आज़ादी का अमृत महोत्सव

कार्यालय प्रमुख अभियंता
लोक स्वास्थ्य यांत्रिकी विभाग
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(An ISO 9001:2015 Certified Office)

क्रमांक 09 /स्था./राज./प्र.अ./लोस्वायॉवि/2022 भोपाल, दिनांक 07/01/22

षष्ठम संशोधन आदेश

तकनीकी समिति की 34वीं बैठक दिनांक 23.12.2021 में लिये गये निर्णय के अनुक्रम में लोक स्वास्थ्य यांत्रिकी विभाग के अंतर्गत जल प्रदाय एवं अन्य संबंधित कार्यों हेतु दिनांक 03.07.2018 से प्रभावशील एकीकृत दर अनुसूची (यूएसओआर) के निम्न चैप्टर/आयटम को संलग्नानुसार पुर्नस्थापित/संशोधित किया जाता है :–

1. चैप्टर IX को पुर्नस्थापित किया जाता है।
2. चैप्टर XVII में क्रमांक 17.38 को संशोधित किया जाता है एवं एक नवीन आयटम क्रमांक 17.48 जोडा जाता है।
3. चैप्टर XIX के आयटम क्रमांक 19.1 से 19.8 को संशोधित किया जाता है।
4. चैप्टर XX के आयटम क्रमांक 20.1 को संशोधित किया जाता है।
5. चैप्टर XXIV के आयटम क्रमांक 24.20.105, 24.20.106, 24.20.105 (ए), 24.20.106(ए) के विवरण में त्रुटि के संबंध में स्पष्टता दी जाती है कि इस आयटम में पंप के अधिकतम Head + 5 metres के बराबर की Flat-Cable शामिल है एवं तदानुसार आयटम में उल्लेखित कर स्पष्ट किया जाता है।

यह संशोधन आज दिनांक से जारी होने वाली समस्त निविदाओं पर लागू होगा। यह आदेश उन निविदाओं पर लागू नहीं होगा जिनकी online submission की समय–सीमा आदेश जारी होने की दिनांक के पूर्व समाप्त हो चुकी है।

संलग्न :– उपरोक्तानुसार।

7.1.2022

(के. के. सोनगरिया)
प्रमुख अभियंता

पृष्ठा. क्रमांक 182/स्था./राज./प्र.अ./लोस्वायॉवि/2021 भोपाल, दिनांक 07/01/2022

प्रतिलिपि :–

1. निज सचिव, माननीय राज्यमंत्रीजी, लोक स्वास्थ्य यांत्रिकी विभाग, भोपाल।
2. अपर मुख्य सचिव, म.प्र. शासन, लोक स्वास्थ्य यांत्रिकी विभाग, मंत्रालय भोपाल।
3. प्रबंध संचालक, म.प्र. जल निगम मर्यादित, विंध्याचल भवन, भोपाल।
4. प्रमुख अभियंता, जल संसाधन विभाग, भोपाल।
5. प्रमुख अभियंता, लोक निर्माण विभाग, भोपाल।
6. प्रमुख अभियंता, नगरीय प्रशासन एवं विकास विभाग, भोपाल।
7. प्रमुख अभियंता, ग्रामीण यांत्रिकी सेवा, भोपाल।
8. समस्त मुख्य अभियंता, लोक स्वास्थ्य यांत्रिकी विभाग, समस्त परिक्षेत्र मध्यप्रदेश।
9. समस्त अधीक्षण यंत्री, लोक स्वास्थ्य यांत्रिकी विभाग, समस्त मण्डल मध्यप्रदेश।
10. समस्त कार्यपालन यंत्री, लोक स्वास्थ्य यांत्रिकी विभाग, समस्त खण्ड मध्यप्रदेश।
11. आदेश नस्ती।

7-1-2022

प्रमुख अभियंता

Government of Madhya Pradesh

Public Health Engineering Department

6th AMENDMENT
OF
UNIFIED SCHEDULE OF RATES (USOR)
w.e.f. 03.07.2018
FOR WATER SUPPLY, SEWERAGE AND ALLIED WORKS

(Issued vide order no. 9 dt 07/01/2022)

Issued by

Engineer-In-Chief
Public Health Engineering Department
Madhya Pradesh, Bhopal

CHAPTER-IX

POLYETHYLENE PIPE, FITTINGS & SPECIALS

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POLYETHYLENE PIPE, FITTINGS & SPECIALS

Applicable Codes

The manufacturing, testing, supplying, laying, jointing and testing at work sites of PE pipes shall comply with IS: 4984-2016 all currently applicable statutes, regulations, standards and amendments and others as follows-

Code no.	Title / Specification
IS 4984:2016	High Density Polyethylene Pipes renamed as PE (Polyethylene Pipes) for Water Supply
IS 2530	Methods of test for polyethylene molding materials and polyethylene compounds GRP Pipes, Joints and Fittings for use for Potable Water Supply
IS 4905	Methods for random sampling
IS 7328	High density polyethylene materials for molding and extrusion
IS 9845	Method of analysis for the determination of specific and/or overall migration of constituents of plastics material and articles intended to come into contact with foodstuffs
IS 10141	Positive list of constituents of polyethylene in contact with food stuffs, pharmaceuticals and drinking water.
IS 10146	Polyethylene for its safe use in contact with foodstuff, Pharmaceuticals and drinking water.
Other Reference Code	
IS 5382	Rubber sealing rings for gas mains, water mains and sewers.
IS 7634	Plastics pipes selection, handling, storage and installation for potable water supplies -Code of practice **part 2 laying and jointing of polyethylene (PE) pipes.**
ISO 4427-1:2019	Plastics piping systems for water supply, and for drainage and sewerage under pressure- Polyethylene -Part 1: General & Part 2: Pipes
ISO 4427- 2:2019	
BS EN 1553 Part 3 or **ISO 8085 Part 3**	Polyethylene fittings for use with polyethylene pipes for the supply of gaseous fuels - Metric series – Specifications - Part 3: Electro fusion fittings
BS EN 12201-Part-3	Plastics piping systems for water supply- Polyethylene (PE) -Part 3: Fittings
ISO 4422-4	Pipes and fittings made of plasticized poly(Vinyl chloride) (PVC-U) for water supply -Specifications -Part 4: Valves and ancillary equipment
IS 8008 Part-1 to 9	Moulded Fitting: Injection moulded/machined High Density Polyethylene (HDPE) fittings for potable Water supplies.
IS:8360 part-1 & Part- 3	Fabricated Fitting: Specification for fabricated high density polyethylene (HDPE) fittings for potable water supplies
ISO 14236	Plastics pipes and fittings — Mechanical-joint compression fittings for use with polyethylene pressure pipes in water supply systems

PART-A- POLYETHYLENE PIPE as per IS 4984:2016

Notes :

1 Raw Material

a) Resin used to manufacture the PE pipe shall be 100% virgin. The Material Classification and Conformity to IS 4984-2016, (Table-2) shall be provided by **the** raw material (resin) manufacturer with documentation duly certified by resin manufacturer.

b) The resin should have been certified an independent laboratory of international repute like Bodycote/Slevan/Advantica for having passed 10000 hour long term hydrostatic strengths (LHTS) test extrapolated to 50 years to show that the resin has minimum MRS of over 10MPa. There should not be any brittle knee at 80 ^{0}C before 5000 hours. Internal certificate of any resin manufacturer will not be acceptable.

c) Certificate from reputed organization or Raw material supplier for having passed the full scale rapid crack propagation test as oer ISO 13478, High density poly ethylene (HDPE) used for manufturing of pipe shall conform to designation PEEWA-50-T-003 of IS 7328. HDPE pipe conforming to designation PEEWA-50-T-003 of IS; 7328 may also be used. Melt Flow rate (MFR) of the specific base density material shall also conform to clause of IS: 7328.

d) The resin/ material shall be compounded with Carbon black. The Carbon black content in the material shall be within 2.5 ± 05% and the dispersion of carbon black shall be satisfactory.

2 Colour

The colour of the PE pipe shall be black.

The colour of the PE pipe shall be black with blue identification stripes for the purpose of identification of the pipes covered in this standard.

Identification Stripes: Each black pipe with shall contain minimum three longitudinal stripes of width 3 mm (Min) in blue colour, circumferentially distributed. These stripes shall be co-extruded during pipe manufacturing and shall not preferably be more than 0.2 mm in depth for wall thickness up to 10mm and 0.5mm beyond 10 mm. The material of the stripes shall be of the same type as used in the base compound for the pipe.

3 Length of straight Pipe & Coiling pipe.

a) Straight Pipe: The Length of straight pipe used shall be **more** than 6 m or as agreed by Engineer-in –charge. Short length of 3 meter (minimum) up to a maximum of 10% of the total supply may be permitted. Pipe beyond 110mm dia shall be supplied in straight length not less than **6m.**

b) Coiling: The pipes supplied in coils shall be coiled on drums of minimum diameter of 18 times the nominal diameter of the pipe ensuring that kinking of pipe is prevented.

4. Marking of pipe / Coil.

Each straight length of pipe shall be clearly marked in indelible ink/paint on either end and for coil at both ends or hot embossed on white base every meter throughout the length of pipe/coil with the following information:

(a) Manufacturer's name/Trade-mark,
(b) Material Designation.
(c) Pressure rating
(d) Standard Dimension Ratio (SDR)
(e) Outside diameter
(f) Lot No./Batch No. containing information of date of manufacture
(g) BIS certification marking on each pipe.

5. Anti-oxidant

The percentage of anti-oxidant used shall not be more than 0.3 percent by mass of finished resin. The anti-oxidant used shall be physiologically harm less and shall be selected from the list given in IS: 10141

6. Reworked Material

No addition of Reworked/ Recycled Material from the manufacturer's own rework material resulting from the manufacture of pipes is permissible and the vendor is required to use only 100% virgin resin /Material.

7. Dimension & Maximum Ovality of Pipe

The outside diameter of pipes, tolerance on the same and ovality of pipe shall be as given in Table 3 and Standard Dimension Ratio (SDR) and corresponding wall Thickness (e) of Pipe shall be as given in Table 4 as per IS 4984 :2016 (Clause 7.4).

8. Visual Appearance

The internal and external surfaces of the pipes shall be smooth, clean and free from grooving and other defects. The ends of pipes shall be cleanly cut squarewith axis of the pipes to within the tolerances given and free from deformity. Slight shallow longitudinal grooves or irregularities in the wall thickness shall be permissible provided that the wall thickness remains within the permissible limits.

9. Performance Requirements: The Pipe shall meet the requirement of IS 4984:2016 for tests like, Internal Pressure Creep Rupture test for pipe- Acceptance & Type Test, Internal Pressure Creep Rupture test- for Pipe Joint, Longitudinal Reversion test , Carbon Black Content & Dispersion , Melt flow rate test, Oxygen Induction Time, Overall migration , Density, Tensile Butt Fusion, Elongation at break & Slow Crack Propagation Rate etc.

10. Standard Quality Assurance Plan(QAP) is enclosed as Annexure-A for TPI by recommended agency or department at factory.

PART-B- PE PIPE (Blue Colour)) as Per ISO 4427:2019

The PE Blue colour pipe (formerly known as MDPE pipe) conforming to ISO 4427:2019(Part 1 & Part 2) manufactured from virgin resin PE 80 Food grade compounded Raw Material having Blue colour only for **PN16(with relevant SDR as per standard)** & quality assurance certificate

from quality agencies as approved by department. Please refer **Annexure-B & Annexure-C** for details of requirement to be maintained by manufacturer, Quality Assurance Plan(QAP) and testing to be performed at factory by the TPI or department.

PART-C- OTHER REQUIREMENTS

1. **Handling, Transportation storage and Lowering of pipes.**
   - If transportation of PE pipes from a distance greater than 300km than pipes shall be received only when bare coils of pipe have been wrapped with Hessian cloth.
   - The truck for transportation of the PE pipes shall be exclusively used for PE pipes only with no other material loaded-especially no metallic, glass and woodenitems. The truck shall not have sharp edges that can damage the pipe.
   - At the time of opening coils it must be remembered that the coils are under tension and must be open in control manner
   - Straight length should be stored on horizontal racks giving continuous support.
   - Loss/damages during transit, handling, storage will be to the contractor's account.

2. **a) Fittings and Specials**:

   All PE fittings/specials shall be fabricated or injection moulded at factory as per IS: 8360 (Part-I & Part-III) and as per IS: 8008 (Part-I to Part-IX). Fittings will be butt welded on the pipes or other fittings by use of heat fusion.

   All PE fittings/ specials shall be of minimum PN 6 or above Pressure class, fabricated in accordance with IS: 8360 (Part I & III). PE Injection molded fittings shall be as per IS: 8008 (Part I to IX). All fittings/specials shall be fabricated or molded at factory only. No fabrication or molding will be allowed at site, unless specifically permitted by the Engineer-in-Charge.

   Fittings will be welded on to the pipes or other fittings by use of Electro- fusion process. Recommended makes for PE / Compression fittings / specials are Kimplas, Georg-Fischer, Glynwed, Trustlene, Astore, Magnum and GPS.

   b) Bends

   PE bends shall be plain square ended conforming to IS: 8360 Part I & III Specifications. Bends shall be molded.

   c) Tee

   PE Tees shall be plain square ended conforming to IS: 8360 Part I & II Specifications. Tees may be equal tees or reduced take off tees. Tees shall be molded.

   d) Reducers

   PE Reducers shall be plain square ended conforming to IS: 8008 Part I & VII Specifications. Reducer must be molded.

   e) Flanged PE Pipe Ends

PE Stub ends shall be square ended conforming to IS: 8008 Part I & VI Specifications. Stub ends will be welded on the pipe. Flange will be of slip on flange type.

3. Electro Fusion Tapping Saddle, Branch Saddle & Electro Fusion fittings:

a. All the Electro fusion fittings should be manufactured with top quality virgin pre-compounded PE 100 resin which should be compatible with the distribution mains.

b. The products shall comply with the requirements of EN 12201-3, EN 1555-3 or ISO 8085-3.

c. All the fittings shall be of SDR 11 rating.

d. The fittings shall have the approval from any three Agencies like KIWA, DVGW, WRC-NSF, U.K. CIPET etc.

e. All the products shall be manufactured by injection molding using virgin compounded PE 100 polymer having a melt flow rate between 0.2- 1.4 grams/10 minutes and shall be compatible for fusing on PE 100 distribution mains manufactured according to the relevant national or international standards. The polymer used should comply with the requirements of EN 12201 -1.

f. Process voltage of all saddles must not exceed a maximum of 40 volts.

4. Compression Fitting-

Compression fitting used for House service connection should comply as per ISO 14236 with Threaded metal inserts –SS 304 with BSP Threads

Pressure Testing-

The Pressure rating of compression fittings should be as per clause 8 of ISO 14236 which shall be PN 16

Dimensions-

The Dimension of compression fittings shall be as per clause 7.1of ISO 14236 Performed.

- Leak tightness under internal pressure.
- Leak tightness under internal Vacuum.
- Long term Pressure Test for Leak tightness for assembled joint
- MRS Value as per ISO 9080
- Resistance to Internal Pressure.
- Effects on Quality of Water-

The Compression fitting for intended for conveyance of Potable water for Human consumption to be tested to comply with BS 6920 specifications in any of the laboratories like DVGW/ KIWA/ SPGN/ WRC –NSF/CIPET and certificate of compliance to be produced for the following parameters:

a. Odour & Flavour of Water.
b. Appearance of Water.
c. Growth of Micro Organism.
d. Extraction of Metals.
e. All fittings with threaded ends should be with BSP threads.

5. **Test to Establish Perfectibility/portability of work**

Specimen of pipe shall be tested to establish the suitability for use in carryingpotable water

i. Smell of the extract
ii. Clarity of the colour of the extract
iii. Acidity and Alkality
iv. Global migration UV absorbing material Heavy metals
v. Unreacted monomers (styrene) and biological tests

6. **Hydraulic Test after laying.**

After laying the pipe hydraulic test shall be done to conform the quality of work and material. There should not be any signs of localized swelling, leakage or weeping.

7. Laying of pipes and fittings/specials includes all precautions to guard against possible damaged to the existing structure/pipes lines, cables etc., taking precautions to prevent dirt from entering the pipe ends, lowering and laying pipes and specials in the trenches with specials arrangement such as cranes, tripods with chain pulley block, use of slings of canvas etc. to fit the ends of pipes and fittings/ specials to lift and lower the same. Inspection of pipes and fittings for defects by striking with a light hammer while suspended. Laying of pipes perfectlytrue in alignment and to gradient etc.

8. Providing and supply of PE pipes (blue colour) house services connections with necessary Electro Fusion & Compression fittings are also given. PE pipes (blue colour) conforming to ISO 4427:2019 with quality assurance certificates from WRAS/CIPET etc, are used. Electro Fusion & compression fittings are to be used as per ISO norms as given in the relevant items.

9. **Measurement**

a) The net length of fixed pipe shall be measured in running meters correct to 10mm. The portion of the pipe inside the joints shall not be included in the length of pipe work, Specials shall be excluded and measured and paid separatelyunder the relevant item.

b) PE Pipes & Fitting are designated by Outer diameter.

10. **This USOR contains the rates of all the items without GST. GST shall be paid separately as per prevailing norms as claimed by the contractor in his bill. All the estimates based on this USOR will include GST as an extra amount as per prevailing rates on the sum of the estimate to arrive at the gross amount.**

11. **The Cost of Third Party Inspection at factory is included in the rates of items.**

POLYETHYLENE PIPE, FITTINGS & SPECIALS

S.No.	Items	Unit	Rates in Rs.		
9.1	**Providing, Laying, Jointing & field testing of PE pipes made from 100% virgin material (Earlier know as High Density Polyethylene pipes, PE 100) confirming to IS 4984/ 14151/ 12786/ 13488 with necessary jointing material like mechanical connector of jointing pipes by heating to the ends of pipes with the help of Teflon coated electric mirror/ heater to the required temperature and then mechanically pressing the ends together against each other, to form a monolithic & leak proof joint by thermosetting process. It may be required to be done with Jack/ Hydraulic Jacks/ Butt fusion machine. (50 mm & above fusion jointed & below 50mm mechanical jointed)**				
	Pressure ⟶		**6Kg/ sq.cm :**	**8Kg/ sq.cm :**	**10 Kg/ sq.cm:**
	63 mm dia	R. mtr.	113.00	139.00	173.00
	75 mm dia	R. mtr.	160.00	197.00	244.00
	90 mm dia	R. mtr.	228.00	281.00	350.00
	110 mm dia	R. mtr.	366.00	421.00	515.00
	125 mm dia	R. mtr.	441.00	535.00	656.00
	140 mm dia	R. mtr.	554.00	673.00	821.00
	160 mm dia	R. mtr.	724.00	882.00	1075.00
	180 mm dia	R. mtr.	910.00	1106.00	1361.00
	200 mm dia	R. mtr.	1128.00	1368.00	1674.00
	225 mm dia	R. mtr.	1426.00	1729.00	2126.00
	250 mm dia	R. mtr.	1759.00	2128.00	2612.00
	280 mm dia	R. mtr.	2194.00	2675.00	3282.00
	315 mm dia	R. mtr.	2768.00	3390.00	4150.00
9.2	**Providing and laying including testing Bend 90° confirming to IS specifications.**				
	Pressure ⟶		**6Kg/ sq.cm :**	**8Kg/ sq.cm :**	**10 Kg/ sq.cm:**
	63 mm dia	Each	82.00	88.00	124.00
	75 mm dia	Each	126.00	130.00	158.00
	90 mm dia	Each	196.00	212.00	253.00
	110 mm dia	Each	260.00	304.00	343.00
	125 mm dia	Each	371.00	448.00	569.00
	140 mm dia	Each	506.00	629.00	777.00
	160 mm dia	Each	709.00	907.00	1129.00
	180 mm dia	Each	996.00	1262.00	1581.00

S.No.	Items	Unit	Rates in Rs.		
	200 mm dia	Each	1337.00	1699.00	2137.00
9.3	**Providing and laying including testing Bend 45° confirming to IS specification.**				
	Pressure ⟶		**6Kg/ sq.cm :**	**8Kg/ sq.cm :**	**10 Kg/ sq.cm:**
	63 mm dia	Each	95.00	95.00	126.00
	75 mm dia	Each	142.00	143.00	191.00
	90 mm dia	Each	206.00	209.00	283.00
	110 mm dia	Each	307.00	355.00	449.00
	125 mm dia	Each	424.00	515.00	653.00
	140 mm dia	Each	623.00	724.00	933.00
	160 mm dia	Each	878.00	1100.00	1339.00
	180 mm dia	Each	1208.00	1336.00	1835.00
	200 mm dia	Each	1594.00	1724.00	2433.00
9.4	**Providing and laying including testing Equal Tee confirming to IS specification**				
	Pressure ⟶		**6Kg/ sq.cm : PN 6**	**8Kg/ sq.cm : PN 8**	**10Kg/ sq.cm: PN 10**
	63 mm dia	Each	101.00	112.00	125.00
	75 mm dia	Each	165.00	172.00	214.00
	90 mm dia	Each	295.00	304.00	366.00
	110 mm dia	Each	432.00	448.00	527.00
	125 mm dia	Each	474.00	595.00	705.00
	140 mm dia	Each	652.00	814.00	965.00
	160 mm dia	Each	920.00	1183.00	1410.00
	180 mm dia	Each	1301.00	1652.00	1983.00
	200 mm dia	Each	1755.00	2237.00	2691.00
9.5	**Providing and laying including testing Pipe end confirming to IS specification.**				
	Pressure ⟶		**6Kg/ sq.cm : PN 6**	**8Kg/ sq.cm : PN 8**	**10Kg/ sq.cm: PN 10**
	63 mm dia	Each	73.00	75.00	78.00
	75 mm dia	Each	93.00	101.00	102.00
	90 mm dia	Each	136.00	154.00	154.00
	110 mm dia	Each	172.00	205.00	206.00
	125 mm dia	Each	266.00	302.00	302.00
	140 mm dia	Each	337.00	382.00	382.00
	160 mm dia	Each	335.00	401.00	401.00
	180 mm dia	Each	526.00	602.00	603.00
	200 mm dia	Each	562.00	623.00	644.00

S.No.	Items	Unit	Rates in Rs.		
9.6	**Providing and laying including testing Reducer: confirming to IS specifications.**				
	Pressure ⟶		**6Kg/sq. cm : PN 6**	**8Kg/sq.cm : PN 8**	**10Kg/sq.cm: PN 10**
	63X50 mm dia	Each	90.00	91.00	95.00
	75X63 mm dia	Each	113.00	116.00	123.00
	90X75 mm dia	Each	123.00	131.00	137.00
	110X90 mm dia	Each	125.00	151.00	162.00
	125X110 mm dia	Each	130.00	174.00	179.00
	140X125 mm dia	Each	155.00	192.00	198.00
	160X140 mm dia	Each	198.00	251.00	279.00
	180X160 mm dia	Each	237.00	320.00	356.00
	200X180 mm dia	Each	273.00	374.00	398.00
9.7	**Providing butt fusion welded joint/joining by heating to the ends with the help of Teflon coated electric mirror/heater ends together etc. by thermosetting processes to PE100 Pipe and specials. (6 kg. 8 kg. 10 kg.) (50 mm & above fusion jointed & below 50 mm mechanical jointed) including testing**				
	63 mm dia	Each	105.00		
	75 mm dia	Each	132.00		
	90 mm dia	Each	146.00		
	110 mm dia	Each	161.00		
	125 mm dia	Each	194.00		
	140 mm dia	Each	206.00		
	160 mm dia	Each	223.00		
	180 mm dia	Each	235.00		
	200 mm dia	Each	250.00		
9.8	**Providing and laying including testing End Cap confirming to IS specifications.**				
	Pressure ⟶		**6Kg/ sq.cm :**	**8Kg/ sq.cm :**	**10 Kg/ sq.cm:**
	63 mm dia	Each	74.00	75.00	80.00
	75 mm dia	Each	91.00	96.00	101.00
	90 mm dia	Each	103.00	106.00	112.00

S.No.	Items	Unit	Rates in Rs.		
	110 mm dia	Each	108.00	109.00	115.00
	125 mm dia	Each	129.00	178.00	182.00
	140 mm dia	Each	187.00	212.00	218.00
	160 mm dia	Each	217.00	309.00	321.00
	180 mm dia	Each	318.00	371.00	387.00
	200 mm dia	Each	380.00	444.00	463.00
9.9	**Providing and Supplying Blue MDPE pipes conforming to ISO 4427:1996 manufactured from virgin resin PE 80 Food grade compounded Raw Material having Blue Colour only with quality assurance certificate from quality agencies like WRC/CIPET (India)/ DVGM /KIWA /SPGN etc. for usage in Drinking Water System The cost shall include testing of all materials, Inspection charges, transportation up to site, transit insurance, loading, unloading, stacking etc. complete.**				
	PN 16 (SDR 9)				
	20 mm dia	R. mtr	36.00		
	25 mm dia	R. mtr	50.00		
	32 mm dia	R. mtr	83.00		
	40 mm dia	R. mtr	108.00		
	50 mm dia	R. mtr	164.00		
9.10	**Providing & Supply of Electro Fusion Tapping Ferrule (Branch Tapping Saddle) female BSP Threaded with SS 304 insert fittings in accordance with BS EN 12201 : Part-3 suitable for drinking water with in black/ blue colour manufactured from compounded PE80/PE100 pipes, in pressure rating SDR 11 with min PN 12.5 rated . The cost such as testing, inspection charges, transportation up to site, transit insurance, loading, unloading, stacking etc. complete.**				
9.10.1	**Electo Fusion Tapping Ferrule Saddle**				
9.10.1	63x15mm	Each	999.00		
9.10.2	63x20mm	Each	999.00		
9.10.3	63x25mm	Each	999.00		
9.10.4	75x15mm	Each	999.00		

S.No.	Items	Unit	Rates in Rs.
9.10.5	75x20mm	Each	999.00
9.10.6	75x25mm	Each	999.00
9.10.7	90x15mm	Each	999.00
9.10.8	90x20mm	Each	999.00
9.10.9	90x25mm	Each	999.00
9.10.10	90x32mm	Each	1296.00
9.10.11	90X40mm	Each	1296.00
9.10.12	90X50mm	Each	1296.00
9.10.13	110X15mm	Each	999.00
9.10.14	110X20mm	Each	999.00
9.10.15	110X25mm	Each	999.00
9.10.16	110X32mm	Each	1296.00
9.10.17	110x40mm	Each	1296.00
9.10.18	110x50mm	Each	1296.00
9.10.19	160x15mm	Each	999.00
9.10.20	160x20mm	Each	999.00
9.10.21	160x25mm	Each	999.00
9.10.22	160x32mm	Each	1416.00
9.10.23	160x40mm	Each	1416.00
9.10.24	160x50mm	Each	1416.00
9.10.25	200x15mm	Each	1410.00
9.10.26	200x20mm	Each	1410.00
9.10.27	200x25mm	Each	1410.00
9.10.28	200x32mm	Each	2040.00
9.10.29	200x40mm	Each	2040.00
9.10.30	200x50mm	Each	2040.00
9.11	**Providing & Supply of Compression fitting, PN 16 rated in conformation to ISO: 14236-2000 and shall be tested as per ISO: 3459, ISO: 3501 & ISO: 3503, suitable for drinking water & approved by WRAS, UKI KIWA etc., in food grade polypropylene and shall be inclusive of all cost such as testing, inspection charges, transportation up to site, transit insurance, loading, unloading, stacking etc. complete.**		
9.11.1.1	**Compression Fittings Metal inserted Compression Female**		

S.No.	Items	Unit	Rates in Rs.
	Threaded Adaptor with SS 304 Material		
9.11.1.1	20x15mm	Each	170.00
9.11.1.2	25x20mm	Each	220.00
9.11.1.3	32x25mm	Each	300.00
9.11.1.4	40x32mm	Each	510.00
9.11.1.5	50x40mm	Each	660.00
9.11.1.6	63x50mm	Each	900.00
9.11..2	**Metal inserted Compression Male Threaded Adaptor with SS 304 Material**		
9.11.2.1	20x15mm	Each	170.00
9.10.2.2	25X20mm	Each	220.00
9.11.2.3	32X25mm	Each	300.00
9.11.2.4	40X32mm	Each	510.00
9.11.2.5	50x40mm	Each	660.00
9.11.2.6	63x50mm	Each	900.00
9.11.3	**Compression 90° Elbow threaded male off take in Metal**		
9.11.3.1	20x15mm	Each	180.00
9.11.3.2	25X20mm	Each	240.00
9.11.3.3	32X25mm	Each	330.00
9.11.3.4	40X32mm	Each	1150.00
9.11.3.5	50x40mm	Each	1500.00
9.11.3.6	63x50mm	Each	2200.00
9.11.4	**Compression 90° Elbow threaded Female off take in Metal**		
9.11.4.1	20x15mm	Each	180.00
9.11.4.2	25X20mm	Each	240.00
9.11.4.3	32X25mm	Each	330.00
9.11.4.4	40X32mm	Each	1150.00
9.11.4.5	50x40mm	Each	1500.00
9.11.4.6	63x50mm	Each	2200.00
9.11.5	**Compression 90° Elbow**		
9.11.5.1	20mm	Each	110.00
9.11.5.2	25mm	Each	150.00
9.11.5.3	32mm	Each	195.00
9.11.5.4	40mm	Each	390.00

S.No.	Items	Unit	Rates in Rs.
9.11.5.5	50mm	Each	554.00
9.11.5.6	63mm	Each	751.00
9.12	**Providing & Supply of PVC Ball Valves in PN16 rating with one end compression using Blue color compression nut in polypropylene material & other end with female threads conforming to ISO:4422-4, certified from WRAS UK/KIWA etc. suitable for food products & drinking water, female threads in accordance with ISO:7/BS/:21/IS: 554 and shall be inclusive of all cost such as testing, inspection charges, transportation up to site, transit insurance, loading, unloading, stacking etc. complete.**		
	PVC Ball Valve with Compression & Female Threads.		
9.12.1	20x15mm	Each	175.00
9.12.2	25X20mm	Each	227.00
9.12.3	32X25mm	Each	256.00
9.12.4	40X32mm	Each	550.00
9.12.5	50x40mm	Each	737.00
9.12.6	63x50mm	Each	1133.00
9.13	**Providing & Supplying of Clamp Saddle (DI Strap Saddle) for House Service connections from metal pipe water distribution mains shall be of fastened strap type with threaded outlet for service connection. Clamp Saddle shall be suitable for nominal size of distribution mains pipe line. The strap shall be elastomer coated (insulated) type for firm grip on pipe as well as to protect the coating on the pipe and to insulate the unidentical metals. The saddle shall be single strap type up to pipe sizes of NB 600 and service outlet 15mm, 20mm & 25mm. Fasteners shall be of threaded nut bolt washer type. The sealing between the saddle and mains shall be obtained by using a profiled elastomer seal matching to the curvature of the pipe. The seal shall be of elastomer type,**		

S.No.	Items	Unit	Rates in Rs.
	suitable for all potable water application. The material of construction of the body, straps, fasteners etc. shall be of non-corrosive material such as engineering plastic (PE/PP) or stainless steel or a combination of both. and shall be inclusive of all cost such as testing, inspection charges, transportation up to site, transit insurance, loading, unloading, stacking etc. complete.		
9.13.1	80 NB x 15mm, 20mm, 25mm	Each	1000.00
9.13.2	100 NB x 15mm, 20mm, 25mm	Each	1100.00
9.13.3	150 NB x 15mm, 20mm, 25mm	Each	1300.00
9.13.4	200 NB x 15mm, 20mm, 25mm	Each	1500.00
9.13.5	250 NB x 15mm, 20mm, 25mm	Each	1700.00
9.13.6	300 NB x 15mm, 20mm, 25mm	Each	1900.00
9.14	**Providing & Supply of Electro Fusion Fittings in accordance with BS EN 12201 : Part-3 suitable for drinking water with in black/blue color manufactured from compounded PE80/PE100 virgin polymer and compatible with PE80/PE100 pipes, in pressure rated SDR 11 with min PN 12.5 rated for water application and shall be inclusive of all cost such as testing, inspection charges, transportation up to site, transit insurance, loading, unloading, stacking etc. complete.**		
9.14.1	**Electro Fusion Coupler**		
9.14.1.1	20mm	Each	100.00
9.14.1.2	25mm	Each	100.00
9.14.1.3	32mm	Each	100.00
9.14.1.4	40mm	Each	185.00
9.14.1.5	50mm	Each	229.00
9.14.1.6	63mm	Each	247.00
9.14.1.7	75mm	Each	444.00
9.14.1.8	90mm	Each	476.00
9.14.1.9	110mm	Each	678.00
9.10.1.10	125mm	Each	689.00
9.14.1.11	140mm	Each	1478.00

S.No.	Items	Unit	Rates in Rs.
9.14.1.12	160mm	Each	1620.00
9.14.1.13	180mm	Each	2419.00
9.14.1.14	200mm	Each	3158.00
9.14.1.15	225mm	Each	3749.00
9.14.1.16	250mm	Each	4568.00
9.14.1.17	280mm	Each	9153.00
9.14.1.18	315mm	Each	9186.00
9.14.2	**Electro Fusion Equal Tee**		
9.14.2.1	20mm	Each	250.00
9.14.2.2	25mm	Each	250.00
9.14.2.3	32mm	Each	250.00
9.14.2.4	40mm	Each	848.00
9.14.2.5	50mm	Each	942.00
9.14.2.6	63mm	Each	1050.00
9.14.2.7	75mm	Each	1400.00
9.14.2.8	90mm	Each	1740.00
9.14.2.9	110mm	Each	2100.00
9.14.2.10	125mm	Each	2600.00
9.14.2.11	140mm	Each	5892.00
9.14.2.12	160mm	Each	8600.00
9.14.2.13	180mm	Each	11000.00
9.14.2.14	200mm	Each	13000.00
9.14.2.15	225mm	Each	19000.00
9.14.2.16	250mm	Each	21000.00
9.14.2.17	280mm	Each	23000.00
9.14.3	**Electro Fusion Elbow 90°**		
9.14.6.3.1	20mm	Each	190.00
9.14.3.2	25mm	Each	190.00
9.14.3.3	32mm	Each	190.00
9.14.3.4	40mm	Each	500.00
9.14.3.5	50mm	Each	500.00
9.14.3.6	63mm	Each	500.00
9.14.3.7	75mm	Each	1100.00
9.14.3.8	90mm	Each	1500.00
9.14.3.9	110mm	Each	2000.00

S.No.	Items	Unit	Rates in Rs.
9.14.3.10	125mm	Each	2400.00
9.14.3.11	140mm	Each	5100.00
9.14.3.12	160mm	Each	6600.00
9.14.3.13	180mm	Each	8500.00
9.14.3.14	200mm	Each	16000.00
9.14.3.15	225mm	Each	18000.00
9.14.3.16	250mm	Each	20000.00
9.14.3.17	280mm	Each	22000.00
9.14.3.18	315mm	Each	25000.00
9.16.4	**Electro Fusion Reducer**		
9.14.4.1	25x20mm	Each	200.00
9.14.4.2	32x20mm	Each	200.00
9.14.4.3	32x25mm	Each	200.00
9.14.4.4	40x32mm	Each	670.00
9.14.4.5	50x32mm	Each	840.00
9.14.4.6	50x40mm	Each	928.00
9.14.4.7	63x32mm	Each	990.00
9.14.4.8	63x40mm	Each	1001.00
9.14.4.9	63x50mm	Each	1160.00
9.14.4.10	90x63mm	Each	1641.00
9.14.4.11	90x75mm	Each	2100.00
9.14.4.12	110x75mm	Each	2650.00
9.14.4.13	110x90mm	Each	3020.00
9.14.4.14	125x90mm	Each	3820.00
9.14.4.15	125x110mm	Each	3820.00
9.14.4.16	140x90mm	Each	4200.00
9.14.4.17	140x110mm	Each	4200.00
9.14.4.18	140x125mm	Each	4200.00
9.14.4.19	160x110mm	Each	5500.00
9.14.4.20	160x125mm	Each	5500.00
9.14.4.21	160x140mm	Each	5500.00
9.14.4.22	180x125mm	Each	6200.00
9.14.4.23	180x140mm	Each	6200.00
9.14.4.24	180x160mm	Each	6200.00
9.14.4.25	200x160mm	Each	7400.00
9.14.4.26	200x180mm	Each	7400.00

S.No.	Items	Unit	Rates in Rs.
9.14.4.27	225x160mm	Each	9000.00
9.14.4.28	225x180mm	Each	9000.00
9.14.4.29	225x200mm	Each	9000.00
9.14.4.30	250x160mm	Each	11000.00
9.14.4.31	250x200mm	Each	11000.00
9.14.4.32	250x225mm	Each	11000.00
9.14.5	**Electro Fusion End Cap**		
9.14.5.1	20mm	Each	152.00
9.14.5.2	25mm	Each	152.00
9.14.5.3	32mm	Each	152.00
9.14.5..4	40mm	Each	330.00
9.14.5.5	50mm	Each	400.00
9.14.5.6	63mm	Each	580.00
9.14.5.7	75mm	Each	870.00
9.14.5.8	90mm	Each	1100.00
9.14.5.9	110mm	Each	1400.00
9.14.5.10	125mm	Each	1700.00
9.14.5.11	140mm	Each	2500.00
9.14.5.12	160mm	Each	3600.00
9.14.5.13	180mm	Each	4400.00
9.14.5.14	200mm	Each	5200.00
9.14.5.15	225mm	Each	8500.00
9.14.5.16	250mm	Each	10000.00
9.14.5.17	280mm	Each	11000.00
9.14.5.18	315mm	Each	12000.00
9.14.6	**Spigot Long Neck Pipe End (Stub End) for Electro Fusion Joint**		
9.14.6.1	63mm	Each	358.00
9.14.6.2	75mm	Each	403.00
9.14.6.3	90mm	Each	505.00
9.14.6.4	110mm	Each	770.00
9.14.6.5	125mm	Each	1213.00
9.14.6.6	140mm	Each	1380.00
9.14.6.7	160mm	Each	1975.00
9.14.6.8	180mm	Each	2663.00
9.14.6.9	200mm	Each	3130.00

S.No.	Items	Unit	Rates in Rs.
9.14.6.10	225mm	Each	3755.00
9.14.6.11	250mm	Each	4313.00
9.14.6.12	280mm	Each	4828.00
9.14.6.13	315mm	Each	6275.00

S.No.	Items	Unit	Rates in Rs.		
9.15	**Providing and supplying of HDPE pipes in 300/500/600 mtr. coils or in lengths, Grade PE 100, conforming to IS 4984-2016 at store or at site.**				
	Pressure -		**6kg/sq. cm**	**8kg/sq. cm.**	**10kg/sq. cm.**
	40mm dia	R. mtr.	48.00	61.00	75.00
	50mm dia	R. mtr.	75.00	94.00	115.00

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Anneuxre-A

Polyethylene Pipe for Water Supply as per IS 4984 : 2016 (With Latest Amendment)
Standard Quality Assurance Plan (QAP) of PE pipes chepter-IX of MPPHED USOR-2018, w.e.f 03.07.2018
(Attached with 6th Ammendment of USOR issued vide EinC, MPPHED order No. 9 dated 07/01/2022)

Sr. No	Clause No.	Name of Test	Type / Method of Check	Test Method	Unit	Extent of Check / Sampling Plan as per IS 4984:2016	Acceptance Norms / Specified Requirements	Documentation / Records	Inspection by		Remarks
									M	TPI / C Or Both	
1	2	3	4	5	6	7	8	9	10	11	12
A	**Raw Material conforming to IS 4984 : 2016 with latest amendment**										
i)	**Raw Material Inspection**										
1	5.1	MATERIAL	Verification & Review of Documents	IS 10146-2003	--	--	Pipe manufacturer shall obtain a certificate to this effect from the manufacturer raw material (as per IS 4984-2016 , clause 5.1 General)	RMTC	R	R	
2	5.2 (Table2)	Density of Raw Material (Base) 27°C		IS:7328-2020 (Cl.- 5.6.2)	Kg/m^3	--	Should be 930 to 960	RMTC	R	R	
3		Melt Flow Rate 190°C/ 5 kg load		IS:2530-1963	gm/10 min	--	0.20 - 1.10	RMTC	R	R	
4		Volatile Matter		IS 4984 – 2016 Annexure C	mg/kg	--	≤ 350	RMTC	R	R	
5		Water Content		IS 4984 – 2016 Annexure D	mg/kg	--	≤ 300	RMTC	R	R	
6		Thermal Stability (OIT)		IS 4984 – 2016 AnnexureB	Minute	--	≥ 20	RMTC	R	R	
ii)	**Carbon Black Master Batch**										
1	5.3	Carbon Black Master Batch (A test report or confirmative certificate may be obtained from the carbon black master batch manufacturer)						RMTC	R	R	
2	a	Mixture of Carbon Black Master Batch – Polyethylene which may include co-polymers of ethylene and higher olefin, in which the higher olefin constituent does not exceed 10 percent (Mass/mass) and density of 910 – 950 kg/m^3							R	R	
3	b	The Constituents used should be from the positive list of Constituents of PE, in contract with food stuff, Pharmaceutical and drinking water as per IS 10141 and should not constitute a toxic hazard, shall not support microbial growth and shall not give rise to an unpleasant taste or odour, cloudiness or discoloration of the water.							R	R	
4	c	Loading of Carbon Black %	Verification & Review of Documents	IS 2530 -63	%	--	Should not exceed 50		R	R	
5	d	Ash Content		ISO 3451 – Pt 1	%	--	< 0.1		R	R	

iii)	Anti-Oxidant										
1	5.4	Anti-Oxidant	Verification & Review of Documents	IS:10141-1982	%	Shall not more than 0.3	IS 4984 : 2016		R	R	
Sr. No	**Clause No.**	**Name of Test**	**Type / Method of Check**	**Test Method**	**Unit**	**Extent of Check / Sampling Plan as per IS 4984:2016**	**Acceptance Norms / Specified Requirements**	**Documentation / Records**	**Inspection by**		**Remarks**
									M	**TPI / C Or Both**	
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
B	**FINISHED PIPE INSPECTION**										
i)	**Acceptance Test (Clause 9.2 , Table 8)**										
1	6.2	Colour	Visual	IS 4984:2016	--	Clause no. 9.2.3 (9.2.3.1 & 9.2.3.3) Table 9	Shall be black with blue identification strip	MTC	P	W	
2	6.2.1	Dimension of stripes									
		No. Of Blue Strip	Visual	IS 4984:2016	No.	Clause no. 9.2.3 (9.2.3.1 & 9.2.3.3) Table 9	Shall be Min. of three longitudinal stripes of minimum width of 3 mm in blue color, circumferentially distributed.	MTC	P	W	
		Width of stripes	Measurement		mm			MTC		W	
		Depth of stripes	Measurement		mm		Shall not preferably be more than 0.2 mm in depth for wall thickness up to 10 mm and 0.5 mm beyond 10 mm	MTC	P	W	
3	7.1	A. Visual appearance	Visual	IS 4984:2016	--	Clause no. 9.2.3 (9.2.3.1 & 9.2.3.3) Table 9	The internal and external surfaces of pipe shall be smooth, clean and free from grooving and other defects. The ends shall be cleanly cut and shall be square with axis of the pipe to within the tolerance given below and free from deformity. Slight shallow longitudinal grooves or irregularities in the wall thickness shall be permissible, provided that the wall thickness remains within the permissible limits.	MTC	P	W	
		B. Maximum out of square of pipe end	Measurement	IS 4984:2016	mm		As per tolerance limit given in clause no. 7.1	MTC	P	W	

Sr. No	Clause No.	Name of Test	Type / Method of Check	Test Method	Unit	Extent of Check / Sampling Plan as per IS 4984:2016	Acceptance Norms / Specified Requirements	Documentation / Records	Inspection by		Remarks
									M	TPI / C Or Both	
1	2	3	4	5	6	7	8	9	10	11	12
4	7.2	Length	Measurement	IS 4984:2016	--	Clause no. 9.2.3 (9.2.3.1 & 9.2.3.3) Table 9	The length of straight pipe shall be 5m to 20m as agreed to between the manufacturer and purchaser. Short lengths of 3 m (minimum) up to the maximum of 10 percent of the total supply may be permitted.	MTC	P	W	
5	7.3	Coiling	Measurement		--	Clause no. 9.2.3 (9.2.3.1 & 9.2.3.3) Table 9	The pipes shall be coiled such that localized deformation, for example buckling and kinking is prevented. The minimum internal diameter of the coil shall not be less than 18 d_n.	MTC	P	W	The lengths of the coiled pipes shall as agreed between the manufacturer and purchaser
6	7.4 Table -3	Dimension of pipe									
a		Outside diameter									
		Minimum	Measurement	IS 4984:2016	mm	Clause no. 9.2.3 (9.2.3.1 & 9.2.3.3) Table 9	As specified in the standard	MTC	P	W	
		Maximum									
		Max Out of roundness (Ovality)									
b	7.4 Table-4	Wall thickness									
		Minimum	Measurement	IS 4984:2016	mm	Clause no. 9.2.3 (9.2.3.1 & 9.2.3.3) Table 9	As specified in the standard	MTC	P	W	
		Maximum	Measurement								

Sr. No	Clause No.	Name of Test	Type / Method of Check	Test Method	Unit	Extent of Check / Sampling Plan as per IS 4984:2016	Acceptance Norms / Specified Requirements	Documentation / Records	Inspection by		Remarks
									M	TPI / C Or Both	
1	2	3	4	5	6	7	8	9	10	11	12
7	8.1.1	**Acceptance test** at (as per material classification/ grade) induced hoop stress for 48 hours at 80^0 C Test Pressure:	Measurement	IS 4984:2016 Annex-E	--	Clause no. 9.2 Table 8 / clause No. 9.2.2 Table 10 / Clause no. 9.2.2 and 9.2.4	Pipe shall show no sign of localized swelling, leakage or weeping and shall not burst during the prescribed test duration.	MTC	P	W	
8	8.1.2	Internal Pressure creep rupture test of pipe joints at (as per material classification / grade) induced hoop stress for 48 hours at 80^0 C Test Pressure:	Measurement	IS 4984:2016 Annex-E	--		The pipe joint under test shall show no signs of localized swelling, leakage or weeping and shall not burst during the prescribed test period.	MTC	P	W	
9	8.2	Longitudinal Reversion test	Measurement	IS 4984:2016 Annex-F	%		Shall not be greater than 3 %	MTC	P	W	
10	8.3	Carbon Black Content	Measurement	IS 2530:1963	%		Shall be within 2.5 ± 0.5 %	MTC	P	W	
		Carbon Black Dispersion			--		Shall be satisfactory	MTC	P	W	
11	8.4	Melt flow rate	Measurement	IS 2530:1963	g/10 min		Shall be between 0.2 to 1.1 g/10min.	MTC	P	W	
		Deviation			%		Shall not differ by more than 30% of the MFR of the material used in manufacturing of pipe (Nominal value: g/10 min)				
12	8.5	Oxidation Induction Time	Measurement	IS 4984:2016 Annex-B	minute		Shall be not less than 20 minute.	MTC	P	W	
13	8.7	Density at 27ºC (Base material)	Measurement	IS 7328:1992	kg/m^3		Shall be between 930.0 to 960.0	MTC	P	W	

Sr. No	Clause No.	Name of Test	Type / Method of Check	Test Method	Unit	Extent of Check / Sampling Plan as per IS 4984:2016	Acceptance Norms / Specified Requirements	Documentation / Records	Inspection by		Remarks
									M	TPI / C Or Both	
1	2	3	4	5	6	7	8	9	10	11	12
14	8.9 (Table 6)	Elongation at break	Measurement	IS 4984:2016 Annex-H	%	Clause no. 9.2 Table 8 / clause No. 9.2.2 Table 10 / Clause no. 9.2.2 and 9.2.4	≥ 350 %	MTC	P	W	
ii)	**Type Test (Clause no. 9.1 , Table – 7)**										
15	**8.0 Table- 5**	**Hydraulic characteristics**									
	8.1.1	Internal Pressure creep rupture test of pipe									
		i) **Type test** at (as per material classification / grade) induced hoop stress for 100 hours at 27^0 C Test Pressure:	Visual	IS 4984:2016 Annex-E	--	Clause no. 9.1 Table 7 / Clause 9.1.2	Pipe shall show no sign of localized swelling, leakage or weeping and shall not burst during the prescribed test duration.	MTC	*	R	
		ii) **Type test** at (as per material classification/ grade) induced hoop stress for 165 hours at 80^0 C Test Pressure:	Visual	IS 4984:2016 Annex-E	--		Pipe shall show no sign of localized swelling, leakage or weeping and shall not burst during the prescribed test duration.	MTC	*	R	
		iii) **Type test** at (as per material classification/ grade) induced hoop stress for 1000 hours at 80^0 C Test Pressure:	Visual	IS 4984:2016 Annex-E	--		Pipe shall show no sign of localized swelling, leakage or weeping and shall not burst during the prescribed test duration.	MTC	*	R	
16	8.6	Overall migration test	Measurement	IS 9845:1998	mg/Liter mg/dm^2		60 (max) 10 (max)	MTC	*	R	

Sr. No	Clause No.	Name of Test	Type / Method of Check	Test Method	Unit	Extent of Check / Sampling Plan as per IS 4984:2016	Acceptance Norms / Specified Requirements	Documentation / Records	Inspection by		Remarks
									M	TPI / C Or Both	
1	2	3	4	5	6	7	8	9	10	11	12
17	8.8	Tensile strength for butt-fusion	Visual	IS 4984:2016 Annex-G	--	Clause no. 9.1 Table 7 / Clause 9.1.2	Shall be ductile failure. If the sample shows brittle fail the test may be considered as a failure. Sample preferably 110 mm Dia/SDR 11 or if not manufacture then higher size/ SDR ratio.	MTC	*	R	
18	8.10	Slow Crack Growth Rate for 500 hrs. at 80^{0}C. internal test pressure.	Visual	IS 4984:2016 Annex- E & J	--		Pipe shall show no sign of localized swelling, leakage or weeping and shall not burst during the prescribed test period. (Test Specimen prepared from pipe size are preferably 110 mm and SDR 11)	MTC	*	R	

LEGENDS:

RMTC - RAW MATERIAL TEST CERTIFICATE
TPI - THIRD PARTY INSPECTION AGENCY WHICH SHALL BE APPRVED BY PHED
C - CUSTOMER (PHED)
R - REVIEW

M TC - MANUFACTURER TEST CERTIFICATE
M - MANUFACTURER
P - PERFORM
W - WITNESS

*** Manufacturer should submit the latest Test Report from NABL Accredited Laboratory as per standard requirement.**

NOTE: -

1. The measuring Instruments & Test Equipment's shall be calibrated periodically through NABL accredited laboratory & put up to TPI/PHED for verification.
2. All pipes of same size and pressure rating in single consignment shall constitute a lot.
3. All specification should be as per contract agreement/relevant IS code / uSOR of department.
4. Sampling criteria as per respective standard / test method.
5. Marking as applicable as per IS 4984 – 2016 (with latest amendment) & department requirements.

(Part of 6th Ammendment of USOR issued vide EinC, MPPHED order No. 9 dated 07/01/2022)

ANNEXURE-B

Public Health Engineering Department

QUALITY ASSURANCE PLAN

(Only for PE pipe- Blue Colour (MDPE pipe) and fitting Products manufacture according of ISO 4427 upto date ammended)

Standared Quality assurance plan (QAP) for PE Blue colour pipe chapter No- IX of MP PHED USOR with w.e.f 03 July 2018 (Attached with 6th Ammendment of USOR issued vide EnC, MPPHED order No. 9 dated 07/01/2022)

S. No.	Stages	Characterlstics	Samples to check	Reference Document	Frequency	Acceptance Criteria	Format of Records	Inspection by		Remarks
								M	TPI/C or both	
1	Inspection of Raw Meterial	Base Denslty	Clause-4.4.1and Table-1 ISO:4427,1183,7328	ISO11832/ASTM D1505	Accoding to ISO-1183-2	930 to 960 kg/m3	RMTC	P	R	
2		Melt Flow Rate	Clause-4.4.1and Table-1 ISO:4427:1183	ISO1133-2005/ASTM D-1238	Accoding to ISO-1183-2	0.2 to 1.40gm/10 Minute(Max Deviation of ± 20% of the Nomineted Value)	RMTC	P	R	
4	Inspaction & Testing of finished product pipe	1) Colour	Clause-5.2 of ISO:4427:2 Annex-A	ISO4427-2	Accoding to ISO-4427-2	Clause-5.2 of ISO:4427:2 Annex-A	MTC	P	W	
		2) Visual appearance	Clause-5.1 of ISO:4427	ISO4427	According to ISO-4427-2	Clause-5.4 of ISO:4427	MTC	P	W	
		3) Length	Clause-6.5 of ISO:4427-2	ISO4427	According to ISO-4427-2	Clause-5.1 of ISO:4427	MTC	P	W	
		4) Coilling	Clause-5.4 of ISO:4427-2	ISO4427-2	According to ISO-4427-2	Clause-5.4 of ISO:4427-2	MTC	P	W	
		5) Dimensions	Clause-6.1 of ISO:4427-2	ISO4427-2	According to ISO-4427-2	Clause-6.1 of ISO:4427-2	MTC	P	W	
		6) Ovality	Clause-6.2 of ISO:4427-2	ISO4427-2	According to ISO-4427-2 & Table-1	ISO-4427-2& Table-1	MTC	P	W	

S. No.	Stages	Characterlstics	Samples to check	Reference Document	Frequency	Acceptance Criteria	Format of Records	Inspection by		Remarks
								M	TPI/C or both	
		7) Wall Thickness	Clause-6.3 of ISO:4427-2	ISO4427-2	According to ISO-4427-2 & Table-2	Clause-6.3 ISO:4427-2&Table-2	MTC	P	W	
5	Hydrostatic Pressure Teet		Clause-7 1and Table-3 of ISO:4427-2 100 hours	ISO1187-1& ISO-1167-2	According to ISO-1167-1	Clause-7 1and Table-3 of ISO:4427-2 100 hours	MTC	P	W	
			Clause-7 1and Table-3 of ISO:4427-2 165 hours	ISO1167-1& ISO-1187-2	According to ISO-1167-1	Clause-7 1and Table of ISO:4427-2 165 hours	MTC	P	R	
			Clause-7 1and Table-3 of ISO:4427-2 1000 hours	ISO1167-1& ISO-1187-2	According to ISO-1167-1	Clause-7 1and Table of ISO:4427-2 1000 hours	MTC	P	R	
6	De-cohesion of eletrofusion joint		Clause-4 1and Table-2 of ISO:4427:2	ISO-13954	According to ISO-4427-1	Percentage of Brittle Fallure $\leq$33.3%	MTC	P	R	
7	Reversion Test		Clause-8 2and Table-5 of ISO:4427:2	ISO-2505	According to ISO-2505	Reversion shall no be greater than 3%	MTC	P	W	
8	Pigment Dispersion (Blue Pigment only)		Clause-4, 2and Table-2 of ISO:4427-1	ISO-18553	According to ISO-18553	$\leq$GRADE 3 Uniform	MTC	P	W	
9	Melt Flow Rate		Clause-8, 2and Table-5 of ISO:4427-2	ISO-1133-2005	According to ISO-1133	0.2 to 1.40gm / 10 Minute (Max Deviation of $\pm$ 20% of the Nometed Value)	MTC	P	W	
10	Oxidation Induction Time		Clause-8, 2and Table-5 of ISO:4427-2	ISO-4427-2	According to ISO-11357-6	Min-20 Minutes	MTC	P	W	

Standared Quality assurance plan (QAP) of MDPE pipe chapter No- IX of MP PHED USOR with w.e.f 03 July 2018
(6th Ammendment of USOR issued vide EnC, MPPHED order No. 9 dated 07/01/2022)

S. No.	Stages	Characterlstics	Samples to check	Reference Document	Frequency	Acceptance Criteria	Format of Records	Inspection by		Remarks
								M	TPI/C or both	
11	Density		Clause-4,4,1& and Table-1 of ISO:4427/1183	ISO-1183-2	According to ISO-1183-2	930 to 960 kg/m3	MTC	P	W	
12	Tenslle Strength for Butt-Fuslon		Clause-4,2 & Table-2 of ISO:4427-1	ISO-13953	According to ISO-13953	No brittle Failure	MTC	P/R	R	
13	Elongation at Break		Clause-5.2 & and Table-5 of ISO:4427-2z	ISO-6259-1 &6259-3	According to ISO-6259	≥350%	MTC	P	W	
14	Slow Crack Growth rate		Clause-4.2 & and Table-2 of ISO:4427-1	ISO-13479/IS-4984	According to ISO-13479	as per ISO 4427	MTC	P/R	R	
15	Marking on Pipe		100%	Clause-11.1.11.2 & Table-6 of ISO:4427-2	Every Coil or Pipe	Clause-11.1.11.2 & Table-6 of ISO:4427-2	MTC	P	W	
16	Effect on Water quality		Review of Document	Raw material Manufacturer's declaration	-	PE Resin Grade shall meet FDA Regulation 21 CFR 177, 1520 is suitable for Food Packaging & Pipes for Drinking Water. Raw Material manufacture's declaration for PE Resin Grade to be reviewed.	-	R	R	

LEGENDS :

RMTC - RAW MATERIAL TEST CERTIFICATE
MTC - MANUFACTURER TEST CERTIFICATE
TPI- THIRD PARTY INSPECTION AGENCY WHICH SHALL BE APPROVED BY PHED

M - MANUFACTURER
C - CUSTOMER (PHED) & TPI

P - PERFORM
R - REVIEW
W - WITNESS

Note : - 1) THE MEASURING INSTRUMENTS & TEST EQUIPMENTS SHALL BE CALIBRATED PERIODICALLY & PUT UP TO TPI/C FOR VERIFICATION
2) ALL PIPES OF SAME SIZE AND PRESSURE RATING IN SINGLE CONSIGNMENT SHALL CONSTTUTE A LOT
3) ALL SPELITICATION SHOULD BE AS PER CONTRACT AGREEMENT/RELAVENNT IS CODE
4) SAMPLING CRITERIA AS PER RESPECTIVE STANDARD/ TEST METHOD.

(Part of 6th Ammendment of USOR issued vide EnC, MPPHED order No. 9 dated 07/01/2022)

(ANNEXURE-C)

Test referneces for PE Blue colour pipe (MDPE) raw material and pipe (Blue colour) as per ISO 4427-2:2019

chapter No- IX of MPPHED USOR 2018 with w.e.f. 03 July 2018

(Attached with 6th ammendment of USOR issued vide order no. 9 dated 07/01/2022)

S.No	Name of Test	Test Method
A	Material	
1	Density	ISO 11832 / ASTMD1505
2	Melt Flow rate	ISO 1133-2005/ASTM D- 1238
3	Valatile mater content	EN 12099
4	Water content	ISO 15512
5	Pigment Dispersion (Blue pigment only	ISO - 18553
6	Oxyent induction time (OIT)	ISO-11357-6
B	**Testing of ifnished product PE pipe (Blue color)**	
3	Appearance (Visual)	ISO 4427
4	Colour	ISO 4427-2
5	Mean outside diameter & out of roundness (Ovality	ISO 4427-2
6	Wall Thickness	ISO 4427-2
7	Coiled	ISO 4427-2
8	Length	ISO 4427-2
9	Hydrostatic strength	ISO 4427-2
i	Hydrostatic strength test for 100 hrs at 20°C	ISO 1187-1 & ISO 1167-2
ii	Hydrostatic strength test for 165 hrs at 80°C	ISO 1167-1 & ISO 1167-2
iii	Hydrostatic strength test for 1000 hrs at 80°C	ISO 1167-1 & ISO 1167-2
10	Oxidation Induction tiem	ISO 4427-2/ISO 11357-6
11	Elongation at Break	ISO 6259-1& 6259-3
12	Melt Flow ratee	ISO-1133-2005
13	Longitudinal Reversion test	ISO- 2505
14	Effect on wáter quality	Raw material manufacturer's declartion
15	Tensile strength for butt-fusion	ISO-13953
16	Slow crack growth rate	ISO 13479
17	Resistance to weathering	ISO 16871
a	Elongation at break	ISO 4427-2:2019(Table-5)& ISO 6259-1& ISO 6259-3
b	Hydrostatic strength test for 1000 hrs at 80 0 C	ISO 4427-2:2019 (Table-3) & ISO 1167-1&ISO 1187-2
18	Marking on pipe	ISO 4427-2

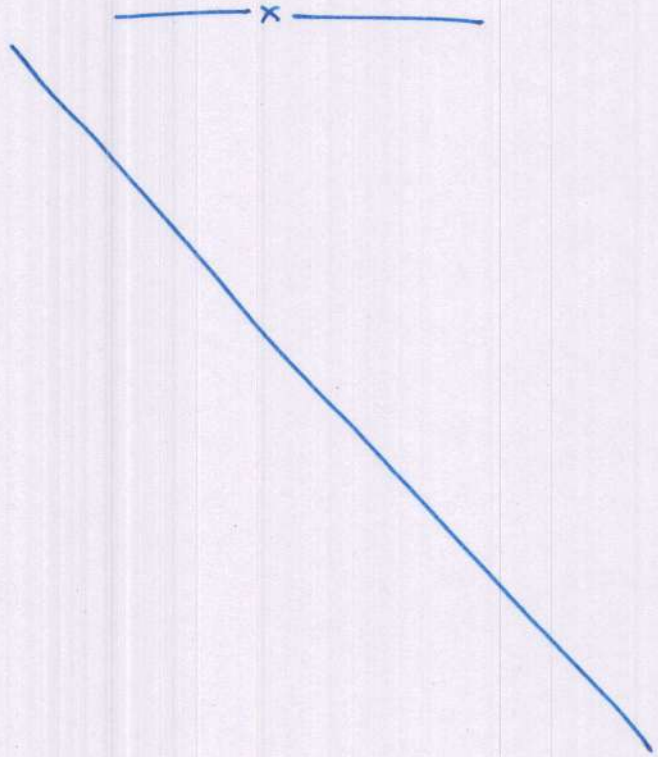
CHAPTER-XVII

GENERAL MISCELLANEOUS

CHAPTER-XVII

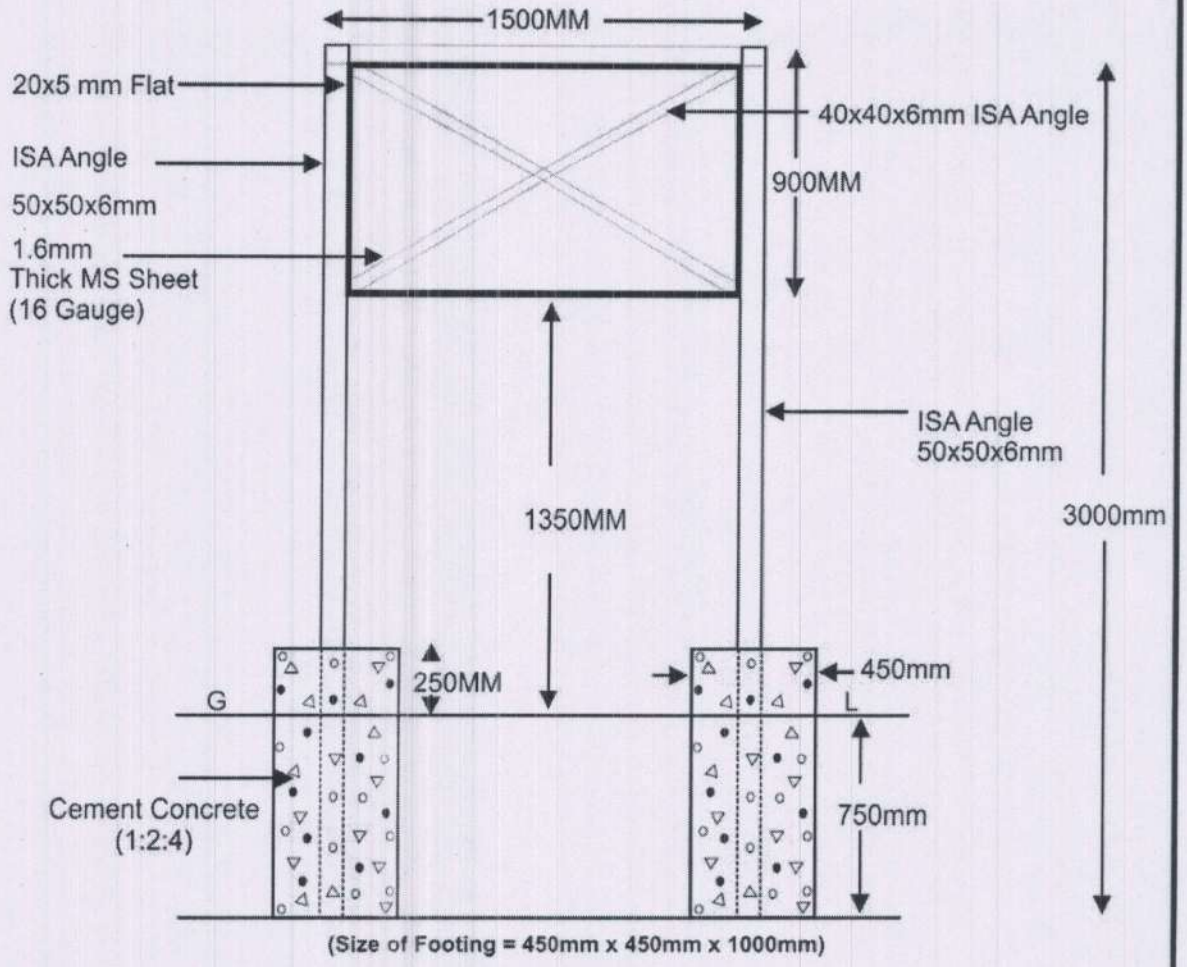
GENERAL MISCELLANEOUS

S.No.	Particulars of Item	Unit	Rate
17.38	**Providing and jointing of following galvanized Iron (MS) Pipes class medium with heavy duty seamless sockets for lowering of submerssible pumps including testing of joints, cost of pipes & heavy duty sockets and jointing materials all complete. Pipes and sockets confirming to IS:1239-2011 Part-II.**		
17.38.1	50mm dia, class medium with heavy duty seamless sockets.	Each	285.00
17.38.2	65mm dia, class medium with heavy duty seamless sockets.	Each	370.00
17.48	**Fabrication, Providing and fixing of typical information board of size 1.50mX0.90m made out as detailed below-** **1. Tow vertical support (post) made out from ISA angle 50.X50X6mm this shall be minimum 0.75m below GL and 2.25m above GL. The vertical post shall be erracted on 450mmX450mmX1000mm foundation blocks (250mm above GL and 750mm below GL) made of cement concrete 1:2:4.** **2. The board shall be fabricated from 1.6mm thick MS sheet of size 1.50mX0.90m, The frame of board shall be fabricated with angle ISA 40X40X6 cross member support from behind and flat 20X5mm support all around board.** **3. Whole structure shall be painted by standard color with lettering, border, heading, and logo etc using synthetic enamel paint of superior quality including supply, welding, excavation, concreting, painting of base, border and lettering, painting and other required details etc complete as directed by Engineer in charge.**	Job	9000.00



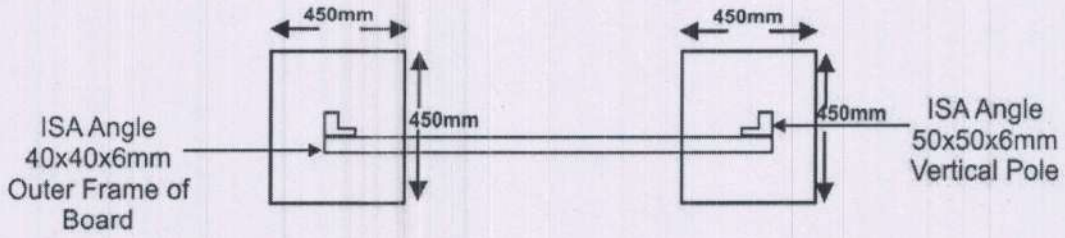
DRAWING OF DISPLAY BOARD

ITEM NO. 17.48



(Size of Footing = 450mm x 450mm x 1000mm)

SECTIONAL ELEVATION



PLAN

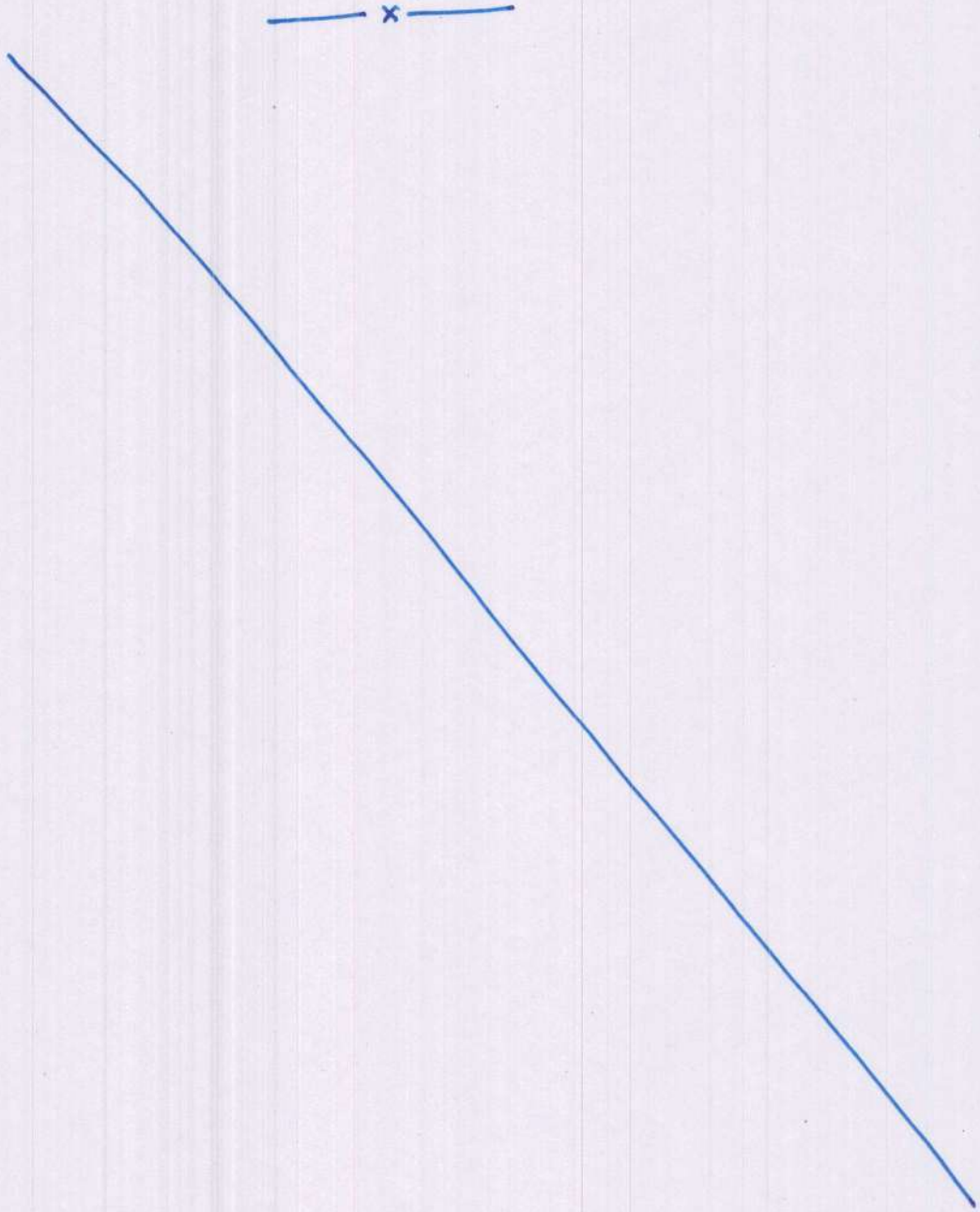
CHAPTER - XIX

CONSTRUCTION OF ORDINARY TUBE WELL

CHAPTER- XIX
CONSTRUCTION OF ORDINARY TUBE WELL

S.No.	Item	Unit	Rate in Rs.
19.1	**Drilling of perfectly vertical bore hole of a diameter to receive 125 mm nominal diameter casing pipe upto desired depth below ground level inclusive of the labour charges for transporting, lowering and fixing of 125 mm nominal diameter M.S./ G.I /U.P.V.C..casing pipe indise the bore hole including all works pertaining to drilling such as transportation , installation and removal of drilling machine etc. complete.**		
(a)	In all type of collapsible strata consisting of soils, clays, sand , moorum, gravel, blouders etc.	Meter	524.00
(b)	In all types of rocks.	Meter	610.00
19.2	**Drilling of perfectly vertical bore hole of 115 m.m. diameter up to desired depth below ground level in all types of rocks including all works pertaining to drilling such as transportation, installation and removal of drilling machine etc. complete.**	Meter	575.00
19.3	**Drilling of perfectly vertical bore hole of a diameter suitable to receive 150 mm nominal diameter casing pipe upto desired depth below ground level inclusive of the labour charges for transporting, lowering and fixing of 150 mm nominal diameter and fixing of 150 mm nominal diameter M.S./ G.I. / U.P.V.C. casing pipe inside the bore hole including all works pertaining to drilling such as transportation, installation and removal of drilling machine etc. complete.**		
(a)	In all type of collapsible strata consisting of soils, clays, sand , moorum, gravel, boulders etc.	Meter	544.00
(b)	In all types of rocks.	Meter	659.00
19.4	**Drilling of perfectly vertical bore hole of 150 m.m. diameter up to desired depth below ground level in all types of rock including all works pertaining to drilling such as transportation, installation and removal of drilling machine etc. complete.**	Meter	629.00
19.5	**Drilling of perfectly vertical bore hole of 165 m.m. diameter up to desired depth below ground level in all types of rock including all works pertaining to drilling such as transportation, installation and removal of drilling machine etc. complete.**	Meter	633.00
19.6	**Drilling of perfectly vertical bore hole of a diameter suitable to receive 200 mm nominal diameter casing pipe upto desired depth below ground level inclusive of the labour charges for transporting, lowering and fixing of 200 mm nominal diameter M.S./ G.I. / U.P.V.C. casing pipe inside the bore hole including all works pertaining to drilling such as transportation, installation and removal of drilling machine etc. complete.**		
(a)	In all type of collapsible strata consisting of soils, clays, sand , moorum, gravel, boulders etc.	Meter	563.00
(b)	In all types of rocks.	Meter	742.00
19.7	**Drilling of perfectly vertical bore hole of 200 m.m. diameter up to desired depth below ground level including all works pertaining to drilling such as transportation, installation and removal of drilling machine etc. complete.**		
(a)	In all type of collapsible strata (intertrappean formation) including charges for transportation , lowering and fixing of 150 mm nominal diameter GI casing pipe, welded joints only .	Meter	642.00
(b)	In all types of rocks.	Meter	801.00

S.No.	Item	Unit	Rate in Rs.
19.8	**Drilling of perfectly vertical bore hole of 150 mm diameter up to desired depth below ground level un all types of strata including all works pertaining to drilling such as transportation installation and removal of drilling machine etc. complete in intertrappean formations (collapsible strata between rocks) including charges for transportation and making all necessary arrangements' etc, including lowering and fixing of 125 mm nominal diameter (G.I. or U.P.V.C. casing pipe .**	Meter	646.00

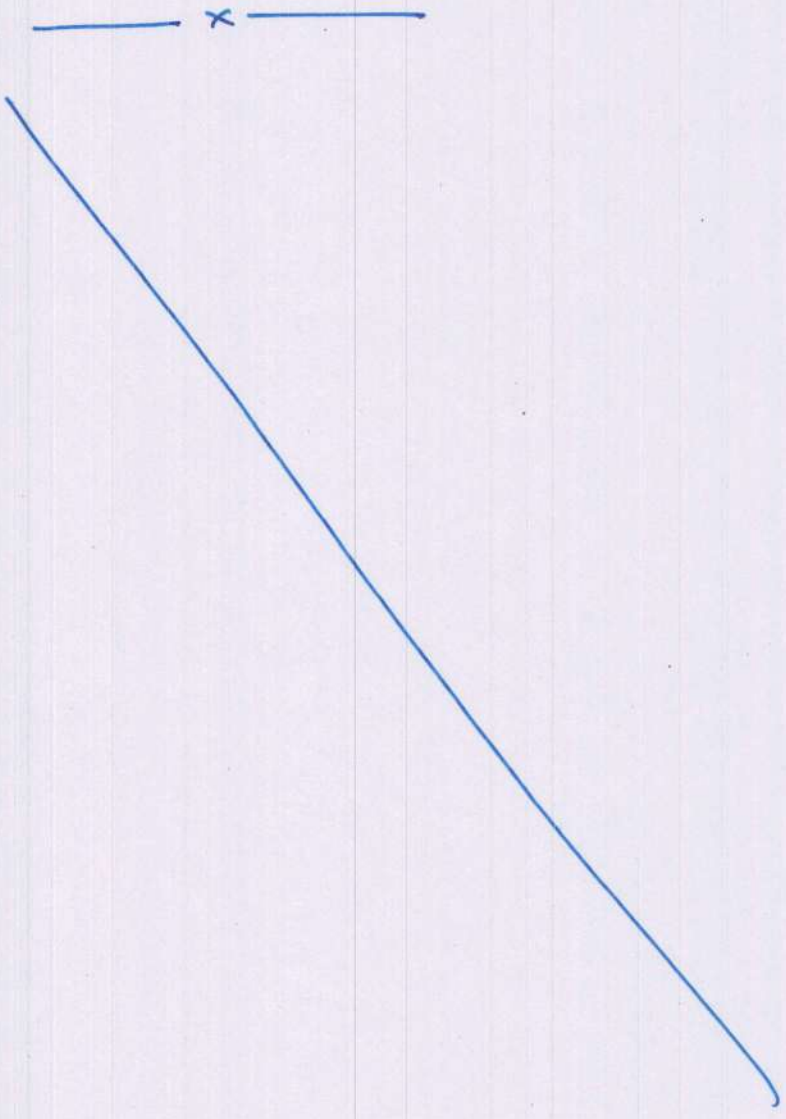


CHAPTER - XX

CONSTRUCTION OF GRAVEL PACKED TUBEWELL

CHAPTER-XX
CONSTRUCTION OF GRAVEL PACKED TUBEWELL

S.No.	Item	Unit	Rate in Rs.
20.1	**Drilling of perfectly vertical bore hole of following diameters for construction of Gravel Packed tube well up to desired depth in alluvial formation consisting of Soils, Clays, Sand, Gravel, Moorum, Boulders etc. and retaining the bore hole by using suitable drilling mud or foam or temporary housing pipe including all works pertaining to drilling such as transportation, installation and removal of drilling machine etc. complete.**		
(a)	300 m.m diameter	Meter	878.00
(b)	350 m.m diameter	Meter	922.00
(c)	400 m.m diameter	Meter	963.00



CHAPTER - XXIV

MISCELLANEOUS ITEMS OF TUBEWELL

CHAPTER- XXIV

MISCELLANEOUS ITEMS OF TUBEWELL

S. No.	Item	Unit	Rate in Rs.
24.20.105	**Supplying & Installation of Energy efficient five star BEE rating ISI Marked required capacity single phase, 50 Hz, 220V, deep well submersible pump Stainless Steel body, suitable for 4"/6" tube well with Control Panel Starter suitable for Submersible pump with dry run protection(Auto Cut-off), connections, including clamps, bore cap, flat cable of length equals to maximum head of the pump plus 5 meters, etc. as required as per specifications but excluding riser pipe, SS/ Nylon wire rope.**		
(i)	0.5 H.P. with 6 to 7 stages, Head Mt. 46-13 Discharge LPM 10-55	Each	20553
(ii)	1 H.P. with upto 5 stages, Head Mt. 35-15 Discharge LPM 40-125	Each	21716
(iii)	1 H.P. with 7 to 8 stages, Head Mt. 61-18 Discharge LPM 25-90	Each	22085
(iv)	1 H.P. with 10 to 11 stages, Head Mt. 74-21 Discharge LPM 15-55	Each	22879
(v)	1 H.P. with 12 to 14 stages, Head Mt. 91-28 Discharge LPM 10-45	Each	23588
(vi)	1.5 H.P. with up to 6 stages, Head Mt. 42-17 Discharge LPM 65-150	Each	25795
(vii)	1.5 H.P. with up to 7 to 8 stages, Head Mt. 56-21 Discharge LPM 40-125	Each	26504
(viii)	1.5 H.P. with to 10 to 11 stages, Head Mt. 84-26 Discharge LPM 25-90	Each	26051
(ix)	1.5 H.P. with 16 to 17 stages, Head Mt. 114-33 Discharge LPM 15-55	Each	26135
(x)	1.5 H.P. with 18 to 20 stages, Head Mt. 130-41 Discharge LPM 10-45	Each	28064
(xi)	2 H.P. with up to 7 to 8 stages, Head Mt. 56-16 Discharge LPM 65-205	Each	29505
(xii)	2 H.P. with to 10 to 11 stages, Head Mt. 77-30 Discharge LPM 40-125	Each	29760
(xiii)	2 H.P. with 14 to 15 stages, Head Mt. 114-36 Discharge LPM 25-90	Each	28569
(xiv)	2 H.P. with 20 to 22 stages, Head Mt. 147-42 Discharge LPM 15-55	Each	28144
(xv)	2 H.P. with 25 stages, Head Mt. 163-58 Discharge LPM 10-45	Each	32738
(xvi)	3 H.P. with 10 to 12 stages, Head Mt. 84-23 Discharge LPM 65-205	Each	31660
(xvii)	3 H.P. with 15 to 17 stages, Head Mt. 119-45 Discharge LPM 40-125	Each	32614
(xviii)	3 H.P. with 20 to 22 stages, Head Mt. 167-51 Discharge LPM 25-90	Each	31320
24.20.105 - A	**Supplying & Installation of Energy efficiant three star BEE rating ISI Marked required capacity single phase, 50 Hz, 220V, deep well submersible pump Stainless Steel body, suitable for 4"/6" tube well with Control Panel Starter suitable for Submersible pump with dry run protection (Auto cut-off), connections, including clamps, bore cap, flat cable of length equals to maximum head of the pump plus 5 meters etc. as required as per specifications but excluding riser pipe, SS/ Nylon wire rope and connection cable.**		

S. No.	Item	Unit	Rate in Rs.
(i)	0.5 H.P. with 6 to 7 stages, Head Mt. 46-13 Discharge LPM 10-55	Each	17200
(ii)	1 H.P. with upto 5 stages, Head Mt. 35-15 Discharge LPM 40-125	Each	18620
(iii)	1 H.P. with 7 to 8 stages, Head Mt. 61-18 Discharge LPM 25-90	Each	18700
(iv)	1 H.P. with 10 to 11 stages, Head Mt. 74-21 Discharge LPM 15-55	Each	19920
(v)	1 H.P. with 12 to 14 stages, Head Mt. 91-28 Discharge LPM 10-45	Each	21670
(vi)	1.5 H.P. with up to 6 stages, Head Mt. 42-17 Discharge LPM 65-150	Each	22120
(vii)	1.5 H.P. with up to 7 to 8 stages, Head Mt. 56-21 Discharge LPM 40-125	Each	25070
(viii)	1.5 H.P. with to 10 to 11 stages, Head Mt. 84-26 Discharge LPM 25-90	Each	25095
(ix)	1.5 H.P. with 16 to 17 stages, Head Mt. 114-33 Discharge LPM 15-55	Each	26120
(x)	1.5 H.P. with 18 to 20 stages, Head Mt. 130-41 Discharge LPM 10-45	Each	27070
(xi)	2 H.P. with up to 7 to 8 stages, Head Mt. 56-16 Discharge LPM 65-205	Each	24345
(xii)	2 H.P. with to 10 to 11 stages, Head Mt. 77-30 Discharge LPM 40-125	Each	24570
(xiii)	2 H.P. with 14 to 15 stages, Head Mt. 114-36 Discharge LPM 25-90	Each	26520
(xiv)	2 H.P. with 20 to 22 stages, Head Mt. 147-42 Discharge LPM 15-55	Each	27375
(xv)	2 H.P. with 25 stages, Head Mt. 163-58 Discharge LPM 10-45	Each	29150
(xvi)	3 H.P. with 10 to 12 stages, Head Mt. 84-23 Discharge LPM 65-205	Each	28225
(xvii)	3 H.P. with 15 to 17 stages, Head Mt. 119-45 Discharge LPM 40-125	Each	28775
(xviii)	3 H.P. with 20 to 22 stages, Head Mt. 167-51 Discharge LPM 25-90	Each	29175
24.20.106	**Supplying & Installation of Energy efficiant five star BEE rating ISI Marked required capacity of Three Phase, 50 Hz, 415V, deep well submersible pump Steel body, suitable for 6"tube well with Control Panel Starter suitable for Submersible pump with dry run protection(Auto cut-off), single phase preventer, connections, including clamps, bore cap, flat cable of length equals to maximum head of the pump plus 5 metres etc. as required as per specifications but excluding riser pipe and connection cable.**		
(i)	3 H.P. with up to 6 stages, Head Mt. 55-7 Discharge LPM 60-510	Each	35576
(ii)	5 H.P. with up to 5 stages, Head Mt. 55-13 Discharge LPM 120-510	Each	39914
(iii)	5 H.P. with 8 to 9 stages, Head Mt. 83-32 Discharge LPM 60-270	Each	42638
(iv)	5 H.P. with 10 to 11 stages, Head Mt. 101-40 Discharge LPM 60-270	Each	45020
(v)	7.5 H.P. with 8 to 10 stages, Head Mt. 117-31 Discharge LPM 60-420	Each	49845
(vi)	7.5 H.P. with 13 to 14 stages, Head Mt. 129-52 Discharge LPM 60-270	Each	56699

S. No.	Item	Unit	Rate in Rs.
(vii)	7.5 H.P. with 15 stages, Head Mt. 138-60 Discharge LPM 60-270	Each	58883
(viii)	10 H.P. with 16 stages, Head Mt. 147-64 Discharge LPM 60-270	Each	62060
(ix)	10 H.P. with 20 stages, Head Mt. 184-80 Discharge LPM 60-270	Each	68414
24.20.106 - A	**Supplying & Installation of Energy efficient three star BEE rating ISI Marked required capacity of Three Phase, 50 Hz, 415V, deep well submersible pump Steel body, suitable for 6"tube well with Control Panel Starter suitable for Submersible pump with dry run protection(Auto cut-off), single phase preventer, connections, including clamps, bore cap, flat cable of length equals to maximum head of the pump plus 5 meters etc. as required as per specifications but excluding riser pipe and connection cable.**		
(i)	3 H.P. with up to 6 stages, Head Mt. 55-7 Discharge LPM 60-510	Each	37775
(ii)	5 H.P. with up to 5 stages, Head Mt. 55-13 Discharge LPM 120-510	Each	38700
(iii)	5 H.P. with 8 to 9 stages, Head Mt. 83-32 Discharge LPM 60-270	Each	41775
(iv)	5 H.P. with 10 to 11 stages, Head Mt. 101-40 Discharge LPM 60-270	Each	41975
(v)	7.5 H.P. with 8 to 10 stages, Head Mt. 117-31 Discharge LPM 60-420	Each	44250
(vi)	7.5 H.P. with 13 to 14 stages, Head Mt. 129-52 Discharge LPM 60-270	Each	52300
(vii)	7.5 H.P. with 15 stages, Head Mt. 138-60 Discharge LPM 60-270	Each	54500
(viii)	10 H.P. with 16 stages, Head Mt. 147-64 Discharge LPM 60-270	Each	60525
(ix)	10 H.P. with 20 stages, Head Mt. 184-80 Discharge LPM 60-270	Each	63915

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