CLIFFS

TIN MILL
PRODUCT BOOK

Table of Contents

Suggestions for Buyers

We call your attention to the following items which, when shown on your orders, will expedite entry, production and shipment. Specifications beyond stated limitations are subject to inquiry.

UNIT OF QUANTITY	Specify whether ordered quantity is base boxes or weight.
ORDERED SIZE	Order accepted in even 1/16 increments. All tin mill products are produced to actual ordered width.
ROLLING INSTRUCTIONS	Rolling width, if critical. (Grain direction is perpendicular to rolling width.)
STEEL TYPE AND TEMPER	Specify if known. Note: Only aluminum killed continuous cast steels are available.
CUSTOMER APPLICATION	Specify end use and any special property requirements. Mill can then determine steel type and temper, if not known. (Samples of parts are desirable.)
COILS	Inside diameter: (16.5" standard, 20"). Maximum coil weight. Maximum outside diameter. Number of acceptable welds or no welds (subject to price extra). On no weld orders, minimum coil weight cannot be greater than 50% of maximum coil weight. If differentially coated, specify whether the marking is coiled inside or outside.
METHOD OF PACKING	Eye vertical on skids – standard; other – inquire. Tail end direction - clockwise or counterclockwise.
METHOD OF TRANSPORTATION	Rail or truck If rail, name of delivering carrier and any restrictions such as maximum car length, etc. If truck, any specific equipment necessary, method of unloading (forklift tractor, overhead crane with “C” hook), whether side or rear unloading, etc.; also receiving days, unloading hours.

1CRETP – Single Reduced Electrolytic Tinplate: Options

TIN COATING

a. Regular or differential
b. Marking system. If differential – lines or geometric
c. Melted (bright), Unmelted (matte) or Fully Alloyed (#05 coating only)

BASE METAL FINISH

a. 7C (stone)
b. 5C (shot blast)
c. Other – inquire

SURFACE TREATMENT

a. Cathodic Dichromate (CDC) – normally furnished when treatment not specified
b. Sodium Dichromate Dip (SDCD)

OILING

a. Acetyl Tributyl Citrate (ATBC)

Limitations

TIN COATING WEIGHTS

Standard coating weights are: No.05, No.10, No.15, No. 20, No. 25, No. 50, No. 75, No. 05/20, No. 05/25, No. 10/20, No. 20/25, No. 20/30, No. 20/50, No. 25/50, No. 20/75
Other coatings - inquire

MINIMUM ACTUAL WIDTHS		
Base Weight	Nominal Thickness	Minimum Actual Width
70 – 135 incl.	.0077" – .0149" incl.	29"

MINIMUM ACTUAL WIDTHS						
Base Weight	Nominal Thickness	Minimum Actual Width Temper				
		T1-BA	T2-BA	T3-BA	T4-CA	T5-CA
70 – 74 incl.	.0077" – .0081" incl.	N/A	36"	36"	36"	36"
75 – 89 incl.	.0083" – .0098" incl.	36"	36"	36"	36"	36"
90 – 135 incl.	.0099" – .0149" incl.	37.5"	37.5"	37.5"	37.5"	37.5"

1CRECCS – Single Reduced Electrolytic Chromium Coated Steel: Options

BASE METAL FINISH

a. 7C (stone) – normally furnished when finish not specified
b. 5C (shot blast)
c. Other - inquire

OILING

a. Acetyl Tributyl Citrate (ATBC)
b. Butyl stearate (BSO) – inquire

INSIDE DIAMETER

a. 16.5” standard
b. Inquire for other ID’s

Limitations

MINIMUM ACTUAL WIDTHS		
Base Weight	Nominal Thickness	Minimum Actual Width
70 – 135 incl.	.0077" – .0149" incl.	29"

MINIMUM ACTUAL WIDTHS						
Base Weight	Nominal Thickness	Minimum Actual Width Steel Types D, L & MR Temper				
		T1-BA	T2-BA	T3-BA	T4-CA	T5-CA
70 – 74 incl.	.0077" – .0081" incl.	N/A	36"	36"	36"	36"
75 – 89 incl.	.0083” – .0098" incl.	36"	36"	36"	36"	36"
90 – 135 incl.	.0099” – .0149" incl.	37.5"	37.5"	37.5"	37.5"	37.5"

1CRBP – Single Reduced Black Plate Steel: Options

BASE METAL FINISH

a. 5C (ahot blast)
b. 7C (stone)
c. Other – inquire

SURFACE

a. As Rolled – Product is considered dry and is provided exclusive of claimable rust/oxidation

Limitations

MINIMUM ACTUAL WIDTHS		
Base Weight	Nominal Thickness	Minimum Actual Width
70 – 135 incl.	.0077" – .0149" incl.	29"

MINIMUM ACTUAL WIDTHS						
Base Weight	Nominal Thickness	Minimum actual width Steel Types D, L & MR Temper				
		T1-BA	T2-BA	T3-BA	T4-CA	T5-CA
70 – 74 incl.	.0077" – .0081" incl.	N/A	36.5"	36.5”	36.5”	36.5”
75 – 89 incl.	.0083” – .0098" incl.	36.5”	36.5”	36.5”	36.5”	36.5”
90 – 135 incl.	.0099” – .0149" incl.	37.5"	37.5"	37.5"	37.5"	37.5"

FHBP – Full Hard Black Plate

STEEL GRADE	ORDERED THICKNESS	ORDERED WIDTH
.07% carbon or less	.0077” – .0090”	29” – 38”
	.0091” – .0149”	29” – 44”
.08% carbon or greater	.0077” – .0090”	29” – 38”
	.0091” – .0149”	29” – 44”

Full Hard Black Plate (FHBP) is ordered and produced to actual thickness

Items exceeding above limitations subject to inquiry

2CRETP – Double Reduced Electrolytic Tinplate: Options

TIN COATING

a. Regular or differential
b. Marking system. If differential – lines or geometric
c. Melted (bright), Unmelted (matte) or Fully Alloyed (#05 coating only)

BASE METAL FINISH

a. 7C (stone)
b. Other – inquire

SURFACE TREATMENT

a. Cathodic Dichromate (CDC) – normally furnished when treatment not specified
b. Sodium Dichromate Dip (SDCD)

OILING

a. Acetyl Tributyl Citrate (ATBC)

Limitations

TIN COATING WEIGHTS

Standard coating weights are: No.05, No.10, No.15, No. 20, No. 25, No. 50, No. 75, No. 05/20, No. 05/25, No. 10/20, No. 20/25, No. 20/30, No. 20/50, No. 25/50, No. 20/75
Other coatings - inquire

WIDTHS			
Base Weight	Nominal Thickness	Minimum Width	Maximum Width
CONTINUOUS ANNEALED			
55 – 135 incl.	.0061” – .0149” incl.	29.5”	37.25”
BATCH ANNEALED			
55 – 135 incl.	.0061” – .0149” incl.	29.5”	37.25”

2CRECCS – Double Reduced Electrolytic Chromium Coated Steel: Options

BASE METAL FINISH

a. 7C (stone)
b. Other – inquire

OILING

a. Acetyl Tributyl Citrate (ATBC)
b. Butyl Stearate (BSO) – inquire

Limitations

WIDTHS			
Base Weight	Nominal Thickness	Minimum Width	Maximum Width
55 – 135 incl.	.0061” – .0149” incl.	29.5”	37.25”

2CRBP – Double Reduced Black Plate: Options

BASE METAL FINISH

a. 7C (stone)
b. Other – inquire

SURFACE

a. As Rolled – Uncontrolled residual rolling oil level not suitable for coating/lithography without prior cleaning by customer

Limitations

WIDTHS – As Rolled or Full-Finish Black Plate			
Base Weight	Nominal Thickness	Minimum Width	Maximum Width
55 – 135 incl.	.0061” – .0149” incl.	29.5”	37.25”

GLOSSARY

Base box — a unit of area equivalent to 112 sheets 14 by 20 inches or 31,360 inches^2 (217.78 ft^2).

Base weight — a term used to describe the thickness of tin mill products. The designated base weight multiplied by a factor of 0.00011 is the nominal decimal thickness, in inches, of the material.

Black plate — light-gauge, low-carbon, cold-reduced steel intended for use in the untinned state or for the production of other tin mill products.

Box annealing — a process involving slow heating of coils to a subcritical temperature, holding, and cooling therefrom, to soften the strip and relieve stresses produced during cold reduction. It is accomplished in a sealed container. By introducing and maintaining an inert or slightly reducing atmosphere during the cycle, a relatively bright surface is obtained.

Burr — metal displaced beyond the plane of the surface by slitting or shearing.

Camber — the greatest deviation of a coil edge from a straight line. The measurement is taken on the concave side and is the perpendicular distance from a straight line to the point of maximum deviation.

Chemical treatment, electrolytic tinplate — a passivating chemical treatment applied to the surface of electrolytic tinplate to stabilize the plate surface characteristics compatible with a specified end use.

Chemically treated steel — light-gauge, low-carbon, cold-reduced steel that has a passivating or chemical treatment applied to the surface to provide rust resistance or retard underfilm corrosion, or both.

Cold reduction — the process of reducing the thickness of the strip cold, generally accomplished by one rolling through a series of four-high mills arranged in tandem.

Continuous annealing — a process consisting of passing the cold-reduced strip continuously and in a single thickness through a series of vertical passes within a furnace consisting of heating, soaking, and cooling zones to soften the strip and relieve stresses produced during cold reduction. An inert or slightly reducing atmosphere is maintained in the furnace to obtain a relatively bright strip.

Differentially coated tinplate—electrolytic tinplate with a different weight of tin coating on each surface.

Double-reduced plate — plate given a second major cold reduction following annealing.

Electrolytic chromium-coated steel — light-gauge, low-carbon, cold-reduced steel on which chromium and chromium oxides have been electrodeposited.

Electrolytic tinplate — light-gauge, low-carbon, cold-reduced steel on which tin has been electrodeposited by an acid or alkaline process.

K Plate — electrolytic tinplate, No. 50 or heavier tin coating, with improved corrosion performance for some galvanic detinning food products as measured by the Special Property Tests for Pickle Lag (PL), Iron Solution Value (ISV), Tin Crystal Size (TCS), and Alloy Tin Couple (ATC) or Aerated Media Polarization (AMP).

The production of K Plate requires special processing and testing. In order to receive K Plate, this requirement must be specified on the order.

Matte finish — a surface that has an unmelted tin coating, generally on a shot-blast finish (SBF) base steel.

Mechanical designation — an arbitrary number to designate Rockwell hardness and ultimate tensile strength characteristics for double-reduced plate.

Oiling — a lubricant film applied to both surfaces of the plate.

Passivating treatment — a surface chemical treatment.

Ratio — the number of base boxes in a package of a given size.

Reflowed finish — a surface that has a melted tin coating.

Rockwell hardness test — a test for determining hardness.

Rolling width — the dimension of the sheet perpendicular to the rolling direction.

Single-reduced plate — plate produced with one major cold reduction.

Surface appearance — visual characteristics determined primarily by the steel surface finish. For electrolytic tinplate, the appearance is also influenced by the weight of coating and by melting or not melting the tin coating.

Surface finishes — steel surface finishes for tin mill products imparted by the finishing-mill work rolls. These may be either ground or blasted-roll finishes.

Temper designation — an arbitrary number to designate a Rockwell hardness range for single-reduced products which indicates the forming properties of the plate.

Temper/Duo mill — a mill for rolling base metal steel after annealing to obtain proper temper, flatness, and surface finish. It may consist of one stand or two stands arranged in tandem.

Tin coating weight — the weight of tin applied to the steel surface, usually stated as pounds per base box, distributed evenly over both surfaces of a base box, the total coated area being 62 720 inches^2 Thus 0.25 lb/bb has a nominal weight of 0.125 lb on each of the two surfaces. Frequently, the coating is referred to as a designation number, and the decimal point is omitted. Thus, 0.25 lb/bb is 25.

For differentially coated tinplate, twice the nominal coating weight on each side is designated, usually by the number method; hence, 10/25 designates the nominal weight of 0.05 lb/bb on one side and 0.125 lb/bb on the other side.

About Cleveland-Cliffs Inc.

Cleveland-Cliffs is the largest flat-rolled steel producer in North America. Founded in 1847 as a mine operator, we are also the largest producer of iron ore pellets in North America. In 2020, we acquired two major steelmakers, AK Steel and ArcelorMittal USA, vertically integrating our legacy iron ore business with quality-focused steel production and emphasis on the automotive end market. Our fully integrated portfolio includes custom-made pellets and hot briquetted iron (HBI); flat-rolled carbon steel, stainless, electrical, plate, tinplate and long steel products; as well as carbon and stainless steel tubing, hot and cold stamping and tooling. Headquartered in Cleveland, Ohio, we employ approximately 25,000 people across our mining, steel and downstream manufacturing operations in the United States and Canada.

CLIFFS

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April 2021