

TATA STEEL



Untapped energy

Speciality Steels for the Oil and Gas industry



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Steels for the Oil and Gas Industry

Producing high integrity steels

For more than 100 years Tata Steel have been a leading manufacturer of speciality steel for the world's most demanding environments backed by an ever expanding list of accreditations.

As a result we can advise on both material selection and supply routes, adding real value to a project from day one. Our experts can support design engineers across a wide variety of disciplines, helping our customers make the correct decision early in the design process.

Special engineering steels are used throughout the oil and gas extraction industry for components where

strength, toughness, resistance to fatigue and corrosion are paramount along with consistency and reliability in operation.

We not only provide steels that endure the extreme operating conditions that prevail in the oil and gas industry, we continually work in partnership with our customers to ensure that product performance is matched by sustainable and efficient supply.

Quality approvals

Our quality management systems have been assessed by over 100 component and equipment manufacturers, end users, third parties and national bodies. Some of the relevant approvals include:

Accreditations

BS EN ISO 9001

BS EN 9100

BS EN ISO 17025 (testing)

Nadcap:

Heat treatment

NDT

Material testing

Schlumberger

Statoil

TUV

Weir Materials Limited

Environmental Approval

ISO 14001

Customer Approvals for Oil and Gas and other demanding sectors

Alstom Energy

Baker Hughes

Boeing Commercial Airplane

British Aerospace

Caterpillar

Det Norske Veritas

Germanischer Lloyd

GKN Aerospace

Halliburton

Lloyds RS

National Oilwell

QUASCO

Ramnas Bruk

Reed Tool Company

Rolls-Royce

Product Range

Product		Metric (mm)	Imperial (in)
Primary Products			
Rolled	Blooms	211 - 457	8 ¹ / ₄ - 18
	Billets	50 - 211	2 - 8 ¹ / ₄
	Slabs	width	3 ⁷ / ₈ - 19 ⁵ / ₈
		thickness	50 - 330
	Rounds	76 - 381	3 - 15
Rerolled Products			
Lengths	Rounds	*25 - 105	1 - 4 ¹ / ₈
	Hexagaons	25 - 80	1 - 3 ¹ / ₈
	Squares	25 - 48	1 - 1 ⁷ / ₈
Coils	Rounds	15.5 - 60	⁵ / ₈ - 2 ⁵ / ₁₆
	Hexagaons	15 - 52	¹⁹ / ₃₂ - 2 ¹ / ₁₆
	Squares	15 - 50	¹⁹ / ₃₂ - 2

Slab width and and thickness combinations available on request.

Maximum turned bar size 350mm or 14in diameter.

Surface finish and heat treatment conditions as specified.

*Smaller sizes by agreement.

Maximum product length	Primary		Rerolled	
	m	ft	m	ft
Rolled Billets	13	42	18	59
Rolled - Other products	13	42	18	59
Turned	13	42	9	30
Heat treated	10.4	34	9	30

Carbon, chain and alloy steels

Grade	Related Standards & Specifications	Summary of Properties	Nominal chemical analysis %								
			C	Mn	Cr	Mo	Ni	V	Nb	Cu	N
Carbon											
LF2	ASTM A350	Standard carbon flange steel with good notch toughness	0.15	1.20	Optional V/Nb to customer requirements						
X65	API 5LX	Higher strength, tough weldable carbon steel with good resistance to Hydrogen Induced Cracking	0.08	1.30							
Flange Steel	ASTM A694										
Chain											
R3	ORQ RQ3	Offshore mooring chain steel	0.30								
ORQ +20%		Intermediate rig grade	0.20							} Alloyed for specific applications and sizes	
R35		Intermediate rig grade	0.20								
R4	K4RIG, RQ4	High strength rig grade	0.25								
Alloy – Heat Treated											
4130	API 6A NACE MR0175, ISO 15156 AISI 4130	Standard 0.3%CrMo steel with good combination of strength and toughness	0.30	0.50	1.00	0.20					
4140	API 6A NACE MR0175, ISO 15156 AISI 4140	Standard 0.4%CrMo steel for use at higher strength levels	0.40	0.80	1.00	0.20					
4140 Mod	NACE MR0175, ISO 15156	Enhanced hardenability version of 4140 for larger section sizes	0.40	1.00	1.00	0.33					
4145H Mod	API7 sections 4/5/6	Enhanced hardenability version of 4145 for larger section sizes, suitable for drill collars	0.47	1.10	1.10	0.33					
F22	ASTM A182, UNSK21590 NACE MR0175, ISO 15156	Weldable steel with good low temperature toughness	0.12	0.50	2.40	1.00					
9Cr1Mo	ASTM A199 ASTM A213 NACE MR0175, ISO 15156	High strength alloy steel with corrosion resistance superior to the 41xx series	0.12	0.50	9.00	1.00					
8630 Mod	NACE MR0175, ISO 15156	High strength alloy steel with good low temperature toughness	0.30	0.85	0.95	0.40	0.85				
4340	ASTM A434	High strength alloy steel	0.40	0.70	0.80	0.25	1.80				
4330V	AMS 6427, ASTM A646 AMS 4330M, UNS K23080	High strength, high toughness, low alloy steel for oil tool applications	0.30	0.85	0.90	0.45	1.80	0.08			
EN30B	B5970 - 1955 835 M30 - B5970 Pt11983	High strength alloy, combined with good impact properties	0.30	0.55	1.25	0.30	4.10				
Alloy Carburising											
8620		Carburising steel	0.20	0.80	0.50	0.20	0.50				
4715		Carburising steel	0.15	0.80	0.45	0.35	1.00				
4815		Carburising steel	0.15	0.50		0.25	3.50				

Carbon, chain and alloy steels

Grade	Related Standards & Specifications	Mechanical properties							
		Minimum tensile properties			R of A %	Hardness (Max) HB	Limited Ruling Section	Heat Treatment	Impact properties Charpy 'V' notch Joules @ temperature
		UTS ksi (N/mm ²)	0.2% PS ksi (N/mm ²)	EI %					
Carbon									
LF2	ASTM A350	70	36	22	30	197		By agreement	20 @ -46°C
X65	API 5LX	77	65				6"	WQ & temper	50 @ -46°C
Flange Steel	ASTM A694								
Chain									
R3	ORQ RQ3	100 (690)	60 (410)	17	50		6"	WQ & temper	60 @ 0°C 40 @ -20°C
ORQ +20%		110 (750)	80 (540)	15	50		5"	WQ & temper	58 @ 0°C
R3S		113 (770)	71 (490)	15	50		61/2"	WQ & temper	65 @ 0°C 45 @ -20°C 50 @ -20°C
R4	K4RIG, RQ4	125 (860)	85 (580)	12	50		5"	WQ & temper	50 @ -20°C
Alloy - Heat treated									
4130	API 6A NACE MR0175, ISO 15156 AISI 4130	100 100	80 75	16 18	35 35	235 235	2" 4"	(N) WQ & temper (N) WQ & temper	20 @ -60°C
4140	API 6A NACE MR0175, ISO 15156 AISI 4140	130 120 100	110 100 80	13 14 20	35 30 40	341 302 235	6" 7" 7"	O/WQ & temper O/WQ & temper O/WQ & temper	40 @ 23°C 54 @ 23°C
4140 Mod	NACE MR0175, ISO 15156	130 100 100	110 80 70	13 20 20	35 40 40	341 235 235	8" 8" 11"	O/WQ & temper O/WQ & temper O/WQ & temper	54 @ 23°C 54 @ 23°C
4145H Mod	API7 sections 4/5/6	140 135	120 110	13 13	40 40	341 341	6 7/8" 12 1/4"	O/WQ & temper O/WQ & temper	54 @ 23°C 54 @ 23°C
F22	ASTM A182, UNSK21590 NACE MR0175, ISO 15156	100	75	18	35	235	7"	WQ & temper	42 @ -60°C
9Cr1Mo	ASTM A199 ASTM A213 NACE MR0175, ISO 15156	100	80	20	40	235	11"	OQ temper/double temper	54 @ 23°C
8630 Mod	NACE MR0175, ISO 15156	100 130	85 110	15 11	35 35	235 341	10" 10"	(N) WQ & temper	42 @ -60°C 27 @ -32°C
4340	ASTM A434	135 (930) 130 (900)	105 (720) 100 (690)	14 14	35 35		7" 9 1/2"	O/WQ & temper	
4330V	AMS 6427, ASTM A646 AMS 4330M, UNS K23080	130 150 165	115 135 165	16 14 12	50 45 40		10"	O/WQ & temper	88 @ 23°C 68 @ -46°C 68 @ 23°C 41 @ -46°C 54 @ 23°C 20 @ -46°C
EN30B	BS970 - 1955 835 M30 - BS970 Pt1 1983	160	135	13	50		10"	O/WQ & temper	60 @ 23°C 20 @ -46°C

Stainless steels

Grade	Related Standards & Specifications	Summary of Properties	Nominal chemical analysis %								
			C	Mn	Cr	Mo	Ni	V	Nb	Cu	N
Martensitic											
410	ASTM A276 ASTM A479 NACE MR0175 ISO 15156	13% Cr steel with high strength and better corrosion resistance than alloy steels	0.10	0.50	13.00						
420	ASTM A276	Lower ferrite 13%Cr steel for improved corrosion resistance and enhanced workability	0.20	0.80	13.00						
F6NM Types*	UNS 42400 NACE MR0175 ISO 15156 ASTM A182	Enhanced 13%Cr steel with excellent low temperature impact properties and corrosion resistance	0.02 0.02	0.70 0.70	13.00 13.00	0.35 0.55	4.00 4.00				
13/2/5	UNS S41427 X2CrNiMoV13-5-2 1.4415 NACE MR0175 ISO 15156	Enhanced 13%Cr steel with superior corrosion resistance, strength and toughness	0.02	0.40	12.25	2.00	5.25	0.20			
Ppt hardening											
520B		Machinable corrosion resistant steel with freedom from distortion on heat treatment to high strengths	0.05	0.80	13.50	1.50	5.50		0.30	1.70	
17/4	UNS S17400 ASTM A564 NACE MR0175 ISO 15156 W 1.4548	Improved corrosion resistant age-hardening stainless steel with minimal distortion and scaling on heat treating after machining	0.05	0.80	16.00		4.00		0.30	3.50	
450	UNS S45000	Corrosion resistant age hardening steel	0.015	0.50	14.60	0.55	5.40		0.40	1.35	
Austenitic**											
304	ASTM A182	Standard stainless steels for high corrosion resistance	0.04	1.50	18.50		9.00				
304L			0.02	1.50	18.50		10.50				
316	ASTM A182	Standard stainless steels for corrosion resistance higher than 304 types	0.04	1.50	17.00	2.50	12.50				
316L			0.02	1.50	17.00	2.50	13.00				
316LN			0.02	1.50	17.00	2.50	12.00				0.14
Duplex											
22/5*	ASTM A182 UNS S31803 NACE MR0175 ISO 15156	Higher strength/superior resistance to stress corrosion cracking for chloride and/or sour gas conditions	0.02	1.50	22.60	3.00	5.50				0.17
25/7*		Higher Cr duplex steel for improved pitting and corrosion resistance	0.02	1.20	25.00	3.00	7.00				0.17
Super Duplex*	UNS S32760	Enhanced strength and resistance to chloride stress corrosion cracking	0.02	0.50	25.50	3.50	7.00			0.70	0.23 +0.70%W

*Available on request **Improved machinable versions (prefixed IM) are also available

Stainless steels

Grade	Related Standards & Specifications	Mechanical properties								
		Minimum tensile properties				R of A %	Hardness (Max) HB	Limited Ruling Section	Heat Treatment (Condition)	Impact properties Charpy 'V' notch Joules @ temperature
		UTS ksi	0.2% PS ksi	El %						
Martensitic										
410	ASTM A276 ASTM A479 NACE MR0175 ISO 15156	100	80	20	40	235	10"	OQ & temper/double temper	20 @ -10°C 27 @ 0°C	
420	ASTM A276	110 100	90 80	17 20	35 40	260 235	6" 10"	OQ & temper/double temper	15 @ -10°C	
F6NM Types*	UNS 42400 NACE MR0175 ISO 15156 ASTM A182	100	80	15	35	241	6"	Air hardened and double tempered	42 @ -60°C	
13/2/5	UNS S41427 X2CrNiMoV13-5-2 1.4415 NACE MR0175 ISO 15156	105 125	95 110	18 15	40 40	28 HRc 32 HRc		OQ & temper stress relieved	54 @ -10°C 30 @ -60°C 54 @ -10°C 30 @ -60°C	
Ppt hardening										
520B	BS55100	180 160 135	150 150 110	10 12 15				St & aged St & aged St & aged	20 @ 23°C (IZOD) 27 @ 23°C (IZOD) 54 @ 23°C (IZOD)	
17/4	UNS S17400 ASTM A564 NACE MR0175 ISO 15156 W 1.4548	190 135 115 125	170 105 75 105	10 16 18 16	40 50 55 50	448 352 293 311		H900 ST & aged H1150 ST & aged H1150M ST & aged H1150D ST & double aged	41 @ 23°C 74 @ 23°C 41 @ 23°C	
450	UNS S45000	125	75	18	55	294		H1150 OQ & aged	75 @ -60°C	
Austenitic**										
304	ASTM A182	75	30	30	50			ST & quenched		
304L		70	25	30	50			ST & quenched		
316	ASTM A182	75	30	30	50			ST & quenched		
316L		70	25	30	50			ST & quenched		
316LN		75	30	30	50			ST & quenched		
Duplex										
22/5*	ASTM A182 UNS S31803 NACE MR0175 ISO 15156	90	65	25	45			ST & quenched		
25/7*		100	70	25	45			ST & quenched		
Super Duplex*	UNS S32760	110	80	25				ST & quenched		

*Available on request **Improved machinable versions (prefixed IM) are also available

Sales contacts

Tata Steel Speciality

Stocksbridge
Sheffield
S36 2JA
United Kingdom
T: +44 (0)114 2882361
F: +44 (0)114 2832079
E: enquiries.ces@tatasteel.com

Tata Steel International

475 N. Martingale Road
Suite 400
Schaumburg
IL 60173
United States
T: +1 847 619 0400
F: +1 847 619 0468
E: CAI@tatasteel.com

Overseas sales

Commercial teams and selected agents operate on behalf of Tata Steel throughout the world including countries shown below.

Australia

T: +61 3 8762 5500 F: +61 3 8762 5549
E: melbourne@tatasteel.com

Brazil

T: +55 21 3385 4570 F: +55 21 3385 4581
E: brazil@tatasteel.com

China

T: +86 21 5405 1616 F: +86 21 5404 5118
E: shanghai@tatasteel.com

Czech Republic

T: +420 2 2491 9545 F: +420 2 2491 9546
E: prague@tatasteel.com

Denmark

T: +45 39 960900 F: +45 39 960949
E: denmark@tatasteel.com

Finland

T: +358 9 4542450 F: +358 9 45424520
E: helsinki@tatasteel.com

France

T: +33 (0) 5627 35720 F: +33 (0) 5627 35725
E: toulouse@tatasteel.com

Germany (Switzerland)

T: +49 211 4926-0 F: +49 211 4926-282
E: dusseldorf@tatasteel.com

Hong Kong

T: +852 2807 0196 F: +852 2503 3430
E: hong-kong@tatasteel.com

India

T: +91 22 2282 3126 F: +91 22 2287 5148
E: mumbai@tatasteel.com

Italy

T: +39 02 422 5541 F: +39 02 422 5542 50
E: milan@tatasteel.com

Japan

T: +81 3 5215 0445 F: +81 3 5215 0447
E: tokyo@tatasteel.com

Malaysia

T: +603 7726 9226 F: +603 7726 9227
E: malaysia@tatasteel.com

Netherlands/Benelux

T: +31 (0) 43 4079 219 F: +31 (0) 43 4079 297
E: benelux@tatasteel.com

New Zealand

T: +64 (09) 271 1780 F: +64 (09) 271 1970
E: auckland@tatasteel.com

Poland

T: +48 32 608 3510 F: +48 32 6083502
E: katowice@tatasteel.com

Portugal

T: +351 217 817 040 F: +351 217 817 049
E: lisbon@tatasteel.com

Singapore

T: +65 6297 6678 F: +65 6297 6682
E: singapore@tatasteel.com

Saudi Arabia

T: +966 2 263 2959 F: +966 2 263 2910
E: jeddah@tatasteel.com

Sweden

T: +46 31 779 3200 F: +46 31 779 3228
E: gothenburg@tatasteel.com

Taiwan

T: +886 2 2356-8488 ext. 188
F: +886 2 2356-8488 ext. 188
E: taipei@tatasteel.com

United Arab Emirates

T: +971 (0) 4 8873 232 F: +971 (0) 4 8873 955
E: dubai@tatasteel.com

USA/Canada/Mexico

T: +1 847 619 0400 F: +1 847 619 0468
E: CAI@tatasteel.com

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www.tatasteel.com

Tata Steel Speciality

Stocksbridge

Sheffield

S36 2JA

United Kingdom

T: +44 (0) 114 2882361

F: +44 (0) 114 2885033

E: enquiries.ces@tatasteel.com

Tata Steel International

475 N. Martingale Road

Suite 400

Schaumburg, IL 60173

United States

T: +1 847 619 0400

F: +1 847 619 0468

E: CAI@tatasteel.com

Tata Steel UK Limited, 30 Millbank, London SW1P 4WY United Kingdom.

Registered No 2280000.

English