

HOT ROLLED COILS,
PLATES AND SHEETS



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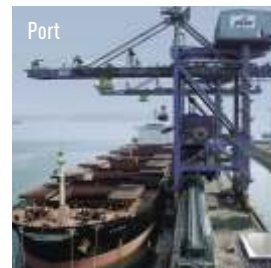
JSW Steel Limited



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JSW GROUP



Port



Energy



Steel



Cement



Information Technology

A \$11 billion conglomerate, JSW Group is a part of the O. P. Jindal Group. JSW has set up business facilities in various core sectors of India, with verticals that are exploring innovative and sustainable avenues in steel, energy, infrastructure and cement. The Group is paving the way for India's development as a global superpower.

JSW Steel is India's leading steel producer and among the world's most illustrious steel company. The Group is also leading in every sector that it operates in.

By maintaining exemplary operational efficiencies, JSW Energy has grown ten-fold in just three years, while JSW Cement creates the building blocks of India with its environment friendly products. JSW Infrastructure is contributing to the nation's development by providing world class services to clients through state-of-the-art ports, terminals, shipyards and other facilities.

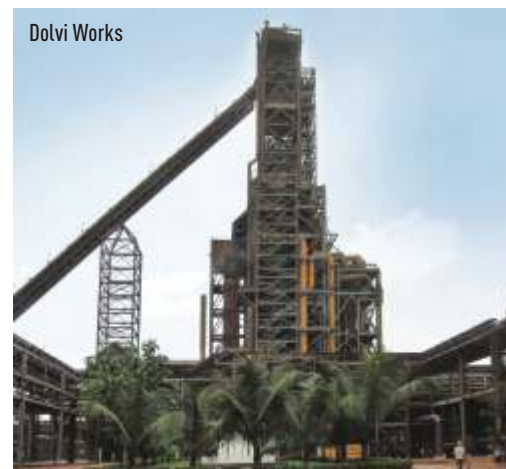
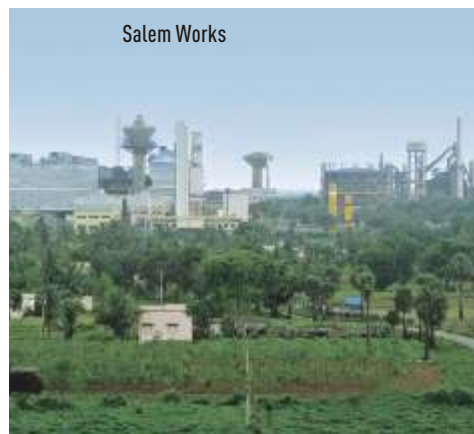
JSW Group is committed to creating more smiles at every step of the journey. JSW Foundation, the Group's CSR and sustainability arm, is in constant pursuit of making life better for communities with its various initiatives in the fields of health, education, livelihood and sports, along with art and culture.

JSW Group is proud to be charting a course to excellence that creates opportunities for every Indian and leads to the creation of a sustainable, dynamic and developed nation.

JSW STEEL LTD.

The flagship company of USD 11 billion JSW Group, JSW Steel is one of India's leading integrated steel manufacturers with a capacity of 14.3 MTPA. It is one of the fastest growing companies in India with a footprint in over 140 countries. With state-of-the-art manufacturing facilities located in Karnataka, Tamil Nadu and Maharashtra, it is recognized for its innovation and quality. JSW offers a wide gamut of steel products that includes Hot Rolled, Cold Rolled, Bare & Pre-painted Galvanized & Galvalume®, TMT Rebars, Wire Rods and Special Steel. JSW Steel continues to enhance its capabilities to meet the rapidly changing global market needs. To stay on the leading edge of technical advancement, JSW has entered into technological collaboration with JFE Steel Corp, Japan to manufacture high strength and advanced high strength steel for the automobile sector. JSW Steel has also entered into a joint venture with Marubeni-Itochu Steel Inc. Tokyo, to set up a state-of-the-art steel processing center.

To strengthen its global network, the Company has also acquired a Pipe and Plate making steel mill in Baytown, Texas in USA. By 2025, JSW Steel aims to produce 40 million tons of steel annually.

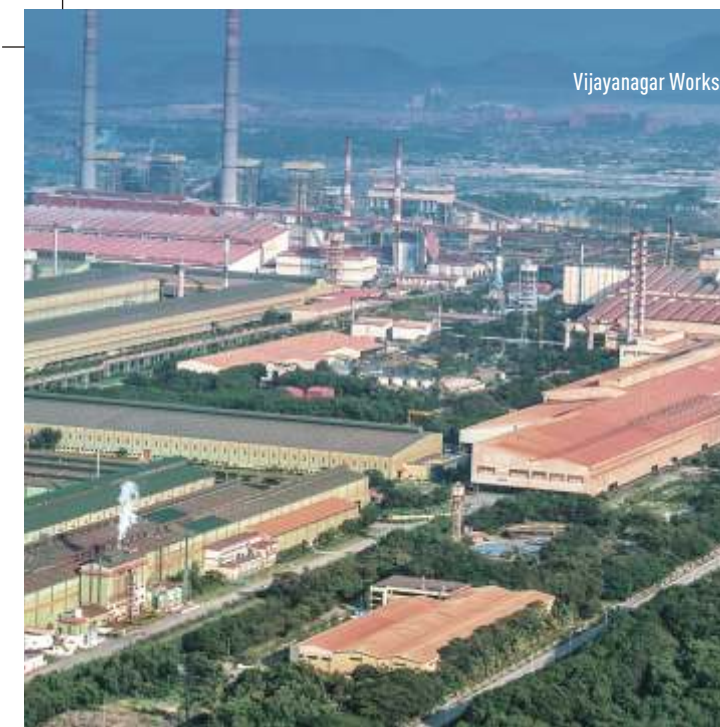


JSW STEEL COATED PRODUCTS LTD.

JSW Steel Coated Products Limited is 100% subsidiary company of JSW Steel, having state-of-the-art manufacturing facilities in the state of Maharashtra.

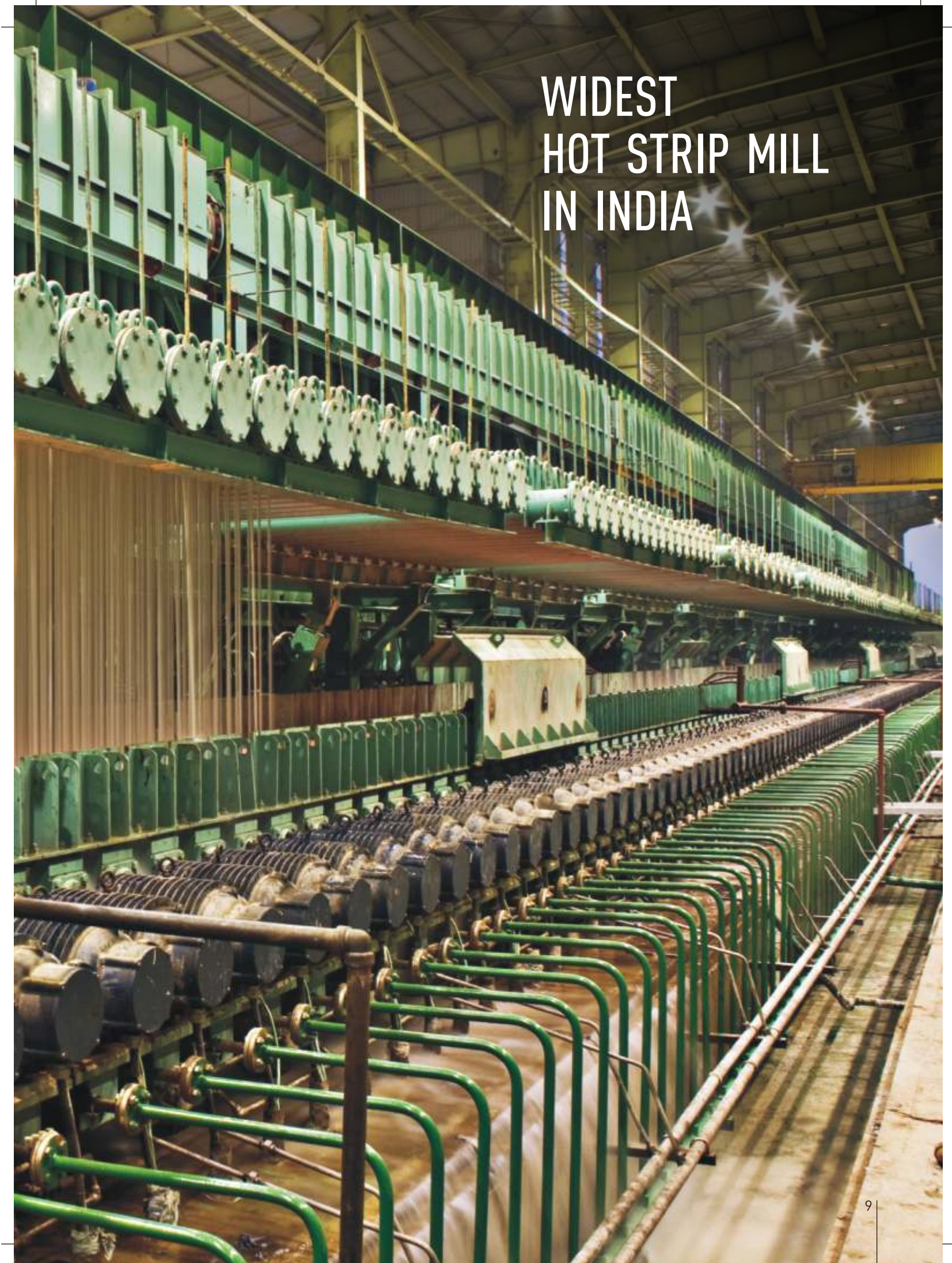
JSW Steel Coated Products Ltd. is India's largest manufacturer and exporter of Coated Steel as well as Colour Coated Steel. The production facilities, Tarapur and Vasind Works, are located in the vicinity of major ports. The company's Kalmeshwar Works is centrally located near Nagpur to serve across regions.

JSW is an ISO 9001:2008 Certified Organization and the first licensee producer for Galvalume® in India. The Tarapur plant is specialized in manufacturing Ultra-Thin Coated Products. The company is also a manufacturer of appliance grade colour coated products. JSW's Kalmeshwar Works is the first producer of Galvanized and Colour Coated Steel in India. JSW also has introduced indigenously manufactured Pre-Coated Metal & Vinyl Coated Metal, for the first time in India, as it focuses on the Appliance Industry.



SETTING BENCHMARKS

- First continuous annealing line in India
- Widest Cold Rolling Mill (upto 1870 mm width)
- India's Largest Coated Steel producer
- First Licensee Galvalume® producer in India
- JSW Steel Salem Works is the largest integrated alloy and special steel plant in India
- Widest Hot Strip Mill in India: 25.4 x 2150 mm
- India's Most Modern and Largest Vertical Caster - 300/260/220 x 2200 mm
- India's only Multi-Radii Bloom Caster (12/16/30 m) operational at Salem Works
- ZERO EFFLUENT discharge for greener & cleaner environment
- 1.5 million trees planted at Vijayanagar Works, transforming the area into a green oasis



WIDEST
HOT STRIP MILL
IN INDIA

JSW HOT ROLLED PRODUCTS

JSW Steel manufactures superlative Hot Rolled (HR) coils at its Hot Strip Mills (HSM), situated at Vijayanagar, Karnataka and at Dolvi, Maharashtra. The production of these coils involves the use of state-of-the-art equipment and manufacturing processes that ensure products of the highest quality. At Vijayanagar, HSM-I has commissioned capacity of 3 MTPA and HSM-II has commissioned capacity of 5 MTPA, equipped with sizing presses and an automatic line inspection facility. It is the widest Hot Strip Mill in India, capable of rolling upto 2150 mm. JSW Steel’s Dolvi unit in Maharastra has commissioned capacity of 3.6 MTPA . The Dolvi unit HSM uses a combination of the advanced Conarc Process and Thin Slab Casting technology, which facilitates the production of HR coils which are superior in quality due to their thinner gauges and finer surface quality. The convenient coastal location of the Dolvi unit allows easy access to the plant and makes the import and export of raw materials and finished goods extremely efficient.



VIJAYANAGAR

The Vijayanagar plant of JSW Steel is the first integrated steel plant to reach 10 MTPA capacity at a single location in India. It is the first plant in India to use the Corex technology for hot metal production. The first Hot Strip Mill at Vijayanagar was commissioned in 1997. Since then it has grown exponentially and now has an installed capacity to produce 10 MTPA of steel. Located 380 kms from Bangalore in Toranagallu, North Karnataka - a part of the Bellary-Hospet iron ore belt - it is a fully integrated steel plant well-connected with both Goa and Chennai ports.

DOLVI

Located on the West coast of India, the plant has a jetty that can handle a capacity of 10 million tonnes per annum. This provides the unit with logistical advantages in importing raw materials and exporting finished products. Located around 80 kms from Mumbai, the unit is well connected via rail, road and sea and has given JSW Steel a strategic presence in Western India. The Dolvi Steel Plant caters to several industries including automotive, infrastructure, construction, machinery, LPG cylinder-manufacturers cold rollers, the oil and gas sectors and consumer durables.



MANUFACTURING FACILITIES

VIJAYANAGAR

Vijayanagar Manufacturing Facilities					
	Pellet	Sinter	Coke Oven	Corex	Blast Furnace
Capacity	Pellet Plant1: 4.2MTPA Pellet Plan2: 5MTPA Total: 9.2MTPA	Sinter Plant1: 2.3MTPA Sinter Plant2: 2.3MTPA Sinter Plant3: 5.75MTPA Sinter Plant4: 2.6MTPA Total: 12.95MTPA	Coke Oven1: 0.6MTPA Coke Oven2: 0.6MTPA Coke Oven3: 1.5MTPA Coke Oven4: 1.9MTPA Total: 4.6MTPA	Corex1: 0.8MTPA Corex2: 0.85MTPA Total - 1.65MTPA	Blast Furnace1: 0.9MTPA Blast Furnace2: 1.3MTPA Blast Furnace3: 2.7MTPA Blast Furnace4: 2.7MTPA Total: 7.6MTPA
Technology / Supplier	M/s. Kvaerner Metals, USA	M/s Otto Kumpo, Germany	Coke Oven1&2: M/s Sesa Kembla, India Coke Oven3&4: M/s MECC, China (Sino Steel)	M/s Voest Alpine, Austria	BF1 - M/s Mecon, India BF2 - M/s Danieli Corus, Netherlands BF3 & 4 - M/s Siemens VAI, UK
Features	Dryers, Ball Mills, Pelletisiers of 7.5m dia, Indurating furnace, Electrostatic Precipitator and Water Re-circulation System	SP1 &2: 204 Square meter Sinter Bed SP3: 496 Square meter Sinter Bed SP4: 231 Square meter Sinter Bed	Coke Oven1&2: Non recovery type with 4 batteries of 279 ovens Coke Oven3&4: Recovery type with 4 batteries of 128 ovens	Coal Blending Station, Coal Drying Plant, Stock House, Water Re-circulation System, Gas Cleaning System and Slag Granulation Plant	BF1 - useful volume of 1250 m3 BF2 - useful volume of 1680 m3 BF3&4 - useful volume of 4019 m3 each

Steel Melting Shop (SMS)				
Convertor	Secondary Steel Making	Caster	HSM	Plate Mill
SMS1 (3 Convertors): 3.9MTPA SMS2 (7 Convertors): 6.0MTPA Total - 9.8MTPA	SMS1: 3LHF & 1RH degasser SMS2: 4LHF & 2RH degassers	SMS1 (4 Slab casters): 3.8MTPA SMS2 (1 Billet caster): 1.5MTPA SMS2 (3 Slab casters): 4.5MTPA Total - 9.8MTPA	HSM1: 3.2MTPA HSM2: 5MTPA Total - 8.2MTPA	NA
M/s SMS Demag, Germany	M/s SMS Demag, Germany	M/s. SMS Demag, Germany M/s. VAI Siemens, UK	HSM1: M/s Danieli, USA HSM2: M/s Mitsubishi- Hitachi, Japan	NA
SMS1 Convertors: 130tons/heat Top Cone Cooling, arrester (DART system), SMS2 Convertors: 170tons/heat from top and Argon from bottom, Pre tap plug & post tap slag Sublance system Combined blowing of oxygen	TPM for SMS1 & 125TPM for RH Degasser: Multi function system, Multiple wire feeding, lance, Hydraulic Rocker Arm System, Recirculation rate : 100 Water cooled roof LHF: Auto Electrode regulation SMS2	Slab Casters: 220/260/300mm Thick with 800 to Auto mould width change, SEN change facility Billet Caster: 165 x 165mm Caster1&2: Curved Moulds with 2200 mm width electromechanical Oscillation, Air mist cooling, Caster 3,4,6,7&8: Dynamic spray cooling, Auto mould width change, Vertical mould with with dynamic soft reduction hydraulic Oscillator, Auto-strand taper control	Thickness 1.4 - 25.4mm and width 900-2100mm HSM1: 2- Reheating Furnace, 1-Roughing mill (Reversible), 6 stand-4 Hi tandem mill (Finishing Mill), Run out Table & 2-Down coilers capable to make Dual Phase steel HSM2: 3- Reheating Furnace, 2-Roughing mill Online Surface inspection system Mill), Run out Table & 3-Down coilers (Reversible), 7 stand-4 Hi tandem mill (Finishing	NA

DOLVI

Dolvi Manufacturing Facilities			
	Pellet	Sinter 1	Sinter 2
Capacity	4 mtpa	2.8 mtpa	2.8 mtpa
Technology / Supplier	METSO, USA	MECC China	Outotec, Germany
Features	Induration process. Wet Grinding system, Travelling grate indurating machine, 464 m2 travel grate for Hearth layer seperation by natural segregation/ HL vibrating screen. Direct filter cake feeding system.	Highest secondary material used in feed mix- 150 Kg/ton of sinter for the day suction Undergate: 1400mm of water column. Bed Area 210 m2. Electrostatic precipitator used for dust collection	Suction Undergate: 1400mm of water column Bed Area 224 m2Electrostatic precipitator used for dust collection

Coke Oven	Blast Furnace	Sponge Iron Plant
1 mtpa	3.5 mtpa	1.6 mtpa
MECC Sino steel, China	Nippon Steel & Sumikin Engineering Co. (NSENGI)	Midrex, USA
5.5 m height, stamp charged, recovery type 2 Nos. of batteries with 55 ovens / battery Wet Quenching Byproduct recovery plant, water treatment plant Coke Oven Gas used for heating at different furnaces and Boilers	Total Volume 4323 m3 4 tap hole, 36 tuyeres, 5 Hot Blast Stove Horizontal staves in hearth area Cast House Dust extraction system 1900000 nm3	Gas based plant, World's first mega module DRI plant. Metallization more than 94% with 1.8% C. World first DRI plant, using coke oven gas for the production of DRI.

ADVANTAGE JSW

VIJAYANAGAR

- KR Process and Co-injection Technology for production of ultra low Sulphur Steel
- Low levels of dissolved Oxygen & Hydrogen:- RH-OB Process
- Clean Steel with low NMI (Non Metallic Inclusions):- Combined Blowing, Sublance System, DART System, Inclusion Morphology Modification, Full Shrouding System, Tundish Furniture, Vertical Bend Caster, Mold Fluid Flow
- Minimum Segregation: Dynamic Soft Reduction Technology
- Close Dimensional Tolerances: Automatic Profile Control Model
- High Strength and Dual Phase Steel (Plain Carbon & Low Alloy) depending on customer requirements
- Flatness/Shape in Cut To Length Form: Automatic Flatness Control Model at HSM and Robust Leveling System in Cut to Length Line

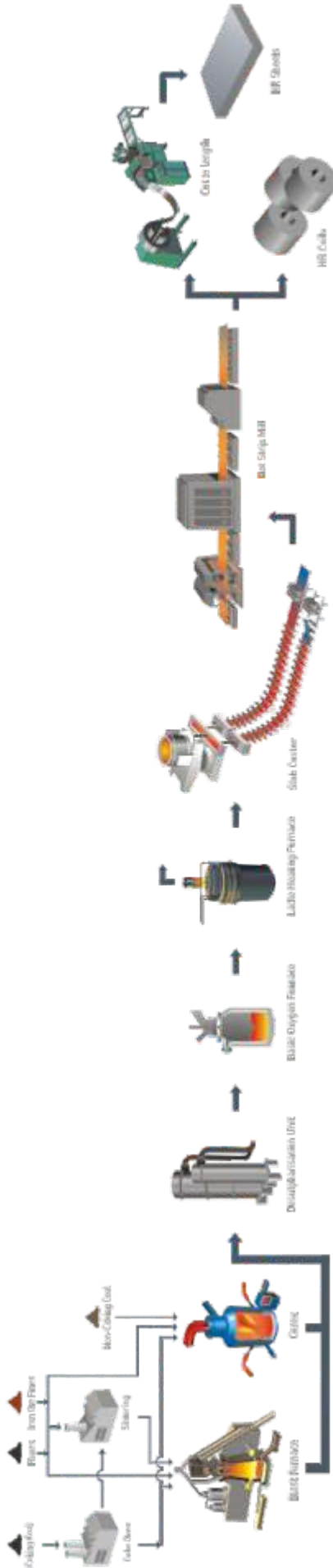
DOLVI

- Expertise in Hot Metal Operation without mixer & Desulphurisation units
- Casting speed of 11 mtr/min in two casters - benchmark in the world
- Thin Slab Casters
- Direct Rolling without any preheating of the slab
- Hydraulic Auto Gauge Control & PCFC for Profile Control
- Raw Material to Hot Rolled Coil in 222 minutes

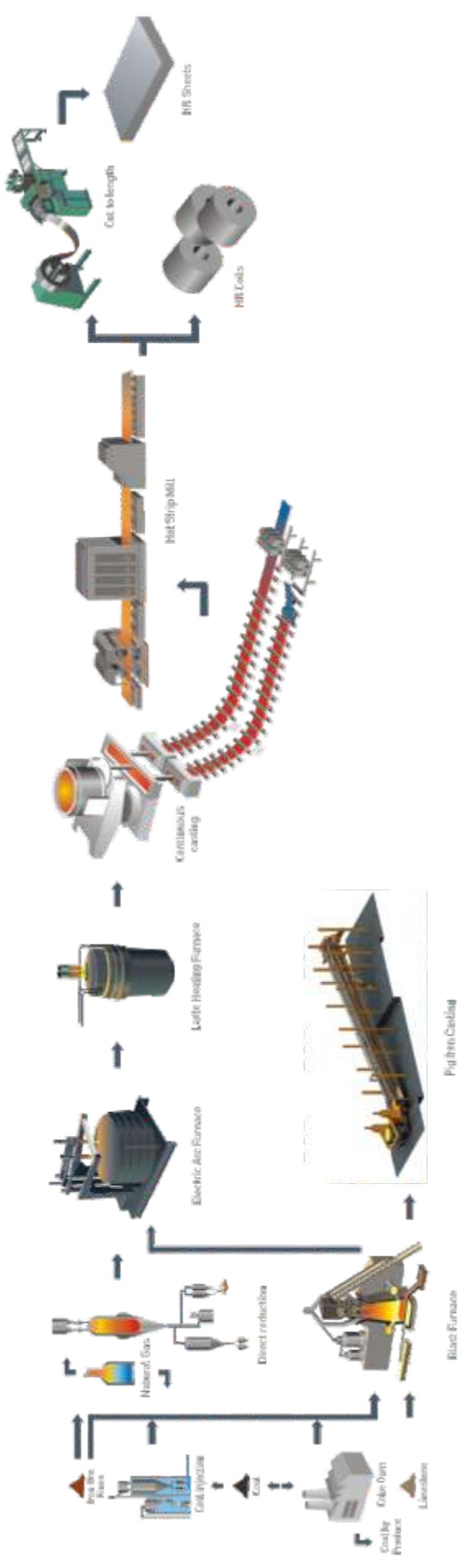


THE MANUFACTURING PROCESS

VIJAYANAGAR



DOLVI



PRODUCT CAPABILITIES

Parameter	Vijayanagar	Dolvi
Grades	Re-rolling Grades, Drawing and Press Forming Grades includes HSLA grades, Tube and Pipe/ Forming Grades, Structural General Engineering/ Tube/ Forming Grades and Chequered Grade, High Tensile General Engineering/Tube/ Forming Grades, LPG/ Low Pressure Vessel Grades, Medium Carbon Grades, Weather Resistance Grades and Line Pipe Grades	Auto, Line pipe (Oil & Gas), Cold Rolled, Pipes & Tubes, Projects & Construction, LPG, Machinery
Thickness (mm)	1.4 – 25.4 mm	1.2 - 25 mm
Width (mm)	900 – 2100 mm	900 - 1550 mm
YS / UTS (Mpa)	As per standards / Customized (Approx Max 620Mpa)	As per standards / Customized
Coil ID	762 (+/- 40) mm	762 (+/- 20) mm
Coil OD	2100mm Max	1800mm Max
Edge	Mill Edge	Mill Edge
Width Tolerance	Width upto 1500mm: - 0/+ 20 mm for 95% of coil length (for balance 5% in Head end and +25 mm max). Width ≥1500mm: - 0/+ 25 mm for 95% of coil length (for balance 5% in Head end and +30 mm max).	+15/-0mm
Thickness Tolerance	Upto 6 mm thickness 3/4th EN for 95% coil length (balance coil length is full EN 10051) and for ≥ 6 mm thickness 6% of thickness for 95% of coil length (balance coil length is full EN 10051).	1.2-1.3mm = +/- 0.030mm, 1.31-1.40mm = +/- 0.050mm, 1.41-4.00 mm = +/- 0.075mm, ≥ 4 - 10 mm = +/- 0.10mm, ≥ 10 mm +/- 1% thk
Tongue/Fish tail	80% of coils 500 mm max each end and 20% coils 1000mm max or as agreed.	800mm Max (500mm Head end, 500mm Tail end)
Packing	1-2 Circumferential and 2 to 4 bands through the eye or As agreed	As Agreed

NOTE:

- Thickness Tolerance, Width Tolerance, Flatness Tolerance and Camber Tolerance shall be as per standards applicable (JIS, EN, ASTM, IS, ISO etc)
- For the steel sheet and the regular portion of the steel coil, measurement of thickness shall be made at any point not less than 40mm from both side edges
- The tolerances do not apply to the head end and tail end of the coils (irregular/uncropped/ fish tail or tongue portion)
- Either plus or minus side of the thickness tolerances given in tables may be limited on request. The total tolerances in this case shall be equal to those given in the table
- Closer Tolerances can be accepted on mutual agreement

TESTING FACILITIES

Parameter	Equipment
Chemical Composition	Optical Emission Spectrometer Oxygen, Hydrogen & Nitrogen Analyzer
Internal Cleanliness	Macro Etching and S Printing
Tensile Properties	Computerized UTM 10T/25T/30T/60T/120T
Hardness	Vickers/Rockwell Hardness Tester
Impact Energy	Impact Testing m/c - (BSEN 450J/ASTM600J)
Bend Test	Bending and folding m/c - 100T
Cupping Value	Hydraulic Erichsen Cupping Tester
Drop Weight Tear Test	DWTT m/c - 30,000J
Microstructure	Metallurgical Microscope with Image Analyzer

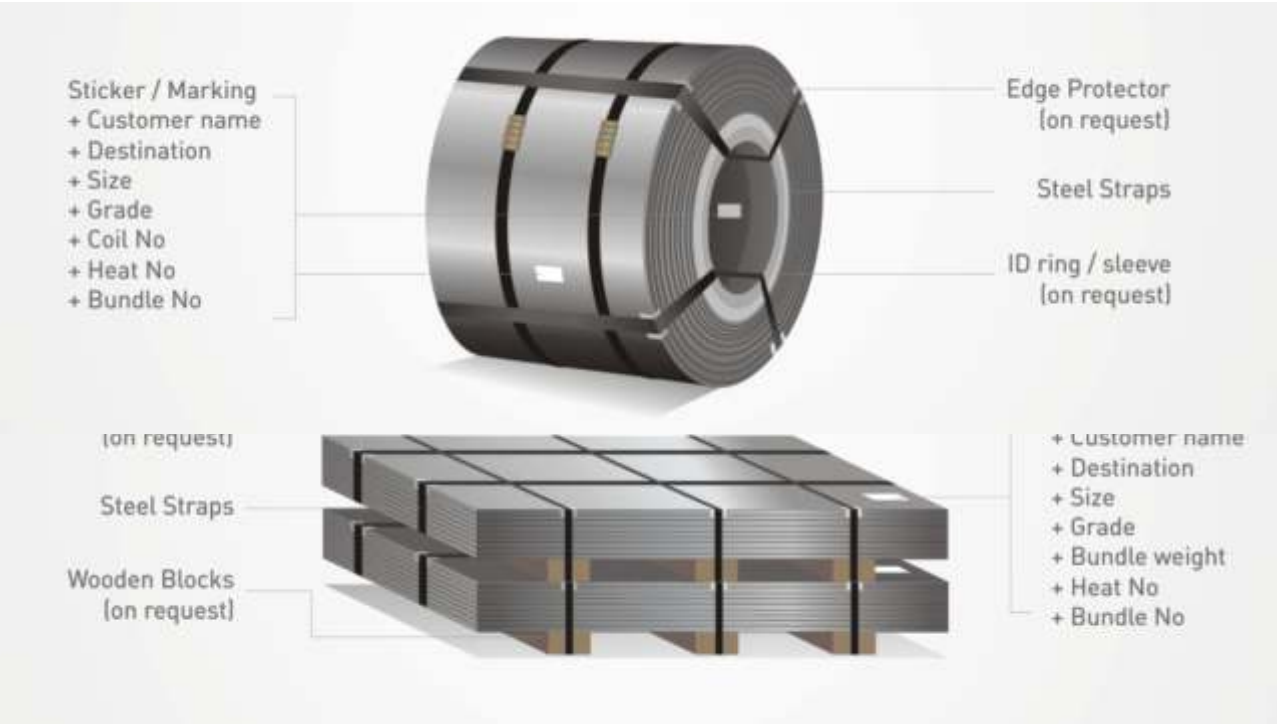


PACKING STANDARD FOR HOT ROLLED COILS:

Customer Type	Thickness minimum mm	Thickness maximum mm	Width minimum mm	Width maximum mm	Bare Steel Strapping (2 digit Numeric code) First Digit: Eye strap Second Digit: Circum strap
Domestic	1.4	25.4	900	2150	32 or as agreed (with ID Steel Ring for nominal thickness up to 2.6mm)
Export & API	1.6	25.4	900	2150	43 or as agreed (with ID Steel Ring for nominal thickness up to 2.6mm)

PRODUCTS ARE PACKED ACCORDING TO THE REQUIREMENT AND TYPICAL HOT ROLLED COIL PACKING IS DISPLAYED BELOW.

HR Packaging



MARKING OF HOT ROLLED COILS

Two labels, one on ID of the coil and the other on OD of the coil will have the following details. Manufacturer Name, Customer Name, Coil No., Heat No., Size (T x W in mm), Grade, Coil Weight. Typical Adhesive Label (refer to the adjacent figure)

Customer: _____

Coil No.: _____

Heat No.: _____

Size: _____

Grade: _____

Weight (MT): _____

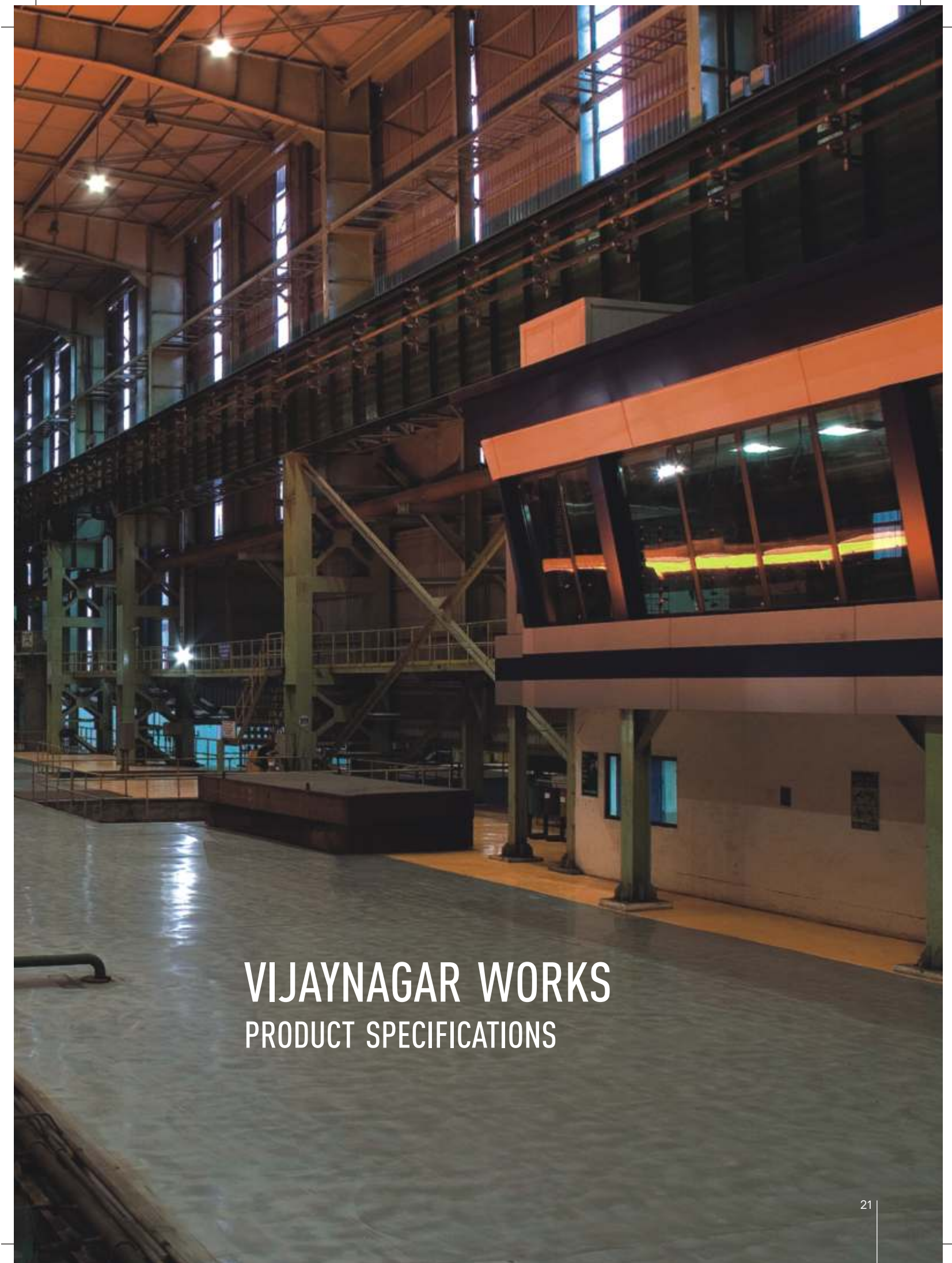
Inspection Date: _____ Class: Prime _____

Note: Packing and Marking are mutually agreed based on customer requirements.

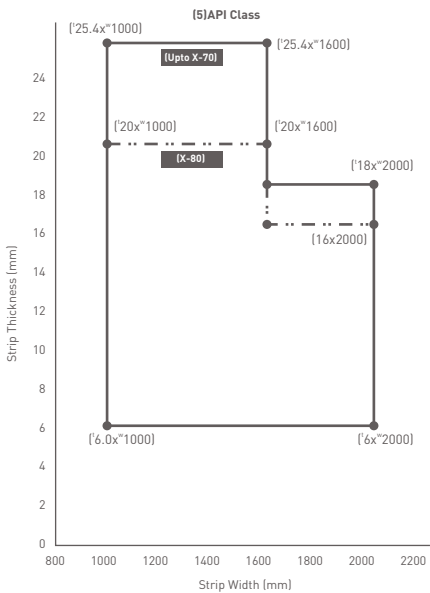
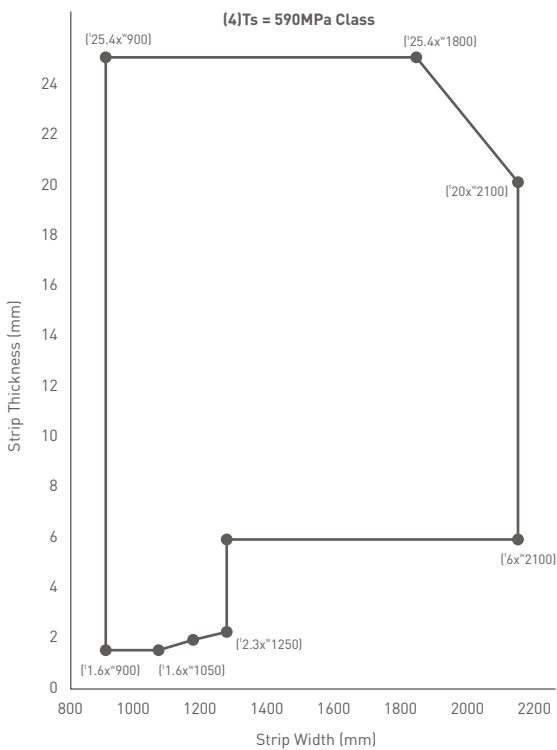
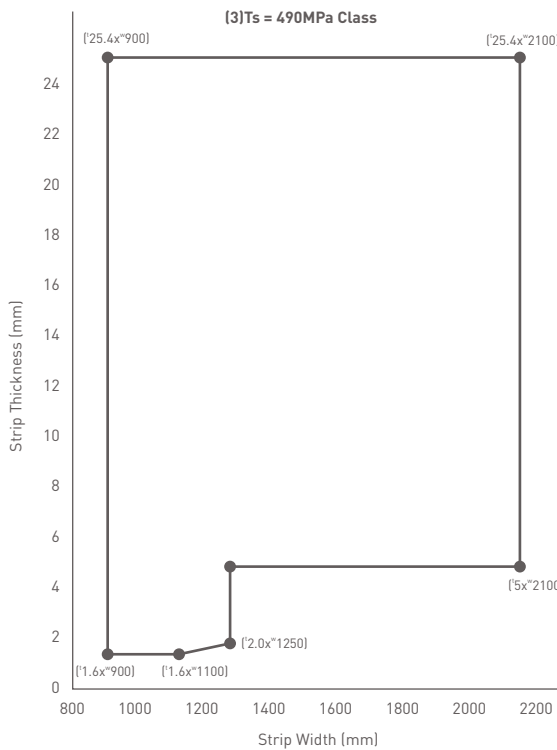
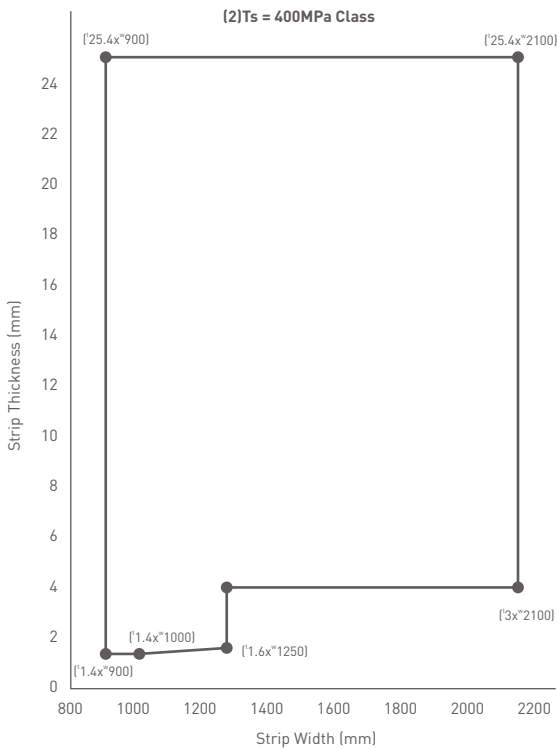
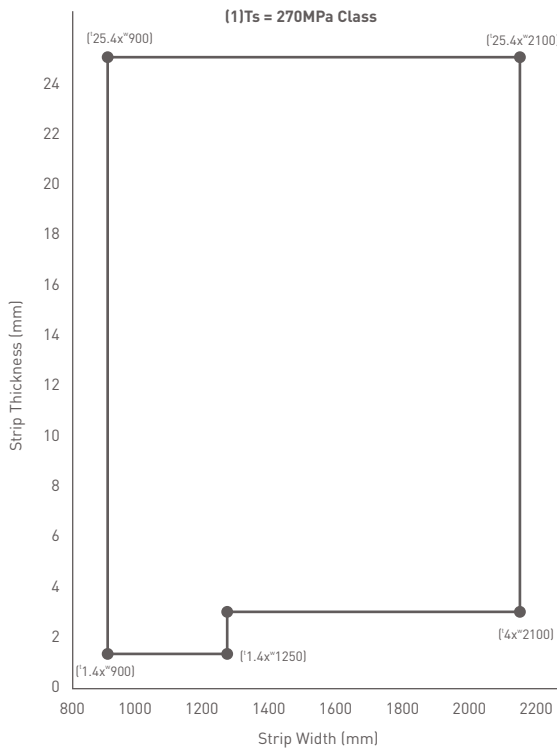
HOT ROLLED CUT TO LENGTH

Product Specification						
Product Range	CTL 5		CTL 6		CTL 7	
	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
Thickness (mm)	8	25.4	1.2	6	2.5	10
Width (mm)	900	2050	900	1600	900	2050
Length (mm)	1500	12000	1000	13000	1000	13000
Bundle Weight (tons)		6		15		15
Capacity (tons/annum)	350000		170000		250000	
Yield Strength	1) YS: ≤450Mpa & TS: ≤590Mpa (Mpa) Max (8.0-25.4mm) x (900-2050mm) 2) YS: 450-600Mpa & TS: 590-800Mpa (Mpa) Max(8.0-20.0mm) x (1000-2050mm) (20-22.0mm) x (1000-1600mm)		900		550	
Tensile Strength			1100		900	





PRODUCT RANGE:



PRODUCT CAPABILITY - HOT ROLLED COILS

Product/Grade		HSM-1	HSM-2
Cold Rolling/Welded Tube		1.6/1.8 x (900-1050) (2.0-3.0) x (900-1280) ≥3.0 x (900-1320)	(1.4-2.0) x (900-1250) (2.0-3.0) x (900-1500) ≥3.0 x (900-2100)
Plain Carbon Structural		1.6/1.8 x 900 (2.0-2.8) x (900-1100) ≥2.8 x (900-1250)	1.4/1.8 x (900-1250) (2.0-4.0) x (900-1500) (4.0-25.0) x (900-2100)
Medium Carbon Grade		(2.2-3.5) x (900-1000) (3.5-6.0) x (900-1150)	(2.2-3.5) x (900-1250) (3.5-6.0) x (900-1400)
High Tensile Grades (Fe 510)		(2.5-3.0) x (900-1000) (3.0-4.0) x (900-1100) ≥4.0 x (900-1250)	(1.6-2.0) x (900-1200) (2.0-3.0) x (900-1250) (3.0-6.0) x (900-1500) (6.0-25.0) x (900-2100)
High Tensile Grades (Fe 590)		(3.2-4.5) x (900-950)	(2.0-2.5) x (900-1200) (2.5-4.0) x (900-1250) (4.0-6.0) x (900-1500) (6.0-25.0) x (900-2100/2000)
API PSL 2 Grades	X42 / X46 / X52 / X56	(4.0-8.0) x (900-1250)	(4.0-6.0) x (1000-1500) (6.0-25.4) x (1000-2000)
	X60 / X65	(6.0-12.0) x (900-1250)	(4.0-8.0) x (1000-1500) (8.0-25.4) x (900-2000)
	X70	(7.0-12.0) x (900-1250)	(6.0-8.0) x (900-1500) (8.0-18.0) x (900-2000) (18.0-25.4) x (900-1600)
	X80	–	(8.0-16.0) x (900-2000) (16.0-20.0) x (900-1600)
Low Carbon, EDD, IF Steel		≥2.0 x (900-1300) for Low Carbon	(1.6-1.8) x (900-1250) ≥3.0 x (900-2100)
Dual Phase Steel / TRIP Steel		–	(3.0-5.0) x (900-1500) (5.0-6.5) x (900-1800)

RE-ROLLING (CRCA & GALVANISING APPLICATIONS)

Standard Specification		Chemical Composition (%)								
Equivalent Specification	Grade	C max	Mn max	S max	P max	Si max	Al	N max	Micro alloys max	CE max
S 11513	Grade D	0.12	0.50	0.035	0.035		0.02 min	0.012		
SAE J403	1010	0.08-0.13	0.30-0.60	0.050	0.030					
EN 10111	Dd11	0.12	0.60	0.045	0.045					
IS 11513	Grade DD	0.10	0.45	0.030	0.030		0.02 min	0.012		
SAE J403	1008	0.10	0.30-0.50	0.050	0.030					
EN 10111	Dd12	0.10	0.45	0.035	0.035					
IS 11513	Grade DD + B	0.10	0.45	0.030	0.030		0.02 min	0.012	B:15-50ppm	
IS 11513	Grade EDD	0.08	0.40	0.025	0.025		0.02 min	0.012		
SAE J403	1005	0.06	0.35	0.050	0.030					
SAE J403	1006	0.08	0.25-0.40	0.050	0.030					
EN 10111	DP13	0.08	0.40	0.030	0.030					
EN 10111	Dp14	0.08	0.35	0.025	0.025					
IS 11513	Grade EDD + B	0.08	0.40	0.025	0.025		0.02 min	0.012	B:15-50ppm	
SAE J403	10B05	0.06	0.35	0.050	0.030				B:8-40ppm	
SAE J403	10B06	0.08	0.25 - 0.40	0.050	0.030				B:8-40ppm	
IS 11513	Grade O	0.15	0.60	0.040	0.040		0.02 min	0.012		
SAE J403	1012	0.10-0.15	0.30-0.60	0.050	0.030					
SAE J403	1015	0.13-0.18	0.30-0.60	0.050	0.030					
IS 11513	Grade H	0.25	1.70	0.045	0.050		0.02 min	0.012		
SAE J403	1018	0.15-0.20	0.60-0.90	0.050	0.030					
IS 11513	Grade MA	0.16	1.60	0.025	0.025		0.02 min	0.012	0.20	

ELECTRICAL STAMPINGS AND FORMING

Standard Specification		Chemical Composition (%)								
Equivalent Specification	Grade	C max	Mn max	S max	P max	Si max	Al	N max	Micro alloys max	CE max
IS 1079	HR1	0.15	0.60	0.035	0.050	0.35	0.015 max	0.012		
IS 1079	Hr2	0.10	0.45	0.035	0.040	0.35	0.015 max	0.012		
IS 1079	Hr3	0.08	0.40	0.030	0.035	0.35	0.015 max	0.012		

MEDIUM CARBON GRADES

Standard Specification		Chemical Composition [%]									
Equivalent Specification	Grade	C max	Mn max	S max		Si max	Al	N max	Cr max	Microalloys max	CE max
SAE J403	1026	0.22-0.28	0.60-0.90	0.050	0.030						
JIS G4051	S28C	0.25-0.31	0.60-0.90	0.030	0.030	0.15-0.35			0.20		
SAE J403	1030	0.28-0.34	0.60-0.90	0.050	0.030						
SAE J403	1030 Mod	0.26-0.34	1.20-1.50	0.050	0.030						
JIS G4051	S30C	0.27-0.33	0.60-0.90	0.030	0.030	0.15-0.35			0.20		
SAE J403	1035	0.32-0.38	0.60-0.90	0.050	0.030				0.20		
SAE J403	1536	0.30-0.37	1.20-1.50	0.050	0.030				0.20		
JIS G4051	S35C	0.32-0.38	0.60-0.90	0.030	0.030	0.15-0.35			0.20		
SAE J403	1040 (Mc11) 1040 (Mc11)	0.37-0.44	0.60-0.90	0.050	0.030				0.20		
SAE J403	1541	0.36-0.44	1.35-1.65	0.050	0.030				0.20		
SAE J403	1042	0.40-0.47	0.60-0.90	0.050	0.030				0.20		
JIS G4051	S40C	0.37-0.43	0.60-0.90	0.030	0.030	0.15-0.35			0.20		
SAE J403	1045	0.43-0.50	0.60-0.90	0.050	0.030				0.30		
JIS G4051	S45C	0.42-0.48	0.60-0.90	0.030	0.030	0.15-0.35			0.30		
SAE J403	1050	0.48-0.55	0.60-0.90	0.050	0.030				0.20		
JIS G4051	S50C	0.47-0.53	0.60-0.90	0.030	0.030	0.15-0.35			0.20		
SAE J403	1055 (Mc12)	0.50-0.60	0.60-0.90	0.050	0.030				0.20		
JIS G4051	S55C	0.52-0.58	0.60-0.90	0.030	0.030	0.15-0.35			0.20		
SAE J403	1060	0.55-0.65	0.60-0.90	0.050	0.030				0.20		

STRUCTURAL, GENERAL ENGINEERING AND FORMING

Standard Specification		Chemical Composition (%)										
Equivalent Specification	Grade	C max	Mn max	S max	P max	Si max	Ai	N max	Micro alloys max	CE max	Tensile Test Direction	YS (Mpa) min
IS 5986	Grade 235 (Fe360)	0.17	1.00	0.040	0.040			0.012	0.20		T	235
EN 10025	S235JR	0.17	1.40	0.035	0.035			0.012		0.35	T	t≤16: 235 t≥16: 225 t≤16: 235 t≥16: 225 t≤16: 235 t≥16: 225
EN 10025	S235J0	0.17	1.40	0.030	0.030			0.012		0.35	T	t≤16: 235 t≥16: 225 t≤16: 235 t≥16: 225 t≤16: 235 t≥16: 225
EN 10025	S235J2	0.17	1.40	0.025	0.025			-		0.35	T	t≤16: 235 t≥16: 225 t≤16: 235 t≥16: 225 t≤16: 235 t≥16: 225
ASTM A1011	SS Grade 36 Type1	0.25	0.90	0.040	0.035				Ti: 0.025		L	250
ASTM A1018	SS Grade 36 Type1	0.25	1.50	0.040	0.035			0.014	Ti: 0.025		L	250
ASTM A1011	SS Grade 40	0.25	0.90	0.040	0.035				Ti: 0.025		L	275
ASTM A1018	SS Grade 40	0.25	1.50	0.040	0.035			0.014	Ti: 0.025		L	275
IS 2062	E250A	0.23	1.50	0.045	0.045	0.40		0.012	0.25	0.42	T	t≤20: 250 t≥20: 240 t≤20: 250 t≥20: 240 t≤20: 250 t≥20: 240
IS 2062	E250BR	0.22	1.50	0.045	0.045	0.40		0.012	0.25	0.41	T	t≤20: 250 t≥20: 240 t≤20: 250 t≥20: 240 t≤20: 250 t≥20: 240
IS 2062	E250B0	0.22	1.50	0.045	0.045	0.40		0.012	0.25	0.41	T	t≤20: 250 t≥20: 240 t≤20: 250 t≥20: 240 t≤20: 250 t≥20: 240
IS 2062	E250C	0.20	1.50	0.040	0.040	0.40		0.012	0.25	0.39	T	t≤20: 250 t≥20: 240 t≤20: 250 t≥20: 240 t≤20: 250 t≥20: 240
IS 5986	Grade 255 (Fe410)	0.20	1.30	0.040	0.040			0.012	0.20	0.42	T	255
JIS G3101	SS400			0.050	0.050						L	t≤16: 245 t≥16: 235 t≤16: 245 t≥16: 235
JIS G3106	SM400A	0.23	2.5xC mi	0.035	0.035						L	t≤16: 245 t≥16: 235 t≤16: 245 t≥16: 235
JIS G3106	SM400B	0.20	0.60-1.40	0.035	0.035	0.35		0.012			L	t≤16: 245 t≥16: 235 t≤16: 245 t≥16: 235
JIS G3106	SM400C	0.18	1.40	0.035	0.035	0.35		0.012		0.40	L	t≤16: 245 t≥16: 235 t≤16: 245 t≥16: 235
EN 10025	S275JR	0.21	1.50	0.035	0.035					0.40	T	t≤16: 275 t≥16: 265 t≤16: 275 t≥16: 265
EN 10025	S275J0	0.18	1.50	0.030	0.030					0.40	T	t≤16: 275 t≥16: 265 t≤16: 275 t≥16: 265
EN 10025	S275J2	0.18	1.50	0.025	0.025						T	t≤16: 275 t≥16: 265 t≤16: 275 t≥16: 265
ASTM A36	A36	0.25	t≥20: 0.8-1.20	0.050	0.040	0.40			Type1/2/3 or 5		T	250
ASTM A572	Grade 42	0.21	1.35	0.050	0.040	0.40					T	290
ASTM A1011	SS Grade 36 Type2	0.25	1.35	0.040	0.035				Ti: 0.025		L	250
ASTM A1011	SS Grade 45	0.25	1.35	0.040	0.035				Ti: 0.025		L	310
ASTM A1018	SS Grade 36 Type2	0.25	1.35	0.040	0.035			0.014	Ti: 0.025	0.43	L	250
IS 2062	E275A	0.23	1.50	0.045	0.045	0.40		0.012	0.25		T	t≤20: 275 t≥20: 265
IS 2062	E275BR	0.22	1.50	0.045	0.045	0.40		0.012	0.25	0.42	T	t≤20: 275 t≥20: 265
IS 2062	E275B0	0.22	1.50	0.045	0.045	0.40		0.012	0.25	0.41	T	t≤20: 275 t≥20: 265
IS 2062	E275C	0.20	1.50	0.040	0.040	0.40		0.012	0.25	0.39	T	t≤20: 275 t≥20: 265
IS 5986	Grade 325	0.20	1.30	0.040	0.040			0.012	0.20	0.42	T	325

Mechanical Properties (' t ' = thickness in mm & 'GL' = Gauge Length)						
UTS (Mpa) min	%El (min) GL: 50mm	%El (min) GL: 80mm	%El (min) GL: 5.65 √ (A)	Bend (180 deg)	Impact Temp C	Impact (J) min
360-470		t≤3: 19	t≥3: 26	t≤12: t t≥12: 2t		
t≤3: 360-510 t≥3: 360-510 t≤3: 360-510 t≥3: 360-510 t≤3: 360-510 t≥3: 360-510		1.5≤t≤2: 17 2≤t≤2.5: 18 2.5≤t≤3: 19	t≥3: 24t≥3: 24 24t≥3: 24	1t	20	27
t≤3: 360-510 t≥3: 360-510 t≤3: 360-510 t≥3: 360-510 t≤3: 360-510 t≥3: 360-510		1.5≤t≤2: 17 2≤t≤2.5: 18 2.5≤t≤3: 19	t≥3: 24t≥3: 24 24t≥3: 24	1t	0	27
t≤3: 360-510 t≥3: 360-510 t≤3: 360-510 t≥3: 360-510 t≤3: 360-510 t≥3: 360-510		1.5≤t≤2: 17 2≤t≤2.5: 18 2.5≤t≤3: 19	t≥3: 24t≥3: 24 24t≥3: 24	1t	-20	27
365	1.6≤t≤2.5: 21 2.5≤t≤6: 22		1.5t			
365	t≥6: 21t≥6: 21t≥6: 21 1.6≤t≤2.5: 20 2.5≤t≤6: 21		1.5t 2t			
380	t≥6: 19		2t			
380			23	2t		
410			23	2t	Room Temp	27
410			23	2t	0	27
410			23	2t	-20	27
410		t≤3: 17	t≥3: 24	t≤12: t t≥12: 2t		
410-520	t≤5: 21			1.5t		
400-510	t≤5: 23					
400-510	t≤5: 23				0	27
400-510	t≤5: 23				0	47
400-510		1.5≤t≤2: 15 2≤t≤2.5: 16 2.5≤t↓3: 17	t≥3: 21		20	27
t≤3: 430-580 t≥3: 410-560 t≤3: 430-580 t≥3: 410-560		1.5≤t≤2: 15 2≤t≤2.5: 16 2.5≤t≤3: 17	t≥3: 21		0	27
t≤3: 430-580 t≥3: 410-560 t≤3: 430-580 t≥3: 410-560		1.5≤t≤2: 15 2≤t≤2.5: 16 2.5≤t≤3: 17	t≥3: 21		-20	27
t≤3: 430-580 t≥3: 410-560 t≤3: 430-580 t≥3: 410-560	21					
400-550	22					
415	1.6≤t≤2.5: 20		2t	2t		
400-550	2.5≤t≤6: 21 1.6≤t≤2.5: 18		2t	2t		
410	2.5≤t≤6: 19 t≥6: 21		2t	2t		
400-550			22	2t		
430						
430			22	2t	Room Temp	27
430			22	2t	0	27
430			22	2t	-20	27
420-530	-		t≥3: 19	t≤12: 2t t≥12: 3t		

CHEQUERED SHEETS AND PLATES FOR STRUCTURAL USE

Standard Specification		Chemical Composition (%)								
Equivalent Specification	Grade	C max	Mn max	S max	P max	Si max	Ai	N max	Micro alloys max	CE max
IS 3502	E250A	0.23	1.50	0.045	0.045	0.40		0.012	0.25	0.42
EN 10025	S275JR	0.21	1.50	0.035	0.035			0.012		0.40
ASTM A36	A36	0.25		0.050	0.040	0.40				

Mechanical Properties (' t ' = thickness in mm & 'GL' = Gauge Length)							
	Tensile Test Direction	YS (Mpa) min	UTS (Mpa)	%El (min) GL: 5.65 √ (A)	Bend (180 deg)	Temp C	Impact (J) min
	T	250	410	23	2t		
	T	275	410-560	21		20	27
	T	250	400-550				

ATMOSHPERIC CORROSION RESISTANCE APPLICATIONS

Standard Specification		Chemical Composition (%)								
Equivalent Specification	Grade	C max	Mn max	S max	P max	Si max	Ai	N max	Micro alloys max	CE max
IRS-M41/97	NA	0.1	0.25 - 0.45	0.030	0.075-0.14	0.28-0.72	0.08 max		Cr: 0.35-0.60 Cu: 0.30-0.60 Ni: 0.20 - 0.47 V: 0.05, Nb: 0.04	
JIS G3125	SPA-H	0.12	0.20-0.50	0.040	0.07-0.15	0.25-0.75			Cr: 0.30-1.25 Cu: 0.25-0.60 Ni: 0.65	
EN 10025	S355J0WP	0.12	1	0.035	0.06-0.15	0.75		0.009	Cr: 0.30-1.25 Cu: 0.25-0.55 Ni: 0.65	
EN 10025	S355J2WP	0.12	1	0.035	0.06-0.15	0.75	0.02 min	0.009	Cr: 0.30-1.25 Cu: 0.25-0.55 Ni: 0.65	
ASTM	Corten A	0.12	0.20-0.50	0.030	0.01-0.20	0.25-0.75			Cr: 0.50-1.25 Cu: 0.25-0.55 Ni: 0.65, V: 0.05	

Mechanical Properties [' t ' = thickness in mm & 'GL' = Gauge Length]								
Tensile Test Direction	YS (Mpa) min	UTS (Mpa)	%El (min) GL: 50mm	%El (min) GL: 80mm	%El (min) GL: 5.65 √ (A)	Bend (180 deg)	Temp C	Impact (J) min
T	340	480			22	1t		
T	t≤6: 345 t≥6: 355	t≤6: 480 t≥6: 490	t≤6: 22		t≥6: 15	t≤6: 0.5t t≥6: 1.5t		
T	355	t≤3: 510-680 t≥3: 470-630		1.5≤t≤2: 14 2≤t≤2.5: 15 2.5≤t≤3: 16	t≥3: 20	2t	0	27
T	355	t≤3: 510-680 t≥3: 470-630		1.5≤t≤2: 14 2≤t≤2.5: 15 2.5≤t≤3: 16	t≥3: 20	2t	-20	27
T	340	480						

HIGH TENSILE STRUCTURAL AND FORMING APPLICATIONS

Standard Specification		Chemical Composition [%]										
Equivalent Specification	Grade	C max	Mn max	S max	P max	Si max	Ai	N max	Micro alloys max	CE max	Tensile Test Direction	YS (Mpa) min
IS 2062	E300A	0.20	1.50	0.045	0.045	0.45		0.012	0.25	0.44	T	t≤20: 300 t≥20: 290
IS 2062	E300BR	0.20	1.50	0.045	0.045	0.45		0.012	0.25	0.44	T	t≤20: 300 t≥20: 290
IS 2062	E300B0	0.20	1.50	0.045	0.045	0.45		0.012	0.25	0.44	T	t≤20: 300 t≥20: 290
IS 2062	E300C	0.20	1.50	0.040	0.040	0.45		0.012	0.25	0.44	T	t≤20: 300 t≥20: 290
IS 5986	Grade 355	0.20	1.50	0.035	0.035			0.012	0.20	0.45	T	355
ASTM A572	Grade 50	0.23 or 0.20	1.35 or 1.50	0.050	0.040	0.40			Type1 / 2 / 3 or 5		T	345
ASTM A1011	SS Grade 50	0.25 or 0.22	1.35 or 1.50	0.040	0.035				Ti: 0.025		L	340
IS 2062	E350A	0.20	1.55	0.045	0.045	0.45		0.012	0.25	0.47	T	t≤20: 350 t≥20: 330
IS 2062	E350BR	0.20	1.55	0.045	0.045	0.45		0.012	0.25	0.47	T	t≤20: 350 t≥20: 330
IS 2062	E350B0	0.20	1.55	0.045	0.045	0.45		0.012	0.25	0.47	T	t≤20: 350 t≥20: 330
IS 2062	E350C	0.20	1.55	0.040	0.040	0.45		0.012	0.25	0.45	T	t≤20: 350 t≥20: 330
IS 5986	Grade 420	0.20	1.50	0.035	0.035			0.012	0.20	0.45	T	420
JIS G3101	SS490			0.050	0.050				0.20		T	t≤16: 285 t≥16: 275
JIS G3106	SM490A	0.20	1.60	0.035	0.035	0.55			0.20		T	t≤16: 325 t≥16: 315
JIS G3106	SM490B	0.18	1.60	0.035	0.035	0.55			0.20		T	t≤16: 325 t≥16: 315
JIS G3106	SM490C	0.18	1.60	0.035	0.035	0.55			0.20		T	t≤16: 325 t≥16: 315
EN 10025	S355JR	0.24	1.60	0.035	0.035	0.55		0.012	1) With out MA or 2) MA: 0.201	0.45	T	t≤16: 355 t≥16: 345
EN 10025	S355J0	0.20	1.60	0.030	0.030	0.55		0.012	0.20	0.45	T	t≤16: 355 t≥16: 345
EN 10025	S355J2	0.20	1.60	0.025	0.025	0.55			0.20	0.45	T	t≤16: 355 t≥16: 345
EN 10025	S355K2	0.20	1.60	0.025	0.025	0.55			0.20	0.45	T	t≤16: 355 t≥16: 345
ASTM A572	Grade 55	0.25 or 0.20	1.35 or 1.60	0.050	0.040	0.40			Type1 / 2 / 3 or 5		T	380
ASTM A1011	SS Grade 55	0.25 or 0.22	1.35 or 1.50	0.040	0.035				Ti: 0.025		L	380
IS 2062	E410A	0.20	1.60	0.045	0.045	0.45		0.012	0.25	0.5	T	t≤20: 410 t≥20: 390
IS 2062	E410BR	0.20	1.60	0.045	0.045	0.45		0.012	0.25	0.5	T	t≤20: 410 t≥20: 390
IS 2062	E410B0	0.20	1.60	0.045	0.045	0.45		0.012	0.25	0.5	T	t≤20: 410 t≥20: 390
IS 2062	E410C	0.20	1.60	0.040	0.040	0.45		0.012	0.25	0.5	T	t≤20: 410 t≥20: 390
IS 5986	Grade 490	0.20	1.50	0.030	0.035			0.012	0.20	0.45	T	490
JIS G3101	SS540			0.050	0.050				0.20		T	t≤16: 400 t≥16: 390
ASTM A572	Grade 60	0.26 or 0.20	1.35 or 1.60	0.050	0.040	0.40			Type1 / 2 / 3 or 5		T	415
IS 2062	E450A	0.22	1.65	0.045	0.045	0.45		0.012	0.25	0.52	T	t≤20: 450 t≥20: 430
IS 2062	E450BR	0.22	1.65	0.045	0.045	0.45		0.012	0.25	0.52	T	t≤20: 450 t≥20: 430
ASTM A572	Grade 65	0.26 or 0.23	1.35 or 1.65	0.050	0.040	0.40			Type1 / 2 / 3 or 5		T	450

Mechanical Properties (' t ' = thickness in mm & 'GL' = Gauge Length)						
UTS (Mpa) min	%El (min) GL: 50mm	%El (min) GL: 80mm	%El (min) GL: 5.65 √ (A)	Bend (180 deg)	Impact Temp C	Impact (J) min
440			22	2t		
440			22	2t	Room Temp	27
440			22	2t	0	27
440			22	2t	-20	27
420-530			t≥3: 18	t ≤12: 2t t ≥12: 3tt		
450	19					
450	1.6≤t≤2.5: 16 2.5≤t≤6: 17			2.5t		
490			22	2t		
490			22	2t	Room Temp	27
490			22	2t	0	27
490			22	2t	-20	27
480-590			t≥3: 15	t ≤12: 2t t ≥12: 3tt		
490-610	t≤5: 19			2t		
490-610	t≤5: 22				0	27
490-610	t≤5: 22				0	47
490-610	t≤5: 22		t≥3: 20t≥3: 20	2t	20	27
t≤3: 510-680 t≥3: 470-630		1.5≤t≤2: 14 2≤t≤2.5: 15 2.5≤t≤3: 16	t≥3: 20t≥3: 20	2t	0	27
t≤3: 510-680 t≥3: 470-630		1.5≤t≤2: 14 2≤t≤2.5: 15 2.5≤t≤3: 16	t≥3: 20t≥3: 20	2t	-20	27
t≤3: 510-680 t≥3: 470-630		1.5≤t≤2: 14 2≤t≤2.5: 15 2.5≤t≤3: 16	t≥3: 20t≥3: 20	2t	-20	40
t≤3: 510-680 t≥3: 470-630		1.5≤t≤2: 14 2≤t≤2.5: 15 2.5≤t≤3: 16				
485	18					
480	1.6≤t≤2.5: 14 2.5≤t≤6: 15			3t		
540			20	2t		
540			20	2t	Room Temp	25
540			20	2t	0	25
540			20	2t	-20	25
540-650			t≥3: 12	t ≤12: 2t t ≥12: 3t		
540	t≤5: 16			2t		
520	16					
570			20	2.5t		
570			20	2.5t	Room Temp	20
550	15					

SIMPLE PRESSURE VESSELS

Standard Specification		Chemical Composition (%)								
Equivalent Specification	Grade	C max	Mn max	S max	P max	Si max	Al	N max	Micro alloys max	CE max
ASTM A285	Grade A	0.17	0.90	0.035	0.035					
ASTM A285	Grade B	0.22	0.90	0.035	0.035					
IS 6240	Grade 1	0.16	0.30 min	0.025	0.025	0.25	0.02 min	0.009	0.10	
IS 15914	HS 235	0.16	0.30 min	0.025	0.025	0.25	0.015 min	0.009	0.10	
EN 10120	P245NB	0.16	0.30 min	0.015	0.025	0.25	0.020 min	0.009	0.08	
ASTM A285	Grade C	0.28	0.90	0.035	0.035					
IS 15914	HS 265	0.18	0.40 min	0.025	0.025	0.30	0.015 min	0.009	0.10	
JIS G3116	SG255	0.20	0.30 min	0.030	0.030					
EN 10120	P265NB	0.19	0.40 min	0.015	0.025	0.25	0.020 min	0.009	0.08	
IS 15914	HS 295	0.19	0.50 min	0.025	0.025	0.35	0.015 min	0.009	0.10	
JIS G3116	SG295	0.20	1.00	0.030	0.030	0.35				
IS 15914	HS 345	0.20	0.70 min	0.025	0.025	0.45	0.015 min	0.009	0.10	
JIS G3116	Sg325	0.20	1.50	0.030	0.030	0.55				

BOILER TUBES AND PRESSURE VESSELS

Standard Specification		Chemical Composition (%)								
Equivalent Specification	Grade	C max	Mn max	S max	P max	Si max	Al	N max	Micro alloys max	CE max
IS 10748	Grade 2	0.12	0.60	0.040	0.040			0.012	0.20	
EN 10028	P235GH	0.16	0.40-1.20	0.015	0.025	0.35	0.020 min	0.012	0.07	
EN 10207	P235S	0.16	0.40-1.20	0.025	0.025	0.35	0.02 min			
ASTM A178	Grade A	0.06-0.18	0.27-0.63	0.035	0.035					
EN 10028	P265GH	0.20	0.60-1.40	0.015	0.025	0.40	0.020 min	0.012	0.07	
EN 10207	P265S	0.20	0.50-1.50	0.025	0.025	0.40	0.02 min			
ASTM A515	Grade 60	0.24	0.90	0.035	0.035	0.15-0.40				
ASTM A516	Grade 60	0.21	0.60-0.90/ 0.85-1.20	0.035	0.035	0.15-0.40				
	16Mo3	0.12-0.20	0.40-0.80	0.040	0.040	0.10-0.35	0.02 max		Mo: 0.25-0.35, Cr, Cu & Ni: 0.30	
EN 10028	16Mo3	0.12-0.20	0.40-0.90	0.010	0.025	0.35		0.012		
ASTM A515	Grade 65	0.28	0.90	0.035	0.035	0.15-0.40				
ASTM A516	Grade 65	0.24	0.85-1.20	0.035	0.035	0.15-0.40				
ASTM A515	Grade 70	0.31	1.20	0.035	0.035	0.15-0.40				
ASTM A516	Grade 70	0.27	0.85-1.20	0.035	0.035	0.15-0.40				

Mechanical Properties (' t ' = thickness in mm & 'GL' = Gauge Length)							
Tensile Test Direction	YS (Mpa) min	UTS (Mpa) min	%El (min) GL: 50mm	%El (min) GL: 80mm	%El (min) GL: 5.65 √ [A]	Bend (180 deg)	ECV (mm) min
T	165	310-450	30				
T	185	345-485	28				
T	240	350-450			25	1t	13.5
T	235	360-460			25		
T	245	360-450		t≤3: 26	3≤t≤5: 34		
T	205	380-515	27				
T	265	410-510			22		
L	255	400	28			1t	
T	265	410-500		t≤3: 24	3≤t≤5: 32		
T	295	450-560			20		
L	295	440	26			1.5t	
T	345	490-610			18		
L	325	490	22			1.5t	

Mechanical Properties (' t ' = thickness in mm & 'GL' = Gauge Length)								
Tensile Test Direction	YS (Mpa) min	UTS (Mpa) min	%El (min) GL: 50mm	%El (min) GL: 80mm	%El (min) GL: 5.65 √ [A]	Bend (180 deg)	Impact Temp C	Impact (J) min
T	210	330			28	21		
T	t≤16: 235	360-480			24		20	40
T	t≤16: 235 t≥16: 225	360-480		2≤t≤2.5: 20 2.5≤t≤3: 21	t≥3: 26t		-20	28
T	t≤16: 265	410-530			22		20	40
T	t≤16: 255 t≥16: 265	410-530		2≤t≤2.5: 17 2.5≤t≤3: 18	t≥3: 22t		-20	28
T	220	415-550	25					
T	220	415-550	25					
T	t≤275	440-590			22		20	31
T	240	450-585	23					
T	240	450-585	23					
T	260	485-620	21					
T	260	485-620	21					

LINE PIPES AND CASING & TUBING

Standard Specification		Chemical Composition (%)												
Equivalent Specification	Grade	C max	Mn max	S max	P max	Si max	Al	N max	V max	Nb max	Ti max	Others max	CE (IIW) max	CE (pcm) max
API 5L	Gr BM	0.22	1.2	0.015	0.025	0.45			0.05	0.05	0.040		0.43	0.25
API 5L	X 42M	0.22	1.3	0.015	0.025	0.45			0.05	0.05	0.040		0.43	0.25
API 5L	X 46M	0.22	1.3	0.015	0.025	0.45			0.05	0.05	0.040		0.43	0.25
API 5L	X 52M	0.22	1.4	0.015	0.025	0.45				0.15			0.43	0.25
API 5L	X 56M	0.22	1.4	0.015	0.025	0.45				0.15			0.43	0.25
API 5L	X 60M	0.12	1.6	0.015	0.025	0.45				0.15		Cr: 0.3	0.43	0.25
API 5L	X 65M	0.12	1.6	0.015	0.025	0.45				0.15		Cr: 0.3	0.43	0.25
API 5L	X 70M	0.12	1.7	0.015	0.025	0.45				0.15		Cr: 0.4, Mo: 0.25	0.43	0.25
API 5L	X 80M	0.12	1.85	0.015	0.025	0.45				0.15		Cr: 0.4, Mo: 0.25	0.43	0.25
API 5CT	J55			0.04	0.04					0.15				

Mechanical Properties (' t ' = thickness in mm & 'GL' = Gauge Length)							
YS (Mpa) min	UTS (Mpa) min	%El (min) GL: 50.8mm	YS/UTS max	Bend (180 deg)	Impact Temp C	Impact (J) min	Hardness max
245-450	415-655		0.93	2t	0	40	HV 248
290-495	415-655		0.93	2t	0	40	HV 248
320-525	435-655		0.93	2t	0	40	HV 248
360-530	460-760		0.93	2t	0	50	HV 248
390-545	490-760		0.93	2t	0	50	HV 248
415-565	520-760		0.93	2t	0	50	HV 248
450-600	535-760		0.93	2t	0	55	HV 248
485-635	570-760		0.93	3t	0	70	HV 248
555-705	625-825		0.93	3t	0	70	HV 248
379-552	517		0.93	2t	0	40	HV 248

ALLOYED STEELS

Standard Specification		Chemical Composition (%)											
Equivalent Specification	Grade	C max	Mn max	S max	P max	Si max	Al	N max	Cr max	Ni max	Cu max	Mo max	Micro alloys max
EN 10132	16MnCr5	0.14-0.19	1.00-1.30	0.035	0.035	0.40			0.80-1.10				
	15Cr3	0.12-0.18	0.40-0.60			0.15-0.35			0.50-0.80				
	50CrV4	0.45-0.55	0.70-1.10	0.035	0.035	0.15-0.40			0.90-1.20				V: 0.10-0.20
EN 10083	51CrV4	0.47-0.55	0.70-1.10	0.035	0.035	0.40			0.90-1.20				V: 0.10-0.25
SAE J404	6150	0.48-0.53	0.70-0.90	0.040	0.035	0.15-0.35			0.80-1.10				V: 0.15min
	58CrV4	0.55-0.62	0.70-1.10	0.035	0.035	0.15-0.40			0.90-1.20				V: 0.10-0.25
JIS G4105	SCM415	0.13-0.18	0.60-0.85	0.030	0.030	0.15-0.35			0.90-1.20			0.15-0.30	
JIS G4105	SCM420	0.18-0.23	0.60-0.85	0.030	0.030	0.15-0.35			0.90-1.20			0.15-0.30	
JIS G4105	SCM435	0.33-0.38	0.60-0.85	0.030	0.030	0.15-0.35			0.90-1.20			0.15-0.30	
EN 10083	34CrMo4	0.30-0.37	0.60-0.90	0.035	0.035	0.40			0.90-1.20			0.15-0.30	
SAE J404	4135	0.33-0.38	0.70-0.90	0.040	0.030	0.15-0.35			0.80-1.10			0.15-0.25	
EN 10083	20MnB5	0.17-0.23	1.10-1.40	0.040	0.035	0.40							B: 0.0008-0.005
SAE J403	15B21	0.18-0.23	1.10-1.40	0.050	0.030								B: 0.0005-0.003
	22MnB5	0.19-0.25	1.10-1.40	0.040	0.035	0.40			0.35				B: 0.0008-0.005
													Ti: 0.025 max
SAE J403	15B22	0.19-0.24	1.10-1.40	0.050	0.030				0.30				B: 0.0005-0.003
	26MnB5	0.23-0.28	1.10-1.40	0.040	0.035	0.40			0.35				B: 0.0008-0.005
													Ti: 0.05 max
SAE J403	15B26	0.22-0.29	1.10-1.40	0.050	0.030				0.30				
EN 10083	30MnB5	0.27-0.33	1.15-1.45	0.040	0.035	0.40							B: 0.0005-0.003
SAE J404	8620	0.18-0.23	0.70-0.90	0.040	0.030	0.15-0.35			0.40-0.60	0.40-0.70		0.15-0.25	B: 0.0008-0.005

Notes

- 1 When the steel is aluminium killed, the total aluminium content shall not be less than 0.02 percent. When the steel is silicon killed, the silicon content shall not be less than 0.10 percent. When the steel is aluminium silicon killed, the silicon content shall not be less than 0.03 percent and total aluminium content shall not be less than 0.01 percent.
- 2 When copper bearing steel is required the copper content shall be between 0.20 and 0.35 percent.
- 3 Classes for the suitability of hot dip galvanizing (for guidance)
Class1 - ≥ Si: 0.03 max and Si+2.5P: 0.09 max
Class2 - ≥ Si: 0.35 max
Class3 - ≥ Si: 0.14 - 0.25 and P: 0.035 max
- 4 Carbon Equivalent (CE) = C + Mn/6 + (Cr+Mo+V)/5 + (Ni+Cu)/15
CE (PCM) = C+Si/30+Mn/20+Cu/20+Ni/60+Cr/20+Mo/15+V/10+5B
- 5 Customized composition and properties may be mutually agreed upon between the purchaser and the supplier.
- 6 Project Orders technical parameters shall be mutually agreed based on the clients requirements
- 7 The values given here are indicative, however the final will be as per standard requirements or mutual agreement.

DRAWING AND PRESS FORMING

Standard Specification		Chemical Composition (%)										
Equivalent Specification	Grade	C max	Mn max	S max	P max	Si max	Ai	N max	Micro alloys max	CE max	Tensile Test Direction	YS (Mpa) min
IS 1079	HR1	0.15	0.60	0.035	0.050		0.02 min	0.012			T	
IS 5986	Grade 165	0.12	0.60	0.040	0.040			0.012	0.20		T	165
EN 10111	DD11	0.12	0.60	0.045	0.045				Ti: 0.025 B: 0.003		T	1.5≤t≤2: 170-360 2≤t≤8: 170-340
IS 1079	HR2	0.10	0.45	0.035	0.040		0.02 min	0.012	Ti: 0.025 B: 0.003		T	
JIS G3131	SPHC	0.15	0.60	0.050	0.050						L	
EN 10111	DD12	0.10	0.45	0.035	0.035				Ti: 0.025 B: 0.003		T	1.5≤t≤2: 170-340 2≤t≤8: 170-320
ASTM A1011	DS Type A	0.08	0.50	0.030	0.020		0.01 min		Ti: 0.025		L	
ASTM A1011	DS Type B	0.02-0.08	0.50	0.030	0.020		0.01 min		Ti: 0.025		L	
IS 1079	HR3	0.08	0.40	0.030	0.035		0.02 min	0.012	Ti: 0.025 B: 0.003		T	
JIS G3131	SPHD	0.10	0.50	0.040	0.040						L	
EN 10111	DD13	0.08	0.40	0.030	0.030				Ti: 0.025 B: 0.003		T	1.5≤t≤2: 170-330 2≤t≤8: 170-310
IS 1079	HR4	0.08	0.35	0.030	0.030		0.02 min	0.012	Ti: 0.025 B: 0.003		T	
JIS G3131	SPHE	0.10	0.50	0.035	0.030						L	
EN 10111	DD14	0.08	0.35	0.025	0.025				Ti: 0.025 B: 0.003		T	1.5≤t≤2: 170-310 2≤t≤8: 170-290
IS 1079	HR0	0.25	1.70	0.045	0.050			0.012			T	
IS 5986	Grade 205 [Fe330]	0.15	0.80	0.040	0.040			0.012	0.20		T	205
JIS G3101	SS330			0.050	0.050						L	t≤16: 205 t≥16: 195
SAE J403	1012	0.10-0.15	0.30-0.60	0.050	0.030							
IS 5986	Grade 235 [Fe360]	0.17	1.00	0.040	0.040			0.012	0.20		T	235
JIS G3113	SAPH370			0.040	0.040						L	t≤6: 225 6≤t≤8: 225 8≤t≤14: 215
EN 10025	S235JR	0.17	1.40	0.035	0.035			0.012		0.35	T	t≤16: 235 t≥16: 225
EN 10025	S235J0	0.17	1.40	0.030	0.030			0.012		0.35	T	t≤16: 235 t≥16: 225
EN 10025	S235J2	0.17	1.40	0.025	0.025			-		0.35	T	t≤16: 235 t≥16: 225

Mechanical Properties (' t ' = thickness in mm & ' GL ' = Gauge Length)						
UTS (Mpa) min	%El (min) GL: 50mm	%El (min) GL: 80mm	%El (min) GL: 5.65 √ (A)	Bend (180 deg)	Impact Temp °C	Impact (J) min
270-440	t≤3: 24t≥3: 29	t≤3: 23	t≥3: 28	2t		
290-400		t≤3: 22	t≥3: 30	t≤12: closet ≥12: 1t		
440 max		1.5≤t≤2: 23 2≤t≤3: 24	3≤t≤8: 28	1t		
270-420	"t≤3: 26t≥3: 31"	t≤3: 25	t≥3: 30	1t		
270	1.2≤t≤1.6: 27 1.6≤t≤3.2: 29 t≤3.2: 31			t≥3.2: Close t≥3.2: 0.5t		
420 max		1.5≤t≤2: 25 2≤t≤3: 26	3≤t≤8: 30	Close		
270-400	"t≤3: 29t≥3: 34"	t≤3: 28	t≥3: 33	Close		
270	1.2≤t≤1.6: 30 1.6≤t≤2: 32 2≤t≤2.5: 33 2.5≤t≤3.2: 35 3.2≤t≤4.0: 37 t≥4.0: 39					
400 max		1.5≤t≤2: 28 2≤t≤3: 29	3≤t≤8: 33	Close		
270-380	t≤3: 32 t≥3: 37	t≤3: 31	t≥3: 36	Close		
270	1.2≤t≤1.6: 31 1.6≤t≤2: 33 2≤t≤2.5: 35 2.5≤t≤3.2: 37 3.2≤t≤4.0: 39 t≥4.0: 41			-		
380 max		1.5≤t≤2: 31 2≤t≤3: 32	3≤t≤8: 36	Close		
				2t		
330-440		t≤3: 20	t≥3: 28	t≤12: tt≥12: 2t		
330-430	t≤5: 26			0.5t		
360-470		t≤3: 19	t≥3: 26	"t≤12: tt≥12: 2t"		
370	1.6≤t≤2: 32 2≤t≤2.5: 33 2.5≤t≤3.15: 353 .15≤t≤4: 36 4≤t≤6.3: 37	t≥6.3: 25 on GL: 200mm		t≤2: 0.5t t≥2: 1t		
t≤3: 360-510 t≥3: 360-510		t≥1.5 ≤2: 17 t≥2 ≤2.5: 18 t≥2.5 ≤3: 19	t≥3: 24	1t	20	27
t≤3: 360-510 t≥3: 360-510	t≥1.5 ≤2: 17	t≥3: 24 t≥2 ≤2.5: 18 t≥2.5 ≤3: 19	1t	0	27	
t≤3: 360-510 t≥3: 360-510	t≥1.5 ≤2: 17	t≥3: 24 t≥2 ≤2.5: 18 t≥2.5 ≤3: 19	1t	-20	27	

DRAWING AND PRESS FORMING

Standard Specification		Chemical Composition (%)										
Equivalent Specification	Grade	C max	Mn max	S max	P max	Si max	Ai	N max	Micro alloys max	CE max	Tensile Test Direction	YS (Mpa) min
SAE J403	1015	0.13-0.18	0.30-0.60	0.050	0.030							
IS 2062	E250A	0.23	1.50	0.045	0.045	0.40		0.012	0.25	0.42	T	t≤20: 250 t≥20: 240
IS 5986	Grade 255 [Fe410]	0.20	1.30	0.040	0.040			0.012	0.20	0.42	T	255
JIS G3101	SS400			0.050	0.050						L	t≤16: 245 t≥16: 235
JIS G3113	SAPH400			0.040	0.040						L	"t≤6: 255 6≤t≤8: 235 8≤t≤14: 235
EN 10025	S275JR	0.21	1.50	0.035	0.035			0.012		0.40	T	t≤16: 275 t≥16: 265
EN 10025	S275J0	0.18	1.50	0.030	0.030			0.012		0.40	T	t≤16: 275 t≥16: 265
EN 10025	S275J2	0.18	1.50	0.025	0.025			-		0.40	T	t≤16: 275 t≥16: 265
SAE J403	1018	0.15-0.20	0.60-0.90	0.050	0.030							
ASTM A36	A36	0.25	t≥20: 0.8-1.20	0.050	0.040	0.40					T	250
IS 2062	E275A	0.23	1.50	0.045	0.045	0.40		0.012	0.25	0.43	T	t≤20: 275 t≥20: 265
IS 2062	E300A	0.20	1.50	0.045	0.045	0.45		0.012	0.25	0.44	T	t≤20: 300 t≥20: 290
JIS G3113	SAPH440			0.040	0.040						L	t≤6: 305 6≤t≤8: 295 8≤t≤14: 275
SAE J403	1020	0.18-0.23	0.30-0.60	0.050	0.030							
SAE J403	1021	0.18-0.23	0.60-0.90	0.050	0.030							
ASTM A1011	HSLAS Grade 50 Class1	0.23 or 0.20	1.35 or 1.50	0.040	0.040				Nb/V/Ti: 0.005 min		L	340
ASTM A1018	HSLAS Grade 50 Class1	0.23	1.50	0.040	0.040				Nb/V/Ti: 0.005 min		L	340
IS 2062 JIS G3134	E350A SPFH490	0.20	1.55	0.045	0.045	0.45		0.012	0.25	0.47	T T	t≤20: 350 t≥20: 330 325
ASTM A1011	HSLAS Grade 55 Class1	0.25 or 0.22	1.35 or 1.50	0.040	0.040				Nb/V/Ti: 0.005 min		L	380
ASTM A1018	HSLAS Grade 55 Class1	0.25	1.50	0.040	0.040				"Nb/V/Ti: 0.005 min		L	380
IS 2062	E410A	0.20	1.60	0.045	0.045	0.45		0.012	0.25	0.5	T	t≤20: 410 t≥20: 390
JIS G3134	SPFH540										T	355

Mechanical Properties (' t ' = thickness in mm & ' GL ' = Gauge Length)						
UTS (Mpa) min	%El (min) GL: 50mm	%El (min) GL: 80mm	%El (min) GL: 5.65 √ (A)	Bend (180 deg)	Impact Temp °C	Impact (J) min
410			23	2t		
410-520		t≤3: 17	t≥3: 24	t≤12: t t≥12: 2t		
400-510	t≤5: 21			1.5t		
400	1.6≤t≤2: 31 2≤t≤2.5: 32 2.5≤t≤3.15: 34 3.15≤t≤4: 35 4≤t≤6.3: 36	t≥6.3: 24 on GL: 200mm		1t		
t≤3: 430-580 t≥3: 410-560 t≥2.5 ≤3: 17		t≥1.5 ≤2: 15 t≥2 ≤2.5: 16	t≥3: 21	2t	20	27
t≤3: 430-580 t≥3: 410-560		t≥1.5 ≤2: 15 t≥2 ≤2.5: 16 t≥2.5 ≤3: 17	t≥3: 21	2t	0	27
t≤3: 430-580 t≥3: 410-560		t≥1.5 ≤2: 15 t≥2 ≤2.5: 16 t≥2.5 ≤3: 17	t≥3: 21	2t	-20	27
400-550	21					
430			22	2t		
440			22	2t		
440	1.6≤t≤2: 29 2≤t≤2.5: 30 2.5≤t≤3.15: 32 3.15≤t≤4: 33 4≤t≤6.3: 34	t≥6.3: 22 on GL: 200mm		t≤2: 1t t≥2: 1.5t		
450	t≤2.5: 20 t≥2.5: 22			2t		
450	t≥6: 20			2t		
490 490	1.6≤t≤2: 22 2≤t≤2.5: 23 2.5≤t≤3.25: 24 3.25≤t≤6: 25		22	2t 1.6≤t≤3.25: 0.5t 3.25≤t≤6: 1t		
480	t≤2.5: 18 t≥2.5: 20			2t		
480	t≥6: 18			2t		
540			20	2t		
540	1.6≤t≤2: 21 2≤t≤2.5: 22 2.5≤t≤3.25: 23 3.25≤t≤6: 24			1.6≤t≤3.25: 1t 3.25≤t≤6: 1.5t		

DRAWING AND PRESS FORMING

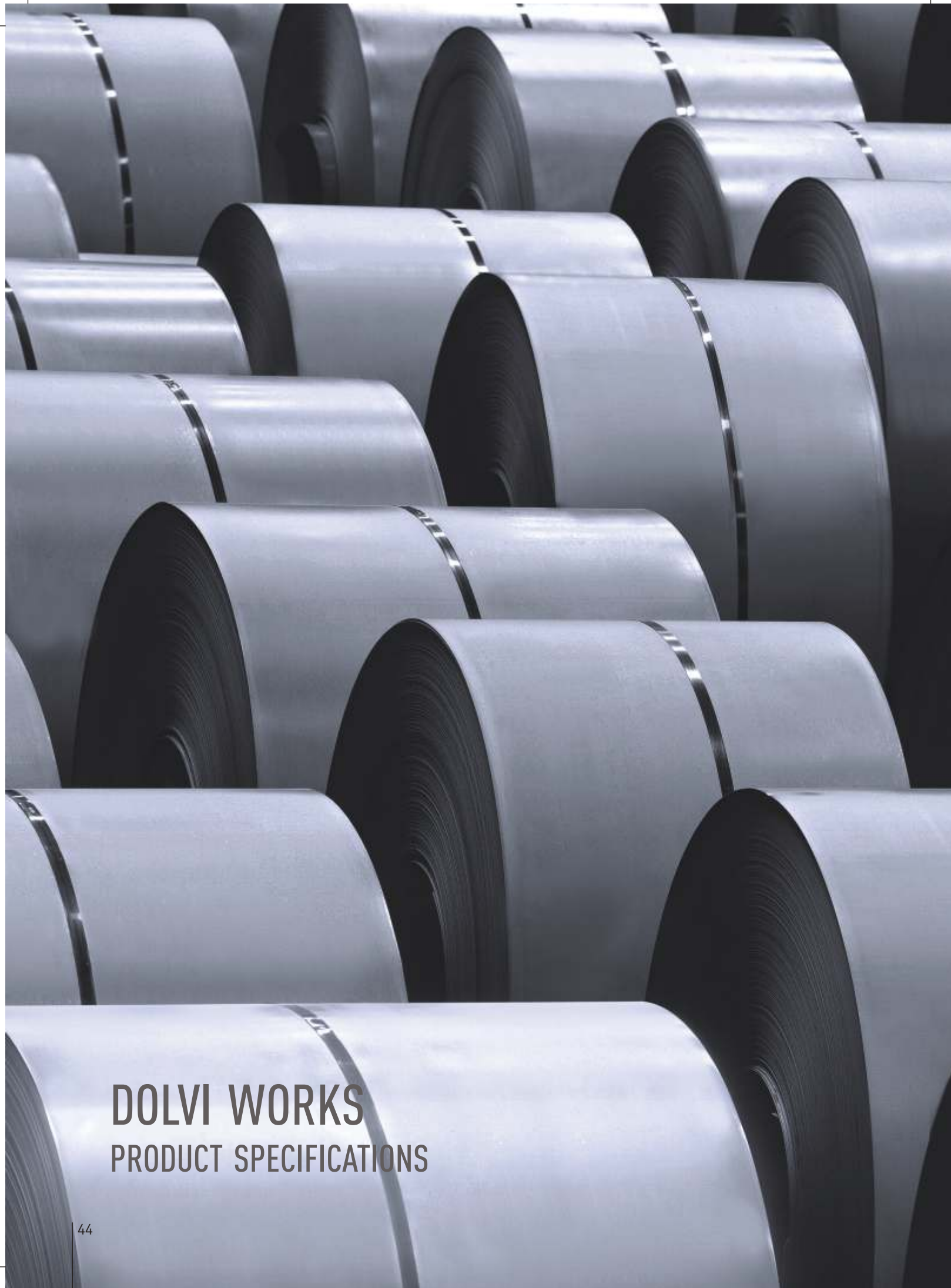
Standard Specification		Chemical Composition (%)										
Equivalent Specification	Grade	C max	Mn max	S max	P max	Si max	Ai	N max	Micro alloys max	CE max	Tensile Test Direction	YS (Mpa) min
ASTM A1011	HSLAS Grade 60 Class1	0.26	1.50	0.040	0.040				Nb/V/Ti: 0.005 min		L	410
ASTM A1018	HSLAS Grade 60 Class1	0.26	1.50	0.040	0.040				Nb/V/Ti: 0.005 min		L	410
IS 2062	E450A	0.22	1.65	0.045	0.045	0.45		0.012	0.25	0.52	T	t≤20: 450 t≥20: 430
JIS G3134	SPFH590										T	420
ASTM A1011	HSLAS Grade 65 Class1	0.26	1.50	0.040	0.040				Nb/V/Ti: 0.005 min		L	450
ASTM A1018	HSLAS Grade 65 Class1	0.26	1.50	0.040	0.040				Nb/V/Ti: 0.005 min		L	450
IS 1079	HR5_MA_YST255	0.16	1.60	0.020	0.020		0.02 min	0.012	0.20		T	
IS 1079	HR5_MA_YST305	0.16	1.60	0.020	0.020		0.02 min	0.012	0.20		T	
ASTM A1011	HSLAS Grade 45 Class2	0.15	1.35	0.040	0.040				Nb/V/Ti: 0.005 min		L	310
ASTM A1018	HSLAS Grade 45 Class2	0.15	1.50	0.040	0.040				Nb/V/Ti: 0.005 min		L	310
EN 10149	S315MC [E34]	0.12	1.30	0.020	0.025	0.50	0.015 min		0.22		L	315(340)
ASTM A1011	HSLAS Grade 45 Class1	0.22 or 0.20	1.35 or 1.45	0.040	0.040				Nb/V/Ti: 0.005 min		L	310
ASTM A1018	HSLAS Grade 45 Class1	0.22	1.50	0.040	0.040				Nb/V/Ti: 0.005 min		L	310
IS 1079	HR5_MA_YST340	0.16	1.60	0.020	0.020		0.02 min	0.012	0.20		T	
IS 5986	Grade 325	0.20	1.30	0.040	0.040			0.012	0.20	0.42	T	325
ASTM A1011	HSLAS Grade 50 Class2	0.15	1.35	0.040	0.040				Nb/V/Ti: 0.005 min		L	340
ASTM A1018	HSLAS Grade 50 Class2	0.15	1.50	0.040	0.040				Nb/V/Ti: 0.005 min		L	340
IS 5986	Grade 355	0.20	1.50	0.035	0.035			0.012	0.20	0.45	T	355
EN 10149	S355MC [E38]	0.12	1.50	0.020	0.025	0.50	0.015 min		0.22		L	355(380)
IS 1079	HR5_MA_YST380	0.16	1.60	0.020	0.020		0.02 min	0.012	0.20		T	

Mechanical Properties (' t ' = thickness in mm & 'GL' = Gauge Length)						
UTS (Mpa) min	%El (min) GL: 50mm	%El (min) GL: 80mm	%El (min) GL: 5.65 √ (A)	Bend (180 deg)	Impact Temp °C	Impact (J) min
520	t≤2.5: 16 t≥2.5: 18			2.5t		
520	t≥6: 16			2.5t		
570			20	2.5t		
590	1.6≤t≤2: 19 2≤t≤2.5: 20 2.5≤t≤3.25: 21 3.25≤t≤6: 22			1.5t		
550	t≤2.5: 14 t≥2.5: 16			3t		
550	t≥6: 14			3t		
320-400	t≥3: 31		t≥3: 30			
370-460	t≥3: 29		t≥3: 28			
380	t≤2.5: 23 t≥2.5: 25			1.5t		
380	t≥6: 22			1.5t		
390-510		t≤3: 20	t≥3: 24	Close		
410	t≤2.5: 23 t≥2.5: 25			1.5t		
410	t≥6: 22			1.5t		
400-500	t≥3: 27		t≥3: 26			
420-530		-	t≥3: 19	t≤12: 2tt≥12: 3t		
410	t≤2.5: 20t≥2.5: 22 t≥2.5: 25			1.5t		
410	t≥6: 20 t≥2.5: 25			1.5t		
420-530		-	t≥3: 18	t≤12: 2tt≥12: 3t		
430-550		t≤3: 19	t≥3: 23	0.5t		
450-570	t≥3: 25		t≥3: 24			

DRAWING AND PRESS FORMING

Standard Specification		Chemical Composition (%)										
Equivalent Specification	Grade	C max	Mn max	S max	P max	Si max	Ai	N max	Micro alloys max	CE max	Tensile Test Direction	YS (Mpa) min
ASTM A1011	HSLAS Grade 55 Class2	0.15	1.35	0.040	0.040				Nb/V/Ti: 0.005 min		L	380
ASTM A1018	HSLAS Grade 55 Class2	0.15	1.50	0.040	0.040				Nb/V/Ti: 0.005 min		L	380
IS 5986	Grade 420	0.20	1.50	0.035	0.035			0.012	0.20	0.45	T	420
EN 10149	S420MC(E42)	0.12	1.60	0.015	0.025	0.50	0.015 min		0.22		L	420(420)
ASTM A1011	HSLAS Grade 60 Class2	0.15	1.50	0.040	0.040				Nb/V/Ti: 0.005 min		L	410
ASTM A1018	HSLAS Grade 60 Class2	0.15	1.50	0.040	0.040				Nb/V/Ti: 0.005 min		L	410
IS 1079	HR5_MA_YST450	0.16	1.60	0.020	0.020		0.02 min	0.012	0.20		T	
EN 10149	S460MC (BSK46/E46)	0.12	1.60	0.015	0.025	0.50	0.015 min		0.22		L	460(460)
ASTM A1011	HSLAS Grade 65 Class2	0.15	1.50	0.040	0.040				Nb/V/Ti: 0.005 min		L	450
ASTM A1018	HSLAS Grade 65 Class2	0.15	1.50	0.040	0.040				Nb/V/Ti: 0.005 min		L	450
IS 1079	HR5_MA_YST500	0.16	1.60	0.020	0.020		0.02 min	0.012	0.20		T	
IS 5986	Grade 490	0.20	1.50	0.030	0.035			0.012	0.20	0.45	T	490
EN 10149	S500MC	0.12	1.70	0.015	0.025	0.50	0.015 min		0.22		L	500
EN 10149	S550MC	0.12	1.80	0.015	0.025	0.50	0.015 min		0.22		L	550
EN 10149	S600MC	0.12	1.90	0.015	0.025	0.50	0.015 min		NB+V+Ti: 0.22 Mo: 0.50		L	600
EN 10149	S650MC	0.12	2.00	0.015	0.025	0.60	0.015 min		NB+V+Ti: 0.25 Mo: 0.50		L	t≤8: 650 t≥8: 630
EN 10149	S700MC	0.12	2.10	0.015	0.025	0.60	0.015 min		NB+V+Ti: 0.26 Mo: 0.50		L	t≤8: 700 t≥8: 680
IS 1079	HR5_DP 590	0.16	2.00	0.020	0.050			0.012	MA: 0.15 Cr+Mo: 1.0		T	

Mechanical Properties (' t ' = thickness in mm & ' GL ' = Gauge Length)						
UTS (Mpa) min	%El (min) GL: 50mm	%El (min) GL: 80mm	%El (min) GL: 5.65 √ (A)	Bend (180 deg)	Impact Temp °C	Impact (J) min
450	t≤2.5: 18t≥2.5: 20 t≥2.5: 25		2t			
450	t≥6: 18			2t		
480-590		-	t≥3: 15	t≤12: 2t t≥12: 3t		
480-620		t≤3: 16	t≥3: 19	0.5t		
480	t≤2.5: 16 t≥2.5: 18			2t		
480	t≥6: 16			2t		
500-620	t≥3: 21		t≥3: 20			
520-670		t≤3: 14	t≥3: 17	1t		
520	t≤2.5: 14 t≥2.5: 16			2.5t		
520	t≥6: 14			2.5t		
550-680	t≥3: 18		t≥3: 17			
540-650		-	t≥3: 12	t≤12: 2t t>12: 3t		
550-700		t≤3: 12	t≥3: 14	1t		
600-760		t≤3: 12	t≥3: 14	1.5t		
650-820		t≤3: 11	t≥3: 13	1.5t		
700-880		t≤3: 10	t≥3: 12	2t		
750-950		t≤3: 10	t≥3: 12	2t		
590	13	t≤3: 15	t≥3: 15			



DOLVI WORKS
PRODUCT SPECIFICATIONS



COLD ROLLING AND GALVANISING

Equivalent Grade					Dimensional Scope		Chemical (% Max unless				
BIS	JIS	EN	SAE/ ASTM	Others	Thickness (mm)	Width (mm)	C	Mn	S	P	Si
IS 11513 Gr EDD			SAE 1006		1.51 - 12.0 1.80 - 12.0	900 - 1270 1271 - 1560	0.05	0.1 - 0.15	0.02	0.02	0.03
IS 11513 Gr EDD			SAE 1006		1.50 - 12.0 1.80 - 12.0 2.0 - 12.0	900 - 1250 1251 - 1350 1351 - 1560	0.05	0.1 - 0.15	0.02	0.02	0.03
IS 1079 Gr EDD			SAE1006		1.5 - 5.0 1.8 - 5.0 2.0 - 5.0	900 - 1250 1251 - 1350 1351 - 1560	0.07	0.3	0.025	0.025	0.05
IS 11513 Gr EDD				DIN 1614 Pt.1 St 24	1.5 - 12.0 1.6 - 12.0 2.0 - 12.0	900 - 1250 1251 - 1350 1351 - 1560	0.08	0.15	0.01	0.02	0
IS 11513 Gr EDD				DIN 1614 Pt.1 St 24	1.5 - 12.0 1.8 - 12.0 2.0 - 12.0	900 - 1250 1251 - 1350 1351 - 1560	0.08	0.4	0.03	0.03	0
Is11513 Gr EDD				DIN1614 Pt.1 St24	1.5 - 12.0 1.8 - 12.0 2.0 - 12.0	900 - 1250 1251 - 1350 1351 - 1560	0.045	0.4	0.03	0.03	0
IS 11513 EDD			SAE 1006	DIN 1614 Pt.1 St 24	1.5 - 12.0 1.8 - 12.0 2.0 - 12.0	900 - 1270 1271 - 1350 1351 - 1560	0.08	0.4	0.03	0.03	0
Is11513 Gr EDD			SAE1006	DIN1614 Pt.1 St24	1.5 - 12.0 1.8 - 12.0 2.0 - 12.0	900 - 1350 1250 - 1251 1351 - 1560	0.05	0.4	0.03	0.03	0
				[Thyssen Krupp Electrical]	1.5 - 12.0 1.8 - 12.0 2.0 - 12.0	900 - 1250 1251 - 1350 1351 - 1560	0.05	0.18- 0.4	0.02	0.025	0.03
Is11513 Gr EDD		EN 10111 Dd11	SAE1006	DIN1614 Pt.1 St24	1.5 - 7.0 1.8 - 7.0 2.0 - 7.0	900 - 1250 1251 - 1450 1451 - 1560	0.06	0.4	0.03	0.03	0
			SAE 1006R		1.6 - 12.0 1.8 - 12.0 2.0 - 12.0	900 - 1250 1251 - 1450 1451 - 1560	0.05	0.3 - 0.6	0.015	0.03 - 0.15	0.1 - 0.25
					3.0 - 6.0	900 - 1450	0.05 - 0.08	0.55 - 0.7	0.015	0.02	0.05
					3.0 - 5.0	900 - 1250	0.06 - 0.08	0.4 - 0.5	0.025	0.025	0.03
		EN10111 DD11, EN10111 Dd13			1.5 - 12.0 1.45 - 12.0 1.9 - 12.0	900 - 1250 1251 - 1350 1351 - 1560	0.12	0.6	0.045	0.045	0
			SAE1008		1.7 - 6.5 1.8 - 6.5 2.0 - 6.5 2.5 - 6.5	900 - 1140 1141 - 1250 1251 - 1350 1351 - 1550	0.05 - 0.08	0.25 - 0.4	0.02	0.02	0.03
			SAE 1010		1.7 - 12.0 1.8 - 12.0 2.0 - 12.0 2.5 - 12.0	900 - 1140 1141 - 1250 1251 - 1350 1351 - 1560	0.065 - 0.13	0.3 - 0.6	0.01	0.02	0.03
			SAE 1541		3.7 - 10.0	900 - 1560	0.36 - 0.42	1.35 - 1.5	0.01	0.02	0.1
IS 6240 Gr - 1			ASTM 621, 622 A621, B622		2.5 - 6.0	900 - 1350	0.2	0.9	0.035	0.035	0.25
				16 MnCr5, 20MnCr5	4.0 - 8.0	900 - 1560	0.17 - 0.22	1.1 - 1.4	0.035	0.035	0.15 - 0.25
IS 2062 [Fe 410 WA & B)			SAE - 1020		2.2 - 8.0 2.5 - 8.0 3.0 - 8.0 3.2 - 8.0	900 - 1250 1251 - 1350 1351 - 1450 1451 - 1560	0.18 - 0.23	0.4 - 0.6	0.02	0.025	0.2
			ASTM 515 Gr70 / SAE 1026		2.2 - 12.0 3.0 - 12.0 3.2 - 12.0 3.5 - 12.0	1251 - 1350 900 - 1250 1351 - 1450 1451 - 1560	0.22 - 0.28	0.6 - 0.9	0.05	0.03	0
			ASTM 515 Gr70 / SAE 1026		2.2 - 12.0 3.0 - 12.0 3.2 - 12.0 3.5 - 12.0	1451 - 1560 900 - 1250 1251 -1350 1351 - 1450	0.24 - 0.29	0.6 - 0.9	0.01	0.03	0.05 - 0.2
			SAE 1030		3.0 - 6.0	900 - 1450	0.28 - 0.32	0.6 - 0.9	0.01	0.01	0.05 - 0.15

Composition otherwise specified)												
Ai (mm)	N ppm	Ni	Cr	Cu	Mo	Nb	V	Ti	YSMPa	UTS mPA	% eLONG	bt 180
0.025 - 0.04	65	0.04	0.04	0.1	0.02							
0.025 - 0.04	65	0.04	0.04	0.1	0.02							
0.02 - 0.04	70	0.04	0.04	0.15								
0.02	50											
0.02	120											
0.02	120											
0.02	120											
0.02	120											
0.015 - 0.055	80	0.04	0.04	0.05				0.01				
0.02	120								270 - 350	330 - 400	25%	
0.015 - 0.07	70	0.1	0.1	0.1	0.02	0.005	0.005	0.005				
0.09 - 0.16	80											
0.02 - 0.06	60											
									230 - 330	250 - 350	25 on GL - 50mm	
0.02	70	0.04	0.04	0.05								
0.02 - 0.06	60	0.04	0.04	0.1								
0.01 - 0.04	70	0.1	0.08	0.1								
0.02	100								240	350 - 450	25 on GL- 5.65A	2.0
0 - 0.02	70	0.1	1.0 - 1.3	0.1								
0.02 - 0.06	75								300	410	25 on GL- 5.65A	
0 - 0.05												
0 - 0.06									260	485	21 on G- 50 mm	
0.1 - 0.06	50		0.03 - 0.1									

COLD ROLLING AND GALVANISING

Equivalent Grade					Dimensional Scope		Chemical (% Max unless				
BIS	JIS	EN	SAE/ ASTM	Others	Thickness (mm)	Width (mm)	C	Mn	S	P	Si
					ITW C 30 3.0 - 10.0 3.5 - 10.0	2.5 - 10 1271 - 1350 1351 - 1560	900 - 1270	0.28 - 0.33	1.2 - 1.3	0.02	0.02
			SAE 1035		2.5 - 12.0 3.0 - 12.0 3.5 - 12.0	900 - 1250 1251 - 1350 1351 - 1560	0.31 - 0.38	0.6 - 0.9	0.035	0.03	0.1 - 0.25
				MC 40	2.8 - 8.0 3.0 - 8.0 4.0 - 8.0	900 - 1250 1251 - 1350 1351 - 1555	0.37 - 0.45	0.6 - 0.9			0
			SAE 1541		3.0 - 8.0	900 - 1270	0.38 - 0.44	1.2 - 1.5	0.01	0.02	0.15
				SCM 435	3.5 - 5.0	900 - 1140	0.23	1.65	0.045	0.045	0.06
				ML 45	2.2 - 8.0 2.8 - 8.0 3.0 - 8.0	900 - 1140 1141 - 1350 1351 - 1450	0.4 - 0.5	0.6 - 0.9			0
					2.3 - 8.0 2.5 - 8.0 4.0 - 8.0 5.0 - 8.0 6.0 - 8.0	900 - 1140 1141 - 1250 1251 - 1350 1351 - 1450 1451 - 1560	0.48 - 0.52	0.65 - 0.75	0.025	0.025	0.2 - 0.25
			SAE 5046H		2.8 - 8.0	900 - 1450	0.43 - 0.5	0.65 - 1.1			0.15 - 0.35
IS 1079 HRS YST255					1.2 - 1.5	900 - 1250	0.16	1.6	0.02	0.02	
IS 10748 Gr1	JISG 3132 & JISF3131 SPHT1				1.6 - 12.0 2.0 - 12.0 2.2 - 12.0 3.0 - 12.0	900 - 1270 1271 - 1350 1351 - 1450 1451 - 1560	0.1	0.3 - 0.5	0.001 - 0.025	0.001 - 0.03	0.001 - 0.03

Composition otherwise specified)													
Ai (mm)	N ppm	Ni	Cr	Cu	Mo	Nb	V	Ti	YSMPa	UTS mPA	% eLONG	bt 180	
0.2 - 0.25	0.005 - 0.015	70	0.1	0.1	0.1	0.02				341 - 419		2t	
0 - 0.02	70								270	500	18 on G- 5.65A		
0.01 - 0.04	70	0.1	0.08	0.1									
	120					0.02 - 0.05			450	550	17 on G- 50 mm	2t	
0.01	70	0.1	0.1	0.1									
0.02	120									320			
0.02 - 0.05	120								230	320	30 on GL- 5.65A	1t	



DRAWING AND PRESS FORMING

Equivalent Grade					Dimensional Scope		Chemical (% Max unless				
BIS	JIS	EN	SAE/ ASTM	Others	Thickness (mm)	Width (mm)	C	Mn	S	P	Si
IIS 11513 Gr EDD			SAE 1006	DIN 1614 Pt.1 St 24	1.5 - 12.0 1.6 - 12.0 2.0 - 12.0 2.5 - 12.0	900 - 1250 1251 - 1350 1351 - 1450 1451 - 1560	0.08	0.4	0.03	0.03	0
				DP-600	3.0 - 5.0	900 - 1270	0.065	1.15 - 1.2	0.01	0.015	0.6
IS 2062-2011 E300	JISG3113 SAPH 440				1.75 - 3.99 2.4 - 3.99 2.6 - 3.99 3.0 - 3.99	900 -1250 1251 - 1350 1351 - 1450 451 - 1560	1	0.21	1.35	0.04	0.04
IS 2062-2011 E300	JISG3113 SAPH 440				4.0 - 6.0	900 - 1560	0.21	1.35	0.04	0.04	0.4
IS 2062-2011 E250					2.3 - 4.2	900 - 1250	0.17	1.4	0.05	0.05	0
	JIS G3113 SAPH 400		SAE 1008		1.5 - 3.49 1.75 - 3.49 2.0 - 3.49	900 - 1270 1271 - 1350 1351 - 1560	0.1	0.5	0.035	0.03	0
	JIS G3113 SAPH 400		SAE 1008		3.5 - 6.0	900 - 1560	0.1	0.5	0.035	0.03	0
	JISG3113 SAPH 400		SAE 1008		1.4 - 3.0	900 - 1270	0.1	0.5	0.035	0.03	0
	JISG3134 SAFH 540				2.6 - 4.5	900 - 1260	0.1	1.7	0.025	0.025	0.4
	JISG3134 SAFH 590				2.6 - 4.5	900 - 1270	0.1	2	0.025	0.025	0.4
IS1079 HRS YST 255					1.2 - 1.5	900 - 1250	0.16	1.6	0.02	0.02	
			KLL 009		3.0 - 13.0	900 - 1550	0.12	0.6	0.02	0.025	0.1
		EN 10149- 2 St355 MC			2.5 - 12.5 3.0 - 12.5	900 - 1250 1251 - 1550	0.12	1.5	0.02	0.025	0.5
IS 1977 Fe 360	JISG3113 SAPH 370			DIN17100	2.0 - 10.0 2.5 - 10.0 3.2 - 10.0	900 - 1140 1251 - 1450 1451 - 1560	0.1	1	0.04	0.04	0.3
IS 1079 D					2.5 - 4.0 3.0 - 4.0 3.2 - 4.0 3.5 - 4.0	900 - 1250 1251 - 1350 1351 - 1450 1451 - 1555	0.2	0.6	0.035	0.035	0.25
		DIN EN 10149- QSTE 380			2.5 - 5.0 2.6 - 5.0 2.8 - 5.0 3.0 - 5.0	900 - 1250 1251 - 1350 1351 - 1450 1451 - 1560	0.21	1.35	0.05	0.04	0.40
		DIN EN 10149- QSTE 380			6.0 - 15.0	900 - 1550	0.21	1.35	0.05	0.04	0.4
IS 2062 A, B, C.	JIG3101 & JISG 3106 Ss400 & SM	EN 100025 S275 JR, S275JO	ASTM A283 & ASTM A570 D & 45	DIN 17100 St 44.2, St 44.3	2.0 - 8.0 3.0 - 8.0 3.5 - 8.0	900 - 1250 1251 - 1450 1451 - 1560	0.22	1.6	0.04	0.04	0.4
IS 2062 A, B, C.	JIG3101 & JISG 3106 Ss400 & SM	EN 100025 S275JR, S275JO	ASTM A283 & ASTM A570 D & 45	DIN17100 St 44.2, St 44.3	8.0 - 20.0	900 - 1560	0.22	1.6	0.04	0.04	0.4

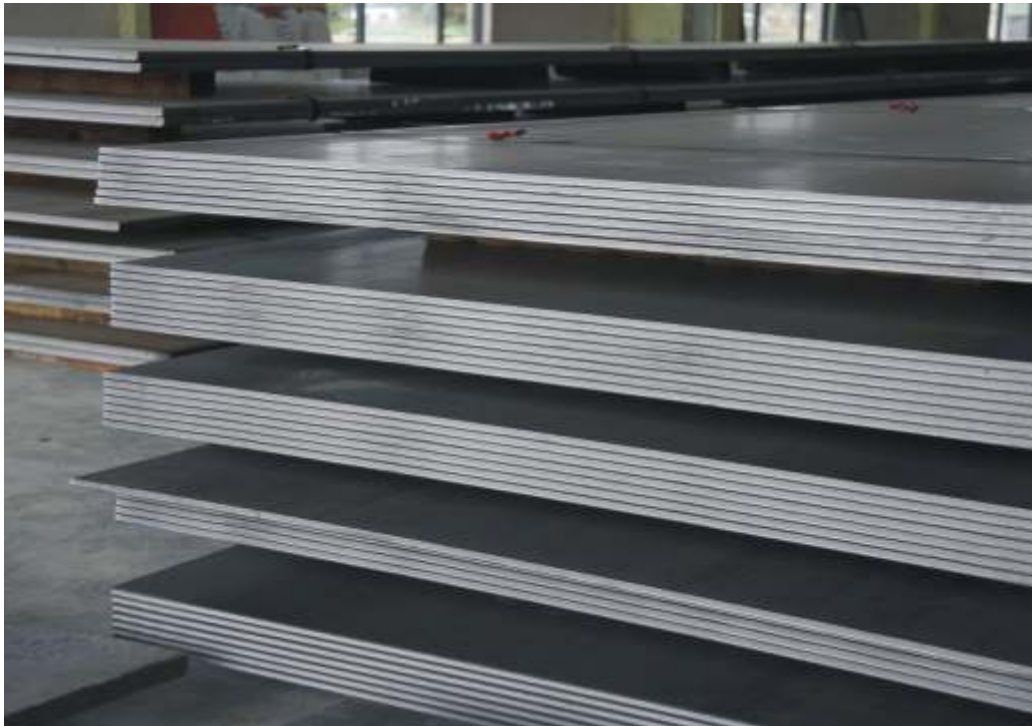
Composition otherwise specified)						Mechanical properties				
Ai (mm)	N ppm	Cr	Nb	V	Ti	YSMPa	UTS Mpa	% Elong	bt 180	Impact Test
0.02	120									
0.02 - 0.04	60	0.7				340 - 400	600 - 700	21 on GL- 50 mm		
0.4	0.02-0.05					305 - 400	440 - 520	30 on GL- 50 mm		
0.02-0.05	60					305 - 400	440 - 520	30 on GL- 50mm		
	120					270 - 350	400 - 490	36 on GL- 50mm	1.5t	
						320	410	32 on GL- 50mm		
						320	410	32 on GL- 50mm		
						320	410 50 mm	32 on GL- 0t		
0 - 0.06	100		0.1	0.1	0.05	355	540	24 on GL- 5.65A	1t	
0.06	100		0.1	0.1	0.05	420	590	22 on GL- 5.65A	1.5t	
	120						320-400	28 on 80 mm GL	Close	
0.02 - 0.07	90					240	350 - 410	35 on GL- 5.65A	0t	27J at 00C
0.015			0.09	0.2	0.15	355	430 - 550	23 on GL- 5.65A	0.5t	
0.02 - 0.06						235	370			
0.02	100						240 - 400	25 on GL- 5.65A	2.0t	
0.02 - 0.05						380 - 460	460 - 550	21 on 50 mm GL		
0.02 - 0.05						380 - 460	460 - 550	21 on GL- 50mm		
	120					250	410	23 on GL- 5.65A	2.0t	
	120					250	410	23 on G- 5.65A	2.0t	

DRAWING AND PRESS FORMING

Equivalent Grade					Dimensional Scope		Chemical (% Max unless				
BIS	JIS	EN	SAE/ ASTM	Others	Thickness (mm)	Width (mm)	C	Mn	S	P	Si
IS 2062-2011 E250					4.0 - 14.0	900 - 1560	0.2	1.2	0.03	0.03	0.3
		DIN EN 10149 QSTE 420			3.0 - 8.0 3.5 - 8.0 4.0 - 8.0 4.5 - 8.0	900 - 1140 1141 - 1250 1251 - 1450 1451 - 1560	0.12	1.0	0.025	0.025	0.4
IS 2062-2011 E450				DIN EN 10149 S460MC	2.7 - 5.0	900 - 1260	0.12	1.6	0.015	0.025	0.5
				KLL - 004	6.0 - 14.0	900 - 1560	0.17	1.2	0.02	0.025	0.05
IS 2062 E350	JISG3106 SM490 AB	EN Fe 10025 510B		DIN17100 St 52.3	2.5 - 5.99 3.0 - 5.99	900 - 1350 1351 - 1560	0.2	1.5	0.04	0.04	0.55
IS 2062 E350	JISG3106 Sm490 A B	EN 10025 Fe510B		DIN 17100 St 52.3	6.0 - 16.0 6.0 - 15.0	900 - 1350 1351 - 1560	0.2	1.5	0.04	0.04	0.55
				Telco SS4012A	1.6 - 3.0 1.8 - 3.0	900 - 1260 1261 - 1560	0.1	0.7	0.03	0.03	0.2
				Telco SS4012A	3.01 - 12.0	900 - 1560	0.1	0.7	0.03	0.03	0.2
				Tata Motor- E-38	2.0 - 10.0	900 - 1560	0.1	1	0.03	0.03	0.4
				BSK 46, Tr46, E-46	3.0 - 8.0	900 - 1560	0.12	1	0.025	0.025	0.1
				Tata Motors E-46	8.01 - 12.0	900 - 1560	0.12	1	0.025	0.025	0.4
				BSK46/ Tata Motors E-46	2.5 - 8.0 2.4 - 8.0 3.0 - 8.0	900 - 1140 1141 - 1250 1251 - 1560	0.12	1	0.025	0.025	0.1



Composition otherwise specified)						Mechanical properties				
Ai (mm)	N ppm	Cr	Nb	V	Ti	YSMPa	UTS Mpa	% Elong	bt 180	Impact Test
0.02 - 0.06						255	410	23 on GL- 50mm	2t	
0.02			0.06	0.095	0.045	420 - 490	520 - 620	21 on GL-	0.5t 5.65A	
			0.09	0.2	0.15	460	520 - 670	14 on G- 50mm	1t	
0.02 - 0.07	120					325 - 405	450 - 530	28 on GL- 5.65A	1t	
	90					355	490 - 630	22 on GL- 5.65A	2t	
	90					355	490 - 630	22 on G- 5.65A	2t	
0.02				0.095		335 - 410	390 - 490	27 on GL- 5.65A	0.5t	
0.02			0.055	0.095	0.045	335 - 410	390 - 490 5.65A	27 on GL-	0.5t	
0.02			0.055	0.095	0.045	370 - 460	440 - 560	25 on GL- 5.65A	0.5t	
0.02			0.06	0.095	0.045	460	500 - 610	21 on GL- 5.65A	0.5t	
0.02			0.06	0.095	0.045	460 - 530	500 - 610	21 on GL- 5.65A	0.5t	
0.02			0.06	0.095	0.045	460 - 530	500 - 610	21 on GL- 5.65A	0.5t	



WELDED TUBES AND PIPES

Equivalent Grade					Dimensional Scope		Chemical (% Max unless				
BIS	JIS	EN	SAE/ASTM	Others	Thickness (mm)	Width (mm)	C	Min	S	P	Si
	JIS G3113 SAPH 400		SAE 1008		1.5 - 3.49 1.75 - 3.49 2.0 - 3.49 2.5 - 3.49	900 - 1270 1271 - 1350 1351 - 1450 1451 - 1560	0.1	0.5	0.035	0.03	0
	JIS G3113 SAPH 400		SAE 1008		3.5 - 6.0	900 - 1560	0.1	0.5	0.035	0.03	0
IS 10748 Gr 1, IS 1079 DD					1.5 - 4.0 1.8 - 4.0 2.5 - 4.0	900 - 1270 1271 - 1350 1351 - 1555	0.055 - 0.1	0.5	0.03	0.035	0
IS 2062 Fe 410CuWA,					4.0 - 20.0	900 - 1560	0.23	1.5	0.05	0.05	0.4
			ASTM A1011-07,HSLA Gr50 CL-1/2; ASTM A 1011-07,SS Grade 50; ASTM A 572 Gr 50		1.6 - 3.99 2.5 - 3.99 2.8 - 3.99	900 - 1250 1251 - 1350 1351 - 1520	0.25	1.35	0.04	0.035	0
			ASTM A 572 - 07 Gr50 Type 1		4.0 - 8.0	900 - 1520	0.23	1.35	0.05	0.04	0.4
			ASTM A 572 - 07 Gr50 Type 1		8.01 - 16.0	900 - 1520	0.23	1.35	0.05	0.04	0.4
IS 2062 E350	JISG3106 SM490A,B	En10025 Fe510B		DIN17100 St 52.3	2.5 - 5.99 3.0 - 5.99	900 - 1350 1351 - 1560	0.2	1.5	0.04	0.04	0.55
IS 2062 E350	JISG3106 SM490A,B	En10025 Fe510B		DIN17100 St 52.3	6.0 - 16.0 6.0 - 15.0	900 - 1350 1351 - 1560	0.2	1.5	0.04	0.04	0.55
IS 2062-2011 E350	JISG3106 SM490A,B	En10025 S355		DIN17100 St 52.3	2.9 - 6.0 2.8 - 6.0 3.0 - 6.0	900 - 1140 1141 - 1250 1251 - 1560	0.2	1.6	0.04	0.04	0.55
IS 2062-2011 E350	JISG3106 SM490A,B	En10025 Fe510B		DIN17100 St 52.3	5.0 - 15.0	900-1560	0.17		0.05	0.05	
IS 10748 Gr1	JISG3132 SPHT1				1.5 - 12.0 1.8 - 12.0 2.2 - 12.0 2.3 - 12.0	950 - 1270 1271 - 1350 1351 - 1450 1451 - 1550	0.1	0.5	0.05	0.05	0
IS 10748 Gr1	JISG3132 SPHT1				1.55 - 12.0 2.0 - 12.0 2.2 - 12.0 3.0 - 12.0	950 - 1270 1271 - 1350 1351 - 1450 1451 - 1550	0.1	0.3 - 0.5	0.001 -	0.001 -	0.001 -
IS 10748 Gr2	JISG3132 SPH1				1.6 - 3.99 2.5 - 3.99	950 - 1250 1251 - 1550	0.1	0.6	0.05	0.05	0
IS 10748 Gr2	JISG3132 SPHT1				1.5 - 12.5 2.2 - 12.5 2.5 - 12.5 3.0 - 12.5	900 - 1250 1251 - 1350 1351 - 1450 1451 - 1555	0.1	0.6	0.05	0.05	0
IS 10748 Gr- 3,IS 2062 A,B			ASTM - A36M	ST42.3	2.4 - 6.4 2.5 - 5.0 3.0 - 5.0	900 - 1350 1351 - 1500 1501 - 1550	0.16	1.2	0.04	0.04	0
IS 10748 Gr- 3,IS 2062 A,B IS 2062 E-250	JIS G 3103 SS400		ASTM - A36M		5.01 - 20.0	900 - 1550	0.16	1.2	0.04	0.04	0
					2.4 - 7.0 2.5 - 7.0 3.0 - 7.0	900 - 1350 1351 - 1500 1501 - 1550	0.23	1.5	0.045	0.045	0.4
IS 2062 E-250					7.01 - 20.0	900 - 1550	0.23	1.5	0.045	0.045	0.4
IS 2062 Fe 410 WA, WB					3.0 - 8.0 4.0 - 8.0	900 - 1250 1251 - 1550	0.22	1.5	0.045	0.045	0.4
IS 2062 Fe 410 WA, WB					8.01 - 16.0 8.01 - 12.0	900 - 1350 1351 - 1550	0.22	1.5	0.045	0.045	0.4

Composition otherwise specified)									Mechanical properties			
Al (min)	N ppm (max)	Ni	Cr	Cu	Mo	Nb	V	Ti	YS Mpa (min)	UTS Mpa (mm)	%Elong (min)	BT 180°
									320	410	32 on GL-50mm	
									320	410	32 on GL-50mm	
0.02	70								170	270 - 400	33 on GL-5.65√A	
	120			0.2 - 0.35					250	410	23 on GL-5.65√A	3t
		0.2	0.15	0.2	0.06	0.008	0.008	0.025	345	450	17 on GL-50mm	2.5t
						0.005 - 0.05			345	450	21 on GL-50mm	1.5t
						0.005 - 0.05			345	450	21 on 50 mm GL	1.5t
	90								355	490 - 630	22 on GL-5.65√A	2t
	90								355	490 - 630	22 on GL-5.65√A	2t
	120								355	490 - 630	20 on GL-5.65√A	3t
	90								235	340-470	19on GL-5.65√A	1.5t
0.02 min	120								170	290	30 on GL-5.65√A	1t
0.02 -	120								230	320	30 on GL-5.65√A	1t
0.02	120								210	330	24 on GL-5.65√A	1t
0.02	120								210	330	30 on GL-5.65√A	1t
0.02	120								240	410	25 on GL-5.65√A	2t
0.02	120								240	410	25 on GL-5.65√A	2t
									250	410	23 on GL-5.65√A	2t
									250	410	23 on GL-5.65√A	2t
120									250	410	23 on GL-5.65√A	2t
120									250	410	23 on GL-5.65√A	2t

LINE PIPES

Equivalent Grade	Dimensional Scope		Chemical Composition (% Max unless otherwise specified)										
API Equivalent	Thickness (mm)	Width (mm)	C	Min	S	P	Si	Al (min)	N ppm (max)	Ni	Cr	Cu	Mo
API 5LB -with Cu (.2 - .35)	7.5 - 12.0	900 - 1550	0.22	1.2	0.015	0.025	0.4					0.2 - 0.35	
API 5L B	4.0 - 8.0	900 - 1550	0.22	1.2	0.015	0.025	0.4	0.015 - 0.03	90				
API 5L B	8.01 - 20.0	900 - 1550	0.22	1.2	0.015	0.025	0.4		90				
API 5L B	8.01 - 20.0	900 - 1550	0.22	1.2	0.015	0.025	0.4	0.015 - 0.03	90				
API 5L B	4.0 - 11.0	900 - 1550	0.22	1.5	0.015	0.025	0.4	0.015 - 0.03	85				
API 5L X42	4.0 - 10.0	910 - 1550	0.22	1.3	0.015	0.025	0.4						
API 5L X42	10.0 - 15.0	950 - 1550	0.22	1.3	0.015	0.025	0.4						
API 5L X42	4.0 - 8.0	950 - 1550	0.08	1.25	0.01	0.02	0.25	0 - 0.05	70	0.2	0.1	0.15	0.08
API 5L B	4.0 - 10.0	900 - 1550	0.120	1.2	0.010	0.018	0.15 - 0.35		100	0.15	0.15	0.2	0.1
API 5L X46	4.0 - 22.0	910 - 1550	0.22	1.4	0.015	0.025	0.4						
API 5L X46	4.5 - 11.5 5.0 - 10.0	900 - 1140 1141 - 1560	0.1	1.0 - 1.35	0.01	0.02	0.15 - 0.25	0 - 0.06	100	0.2	0.1	0.15	0.15
API 5L X52	4.0 - 16.0	950 - 1550	0.22	1.4	0.015	0.025	0.4						
API 5L X52	4.0 - 8.0	950 - 1550	0.16	1.5	0.01	0.02	0.35	0-0.07	120	0.2	0.2	0.35	0.01
API 5L X56	4.0 - 16.0	950 - 1550	0.15	1.1 - 1.4	0.015	0.02	0.35	0.06	100				
API 5L X60	8.0 - 16.0	950 - 1560	0.12	1.1 - 1.35	0.01	0.02	0.35	0.06	100				
API 5L X60	4.0 - 16.0	950 - 1560	0.22	1.4	0.015	0.025	0						
API 5L X65	4.0 - 12.7	900 - 1550	0.22	1.45	0.015	0.025	0						
API 5L X65	12.71 - 16.0	900 - 1500	0.22	1.65	0.015	0.025	0.4						
API 5L X70	6.0 - 12.0	950 - 1500	0.22	1.65	0.015	0.025	0.4						
API 5L X80	6.0 - 10.0	900-1550	0.22	1.85	0.015	0.025	0	0 - 0.15	100				

			Mechanical properties							
Nb	V	Ti	YS Mpa (min)	UTS Mpa (mm)	%Elong (min)	BT 180º	Impact Test	YS/UTS (max)	DWTT	ASTM (Grain Size)
0.05	0.05	0.04	245 - 450	415 - 760	30 on GL - 50 mm	1t	27J at -20:C	0.9		8
			245 - 360	425 - 600	30 on GL - 50 mm	1t	90J at -20:C	0.87	90% on - 20:C	8
			241 - 448	414 - 758	30 on GL - 50 mm	1t	27J at -20:C	0.9		8
			245 - 360	425 - 600	30 on GL - 50 mm	1t	90J at -20:C	0.87	90% on - 20:C	
			241 - 448	414 - 758	30 on GL - 50mm	1t	27J at -20:C	0.9		8
			290 - 496	414 - 758	30 on GL - 50mm	1t	27J at -20:C	0.9		8
			290 - 496	414 - 758	30 on GL - 50mm	1t	27J at -20:C	0.9		
0.05	0.05	0.05	300 - 400	425	26 on GL - 50mm		100J at -20:C	0.85		
0.04	0.05	0.04	260 - 400	435 - 600	30 on GL - 50mm	2t	90J at -20:C	0.9	90% on - 20:C	8
			317 - 524	434 - 758	28 on GL - 50mm	1t	68J at -5:C	0.9		8
0.05	0.08	0.05	330 - 410	450 - 550	30 on GL - 50mm	1t		0.85		7
			359 - 531	455 - 758	27 on GL - 50mm	1t	27J at -20:C	0.9		8
0.05	0.08	0.1	360-500	460-585	25 on GL - 50mm	1t	50J at -20:C	0.87		8
0.04	0.05	0.05	390 - 540	495 - 650	26 on GL - 50mm	2t	55J at 0:C	0.88	85% on - 20:C	8
0.04	0.04	0.04	390 - 530	520 - 680	28 on GL - 50mm	2t	85J at 0:C	0.9	90% on 0:C	7
0.05	0.06		414 - 565	517 - 758	24 on GL - 50mm	1t	35J at -20:C	0.9		8
			448 - 600	531 - 758	24 on GL - 50mm	2t	40J at 0:C	0.9		8
			448 - 600	531 - 758	24 on GL - 50mm	2t	70J at -10:C	0.88		8
		0.06	483 - 621	565 - 758	27 on GL - 50mm	2t	40J at -10:C	0.9		8
		0.06	552 - 690	621 - 827	21 on GL - 50mm	2t	68J at 0:C	0.9		8

ELECTRICAL STAMPING AND FORMING

Equivalent Grade					Dimensional Scope			
BIS	JIS	EN	SAE/ASTM	Others	Thickness (mm)	Width (mm)	C	Mn
				Raymond Ld0106 / Thyssan Krupp Electrical	2.0 - 4.0	900 - 1250	0.015	0.2 - 0.4
As Per Standards					2.0 - 4.0 2.1 - 4.0	900 - 1050 1051 - 1250	0.1	0.6 - 1.1
IS 11513 D, DD			SAE 1008	DIN1614 Pt.1 St 22, RSt 23	1.8 - 5.0 2.0 - 5.0 2.2 - 5.0 2.5 - 5.0	900 - 1140 1141 - 1250 1251 - 1450 1451 - 1560	0.12	0.5

Chemical Composition (% Max unless otherwise specified)								
S	P	Si	Al (min)	N ppm (max)	Ni	Cr	Cu	Ti
0.015	0.07 - 0.1	0.2 - 0.6	0.2 - 0.4	50	0.05	0.05	0.07	0.007
0.01	0.02 - 0.03	0.95 - 1.2	0.2 - 0.4	40	0.04	0.04	0.1	
0.04	0.04	0	0.005	120				

MEDIUM CARBON UN-ALLOYED GRADES

Equivalent Grade					Dimensional Scope			
BIS	JIS	EN	SAE/ASTM	Others	Thickness (mm)	Width (mm)	C	Mn
IS 2062 E350 BR		EN 10025 S355JR	ASTM A 572 Gr 50		4.0 - 20.0 5.0 - 20.0	900 - 1250 1251 - 1560	0.2	1.5
			ASTM A 572 Gr 50 Type I		2.0 - 10.0 2.5 - 10.0 2.8 - 10.0 3.2 - 10.0 4.0 - 10.0	900 - 1140 1141 - 1250 1251 - 1350 1351 - 1450 1451 - 1560	0.23	1.35
IS 2062-2011 E250					2.2 - 8.0 2.4 - 8.0 3.0 - 8.0 3.5 - 8.0	900 - 1250 1251 - 1350 1351 - 1450 1451 - 1560	0.16 - 0.2	0.3-0.4
IS 2062 E250 (Fe 410WA &WB)			ASTM A 572 Gr 42 (290); ASTM A 515 Gr 60 (415); ASTM A 1011 SS & HSLA Gr 45		4.0 - 12.5	900 - 1350	0.22	1.5
IS 2062-2006 E 250A		EN 10025-2-2004 S275JO			4.0 - 20.0 4.0 - 16.0	900 - 1350 1351 - 1560	0.23	1.5
			SAE 1018		2.0 - 8.0 2.5 - 8.0 3.0 - 8.0 3.2 - 8.0	900 - 1250 1251 - 1350 1351 - 1450 1451 - 1560	0.18 - 0.22	0.75 - 0.9
			SAE1018		2.0 - 8.0 2.5 - 8.0 3.0 - 8.0 3.2 - 8.0	900 - 1250 1251 - 1350 1351 - 1450 1451 - 1560	0.15 - 0.2	0.6 - 0.9
IS 2062-2011 E350		En1002 5 S355JR	ASTM A 1011 SS & HSLA Gr 55/60 ; ASTM A 572 Gr 55		2.0 - 16.0 2.2 - 12.0 2.5 - 12.0 3.0 - 12.0	900 - 1270 1271 - 1360 1361 - 1450 1451 - 1560	0.2	1.6
IS 2062 -2011 E410				TATA 55HF	6.0 - 16.0	900 - 1560	0.2	1.2 - 1.7
				16 MnCr5, 20MnCr5	4.0 - 8.0	900 - 1560	0.17 - 0.22	1.1 - 1.4
IS 2062 (Fe 410WA & B)			SAE - 1020		2.2 - 8.0 2.5 - 8.0 3.0 - 8.0 3.2 - 8.0	900 - 1250 1251 - 1350 1351 - 1450 1451 - 1560	0.18 - 0.23	0.4 - 0.6
			ASTM 515 Gr70 / SAE 1026		2.2 - 12.0 3.0 - 12.0 3.2 - 12.0 3.5 - 12.0	900 - 1250 1251 - 1350 1351 - 1450 1451 - 1560	0.22 - 0.28	0.6 - 0.9
			ASTM 515 Gr70 / SAE 1026		2.2 - 12.0 3.0 - 12.0 3.2 - 12.0 3.5 - 12.0	900 - 1250 1251 -1350 1351 - 1450 1451 - 1560	0.24 - 0.29	0.6 - 0.9
			SAE 1030		3.0 - 6.0	900 - 1450	0.28 - 0.32	0.6 - 0.9
				ITW C 30	2.5 - 10 3.0 - 10.0 3.5 - 10.0	900 - 1270 1271 - 1350 1351 - 1560	0.28 - 0.33	1.2 - 1.3
			SAE 1035		2.5 - 12.0 3.0 - 12.0 3.5 - 12.0	900 - 1250 1251 -1350 1351 - 1560	0.31 - 0.38	0.6 - 0.9
				MC 40	2.8 - 8.0 3.0 - 8.0 4.0 - 8.0	900 - 1250 1251 - 1350 1351 - 1555	0.37 - 0.45	0.6 - 0.9
			SAE 1541		3.0 - 8.0	900 - 1270	0.38 - 0.44	1.2 - 1.5
IS 2062 E 250 A, B					2.2 - 10.0 3.0 - 10.0 3.5 - 10.0 4.0 - 10.0	900 - 1250 1251 - 1350 1351 - 1450 1451 - 1560	0.22	1.5
IS 2062 E 250 A, B					10.01-20.0	900 -1560	0.22	1.5
IS 2062 - 2006 E 250A		EN 10025 S275JR			4.0 - 16.0	900 - 1560	0.2	1.2

Chemical Composition [% Max unless otherwise specified]														
S	P	Si	Al (min)	N ppm (max)	Ni	Cr	Cu	Mo	Nb	YS (Mpa)	UTS (Mpa)	%Elong	Bt180	Impact
0.045	0.045	0.45		120					0.02 - 0.035	355	490 - 630	22 on GL-5.65 A	2t	27J at 27°C
0.04	0.035	0.4	0.01 - 0.04		0.2	0.15	0.2	0.06		345	450	21 on GL-50 mm		
0.03	0.03	0.035	0.01-0.07	70						240	410	25 on 5.65 A	2t	
0.045	0.045	0.4		120					0.005	310	410	23 on GL-5.65 A	2t	
0.045	0.045	0.4		120						275	410 - 560	23 on GL-5.65 A	2t	
0.015	0.025	0.1	0.02 - 0.06	75										
0.03	0.05													
0.04	0.04	0.55		90					0.005	355	490 - 630	22 on GL-5.65 A	2t	
0.04	0.04	0.4		90						410	540	20 on GL-5.65 A	2t	30J at 20°C
0.035	0.035	0.15 - 0.25	0 - 0.02	70	0.1	1.0 - 1.3	0.1							
0.02	0.025	0.2	0.02 - 0.06	75						300	410	25 on GL-5.65 A		
0.05	0.03	0	0 - 0.05											
0.01	0.03	0.05 - 0.2	0 - 0.06							260	485	21 on GL-50 mm		
0.01	0.01	0.05 - 0.15	0.1 - 0.06	50		0.03 - 0.1								
0.02	0.02	0.2 - 0.25	0.005 - 0.015	70	0.1	0.1	0.1	0.02		341 - 419			2t	
0.035	0.03	0.1 - 0.25	0 - 0.02	70						270	500	18 on GL-5.65 A		
		0												
0.01	0.02	0.15	0.01 - 0.04	70	0.1	0.08	0.1							
0.045	0.045	0.4		120						250	410	23 on GL-5.65 A	2t	
0.045	0.045	0.4		120						250	410	23 on GL-5.65 A	2t	
0.04	0.04	0.45		120						240	410	25 on GL-5.65 A	2t	

MEDIUM CARBON UN-ALLOYED GRADES

Equivalent Grade					Dimensional Scope			
BIS	JIS	EN	SAE/ASTM	Others	Thickness (mm)	Width (mm)	C	Mn
			ASTM A572 Gr 50 Type I		2.2 - 10.0 2.5 - 10.0 3.0 - 10.0 3.5 - 10.0 4.0 - 10.0	900 - 1140 1141 - 1250 1251 - 1350 1351 - 1450 1451 - 1560	0.23	1.35
			ASTM A572 Gr 50 Type I		10.01 - 20	900 - 1560	0.23	1.35
			ASTM A572 Gr 50 Type I		2.2 - 10.0 2.5 - 10.0 3.0 - 10.0 3.5 - 10.0 4.0 - 10.0	900 - 1140 1141 - 1250 1251 - 1350 1351 - 1450 1451 - 1560	0.23	1.35
			ASTM A572 Gr 50		10.01 - 20	900 - 1560	0.23	1.35
			ASTM A572 Gr 50 Type I		10.01 - 15	900 -1560		0.23
IS 2062 E 350 BR		EN 10025 S355JR	ASTM A572 Gr 50		4.0 - 12	900 -1560		1.5
IS 2062 E 350 BR		EN 10025 S355JR	ASTM A572 Gr 50		12.01 - 20	900 -1560		1.5
IS 2062-2011 E350		EN 10025 Fe510B		DIN 17100 St 52.3	3.8 - 15.0 4.0 - 15.0	900 - 1270 1271 - 1560	0.2	1.5
IS 2062-2011 E350		En10025 Fe510B		DIN17100 St52.3	12.01 - 16	900-1560	0.2	1.5
IS 2062 E450			ASTM A 572 Gr 65 Type I		4.0 - 10.0 5.0 - 10.0	900 - 1250 1251 - 1560	0.23	1.65
IS 2062 E450			ASTM A 572 Gr 65 Type I		10.01 - 20	900 - 1560	0.23	1.65
				SCM 435	3.5 - 5.0	900 - 1140	0.23	1.65
				ML 45	2.2 - 8.0 2.8 - 8.0 3.0 - 8.0	900 - 1140 1141 - 1350 1351 - 1450	0.4 - 0.5	0.6 - 0.9
					2.3 - 8.0 2.5 - 8.0 4.0 - 8.0 5.0 - 8.0 6.0 - 8.0	900 - 1140 1141 - 1250 1251 - 1350 1351 - 1450 1451 - 1560	0.48 - 0.52	0.65 - 0.75
			SAE 5046H		2.8 - 8.0	900 - 1450	0.43 - 0.5	0.65 - 1.1

Chemical Composition [% Max unless otherwise specified]														
S	P	Si	Al (min)	N ppm (max)	Ni	Cr	Cu	Mo	Nb	YS (Mpa)	UTS (Mpa)	%Elong	Bt180	Impact
0.05	0.04	0.4							0.005 - 0.05	345	450	21 on GL-50 mm	1.5t	
0.05	0.04	0.4							0.005 - 0.05	345	450	21 on GL-50 mm	1.5t	
0.05	0.04	0.06		120					0.005 - 0.05	345	450	21 on GL-50 mm	1.5t	
0.05	0.04	0.06		120					0.005 - 0.05	345	450	21 on GL-50 mm	1.5t	
1.35	0.05	0.04	0.4							345	450	21 on GL-50 mm	1.5t	
0.045	0.045	0.45	0.01-0.06	120						375	490-615	22 on GL-5.65 A	2t	27J at 27°C
0.045	0.045	0.45	0.01-0.06	120						375	490-615	22 on GL-5.65 A	2t	27J at 27°C
0.045	0.045	0.45		120						355	490 - 630	20 on GL-5.65 A	3t	
0.045	0.045	0.45		120						355	490 - 630	20 on GL-5.65 A	3t	
0.045	0.045	0.06		120					0.02 - 0.05	450	550	17 on GL-5.65 A	2t	
0.045	0.045	0.06		120					0.02 - 0.05	450	550	17 on GL-5.65 A	2t	
0.045	0.045	0.06		120					0.02 - 0.05	450	550	17 on GL-50 mm	2t	
0.025	0.025	0.2 - 0.25	0.01	70	0.1	0.1	0.1							
		0.15 - 0.35				0.2 - 0.4								

SIMPLE PRESSURE VESSELS

Equivalent Grade				Dimensional Scope		Chemical Composition (% max unless or as specified)				
BIS	JIS	EN	SAE/ ASTM	Thickness (mm)	Width (mm)	C	Mn	S	P	Si
IS 11513 Gr EDD			SAE 1006	1.5 - 12.0 1.8 - 12.0	900 -1250 1251 - 1350	0.06	0.3	0.015	0.02	0.03 2.0 - 12.0
"IS 6240 Gr - 1"			ASTM 621,622 A621,B622	2.5 - 6.0	900 - 1350	0.2	0.9	0.035	0.035	0.25
IS 2062- 2011 E250	JISG3116 Sg255			2.5 - 6.0	900 - 1560	0.2	0.3 min	0.04	0.04	
IS 2062- 2011 E300	JISG3116 Sg295			2.5 - 5.0 2.8 - 5.0	900 - 1250 1251 - 1350	0.2	1.0	0.04	0.04	0.35
IS 2062- 2011 E300		EN10120 P265NB		2.1 - 2.5	900-1320	0.2	1.0	0.04	0.04	0.35
IS 2062- 2011 E300		EN10120 P310NB 1.0437		2.2 - 5.0 2.5 - 5.0 3.0 - 5.0	900 - 1140 1141 - 1250 1251 - 1350	0.2	0.7 (min)	0.015	0.025	0.5
IS15914: 2011 Hs345		EN10120 P355NB 1.0557		2.1 - 3.0 2.5 - 3.0	900 - 1250 1251 - 1350	0.2	0.7 - 2.0	0.015	0.025	0.5

									Mechanical properties				
Al (min)	N ppm (max)	Ni	Cr	Cu	Mo	Nb	V	Ti	YS Mpa (Min)	UTS MPa	% Elong (Min)	BT 180°	Impact Test
0.02 - 0.06 1351 - 1560	70	0.1	0.1	0.1	0.02				50				
0.02	100								240	350-450	25 on GL- 5.65VA	2t	
									255	400	28 on 50mm GL	1t	
									295	440	26 on 50mm GL	1.5t	
									295	440	26 on 50mm GL	1.5t	
0.02	90					0.05		0.03	310	460-550	21 on GL- 5.65VA		
	90					0.05	0.05	0.03	355	510 - 620	20 on 80mm GL		

BOILER TUBES AND PRESSURE VESSELS

Equivalent Grade			Dimensional Scope		Chemical Composition (% max unless or as specified)		
BIS	JIS	EN	SAE/ ASTM	Others	Thickness (mm)	Width (mm)	C
IS 2002 Gr1, IS 2062 E-250			ASTM A516 Gr 55		2.4 - 7.0 2.5 - 7.0 3.0 - 7.0	900 - 1350 1351 - 1500 1501 - 1550	0.23
IS 1977 Fe 360	JISG3113 SAPH370		ASTM A516 Gr 55	DIN17100 St 37.2	2.0 - 10.0 2.2 - 10.0 2.5 - 10.0 3.2 - 10.0	900 - 1140 1141 - 1250 1251 - 1450 1451 - 1560	0.1
IS 2002 Gr3, IS 2062 E350	JISG3106 SM490A.B	En10025 Fe510B	ASTM A516 Gr 65	DIN17100 St 52.3	2.5 - 5.99 3.0 - 5.99	900 - 1350 1351 - 1560	0.2
IS 2002 Gr3, IS 2062 E350	JISG3106 SM490A.B	En10025 Fe510B	ASTM A516 Gr 65	DIN17100 St 52.3	6.0 - 16.0 6.0 - 15.0	900 - 1350 1351 - 1560	0.2

						Mechanical properties			
Mn	S	P	Si	Al (min)	N ppm (max)	YS Mpa (Min)	UTS MPa	% Elong (Min)	BT 180°
1.5	0.045	0.045	0.4			250	410	23 on GL-5.65vA	2t
1	0.04	0.04	0.3	0.02 - 0.06		235	370		
1.5	0.04	0.04	0.55		90	355	490 - 630	22 on GL-5.65vA	2t
1.5	0.04	0.04	0.55		90	355	490 - 630	22 on GL-5.65vA	2t

HSLA GRADES

Equivalent Grade				Dimensional Scope		Chemical Composition (% max unless or as specified)				
BIS	JIS	EN	SAE/ ASTM	Others	Thickness (mm)	Width (mm)	C	Mn	S	P
IS 2062 - 2011 E550				SRDPS 60/ Domex550 MC/ 80KSi	5.0 - 10.0	900 - 1560	0.12	1.8	0.01	0.025
IS 2062- 2011 E650			SS 4082(TATA)/ Domex 650	4.5 - 10.0	900 - 1560	0.12	2	0.015	0.025	0.6
				DP-600	3.0 - 5.0	900 - 1250	0.065	1.15 - 1.2	0.01	0.015
IS 2062- 2011 E300	JISG3113 SAPH440				1.75 - 3.99 2.4 - 3.99 2.6 - 3.99 3.0 - 3.99	900 - 1250 1251 - 1350 1351 - 1450 1451 - 1560	0.21	1.35	0.04	0.04
IS 2062- 2011 E300	JISG3113 SAPH440				4.0 - 6.0	900 - 1560	0.21	1.35	0.04	0.04
	JISG3134 SAFH540				2.6 - 4.5	900 - 1260	0.1	1.7	0.025	0.025
	JISG3134 SAFH590				2.6 - 4.5	900 - 1260	0.1	2	0.025	0.025
IS 2062- 2011 E250				WIR006 - Issue C	4.0 - 14.0	900 - 1560	0.2	1.2	0.03	0.03
		DIN EN 10149 QSTE 420			3.0 - 8.0 3.5 - 8.0 4.0 - 8.0 4.5 - 8.0	900 - 1140 1141 - 1250 1251 - 1450 1451 - 1560	0.12	1.0	0.025	0.025
IS 2062- 2011 E300	JIS G3113 SAPH 440				1.75 - 3.99 2.4 - 3.99 2.6 - 3.99 3.0 - 3.99	900 - 1250 1251 - 1350 1351 - 1450 1451 - 1560	0.21	1.35	0.05	0.04
IS 2062- 2011 E300	JIS G3113 SAPH 440				4.0 - 6.0 4.0 - 8.0	900 - 1450 1451 - 1560	0.21	1.35	0.04	0.04
IS 2062- 2011 E450				DIN EN 10149 S460MC	2.7 - 5.0	900 - 1260	0.12	1.6	0.015	0.025
				KLL 022	8.0 - 15.0	900 - 1500	0.1	1.5	0.01	0.015
			ASTM A 1011- 07, ASTM A 572 Gr 50	SS Gr 50, HSLA GR50 CL-1/2	1.6 - 3.99 2.5 - 3.99 2.8 - 3.9	900 - 1250 1251 - 1350 1351 - 1520	0.25	1.35	0.04	0.035
			ASTM A 572- 07 Gr50 Type 1		4.0 - 8.0	900 - 1520	0.23	1.35	0.05	0.04
			ASTM A 572- 07 Gr50 Type 1		8.01 - 16.0	900 - 1520	0.23	1.35	0.05	0.04
				KLL - 004	6.0 - 14.0	900 - 1560	0.17	1.2	0.02	0.025
IS 2062 E350	JISG3106 SM490A.B	En10025 Fe510B		DIN17100 St 52.3	2.5 - 5.99 3.0 - 5.99	900 - 1350 1351 - 1560	0.2	1.5	0.04	0.04
IS 2062 E350	JISG3106 SM490A.B	En10025 Fe510B		DIN17100 St 52.3	6.0 - 16.0 6.0 - 15.0	900 - 1350 1351 - 1560	0.2	1.5	0.04	0.04
IS:2062 E450 Cu B0 (Fe570)					3.0 - 4.5 4.0 - 4.5	900 - 1250 1251 - 1560	0.22	1.6	0.045	0.045
IS:2062 E450 Cu B0 (Fe570)					4.51 - 20.0	900 - 1560	0.22	1.6	0.045	0.045
				Telco SS4012A	1.6 - 3.0 1.8 - 3.0	900 - 1260 1261 - 1560	0.1	0.7	0.03	0.03
				Telco SS4012A	3.01 - 12.0	900 - 1560	0.1	0.7	0.03	0.03
				Tata Motor E-38	2.0 - 10.0	900 - 1560	0.1	1	0.03	0.03
				BSK 46, TR46, E-46	3.0 - 8.0	900 - 1560	0.12	1	0.025	0.025
				Tata Motors E-46	8.01 - 12.0	900 - 1560	0.12	1	0.025	0.025
				BSK46/ Tata Motors E-46	2.5 - 8.0 2.4 - 8.0 3.0 - 8.0	900 - 1140 1141 - 1250 1251 - 1560	0.12	1	0.025	0.025

										Mechanical properties				
Si	Al (min)	N ppm (max)	Ni	Cr	Cu	Mo	Nb	V	Ti	YS Mpa (Min)	UTS MPa (Min)	% Elong	BT 180°	Impact Test
0.5	0.015						0.09	0.2	0.15	550	600 - 760	17 on 50 mm GL	2t	27J at - 40°C
0.02 - 0.06						0.5	0.09	0.2	0.15	650	700 - 800 5.65vA	14 on GL-	1.2t	27J at - 40°C
0.6	0.02 - 0.04	60								340 - 400	600 - 700	21 on GL- 50 mm		
0.4	0.02 - 0.05									305 - 400	440 - 520	30 on GL- 50 mm		
0.4	0.02 - 0.05									305 - 400	440 - 520	30 on GL- 50 mm		
0.4	0 - 0.06	100								355	540	24 on GL- 5.65vA	1t	
0.4	0 - 0.06	100								420	590	22 on GL- 5.65vA	1.5t	
0.3	0.02 - 0.06									255	410	23 on GL- 50 mm	2t	
0.4	0.02						0.06	0.095	0.045	420 - 490	520 - 620	21 on GL- 5.65vA	0.5t	
0.4	0.02 - 0.05									300 - 400	440 - 520			
0.4	0.02 - 0.05									305 - 400	440 - 520			
0.5							0.09	0.2	0.15	460	520 - 670	14 on GL- 50mm	1t	
0.05	0.02 - 0.07	120					0.09		0.22	375	500	25 on GL- 5.65vA	1t	27J at - 0°C
	0.2		0.2	0.06	0.2	0.06	0.008	0.008	0.025	345	450	17 on GL- 50mm	2.5t	
0.4							0.005 - 0.05			345	450	21 on GL- 50mm	1.5t	
0.4							0.005 - 0.05			345	450	21 on GL- 50mm	1.5t	
0.05	0.02 - 0.07	120								325 - 405	450 - 530	28 on GL- 5.65vA	1t	
0.55		90								355	490 - 630	22 on GL- 5.65vA	2t	
0.55		90								355	490 - 630	22 on GL- 5.65vA	2t	
0.45	0.020	120			0.2 - 0.35					450	570	20 on GL- 5.65vA	2.5t	20J at 0°C
0.45	0.020	120			0.2 - 0.35					450	570	20 on GL- 5.65vA	2.5t	20J at 0°C
0.2	0.02							0.095		335 - 410	390 - 490	27 on GL- 5.65vA	0.5t	
0.2	0.02						0.055	0.095	0.045	335 - 410	390 - 490	27 on GL- 5.65vA	0.5t	
0.4	0.02						0.055	0.095	0.045	370 - 460	440 - 560	25 on GL- 5.65vA	0.5t	
0.1	0.02						0.06	0.095	0.045	460	500 - 610	21 on GL- 5.65vA	0.5t	
0.4	0.02						0.06	0.095	0.045	460 - 530	500 - 610	21 on GL- 5.65vA	0.5t	
0.1	0.02						0.06	0.095	0.045	460 - 530	500 - 610	21 on GL- 5.65vA	0.5t	

HIGH TENSILE STRUCTURAL APPLICATION

Equivalent Grade				Dimensional Scope		Chemical Composition (% max unless otherwise specified)				
BIS	JIS	EN	SAE/ ASTM	Others	Thickness (mm)	Width (mm)	C	Mn	S	P
IS:2062 E450 Cu					3.0 - 4.5 4.0 - 4.5	900 - 1250 1251 - 1560	0.22	1.6	0.045	0.045
BO(Fe570) IS:2062 E450 Cu BO(Fe570)					4.51 - 20.0	900 - 1560	0.22	1.6	0.045	0.045
IS 10748			ASTM - A36M	ST42.3	2.4 - 6.4	900 - 1350	0.16	1.2	0.04	0.04
Gr-3,IS 2062 A, B					2.5 - 5.0 3.0 - 5.0	1351 - 1500 1501 - 1550				
IS 10748 Gr-3,IS 2062 A, B	JIS G 3103 Ss400		ASTM - A36M		5.01 - 20.0	900 - 1550	0.16	1.2	0.04	0.04
IS 2062 E-250					2.4 - 7.0 2.5 - 7.0 3.0 - 7.0	900 - 1350 1351 - 1500 1501 - 1550	0.23	1.5	0.045	0.045
IS 2062 E-250					7.01 - 20.0	900 - 1550	0.23	1.5	0.045	0.045
IS 2062 Fe 410 WA, WB					3.0 - 8.0 4.0 - 8.0	900 - 1250 1251 - 1550	0.22	1.5	0.045	0.045
IS 2062 Fe 410 WA, WB					8.01 - 16.0 8.01 - 12.0	900 - 1350 1351 - 1550	0.22	1.5	0.045	0.045

										Mechanical properties				
Si	Al	N ppm (max)	Ni	Cr	Cu	Mo	Nb	V	Ti	YS Mpa (Min)	UTS MPa (Min)	% Elong	BT 180°	Impact Test
0.45	0.020	120			0.2 - 0.35					450	570	20 on GL- 5.65 A	2.5t	20J at 0°C
0.45	0.020	120			0.2 - 0.35					450	570	20 on GL- 5.65 A	2.5t	20J at 0°C
0	0.02	120								240	410	25 on GL-	2t	
												5.65 A		
0	0.02	120								240	410	25 on GL- 5.65 A	2t	
0.4										250	410	23 on GL- 5.65 A	2t	
0.4										250	410	23 on GL- 5.65 A	2t	
0.4		120								250	410	23 on GL-5.65 A 5.65 A	2t	
0.4		120								250	410	23 on GL-5.65 A 5.65 A	2t	

CHEQUERED SHEETS AND PLATES FOR STRUCTURAL USE

Equivalent Grade				Dimensional Scope		Chemical Composition (% max unless or as specified)			
BIS	JIS	EN	SAE/ ASTM	Others	Thickness (mm)	Width (mm)	C	Mn	
IS 2062 Gr A, IS 3502			ASTM A36, ASTM A786		2.5 - 6.0 3.0 - 6.0	900 - 1250 1251 - 1350	0.22	1.6	
IS 2062 Gr A, IS 3502			ASTM A36, ASTM A786		6.01 - 10.0	900 - 1500	0.22	1.6	

		Mechanical properties							
S	P	Si	Al (min)	N ppm (max)	YS Mpa (Min)	UTS MPa (Min)	% Elong	BT 180°	
0.04	0.04	0.4		120	240	410	25 on GL- 5.65 ✓A	2t	
0.04	0.04	0.4		120	240	410	25 on GL- 5.65 ✓A	2t	

STRUCTURAL AND GENERAL ENGINEERING

Equivalent Grade				Dimensional Scope		Chemical Composition (% max unless otherwise specified)				
BIS	JIS	EN	SAE/ ASTM	Others	Thickness (mm)	Width (mm)	C	Mn	S	P
IS 2062 E350 BR		EN 10025 S355JR	ASTM A 572 Grade 50		4.0 - 20.0 5.0 - 20.0	900 - 1250 1251 - 1560	0.2	1.5	0.045	0.045
			ASTM A 572 Gr 50 Type I		2.0 - 10.0 2.5 - 10.0 2.8 - 10.0 3.2 - 10.0 4.0 - 10.0	900 - 1140 1141 - 1250 1251 - 1350 1351 - 1450 1451 - 1560	0.23	1.35	0.04	0.05
IS 2062- 2011 E250					2.2 - 8.0 2.4 - 8.0 3.0 - 8.0 3.5 - 8.0	900 - 1250 1251 - 1350 1351 - 1450 1451 - 1560	0.16 - 0.2	0.3-0.4	0.03	0.03
IS 2062 E250 (Fe 410 WA &WB)			ASTM A 572 Gr 42 (290); ASTM A 515 GR 60 (415); ASTM A 1011 SS & HSLA Gr 45		4.0 - 12.5	900 - 1350	0.22	1.5	0.045	0.045
IS 2062- 2006 E 250A		EN 10025-2- 2004 S275JO			4.0 - 20.0 4.0 - 16.0	900 - 1350 1351 - 1560	0.23	1.5	0.045	0.045
			SAE 1018		2.0 - 8.0 2.5 - 8.0 3.0 - 8.0 3.2 - 8.0	900 - 1250 1251 - 1350 1351 - 1450 1451 - 1560	0.18 - 0.22	0.75 - 0.9	0.015	0.025
			SAE1018		2.0 - 8.0 2.5 - 8.0 3.0 - 8.0 3.2 - 8.0	900 - 1250 1251 - 1350 1351 - 1450 1451 - 1560	0.15 - 0.2	0.6 - 0.9	0.03	0.05
IS 2062- 2011 E350		En10025 S355JR	ASTM A 1011 SS & HSLA Gr 55/60; ASTM A 572 Gr 55		2.0 - 16.0 2.2 - 12.0 2.5 - 12.0 3.0 - 12.0	900 - 1270 1271 - 1360 1361 - 1450 1451 - 1560	0.2	1.6	0.04	0.04
IS 2062 - 2011 E410				TATA 55HF	6.0 - 16.0	900 - 1560	0.2	1.2 - 1.7	0.04	0.04
IS 2062 E 250 A, B.					2.2 - 10.0 3.0 - 10.0 3.5 - 10.0 0.4 - 10.0	900 - 1250 1251 - 1350 1351 - 1450 1451 - 1560	0.22	1.5	0.045	0.045
IS 2062 E 250 A, B.					10.01 - 20.0	900 -1560	0.22	1.5	0.045	0.045
			ASTM A572 Gr.50 Type I		2.2 - 10.0 2.5 - 10.0 3.0 - 10.0 3.5 - 10.0 4.0 - 10.0	900 - 1140 1141 - 1250 1251 - 1350 1351 - 1450 1451 - 1560	0.23	1.35	0.05	0.04
			ASTM A572 Gr.50 Type I		10.01 - 20.0	900 - 1560	0.23	1.35	0.05	0.04
			ASTM A572 Gr.50 Type I		2.2 - 10.0 2.5 - 10.0 3.0 - 10.0 3.5 - 10.0 4.0 - 10.0	900 - 1140 1141 - 1250 1251 - 1350 1351 - 1450 1451 - 1560	0.23	1.35	0.05	0.04
			ASTM A572 Gr.50		10.01 - 20.0	900 - 1560	0.23	1.35	0.05	0.04
			ASTM A572 Gr. 50 Type I		10.01 - 15.0	900 -1560	0.23	1.35	0.05	0.04
IS 2062 E 350 BR		EN 10025 S355JR	ASTM A572 Gr. 50		4.0 - 12.0	900 -1560		1.5	0.045	0.045
IS 2062 E 350 BR		EN 10025 S355JR	ASTM A572 Gr. 50		12.01 - 20.0	900 -1560		1.5	0.045	0.045

										Mechanical properties				
Si	Al	N ppm (max)	Ni	Cr	Cu	Mo	Nb	V	Ti	YS Mpa (Min)	UTS MPa (Min)	% Elong	BT 180°	Impact Test
0.45		120					0.02 - 0.035			355	490 - 630	22 on GL- 5.65 A	2t	27J at 27°C
0.4							0.005 - 0.05			345	450	21 on GL - 50 mm	1.5t	
0.035	0.01 - 0.07	70								240	410	25 on GL- 5.65 A	2t	
0.4		120					0.005			310	410	23 on GL- 5.65 A	2t	
0.4		120								275	410 - 560	23 on GL- 5.65 A	2t	
0.1	0.02 - 0.06	75												
0.55		90					0.005			355	490 - 630	22 on GL- 5.65 A	2.0t	
0.4		90								410	540	20 on GL- 5.65 A	2t	30J at 20°C
0.4		120								250	410	23 on GL- 5.65 A	2t	
0.4		120								250	410	23 on GL- 5.65 A	2t	
0.4							0.005 - 0.05			345	450	21 on GL- 50 mm	1.5t	
0.4							0.005 - 0.05			345	450	21 on GL- 50 mm	1.5t	
0.06		120					0.005 - 0.05			345	450	21 on GL- 50 mm	1.5t	
0.06		120					0.005 - 0.05			345	450	21 on GL- 50 mm	1.5t	
0.4										345	450	21 on GL- 50 mm	1.5t	
0.45	0.01 - 0.06	120								375	490-615	22 on GL- 5.65 A	2t	27J at 27°C
0.45	0.01 - 0.06	120								375	490-615	22 on GL- 5.65 A	2t	27J at 27°C

HIGH TENSILE STRUCTURAL APPLICATION

Equivalent Grade				Dimensional Scope		Chemical Composition [% max unless otherwise specified]				
BIS	JIS	EN	SAE/ ASTM	Others	Thickness (mm)	Width (mm)	C	Mn	S	P
		EN 10149-2 ST355MC DIN EN 10149-QSTE 380			2.5 - 12.5 3.0 - 12.5 2.5 - 5.0 2.6 - 5.0 2.8 - 5.0 3.0 - 5.0	900 - 1250 1251 - 1550 900 - 1250 1251 - 1350 1351 - 1450 1451 - 1560	0.12 0.21	1.5 1.35	0.02 0.05	0.025 0.04
		DIN EN 10149-QSTE 380			6.0 - 15.0	900 - 1550	0.21	1.35	0.05	0.04
IS 2062 A, B, C.	JIG3101 & JISG3106 SS400 &SM	En100025 S275JR, S275JO	ASTM A283 & ASTM A570 D & 45	DIN17100 St 44.2, St 44.3	2.0 - 8.0 3.0 - 8.0 3.5 - 8.0	900 - 1250 1251 - 1450 1451 - 1560	0.22	1.6	0.04	0.04
IS 2062- 2011 E250				WIR006 - Issue C	4.0 - 14.0	900 - 1560	0.2	1.2	0.03	0.03
		DIN EN 10149 QSTE 420			3.0 - 8.0 3.5 - 8.0 4.0 - 8.0 4.5 - 8.0	900 - 1140 1141 - 1250 1251 - 1450 1451 - 1560	0.12	1.0	0.025	0.025
IS 2062- 2011 E300	JIS G3113 SAPH 440				1.75 - 3.99 2.4 - 3.99 2.6 - 3.99 3.0 - 3.99	900 - 1250 1251 - 1350 1351 - 1450 1451 - 1560	0.21	1.35	0.05	0.04
IS 2062- 2011 E300	JIS G3113 SAPH 440				4.0 - 6.0 4.0 - 8.0	900 - 1450 1451 - 1560	0.21	1.35	0.04	0.04
IS 2062- 2011 E450		DIN EN MC 10149 S460			2.7 - 5.0	900 - 1260	0.12	1.6	0.015	0.025
				KLL 022	8.0 - 15.0	900 - 1500	0.1	1.5	0.01	0.015
IS-2062 E350			ASTM A 572 Gr 50		1.6 - 3.99 2.5 - 3.99 2.8 - 3.99	900 - 1250 1251 - 1350 1351 - 1520	0.25	1.35	.04	.035
			ASTM A 1011- 07, ASTM A 572 Gr 50	SS Gr 50, HSLA Gr50 CL-1/2	1.6 - 3.9 2.5 - 3.99 2.8 - 3.99	900 - 1250 1251 - 1350 1351 - 1520	0.25	1.35	0.04	0.035
			ASTM A 572- 07 Gr50 Type 1		4.0 - 8.0	900 - 1520	0.23	1.35	0.05	0.04
			ASTM A 572- 07 Gr50 Type 1		8.01 - 16.0	900 - 1520	0.23	1.35	0.05	0.04
			ASTM A 572 Gr50		4.0 - 8.0	900 - 1560	0.25	1.35	0.05	0.04
				KLL - 004	6.0 - 14.0	900 - 1560	0.17	1.2	0.02	0.025
IS 2062 E350	JISG3106 SM490A.B	EN10025 Fe510B		DIN17100 St 52.3	2.5 - 5.99 3.0 - 5.99	900 - 1350 1351 - 1560	0.2	1.5	0.04	0.04
IS 2062 E350	JISG3106 SM490A.B	EN10025 Fe510B		DIN17100 St 52.3	6.0 - 16.0 6.0 - 15.0	900 - 1350 1351 - 1560	0.2	1.5	0.04	0.04
IS 2062- 2011 E350	JISG3106 SM490A.B	EN10025 S355		DIN17100	2.9 - 6.0	900 - 1560	0.2	1.6	0.04	0.04
IS 2062- 2011 E350	JISG3106 SM490A.B	EN10025 Fe510B		DIN17100 St 52.3	5.0 - 15.0	900 - 1560	0.2	1.6	0.04	0.04
IS 2062- 2011 E350	JISG3106 SM490A.B	EN10025 Fe510B		DIN17100 St 52.3	12.01 - 16.0	900 - 1250	0.2	1.6	0.04	0.04
IS 2062- 2011 E350	JISG3106 SM490A.B	En10025 Fe510B		DIN17100 St 52.3	2.5 - 6.0 3.0 - 6.0	900 - 1250 1251 - 1450	0.2	1.6	0.04	0.04
IS 2062- 2011 E351			ASTM A 572 Gr 65		2.5 - 4.99 3.0 - 4.99	900 - 1250 1251 - 1560	0.23	1.65	0.045	0.045

										Mechanical properties				
Si	Al	N ppm (max)	Ni	Cr	Cu	Mo	Nb	V	Ti	YS Mpa (Min)	UTS MPa (Min)	% Elong	BT 180°	Impact Test
0.5 0.4	0.015 0.02 - 0.05						0.09	0.2	0.15	355 380 - 460	430 - 550 460 - 550	23 on GL- 5.65 A 21 on GL- 50mm	0.5t	
0.4	0.02 - 0.05									380 - 460	460 - 550	21 on GL- 50mm		
0.4		120								250	410	23 on GL- 5.65 A	2t	
0.3	0.02 - 0.06									255	410	23 on GL- 50mm	2t	
0.4	0.02						0.06	0.095	0.045	420 - 490	520 - 620	21 on GL- 5.65 A	0.5t	
0.4	0.02 - 0.05									300 - 400	440 -520			
0.4	0.02 - 0.05									305 - 400	440 - 520			
0.5							0.09	0.2	0.15	460	520 - 670	14 on GL- 50mm	1t	
0.05	0.02 - 0.07	120						0.09	0.22	375	500	25 on GL- 5.65 A	1t	27J at 0°C
.06										345	450	17 on GL- 50mm	2.5t	
	0.2		0.2	0.06	0.2	0.06	0.008	0.008	0.025	345	450	17 on GL- 50 mm	2.5t	
0.4							0.005 - 0.05			345	450	21 on GL- 50 mm	1.5t	
0.4							0.005 - 0.05			345	450	21 on GL- 50 mm	1.5t	
0.4										345	450	21 on GL- 50 mm		
0.05	0.02 - 0.07	120								325 - 405	450 - 530	28 on GL- 5.65 A	1t	
0.55		90								355	490 - 630	22 on GL- 5.65 A	2t	
0.55		90								355	490 - 630	22 on GL- 5.65 A	2t	
0.55		120								355	490 - 630	20 on GL- 5.65 A	3t	
0.55		120								355	490 - 630	20 on GL- 5.65 A	3t	
0.55		120								355	490 - 630	20 on GL- 5.65 A	3t	
0.55		120								355	517 - 630	20 on GL- 5.65 A	3t	27J at 20°C
0.06		120								450	550	17 on GL- 50mm	2.0t	



THE ULTIMATE TEST

Hot Rolled Coils are used in a variety of applications

- Automobiles
- Boiler and Pressure Vessels
- Ship Building
- Railways
- Transmission Towers
- Oil and Petrochemicals
- Coal and Mining
- General and Heavy Engineering



SALES OFFICES

AHMEDABAD

410, Abhishilp Complex, Near Keshavbag Party Plot,
Manasi Cross Road, Satellite, Ahmedabad - 380 015
Tel.: 079-40029508, 40029510, 40029509

BENGALURU

The Estate,
3rd Floor, West Wing, 121,
Dickenson Road, Bengaluru - 560 042
Tel.: 080-42448888

CHENNAI

Fagun Mansion, 5th Floor,
New No.74, Old No.26, Ethiraj Salai, Egmore,
Chennai - 600 008
Tel.: 044-28297420, 28297422

COIMBATORE

T. V. Swamy Road (West), Coimbatore - 641 002
Tel.: 0422-2541870

DELHI

Thapar House, Janpath, New Delhi - 110 001
Tel.: 011-46050000

FARIDABAD

Plot No. 161, Sector 24, Faridabad - 121 004, Haryana
Tel.: 0129-2239248, 2232387

NOIDA

14A, Industrial Area, Buland Shar Road,
Ghaziabad - 201 009
Tel.: 0120-3262875, 2867142

GUWAHATI

106, 3rd Floor, Meer Market, Maszid Lane, Kamarpatty,
Guwahati - 781 001
Tel.: 0361-2730054

HYDERABAD

7th Floor, Surya Towers, 105, Sardar Patel Road,
Secunderabad - 500 003
Tel.: 040-27846669/ 79

INDORE

3rd Floor, Lakshya Badgara, 13/1,
New Palasia, Near Curewell Hospital, Indore - 452 001
Tel.: 0731-2532156/57/58/59, 4043613

JAIPUR

Evershine Tower, F-1, 705, 7th floor,
Amarpali Circle, Vaishali Nagar, Jaipur - 302 021
Tel.: 0141 4026760/62/63/64

KANPUR

Room No.105, Ratan Esquire, Chunniganj,
Kanpur - 208 001
Tel.: 0512-3271907

KOCHI

Mitsun Enterprise, 30/1854 B4, 1st Floor, Ponnurunni
Road, Chalikkavattom Junction, Vytilla P.O.,
Kochi - 682 019
Tel.: 0484-4026392/ 4063294

KOLKATA

Godrej Waterside, 10th floor, Tower - 1, Unit No. 1003,
Block-DP, Plot- 5, Sector V, Salt Lake City, Kolkata - 700 091
Tel.: 033-40002020

LUDHIANA

109, Modelgram, Near Kochar Market, Opp. Malwa
School, Ludhiana - 141 002
Tel.: 0161-6578944, 6450816

MUMBAI

Grande Palladium, 6th Floor, 175,
CST Road, Kalina, Santacruz (East),
Mumbai - 400 098
Tel.: 022-61871000

NAGPUR

Poonam Plaza, Palm Road, Civil Lines, Nagpur-440 001
Tel.: 0712- 2520333

PATNA

1, Tilak Nagar East, Behind Patna Diesel, Kankarbagh,
Patna - 800 020
Tel: 08002230517

PUNE

2nd Floor, Mahendra Chambers, Mayfair Building A,
Dhole Patil Road, Pune - 411 001
Tel.: 020-64104547, 27111427

RUDRAPUR

Plot No. 264, By Pass Road, Village Kishanpur, Kichha,
District Udam Singh Nagar Uttarakand - 263 148
Tel.: 05944-263290

