A20 - Amstrong® - High Strength Steels

A significant weight reduction can be achieved by using Amstrong® steels.

The lighter the trailer, the heavier the payload that can be transported.

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Properties

Amstrong® steels are characterised by high ductility, controlled internal purity, fine grain structure and low carbon content.

On request, Amstrong® may be delivered with an improved surface finish on black hot-rolled product called MASC (Micro Adhesive Scale). Contact our commercial teams for further information.

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Advantages

Amstrong® steels combine:

- Outstanding mechanical properties
  - High strength
  - Toughness
  - Fatigue resistance
- Good formability, and
- Good weldability

With their high strength, they are an excellent choice when weight-saving is a priority, and are frequently used to replace structural steels.

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Applications

High strength Amstrong® steels are used in a wide range of applications in transport (earth movers, trailers, agricultural and railroad machinery etc), profiling (racks etc) and building (cranes, safety barriers, light poles etc). Significant weight reductions can be achieved by using Amstrong® steels, especially for cranes and heavy vehicle trailers, thus allowing a larger payload.

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Brand correspondence

	EN 10149-2:2013	SEW 092:1990	UNE 36090	NF A 36-231:1992	BS 1449/1	ASTM A1011-12	Old brand names
Amstrong® 240MC							
Amstrong® 280MC		*QstE300TM*	*AE275HC*		*HR40 F30*		*Soldur 280/ Profilar 300/ BSK 30*
S315MC EN 10149-2	S315MC						
Amstrong® 315MC	S315MC	QstE340TM		E315D		HSLAS-F Grade 45 class 2	Soldur 320/Profilar 340/BSK 34/SPXE 340
S355MC EN 10149-2	S355MC						
Amstrong® 355MC	S355MC	QstE380TM	AE340HC	E355D	HR43 F35	HSLAS-F Grade 50 class 2	Soldur 360/Profilar 380/BSK 38/SPXE 380
Amstrong® 390MC		*QstE420TM*	*AE390HC*		*HR46 F40*		*Profilar 420/ BSK 42/ SPXE 420*
S420MC EN 10149-2	S420MC						
Amstrong® 420MC	S420MC	QstE460TM	AE440HC	E420D	HR50 F45	HSLAS-F Grade 60 class 2	Soldur 420/Profilar 460/BSK 46
S460MC EN 10149-2	S460MC						
Amstrong® 460MC	S460MC	QstE500TM	AE490HC			HSLAS-F Grade 65 class 2	Soldur 460/Profilar 500/BSK 50/SPXE 480
S500MC EN 10149-2	S500MC						
Amstrong® 500MC	S500MC	QstE550TM		E490D		HSLAS-F Grade 70 class 2	Soldur 500/Profilar 550/BSK 55/SPXE 530
S550MC EN 10149-2	S550MC						
Amstrong® 550MC	S550MC	(QstE600TM)		E560D	HR60 F55	HSLAS-F Grade 80 class 2	Soldur 550
S600MC EN 10149-2	S600MC	(QstE650TM)					
Amstrong® 600MC	S600MC	(QstE650TM)					

Grades in italics: not included in the standard

() Closest grade as no fully equivalent grade exists.

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Dimensions

Mill finish

Thickness (mm)	Min width	Amstrong® 240MC	Amstrong® 280MC	S315MC EN 10149-2, Amstrong® 315MC	S355MC EN 10149-2, Amstrong® 355MC	Amstrong® 390MC
		Max width	Max width	Max width	Max width	Max width
1.50 ≤ th < 1.60	800	1540	1350	1300	1180	-
1.60 ≤ th < 1.70						
1.70 ≤ th < 1.80		1590	1450	1450	1250	1020
1.80 ≤ th < 1.90		1630			1300	1200
1.90 ≤ th < 2.00		1780	1500	1540	1400	1250
2.00 ≤ th < 2.20		1830	1600	1600	1450	1350
2.20 ≤ th < 2.40			1680		1470	1400
2.40 ≤ th < 2.50		1930	1800	1680	1550	
2.50 ≤ th < 2.60		1980	1850	1740		1450
2.60 ≤ th < 2.80			1880		1700	
2.80 ≤ th < 3.00		2030		1820		1530
3.00 ≤ th < 3.30		2040	2030	2000	1790	1600
3.30 ≤ th < 3.50		2130	2130	2030	1820	1650
3.50 ≤ th < 4.00				2130	1880	1750
4.00 ≤ th < 4.50					2040	2040
4.50 ≤ th < 5.50		2040			2150	2150
5.50 ≤ th < 6.00						
6.00 ≤ th < 6.50			2030			
6.50 ≤ th < 8.50		1790				
8.50 ≤ th < 9.50						
9.50 ≤ th < 10.00		1570				
10.00 ≤ th < 12.00			1700			
12.00 ≤ th < 13.00			1570			

Thickness (mm)	Min width	S420MC EN 10149-2, Amstrong® 420MC	S460MC EN 10149-2, Amstrong® 460MC	S500MC EN 10149-2, Amstrong® 500MC	S550MC EN 10149-2, Amstrong® 550MC	S600MC EN 10149-2, Amstrong® 600MC
		Max width	Max width	Max width	Max width	Max width
1.50 ≤ th < 1.60	800	-	-	-	-	-
1.60 ≤ th < 1.70						
1.70 ≤ th < 1.80						
1.80 ≤ th < 1.90		1020	1200	1050		
1.90 ≤ th < 2.00		1250	1250	1120	940	
2.00 ≤ th < 2.20		1350	1350	1280	1200	1100
2.20 ≤ th < 2.40				1320		1170
2.40 ≤ th < 2.50		1400	1400	1380	1350	1200
2.50 ≤ th < 2.60			1450	1420	1380	1250
2.60 ≤ th < 2.80		1450		1460	1410	1340
2.80 ≤ th < 3.00		1520	1510	1520	1470	
3.00 ≤ th < 3.30		1650	1650	1570	1530	
3.30 ≤ th < 3.50		1700	1700	1650	1630	
3.50 ≤ th < 4.00		1780	1780	1740	1740	1440
4.00 ≤ th < 4.50		2040	2020	2020	2020	1540
4.50 ≤ th < 5.50		2150	2150	2150	2150	1630
5.50 ≤ th < 6.00						1830
6.00 ≤ th < 6.50						2135
6.50 ≤ th < 8.50					2130	
8.50 ≤ th < 9.50					2050	1980
9.50 ≤ th < 10.00						1930
10.00 ≤ th < 12.00				2130	1380	-
12.00 ≤ th < 13.00			2050		-	

Thickness (mm)	Min width	Amstrong® 240MC	Amstrong® 280MC	S315MC EN 10149-2, Amstrong® 315MC	S355MC EN 10149-2, Amstrong® 355MC	Amstrong® 390MC
		Max width	Max width	Max width	Max width	Max width
13.00 ≤ th < 14.00	800	1570	1570	2130	2150	2150
14.00 ≤ th < 15.00						
15.00 ≤ th < 16.00		1370	1370	2050		1370

Thickness (mm)	Min width	S420MC EN 10149-2, Amstrong® 420MC	S460MC EN 10149-2, Amstrong® 460MC	S500MC EN 10149-2, Amstrong® 500MC	S550MC EN 10149-2, Amstrong® 550MC	S600MC EN 10149-2, Amstrong® 600MC
		Max width	Max width	Max width	Max width	Max width
13.00 ≤ th < 14.00	800	2150	2050	-	-	-
14.00 ≤ th < 15.00						
15.00 ≤ th < 16.00		2050				

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Thickness (mm)	Min width	Amstrong® 240MC	Amstrong® 280MC	S315MC EN 10149-2, Amstrong® 315MC	S355MC EN 10149-2, Amstrong® 355MC	Amstrong® 390MC
		Max width	Max width	Max width	Max width	Max width
1.50 ≤ th < 1.60	800	1540	1320	1140	1090	-
1.60 ≤ th < 1.70			1350	1190	1160	
1.70 ≤ th < 1.80		1590	1420	1270	1230	1020
1.80 ≤ th < 1.90		1630	1450	1320	1300	1100
1.90 ≤ th < 2.00		1780	1500	1540	1330	1180
2.00 ≤ th < 2.10		1830	1600		1450	1350
2.10 ≤ th < 2.20			1620			
2.20 ≤ th < 2.30			1680			
2.30 ≤ th < 2.40		1930	1740		1525	1400
2.40 ≤ th < 2.50			1800	1560	1540	
2.50 ≤ th < 2.60		1980	1850	1730	1560	1450
2.60 ≤ th < 2.70			1880		1580	1470
2.70 ≤ th < 2.80		2030			1600	1500
2.80 ≤ th < 2.90					1630	1530
2.90 ≤ th < 3.00					1650	1560
3.00 ≤ th < 3.10				1880	1730	1580
3.10 ≤ th < 3.20						1620
3.20 ≤ th < 3.30			1840			1660
3.30 ≤ th < 3.40		2130			1740	1720
3.40 ≤ th < 3.50						1740
3.50 ≤ th < 3.60				2130	1880	1780
3.60 ≤ th < 3.70						1820
3.70 ≤ th < 3.80						1860
3.80 ≤ th < 3.90					1920	1920
3.90 ≤ th < 4.00					1980	1980
4.00 ≤ th < 4.10					2040	2040
4.10 ≤ th < 5.00					2070	2070
5.00 ≤ th < 6.00		1520			2130	2130
6.00 ≤ th < 6.10			1600			
6.10 ≤ th < 6.30						2070

Thickness (mm)	Min width	S420MC EN 10149-2, Amstrong® 420MC	S460MC EN 10149-2	Amstrong® 460MC	S500MC EN 10149-2, Amstrong® 500MC	S550MC EN 10149-2	Amstrong® 550MC	S600MC EN 10149-2, Amstrong® 600MC
		Max width	Max width	Max width	Max width	Max width	Max width	Max width
1.50 ≤ th < 1.60	800	-	-	-	-	-	-	-
1.60 ≤ th < 1.70								
1.70 ≤ th < 1.80								
1.80 ≤ th < 1.90		1020			1050			
1.90 ≤ th < 2.00		1120	1050	1050	1120	940	940	
2.00 ≤ th < 2.10		1350	1350	1350	1280	1230	1230	1100
2.10 ≤ th < 2.20					1310	1260	1260	
2.20 ≤ th < 2.30					1340	1290	1290	1170
2.30 ≤ th < 2.40		1400	1400	1400	1370	1320	1320	
2.40 ≤ th < 2.50					1400	1350	1350	1200
2.50 ≤ th < 2.60		1450	1450	1450	1430	1380	1380	1250
2.60 ≤ th < 2.70					1460	1410	1410	1340
2.70 ≤ th < 2.80		1480			1490	1440	1440	
2.80 ≤ th < 2.90		1520	1510	1510	1520	1470	1470	
2.90 ≤ th < 3.00		1540	1540	1540	1550	1500	1500	
3.00 ≤ th < 3.10		1580	1580	1580	1580	1530	1530	
3.10 ≤ th < 3.20		1620	1620	1620	1600	1560	1560	
3.20 ≤ th < 3.30		1660	1660	1660	1620	1590	1590	
3.30 ≤ th < 3.40		1720	1720	1720		1630	1630	
3.40 ≤ th < 3.50		1740	1740	1740	1680	1680	1680	
3.50 ≤ th < 3.60		1780	1780	1780	1750	1750	1750	1440
3.60 ≤ th < 3.70		1820	1820	1820	1800	1800	1800	
3.70 ≤ th < 3.80		1860	1860	1860	1850	1850	1850	
3.80 ≤ th < 3.90		1920	1920	1920	1900	1900	1900	
3.90 ≤ th < 4.00		1980	1980	1980	1950	1950	1950	
4.00 ≤ th < 4.10		2040	2020	2020	2020	2020	2020	1340
4.10 ≤ th < 5.00		2070	2070	2070	2070	2070	2070	
5.00 ≤ th < 6.00		2130						1240
6.00 ≤ th < 6.10			2130					1525
6.10 ≤ th < 6.30		2070	2070					

Thickness (mm)	Min width	Amstrong® 240MC	Amstrong® 280MC	S315MC EN 10149-2, Amstrong® 315MC	S355MC EN 10149-2, Amstrong® 355MC	Amstrong® 390MC
		Max width	Max width	Max width	Max width	Max width
6.30 ≤ th < 7.00	800	1520	1600	2130	2130	1700
7.00 ≤ th < 7.10			1525	1550		
7.10 ≤ th < 8.00					1550	1525
8.00 ≤ th < 8.10						
8.10 ≤ th < 10.00				1525	1525	
10.00 ≤ th < 12.00		*	*			
12.00 ≤ th < 13.00				*	*	*

Thickness (mm)	Min width	S420MC EN 10149-2, Amstrong® 420MC	S460MC EN 10149-2	Amstrong® 460MC	S500MC EN 10149-2, Amstrong® 500MC	S550MC EN 10149-2	Amstrong® 550MC	S600MC EN 10149-2, Amstrong® 600MC
		Max width	Max width	Max width	Max width	Max width	Max width	Max width
6.30 ≤ th < 7.00	800	1700	1525	1525	1525	1525	1525	1525
7.00 ≤ th < 7.10								
7.10 ≤ th < 8.00		1525						-
8.00 ≤ th < 8.10								
8.10 ≤ th < 10.00								
10.00 ≤ th < 12.00			*	*	*	*	-	
12.00 ≤ th < 13.00		*					*	

* Pickled products with thicknesses up to 15 mm may be delivered after prior agreement: please contact us.

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Mechanical properties

	Direction	Thickness (mm)	R_e (MPa)	R_m (MPa)	A_{80} (%)	A 5.65$\sqrt{S_o}$ (%)	Min. mandrel diameter for 180° bending	KV -20°C (J)
Amstrong® 240MC	L	< 3	240 - 320	340 - 450	≥ 27	-	-	-
		3 - 6			-	≥ 32		
		6 - 16						≥ 40
	T	< 3	260 - 340	340 - 450	≥ 26	-	0	-
		3 - 16			-	≥ 31		
Amstrong® 280MC	L	< 3	280 - 350	370 - 450	≥ 26	-	-	-
		3 - 6			-	≥ 30		
		6 - 16						≥ 40
	T	< 3	300 - 380	370 - 450	≥ 25	-	0	-
		3 - 16			-	≥ 29		
S315MC EN 10149-2	L	1.5 - 3	≥ 315	390 - 510	≥ 20	-	-	-
		3 - 20			-	≥ 24		
	T	1.5 - 20	-	-	-	-	0	-
Amstrong® 315MC	L	< 3	315 - **395**	**415 - 495**	**≥ 24**	-	-	-
		3 - 6			-	**≥ 28**		
		6 - 16						**≥ 40**
	T	< 3	**340 - 420**	**420 - 500**	**≥ 23**	-	0	-
		3 - 16			-	**≥ 27**		
S355MC EN 10149-2	L	1.5 - 3	≥ 355	430 - 550	≥ 19	-	-	-
		3 - 20			-	≥ 23		
	T	1.5 - 20	-	-	-	-	≥ 0.5 x t	-
Amstrong® 355MC	L	< 3	355 - **435**	430 - **520**	**≥ 22**	-	-	-
		3 - 6			-	**≥ 25**		
		6 - 16						**≥ 40**
	T	< 3	**380 - 460**	**440 - 530**	**≥ 21**	-	0	-
		3 - 16			-	**≥ 24**		
Amstrong® 390MC	L	< 3	390 - 480	460 - 560	≥ 20	-	-	-
		3 - 6			-	≥ 24		
		6 - 16						≥ 40
	T	< 3	420 - 500	470 - 570	≥ 19	-	0	-
		3 - 16			-	≥ 23		

Grades in italics: not included in the standard

Values in bold: tighter than the standard

	Direction	Thickness (mm)	R_e **(MPa)**	R_m **(MPa)**	A_{80} **(%)**	A $5.65\sqrt{S_o}$ **(%)**	Min. mandrel diameter for 180° bending	KV -20°C **(J)**
S420MC EN 10149-2	L	1.5 - 3	≥ 420	480 - 620	≥ 16	-	-	-
		3 - 20			-	≥ 19		
	T	1.5 - 20	-	-	-	-	≥ 0.5 x t	-
Amstrong® 420MC	L	< 3	420 - **520**	**490 - 600**	**≥ 18**	-	-	-
		3 - 6			-	**≥ 22**		
		6 - 16						**≥ 40**
	T	< 3	**450 - 550**	**500 - 600**	**≥ 17**	-	**≥ 0.2 x t**	-
		3 - 13			-	**≥ 21**		
		13 - 16					≥ 0.5 x t	
S460MC EN 10149-2	L	1.5 - 3	≥ 460	520 - 670	≥ 14	-	-	-
		3 - 20			-	≥ 17		
	T	1.5 - 20	-	-	-	-	≥ 1 x t	-

Values in bold: tighter than the standard

	Direction	Thickness (mm)	R_e **(MPa)**	R_m **(MPa)**	A_{80} **(%)**	A $5.65\sqrt{S_o}$ **(%)**	Min. mandrel diameter for 180° bending	KV -20°C **(J)**
Amstrong® 460MC	L	< 3	460 - **560**	520 - **640**	**≥ 15**	-	-	-
		3 - 6			-	**≥ 18**		
		6 - 16						**≥ 40**
	T	< 3	**490 - 590**	**530 - 640**	**≥ 14**	-	**≥ 0.6 x t**	-
		3 - 6			-	**≥ 17**		
		6 - 16					≥ 1 x t	
S500MC EN 10149-2	L	1.5 - 3	≥ 500	550 - 700	≥ 12	-	-	-
		3 - 16			-	≥ 14		
		16 - 20				-		
	T	1.5 - 16	-	-	-	-	≥ 1 x t	-
Amstrong® 500MC	L	< 2	500 - **600**	**560** - 700	≥ 15	-	-	-
		2 - 3			**≥ 16**			
		3 - 6			-	**≥ 19**		
		6 - 16						**≥ 40**
	T	< 2	**530 - 630**	**570 - 700**	**≥ 14**	-	**≥ 0.6 x t**	-
		2 - 3			**≥ 15**			
		3 - 6			-	**≥ 18**		
		6 - 16					≥ 1 x t	
S550MC EN 10149-2	L	1.5 - 3	≥ 550	600 - 760	≥ 12	-	-	-
		3 - 16			-	≥ 14		
		16 - 20				-		
	T	1.5 - 16	-	-	-	-	≥ 1.5 x t	-
Amstrong® 550MC	L	< 3	550 - **650**	**620 - 750**	≥ 12	-	-	-
		3 - 6			-	≥ 14		
		6 - 16						**≥ 40**
	T	< 3	**580 - 680**	**630 - 750**	**≥ 11**	-	**≥ 0.8 x t**	-
		3 - 6			-	**≥ 13**		
		6 - 16					≥ 1.5 x t	
S600MC EN 10149-2	L	2 - 3	≥ 600	650 - 820	≥ 11	-	-	-
		3 - 10			-	≥ 13		
	T	2 - 10	-	-	-	-	≥ 1.5 x t	-

Values in bold: tighter than the standard

	Direction	Thickness (mm)	R_e **(MPa)**	R_m **(MPa)**	A_{80} **(%)**	A $5.65\sqrt{S_o}$ **(%)**	Min. mandrel diameter for 180° bending	KV -20°C **(J)**
Amstrong® 600MC	L	2 - 3	≥ 600	650 - 820	≥ 11	-	-	-
		3 - 6			-	≥ 13		
		6 - 10						**≥ 40**
	T	2 - 3	**≥ 620**	**660 - 820**	**≥ 10**	-	≥ 1.5 x t	-
		3 - 10			-	**≥ 12**		

Values in bold: tighter than the standard

For Amstrong® grades, the mechanical properties are guaranteed in both directions.

Minimum specified mandrel diameter for bending angles up to 180° according to EN 10149-2:2013

t = nominal thickness

Toughness guarantee at -40°C: on request

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Chemical composition

	C (%)	Mn (%)	P (%)	S (%)	Si (%)	Al (%)	Nb (%)	V (%)	Ti (%)	C_{eq} (%)	Mo (%)	B (%)	Galvanisation
Amstrong® 240MC	≤ **0.100**	≤ **0.80**	≤ **0.020**	≤ **0.020**	≤ **0.03**	≥ 0.015	≤ **0.025**	≤ **0.200**	≤ **0.150**	≤ **0.18**	-	-	Class 1
Amstrong® 280MC	≤ **0.080**	≤ **0.80**	≤ **0.020**	≤ **0.015**	≤ **0.03**	≥ 0.015	≤ **0.025**	≤ **0.200**	≤ **0.150**	≤ **0.23**	-	-	Class 1
S315MC EN 10149-2	≤ 0.120	≤ 1.30	≤ 0.025	≤ 0.020	≤ 0.50	≥ 0.015	≤ 0.090	≤ 0.200	≤ 0.150	-	-	-	No
Amstrong® 315MC	≤ **0.100**	≤ **0.70**	≤ **0.020**	≤ **0.015**	≤ **0.03**	≥ 0.015	≤ **0.045**	≤ 0.200	≤ 0.150	≤ **0.25**	-	-	Class 1
S355MC EN 10149-2	≤ 0.120	≤ 1.50	≤ 0.025	≤ 0.020	≤ 0.50	≥ 0.015	≤ 0.090	≤ 0.200	≤ 0.150	-	-	-	No
Amstrong® 355MC	≤ **0.100**	≤ **1.40**	≤ **0.020**	≤ **0.015**	≤ **0.03**	≥ 0.015	≤ **0.065**	≤ 0.200	≤ 0.150	≤ **0.32**	-	-	Class 1
Amstrong® 390MC	≤ **0.100**	≤ **1.50**	≤ **0.020**	≤ **0.012**	≤ **0.03**	≥ 0.015	≤ **0.065**	≤ **0.200**	≤ **0.150**	≤ **0.36**	-	-	Class 1
S420MC EN 10149-2	≤ 0.120	≤ 1.60	≤ 0.025	≤ 0.015	≤ 0.50	≥ 0.015	≤ 0.090	≤ 0.200	≤ 0.150	-	-	-	No
Amstrong® 420MC	≤ **0.110**	≤ **1.50**	≤ **0.020**	≤ **0.012**	≤ **0.03**	≥ 0.015	≤ **0.065**	≤ 0.200	≤ **0.150**	≤ **0.38**	-	-	Class 1
S460MC EN 10149-2	≤ 0.120	≤ 1.60	≤ 0.025	≤ 0.015	≤ 0.50	≥ 0.015	≤ 0.090	≤ 0.200	≤ 0.150	-	-	-	No
Amstrong® 460MC	≤ 0.120	≤ **1.50**	≤ **0.020**	≤ **0.012**	≤ **0.03**	≥ 0.015	≤ **0.080**	≤ 0.200	≤ 0.150	≤ **0.40**	-	-	Class 1
S500MC EN 10149-2	≤ 0.120	≤ 1.70	≤ 0.025	≤ 0.015	≤ 0.50	≥ 0.015	≤ 0.090	≤ 0.200	≤ 0.150	-	-	-	No
Amstrong® 500MC	≤ 0.120	≤ 1.70	≤ **0.020**	≤ **0.012**	≤ **0.03**	≥ 0.015	≤ 0.090	≤ 0.200	≤ 0.150	≤ **0.42**	-	-	Class 1
S550MC EN 10149-2	≤ 0.120	≤ 1.80	≤ 0.025	≤ 0.015	≤ 0.50	≥ 0.015	≤ 0.090	≤ 0.200	≤ 0.150	-	-	-	No
Amstrong® 550MC	≤ **0.100**	≤ **1.70**	≤ **0.020**	≤ **0.012**	≤ **0.03**	≥ 0.015	≤ 0.090	≤ 0.200	≤ 0.150	≤ **0.44**	-	-	Class 1
S600MC EN 10149-2	≤ 0.120	≤ 1.90	≤ 0.025	≤ 0.015	≤ 0.50	≥ 0.015	≤ 0.090	≤ 0.200	≤ 0.220	-	≤ 0.50	≤ 0.0050	No
Amstrong® 600MC	≤ 0.120	≤ 1.90	≤ **0.020**	≤ 0.015	≤ **0.03**	≥ 0.015	≤ 0.090	≤ 0.200	≤ 0.220	≤ **0.44**	≤ 0.50	≤ 0.0050	Class 1

Grades in italics: not included in the standard

Values in bold: tighter than the standard

The chemical properties given are based on cast analysis data.

V+Nb+Ti ≤ 0.22%.

Suitability for hot-dip zinc coating is defined as per the requirements of EN ISO 14713-2 Table 1 and NFA 35-503.

Any questions?
Ask them via our contact form on https://industry.arcelormittal.com/getintouch