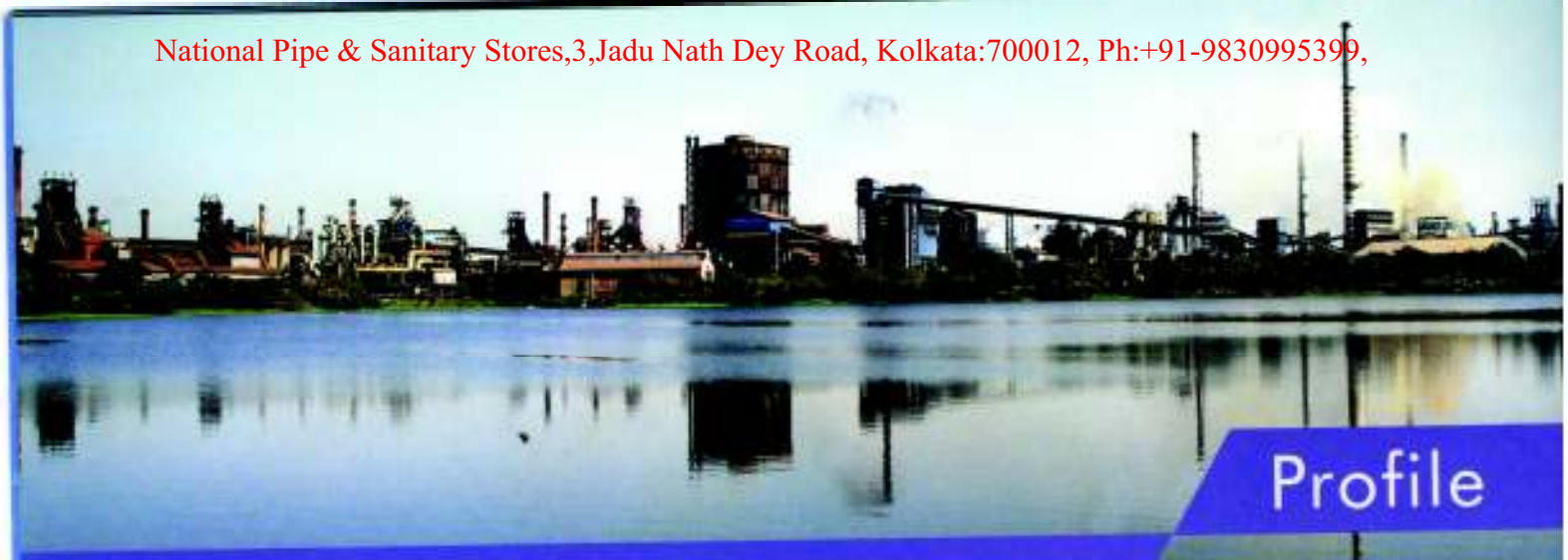
TATA PIPES
FOR NOW. FOR YEARS.

TATA
TATA STEEL

# Tata Pipes

## Commercial Tubes for Conveyance Applications



# Profile

Located at Jamshedpur, Tata Steel Ltd. was established in 1907 and was the first Integrated Steel Plant in India. It commenced its operations in 1911, with a capacity of 1,00,000 tonnes per annum of ingots and expanded to a million tonnes per annum of saleable steel by the mid fifties.

Presently it has an annual capacity of 6 million tonnes at its Jamshedpur Plant. The Plant, equipped with the latest steel making facilities such as Basic Oxygen Furnaces, Vacuum Degassing and Continuous Casting Units, presents the very epitome of technological advancement. A whole range of steels addressing the needs of the Construction / Engineering and Automotive sector, testify to Tata Steel's capability. These products have found acceptance not only in the domestic market but all over the world.

# Contents



# Tata Steel - Tubes Division

A new dimension in steel tube technology opened up in India in the early 50's – with the establishment of the Indian Tube Company Limited (ITC), on the 17th of December 1954. It was the outcome of a joint venture between Tata Steel and Stewarts and Lloyds of UK. In 1985, the Indian Tube Company merged with Tata Steel to form the Tata Steel - Tubes Division. The Tubes Strategic Business Unit (SBU), today, is a leading manufacturer of welded pipes and tubes in the country with an annual production capacity of around, 4,00,000 tonnes, with expansion plans on the anvil.

Indian Tube Company Limited (ITC), 1954.

The Tubes Division manufactures commercial, structural and precision tubes at its Jamshedpur - Tubes Division Plant. The SBU has a network of sales offices across the country with the marketing headquarters in Kolkata to provide better customer service.


The modernised Tubes SBU Plant in Jamshedpur

## State-of-the-art technology

The Tubes SBU has embraced the culture of business excellence reflected through a leading presence across several lines of business. A high degree of customisation has been achieved through a comprehensive plant modernisation programme, involving upgradation of the [illegible] technology and process control.

## Lines of business

The three main lines of business are:

- Commercial Tubes - for the Conveyance segments, sold under the brand name of "**Tata Pipes**"
- Structural Tubes - for the Construction segment, sold under the brand name of "**Tata Stuctura**"
- Precision Tubes - for the Auto and Boiler segments

Tubes being manufactured in state-of-the-art HFIW Mill

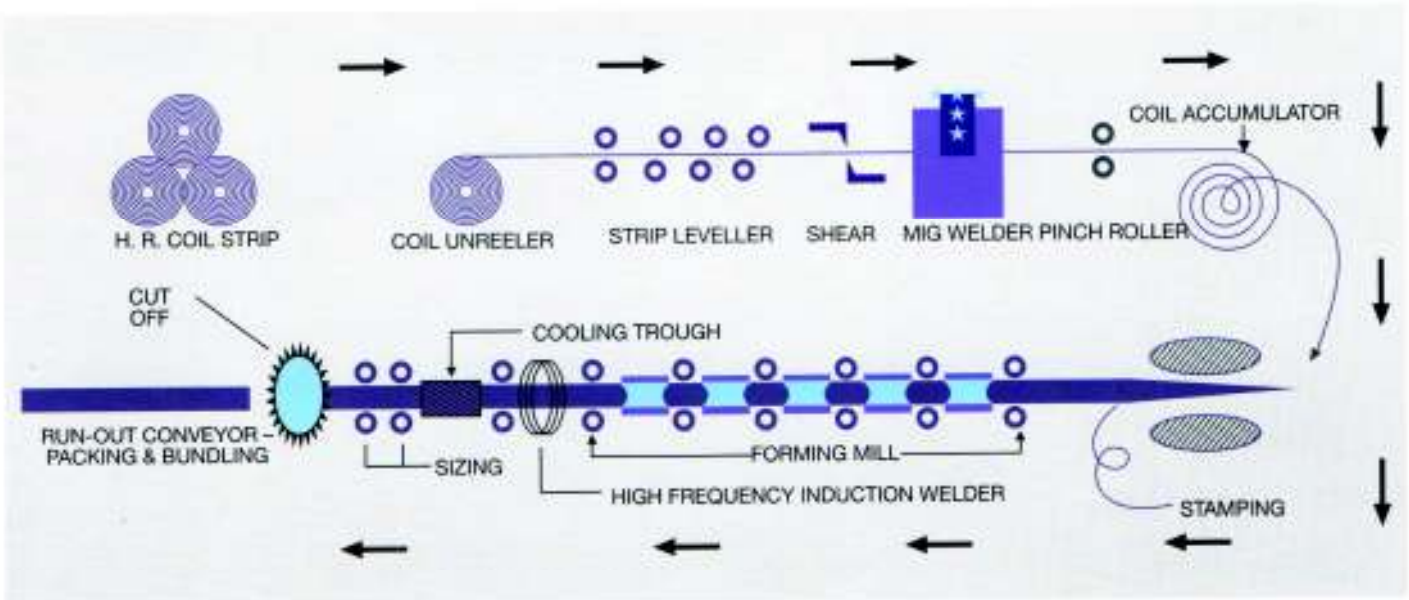
 

# Manufacturing Process

HFIW induction welding in progress

Control room for on-line Non-Destructive testing

The Tubes Plant at Jamshedpur boasts of state-of-the-art facilities in tube making, with technology from OTO Mills (Italy), Kusakabe (Japan) and MAIR Research (Italy). Tata Pipes are manufactured by the High Frequency Induction Welding (HFIW) Process. The process, also known as the Cold Process, uses HR strips, which are manufactured at Tata Steel's modern Hot Strip Mill. In the HFIW process, the HR coil goes through the MIG welder, while a steady flow is assured from the horizontal/vertical coil accumulator. Cold Stamping is done at this stage with the TATA seal of quality. The tubes then progressively form as the strip passes through successive rolls and is followed by the high frequency induction welding at the edges to complete the weld. External beads due to weld deposition on the outer surface of the tubes is then removed to ensure a smooth surface finish. Following the welding process, an eddy current non-destructive testing machine screens out the imperfectly welded tubes. Tubes that pass the test are cut into required lenghts by cold saw, which gives smooth burr-less square cutting edge. Tubes are then packed in hexagonal bundles by MAIR Auto-packing machine.




A line diagram depicting the flow of material in the HFIW Mill

## State-of-the-art technology from...

# Manufacturing Process at a glance

1. Slit HR Coil

2. HR Coil inserted on the uncoiler

3. Floop ensures a steady flow of coil

4. HR Coil passes through the mill roll train

5. Formation of Tube through the rolls

6. High Frequency Induction Welding at the edges

7. Cut to length by cold saw

8. Galvanizing after pickling and cleaning

9. Threading & Socketing

10. Automatic Bundling & Packing

11. Tubes packed in Hexagonal Bundles

12. Tubes dispatched across India

# Finishing and Packaging

## Finishing Operations for Tubes

Extraction system of tubes from molten bath of zinc during hot dip galvanising of tubes

### 1. Galvanising

The high-tech hot-dip galvanizing process is used, in which the tubes are pickled (i.e. washed in acid baths to clean out impurities) just before galvanizing. Once galvanization is complete, the tubes are picked up by magnetic rolls and super-heated steam is blown through them to ensure clean bores and uniform coating on both surfaces.


Dot Matrix Printing

### 3. Dot Matrix Printing on Galvanized Pipes

Post galvanizing, the pipes are imprinted with the nominal bore, class, length and the zinc coating as per specifications, using a dot matrix printer. The dot matrix printing is done only on galvanized pipes.

Threading machine used for threading of tubes ordered in threaded and socketed condition

### 2. Threading and socketing

The tubes are screwed with taper pipe threads and sockets with parallel threads as per IS:554. The parameters related to threading are checked during operations, with carefully calibrated gauges.


MAIR Research Auto-packing machine

### 4. Packaging

The finished tubes, light, medium and heavy are packed on the packing tables and bundled separately on the bundling machine. The loading operations are then carried out by fully mechanized cranes on to trucks, for transportation across the country.

# Tata Quality - The 'Q' Factor

TATA Steel lays a great emphasis on quality and all the tubes manufactured undergo various quality assurance tests, to ensure customer delight. The manufacturing process is governed by a comprehensive quality plan. Each and every plant in the Tubes SBU today has been certified to ISO : 9001:2000.

Bend testing machine used for testing bend ductility, weld quality and quality of zinc coating on the tubes

Brinnel & Vickers hardness testing machine in operation

Flattening test in progress


Indian Register Quality Systems

Certificate Of Approval

Tata Steel Limited
Tubes Division

ISO 9001 : 2008

Manufacture, Marketing and Supply of Steel Tubes


Indian Register Quality Systems

Certificate Of Approval

Tata Steel Limited
Tubes Division

ISO 14001 : 2004

Manufacture and Supply of Steel Tubes


Indian Register Quality Systems

Certificate Of Approval

Tata Steel Limited
Tubes Division

OHSAS 18001 : 2007

Manufacture, Marketing and Supply of Steel Tubes

# Product Range

## 15 mm NB to 150 mm NB


Colour coded Tata Pipes
Class A (Light) Class B (Medium) Class C (Heavy)

**Surface Finish**
Galvanised and black

**End finish**
Plain at ends/Screwed and Socketed

**Specifications**
IS 1239 Part-1, IS 1161, BS 1387, IS 4923, IS 9295, IS 3601 & IS 3589

**Identification**
Tata mark cold stamped

## 168.3 mm OD to 323.9 mm OD

Larger diameter pipes being bundled for shipment

**Thickness Range**
168.3mm OD : 4.0mm to 4.50mm
219.1mm OD : 4.0mm to 6.3mm
273.1mm OD : 4.0mm to 6.3mm
323.9mm OD : 5.0mm to 7.0mm

**Surface Finish:** Black
**End Finish:** Plain at ends
**Specifications:** IS :3589


Tata mark cold stamped

## Dot Matrix Printing for galvanised pipes

To add to the cold-stamping during the manufacturing process, "Tata Pipes" is now also printed on the pipes using automatic high-end dot matrix printers.


Dot matrix printing

# Why use Tata Pipes?

TATA

TATA STEEL

**1. The trusted Tata name –** Tata pipes come with the same quality assurance, which you would associate with the Tata name.


**2. Guaranteed 360 GSM Zinc Coating –** Consistent and uniform Zinc coating both on outside and inside of tubes, offers greater resistance to corrosion, prevents water contamination and results in increased longevity.

**3. Exact Length of 6 metres –** No chance of being cheated and no wastage of pipes.


**4. Available at a uniform price –** The only pipes brand with a Recommended Consumer Price.

**5. Thickness as per specification IS: 1239 & IS: 3589 –** Strict adherence to Scheme of Testing and Inspection laid down by Bureau of Indian Standards (BIS) as per licensing norm – Always reliable.


**6. Boron$^{+}$ Steel –** Superior threadability, hence strong joints. (For specific applications).


**7. Available only at authorized retail outlets –** A tension-free buying experience with no hassles.

# Segments - Plumbing & Irrigation

## Plumbing

A pioneer in plumbing pipes, Tata Pipes has been bringing water into our homes, and joy in our lives, for over 50 years.

Sizes normally used: **15 mm, 20 mm and 25 mm** NB Galvanized Plain Ended or Socketed Steel Pipes IS: 1239.

Tata Pipes for plumbing are made of **Boron+ steel**, giving them superior threadability and strong joints, making them rust-free and leak-proof.

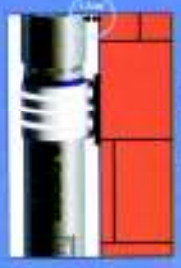
## Irrigation

Sizes normally used: **32mm to 150 mm** NB Galvanized Plain Ended or Socketed Steel Pipes IS:1239

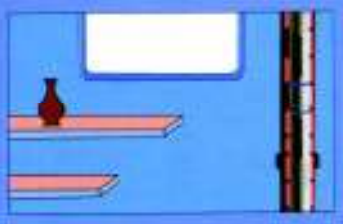
Tata pipes ensure that the Indian farmer is no longer at the mercy of the rains.

- Tata Pipes for boring are heavy and sink easily into the ground
- They are resistant to corrosion and rust-proof, hence can be used effectively for a long period of time without any maintenance hassles
- Tata pipes have deep threads and strong sockets, for a better grip
- Tata pipes can be re-sunk time and again, and are worth a lot even as scrap

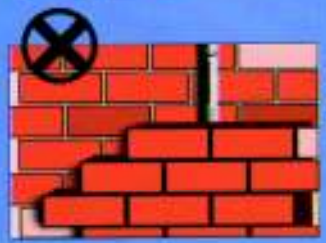
## Plumbing Best Practices



1. For fixing the pipe, a clamp should be used, keeping the pipe about 1.5 cm away from the wall.

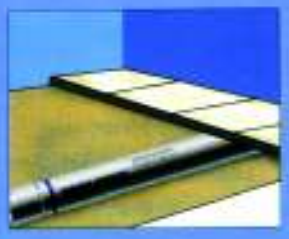


2. In case of concealment of pipes, encasing may be adopted or the pipe can be fixed inside ducts and recesses.



3. Pipes should not be buried inside brick walls or solid floors.

4. When the pipes are embedded in walls or floors, it should be covered with Hessian cloth dipped in coal tar/ Black Japan.



5. Life of galvanised pipes is increased when it is not in direct contact with lime mortar or lime concrete.

6. When the pipes are laid under the floor, it concrete floors.

7. Heat insulation like thermocol or glass wool should be provided for hot water pipes as per specification. When the service line is complete, it should be slowly and carefully charged with water and pressure tested to ensure leak-proofness.

# Segments - Process Industries

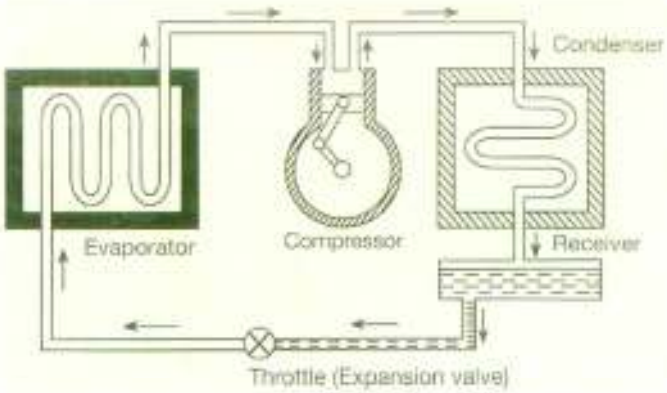
## Cold Storage

Cold Storage Plants are meant to preserve the perishable commodities of food items for a longer period, with retention of the original colour, flavour and taste.

Unlike cold storage plants in developed countries, cold storages in our country have perforce adapted technology to local resource availability and needs. But with new opportunities emerging and with increasing competition, there is now a need to ensure technological & operational excellence if optimum benefits are to be obtained.

## Design & application of Pipes in Cold Storages

Cold storage plants are large warehouses equipped with a vapour compression system for refrigeration, traditionally using ammonia as the refrigerant. The system functions through a network consisting of a compressor, condenser, expansion valve and an evaporator.




A simplified flow diagram of a vapour compression refrigeration system

If the performance of the refrigeration system is to be optimized, it is necessary to ensure that pipes of right dimensions and quality are used across the system. Apart from the intricate pipe network in condensers and evaporators, designated as 'heat exchangers', the vapour compression refrigeration system has to include interconnecting pipes for these heat exchangers.

**Pipe Sizes normally used : 15 mm NB to 200 mm**

If you are in the business of cold storage, and are setting for ordinary pipes you are running the risk of leakage. Because, nothing really matches up to the superior quality of Tata Pipes. It is backed by over 50 years of manufacturing expertise in steel tubes & pipes and bears the trusted Tata name.

## Tata Pipes : Ideal for Cold Storage

- Made of high quality in-house steel - bringing down the possibilities of unforeseen leakages especially in the condenser which is exposed to the atmosphere
- Smooth inner surfaces reduce friction losses thereby improving the performance of the system and lowering running costs

**Endorsements**

"Tata Pipes offer value for money because leakage of ammonia can have disastrous consequences. It has been found that this risk exists in cheaper quality pipes, whereas with Tata Pipes consumers have rarely faced these problems"

**Mr Ashoke Ghosh**

Refrigeration Consultant, Member American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHEAW)

"Tata Pipes have always been found to be of superior quality as compared to all other brands of pipes in terms of dimensional accuracy, reliability and other parameters"

**Mr Dipak Guha**

Refrigeration & Air-conditioning Consultant, Refcon Projects, Kolkata

# Segments - Process Industries

## HVAC

HVAC stands for Heating, Ventilation, and Air-Conditioning—three closely related fundamental functions with both commercial and residential applications. The concept was coined by Volkart Brothers, being the pioneers in this segment, and was introduced way back in 1950.

The steady growth of the real estate market in India has created opportunities for major developers to promote large format office spaces and associated structures like malls, resorts, hi-tech hospitals, etc. This growth has necessitated in realising the importance of the HVAC and Fire-fighting systems in both residential and commercial structures as a prime essential for safety and health.

HVAC can further be distinguished as two separate segments –

- Commercial Cooling – large spaces of hotels, IT parks, malls, airports etc.
- Process Cooling – for sterilized rooms of pharmaceutical and manufacturing industries

The primary use of HVAC is to regulate room temperature, humidity, and air flow, ensuring that such elements remain within their acceptable ranges. Effective control of such factors minimizes health-related risks.

## Chillers/Air Conditioners – Standard Procedures

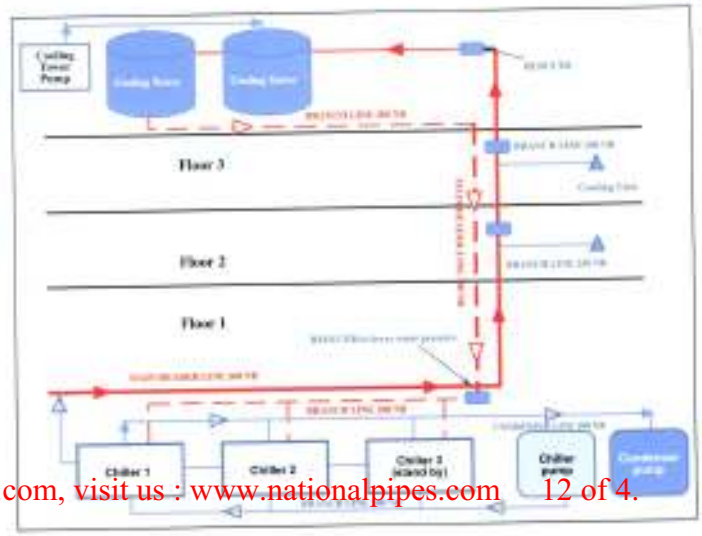
For application of MS Pipes in this segment, details regarding the common practices followed, sizes of steel pipes used, and specifications required are as given below.

Class of MS Pipes to be used in Air Conditioning and Chiller Systems depends

- Pipes used in Fan Coil Unit – 25 NB to 32 NB
- Pipes used from chiller header to AHU (Air Handling Unit) – 50 NB to 150 NB
- Pipes used in chiller branch lines – 150 NB to 250 NB
- Pipes used in chiller main lines – 300 NB to 500 NB

Thicknesses of pipes with respect to grades are given below.

| Pipe size | Material | Specification |
|---|---|---|
| Up to 40 NB | MS "C" Class | IS 1239: 1973 Part I&II |
| 50 NB-150 NB | MS "C" Class | IS 1239: 1973 Part I&II |
| 200 NB & 250 NB | Welded pipe with minimum 5 mm thickness | IS 3589:1966 |
| 300 NB | Welded pipe with minimum 6 mm thickness | IS 3589:1966 |
| 300 NB & over | Welded pipe with minimum 8 mm thickness | IS 3589:1966 |



# Segments - Process Industries

## Fire-Fighting

It has evolved as a prime safety parameter for any real estate development. For any construction above 3 floors, irrespective of being residential or commercial and manufacturing units, fire-fighting is now a mandatory requirement.

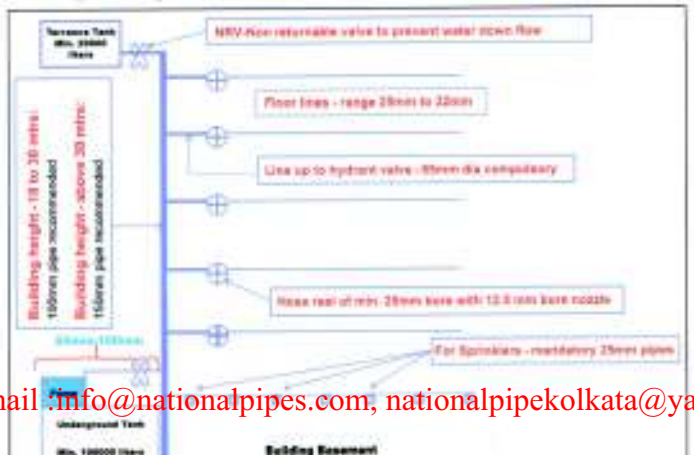
Tata Pipes have forged market leadership in the Fire-fighting segments by providing a clearly superior performance over competition. Usage in projects throughout India is testimony to Tata Pipes' attention to quality and safety.

Sizes normally used range from 25 mm to 300 mm NB "C" Class MS Pipes with plain end or socketed confirming to IS: 1239 & IS: 3589 specifications.

## Guidelines For Water Supply Arrangements For Fire-Fighting (IS: 3844 & IS: 9668)

Basic requirements as per standard norms of Fire-Fighting (IS 3844 & IS 9668) in high-rise buildings are as given below –

- For buildings of height of 18 mtrs to 30 mtrs, the risers should not be less than 100mm internal diameter
- For buildings exceeding height of 30 mtrs, the risers should not be less than 150 mm diameter
- The hydrant coupling valve in each floor should be of minimum 65 mm MS Pipe
- Hose reel bore of 25 mm diameter with 8 mm hose should be used
- For effective water jet force, a 12.5 mm bore nozzle should be used
- Overhead tank should not be of capacity less than 20,000 litres
- The underground tank should not be of capacity less than 1,00,000 litres
- Depending on the height of the building, 80mm to 100 mm pipes should be used for line from pump to main hydrant
- For individual floor lines, pipes of diameter 25mm to 32mm should be used
- For sprinkler system, 25mm pipes should be used




## Internal hydrants

In an internal hydrant, the installation comprises of the following elements:

- Riser mains, down-comer mains or external mains to feed water from the source to the required point under pressure
- Fire fighting pump/pumps with all fitments and components and pump control panel, housed in a pump house
- All necessary components like internal hydrants (landing valves) and external hydrants, hose reels, hoses and branch pipes, suitably housed
- Hydrant valves - to be mounted horizontally to prevent impurity deposition

## External Hydrants

- For external hydrants, piping (water main) should be laid preferably underground, to avoid it getting damaged by moving vehicles, etc
- To avoid rusting, underground pipes should be either of cast iron conforming to IS 1536 or MS/GI conforming to IS 1239, in which case it should be properly treated with a coat of primary paint with two coats of bitumen paint
- The pipes should be properly supported on pedestals - not more than 3 m apart
- Underground pipes should be laid 1 m below to avoid damage during road repair. At road crossings where heavy vehicles are expected to pass, it should pass through RCC pipe for additional protection

## Suction and Delivery Pipe Sizes

The suction and delivery pipes should be of adequate size to meet the functional requirements of the pump, and should not be less than following:

| | Suction | Delivery |
|---|---|---|
| a) 450 l/min terrace pump | 50 mm | 50 mm |
| b) 900 l/min terrace pump | 75 mm | 50 mm |
| c) 1 400 l/min terrace pump | 100 mm | 100 mm |
| d) 2 280 l/min fire pump | 150 mm | 150 mm |
| e) 2 850 l/min fire pump | 200 mm | 150 mm |
| f) 4 540 l/min fire pump | 250 mm | 200 mm |

## Risers & Pumps

- The rising mains/down-comer mains should be of galvanized iron pipes conforming to medium class of IS 1239
- The pump should have an alternate source of power supply in case of emergency
- The main fire pump at the underground water tank, with the capacity to discharge 900 litres per minute at 3 bar pressure as measured at the terrace level, should be installed

# Specification of Pipes: IS 1239 & IS 3589

Dimensions and nominal mass of Steel Tubes - Light, Medium & Heavy Conforming to IS : 1239 (part-1) 2004

| Nominal Bore (mm) | Class or Category | Outside diameter (mm) | | Thickness (mm) | Mass of Tube Black & Galvanised | | | |
|---|---|---|---|---|---|---|---|---|
| | | Max | Min | | Plain End Kg/m | Screwed & Socketed Kg/m | Plain End Metre/Ton | Screwed & Socketed Metre/Ton |
| 15 | L | 21.4 | 21.0 | 2.0 | 0.947 | 0.956 | 1056 | 1046 |
| | M | 21.8 | 21.0 | 2.6 | 1.21 | 1.22 | 826 | 820 |
| | H | 21.8 | 21.0 | 3.2 | 1.44 | 1.45 | 694 | 690 |
| 20 | L | 26.9 | 26.4 | 2.3 | 1.38 | 1.39 | 725 | 719 |
| | M | 27.3 | 26.5 | 2.6 | 1.56 | 1.57 | 641 | 637 |
| | H | 27.3 | 26.5 | 3.2 | 1.87 | 1.88 | 536 | 532 |
| 25 | L | 33.6 | 33.2 | 2.6 | 1.98 | 2.00 | 505 | 500 |
| | M | 34.2 | 33.3 | 3.2 | 2.41 | 2.43 | 415 | 412 |
| | H | 34.2 | 33.3 | 4.0 | 2.93 | 2.95 | 341 | 339 |
| 32 | L | 42.5 | 41.9 | 2.6 | 2.54 | 2.57 | 394 | 389 |
| | M | 42.9 | 42.0 | 3.2 | 3.10 | 3.13 | 323 | 319 |
| | H | 42.9 | 42.0 | 4.0 | 3.79 | 3.82 | 264 | 262 |
| 40 | L | 48.4 | 47.8 | 2.9 | 3.23 | 3.27 | 310 | 306 |
| | M | 48.8 | 47.9 | 3.2 | 3.56 | 3.60 | 281 | 278 |
| | H | 48.8 | 47.9 | 4.0 | 4.37 | 4.41 | 229 | 227 |
| 50 | L | 60.2 | 59.6 | 2.9 | 4.08 | 4.15 | 245 | 241 |
| | M | 60.8 | 59.7 | 3.6 | 5.03 | 5.10 | 199 | 196 |
| | H | 60.8 | 59.7 | 4.5 | 6.19 | 6.26 | 162 | 160 |
| 65 | L | 76.0 | 75.2 | 3.2 | 5.71 | 5.83 | 176 | 172 |
| | M | 76.6 | 75.3 | 3.6 | 6.42 | 6.54 | 156 | 153 |
| | H | 76.6 | 75.3 | 4.5 | 7.93 | 8.05 | 126 | 124 |
| 80 | L | 88.7 | 87.9 | 3.2 | 6.72 | 6.89 | 149 | 145 |
| | M | 89.5 | 88.0 | 4.0 | 8.36 | 8.53 | 120 | 117 |
| | H | 89.5 | 88.0 | 4.8 | 9.90 | 10.1 | 101 | 96 |
| 100 | L | 113.8 | 113.0 | 3.6 | 9.75 | 10.0 | 103 | 100 |
| | M | 115.0 | 113.1 | 4.5 | 12.2 | 12.5 | 82 | 80 |
| | H | 115.0 | 113.1 | 5.4 | 14.5 | 14.8 | 69 | 68 |
| 125 | M | 140.8 | 138.5 | 4.8 | 15.9 | 16.4 | 63 | 61 |
| | H | 140.8 | 138.5 | 5.4 | 17.9 | 18.4 | 56 | 54 |
| 150 | M | 166.5 | 163.9 | 4.8 | 18.9 | 19.5 | 53 | 51 |
| | H | 166.5 | 163.9 | 5.4 | 21.3 | 21.9 | 47 | 46 |

Large diameter pipes to specifications IS 3589:2001

| TUBES FOR WATER, GAS, AND SEWAGE EXTRACTS from IS:3589:2001 | | | | | | |
|---|---|---|---|---|---|---|
| Specification | Chemicals requirements Ladle Analysis (%) | | | | Physical Properties requirement (Minimum Values) | |
| | Steel Grade | C (max) | P (max) | S (max) | Tensile Strength MPa (min) | % Elongation 5.65 √S, (min) |
| IS : 3589 | Fe330 | 0.17 | 0.055 | 0.055 | 330 | 20 |

| Specification | TEST | | Permissible Variations | | |
|---|---|---|---|---|---|
| | Hydrostatic Test MPa | Flattening Test | Outside Diameter | Thickness | Straightness |
| IS 3589 | 5 | No opening shall occur by fracture in the weld until the distance between the plates <75% of OD. For further details see Spec | (±)0.75% | (±) 10% | Deviation less than 2% of the total length. |

| Dimensions and Nominal mass of Steel Tubes - Preferred Sizes. | | | | |
|---|---|---|---|---|
| Nominal Bore (mm) | Outside Diameter (mm) | Thickness (mm) | Mass of Tube (Kg/Mtr.)* | Mass of Tube (Metre/Ton)* |
| 200 | 219.1 | 4.35 | 23.04 | 43.40 |
| 200 | 219.1 | 5.00 | 26.40 | 37.88 |
| 200 | 219.1 | 6.35 | 33.32 | 30.01 |
| 250 | 273.1 | 5.00 | 33.06 | 30.25 |
| 250 | 273.1 | 6.35 | 41.77 | 23.94 |
| 300 | 323.9 | 5.00 | 39.32 | 25.43 |
| 300 | 323.9 | 6.35 | 49.72 | 20.11 |

* Approximate figures.

Note: The approximate Kg/Mtr. can be calculated using the formula, Kg/Mtr = (D-t) x t x 0.0246615 D = Outside diameter in mm, T = Thickness in mm

MPa = Megapascal = N/Sq.mm, N = Newton = kg m/sq.second, s = second, t = thickness, D = diameter, Utl = Up to and including