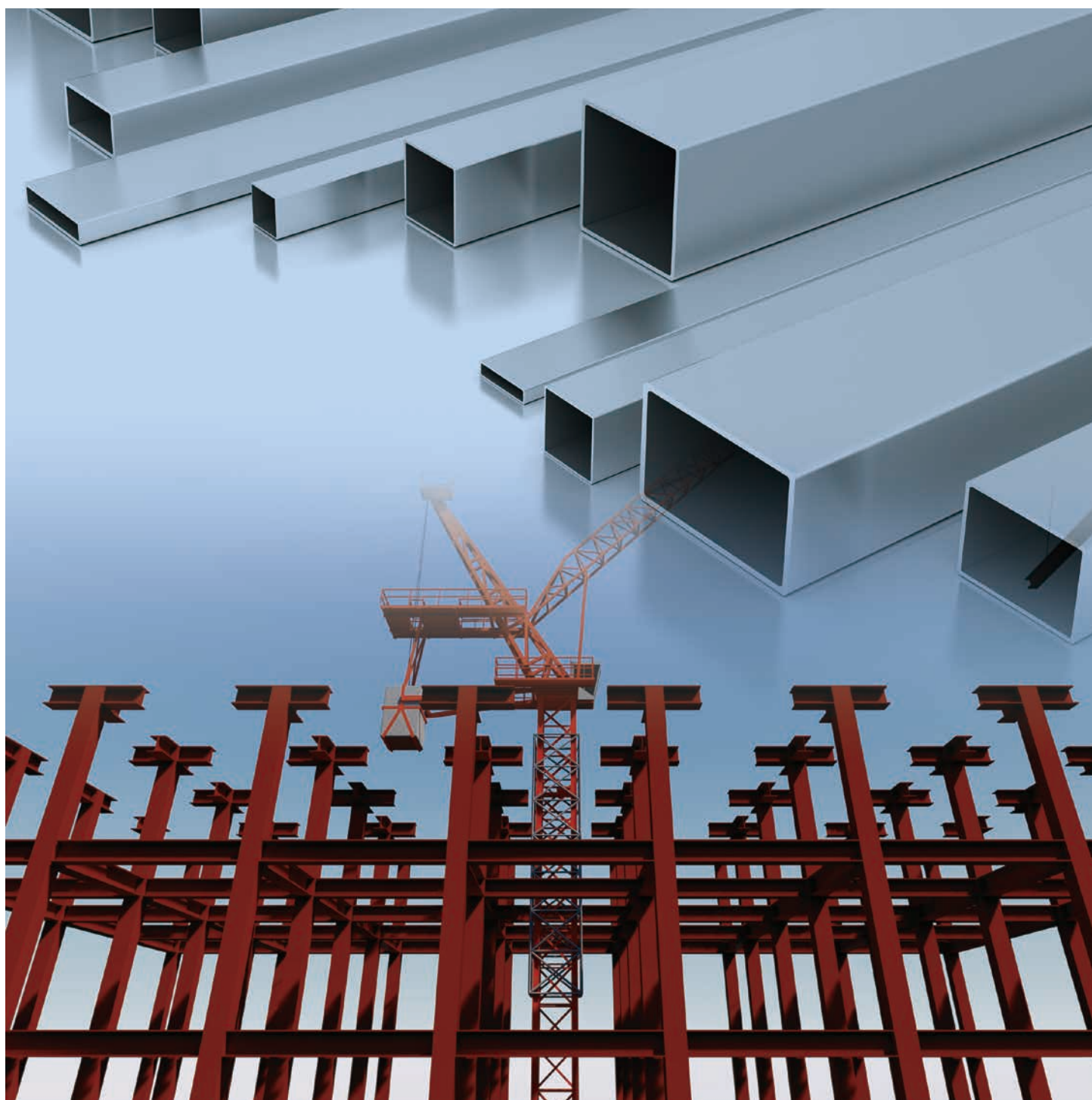




JFE Hot Rolled Steel Strip for general structure application



JFE Steel Corporation



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JFE Hot Rolled Steel Strip for general structure application

(For Pipes, Tubes, Columns, C-channels, Purlin, others)

1 Stable high quality

JFE manufactures its product through integrated manufacturing process and product management system. Integrated process from blast furnace, steel making, continuous casting and hot rolled strip mill contribute for high quality strips with accurate dimension and excellent surface conditions.

2 Various product line-up

JFE produces various steel strips

- JFE HP series, JFE own proprietary grade
- Public standards, JIS, ASTM, EN, IS

3 Technical services for customers

- Advise for customer material selection based on required specification, customer processing etc.
- Trial order production and technical assistance for evaluation
- Continued technical support for our ordered products

JFE produces various hot rolled steel strips for general structures based on JFE proprietary and public standards.

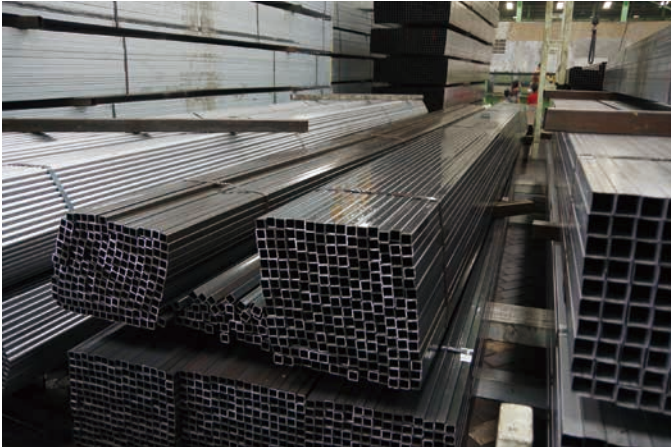
JFE proprietary and Public standards

Main applications	Tensile strength (MPa)	JFE proprietary standard	Public standard			
		JFE-HP	JIS G 3132 G 3101 G 3106	ASTM A36M A1011M	EN 10025-2	IS 2062 IS 10748
Small and medium diameter pipes and tubes	270 min.	JFE-HP290 JFE-HP320 JFE-HP340 JFE-HP370	SPHT1 SPHT2	SS Grade 30		Gr1 Gr2
General structures	400 min.	JFE-HP410	SPHT3 SS400 SM400A	A36 SS Grade 45	S235JR	E250 Gr3
Strength structures, Purlin	440 min.	JFE-HP440		SS Grade 50 HSLAS Grade 50 Class 1	S275JR	E300
High strength structures, Large diameter square pipes	490 min.	JFE-HP490 JFE-HP540	SPHT4 SS490 SM490A SM490YA	HSLAS Grade 60 Class1	S355JR	E350

For ASTM and EN standard inquiries, JFE may propose modified specifications.
(Please contact JFE for details)

JFE Hot Rolled Steel Strip for general structure application

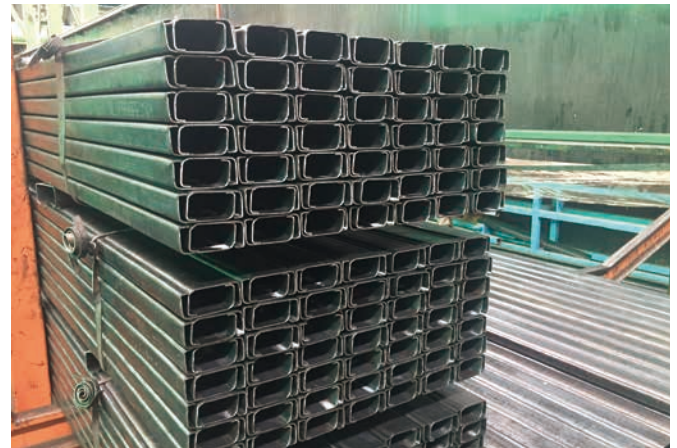
Applications



Small diameter pipes and tubes



Square pipes (Columns)



C-channels



Lightweight welded steel

JFE Proprietary Standard

Feature

: Various strength range compare to JIS which provide options for customer purchase.

Designation	Chemical Composition (wt%)					
	C	Si	Mn	P	S	Al total
JFE-HP290	0.10max.	0.35max.	0.50max.	0.035max.	0.035max.	–
JFE-HP320	0.18max.	0.35max.	0.60max.	0.035max.	0.035max.	–
JFE-HP340	0.18max.	0.35max.	0.60max.	0.035max.	0.035max.	–
JFE-HP370	0.25max.	0.35max.	0.30-0.90	0.035max.	0.035max.	–
JFE-HP410	0.25max.	0.35max.	0.30-0.90	0.035max.	0.035max.	–
JFE-HP440	0.30max.	0.35max.	0.30-1.00	0.035max.	0.035max.	–
JFE-HP490	0.30max.	0.35max.	0.30-1.00	0.035max.	0.035max.	–
JFE-HP540	0.23max.	0.35max.	1.50max.	0.035max.	0.035max.	0.080max.

Reference : Bending test will be performed when requested by customers.

Dimension tolerance

Please contact JFE for detail.



JFE Hot Rolled Steel Strip for general structure application

Tensile Test							
Yield point Or Yield strength min. (MPa)	Tensile strength min. (MPa)	Elongation min. (%)					Test Piece and Testing Direction
		Thickness (mm)					
		1.2≤ <1.6	1.6≤ <3.0	3.0≤ <6.0	6.0≤ <13.0	13.0≤ ≤16.0	
–	290	30	32	35	37	38	JIS No.5 Rolling Direction
175	320	28	30	33	36	37	
205	340	26	28	31	34	36	
215	370	–	25	28	31	33	
245	410	–	22	25	28	30	
305	440	–	21	24	27	29	
345	490	–	19	23	25	27	
390	540	–	–	18	20	22	



JIS (Japanese Industrial Standard)

Classification	Designation	Chemical Composition (wt%)					Yield point Or Yield strength (MPa)
		C	Si	Mn	P	S	
Hot-Rolled Carbon Steel Strip for Pipes and Tubes JIS G 3132-2018	SPHT1	0.10 max.	0.35 max. (a)	0.50 max.	0.040 max.	0.040 max.	—
	SPHT2	0.18 max.	0.35 max. (a)	0.60 max.	0.040 max.	0.040 max.	—
	SPHT3	0.25 max.	0.35 max. (a)	0.30 to 0.90	0.040 max.	0.040 max.	—
	SPHT4	0.30 max.	0.35 max. (a)	0.30 to 1.00	0.040 max.	0.040 max.	—
Rolled Steels for General Structure JIS G 3101-2020	SS400	—	—	—	0.050 max.	0.050 max.	245 min.
							235 min.
	SS490	—	—	—	0.050 max.	0.050 max.	285 min.
							275 min.
Rolled Steels for Welded Structure JIS G 3106-2020	SM400A	0.23 max.	—	2.5 × C min.	0.035 max.	0.035 max.	245 min.
							235 min.
	SM490A	0.20 max.	0.55 max.	1.60 max.	0.035 max.	0.035 max.	325 min.
							315 min.
	SM490YA	0.20 max.	0.55 max.	1.60 max.	0.035 max.	0.035 max.	365 min.
							355 min.

- a) In case of galvanizing for steel pipes, it may be 0.04% or less depending on the agreement between the receiving party and the delivering party.
b) Depending on the agreement between the parties, the following value may be applied as the lower limit of the elongation. SPHT3: 20%, SPHT4: 15%
c) JIS No. 3 test piece may be used for bending test of steel materials which thickness is 5mm or less.

Please refer to the latest standard document for details.

JFE Hot Rolled Steel Strip for general structure application

Tensile Test				Bendability			
Tensile strength (MPa)	Thickness	Elongation (%)	Tensile Test Piece	Bending Angle	Thickness	Inside Radius Thickness $\leq 3.0\text{mm}$	Test Piece
270 min.	$1.2\text{mm} \leq t < 1.6\text{mm}$	30 min.	JIS No.5 in rolling direction	180°	$t \leq 3.0\text{mm}$	Flat on itself	JIS No.3 in rolling direction
	$1.6\text{mm} \leq t < 3.0\text{mm}$	32 min.			$3.0\text{mm} < t \leq 13\text{mm}$	Thickness $\times 0.5$	
	$3.0\text{mm} \leq t < 6.0\text{mm}$	35 min.				Thickness $\times 1.0$	
	$6.0\text{mm} \leq t \leq 13\text{mm}$	37 min.			$3.0\text{mm} < t \leq 13\text{mm}$	Thickness $\times 1.5$	
340 min.	$1.2\text{mm} \leq t < 1.6\text{mm}$	25 min.		180°	$t \leq 3.0\text{mm}$	Thickness $\times 1.0$	
	$1.6\text{mm} \leq t < 3.0\text{mm}$	27 min.			$3.0\text{mm} < t \leq 13\text{mm}$	Thickness $\times 1.5$	
	$3.0\text{mm} \leq t < 6.0\text{mm}$	30 min.				Thickness $\times 2.0$	
	$6.0\text{mm} \leq t \leq 13\text{mm}$	32 min.			$3.0\text{mm} < t \leq 13\text{mm}$	Thickness $\times 2.0$	
410 min.	$1.2\text{mm} \leq t < 1.6\text{mm}$	– (b)		180°	$t \leq 3.0\text{mm}$	Thickness $\times 1.5$	
	$1.6\text{mm} \leq t < 3.0\text{mm}$	22 min.			$3.0\text{mm} < t \leq 13\text{mm}$	Thickness $\times 2.0$	
	$3.0\text{mm} \leq t < 6.0\text{mm}$	25 min.				Thickness $\times 2.0$	
	$6.0\text{mm} \leq t \leq 13\text{mm}$	27 min.			$3.0\text{mm} < t \leq 13\text{mm}$	Thickness $\times 2.0$	
490 min.	$1.2\text{mm} \leq t < 1.6\text{mm}$	– (b)		180°	$t \leq 3.0\text{mm}$	Thickness $\times 1.5$	
	$1.6\text{mm} \leq t < 3.0\text{mm}$	18 min.			$3.0\text{mm} < t \leq 13\text{mm}$	Thickness $\times 2.0$	
	$3.0\text{mm} \leq t < 6.0\text{mm}$	20 min.				Thickness $\times 2.0$	
	$6.0\text{mm} \leq t \leq 13\text{mm}$	22 min.			$3.0\text{mm} < t \leq 13\text{mm}$	Thickness $\times 2.0$	
400 to 510	$t \leq 5\text{mm}$	21 min.	JIS No.5	180°	–	Thickness $\times 1.5$	JIS No.1 (c)
	$5\text{mm} < t \leq 16\text{mm}$	17 min.	JIS No.1A				
	$16\text{mm} < t$	21 min.	JIS No.1A				
490 to 610	$t \leq 5\text{mm}$	19 min.	JIS No.5	180°	–	Thickness $\times 2.0$	JIS No.1 (c)
	$5\text{mm} < t \leq 16\text{mm}$	15 min.	JIS No.1A				
	$16\text{mm} < t$	19 min.	JIS No.1A				
400 to 510	$t \leq 5\text{mm}$	23 min.	JIS No.5	–	–	–	–
	$5\text{mm} < t \leq 16\text{mm}$	18 min.	JIS No.1A				
	$16\text{mm} < t$	22 min.	JIS No.1A				
490 to 610	$t \leq 5\text{mm}$	22 min.	JIS No.5	–	–	–	–
	$5\text{mm} < t \leq 16\text{mm}$	17 min.	JIS No.1A				
	$16\text{mm} < t$	21 min.	JIS No.1A				
490 to 610	$t \leq 5\text{mm}$	19 min.	JIS No.5	–	–	–	–
	$5\text{mm} < t \leq 16\text{mm}$	15 min.	JIS No.1A				
	$16\text{mm} < t$	19 min.	JIS No.1A				

ASTM Standard

Classification	Designation	Chemical Composition (wt%)							
		C	Si	Mn	P	S	Cu	Ni	Cr
ASTM A36M-19 Carbon Structural Steel	A36M (Thickness up to 20mm)	0.25 max.	0.40 max.	–	0.030 max.	0.030 max.	0.20 min. when specified	–	–
ASTM A1011M-23	SS Grade 30	0.25 max.	–	0.90 max.	0.035 max.	0.04 max.	0.20 max. (b)	0.20 max.	0.15 max.
	SS Grade 45 Type 1 (C)	0.25 max.	–	1.35 max.	0.035 max.	0.04 max.	0.20 max. (b)	0.20 max.	0.15 max.
	SS Grade 50 (C)	0.25 max.	–	1.35 max.	0.035 max.	0.04 max.	0.20 max. (b)	0.20 max.	0.15 max.
	HSLAS Grade 50 Class 1 (C)	0.23 max.	–	1.35 max.	0.04 max.	0.04 max.	0.20 max. (b)	0.20 max.	0.15 max.
	HSLAS Grade 60 Class 1	0.26 max.	–	1.50 max.	0.04 max.	0.04 max.	0.20 max. (b)	0.20 max.	0.15 max.

(a) For plates wider than 24 in. [600mm], the elongation requirement is reduced two percentage points.

(b) When copper is specified, a minimum of 0.20% is required. When copper steel is not specified, the copper limit is a maximum requirement.

(c) For each reduction of 0.01% below the specified carbon maximum, an increase of 0.06% manganese above the specified maximum will be permitted up to maximum of 1.50%.

Please refer to the latest standard document for details.

For ASTM Standards inquiries, JFE may propose modified standard.

(Please contact JFE for details)

JFE Hot Rolled Steel Strip for general structure application

				Tensile Test				
Mo	V	Cb/Nb	Ti	Yield point Or Yield strength (MPa)	Tensile strength (MPa)	Thickness	Elongation (%)	Tensile Test Piece
—	—	—	—	250 min. [36 ksi min.]	400 to 550 [58 to 80 ksi]	—	23 min. (a)	Parallel to the rolling direction
0.06 max.	0.008 max.	0.008 max.	0.025 max.	205 min. [30 ksi min.]	340 min. [49 ksi min.]	1.2mm≤t<1.6mm	21 min.	
						1.6mm≤t<2.5mm	24 min.	
						2.5mm≤t<6.0mm	25 min.	
0.06 max.	0.008 max.	0.008 max.	0.025 max.	310 min. [45 ksi min.]	410 min. [60 ksi min.]	1.2mm≤t<1.6mm	13 min.	
						1.6mm≤t<3.0mm	18 min.	
						3.0mm≤t<6.0mm	19 min.	
0.06 max.	0.008 max.	0.008 max.	0.025 max.	340 min. [50 ksi min.]	450 min. [65 ksi min.]	1.2mm≤t<1.6mm	11 min.	
						1.6mm≤t<3.0mm	16 min.	
						3.0mm≤t<6.0mm	17 min.	
0.06 max.	0.01 min.	0.005 min.	0.005 min.	340 min. [50 ksi min.]	450 min. [65 ksi min.]	≤2.5mm	20	
						>2.5mm	22	
0.06 max.	0.01 min.	0.005 min.	0.005 min.	410 min. [60 ksi min.]	520 min. [75 ksi min.]	≤2.5mm	16	
						>2.5mm	18	

EN Standard

Classification	Designation	Chemical Composition (wt%)							
		C	Si	Mn	P	S	N (a)	Cu	Carbon Equivalent Value
EN 10025-2 : 2019 Hot rolled products of structural steels (Thickness up to 16mm)	S235JR	0.17 max.	–	1.40 max.	0.035 max.	0.035 max.	0.012 max.	0.55 max.	0.35 max.
	S275JR	0.21 max.	–	1.50 max.	0.035 max.	0.04 max.	0.012 max.	0.55 max.	0.40 max.
	S355JR	0.24 max.	0.55 max.	1.60 max.	0.035 max.	0.04 max.	0.012 max.	0.55 max.	0.45 max.

For determining the carbon equivalent value the following IIW (International Institute of Welding) formula shall be used:

$$CEV = C + \frac{Mn}{6} + \frac{Cr+Mo+V}{5} + \frac{Ni+Cu}{15}$$

- a) The max. value for nitrogen does not apply if the chemical composition shows a minimum total Al content of 0.020% or alternatively min. 0.015% acid soluble Al or if sufficient other N binding elements are present. In this case the N binding elements shall be mentioned in the inspection document.

Indian Standard

Classification	Designation	Chemical Composition (wt%)						Yield stress (MPa)
		C	Si	Mn	P	S	Carbon Equivalent	
IS 2062 :2011 Hot rolled medium and high tensile structural steel (a) Thickness<20mm	E250 A	0.23 max.	0.40 max.	1.50 max.	0.045 max.	0.045 max.	0.42 max.	250 min.
	E300 A	0.20 max.	0.45 max.	1.50 max.	0.045 max.	0.045 max.	0.44 max.	300 min.
	E350 A	0.20 max.	0.45 max.	1.55 max.	0.045 max.	0.045 max.	0.47 max.	350 min.
IS 10748 :2004 HOT rolled steel strip for welded tubes and pipes (b)	Gr1	0.10 max.	–	0.50 max.	0.040 max.	0.040 max.	–	170 min.
	Gr2	0.12 max.	–	0.60 max.	0.040 max.	0.040 max.	–	210 min.
	Gr3	0.16 max.	–	1.20 max.	0.040 max.	0.040 max.	–	240 min.

Carbon equivalent (CE) would be calculated based on ladle analysis, only

$$CE = C + \frac{Mn}{6} + \frac{Cr+Mo+V}{5} + \frac{Ni+Cu}{15}$$

- a) Micro-alloying elements like Nb, V and Ti may be added singly or in combination. Total micro-alloying elements shall not be more than 0.25 percent.
b) Micro-alloying elements like Nb, V and Ti, when used individually or in combination, the total content shall not exceed 0.20 percent.
c) Nitrogen content of steel shall not exceed 0.012 percent which shall be ensured by the manufacturer by occasional check analysis.

JFE Hot Rolled Steel Strip for general structure application

Tensile Test								
Yield strength (MPa)	Tensile strength (MPa)		Elongation (%)					Tensile Test Piece
	Thickness (mm)		Thickness (mm)					
	<3	≥ 3 ≤ 16	>1 ≤ 1.5	>1.5 ≤ 2	>2 ≤ 2.5	>2.5 <3	≥ 3 ≤ 16	
235 min.	360 to 510	360 to 510	16 min.	17 min.	18 min.	19 min.	24 min.	Transverse to the rolling direction L0=80mm thickness<3mm L0=5.65√S0 thickness≥3mm
275 min.	430 to 580	410 to 560	14 min.	15 min.	16 min.	17 min.	21 min.	
355 min.	510 to 680	470 to 630	13 min.	14 min.	15 min.	16 min.	20 min.	

Please refer to the latest standard document for details.

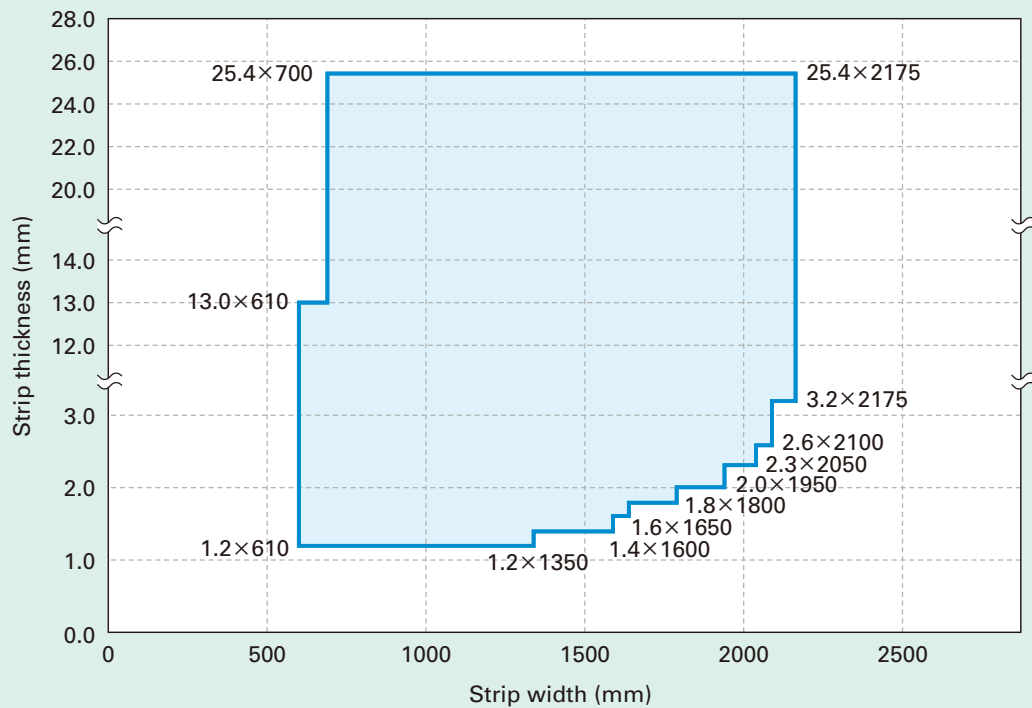
For EN Standards inquiries, JFE may propose modified standard. (Please contact JFE for details)

Tensile Test			Bend Test		
Tensile strength (MPa)	Elongation (%)	Tensile Test Piece	Bending Angle	Internal Bend Diameter	Bend Test Piece
410 min.	23 min.	Crosswise (transverse) to the rolling direction Gauge Length L0=5.65√S0	180°	2t	Crosswise (transverse) to the rolling direction
440 min.	22 min.		180°	2t	
490 min.	22 min.		180°	2t	
290 min.	30 min.		180°	t	
330 min.	28 min.		180°	2t	
410 min.	25 min.		180°	2t	

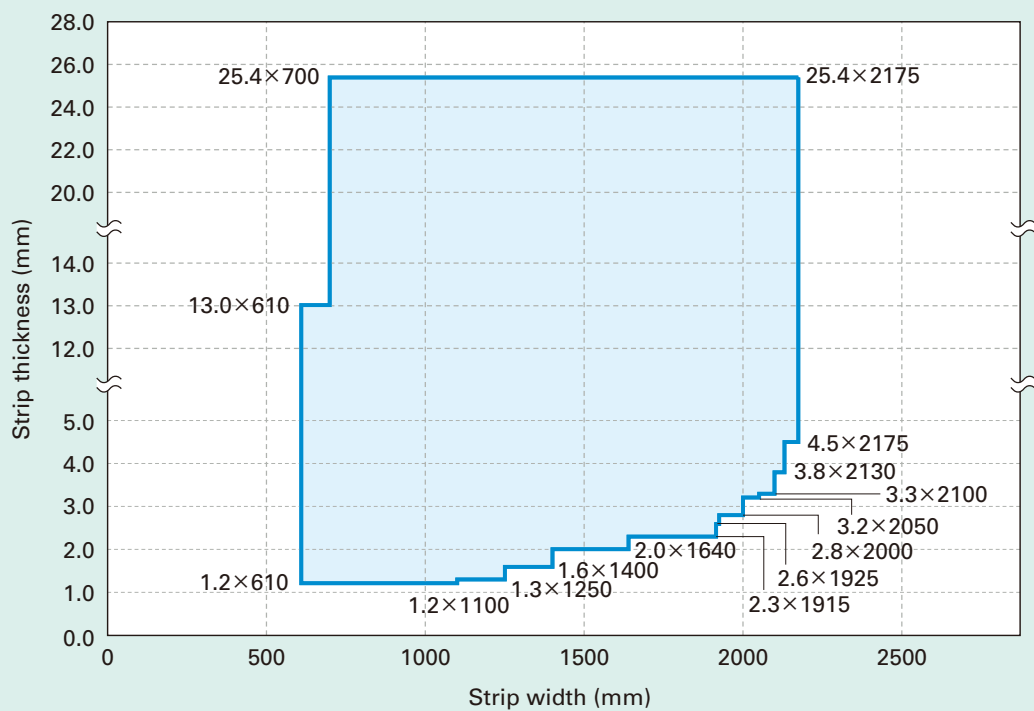
Please refer to the latest standard document for details.

Available product size range

■ Minimum tensile strength : 270MPa class



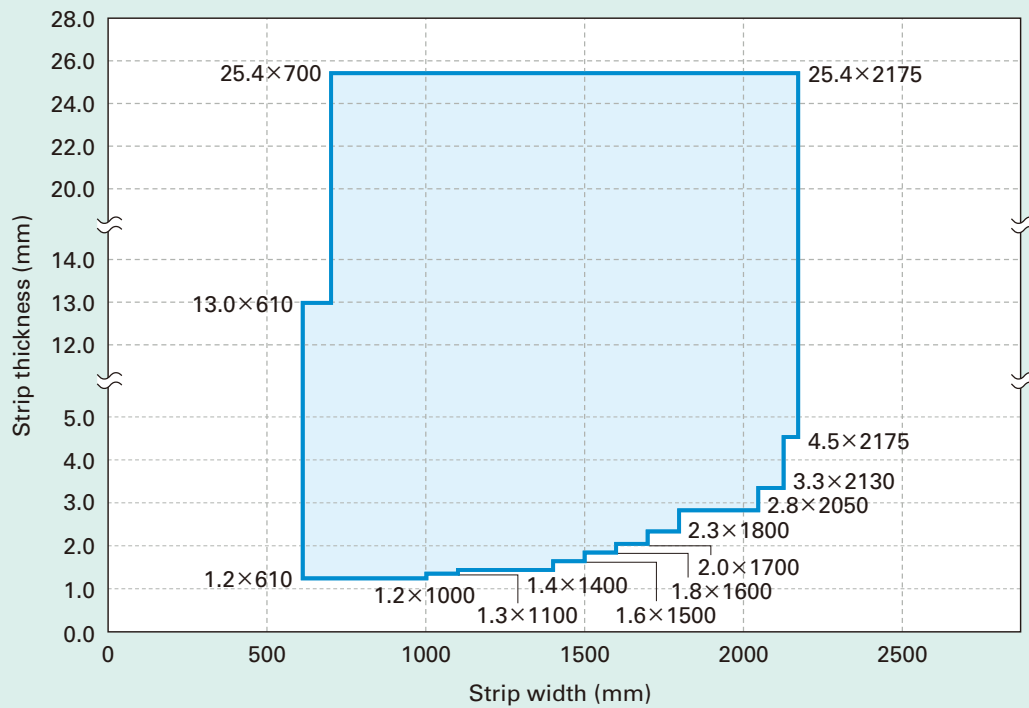
■ Minimum tensile strength : 400MPa class



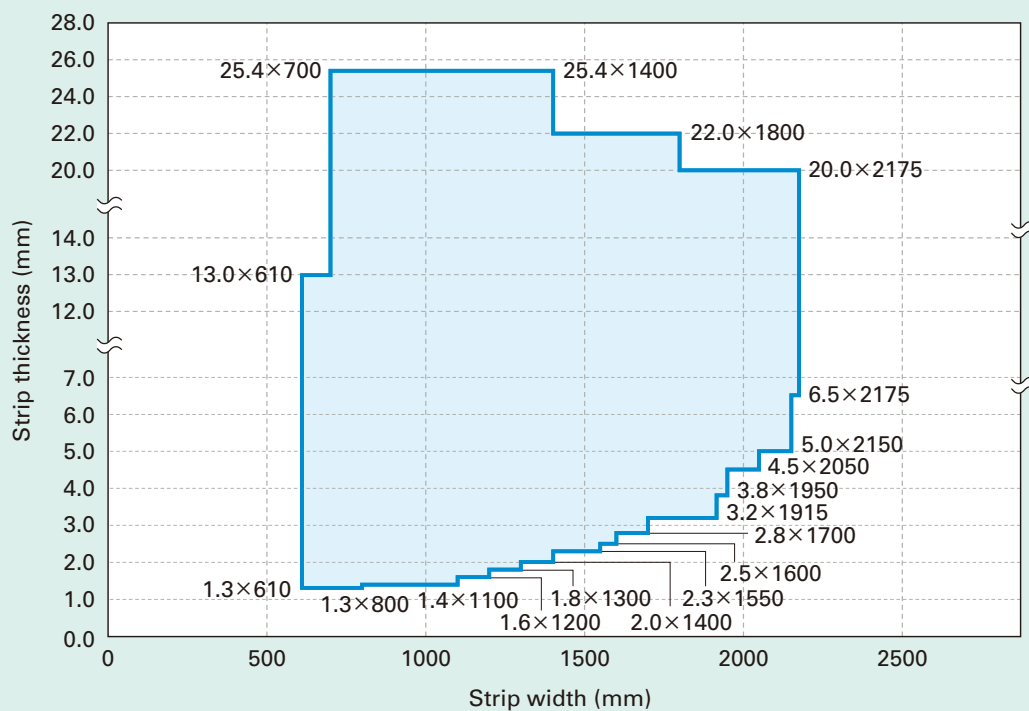
As there may be minor changes of the available product size range according to standard, application and method of working, contact and negotiation will be welcomed.

JFE Hot Rolled Steel Strip for general structure application

■ Minimum tensile strength : 440MPa class



■ Minimum tensile strength : 490MPa class



As there may be minor changes of the available product size range according to standard, application and method of working, contact and negotiation will be welcomed.

JFE Steel Corporation

<https://www.jfe-steel.co.jp/en/>

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