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_e [1] MPa	Tensile strength R_m MPa	Fracture elongation A_{80} [2] %	Vertical anisotropy r_{90}	Work hardening exponent n_{90}
Code	Material no.				min.	min.	min.
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 %					
			C	Si	Mn	P	S	Ti
Code	Material no.		max.	max.	max.	max.	max.	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_{eL})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 ≤ 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 ≤ 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	Tensile strength R_m [2] MPa	Fracture elongation A_{80} [3] %
Code	Material no.		min.	min.	min.
S220GD	1.0241	+Z, +ZF, +ZA, +AZ	220	300	20
S250GD	1.0242	+Z, +ZF, +ZA, +AZ, +AS	250	330	19
S280GD	1.0244	+Z, +ZF, +ZA, +AZ, +AS	280	360	18
S320GD	1.0250	+Z, +ZF, +ZA, +AZ, +AS	320	390	17
S350GD	1.0529	+Z, +ZF, +ZA, +AZ, +AS	350	420	16
S550GD	1.0531	+Z, +ZF, +ZA, +AZ	550	560	–

Chemical composition (Melt analysis)

Percentage by mass %				
C	Si	Mn	P	S
max.	max.	max.	max.	max.
0.20	0.60	1.70	0.10	0.045
0.20	0.60	1.70	0.10	0.045
0.20	0.60	1.70	0.10	0.045
0.20	0.60	1.70	0.10	0.045
0.20	0.60	1.70	0.10	0.045
0.20	0.60	1.70	0.10	0.045
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 ≤ 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]	Bake hardening index BH_2 MPa	Tensile strength R_m	Fracture elongation A_{80} [2] [3]	Vertical anisotropy r_{90} [3] [4]	Work hardening exponent n_{90}
Code	Material no.		N/mm²	min. N/mm²	MPa N/mm²	% min. quer	min.	min.
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 %							
			C	Si	Mn	P	S	Al_{total}	Nb	Ti
Code	Material no.		max.	max.	max.	max.	max.		max.	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	Tensile strength	Fracture elongation	Work hardening exponent	Bake hardening index
Code	Material no.		$R_{p0.2}$ [1] MPa	R_m MPa min.	A_{80} [1) 2)] % min.	$n_{10\text{-}UE}$ min.	BH_2 MPa min.
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	Tensile strength	Fracture elongation	Work hardening exponent	Bake hardening index
Code	Material no.		$R_{p0.2}$ [1] MPa	R_m MPa min.	A_{80} [1) 2)] % min.	$n_{10\text{-}UE}$ min.	BH_2 MPa min.
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.

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 Percentage by mass %									
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

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.			

Available coating types

Coating code no.	Minimum coating volume, in g/m², on both sides		Theoretical reference value for coating thickness per side in µm		Density g/cm³
	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

- **NA** = Usual zinc spangle in different sizes with usual surface
- **MA** = Small zinc spangle with usual surface
- **MB** = Re-rolled with improved surface
- **MC** = Re-rolled with best surface
- **RA** = Usual surface zinc/iron alloy
- **RB** = Improved surface zinc/iron alloy
- **RC** = Best surface zinc/iron alloy

Subsequent surface treatment

- **C** = Chemically passivated
- **O** = Oiled
- **CO** = Chemically passivated and oiled
- **P** = Phosphatized
- **PO** = Phosphatized and oiled
- **S** = Sealed
- **U** = Untreated

Coating processes

- **+Z** = Galvanised (99 % Zn)
- **+ZF** = Zinc-iron alloy (galvanealed)
- **+ZA** = Zinc/aluminium (Galfan, Zn + 5 % Al)
- **+AZ** = Aluminium/zinc (Galvalume 55 % Al + 1.6 % Si + Zn)
- **+AS** = Aluminium-silicon coating (11 % Si + Al)
- **+ZM** = Zinc-magnesium (1 – 2 % Mg + 1-2 % Al + Zn)*

* yet standardised in EN 10246, available in various qualities and coating volumes.