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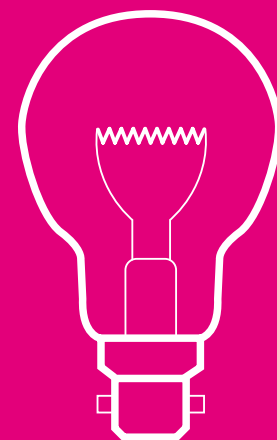
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Power generation

High Temperature Blading and Bolting Steels



Introduction

With over 100 years in the business, our experience goes far beyond the confines of just steel manufacturing. We can advise on both material selection and supply routes, adding real value to a project from day one. Corus experts 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 power generation industry for components where high temperature properties, strength, toughness, resistance to creep, fatigue and corrosion are paramount. Consistency and reliability are absolutely key. We not only provide steels that endure the extreme operating conditions that prevail in turbine applications, we work in partnership with our customers to ensure that product performance is matched by sustainable and efficient supply.

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Quality approvals

The quality assurance procedures of Corus Engineering Steels have been assessed and approved by over 100 component and equipment manufacturers, end users and national bodies.

The relevant power generation industry approvals, and major approvals gained in other quality engineering sectors, include:

Alstom
 Baker Oil Tools
 Boeing Commercial Airplane
 British Aerospace
 BS EN ISO 9001
 Caterpillar
 Civil Aviation Authority
 Det Norske Veritas
 EAQF 94
 Ford Motor Company
 GKN ADD
 Halliburton
 Lloyds RS
 M.O.D.
 Mobil
 National Oilwell
 QUASCO
 Reed Tool Company
 Rolls Royce
 Scana Ramnas
 Siemens
 Statoil
 T.U.V.
 Weir Materials Limited
 Westinghouse

Product range

Product		Metric (mm)	Imperial (in)
Primary Products			
Rolled	Blooms	150 - 457	6 - 18
	Billets	50 - 228	2 - 9
	Gothics (A/C)	111 - 362	4 ⁷ / ₁₆ - 14 ¹ / ₂
	Slabs width	76 - 1054	3 - 41 ¹ / ₂
	thickness	44 - 317	1 ³ / ₄ - 12 ¹ / ₂
Cast	Rounds	76 - 381	3 - 15
	Squares	140 - 180	
	Rounds	125, 140, 155, 160, 175 & 200	
Rerolled Products			
Lengths	Rounds	15.5 - 115	⁵ / ₈ - 4 ¹ / ₂
	Hexagons	19 - 81.5	³ / ₄ - 3 ³ / ₁₆
	Squares	18 - 103	¹¹ / ₁₆ - 4 ¹ / ₈
Coils	Rounds	13.5 - 42	¹⁷ / ₃₂ - 1 ²¹ / ₃₂
	Hexagons	13.5 - 33.5	¹⁷ / ₃₂ - 1 ⁵ / ₁₆
	Squares	14 - 24	⁹ / ₁₆ - ¹⁵ / ₁₆

Slab width and thickness combinations available on request.
 Maximum turned bar size 350mm or 14in diameter.
 Surface finish and heat treatment conditions as specified.

Maximum product lengths are:

Supplied Condition	Primary		Rerolled	
	m	ft	m	ft
Cast	18	59	Not applicable	
Rolled - Billets <180mm	15	49	Not applicable	
Rolled - Other products	13.1	43	18	59
Turned	13.1	43	8.5	28
Heat Treated	10.4	34	8.5	28

Carbon and alloy steels

Grade	Related Standards & Specifications	Summary of Properties
Durehete 900[†]	42CrMo5.6 Steel No 1.7233* BS 1506 631-850	For use up to 480°C
Durehete 950[†]	40CrMoV4.6 Steel No 1.7711* BS 1506 671-850 ASTM A193 B16 DIN 17240 W1.7711 EN1515-1	For use up to 510°C
Durehete 1055[†]	20CrMoVTiB4.10 Steel No 1.7729* BS 1506 681-820 EN1515-1	For use up to 570°C
C35E* Steel Number 1.1181	DIN 17240 W1.1181 EN1515-1	For use up to 350°C
25CrMo4* Steel Number 1.7218	DIN 17240 W1.7258 EN1515-1	For use up to 400°C
21CrMoV5.7* Steel Number 1.7709	DIN 17240 W1.7709 EN1515-1	For use up to 540°C
42CrMo4* Steel Number 1.7225	ASTM A193 B7 BS 1506 630-860	For use up to 450°C

Chemical analysis

Grade	Nominal Chemical Analysis %									
	C	Si	Mn	Cr	Mo	Ni	V	Ti	B	Al
Durehete 900[†]	0.40	0.25	0.55	1.30	0.60					
Durehete 950[†]	0.40	0.25	0.55	1.10	0.55		0.30			
Durehete 1055[†]	0.20	0.25	0.50	1.00	1.00		0.70	0.10	0.003	0.04
C35E*	0.35	0.25	0.70							
25CrMo4*	0.25	0.25	0.70	1.00	0.30					
21CrMoV5.7*	0.20	0.25	0.60	1.25	0.70		0.30			
42CrMo4*	0.40	0.25	0.80	1.00	0.20					

[†]Data sheets including elevated temperature properties available

* Designated grade and steel number of Euronorm Standard EN10269

Carbon and alloy steels

Grade	Related Standards & Specifications	Minimum Tensile Properties			
		UTS ksi (N/mm ²)	0.2%PS ksi (N/mm ²)	EI %	R of A %
Durehete 900[†]	42CrMo5.6*				
	Steel No.1.7233* BS 1506 631-850	860 850	700 640	16 16	50 50
Durehete 950[†]	40CrMoV4.6*				
	Steel No.1.7711* BS 1506 671-850	850 850	700 640	14 14	45 45
	ASTM A193 B16 DIN 17240 W1.7711 EN1515-1				
Durehete 1055[†]	20CrMoVTiB4.10*				
	Steel No. 1.7729* BS 1506 681-820 EN1515-1	820 820	660 660	15 15	50 50
C35E*	DIN 17240 W1.1181				
	Steel No. 1.1181 EN1515-1	500 500	300 300	22 22	45 45
25CrMo4*	DIN 17240 W1.7258				
	Steel No. 1.7218 EN1515-1	600 600	440 420	18 18	60 60
21CrMoV5.7*	DIN 17240 W1.7709				
	Steel No. 1.7709 EN1515-1	700	550	16	60
42CrMo4	ASTM A193 B7				
	Steel No. 1.7225 BS 1506 630-860	860	730	14	50

Mechanical properties

Hardness (Max) HB	Limiting Ruling Section	Heat Treatment	Impact (ISO V) Joules
302	≤100mm	Oil quenched and tempered	50min
302	>100mm to 150mm		40min
302	≤100mm	Oil quenched and tempered	30min
302	>100mm to 160mm		25min
302	≤100mm	Oil or water quenched and tempered	40min
302	>100mm to 160mm		27min
	≤60mm	Oil quenched and tempered	55min
	>60mm to 150mm		39min
	≤100mm	Oil quenched or air cooled and tempered	60min
	>100mm to 150mm		45min
	≤160mm	Oil quenched or air cooled and tempered	63min
	≤60mm	Quenched and tempered	50min

[†]Data sheets including elevated temperature properties available

* Designated grade and steel number of Euronorm Standard EN10269

Stainless steels

Grade	Related Standards & Specifications	Summary of Properties
Martensitic Jethete M152	X12CrNiMoV12.3* Steel Number 1.4938*	High strength with good oxidation resistance
Jethete 448	W 1.4914	High strength with good oxidation resistance
X19CrMoNbVN11.1^{1*} Steel Number 1.4913	DIN 17240 W1.4913 NFA 35.558 Z20CDNbV11	For use up to 580°C Also used for turbine parts
X22CrMoV12.1[*] Steel Number 1.4923	DIN 17240 W1.4923 NFA 35.578 Z20CDV12	For use up to 580°C Also used for turbine parts
ASTM A193 B6	-	-
ASTM A437 B4B	-	-
Austenitic Esshete 1250 Warm worked ^{††}	BS3059-Pt2 215S15 ASTM A213-S21500 Composition only	An austenitic creep resistant steel for use at 550-675°C supplied in the warm worked condition
ASTM A193 B8 types		Various stabilised and unstabilised austenitic stainless steel compositions

¹Data sheets including elevated temperature properties available

* Designated grade and steel number of Euronorm Standard EN10269

^{††} Supplied in conjunction with Firth Rixson Special Steels

Chemical analysis

Grade	Nominal Chemical Analysis %								
	C	Si	Mn	Cr	Mo	Ni	V	Nb	N
Jethete M152[†]	0.11	0.20	0.80	11.50	1.60	2.60	0.30		0.030
Jethete M448[†]	0.13	0.40	1.00	10.50	0.60	1.00	0.15	0.40	0.060
X19CrMoNbVN11.1^{1*}	0.20	0.30	0.60	10.80	0.70	0.40	0.20	0.30	0.075
X22CrMoV 12.1[*]	0.20	0.30	0.60	11.80	1.00	0.60	0.30		
ASTM A193 B6	0.10	0.30	0.50	12.50					
ASTM A437 B4B	0.22	0.30	0.075	12.00	1.00	0.75	0.25		+1.00%W
Esshete 1250[†]	0.10	0.60	6.30	15.00	1.00	10.00	0.30	1.00	+0.006%B

Stainless steels

Grade	Related Standards & Specifications	Minimum Tensile Properties				R of A %
		UTS ksi (N/mm ²)	0.2%PS ksi (N/mm ²)	El %		
Martensitic Jethete M152	X12CrNiMoV12.3* Steel No 1.4938	930	760	14	40	
Jethete 448	W1.4914	930	760	10	-	
X19CrMoNbVN11.1[†] Steel No. 1.4913	DIN 17240 W1.4913 NFA 35.558 Z20CDNbV 11	900	750	12	40	
X22CrMoV12.1* Steel No. 1.4923	DIN 17240 W1.4923 NFA 35.578 Z20CDV 12	800 900	600 700	14 11	40 35	
ASTM A193 B6		760	585	15	50	
ASTM A437 B4B		1000	720	13	30	
Austenitic Esshete 1250 Warm worked ^{††}	BS3059-Pt2 215S15 ASTM A213-S21500 Composition only	660	510	25	-	
ASTM A193 B8 types		515	215	30	50	

Mechanical properties

Hardness (Max) HB	Limiting Ruling Section	Heat Treatment	Impact (ISO V) Joules
-	≤160mm	Oil quenched or air cooled and tempered	20min
-	≤200mm	Oil quenched and tempered	
-	≤160mm	Oil quenched or air cooled and tempered	20min
-	≤160mm QT1 ≤160mm QT2	Oil quenched or air cooled and tempered	20min
-	≤100mm	Quenched and tempered	-
-		Quenched and tempered	-
-	≤90mm	Solution treated and warm worked	-
-		Solution treated. Mechanical properties can be increased by subsequent warm working.	-

[†]Data sheets including elevated temperature properties available

- Designated grade and steel number of Euronorm Standard EN10269

^{††} Supplied in conjunction with Firth Rixson Special Steels

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For more detailed information contact
either main sales office.