Cortichapa

TOLERANCE TABLES
GALVANISED AND HOT-DIP GALVANISED COATINGS

1. Tolerances for specified minimum yield strength steel grades **< 260 MPa EN 10143**

Nominal thickness	Normal tolerances for a nominal width of:			Restricted tolerances for a nominal width of:		
	≤ 1200	> 1200 ≤ 1500	> 1500	≤ 1200	> 1200 ≤ 1500	> 1500
≥ 0.20 a 0.40	± 0.04	± 0.05	± 0.06	± 0.030	± 0.035	± 0.040
> 0.40 a 0.60	± 0.04	± 0.05	± 0.06	± 0.035	± 0.040	± 0.045
> 0.60 a 0.80	± 0.05	± 0.06	± 0.07	±0.040	±0.045	± 0.050
> 0.80 a 1.00	± 0.06	± 0.07	± 0.08	± 0.045	±0.050	± 0.060
> 1.00 a 1.20	± 0.07	± 0.08	± 0.09	± 0.050	±0.060	± 0.070
> 1.20 a 1.60	± 0.10	± 0.11	± 0.12	±0.060	±0.070	± 0.080
> 1.60 a 2.00	± 0.12	± 0.13	± 0.14	±0.070	±0.080	± 0.090
> 2.00 a 2.50	± 0.14	± 0.15	± 0.16	±0.090	±0.100	± 0.110
> 2.50 a 3.00	± 0.17	± 0.17	± 0.18	±0.110	±0.120	± 0.130
> 3.00 a 5.00	± 0.20	± 0.20	± 0.21	± 0.15	± 0.16	± 0.17
> 5.00 a 6.50	± 0.22	± 0.22	± 0.23	± 0.17	± 0.18	± 0.19

2. Tolerances for specified minimum yield strength steel grades **260 MPa≤ 360 MPa** and for types **DX51D and S550GD EN 10143**

Nominal thickness	Normal tolerances for a nominal width of:			Restricted tolerances for a nominal width of:		
	≤ 1200	> 1200 ≤ 1500	> 1500	≤ 1200	> 1200 ≤ 1500	> 1500
≥ 0.20 a 0.40	± 0.05	± 0.06	± 0.07	± 0.035	± 0.040	± 0.045
> 0.40 a 0.60	± 0.05	± 0.06	± 0.07	± 0.040	± 0.045	± 0.050
> 0.60 a 0.80	± 0.06	± 0.07	± 0.08	±0.045	±0.050	± 0.050
> 0.80 a 1.00	± 0.07	± 0.08	± 0.09	± 0.050	±0.060	± 0.060
> 1.00 a 1.20	± 0.08	± 0.09	± 0.11	± 0.060	±0.070	± 0.070
> 1.20 a 1.60	± 0.11	± 0.13	± 0.14	±0.070	±0.080	± 0.080
> 1.60 a 2.00	± 0.14	± 0.15	± 0.16	±0.080	±0.090	± 0.090
> 2.00 a 2.50	± 0.16	± 0.17	± 0.18	±0.110	±0.120	± 0.110
> 2.50 a 3.00	± 0.19	± 0.20	± 0.20	±0.130	±0.140	± 0.130
> 3.00 a 5.00	± 0.22	± 0.24	± 0.25	± 0.17	± 0.18	± 0.19
> 5.00 a 6.50	± 0.24	± 0.25	± 0.26	± 0.19	± 0.20	± 0.21

3. Tolerances for specified minimum yield strength steel grades **360 MPa ≤ 420 MPa EN 10143**

Nominal thickness	Normal tolerances for a nominal width of:			Restricted tolerances for a nominal width of:		
	≤ 1200	> 1200 ≤ 1500	> 1500	≤ 1200	> 1200 ≤ 1500	> 1500
≥ 0.35 a 0.40	± 0.05	± 0.06	± 0.07	± 0.040	± 0.045	± 0.050
> 0.40 a 0.60	± 0.06	± 0.07	± 0.08	± 0.045	± 0.050	± 0.060
> 0.60 a 0.80	± 0.07	± 0.08	± 0.09	±0.050	±0.060	± 0.070
> 0.80 a 1.00	± 0.08	± 0.09	± 0.11	± 0.060	±0.070	± 0.080
> 1.00 a 1.20	± 0.10	± 0.11	± 0.12	± 0.070	±0.080	± 0.090
> 1.20 a 1.60	± 0.13	± 0.14	± 0.16	±0.080	±0.090	± 0.110
> 1.60 a 2.00	± 0.16	± 0.17	± 0.19	±0.090	±0.110	± 0.120
> 2.00 a 2.50	± 0.18	± 0.20	± 0.21	±0.120	±0.130	± 0.140
> 2.50 a 3.00	± 0.22	± 0.22	± 0.23	±0.140	±0.150	± 0.160
> 3.00 a 5.00	± 0.22	± 0.24	± 0.25	± 0.17	± 0.18	± 0.19
> 5.00 a 6.50	± 0.24	± 0.25	± 0.26	± 0.19	± 0.20	± 0.21

4. Tolerances for specified minimum yield strength steel grades **420 MPa ≤ 900 MPa EN 10143**

Nominal thickness	Normal tolerances for a nominal width of:			Restricted tolerances for a nominal width of:		
	≤ 1200	> 1200 ≤ 1500	> 1500	≤ 1200	> 1200 ≤ 1500	> 1500
≥ 0.35 a 0.40	± 0.06	± 0.07	± 0.08	± 0.045	± 0.050	± 0.060
> 0.40 a 0.60	± 0.06	± 0.08	± 0.09	± 0.050	± 0.060	± 0.070
> 0.60 a 0.80	± 0.07	± 0.09	± 0.11	±0.060	±0.070	± 0.080
> 0.80 a 1.00	± 0.09	± 0.11	± 0.12	± 0.070	±0.080	± 0.090
> 1.00 a 1.20	± 0.11	± 0.13	± 0.14	± 0.080	±0.090	± 0.110
> 1.20 a 1.60	± 0.15	± 0.16	± 0.18	±0.090	±0.110	± 0.120
> 1.60 a 2.00	± 0.18	± 0.19	± 0.21	±0.110	±0.120	± 0.140
> 2.00 a 2.50	± 0.21	± 0.22	± 0.24	±0.140	±0.150	± 0.170
> 2.50 a 3.00	± 0.24	± 0.25	± 0.26	±0.170	±0.180	± 0.190
> 3.00 a 5.00	± 0.26	± 0.27	± 0.28	± 0.23	± 0.24	± 0.26
> 5.00 a 6.50	± 0.28	± 0.29	± 0.30	± 0.25	± 0.26	± 0.28

5. Width tolerance for wide strips and wide sheets ≥600 mm (bordes brutos) EN 10143

Type of tolerance	Nominal width			
	600≤ 1200	1200 a ≤ 1500	1500 a ≤1800	>1800
Normal	± 0.05	± 0.06	± 0.07	± 0.040
Restricted	± 0.06	± 0.07	± 0.08	± 0.045

6. Tolerances on wide strip obtained by slitting with a width of less than 600 mm EN 10143

Type of tolerance	Nominal thickness	Nominal width			
		600≤ 1200	1200 a ≤ 1500	1500 a ≤1800	>1800
Normal	< 0.6	- 0 + 0.4	- 0 + 0.5	- 0 + 0.7	- 0 + 1.0
	≥ 0.6 a < 1.0	- 0 + 0.5	- 0 + 0.6	- 0 + 0.9	- 0 + 1.2
	≥ 1.0 a < 2.0	- 0 + 0.6	- 0 + 0.8	- 0 + 1.1	- 0 + 1.4
	≥ 2.0 a ≤ 3.0	- 0 + 0.7	- 0 + 1.0	- 0 + 1.3	- 0 + 1.6
	≥ 3.0 a ≤ 5.0	- 0 + 0.8	- 0 + 1.1	- 0 + 1.4	- 0 + 1.7
	≥ 5.0 a ≤ 6.5	- 0 + 0.9	- 0 + 1.2	- 0 + 1.5	- 0 + 1.8
Restricted	< 0.6	- 0 + 0.2	- 0 + 0.2	- 0 + 0.3	- 0 + 0.5
	≥ 0.6 a < 1.0	- 0 + 0.2	- 0 + 0.3	- 0 + 0.4	- 0 + 0.6
	≥ 1.0 a < 2.0	- 0 + 0.3	- 0 + 0.4	- 0 + 0.5	- 0 + 0.7
	≥ 2.0 a < 3.0	- 0 + 0.4	- 0 + 0.5	- 0 + 0.6	- 0 + 0.8
	≥ 3.0 a < 5.0	- 0 + 0.5	- 0 + 0.6	- 0 + 0.7	- 0 + 0.9
	≥ 5.0 a < 6.5	- 0 + 0.6	- 0 + 0.7	- 0 + 0.8	- 0 + 0.10

7. Length tolerance
EN 10143

	Nominal width		
Type of tolerance	600≤ 1200	1200 a ≤ 1500	1500 a ≤1800
Normal	- 0 + 6	- 0 + 0,3%	Por acuerdo
Restricted	- 0 + 3	- 0 +0,15%	Por acuerdo

8. Flatness tolerances for specified yield strength steel grades
<260 MPa EN 10143

		Nominal width			
Type of tolerance	**Nominal width**	< 0,7	≤ 0,7 a < 1,6	≤ 1,6 a < 3	≤ 3,0 a ≤ 6,5
Normal	< 1200	10	8		15
	≥ 1200 a < 1500	12	10		18
	≥ 1500	17	15		23
Restricted	< 1200	5	4	3	8
	≥ 1200 a < 1500	6	5	4	9
	≥ 1500	8	7	6	12

9. Flatness tolerances for specified minimum yield strength steel grades
260 MPa ≤ 360 MPa and for types DX51D and S550GD EN 10143

		Maximum wave height for nominal thickness			
Type of tolerance	**Nominal width**	< 0,7	≤ 0,7 a < 1,6	≤ 1,6 a < 3	≤ 3,0 a ≤ 6,5
Normal	< 1200	13	10		18
	≥ 1200 a < 1500	15	13		25
	≥ 1500	20	19		28
Restricted	< 1200	8	6	5	9
	≥ 1200 a < 1500	9	8	6	12
	≥ 1500	12	10	9	14

10. Chemical composition (casting analysis) of low-carbon cold-forming steels
Standard 10346

Steel type			Chemical composition % by mass max.					
Grade	Number	Symbols for available coating types	C	Si	Mn	P	S	Ti
DX51D	1.0226	+Z,+ZF,+ZA,+AZ,+AS	0,18	0,50	1,20	0,12	0,045	0,30
DX52D	1.0350	+Z,+ZF,+ZA,+AZ,+AS	0,12	0,50	0,60	0,10	0,045	0,30
DX53D	1.0355	+Z,+ZF,+ZA,+AZ,+AS	0,12	0,50	0,60	0,10	0,045	0,30
DX54D	1.0306	+Z,+ZF,+ZA,+AZ,+AS	0,12	0,50	0,60	0,10	0,045	0,30
DX55D	1.0309	+AS	0,12	0,50	0,60	0,10	0,045	0,30
DX56D	1.0322	+Z,+ZF,+ZA,+AS	0,12	0,50	0,60	0,10	0,045	0,30
DX57D	1.0853	+Z,+ZF,+ZA,+AS	0,12	0,50	0,60	0,10	0,045	0,30

11. Chemical composition (casting analysis) of construction steels
EN 10346

Steel type		Symbols for available coating types	Chemical composition % by mass max.				
Grade	Number		C	Si	Mn	P	S
S220GD	1.0241	+Z,+ZF,+ZA,+AZ					
S250GD	1.0242	+Z,+ZF,+ZA,+AZ,					
S280GD	1.0244	+AS					
S320GD	1.0250	+Z,+ZF,+ZA,+AZ,	0,20	0,60	1,70	0,10	0,045
S350GD	1.0529	+AS					
S550GD	1.0531	+Z,+ZF,+ZA,+AZ,					
DX57D	1.0853	+AS					

12. Mechanical properties (transverse direction) of high yield strength steels for cold forming

EN 10346

Grade	Number	Symbols for available coating types	Chemical composition % by mass max					
			Conventional yield strength Rp0,2		Conventional yield strength Rp0,2		R_{90} min	N_{90} min
HX160YD	1.0910		160 a 220	_	300 a 360	37	1,9	0,20
HX180YD	1.0921		180 a 240	_	330 a 390	34	1,7	0,18
HX180BD	1.0914		180 a 240	35	290 a 360	34	1,5	0,16
HX220YD	1.0923		220 a 280	_	340 a 420	32	1,5	0,17
HX220BD	1.0919		220 a 280	35	320 a 400	32	1,2	0,15
HX260YD	1.0926		260 a 320	_	380 a 440	30	1,4	0,16
HX260BD	1.0924		260 a 320	35	360 a 440	28	w_	_
HX260LAD	1.0929	+Z +ZF	260 a 330	_	350 a 430	26	_	_
HX300YD	1.0927	+ZA	300 a 360	_	390 a 470	27	1,3	0,15
HX300BD	1.0930	+AZ +AS	300 a 360	35	400 a 480	26	_	_
HX300LAD	1.0932		300 a 380	_	380 a 480	23	_	_
HX340BD	1.0945		340 a 400	35	440 a 520	24	_	_
HX340LAD	1.0933		340 a 420	_	410 a 510	21	_	_
HX380LAD	1.0934		380 a 480	_	440 a 560	19	_	_
HX420LAD	1.0935		420 a 520	_	470 a 590	17	_	_
HX460LAD	1.0990		460 a 560	_	500 a 640	15	_	_
HX500LAD	1.0991		500 a 620	_	530 a 690	13	_	_

13. Chemical composition (casting analysis) of high yield strength steels for cold forming **EN 10346**

Grade	Number	Symbols for available coating types	Chemical composition % by mass							
			C Máx	Yes Máx	Mn Máx	P Máx	S Máx	To Total Min.	Nb Máx	Ti Máx
HX160YD	1.0910		0,01	0,30	0,60	0,06	0,025	0,01	0,09	0,12
HX180YD	1.0921		0,01	0,30	0,70	0,06	0,025	0,01	0,09	0,12
HX180BD	1.0914		0,06	0,50	0,70	0,06	0,025	0,015	0,09	0,12
HX220YD	1.0923		0,01	0,30	0,90	0,08	0,025	0,01	0,09	0,12
HX220BD	1.0919		0,08	0,50	0,70	0,085	0,025	0,015	0,09	0,12
HX260YD	1.0926		0,01	0,30	1,60	0,10	0,025	0,01	0,09	0,12
HX260BD	1.0924		0,1	0,50	1,00	0,10	0,030	0,01	0,09	0,12
HX260LAD	1.0929	+Z +ZF	0,11	0,50	1,00	0,030	0,025	0,015	0,09	0,15
HX300YD	1.0927	+ZA	0,015	0,30	1,60	0,10	0,025	0,01	0,09	0,12
HX300BD	1.0930	+AZ +AS	0,11	0,50	0,80	0,12	0,025	0,01	0,09	0,12
HX300LAD	1.0932		0,12	0,50	1,4	0,030	0,025	0,015	0,09	0,15
HX340BD	1.0945		0,11	0,50	0,80	0,12	0,025	0,01	0,09	0,12
HX340LAD	1.0933		0,12	0,50	1,40	0,030	0,025	0,015	0,10	0,15
HX380LAD	1.0934		0,12	0,50	1,50	0,030	0,025	0,015	0,10	0,15
HX420LAD	1.0935		0,12	0,50	1,60	0,030	0,025	0,015	0,10	0,15
HX460LAD	1.0990		0,15	0,50	1,70	0,030	0,025	0,015	0,10	0,15
HX500LAD	1.0991		0,15	0,50	1,70	0,030	0,025	0,015	0,10	0,15

14. Chemical composition (casting analysis) of high yield strength steels for cold forming_ EN 10346

Grade	Number	Symbols for available coating types	Chemical composition % by mass									
			C Máx	Ye Máx	Mn Máx	P Máx	S Máx	To Total	Cr+Mo máx	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		0,18	0,50	1,80	0,025	0,010	≥0,015	0,30	0,15		
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		0,14		2,00							
HCT600X	1.0941		0,17		2,20							
HDT580X	1.0936	+Z+ZF	0,17		2,20							
HCT780X	1.0943	+Z+ZF+ZA	0,18		2,50							
HCT980X	1.0944		0,23		2,50							
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		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						1,00		0,20	
HCT780C	1.0954	+Z+ZF+ZA	0,18						1,00		0,20	
HDT780C	1.0957	+Z+ZF	0,18						1,00		0,20	
HDT950C	1.0958		0,25						1,20		0,20	
HCT980C	1.0955	+Z+ZF+ZA	0,25						1,20		0,22	
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

15. Mechanical properties (transverse direction) of low-carbon cold confirmation steels

EN 10346

Grade	Number	Symbols for available coating types	Yield strength Re MPa	Tensile strength Rm MPa	Elongation A80 % min	r_{90} min	n_{90} min
DX51D	1.0226	+Z+ZF+ZA +AZ+AS	_	270 a 500	22	_	_
DX52D	1.0350	+Z+ZF+ZA +AZ+AS	140 a 300	270 a 420	26	_	_
DX53D	1.0355	+Z+ZF+ZA +AZ+AS	140 a 260	270 a 380	30	_	_
DX54D	1.0306	+Z+ZA	120 a 220	260 a 350	36	1,6	0,18
DX54D	1.0306	+ZF	120 a 220	260 a 350	34	1,4	0,18
DX54D	1.0306	+AZ	120 a 220	260 a 350	36	_	
DX54D	1.0306	+AS	120 a 220	260 a 350	34	1,4	0,18
DX55D	1.0309	+AS	140 a 240	270 a 370	30	_	
DX56D	1.0322	+Z+ZA	120 a 180	260 a 350	39	1,9	0,21
DX56D	1.0322	+ZF	120 a 180	260 a 350	37	1,7	0,20
DX56D	1.0322	+AS	120 a 180	260 a 350	39	1,7	0,20
DX57D	1.0853	+Z+ZA	120 a 170	260 a 350	41	2,1	0,22
DX57D	1.0853	+ZF	120 a 170	260 a 350	39	1,9	0,21
DX57D	1.0853	+AS	120 a 170	260 a 350	41	1,9	0,21

16. . Mechanical properties (longitudinal direction) of structural steels
EN 10346

Grade	Number	Symbols for available coating types	Mechanical properties		
			Elastic limit Rp0,2 MPa Min	Tensile strength Rm MPa min	Elongation A80% 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	_

17. Mechanical properties for multiphase cold-forming steels (cold-rolled products)
EN 10346

Steel type +Z+ZF+ZA						
Grade	Number	Conventional yield strength Rp0,2 MPa	Tensile strength Rm MPa min	Elongation A80 % min	N_{10} min	BH_2 MPa min
DP Steels						
HCT450X	1.0937	260 a 340	450	27	0,16	30
HCT500X	1.0939	300 a 380	500	23	0,15	30
HCT600X	1.0941	340 a 420	600	20	0,14	30
HCT780X	1.0943	450 a 560	780	14	_	30
HCT980X	1.0944	600 a 750	980	10	_	30
TRIP Steels						
HCT980X	1.0944	430 a 550	690	23	0,18	40
HCT690T	1.0947	470 a 600	780	21	0,16	40
CP Steels						
HCT600C	1.0953	350 a 500	600	16	_	30
HDT750C	1.0956	500 a 700	780	10	_	30
HCT780C	1.0954	700 a 900	980	7	_	30

18. Mechanical properties for multiphase cold-forming steels (cold rolled products)

EN 10346

Steel type +Z+ZF						
Grade	**Number**	**Conventional yield strength Rp0,2 MPa**	**Tensile strength Rm MPa min**	**Elongation A80 % min**	**N_{10} min**	**BH_2 MPa min**
FB Steels						
HCT450F	1.0937	320 a 420	450	23	_	30
HCT560F	1.0939	460 a 570	560	16	_	30
DP Steels						
HCT780X	1.0943	330 a 460	580	19	0,13	30
CP Steels						
HCT980X	1.0944	620 a 760	750	10	_	30
HCT690T	1.0947	680 a 830	780	10	_	30
HCT600C	1.0953	720 a 920	950	9	_	30
MS Steels						
HCT780C	1.0954	900 a 1150	1200	5	_	30