

TATA STEEL



INFIRE™ BS EN 10255

Conveyance Tube: Fire Defence Products



INFIRE™

Our INFIRE™ tube has been specifically developed for use by industry leaders in sprinkler systems and for the conveyance of water for fire suppression.

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Our INFIRE™ products are produced in the UK from our tube manufacturing facilities located in Corby, Northamptonshire

- Our hot mills use a proven stretch reduction process for bendable, threadable and groovable products
- Controlled, high frequency induction welding process
- Rigorous process control produces uniform and exacting tolerances
- Through product tracking ensures complete traceability

INFIRE™ tube for fire defence applications

- Manufactured and tested to BS EN 10255
- Readily available in a range of sizes
- Rigid, robust and well proven in use over many years
- Sustainable and fully recyclable
- Supported by a team of dedicated UK account managers and technical staff

Our INFIRE™ tube is manufactured from high quality hot rolled coil produced from fully-killed steel manufactured in the UK by our supply chain partner in Port Talbot, South Wales

- Produced to a composition designed to eliminate any tendency for strain age embrittlement in service
- Fine grain practice for enhanced ductility and weldability

INFIRE™ tube offers many advantages

- Choice of sizes from 25mm to 150mm nominal bore
- Available in medium weight
- Robust and reliable
- Thermal stability during typical operating conditions
- Choice of plain or grooved ends
- Supplied red painted
- Low definition tube marking
- Supplied in exact cut lengths (-0/+5mm tolerance)
- Class A1 fire rating
- Proven in service
- CE marked in accordance with BS EN 10255 (CE CPD CAT 4)



INFIRE™ chemical composition (cast analysis) and mechanical properties

Steel Grade		Chemical Composition %				Mechanical Properties		
Steel Name	Steel Number	C max	Mn max	P max	S max	Upper Yield Strength R _{eH} min (MPa)	Tensile Strength R _m (MPa)	Elongation A min %
S195T	1.0026	0,20	1,40	0,035	0,030	195	320 to 520	20

INFIRE™ tube data

Nominal Bore		Outside Diameter		Wall Thickness	Medium Weight
NB		OD		T	Weight per metre Plain end/grooved
(mm)	(inch)	Max (mm)	Min (mm)	(mm)	(kg/m)
25	1	34.2	33.3	3.2	2.41
32	1¼	42.9	42.0	3.2	3.10
40	1½	48.8	47.9	3.2	3.57
50	2	60.8	59.7	3.6	5.03
65	2½	76.6	75.3	3.6	6.43
80	3	89.5	88.0	4.0	8.37
100	4	115.0	113.1	4.5	12.20
125	5	140.8	138.5	5.0	16.60
150	6	166.5	163.9	5.0	19.70

PRE-GROOVED TUBE

Our INFIRE™ pre-grooved carbon steel tube offers a robust and cost-effective jointing method. Manufactured to exacting standards, our pre-grooved tube is the latest product in our well-proven fire defence range.



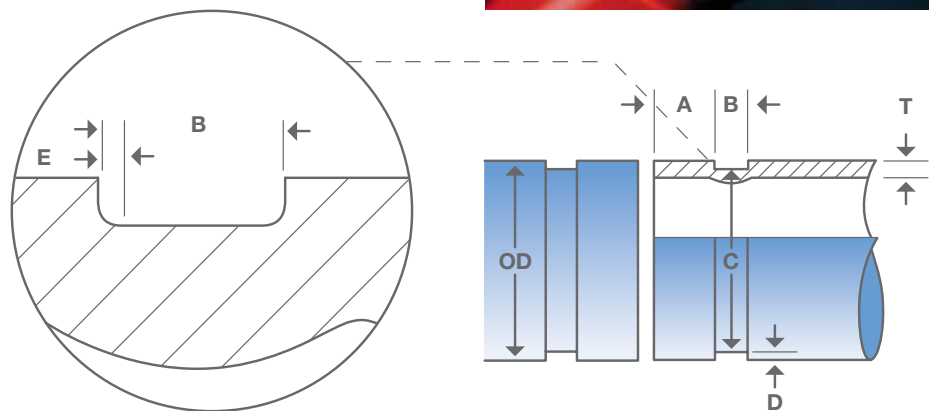
It is possible to use a number of jointing methods for steel tubes but the principal methods recommended for sprinkler systems are either butt-welding, grooved couplings, flanged or screwed & socketed joints.

Pre-grooved tube is becoming more popular due to the time and cost savings that can be achieved during installation.

Our INFIRE™ pre-grooved tube is manufactured using state of the art grooving machines, we are able to manufacture to the exacting tolerances required by leading coupling suppliers.

Features and Benefits

- Quicker to install than a welded, flanged or threaded system
- Joints can be dismantled and reassembled to facilitate modifications to piping systems, maintenance of pumps etc.
- Minimal equipment investment – only a spanner or socket required for assembly
- Service down time minimised
- No hot work permits required
- No X-Ray/Non-Destructive Testing (NDT) required
- Grooved ended pipework is significantly lighter than flanged pipework
- The use of grooved products provides a cleaner system compared to a welded or threaded system



Dimensions

- Groove diameter (C) should be measured using a 'Diameter Tap' (available from coupling manufacturers)
- The groove diameter (C) must be within the max and min tolerance shown in the table below, measured at the weld area and at 90 degrees to the weld

INFIRE™ tube data

Basic Dimensions (mm)

Nominal Bore NB		Outside Diameter OD		Gasket Seat A	Groove Width B	Groove Diameter C		Groove Depth D	Groove Corner E	Flare Diameter
(mm)	(inch)	(max)	(min)	(+/- 0.76)	(+/- 0.76)	(max)	(min)	(ref)	(max)	(max)
25	1	34.2	33.2	15.9	7.1	30.2	29.8	1.6	2.0	36.3
32	1¼	42.9	42.0	15.9	7.1	39.0	38.6	1.6	2.0	45.0
40	1½	48.8	47.9	15.9	7.1	45.1	44.7	1.6	2.0	51.1
50	2	60.8	59.7	15.9	8.7	57.2	56.8	1.6	2.0	63.0
65	2½	76.6	75.3	15.9	8.7	72.3	71.8	2.0	2.0	78.7
80	3	89.5	88.0	15.9	8.7	85.0	84.5	2.0	2.0	91.4
100	4	115.0	113.1	15.9	8.7	110.1	109.6	2.1	2.0	116.8
125	5	140.8	138.5	15.9	8.7	135.5	135.0	2.1	2.0	142.2
150	6	166.5	163.9	15.9	8.7	160.8	160.2	2.2	2.0	167.6

TECHNICAL DATA

General

INFIRE™ tube is manufactured in accordance with BS EN 10255 and is supplied in either hot finished or cold-formed conditions at our discretion. INFIRE tube typically has the internal weld bead left in place. When present, the height of the internal bead is controlled to 60% max of the nominal wall thickness.

INFIRE™ tube is not recommended for applications applicable to the European Directive 97/23/EC (the Pressure Equipment Directive, or PED).

End finishes

INFIRE tube can be supplied with plain or pre-grooved ends.

Pressure ratings

For butt-welded or grooved pipe work systems the pressures shown below apply. Pressure ratings are a function of the joint integrity.

Nominal Bore NB		Maximum operating pressure water/air ambient temperature
(mm)	(inch)	(Bar)
25	1	50.0
32-40	1¼ – 1½	40.0
50-80	2 – 3	28.0
100-150	4 – 6	25.0

Surface finish

The red paint, normally applied to steel tubes for sprinkler systems, is intended as a primer/temporary/transit protection for the tubes and it should not be assumed to offer any degree of long term protection.

Bending

INFIRE™ tube is not recommended for bending – the British Automatic Fire Sprinkler Association (BAFSA) state that pipe work in sprinkler systems should never be bent because the effect of bending may reduce the internal bore of the pipe and thus reduce the rate of water delivery.^[3]

Operating temperature

INFIRE™ tube is not recommended for elevated temperature use. BS EN 10225 does not provide elevated temperature mechanical data.

Leak tightness

INFIRE™ tube is eddy current tested, in accordance with BS EN 10246-1.

Compliance with European directives

BS EN 10225 has been prepared in accordance with the Construction Products Directive (89/106/EEC) and Mandate M/131. For applications where the PED applies, we recommend the use of INSTALL+™ tube – dual certified to BS EN 10255 and BS EN 10217-1, which carries a presumption of conformity with European Directive 97/23/EC (PED).

Fire Rating

In accordance with section 8.7 of BS EN 10255 INFIRE™ tube is class A1 and therefore does not need to be tested for reaction to fire. Please contact us for further information.

Test Certification

We operate a Quality Assurance system conforming to BS EN ISO 9001. INFIRE™ tube is subjected to non-specific inspection and testing in accordance with BS EN 10021 and can be supplied with either a 2.1 type Certificate of Compliance or a 2.2 Test Report in accordance with BS EN 10204.

A Tata Steel 2.2 Test Report can be supplied if requested at the time of order showing the chemical composition (ladle analysis) together with a tensile test result (yield strength, tensile strength and elongation) representative of the product.

CE marking

INFIRE™ products are CE marked to CPD CAT 4 for tubes for use in installations for transport/disposal/storage of water not intended for human consumption.

INFIRE™ products are not suitable for CPD CAT3 applications involving gas/fuels where the use of INSTALL+™ is recommended.

Tubes manufactured from the 1st January 2011 shall be CE marked.

SUSTAINABILITY

The essential properties of steel make it a sustainable choice for a wide range of applications.

Steel is strong, durable, versatile, reusable and most importantly – it is 100% recyclable.

Sustainability not only delivers environmental benefits, but also enhances social and economic factors.

Steel is an important part of modern life, providing materials for use in varied applications, such as construction, transport, domestic goods and packaging sectors amongst others. There is hardly any object in common use that does not contain steel, or that has not been produced by equipment containing steel.

In the conveyance industry, modern steel designs can employ fixing techniques that lend themselves to be easily dismantled. With such flexible design, entire conveyance systems can be taken down for recycling or re-assembly elsewhere.

Benefits of using steel



The steel industry provides a stable working environment for many workers compared to other employment sectors.



Steel has economic value at the end of a product's life, allowing it to be re-used or recycled.



Tata Steel recycles more than three million tonnes of steel scrap each year in the UK, saving CO₂ emissions equivalent to those produced by almost a million households.



Steel recycling is a closed loop process, allowing steel to be recycled over and over again.



All new steel products contain some recycled steel which, in itself, may have been recycled or re-used many times (multi-recyclable).



The re-use of steel products offers an even greater environmental advantage than recycling.



Steel has a high strength-to-weight ratio, which allows for resource efficient design.



Over 80% of all steel scrap is recaptured and recycled.

LIFE EXPECTANCY

Service life

The lifespan of any carbon steel tube is dependent on:

- The specific service conditions
- The system being properly designed
- Correct installation procedures being followed
- The adoption of suitable maintenance practice
- The use of appropriate corrosion protection, inhibitors or other system additives

Steel tube correctly installed and maintained in accordance with best industry practices should have a satisfactory service life. However, it is not possible to declare an actual working life since this will depend on many factors whilst in operation that are beyond the direct control of the steel tube manufacturer.



Corrosion protection

The combined presence of oxygen and moisture is normally necessary for corrosion of carbon steel to occur. Environmental factors, such as whether the water is soft or hard, the presence of bacteria, and the dissolved oxygen and carbon dioxide contents can all influence the rate of corrosion and the interaction between these various factors is complex.

A range of external coatings may be applied to steel tubes where external corrosion protection is specifically required.

Galvanised tube is also available from Tata Steel, and can be used for increased corrosion protection. Although this is not essential for appropriately designed sprinkler systems.

Where tube is supplied hot dipped galvanised, a suitable steel composition is preferable. As a general guideline, this means that the silicon content of the steel tube should ideally either be $\leq 0.05\%$ or in the range 0.15 – 0.25%.

Hot dip galvanizing is normally carried out either in accordance with BS EN 10240 or BS EN ISO 1461. Galvanised tubes should not be used in contact with copper based alloy tubing, fittings or washers, due to the possibility of a galvanic corrosion reaction (note: electrical continuity has to be considered in the choice of product and system design).

Corrosion prevention

The use of corrosion inhibitors and employing best practice with regards to maintenance, servicing and repair of any damaged areas will ensure optimised life expectancy.

References

BS EN 10255: 2004-A1: 2007 Non-alloy steel tubes suitable for welding and threading. Technical delivery conditions.

BS EN 10021: 2006 General technical delivery requirements for steel products.

BS EN 10204: 2004 Metallic materials. Types of inspection documents.

BS EN 10246-1: 1996 Non-destructive testing of steel tubes. Part 1: Automatic electromagnetic testing of seamless and welded (except submerged arc welded) ferromagnetic steel tubes for verification of hydraulic leak-tightness.

BS EN ISO 9001: 2008 Quality management systems requirements.

BS EN 10217-1: 2002-A1: 2006 Welded steel tubes for pressure purposes. Technical delivery conditions. Part 1: Non-alloy steel tubes with specified room temperature properties.

European Directive 97/23/EC concerning pressure equipment.

European Directive 89/106/EEC relating to construction products.

Mandate M/131 – Pipes, tanks and ancillaries not in contact with water intended for human consumption.

BAFSA Sprinkler Yearbook 2007/2008, [p121], www.basa.org.

www.tatasteel.com

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