TATA STEEL
WeAlsoMakeTomorrow

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TATA PIPES
FLOW OF LIFE

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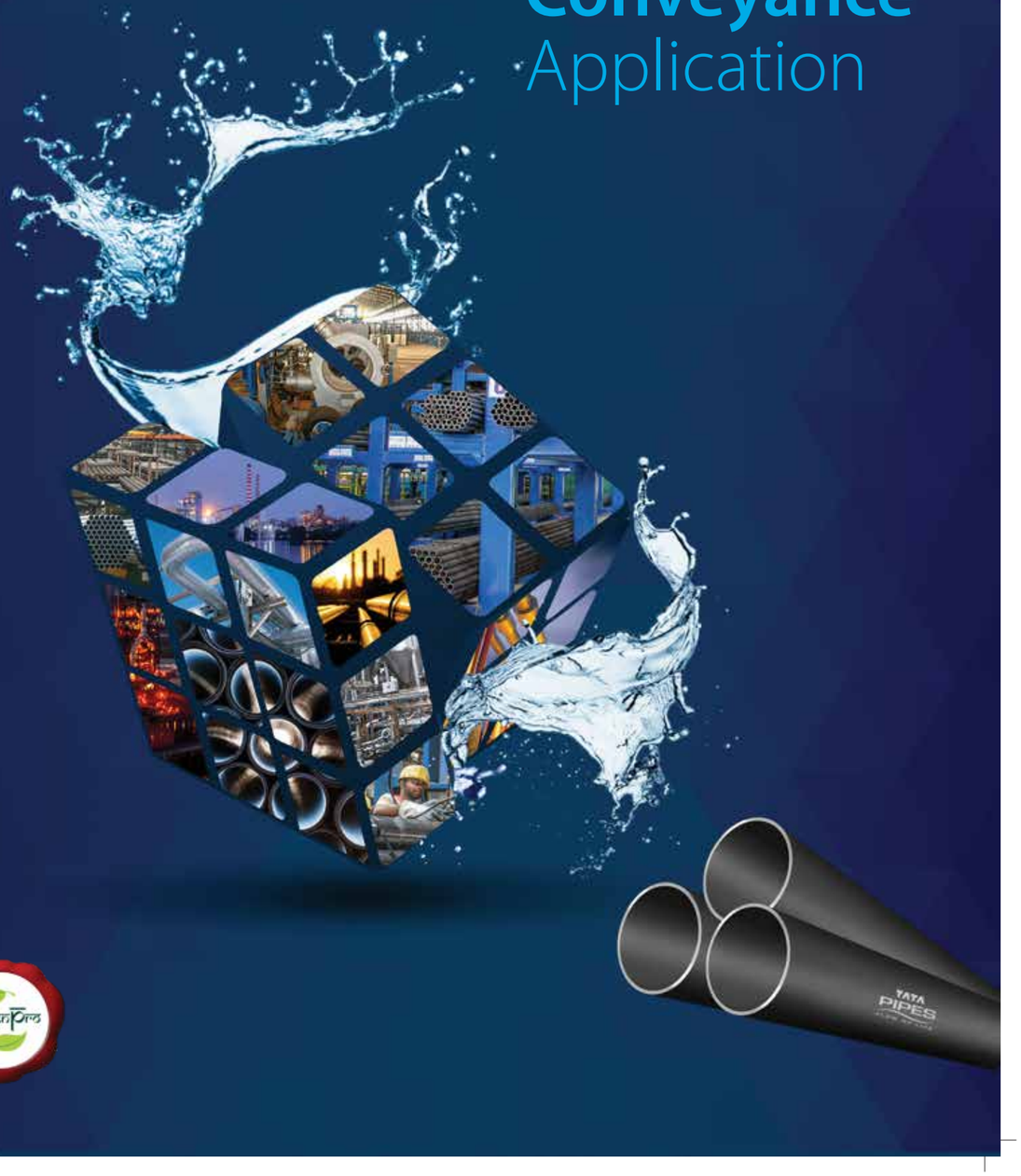
TATA PIPES
FLOW OF LIFE

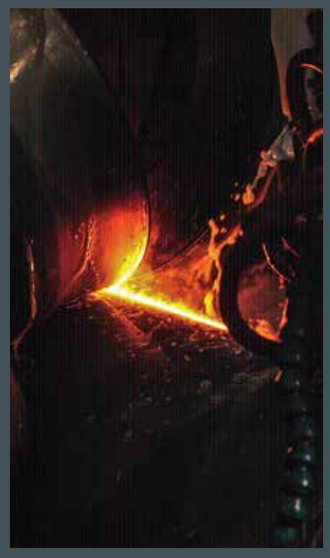
Pipes for **Conveyance** Application



GreenPro

PROFILE

CONTENTS



Established in Jamshedpur, India in the year 1907, Tata Steel is part of the 150-year-old Tata group. Bringing to reality the vision of its founder, J. N. Tata, who inspired the steel and power industry in India. The Tata Steel Group is amongst the top 10 largest steel manufacturers in the world and is known to be the hallmark of corporate citizenship and business ethics. With operations in 26 countries and commercial presence in 50 countries, the Tata Steel Group has a steel production capacity of 27.5 MnTPA (as on March 31, 2018) and registered a turnover of US $9310 Mn in FY 2018. Tata Steel India has manufacturing units at Jamshedpur, Jharkhand, with a production capacity of 10 MnTPA and at Kalinganagar, Odisha, with a production capacity of 3 MnTPA. In FY 2017-18, our Kalinganagar unit received approvals for expansion to 8 MnTPA. Tata Steel operates with a completely integrated value chain that extends from mining to finished steel goods.

In 2018, Tata Steel acquired erstwhile Bhushan Steel Limited now renamed as Tata Steel BSL Limited which was India's fifth largest flat steel producing company with an existing steel production capacity of 5.6 million tonnes per annum (MTPA) as on March 31, 2018. It has India's largest Cold Rolled Steel Plant and is one of the largest suppliers of automotive grade and high carbon special steel in the country.

Tata Steel- Tubes Division

A new dimension in steel tube technology opened 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), has retained its leadership position in the segments it operates, and it has an installed capacity of over 6,00,000 tons per annum. 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 marketing headquarters in Kolkata to provide better customer service.

In 2018, Tata Steel acquired the erstwhile Bhushan Steel, now known as Tata Steel BSL (TSBSL), having installed tube manufacturing capacity of 8,50,000 tons at its Sahibabad, Hosur & Khopoli plants located in key consumption hubs of India. The Khopoli plant of TSBSL has two large diameter ERW pipe mills of 5,50,000 tons/annum capacity capable of producing pipes for conveyance, structural as well as the Oil & Gas segment thus making Tata Steel the most diversified tube & pipe manufacturer in India.

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 plant, technology and process control.

Business Verticals

THE FOUR MAIN LINE OF BUSINESS ARE:

1

Conveyance Tubes

Galvanized & MS tubes under the brand "Tata Pipes" cater to conveyance requirements of process industries, rehydrants and HVAC, irrigation borewell segment as well as plumbing applications for water supply.

2

Structural Tubes

High quality hollow sections under the brand name "Tata Structura" cater to the construction segment for load bearing and aesthetic applications.

3

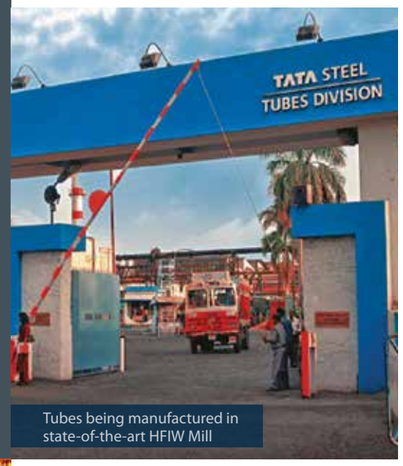
Precision Tubes

Manufactured with utmost precision these tubes cater to the high end- Automotive, Boiler & Eeneral Engineering segments.

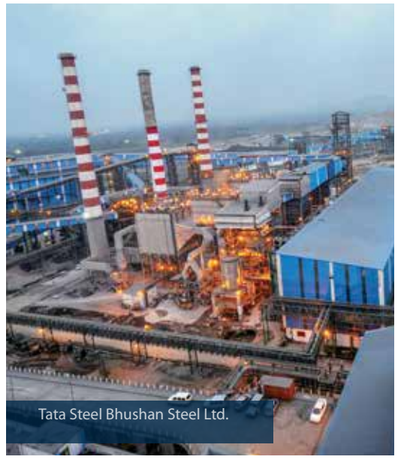
4

Pipes for Oil & Gas

TSBSL is a leading supplier of high quality ERW pipes to the Oil & Gas industry around the world with a complete range of tubes required for the same.



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



Tata Steel Bhushan Steel Ltd.

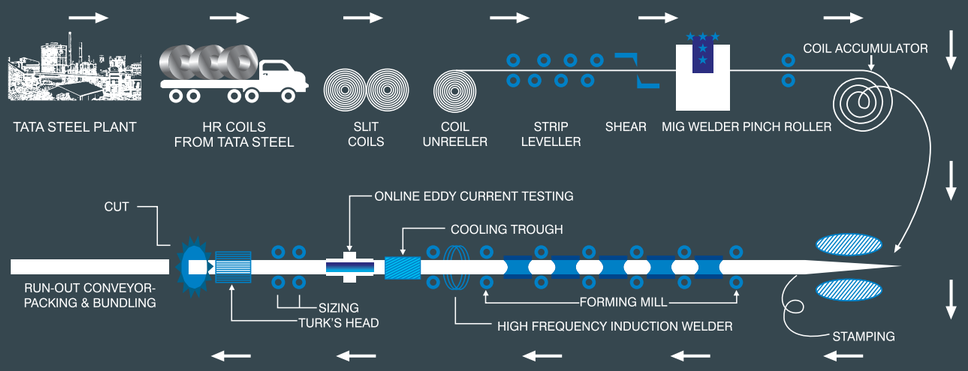
The modernised Tubes SBU Plant in Jamshedpur

HFIW induction welding in process

Control room for on-line Non-Destructive testing

Manufacturing Process

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 coils 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 and cut into required lengths by cold saw, which gives smooth burr-less square cutting edge. Tubes are then packed in hexagonal bundles by MAIR Auto- packing machines.



Finishing and Packaging

FINISHING OPERATIONS FOR TUBES

Threading machine used for threaded and socketed pipes

Galvanising

TSL uses a hi-tech hot-dip galvanising process in which the tubes are pickled to remove the impurities before galvanising.

Bevelling

Bevelling can be done by machining a pipe end - cutting away material to get an angle on the pipe. The weld preparation is the base to start from before you begin with welding the pipe.

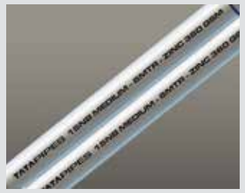
Extraction system of tubes from molten bath of zinc during hot dip galvanising of tubes

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 calibrated gauges.

Coating/Varnishing Facilities

Pipe coating facilities available through TSBSL can be finished Fusion bonded epoxy coating, 3 layer polyethylene coating/Poly propylene coating or PU coating.



Dot Matrix Printing and Brand Identification

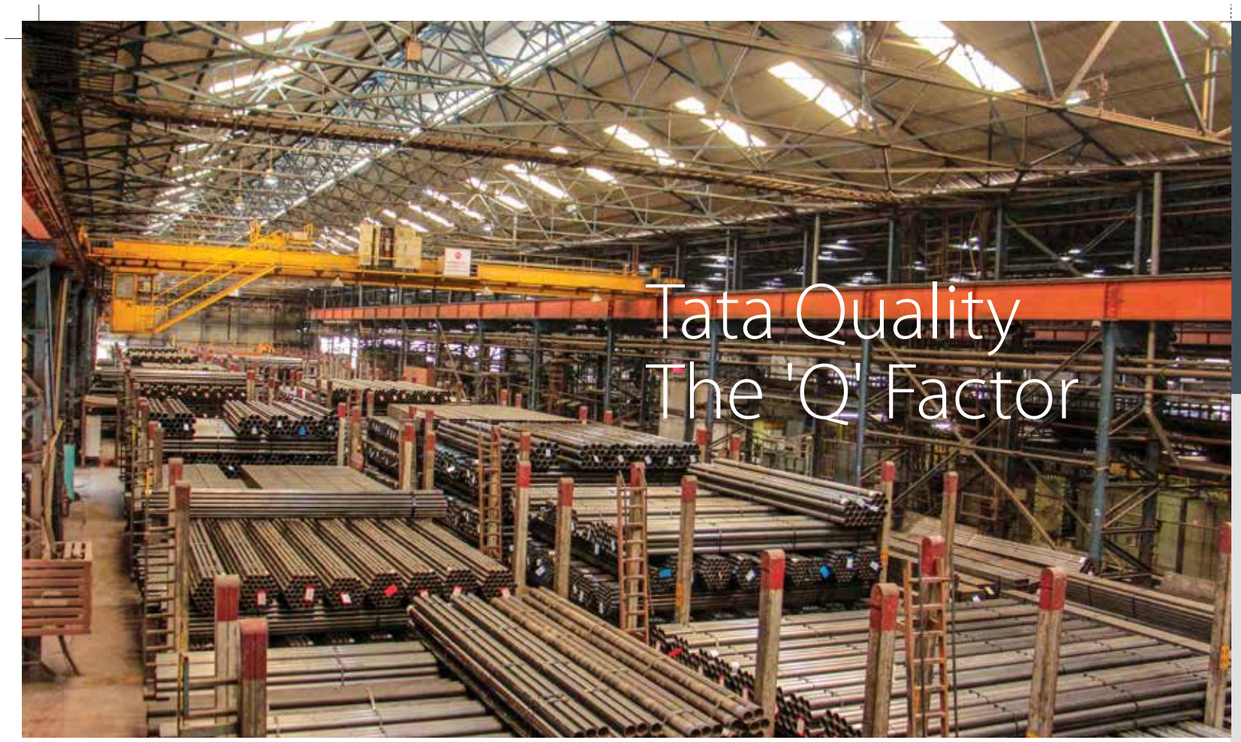
Dot Matrix Printing and Brand Identification

Each pipe is hot stamped with Tata Pipes logo for ensuring authenticity. The pipes are imprinted with the normal bore, class, length and the zinc coating as per specifications, using the Dot Matrix Printer.

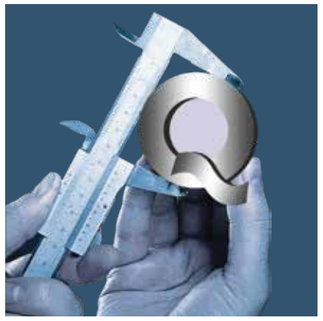
MAIR Research Auto-packing machines

Packaging

The finished pipes are packed on the packing tables and bundled separately on the bundling machine. The loading operations are then carried out by fully mechanised cranes onto 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 a number of quality assurance tests, to ensure customer delight.

The manufacturing process is governed by a comprehensive quality plan. Each plant in the Tubes SBU has been certified to ISO: 9001:2015.

Bend testing machine used for checking weld quality and zinc coating

Tensile Test in progress

All the tubes go through following testing processes:
100% Online Eddy Current Testing (Non-Destructive Testing)

NON DESTRUCTIVE TESTING

- Online Eddy Current Test
- Dimension measurements in mill as per Scheme of Testing (STI)

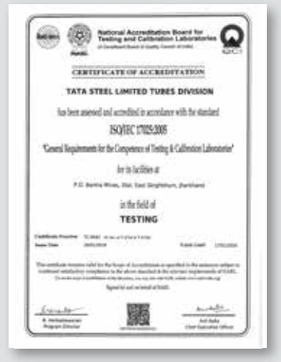
DESTRUCTIVE TESTING

- Bend Test up to 50mm NB
- Flattening Test above 50mm NB

LABORATORY TESTING

- Tensile Test
- Flattening Test above 50mm NB
- Hardness Test

Accreditions



Product Range

Specifications
IS: 1239 Part-1, IS 3589, ASTM Standards

Size Range
15 mm NB to 600 mm NB (1/2" to 24")

Colour coded Tata Pipes
Colour yellow (Light) Colour Blue (Medium) Colour Red (Heavy)

Surface Finish
Galvanised and Black

End finish
Plain at ends/Screwed and Socketed/ bevel end

Identification
Tata Pipes Logo Hot Stamping

Thickness
2 mm to 20 mm

Length
6mtr to 18.5 mtr.

Why use Tata Pipes?

The trusted Tata name & Quality: Tata Pipes come with the same quality assurance, which you would associate with the Tata name. Tata Pipes is the oldest brand of Tata Steel and well trusted in the industry from over 50 years for quality & strength.

Full range of Product with TSBSL (upto 24" OD & 20mm thickness): With TSBSL acquisition, Tata Pipes is now available in an expanded product range from 0.5" to 24" NB with thickness up to 20 mm, and is the chosen brand for project customers.

Integrated Steel Tube manufacturing & Raw Material Quality Assurance: Tata Pipes are made from superior IS10748 Grade 1 / Grade 3 steel rolled in-house from our modern hot strip mills, providing better formability, weldability & corrosion resistance for longer life.

Environment Friendly: Tata Pipes is the first and only pipe brand in India to be certified with GreenPro certificate by CII – Indian Green Building Council, as a mark of guarantee that our product is environment friendly throughout its lifecycle.

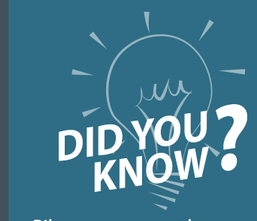
Value for Money: Strict adherence & stringent tolerance to Scheme of Testing, Thickness as per specifications of IS:1239 and IS:3589, ASTM standard and Inspection laid by Bureau of Indian Standards (BIS) as per licensing norms. Online NDT/Eddy Current testing ensures Zero Defects in pipes. Flattening, Bending Drift & Weld macro tests ensure weld strength & leak proof joints.

CT - GI: 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. Every Pipe is marked with Batch Id making it fully traceable. Boron+ Steel: Superior threads, hence stronger joints.

Housing & Commercial

Real estate sector in India is expected to reach a market size of US$ 1 trillion by 2030 from US$ 120 billion in 2017 and contribute 13 per cent of the country's GDP by 2025. Retail, housing, hospitality and commercial real estate are growing significantly, providing the much-needed infrastructure for India's growing needs. This accelerated growth has compelled in understanding the significance of Plumbing, Fire-fighting and HVAC applications in both commercial & residential structures as an important part for health and safety.

"Tata Pipes" has been playing an important role since inception in advancement of this segment.



Bihar government has undertaken a massive project "Har Ghar Nal ka Jal" for ensuring water connection to around 2 crore households to end their dependence on Hand-pumps. Tata Pipes is proud to have supplied to this prestigious project.

WeAlsoMakeTomorrow

PLUMBING

A pioneer in plumbing pipes, Tata Pipes has been bringing water into our homes, and joy in our lives for over 50 years. Tata Pipes are utilized for both cold and hot plumbing house hold applications for many decades now.

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

Tata Pipes have been used in prestigious projects like "Har Ghar Nal Ka Jal" which aims to provide clean drinking water to approximately 2 crore households of Bihar.

Tata Pipes "Best Suited for Plumbing Applications"
Tata Pipes for plumbing are made of Boron+ steel, giving them superior threadability and strong joints, making them rust-free and leak-proof. And they come with the guarantee of minimum 360 GSM Zinc coating for longer life.

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 prestigious projects throughout India is testimony to Tata Pipes' attention to quality and safety. It is important to use Good quality MS & GI pipes for better fire-fighting efficiency. These days GI pipes are mandate in some of the states for fire-fighting applications for longer life of pipes and higher safety. A fire-fighting system is the most essential part of the building services, with an aim to protect life and property.

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

Internal Hydrants

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

- Riser mains, down- corner mains and 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 IS1239, 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 3m apart
- Underground pipes should be laid 1m 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.

In all our projects so far, we have only used Tata MS & GI Pipes and have never thought about any other brand because of unparalleled reliability, trust and service.

Ajitesh Sharma
Technofire Engineers Pvt. Ltd.
Govt. approved & Internationally accredited Fire safety Auditor

We strongly recommend and use India's Leading Steel Pipe brand 'TATA pipes' for all our projects. The consistency in quality and wide spread dealer network of TATA pipes provide ease of business and confidence among its clients.

Choudhary Trading
Corporation Fire & Safety solutions

We prefer TATA pipes in all our projects due to consistency in parameters like pipe length, straightness and better yield strength and excellent service rendered by its channel partner for more than 3 decades.

Hiren Patel
M.D. – Aashir Engineering Pvt. Ltd
BIM (Building Information Modeling)
Service Provider, Gujarat

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 the following:

Riser and Pumps

- The rising mains/down-corner mains should be of galvanised iron pipes conforming to medium class of IS:1239
- The pump should have an alternate power supply in case of emergency
- The main fire pump at the underground water tank with the capacity to discharge 900 litres per minutes at 3 bar pressure as measured at the terrace level, should be installed
- Good quality pipes should be used for better fire fighting efficiency

"Tata Pipes" have been the preferred choice for fire hydrant systems for many eminent names, including Taj Hotels, Gwalior Alcobrew, Associate Alcohols, Lanxess Chemicals, Dabur, Piramal Healthcare, RSPL, APOLLO Premier , C21 Business park, and many other manufacturing units, hospitals, corporate houses and real estate projects.

HVAC

HVAC stands for Heating, Ventilation, and Air-Conditioning - three closely related fundamental functions with both commercial and residential applications. 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. The main application of HVAC is to stabilize air flow, room temperature and humidity, which ensures that all such elements stay within the acceptable limits. Operative control of all these factors minimizes the risks related to health.

HVAC can further be distinguished as two separate segments.

- Commercial Cooling: e.g. large spaces of hotels, IT parks, malls, airports etc.
- Process Cooling: For sterilised rooms of pharmaceutical and manufacturing industries

Chiller/Air-Conditoners- 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 on environmental conditions like proximity to sea, corrosiveness, cooling flow, cooling zone and operating pressure.

- Pipes used in Fan Coil Unit- 25 NB to 32 NB
- Pipes used from chiller heater 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 Nm

Tata Pipes is a trusted name in HVAC applications and have been used in prestigious projects like.
ITC Sonar Bangla, ITC Kohenur, Asian Paints, ITC Park Kolkata, NMDC Steel Plant, IKEA, NTPC, Guwahati Airport, Bosch, Google, Oracle etc.

Thickness of pipes with respect to grades are given below

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

Industrial Applications

MS Pipes are used in all process industries, chemical Industries, Cold Storages, Ice factories, Pharmaceutical plants, Dairy Industries, Refineries & collieries.

COLD STORAGE

Cold storage plants are meant to store the perishable commodities like potatoes, seeds, vegetables, fruits, pharmaceuticals and frozen food items for a considerably longer period, retaining the original colour, flavour and taste.

The cold storage segment is expected to grow at a CAGR of 13-15% led by the meat, seafood, exotic fruits & vegetables and bio-phamaceuticals where organized players with multi-purpose cold storages are preferred due to stringent quality requirements & regulations. With new export opportunities emerging and with increasing competition, there is now a need to ensure technological and operational excellence, if optimum benefits are to be obtained.

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

Pipe Sizes normally used: 15mm NB to 200 mm NB Black/ Galvanized Heavy Plain Ended Steel Pipes conforming to IS: 1239/IS:3589

More customers are now opting for Galvanized Pipes in condensers for better life of the pipes which do not require frequent change thus hampering business. Also, some states like Maharashtra & Karnataka have mandated use GI Pipes in cold storages.

Tata Pipes: The Ideal & Preferred Brand for Cold Storages

- 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 the running costs
- Backed by over 50 years of manufacturing expertise in steel tubes and pipes and bears the trusted Tata name.

> 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, Refrigeration and Air Conditioning Engineers (ASHEAW)

> "We have been using Tata Pipes in our plants for over 20 years now. Tata Pipes is unparalleled when it comes to quality & bendability and is a notch above other brands.

Mr B Venkat Ra
Head Engineering Aurobindo Pharma Unit I Hyderabad

PHARMACEUTICAL INDUSTRY

Pharmaceutical Plants manufacture medicines, vaccines and APIs used to produce other general drugs. India is the largest provider of generic drugs globally. Indian pharmaceutical industry supplies over 50% of the global demand for various vaccines, 40% of generic demand in the US and 25% of all medicines in the UK. With India emerging as a favourable supply destination, the industry is likely to witness considerable growth in next few years.

Design and Application of Pipes in Pharmaceutical Industry:

MS pipes are required in:

- Methanol water chiller units
- Utilities (air, gas, water, cooling water, raw water transportation)
- Fire Hydrant System

They use PU based paint/coating on their MS pipes to prevent corrosion.

Pipe Sizes normally used: 40mm NB to 150 mm Black Plain Ended Steel Pipes conforming to IS: 1239

Major customers preferring Tata Pipes in their projects:

Divi's Lab, Aurobindo Pharma, Dr Reddy's Lab

DAIRY INDUSTRY:

India has been the leading producer and consumer of dairy products worldwide since 1998 with a sustained growth in the availability of milk and milk products. Dairy activities form an essential part of the rural Indian economy, serving as an important source of employment and income. Most of the dairy plants are located around Gujarat, Delhi, Punjab, Mumbai, UP, Bihar & Hyderabad.

The dairy product flows between the components of the plant in the pipe system. A dairy also has conduit systems for other media such as water, steam, cleaning solutions, coolant and compressed air. A waste-water system to the drain is also necessary. All components in contact with the dairy product are made of stainless steel and for all other water & steam applications MS/ GI pipes are used.

Gi pipe medium/heavy

- 25mm to 300mm dia - water application
- Main sizes: 25mm, 50mm & 150mm - medium grade

Ms pipe heavy

- 15mm to 300mm dia - water & steam application
- Main sizes: 50mm, 100mm - heavy grades

Water Supply & Sanitation

Clean water supply and hygienic sanitation facilities are the two basic essential amenities, the community needs on a top priority for healthy living. Steady investments in WSS and irrigation segments by both central and state governments to increase penetration of safe drinking water and improve sanitation facilities has been driving demand for large diameter ERW steel pipes.

With the acquisition of Tata Steel BSL, Tata Pipes now offers full range of products for the WSS segment – from ½" up to 24" (600 mm NB) thereby being the preferred brand for large projects.

Fe 330, Fe 410, Fe 450 – Pipes can be used conforming to IS: 3589

DID YOU KNOW?

Through Projects like Jalanidhi, by Kerala Government "Tata Pipes" has supported in catering water and sanitation needs of Rural areas and has helped provide a provision of safe water supply & hygienic sanitation in Kerala. Tata Pipes is proud to have supplied to this project.

WeAlsoMakeTomorrow

IRRIGATION

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

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

- Tata Pipes for boring are heavy and sink easily into the grounds
- 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 re-sunk time and again, and are re-saleable after use.

DO'S AND DON'TS FOR BLACK MS PIPES

DO'S

- For IS:1239 tubes If threads are made on the pipe, threading should be made as per norms of IS: 554.
- Paint / bituminous compounds coating of approved quality to be applied before use as per IS 2065
- Anti Corrosive Paint coating and wrapping of tape to be done before concealing in walls/ floor or in underground. Under the floors or underground the pipes shall be laid in a layer of sand filling.
- Use BIS approved pipes , sockets and other fittings only.
- Testing for leak proof joint to be done. This should be examined properly before laying or concealing the pipes.
- Engage only qualified/ trained welders / for laying of pipes. Ensure leak proof tightness in case of flanged joints.
- Follow the guidelines as per IS : 3589 – Steel pipes for water and sewage(annexures A to D) for protection against corrosion for laying of pipes.
- The pipes shall be carefully cleared off all foreign matter before being laid. or charged
- Any coating, sheathing or wrapping of the pipes shall be examined for damage and repaired, where necessary, and shall also be made continuous over the joints.
- Wherever possible back-boards shall be provided in chases for fixing the piping; otherwise lead piping shall be protected from contact with lime or cement by building paper or felt.
- All lagging exposed to moist conditions shall be waterproof or covered with a waterproof wrapping.
- Pipes should be stored in properly inside covered shed to protect from rust.
- In choosing the material for piping and fittings, account shall betaken of the character of the water to be conveyed through it, the nature of the ground in which the piping is to be laid. The material shall be resistant to corrosion, both inside and outside or shall be suitably protected against corrosion .outer layer shall not coincide with the overlap of the inner layer tape.
- Where the laying of any pipe through corrosive soil or pervious material is unavoidable, the piping shall be properly protected from contact with such soil or material by being carried through an exterior cast iron tube or by some other suitable means as approved by the Authority
- After laying and jointing, the main shall be slowly and carefully charged with water, so that all air is expelled from the main by providing a 25-mm inlet with a stopcock allowed to stand full of water for a few days if time permits, and then tested under- pressure. The test pressure shall be O-5 N/mm* or the maximum working pressure plus 50 percent, whichever is the greater.

DON'TS

- Numbers of threads not within the specification limits to avoid leakage from joint.
- Pipes should not come in direct contact with lime-mortar / soils to avoid corrosion.
- The pipes shall not ordinarily be buried in underground. Where un-avoidable, pipes may buried for short distances, provided adequate protection is given against damage.
- Not recommended for conveying acidic / high alkaline water or any other corrosive liquids.

Specification of Pipes: IS 1239

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

Nominal Bore (mm)	Class or Category	Outside Diameter (mm)		Thickness (mm)	Nominal 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	594	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	535	532
25	L	33.8	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	175	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	113.9	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	54
	H	166.5	163.9	5.4	21.3	21.9	47	46

Tata pipe rolling capability for TSL and TSBSL (greater than 6″ OD) as per IS:3589

	Pipe OD.		THICKNESS (mm)													
FG THK -->	Inch	mm	4	5	6	6.35	7.1	8	8.7	9.5	10	12	12.7	14	16	18	20
1	8	219.1															
2	10	273.1															
3	12	323.9															
4	14	355.6															
5	16	406.4															
6	18	457															
7	20	508															
8	22	559															
9	24	610															

NOTE:

- 273.1 - Mill rolling min RM thkness - 4mm

Dimensions and Nominal mass of Steel Tubes - Preferred Sizes Specification of pipes : IS:3589

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
350	355.6	5	43.23	23.13
350	355.6	6.35	54.69	18.28
400	406.4	5	49.50	20.20
400	406.4	6	59.25	16.88
450	457	6	66.73	14.98
450	457	8	88.58	11.29
500	508	8	98.65	10.14
500	508	10	122.81	8.14
550	559	8	108.71	9.20
550	559	10	135.39	7.39
600	610	10	147.97	6.76

For details of other section, pleae contact your Tata Steel representative.

Specifications of Pipes Large Diameter IS 3589:2001

Pipes For Water, Gas And Sewage Extracts from IS: 3589:2001

Specification	Chemicals requirements Ladle Analysis (%)				Physical Properties requirment (Minimum Values)	
	Steel Grade	C (max)	P (max)	S (max)	Tensile Strength Mpa (mm)	% Elongation $5.65\sqrt{S_0}$ (min)
IS : 3589	Fe330	0.17	0.055	0.055	330	20
IS : 3589	Fe410	0.20	0.040	0.040	410	18

Specification	Test		Permissilbe Variations		
	Hydrostatic Test Mpa	Flattening Test	Outside Diameter	Thickness	Straightness
IS : 3589	5	No opening shall occur bu fracture in the weld untill the distance between the plates <75% of OD. For further detailsd see Spec	(±)0.75%	(±) 10%	Deviation less than 2% of the total length

Approved Standards for Pipes

Specification	Grade	Application
IS: 1239 (PART-1)	330	MILD STEEL TUBES FOR WATER AND AIR
IS:3589	FE 330 FE 410 FE450	STEEL PIPE FOR WATER & SEWAGE
IS:4270	FE 410 FE 450	STEEL TUBES FOR WATER WELLS
IS:9295	ERW 210 ERW 240 ERW 310	STEEL TUBES FOR IDEALERS BELT CONVEYORS
ASTM A-53	GR. A GR. B	STEEL PIPE FOR STEAM, WATER,AIR LINES,MECHANICAL AND P RESSURE APPLICATION
API 5L	GR. A TO X-70 (PSL-1 & PSL-2)	STEEL LINE PIPES FOR OIL AND GAS SERVICE
API 5CT	H 40 (PSL-1) J 55 (PSL-1)	STEEL TUBES & PIPES FOR CASING AND TUBING

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