

Rolling and Annealing Mill :



The cold rolling process is about the continuous cold reducing of the thickness of hot rolled pickled steel sheet through the combined action of crushing (compression) and stretching (pull) carried by rotating working cylinders.

The standards of the rolling mill are as follows:

	Thickness	Width	Inner diameter	Max weight
Entrance	1.20 – 4.5 mm	600 – 1300 mm	508 - 610 mm	25 T
Entrance	0.18 – 2.20 mm	600 – 1300 mm	508 mm	25 T

Further to the cold rolling, the metal becomes hard and short. Consequently, it must then undergo a re-crystallization annealing (Batch Annealing Furnace) to endow it with some of the qualities of plasticity necessary for sheet forming, and also to clean the surface of the sheet from residues of rolling oil. Annealing requires different heating and cooling programs according to the class of product requested. Products grades are as follows:

ST 12: destined to normal folding and forming

ST 13: destined to a more severe cold folding and forming

ST 14: destined to deep stamping

Standards of the bell furnace are as follows:

Max weight/base	Max height/base	Width	Inner diameter	Max weight
100 T	4400 mm	600 – 1300 mm	600 – 1300 mm	25 T

The skin-pass operation (SKP) takes place after annealing and consists in giving a slight stretching to the band by a passage with a weak decrease in thickness through a scratchy cylinder in order to print the roughness on the sheet and adjust the mechanical properties.

a - Definition and applications

The cold rolled sheet is a soft non mixed steel, destined for shaping through cold folding or stamping. It is suitable for surface coating (phosphatation, painting, galvanization, electrolytic coating ...) it is mainly used in the following sectors:

- *Building material (tube, profile, hardware, metal frame....)
- *Home electrical appliances (oven, washing machine...)
- *Air conditioning material and accessories (ventilation, heating....)
- *Metal packing (metal shafts...)
- *Metal packing (metal shafts...)
- *Road equipment

b - References standards and equivalence systems

The cold-rolled products are manufactured according to the norme EN 10130.

In accordance with norm	EN 10130 (1998)	EN 10027-1 et ECIS IC10	NFA 36-401(1983)	DIN 1623(1983)	ASTM	JIS G 3141 (1996)
Symbolic Designation	FeP01	DC 01	C	ST12	A 366-CQ	SPCC
	FeP03	DC 03	E	ST13	A619 DQ	SPCD
	FeP04	DC 04	ES	RRST14	A620 DQSK	SPCE

c - Surface characteristics

Surface aspect

Two surface aspects might be opted for:

A: for non visible pieces: defects such as pores, slight smut, small marks, weak stripes or mild coloration which do not hinder the capacity of forming and adhering of surface coating are allowed.

B: for visible pieces: face being of the best aspect should be kept without any defect that might compromise the uniform aspect of a quality painting or an electrolytic coating. The opposed face must at least present the surface aspect A.

Surface finishing

Different types of surface are feasible and defined by roughness values (Ra).

Surface finishing	Symbol	Roughness
Brilliant	b	$Ra \leq 0.4 \mu m$
Half-brilliant	g	$Ra \leq 0.9 \mu m$
Normal	m	$0.6 \mu m < Ra \leq 1.9 \mu m$
Rough	r	$Ra > 1.6 \mu m$

d - Delivery conditions

Products are generally provided in skin passed and oiled. In case of agreement at the time of the order, non skin passed products, not oiled and not annealed(FH) may be put under the disposal of the buyer. The responsibility of the manufacturer as to the risk of rust can not be assumed concerning not oiled products. Risk of apparition of scratches during the handling, transport and work can not commit the liability of the manufacturer.

e -Edge condition

Edges are normally cut after pickling in such a manner to give them the requested width with the normal tolerance and quality of standard edges. In case of agreement at order, products with roughedges may be put under buyer's disposal. Width tolerances are those of the hot-rolled sheet.

f - Production table and dimensional tolerances

Dimensions in millimeters

Nominal thickness (mm)	Normal tolerance for nominal width of :		Narrow tolerances (S) for nominal width of :	
	≤ 1200	> 1200 to ≤ 1250	≤ 1200	> 1200 to ≤ 1250
≥ 0,25 to ≤ 0,40	± 0.04	± 0.05	± 0.025	± 0.035
≥ 0,40 to ≤ 0,60	± 0.05	± 0.06	± 0.035	± 0.045
≥ 0,60 to ≤ 0,80	± 0.06	± 0.07	± 0.04	± 0.05
≥ 0,80 to ≤ 1,00	± 0.07	± 0.08	± 0.045	± 0.06
≥ 1,00 to ≤ 1,20	± 0.08	± 0.09	± 0.055	± 0.07
≥ 1,20 to ≤ 1,60	± 0.10	± 0.11	± 0.07	± 0.08
≥ 1,60 to ≤ 2,00	± 0.12	± 0.13	± 0.08	± 0.09
≥ 2,00 to ≤ 2,50	± 0.14	± 0.15	± 0.10	± 0.11

Nominal width (mm)	Normal tolerances		Narrow tolerances(S)	
	Inferior	Superior	Inferior	Superior
≤ 1200	0	+4	0	+2
> 1200 to ≤ 1250	0	+5	0	+2

Cold-rolled coils have an inner diameter of 508 mm. Weight should be agreed at the time of the order knowing that the maximum weight is 25T. Quite all of these products may be delivered:

In coils

In cut sheet loads

In strips and bands

Maghreb Steel plants are equipped in such a manner to meet the specific orders not listed in the production table.