



## E20 - Hot dip galvanised steels

*These steels can be used in a very wide range of applications, both indoors and outdoors. One example is this metallic ceiling for a railway station.*

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## Properties

ArcelorMittal's hot dip galvanised steels consist of a steel substrate with a metallic zinc coating applied by means of a continuous hot dip galvanising process. Metallic zinc coatings are available in steel grades ranging from steel for bending and deep drawing applications, to structural steels and high yield strength steels.

A glossy surface finish obtained under specific skin-pass conditions (either non-skin-passed or skin-passed with smooth cylinders to obtain low roughness) can be provided if required at time of enquiry.

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## Advantages

Hot dip galvanised products offer excellent corrosion resistance combined with very good forming properties. The coating process can apply very thick zinc layers, up to 725 g/m<sup>2</sup> (total of both sides).

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# Applications

ArcelorMittal's hot dip galvanised steels can be used in a very wide range of applications for industrial markets, both indoors and outdoors. Some of the most common applications are:

- Building: wide sections for roofing and cladding, doors, door frames, metallic ceilings, partitions, structural members etc
- Domestic appliances: all appliances for this sector (both white and brown goods) are manufactured with hot dip galvanised steels
- Miscellaneous: electrical cabinets, aeraulic components, air conditioners, road signs etc

Zinc hot dip galvanised steel is suitable for contact with foodstuffs under certain conditions, as specified in the Regulation (EC) No. 1935/2004 and French standard NF A 36-712-1. Please contact us for further information on this subject.

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# Recommendations for use

## Storage

Galvanised strips are usually supplied passivated or oiled to temporarily limit any risk of white rust formation. During transport and storage, all necessary precautions must be taken to keep the material dry and to prevent the formation of condensation. Improved protection can be achieved by the application of an Easyfilm® thin organic coating (please see data sheet E80 for the specific properties of Easyfilm®).

## Forming and joining

The forming and joining techniques currently used for uncoated steel are also suitable for galvanised steel. It is essential to select a coating thickness that is compatible with the forming and joining processes envisaged, without compromising the desired degree of corrosion protection.

## Painting

Hot dip galvanised steels can be painted after degreasing and surface treatment when supplied oiled. If an Easyfilm® thin organic coating has been applied, they can be painted directly, without any prior surface treatment. However, the paint must be compatible with the Easyfilm® resin.

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# Weldability

In electrical resistance welding, the welding current must be suitably regulated and regularly adjusted. Electrode life can be extended by regularly stepping up the welding current and periodically dressing (machining) the electrodes.

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# Coating weight and typical thickness

Designation EN 10346	Coating weight - double sided (g/m <sup>2</sup> )	Coating thickness (µm per side)
Z100	100	7.0
Z140	140	10.0
Z200	200	14.0
Z225	225	16.0
Z275	275	20.0
Z350	350	25.0
Z450	450	31.0
Z600	600	42.0
Not included in the standard		
Z80	80	5.5
Z725	725	51.0

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# Brand correspondence

## Steels for cold forming and deep drawing applications

	EN 10142:1991	DIN 17162/1	NF A36- 321	BS 2989	ASTM A653	EN 10142:2000	PN-89/H- 92125:1989	EN 10292:2007	EN 10326:2004	EN 10147:2000
DX51D +Z EN 10346	FeP02 G	St 01Z / St 02Z		Z1 G / Z2 G	CS	DX51D+Z	P,T,G			
DX52D +Z EN 10346	FeP03 G	St 03Z	GC	Z3 G	FS	DX52D+Z				
DX53D +Z EN 10346	FeP05 G	St 04Z / St 05Z	GE	Z4 G	DDS	DX53D+Z	B			
DX54D +Z EN 10346	FeP06 G	St 06Z	GES	Z5 G	EDDS	DX54D+Z				
DX56D +Z EN 10346	FeP07 G	St 07Z				DX56D+Z				
DX57D +Z EN 10346										

	EN 10346:2009	EN 10346:2015	EN 10327:2004	EN 10147:1991	DIN 17162/2	NF A36-322	Old brand names
DX51D +Z EN 10346	DX51D+Z	DX51D+Z	DX51D+Z				
DX52D +Z EN 10346	DX52D+Z	DX52D+Z	DX52D+Z				Solstamp® 03
DX53D +Z EN 10346	DX53D+Z	DX53D+Z	DX53D+Z				
DX54D +Z EN 10346	DX54D+Z	DX54D+Z	DX54D+Z				Solstamp® 04
DX56D +Z EN 10346	DX56D+Z	DX56D+Z	DX56D+Z				Solstamp® 05
DX57D +Z EN 10346	DX57D+Z	DX57D+Z	DX57D+Z				

**Structural steels**

	EN 10142:1991	DIN 17162/1	NF A36- 321	BS 2989	ASTM A653	EN 10142:2000	PN-89/H- 92125:1989	EN 10292:2007	EN 10326:2004	EN 10147:2000
S220GD +Z EN 10346				Z22 G	CS Type B				S220GD+Z	S220GD+Z
S250GD +Z EN 10346				Z25 G	SS Grade 230				S250GD+Z	S250GD+Z
S280GD +Z EN 10346				Z28 G	SS Grade 255				S280GD+Z	S280GD+Z
S320GD +Z EN 10346					SS Grade 275				S320GD+Z	S320GD+Z
S350GD +Z EN 10346				Z35 G	HSLA Type A Grade 340				S350GD+Z	S350GD+Z
S390GD +Z EN 10346										
S420GD +Z EN 10346										
S420GD-HyPer® +Z**										
S450GD +Z EN 10346										
S450GD-HyPer® +Z**										
S550GD +Z EN 10346									S550GD+Z	S550GD+Z
S550GD-HyPer® +Z**										

\*\* Steel grade with  $R_m/R_e > 1.1$  in accordance with the requirements of Eurocode 3 (EN 1993-1-1)

	EN 10346:2009	EN 10346:2015	EN 10327:2004	EN 10147:1991	DIN 17162/2	NF A36-322	Old brand names
S220GD +Z EN 10346	S220GD+Z	S220GD+Z		FeE 220 G	StE 220-2Z	C.230	SC220GD+Z
S250GD +Z EN 10346	S250GD+Z	S250GD+Z		FeE 250 G	StE 250-2Z	C.250	SC250GD+Z
S280GD +Z EN 10346	S280GD+Z	S280GD+Z		FeE 280 G	StE 280-2Z	C.280	SC280GD+Z
S320GD +Z EN 10346	S320GD+Z	S320GD+Z		FeE 320 G	StE 320-2Z	C.320	SC320GD+Z
S350GD +Z EN 10346	S350GD+Z	S350GD+Z		FeE 350 G	StE 350-2Z	C.350	SC350GD+Z
S390GD +Z EN 10346		S390GD+Z					SC390GD+Z
S420GD +Z EN 10346		S420GD+Z					
S420GD-HyPer® +Z**							
S450GD +Z EN 10346		S450GD+Z					
S450GD-HyPer® +Z**							
S550GD +Z EN 10346	S550GD+Z	S550GD+Z		FeE 550 G		C.550	SC550GD+Z
S550GD-HyPer® +Z**							

\*\* Steel grade with  $R_m/R_e > 1.1$  in accordance with the requirements of Eurocode 3 (EN 1993-1-1)

**High strength interstitial free steels**

	EN 10142:1991	DIN 17162/1	NF A36- 321	BS 2989	ASTM A653	EN 10142:2000	PN-89/H- 92125:1989	EN 10292:2007	EN 10326:2004	EN 10147:2000
HX180YD +Z EN 10346								HX180YD+Z		
HX220YD +Z EN 10346								HX220YD+Z		
HX260YD +Z EN 10346								HX260YD+Z		
HX300YD +Z EN 10346								HX300YD+Z		

	EN 10346:2009	EN 10346:2015	EN 10327:2004	EN 10147:1991	DIN 17162/2	NF A36-322	Old brand names
HX180YD +Z EN 10346	HX180YD+Z	HX180YD+Z					H180YD+Z
HX220YD +Z EN 10346	HX220YD+Z	HX220YD+Z					H220YD+Z
HX260YD +Z EN 10346	HX260YD+Z	HX260YD+Z					H260YD+Z
HX300YD +Z EN 10346	HX300YD+Z	HX300YD+Z					

### High Strength Low Alloy steels

	EN 10142:1991	DIN 17162/1	NF A36-321	BS 2989	ASTM A653	EN 10142:2000	PN-89/H-92125:1989	EN 10292:2007	EN 10326:2004	EN 10147:2000
HX260LAD +Z EN 10346								HX260LAD+Z		
HX300LAD +Z EN 10346								HX300LAD+Z		
HX340LAD +Z EN 10346								HX340LAD+Z		
HX380LAD +Z EN 10346								HX380LAD+Z		
HX420LAD +Z EN 10346								HX420LAD+Z		
HX460LAD +Z EN 10346										
HX500LAD +Z EN 10346										
HX700LAD +Z*										

\* Steel grade HX700LAD +Z is not recommended for automotive applications.

	EN 10346:2009	EN 10346:2015	EN 10327:2004	EN 10147:1991	DIN 17162/2	NF A36-322	Old brand names
HX260LAD +Z EN 10346	HX260LAD+Z	HX260LAD+Z					MA 240L/Profilar <sup>®</sup> 260/Soldur <sup>®</sup> 260
HX300LAD +Z EN 10346	HX300LAD+Z	HX300LAD+Z					MA 280L/Profilar <sup>®</sup> 300/E280D+Z/Soldur <sup>®</sup> 280
HX340LAD +Z EN 10346	HX340LAD+Z	HX340LAD+Z					MA 320L/Profilar <sup>®</sup> 340/E320D+Z/Soldur <sup>®</sup> 320
HX380LAD +Z EN 10346	HX380LAD+Z	HX380LAD+Z					MA 360L/Profilar <sup>®</sup> 380/E360D+Z/Soldur <sup>®</sup> 380
HX420LAD +Z EN 10346	HX420LAD+Z	HX420LAD+Z					MA 400L/Profilar <sup>®</sup> 420
HX460LAD +Z EN 10346	HX460LAD+Z	HX460LAD+Z					MA 440L
HX500LAD +Z EN 10346	HX500LAD+Z	HX500LAD+Z					
HX700LAD +Z*							

\* Steel grade HX700LAD +Z is not recommended for automotive applications.



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# Dimensions

Steels for cold forming and deep drawing applications

Thickness (mm)	Min width	DX51D +Z EN 10346, DX52D +Z EN 10346	DX53D +Z EN 10346	DX54D +Z EN 10346	DX56D +Z EN 10346	DX57D +Z EN 10346		
		Max width	Max width	Max width	Max width	Max width		
0.20 ≤ th < 0.30	800	1100	-	-	-	-		
0.30 ≤ th < 0.35		1280	1030	1280	1140			
0.35 ≤ th < 0.40		1270	1140	1400	1200			
0.40 ≤ th < 0.45		1490	1500	1500	1430			
0.45 ≤ th < 0.50		1610		1570	1500			
0.50 ≤ th < 0.60		1640	1640	1660	1640	1540		
0.60 ≤ th < 0.65		1840	1740	1850	1820	1700		
0.65 ≤ th < 0.75		1860	1840	1950	1850	1810		
0.75 ≤ th < 0.85		2069	2069	1940	2000	1990	1840	
0.85 ≤ th < 1.40				2069	2069	2069	2069	1750
1.40 ≤ th < 1.50								1750
1.50 ≤ th < 1.75				1570				
1.75 ≤ th < 1.85		2000	2000	2000	2000	1510		
1.85 ≤ th < 1.90		2020	2020	1930	1950			
1.90 ≤ th < 1.95		1940	1970	1900	1900			
1.95 ≤ th < 2.00		1920	1920	1830	1830			
2.00 ≤ th < 2.05		1870	1870	1780	1780			
2.05 ≤ th < 2.10		1830	1830	1790	1790			
2.10 ≤ th < 2.35		1760	1760	1780	1700		1700	
2.35 ≤ th < 2.50				1620	1760		1515	
2.50 ≤ th < 2.55	1510			1630				
2.55 ≤ th < 3.05	1670	-	-	-	-			
3.05 ≤ th < 3.35	1620							
3.35 ≤ th < 4.00								
4.00 ≤ th < 4.30								
4.30 ≤ th < 4.60	1500							
4.60 ≤ th < 5.50								
5.50 ≤ th < 6.35		-						

Structural steels

Thickness (mm)	Min width	S220GD +Z EN 10346, S250GD +Z EN 10346	S280GD +Z EN 10346	S320GD +Z EN 10346	S350GD +Z EN 10346	S390GD +Z EN 10346, S420GD +Z EN 10346, S450GD +Z EN 10346	S420GD-HyPer® +Z**	S450GD-HyPer® +Z**	S550GD +Z EN 10346	S550GD-HyPer® +Z**				
		Max width	Max width	Max width	Max width	Max width	Max width	Max width	Max width	Max width				
0.25 ≤ th < 0.30	800	1250	1140	1150	-	-	-	-	-	-				
0.30 ≤ th < 0.35		1290	1250	1260	1170	-	-	-	-	-				
0.35 ≤ th < 0.40		1380	1350	1380	1300	1150	-	-	-	-				
0.40 ≤ th < 0.45		1500	1470	1500		1220	-	-	-	1230	-			
0.45 ≤ th < 0.50		1620	1640	1620	1460	1300	-	-	-	-	-			
0.50 ≤ th < 0.55		1640		1640	1510	1330	-	-	-	-	-			
0.55 ≤ th < 0.60		1730	1860	1640	1540	1300	-	-	-	1400	-			
0.60 ≤ th < 0.65		1840		1700	1700	1560	1350	-	-	-	-	-		
0.65 ≤ th < 0.70		1860		1780	1720	1600	1380	-	-	-	-	-		
0.70 ≤ th < 0.75		1970		1780		1610	1410	1380	-	-	-	-	-	
0.75 ≤ th < 0.80		2060		1860	1740	1630	1440	-	-	-	-	-	-	
0.80 ≤ th < 0.85					1770	1660	1470	-	-	-	-	-	-	-
0.85 ≤ th < 1.05					1810	1680	1500	-	-	-	-	-	-	-
1.05 ≤ th < 1.50					1860	1760	1600	-	-	-	-	-	-	-
1.50 ≤ th < 1.75		1700		1700	1850	1800	-	-	-	-	-	-	-	
1.75 ≤ th < 1.80					1780	1780	1800	-	-	-	-	-	-	-
1.80 ≤ th < 1.85			1730		1730	1730	-	-	-	-	-	-	-	
1.85 ≤ th < 1.90			1970		1830	1690	1690	1575	-	-	-	-	-	
1.90 ≤ th < 1.95			1920		1660	1640	1640	-	-	-	1195	-	-	
1.95 ≤ th < 2.00			1870		1220	-	-	-	-	-	1220	-	-	
2.00 ≤ th < 2.05			1830		1320	1800	1320	1260	-	-	-	-	-	
2.05 ≤ th < 2.10			1780		1295	1780	1325	1295	-	-	-	-	-	
2.10 ≤ th < 2.15		1740	1330	1740	1330	1320	-	-	-	-	-			
2.15 ≤ th < 2.20		1700	1640	1700	1345	1340	1620	-	-	1300	1300			
2.20 ≤ th < 2.25	1660			1360	1360	-	-	-	-	-	-			
2.25 ≤ th < 2.30	1390			1390	-	-	-	-	-	-	-			
2.30 ≤ th < 2.35	1410			1410	1650	1410	1410	-	-	-	-	-		
2.35 ≤ th < 2.40	1750			1660	1650	1435	1435	-	-	-	-	-		

\*\* Steel grade with R<sub>m</sub>/R<sub>e</sub> > 1.1 in accordance with the requirements of Eurocode 3 (EN 1993-1-1)

Thickness (mm)	Min width	S220GD +Z EN 10346, S250GD +Z EN 10346	S280GD +Z EN 10346	S320GD +Z EN 10346	S350GD +Z EN 10346	S390GD +Z EN 10346, S420GD +Z EN 10346, S450GD +Z EN 10346	S420GD-HyPer® +Z**	S450GD-HyPer® +Z**	S550GD +Z EN 10346	S550GD-HyPer® +Z**
		Max width	Max width	Max width	Max width	Max width	Max width	Max width	Max width	Max width
2.40 ≤ th < 2.45	800	1750	1660	1670	1670	1620	1450	1450	1300	1300
2.45 ≤ th < 2.50			1670	1690	1680		1465	1465		
2.50 ≤ th < 2.65					1690	1630	1485	1485	1320	1320
2.65 ≤ th < 2.75			1680	1700	1560	1500	1500	1345	1345	
2.75 ≤ th < 2.95					1610	1550	1550	1395	1395	
2.95 ≤ th < 3.00			1670	1670	1640	1620	1640	1640	1480	1480
3.00 ≤ th < 3.15		1630	1630	1500						
3.15 ≤ th < 3.35		1620	1620	1620	1610	1650	1650	-	1555	
3.35 ≤ th < 4.00		1500	1600	1500	1500				1650	1650
4.00 ≤ th < 4.55						1235				
4.55 ≤ th < 5.45			1500	-	-	-	-	-	-	
5.45 ≤ th < 6.35		-	1280	-	-	-	-	-	-	

\*\* Steel grade with  $R_m/R_e > 1.1$  in accordance with the requirements of Eurocode 3 (EN 1993-1-1)

High strength interstitial free steels

Thickness (mm)	Min width	HX180YD +Z EN 10346	HX220YD +Z EN 10346	HX260YD +Z EN 10346	HX300YD +Z EN 10346										
		Max width	Max width	Max width	Max width										
0.25 ≤ th < 0.30	800		-	-											
0.30 ≤ th < 0.35			-	-											
0.35 ≤ th < 0.40			-	1270		1650									
0.40 ≤ th < 0.45				1330											
0.45 ≤ th < 0.50				1480											
0.50 ≤ th < 0.55			1470	1820		1400									
0.55 ≤ th < 0.60			1580	1830		1480									
0.60 ≤ th < 0.65			1830	1840		1660									
0.65 ≤ th < 0.70			2070	2070		1830	1640								
0.70 ≤ th < 0.75						2070		2070	1650						
0.75 ≤ th < 0.80		2070			2070		1670								
0.80 ≤ th < 0.85										2020	2020	1650			
0.85 ≤ th < 1.05													1970	1970	1610
1.05 ≤ th < 1.50															
1.50 ≤ th < 1.75													1870	1870	1530
1.75 ≤ th < 1.80										1830	1830	1500			
1.80 ≤ th < 1.85		1780			1780		1410								
1.85 ≤ th < 1.90		1740			1740	1370									
1.90 ≤ th < 1.95		1700	1700												
1.95 ≤ th < 2.00		1660	1660												
2.00 ≤ th < 2.05		1620	1650		1650										
2.05 ≤ th < 2.10		1600													
2.10 ≤ th < 2.15		1570	1620		1620										
2.15 ≤ th < 2.20			1600			1600									
2.20 ≤ th < 2.25		1410	1520		1520										
2.25 ≤ th < 2.30		1360													
2.30 ≤ th < 2.35		-	1520		1520										
2.35 ≤ th < 2.40						-	-	-							
2.40 ≤ th < 2.45				-					-						
2.45 ≤ th < 2.50		-	-	-											
2.50 ≤ th < 2.65		-	-	-											
2.65 ≤ th < 2.75		-	-	-											
2.75 ≤ th < 2.95	-	-	-												
2.95 ≤ th < 3.00	-	-	-												

High Strength Low Alloy steels

Thickness (mm)	Min width	HX260LAD +Z EN 10346	HX300LAD +Z EN 10346	HX340LAD +Z EN 10346	HX380LAD +Z EN 10346	HX420LAD +Z EN 10346	HX460LAD +Z EN 10346	HX500LAD +Z EN 10346	HX700LAD +Z*					
		Max width	Max width	Max width	Max width	Max width	Max width	Max width	Max width					
0.30 ≤ th < 0.35	800	1250	1230	1230	1170	-	-	-	-					
0.35 ≤ th < 0.40		1360	1300	1300	1300	-	-	-	-					
0.40 ≤ th < 0.45		1480		1380	950	-	-	-	-					
0.45 ≤ th < 0.50		1590	1520	1520	1460	1260	1400	-	-					
0.50 ≤ th < 0.55		1640	1610	1610	1510	1500	1460	-	-					
0.55 ≤ th < 0.60		1730		1630	1540		1500	-	-	-				
0.60 ≤ th < 0.65		1840	1700	1700	1560	1550	1550	-	-					
0.65 ≤ th < 0.70		1860	1780	1780	1590		1570	-	-	-				
0.70 ≤ th < 0.75			1810	1810	1630	1620	-	-	-					
0.75 ≤ th < 0.80			1840	1840		1660	1650	-	-	-				
0.80 ≤ th < 0.85			1860	1860	1860	1680	1710	-	-	-				
0.85 ≤ th < 0.90						1700	-	-	-	-	-	-		
0.90 ≤ th < 1.00						1740	1730	-	-	-	-	-		
1.00 ≤ th < 1.05						1760	1750	-	-	-	-	-		
1.05 ≤ th < 1.10		1780				1770	-	-	-	-	-			
1.10 ≤ th < 1.15		1790	1822	-	-	-	-	-						
1.15 ≤ th < 1.25		1990	1860	1860	1830	1690	-	-	-					
1.25 ≤ th < 1.30					1830	1690	-	-	-	-	-			
1.30 ≤ th < 1.40					1850	1820	1830	1840	1570	-	-	-		
1.40 ≤ th < 1.45								1840	1570	-	-	-	-	-
1.45 ≤ th < 1.50								1850	1570	-	-	-	-	-
1.50 ≤ th < 1.55					1830	1830	1830	1850	1840	-	-	-		
1.55 ≤ th < 1.60								1780	1780	-	-	-	-	-
1.60 ≤ th < 1.65								1750	1750	-	-	-	-	-
1.65 ≤ th < 1.70	1730							1730	-	-	-	-	-	
1.70 ≤ th < 1.75	1830				1830	1830	1780	1730	1500	-	-			
1.75 ≤ th < 1.80		1730	1730	-			-	-	-	-				
1.80 ≤ th < 1.85		1690	1640	-			-	-	-	-				
1.85 ≤ th < 1.90														

\* Steel grade HX700LAD +Z is not recommended for automotive applications.

Thickness (mm)	Min width	HX260LAD +Z EN 10346	HX300LAD +Z EN 10346	HX340LAD +Z EN 10346	HX380LAD +Z EN 10346	HX420LAD +Z EN 10346	HX460LAD +Z EN 10346	HX500LAD +Z EN 10346	HX700LAD +Z*		
		Max width	Max width	Max width	Max width	Max width	Max width	Max width	Max width		
1.90 ≤ th < 1.95	800	1920	1800	1830	1640	1640	1570	1500	-		
1.95 ≤ th < 2.00		1870	1780								
2.00 ≤ th < 2.05		1830	1750	1800			1510			1250	
2.05 ≤ th < 2.10		1780		1780			1270				
2.10 ≤ th < 2.15		1740	1720	1740			1300				
2.15 ≤ th < 2.20		1700	1690	1700			1310				
2.20 ≤ th < 2.25		1660		1660			1320				
2.25 ≤ th < 2.30		1640	1710	1650			1630			1340	
2.30 ≤ th < 2.35							1640			1350	
2.35 ≤ th < 2.40		1660	1710	1670			1650			1360	
2.40 ≤ th < 2.45							1670			1380	
2.45 ≤ th < 2.50		1680	1690	1680			1390				
2.50 ≤ th < 2.55		1700	1710	1710			1520			1400	
2.55 ≤ th < 2.65		1710					1740			1700	1530
2.65 ≤ th < 2.75			1720	1760						1710	1560
2.75 ≤ th < 2.85		1730	1760				1710				1590
2.85 ≤ th < 2.95				1550						1490	
2.95 ≤ th < 3.05		1600	1520								
3.05 ≤ th < 3.15		1690	1690	1690			1640			1660	-
3.15 ≤ th < 3.35							1620				
3.35 ≤ th < 4.00		1690	1690	1690			1640			1600	
4.00 ≤ th < 4.55							1570				
4.55 ≤ th < 4.65		1680	1680	1680						1600	
4.65 ≤ th < 4.85							1580				
4.85 ≤ th < 5.00		1570	1570	1570							
5.00 ≤ th < 5.25							1550			1550	
5.25 ≤ th < 5.50		1550	1550	1550							
5.50 ≤ th < 5.60							1680			1680	
5.60 ≤ th < 6.00	1580	1580	1580	1570							
6.00 ≤ th < 6.20	1550	1550	1550	1550	1550						

\* Steel grade HX700LAD +Z is not recommended for automotive applications.

Thickness (mm)	Min width	HX260LAD +Z EN 10346	HX300LAD +Z EN 10346	HX340LAD +Z EN 10346	HX380LAD +Z EN 10346	HX420LAD +Z EN 10346	HX460LAD +Z EN 10346	HX500LAD +Z EN 10346	HX700LAD +Z*
		Max width	Max width	Max width	Max width	Max width	Max width	Max width	Max width
6.20 ≤ th < 6.35	800	1490	1490	1490	-	1490	1490	-	-

\* Steel grade HX700LAD +Z is not recommended for automotive applications.

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# Mechanical properties

## Steels for cold forming and deep drawing applications

	Notes	Direction	Thickness (mm)	R <sub>e</sub> (MPa)	R <sub>m</sub> (MPa)	A <sub>80</sub> (%)	MP guarantees (Months)	r <sub>90</sub>	n <sub>90</sub>
DX51D +Z EN 10346		T	0.2 - 0.35	-	270 - 500	≥ 15	< 1	-	-
			0.35 - 0.5			≥ 18			
			0.5 - 0.7			≥ 20			
			0.7 - 6			≥ 22			
DX52D +Z EN 10346	1	T	0.3 - 0.5	140 - 300	270 - 420	≥ 22	< 1	-	-
			0.5 - 0.7			≥ 24			
			0.7 - 6			≥ 26			
DX53D +Z EN 10346		T	0.3 - 0.5	140 - 260	270 - 380	≥ 26	< 1	-	-
			0.5 - 0.7			≥ 28			
			0.7 - 6			≥ 30			
DX54D +Z EN 10346		T	0.3 - 0.5	120 - 220	260 - 350	≥ 32	< 6	≥ 1.6	≥ 0.180
			0.5 - 0.7			≥ 34		≥ 1.4	
			0.7 - 1.5			≥ 36		≥ 1.2	
			1.5 - 2						
			2 - 3						
DX56D +Z EN 10346		T	0.3 - 0.5	120 - 180	260 - 350	≥ 35	< 6	≥ 1.9	≥ 0.210
			0.5 - 0.7			≥ 37		≥ 1.7	
			0.7 - 1.5			≥ 39		≥ 1.5	
			1.5 - 2						
			2 - 3						
DX57D +Z EN 10346		T	0.5 - 0.7	120 - 170	260 - 350	≥ 39	< 6	≥ 2.1	≥ 0.220
			0.7 - 1.5			≥ 41		≥ 1.9	
			1.5 - 2					≥ 1.7	
			2 - 3						

1. For DX52D +Z EN 10346 the R<sub>e</sub>-value only applies to skin-passed products (surface qualities B and C).



**Structural steels**

	Notes	Direction	Thickness (mm)	R <sub>e</sub> (MPa)	R <sub>m</sub> (MPa)	A <sub>80</sub> (%)	MP guarantees (Months)
S220GD +Z EN 10346		L	0.25 - 0.35	≥ 220	≥ 300	≥ 13	< 1
			0.35 - 0.5			≥ 16	
			0.5 - 0.7			≥ 18	
			0.7 - 6			≥ 20	
S250GD +Z EN 10346		L	0.25 - 0.35	≥ 250	≥ 330	≥ 12	< 1
			0.35 - 0.5			≥ 15	
			0.5 - 0.7			≥ 17	
			0.7 - 6			≥ 19	
S280GD +Z EN 10346		L	0.25 - 0.35	≥ 280	≥ 360	≥ 11	< 1
			0.35 - 0.5			≥ 14	
			0.5 - 0.7			≥ 16	
			0.7 - 6			≥ 18	
S320GD +Z EN 10346		L	0.25 - 0.35	≥ 320	≥ 390	≥ 10	< 1
			0.35 - 0.5			≥ 13	
			0.5 - 0.7			≥ 15	
			0.7 - 6			≥ 17	
S350GD +Z EN 10346		L	0.3 - 0.5	≥ 350	≥ 420	≥ 12	< 1
			0.5 - 0.7			≥ 14	
			0.7 - 6			≥ 16	
S390GD +Z EN 10346		L	0.35 - 0.5	≥ 390	≥ 460	≥ 12	< 1
			0.5 - 0.7			≥ 14	
			0.7 - 6			≥ 16	
S420GD +Z EN 10346		L	0.35 - 0.5	≥ 420	≥ 480	≥ 11	< 1
			0.5 - 0.7			≥ 13	
			0.7 - 6			≥ 15	

	Notes	Direction	Thickness (mm)	R <sub>e</sub> (MPa)	R <sub>m</sub> (MPa)	A <sub>80</sub> (%)	MP guarantees (Months)
S420GD-HyPer <sup>®</sup> +Z**	1	L	0.7 - 4	≥ 420	480 - 620	≥ 15	< 1
S450GD +Z EN 10346		L	0.35 - 0.5	≥ 450	≥ 510	≥ 10	< 1
			0.5 - 0.7			≥ 12	
			0.7 - 6			≥ 14	
S450GD-HyPer <sup>®</sup> +Z**	1	L	0.7 - 4	≥ 450	510 - 650	≥ 15	< 1
S550GD +Z EN 10346		L	0.2 - 3	≥ 550	≥ 560	-	< 1
S550GD-HyPer <sup>®</sup> +Z**	1	L	0.7 - 6	≥ 550	600 - 760	≥ 13	< 1

\*\* Steel grade with R<sub>m</sub>/R<sub>e</sub> > 1.1 in accordance with the requirements of Eurocode 3 (EN 1993-1-1)

1. Upper limit of R<sub>m</sub> for easier piercing and screwing.

## High strength interstitial free steels

	Direction	Thickness (mm)	R <sub>e</sub> (MPa)	R <sub>m</sub> (MPa)	A <sub>80</sub> (%)	MP guarantees (Months)	r <sub>90</sub>	n <sub>90</sub>
HX180YD +Z EN 10346	T	0.45 - 0.5	180 - 240	330 - 390	≥ 30	< 6	≥ 1.3	≥ 0.140
		0.5 - 0.7			≥ 32		≥ 1.5	≥ 0.170
		0.7 - 3			≥ 34		≥ 1.7	≥ 0.180
HX220YD +Z EN 10346	T	0.45 - 0.5	220 - 280	340 - 420	≥ 28	< 6	≥ 1.1	≥ 0.130
		0.5 - 0.7			≥ 30		≥ 1.3	≥ 0.160
		0.7 - 3			≥ 32		≥ 1.5	≥ 0.170
HX260YD +Z EN 10346	T	0.45 - 0.5	260 - 320	380 - 440	≥ 26	< 6	≥ 1	≥ 0.120
		0.5 - 0.7			≥ 28		≥ 1.2	≥ 0.150
		0.7 - 3			≥ 30		≥ 1.4	≥ 0.160
HX300YD +Z EN 10346	T	0.45 - 0.5	300 - 360	390 - 470	≥ 23	< 6	≥ 0.9	≥ 0.110
		0.5 - 0.7			≥ 25		≥ 1.1	≥ 0.140
		0.7 - 3			≥ 27		≥ 1.3	≥ 0.150

## High Strength Low Alloy steels

	Direction	Thickness (mm)	R <sub>e</sub> (MPa)	R <sub>m</sub> (MPa)	A <sub>80</sub> (%)	MP guarantees (Months)
HX260LAD +Z EN 10346	T	0.3 - 0.5	260 - 330	350 - 430	≥ 22	< 6
		0.5 - 0.7			≥ 24	
		0.7 - 6			≥ 26	
HX300LAD +Z EN 10346	T	0.3 - 0.5	300 - 380	380 - 480	≥ 19	< 6
		0.5 - 0.7			≥ 21	
		0.7 - 6			≥ 23	
HX340LAD +Z EN 10346	T	0.3 - 0.5	340 - 420	410 - 510	≥ 17	< 6
		0.5 - 0.7			≥ 19	
		0.7 - 6			≥ 21	
HX380LAD +Z EN 10346	T	0.3 - 0.5	380 - 480	440 - 560	≥ 15	< 6
		0.5 - 0.7			≥ 17	
		0.7 - 6			≥ 19	
HX420LAD +Z EN 10346	T	0.3 - 0.5	420 - 520	470 - 590	≥ 13	< 6
		0.5 - 0.7			≥ 15	
		0.7 - 6			≥ 17	
HX460LAD +Z EN 10346	T	0.4 - 0.5	460 - 560	500 - 640	≥ 11	< 6
		0.5 - 0.7			≥ 13	
		0.7 - 6			≥ 15	
HX500LAD +Z EN 10346	T	1.5 - 6	500 - 620	530 - 690	≥ 13	< 6
HX700LAD +Z*	T	2 - 3	700 - 840	750 - 950	≥ 10	< 6

\* Steel grade HX700LAD +Z is not recommended for automotive applications.

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# Chemical composition

## Steels for cold forming and deep drawing applications

	C (%)	Mn (%)	P (%)	S (%)	Si (%)	Ti (%)
DX51D +Z EN 10346	≤ 0.180	≤ 1.20	≤ 0.120	≤ 0.045	≤ 0.50	≤ 0.300
DX52D +Z EN 10346	≤ 0.120	≤ 0.60	≤ 0.100	≤ 0.045	≤ 0.50	≤ 0.300
DX53D +Z EN 10346	≤ 0.120	≤ 0.60	≤ 0.100	≤ 0.045	≤ 0.50	≤ 0.300
DX54D +Z EN 10346	≤ 0.120	≤ 0.60	≤ 0.100	≤ 0.045	≤ 0.50	≤ 0.300
DX56D +Z EN 10346	≤ 0.120	≤ 0.60	≤ 0.100	≤ 0.045	≤ 0.50	≤ 0.300
DX57D +Z EN 10346	≤ 0.120	≤ 0.60	≤ 0.100	≤ 0.045	≤ 0.50	≤ 0.300

## Structural steels

	C (%)	Mn (%)	P (%)	S (%)	Si (%)
S220GD +Z EN 10346	≤ 0.200	≤ 1.70	≤ 0.100	≤ 0.045	≤ 0.60
S250GD +Z EN 10346	≤ 0.200	≤ 1.70	≤ 0.100	≤ 0.045	≤ 0.60
S280GD +Z EN 10346	≤ 0.200	≤ 1.70	≤ 0.100	≤ 0.045	≤ 0.60
S320GD +Z EN 10346	≤ 0.200	≤ 1.70	≤ 0.100	≤ 0.045	≤ 0.60
S350GD +Z EN 10346	≤ 0.200	≤ 1.70	≤ 0.100	≤ 0.045	≤ 0.60
S390GD +Z EN 10346	≤ 0.200	≤ 1.70	≤ 0.100	≤ 0.045	≤ 0.60
S420GD +Z EN 10346	≤ 0.200	≤ 1.70	≤ 0.100	≤ 0.045	≤ 0.60
S420GD-HyPer <sup>®</sup> +Z**	≤ 0.200	≤ 1.70	≤ 0.100	≤ 0.045	≤ 0.60
S450GD +Z EN 10346	≤ 0.200	≤ 1.70	≤ 0.100	≤ 0.045	≤ 0.60
S450GD-HyPer <sup>®</sup> +Z**	≤ 0.200	≤ 1.70	≤ 0.100	≤ 0.045	≤ 0.60
S550GD +Z EN 10346	≤ 0.200	≤ 1.70	≤ 0.100	≤ 0.045	≤ 0.60
S550GD-HyPer <sup>®</sup> +Z**	≤ 0.200	≤ 1.70	≤ 0.100	≤ 0.040	≤ 0.60

\*\* Steel grade with  $R_m/R_e > 1.1$  in accordance with the requirements of Eurocode 3 (EN 1993-1-1)

## High strength interstitial free steels

	C (%)	Mn (%)	P (%)	S (%)	Si (%)	Al (%)	Nb (%)	Ti (%)
HX180YD +Z EN 10346	≤ 0.010	≤ 0.70	≤ 0.060	≤ 0.025	≤ 0.30	≥ 0.010	≤ 0.090	≤ 0.120
HX220YD +Z EN 10346	≤ 0.010	≤ 0.90	≤ 0.080	≤ 0.025	≤ 0.30	≥ 0.010	≤ 0.090	≤ 0.120
HX260YD +Z EN 10346	≤ 0.010	≤ 1.60	≤ 0.100	≤ 0.025	≤ 0.30	≥ 0.010	≤ 0.090	≤ 0.120
HX300YD +Z EN 10346	≤ 0.015	≤ 1.60	≤ 0.100	≤ 0.025	≤ 0.30	≥ 0.010	≤ 0.090	≤ 0.120

## High Strength Low Alloy steels

	C (%)	Mn (%)	P (%)	S (%)	Si (%)	Al (%)	Nb (%)	Ti (%)
HX260LAD +Z EN 10346	≤ 0.110	≤ 1.00	≤ 0.030	≤ 0.025	≤ 0.50	≥ 0.015	≤ 0.090	≤ 0.150
HX300LAD +Z EN 10346	≤ 0.120	≤ 1.40	≤ 0.030	≤ 0.025	≤ 0.50	≥ 0.015	≤ 0.090	≤ 0.150
HX340LAD +Z EN 10346	≤ 0.120	≤ 1.40	≤ 0.030	≤ 0.025	≤ 0.50	≥ 0.015	≤ 0.100	≤ 0.150
HX380LAD +Z EN 10346	≤ 0.120	≤ 1.50	≤ 0.030	≤ 0.025	≤ 0.50	≥ 0.015	≤ 0.100	≤ 0.150
HX420LAD +Z EN 10346	≤ 0.120	≤ 1.60	≤ 0.030	≤ 0.025	≤ 0.50	≥ 0.015	≤ 0.100	≤ 0.150
HX460LAD +Z EN 10346	≤ 0.150	≤ 1.70	≤ 0.030	≤ 0.025	≤ 0.50	≥ 0.015	≤ 0.100	≤ 0.150
HX500LAD +Z EN 10346	≤ 0.150	≤ 1.70	≤ 0.030	≤ 0.025	≤ 0.50	≥ 0.015	≤ 0.100	≤ 0.150
HX700LAD +Z*	≤ 0.100	≤ 2.10	≤ 0.025	≤ 0.010	≤ 0.35	≥ 0.020	≤ 0.090	≤ 0.150

\* Steel grade HX700LAD +Z is not recommended for automotive applications.

### Any questions?

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