

EMW delivery range	Coils	Slit strip	Cut-to-size sheet	
				
Thicknesses	from 0.30 – 4.50 mm	from 0.30 – 4.50 mm	from 0.40 – 3.00 mm	
Widths	up to 1,850 mm	up to 1,850 mm	up to 1,530 mm	up to 1,850 mm
Lengths	---	---	up to 8,000 mm	up to 3,000 mm
Tolerances	Acc. to DIN EN 10143; finer tolerances available by arrangement.			

Soft grades – hot-dip coated steel strip and sheet made of soft steels acc. to DIN EN 10346 : 2009

Mechanical properties (lat.)

Steel grade/type		Symbol for the type of surface finishing	Elongation limit R_{e1} ¹⁾ MPa	Tensile strength R_m MPa	Fracture elongation A_{80} ²⁾ %	Vertical anisotropy r_{90} min.	Work hardening exponent n_{90} min.
Code	Material no.						
DX51D	1.0226	+Z, +ZF, +ZA, +AZ, +AS	–	270 – 500	22	–	–
DX52D	1.0350	+Z, +ZF, +ZA, +AZ, +AS	140 – 300 ³⁾	270 – 420	26	–	–
DX53D	1.0355	+Z, +ZF, +ZA, +AZ, +AS	140 – 260	270 – 380	30	–	–
DX54D	1.0306	+Z, +ZA	120 – 220	260 – 350	36	1.6 ⁴⁾	0.18
DX54D	1.0306	+ZF	120 – 220	260 – 350	34	1.4 ⁴⁾	0.18
DX54D	1.0306	+AZ	120 – 220	260 – 350	36	–	–
DX54D	1.0306	+AS	120 – 220	260 – 350	34	1.4 ⁴⁾⁵⁾	0.18 ⁵⁾
DX55D ⁶⁾	1.0309	+AS	140 – 240	270 – 370	30	–	–
DX56D	1.0322	+Z, +ZA	120 – 180	260 – 350	39	1.9 ⁴⁾	0.21
DX56D	1.0322	+ZF	120 – 180	260 – 350	37	1.7 ⁴⁾⁵⁾	0.20 ⁵⁾
DX56D	1.0322	+AS	120 – 180	260 – 350	39	1.7 ⁴⁾⁵⁾	0.20 ⁵⁾
DX57D	1.0853	+Z, +ZA	120 – 170	260 – 350	41	2.1 ⁴⁾	0.22
DX57D	1.0853	+ZF	120 – 170	260 – 350	39	1.9 ⁴⁾⁵⁾	0.21 ⁴⁾
DX57D	1.0853	+AS	120 – 170	260 – 350	41	1.9 ⁴⁾⁵⁾	0.21 ⁴⁾

Chemical composition (melt analysis) of soft steels for cold forming

Steel grade/type		Symbol for the type of surface finishing	Chemical composition Percentage by mass %					
Code	Material no.		C max.	Si max.	Mn max.	P max.	S max.	Ti max.
DX51D	1.0226	+Z, +ZF, +ZA, +AZ, +AS	0.18	0.5	1.20	0.12	0.045	0.30
DX52D	1.0350	+Z, +ZF, +ZA, +AZ, +AS	0.12	0.5	0.60	0.10	0.045	0.30
DX53D	1.0355	+Z, +ZF, +ZA, +AZ, +AS	0.12	0.5	0.60	0.10	0.045	0.30
DX54D	1.0306	+Z, +ZF, +ZA, +AZ, +AS	0.12	0.5	0.60	0.10	0.045	0.30
DX55D	1.0309	+AS	0.12	0.5	0.60	0.10	0.045	0.30
DX56D	1.0322	+Z, +ZF, +ZA, +AS	0.12	0.5	0.60	0.10	0.045	0.30
DX57D	1.0853	+Z, +ZF, +ZA, +AS	0.12	0.5	0.60	0.10	0.045	0.30

Z = Hot-dip galvanized **ZF** = Galvannealed **ZA** = Galfan **AZ** = Galvalume **AS** = Hot-dip aluminised

¹⁾ If the yield point is not pronounced, the values for the 0.2 % elongation limit ($R_{p0.2}$) apply. If pronounced, the values for the lower yield point (R_{e1}) apply.

²⁾ Reduced minimum values for fracture elongation apply for product thicknesses of $t > 0.50$ mm (4 units less) and for 0.50 mm $< t \leq 0.70$ mm (2 units less).

³⁾ This value only applies for cold re-rolled products (surface groups B and C).

⁴⁾ For $t > 1.5$ mm, the r_{90} value is reduced by 0.2.

⁵⁾ For $t \leq 0.70$ mm, the r_{90} value is reduced by 0.2 and the n_{90} value by 0.01.

⁶⁾ Please note the minimum fracture elongation value for DX55D + AS products, which does not follow the usual system. DX55D + AS products are marked according to the best heat resistance.

Construction steels – continuously hot-dip coated steel strip and sheet made of construction steels acc. to DIN EN 10346 : 2006

Mechanical properties (long.)

Steel grade/type		Symbol for the type of surface finishing	Elongation limit $R_{p0.2}$ ¹⁾ MPa min.	Tensile strength R_m ²⁾ MPa min.	Fracture elongation A_{80} ³⁾ % min.	Chemical composition (Melt analysis) Percentage by mass %				
Code	Material no.					C max.	Si max.	Mn max.	P max.	S max.
S220GD	1.0241	+Z, +ZF, +ZA, +AZ	220	300	20	0.20	0.60	1.70	0.10	0.045
S250GD	1.0242	+Z, +ZF, +ZA, +AZ, +AS	250	330	19	0.20	0.60	1.70	0.10	0.045
S280GD	1.0244	+Z, +ZF, +ZA, +AZ, +AS	280	360	18	0.20	0.60	1.70	0.10	0.045
S320GD	1.0250	+Z, +ZF, +ZA, +AZ, +AS	320	390	17	0.20	0.60	1.70	0.10	0.045
S350GD	1.0529	+Z, +ZF, +ZA, +AZ, +AS	350	420	16	0.20	0.60	1.70	0.10	0.045
S550GD	1.0531	+Z, +ZF, +ZA, +AZ	550	560	–	0.20	0.60	1.70	0.10	0.045

¹⁾ If the yield point is pronounced, the values for the upper yield point (R_{eH}) apply.

²⁾ For all steel grades, with the exception of S550GD, a range of 140 MPa can be expected for tensile strength.

³⁾ Reduced minimum values for fracture elongation apply for product thicknesses of $t > 0.50$ mm (4 units less) and for 0.50 mm $< t \leq 0.70$ mm (2 units less).

EMW delivery range	Coils	Slit strip	Cut-to-size sheet	
				
Thicknesses	from 0.30 – 4.50 mm	from 0.30 – 4.50 mm	from 0.40 – 3.00 mm	
Widths	up to 1,850 mm	up to 1,850 mm	up to 1,530 mm	up to 1,850 mm
Lengths	---	---	up to 8,000 mm	up to 3,000 mm
Tolerances	Acc. to DIN EN 10143; finer tolerances available by arrangement.			

Microalloyed grades – continuously hot-dip coated steel strip and sheet made of steels with a high yield point for cold forming acc. to DIN EN 10346 : 2009

Mechanical properties (lat.)

Steel grade/type		Symbol for the type of surface finishing	0.2 % Elongation limit $R_{p0.2}^{1)}$ N/mm ²	Bake hardening index BH ₂ MPa min. N/mm ²	Tensile strength R_m MPa N/mm ²	Fracture elongation $A_{80}^{2)3)}$ % min. quer	Vertical anisotropy $r_{90}^{3)4)}$ min.	Work hardening exponent n_{90} min.
Code	Material no.							
HX160YD	1.0910	+Z, +ZF, +ZA, +AZ, +AS	160 – 220	–	300 – 360	37	1.9	0.20
HX180YD	1.0921	+Z, +ZF, +ZA, +AZ, +AS	180 – 240	–	330 – 390	34	1.7	0.18
HX180BD	1.0914	+Z, +ZF, +ZA, +AZ, +AS	180 – 240	35	290 – 360	34	1.5	0.16
HX220YD	1.0923	+Z, +ZF, +ZA, +AZ, +AS	220 – 280	–	340 – 420	32	1.5	0.17
HX220BD	1.0919	+Z, +ZF, +ZA, +AZ, +AS	220 – 280	35	320 – 400	32	1.2	0.15
HX260YD	1.0926	+Z, +ZF, +ZA, +AZ, +AS	260 – 320	–	380 – 440	30	1.4	0.16
HX260BD	1.0924	+Z, +ZF, +ZA, +AZ, +AS	260 – 320	35	360 – 440	28	–	–
HX260LAD	1.0929	+Z, +ZF, +ZA, +AZ, +AS	260 – 330	–	350 – 430	26	–	–
HX300YD	1.0927	+Z, +ZF, +ZA, +AZ, +AS	300 – 360	–	390 – 470	27	1.3	0.15
HX300BD	1.0930	+Z, +ZF, +ZA, +AZ, +AS	300 – 360	35	400 – 480	26	–	–
HX300LAD	1.0932	+Z, +ZF, +ZA, +AZ, +AS	300 – 380	–	380 – 480	23	–	–
HX340BD	1.0945	+Z, +ZF, +ZA, +AZ, +AS	340 – 400	35	440 – 520	24	–	–
HX340LAD	1.0933	+Z, +ZF, +ZA, +AZ, +AS	340 – 420	–	410 – 510	21	–	–
HX380LAD	1.0934	+Z, +ZF, +ZA, +AZ, +AS	380 – 480	–	440 – 560	19	–	–
HX420LAD	1.0935	+Z, +ZF, +ZA, +AZ, +AS	420 – 520	–	470 – 590	17	–	–
HX460LAD	1.0990	+Z, +ZF, +ZA, +AZ, +AS	460 – 560	–	500 – 640	15	–	–
HX500LAD	1.0991	+Z, +ZF, +ZA, +AZ, +AS	500 – 620	–	530 – 690	13	–	–

Chemical composition (Melt analysis)

Steel grade/type		Symbol for the type of surface finishing	Chemical composition Percentage by mass %							
Code	Material no.		C max.	Si max.	Mn max.	P max.	S max.	Al _{total}	Nb max.	Ti max.
HX160YD	1.0910	+Z, +ZF, +ZA, +AZ, +AS	0.01	0.15	0.70	0.06	0.025	≤ 0.1	0.09	0.12
HX180YD	1.0921	+Z, +ZF, +ZA, +AZ, +AS	0.01	0.20	0.70	0.06	0.025	≤ 0.1	0.09	0.12
HX180BD	1.0914	+Z, +ZF, +ZA, +AZ, +AS	0.10	0.50	0.70	0.06	0.025	≤ 0.1	0.09	0.12
HX220YD	1.0923	+Z, +ZF, +ZA, +AZ, +AS	0.01	0.20	0.90	0.08	0.025	≤ 0.1	0.09	0.12
HX220BD	1.0919	+Z, +ZF, +ZA, +AZ, +AS	0.10	0.50	0.70	0.08	0.025	≤ 0.1	0.09	0.12
HX260YD	1.0926	+Z, +ZF, +ZA, +AZ, +AS	0.01	0.25	1.30	0.10	0.025	≤ 0.1	0.09	0.12
HX260BD	1.0924	+Z, +ZF, +ZA, +AZ, +AS	0.10	0.50	0.80	0.10	0.025	≤ 0.1	0.09	0.12
HX260LAD	1.0929	+Z, +ZF, +ZA, +AZ, +AS	0.11	0.50	0.60	0.030	0.025	≤ 0.015	0.09	0.12
HX300YD	1.0927	+Z, +ZF, +ZA, +AZ, +AS	0.015	0.30	1.60	0.10	0.025	≤ 0.1	0.09	0.12
HX300BD	1.0930	+Z, +ZF, +ZA, +AZ, +AS	0.11	0.50	0.80	0.12	0.025	≤ 0.1	0.09	0.12
HX300LAD	1.0932	+Z, +ZF, +ZA, +AZ, +AS	0.11	0.50	1.00	0.030	0.025	≤ 0.1	0.09	0.15
HX340BD	1.0945	+Z, +ZF, +ZA, +AZ, +AS	0.11	0.50	0.80	0.12	0.025	≤ 0.1	0.09	0.12
HX340LAD	1.0933	+Z, +ZF, +ZA, +AZ, +AS	0.11	0.50	1.00	0.030	0.025	≤ 0.015	0.09	0.15
HX380LAD	1.0934	+Z, +ZF, +ZA, +AZ, +AS	0.11	0.50	1.40	0.030	0.025	≤ 0.015	0.09	0.15
HX420LAD	1.0935	+Z, +ZF, +ZA, +AZ, +AS	0.11	0.50	1.40	0.030	0.025	≤ 0.015	0.09	0.15
HX460LAD	1.0990	+Z, +ZF, +ZA, +AZ, +AS	0.15	0.50	1.70	0.030	0.025	≤ 0.015	0.09	0.15
HX500LAD	1.0991	+Z, +ZF, +ZA, +AZ, +AS	0.15	0.50	1.70	0.030	0.025	≤ 0.015	0.09	0.15

B = Bake-hardening **LA** = Low alloy (microalloyed) **Y** = Interstitial free (IF Steel)

¹⁾ If the yield point is pronounced, the values for the lower yield point (R_{eL}) apply.

²⁾ Reduced fracture elongation values for product thicknesses >0.5 mm (minus 4 units) and for thicknesses > 0.5 mm and > 0.7 mm (minus 2 units).

³⁾ For AS, AZ and ZF coatings, the A_{80} minimum values are reduced by 2 units and the r_{90} minimum values by 0.2.

⁴⁾ For product thicknesses > 1.5 mm, the minimum r_{90} value is reduced by 0.2.

EMW delivery range	Coils	Slit strip	Cut-to-size sheet	
				
Thicknesses	from 0.30 – 4.50 mm	from 0.30 – 4.50 mm	from 0.40 – 3.00 mm	
Widths	up to 1,850 mm	up to 1,850 mm	up to 1,530 mm	up to 1,850 mm
Lengths	---	---	up to 8,000 mm	up to 3,000 mm
Tolerances	Acc. to DIN EN 10143; finer tolerances available by arrangement.			

Multiphase steels – continuous electrolytic strip and sheet made of multiphase steels for cold forming acc. to EN 10346 : 2009

Mechanical properties (lat.) cold-rolled products

Steel grade/type		Symbol for the type of surface finishing	Elongation limit $R_{p0.2}^{1)}$ MPa	Tensile strength R_m MPa min.	Fracture elongation $A_{80}^{1)2)}$ % min.	Work hardening exponent n_{10-UE} min.	Bake hardening index BH_2 MPa min.
Code	Material no.						
DP-steels							
HCT450X	1.0937	+Z, +ZF, +ZA	260 – 340	450	27	0.16	30
HCT500X	1.0939	+Z, +ZF, +ZA	300 – 380	500	23	0.15	30
HCT600X	1.0941	+Z, +ZF, +ZA	340 – 420	600	20	0.14	30
HCT780X	1.0943	+Z, +ZF, +ZA	450 – 560	780	14	–	30
HCT980X	1.0944	+Z, +ZF, +ZA	600 – 750	980	10	–	30
TRIP-steels							
HCT690T	1.0947	+Z, +ZF, +ZA	430 – 550	690	23	0.18	40
HCT780T	1.0948	+Z, +ZF, +ZA	470 – 600	780	21	0.16	40
CP-steels							
HCT600C	1.0953	+Z, +ZF, +ZA	350 – 500	600	16	–	30
HCT780C	1.0954	+Z, +ZF, +ZA	500 – 700	780	10	–	30
HCT980C	1.0955	+Z, +ZF, +ZA	700 – 900	980	7	–	30

Mechanical properties (lat.) warm-rolled products

Steel grade/type		Symbol for the type of surface finishing	Elongation limit $R_{p0.2}^{1)}$ MPa	Tensile strength R_m MPa min.	Fracture elongation $A_{80}^{1)2)}$ % min.	Work hardening exponent n_{10-UE} min.	Bake hardening index BH_2 MPa min.
Code	Material no.						
FB-steels							
HDT450F	1.0961	+Z, +ZF	320 – 420	450	23	–	30
HDT560F	1.0959	+Z, +ZF	460 – 570	560	16	–	30
DP-steels							
HDT580X	1.0936	+Z, +ZF	330 – 460	580	19	0.13	30
CP-steels							
HDT750C	1.0956	+Z, +ZF	620 – 760	750	10	–	30
HDT780C	1.0957	+Z, +ZF	680 – 830	780	10	–	30
HDT950C	1.0958	+Z, +ZF	720 – 920	950	9	–	30
MS-steels							
HDT1200M	1.0965	+Z, +ZF	900 – 1150	1200	5	–	30

¹⁾ Reduced fracture elongation values for product thicknesses $t < 0.5$ mm (minus 4 units) and for 0.5 mm $< t < 0.7$ mm (minus 2 units).

²⁾ For ZF coatings, reduced fracture elongation values of 2 units less are valid.

X. Hot-dip galvanized sheet

EMW delivery range	Coils	Slit strip	Cut-to-size sheet	
				
Thicknesses	from 0.30 – 4.50 mm	from 0.30 – 4.50 mm	from 0.40 – 3.00 mm	
Widths	up to 1,850 mm	up to 1,850 mm	up to 1,530 mm	up to 1,850 mm
Lengths	---	---	up to 8,000 mm	up to 3,000 mm
Tolerances	Acc. to DIN EN 10143; finer tolerances available by arrangement.			

Multiphase steels – continuous electrolytic strip and sheet made of multiphase steels for cold forming acc. to EN 10346 : 2009

Chemical composition (Melt analysis)

Steel grade/type		Symbol for the type of surface finishing	Chemical composition									
Code ¹⁾	Material no.		C max.	Si max.	Mn max.	P max.	S max.	Al _{total}	Cr + Mo max.	Nb + Ti max.	V max.	B max.
FB-steels												
HDT450F	1.0961	+Z, +ZF	0.18	0.50	1.20	0.030	0.010	≥ 0.015	0.30	0.05	0.15	0.005
HDT560F	1.0959	+Z, +ZF	0.18	0.50	1.80	0.025	0.010	≥ 0.015	0.30	0.15	0.15	0.005
DP-steels												
HCT450X	1.0937	+Z, +ZF, +ZA	0.14	0.80	2.00	0.080	0.015	≤ 2.00	1.00	0.15	0.20	0.005
HCT500X	1.0939	+Z, +ZF, +ZA	0.14	0.80	2.00	0.080	0.015	≤ 2.00	1.00	0.15	0.20	0.005
HCT600X	1.0941	+Z, +ZF, +ZA	0.17	0.80	2.20	0.080	0.015	≤ 2.00	1.00	0.15	0.20	0.005
HCT580X	1.0936	+Z, +ZF	0.17	0.80	2.20	0.080	0.015	≤ 2.00	1.00	0.15	0.20	0.005
HCT780X	1.0943	+Z, +ZF, +ZA	0.18	0.80	2.50	0.080	0.015	≤ 2.00	1.00	0.15	0.20	0.005
HCT980X	1.0944	+Z, +ZF, +ZA	0.23	0.80	2.50	0.080	0.015	≤ 2.00	1.00	0.15	0.20	0.005
TRIP-steels												
HCT690T	1.0947	+Z, +ZF, +ZA	0.32	2.20	2.50	0.12	0.015	≤ 2.00	0.60	0.20	0.20	0.005
HCT780T	1.0948	+Z, +ZF, +ZA	0.32	2.20	2.50	0.12	0.015	≤ 2.00	0.60	0.20	0.20	0.005
CP-steels												
HCT600C	1.0953	+Z, +ZF, +ZA	0.18	0.80	2.20	0.080	0.015	≤ 2.00	1.00	0.15	0.20	0.005
HDT750C	1.0956	+Z, +ZF	0.18	0.80	2.20	0.080	0.015	≤ 2.00	1.00	0.15	0.20	0.005
HCT780C	1.0954	+Z, +ZF, +ZA	0.18	0.80	2.20	0.080	0.015	≤ 2.00	1.00	0.15	0.20	0.005
HDT780C	1.0957	+Z, +ZF	0.18	0.80	2.20	0.080	0.015	≤ 2.00	1.00	0.15	0.20	0.005
HDT950C	1.0958	+Z, +ZF	0.25	0.80	2.20	0.080	0.015	≤ 2.00	1.20	0.15	0.20	0.005
HCT980C	1.0955	+Z, +ZF, +ZA	0.25	0.80	2.20	0.080	0.015	≤ 2.00	1.20	0.15	0.22	0.005
MS-steels												
HDT1200M	1.0965	+Z, +ZF	0.25	0.80	2.00	0.060	0.015	≤ 2.00	1.20	0.15	0.22	0.005

F = Ferritic-bainitic **X** = Dual phase **T** = TRIP **C** = Complex phase **M** = Martensitic

¹⁾ C = Cold-rolled products D = Warm-rolled products



EMW delivery range	Coils	Slit strip	Cut-to-size sheet	
				
Thicknesses	from 0.30 – 4.50 mm	from 0.30 – 4.50 mm	from 0.40 – 3.00 mm	
Widths	up to 1,850 mm	up to 1,850 mm	up to 1,530 mm	up to 1,850 mm
Lengths	---	---	up to 8,000 mm	up to 3,000 mm
Tolerances	Acc. to DIN EN 10143; finer tolerances available by arrangement.			

Available coating types

Coating code no.	Minimum coating volume, in g/m ² , on both sides		Theoretical reference value for coating thickness per side in µm		Density g/cm ³
	Triple surface test	Single surface test	Typical value ¹⁾	Range ²⁾	
Zinc coating volume (Z)					
Z100	100	85	7	5 – 12	7,1
Z140	140	120	10	7 – 15	7.1
Z200	200	170	14	10 – 20	7.1
Z225	225	195	16	11 – 22	7.1
Z275	275	235	20	15 – 27	7.1
Z350	350	300	25	19 – 33	7.1
Z450	450	385	32	24 – 42	7.1
Z600	600	510	42	32 – 55	7.1
Zinc/iron alloy coating volume (ZF)					
ZF100	100	85	7	5 – 12	7.1
ZF120	120	100	8	6 – 13	7.1
Zinc/aluminium alloy coating volume (ZA)					
ZA095	95	80	7	5 – 12	6.9
ZA130	130	110	10	7 – 15	6.9
ZA185	185	155	14	10 – 20	6.9
ZA200	200	170	15	11 – 21	6.9
ZA255	255	215	20	15 – 27	6.9
ZA300	300	255	23	17 – 31	6.9
Aluminium/zinc alloy coating volume (AZ) not for multiphase steels					
AZ100	100	85	13	9 – 19	3.8
AZ150	150	130	20	15 – 27	3.8
AZ185	185	160	25	19 – 33	3.8
Aluminium/silicon alloy coating volume (AS) not for multiphase steels					
AS060	60	45	8	6 – 13	3.0
AS080	80	60	14	10 – 20	3.0
AS100	100	75	17	12 – 23	3.0
AS120	120	90	20	15 – 27	3.0
AS150	150	115	25	19 – 33	3.0

¹⁾ Layer thicknesses can be calculated from the coating volumes.

²⁾ Users may assume that these limits will be maintained on the top and bottom sides.

Surfaces

Surface types	Subsequent surface treatment	Coating processes
NA = Usual zinc spangle in different sizes with usual surface	C = Chemically passivated	+Z = Galvanised (99 % Zn)
MA = Small zinc spangle with usual surface	O = Oiled	+ZF = Zinc-iron alloy (galvanealed)
MB = Re-rolled with improved surface	CO = Chemically passivated and oiled	+ZA = Zinc/aluminium (Galfan, Zn + 5 % Al)
MC = Re-rolled with best surface	P = Phosphatized	+AZ = Aluminium/zinc (Galvalume 55 % Al + 1.6 % Si + Zn)
RA = Usual surface zinc/iron alloy	PO = Phosphatized and oiled	+AS = Aluminium-silicon coating (11 % Si + Al)
RB = Improved surface zinc/iron alloy	S = Sealed	+ZM = Zinc-magnesium (1 – 2 % Mg + 1-2 % Al + Zn)*
RC = Best surface zinc/iron alloy	U = Untreated	* yet standardised in EN 10246, available in various qualities and coating volumes.