



## 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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E20

## 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

For other coating weights, please contact us.

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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
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 10326:2004	EN 10147:2000	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
S220GD +Z EN 10346				Z22 G	CS Type B			
S250GD +Z EN 10346				Z25 G	SS Grade 230			
S280GD +Z EN 10346				Z28 G	SS Grade 255			
S320GD +Z EN 10346					SS Grade 275			
S350GD +Z EN 10346				Z35 G	HSLA Type A Grade 340			
S390GD +Z EN 10346								
S420GD +Z EN 10346								
S420GD-HyPer <sup>®</sup> +Z**								
S450GD +Z EN 10346								
S450GD-HyPer <sup>®</sup> +Z**								
S550GD +Z EN 10346								
S550GD-HyPer <sup>®</sup> +Z***								
** Steel grade with $R_m/R_e > 1.1$ in accordance with the requirements of Eurocode 3 (EN 1993-1-1)								
*** Steel grade with $R_m/R_e > 1.05$ in accordance with the requirements of Eurocode 3 (EN 1993-1-12)								

	EN 10326:2004	EN 10147:2000	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	S220GD+Z	S220GD+Z		FeE 220 G	StE 220-2Z	C.230	SC220GD+Z
S250GD +Z EN 10346	S250GD+Z	S250GD+Z	S250GD+Z	S250GD+Z		FeE 250 G	StE 250-2Z	C.250	SC250GD+Z
S280GD +Z EN 10346	S280GD+Z	S280GD+Z	S280GD+Z	S280GD+Z		FeE 280 G	StE 280-2Z	C.280	SC280GD+Z
S320GD +Z EN 10346	S320GD+Z	S320GD+Z	S320GD+Z	S320GD+Z		FeE 320 G	StE 320-2Z	C.320	SC320GD+Z
S350GD +Z EN 10346	S350GD+Z	S350GD+Z	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 <sup>®</sup> +Z**									
S450GD +Z EN 10346				S450GD+Z					
S450GD-HyPer <sup>®</sup> +Z**									
S550GD +Z EN 10346	S550GD+Z	S550GD+Z	S550GD+Z	S550GD+Z		FeE 550 G		C.550	SC550GD+Z
S550GD-HyPer <sup>®</sup> +Z***									
** Steel grade with $R_m/R_e > 1.1$ in accordance with the requirements of Eurocode 3 (EN 1993-1-1)									
*** Steel grade with $R_m/R_e > 1.05$ in accordance with the requirements of Eurocode 3 (EN 1993-1-12)									

### 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
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 10326:2004	EN 10147:2000	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
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 10326:2004	EN 10147:2000	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	Max width	
0.30 ≤ th < 0.35	-	1250	1250	1250	1250	1000	-	
0.35 ≤ th < 0.40		1305	1305			1130		
0.40 ≤ th < 0.45		1675	1375	1360	1350	1230		
0.45 ≤ th < 0.50			1600	1640	1640	1500		
0.50 ≤ th < 0.60		1850	1675	1680	1680	1680		1540
0.60 ≤ th < 0.65		2080	2080	2080	2080	2080		1700
0.65 ≤ th < 0.75								1810
0.75 ≤ th < 1.40								1840
1.40 ≤ th < 1.50								1750
1.50 ≤ th < 1.75								1570
1.75 ≤ th < 1.85		2075	2075	2075	2075	2075		1510
1.85 ≤ th < 1.90								-
1.90 ≤ th < 1.95		2020	2020	2020	2020	2020		
1.95 ≤ th < 2.00		1975	1975	1975	1975	1975		
2.00 ≤ th < 2.05		1930	1930	1930	1930	1930		
2.05 ≤ th < 2.10		1880	1880	1880	1880	1880		
2.10 ≤ th < 2.35		1645	1645	1675	1675	1675		
2.35 ≤ th < 2.50				1580	1580	1580		
2.50 ≤ th < 2.55				1540	1540	1540		
2.55 ≤ th < 3.00				1310	1520	1520		
3.00 ≤ th < 4.30	-	-	-	-	-			
4.30 ≤ th < 4.60						1630	1630	
4.60 ≤ th < 5.50						1380	1380	
5.50 ≤ th < 6.00						1250	1250	

Structural steels

Thickness (mm)	Min width	S220GD	S250GD	S280GD	S320GD	S350GD	S390GD +Z EN	S420GD-HyPer®	S450GD-HyPer®	S550GD	S550GD-HyPer®	
		+Z EN 10346	+Z EN 10346	+Z EN 10346	+Z EN 10346	+Z EN 10346	+Z EN 10346	10346, S420GD +Z EN 10346, S450GD +Z EN 10346	+Z**	+Z**	+Z EN 10346	+Z***
		Max width	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	1250	-	-	-	-	-	-	-	-	
0.30 ≤ th < 0.35		1280		1250	-	-	-	-	-	-	-	-
0.35 ≤ th < 0.40		1305	1305	1350	1300	1300	-	-	-	-	-	
0.40 ≤ th < 0.45		1680	1680	1680	1390	1385	1310	1110	-	1230	-	
0.45 ≤ th < 0.50					1470	1460	1365	1190	-	-	-	-
0.50 ≤ th < 0.55					1520	1510	1410	1260	-	-	-	-
0.55 ≤ th < 0.60		1825	1810	-	1675	1620	-	1300	1290	1400	1255	
0.60 ≤ th < 0.65		1840	1990	1730	1720	1690	1400	1330	1330			
0.65 ≤ th < 0.70		2080	2080	1850	1800	-	1520	1370	1410	1500	1500	
0.70 ≤ th < 0.75				1865	-	1545	1400	1510				
0.75 ≤ th < 0.80				-	1805	-	1590	1430	1610			
0.80 ≤ th < 0.85		2080	2080	1865	-	1595	1455	1650	1695	1635		
0.85 ≤ th < 1.05				1875	-	1610	1480	-	1695	1695		
1.05 ≤ th < 1.50		-	-	-	1850	1700	1580	-	-	1695		
1.50 ≤ th < 1.75		1860	-	1860	1840	1795	-	1770	-	1500		
1.75 ≤ th < 1.80		1900	1950	1895	-	1790	-	-	-	1450		
1.80 ≤ th < 1.85		2075	1955	2010	-	1800	1740	1740	1580	-	1420	
1.85 ≤ th < 1.90			2030	2030	1955	-	1700	1700	-	-	1385	
1.90 ≤ th < 1.95		2025	2025	2025	1965	1830	-	1650	-	-	-	
1.95 ≤ th < 2.00		1975	1975	1975	1950	1870	-	1610	1570	-	-	
2.00 ≤ th < 2.05	1930	1930	1930	1930	1860	-	1575	1530	-	-		
2.05 ≤ th < 2.10	1880	1880	1880	1880	1850	-	1530	1495	-	-		
2.10 ≤ th < 2.15	1840	1840	1840	1840	1840	1650	1465	1465	1200	1300		
2.15 ≤ th < 2.20	1790	1790	1790	1790	1790	-	1350	1340	-	-		
2.20 ≤ th < 2.25	1750	1750	1750	1750	1750	-	1355	1360	-	-		
2.25 ≤ th < 2.30	1710	1710	1710	1710	1710	-	1380	1380	1205	-		
2.30 ≤ th < 2.35	1660	1660	1660	1660	1660	-	1400	1400	1215	-		

\*\* 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)

\*\*\* Steel grade with R<sub>m</sub>/R<sub>e</sub> > 1.05 in accordance with the requirements of Eurocode 3 (EN 1993-1-12)

Thickness (mm)	Min width	S220GD	S250GD	S280GD	S320GD	S350GD	S390GD +Z EN	S420GD-HyPer®	S450GD-HyPer®	S550GD	S550GD-HyPer®			
		+Z EN 10346	+Z EN 10346	+Z EN 10346	+Z EN 10346	+Z EN 10346	10346, S420GD +Z EN 10346, S450GD +Z EN 10346	+Z**	+Z**	+Z EN 10346	+Z***			
		Max width	Max width	Max width	Max width	Max width	Max width	Max width	Max width	Max width	Max width			
2.35 ≤ th < 2.40	800	1650	1650	1650	1650	1650	1650	1425	1425	1230	1300			
2.40 ≤ th < 2.45					1600	1600	1610	1450	1450	1240				
2.45 ≤ th < 2.50					1580	1580	1540	1460	1460	1260				
2.50 ≤ th < 2.65					1570	1570		1480	1480	1280	1320			
2.65 ≤ th < 2.75					1580	1580		1490	1490	1340				
2.75 ≤ th < 2.95					1590	1590		1510	1510	1395	1400			
2.95 ≤ th < 3.00					1610	1610		1565	1560	1560	1480	1480		
3.00 ≤ th < 3.15					1615	1615	1580	1580	1580	1500	1500			
3.15 ≤ th < 3.35					1640	1630	1640	1640	1640	1550	1555			
3.35 ≤ th < 4.00					1650	1650	1650	1650	1650	1385	1500			
4.00 ≤ th < 4.55					1640	1640	1640	1640	1640	1560	1560	1235	1600	
4.55 ≤ th < 5.45					1400	1400	1400	1400	1400	1315	1315	1315	970	970
5.45 ≤ th < 6.00					1250	1250	1250	1250	1250	1160	1160	1160	-	-

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

\*\*\* Steel grade with  $R_m/R_e > 1.05$  in accordance with the requirements of Eurocode 3 (EN 1993-1-12)

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			-	1355		1250	
0.40 ≤ th < 0.45			1640	1360			
0.45 ≤ th < 0.50				1450			
0.50 ≤ th < 0.55			1470	1820	1645	1340	
0.55 ≤ th < 0.60			1580	1830		1480	
0.60 ≤ th < 0.65			1830	2080	1830	1640	
0.65 ≤ th < 0.70			2080		2075		1670
0.70 ≤ th < 0.75							
0.75 ≤ th < 0.80							
0.80 ≤ th < 0.85					1650		
0.85 ≤ th < 1.05			2080		1750		
1.05 ≤ th < 1.20					1670		
1.20 ≤ th < 1.50							
1.50 ≤ th < 1.75							
1.75 ≤ th < 1.80							
1.80 ≤ th < 1.85			2075	2075			
1.85 ≤ th < 1.90							
1.90 ≤ th < 1.95			2020	2020	1920	1650	
1.95 ≤ th < 2.00			1970	1970	1970	1610	
2.00 ≤ th < 2.05			1930	1930	1930	1570	
2.05 ≤ th < 2.10			1880	1880	1880	1530	
2.10 ≤ th < 2.15			1840	1840	1840	1500	
2.15 ≤ th < 2.20			1800	1800	1795		
2.20 ≤ th < 2.25			1760	1750	1750	1410	
2.25 ≤ th < 2.30			1720	1720	1720	1375	
2.30 ≤ th < 2.35			1680	1680	1680		
2.35 ≤ th < 2.40			1640	1640	1640		
2.40 ≤ th < 2.45			1610	1610	1610		
2.45 ≤ th < 2.50			1580	1580	1580		
2.50 ≤ th < 2.65			1495	1520	1520		
2.65 ≤ th < 2.75			1430				
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	1210	-	-	-	-	-					
0.35 ≤ th < 0.40		1300	1300	1300	1300	1260	-	-	-					
0.40 ≤ th < 0.45		1380		1380										
0.45 ≤ th < 0.50		1590	1520	1460	1460	1360	1360	-						
0.50 ≤ th < 0.55		1660	1610	1610	1510	1625	1390							
0.55 ≤ th < 0.60		1680		1630	1600	1645	1450	1260						
0.60 ≤ th < 0.65		2075	1700	1680	1625	1650	1500	1320						
0.65 ≤ th < 0.70		2080	1780	1800	1640	1690	1600	1420						
0.70 ≤ th < 0.75					1680		1660	1500						
0.75 ≤ th < 0.80					1610									
0.80 ≤ th < 0.85					1810		1710	1650						
0.85 ≤ th < 0.90					1820		1725	1695						
0.90 ≤ th < 1.00					1760		1690							
1.00 ≤ th < 1.05					1790									
1.05 ≤ th < 1.10					1810				1710					
1.10 ≤ th < 1.15					1825				1730					
1.15 ≤ th < 1.25					1860				1750	1720				
1.25 ≤ th < 1.30										1760				
1.30 ≤ th < 1.40					1845				1780	1780				
1.40 ≤ th < 1.45		1845	1795											
1.45 ≤ th < 1.50				1845		1795								
1.50 ≤ th < 1.55										1795	1800			
1.55 ≤ th < 1.60												1640		
1.60 ≤ th < 1.65								1600						
1.65 ≤ th < 1.70	1860						1800	1580						
1.70 ≤ th < 1.75												1840	1900	
1.75 ≤ th < 1.80	1810						1950	1790				1780	1790	
1.80 ≤ th < 1.85	1740						2010	1795				1730	1740	
1.85 ≤ th < 1.90	1700						2030	1950				1830	1700	1700

\* 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	1650	2025	1950	1830	1650	1650	1580	-	
1.95 ≤ th < 2.00			1970		1860	1610	1610	1560		
2.00 ≤ th < 2.05	800	1645	1880	1920	1855	1570	1570	1530	1250	
2.05 ≤ th < 2.10				1880	1850		1550	1520	1490	1245
2.10 ≤ th < 2.15			1830	1830	1840	1450		1460	1275	
2.15 ≤ th < 2.20			1750	1790	1790	1375	1350	1285		
2.20 ≤ th < 2.25				1750	1750	1360	1370	1300		
2.25 ≤ th < 2.30			1700	1700	1700	1380	1400	1310		
2.30 ≤ th < 2.35			1680	1680	1680	1400	1420	1325		
2.35 ≤ th < 2.40			1645	1645	1650	1650	1420	1445	1335	
2.40 ≤ th < 2.45					1600	1600	1450	1460	1350	
2.45 ≤ th < 2.50				1570	1645	1570	1540	1460	1470	1360
2.50 ≤ th < 2.55								1470	1475	1375
2.55 ≤ th < 2.65				1475		1490	1385			
2.65 ≤ th < 2.75				1490		1510	1410			
2.75 ≤ th < 2.85				1510		1530	1435			
2.85 ≤ th < 2.95				1530		1560	1460			
2.95 ≤ th < 3.05				1560		1560	1495			
3.05 ≤ th < 3.15				1590		1590	1640			
3.15 ≤ th < 3.35			1590	1640		1630	1640	1645	1650	
3.35 ≤ th < 4.00			1645	1645		1645	1645	1645	1645	
4.00 ≤ th < 4.55			1550	1560	1560	1560	1560	1560		
4.55 ≤ th < 4.65	1610	1610	1610	1520	1530	1530	1530			
4.65 ≤ th < 4.85	1560	1560	1560	1480	1480	1480	1480	-		
4.85 ≤ th < 5.00	1520	1520	1520	1440	1440	1440	1440			
5.00 ≤ th < 5.25	1450	1450	1450	1370	1370	1370	1370			
5.25 ≤ th < 5.50	1380	1380	1380	1290	1290	1290	1290			
5.50 ≤ th < 5.60	1350	1350	1350	1270	1270	1270	1270			
5.60 ≤ th < 6.00	1250	1250	1250	1165	1165	1165	1165			
6.00 ≤ th < 6.20	-	-	-	-	-	-	-			

\* 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	-	-	-	-	-	-	-	-

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



E20

# 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					≥ 1.7	

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	
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 - 5	≥ 550	600 - 760	≥ 13	≤ 1
			5 - 6			≥ 14	
** 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)							
*** Steel grade with R <sub>m</sub> /R <sub>e</sub> > 1.05 in accordance with the requirements of Eurocode 3 (EN 1993-1-12)							
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.

# 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

	Notes	C (%)	Mn (%)	P (%)	S (%)	Si (%)
S220GD +Z EN 10346	1	≤ 0.200	≤ 1.70	≤ 0.100	≤ 0.045	≤ 0.60
S250GD +Z EN 10346	1	≤ 0.200	≤ 1.70	≤ 0.100	≤ 0.045	≤ 0.60
S280GD +Z EN 10346	1	≤ 0.200	≤ 1.70	≤ 0.100	≤ 0.045	≤ 0.60
S320GD +Z EN 10346	1	≤ 0.200	≤ 1.70	≤ 0.100	≤ 0.045	≤ 0.60
S350GD +Z EN 10346	1	≤ 0.200	≤ 1.70	≤ 0.100	≤ 0.045	≤ 0.60
S390GD +Z EN 10346	1	≤ 0.200	≤ 1.70	≤ 0.100	≤ 0.045	≤ 0.60
S420GD +Z EN 10346	1	≤ 0.200	≤ 1.70	≤ 0.100	≤ 0.045	≤ 0.60
S420GD-HyPer <sup>®</sup> +Z**	1	≤ 0.200	≤ 1.70	≤ 0.100	≤ 0.045	≤ 0.60
S450GD +Z EN 10346	1	≤ 0.200	≤ 1.70	≤ 0.100	≤ 0.045	≤ 0.60
S450GD-HyPer <sup>®</sup> +Z**	1	≤ 0.200	≤ 1.70	≤ 0.100	≤ 0.045	≤ 0.60
S550GD +Z EN 10346	1	≤ 0.200	≤ 1.70	≤ 0.100	≤ 0.045	≤ 0.60
S550GD-HyPer <sup>®</sup> +Z***	2+1	≤ 0.200	≤ 1.70	≤ 0.100	≤ 0.045	≤ 0.60

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

\*\*\* Steel grade with  $R_m/R_e > 1.05$  in accordance with the requirements of Eurocode 3 (EN 1993-1-12)

1. If, by agreement at the time of enquiry and order, other chemical elements are added, they shall be mentioned on the inspection document which may need a change of classification.

2. Nb ≤ 0.100% and Ti ≤ 0.08%

## 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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