PRAKASH

# SURYA

Steel Tubes & Pipes

## Delivering Trust across the globe!

EXPORTS TO OVER 50 COUNTRIES

Built to Last forever


## ERW & SPIRAL WELDED PIPES

www.surya.co.in

# About Us

Surya Group is a vast conglomerate having business interest in Steel Pipes, CR Strips and Lighting Industry. Surya's modernised and state-of-the-art production facilities based at Bahadurgarh (Haryana), Bhuj (Gujarat), Gwalior (M.P) & Hindupur (A.P) are certified for ISO 9001:2015, ISO 14001:2015, ISO (OHSS) 45001:2018. We are the only national player having a presence in Commercial, Structural, Automobile and Oil & Gas Sector with our wide range of ERW and Spiral Welded Pipes.

Surya is catering to the varied market needs and requirements in both Steel Pipe and Lighting Industry. Surya pipes manufacturing range includes wide spectrum i.e. Plumbing, Fire Fighting, HVAC, Irrigation, Process Industry, Structural Hollow Sections, Industrial usage, Automobile, Infrastructure, Construction,

Oil & Gas API Line Pipes, Power, Casing and many more.

Surya is the largest Manufacturer and Exporter of Galvanized Steel Pipes. With a turnover of over Rs. 7,500 Crores, Surya's quest for growth is never ending. The organization is blessed with an intellectual team of Engineers, Technical and Quality experts to deliver products as per various National & International standards. Surya is specialized in Oil & Gas utility Line Pipe with American Petroleum Institute - API 5L Monogram up to Grade X-80, Casing & Tubing as per API 5CT. Our plants are also certified by UL, FM, SLS and CE Certifications.

The Pan-India Marketing and Distribution network provides us access and reach to every nook and corner of the Country. We are privileged to be considered as preferred brand across several segments. The group's Lighting business is commanding the Second Largest Market Share in India and provides total Lighting Solutions to its customers. Surya's PVC division, based at Kashipur (Uttarakhand) is presently manufacturing and supplying CPVC, uPVC, Agri, SWR, Column Pipes & Fittings used for various applications with world's best manufacturing technology.

The strength of Surya pipes lies in its large DIA pipes, with diameter ranging from 114.3 mm to 406.4 mm in ERW & 457mm to 2667mm in Spiral. It has achieved remarkable success in producing various special grades, including API 5L grade A, grade B as well as X42, X46, X52, X56, X60, X65, X70, X80, PSL1, PSL 2 and API 5CT grade H40, J55, K55, PSL1.

ONE OF THE **LARGEST** PIPE **MANUFACTURER** WITH **CAPACITY** ABOUT **10,00,000 MT** (1MILLION) PER ANNUM.

FIRM **COMMITMENT** TO **EXCELLENCE** IN **QUALITY,** A **BRAND LEADER** IN BOTH **STEEL PIPE** AND **LIGHTING INDUSTRY.**

THE COMPANY HAS A **WIDE MARKETING** NETWORK WITH ITS **BRANCHES, DISTRIBUTORS** AND **DEALERS** NETWORK SPREAD **ALL** OVER THE **COUNTRY.**

A **TURNOVER** OVER **RS 7,500 CRORES.** THE GROUP'S QUEST FOR **GROWTH** IS NEVER ENDING.

ONE OF THE **BIGGEST** INDIAN CORPORATE EXPORTING TO OVER **50 COUNTRIES.**

**SURYA GROUP** IS TAKING BIG STRIDES IN ITS CHOSEN AREAS WITH TESTED **SKILLS, COMMITMENT, SKILLED WORKFORCE** ,VAST EXPERIENCE AND MATURE **LEADERSHIP.**

# Our Manufacturing Plants

PRAKASH
SURYA
Steel Tubes & Pipes

# Exports To Over 50 Countries

NEW ZEALAND

USA

UNITED KINGDOM

HONG KONG

AUSTRALIA

EUROPE

CANADA

U.A.E.

MALAYSIA

MAURITIUS

OMAN

KUWAIT

SAUDI ARABIA

SINGAPORE

QATAR

GHANA

JORDAN

BAHRAIN

TANZANIA

SEYCHELLES

UGANDA

SRI LANKA

ETHIOPIA

CYPRUS

MYANMAR

EGYPT

SPAIN

SLOVENIA

MEXICO

NIGERIA



# ERW PIPE PLANT

ERW pipes are extensively used in agriculture, industry, construction activities like scaffolding and casing in bore wells. These are used for conveying water, gas, crude oil and chemicals at various pressures and densities over long distances. Considering the challenging and varied applications, the pipes are produced to meet very high standards of both national and international specifications .

Quality assurance begins at the raw material stage and continues right through all the manufacturing operations, till the pipes are packed for dispatch. The quality assurance department is fully backed by a modern laboratory for various metallurgical & chemical tests and a test house for testing physical properties. It has been awarded the prestigious ISO 9001:2015 certificate by DNV GL Business Assurance for its quality systems.

Surya Group has installed capacity of 12,15,000 MT per annum to manufacture ERW pipes from OD ½" (21.3mm) to 16" (406.4mm) according to various National & International specifications including API5L upto Grade X80 PSL2. The Group has entered in manufacturing of Oil Country Tubular Goods (OCTG) as per API 5CT Gr H40, J55, K55 PSL 1 & have supplied successfully to USA market. We are also supplying pipes conforming to EN : 10255, EN : 10219, EN : 10217-1, AS : 1074, AS/NZ 1163: 2016, ASTM A 53, BS EN - 39, ASTM A 500, ASTM A 252, ASTM A 795. Besides above, our plant is supplying black, red painted, galvanized & roll-grooved pipes.

# TESTING & QUALITY CONTROL

The trained and committed work force ensures high quality of pipes made to various national and international standards, including the demanding API specifications.


# Our Credentials To Quality Supremacy

Surya's relentless pursuit and quest for success is unmatched. Many such International accreditations and certifications have been awarded to Surya from governing bodies for meeting the best of quality standards. The special grades that have graced SURYA and made it one of the biggest Indian companies includes API 5L grade A, API 5L grade B as well as API 5L grade X42 to X80. The state-of-the-art plants have certifications from API and ISO 9001:2015 by DNV GL.

## Product Profile : ERW Pipes

| NPS | Thickness | Capacity (MT per annum) | Length | Specifications | Pipe Ends |
|---|---|---|---|---|---|
| ½" (21.3mm) to 16" (406.4mm) | 0.063" (1.6 mm) to 0.500" (12.7 mm) | 12,15,000 MT (1.215 Million) | 9.84 feet (3000 mm) to 42.32 feet (12900) mm | All National / International specifications including API5L upto X-80 PSL2, API 5CT H40, J55, K55 PSL1, EN : 10255, EN :10219, EN : 10217-1, AS : 1074, AS NZ 1163: 2016, ASTM A 53, BS EN - 39, ASTM A 500 ASTM A 252, ASTM A 795 | Plain / Bevelled/ Roll-Grooved |

# ERW PIPES

## Water Pipelines

Water Mains, Plumbing, Sewerage Systems,
STP, WTP, Fire, HVAC,
Industrial Water Lines, Plant Piping.
IS:1239, IS:3589, ASTM A 53, JIS G 3444,
EN 10255, EN 10217-1, AS:1074,
ASNZ:1163:2016.

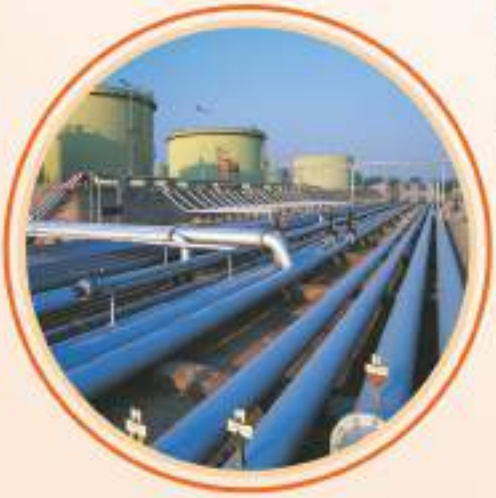
## Agriculture & Irrigation

Deep Tube-Wells & Casing Pipes.
IS:4270

## Construction Industries

Scaffolding & Structural Purposes.
IS:1161, IS:4923, EN 39,
EN 10219- Part 1 & 2, AS NZ 1163:2016
ASTM A 500
Electrical Poles & Telecom Tower (IS:1161)

ERW



## Oil Pipelines

Oil Refinery Piping, Crude Oil Piping
Cross-Country Pipeline
API 5L (PSL 1 & PSL 2), IS/ISO :3183

## Gas Pipelines

Pipelines for Natural Gas, LPG,
Domestic Gas line (home to home)CGD
IS :1239 and other Non-Toxic Gases.
API 5L (PSL 1 & PSL 2),
IS/ISO 3183, JIS G 3444

# SPECIFICATIONS & APPLICATIONS

The products conform to the following
National & International specifications

## Power Projects

Ash Handling System, LP Piping, API 5L
IS:3589, IS:1239

## Fire Fighting System

ASTM A 53, ASTM A 795
IS:3589, IS:1239

# PIPES

## Sugar Industries

Steel Tubes for Mechanical &
General Engineering Purposes.
(IS:3601, BS:1775, ASTM A513)

## Warehouses & Highways

(ASTM A500, EN10219, IS 4923,
AS/NZS1163, CSA)

## Other Purposes

Supply of Exhaust Piping,
Cold Storage Industry,
LPG Cylinder Supporting Rings. (IS:1239)
Steel Tubes for Idlers &
Belt Conveyors (IS:9295),
Electrical Poles &
Telecom Tower (IS:1161),
Tubular Swaged Poles IS 2713:1980
HVAC (Heating Ventilation Air-Conditioning)

# Testimony to Our Capability

## Three star "Certificate of Recognition" from Govt. of India

### Management System Certificate :

- ISO 9001:2015
- ISO 14001:2015
- ISO 45001:2018

### Product and Marking Certificate :

- API 5L
- API 5CT
- EN 10219-1:2006 – Construction Product Regulation 305/2011
- EN 10255:2004+A1:2007 – Construction Product Regulation 305/2011
- EN 10217-1:2019
- EN 10217-1:2019-Pressure Equipment Directive 2014/68/EU
- UL
- FM Approval
- SLS 829:2009 – GI Pipes
- AFP– 2977 (Activfire) for AS 1074
- AFP– 3206 (Activfire) for ASTM A135/A53
- BIS Licenses (IS 1239 (part-1), IS 3589, IS 4270 , IS 1161, IS 4923, IS/ISO 3183, IS 3601 , IS 9295, IS 9537 (part-2), IS 2713 (part 1-3), IS 5504)

# Testimony To Our Capability

DNV

MANAGEMENT SYSTEM CERTIFICATE

This is to certify that the management system of

**Surya Roshni Limited**

has been found to conform to the Quality Management System standard:

**ISO 9001:2015**

This certificate is valid for the following scope:

- Manufacture of HSAW (helical submerged arc welded) pipes and ERW (electric resistance welded) pipes and tubes for oil and gas, water & structural purposes
- Performing anticorrosion coating (three layer polyethylene, three-layer polypropylene, single and double layer fusion bonded epoxy, lacquer coating, primer coating and galvanizing)

CERTIFICATE NO
70121-2010-AQ-IND-RvA
ISO 9001:2015

DNV

MANAGEMENT SYSTEM CERTIFICATE

This is to certify that the management system of

**Surya Roshni Limited**

has been found to conform to the Occupational Health and Safety Management System standard:

**ISO 45001:2018**

This certificate is valid for the following scope:

Manufacture of HSAW (helical submerged arc welded) and ERW (electric resistance welded) pipes and tubes for oil and gas, water & structural purpose and performing anticorrosion coating (three layer polyethylene, three layer polypropylene, single and double layer fusion bonded epoxy, liquor coating, primer coating and galvanizing).

CERTIFICATE NO
260692-2018-AHSO-IND-RvA
OHSAS 18001: 2007

DNV

MANAGEMENT SYSTEM CERTIFICATE

This is to certify that the management system of

**Surya Roshni Limited**

has been found to conform to the Environmental Management System standard:

**ISO 14001:2015**

This certificate is valid for the following scope:

Manufacture of HSAW (helical submerged arc welded) and ERW (electric resistance welded) pipes and tubes for oil and gas, water & structural purpose and performing anticorrosion coating (three layer polyethylene, three layer polypropylene, single and double layer fusion bonded epoxy, liquor coating, primer coating and galvanizing)

CERTIFICATE NO
177047-2015-AE-IND-RvA
ISO 14001:2015

Certificate of Compliance

Underwriters Laboratories Inc.

SURYA ROSHNI LTD

Look for the UL Recognized Component Mark on the product

UL CERTIFICATE
No. : 20100301-EX15061

# Testimony To Our Capability

DNV·GL

CERTIFICATE OF CONFORMITY OF THE FACTORY PRODUCTION CONTROL

**Surya Roshni Limited**

**Surya Roshni Limited**

CERTIFICATE NO
EN 10219-1:2006
1162-CPR-0513 Rev.2

DNV·GL

CERTIFICATE OF
FACTORY PRODUCTION CONTROL

**Non-alloy steel tubes suitable for welding and threading**

Manufactured by

**Surya Roshni Limited**

**Applications/Limitations**

CERTIFICATE NO
10139-2017-CE-IND-Rev. 2

DNV

MATERIAL MANUFACTURE CERTIFICATE

This is to certify that:

**Surya Roshni Limited**
Survey No 186, Anjar Mundra Highway, Vill. Bhuvad, tal. Anjar, Dist. Kutch, PIN-370130, India

for

**Non-Alloy Welded Steel Tubes for Pressure Purposes**

has implemented and is maintaining a certified quality assurance system which has undergone a specific assessment for materials for applications covered by Directive 2014/68/EU on pressure equipment, and is found to comply with Annex I, section 4.3, for acceptance of type 3.1 material certificates according to EN 10204:2004

Further details are given in the following pages

FM CERTIFICATE
No. : 0003047635

FM APPROVED

Certificate of Compliance

FM Approvals

SLS CERTIFICATE
SLS 829:2009

SRI LANKA STANDARDS INSTITUTION

Permit for the Use of SLS Certification Mark

Active Fire
Certificate : afp - 2977

ACTIVFIRE

Certificate of Conformity

afp - 2977

Standard Mark
License : AS 1074-1989

ACTIVFIRE

Certificate of Conformity

afp - 3206

Activ Fire
Certificate : afp - 3206

Schedule to

Certificate of Conformity

afp - 3206

**Certificate of Authority to use the Official API Monogram**

**License Number:** 5CT-1378 **ORIGINAL**

The American Petroleum Institute hereby grants to

**SURYA ROSHNI LIMITED**
**Survey #188, Village Bhuvad**
**Anjar Mundra Highway**
**Taluka Anjar, Gujarat**
**India**

the right to use the Official API Monogram® on manufactured products under the conditions in the official publications of the American Petroleum Institute entitled API Spec Q1® and **API-5CT** and in accordance with the provisions of the License Agreement.

In all cases where the Official API Monogram is applied, the API Monogram shall be used in conjunction with this certificate number: **5CT-1378**

The American Petroleum Institute reserves the right to revoke this authorization to use the Official API Monogram for any reason satisfactory to the Board of Directors of the American Petroleum Institute.

The scope of this license includes the following: Manufacturer of Electric-Welded Casing or Tubing (Plain End) H40, PSL 1, J55, PSL 1, K55, PSL 1

QMS Exclusions: Design and Development; Servicing

**Effective Date:** MAY 10, 2022
**Expiration Date:** MAY 10, 2025

**To verify the authenticity of this license, go to www.api.org/compositelist.**

Senior Vice President of Global Industry Services

API 5CT
License No. : 1378

**Certificate of Authority to use the Official API Monogram**

**License Number:** 5L-0794 **ORIGINAL**

The American Petroleum Institute hereby grants to

**SURYA ROSHNI LIMITED**
**Survey #188, Village Bhuvad**
**Anjar Mundra Highway**
**Taluka Anjar, Gujarat**
**India**

the right to use the Official API Monogram® on manufactured products under the conditions in the official publications of the American Petroleum Institute entitled API Spec Q1® and **API-5L** and in accordance with the provisions of the License Agreement.

In all cases where the Official API Monogram is applied, the API Monogram shall be used in conjunction with this certificate number: **5L-0794**

The American Petroleum Institute reserves the right to revoke this authorization to use the Official API Monogram for any reason satisfactory to the Board of Directors of the American Petroleum Institute.

The scope of this license includes the following: Manufacturer of Line Pipe Pipe Grd at PSL 1 - Type of Pipe: HFW / Delivery Condition: N / Max. Grade: X70 / Delivery Condition: N / Max. Grade: X70 and / Delivery Condition: N / Max. Grade: X70 - Type of Pipe: SAWH / Delivery Condition: M / Max. Grade: X70 / Delivery Condition: N / Max. Grade: X70 and / Delivery Condition: N / Max. Grade: X70 / Manufacturer of Line Pipe Plate Grd at PSL 2 - Type of Pipe: HFW / Delivery Condition: M / Max. Grade: X80 and / Delivery Condition: N / Max. Grade: X80 - Type of Pipe: SAWH / Delivery Condition: M / Max. Grade: X80 and / Delivery Condition: N / Max. Grade: X80 - Manufacturer of Line Pipe Plate Grd at PSL 2 - Service Annex H - Type of Pipe: HFW / Delivery Condition: M / Max. Grade: X70 and / Delivery Condition: N / Max. Grade: X80 - Type of Pipe: SAWH / Delivery Condition: M / Max. Grade: X70 and / Delivery Condition: N / Max. Grade: X80 - Manufacturer of Line Pipe Plate Grd at PSL 2 - Service Annex J - Type of Pipe: HFW / Delivery Condition: M / Max. Grade: X80 and / Delivery Condition: N / Max. Grade: X70 - Type of Pipe: SAWH / Delivery Condition: M / Max. Grade: X80 and / Delivery Condition: N / Max. Grade: X70

QMS Exclusions: Design and Development; Servicing

**Effective Date:** MAY 10, 2022
**Expiration Date:** MAY 10, 2025

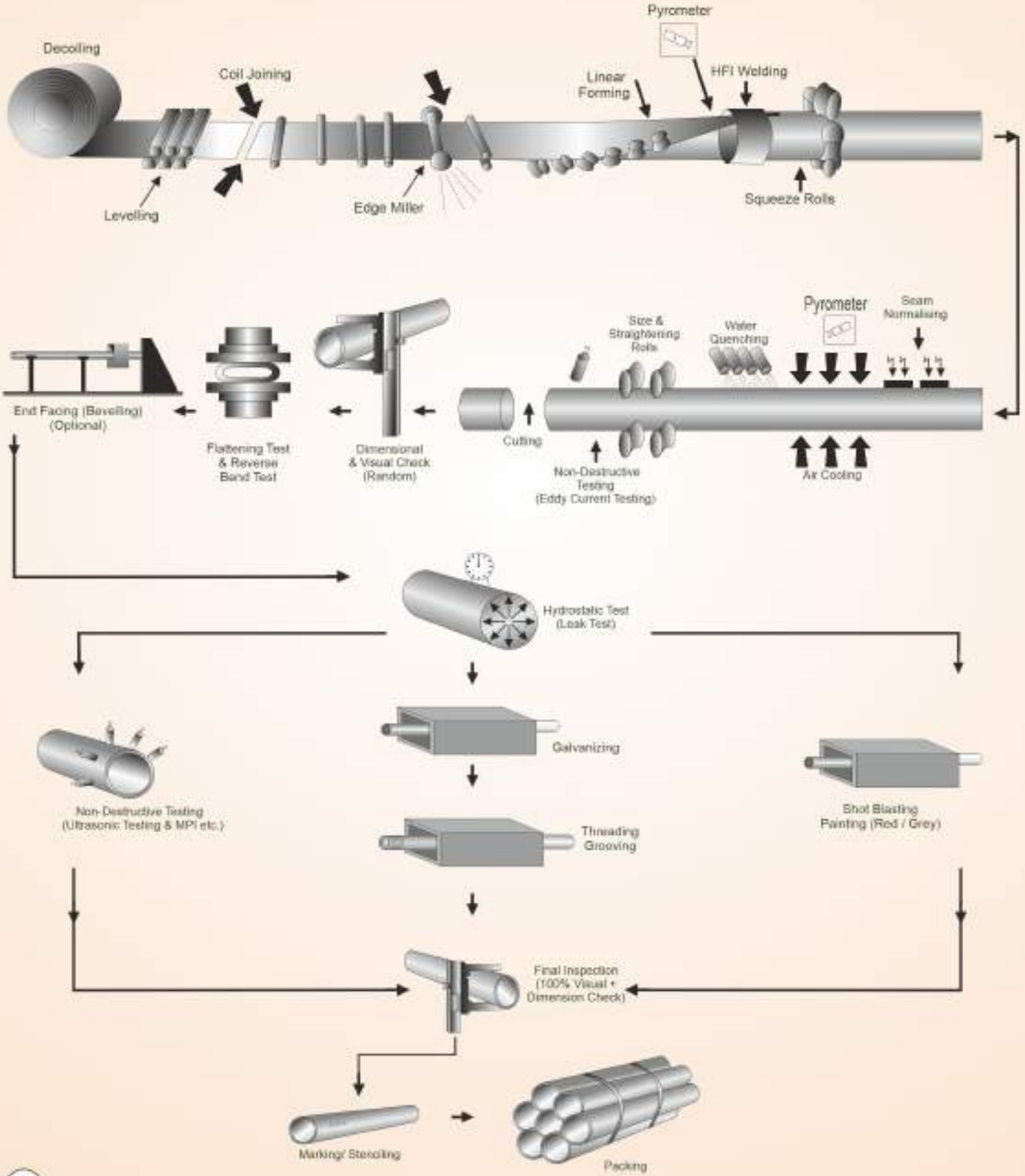
**To verify the authenticity of this license, go to www.api.org/compositelist.**

Senior Vice President of Global Industry Services

API 5L
License No. : 0794

PRAKASH
SURYA
Steel Tubes & Pipes

# FLOW CHART : ERW



## TECHNICAL DATA OF PIPES CONFORMING TO ASTM A-53 GR. A & B

| NPS Designator | DN Designator | Outside Diameter | | Schedule No | Wall Thickness | | Mass of Plain end Pipe | | Weight of Black & Galvanized Pipe Screwed & Socketed | | Test Pressure | | | | Pieces/ bundle |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Grade A | | Grade B | | |
| | | Inch | mm | | inch | mm | Kg/Mtr | lb/ft | lb/ft | Kg/Mtr | MPa | PSI | MPa | PSI | |
| ⅛ | 15 | 0.840 | 21.3 | 40 | 0.109 | 2.77 | 1.27 | 0.85 | 0.86 | 1.27 | 4.8 | (700) | 4.8 | (700) | 120 |
| ¾ | 20 | 1.050 | 26.7 | 40 | 0.113 | 2.87 | 1.69 | 1.13 | 1.14 | 1.69 | 4.8 | (700) | 4.8 | (700) | 84 |
| 1 | 25 | 1.315 | 33.4 | 40 | 0.133 | 3.38 | 2.50 | 1.68 | 1.69 | 2.50 | 4.8 | (700) | 4.8 | (700) | 60 |
| 1¼ | 32 | 1.660 | 42.2 | 40 | 0.140 | 3.56 | 3.39 | 2.27 | 2.28 | 3.40 | 8.3 | (1200) | 9 | (1300) | 42 |
| 1½ | 40 | 1.900 | 48.3 | 40 | 0.145 | 3.68 | 4.05 | 2.72 | 2.74 | 4.04 | 8.3 | (1200) | 9 | (1300) | 36 |
| 2 | 50 | 2.375 | 60.3 | 40 | 0.154 | 3.91 | 5.44 | 3.66 | 3.68 | 5.46 | 15.9 | (2300) | 17.2 | (2500) | 26 |
| 2½ | 65 | 2.875 | 73.0 | 40 | 0.203 | 5.16 | 8.63 | 5.80 | 5.85 | 8.67 | 17.2 | (2500) | 17.2 | (2500) | 18 |
| 3 | 80 | 3.500 | 88.9 | 40 | 0.216 | 5.49 | 11.29 | 7.58 | 7.68 | 11.36 | 15.3 | (2220) | 17.2 | (2500) | 14 |
| 3½ | 90 | 4.000 | 101.6 | 40 | 0.226 | 5.74 | 13.57 | 9.12 | 9.27 | 13.71 | 14.0 | (2030) | 16.3 | (2370) | 12 |
| 4 | 100 | 4.500 | 114.3 | 40 | 0.237 | 6.02 | 16.07 | 10.80 | 10.92 | 16.23 | 13.1 | (1900) | 15.2 | (2210) | 10 |
| 5 | 125 | 5.563 | 141.3 | 40 | 0.258 | 6.55 | 21.77 | 14.63 | 14.90 | 22.07 | 11.5 | (1670) | 13.4 | (1950) | 7 |
| 6 | 150 | 6.625 | 168.3 | 40 | 0.280 | 7.11 | 28.26 | 18.99 | 19.34 | 28.58 | 10.5 | (1520) | 12.3 | (1780) | 7 |
| 8 | 200 | 8.625 | 219.1 | 20 | 0.250 | 6.35 | 33.31 | 22.38 | 34.92 | 23.47 | 7.20 | (1040) | 8.4 | (1220) | - |
| 8 | 200 | 8.625 | 219.1 | 30 | 0.277 | 7.04 | 36.31 | 24.72 | 38.07 | 25.53 | 7.80 | (1160) | 9.3 | (1350) | - |
| 8 | 200 | 8.625 | 219.1 | 40 | 0.322 | 8.18 | 42.55 | 28.58 | 29.35 | 43.73 | 9.2 | (1340) | 10.8 | (1570) | - |
| 10 | 250 | 10.750 | 273.0 | 20 | 0.250 | 6.35 | 41.75 | 28.06 | - | - | 5.8 | (840) | 6.8 | (980) | - |
| 10 | 250 | 10.750 | 273.0 | 30 | 0.307 | 7.80 | 51.01 | 34.27 | - | - | 7.10 | (1030) | 8.3 | (1200) | - |
| 10 | 250 | 10.750 | 273.0 | 40 | 0..365 | 9.27 | 60.29 | 40.52 | - | - | 8.4 | (1220) | 9.9 | (1430) | - |
| 12 | 300 | 12.750 | 323.8 | 20 | 0.250 | 6.35 | 49.71 | 33.41 | - | - | 4.9 | (709) | 5.7 | (820) | - |
| 12 | 300 | 12.750 | 323.8 | 30 | 0.330 | 8.38 | 65.18 | 43.81 | - | - | 6.4 | (930) | 7.5 | (1090) | - |
| 12 | 300 | 12.750 | 323.8 | STD | 0.375 | 9.52 | 73.78 | 49.61 | - | - | 7.3 | (1060) | 8.5 | (1240) | - |
| 12 | 300 | 12.750 | 323.8 | 40 | 0.406 | 10.31 | 79.70 | 53.57 | - | - | 7.9 | (1150) | 9.2 | (1340) | - |
| 14 | 350 | 14.000 | 355.6 | 10 | 0.250 | 6.35 | 54.69 | 36.75 | - | - | 4.4 | (640) | 5.2 | (750) | - |
| 14 | 350 | 14.000 | 355.6 | 20 | 0.312 | 7.92 | 67.90 | 45.65 | - | - | 5.50 | (800) | 6.5 | (940) | - |
| 14 | 350 | 14.000 | 355.6 | 30 | 0.375 | 9.52 | 81.25 | 54.62 | - | - | 6.6 | (960) | 7.7 | (1120) | - |
| 14 | 350 | 14.000 | 355.6 | 40 | 0.438 | 11.13 | 94.55 | 63.50 | - | - | 7.8 | (1130) | 9 | (1310) | - |
| 16 | 400 | 16.000 | 406.4 | 10 | 0.250 | 6.35 | 62.64 | 42.09 | - | - | 3.9 | (560) | 4.5 | (660) | - |
| 16 | 400 | 16.000 | 406.4 | 20 | 0.312 | 7.92 | 77.83 | 52.32 | - | - | 4.80 | (700) | 5.7 | (820) | - |
| 16 | 400 | 16.000 | 406.4 | 30 | 0.375 | 9.52 | 93.17 | 62.64 | - | - | 5.8 | (840) | 6.8 | (980) | - |
| 16 | 400 | 16.000 | 406.4 | 40 | 0.500 | 12.72 | 123.30 | 82.85 | - | - | 7.7 | (1120) | 9 | (1310) | - |

### Tolerances

| | | |
|---|---|---|
| Outside Diameter | Pipe Size upto & including DN 40 | +/- 0.4 mm of OD |
| | Pipe size DN 50 or larger | +/- 1% of OD |
| Thickness | - 12.5% (max) / + Not specified | |
| Weight | +/- 10% | |

**Testing**

| | | |
|---|---|---|
| Online NDT | For Pipes NPS 2 (DN 50) or larger | |
| | Weld seam of each pipe shall be tested by Eddy Current Test | |
| Bend Test | For pipes upto & including DN 50 | |
| | Bending angle | 90° |
| | Bending radius | 12 times to the OD of Tube (no crack in body & weld) |
| Flattening (0° & 90°) | For pipes over DN 50 | |
| | 1. Flatten upto 2/3 of OD for ductility of weld | |
| | 2. Flatten upto 1/3 of OD for ductility of steel | |
| | 3. Full Flattening for testing of lamination or Unsound material | |

### Mechanical Properties

| | Grade A | Grade B |
|---|---|---|
| Yield Strength | 205 MPa (Min) | 240 MPa (Min) |
| Tensile Strength | 330 MPa (Min) | 415 MPa (Min) |
| Elongation | As per ASTM A-53 | |

### Chemical Composition (Max %)

| | Carbon | Manganese | Phosphorus | Sulphur | Copper | Nickel | Chromium | Molybdenum | Vanadium |
|---|---|---|---|---|---|---|---|---|---|
| Grade A | 0.25 | 0.95 | 0.05 | 0.045 | 0.4 | 0.4 | 0.4 | 0.15 | 0.08 |
| Grade B | 0.3 | 1.2 | 0.05 | 0.045 | 0.4 | 0.4 | 0.4 | 0.15 | 0.08 |

Cu + Ni + Cr + Mb + V < 1%

### Galvanizing (As per ASTM A-53 with test method ASTM A 90/A90M)

| | |
|---|---|
| Minimum of any surface of specimen | 0.400 Kg/Mtr$^2$ (55 microns approx) |
| Average of one specimen | 0.490 Kg/Mtr$^2$ (70 microns approx) |
| Average of two specimen | 0.550 Kg/Mtr$^2$ (79 microns approx) |

**Marking:** Online stenciling as per the standard & client requirements.

## TECHNICAL DATA OF PIPES CONFORMING TO EN:10255

| Nominal Size | | Class | Outside Diameter (mm) | | Thick. (mm) | Weight (Plain End) (Kg/mtr.) | Weight (Socketed) (Kg/mtr.) | Pcs per Bundle |
|---|---|---|---|---|---|---|---|---|
| DN | Inch | | Min | Max | | | | |
| 15 | 1/2 | L1 | 21.0 | 21.7 | 2.30 | 1.08 | 1.09 | 169 |
| 20 | 3/4 | L1 | 26.4 | 27.1 | 2.30 | 1.39 | 1.40 | 127 |
| 25 | 1 | L1 | 33.2 | 34.0 | 2.90 | 2.20 | 2.22 | 91 |
| 32 | 1 1/4 | L1 | 41.9 | 42.7 | 2.90 | 2.82 | 2.85 | 61 |
| 40 | 1 1/2 | L1 | 47.8 | 48.6 | 2.90 | 3.24 | 3.28 | 61 |
| 50 | 2 | L1 | 59.6 | 60.7 | 3.20 | 4.49 | 4.56 | 37 |
| 65 | 2 1/2 | L1 | 75.2 | 76.3 | 3.20 | 5.73 | 5.85 | 37 |
| 80 | 3 | L1 | 87.9 | 89.4 | 3.60 | 7.65 | 7.72 | 19 |
| 100 | 4 | L1 | 113.0 | 114.9 | 4.00 | 10.80 | 11.10 | 19 |
| 15 | 1/2 | L2 | 21.0 | 21.4 | 2.00 | 0.947 | 0.956 | 169 |
| 20 | 3/4 | L2 | 26.4 | 26.9 | 2.30 | 1.380 | 1.390 | 127 |
| 25 | 1 | L2 | 33.2 | 33.8 | 2.60 | 1.98 | 2.00 | 91 |
| 32 | 1 1/4 | L2 | 41.9 | 42.5 | 2.60 | 2.540 | 2.570 | 61 |
| 40 | 1 1/2 | L2 | 47.8 | 48.4 | 2.90 | 3.230 | 3.270 | 61 |
| 50 | 2 | L2 | 59.6 | 60.2 | 2.90 | 4.08 | 4.15 | 37 |
| 65 | 2 1/2 | L2 | 75.2 | 76.0 | 3.20 | 5.710 | 5.830 | 37 |
| 80 | 3 | L2 | 87.9 | 88.7 | 3.20 | 6.720 | 6.890 | 19 |
| 100 | 4 | L2 | 113.0 | 113.9 | 3.60 | 9.75 | 10.00 | 19 |
| 15 | 1/2 | L | 21.0 | 21.7 | 2.30 | 1.08 | 1.09 | 169 |
| 20 | 3/4 | L | 26.4 | 27.1 | 2.30 | 1.40 | 1.41 | 127 |
| 25 | 1 | L | 33.2 | 34.0 | 2.90 | 2.20 | 2.22 | 91 |
| 32 | 1 1/4 | L | 41.9 | 42.7 | 2.90 | 2.82 | 2.85 | 61 |
| 40 | 1 1/2 | L | 47.8 | 48.6 | 2.90 | 3.25 | 3.29 | 61 |
| 50 | 2 | L | 59.6 | 60.7 | 3.20 | 4.51 | 4.58 | 37 |
| 65 | 2 1/2 | L | 75.2 | 76.0 | 3.20 | 5.75 | 5.87 | 37 |
| 80 | 3 | L | 87.9 | 88.7 | 3.20 | 6.76 | 6.93 | 19 |
| 100 | 4 | L | 113.0 | 113.9 | 3.60 | 9.83 | 10.10 | 19 |
| 125 | 5 | L | 138.5 | 140.8 | 4.50 | 15.00 | 15.50 | 10 |
| 150 | 6 | L | 163.9 | 166.5 | 4.50 | 17.80 | 18.40 | 10 |
| 15 | 1/2 | M | 21.0 | 21.8 | 2.60 | 1.21 | 1.22 | 169 |
| 20 | 3/4 | M | 26.5 | 27.3 | 2.60 | 1.56 | 1.57 | 127 |
| 25 | 1 | M | 33.3 | 34.2 | 3.20 | 2.41 | 2.43 | 91 |
| 32 | 1 1/4 | M | 42.0 | 42.9 | 3.20 | 3.10 | 3.13 | 61 |
| 40 | 1 1/2 | M | 47.9 | 48.8 | 3.20 | 3.56 | 3.60 | 61 |
| 50 | 2 | M | 59.7 | 60.8 | 3.60 | 5.03 | 5.10 | 37 |
| 65 | 2 1/2 | M | 75.3 | 76.6 | 3.60 | 6.42 | 6.54 | 37 |
| 80 | 3 | M | 88.0 | 89.5 | 4.00 | 8.36 | 8.53 | 19 |
| 100 | 4 | M | 113.1 | 115.0 | 4.50 | 12.20 | 12.50 | 19 |
| 125 | 5 | M | 138.5 | 140.8 | 5.00 | 16.60 | 17.10 | 10 |
| 150 | 6 | M | 163.9 | 166.5 | 5.00 | 19.80 | 20.40 | 10 |
| 15 | 1/2 | H | 21.0 | 21.8 | 3.20 | 1.44 | 1.45 | 169 |
| 20 | 3/4 | H | 26.5 | 27.3 | 3.20 | 1.87 | 1.88 | 127 |
| 25 | 1 | H | 33.3 | 34.2 | 4.00 | 2.93 | 2.95 | 91 |
| 32 | 1 1/4 | H | 42.0 | 42.9 | 4.00 | 3.79 | 3.82 | 61 |
| 40 | 1 1/2 | H | 47.9 | 48.8 | 4.00 | 4.37 | 4.41 | 61 |
| 50 | 2 | H | 59.7 | 60.8 | 4.50 | 6.19 | 6.26 | 37 |
| 65 | 2 1/2 | H | 75.3 | 76.6 | 4.50 | 7.93 | 8.05 | 37 |
| 80 | 3 | H | 88.0 | 89.5 | 5.00 | 10.30 | 10.50 | 19 |
| 100 | 4 | H | 113.1 | 115.0 | 5.40 | 14.50 | 14.80 | 10 |
| 125 | 5 | H | 138.5 | 140.8 | 5.40 | 17.90 | 18.40 | 10 |
| 150 | 6 | H | 163.9 | 166.5 | 5.40 | 21.30 | 21.90 | 10 |

### Tolerances

Outside Diameter as per above table

Thickness

| Medium | Heavy | Light L | Light L1 | Light L2 |
|---|---|---|---|---|
| ±10% | ±10% | ±10% | -8% | -8% |

Weight ±7.5% for M, H & L series (on lot) and +10%/-8% for L1 & L2 series

| Mechanical Properties | | Chemical Properties | |
|---|---|---|---|
| | | Carbon | 0.20 % Max |
| Yield Strength | 195 MPa (Minimum) | Manganese | 1.40 % Max |
| Tenslie Strength | 320 to 520 MPa | Phosphorus | 0.035 % Max |
| %Elongation | 20% Minimum | Sulphur | 0.030 % Max |

### Bend Test

For Tubes upto & including 2"

Black Tube
- Bending Angle: 90°
- Bending Radius: As per EN 10255
- Weld Position: outside of the bend

Galvanized Tube
- Bending angle: 90°
- Bending radius: 8 times to the OD of Tube
- Weld Position: outside of the bend

### Flattening Test

For Tubes above 2"

1. Flatten upto 75% of tube dia for weld test (Weld at 12 or 3 O'clock position)
2. Flatten upto 60% of tube dia for Base metal test

**Leak Tightness Test** 100% Hydrotesting at 50 bar or online eddy current testing

**Galvanizing Test** As per EN 10240 / EN ISO 1461

**Threading** As per EN 10226-1

# TR1

## TECHNICAL DATA OF PIPES CONFORMING TO **EN : 10217-1**

| SIZE OD (mm) | * WALL THICKNESS (mm) | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1.8 | 2 | 2.3 | 2.6 | 2.9 | 3.2 | 3.6 | 4 | 4.5 | 5 | 5.6 | 6.3 | 7.1 | 8 | 8.8 | 10 | 11 | 12.5 |
| 21.3 | | | | | | | | | | | | | | | | | | |
| 26.9 | | | | | | | | | | | | | | | | | | |
| 33.7 | | | | | | | | | | | | | | | | | | |
| 42.4 | | | | | | | | | | | | | | | | | | |
| 48.3 | | | | | | | | | | | | | | | | | | |
| 60.3 | | | | | | | | | | | | | | | | | | |
| 76.1 | | | | | | | | | | | | | | | | | | |
| 88.9 | | | | | | | | | | | | | | | | | | |
| 114.3 | | | | | | | | | | | | | | | | | | |
| 139.7 | | | | | | | | | | | | | | | | | | |
| 168.3 | | | | | | | | | | | | | | | | | | |
| 219.1 | | | | | | | | | | | | | | | | | | |
| 244.5 | | | | | | | | | | | | | | | | | | |
| 273.0 | | | | | | | | | | | | | | | | | | |
| 323.9 | | | | | | | | | | | | | | | | | | |
| 355.6 | | | | | | | | | | | | | | | | | | |
| 406.4 | | | | | | | | | | | | | | | | | | |

* Preferred thickness are as per shaded area with blue color.

### Tolerances on dimensions

| | |
|---|---|
| Outside Diameter | For ≤ 219.1: ±1% or ±0.5 mm whichever is greater; For > 219.1: ±0.75% or ± 6 mm whichever is smaller |
| Thickness | For T ≤ 5mm: ±10% or ±0.3mm whichever is greater; for 5< T ≤ 40 mm: ± 8% or ± 2 mm whichever is smaller |
| Height of weld seam | Outside trimmed and inside 1.5 mm max. |
| Straightness | 0.15% of total length and 3 mm over any 1 m length |

### MECHANICAL PROPERTIES

| Grade | YS Min MPa | | TS Min MPa | %El Min | |
|---|---|---|---|---|---|
| | T ≤ 16 | 16 < T ≤ 40 | | long. | trans. |
| P195TR1 | 195 | 185 | 320-440 | 27 | 25 |
| P235TR1 | 235 | 225 | 360-500 | 25 | 23 |
| P265TR1 | 265 | 255 | 410-570 | 21 | 19 |

### CHEMICAL COMPOSITION (%)

| Grade | C (Max) | Si (Max) | Mn (Max) | P (Max) | S (Max) | Cr (Max) | Mo (Max) | Ni (Max) | Al (Min) | Cu (Max) | Nb (Max) | Ti (Max) | V (Max) | Cr+Cu+Mo+Ni (Max) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P195TR1 | 0.130 | 0.350 | 0.700 | 0.025 | 0.020 | 0.300 | 0.080 | 0.300 | -- | 0.300 | 0.010 | 0.040 | 0.020 | 0.700 |
| P235TR1 | 0.160 | 0.350 | 1.200 | 0.025 | 0.020 | 0.300 | 0.080 | 0.300 | -- | 0.300 | 0.010 | 0.040 | 0.020 | 0.700 |
| P265TR1 | 0.200 | 0.400 | 1.400 | 0.025 | 0.020 | 0.300 | 0.080 | 0.300 | -- | 0.300 | 0.010 | 0.040 | 0.020 | 0.700 |

### Drift Expanding Test : For sizes D≤150mm & T≤10

| Grade | P195 TR1 | P235 TR1 | P265 TR1 |
|---|---|---|---|
| | % increase in diameter | | |
| For d/D≤0.8 | 10 | 10 | 8 |
| For d/D>0.8 | 12 | 12 | 10 |

**Flattening Test** Flatten until the distance (H) between plates reaches the value calculated by formula:

$$H = \frac{(1 + C)}{C + (T / D)} \times T$$

C - 0.9 for steel grade P195TR1 & P235TR1

C - 0.7 for steel grade P265TR1

D - Diameter of the tube; T - Thickness of the tube; C - Constant

**Leak Tightness Test** 100% Hydrotesting at 70 bar or Electromagnetic testing

**Non Destructive Test** Full length of weld seam shall be subjected to non destructive test for the detection of longitudinal imperfections

## TECHNICAL DATA OF PIPES CONFORMING TO **BS EN 39**

(Non alloy steel tube for use with EN74 couplers in the construction of false work and working scaffolds)

| DESIGNATION OF THREAD | NOMINAL DIAMETER | TYPE | OUTSIDE DIMETER (MM) | | | STANDARD | WEIGHT (KG/MTR) | PCS/ BUNDLE |
|---|---|---|---|---|---|---|---|---|
| INCH | DN | | STANDARD | MINIMUM | MAXIMUM | THICKNESS (MM) | | |
| 1½" | 40 | 3 | 48.3 | 47.8 | 48.8 | 3.20 | 3.56 | 61 |
| 1½" | 40 | 4 | 48.3 | 47.8 | 48.8 | 4.00 | 4.37 | 61 |
| -- | -- | -- | 38.1 | 37.5 | 38.5 | 3.20 | 2.75 | 61 |
| -- | -- | -- | 38.1 | 37.5 | 38.5 | 4.00 | 3.36 | 61 |

## CHEMICAL COMPOSITION AND MECHANICAL PROPERTIES

| STEEL GRADE | | CHEMICAL COMPOSITION | | | | | | MECHANICAL PROPERTIES | | |
|---|---|---|---|---|---|---|---|---|---|---|
| STEEL NAME | STEEL NUMBER | C % max | Mn % max | P % max | S % max | Si %max | Al % (MIN.) | YIELD STRENGTH (Mpa) MIN. | TENSILE STRENGTH (MPa) | % ELONGATION (MIN) |
| S235GT | 1.0106 | 0.200 | 1.400 | 0.040 | 0.045 | 0.040 | 0.020 | 235 | 340 - 520 | 24 |

* The steel shall be killed.

## TECHNICAL DETAILS

| **Characteristics** | **Tolerances & Technical details** |
|---|---|
| Thickness | -10% on standard wall thickness |
| Straightness | 0.20% of total length |
| Mass per unit length | Not less than 7.5% the specified mass on individual lengths |
| Inside diameter of tube | Shall allow insertion of a gauge of diameter 37.7mm for a minimum length of 200mm from both pipe ends. |
| Flattening Test | Keep the weld at 90° and flatten upto 75% of OD, No cracks or flaws are allowed on the weld. Further flatten upto 60% of OD, No cracks or flaws are allowed in the material elsewhere than in the weld. |
| Galvanizing Coating | As per EN 10240 B2 (40Microns minimum ) |
| Marking | (a) Embossing " BS EN 39 - 3 or 4 and SURYA at every meter on pipe as per customer requirement.<br>(b) Stencilling " BS EN 39 - 3 or 4 and SURYA at every meter on pipe as per customer requirement. |
| End Uses | (a) 48.3mm (1½") pipes are used for Standard and Ledgers of different lengths.<br>(b) 38.1mm pipes used for Universal Jack. |

Note:- In addition to the above, we can manufacture the pipes related to Scaffolding in other sizes & higher grades like:- S275J0H, S275J2H, S355J0H & S355J2H etc as per the customer requirement.

# TECHNICAL DATA OF PIPES CONFORMING TO **AS:1074**

| DN Size | | Class | O.D. (mm) | | Thick. (mm) | Weight (Plain End) (Kg/mtr.) | Weight (Socketed) (Kg/mtr.) | Pcs per Bundle |
|---|---|---|---|---|---|---|---|---|
| Inch | DN | | Min | Max | | | | |
| ½" | 15 | L | 21.0 | 21.4 | 2.00 | 0.947 | 0.956 | **217** |
| ¾" | 20 | L | 26.4 | 26.9 | 2.30 | 1.380 | 1.390 | **127** |
| 1" | 25 | L | 33.2 | 33.8 | 2.60 | 1.980 | 2.000 | **91** |
| 1¼" | 32 | L | 41.9 | 42.5 | 2.60 | 2.540 | 2.570 | **61** |
| 1½" | 40 | L | 47.8 | 48.4 | 2.90 | 3.230 | 3.270 | **61** |
| 2" | 50 | L | 59.6 | 60.2 | 2.90 | 4.080 | 4.150 | **37** |
| 2½" | 65 | L | 75.2 | 76.0 | 3.20 | 5.710 | 5.830 | **37** |
| 3" | 80 | L | 87.9 | 88.7 | 3.20 | 6.720 | 6.890 | **19** |
| 4" | 100 | L | 113.0 | 113.9 | 3.60 | 9.750 | 10.000 | **19** |
| ½" | 15 | M | 21.1 | 21.7 | 2.60 | 1.210 | 1.220 | **217** |
| ¾" | 20 | M | 26.6 | 27.2 | 2.60 | 1.560 | 1.570 | **127** |
| 1" | 25 | M | 33.4 | 34.2 | 3.20 | 2.410 | 2.430 | **91** |
| 1¼" | 32 | M | 42.1 | 42.9 | 3.20 | 3.100 | 3.130 | **61** |
| 1½" | 40 | M | 48.0 | 48.8 | 3.20 | 3.570 | 3.610 | **61** |
| 2" | 50 | M | 59.8 | 60.8 | 3.60 | 5.030 | 5.100 | **37** |
| 2½" | 65 | M | 75.4 | 76.6 | 3.60 | 6.430 | 6.550 | **37** |
| 3" | 80 | M | 88.1 | 89.5 | 4.00 | 8.370 | 8.540 | **19** |
| 4" | 100 | M | 113.3 | 114.9 | 4.50 | 12.200 | 12.500 | **19** |
| 5" | 125 | M | 138.7 | 140.6 | 5.00 | 16.600 | 17.100 | **13** |
| 6" | 150 | M | 164.1 | 166.1 | 5.00 | 19.700 | 20.300 | **10** |
| ½" | 15 | H | 21.1 | 21.7 | 3.20 | 1.440 | 1.450 | **217** |
| ¾" | 20 | H | 26.6 | 27.2 | 3.20 | 1.870 | 1.880 | **127** |
| 1" | 25 | H | 33.4 | 34.2 | 4.00 | 2.940 | 2.960 | **91** |
| 1¼" | 32 | H | 42.1 | 42.9 | 4.00 | 3.800 | 3.830 | **61** |
| 1½" | 40 | H | 48.0 | 48.8 | 4.00 | 4.380 | 4.420 | **61** |
| 2" | 50 | H | 59.8 | 60.8 | 4.50 | 6.190 | 6.260 | **37** |
| 2½" | 65 | H | 75.4 | 76.6 | 4.50 | 7.930 | 8.050 | **37** |
| 3" | 80 | H | 88.1 | 89.5 | 5.00 | 10.300 | 10.500 | **19** |
| 4" | 100 | H | 113.3 | 114.9 | 5.40 | 14.500 | 14.800 | **19** |
| 5" | 125 | H | 138.7 | 140.6 | 5.40 | 17.900 | 18.400 | **13** |
| 6" | 150 | H | 164.1 | 166.1 | 5.40 | 21.300 | 21.900 | **10** |

Tolerances

Outside Diameter as per above table

| Thickness | Light | Medium | Heavy |
|---|---|---|---|
| | -8% | -10% | -10% |
| | +unlimited | +unlimited | +unlimited |

Weight -8% & +10% (for single tube)

Mechanical Properties

| | |
|---|---|
| Yield Strength | 195MPa Minimum |
| Tensile Strength | 320 to 460 MPa |
| %Elongation | 20% Minimum |

Chemical Properties

| | |
|---|---|
| Phosphorus | 0.045 % Max |
| Sulphur | 0.045 % Max |
| Carbon Equivalent | 0.40 % Max |

Ductility Test — For Tubes upto & including 2"

Black Tube
- Bending angle: 180°
- Bending radius: 6 times to the OD of Tube
- Weld Position: 3 O'clock

Galvanized Tube
- Bending angle: 90°
- Bending radius: 8 times to the OD of Tube
- Weld Position: 3 O'clock

Ductility Test — For Tubes above 2"
1. Flatten upto 75% of tube dia for weld test (Weld at 3 O'clock position)
2. Flatten upto 60% of tube dia for Base metal test

Leak Tightness Test — 100% Hydrotesting at 5 MPa or online eddy current testing or ultrasonic testing

Mass of Zinc Coating — 300 gm / meter$^2$ as per AS/NZS 4792- 2006

Galvanizing Test
1. Bore test (for tubes upto 1")
2. Copper Sulphate Test

Threading — As per AS 1722-1

## TECHNICAL DATA OF PIPES CONFORMING TO EN : 10219 - 1 & 2 CIRCULAR HOLLOW SECTION

| SIZE OD (mm) | WALL THICKNESS (mm) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2 | 2.5 | 3 | 4 | 5 | 6 | 6.3 | 8 | 10 | 12 | 12.5 |
| | Mass per unit length (Kg/mtr) | | | | | | | | | | |
| 21.3 | 0.95 | 1.16 | 1.35 | | | | | | | | |
| 26.9 | 1.23 | 1.50 | 1.77 | | | | | | | | |
| 33.7 | 1.56 | 1.92 | 2.27 | | | | | | | | |
| 42.4 | 1.99 | 2.46 | 2.91 | 3.79 | | | | | | | |
| 48.3 | 2.28 | 2.82 | 3.35 | 4.37 | 5.34 | | | | | | |
| 60.3 | 2.88 | 3.56 | 4.24 | 5.55 | 6.82 | | | | | | |
| 76.1 | 3.65 | 4.54 | 5.41 | 7.11 | 8.77 | 10.40 | 10.80 | | | | |
| 88.9 | 4.29 | 5.33 | 6.36 | 8.38 | 10.30 | 12.30 | 12.80 | | | | |
| 101.6 | 4.91 | 6.11 | 7.29 | 9.63 | 11.90 | 14.10 | 14.80 | | | | |
| 114.3 | | 6.89 | 8.23 | 10.90 | 13.50 | 16.00 | 16.80 | 21.00 | | | |
| 139.7 | | | 10.10 | 13.40 | 16.60 | 19.80 | 20.70 | 26.00 | 32.00 | | |
| 168.3 | | | 12.20 | 16.20 | 20.10 | 24.00 | 25.20 | 31.60 | 39.00 | | |
| 219.1 | | | | 21.20 | 26.40 | 31.50 | 33.10 | 41.60 | 51.60 | 61.30 | 63.70 |
| 244.5 | | | | | 29.50 | 35.30 | 37.00 | 46.70 | 57.80 | 68.80 | 71.50 |
| 273.0 | | | | | 33.00 | 39.50 | 41.40 | 52.30 | 64.90 | 77.20 | 80.30 |

### Tolerances on dimensions

| Characteristics | Tolerances |
|---|---|
| Outside Dimensions | ±1%, with a minimum of ±0.5 mm and a maximum of ±10 mm |
| Thickness | For D ≤ 406.4 mm, T ≤ 5mm : ±10%, T > 5 mm ± 0.5mm, For D > 406.4 mm; ±10% with a maximum of ± 2mm |
| Out-of-Roundness | 2% for hollow sections having a diameter to thickness ratio not exceeding 100 |
| Straightness | 0.20% of total length and 3mm over any 1 m length |
| Mass per unit length | ± 6% on individual delivered lengths |

## MECHANICAL PROPERTIES

| Grade | YS Min MPa T≤16mm | TS Min MPa | | %El Min | Minimum impact energy J | | |
|---|---|---|---|---|---|---|---|
| | | T < 3mm | 3≤T≤40mm | T≤40 | -20° C | 0° C | 20° C |
| S235 JRH | 235 | 360-510 | 360-510 | 24 | -- | -- | 27 |
| S275 J0H | 275 | 430-580 | 410-560 | 20 | -- | 27 | -- |
| S275 J2H | | | | | 27 | -- | -- |
| S355 J0H | 355 | 510-680 | 470-630 | 20 | -- | 27 | -- |
| S355 J2H | | | | | 27 | -- | -- |
| S355 K2H | | | | | 40 | -- | -- |

## CHEMICAL COMPOSITION (%) Max.

| Grade | C | Si | Mn | P | S | N | CEV |
|---|---|---|---|---|---|---|---|
| S235 JRH | 0.170 | -- | 1.400 | 0.040 | 0.040 | 0.009 | 0.350 |
| S275 J0H | 0.200 | -- | 1.500 | 0.035 | 0.035 | 0.009 | 0.400 |
| S275 J2H | 0.200 | -- | 1.500 | 0.030 | 0.030 | -- | 0.400 |
| S355 J0H | 0.220 | 0.550 | 1.600 | 0.035 | 0.035 | 0.009 | 0.450 |
| S355 J2H | 0.220 | 0.550 | 1.600 | 0.030 | 0.030 | -- | 0.450 |
| S355 K2H | 0.220 | 0.550 | 1.600 | 0.030 | 0.030 | -- | 0.450 |

## TECHNICAL DATA OF PIPES CONFORMING TO AS / NZS : 1163

| SIZE | WALL THICKNESS (mm) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CHS OD | 2.30 | 2.60 | 3.00 | 3.20 | 3.50 | 3.60 | 4.00 | 4.50 | 4.80 | 4.90 | 5.00 | 5.40 | 5.50 | 5.90 | 6.00 | 6.40 | 7.10 | 8.20 | 9.30 | 9.50 | 12.70 |
| (mm) | Mass per unit length (Kg/mtr) | | | | | | | | | | | | | | | | | | | | |
| 21.3 | | 1.20 | | 1.43 | | 1.57 | | | | | | | | | | | | | | | |
| 26.9 | | 1.56 | | 1.87 | | | 2.26 | | | | | | | | | | | | | | |
| 33.7 | | | | 2.41 | | | 2.93 | 3.24 | | | | | | | | | | | | | |
| 42.4 | | | | 3.09 | | | 3.79 | | | 4.53 | | | | | | | | | | | |
| 48.3 | | | | 3.56 | | | 4.37 | | | | | 5.71 | | | | | | | | | |
| 60.3 | | | | | | 5.03 | | 6.19 | | | | 7.31 | | | | | | | | | |
| 76.1 | 4.19 | | | 5.75 | | 6.44 | | 7.95 | | | | | | 10.20 | | | | | | | |
| 88.9 | | 5.53 | | 6.76 | | | 8.38 | | 9.96 | | 10.30 | | 11.30 | 12.10 | | | | | | | |
| 101.6 | | 6.35 | | 7.77 | | | 9.63 | | | | 11.90 | | | | | | | | | | |
| 114.3 | | | | 8.77 | | 9.83 | | 12.20 | 13.50 | | | 14.50 | | | 16.00 | | | | | | |
| 139.7 | | | 10.10 | | 11.60 | | | | | | 16.60 | 17.90 | | | | | | | | | |
| 165.1 | | | 12.00 | | 13.90 | | | | | | 19.70 | 21.30 | | | | | | | | | |
| 168.3 | | | | | | | | | 19.40 | | | | | | | 25.60 | 28.20 | | | | |
| 219.1 | | | | | | | | | 25.40 | | | | | | | 33.60 | | 42.60 | | | |
| 273.1 | | | | | | | | | 31.80 | | | | | | | 42.10 | | | 60.50 | | |
| 323.9 | | | | | | | | | | | | | | | | 50.10 | | | | 73.70 | 97.50 |
| 355.6 | | | | | | | | | | | | | | | | 55.10 | | | | 81.10 | 107.00 |
| 406.4 | | | | | | | | | | | | | | | | 63.10 | | | | 93.00 | 123.00 |

### Tolerances on dimensions

| Characteristics | Tolerances |
|---|---|
| External Dimensions | ±1%, with a minimum of ±0.5 mm and a maximum of ±10 mm |
| Thickness | For $d_o \leq 406.4$ mm: ±10%; For $d_o > 406.4$ mm: ±10% with a max of ±2 mm |
| Out-of-roundness | ± 2% for hollow sections having a diameter to thickness ratio not exceeding 100 |
| Straightness | 0.20% of total length |
| Mass per unit length | Not less than 0.96 times the specified mass on individual lengths |

## MECHANICAL PROPERTIES

| Grade | YS Min | TS Min | %El Min | | | Minimum Absorbed Energy, Joules | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | $d_o/t$ | | | Avg. of 3 tests | | | Individual tests | | |
| | MPa | MPa | ≤15 | >15≤30 | >30 | 10x10 | 10x7.5 | 10x5.0 | 10x10 | 10x7.5 | 10x5.0 |
| C250, C250L0 | 250 | 320 | 18 | 20 | 22 | 27 | 22 | 18 | 20 | 16 | 13 |
| C350, C350L0 | 350 | 430 | 16 | 18 | 20 | 27 | 22 | 18 | 20 | 16 | 13 |
| C450, C450L0 | 450 | 500 | 12 | 14 | 16 | 27 | 22 | 18 | 20 | 16 | 13 |

## CHEMICAL COMPOSITION (%) Max.

| Grade | C | Si | Mn | P | S | Cu | Ni | Cr | Mo | V | Nb | Ti | Al | V+Nb | CE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C250, C250L0 | 0.120 | 0.05 | 0.50 | 0.03 | 0.03 | 0.25 | 0.25 | 0.15 | 0.10 | 0.02 | 0.01 | 0.04 | 0.10 | 0.03 | 0.25 |
| C350, C350L0 | 0.200 | 0.25 | 1.60 | 0.03 | 0.03 | 0.25 | 0.25 | 0.30 | 0.10 | 0.10 | 0.01 | 0.04 | 0.10 | 0.11 | 0.43 |
| C450, C450L0 | 0.200 | 0.25* | 1.70 | 0.03 | 0.03 | 0.25 | 0.25 | 0.50 | 0.35 | 0.10 | 0.01 | 0.04 | 0.10 | 0.11 | 0.43 |

*Note For Circular hollow section (CHS) this silicon limit shall be 0.45

### Manipulation (Bend Test)

For Galvanized Tubes upto & including 60.3 mm

| | |
|---|---|
| Bending angle | 90° |
| Bending radius | 6 times to the OD of Tube |

### Flattening Test

1. Flatten upto 75% of tube dia for weld test (Weld at 45° position for do≤60mm)
2. Flatten upto 75% of tube dia for weld test (Weld at 90° position for do>60mm)

## TECHNICAL DATA OF PIPES CONFORMING TO **ASTM A252**

| OUTSIDE DIAMETER | | DIAMETER TOLERANCE (mm) (Inch) | | STANDARD THICKNESS | | WEIGHT | |
|---|---|---|---|---|---|---|---|
| (Inch) | (mm) | (Min) | (Max) | (mm) | (Inch) | (Kg/mtr) | (lb/ft) |
| 6" | 152.4 | 150.88 (5.940") | 153.92 (6.059") | 3.40 | 0.134 | 12.51 | 8.40 |
| | | | | 3.58 | 0.141 | 13.14 | 8.83 |
| | | | | 3.96 | 0.156 | 14.50 | 9.75 |
| | | | | 4.17 | 0.164 | 15.23 | 10.23 |
| | | | | 4.37 | 0.172 | 15.95 | 10.72 |
| 8⅝" | 219.1 | 216.91 (8.539") | 221.29 (8.712") | 4.37 | 0.172 | 23.13 | 15.54 |
| | | | | 4.78 | 0.188 | 25.24 | 16.96 |
| | | | | 5.16 | 0.203 | 27.20 | 18.28 |
| | | | | 5.56 | 0.219 | 29.29 | 19.68 |
| | | | | 6.35 | 0.250 | 33.31 | 22.38 |
| | | | | 7.04 | 0.277 | 36.79 | 24.72 |
| | | | | 7.92 | 0.312 | 41.27 | 27.73 |
| | | | | 8.18 | 0.322 | 42.54 | 28.58 |
| | | | | 8.74 | 0.344 | 45.33 | 30.46 |
| | | | | 9.53 | 0.375 | 49.23 | 33.08 |
| | | | | 11.13 | 0.438 | 57.06 | 38.34 |
| | | | | 12.70 | 0.500 | 64.64 | 43.43 |
| 10¾" | 273.0 | 270.27 (10.640") | 275.73 (10.855") | 4.17 | 0.164 | 27.62 | 18.56 |
| | | | | 4.37 | 0.172 | 28.94 | 19.45 |
| | | | | 4.55 | 0.179 | 30.10 | 20.22 |
| | | | | 4.78 | 0.188 | 31.59 | 21.22 |
| | | | | 5.16 | 0.203 | 34.06 | 22.88 |
| | | | | 5.56 | 0.219 | 36.69 | 24.65 |
| | | | | 5.84 | 0.230 | 38.49 | 25.86 |
| | | | | 6.35 | 0.250 | 41.75 | 28.06 |
| | | | | 7.09 | 0.279 | 46.47 | 31.22 |
| | | | | 7.80 | 0.307 | 51.00 | 34.27 |
| | | | | 8.74 | 0.344 | 56.94 | 38.26 |
| | | | | 9.27 | 0.365 | 60.29 | 40.51 |
| | | | | 11.13 | 0.438 | 71.84 | 48.27 |
| | | | | 12.70 | 0.500 | 81.52 | 54.78 |
| 12¾" | 323.8 | 320.56 (12.620") | 327.04 (12.875") | 4.78 | 0.188 | 37.57 | 25.24 |
| | | | | 5.16 | 0.203 | 40.52 | 27.22 |
| | | | | 5.56 | 0.219 | 43.65 | 29.33 |
| | | | | 6.35 | 0.250 | 49.71 | 33.40 |
| | | | | 7.14 | 0.281 | 55.74 | 37.45 |
| | | | | 7.92 | 0.312 | 61.73 | 41.48 |
| | | | | 8.38 | 0.330 | 65.20 | 43.81 |
| | | | | 8.74 | 0.344 | 67.89 | 45.61 |
| | | | | 9.53 | 0.375 | 73.82 | 49.60 |
| | | | | 11.13 | 0.438 | 85.78 | 57.64 |
| | | | | 12.70 | 0.500 | 97.43 | 65.47 |

## TECHNICAL DATA OF PIPES CONFORMING TO **ASTM A252**

| OUTSIDE DIAMETER | | DIAMETER TOLERANCE (mm) (Inch) | | STANDARD THICKNESS | | WEIGHT | |
|---|---|---|---|---|---|---|---|
| (Inch) | (mm) | (Min) | (Max) | (mm) | (Inch) | (Kg/mtr) | (lb/ft) |
| 14" | 355.6 | 352.04 (13.859") | 359.156 (14.140") | 4.78 | 0.188 | 41.31 | 27.76 |
| | | | | 5.16 | 0.203 | 44.56 | 29.94 |
| | | | | 5.56 | 0.219 | 48.02 | 32.26 |
| | | | | 5.84 | 0.230 | 50.39 | 33.86 |
| | | | | 6.35 | 0.250 | 54.69 | 36.75 |
| | | | | 7.14 | 0.281 | 61.33 | 41.21 |
| | | | | 7.92 | 0.312 | 67.94 | 45.65 |
| | | | | 8.74 | 0.344 | 74.74 | 50.22 |
| | | | | 9.53 | 0.375 | 81.29 | 54.62 |
| | | | | 11.13 | 0.438 | 94.51 | 63.50 |
| | | | | 11.91 | 0.469 | 100.96 | 67.84 |
| | | | | 12.70 | 0.500 | 107.39 | 72.16 |
| 16" | 406.40 | 402.34 (15.840") | 410.46 (16.159") | 4.78 | 0.188 | 47.29 | 31.78 |
| | | | | 5.16 | 0.203 | 51.02 | 34.28 |
| | | | | 5.56 | 0.219 | 54.98 | 36.95 |
| | | | | 5.84 | 0.230 | 57.71 | 38.77 |
| | | | | 6.35 | 0.250 | 62.64 | 42.09 |
| | | | | 7.14 | 0.281 | 70.27 | 47.22 |
| | | | | 7.92 | 0.312 | 77.87 | 52.32 |
| | | | | 8.74 | 0.344 | 85.68 | 57.57 |
| | | | | 9.53 | 0.375 | 93.22 | 62.64 |
| | | | | 11.13 | 0.438 | 108.44 | 72.86 |
| | | | | 11.91 | 0.469 | 115.89 | 77.87 |
| | | | | 12.70 | 0.500 | 123.30 | 82.85 |

Chemical Properties :- Phosphorus = 0.050% (Max.)

Mechanical Properties :-

| MECHANICAL PROPERTIES | | | |
|---|---|---|---|
| | **Grade 1** | **Grade 2** | **Grade 3** |
| Tensile Strength (MPa) | 345 | 415 | 455 |
| Yield Strength (MPa) | 205 | 240 | 310 |
| %Elongation in (50mm) | 30 | 25 | 20 |
| * Deduction | 1.50 | 1.25 | 1.00 |

* For nominal wall thicknesses less than 7.90 mm, the deduction from the basic minimum elongation in 2 in. (50.80 mm) for each 0.8 mm decrease in nominal wall thickness below 7.9 mm, in percentage points.

## TECHNICAL DETAILS

| **Characteristics** | **Tolerances & Technical details** |
|---|---|
| Outside Diameter (OD) | For Round Pipes, ± 1 % of OD |
| Thickness | -12.5% of specific wall thickness. |
| Weight | For each tube - 5% & +15% of standard weight (Calculated Weight). |
| Length | Pipe shall be furnished in single random length, double random length or in uniform length as per the customer requirement. |
| Straightness | The finished pipe shall be reasonably straight. |
| End | Pipe shall be finished with Square cut (Plain End) or Bevel End (30° -0/+5°). |
| Surface Protection | Black & Galvanized coating as per Customer requirement. |
| Marking (Stencilling) | * PRAKASH SURYA, Specification designation, Grade, Outside diameter, Thickness, Process of manufacturing & Heat No." on pipe and any thing specific as per the customer requirement. |

## TECHNICAL DATA OF PIPES CONFORMING TO ASTM A795

(This specification covers Black and Zinc-Coated (Hot-Dipped Galvanized) welded steel pipe in use for fire protection systems.)

### Dimensions, Weights, and Test Pressure For Light-Weight Fire Protection Pipe—Schedule 10A

| DN | NPS DESIGNATOR | OUTSIDE DIAMETER | DIAMETER TOLERANCE | | STANDARD THICKNESS | | SCHEDULE | WEIGHT | | TEST PRESSURE | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | (mm) | (Min) | (Max) | (mm) | (Inch) | | (Kg/mtr) | (lb/ft) | (psi) | (kPa) |
| 20 | 3/4 | 26.7 | 26.30 | 27.10 | 2.11 | 0.083 | 10 | 1.28 | 0.86 | 700 | 4800 |
| 25 | 1 | 33.4 | 33.00 | 33.80 | 2.77 | 0.109 | 10 | 2.09 | 1.41 | 700 | 4800 |
| 32 | 1¼ | 42.2 | 41.80 | 42.60 | 2.77 | 0.109 | 10 | 2.69 | 1.81 | 1000 | 6900 |
| 40 | 1½ | 48.3 | 47.90 | 48.70 | 2.77 | 0.109 | 10 | 3.11 | 2.09 | 1000 | 6900 |
| 50 | 2 | 60.3 | 59.70 | 60.90 | 2.77 | 0.109 | 10 | 3.93 | 2.64 | 1000 | 6900 |
| 65 | 2½ | 73.0 | 72.27 | 73.73 | 3.05 | 0.120 | 10 | 5.26 | 3.53 | 1000 | 6900 |
| 80 | 3 | 88.9 | 88.01 | 89.79 | 3.05 | 0.120 | 10 | 6.46 | 4.34 | 1000 | 6900 |
| 90 | 3½ | 101.6 | 100.58 | 102.62 | 3.05 | 0.120 | 10 | 7.41 | 4.98 | 1200 | 8300 |
| 100 | 4 | 114.3 | 113.16 | 115.44 | 3.05 | 0.120 | 10 | 8.37 | 5.62 | 1200 | 8300 |
| 125 | 5 | 141.3 | 139.89 | 142.71 | 3.40 | 0.134 | 10 | 11.58 | 7.78 | 1200 | 8300 |
| 150 | 6 | 168.3 | 166.62 | 169.98 | 3.40 | 0.134 | 10 | 13.85 | 9.30 | 1000 | 6900 |
| 200 | 8 | 219.1 | 216.91 | 221.29 | 4.78 | 0.188 | 10 | 25.26 | 16.96 | 800 | 5500 |
| 250 | 10 | 273.0 | 270.27 | 275.73 | 4.78 | 0.188 | 10 | 31.62 | 21.23 | 700 | 4800 |

### Dimensions, Weights, Test Pressures For Standard-Weight Fire Protection Pipe—Schedule 40

| DN | NPS DESIGNATOR | OUTSIDE DIAMETER | DIAMETER TOLERANCE | | STANDARD THICKNESS | | SCHEDULE | WEIGHT | | TEST PRESSURE | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | (mm) | (Min) | (Max) | (mm) | (Inch) | | (Kg/mtr) | (lb/ft) | (psi) | (kPa) |
| 15 | 1/2 | 21.3 | 20.90 | 21.70 | 2.77 | 0.109 | 40 | 1.27 | 0.85 | 700 | 4800 |
| 20 | 3/4 | 26.7 | 26.30 | 27.10 | 2.87 | 0.113 | 40 | 1.68 | 1.13 | 700 | 4800 |
| 25 | 1 | 33.4 | 33.00 | 33.80 | 3.38 | 0.133 | 40 | 2.50 | 1.68 | 700 | 4800 |
| 32 | 1¼ | 42.2 | 41.80 | 42.60 | 3.56 | 0.140 | 40 | 3.40 | 2.28 | 1000 | 6900 |
| 40 | 1½ | 48.3 | 47.90 | 48.70 | 3.68 | 0.145 | 40 | 4.07 | 2.73 | 1000 | 6900 |
| 50 | 2 | 60.3 | 59.70 | 60.90 | 3.91 | 0.154 | 40 | 5.50 | 3.69 | 1000 | 6900 |
| 65 | 2½ | 73.0 | 72.27 | 73.73 | 5.16 | 0.203 | 40 | 8.68 | 5.83 | 1000 | 6900 |
| 80 | 3 | 88.9 | 88.01 | 89.79 | 5.49 | 0.216 | 40 | 11.35 | 7.62 | 1000 | 6900 |
| 90 | 3½ | 101.6 | 100.58 | 102.62 | 5.74 | 0.226 | 40 | 13.71 | 9.21 | 1200 | 8300 |
| 100 | 4 | 114.3 | 113.16 | 115.44 | 6.02 | 0.237 | 40 | 16.25 | 10.91 | 1200 | 8300 |
| 125 | 5 | 141.3 | 139.89 | 142.71 | 6.55 | 0.258 | 40 | 22.07 | 14.82 | 1200 | 8300 |
| 150 | 6 | 168.3 | 166.62 | 169.98 | 7.11 | 0.280 | 40 | 28.60 | 19.20 | 1200 | 8300 |

### Dimensions, Weights, Test Pressures For Standard-Weight Fire Protection Pipe—Schedule 30

| DN | NPS DESIG-NATOR | OUTSIDE DIAMETER | DIAMETER TOLERANCE | | STANDARD THICKNESS | | SCHEDULE | WEIGHT | | TEST PRESSURE | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | (mm) | (Min) | (Max) | (mm) | (Inch) | | (Kg/mtr) | (lb/ft) | (psi) | (kPa) |
| 200 | 8 | 219.1 | 216.91 | 221.29 | 7.04 | 0.277 | 30 | 38.09 | 25.57 | 1200 | 8300 |
| 250 | 10 | 273.1 | 273.1 | 275.73 | 7.80 | 0.307 | 30 | 53.29 | 35.78 | 1000 | 6900 |

### CHEMICAL COMPOSITION

| GRADE | CHEMICAL COMPOSITION (Maximum) | | | |
|---|---|---|---|---|
| | C % | Mn % | P % | S % |
| A | 0.250 | 0.950 | 0.035 | 0.035 |
| B | 0.300 | 1.200 | 0.035 | 0.035 |

## TECHNICAL DETAILS

| Characteristics | Tolerances & Technical details |
|---|---|
| Outside Diameter | NPS 1½[DN 40] and under ± 0.016 inch [0.41 mm] & NPS 2 [DN 50] and over ± 1 % of OD. |
| Thickness | -12.5% of specific wall thickness. |
| Weight | For each tube ± 5% of standard weight. |
| Length | Pipe shall be furnished in single random lengths of 16 to 22 ft [4.9 to 6.7 m] or in uniform length as per the customer requirement. |
| Straightness | The finished pipe shall be reasonably straight. |
| Heat Treatment | The weld seam of pipe in Grade B shall be heat treated after welding to a minimum of 1000 °F [540 °C] so that no untempered martensite remains. |
| Flattening Test | Keep the weld at 0° or 90° from the line of direction of force and flatten upto 66% of OD, No cracks or breaks are allowed on the weld. Further flatten upto 33% of OD, No cracks or breaks are allowed in the material and during third step, Evidence of laminated or unsound material or of incomplete weld that is revealed during the entire flattening test shall be cause for rejection. |
| Hydro Test | Each length of pipe shall be tested by hydrostatic test without leakage through the pipe wall. |
| Nondestructive Test | Each length of pipe, size 2NPS (50DN) and larger shall be tested by non destructive electric test (Ultrasonic Teet & Eddy-Current Test) in accordance with Practice E213 and Practice E309 as per customer requirements. |
| Mass of Zinc Coating | Average of two specimens 460 gm/mtr² & Individual specimen not less than 400 gm/mtr². |
| Surface Protection | Black & Galvanized coating as per Customer requirement. |
| End | Pipe shall be finished with Square cut (plain End), Bevel End (30° -0/+5°), Roll Groove & Threading. |
| Threading | All threads shall be in accordance with the gauging practice and tolerances of ASME B1.20.1. |
| Marking (Stenciling) | " SURYA Specification designation, Grade, Outside diameter, Thickness, Process of type E manufacturing & Heat No." on pipe and any thing specific as per customer requirement. |

# INTRODUCING DFT

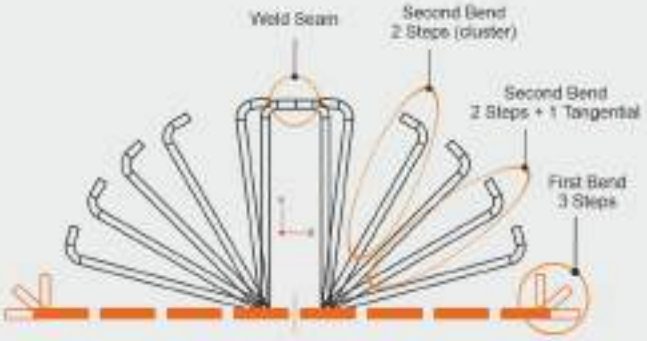
Direct Forming Technology

New technology always aims to simplify the process and save the time and labour. Surya introduces the best in class Direct Forming Technology (DFT), paving an innovative route of high tech designed methodology to produce ERW Structural Steel Section Pipes. This technology sizably reduces the time of producing customized hollow section by including it into mill range without changing the roll. Being a completely automatic and computerized process, DFT saves the setup time, makes operation setting accurate, easy and efficient. Compared to traditional production processes, this method is completely automatic and computerized all PLC control with DC digital control system only to motorize the roller movement during the size changes.

DFT not only saves time from setting up rollers, it also cut shorts the process of forming rectangular/square sections. It is a direct square or rectangle roll forming machine. In traditional setup, all sections (Square/Rectangle) pipes used to be made out of round pipes. That means until weld rolls you have a round tube and after that you make square or rectangle out of it, this has been changed, new DFT standard directly start corners forming from the 1st pass itself.

## Advantages of DFT

- **Speeds up the Hollow section formation:-** Providing a customized hollow sections for architects won't be that difficult a task.
- **Just in time Delivery:-** In this technology size change over time will be reduced substantially, which leads to fast change over all sizes resultantly quick delivery to the costumer, even in small lots.
- Since the process is autonomous & computer measured, Perfect pipe quality with perfect dimensions and corner radius control is assured.
- Proven design
- Easy to operate and maintain
- High automation level
- Orbital cold saw for burr free end cutting to ensure faster delivery of order even in small lots also.




Design of Section Pipe

## Information about Specification, Grades and Sizes covered under DFT

| Specification | Grades | Sizes covered in SHS | Sizes covered in RHS |
|---|---|---|---|
| IS 4923:2017, ASTM A500/A500M-21, CSA, EN 10219-1&2 & AS/NZS 1163:2015 | YSt 210, 240, 310,355 A 500-Gr.B C & D, S235, S275, S355, G40.20-13/ G40.21-13 | 150 x 150 x 3 to 8 mm<br>160 x 160 x 3 to 8 mm<br>180 x 180 x 3 to 10 mm<br>190 x 190 x 4 to 10 mm<br>200 x 200 x 4 to 12.7 mm<br>210 x 210 x 5 to 12.7 mm<br>220 x 220 x 5 to 12.7 mm<br>250 x 250 x 5 to 12.7 mm<br>280 x 280 x 5 to 12.7 mm<br>300 x 300 x 5 to 12.7 mm | 150 x 200 x 4 to 12.7 mm<br>150 x 250 x 5 to 12.7 mm<br>150 x 300 x 5 to 12.7 mm<br>180 x 260 x 5 to 12.7 mm<br>200 x 300 x 5 to 12.7 mm<br>210 x 310 x 5 to 12.7 mm<br>200 x 400 x 5 to 12.7 mm<br>250 x 350 x 5 to 12.7 mm |

**Note:** Sizes other than mentioned in table can also be customized.

## Information about Raw Material to be used and Mechanical Properties of Sizes covered under DFT :

- **Raw Material :-** As per the Specification.
- **Thickness Range :-** From 3 mm (0.118 Inch) to 12.70 mm (0.500 Inch)
- **Standard Length** Supply 6 to 15 meters as per customer requirement in IS 4923:2017 (Any Length) with Tolerance +6 mm, -0 mm.

### Mechanical Properties are as under :

| Grades | Yield Strength (min) in MPA | Tensile Strength (min) in MPA | Elongation% |
|---|---|---|---|
| YSt 210 | 210 | 330 | 20 |
| YSt 240 | 240 | 410 | 15 |
| YSt 310 | 310 | 450 | 10 |
| YSt 355 | 355 | 490 | 10 |

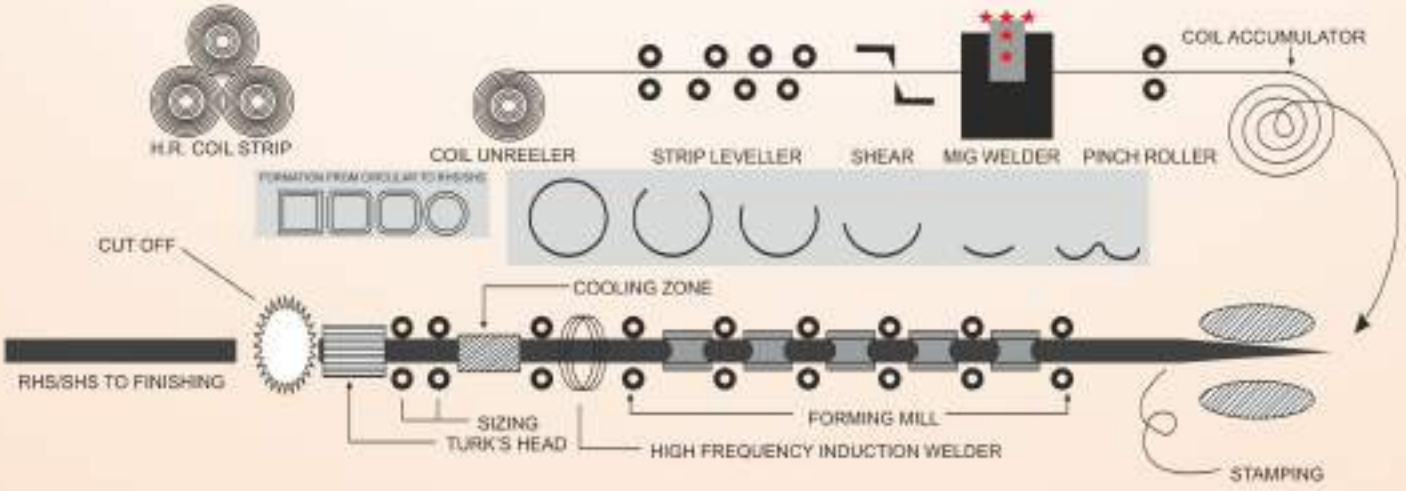

# For Structural Usage SHS / RHS / CHS

IS 4923:2017, IS 1161:2014, EN10219-1 & 2 , AS/NZS 1163 :2016 , ASTM A 500/A500 M -21, CSA G40.20/21-13, Grade YSt 210, YSt 240, YSt 310, YSt 355

## Structural Steel Hollow Sections

Surya Group has wide range of Structural Steel Hollow Sections under various grades YSt 210/240/310/355 at works. Along with standard sizes we also manufacture extra light series (up to 1mm thickness) sections. We keep finish goods for all regular sizes and thus require low lead time for delivery. Surya's product development/application team continuously assess the needs of the market to develop new sizes/value added products such as Hot Dip Galvanized, HRPO, CR and GP Section. Surya's distributors keep stock at their end to service day to day fabrication jobs.

## Manufacturing Process



Dimensions Properties Of

# SQUARE HOLLOW SECTIONS (SHS) FOR STRUCTURAL PURPOSE

## CONFIRMING TO IS 4923:2017 ( GRADE YSt 210, YSt 240, YSt 310, YSt 355 )

| Size SHS (DxWxT) | DEPTH (D) | WIDTH (B) | THICKNESS (t) | WEIGHT | AREA OF SECTION | MOMENT OF INERTIA | RADIUS OF GYRATION | ELASTIC MODULUS | PLASTIC MODULUS |
|---|---|---|---|---|---|---|---|---|---|
| mm | mm | mm | mm | kg/m | cm2 | cm4 | cm | cm3 | cm3 |
| 20 x 20 x 2 | 20 | 20 | 2.00 | 1.15 | 1.33 | 0.58 | 0.68 | 0.61 | 0.61 |
| 20 x 20 x 2.6 | 20 | 20 | 2.60 | 1.46 | 2.17 | 0.63 | 0.66 | 0.66 | 0.66 |
| 25 x 25 x 2 | 25 | 25 | 2.00 | 1.36 | 1.74 | 1.48 | 0.92 | 1.19 | 1.47 |
| 25 x 25 x 2.6 | 25 | 25 | 2.60 | 1.69 | 2.16 | 1.72 | 0.89 | 1.38 | 1.76 |
| 25 x 25 x 3.2 | 25 | 25 | 3.20 | 1.98 | 2.53 | 1.89 | 0.86 | 1.51 | 1.98 |
| 30 x 30 x 2 | 30 | 30 | 2.00 | 1.68 | 2.14 | 2.72 | 1.13 | 1.81 | 2.21 |
| 30 x 30 x 2.6 | 30 | 30 | 2.60 | 2.10 | 2,68 | 3.23 | 1.10 | 2.15 | 2.68 |
| 30 x 30 x 3.2 | 30 | 30 | 3.20 | 2.49 | 3.17 | 3.62 | 1.07 | 2.41 | 3.08 |
| 32 x 32 x 2.6 | 32 | 32 | 2.60 | 2.26 | 2.88 | 4.02 | 1.18 | 2.51 | 3.11 |
| 32 x 32 x 3.2 | 32 | 32 | 3.20 | 2.69 | 3.42 | 4.54 | 1.15 | 2.84 | 3.59 |
| 32 x 32 x 4 | 32 | 32 | 4.00 | 3.19 | 4.07 | 5.02 | 1.11 | 3.14 | 4.11 |
| 35 x 35 x 2.6 | 35 | 35 | 2.60 | 2.51 | 3.20 | 5.43 | 1.30 | 3.10 | 3.81 |
| 35 x 35 x 3.2 | 35 | 35 | 3.20 | 2.99 | 3.81 | 6.18 | 1.27 | 3.53 | 4.42 |
| 35 x 35 x 4 | 35 | 35 | 4.00 | 3.57 | 4.55 | 6.93 | 1.23 | 3.96 | 5.11 |
| 38 x 38 x 2 | 38 | 38 | 2.00 | 2.18 | 2.78 | 5.88 | 1.46 | 3.10 | 3.70 |
| 38 x 38 x 2.6 | 38 | 38 | 2.60 | 2.75 | 3.51 | 7.14 | 1.43 | 3.76 | 4.57 |
| 38 x 38 x 3.2 | 38 | 38 | 3.20 | 3.29 | 4.19 | 8.18 | 1.40 | 4.30 | 5.34 |
| 38 x 38 x 4 | 38 | 38 | 4.00 | 3.95 | 5.03 | 9.26 | 1.36 | 4.87 | 6.22 |
| 40 x 40 x 2 | 40 | 40 | 2.00 | 2.31 | 2.94 | 6.94 | 1.54 | 3.47 | 4.13 |
| 40 x 40 x 2.6 | 40 | 40 | 2.60 | 2.92 | 3.72 | 8.45 | 1.51 | 4.22 | 5.12 |
| 40 x 40 x 3.2 | 40 | 40 | 3.20 | 3.49 | 4.45 | 9.72 | 1.48 | 4.86 | 6.00 |
| 40 x 40 x 4 | 40 | 40 | 4.00 | 4.20 | 5.35 | 11.07 | 1.44 | 5.54 | 7.01 |
| 45 x 45 x 2.6 | 45 | 45 | 2.60 | 3.33 | 4.24 | 12.42 | 1.71 | 5.52 | 6.64 |
| 45 x 45 x 2.9 | 45 | 45 | 2.90 | 3.66 | 4.67 | 13.45 | 1.70 | 5.98 | 7.25 |
| 45 x 45 x 3.2 | 45 | 45 | 3.20 | 3.99 | 5.09 | 14.41 | 1.68 | 6.40 | 7.82 |
| 45 x 45 x 4 | 45 | 45 | 4.00 | 4.83 | 6.15 | 16.61 | 1.64 | 7.38 | 9.22 |
| 45 x 45 x 4.5 | 45 | 45 | 4.50 | 5.31 | 6.77 | 17.74 | 1.62 | 7.88 | 9.99 |
| 49.5 x 49.5 x 2.6 | 49.5 | 49.5 | 2.60 | 3.69 | 4.70 | 16.91 | 1.90 | 6.83 | 8.16 |
| 49.5 x 49.5 x 3.2 | 49.5 | 49.5 | 3.20 | 4.45 | 5.66 | 19.74 | 1.87 | 7.98 | 9.67 |
| 49.5 x 49.5 x 4 | 49.5 | 49.5 | 4.00 | 5.39 | 6.87 | 212 9 | 1.83 | 9.27 | 11.46 |
| 63.5 x 63.5 x 3.2 | 63.5 | 63.5 | 3.20 | 5.85 | 7.46 | 44.35 | 2.44 | 13.97 | 16.65 |
| 63.5 x 63.5 x 3.6 | 63.5 | 63.5 | 3.60 | 6.51 | 8.29 | 48.55 | 2.42 | 15.29 | 18.36 |
| 63.5 x 63.5 x 4.5 | 63.5 | 63.5 | 4.50 | 7.93 | 10.10 | 57.00 | 2.38 | 17.95 | 21.93 |
| 72 x 7.2 x 3.2 | 72 | 72 | 3.20 | 6.71 | 8.54 | 66.32 | 2.79 | 18.42 | 21.80 |
| 72 x 72 x 4 | 72 | 72 | 4.00 | 8.22 | 10.47 | 79.03 | 2.75 | 21.95 | 26.32 |
| 72 x 72 x 4.8 | 72 | 72 | 4.80 | 9.66 | 12.31 | 90.31 | 2.71 | 25.09 | 30.48 |
| 75 x 75 x 3.2 | 75 | 75 | 3.20 | 7.01 | 8.93 | 75.53 | 2.91 | 20.14 | 23.79 |
| 75 x 75 x 3.6 | 75 | 75 | 3.60 | 7.81 | 9.95 | 83.06 | 2.89 | 22.15 | 26.32 |
| 75 x 75 x 4.5 | 75 | 75 | 4.50 | 9.55 | 12.17 | 98.55 | 2.85 | 26.28 | 31.68 |
| 88.9 x 88.9 x 3.2 | 88.9 | 88.9 | 3.20 | 8.40 | 10.71 | 129.40 | 3.48 | 29.11 | 34.11 |
| 88.9 x 88.9 x 3.6 | 88.9 | 88.9 | 3.60 | 9.38 | 11.95 | 142.83 | 3.46 | 32.13 | 37.85 |
| 88.9 x 88.9 x 4.5 | 88.9 | 88.9 | 4.50 | 11.52 | 14.67 | 170.97 | 3.41 | 38.46 | 45.85 |

| Size SHS (DxWxT) | DEPTH (D) | WIDTH (B) | THICKNESS (t) | WEIGHT | AREA OF SECTION | MOMENT OF INERTIA | RADIUS OF GYRATION | ELASTIC MODULUS | PLASTIC MODULUS |
|---|---|---|---|---|---|---|---|---|---|
| mm | mm | mm | mm | kg/m | cm2 | cm4 | cm | cm3 | cm3 |
| 91.5 x 91.5 x 3.6 | 91.5 | 91.5 | 3.60 | 9.67 | 12.32 | 156.49 | 3.56 | 34.21 | 40.24 |
| 91.5 x 91.5 x 4.5 | 91.5 | 91.5 | 4.50 | 11.88 | 15.14 | 187.57 | 3.52 | 41.00 | 48.79 |
| 91.5 x 91.5 x 4.8 | 91.5 | 91.5 | 4.80 | 12.60 | 16.05 | 197.27 | 3.51 | 43.12 | 51.51 |
| 100 x 100 x 4 | 100 | 100 | 4.00 | 11.73 | 14.95 | 226.35 | 3.89 | 45.27 | 53.30 |
| 100 x 100 x 5 | 100 | 100 | 5.00 | 14.41 | 18.36 | 271.10 | 3.84 | 54.22 | 64.59 |
| 100 x 100 x 6 | 100 | 100 | 6.00 | 16.98 | 21.63 | 311.47 | 3.79 | 62.29 | 75.09 |
| 113.5 x 113.5 x 4.5 | 113.5 | 113.5 | 4.50 | 14.99 | 19.10 | 372.88 | 4.42 | 65.71 | 77.32 |
| 113.5 x 113.5 x 4.8 | 113.5 | 113.5 | 4.80 | 15.92 | 20.28 | 393.30 | 4.40 | 69.30 | 81.81 |
| 113.5 x 113.5 x 5.4 | 113.5 | 113.5 | 5.40 | 17.74 | 22.60 | 432.58 | 4.38 | 76.23 | 90.54 |
| 113.5 x 113.5 x 6 | 113.5 | 113.5 | 6.00 | 19.53 | 24.87 | 469.81 | 4.35 | 82.79 | 98.95 |
| 125 x 125 x 4.5 | 125 | 125 | 4.50 | 16.62 | 21.17 | 505.83 | 4.89 | 80.93 | 94.84 |
| 125 x 125 x 5 | 125 | 125 | 5.00 | 18.34 | 23.36 | 552.62 | 4.86 | 88.42 | 104.09 |
| 125 x 125 x 6 | 125 | 125 | 6.00 | 21.69 | 27.63 | 640.89 | 4.82 | 102.54 | 121.86 |
| 132 x 132 x 4.5 | 132 | 132 | 4.50 | 17.61 | 22.43 | 600.45 | 5.17 | 90.98 | 106.37 |
| 132 x 132 x 4.8 | 132 | 132 | 4.80 | 18.71 | 23.83 | 634.39 | 5.16 | 96.12 | 112.68 |
| 132 x 132 x 5.4 | 132 | 132 | 5.40 | 20.88 | 26.60 | 700.11 | 5.13 | 106.08 | 125.01 |
| 132 x 132 x 6 | 132 | 132 | 6.00 | 23.01 | 29.31 | 762.98 | 5.10 | 115.60 | 136.97 |
| 150 x 150 x 5 | 150 | 150 | 5.00 | 22.26 | 28.36 | 982.12 | 5.89 | 130.95 | 152.97 |
| 150 x 150 x 6 | 150 | 150 | 6.00 | 26.40 | 33.63 | 1145.91 | 5.84 | 152.79 | 179.87 |
| 150 x 150 x 7 | 150 | 150 | 7.00 | 30.44 | 38.78 | 1299.44 | 5.79 | 173.26 | 205.57 |
| 150 x 150 x 8 | 150 | 150 | 8.00 | 34.38 | 43.79 | 1443.00 | 5.74 | 192.40 | 230.09 |
| 180 x 180 x 4 | 180 | 180 | 4.00 | 21.90 | 27.90 | 1434.00 | 7.17 | 159.00 | 184.00 |
| 180 x 180 x 5 | 180 | 180 | 5.00 | 27.20 | 34.60 | 1755.00 | 7.12 | 195.00 | 226.00 |
| 180 x 180 x 6 | 180 | 180 | 6.00 | 32.05 | 40.83 | 2036.00 | 7.06 | 226.00 | 280.00 |
| 180 x 180 x 8 | 180 | 180 | 8.00 | 42.50 | 54.10 | 2633.00 | 6.98 | 293.00 | 346.00 |
| 220 x 220 x 6 | 220 | 220 | 6.00 | 39.59 | 50.43 | 3813.36 | 8.70 | 346.67 | 402.16 |
| 220 x 220 x 8 | 220 | 220 | 8.00 | 51.96 | 66.19 | 4894.99 | 8.60 | 445.00 | 521.67 |
| 220 x 220 x 10 | 220 | 220 | 10.00 | 63.92 | 81.43 | 5887.19 | 8.50 | 535.20 | 634.11 |
| 220 x 220 x 12 | 220 | 220 | 12.00 | 75.47 | 96.14 | 6793.08 | 8.41 | 617.55 | 739.60 |
| 250 x 250 x 6 | 250 | 250 | 6.00 | 45.24 | 57.63 | 5672.00 | 9.92 | 453.76 | 524.43 |
| 250 x 250 x 8 | 250 | 250 | 8.00 | 59.50 | 75.79 | 7315.65 | 9.82 | 585.25 | 682.64 |
| 250 x 250 x 10 | 250 | 250 | 10.00 | 73.34 | 93.43 | 8841.86 | 9.73 | 707.35 | 832.74 |
| 250 x 250 x 12 | 250 | 250 | 12.00 | 86.77 | 110.54 | 10254.21 | 9.63 | 820.34 | 974.87 |
| 300 x 300 x 6 | 300 | 300 | 6.00 | 54.66 | 69.63 | 9963.67 | 11.96 | 664.24 | 764.21 |
| 300 x 300 x 8 | 300 | 300 | 8.00 | 72.06 | 91.79 | 12925.07 | 11.87 | 861.67 | 998.91 |
| 300 x 300 x 10 | 300 | 300 | 10.00 | 89.04 | 113.43 | 15713.90 | 11.77 | 1047.59 | 1223.79 |
| 300 x 300 x 12 | 300 | 300 | 12.00 | 105.61 | 134.54 | 18334.49 | 11.67 | 1222.30 | 14'38.98 |

**Note:** Apart from above mentioned sizes, we also manufacture customized and need based requirement.


## DIMENSIONAL TOLERANCES

| SECTION TYPE | GRADE | OUTSIDE DIMENTION | THICK-NESS | SQUARE NESS | CORNER RADIUS | WEIGHT INDIVIDUAL LENGTHS | WEIGHT ON LOT OF 10 MT | CUSTOMIZED OFFER |
|---|---|---|---|---|---|---|---|---|
| SHS IS :4923 | YSt - 210 YSt - 240 YSt - 310 YSt - 355 | ±1% with a min of ±0.50 mm | ± 7.5% | 90 deg ± 2deg. | 3t max | -8%, +10% | ± 7% | Length-4M to 12M Thickness -1.0mm to 12mm |

Dimensions Properties Of

# STEEL RECTANGULAR HOLLOW SECTIONS (RHS) FOR STRUCTURAL PURPOSE

## CONFIRMING TO IS 4923:2017 ( GRADE YSt 210, YSt 240, YSt 310, YSt 355 )

| RHS DxB | DEPTH (D) | WIDTH (B) | THICK-NESS (t) | WEIGHT | AREA OF SECTION | MOMENT OF INERTIA ABOUT | | RADIUS OF GYRATION | | ELASTIC MODULUS | | PLASTIC MODULUS | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | X-X | Y-Y | X-X | Y-Y | X-X | Y-Y | X-X | Y-Y |
| mm | mm | mm | mm | kg/m | cm2 | cm4 | | cm | | cm3 | | cm3 | |
| 50 x 25 x 2.9 | 50 | 25 | 2.90 | 2.98 | 3.80 | 10.93 | 3.60 | 1.70 | 0.97 | 0.00 | 2.88 | 5.72 | 3.48 |
| 50 x 25 x 3.2 | 50 | 25 | 3.20 | 3.24 | 4.13 | 11.63 | 3.80 | 1.68 | 0.96 | 4.65 | 3.04 | 6.14 | 3.73 |
| 60 x 40 x 2.9 | 60 | 40 | 2.90 | 4.12 | 5.25 | 24.74 | 13.11 | 2.17 | 1.58 | 8.25 | 6.56 | 10.24 | 7.73 |
| 66 x 33 x 2.6 | 66 | 33 | 2.60 | 3.69 | 4.70 | 25.15 | 8.43 | 2.31 | 1.34 | 7.62 | 5.11 | 9.68 | 5.94 |
| 66 x 33 x 2.9 | 66 | 33 | 2.90 | 4.07 | 5.19 | 27.33 | 9.12 | 2.29 | 1.33 | 8.28 | 5.53 | 10.59 | 6.49 |
| 66 x 33 x 3.6 | 66 | 33 | 3.60 | 4.93 | 6.28 | 31.87 | 10.52 | 2.25 | 1.29 | 9.66 | 6.37 | 12.56 | 7.65 |
| 66 x 33 x 4.5 | 66 | 33 | 4.50 | 5.95 | 7.58 | 36.64 | 11.93 | 2.20 | 1.25 | 11.10 | 7.23 | 14.76 | 8.94 |
| 70 x 30 x 2.9 | 70 | 30 | 2.90 | 4.12 | 5.25 | 29.82 | 7.72 | 2.38 | 1.21 | 8.52 | 5.14 | 11.07 | 6.04 |
| 70 x 30 x 3.2 | 70 | 30 | 3.20 | 4.50 | 5.73 | 32.04 | 8.24 | 2.37 | 1.20 | 9.15 | 5.49 | 11.98 | 6.51 |
| 70 x 30 x 4 | 70 | 30 | 4.00 | 5.45 | 6.95 | 37.23 | 9.42 | 2.31 | 1.16 | 10.64 | 6.28 | 14.19 | 7.66 |
| 80 x 40 x 2.9 | 80 | 40 | 2.90 | 5.03 | 6.41 | 50.67 | 17.11 | 2.82 | 1.63 | 12.72 | 8.56 | 16.07 | 9.88 |
| 80 x 40 x 3.2 | 80 | 40 | 3.20 | 5.50 | 7.01 | 54.94 | 18.41 | 2.80 | 1.62 | 13.74 | 9.21 | 17.46 | 10.71 |
| 80 x 40 x 4 | 80 | 40 | 4.00 | 6.71 | 8.55 | 64.79 | 21.49 | 2.75 | 1.59 | 16.20 | 10.74 | 20.91 | 12.77 |
| 96 x 48 x 3.2 | 96 | 48 | 3.20 | 6.71 | 8.54 | 98.61 | 33.28 | 3.40 | 1.97 | 20.54 | 13.87 | 25.85 | 15.91 |
| 96 x 48 x 4 | 96 | 48 | 4.00 | 8.22 | 10.47 | 117.54 | 39.32 | 3.35 | 1.94 | 24.49 | 16.38 | 31.20 | 19.14 |
| 96 x 48 x 4.8 | 96 | 48 | 4.80 | 9.66 | 12.31 | 134.35 | 44.55 | 3.30 | 1.90 | 27.99 | 18.56 | 36.13 | 22.07 |
| 100 x 50 x 3.2 | 100 | 50 | 3.20 | 7.01 | 8.93 | 112.29 | 37.95 | 3.55 | 2.06 | 22.46 | 15.18 | 28.20 | 17.37 |
| 100 x 50 x 4 | 100 | 50 | 4.00 | 8.59 | 10.95 | 134.14 | 44.95 | 3.50 | 2.03 | 26.83 | 17.98 | 34.10 | 20.93 |
| 122 x 6.1 x 3.6 | 122 | 61 | 3.60 | 9.67 | 12.32 | 232.61 | 78.83 | 4.34 | 2.53 | 38.13 | 25.84 | 47.71 | 29.42 |
| 122 x 6.1 x 4.5 | 122 | 61 | 4 .50 | 11.88 | 15.14 | 278.94 | 93.78 | 4.29 | 2.49 | 45.73 | 30.75 | 57.84 | 35.55 |
| 122 x 6.1 x 5.4 | 122 | 61 | 5.40 | 14.01 | 17.85 | 320.83 | 107.03 | 4.24 | 2.45 | 52.60 | 35.09 | 67.28 | 41.22 |
| 127 x 50 x 3.6 | 127 | 50 | 3.60 | 9.34 | 11.89 | 227.08 | 52.05 | 4.37 | 2.09 | 35.76 | 20.82 | 45.95 | 23.70 |
| 127 x 50 x 4.6 | 127 | 50 | 4.60 | 11.69 | 14.89 | 276.33 | 62.46 | 4.31 | 2.05 | 43.52 | 24.98 | 56.65 | 29.03 |
| 145 x 82 x 4.8 | 145 | 82 | 4.80 | 15.92 | 20.28 | 555.16 | 228.50 | 5.23 | 3.36 | 76.57 | 55.73 | 94.93 | 63.93 |
| 145 x 82 x 5.4 | 145 | 82 | 5.40 | 17.74 | 22.60 | 610.85 | 250.59 | 5.20 | 3.33 | 84.26 | 61.12 | 105.06 | 70.66 |
| 172 x 92 x 4.8 | 172 | 92 | 4.80 | 18.71 | 23.83 | 917.13 | 346.91 | 6.20 | 3.82 | 106.64 | 75.41 | 132.07 | 85.61 |
| 172 x 92 x 5.4 | 172 | 92 | 5.40 | 20.88 | 26.60 | 1012.47 | 381.74 | 6.17 | 3.79 | 117.73 | 82.99 | 146.54 | 94.85 |
| 200 x 100 x 4 | 200 | 100 | 4.00 | 18.01 | 22.95 | 1199.71 | 410.78 | 7.23 | 4.23 | 119.97 | 82.16 | 148.03 | 91.70 |
| 200 x 100 x 5 | 200 | 100 | 5.00 | 22.26 | 28.36 | 1459.25 | 496.94 | 7.17 | 4.19 | 145.93 | 99.39 | 181.36 | 112.09 |
| 200 x 100 x 6 | 200 | 100 | 6.00 | 26.40 | 33.63 | 1703.31 | 576.91 | 7.12 | 4.14 | 170.33 | 115.38 | 213.25 | 131.49 |
| 200 x 100 x 8 | 200 | 100 | 8.00 | 34.38 | 43.79 | 2146.21 | 719.19 | 7.00 | 4.05 | 214.62 | 143.84 | 272.76 | 167.42 |
| 220 x 140 x 4 | 220 | 140 | 4.00 | 21.78 | 27.75 | 1892.55 | 947.64 | 8.26 | 5.84 | 172.05 | 135.38 | 206.34 | 151.67 |
| 220 x 140 x 5 | 220 | 140 | 5.00 | 26.97 | 34.36 | 2313.36 | 1155.23 | 8.21 | 5.80 | 210.31 | 165.03 | 253.72 | 186.30 |
| 220 x 140 x 6 | 220 | 140 | 6.00 | 32.05 | 40.83 | 2713.97 | 1351.66 | 8.15 | 5.75 | 246.72 | 193.09 | 299.44 | 219.64 |
| 220 x 140 x 8 | 220 | 140 | 8.00 | 41.91 | 53.39 | 3456.10 | 1712.17 | 8.05 | 5.66 | 314.19 | 244.60 | 385.99 | 282.52 |
| 240 x 120 x 4 | 240 | 120 | 4.00 | 21.78 | 27.75 | 2110.72 | 725.35 | 8.72 | 5.11 | 175.89 | 120.89 | 216.01 | 134.00 |
| 240 x 120 x 5 | 240 | 120 | 5.00 | 26.97 | 34.36 | 2579.67 | 882.47 | 8.67 | 5.07 | 214.97 | 147.08 | 265.57 | 164.44 |
| 240 x 120 x 6 | 240 | 120 | 6.00 | 32.05 | 40.83 | 3025.91 | 1030.45 | 8.61 | 5.02 | 252.16 | 171.74 | 313.39 | 193.69 |

Dimensions Properties Of

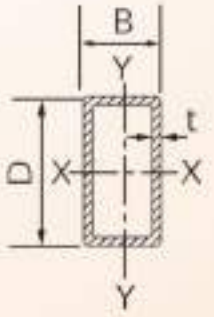
# STEEL RECTANGULAR HOLLOW SECTIONS (RHS) FOR STRUCTURAL PURPOSE

## CONFIRMING TO IS 4923:2017 ( GRADE YSt 210, YSt 240, YSt 310, YSt 355 )

| RHS DxB | DEPTH (D) | WIDTH (B) | THICK-NESS (t) | WEIGHT | AREA OF SECTION | MOMENT OF INERTIA ABOUT | | RADIUS OF GYRATION | | ELASTIC MODULUS | | PLASTIC MODULUS | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | X-X | Y-Y | X-X | Y-Y | X-X | Y-Y | X-X | Y-Y |
| mm | mm | mm | mm | kg/m | cm2 | cm4 | | cm | | cm3 | | cm3 | |
| 240 x 120 x 8 | 240 | 120 | 8.00 | 41.91 | 53.39 | 3851.84 | 1299.95 | 8.49 | 4.93 | 320.99 | 216.66 | 403.86 | 248.65 |
| 260 x 180 x 6 | 260 | 180 | 6.00 | 39.59 | 50.43 | 4855.87 | 2763.43 | 9.81 | 7.40 | 373.53 | 307.05 | 446.86 | 347.86 |
| 260 x 180 x 8 | 260 | 180 | 8.00 | 51.96 | 66.19 | 6238.69 | 3538.10 | 9.71 | 7.31 | 479.90 | 393.12 | 579.81 | 450.74 |
| 260 x 180 x 10 | 260 | 180 | 10.00 | 63.92 | 81.43 | 7509.51 | 4244.26 | 9.60 | 7.22 | 577.65 | 471.58 | 704.95 | 547.27 |
| 260 x 180 x 12 | 260 | 180 | 12.00 | 75.47 | 96.14 | 8671.80 | 4884.69 | 9.50 | 7.13 | 667.06 | 542.74 | 822.41 | 637.59 |
| 300 x 150 x 6 | 300 | 150 | 6.00 | 40.53 | 51.63 | 6073.51 | 2079.57 | 10.85 | 6.35 | 404.90 | 277.28 | 499.61 | 309.47 |
| 300 x 150 x 8 | 300 | 150 | 8.00 | 53.22 | 67.79 | 7807.95 | 2654.12 | 10.73 | 6.26 | 520.53 | 353.88 | 648.51 | 400.49 |
| 300 x 150 x 10 | 300 | 150 | 10.00 | 65.49 | 83.43 | 9403.90 | 3173.71 | 10.62 | 6.17 | 626.93 | 423.16 | 788.79 | 485.64 |
| 300 x 150 x 12 | 300 | 150 | 12.00 | 77.35 | 98.54 | 10865.21 | 3640.89 | 10.50 | 6.08 | 724.35 | 485.45 | 920.58 | 565.04 |
| 300 x 200 x 6 | 300 | 200 | 6.00 | 45.24 | 57.63 | 7370.23 | 3962.19 | 11.31 | 8.29 | 491.35 | 396.22 | 587.81 | 446.05 |
| 300 x 200 x 8 | 300 | 200 | 8.00 | 59.50 | 75.79 | 9513.66 | 5097.04 | 11.20 | 8.20 | 634.24 | 509.70 | 765.31 | 579.96 |
| 300 x 200 x 10 | 300 | 200 | 10.00 | 73.34 | 93.43 | 11507.24 | 6144.30 | 11.10 | 8.11 | 767.15 | 614.43 | 933.79 | 706.69 |
| 300 x 200 x 12 | 300 | 200 | 12.00 | 86.77 | 110.54 | 13354.97 | 7107.11 | 10.99 | 8.02 | 890.33 | 710.71 | 1093.38 | 826.36 |
| 350 x 250 x 6 | 350 | 250 | 6.00 | 54.66 | 69.63 | 12457.31 | 7458.44 | 13.38 | 10.35 | 711.85 | 596.68 | 842.58 | 670.83 |
| 350 x 250 x 8 | 350 | 250 | 8.00 | 72.06 | 91.79 | 16170.48 | 9659.06 | 13.27 | 10.26 | 924.03 | 772.73 | 1101.58 | 876.24 |
| 350 x 250 x 10 | 350 | 250 | 10.00 | 89.04 | 113.43 | 19672.08 | 11723.53 | 13.17 | 10.17 | 1124.12 | 937.88 | 1349.84 | 1072.74 |
| 350 x 250 x 12 | 350 | 250 | 12.00 | 105.61 | 134.54 | 22966.89 | 13655.73 | 13.07 | 10.07 | 1312.39 | 1092.46 | 1587.49 | 1260.47 |
| 400 x 200 x 8 | 400 | 200 | 8.00 | 72.06 | 91.79 | 19195.28 | 6572.45 | 14.46 | 8.46 | 959.76 | 657.25 | 1184.25 | 733.56 |
| 400 x 200 x 10 | 400 | 200 | 10.00 | 89.04 | 113.43 | 23348.08 | 7950.97 | 14.35 | 8.37 | 1167.40 | 795.10 | 1450.89 | 896.69 |
| 400 x 200 x 12 | 400 | 200 | 12.00 | 105.61 | 134.54 | 27252.93 | 9230.63 | 14.23 | 8.28 | 1362.65 | 923.06 | 1706.00 | 1051.96 |

**Note :** Sizes other than specified above may be supplied as per the customer requirement.

| GRADE | T.S. (MIN) MPa | Y.S.(MIN) MPa | % ELONGATION | |
|---|---|---|---|---|
| | | | 25.4 MM & UNDER | OVER 25.4 MM |
| YSt - 210 | 330 | 210 | 12 | 20 |
| YSt - 240 | 410 | 240 | 10 | 15 |
| YSt - 310 | 450 | 310 | 8 | 10 |
| YSt - 355 | 490 | 355 | 8 | 10 |




## DIMENSIONAL TOLERANCES

| SECTION TYPE | GRADE | OUTSIDE DIMENTION | THICKNESS | SQUARE NESS | CORNER RADIUS | WEIGHT INDIVIDUAL LENGTHS | WEIGHT ON LOT OF 10 MT | CUSTOMIZED OFFER |
|---|---|---|---|---|---|---|---|---|
| RHS IS :4923 | YSt - 210<br>YSt - 240<br>YSt - 310<br>YSt - 355 | ±1% with a min of ±0.50 mm | ± 7.5% | 90 deg ± 2deg. | 3t max | -8%, +10% | ± 7% | Length-4M to 12M<br>Thickn4ess-<br>1.0mm to 12mm |

## MALANPUR SECTION CHART

### Sqaure

| Sizes | OD in mm | Thickness | |
|---|---|---|---|
| | | Inch | mm |
| 6 x 6 | 152.4 x 152.4 | 0.188 | 4.78 |
| | | 0.250 | 6.35 |
| | | 0.313 | 7.95 |
| 7 x 7 | 177.8 x 177.8 | 0.188 | 4.78 |
| | | 0.250 | 6.35 |
| | | 0.313 | 7.95 |
| | | 0.375 | 9.53 |
| 8 x 8 | 203.2 x 203.2 | 0.188 | 4.78 |
| | | 0.250 | 6.35 |
| | | 0.313 | 7.95 |
| | | 0.375 | 9.53 |
| | | 0.500 | 12.70 |
| 10 x 10 | 254 x 254 | 0.188 | 4.78 |
| | | 0.250 | 6.35 |
| | | 0.313 | 7.95 |
| | | 0.375 | 9.53 |
| | | 0.500 | 12.70 |
| 12 x 12 | 304.8 x 304.8 | 0.188 | 4.78 |
| | | 0.250 | 6.35 |
| | | 0.313 | 7.95 |
| | | 0.375 | 9.53 |
| | | 0.500 | 12.70 |

| Length | 6 to 15 Meter |
|---|---|

**Note:** Rolling thickness will be on as per tolerances.

### Rectangular

| Sizes | OD in mm | Thickness | |
|---|---|---|---|
| | | Inch | mm |
| 6 x 8 | 152.4 x 203.2 | 0.188 | 4.78 |
| | | 0.250 | 6.35 |
| | | 0.313 | 7.95 |
| | | 0.375 | 9.53 |
| | | 0.500 | 12.70 |
| 6 x 10 | 152.4 x 254 | 0.188 | 4.78 |
| | | 0.250 | 6.35 |
| | | 0.313 | 7.95 |
| | | 0.375 | 9.53 |
| | | 0.500 | 12.70 |
| 6 x 12 | 152.4 x 304.8 | 0.188 | 4.78 |
| | | 0.250 | 6.35 |
| | | 0.313 | 7.95 |
| | | 0.375 | 9.53 |
| | | 0.500 | 12.70 |
| 8 x 10 | 203.2 x 254 | 0.188 | 4.78 |
| | | 0.250 | 6.35 |
| | | 0.313 | 7.95 |
| | | 0.375 | 9.53 |
| | | 0.500 | 12.70 |
| 8 x 12 | 203.2x 304.8 | 0.188 | 4.78 |
| | | 0.250 | 6.35 |
| | | 0.313 | 7.95 |
| | | 0.375 | 9.53 |
| | | 0.500 | 12.70 |
| 10 x 12 | 254 x 304.8 | 0.188 | 4.78 |
| | | 0.250 | 6.35 |
| | | 0.313 | 7.95 |
| | | 0.375 | 9.53 |
| | | 0.500 | 12.70 |

## BHUJ SECTION CHART

### Sqaure

| Sizes | Thickness | |
|---|---|---|
| | Inch | mm |
| 2 x 2 | 0.120 | 3.05 |
| | 0.188 | 4.78 |
| 2½ x 2½ | 0.120 | 3.05 |
| | 0.188 | 4.78 |
| 3 x 3 | 0.188 | 4.78 |
| | 0.250 | 6.35 |
| 4 x 4 | 0.188 | 4.78 |
| | 0.250 | 6.35 |
| 5 x 5 | 0.188 | 4.78 |
| | 0.250 | 6.35 |
| | | |

### Rectangular

| Sizes | Thickness | |
|---|---|---|
| | Inch | mm |
| 3X2 | 0.120 | 3.05 |
| | 0.188 | 4.78 |
| 4X2 | 0.120 | 3.05 |
| | 0.188 | 4.78 |
| | 0.250 | 6.35 |
| 5x3 | 0.188 | 4.78 |
| | 0.250 | 6.35 |
| 6X2 | 0.188 | 4.78 |
| | 0.250 | 6.35 |
| 6X4 | 0.188 | 4.78 |
| | 0.250 | 6.35 |

# TECHNICAL DATA OF PIPES CONFORMING TO API 5L- (Latest Edition)

| Size | Outside Dioneter | | Wall Thickness | | Mass of Plain end Pipe | | Standard Test Pressure | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Gr A | Gr B | Gr X42 | Gr X46 | Gr X52 | Gr X56 | Gr X60 | Gr X65 | Gr X70 |
| | mm | inch | mm | inch | Kg/Mtr. | Lb/Ft. | MPa | MPa | MPa | MPa | MPa | MPa | MPa | MPa | MPa |
| 3½ | 88.9 | 3.500 | 2.10 | 0.083 | 4.50 | 3.03 | 6.0 | 7.0 | 8.2 | 9.1 | 10.2 | 11.1 | 11.8 | 12.8 | 13.7 |
| | 88.9 | | 2.80 | 0.109 | 5.95 | 3.95 | 8.0 | 9.3 | 11.0 | 12.1 | 13.6 | 14.7 | 15.7 | 17.0 | 18.3 |
| | 88.9 | | 3.20 | 0.125 | 6.76 | 4.51 | 9.1 | 10.6 | 12.5 | 13.8 | 15.6 | 16.8 | 17.9 | 19.4 | 20.9 |
| | 88.9 | | 3.60 | 0.141 | 7.57 | 5.06 | 10.2 | 11.9 | 14.1 | 15.5 | 17.5 | 19.0 | 20.2 | 21.9 | 23.6 |
| | 88.9 | | 4.00 | 0.156 | 8.37 | 5.58 | 11.3 | 13.2 | 15.7 | 17.3 | 19.4 | 21.1 | 22.4 | 24.3 | 26.2 |
| | 88.9 | | 4.40 | 0.172 | 9.17 | 6.12 | 12.5 | 14.6 | 17.2 | 19.0 | 21.4 | 23.2 | 24.6 | 26.7 | 28.8 |
| | 88.9 | | 4.80 | 0.188 | 9.95 | 6.66 | 13.5 | 15.9 | 18.8 | 20.7 | 23.3 | 25.3 | 26.9 | 29.2 | 31.4 |
| | 88.9 | | 5.50 | 0.216 | 11.31 | 7.58 | 15.6 | 18.2 | 21.5 | 23.8 | 26.7 | 29.0 | 30.8 | 33.4 | 36.0 |
| 4 | 101.6 | 4.000 | 2.10 | 0.083 | 5.15 | 3.48 | 5.2 | 6.1 | 7.2 | 7.9 | 8.9 | 9.7 | 10.3 | 11.2 | 12.0 |
| | 101.6 | | 2.80 | 0.109 | 6.82 | 4.53 | 6.9 | 8.1 | 9.6 | 10.6 | 11.9 | 12.9 | 13.7 | 14.9 | 16.0 |
| | 101.6 | | 3.20 | 0.125 | 7.76 | 5.18 | 7.9 | 9.3 | 11.0 | 12.1 | 13.6 | 14.7 | 15.7 | 17.0 | 18.3 |
| | 101.6 | | 3.60 | 0.141 | 8.70 | 5.82 | 8.9 | 10.4 | 12.3 | 13.6 | 15.3 | 16.6 | 17.6 | 19.1 | 20.6 |
| | 101.6 | | 4.00 | 0.156 | 9.63 | 6.41 | 9.9 | 11.6 | 13.7 | 15.1 | 17.0 | 18.4 | 19.6 | 21.3 | 22.9 |
| | 101.6 | | 4.40 | 0.172 | 10.55 | 7.04 | 10.9 | 12.7 | 15.1 | 16.6 | 18.7 | 20.3 | 21.5 | 23.4 | 25.2 |
| | 101.6 | | 4.80 | 0.188 | 11.46 | 7.66 | 11.9 | 13.9 | 16.4 | 18.1 | 20.4 | 22.1 | 23.5 | 25.5 | 27.5 |
| | 101.6 | | 5.70 | 0.226 | 13.48 | 9.12 | 14.1 | 16.5 | 19.5 | 21.5 | 24.2 | 26.3 | 27.9 | 30.3 | 32.7 |
| 4½ | 114.3 | 4.500 | 2.10 | 0.083 | 5.81 | 3.92 | 4.6 | 5.4 | 6.4 | 7.1 | 7.9 | 8.6 | 9.1 | 9.9 | 10.7 |
| | 114.3 | | 3.20 | 0.125 | 8.77 | 5.85 | 7.1 | 8.2 | 9.7 | 10.8 | 12.1 | 13.1 | 13.9 | 15.1 | 16.3 |
| | 114.3 | | 3.60 | 0.141 | 9.83 | 6.57 | 7.9 | 9.3 | 11.0 | 12.1 | 13.6 | 14.7 | 15.7 | 17.0 | 18.3 |
| | 114.3 | | 4.00 | 0.156 | 10.88 | 7.24 | 8.8 | 10.3 | 12.2 | 13.4 | 15.1 | 16.4 | 17.4 | 18.9 | 20.4 |
| | 114.3 | | 4.40 | 0.172 | 11.92 | 7.96 | 9.7 | 11.3 | 13.4 | 14.8 | 16.6 | 18.0 | 19.2 | 20.8 | 22.4 |
| | 114.3 | | 4.80 | 0.188 | 12.96 | 8.67 | 10.6 | 12.3 | 14.6 | 16.1 | 18.1 | 19.7 | 20.9 | 22.7 | 24.4 |
| | 114.3 | | 5.20 | 0.203 | 13.99 | 9.32 | 11.5 | 13.4 | 15.8 | 17.5 | 19.7 | 21.3 | 22.7 | 24.6 | 26.5 |
| | 114.3 | | 5.60 | 0.219 | 15.01 | 10.02 | 12.3 | 14.4 | 17.0 | 18.8 | 21.2 | 22.9 | 24.4 | 26.5 | 28.5 |
| | 114.3 | | 6.00 | 0.237 | 16.02 | 10.80 | 13.2 | 15.4 | 18.3 | 20.2 | 22.7 | 24.6 | 26.1 | 28.3 | 30.6 |
| | 114.3 | | 6.40 | 0.250 | 17.03 | 11.36 | 14.1 | 16.5 | 19.5 | 21.5 | 24.2 | 26.2 | 27.9 | 30.2 | 32.6 |
| | 114.3 | | 7.10 | 0.280 | 18.77 | 12.59 | 15.7 | 18.3 | 21.6 | 23.9 | 26.9 | 29.1 | 30.9 | 33.5 | 36.2 |
| 5-9/16 | 141.3 | 5.563 | 2.10 | 0.083 | 7.21 | 4.86 | 3.7 | 4.4 | 5.2 | 5.7 | 6.4 | 7.0 | 7.4 | 8.0 | 8.6 |
| | 141.3 | | 3.20 | 0.125 | 10.90 | 7.27 | 5.7 | 6.7 | 7.9 | 8.7 | 9.8 | 10.6 | 11.3 | 12.2 | 13.2 |
| | 141.3 | | 4.00 | 0.156 | 13.54 | 9.02 | 7.1 | 8.3 | 9.9 | 10.9 | 12.2 | 13.2 | 14.1 | 15.3 | 16.5 |
| | 141.3 | | 4.80 | 0.188 | 16.16 | 10.80 | 8.6 | 10.0 | 11.8 | 13.0 | 14.7 | 15.9 | 16.9 | 18.3 | 19.8 |
| | 141.3 | | 5.60 | 0.219 | 18.74 | 12.51 | 10.0 | 11.7 | 13.8 | 15.2 | 17.1 | 18.5 | 19.7 | 21.4 | 23.1 |
| | 141.3 | | 6.60 | 0.258 | 21.92 | 14.63 | 11.8 | 13.7 | 16.3 | 17.9 | 20.2 | 21.9 | 23.3 | 25.2 | 27.2 |
| 6-5/8 | 168.3 | 6.625 | 2.10 | 0.083 | 8.61 | 5.80 | 3.1 | 4.6 | 5.4 | 6.0 | 6.7 | 7.3 | 7.8 | 8.4 | 9.1 |
| | 168.3 | | 2.80 | 0.109 | 11.43 | 7.59 | 4.2 | 6.1 | 7.2 | 8.0 | 9.0 | 9.7 | 10.4 | 11.2 | 12.1 |
| | 168.3 | | 3.20 | 0.125 | 13.03 | 8.69 | 4.8 | 7.0 | 8.3 | 9.1 | 10.3 | 11.1 | 11.8 | 12.8 | 13.8 |
| | 168.3 | | 3.60 | 0.141 | 14.62 | 9.77 | 5.4 | 7.9 | 9.3 | 10.3 | 11.6 | 12.5 | 13.3 | 14.4 | 15.6 |
| | 168.3 | | 4.00 | 0.156 | 16.21 | 10.79 | 6.0 | 8.7 | 10.3 | 11.4 | 12.8 | 13.9 | 14.8 | 16.0 | 17.3 |
| | 168.3 | | 4.40 | 0.172 | 17.78 | 11.87 | 6.6 | 9.6 | 11.4 | 12.5 | 14.1 | 15.3 | 16.3 | 17.6 | 19.0 |
| | 168.3 | | 4.80 | 0.188 | 19.35 | 12.94 | 7.2 | 10.5 | 12.4 | 13.7 | 15.4 | 16.7 | 17.8 | 19.3 | 20.7 |
| | 168.3 | | 5.20 | 0.203 | 20.91 | 13.94 | 7.8 | 11.4 | 13.4 | 14.8 | 16.7 | 18.1 | 19.2 | 20.9 | 22.5 |
| | 168.3 | | 5.60 | 0.219 | 22.47 | 15.00 | 8.4 | 12.2 | 14.5 | 16.0 | 18.0 | 19.5 | 20.7 | 22.5 | 24.2 |
| | 168.3 | | 6.40 | 0.250 | 25.55 | 17.04 | 9.6 | 14.0 | 16.5 | 18.3 | 20.5 | 22.2 | 23.7 | 25.7 | 27.7 |
| | 168.3 | | 7.10 | 0.280 | 28.22 | 18.99 | 10.6 | 15.5 | 18.4 | 20.2 | 22.8 | 24.7 | 26.3 | 28.5 | 30.7 |
| | 168.3 | | 7.90 | 0.312 | 31.25 | 21.06 | 11.8 | 17.3 | 20.4 | 22.5 | 25.3 | 27.5 | 29.2 | 31.7 | 34.1 |
| | 168.3 | | 8.70 | 0.344 | 34.24 | 23.10 | 13.0 | 19.0 | 22.5 | 24.8 | 27.9 | 30.2 | 32.2 | 34.9 | 37.6 |
| 8-5/8 | 219.1 | 8.625 | 3.20 | 0.125 | 17.04 | 11.36 | 3.7 | 5.4 | 6.4 | 7.0 | 7.9 | 8.5 | 9.1 | 9.9 | 10.6 |
| | 219.1 | | 4.00 | 0.156 | 21.22 | 14.12 | 4.6 | 6.7 | 7.9 | 8.8 | 9.9 | 10.7 | 11.4 | 12.3 | 13.3 |
| | 219.1 | | 4.80 | 0.188 | 25.37 | 16.96 | 5.5 | 8.1 | 9.5 | 10.5 | 11.8 | 12.8 | 13.6 | 14.8 | 15.9 |
| | 219.1 | | 5.20 | 0.203 | 27.43 | 18.28 | 6.0 | 8.7 | 10.3 | 11.4 | 12.8 | 13.9 | 14.8 | 16.0 | 17.3 |
| | 219.1 | | 5.60 | 0.219 | 29.48 | 19.68 | 6.4 | 9.4 | 11.1 | 12.3 | 13.8 | 15.0 | 15.9 | 17.3 | 18.6 |
| | 219.1 | | 6.40 | 0.250 | 33.57 | 22.38 | 7.4 | 10.7 | 12.7 | 14.0 | 15.8 | 17.1 | 18.2 | 19.7 | 21.3 |
| | 219.1 | | 7.00 | 0.277 | 36.61 | 24.72 | 8.1 | 11.7 | 13.9 | 15.3 | 17.3 | 18.7 | 19.9 | 21.6 | 23.2 |
| | 219.1 | | 7.90 | 0.312 | 41.14 | 27.73 | 9.1 | 13.3 | 15.7 | 17.3 | 19.5 | 21.1 | 22.4 | 24.3 | 26.2 |
| | 219.1 | | 8.20 | 0.322 | 42.65 | 28.58 | 9.4 | 13.8 | 16.3 | 18.0 | 20.2 | 21.9 | 23.3 | 25.3 | 27.2 |
| | 219.1 | | 8.70 | 0.344 | 45.14 | 30.45 | 10.0 | 14.6 | 17.3 | 19.1 | 21.4 | 23.2 | 24.7 | 26.8 | 28.9 |
| | 219.1 | | 9.50 | 0.375 | 49.10 | 33.07 | 10.9 | 15.9 | 18.9 | 20.8 | 23.4 | 25.4 | 27.0 | 29.3 | 31.5 |
| 10¾ | 273.1 | 10.750 | 4.00 | 0.156 | 26.54 | 17.67 | 5.2 | 6.1 | 7.2 | 8.0 | 9.0 | 9.7 | 10.3 | 11.2 | 12.1 |
| | 273.1 | | 4.80 | 0.188 | 31.76 | 21.23 | 6.3 | 7.3 | 8.7 | 9.6 | 10.8 | 11.7 | 12.4 | 13.4 | 14.5 |
| | 273.1 | | 5.20 | 0.203 | 34.35 | 22.89 | 6.8 | 7.9 | 9.4 | 10.4 | 11.7 | 12.6 | 13.4 | 14.6 | 15.7 |
| | 273.1 | | 5.60 | 0.219 | 36.94 | 24.65 | 7.3 | 8.5 | 10.1 | 11.2 | 12.5 | 13.6 | 14.5 | 15.7 | 16.9 |
| | 273.1 | | 6.40 | 0.250 | 42.09 | 28.06 | 8.4 | 9.8 | 11.6 | 12.7 | 14.3 | 15.5 | 16.5 | 17.9 | 19.3 |
| | 273.1 | | 7.10 | 0.279 | 46.57 | 31.23 | 9.3 | 10.8 | 12.8 | 14.1 | 15.9 | 17.2 | 18.3 | 19.9 | 21.4 |
| | 273.1 | | 7.80 | 0.307 | 51.03 | 34.27 | 10.2 | 11.9 | 14.1 | 15.5 | 17.5 | 18.9 | 20.1 | 21.8 | 23.5 |
| | 273.1 | | 8.70 | 0.344 | 56.72 | 38.27 | 11.4 | 13.3 | 15.7 | 17.3 | 19.5 | 21.1 | 22.5 | 24.4 | 26.3 |
| | 273.1 | | 9.30 | 0.365 | 60.50 | 40.52 | 12.2 | 14.2 | 16.8 | 18.5 | 20.9 | 22.6 | 24.0 | 26.1 | 28.1 |
| | 273.1 | | 11.10 | 0.438 | 71.72 | 48.28 | 14.5 | 16.9 | 20.0 | 22.1 | 24.9 | 26.9 | 28.7 | 31.1 | 33.5 |

| TECHNICAL DATA OF PIPES CONFORMING TO API 5L- (Latest Edition) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 12¾ | 323.9 | 12.750 | 4.40 | 0.172 | 34.67 | 23.13 | 4.8 | 5.7 | 6.7 | 7.4 | 8.3 | 9.0 | 9.6 | 10.4 | 11.2 |
| | 323.9 | | 4.80 | 0.188 | 37.77 | 25.25 | 5.3 | 6.2 | 7.3 | 8.1 | 9.1 | 9.8 | 10.5 | 11.3 | 12.2 |
| | 323.9 | | 5.20 | 0.203 | 40.87 | 27.23 | 5.7 | 6.7 | 7.9 | 8.7 | 9.8 | 10.6 | 11.3 | 12.3 | 13.2 |
| | 323.9 | | 5.60 | 0.219 | 43.96 | 29.34 | 6.2 | 7.2 | 8.5 | 9.4 | 10.6 | 11.5 | 12.2 | 13.2 | 14.3 |
| | 323.9 | | 6.40 | 0.250 | 50.11 | 33.41 | 7.1 | 8.2 | 9.7 | 10.7 | 12.1 | 13.1 | 13.9 | 15.1 | 16.3 |
| | 323.9 | | 7.10 | 0.281 | 55.47 | 37.46 | 7.8 | 9.1 | 10.8 | 11.9 | 13.4 | 14.5 | 15.5 | 16.8 | 18.1 |
| | 323.9 | | 7.90 | 0.312 | 61.56 | 41.48 | 8.7 | 10.2 | 12.0 | 13.3 | 14.9 | 16.2 | 17.2 | 18.7 | 20.1 |
| | 323.9 | | 8.40 | 0.330 | 65.35 | 43.81 | 9.3 | 10.8 | 12.8 | 14.1 | 15.9 | 17.2 | 18.3 | 19.8 | 21.4 |
| | 323.9 | | 8.70 | 0.344 | 67.62 | 45.62 | 9.6 | 11.2 | 13.2 | 14.6 | 16.4 | 17.8 | 18.9 | 20.5 | 22.1 |
| | 323.9 | | 9.50 | 0.375 | 73.65 | 49.61 | 10.5 | 12.2 | 14.5 | 16.0 | 17.9 | 19.4 | 20.7 | 22.4 | 24.2 |
| | 323.9 | | 10.30 | 0.406 | 79.65 | 53.57 | 11.4 | 13.2 | 15.7 | 17.3 | 19.5 | 21.1 | 22.4 | 24.3 | 26.2 |
| | 323.9 | | 11.10 | 0.438 | 85.62 | 57.66 | 12.2 | 14.3 | 16.9 | 18.6 | 21.0 | 22.7 | 24.2 | 26.2 | 28.3 |
| 14 | 355.6 | 14.000 | 4.80 | 0.188 | 41.52 | 27.76 | 4.8 | 5.6 | 6.7 | 7.3 | 8.3 | 8.9 | 9.5 | 10.3 | 11.1 |
| | 355.6 | | 5.20 | 0.203 | 44.93 | 29.94 | 5.2 | 6.1 | 7.2 | 8.0 | 8.9 | 9.7 | 10.3 | 11.2 | 12.1 |
| | 355.6 | | 5.30 | 0.210 | 45.78 | 30.96 | 5.3 | 6.2 | 7.3 | 8.1 | 9.1 | 9.9 | 10.5 | 11.4 | 12.3 |
| | 355.6 | | 5.60 | 0.219 | 48.33 | 32.26 | 5.6 | 6.6 | 7.8 | 8.6 | 9.6 | 10.4 | 11.1 | 12.0 | 13.0 |
| | 355.6 | | 6.40 | 0.250 | 55.11 | 36.75 | 6.4 | 7.5 | 8.9 | 9.8 | 11.0 | 11.9 | 12.7 | 13.8 | 14.8 |
| | 355.6 | | 7.10 | 0.281 | 61.02 | 41.21 | 7.1 | 8.3 | 9.8 | 10.9 | 12.2 | 13.2 | 14.1 | 15.3 | 16.5 |
| | 355.6 | | 7.90 | 0.312 | 67.74 | 45.65 | 7.9 | 9.3 | 11.0 | 12.1 | 13.6 | 14.7 | 15.7 | 17.0 | 18.3 |
| | 355.6 | | 8.70 | 0.344 | 74.42 | 50.22 | 8.7 | 10.2 | 12.1 | 13.3 | 15.0 | 16.2 | 17.3 | 18.7 | 20.2 |
| | 355.6 | | 9.50 | 0.375 | 81.08 | 54.62 | 9.5 | 11.1 | 13.2 | 14.5 | 16.3 | 17.7 | 18.8 | 20.4 | 22.0 |
| | 355.6 | | 10.30 | 0.406 | 87.71 | 59.00 | 10.3 | 12.1 | 14.3 | 15.8 | 17.7 | 19.2 | 20.4 | 22.2 | 23.9 |
| | 355.6 | | 11.10 | 0.438 | 94.30 | 63.50 | 11.1 | 13.0 | 15.4 | 17.0 | 19.1 | 20.7 | 22.0 | 23.9 | 25.7 |
| 16 | 406.4 | 16.000 | 4.80 | 0.188 | 47.54 | 31.78 | 4.2 | 4.9 | 5.8 | 6.4 | 7.2 | 7.8 | 8.3 | 9.0 | 9.7 |
| | 406.4 | | 5.20 | 0.203 | 51.45 | 34.28 | 4.6 | 5.3 | 6.3 | 7.0 | 7.8 | 8.5 | 9.0 | 9.8 | 10.5 |
| | 406.4 | | 5.60 | 0.219 | 55.35 | 36.95 | 4.9 | 5.7 | 6.8 | 7.5 | 8.4 | 9.1 | 9.7 | 10.5 | 11.4 |
| | 406.4 | | 6.40 | 0.250 | 63.13 | 42.09 | 5.6 | 6.6 | 7.8 | 8.6 | 9.6 | 10.4 | 11.1 | 12.0 | 13.0 |
| | 406.4 | | 7.10 | 0.281 | 69.91 | 47.22 | 6.2 | 7.3 | 8.6 | 9.5 | 10.7 | 11.6 | 12.3 | 13.4 | 14.4 |
| | 406.4 | | 7.90 | 0.312 | 77.63 | 52.32 | 6.9 | 8.1 | 9.6 | 10.6 | 11.9 | 12.9 | 13.7 | 14.9 | 16.0 |
| | 406.4 | | 8.70 | 0.344 | 85.32 | 57.57 | 7.6 | 8.9 | 10.6 | 11.6 | 13.1 | 14.2 | 15.1 | 16.4 | 17.7 |
| | 406.4 | | 9.50 | 0.375 | 92.96 | 62.64 | 8.3 | 9.7 | 11.5 | 12.7 | 14.3 | 15.5 | 16.5 | 17.9 | 19.3 |
| | 406.4 | | 10.30 | 0.406 | 100.61 | 67.68 | 9.0 | 10.6 | 12.5 | 13.8 | 15.5 | 16.8 | 17.9 | 19.4 | 20.9 |
| | 406.4 | | 11.10 | 0.438 | 108.2 | 72.86 | 9.8 | 11.4 | 13.5 | 14.9 | 16.7 | 18.1 | 19.3 | 20.9 | 22.5 |

## Tolerances :-

### 1) Outside diameter of Body & Ends :

| Specified OD (mm) | Body Tolerance | Ends Tolerance (mm) | Out-of-roundness tolerances (mm) | |
|---|---|---|---|---|
| | | | Pipe except the end | Pipe end |
| ≥ 88.9 to 168.3 | ±0.0075 D | -0.40, +1.60 | 0.020 D | 0.015 D |
| >168.3 to 610 | ±0.0075 D but max. of ±3.20 mm | ±0.005 D, but max. of ±1.60 mm | 0.020 D | 0.015 D |
| > 610 to 1422 | ±0.005 D but max. of ±4.0 mm | ±1.60 mm | 0.015 D | 0.010 D |
| >1422 | As agreed | | | |

### 2) Thickness :

<5.0 mm = ±0.5 mm

>5.0 to <15.0 = ±0.1t

≥15.0 mm = ± 1.5 mm

(where t = wall thickness)

### 3) Mass :

+10%, -3½% of standard weight

## Mechanical properties :

| PSL 1 | Gr.A | Gr.B | Gr.X42 | Gr.X46 | Gr.X52 | Gr.X56 | Gr.X60 | Gr.X65 | Gr.X70 |
|---|---|---|---|---|---|---|---|---|---|
| Yield strength MPa (min.) | 210 | 245 | 290 | 320 | 360 | 390 | 415 | 450 | 485 |
| Tensile strength MPa (min.) | 335 | 415 | 415 | 435 | 460 | 490 | 520 | 535 | 570 |
| Elongation (% Min.) | Min. elong. Shall be determined by $A=1940\ A^{0.2}/U^{0.9}$ (Where A=Area of test specimen, U=Min. specified tensile strength) | | | | | | | | |

| PSL 2 | Gr.AM | Gr.BM | Gr.X42M | Gr.X46M | Gr.X52M | Gr.X56M | Gr.X60M | Gr.X65M | Gr.X70M |
|---|---|---|---|---|---|---|---|---|---|
| Yield strength MPa (min.) | - | 245-450e | 290-496 | 320-525 | 360-530 | 390-545 | 415-565 | 450-600 | 485-635 |
| Tensile strength MPa (min.) | - | 415-655 | 415-655 | 435-655 | 460-760 | 490-760 | 520-760 | 535-760 | 570-760 |
| Elongation (% Min.) | Min. elong. Shall be determined by $A_f=1940\ A^{0.2}/U^{0.9}$ (Where A=Area of test specimen, U=Min. specified tensile strength) | | | | | | | | |
| Ratio (YS/TS) Max. | 0.93 | | | | | | | | |

e = For pipe with D<219.1 mm, the maximum yield strength shall be ≤495 MPa

# TECHNICAL DATA OF PIPE CONFORMING TO API 5L

CHEMICAL COMPOSITION FOR PSL 1 WELDED PIPES UPTO 25 mm WALL THICKNESS

| Steel Grade (Steel Name) | *Mass fraction based upon heat and product analysis % | | | |
|---|---|---|---|---|
| | C max | Mn max | P max | S max |
| L 210 or Grade A | 0.22 | 0.90 | 0.030 | 0.030 |
| L 245 or Grade B | 0.26 | 1.20 | 0.030 | 0.030 |
| L 290 or X 42 | 0.26 | 1.30 | 0.030 | 0.030 |
| L 320 or X 46 | 0.26 | 1.40 | 0.030 | 0.030 |
| L 360 or X 52 | 0.26 | 1.40 | 0.030 | 0.030 |
| L 390 or X 56 | 0.26 | 1.40 | 0.030 | 0.030 |
| L 415 or X 60 | 0.26 | 1.40 | 0.030 | 0.030 |
| L 450 or X 65 | 0.26 | 1.45 | 0.030 | 0.030 |
| L 485 or X 70 | 0.26 | 1.65 | 0.030 | 0.030 |

*Other requirements as per API 5L

PIPE TENSILE TEST REQUIREMENT FOR PSL 1 WELDED PIPES
( Delivery Condition - R, N & M)

| Pipe Grade | Yield Strength (Y.S.) MPa (psi) Minimum | Tensile Strength MPa (psi) Minimum |
|---|---|---|
| L 210 or Grade A | 210 (30500) | 335 (48600) |
| L 245 or Grade B | 245 (35500) | 415 (60200) |
| L 290 or X 42 | 290 (42100) | 415 (60200) |
| L 320 or X 46 | 320 (46400) | 435 (63100) |
| L 360 or X 52 | 360 (52200) | 460 (66700) |
| L 390 or X 56 | 390 (56600) | 490 (71100) |
| L 415 or X 60 | 415 (60200) | 520 (75400) |
| L 450 or X 65 | 450 (65300) | 535 (77600) |
| L 485 or X 70 | 485 (70300) | 570 (82700) |

# TECHNICAL DATA OF PIPE CONFORMING TO API 5L

## CHEMICAL COMPOSITION FOR PSL 2 WELDED PIPES UPTO 25 mm WALL THICKNESS

| Steel Grade (Steel Name) | Mass fraction based upon heat and product analysis % maximum | | | | | | | | Carbon Equivalent (% Maximum) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | C | Si | Mn | P | S | V | Nb | Ti | CE (IIW) | CE (PCM) |
| L 245 or Grade B | 0.22 | 0.45 | 1.20 | 0.025 | 0.015 | 0.05 | 0.05 | 0.04 | 0.43 | 0.25 |
| L 290 or X 42 | 0.22 | 0.45 | 1.30 | 0.025 | 0.015 | 0.05 | 0.05 | 0.04 | 0.43 | 0.25 |
| L 320 or X 46 | 0.22 | 0.45 | 1.30 | 0.025 | 0.015 | 0.05 | 0.05 | 0.04 | 0.43 | 0.25 |
| L 360 or X 52 | 0.22 | 0.45 | 1.40 | 0.025 | 0.015 | * | * | * | 0.43 | 0.25 |
| L 390 or X 56 | 0.22 | 0.45 | 1.40 | 0.025 | 0.015 | * | * | * | 0.43 | 0.25 |
| L 415 or X 60 | 0.12 | 0.45 | 1.60 | 0.025 | 0.015 | * | * | * | 0.43 | 0.25 |
| L 450 or X 65 | 0.12 | 0.45 | 1.60 | 0.025 | 0.015 | * | * | * | 0.43 | 0.25 |
| L 485 or X 70 | 0.12 | 0.45 | 1.70 | 0.025 | 0.015 | * | * | * | 0.43 | 0.25 |
| L 555 or X 80 | 0.12 | 0.45 | 1.85 | 0.025 | 0.015 | * | * | * | 0.43 | 0.25 |

*This is as per API Specification 5L

## PIPE TENSILE TEST REQUIREMENT FOR PSL 2 WELDED PIPES
( Delivery Condition - N & M)

| Pipe Grade | Yield Strength (Y.S.) MPa (psi) | | Tensile Strength MPa (psi) | | Ratio (YS/UTS) |
|---|---|---|---|---|---|
| | Minimum | Maximum | Minimum | Maximum | Maximum |
| L 245M or Grade BM | 245 (35500) | 450 (65300) | 415 (60200) | 655 (95000) | 0.93 |
| L 290M or X 42M | 290 (42100) | 495 (71800) | 415 (60200) | 655 (95000) | 0.93 |
| L 320M or X 46M | 320 (46400) | 525 (76100) | 435 (63100) | 655 (95000) | 0.93 |
| L 360M or X 52M | 360 (52200) | 530 (76900) | 460 (66700) | 760 (110200) | 0.93 |
| L 390M or X 56M | 390 (56600) | 545 (79000) | 490 (71100) | 760 (110200) | 0.93 |
| L 415M or X 60M | 415 (60200) | 565 (81900) | 520 (75400) | 760 (110200) | 0.93 |
| L 450M or X 65M | 450 (65300) | 600 (87000) | 535 (77600) | 760 (110200) | 0.93 |
| L 485M or X 70M | 485 (70300) | 635 (92100) | 570 (82700) | 760 (110200) | 0.93 |
| L 555M or X 80M | 555 (80500) | 705 (102300) | 625 (90600) | 825 (119700) | 0.93 |

*This is as per API Specification 5L

### Destructive & Non-Destructive Testing

**Mechanical Testing** Mechanical testing shall be done as API 5L

**Hydrostatic Testing** 100% of pipe shall be tested at a pressure specified in API 5L

**NDT**
Weld seam of each pipe shall be tested by online Eddy Current Test

PSL-1
Pipe body and weld seam shall be tested by Ultrasonic Test (after hydro test)

PSL-2
For pipes over size 2.375"

**Flattening (0° & 90°)** 1. Flatten upto 1/2 of OD (no crack in weld) 2. Flatten upto 1/3 of OD (no cracks or breaks other than in weld) 3. Full Flattening ( no Lamination or burnt metal)

**Reverse Bend Test** Customer Specification to determine strength of weld

**Metallography** For Grain size and Grain Structure

**Impact Testing** For PSL-2 Pipes only (at 0°C) Min value for one sample = 22 J, Min Avg. value of 3 samples = 27 J or as per API 5L

# COLD ROLLED STRIPS & SHEETS

## Cold Rolled Steel Plant

Cold Rolled Steel Strips/Sheets serve as critical inputs for a range of applications in a wide spectrum of industries. Considering the sophisticated applications, the CR Steel Strips are required to meet high standards of inherent quality , surface finish , heat treatment and close tolerance on dimension.

CR Strip division at Bahadurgarh is meeting these stringent requirements for sophisticated application with a production capacity of about 1,15,000 MT per annum.

Surya Roshni has made its presence felt in the market serving important customer particularly in the northern and western regions. Each supply is customised to specific customer requirement in term of quality delivery, technical delivery conditions etc. Attempt is made to develop long term relationship based on trust and transparency with its stress on quality, timely supplies and responsive customer service, it has built enduring relationship with its clients. It is now fully geared to meet the demanding needs of high value -added segment of Cold Rolled steel market throughout the country.

# SPIRAL WELDED PIPES

## GROWTH PROSPECTS OF SPIRAL PIPES

**OIL PIPE LINES**
Oil Refinery Piping, Crude Oil Piping, Cross Country Pipe Line.

**WATER PIPE LINES**
Water Mains, Sewerage Systems, Industrial Water Lines, Plant Piping.

**STRUCTURAL**
Piping pile foundation for high rise buildings, Well casing.

**CHEMICAL INDUSTRIES**
Conveying of Chemicals

**GAS PIPE LINES**
Pipe Lines for Natural Gas, LPG

PRAKASH
SURYA
Steel Tubes & Pipes

# SPIRAL WELDED PIPE PLANT

The plant situated in an area of about 100 acres and located on the National Highway at Bhuvad village (Anjar) in Kutch district of Gujarat State producing Spiral Welded Pipes in the range from 18" (457mm) to 105" (2667mm) with maximum wall thickness of 1" (25.4mm). The pipes are produced to meet high standards of specifications both, national and international, including that of API(American Petroleum Institute), conforming to API specifications up to Gr.X80. This plant has extended capacity of 2,00,000 MT per annum.

All the machines for manufacturing of Spiral Welded Pipes are imported from Byard Malaysia and Germany, who are world class manufacturers of Spiral Pipe Plant machinery. It is taking advantage of the strategic location in close proximity to the ports at Kandla (22km) and Mundra (35km) that have facilities for handling heavy cargo.

PRAKASH
SURYA
Steel Tubes & Pipes

# FLOW CHART: SAWH

DECOILING

SUBMERGED ARC WELDING FOR COIL TO COIL JOINING

COIL ULTRASONIC TESTING

EDGE MILLING

PIPE FORMING AND SUBMERGED ARC WELDING (INSIDE & OUTSIDE)

PLASMA ARC CUTTING

REAL TIME RADIOGRAPHY (RTR) / FLUOROSCOPY

BEVELLING OF ENDS

HYDROSTATIC TESTING

ULTRASONIC TESTING OF THE WELD AND HAZ

X-RAY INSPECTION OF PIPE ENDS

MAGNETIC PARTICLE INSPECTION (MPI) / RESIDUAL MAGNETISM

WEIGHT MEASUREMENT

FINAL INSPECTION (100% VISUAL + DIMENSION CHECK)

MARKING

LOADING & DISPATCHING

# Product Profile : SAWH Pipes

| Outside Diameter | Thickness | Capacity (MT per annum) | Length | Grade | Pipe Ends |
|---|---|---|---|---|---|
| 18" (457 mm) to 105" (2667mm) | 0.196' (5 mm) to 0.984' (25 mm) | 2,00,000 (0.2 Million) | Upto 42.65 feet (13000mm) | API 5L GR upto X80, ASTM A 252, ASTM A 139, IS 3589, IS 5504, | Plain / Bevelled |

MANAGEMENT SYSTEM CERTIFICATION
DNV·GL
ISO 9001 · ISO 14001
OHSAS 18001

**ISO 9001:2015**
70121-2010-AQ-IND-RvA
**ISO 14001:2015**
177047-2015-AE-IND-RvA
**OHSAS 18001:2007**
260692-2018-AHSO-IND-RvA

# TESTING AND QUALITY CONTROL FACILITIES

Besides the numerous quality assurance measures during the manufacturing process and at various inspection points, the following facilities are also utilized for ensuring stringent quality standards.

| | |
|---|---|
| • Universal Testing Machines (Digital) | For material testing (mechanical properties) |
| • Ultrasonic Testing Machine (NDT) (Parent Metal / Welds ) | For checking strip laminations and flaw detection on welds and on pipes in auto mode |
| • Metallurgical Microscope | For checking and evaluating the grain size & grain structure of material, heat affected and weld zones |
| • Vickers Hardness Tester (Digital) | For checking micro & macro hardness on weld, heat affected zone and base metal |
| • Digital Ultrasonic Thickness Gauge | For checking thickness of pipes |
| • Mandrels and Fixtures | Guided bend test (GBT) |
| • Impact Test Machine (Charpy v notch) | For Evaluating toughness in base metal, weld and HAZ of pipes |
| • Drop weight tear test | For evaluating the % shear area of material for Ductility |
| • Spectroscope | For checking chemical composition of raw material & product |

Apart from the above important testing machines, we have digital temperature recorders for measuring welding temperature, auto pressure recorder for measuring hydraulic test pressure and many other sophisticated measuring instruments.

The trained and committed work force ensures high quality of pipes made to various national and international standards including the requirement of API specifications. The quality control system is audited time to time by the various certification bodies including API to verify the effectiveness of the system.

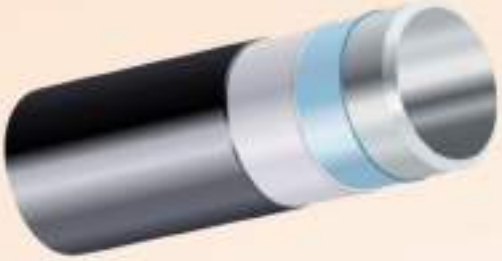
# FOCUS ON QUALITY

Customer satisfaction drives Surya in everything that it does. No wonder, its commitment to the high quality of its pipes commences right from the selection of raw material and continues at every stage of manufacturing process till the finished product.

# MODERN LABORATORY

To ensure product reliability through process control, Surya has a fully equipped mechanical, Chemical and metallurgical laboratory with all the tools essential for comprehensive product quality testing and evaluation to withstand reactive processes. Hydro testing of pipes is undertaken to detect leaks and fissures. Destructive testing of pipes entails performance examination of the weld, as well as their tensile and compressive strength.

# 3LPE/PP/FBE EXTERNAL COATING



Three Layer Polyethylene/ Polypropylene coating Systems (3LPE/PP), a multi layer coating composed of three functional components: a high performance fusion bonded epoxy (FBE) followed by a copolymer adhesive and an outer layer of polyethylene/polypropylene which provides tough and durable protection. 3LPE/PP Systems provide excellent pipeline protection for small and large diameter pipelines with moderately high operating temperatures.

The 3-LPE/PP coated pipe are as follows:

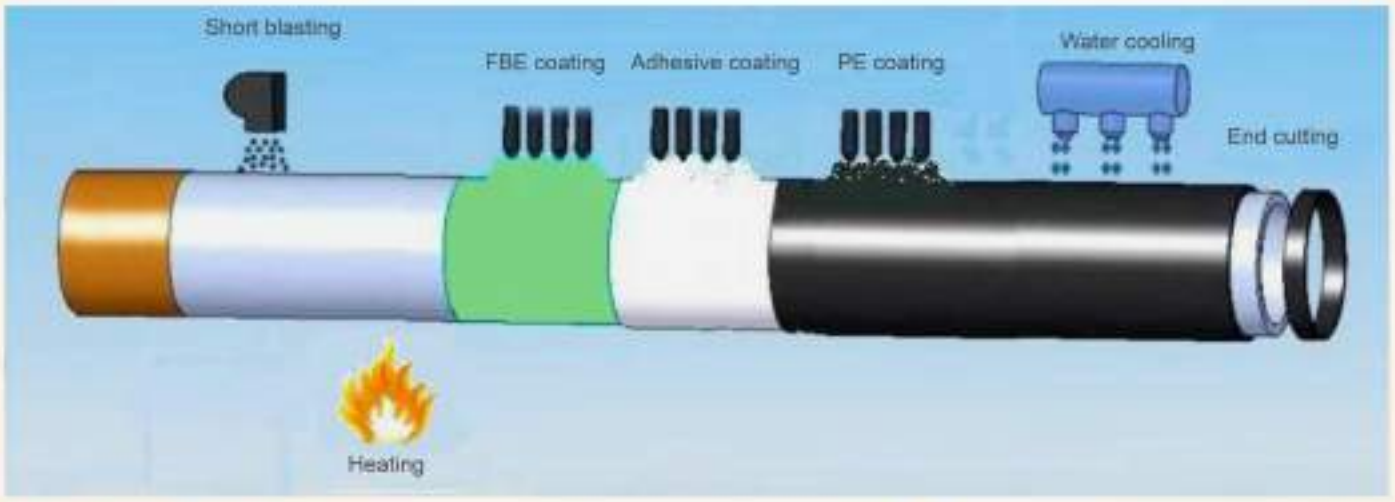
Pipes are preheated, external blasting is carried out for cleaning and roughness then inspected. In case of high salt contamination the pipes are treated with phosphoric acid and washed with high pressure DM water to neutralize the chloride contents. The pipes are loaded on coating conveyor and heated between 180-230°C or as per powder manufacturer's recommendation;

THREE LAYER PE/PP COATING

Layer 1: This is the corrosion protective layer. This layer is of fusion bonded epoxy which offers very good corrosion protection. The fusion bonded epoxy has a very good bonding with the blasted steel surface.

Layer 2: This layer is the copolymer adhesive. The copolymer adhesive is a malefic anhydride grafted polyethylene compound. This material has good chemical bonding to the fusion bonded epoxy and the top layer polyethylene.

Layer 3: This layer is for physical protection and consists of polyethylene/Polypropylene. Since the copolymer adhesive and polyethylene are similar, they bond well with each other




## 3 LPE COATING

## END CLEANING

After coating, pipes are passed through quenching zone to bring down the temperature below 80°C for smooth handling and cut back operation as per client requirement.

Pipes are tested with Holiday detector with 25 KV voltage to detect pin holes and other various testing peel test, thickness check, impact test and lab tests etc for coated pipes and raw materials.

Corrosion Resistance :

- 3LPE/PP Coating prevents steel pipe from corrosion.
- Excellent chemical resistance properties and resistance to cathodic disbondment.
- 3LPE/PP Coating has got good resistance to moisture permeability.

Mechanical Protection:

- Top coat of polyethylene/polypropylene prevents abrasion and damage to fusion bonded epoxy during handling.
- High Bond Strength :
- The external coating and epoxy is bonded firmly to the steel pipe surface and this is mean to adhesion strength (ASTM D 4541).

APPLICATIONS

3LPE/PP coated steel pipes are mainly used in the following applications where the pipes are either buried or submerged:

- Drinking water pipe lines, Oil and gas pipelines
- In plant process water applications

STANDARDS AND SPECIFICATIONS

3LPE/PP pipes are coated according to the following standards:

- DIN 30670
- CSA Z245.21
- ISO 21809-1
- or any other International standard/client specs

| CAPACITY/RANGE | FBE/3LPE/3LPP |
|---|---|
| Capacity per Hour | 360 ($M^2$) |
| Minimum Pipe Diameter | 114.3 MM (4.5") |
| Maximum Pipe Diameter | 1625.6 MM (64") |
| Minimum Pipe Length | 9.0 M (29.52') |
| Maximum Pipe Length | 12.8 M (41.98') |

# INTERNAL COATING

A spraying nozzle used to spray the liquid epoxy inside the pipe as per the required thickness. Before applying the epoxy paint, internal surface of the pipes are blasted and cleaned.

FEATURES OF INTERNAL EPOXY COATING

- Increase gas flow
- Excellent Corrosion Resistance
- High Steel Adhesion
- Low mechanical & abrasion Resistance
- High Impermeability for water / gas
- Low Electrical Resistance
- Decrease line maintenance and up keep costs

INTERNAL COATING

| Type of Coating | Capacity | Coating |
|---|---|---|
| INTERNAL COATING | 360 SQM/HOUR<br>219.1mm to 1626mm<br>PIPE SIZE - 8⅝"- 64"<br>LENGTH - 9 to 12.8 Meters<br>29.53 to 42 feet | INTERNAL CLEANING & SPRAY PAINTING |

# OCTG

## OIL COUNTRY TUBULAR GOODS

- These are used for casing and tubing application in Oil & Gas industry.
- Electric Resistance Welded Tubing & Casing manufactured by SURYA, fully comply with API 5CT requirement .
- Product Standard / Material Quality – API 5CT – H40,J55,K55 PSL 1
- Pipes produced by SURYA are with tight tolerance on product including roundness, straightness with length up to 12.90 meter (42 feet), besides sourcing reliable high quality steel .
- Most popular range in Tubing & casing is covered. The range (60.3mm to 114.3mm) for Tubing is from OD 2-3/8 to 4-1/2 Inch & for casing it is from OD 4-1/2 to 16 Inch (114.3mm to 406.4mm).


PRAKASH
# SURYA
*Steel Tubes & Pipes*

## Delivering Trust...
## ...across the globe!

**SURYA ROSHNI LTD.**

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