

LONG STEEL PRODUCTS

CLEVELAND-CLIFFS STEELTON



Forging

Railroad



Cleveland-Cliffs Steelton, one of only three rail producers in the Americas, is located along the Susquehanna River in Steelton, Pennsylvania, 100 miles west of Philadelphia. The eastern Pennsylvania location provides convenient and economical access to customers through an excellent network of highways and railroads, as well as easy access to several deep-water ports.

The plant operates a 150-ton D.C. electric-arc furnace with ladle refining and vacuum degassing, a three-strand continuous jumbo bloom caster, and an ingot-teeming facility, along with various rolling and finishing mills. Steelton produces railroad rails, forging quality ingots and blooms, as well as various bar products for use in railroad, open-die forging, and industrial applications.

LONG STEEL PRODUCTS

Products

AS-CAST BLOOMS



23.6 x 14.6 in.

ROLLED BLOOMS



6 x 6, 8 x 8, 10 x 10,
12 x 12, 14 x 14 in.

RAIL



T-Rail 85-141 lbs./yard
Crane Rail 104-175 lbs./yard

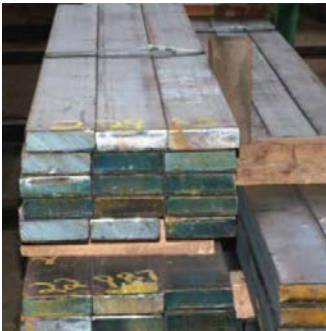
INGOTS



Bottom-poured 34-78 in.

BARS AND SPECIAL SECTIONS – 20 INCH MILL

SQUARE EDGE FLATS



BILLETS



DOUBLE BEVEL FLATS



MAIN FRAME



WHEEL RIMS



SPLICE BAR



LONG STEEL PRODUCTS

As-Cast and Rolled Blooms

Process	Electric Furnace, Ladle Refined, Argon Stirred, Vacuum Degassed, Continuous Cast, Electromagnetic Stirring, Rolled
Section Size	As-Cast: 23.6 x 14.6 in. (344 in ²) 600 x 370 mm (222,000 mm ²) Rolled: Round Cornered Square (RCS): 6 - 14 in. (150 - 355 mm) Rectangles: 6 - 14 in. thick x 10 - 22 in. wide (150 - 355 mm x 255 - 560 mm)
Reduction Ratio	From 1.7:1 at 14 in. RCS to 9.6:1 at 6 in. RCS Based on As-Cast cross sectional area of 344 in.
Center Soundness	Guaranteed through 10 in. (254 mm) RCS for most grades
Bloom Length	As-Cast: 8 ½ - 19 ½ ft. (2,591 - 5,944 mm) Rolled: 11 - 21 ft. (3,353 - 6,401 mm) [to 32 ft. (9,750 mm) for certain RCS sections]
Corner Radius	From ¾ - 3 in. (19 - 76 mm), depending on bloom size
End Condition	As-Cast: Precision Torch Cut Rolled: Hot Sheared
Heat Sizes	As-Cast: 130 NT (117 MT) +/- 10 NT Rolled: 125 NT (114 MT) +/- 10 NT
Microcleanliness	Magnetic Particle: AMS 2301/AMS 2304 Ultrasonic: 1/8 in. Flat Bottom Hole (Rolled Blooms)
Typical Grades	Carbon: AISI or SAE 1010-1095, 11XX, 15XX Alloy: AISI or SAE 40XX, 41XX, 43XX, 51XX, 86XX ASTM Structural & HSLA Microalloy, Boron Treated & H-Steels Other Grades to Customer Chemistries



LONG STEEL PRODUCTS

Square Edge Flats

X = CAN PRODUCE

		THICKNESS (in.)										
		½ - 1	1 - 1 ½	1 ½ - 2	2 - 2 ½	2 ½ - 3	3 - 3 ½	3 ½ - 4	4 - 4 ½	4 ½ - 5	5 - 5 ½	5 ½ - 6
WIDTHS (in.)	3 ¾ - 4	INQUIRE	X	X	X	X	INQUIRE	NO	NO	NO	NO	NO
	4 - 5	INQUIRE	X	X	X	X	X	X	X	NO	NO	NO
	5 - 6	INQUIRE	X	X	X	X	X	X	X	X	X	NO
	6 - 7	X	X	X	X	X	X	X	X	X	X	NO
	7 - 8	X	X	X	X	X	X	X	X	X	X	INQUIRE
	8 - 9	X	X	X	X	X	X	X	X	X	X	INQUIRE
	9 - 10	X	X	X	X	X	X	X	X	X	X	INQUIRE
	10 - 11	X	X	X	X	X	X	X	X	X	X	INQUIRE
	11 - 12	X	X	X	X	X	X	X	X	X	X	INQUIRE
	12 - 13	X	X	X	X	X	X	X	X	X	X	INQUIRE
	13 - 14	X	X	X	X	X	X	X	X	X	X	INQUIRE
	14 - 15	X	X	X	X	X	X	X	X	X	X	INQUIRE
	15 - 16	X	X	X	X	X	X	X	X	X	X	INQUIRE
	16 - 17	X	X	X	X	X	X	X	X	X	X	INQUIRE
	17 - 18	X	X	X	X	X	X	X	X	X	X	INQUIRE
	18 - 19	X	X	X	X	X	X	X	X	X	X	INQUIRE
	19 - 20	INQUIRE	X	X	X	X	X	INQUIRE	INQUIRE	INQUIRE	INQUIRE	INQUIRE
	20 - 21	INQUIRE	X	X	X	X	X	INQUIRE	INQUIRE	INQUIRE	INQUIRE	INQUIRE
	21 - 22	INQUIRE	X	X	X	X	X	INQUIRE	INQUIRE	INQUIRE	INQUIRE	INQUIRE
	22 - 23	INQUIRE	X	X	X	X	X	INQUIRE	INQUIRE	INQUIRE	INQUIRE	INQUIRE
23 - 24	INQUIRE	X	X	X	X	X	INQUIRE	INQUIRE	INQUIRE	INQUIRE	INQUIRE	

STANDARD CHARACTERISTICS

Intermediate Thickness	No width and thickness incremental limitations				
Width Tolerance	ASTM A-29 tolerances, others by inquiry, sizes beyond chart +1/8 in., -3/32 in.				
Thickness Tolerance	ASTM A-29 tolerances, others by inquiry, sizes beyond chart are same as 8 in. width				
Lengths	Minimum of 12 ft., maximum of 40 ft., other lengths by inquiry				
Length Tolerance	+2, -0 in., others by inquiry				
Ends Sheared	Sizes up to 3 ½ in. thick and 16 in. wide				
Ends Hot Sawn	Sizes over 3 ½ in. thick and/or over 16 in. wide				
Ends Cold Sawn	Lengths less than 12 ft. or by inquiry				
Lift Size	Standard is 5 tons, other by inquiry				
Straightness	Standard is ¼ in. in 5 ft. length. By inquiry, can do 1/8 in. in 5 ft. length				
Corner Radius	1/16 in. +/- 1/32 in. for thickness under 4 in. rolled on UM stand. 1/8 in. +/- 1/16 in. for thickness 4 in. and thicker. Rolled on UM stand. Some sizes (marked in bold above) have option of rolling on 2-high stands to reduce concavity, inquire sizes.				
Bar Thickness (in.) >	2 ½ - 3	3 - 3 ½	3 ½ - 4	4 - 5	Over 5
Edge Concavity – Typical Per Side (in.)	0.020	0.025	0.030	0.040	0.050

LONG STEEL PRODUCTS

Ingots

Forging Quality Ingots

- Bottom-poured
- Ladle refined metallurgy
- Vacuum tank degassed
- 150-ton electric furnace
- Heat size – 125 to 145 NT
- Multiple ingot sizes per heat (inquire)
- Carbon: 10XX, 11XX, 15XX, A105, A266, A350-LF2, LF6, A707-L3 & L5, etc.
- Alloy: 41XX, 43XX, 86XX, A182-F11, F22, etc.



Bottom Poured Ingots

ROUND SMOOTH SIDE NON-TAPERED MOLDS

Size (in.)	Top Diameter (in.)	Bottom Diameter (in.)	Mean Area (sq. in.)	Maximum			Minimum			Approx. Hot Top Volume (%)
				Body Length (in.)	Body Weight (lbs.)	Ingot Gross Weight (lbs.)	Body Length (in.)	Body Weight (lbs.)	Ingot Gross Weight (lbs.)	
34 x 168	34.4	34.4	929	149	35,280	38,840	134	31,730	35,170	8.9
40 x 145	40	40	1,256	125	39,740	44,730	105	33,380	37,560	10.9

ROUND CORRUGATED TAPERED (BEU) MOLDS

Mold Size (in.)	Top Diameter (in.)	Bottom Diameter (in.)	Mean Area (sq. in.)	Maximum			Minimum			Approx. Hot Top Volume (%)
				Body Length (in.)	Body Weight (lbs.)	Ingot Gross Weight (lbs.)	Body Length (in.)	Body Weight (lbs.)	Ingot Gross Weight (lbs.)	
40 x 90	40.75	35	1,067	79	21,960	24,710	60	16,060	18,545	11.0
40 x 120	40.75	35.25	1,070	105	29,580	33,125	80	21,730	24,480	10.5
40 x 130	40.75	35.25	1,063	115	31,910	35,720	98	26,570	29,850	10.5
48 x 84	48.75	44	1,592	72	29,940	34,600	52	21,010	25,290	13.0
48 x 110	48.75	41.75	1,523	97	38,560	43,600	77	29,650	34,310	11.5
52 x 138	52	46	1,747	112	50,460	59,980	90	39,800	47,340	15.0
62 x 130	62	54.5	2,511	102	64,500	77,330	90	56,220	67,810	16.0
69 x 120	69	62	3,180	94	75,560	90,940	82	65,170	78,190	16.0
78 x 120	78	71	4,109	93	96,710	116,440	81	83,400	100,080	16.0

LONG STEEL PRODUCTS



About Cleveland-Cliffs Inc.

Cleveland-Cliffs is the largest flat-rolled steel producer in North America. Founded in 1847 as a mine operator, Cliffs also is the largest manufacturer of iron ore pellets in North America. The Company is vertically integrated from mined raw materials and direct reduced iron to primary steelmaking and downstream finishing, stamping, tooling, and tubing. The Company serves a diverse range of markets due to its comprehensive offering of flat-rolled steel products and is the largest steel supplier to the automotive industry in North America. Headquartered in Cleveland, Ohio, Cleveland-Cliffs employs approximately 25,000 people across its mining, steel and downstream manufacturing operations in the United States and Canada.

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