

Rs.6,70,667.15/-Tender ID:

**GUJARAT WATERSUPPLY & SEWERAGE BOARD**  
(A WHOLLY OWNED GOVERNMENT OF GUJARAT UNDERTAKING)



**Name of Work: -** “Providing, supplying, Lowering Laying & Jointing 200 mm Dia Pvc Pipe line Sump to Existing pipeline conn. Of old Sump at Atkot Village Ta.Jasdan Dist.Rajkot Under Rejuvenation Programme.”

Taluka: - Jasdan

District: -Rajkot.

Estimated Cost: - **Rs.6,70,667.15/-****VOLUME – II- B****Technical specifications / Works specifications**

Office of the Executive Engineer,  
II nd floor, “JAL BHAVAN” Near Bishop House,  
Opp. Sarita vihar Society, University Road,  
RAJKOT.

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**Taluka: - Jasdan**

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## **Detailed Specification**

### **Item No 1 :- . Providing & supplying PVC Pipes**

**(with Elastometric Sealing Ring)**

**Providing and supplying in standard length ISI mark rigid unplasticised PVC Pipes suitable for potable water with ring fit 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 department stores and including cost of jointing materialsetc. Complete.**

#### **UNPLASTICIZED PVC PIPES :**

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
- Elastometric 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 / cm<sup>3</sup>.

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.

- In line with BIS 4985-2000 the tolerance on outside diameter of the pipe shall be as under:

Nominal outside Diameter	Min. outside diameter in mm		Outside diameter at any point in mm	
	Minimum	Maximum	Minimum	Maximum
90	90	90.3	88.9	91.1
110	110	110.4	108.6	111.4
140	140	140.5	138.3	141.7
160	160	160.5	158.0	162.0
180	180	180.6	177.8	182.2
200	200	200.6	197.6	202.4
250	250	250.8	247.0	253.0
225	225	225.7	222.3	227.7
280	280	280.9	276.6	283.4
315	315	316	311.2	318.8

- “The pipes shall be transported to the store by flat floored trucks in pre packed wooden crate. The height of crate should not be exceeding more than 2 meters. The both ends of packaging unit (crate) shall be covered with plastic sheet to ensure adequate protection during transport. At the time of packing and stacking of pipes, the sockets shall be alternated within the pipe of pipes and shall project sufficiently for the pipes to be correctly supported along their whole length. The pipes shall rest uniformly on the vehicle bed over their whole length during transport to avoid sagging or deformation.

The packing material like wooden crate, plastic sheet etc. shall be the property of tenderer and he is permitted to reuse the packing material for transporting next batch of pipes”.

- The pressure rating of pipes shall be in accordance with IS 4985 with a maximum continuous working pressure at 27<sup>0</sup> C. of 6 & 10 kg/cm<sup>2</sup>. This working pressure shall be down graded for ambient underground soil temperature of 45<sup>0</sup> C. as per the figure given in IS 4985 for design purposes.
- The pipes when subjected to internal hydrostatic pressure in accordance with IS: 12235-1986 (part – 8) shall not burst during the prescribed test duration. The temperature, duration and test and induced internal stress shall conform to the parameters given below:

Sr. No.	Test	Temp. (°C)	Min. duration (h)	Induced Stress (Mpa)	Requirements
1	Type test	60	1000	10	No failure
2	Acceptance Test	27	1	36	No failure

- The integral socket of the pipe shall be tested for internal hydrostatic pressure in accordance with ISO: 3603 and ISO 1167.
- The UPVC pipe shall not contain vinyl chloride monomer (VCM) exceeding 1 ppm when determined by means of gas phase chromatography using the “headspace” method according to IS: 10151.
- The wall of the socket and the wall of the plain pipe shall not transmit more than 0.2% of visible light falling on them when tested in accordance with IS:12235 (part -3).

The pipes shall be supplied in straight length of 6 mtrs with tolerance of +20mm and -0mm. The effective length of socket pipe shall be considered as shown in figure 2 of IS 4985.

All plastic and non plastic material for components of the UPVC piping system e.g. Elastomeric sealing ring, lubricants, when in permanent or in temporary contact with water which is intended for human consumption, shall not adversely affect the quality of the drinking water.

Concentrations of chemicals, biological agents or other substance leached from pipe materials in contact with drinking water and the values of the relevant physical parameters, shall not exceed the maximum values recommended by IS: 10500.

The pipe material shall be in accordance with IS 4985, clause 6.3.

- The quality control system and sampling model shall be as under:

#### **TEMPERATURE VARIATIONS:**

All the pipes to be manufactured, supplied and delivered shall be subjected to weather conditions like sun, dust, rain, wind as available in State of Gujarat. They shall be also subjected to carry and convey drinking water under variable temperature conditions ranging from 4 C<sup>0</sup> to 45 C<sup>0</sup>.

#### **MARKING :**

The methods of marking all the pipes to be delivered under scope of contract shall ensure that all the information will remain legible even after transportation, storage in open space etc. In general the legible and indelible marking upon the goods shall indicate the followings;

- i) Certification mark on each pipe.
- ii) Manufacturers brand name and/or trademark.
- iii) Purchasers mark as "GWSSB" be inscribed.
- iv) The outside diameter and pressure rating.
- v) Batch number or lot number.
- vi) Inspector's mark on each pipe
- vi) Any other important matter that the manufacturer or purchaser deems fit to be inscribed.

#### **Elastometric sealing ring**

These sealing ring shall be Sturine Butadin in red color as specified in IS. The lubricant applied for jointing of elastomatic rubber ring shall be of good quality and comply the following specifications:**MUST HAVE PASTE LIKE CONSISTENCY AND BE READY FOR USE, PREFERABLY SOAP JELLY.HAS TO ADHERE WET AND DRY SURFACES OF UPVC PIPES AND RUBBER RING.MUST BE NON-TOXIC.MUST BE WATER-SOLUBLE.**

- a) Must non-affecting physio-chemical and organoleptic properties of drinking water carried on the pipe.
- b) Must not have an objectionable odour.
- c) Must not harmful to the skin.

Elastomatic sealing ring shall be in accordance with one of the types (Type - 1 to Type – 6) as per ISS 5382. These sealing rings shall be EPDM rubber ring. The sealing ring shall be with ISI mark.

In case of imported EPDM Ring, such rings shall conform to relevant International Standards or the Standards of country of origin, which are equivalent or higher than the Bureau of Indian Standard Specifications. In case of manufacturers who have applied for getting a BIS certification mark, it would be mandatory for such bidders to produce the BIS certification license on or before the date of opening of the price bids. An undertaking in this regard shall have to be provided along with the technical bid.

The rubber sealing rings shall be vulcanized from Ethylene Propylene (EPDM) with strengths as per table 2 of IS 5382-1985.

**TYPE TEST:**

- a) Type test capacity, test for effect on water, test for resistance to Sulfuric Acid, internal Hydrostatic pressure test for 1000 Hrs. shall be carried out at least once at any time during the contract. Or shall be taken at least once during every six months irrespective of the ordered quantity.
- b) The said type test shall be taken by the GWSSB's representative or third party inspection agency at the in-house laboratory of the manufacturer

**COLOR OF PIPES:**

- The color of the pipes shall be as per IS 4985-2000.
- The pipes shall bear ISI mark confirming to IS:4985-2000 or its latest amendment/revision if any.

**TEST FOR PVC RESIN & PIPE:****Test For PVC Resin**

It shall be sufficient to show the certificate of chemical test (in accordance with IS 4669) to the inspecting authority to confirm the 'K' value to be 64 to 67 as per clause No. 6.1.2. of IS 4985-2000

**Specific Gravity and Ash Content Tests:****a) Density:**

These tests shall be carried out by the inspection agency as per the IS:4985-2000 OR its latest revision OR amendments. The value shall be between 1.40 and 1.46 as per the ISS clause No. 10.6

**b) Sulphate Ash content:**

When tested as per Annex B, of IS 4985-2000, the sulphated ash content in the pipe shall not exceed 10 percent.

**c) Other test shall be carried out as per ISS 4985-2000 or its latest revision or amendment****TOLERANCE IN WEIGHT OF PIPES:**

(-) 1% tolerance in actual weight of pipes shall be allowed but in overall weight there should not be any minus tolerance i.e. minus tolerance may be compensated in overall weight. If the tolerance is in minus, the consignment shall be outright rejected. The weight of pipes as given in Appendix-I shall be considered. If required the consignee can weight the whole lot of supply for verification.

**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 unplasticized ring fit type PVC pipes are as per IS 4985-2000.

The bidder shall have to arrange for random testing of pipes brought on site, in CIPET in the presence of GWSSB's representative and on satisfactory report from the CIPET the payment of pipes will be made.

**METHOD OF MEASUREMENT OF PIPES:**

The measurement shall be recorded in running meter of pipe length laid along center line or axis of pipe line including tees, enlarges, reducers and bends correct up to 0.01M. length. No payment shall be made for overlaps etc. The payment shall be paid after completion of whole item as mentioned in price bid on Running Meter basis and 10% shall be withheld for satisfactory hydraulic testing".

**Mode of measurement and payments**

**Payment will be as per payment schedule**

**Lowering laying, jointing PVC pipes and specials of following class and diameter including cost of conveyance from store to site of works including cost of labour, material, giving satisfactory hydraulic testing as per ISI code etc. complete. This item includes,**

- 1) Murrum bedding from selected excavated stuff 20 cm thick &**
- 2) Including job connection with existing line**

- 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 through out 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.

### **THE SCOPE FOR THE ITEM COVER**

Cost of additional excavation required for jointing clearing the site of all scrubs, bushes, and trees and dewatering where necessary.

Labour for laying pipes in trenches to correct alignment at required depth with tools, including cutting of pipes and specials if required for laying of pipes including connecting pipes to specials and appurtenances. Cost of the scaffolding, tools and plants, ropes etc.

Protection of existing works from damage and cost of repair to the damages carried out to the existing structure, sewer line telephone/electricity cables, electric cables, electric lines, gas pipe line, irrigation pipe line etc.

The pipe laying across the state highways, national highways etc. will have to be done either through open cut method or through push through method depending upon the requirement to be prescribed by the sanctioning authority. However, mostly it would be push through method.

**GWSSB will not be able to provide water for testing of the pipelines & water containers of the project. This shall have to be managed by the contractor at his cost and risk.**

Labour for making joints including jointing material for joints, tools as well as tests. Testing of pipes for leakage under water pressure and flushing the pipes after testing and construction work shall have to be arranged by the contractor at his own cost.

**METHOD OF MEASUREMENT OF PIPES:**

The measurement shall be recorded in running meter of pipe length laid along center line or axis of pipe line including tees, enlarges, reducers and bends correct up to 0.01M. length. No payment shall be made for overlaps etc. The payment shall be paid after completion of whole item as mentioned in price bid on Running Meter basis.

**Mode of measurement and payments**

Payment will be as per payment schedule

**TESTING OF WATER PIPES:**

After each section of the pipeline has been completed it shall be tested for water tightness before being covered. The contractor shall at his own cost fill up water in pipe line and given necessary hydraulic test section by section and the pipe line shall stand the pressure which shall stand the pressure which shall exceed the working pressure by (a) 50% of the highest pressure in the section. (b) 30m whichever is less without showing any leakage or sweating any where in the pipes joints specials valves etc. if any defect are found the contractor shall be made good the same at his own cost.

Any leaking joints shall be made good and above test pressure in to be lowered gradually after satisfactory test is & over.

GWSSB will not be able to provide water for testing of the pipelines & water containers of the project. This shall have to be managed by the contractor at his costs and risk.

The hydraulic test shall be given again if considered necessary by the Executive Engineer or his representative to show that no further leakages or sweating is there. The contractor shall have to make necessary arrangements for water testing as well as plugging the opened of pipes etc. as directed without claiming any extra cost. The pipelines shall be kept filled with water for a work lines shall be kept filled with water for a week or till it is situated for testing is done.

If the pipe lines are laid in detached sanctioned & not in continuous length due to any reasons such as non availability of specials or due to obstacle etc. The contractor shall see that no end of pipes length is kept open-ends are immediately covered up either by suitable blank flange or cap slug or by means of double layer gunny bags clothes tied properly by mild steel wire without any claim for extra-cost.

The pipe laying across the state highways, national highways etc. will have to be done either through open cut method or through push through method depending upon the requirement to be prescribed by the sanctioning authority. However, mostly it would be push through method.

**Mode of measurement and payments**

Payment will be as per payment schedule

**Item No 2 :- . EXCAVATION FOR PIPE LINE TRENCHES**



**Excavation for pipe line trenches including all safety provision using site rails and stacking excavated stuff up to a lead of 90 mts. cleaning the site etc. complete for lift and strata as specified. Up to 1.50 mt depth.**

- a) In all sorts of soil and soft murrum
- b) In hard murrum, boulders including macadam road
- c) In soft rock, Masonry C:M or L:M
- d) In Hard rock, or C:C in 1:2:4 or RCC including blasting or / chiseling

## **1.0 GENERAL**

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

### **2.0 CLEARING OF SITES:**

**2.1** 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.

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

**2.3** 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.

**2.4** 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 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**

**4.1** 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 earth cover over the pipe shall be 1.0 mt. for all

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:**

**5.1** Shoring & strutting and dewatering if required shall have to be carried out by the contractor, for which any extra charge will not be paid

**5.2** 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**

**6.1** The trenches shall be strongly fenced and red light signal shall be kept at night and arrangement of watchman to prevent accidents should be done, sufficient care protective measure shall be taken to see that the excavation shall not affect or damage the adjoining structure. The contractor shall be entirely responsible for any injury to life and damage to the properties etc. Necessary protection work such as guide ropes, crossing places, barricades, caution boards etc. shall be provided by the contractor.

**7.0** The excavation in all sorts of soil, hard murram, 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**

**8.1** 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**

**9.1.1** 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 testing 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.

**9.2** The contractor shall break the road surface by excavation chiseling to the exact width and length as shown on the drawing or as directed by the Engineer-in-charge.

The excavated stuff shall be deposited in uniform layers to avoid mixing with other kind of materials at non-objectionable place or as directed by the Engineer-in-charge.

#### **10.0 MEASUREMENT AND PAYMENT**

**10.1** The payment of excavation shall not be made separately of this item as pipe line work item is a consolidate item which includes excavation.

**10.2 Minimum pipe trench Dimension shall be strictly followed as under.**

<b>P.V.C PIPE,</b>			
Dia in mm	Length in Mtr.	Width of Trench	Depth of Trench
110 MM	654	0.60	1

**10.3** This item of excavation shall include unless and otherwise mentioned.

- (a) Clearing of site
- (b) Setting out work including all materials and labour.
- (c) Providing and subsequently removing, shoring and strutting outing slopes etc.
- (d) Excavation and removal and staking of all excavated stuff as directed.
- (e) Necessary protection including labour materials equipment etc. to ensure safety and protection against risk or accident.
- (f) Providing facilities for inspection and damage to property if caused during progress of work.
- (g) Compensation for injury to life and damage to property if caused during progress of work.
- (h) Restoring of water supply connections, sewer connections, telephone lines, khalkuva soapiest etc. if damaged by contractor without extra payment.
- (i) Dewatering of excavated pit trench during the progress of work.
- (j) Clearing the site on completion of works directed by the Engineer.

The pressure rating of pipes shall be in accordance with IS 4985 with a maximum continuous working pressure at 27<sup>0</sup> C. of 6 & 10 kg/cm<sup>2</sup>. This working pressure shall be down graded for ambient underground soil temperature of 45<sup>0</sup> C. as per the figure given in IS 4985 for design purposes.

- The pipes when subjected to internal hydrostatic pressure in accordance with IS: 12235-1986 (part – 8) shall not burst during the prescribed test duration. The temperature, duration and test and induced internal stress shall conform to the parameters given below:

Sr. No.	Test	Temp. (°C)	Min. duration (h)	Induced Stress (Mpa)	Requirements
1	Type test	60	1000	10	No failure
2	Acceptance Test	27	1	36	No failure

### **3. SLUICE VALVES**

#### **a) SUPPLY**

Providing and supplying ISI mark CI D/F Sluice valves , butterfly valves, Reflux valves & Air valve of following class and diameter including all taxes, insurance, transportation, freight charges, octroi, inspection charges, loading, unloading, conveyance to departmental stores, stacking etc. complete. and Lowering, laying and jointing in position following C.I.,D.F Reflux valves, Butterfly valves, and Sluice valves & Air valve including cost of all labour, jointing material, including nut bolts and giving satisfactory hydraulic testing, etc. complete.

350 to 600 mm dia Butter fly valve

80 to 300 mm dia Sluice valve

#### **3.1 SLUICE VALVE**

Sluice valve as per I.S: 780 & 2906/1984 or its latest revision.

#### **1.0 GENERAL**

The contractor shall be covering manufacturing, supplying and delivery of: Sluice valve conforming to IS: 2906-1984 & IS: 780-1984 or its latest revision (Specification for sluice valves (50 to 900 mm size) with ISI certification

#### **2.0 STANDARDS**

The C.I. sluice valves to be manufactured, supplied and delivered under the scope of this contract shall be manufactured in accordance with and conforming to Indian standard specifications as given below: with ISI certification mark on each sluice valves.

#### **3.0 TEMPERATURE VARIATION**

All sluice valves manufactured, supplied and delivered shall be subjected to drinking water under variable temperature condition ranging from 4<sup>0</sup> to 45<sup>0</sup> C.

#### **4.0 MARKING**

The legible and in deniable marking upon each valve shall indicate the following:

- (1) ISI certification mark on each sluice valve only.
- (2) Manufacture's brand name and/or trade mark.
- (3) Size of valve and nominal pressure of valve.
- (4) Serial number of cast.
- (5) Serial number in punch
- (6) Where a valve has been tested for only open and test, it should be marked '0' distinctly and permanently.

Any other important matter that the manufacturer deems fit to be inscribed embossed.

#### **5.0 TEST CERTIFICATE**

5.1 The contractor shall always provide manufacture's test certificate in accordance with every batch/ lot as valves so manufactured and supplied.

5.2 The contractor shall also produce, in addition to manufacture's test certificate the inspection certificate issued by the authorized person /agency appointed by Engineer/board for the same purpose. The inspection charges of the authorized person/agency as fixed by G.W.S.S.B shall have to be borne by the contractor and the necessary payment to the inspecting agency shall be paid by the contractor as per the terms and condition of G.W.S.S.B.

## 6.0 NOMINAL PRESSURE

6.1 Sluice valves shall be designed by nominal pressure (PN) defined as the maximum permissible gauge working pressure in Mpa as "PN-II" ( Mpa= 10 kgf/m<sup>2</sup> approx)

6.2 The nominal size shall refer to the nominal bore at any point, shall not be less than the nominal size required.

## 7.0 MATERIAL:

7.1 The materials for the different component parts of the sluice valve shall confirm to requirements given in Table

Materials for components parts of sluice valve

Sr. No	Component	Material	Ref.to	Grade of designation
1	Body, bonnet wedge stuffing box, gland thrust plate, cap.	Grey cast iron	210-FG 1978(1)	
2	Steam	High tensile brass	320-1962(2)	Ally 1 of 2
3	Wedge nut	Leaded tin bronze	318-1962(3)	2
4	Body seat ring, wedge facing ring	Leaded tin bronze	318-1962(3)	2
5	Bolts	Carbon steel	1367-1967(4)	Class 4.6
6	Nuts	Carbon steel	1367-1967(4)	Class 4
7	Bonnet gasket	Compressed fiber Board	2712-1971(5)	C
8	Gland packing	Jute & hemp	5414-1969(6)	--

- (1) Specification for grey iron castings (third revision).
- (2) Specification for high tensile brass rods and sections (revised).
- (3) Specification for leaded tin bronze ingots and casting (revised).
- (4) Specification for technical supply condition threaded fasteners (first revision)
- (5) Specification for compressed asbestos fiber jointing (first revision)
- (6) Specification for gland packing, jute and hemp.

## 8.0 MANUFACTURE

Sluice valve bodies for 80 mm to 900 mm size valves shall be provided with double flanged ends connection.

## 9.0 FLANGES

The flanges and their dimensions of drilling shall be in accordance with part IV and VI of I.S. 1538 (Part I to XXII) 1976 (Specification for cast Iron fittings for pressure pipes for water gas and sewage) or its latest revision.

#### **10.0 MODE OF MEASUREMENT AND PAYMENT**

Measurement shall be paid on number basis as per relevant dia of the item as per payment schedule.

### **Item No 4 :- LOWERING LAYING & JOINTING PVC PIPELINE**

**Lowering laying, jointing PVC pipes and specials of following class and diameter including cost of conveyance from store to site of works including cost of labour, material, giving satisfactory hydraulic testing as per ISI code etc. complete. This item includes,**

**Including job connection with existing line**

**110 mm dia. PVC 6 kg/cm<sup>2</sup> pipeline**

- 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 through out 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

#### **THE SCOPE FOR THE ITEM COVER**

Cost of additional excavation required for jointing clearing the site of all scrubs, bushes, and trees and dewatering where necessary.

Labour for laying pipes in trenches to correct alignment at required depth with tools, including cutting of pipes and specials if required for laying of pipes including connecting pipes to specials and appurtenances. Cost of the scaffolding, tools and plants, ropes etc.

Protection of existing works from damage and cost of repair to the damages carried out to the existing structure, sewer line telephone/electricity cables, electric cables, electric lines, gas pipe line, irrigation pipe line etc.

The pipe laying across the state highways, national highways etc. will have to be done either through open cut method or through push through method depending upon the requirement to be prescribed by the sanctioning authority. However, mostly it would be push through method.

**GWSSB will not be able to provide water for testing of the pipelines & water containers of the project. This shall have to be managed by the contractor at his cost and risk.**

Labour for making joints including jointing material for joints, tools as well as tests. Testing of pipes for leakage under water pressure and flushing the pipes after testing and construction work shall have to be arranged by the contractor at his own cost.

**METHOD OF MEASUREMENT OF PIPES:**

The measurement shall be recorded in running meter of pipe length laid along center line or axis of pipe line including tees, enlarges, reducers and bends correct up to 0.01M. length. No payment shall be made for overlaps etc. The payment shall be paid after completion of whole item as mentioned in price bid on Running Meter basis.

**Mode of measurement and payments**

Payment will be as per payment schedule

**TESTING OF WATER PIPES:**

After each section of the pipeline has been completed it shall be tested for water tightness before being covered. The contractor shall at his own cost fill up water in pipe line and given necessary hydraulic test section by section and the pipe line shall stand the pressure which shall stand the pressure which shall exceed the working pressure by (a) 50% of the highest pressure in the section. (b) 30m whichever is less without showing any leakage or sweating any where in the pipes joints specials valves etc. if any defect are found the contractor shall be made good the same at his own cost.

Any leaking joints shall be made good and above test pressure in to be lowered gradually after satisfactory test is & over.

GWSSB will not be able to provide water for testing of the pipelines & water containers of the project. This shall have to be managed by the contractor at his costs and risk.

The hydraulic test shall be given again if considered necessary by the Executive Engineer or his representative to show that no further leakages or sweating is there. The contractor shall have to make necessary arrangements for water testing as well as plugging the opened of pipes etc. as directed without claiming any extra cost. The pipelines shall be kept filled with water for a work lines shall be kept filled with water for a week or till it is situated for testing is done.

If the pipe lines are laid in detached sanctioned & not in continuous length due to any reasons such as non availability of specials or due to obstacle etc. The contractor shall see that no end of pipes length is kept open-ends are immediately covered up either by suitable blank flange or cap slug or by means of double layer gunny bags clothes tied properly by mild steel wire without any claim for extra-cost.

The pipe laying across the state highways, national highways etc. will have to be done either through open cut method or through push through method depending upon the requirement to be prescribed by the sanctioning authority. However, mostly it would be push through method.

**Mode of measurement and payments**

Payment will be as per payment schedule

**Item No. 5****Lowering, laying and jointing of Valves Sluice valves, Butterfly valves, and Air valves**

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 (Rate for all class of valves)

**[A] SLUICE VALVES, BUTTERFLY VALVES, REFLUX VALVE, SCOUR VALVE****1.0 SUPPLY OF MATERIAL**

- 1.1 Cast iron double-flanged sluice valve/butterfly valves with two tailpieces suitable to pipe shall be supplied and carted by the contractor as per latest IS. The rate shall include loading, unloading and stacking at site.
- 1.2 The sluice valve/butterfly valves and tailpieces shall be examined before laying for cracks and other flows. They shall be undamaged in all respect.
- 1.3 The sluice valves/butterfly valves shall be operated before laying.
- 1.4 All grits and foreign materials shall be removed from the inside of the valves before placing.
- 1.5 All the four faces shall be thoroughly cleaned and coated with a thin layer of mineral grease.
- 1.6 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, C.I. tailpiece 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 approved from the engineer-in-charge before use
- 2.4 The nut and bolts shall conform to specification of materials.
- 2.5 The rubber packing shall conform all specifications as narrated in 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 tailpieces 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 tailpiece 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 After installation of sluice valve/butterfly valve the same is tested to 1 1/2 times of its test pressure.
- 4.2 The joints sluice valve/butterfly valve shall withstand the test pressure of pipelines.
- 4.3 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.

## Item No. 6

### Concrete Encasing

**Providing C.C.M -100 for encasing using trap metal size 12 mm to 50 mm including Form work, curing, consolidation etc. comp.**

- 1) Specification for Encasing of Pipe is as under:
- 2) "Encasing of pipe shall be carried out in cement concrete M-100 using trap metal as per instructions of the engineer in charge. Materials and workmanship shall be as per specification of concrete.
- 3) Payment shall be made of Cum. basis.
- 4) The payment shall be made as per the Cubic meter of Cement Concrete Executed.

## Item No. 7

### Refilling:

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

This item include labour charges required for refilling the pipe line trenches, ramming, watering, consolidating in each 20 cm thick layer.

The surplus stuff shall be dispose as per instruction of Engineer-in charge within radius of 3.0 km.

The deficit quantity of earth in case of rain or other circumstances shall be brought by contractor with out any extra cost.

**The payment of refilling shall not be made separately of this item as pipe line work item is a consolidate item which includes refilling.**

**Deputy Executive Engineer  
P.H.S. Sub Division  
Jasdan.**