

The contractor shall be entirely responsible for any injury to life and damage to the properties etc. Necessary protection work etc. shall be provided by the contractor.

7.0 The excavation in all sorts of soil, hard murrum, soft rock or hard rock or any type of soil shall have to be carried out up to the required depth by the agency, no extra payment shall be given for soft/ hard rock.

8 DISPOSAL OF EXCAVATED STUFF

No excavated stuff from trench are to be placed even temporarily nearer than 1.5 meter or greater distance up to 90 meter or as prescribed by the Engineer from the outer edge of trench. All excavated material will be the property of the board. The rate of excavated includes sorting out of useful materials and stacking then separately as directed within specified lead. The excavated stuff suitable and useful for refilling or for other use shall be stacked at convenient places. The materials not useful in any wet shall be disposal off as directed by the Engineer from the outer edge of trench.

8.2 The site should be cleared off on completion of work.

9.0 ADDITIONAL REQUIREMENTS

At the joints of pipes, the trench shall be excavated to an additional depth of 15 cm. and width of 30 cm. And length of 15 cm. beyond the edge of collar on both the sides or as directed. The rate include for such extra excavation made at the joints. The trenches shall be excavated perfectly in straight line. The bottom of the trench shall be kept as per invert level or as directed. To maintain the proper slop the usual method of site rails and boning rods shall be adopted. The contractor shall have to provide and fix and maintain sight rails and boning rod without any extra cost.

If the contractor fails or makes delay to give hydraulic test of the pipe line laid in any of the section, without any genuine reason, he shall be responsible to get any part of the length trenches refill in such case i.e. before tasting for safety of pedestrian and/or vehicular traffic as found necessary by the engineer-in-charge without any extra cost. If found necessary any directed by the Engineer-in-charge. The contractor shall have to excavate the refilled trenches, during hydraulic test without any extra cost.

At all road crossings, trenches shall be excavated only for half width of the road and pipe shall be laid. The other half shall be excavated only after back filling over the laid pipeline is done so as to make it suitable for the traffic. The contractor shall provide direction when the pipeline is to be laid along the road as required and shall maintain the diversion or any part of it, without any extra cost. At all road crossings, the pipe shall be laid below the crest of road.

MEASUREMENT AND PAYMENT

The payment shall be made on Cum. basis.

Item No.4

Lowering, laying, fixing and jointing PVC/uPVC/cPVC pipes and specials of following class and diameter including cost of conveyance from stores to site of works including cost of labour, material, cement solvent, giving satisfactory hydraulic testing as per ISI code.

110 mm Dia

- 1) The excavation for trenches shall be done before laying of the pipes as per required depth and width so that adequate space can be made available for joint.
- 2) The pipes & joints shall be procured, supplied by the Contractor at work site at his own cost. Every care shall be taken in carting them to site. During transportation any damage shall be occurring to pipes for fittings the replacement of pipes given by the contractor at his own cost.
- 3) Before laying the pipes it shall be brushed throughout length so that the dust and soil can be removed.
- 4) Reducer bends tees, and adopter etc. to be supplied by the contractor as per requirement.
- 5) All the specials such as bends, tees, reducer, etc. shall be fixed as per instruction of engineer-in-charge in the pipeline.

6) The pipe shall be hydraulically tested during the testing no leakage shall be observed. If, leakage observed, it shall be set rightly by the contractor at his own cost as per the instruction of engineer-in-charge. The payment shall be as per payment schedule.

b) PVC Specials

1. Specials as per site requirement shall be supplied by the contractor. The specials should be as per standard and shall be got approved by the Engineer in charge before being used. The specials should be perfectly in working condition and having necessary threads holes etc. as per standard.
2. PVC specials should be as per IS standard specification and should be price make. All the specials should be suitable for PVC pipes for which it is being used.

Method Of Measurement and Payment:

Payment shall be made per Rmt. Basis.

Item No.5

Lowering, laying and jointing G. I. pipes with G. I. specials of following diameters in proper position, grade and alignment as directed by Engineer-in-charge including conveyance from stores to site of work, labour, giving hydraulic testing, etc. complete.

100 mm Dia

The work shall be carried out as per the description of the item in Schedule-B

The required G.I. Pipe shall be provided by contractor at site of work "B" class.

Galvanized M.S. tubes with coupling medium type shall be supplied by contractor.

The G.I. Pipe shall be "B" class rate including fixing necessary hand, elbow, tees, reducers etc. payment shall be made on Rmt. Basis.

G.I. Pipe shall be fitted properly including bend, Tees, Elbow, Union etc.

Fitting shall be in properly manner as pump line

No leakage shall be observed if leakage is accrued same shall be rectified etc. comp.

Method Of Measurement and Payment:

Payment shall be made per Rmt. Basis.

Item No.6

Refilling the pipeline trenches incl. ramming, watering, consolidating disposal of surplus stuff as directed within a radius of 3 km.

On completion of the pipe laying operations in any section, for a length of about 100m and while further work is still in progress, refilling of trenches shall be started by the Contractor with a view of restricting the length of open trenches. Pipe laying shall closely follow the progress of Trench Excavation and the Contractor shall not permit unreasonably excessive lengths of trench excavation to remain open while awaiting testing of the pipeline. If the Engineer considers that the Contractor is not complying with any of the foregoing requirements, he may prohibit further trench excavation until he is satisfied with the progress of laying and testing of pipes and refilling

of trenches. The excavated material nearest to the trench shall be used filling. Care shall be taken during backfilling, not to injure or disturb the pipes, joints or coating. Filling shall be carried out simultaneously on both sides of the pipes so that unequal pressure does not occur. Walking or working on the completed pipeline unless the trench has been filled to height of at least 30cm over the top of the pipe except as may be necessary for tamping etc., during backfilling work.

The remaining portion of the trench may be filled in with a mixture of hard and soft material free from boulders and clods of earth larger than 150mm in size if sufficient quantity of good earth and murrum are not available. The trench shall be refilled so as to build up to the original ground level, keeping due allowance for subsequent settlement likely to take place. The top 300mm layer or fertile agricultural soil shall be kept aside during excavation and shall be laid in layers near ground level during refilling.

To prevent buckling of pipe shell of diameters 1200mm and above, pipes shall be strutted from inside while the work of refilling is in progress, for which no separate payment shall be made.

Strutting shall be done by means of strong spiders having at least 6 arms which shall be sufficiently stiff to resist all deformation. Spiders shall be provided at a maximum interval of 2m & shall be welded in such a way that internal coating does not get burnt.

The Engineer shall, at all times, have powers to decide which portion of the excavated materials shall be for filling and in which portion of the site and in what manner it shall be so used.

If any material remains as surplus it shall be disposed of as directed by the Engineer, which includes loading, unloading, transporting and spreading as directed within all lead. If the Contractor fails to remove the earth from site within 7 days after the period specified in a written notice, the Engineer may arrange to carry out such work at the Contractor's risk and cost or may impose such fine for such omission as he may deem fit. Particular care shall be taken to keep the trench dry during the entire refilling operation.

If suitable material for refilling is not available for excavation the Contractor shall bring earth, murrum of approved quality as directed by the Engineer.

No mechanical plant other than approved compacting equipment shall run over or operate within the trench until backfilling has reached its final level or the approval of the Engineer has been obtained.

Subsidence in filling in : Should any subsidence take place either in the filling of the trenches or near about it during the maintenance period of 24 months from the completion of the Contract Works, the Contractor shall make good the same at his own cost or the Engineer may without notice to the Contractor, make good the same in any way and with any material that he may think proper, at the expense of the Contractor. The Engineer may also, if he anticipates occurrence of any subsidence, employ persons to give him timely notice of the necessity of making good the same, and the expenses on this account shall be charged to the Contractor.

Payment shall be as per payment schedule

The payment shall be made on Cum. Basis.

Item No.7

Providing and supplying C. I. Air valves of approved make & quality of following class and diameter including all taxes, insurance, transportation, freight charges, octroi, inspection charges, loading, unloading, conveyance to departmental stores, stacking etc. complete.

without Isolating Sluice Valve PN 1.0

50 mm Dia

General

Tamper proof air valve conforming to AWWA C 512, having outlet for admission and release of bulk volume of air during emptying and filling of the pipeline. The ball sealed orifice shall always remain open while air is exhausting and is immediately closed when Water rises in the chamber, lifts the ball and seals the orifice.

It shall also ensure that there are no recesses or pockets, sheltering, escaping air for the large orifice (low pressure) ball to drop into when the valve open. Turbulent air at the time of filling of pipe shall not circulate in such cavities and cause the ball to blown into when the valve is open.

Turbulent air at the time of filling of pipe shall not circulate in such cavities and cause the ball to blown into the discharging air streams, blowing the valve shut prematurely. The cone angle of the lower pressure chamber shall be such that even at the critical velocity of all air escape at 300 m/sec.

The total impact force on the ball is less than the suction force on the angular area between the ball and the cone. The design of the valve should be such as to allow maximum free air discharge at various pressure differentials.

The low pressure cover shall be massive and designed to withstand full operating thrust in working Conditions. The seat ring shall be held securely in place under the low pressure cover by a joint supporting ring to prevent it from sagging when the ball is not sealing the orifice.

Positive material Identification (PMI Test)

PMI test shall be checked at random for Stainless steel parts.

Test Certificates

When specified by Owner, the manufacturer shall issue a test certificate confirming that the valves have been tested in accordance with this standard and stating the actual pressures and medium used in the test.

Marking

Marking shall be cast integral on the body or on a plate securely attached to the body for 'DN' size, 'PN' rating, Heat Number and Serial number.

Painting

Each valve shall be drained, cleaned, prepared and suitable protected with 2 coats of red oxide and then black bituminous paint for minimum of 150 micron DFT on surfaces before dispatch.

Datasheet:

TAMPER PROOF AIR VALVE				
Sr No	Component	PN- 1.0	PN-1.6	PN-2.0
1	Body	CI IS 210 Gr. FG260	CI IS 210 Gr. FG260	ASTM A216 Gr. WCB
2	Cover	CI IS 210 Gr. FG260	CI IS 210 Gr. FG260	ASTM A216 Gr. WCB
3	Float	SS 410	SS 304	SS 304
4	Seat	EPDM	EPDM	EPDM
5	Float Guide	SS 410	SS 304	SS 304
6	Orifice	SS 410	SS 304	SS 304
7	Gasket	EPDM	EPDM	EPDM
8	Nut Bolt	Carbon steel	Carbon steel	Stainless Steel
9	Flange End	IS 1538	IS 1538	ASME/ANSI B16.5 Class 150

Mode of measurements and payment:

The measurement shall be taken in No. and The Payment shall be made on No.. basis as per Payment

Item No.8

Erection of Air valve with Air valve riser by installing new MS pipe of 6mm thick or Heavy Duty GI pipe and 3.2mt length with necessary fitting such as flange of appropriate size, nut bolts and embedded the pipe in RCC M-15 with offset of 10cm around pipe with necessary steel etc complete.

Dia of Air Valve 50mm & MS Pipe Erection of Air valve riser

1.0 SUPPLY OF MATERIAL

- 1.1 50 mm Dia Mild Steel pipe shall be supplied and carted by the contractor. The rate shall include loading, unloading and stacking at site.
- 1.2 The mild steel pipe shall be examined before erecting for cracks and other flaws. They shall be undamaged in all respect.
- 1.3 The mild steel pipe shall be properly checked before erecting.
- 1.4 All grits and foreign materials shall be removed from the inside of MS pipe before erecting.
- 1.5 All the faces of pipe shall be thoroughly cleaned.

2.0 JOINTING MATERIAL

- 2.1 The contractor shall provide all necessary jointing materials such as nuts bolts, rubber packing white zinc jute lead wool etc.
- 2.2 All tools and plant required for installation of sluice valve shall be provided by the contractor.
- 2.3 All jointing materials shall be not approved from the engineer-in-charge before use
- 2.4 The nut and bolts shall conform to Item No MSP-19 of specification of materials.
- 2.5 The rubber packing shall confirm all specifications as narrated in Item No MSP-20 of specifications of materials.

Specifications for Air Riser for Pipeline are as under:

The work of air valve riser shall be carried as per drawing attached. Column/ Footings for Air riser pipe shall be carried out in cement concrete M-150 using trap metal as per instructions and workmanship of the engineering in charge. Materials and workmanship shall be given in concrete section.” The reinforcement as per IS Standard and specifications. The item Air Valve raising includes the cost of providing and laying cement concrete M-150 base MS clamps, MS pipe 4.50 mt., M.S. flange, nut, bolts, rubber packing and cement concrete column in M-150 etc. complete.

MODE OF MEASUREMENT AND PAYMENT

Measurement shall be paid on number basis as per payment schedule.

Item No.9

Providing and supplying ISI mark CI D/F Sluice Valves as per IS:14846 (Latest Edition) of following class and diameter including all taxes, insurance, transportation, freight charges, octroi, inspection charges, loading unloading. conveyance to departmental stores, stacking etc. complete.

**A) Sluice Valve with ISI mark PN-1 with hand Wheel/Cap Operated (PD Type Short Body)
100 mm Dia**

Design Features

Sluice valve shall conform to IS 14846 (ISI Marked). Except pump house, these valves are to be installed in valve chamber. All valves of pump house and rising mains shall be non-rising stem type.

The valves shall be free from sharp projections, which are likely to catch and hold stringy materials. Valves shall close with clockwise rotation of the hand wheel. The direction of closing and opening shall be marked on the hand wheel.

Necessary joining materials viz. bolts, nuts, washers, packing etc. shall be provided by the contractor at his cost. The valves shall be fixed so as to have axis perfectly horizontal. If required the contractor shall also carry out drilling of holes of appropriate diameter in flanges in required numbers. A hand wheel shall be provided for emergency operation. The hand wheel drive shall be mechanically independent.

The valve design shall take care of the pressure drop across the valve disc in case of partial opening of the valve and shall take care of the erosion and cavitation effect on the body and disc during such operation. Valve(s)

subjected to back pressure shall have the valve seat, disc and the operator suitably designed to ensure trouble-free operation. The shaft diameter shall take into consideration, the maximum torque required for the valve operation, the maximum differential pressure across the valve disc when the valve is closed and the shock load due to accidental closure of the valve disc. The disc shall be designed for maximum differential pressure across the valve as well as the shock load due to accidental closure of the valve. Disc design shall offer minimum head loss. Disc shall also offer minimum resistance to flow Disc shape shall be contoured.

Valve seats shall be of a design that permits removal and replacement at site and shall be securely clamped on the body or disc of the valve. Seat material shall be suitable for the operating conditions and handling fluid and may be suitably reinforced, if required. The seat design shall permit easy removal for replacement purposes without the need for removing the valve from the line. No deposited or welded seat rings permitted. The valve bearings shall be of 'self-lubricated' type and shall not have any harmful effect due to handling fluid. Adjustable thrust bearing(s) shall be provided to hold the valve disc securely in the center of the valve seat. Each Sluice Valve shall be provided with a hand wheel for manual operation. For the Valves located at inaccessible position, it shall be provided with extension spindle and floor stand or hand lever / round chain to facilitate manual operation.

Painting

Each valve shall be drained, cleaned, prepared and suitable protected with 2 coats of red oxide and then black bituminous paint for minimum of 150 micron DFT on surfaces before dispatch.

Mode of measurements and payment:

The measurement shall be taken in No. and The Payment shall be made on No. basis as per Payment schedule

Item No.10

Lowering, laying and jointing in position following C. I. / D/F Reflux valves, Butterfly valves, Sluice valves and Air valves including cost of all labour, jointing material, including nut bolts and giving satisfactory hydraulic testing, etc. complete.

100 mm Dia

1.0 Lowering, Laying and Jointing of Sluice valve

- (i) Cast iron double flanged sluice valve/butterfly valves with two tail pieces suitable to pipe shall be supplied by the board and they shall be carted by the contractor at his own cost from the departmental store or any other store as directed. The rate shall include loading, unloading and stacking at site.
- (ii) The sluice valve/butterfly valves and tail pieces shall be examined before laying for cracks and other flows. They shall be undamaged in all respect.
- (iii) The sluice valves/butterfly valves shall be operated before laying.
- (iv) All grits and foreign materials shall be removed from the inside of the valves before placing.
- (v) All the four faces shall be thoroughly cleaned and coated with a thin layer of mineral grease.
- (vi) The tightening of gland shall be checked with a pair of inside-calipers. Clearance between the top of stuffing box and the underside of the gland shall be uniform all the sides.

2.0 JOINTING MATERIAL

- 2.1 The contractor shall provide all necessary jointing materials such as nuts bolts, rubber packing white zinc jute lead wool etc.
- 2.2 All tools and plant required for installation of sluice valve shall be provided by the contractor.
- 2.3 All jointing materials shall be not approved from the engineer-in-charge before us
- 2.4 The nut and bolts shall conform to Item No MSP-19 of specification of materials.
- 2.5 The rubber packing shall confirm all specifications as narrated in Item No MSP-20 of specifications of materials.

3.0 INSTALLATION

- 3.1 The sluice valve/butterfly valve shall be lowered in to the trench carefully, so that no part is damaged during lowering operation.
- 3.2 If necessary tail pieces shall be fitted with sluice valve first outside the trench and then lowered in to the trench.

- 3.3 The rubber packing shall be three ply and of approved thickness. The packing shall be of full diameter of the flange with necessary holes and the sluice/butterfly valve bore. It shall be even at both the inner and outer edges.
- 3.4 The flange faces thoroughly greased.
- 3.5 If flange faces are not free, the contractor shall use thin fibers of lead wool.
- 3.6 After placing the packing, nuts and bolts shall be inserted and tightened to make the joint.
- 3.7 The valve shall be tightly closed when being installed to prevent any foreign materials from getting in between the working parts of the valve.
- 3.8 Each flange bolt shall be tightened a little at a time taking care to tighten diametrically opposite bolts alternatively.
- 3.9 The sluice valve/butterfly valve shall be installed in such a way that its spindle shall remain in truly vertical position.
- 3.10 The other end of tail piece shall be fitted with pipes so that continuous lines can work.
- 3.11 Extra excavation required for facility of lowering and fixing sluice valve shall not be paid for.

4.0 TESTING

- 4.1 The joints sluice valve/butterfly valve shall withstand the test pressure of pipelines.
- 4.2 Defects noticed during test and operation of sluice valve shall be rectified by the contractor at his own cost without any extra claim to the entire satisfaction of the Engineer-in-charge.

Mode of measurements and payment:

The measurement shall be taken in No. and The Payment shall be made on No. basis as per Payment schedule

Item No.11

Labour charges for repairing of leakage in PVC pipeline of folling dia meter at different places including necessary excavation manually or by mechanise excavation, dewatering removing of mud, cleaning of pipe and leakage portion, cutting the pipeline & removing piece of pipe from trench with inlussive of mechanical devices JCB, Hydra/Crain if necessary & labours required with providing material such couplers, solution etc. comp. (incl. all material but Exclu. cost of pipe)

110 mm Dia

90 mm Dia

- The work shall be carried out as per Item Description & instruction of Engineer in charge.
- No extra Payment paid for Dewatering, Excavation, Mud Removing, JCB, Hydra & Crane etc.
- No damage shall be occurred to existing line/structure.
- If any damage occurred, it should be rectified by the contractor at his own cost.
- The connection work shall be put into commission into its original condition after completion of the main work.

The payment shall be made on number basis as per price bid.

Item No.12

Drilling of Horizontal bore hole for water main pipeline under the Railway/Road tracks in all strata with required length including fixing of M S.(or as specified by Railway/Road authority) casing pipe of suitable size and Thickness. Rate includes the cost of Drilling of bore hole Casing pipe & welding pushing etc complete but excluding the cost of water main, valves and other items. Entire work should be as per Approved Drawing and as per instruction of Railway/ Road authority for Following diameter of Bore hole.

Horizontal Drilling -200 & MS Casing Pipe -150 Thick :5

At railways or Road, public highways, at such other crossings as are shown in the construction drawings issued by the company the pipeline shall be installed in MS casing pipes conforming to the specifications given herein.

The casing pipes shall be installed in accordance with the details given in drawing and the casing, bushing and insulators, etc., shall be installed on the carrier pipe as detailed in drawings. Casing pipe size shall be about 100 mm (Hundred millimeters) larger than the carrier pipe to facilitate the insertion of the later without disturbing the casing pipe and to provide adequate drainage, Casing shall be installed with even bearing throughout its length and shall slope towards one end, as specified or desired by the engineer-in-charge. The ends of the casing shall be sealed to outside of carrier pipe in accordance with the details given in drawing.

Before installation, holes for installing vent pipes shall be cut and burrs if any shall be removed. The welding of both carrier pipe and casing pipe shall be done in accordance with the welding specifications, given herein. Before installing the casing pipe, it should be cleaned of all internal obstructions and during installation care should be taken to keep the inside clean.

The section of carrier pipe to be placed in any casing shall be closed at each end, hydrostatically tested preferably with dead weight tester for at least two hours. Only on successful completion of this test, shall the carrier pipe section be inserted in the casing pipe. The installation of casing may open cut as circumstances may permit or require as directed by the engineer-in-charge.

The installation of casing in bended section of the carrier pipe shall be performed by metre bends of the casing pipe provided that the length of each metre cut out of casing pipe shall be such as to provide a clearance of at least 1-1/2" between the inside of the casing pipe and the outside of the coated carrier pipe.

Excavation for casing installation shall be immediately backfilled at the completion of the work with suitable solid matter and packed thoroughly to prevent seepage of water into the excavation.

ROAD, RAILWAY AND IRRIGATION CANAL CROSSINGS:

At road, canal and railway crossings the work shall be performed to the specifications of local authorities or such public bodies as may be in charge (S) of roads, railways and canals to be crossed.

In case, however the minimum requirements of the governing agencies are less than those set out in the drawing or the specifications given herein, then the requirements given in the drawings and the specifications given for encased line shall be followed.

Whereas the casing pipe in the case of encased line to be laid normal by boring, tunneling, engineer-in-charge may at his discretion permit open-cuts to be made for the installation of casing provided, however, that the TENDERER shall procure the necessary permit / license for the same from competent authority. At locations wherein the open cut methods are permitted, the TENDERER shall pass the carrier pipe through the casing located in the trench after the approval of the engineer-in-charge in writing and care shall be exercised to avoid damage to pipe coating and wrapping during this operation. The TENDERER shall produce a certificate in writing from concerned authorities for its satisfactory restoration and payment therefore.

At all crossings the carrier pipe shall be laid straight without bends so that if necessary the pipe at a later date may be replaced without cutting the casing. The carrier pipe shall extend at least 2 meters beyond the end of casing pipe at either end.

At railway crossings the TENDERER shall eliminate unnecessary bending of pipe to conform to the contour of ground by gradually deepening the ditch at such approaches as directed by the engineer-in-charge. Where the installation of the casing has been made by open cut TENDERER shall install suitable temporary bridge work ensuring the safety of the traffic aids and safeguards for protection of the public safety, or he shall provide suitable diversions as desired by the engineer-in-charge.

At all railways pipeline crossings shall be bored with horizontal boring machine.

The method of carrying out a cased crossing by boring for various crossings on this pipeline route shall be jointly inspected by the representative of the COMPANY and TENDERER for each category of work prior to commencement of actual work.

Pipeline under railway track and irrigation canal an applicable portion of the right-of-way shall be encased in accordance with the specification. This item of work shall include, necessary clearing and grading required therefore, trenching to the depths and widths required, welding of casing and carrier pipes, testing, lowering in, installation of vent assemblies, end seals, insulator and all other fittings that may be required, backfilling, clean up, complete restoration to the original condition and further strengthening and protective works as may be required. The work shall be carried out in accordance with the drawings and as directed

by the engineer-in-charge. For various operations mentioned above, the specifications pertaining to these operations shall apply in addition to the specifications given herein.

The TENDERER shall be permitted to use William Sons type Neoprene seals in place of concrete end seals for the crossings. The item shall be procured by the TENDERER himself as per the provisions under the appropriate head of work in case TENDERER so desires. The representative of the COMPANY may also be associated to determine the quality of the material and its delivery schedule from the open market. However, the particular work defined under the proper head shall not be delayed on account of non-availability of Neoprene end seals. In such case, concrete seals may be provided.

On both ends of pushing concrete supports are to be provided as per direction of engineer-in-charge.

MODE OF PAYMENT:

The payment shall be made on Rmt. basis.

Measurement should be done on Rmt. basis and Payment should be made as per payment schedule.

Item No.13

Providing C.C.M.:100 for encasing pipes using trap metal size 12 mm to 50 mm incl. form work curing consolidation etc. complete for various location on pipe line

(A) Using trap metal 20 mm size

The concrete shall consist of one part of ordinary Portland cement conforming to IS 269-1976 Three parts of well graded angular best quality river sand free of dust and organic matter and size 1 mm. To 3 mm and Six parts of approved quality black trap kapachi of size 12 mm to 25 mm. All C.C. work shall be carried out as per I.S.S. regulations and as per standing practice and ordered prevailing in PWD. All the items are to be carried out as per details supplied and as required and directed by the engineer in charge or his authorized agencies. The work will have to be strictly as per approved design and as directed by the engineer in charge.

Aggregate

The course aggregate and the fine aggregate for the concrete shall be hard, clean, tough & durable and shall be free from all deleterious matter such as dust, lump of clay, soft & flaky pieces, shale alkali, organic matter.

The materials shall be got approved by the Engineer-In-Charge or his agent.

Proportion

The proportion of course and fine aggregate shall be that one part of cement, three parts of fine aggregates & Six parts of course aggregates by volume. The proportion of cement & water of the water cement ratio shall be as specified, having regard to the nature of work & strength to be developed.

Mixing

Whether the concrete is mixed by hand or in a mechanical mixture. It shall be thoroughly mixed and the concrete placed in its final position with the minimum of delay. Every piece of aggregate shall be uniformly coated by cement paste.

Laying & Consolidation

The concrete must be laid gently (Not dumped) from height so as not to prevent segregation of aggregates. After placing it shall be well compacted by tampl and/or mortar to cream up. In no case ramming shall be prolonged after the cement has begun to take its initial set. In no case, more water is added in order to reduce the work of completion.

Curing.

As soon as the concrete has set sufficiently the surface shall be protected from rapid drying by being covered with wet sand, wet gunny bags or where possible by foaming shallow pools water on the top. The setting shall be continued for at least 10 days & usually two to three weeks.

Workmanship

Water stops shall be cleaned before placing them in position. Oil or grease shall be removed thoroughly using water and suitable detergents. Water stops shall be procured in long lengths as manufactured to avoid joints as far as possible. Standard L or T type of intersection pieces shall be procured for use depending on their requirement. Any non-standard junctions shall be made by cutting the pieces to profile for jointing. Lapping of water stops shall not be permitted. All jointing shall be of fusion welded type as per manufacturer's instructions. Water stops shall be placed at the correct location/level and suitably supported at intervals with the reinforcement to ensure that it does not deviate from its intended position during concreting and vibrating. Care shall also be taken to ensure that no honey-combing occurs because of the serrations/end grips, by placing concrete with smaller size aggregates in this region. Projecting portions of the water stops embedded in concrete shall be thoroughly cleaned of all mortar/ concrete coating before resuming further concreting operations. The projecting water stop shall also be suitably supported at intervals with the reinforcement to maintain its intended position during concreting so as to ensure that it does not bend leading to formation of pockets. In addition, smaller size aggregates shall be used for concreting in this region also.

Mode of payment

The rate shall be paid per cum. of completed work as per payment schedule.

Item No.-14

**Construction of valves chambers in brick or bela stone masonry, locally available in C. M. 16. Foundation concrete 150 mm thick in C. C. 1:4:8 of trap metal size 25 mm to 40 mm thick, inside cement plaster in C. M. 1:3 and cement pointing outside in C. M. 1:3 and top cover of precast RCC slab 100 mm thick (with key hole in two parts, each with handles or MS Bar etc. complete as given size) Upto 1 Mt. depth from G. L. to pipe invert level incl, complete civil works but exd. cost of excavation and refilling, with cast in situ RCC slab in one single piece with fixing of CI-MH Frame and cover (excl. cost of CI-MH Frame and cover) with 23 mm thick brick masonry wall in CM 1:6
0.90 x 0.90 and 1.00 mt. Depth With Precast Slab in Two Parts 15 mm**

Materials such as Cement, sand, coarse aggregate, bricks, reinforcement, water etc. to be used for this work shall be confirming to specification laid down in material section.

Location

Chamber shall be constructed at places approved by the Employer's Representative.

Where valves are provided for maintenance of the pipeline.

Excavation / P.C.C.

Excavation, shoring, dewatering/ P.C.C. etc. for the pits of chambers, laying of pipes and fittings/specials shall be done in accordance with Employer's Requirements described elsewhere in the document.

Bed Concrete

The bed concrete 150 mm thick for chamber shall be done in C.C. 1:4:8 as directed by the Engineer-in-charge using trap metal of 25 mm to 40 mm.

Bricks

Bricks used for construction of manholes shall conform to the relevant Indian Standards. They shall be sound, hard, and homogeneous in texture, well burnt in kiln without being vitrified, table molded, deep red, cherry or copper coloured, of regular shape and size and shall have sharp and square and parallel faces. The bricks shall be free from pores, chips, flaws or humps of any kind. Bricks containing ungrounded particles, which absorb water more than 1/6th of their weight when soaked in water for twenty-four hours, shall be rejected. Over burnt or under burnt bricks shall be liable to rejection. The bricks shall give a clear ringing sound when struck and shall have a minimum crushing strength of 50 kg/sq.cm. The class and quality requirements of bricks shall be as laid down in IS: 1077.

The size of the brick shall be 23.0 x 11.5 x 7.5 cm. unless otherwise specified; but tolerance up to 3 mm in each direction shall be permitted. Only full size brick shall be used for masonry work. Brick bats shall be used only with the permission of Employer's Representative to make up required wall length or for bonding. Sample bricks shall be submitted to the Employer's Representative for approval and bricks supplied shall conform to approved samples. If required by the Employer's Representative, brick sample shall be tested as per IS: 3495 by Contractor. Bricks rejected by the Employer's Representative shall be removed from the Site within 24 hours.

Cement Mortar

Mortar for masonry shall be as per IS: 2250. Chambers shall be constructed in brick masonry with cement mortar (1:6) unless otherwise specified. Gauge boxes for sand shall be of such dimensions that one bag containing 50 kg. of cement forms one unit. The sand shall be free from clay, shale, loam, alkali and organic matter and shall be of sound, hard, clean and durable particles. Sand shall be as approved by the Employer's Representative. If required by the Employer's Representative sand shall be thoroughly washed till it is free of any contamination.

For preparing cement mortar, the ingredients shall first be mixed thoroughly in dry conditions. Water shall then be added and mixing continued to give a uniform mix of required consistency. Cement mortar shall be used within 25 minutes of mixing. Mortar left unused in the specified period shall be rejected.

The Contractor shall arrange for tests on mortar samples if so required by Employer's Representative. Re-tempering of mortar shall not be permitted.

Brick Masonry

All bricks shall be thoroughly soaked in clean water for at least one hour immediately before being laid. The cement mortar for brick masonry work of Chambers shall be in the proportion specified in drawing. Brick work 230 mm thick and over shall be laid in English Bond unless otherwise specified. 115 mm thick brick work shall be laid with stretchers. For laying bricks, a layer of mortar shall be spread over the full width of suitable length of the lower course. Each brick shall be pressed into the mortar and shoved into final position so as to embed the brick fully in mortar. Bricks shall be laid with frogs uppermost.

All brickwork shall be in plumb and square/ circular unless otherwise shown on drawing and true to dimensions shown. Vertical joints in alternate courses shall come directly one over the other and be in line. Horizontal courses shall be leveled. The thickness of brick courses shall be kept uniform. For walls of thickness greater than 230 mm both faces shall be kept in vertical planes unless otherwise specified. All interconnected brickwork shall be carried out at nearly one level so that there is uniform distribution of pressure on the supporting structure and no portion of the work shall be left more than one course lower than the adjacent work. Where this is not possible, the work shall be raked back according to bond (and not saw toothed) at an angle not exceeding 45 degrees. But in no case the level difference between adjoining walls shall exceed 1.25 M. Workmanship shall conform to IS: 2212.

Brick shall be so laid that all joints are well filled with mortar. The thickness of joints shall not be less than 6 mm and not more than 10 mm. The face joints shall be raked to a minimum depth of 12 mm by raking tools daily during the progress of work when the mortar is still green, so as to provide a proper key for the plastering to be done. When plastering is not required to be done, the joints shall be uniform in thickness and be struck flush and finished at the time of laying. The face of brickwork shall be cleaned daily and all mortar droppings removed. The surface of each course shall be thoroughly cleaned of all dirt before another course is laid on top. If mortar in the lower courses has begun to set, the joints shall be raked out to a depth of 12 mm before another course is laid.

Cement Plaster

All joints in masonry shall be raked to a depth of 12 mm with hooked tool made for the purpose when the mortar is still green and in any case within 48 hours of its laying. The surface to be rendered shall be washed with fresh clean water free from all dirt, loose material, grease etc. and thoroughly wetted for 6 hours before plastering work is commenced. Concrete surfaces to be rendered will however be kept dry. The wall should not be too wet but only damp at the time of plastering. The damping shall be uniform to get uniform bond between the plaster and the wall.

The proportion of the cement mortar shall be as approved on relevant drawings. Cement shall be mixed thoroughly in dry condition and then just enough water added to obtain a workable consistency. The quality of water, sand and cement shall be as per relevant I.S. The mortar thus mixed shall be used immediately and in no case shall the mortar be allowed to remain for more than 25 minutes after mixing with water.

Curing of plaster shall be started as soon as the applied plaster has hardened enough so as not to be damaged. Curing shall be done by continuously applying water in a fine spray and shall be carried out for at least 7 days.

Plastering shall be done on inner face of brick masonry in cement mortar (1:3) and 15 mm thick unless otherwise specified.

Cement pointing in C: M (1:3) shall be done on outside the chamber including racking out joints, curing etc. complete as directed by the engineer-in-charge.

Cement Concrete Block

The C.C. blocks for the chamber shall be constructed in cement concrete of M15 grade to take care of weight of valves.

Pipe Entering or Leaving Chamber

Whenever a pipe enters or leaves a chamber, bricks on edge must be cut to a proper form and laid around the upper end of the pipe so as to form an arch. All around the pipes, there shall be a joint of cement mortar (1:2) 13 mm thick between it and the bricks.

Precast Reinforced Cement Concrete Slab with key holes

Precast Reinforced cement concrete top slab shall be casted in pieces for covering the chamber. Necessary keyholes shall be provided at appropriate place for operation of spindle of valve. The minimum thickness of slab shall be 100mm and same shall be casted in C.C. of M20 grade. The required reinforcement shall be provided. The top & bottom surface of precast slab shall be finished with cement mortar 1:3.

Measurement and Payment

Measurement shall be paid on number basis as per payment schedule.

Sign of Contractor

Executive Engineer
P.H. Dharoi Project Division
MEHSANA