• TOLERANCES

THICKNESS TOLERANCES

NOMINAL THICKNESS (mm)		Nominal thickness tolerances (A) for nominal widths (W) of (mm)					
		Cold-rolled Steel			Cold-rolled and Electrolytic zinc coating Steel	Coated Steel	Hot-rolled Steel
		EN 10140			EN 10131	EN 10143	EN 10051
>	≤	W < 125	125 ≤ W < 250	250 ≤ W < 600	600 ≤ W ≤ 1200	W ≤ 1200	600 ≤ W ≤ 1200
-	0.10	± 0.008	± 0.010	± 0.015	-		
0.10	0.15	± 0.010	± 0.015	± 0.020	-		
0.15	0.25	± 0.015	± 0.020	± 0.025	-	± 0.050	-
0.25	0.35	± 0.020	± 0.025	± 0.030	-		
0.35	0.40	± 0.020	± 0.025	± 0.030	± 0.040		
0.40	0.60	± 0.025	± 0.030	± 0.035	± 0.050 (only electrolytic zinc coating)	± 0.060	-
0.60	0.80	± 0.030	± 0.035	± 0.040	± 0.060	± 0.070	-
0.80	1.00	± 0.030	± 0.035	± 0.040	± 0.070	± 0.080	-
1.00	1.20	± 0.035	± 0.040	± 0.050	± 0.080	± 0.090	
1.20	1.50	± 0.035	± 0.040	± 0.050	± 0.100	± 0.110	± 0.130
1.50	2.00	± 0.045	± 0.050	± 0.060	± 0.120	± 0.130	
2.00	2.50	± 0.045	± 0.050	± 0.060	± 0.140	± 0.150	± 0.140
2.50	3.00	± 0.055	± 0.060	± 0.075	± 0.160	± 0.170	± 0.150
3.00	4.00	± 0.055	± 0.060	± 0.075	-	-	± 0.170
4.00	5.00	± 0.070	± 0.075	± 0.090	-	-	± 0.180
5.00	6.00				-	-	± 0.200

The thickness of tin coated steel shall meet the following (as per EN 10202):

- Deviations from the agreed thickness should not exceed ± 5% in the middle of the strip.
- Any such deviation will be between +5% and -8%, measured at any point outside of a 6mm margin from the natural edge.
- The average thickness will not deviate from the nominal thickness more than ±2% in orders for more than 10,000 strips (or the equivalent meters for coils).

THICKNESS TOLERANCES

NOMINAL THICKNESS (mm)		Width tolerances (W) for nominal widths of (mm)					
		Cold-rolled					
		EN 10140					
		W < 125		125 ≤ W < 250		125 ≤ W < 600	
		A	B	A	B	A	B
>	≤	Normal	Fine	Normal	Fine	Normal	Fine
0.10	0.60	± 0.15	± 0.10	± 0.20	± 0.13	± 0.25	± 0.18
0.60	1.50	± 0.20	± 0.13	± 0.25	± 0.18	± 0.30	± 0.20
1.50	2.50	± 0.25	± 0.18	± 0.30	± 0.20	± 0.35	± 0.25
2.50	4.00	± 0.30	± 0.20	± 0.35	± 0.25	± 0.40	± 0.30
4.00	6.00	± 0.35	± 0.25	± 0.40	± 0.30	± 0.45	± 0.35

STRAIGHTNESS TOLERANCES

NOMINAL WIDTH (W)	Maximum deviation	
	2000 mm	
	width (t)	
	t ≤ 1.20 mm	t > 1.20 mm
3 ≤ W < 6	10.00	15.00
6 ≤ W < 10	8.00	12.00
10 ≤ W < 20	4.00	6.00
20 ≤ W < 350	2.00	4.00

Other grades and specifications of strips available through the Sales Department.

LOW-CARBON STEEL STRIP

VINCO
VIZCAINA DE INDUSTRIA Y COMERCIO

Vizcaína de Industria y Comercio, S.A.
Polígono Sarrikola | Telf.- +34 94 412 33 99
c/ Bizkargi, 6 | Fax - +34 94 486 83 01
E-48195 **Larrabetzu - Bizkaia** | e-mail: info@vinco.es

SPAIN | www.vinco.es

VINCO
VIZCAINA DE INDUSTRIA Y COMERCIO

• CHEMICAL COMPOSITION

APPROXIMATE EQUIVALENCE				CHEMICAL COMPOSITION								
EN		DIN DESIG.	ASTM/SAE DESIG.	C %	Si ≤%	Mn %	P ≤%	S ≤%	V ≤%	Al %	Ti %	Others %
DESIG.	STANDARD											
Cold-rolled and Electrolytic zinc coated Low-carbon Steel (+ZE)												
DC01	EN10130	St2/St12	A 366/1012	≤ 0.12	-	≤ 0.60	0.045	0.045	-	-	-	-
DC03	EN10130	RRSt3/RRSt13	A 619	≤ 0.10	-	≤ 0.45	0.035	0.035	-	-	-	-
DC04	EN10130	St4/St14	A 620/1008	≤ 0.080	-	≤ 0.40	0.030	0.030	-	-	-	-
S355J0	EN10025	St52-3	-	≤ 0.20	≤ 0.55	≤ 1.60	0.040	0.040	-	-	-	N≤ 0.009
Hot-rolled Low-carbon Steel												
DD11	EN10111	StW22	A 621/1008	≤ 0.12	-	≤ 0.60	0.045	0.045	-	-	-	-
DD14	EN10111	-	-	≤ 0.080	-	≤ 0.35	0.025	0.025	-	-	-	-
High strenght Steel												
S315MC	EN10149	QStE340TM	-	≤ 0.12	≤ 0.50	≤ 1.30	0.025	0.020	0.20	≥ 0.015	≤ 0.15	Nb≤0.09(1)
S420MC	EN10149	QStE420TM	-	≤ 0.12	≤ 0.50	≤ 1.60	0.025	0.015	0.20	≥ 0.015	≤ 0.15	Nb≤0.09(1)
S500MC	EN10149	QStE500TM	-	≤ 0.12	≤ 0.50	≤ 1.70	0.025	0.015	0.20	≥ 0.015	≤ 0.15	Nb≤0.09(1)
S550MC	EN10149	QStE550TM	-	≤ 0.12	≤ 0.50	≤ 1.80	0.025	0.015	0.20	≥ 0.015	≤ 0.15	Nb≤0.09(1)
S700MC	EN10149	QStE690TM	-	≤ 0.12	≤ 0.60	≤ 2.10	0.025	0.015	0.20	≥ 0.015	≤ 0.22	Nb≤0.09 Mo≤0.50 B≤0.005(1)
Easy Machining Steel												
11SMn30	-	9SMn28	1213	≤ 0.14	≤ 0.050	0.90-1.30	0.11	0.33	-	-	-	-
11SMnPb30	-	9SMnPb28	12L 13	≤ 0.14	≤ 0.050	0.90-1.30	0.11	0.33	-	-	-	Pb:0.20-0.35
Galvanized (+G), Aluminium-coated (+AS) and Zinc-Aluminium coated (+ZA) Steel												
DX51D	-	St 02 Z	-	≤ 0.14	-	Grade determined by mechanical specifications, according to standards EN 10142, EN 10154 and EN 10214						
DX53D	-	-	-	≤ 0.14	-	Grade determined by mechanical specifications, according to standards EN 10142, EN 10154 and EN 10214						
Tin coated Steel												
TS245/T52	EN1202	-	-	The chemical composition is not specified in standards.								
TS275/T57	EN1202	-	-	The chemical composition is not specified in standards.								
TS415/T61	EN1202	-	-	The chemical composition is not specified in standards.								

(1) Nb + V + Ti ≤ 0.22

• SURFACE APPEARANCES AND FINISHES IN COLD-ROLLED STEEL (EN 10139)

SURFACE APPEARANCE			SURFACE FINISH
Symbol	Specifications	Field of application	
MA	Shiny, metallically clean surface, pores, small flaws and scratches are allowed.	All thicknesses and all heat treatments.	RR, RM, RL
MB	Shiny, metallically clean surface. Pores, scratches and grooves are allowed, providing the surface looks uniform.	≤ 2.00 mm thicknesses All thermal treatments except annealing (A).	RM, RL
MC	Shiny, metallically clean surface. Pores, scratches and grooves are allowed, providing they do not affect the shiny look of the surface.	≤ 1.00 mm thicknesses All thermal treatments except annealing (A)	RN

Surface finishes are characterized by the R_a mean roughness values:

Rough	RR	$R_a \geq 1.5\ \mu m$
Matt	RM	$0.6\ \mu m < R_a \leq 1.8\ \mu m$
Normal	RL	$R_a \leq 0.6\ \mu m$
Bright	RN	$R_a \leq 0.2\ \mu m$

• EDGES

Slit	GK		
Special	SK	Rounded	
		Round	

• SURFACE PROTECTION TREATMENTS FOR COATED STEEL

Symbol	Treatment type
C	Chemically passivated
CO	Chemically passivated and oiled
O	Oiled
U	According to the coating, that is, untreated

• COATING SPECIFICATIONS

1- GALVANIZED STEEL as per EN 10142

COATING MASS

DESIGNATION	MINIMUM COATING MASS (including both sides) [g/sq m]	
	Testing at three points	Testing at one point
Z100	100	85
Z200	200	170
Z275	275	235

COATING FINISH

Regular Spangle (N)	This finish is the result of the natural solidifying of zinc. Depending on the galvanizing conditions, it is not possible to obtain a spangle or bright and even-sized zinc crystals. These factors do not affect the coating's quality.
Minimum Spangle (M)	This finish is obtained when the zinc solidifying process has been controlled properly. The surface will show a limited spangle which may not be visible to the naked eye. This finish is requested when the normal spangle does not meet the requirements of the surface's appearance.

COMMENT: aside from the standard, SF (zero spangle) can be supplied.

SURFACE FINISH

As coated (A)	In this finish, small craters heterogeneous spangles, black spots, light scratches and small passivation spots are allowed. A slight localized ribbing and over-thickness may be found in the zinc coating. Only with a regular spangle (N).
Improved (B)	The B finish is generally obtained with a temper (skin pass). In this finish, localized flaws such as the ones that owing to a stop in the tooling, cylinder marks, roughness, grooves, indentations, spangle roughness and over-thickness in the zinc coating are allowable, as well as light passivation marks.
Best Quality (C)	The C finish is obtained with a temper (skin pass). The side with the best finish should be free of flaws and in no case shall it affect the uniformity of good quality paint. The other side shall have a B finish, at least.

2- ALUMINIUM-COATED STEEL as per EN 10154

COATING MASS

DESIGNATION	MINIMUM COATING ON BOTH SIDES			
	Triple sample testing		Single sample testing	
	Thickness (*)	Thickness (*)	Thickness (*)	Thickness (*)
	µm	g/m²	µm	g/m²
AS100	17.00	100	12.75	75
AS120	20.40	120	15.30	90
AS150	25.50	150	19.55	115

(*) by face

SURFACES APPEARENCES AND FINISHES (EN 10154)

Improved (B)	Slightly tempered. Small localized flaws such as the ones that owing to a stop in the tooling, cylinder marks, roughness, grooves, indentations, spangle roughness and over-thickness in the coating are allowable, as well as light passivation marks. Pittings are not allowed.
Best Quality (C)	Slightly tempered. The side with the best finish should be free of flaws and in no case shall it affect the uniformity of good subsequent quality paint. The other side shall have a B finish, at least.

3- STEEL WITH A ZINC-ALUMINUM COATING AS PER EN 10214

COATING MASS

DESIGNATION	MINIMUM COATING MASS (THE SUM OF BOTH SIDES) [g/sq m]	
	Triple sample testing	Single sample testing
ZA95	95	80
ZA130	130	110
ZA185	185	155

SURFACE APPEARANCE AND FINISH (EN 10214)

Ordinary (A)	Small, uniform craters in the spangle, black spots, light scratches and small passivation spots are allowed. A slight localized ribbing and over-thickness in the coating may be obtained.

- SPANGLE TYPE Regular spangle (N)

4- ELECTROLYTIC ZINC COATED STEEL AS PER EN 10152

COATINGS

DESIGNATION	NOMINAL VALUE OF THE ZINC COATING MASS ON EACH SIDE		MINIMUM VALUES OF THE COATING MASS FOR EACH SIDE	
	Thickness (µm)	Mass (g/sq m)	Thickness (µm)	Mass (g/sq m)
ZE25/25	2.5	18	1.7	12
ZE50/50	5	36	4.1	29
ZE100/100	10	72	9.1	65

SURFACE APPEARANCE AND FINISH (EN 10215)

As coated (A)	Flaws such as blisters, slight indentations, small marks, insignificant scratches and slight changes of colour that do not affect the capability, shaping and adherence to subsequent surface coverings are allowed.
Improved (B)	The best of the two sides shall have no imperfections that may spoil the uniform appearance of a high-quality subsequent paint finish. For coatings on one side only, this requirement will apply to the coated side, unless otherwise convened. The other side is to meet the requirements for the appearance A side, at least.

5- TIN COATED STEEL as per EN 10202 (TOLERANCES as per EN 10202)

MOST COMMON COATINGS

NOMINAL COATING		USES FOR HIGH-SPEED WELDING (HS)				OTHER USES (SP)	
Mass (g/ sq m)	Thickness (µm)	Mass (g/ sq m)		Thickness (µm)		Mass (g/ sq m)	Thickness (µm)
		min.	max.	min.	max.	max.	min.
2.80	0.39	2.30	3.90	0.32	0.54	2.30	0.32
5.60	0.78	4.70	7.20	0.65	1.00	4.70	0.65
11.20	1.56	9.55	-	1.33	-	9.55	1.33

ANNEALED SURFACE APPEARANCE AND FINISH

Finish	Code	Nominal surface roughness of the steel base µm R_a
Bright	BR	≤0.35
Matt	MM	Miscellaneous
Stone	ST	0.35 - 0.60

• MECHANICAL CHARACTERISTICS

STEEL QUALITY		FOURNITURE		HARDNESS		YIELD POINT	TENSILE STRENGTH	ELONGATION (min) %
Desig.	Standard	Condition	Symbol			N/ sq mm	N/ sq mm	A_{80}
Cold-rolled and Electrolytic zinc coated (+ ZE) Low-carbon Steel								
DC01	EN 10139 Y EN 10152	Annealed (A)		≤ 105	HV	-	270-390	28%
		Brightly tempered (LC)		≤ 115	HV	≤ 280	270-410	28%
	EN 10139	Tempered	C290	95-125	HV	200-380	290-430	18%
			C340	105-155	HV	≥ 250	340-490	-
			C390	117-172	HV	≥ 310	390-540	-
			C440	135-185	HV	≥ 360	440-590	-
			C490	155-200	HV	≥ 420	490-640	-
			C590	185-225	HV	≥ 520	590-740	-
			C690	≥ 215	HV	≥ 630	≥ 690	-
DC03	EN 10139 Y EN 10152	Annealed (A)		≤ 100	HV	-	270-370	34%
		Brightly tempered (LC)		≤ 110	HV	≤ 240	270-370	34%
	EN 10139	Tempered	C290	95-117	HV	210-355	290-390	22%
			C340	105-130	HV	≥ 240	340-440	-
			C390	117-155	HV	≥ 330	390-490	-
			C440	135-172	HV	≥ 380	440-540	-
			C490	155-185	HV	≥ 440	490-590	-
			C590	≥ 185	HV	≥ 540	≥ 590	-
DC04	EN 10139	Annealed (A)		≤ 95	HV	-	270-350	38%
		Brightly tempered (LC)		≤ 105	HV	≤ 210	270-350	38%
		Tempered	C290	95-117	HV	220-325	290-390	24%
			C340	105-130	HV	≥ 240	340-440	-
			C390	117-155	HV	≥ 350	390-490	-
			C440	135-172	HV	≥ 400	440-540	-
			C490	155-185	HV	≥ 460	490-590	-
			C590	185-215	HV	≥ 560	590-690	-
S355J0	EN 10025	-		-	-	345-355	490-680	-
Hot-rolled Low-carbon Steel								
DD11	EN 10111	L/C skin-pass, not chemically pickled		-		170-340	≤ 440	23%
DD14	EN 10111			-		170-290	≤ 380	31%
High strenght Steel								
S315MC	EN 10149	Thermomechanical rolling		-		≥ 315	390-510	20%
S420MC	EN 10149			-		≥ 420	480-620	16%
S500MC	EN 10149			-		≥ 500	550-700	12%
S550MC	EN 10149			-		≥ 555	600-760	12%
S700MC	EN 10149			-		≥ 700	750-950	10%
Easy Machining Steel								
11SMn28	EN 10087	L/C skin-pass, not chemically pickled		The mechanical specifications are to be convened before placing an order. The chemical composition of the material is warranted in any case.				
11SMnPb28	EN 10087							
Galvanized, Tin coated and Zinc-Aluminium coated Steel								
DX51D	+Z EN 10142	For folding and profiling		-		-	270-500	22%
	+AS EN 10154			-				
	+ZA EN 10214							
DX53D	+Z EN 10142	For deep drawing		-		≤ 260	270-380	30%
	+AS EN 10154			-				
	+ZA EN 10214			-				
Tin coated Steel								
TS245/T52	EN 10202	-		47-59	HRB	195-295	290-390	-
TS275/T57	EN 10202	-		56-66	HRB	225-325	325-425	-
TS415/T61	EN 10202	-		61-72	HRB	365-465	385-485	-