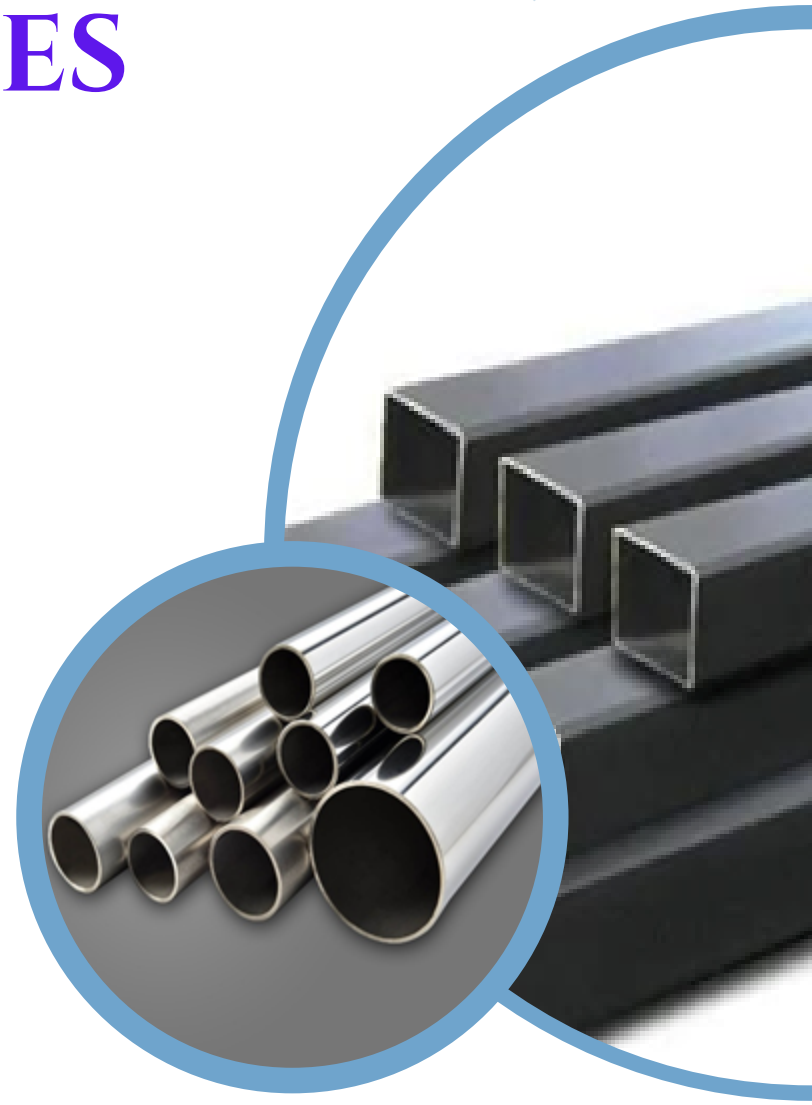
मानकः पथप्रदर्शकः

COMPENDIUM OF INDIAN STANDARDS ON

STEEL TUBES & PIPES



Prepared By:

METALLURGICAL ENGINEERING DEPARTMENT

BUREAU OF INDIAN STANDARDS
NEW DELHI

INTRODUCTION

This compendium gives a list and brief description of the various raw materials, products and test methods standards formulated by Bureau of Indian Standards on Steel Tubes & Pipes. These standard have been formulated by Steel Tubes, Pipes and Fittings Sectional Committee (MTD 19) of Bureau of Indian Standards.

This compendium aims at providing an overview of Indian Standards on Steel Tubes & Pipes, offering insights into their varieties.

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1. INDIAN STANDARDS FOR STEEL TUBES & PIPES

i. **IS 3589 : 2001 Steel pipes for water and sewage:** This standard specifies the chemical composition, mechanical properties, and physical requirements for steel pipes used in water supply and sewage systems, covering sizes from 168.3 mm to 2540 mm in diameter. These pipes are designed to handle large volumes of fluid under varying pressure and environmental conditions, making them suitable for municipal and industrial infrastructure.

ii. **IS 3074 : 2013 Steel tubes for automotive purposes:** This standard specifies the requirements for steel tubes used in automotive applications, including two-wheelers and three-wheelers, with sizes up to and including 114.3 mm outside diameter. These tubes are designed for critical automotive components requiring high strength, dimensional accuracy, and reliability under dynamic loading conditions.

iii. **IS 5429:2013 Dimensions for steel tubes for automotive purposes:** This standard specifies the dimensional requirements for various types of steel tubes used in the automotive sector, including Electric Resistance Welded (ERW), High-Frequency Induction Welded (HFIW), Cold Drawn Seamless (CDS), and Cold Drawn Electric Resistance Welded (CEW) tubes. These tubes are commonly used in the manufacturing of components for automobiles, scooters, and motorcycles, where precision and consistency are critical.

iv. **IS 1161 : 2014 Steel tubes for structural purposes:** This standard specifies the requirements for hot-finished seamless (HFS), electric resistance welded (ERW), and high-frequency induction welded (HFIW) steel tubes used for structural applications. These tubes are primarily used in construction, infrastructure, and fabrication where high strength, uniformity, and dimensional accuracy are essential.

v. **IS 11714 : Part 1 to 5:1986 Specification for steel tubes for heat exchangers:** This standard covers the requirements for welded and seamless carbon steel and alloy steel tubes used in tubular heat exchangers, condensers, and similar heat transfer equipment. These tubes are designed to withstand thermal stress, corrosion, and pressure variations typically encountered in heat exchanger applications across industries.

vi. **IS 1239 : Part 1:2004 Steel tubes, tubulars and other wrought steel fittings: Part 1 steel tubes:** This part of the standard specifies the requirements for welded and seamless steel tubes with plain ends or with screwed and socketed ends. These tubes are intended for conveying water, non-hazardous gases, air, and steam under moderate pressure. They are widely used in plumbing, industrial piping, and low-pressure service applications.

vii. **IS 2416 : 1986 Specification for boiler and superheater tubes for marine and naval purposes:** This standard outlines the requirements for various types of steel tubes used in marine and naval boiler and superheater applications. It includes cold-finished seamless, hot-finished seamless, electric resistance welded (ERW), induction welded, and cold-finished ERW and induction welded steel tubes. These tubes are designed to withstand high-pressure and high-temperature conditions typically encountered in marine boiler systems.

viii. **IS 3601 : 2006 Steel tubes for mechanical and general engineering purposes:** This standard specifies the mechanical, physical, and visual requirements for carbon steel tubes used in general engineering applications. It covers various types of tubes including welded, hot-finished seamless (HFS), cold-drawn seamless (CDS), and cold-drawn electric resistance welded (CEW) tubes. These tubes are widely used in fabrication, machinery, and structural applications where moderate strength and good formability are essential.

ix. **IS 4923 : 2017 Hollow steel sections for structural use:** This standard specifies the requirements for hot-formed and cold-formed square and rectangular hollow steel sections intended for structural applications. These sections are commonly used in construction and engineering projects for their high strength-to-weight ratio and versatility. However, they may not be suitable for dynamically loaded welded structures where low-temperature impact toughness is critical.

x. **IS 9295 : 2024 Steel tubes for idlers for belt conveyors:** This standard specifies the requirements for steel tubes used in idlers for belt conveyors. These tubes are designed to provide strength, durability, and resistance to wear, ensuring reliable performance in material handling and conveyor systems across industries.

xi. **IS 17876 : 2022 Stainless Steel Welded Pipes and Tubes for General Service:** This standard specifies the requirements for welded stainless steel pipes and tubes intended for general service applications. These pipes and tubes are valued for their corrosion resistance and durability in various industrial and commercial environments.

xii. **IS 17875 : 2022 Stainless Steel Seamless Pipes and Tubes for General Service:** This standard specifies the requirements for seamless stainless steel pipes and tubes used in general service applications. These seamless pipes and tubes are known for their strength, corrosion resistance, and reliability in diverse industrial settings.

xiii. **IS 6913 : 1973 Stainless Steel Tubes for the Food and Beverage Industry:** This standard specifies the requirements for seamless, welded, and heavily cold-worked welded stainless steel tubes with an outside diameter up to 304.8 mm. These tubes are intended for use in the food, beverage, dairy, and pharmaceutical industries, where a special surface finish is essential to ensure hygiene, corrosion resistance, and cleanability.

xiv. **IS/ISO 3183 : 2019 Petroleum and Natural Gas Industries – Steel Pipe for Pipeline Transportation Systems:** This standard specifies the requirements for seamless and welded steel pipes (Product Specification Levels PSL 1 and PSL 2) used in pipeline transportation systems for petroleum and natural gas industries. It supplements API Specification 5L (46th edition, 2018) with specific deviations outlined in the document. The standard does not apply to cast pipes and focuses on ensuring safety, performance, and reliability in energy transport infrastructure.

xv. **IS 6631:1972 – Steel Pipes for Hydraulic Purposes:** This standard covers the requirements for seamless and welded carbon steel pipes used in hydraulic systems with working fluids like water and oil. It applies to pipes with outside diameters

ranging from 13.5 mm to 127 mm, suitable for design pressures up to 9.8 N/mm², above 9.8 N/mm² and up to 17 N/mm², and above 17 N/mm² and up to 34 N/mm². These pipes are designed to perform reliably in high-pressure hydraulic applications.

xvi. **IS 6630:1985 – Seamless Ferritic Alloy Steel Pipes for High Temperature Steam Services:** This standard specifies the requirements for seamless ferritic alloy steel pipes intended for use in high-temperature steam services. These pipes are designed to withstand elevated temperatures and pressures, making them suitable for use in boilers, heat exchangers, and other thermal power and industrial steam systems where material strength and thermal resistance are critical.

xvii. **IS 6286:1971 Seamless and Welded Steel Pipes for Sub-Zero Temperature Service:** This standard specifies the requirements for four grades of seamless and electric welded steel pipes used for conveying fluids at sub-zero temperatures. These pipes are designed to retain their mechanical properties and toughness in low-temperature environments, making them suitable for applications such as cryogenic systems, cold storage, and arctic service pipelines.

2. INDIAN STANDARDS FOR RAW MATERIALS USED IN STEEL TUBES MANUFACTURING

Sr. No.	IS NO.	Title
1	IS 2062 : 2011	Hot rolled medium and high tensile structural steel
2	IS 10748 : 2004	Hot - Rolled steel strip for welded tubes and pipes
3	IS 6911 : 2017	Stainless steel plate, sheet and strip
4	IS 1079 : 2017	Hot rolled carbon steel sheet, plate and strip
5	IS 12367 : 1988	Specification for cold - Rolled carbon steel strips/coils for manufacture of welded tubes
6	IS 15647 : 2006	Hot rolled steel narrow width strip for welded tubes and pipes
7	IS 6603 : 2024	Stainless Steel Semi-Finished Products, Bars, Wire Rods and Bright Bar

3. INDIAN STANDARDS ON TEST METHODS USED IN STEEL TUBES TESTING

TEST	STANDARDS
Chemical Composition Test	i. **IS 228 (Part 1)** – Determination of carbon (Gravimetric and volumetric methods) ii. **IS 228 (Part 2)** – Determination of sulfur (Evolution method) iii. **IS 228 (Part 3)** – Determination of phosphorus (Volumetric method) iv. **IS 228 (Part 4)** – Determination of manganese (Volumetric method)

	v. **IS 228 (Part 5)** – Determination of silicon (Gravimetric method) vi. **IS 228 (Part 6)** – Determination of nickel (Gravimetric method) vii. **IS 228 (Part 7)** – Determination of chromium (Gravimetric method) viii. **IS 228 (Part 8)** – Determination of copper (Electrolytic method) ix. **IS 228 (Part 9)** – Determination of aluminum (Gravimetric method) x. **IS 228 (Part 10)** – Determination of tungsten (Gravimetric method) xi. **IS 228 (Part 11)** – Determination of molybdenum (Gravimetric method) xii. **IS 228 (Part 12)** – Determination of vanadium (Colorimetric method) xiii. **IS 228 (Part 13)** – Determination of cobalt (Gravimetric method) xiv. **IS 228 (Part 14)** – Determination of nitrogen (Gas-volumetric method) xv. **IS 228 (Part 15)** – Determination of titanium (Colorimetric method) xvi. **IS 228 (Part 16)** – Determination of boron (Curcumin method) xvii. **IS 228 (Part 17)** – Determination of arsenic (Silver diethyldithiocarbamate method) xviii. **IS 228 (Part 18)** – Determination of tin (Gravimetric method) xix. **IS 228 (Part 19)** – Determination of lead (Volumetric and gravimetric methods) xx. **IS 228 (Part 20)** – Determination of oxygen (Fusion method) xxi. **IS 9879 : 1996** - Method for emission spectrometric analysis of austenitic and ferritic stainless steels point to plane technique (Instrumental method)
Tensile Test	i. **IS 1608 (Part 1) : 2022/ISO 6892-1 : 2019** — Metallic materials — Tensile testing Part 1 Method of test at room temperature ii. **IS 1608 (Part 2) : 2020/ISO 6892-2 : 2018** — Metallic Materials — Tensile Testing Part 2 Method of Test at Elevated Temperature iii. **IS 1608 (Part 3) : 2018/ISO 6892-3 : 2015** — Metallic materials — Tensile testing Part 3 method of test at low temperature
Bend Test	i. **IS 1599 : 2023/ISO 7438 : 2020** — Metallic materials — Bend test
Hardness Test	i. **IS 1500 (Part 1) : 2019 /ISO 6506-1 : 2014** - Metallic materials — Brinell hardness test Part 1 test method ii. **IS 1586 (Part 1) : 2018/ISO 6508-1 : 2016** - Metallic materials — Rockwell hardness test Part 1 test method iii. **IS 1501 (Part 1) : 2020/ISO 6507-1:2018** - Metallic materials — Vicker's hardness Test Part 1 Test method
Impact Test	i. **IS 1757 (Part 1) : 2020/ISO 148-1 : 2016** — Metallic materials — Charpy pendulum impact test Part 1 Test method
Other Tests	i. **IS 2335 : 2005 IS 2335:2005 / ISO 8493:1998** - Metallic Materials - Tube - Drift expanding test ii. **IS 12260 : 2018 ISO 8495 : 2013**- Metallic Materials - Tube - Ring - Expanding test iii. **IS 12278 : 2018 ISO 8496:2013** Metallic Materials - Tube - Ring tensile test iv. **IS 2329 : 2005 IS 2329:2005 / ISO 8491:1998** - Metallic materials - Tube (In Full Section) - Bend test v. **IS 2330 : 2018** - Metallic Materials - Tube - Flanging Test