

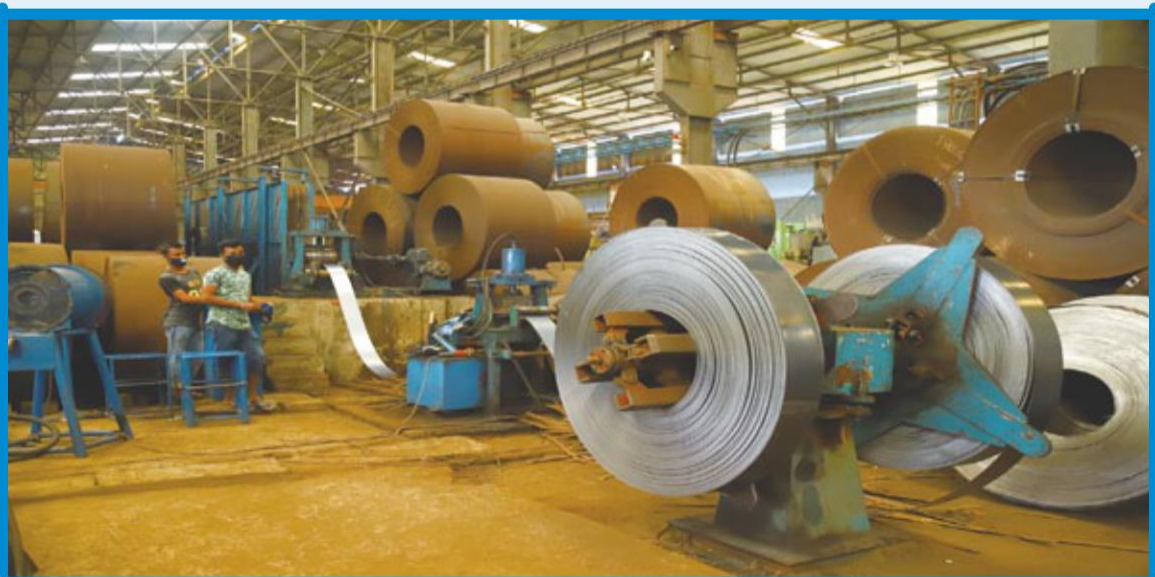
Strong & Durable



UNION STEEL TUBES LIMITED

Best Quality G.I, M.S. & Black Pipes (20 & 40 Schedules)

ISO 9001-2015 Certified











Union Steel Tubes Limited

Creating Benchmarks
ISO 9001-2015 Certified

The modern tubes and pipes industries in Bangladesh owe its origin to the grand vision of union steel tubes limited since 2003, for production of steel pipe. Union steel tubes limited as a company with volume over 60,000 tons per annum product HFW/HFIW pipes Black & Galvanized from ½" to 14" diameter with thickness from 1.60mm to 12mm conforming to various national & international standard/specifications.

WHAT SETS US APART

1. Brand Equity:

We market our product under union brand that enjoys good reputation across the globe.

2. Technical Advancement:

We have always been a pioneer in adapting latest technology high speed mills from India which help in providing the best quality rolled tubes with solid state high frequency welder. Spiral coil accumulator and online/offline NDT.

3. "O" Ovality:

One of the few manufactures in Bangladesh has online Rotatory sizing Mill. We are capable of providing tubes with minimum ovality for high precision in use.

4. Raw Material:

We acquire 100% specially tested, best quality hot rolled coils for rolling our tubes which makes our tubes high pressure resistant with high strength.

5. Bur-Free Ends:

We have cold saw installed on the mills which provides bur-free ends in our tubes or hollow sections.

6. Certification:

We are certified by reputed international agencies like ISO 9001-2015. Additionally all its products are BSTI licensed, BUET tested and marked for domestic market as per applicable BDS specification.

HFW High Test Line Pipes Facility

Production Capacity	600000 MT per annum
Manufacturing Process	Solid State HF Welding
Outside Diameter Rounds	21 mm -386 mm
Thickness Range	1.6 mm – 12 mm
Coating Type	Black and Galvanized
Pipe Length	20 RFT, 6 meters to 12 meters
Specifications	ASTM / BS / BDS
Pipe Ends	Beveled or Plain End
Protective Coating	Bare or Rust Preventing Coating
End Production	Protected with Plastic Caps

INTRODUCTION

1. The factory is situated at Bhulta, Rupgonj, Narayongonj on the Dhaka-Norshingdi highway about 26 km from capital city of Dhaka on about 26 bigha land where the factory shade is 71000 square feet.
2. The factory started its journey with interest in providing complete solution to its customers in the field of GI and MS pipe holding the largest GI plant of the country and the largest MS plant in the private sector.
3. The factory processes most modern machineries operating with latest technology.
4. The factory consists of five mills. Two mills with the product ranged of ½" to 2" pipes with production capacity of 15 meters to 40 meters per minute and the other one with the range of 2 1/2" to 8" dia pipes with production capacity of up to 30 meters per minute. One of the other two factories produces 40 schedule pipes from 1" to 2 1/2", 3" to 14" in the other.
5. High frequency welders and solid state welders of modern technology are used in the factories.
6. The factory has a well-equipped galvanizing unit with mechanized system for pipe movements from one step to another. Each mill production capacity is maximum 4 ton per hour.
7. The factory has its own power generation system with a 1030 KW generator and the factory is capable of operating uninterrupted production processes and unaffected by power failure of external power supply.
8. Union Steel Tubes Ltd. is ISO 9001-2015 certified for its quality management system with the achievement of all the necessary certification from BSTI, BUET by implementing stringent quality control process and providing its customers with a guarantee of product excellence.

FEATURES

1. **Installed Capacity:** 15-16 million meters per year (max.) in two shift operations.
2. **Product Range:** ½" to 14" nominal dia pipes.
3. **Galvanizing Capacity:** Maximum 4 ton per hour.
4. **Production Process:** Electricity resistance Welding (ERW) and solid state welding process, employing high frequency system is used for manufacturing the pipes. Pipes are galvanized by Hot Dip Galvanizing process.
5. **End Finish:** G.I. pipes are taper-threaded as per B.S.-21 pipe thread; Black pipes are either plane-ended or beveled.
6. **Pipe Grade/Brand:** Depending on size and wall thickness pipes are manufactured in the following brands-:

-Union silver

-Union Gold

-Union Diamond

-Union Ruby

Special Size:

To meet customers specific requirements for pipes with special thickness are tailor-made on confirmed order with advance if the quantity is reasonably high and suitable for a batch production.

Hydrostatic Testing:

All Pipes are tested at a hydrostatic test pressure of 712 PSI (50 kg/cm²), on hydrostatic machine.

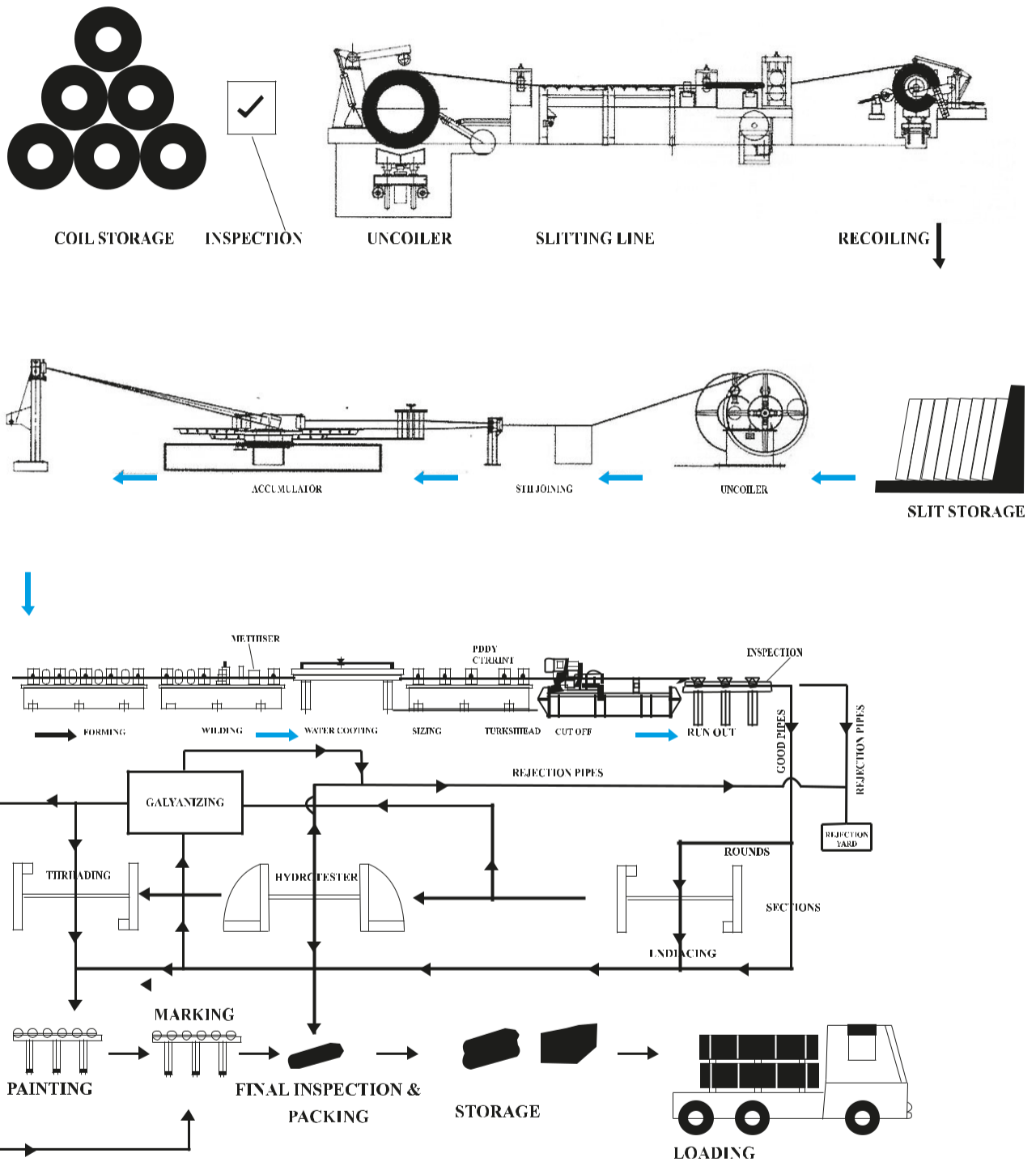
Tolerance on Dimensions:

Pipes are manufactured in different sizes with different wall thickness and marked with different brand seal (Silver, Gold etc.). Diameters of pipes are within the tolerance level of maximum and minimum diameters. The standard length of the pipes are 6.1 meters (20 ft.) with a tolerance ± 3 mm.

Standards:

General purpose mild steel tubes/pipes are produced according to the Japanese standard JIS G 3132 SPHT 1 (British Standard BS-1387) and Bangladesh Standard BDS-1031. Galvanizing is done according to the British Standard BS-729 which is equivalent to DIN-2444 and IS-4736.

PROCESS FLOW CHART



DIMENSION, WEIGHT AND TEST PRESSURE FOR PIPES

Series and Class of pipes	Nominal Dia		Wall Thickness		Out Side Dia		Maximum Ovality	Weight		Length	Meter/m.Ton	Hydrostatic Test Pressure Kg/cm ² (PSI)
	in	mm	mm	mm	min	max	mm	M.S.	G.I.	M.S.	G.I.	
Union Silver	1/2"	15	1.60	21.0	21.0	21.4	0.2	0.78	0.82	1282	1149	50 (711.30)
	3/4"	20	1.70	26.4	26.4	26.9	0.2	1.06	1.18	943	847	
	1"	25	1.90	33.2	33.2	33.8	0.2	1.50	1.65	666	606	
	1 1/4"	32	2.00	41.9	41.9	42.5	0.2	2.01	2.202	497	545	
	1 1/2"	40	2.10	47.8	47.8	48.4	0.2	2.42	2.66	413	375	
	2"	50	2.35	59.6	59.6	60.2	0.3	3.38	3.68	295	271	
	2 1/2"	65	2.45	75.2	75.2	76.0	0.3	4.48	4.870	223	205	
	3"	80	2.60	87.9	87.9	88.7	0.3	5.57	6.05	179	165	
	4"	100	3.00	113.0	113.0	113.9	0.3	8.28	8.88	120	112	
	5"	125	3.60	138.5	138.5	140.0	0.3	12.18	12.48	82	80	
	6"	150	3.60	163.9	163.9	166.5	0.3	14.81	15.32	67	65	
	8"	200	4.00	218.0	218.0	219.5	0.3	21.48	22.11	46	45	



DIMENSION, WEIGHT AND TEST PRESSURE FOR PIPES

Series and Class of pipes	Nominal Dia		Wall Thickness	Out Side Dia		Maximum Ovality	Weight		Length	Meter/m.Ton	Hydrostatic Test Pressure
	in	mm	mm	min	max	mm	M.S.	G.I.	M.S.	G.I.	Kg/cm ² (PSI)
Union Gold	1/2"	15	2.00	21.0	21.4	0.2	0.954	1.030	1048	970	50 (711.30)
	3/4"	20	2.00	26.4	26.9	0.2	1.23	1.35	813	740	
	1"	25	2.35	33.2	33.8	0.2	2.83	1.98	546	505	
	1 1/4"	32	2.35	41.9	42.5	0.2	2.34	2.532	427	394	
	1 1/2"	40	2.60	47.8	48.4	0.2	2.95	3.19	338	313	
	2"	50	2.60	59.6	60.2	0.3	3.78	4.03	268	248	
	2 1/2"	65	2.90	75.2	76.0	0.3	5.26	5.650	190	177	
	3"	80	2.90	87.9	88.7	0.3	6.19	6.67	161	149	
	4"	100	3.60	113.0	113.9	0.3	9.88	10.48	101	95	
	5"	125	4.00	138.5	140.0	0.3	13.37	13.62	74	73	
	6"	150	4.00	163.9	166.5	0.3	15.93	16.36	62	61	
	8"	200	4.80	218.0	219.5	0.3	25.16	25.85	39	38	



DIMENSION, WEIGHT AND TEST PRESSURE FOR PIPES

Series and Class of pipes	Nominal Dia		Wall Thickness		Out Side Dia		Maximum Ovality	Weight kg/meter		Length	Meter/m.Ton	Hydrostatic Test Pressure
	in	mm	mm	mm	min	max		M.S.	G.I.	M.S.	G.I.	
Union Diamond	1/2"	15	2.35	21.0	21.4	0.2	1.11	1.20	833			50 (711.30)
	3/4"	20	2.35	26.0	26.9	0.2	1.41	1.552	644			
	1"	25	2.60	33.2	33.8	0.2	2.01	2.204	453			
	1 1/4"	32	2.60	41.9	42.5	0.2	2.06	2.784	359			
	1 1/2"	40	2.90	47.8	48.4	0.2	3.25	3.517	284			
	2"	50	2.90	59.6	60.2	0.2	4.11	4.236	236			
	2 1/2"	65	3.20	75.2	76.0	0.3	5.80	6.120	163			
	3"	80	3.20	87.9	88.7	0.3	6.81	7.014	140			
	4"	100	4.00	113.0	113.9	0.3	11.01	11.61	86			
	5"	125	4.80	138.5	140.0	0.3	15.61	15.91	62			
	6"	150	4.80	163.9	166.5	0.3	18.76	19.11	52			
	8"	200	5.60	218.0	219.5	0.3	29.52	29.98	32			



DIMENSION, WEIGHT AND TEST PRESSURE FOR PIPES

Series and Class of pipes	Nominal Dia		Wall Thickness	Out Side Dia		Maximum Ovality	Weight		Length	Meter/m.Ton	Hydrostatic Test Pressure Kg/cm ² (PSI)
	in	mm	mm	min	max	mm	M.S.	G.I.	M.S.	G.I.	
Union Ruby	1/2"	15	2.60	21.1	21.7	0.2	1.22	1.30	819	769	50 (711.30)
	3/4"	20	2.60	26.6	27.2	0.2	1.58	1.68	632	595	
	1"	25	2.90	33.4	34.2	0.2	2.24	2.39	446	418	
	1 1/4"	32	2.90	41.9	42.5	0.2	2.06	2.784	387	359	
	1 1/2"	40	3.20	48.0	48.8	0.2	3.61	3.87	277	258	
	2"	50	3.20	59.8	60.8	0.3	6.28	6.58	159	151	
	2 1/2"	65	4.00	75.4	76.6	0.3	7.20	7.590	138	131	
	3"	80	3.65	88.1	89.5	0.3	7.72	8.20	129	121	
	4"	100	4.50(Special)	113.3	114.9	0.3	12.33	12.93	81	77	
	5"	125	5.40	138.5	140	0.3	17.80	18.55	56	53	
	8"	200	6.40	218.0	219.5	0.3	33.55	34.01	29	28	



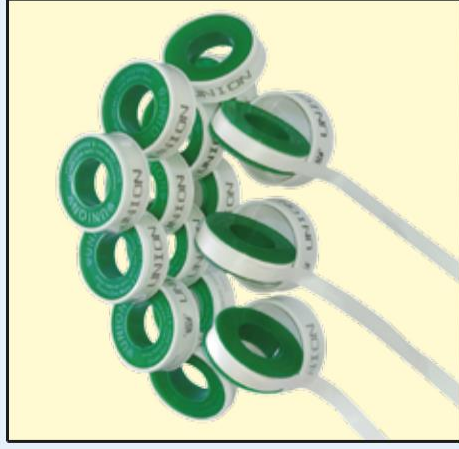
Dimension, Weight and Test pressure for pipes (40 Schedule)

Nominal Dia		Wall Thickness	Out Side Dia	Inside Dia	Weight (kg/meter)	Length (Meter/m.Ton)	Hydrostatic Test Pressure	
in	mm	mm	mm	mm	Black Pipe	Black Pipe	(PSI)	Kg/cm ²
1"	25	3.38	33.4	26.64	2.50	400	700	49.21
1 1/4"	32	3.56	42.2	35.05	3.39	294	1200	84.36
1 1/2"	40	3.68	48.3	40.89	4.05	246	1200	84.36
2"	50	3.91	60.3	52.50	5.44	183	2300	161.69
2 1/2"	65	5.16	73.0	62.71	8.63	115	2500	175.75
3"	80	5.49	88.9	77.92	11.29	88	2220	156.066
4"	100	6.02	114.3	102.26	16.07	62	1900	133.57
5"	125	6.55	141.3	128.20	21.77	46	1670	117.401
6"	150	7.11	168.3	154.05	28.26	35	1520	106.856
8"	200	8.18	219.1	202.72	42.55	23	1340	94.202
10"	250	9.27	273.0	254.51	60.31	16	1220	85.766
12"	300	10.31	323.8	303.23	79.73	12	1160	81.548
14"	350	11.13	355.6	333.34	94.55	10	1130	79.439



Union PTFE Thread Seal Tape

Grade	Standard Grade	Premium Grade
	Standard Density	High Density
Description	The economical choice	Maximum sealing power. So efficient, you can use less tape. Complies with certain building codes requiring green, thicker, more dense tape for gas service lines.
Color	Natural	Natural
Density	Standard 1.0 to 1.2	Standard 1.6
Thickness	0.008mm to 0.009mm	0.01mm to 0.0125mm
Standard Widths & Lengths	11.5mm x 15000mm	12mm x 20000mm
Package	Plastic Spool & Shell	Plastic Spool & Shell



ইউনিয়ন পি.টি.এফ.ই থ্রেড সীল টেপ নামে নয়, মানেই আসল পরিচয়।







Round Tubes

Outside Diameter: 21.3 mm - 355.6 mm

Thickness Range: 1.6 mm - 12 mm

Length: 20 Rft & 6 meter to 12 meter

Applications

- Liquid Transmission
- Idlers
- Mechanical and General Engineering
- Structural
- Water Wells
- Fire protection
- Fencing
- & Many more....

Production Standards

- BDS 1031:2006
- BS-1387
- BS-729
- IS-4736

Tests Performed

- Hydrostatic Test
- Eddy Current Test
- Flattening/Flaring Test/Bend Test
- Chemical Analysis
- Other Tests as required by the standard

Finishing Operations

- Plain End
- Threaded and Coupled
- Cut Lengths

Surface Protection

- Black (Self Colored Uncoated)
- Outside Protective Coating-Oil/Varnish/3LPE/3LPP/FBE
- Hot Dip Galvanized



BANGLADESH STANDARD SPECIFICATION FOR Mild Steel (MS) Pipe and Galvanized Iron (GI) Pipe (Ist revision)

0. FOREWORD

0.1 This Bangladesh Standard was adopted by the Bangladesh Standards Institution on 24-07-2006 after the BDS 1031:1983 had been reviewed, thoroughly discussed and finalized by the sectional committee for Pipe and Pipe Fittings and had been endorsed by the Engineering (Civil) Divisional Committee.

0.2 This standard is related to the trade practices followed in the country in the field. In the formulation of this standard due consideration has also been given to international coordination among the standards prevailing in different countries,

0.3 This standard is subject to periodical reviews and amendments to cope with the latest industrial and technological innovations. Any suggestion for improvement will be recorded and placed before the committee in due course.

0.4 In the revision of this standard assistance has been drawn from BS 1387 : 1990, ISO 559, ISO 4200, ISO 65, IS 1239 (P-I) ASTM-A 53-79 (P-I) and assistance so derived is acknowledged herein with thanks.

1. SCOPE

This standard specifies the requirements for butt welded and seamless screwed, socketed and plain end Mild Steel Pipes and Galvanized Iron (GI) Pipes

2. TERMINOLOGY

For the Purpose of this standard, the following definitions shall apply.

2.1 Seamless tube - Pierced solid product, hot worked and hot or cold finished.

2.2 Welded tube - Flat product formed into a circular shape and longitudinally or Spirally welded.

2.3 Black tube - Tube as manufactured, but without any subsequent surface treatment.

2.4 Exact length of screwed and socketed tube - The length of the tube exclusive of the socket.

2.5 Length of screwed and socketed tube - The length of the tube inclusive of the socket.

2.6 Nominal bore - A size reference denoting the approximate bore of the tube. For each size of tube, the outside diameter is fixed by the corresponding screw thread dimensions and therefore, the actual bore of each size of tube will vary according to the thickness.

2.7 Random length - Normal-manufacturing lengths which may vary over a range of several metres. Alternatively length range agreed to between the purchaser and the manufacturer.

2.8 Socket - The screwed coupling utilized in jointing the tubes together.

2.9 Pipe (Tube) - A long, hollow, open-ended object of circular or other cross-section. The term tube is synonymous with the term pipe.

3. DESIGNATION

3.1 Mild steel tubes covered by this standard shall be designated by their nominal bore and shall be further classified as follows depending on wall thickness.

- a) Heavy series for seamless and welded black steel tubes
- b) Medium series for seamless and welded black steel tubes
- c) Light series for seamless and welded black steel tubes

3.2 Mild steel socket/malleable cast iron socket (galvanized) shall be designated by the respective nominal bore of the tube for which it is intended.

4. FIELD OF APPLICATION

4.1 Ordinarily all the types of pipes may be used for conveying gas and water. Only "Medium" and "Heavy" tubes are recommended for conveying steam. The permissible pressures and temperature for different sizes of tubes for conveying steam are given in Appendix B-

5. SUPPLY OF MATERIAL

5.1 General requirements relating to the supply of mild steel tubes and sockets shall conform to BDS 1033:1983 General requirements for the supply of metallurgical materials.

6. MANUFACTURE

6.1 Tubes shall be made from tested quality steel manufactured by any approved processes (see also 5.1)

6.1.1 Steel tubes and sockets shall be manufactured by one of the following processes:

- a) Hot-finished seamless (HFS),
- b) Electric resistance welded (ERW),
- c) High frequency induction welded (HFIW),
- d) Hot-finished welded (HFW).

NOTE -1 Tubes made by manual welding are not covered by this specification.

NOTE -2 Hand welding of sockets may be permitted provided the test requirements covered by this standard are complied with.

6.1.2 'Light', 'medium' and 'heavy' tubes and all sockets shall be either welded or seamless as agreed to between the purchaser and the manufacturer.

6.2 'Medium' and 'heavy' tubes for use in steam services shall be manufactured from mild steel made by the open-hearth, electric or basic oxygen process.

6.2.1 If any other process is employed in the manufacture, prior approval of the purchaser shall be obtained.

6.2.2 All electric welded tubes and sockets (medium and heavy class used for steam services) shall be normalized.

7. MATERIAL

7.1 Tensile properties - The tensile strength of lengths/strips cut from selected tube shall be at least 32 kgf/mm² when tested in accordance with the standard method.

7.2 Elongation percent - The elongation percent on a gauge length of $5.65 \sqrt{S_0}$ (where S_0 is the original cross sectional area of the test specimen) shall not be less than 950 divided by the tensile strength of the specimen with an absolute minimum elongation of 20 percent.

7.3 Chemical composition

The material for mild steel pipe /GI pipe shall be of the following composition:

Element	Composition (%)
Carbon	0.17-0.25
Sulphur	0.060
Phosphorous	0.060
Manganese	0.95-1.20

7.3.1 The ladle analysis - The steel for tubes and sockets used for conveying water and gas purposes shall not show sulphur and phosphorus in amount exceeding 0.060 percent each.

7.3.2 The ladle analysis- The steel for tubes and sockets used for conveying steam services shall not show sulphur and phosphorus in amounts exceeding 0.050 percent.

7.3.2.1 Product analysis - The maximum permissible variation of sulphur and phosphorus in the case of product analysis from the limits stated in 7.2.1 and 7.2.2 shall be 0.005 percent each.

NOTE: *The product analysis is not applicable to rimming quality steel.*

8. DIMENSIONS

8.1 The dimensions of tubes shall be in accordance with Table 1, 2, 3 and 4 subject to tolerances permitted in 10 dimensions of sockets shall be in accordance with Table 4.

9. WEIGHT (MASS)

9.1 Nominal weight of 'Light' Medium' and 'Heavy', black tubes shall be as specified in Table 1, 2, 3 respectively.

NOTE: *Nominal weight and conventional mass carry same meaning.*

10. TOLERANCES ON THICKNESS AND WEIGHT (MASS)

10.1 *The following manufacturing tolerances shall be permitted on the tubes and sockets:*

(a) Thickness

1) Butt welded Light tubes	+ Not limited - 8 percent
Medium and heavy tubes	+ Not limited - 10 percent
2) Seamless tubes	+ Not limited - 12.5 percent

(b) Weight (mass)

(i) Single tube (irrespective of the quantity)	+ 10 percent - 8 percent
(ii) For quantities of less than 150 m of one size	+10 percent - 8 percent
(iii) For quantities of 150 m and over of one size	± 4 percent

**TABLE 1 DIMENSIONS AND NOMINAL WEIGHTS OF BLACK STEEL
TUBES (LIGHT) (Clause 9.1)**

NOMINAL BORE	OUTSIDE DIAMETER		THICKNESS	WEIGHT OF BLACK TUBE	
	Maximum	Minimum		Plain End	Screwed and Socketed
(1)	(2)	(3)	(4)	(5)	(6)
mm	mm	mm	mm	kg/m	kg/m
6	10.1	9.7	1.8	0.361	0.364
8	13.6	13.2	1.8	0.517	0.521
10	17.1	16.7	1.8	0.674	0.630
15	21.4	21.0	2.0	0.952	0.961
20	26.9	26.4	2.35	1.41	1.42
25	33.8	33.2	2.65	2.01	2.03
32	42.5	41.9	2.65	2.58	2.61
40	48.4	47.8	2.9	3.25	3.29
50	60.2	59.6	2.9	4.11	4.18
65	76.0	75.2	3.25	5.80	5.92
80	88.7	87.9	3.25	6.81	6.98
100	113.9*	113.0	3.65	9.89	10.2

* For seamless tubes, maximum outside diameter of 100 mm tube shall be 114.0 mm and weight 9.94 kg/m for plain end.

**TABLE 2 DIMENSIONS AND NOMINAL WEIGHTS OF BLACK STEEL
TUBES (MEDIUM) (Clause 9.1)**

NOMINAL BORE	OUTSIDE DIAMETER		THICKNESS	WEIGHT OF BLACK TUBE	
	Maximum	Minimum		Plain End	Screwed and
(1)	(2)	(3)	(4)	(5)	(6)
mm	mm	mm	mm	kg/m	kg/m
6	10.6	9.8	2.0	0.407	0.410
8	14.0	13.2	2.35	0.650	0.654
10	17.5	16.7	2.35	0.852	0.858
15	21.8	21.0	2.65	1.22	1.23
20	27.3	26.5	2.65	1.58	1.59
25	34.2	33.3	3.25	2.44	2.46
32	42.9	42.0	3.25	3.14	3.17
40	48.8	47.9	3.25	3.61	3.65
50	60.8	59.7	3.65	5.10	5.17
65	76.6	75.3	3.56	6.51	6.63
80	89.5	88.0	4.05	8.47	8.64
100	115.0	113.1	4.5	12.1	12.4
125	140.8	138.5	4.85	16.2	16.7
150	166.5	163.9	4.85	19.2	19.8

**TABLE 3 DIMENSIONS AND NOMINAL WEIGHTS OF BLACK STEEL
TUBES (HEAVY) (Clause 9.1)**

NOMINAL BORE	OUTSIDE DIAMETER		THICKNESS	WEIGHT OF BLACK TUDE	
	Maximum	Minimum		Plain End	Screwed and Socketed
(1)	(2)	(3)	(4)	(5)	(6)
mm	mm	mm	mm	kg/m	kg/m
6	10.6	9.8	2.65	0.493	0.496
8	14.0	13.2	2.9	0.769	0.773
10 -	17.5	16.7	2.9	1.02	1.03
15	21.8	21.0	3.25	1.45	1.46
20	27.3	26.5	3.25	1.90	1.91
25	34.2	33.3	4.05	2.97	2.99
32	42.9	42.0	4.05	3.84	3.87
40	48.8	47.9	4.05	4.43	4.47
50	60.8	59.7	4.5	6.17	6.24
65	76.6	75.3	4.5	7.90	8.02
80	89.5	88.0	4.85	10.1	10.3
1000	115.0	113.1	5.4	14.4	14.7
125	140.0	138.5	5.4	17.8	18.3
150	166.5	163.9	5.4	21.2	21.8

11. LENGTHS

11.1 Random Length - Tubes shall be supplied in random lengths from 4 to 7m.

11.1.1 For orders of over 150 m of any one size of tube, it shall be permissible to supply short random lengths from 2 to 4 m, provided that the number of such lengths does not exceed 7.5 percent of the total number of lengths for sizes 65 to and including 100 mm nominal bore, and 5 percent for all other sizes. In addition, it shall be permissible for two lengths to be jointed together to make a random length, provided that the number of such jointed lengths does not exceed 7.5 percent of the total number of lengths for sizes 65 to and including 100 mm nominal bore, and 5 percent for all other sizes.

11.2 Exact Lengths - Where exact lengths are specified, either for screwed and socketed tubes or for plain end tubes, each tube shall be within

+ 6

- 0 mm of the specified length.

12. CALCULATION OF MASS PER UNIT LENGTH

The dimensions in millimetres given in the tables are considered to be "Corresponding Values" although some of them are not exact equivalents. In all cases however, the dimensions ensure practical interchangeability.

12.1 The conventional masses have been determined by taking the arithmetical mean between the theoretical masses calculated with the formula:

$$M = (D-T)T \times 0.024\ 661$$

Where, M = mass per unit of length, in kilograms per metre;

D - Specified outside diameter, in millimetres;

T = Specified wall thickness, in millimetres;

12.1.1 JOINTS

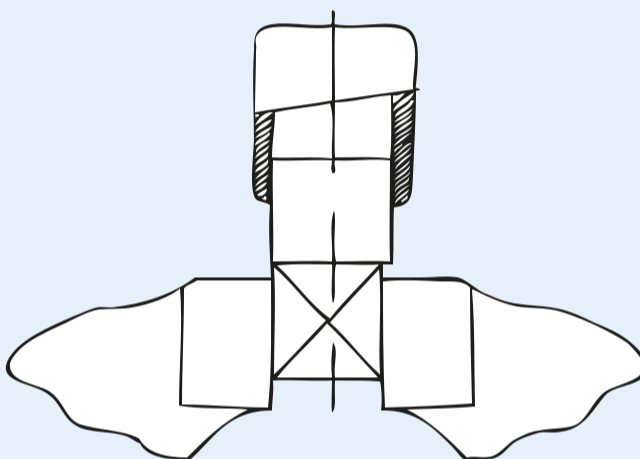
12.1.2 All screwed tubes and sockets shall be supplied with pipe threads.

12.1.3 Unless specified otherwise, tubes shall be supplied screwed with taper threads and sockets with parallel threads.

However, in the case of 'light' tubes, the application of taper pipe threads may be within the limits shown in col. 2 and 3 of Table 1. Where the tube approaches the lower limit of outside diameter, some 'run out' threads (perfect at root and imperfect at the crest) may be expected from and beyond the gauge plane. Such 'run out' threads shall not be regarded as justification for rejection of the tubes. Also the minimum length of threads in 'light' tubes shall be 80 percent.

12.2 Each tube shall be supplied with one socket. The ends of sockets shall be chamfered internally to prevent damage to the leading thread. Tapping of sockets shall be done from one end only.

TABLE 4 DIMENSIONS OF SOCKETS
all dimensions in millimeters (Clause 9.1)



NOMINAL BORE	OUTSIDE DIAMETER, A	LENGTH, B
	Min	Min
(1)	(2)	(3)
6	15	19
8	18.5	27
10	22	24
15	27	37
20	32.5	39
25	39.5	46
32	49	51
40	56	51
50	68	60
65	84	69
80	98	75
100	124	87
125	151	96
150	178	96

NOTE - The socket lengths shown in this table meet the requirements of ISO/ R 50-1957, but the minimum lengths has been increased to allow for the chamfer at the ends of the socket and is based on :

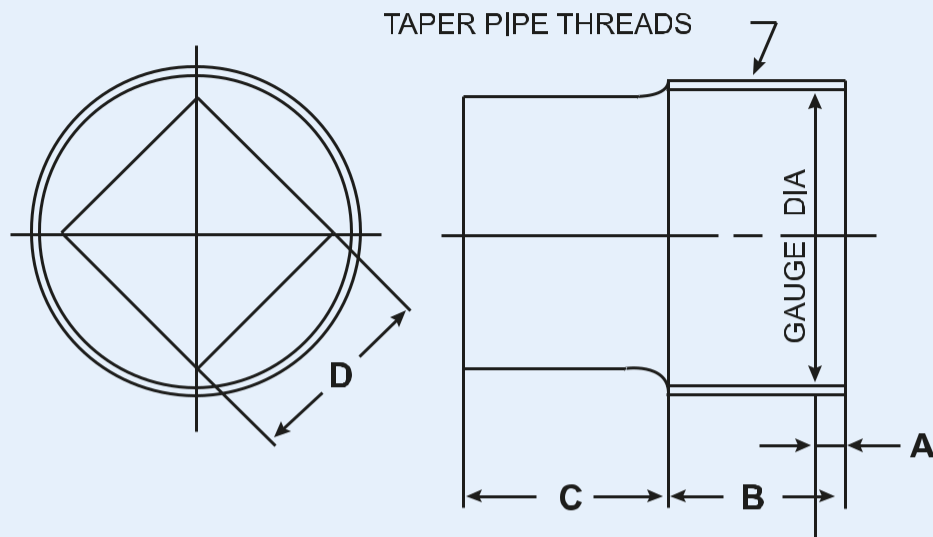
$$B = 2L + 3\frac{1}{2}P$$

Where-

L = length of useful thread on pipe end,

P = pitch of thread.

TABLE 5 DIMENSIONS OF TAPER SCREW PLUGS FOR EXPANSION TEST
(Clause 9.1) all dimensions in millimeters.



NAOMINAL BORE	GAUGE DIAMETER	THRDLAND PER 25.4 MM	NUMBER OF THREAD	A	B	C	D
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(9)
6	9.728	28	2	1.8	13	11	7
8	13.157	19	2	2.8	19	13	10
10	16.662	19	2	2.8	19	16	13
15	20.955	14	2	3.6	25	19	14
20	26.441	14	2	3.6	25	29	17
25	33.249	11	2	4.6	32	29	21
32	41.910	11	2	4.6	32	32	27
40	47.803	11	2	4.6	32	38	32
50	59.614	11	2	4.6	32	38	37
69	75.184	11	2	4.6	32	51	48
80	87.884	11	2	4.6	32	57	54
90	100.330	11	2	4.6	32	60	64
100	113.030	11	2	4.6	32	64	70
125	138.430	11	2	4.6	32	67	76
150	163.830	11	2	4.6	32	70	89

13. GALVANIZING

13.1 For tubes with thickness up to 6mm the minimum mass of zinc coating, when determined on a 100 mm long shall be 40 gm/m²

13.2 Quality of zinc - The quality of zinc coating on the tube shall be at least grade Zn 99.000 which shall be used for the purpose of galvanizing.

13.3 The mass of coating expressed in kilograms per square metre shall be calculated by dividing the total weight of zinc (inside plus outside) by the total area (inside plus outside) of the coated surface.

13.4 The zinc coating shall be uniform, adherent, reasonably smooth and free from such imperfections as flux, ash and dross inclusions, bare patches, black spots pimples, lumpiness, runs

rust stains bulky white deposits, and blisters.

14. HYDRAULIC TEST

14.1 Each tube shall be hydraulically tested at the manufacturer's works either before or after galvanizing.

14.2 Each tube shall withstand a test pressure of 50kg/m² without showing defects of any kind. The test pressure shall be maintained for at least 5 s.

14.3 The pressure shall be applied by approved means and maintained sufficiently long for proof and inspection. The testing apparatus shall be fitted with an accurate pressure indicator, and provision shall be made for its accuracy to be verified by the purchaser, if required.

15. TESTS ON FINISHED TUBES AND SOCKETS

The following tests shall be carried out by the manufacturer on finished tubes and sockets.

15.1 Bend test on tubes up to and including 50 mm nominal bore - When tested the finished tubes shall be capable of withstanding the bend test without showing any signs of fracture or failure. Welded tubes shall be bent with the weld at 90 to the plane of bending. The tubes shall not be filled for this test.

15.1.1 Un galvanized tubes shall be capable of being bent cold, without cracking, through 1800 round a former having a radius at the bottom of groove, in the plane of bending, equal to six times the outside diameter of the tube.

15.1.2 Galvanized tubes shall be capable of being bent cold, without cracking of the steel, through 900 round a former having a radius at the bottom of the groove equal to eight times the outside diameter of the tube.

15.2 Flattening test on tubes above 50 mm nominal bore - Rings, not less than 40 mm in length cut from the ends of the selected tubes, shall be flattened between parallel plates with the weld if any at 900 (point of maximum bending). No opening shall occur by fracture in the weld until the distance between the plates is less than 75 percent of the original outside diameter of the pipe and no cracks or breaks in the metals elsewhere than in the weld shall occur until the distance between the plates is less than 60 percent of the original outside diameter.

15.2.1 The test rings may have the inner and outer edges rounded.

15.3 Expansion test on sockets - It shall be carried out on socket blanks or sockets and the minimum increase in outside diameter after expansion shall be 7.5 percent without

15.4 Retest - Should any of the test pieces first selected fail to pass any of the tests specified, two further samples shall be selected for testing in respect of each failure. Should the test pieces from both these additional samples pass, the material shall be deemed as not complying with the standard.

16. WORKMANSHIP

The tubes shall be cleanly finished and free from scales inside and outside surfaces of the tubes shall be free from injurious defects for use. They shall be reasonably straight, free from cracks surface flows laminations and other defects. The screw threads of screwed tubes and sockets shall be clean and well cut. The ends shall be cut cleanly and square with the axis of the tube.

17. MARKING

17.1 All pipes shall bear the print of the following:

- i) Manufacturers name and identification or trade marks.
- ii) Classification designation.

- iii) Nominal size of the pipe.
- iv) Number of this Bangladesh Standard.
- v) Country of the origin.

17.2 The different classes of pipes shall be distinguished by relief letter at 3m spacing or less which shall be embossed as follows before the tubes leave the manufacture's works:

Colour	Symbol
Red	H
Blue	M
Yellow	C

17.3 The pipes and tubes may also be marked with the BSTI Certification Mark. The use of the BSTI Certification Mark is governed by the provisions of the Bangladesh Standards & Testing Institution. Ordinance, 1985 and Rules and Regulations made there under. The detail conditions for obtaining licence for using standard mark may be obtained from the Institution.

17.4 All along random lengths shall each have two 75 mm approximately bands, one each near each end; all other lengths each have one 75 mm band.

18. PROTECTION AND PACKING

18.1 Where tubes are bundled for transport, all qualities of tubes are bundled for export; all quantities of tubes shall be packed in accordance with Bangladesh standard - Code of practice for packaging of steel tubes (under preparation). Unless otherwise specified black tubes may be supplied unvarnished or unpainted externally unless ordered varnished/painted externally throughout the length.

19. SAMPLING OF TUBES AND SOCKETS

19.1 Lot - For the purpose of drawing samples all mild steel tubes bearing same designation and manufactured under a single process shall be grouped together to constitute a lot. Each lot shall be sampled separately and assessed for conformity to this specification.

19.2 SAMPLING AND CRITERIA FOR CONFORMITY - The procedure for sampling of tubes for various tests and criteria for conformity shall be as given in Appendix A. For expansion test on sockets the scale of sampling (sample size) and acceptance number shall be as given for other physical tests in Table 2 of Appendix A.

Appendix-A

A-I PROCESS INSPECTION

A-I.1 The object of inspecting and testing steel pipes, tubes and fittings by the purchaser is to ensure their conformity to the specification requirements, where as inspection done by the manufacturer during production is to ensure conformity to relevant specifications as also to maintain better control over the process. The manufacturer may take representative samples of the items at regular intervals to control the quality fluctuations. The inspection levels given in Appendix B may serve as a guide for routine control over the manufacturing process.

A-1.2 LOT INSPECTION

In case adequate and satisfactory system of quality control has been maintained, the resulting data and information may be made available to the purchaser along with the items supplied to enable him to judge the acceptability of the lot. When it is not possible to make such information available to the purchaser or when the purchaser so desires, the procedure laid down in the following clauses shall be followed for determining the conformity of the lot of steel pipes, tubes and fittings to the requirements of the relevant specifications.

The samples shall be selected and examined for each lot separately for ascertaining their conformity to the requirements of the relevant specification.

Unless other wise agreed to between the supplier and purchaser, each and every item shall be inspected/tested for surface defects and the defective ones removed. If agreed to between the parties concerned, the hydraulic test may also be conducted on each and every tube preferably before finishing.

A. 1.3 The lot which has been found satisfactory in respect of visual characteristics shall be tested for weight and dimensional characteristics like length, thickness and diameter. The number of items to be selected from a lot for the checking of dimensional characteristics depends on the size of the lot and shall be taken in accordance with the relevant columns of Table 1. In the case of circular pipes and tubes with outside diameter less than or equal to 200 mm the scale of sampling would be in accordance with columns 1 and 2 of Table I. In the case of all other circular pipes and tubes with outside dia more than 200 mm as also pipes and tubes of non-circular cross sections, the scale of sampling would be in accordance with columns 1 and 4 of Table 1.

TABLE 1 SCALE OF SAMPLING AND PERMISSIBLE NUMBER OF DEFECTIVES FOR DIMENSIONAL CHARACTERISTICS

Lot Size	PIPES OR TUBES (OUTSIDE DIA <200 mm)		OTHERS	
	Sample	Acceptance Size Number	Sample Size	Acceptance Number
(1)	(2)	(3)	(4)	(5)
Up to 100	3	0	2	0
101 to 150	5	0	3	0
151 to 300	8	0	5	0
301 to 500	13	0	8	0
501 to 1000	20	1	13	0
1001 to 3000	32	2	20	1
3001 to 10000	50	3	32	2
10001 and above	80	5	50	3

A-1.4 Each of the items selected according to 4.2 shall be inspected for all dimensional requirements. Any item failing to meet one or more dimensional requirements shall be considered as defective. If the number of defectives found in the sample checked for dimensional characteristics is less than or equal to the corresponding acceptance number, lot shall be deemed as having met the dimensional requirements of the relevant deification, otherwise not.

In the case of those lots which have been found unsatisfactory, all the items in the lot may be inspected for dimensional characteristics and the defectives be removed, if agreed to between the purchaser and the supplier.

A-1.5 The lot shall also be tested for appropriate physical characteristics like tensile strength, bend, flattening and drift tests. The number of items to be drawn in accordance with Table 2 may be taken at random from that already drawn for dimensional inspection.

From each of the items so chosen, the required number of test specimens shall be prepared for conducting the physical tests specified. The manner of preparation of test specimens as well as their dimensions shall be in accordance with the relevant specifications. Any item failing to meet the requirements of a physical test shall be considered as a defective.

TABLE 2 SCALE OF SAMPLING AND PERMISSIBLE NUMBER OF DEFECTIVES FOR PHYSICAL TESTS (TENSILE, BEND, FLATTENING AND DRIFT)

LOT SIZE	STAGE OF THE SAMPLE	SAMPLE SIZE FOR EACH PHYSICAL TEST	ACCEPTANCE NUMBER (a)	REJECTION NUMBER (r)
(1)	(2)	(3)	(4)	(5)
301 to 800	First	5	0	2
	Second	5	1	2
801 to 3000	First	8	0	
	Second	8	2	3
3001 and above	First	13	1	3
	Second	13	3	4

NOTE: For lot size less than 300, the sample size and criteria for acceptance will be as agreed to between the purchaser and the supplier.

For any of the physical tests, if in the first sample the number of defective items is less than or equal to the corresponding acceptance number (a) the lot shall be declared as conforming to the requirement of that test. If the number of defectives is greater than or equal to the corresponding rejection number (r), the lot shall be deemed as not meeting the requirement of that particular physical test. If the number of defectives is greater than the acceptance number but less than the rejection number, a second sample of the same size as the first shall be taken to determine the conformity or otherwise of the lot. The number of defectives found in the first and second samples shall be combined and if the combined number of defectives is less than or equal to the corresponding acceptance number of the second sample, the lot shall be declared as conforming to the requirements of the particular physical test, otherwise not.

APPENDIX B

(Clause 3.1)

MAXIMUM PERMISSIBLE PRESSURE AND TEMPERATURES FOR TUBES FOR CONVEYING STEAM

B-1. The maximum permissible pressures and temperatures for tubes with screwed and socketed joints shall be as given in Table 6.

**TABLE 6 MAXIMUM PERMISSIBLE PRESSURE AND TEMPERATURES FOR
TUBES WITH SCREWED AND SOCKETED JOINTS**

NOMINAL BORE	MAXIMUM PERMISSIBLE PRESSURE	MAXIMUM PERMISSIBLE TEMPERATURE
(1)	(2)	(3)
mm	N/cm ²	°C
Up to and including 25	118	260
Over 25 up to and including 40	103	260
Over 40 up to and including 80	88	260
100	69	260
125	58	260
150	49	260

B-2 For tubes fitted with appropriate flanges or suitably butt welded together, the maximum permissible pressure shall be 206 N/cm² and the maximum permissible temperature 260°C.



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