

São Francisco do Sul, located in the northeastern part of Santa Catarina state, in southern Brazil, was chosen as ArcelorMittal Vega's site especially because of its strategic location near to the main Brazilian and Mercosul car makers as well as São Francisco do Sul's harbour, railway and road networks.

ArcelorMittal Vega's integrated management system has been recognized since its implementation, including ISO 9001, ISO 14001, OHSAS 18001 and IATF 16949 certifications.

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ArcelorMittal Vega is an industrial plant operating since July 2003 focused on the processing of flat carbon steels based on the supply of hot rolled coils by ArcelorMittal Tubarão. Its facility features the most modern equipment and state-of-the-art technology in surface treatment, cold rolling as well as hot-dip galvanizing processes.

Among the main end-uses for ArcelorMittal Vega products feature: automotive applications, household appliances, civil construction, pipes, packaging, motor

ArcelorMittal Vega's largest private investment: US\$ 420 million. The industrial processes have been established in an overall area, whose production capacity is now around 1.6 million ton per year.

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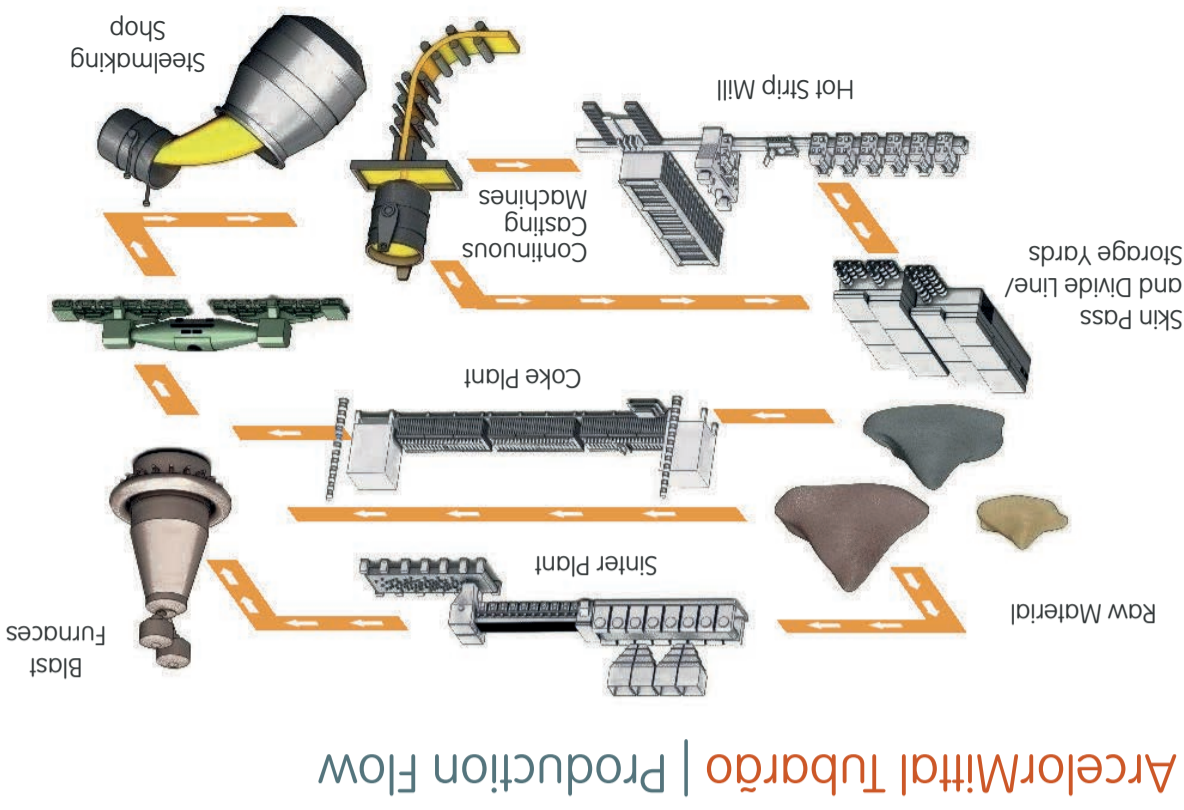
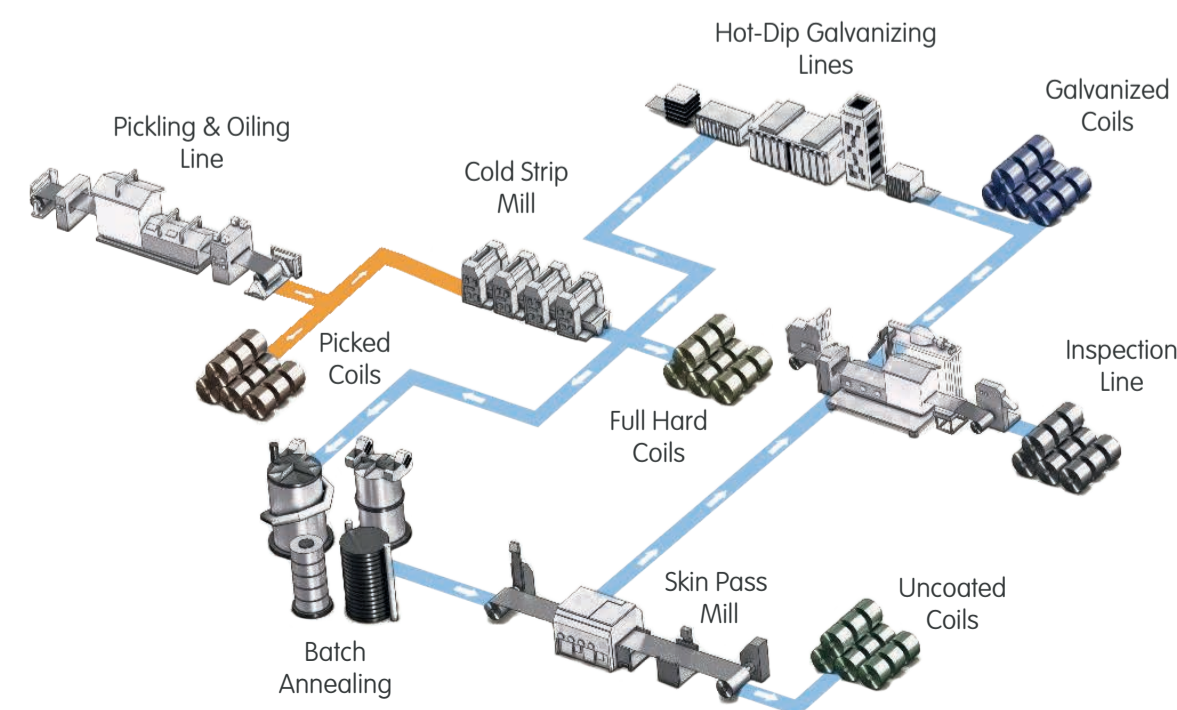
ArcelorMittal Vega

Location and Logistics

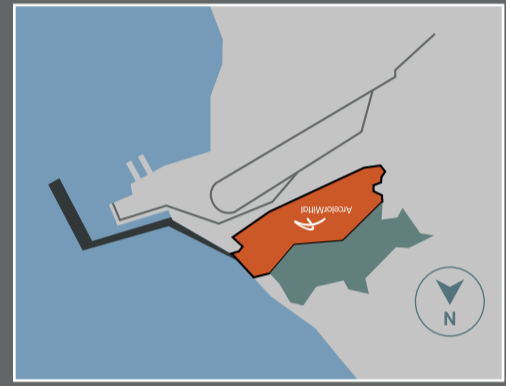
ArcelorMittal Vega strives to obtain high quality standards when it comes to customer-oriented strategies including sales, logistic and technical assistance services.



ArcelorMittal Vega | Production Flow



ArcelorMittal Tubarão | Production Flow



ArcelorMittal Tubarão facilities comprise approximately 3,400 acres (~1.37 km) in the city of Serra, metropolitan region of Vitória, Espírito Santo State.

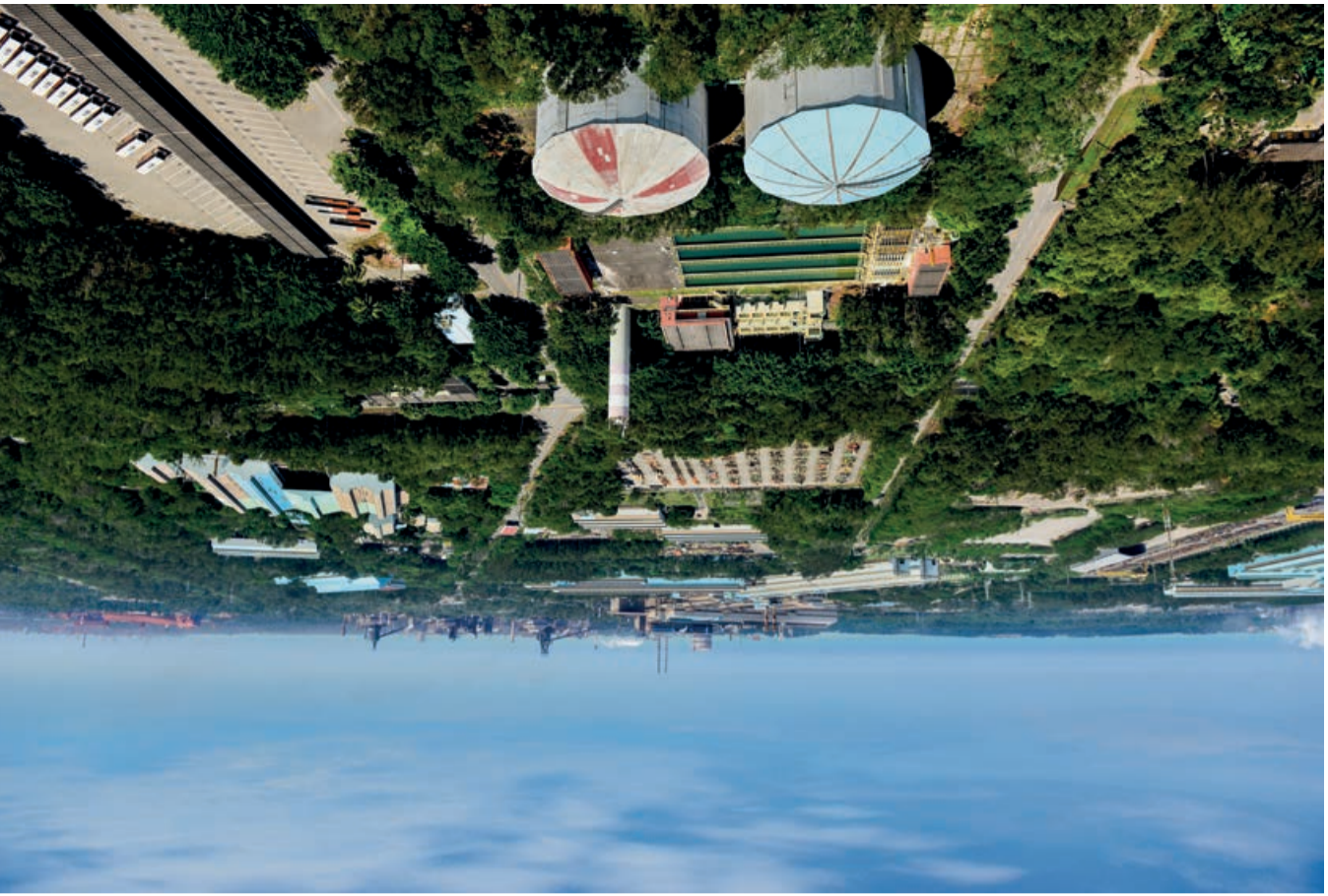
Location and Logistics



In June 2006 the worldwide Arcelor Group merged with Mittal Steel to become ArcelorMittal, managing a steel turnover of 1.6 million tons a year and employing a workforce of approximately 210,000 employees. In Brazil, the ArcelorMittal output is currently 1.5 million metric tons of steel products a year with 16,000 employees being currently the biggest industrial group in South America.

In 2005, Arcelor Brasil was created from the merger of Companhia Siderúrgica de Tubarão, Vega do Sul and Basic Oxygen Furnaces (BOF), three Continuous Casting Machines (CCM) and one Hot Strip Mill (HSM). The HSM, which started operation in August 2002, translates a

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Commissioned in 1976 as a Brazilian state-controlled joint venture with interests owned by foreign steelmaking groups led by Kawasaki Steel Corporation (Japan) and ArcelorMittal Tubarão started its steel production in November 1983 and was later handed over to the private sector in July 1992.

ArcelorMittal Tubarão's current installed capacity is 7.5 million tons of molten steel a year, based on one sinter plant, two coke plants, three Blast Furnaces (BF), three Basic Oxygen Furnaces (BOF), three Continuous Casting Machines (CCM) and one Hot Strip Mill (HSM). The HSM, which started operation in August 2002, translates a

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ArcelorMittal Tubarão



ArcelorMittal Tubarão

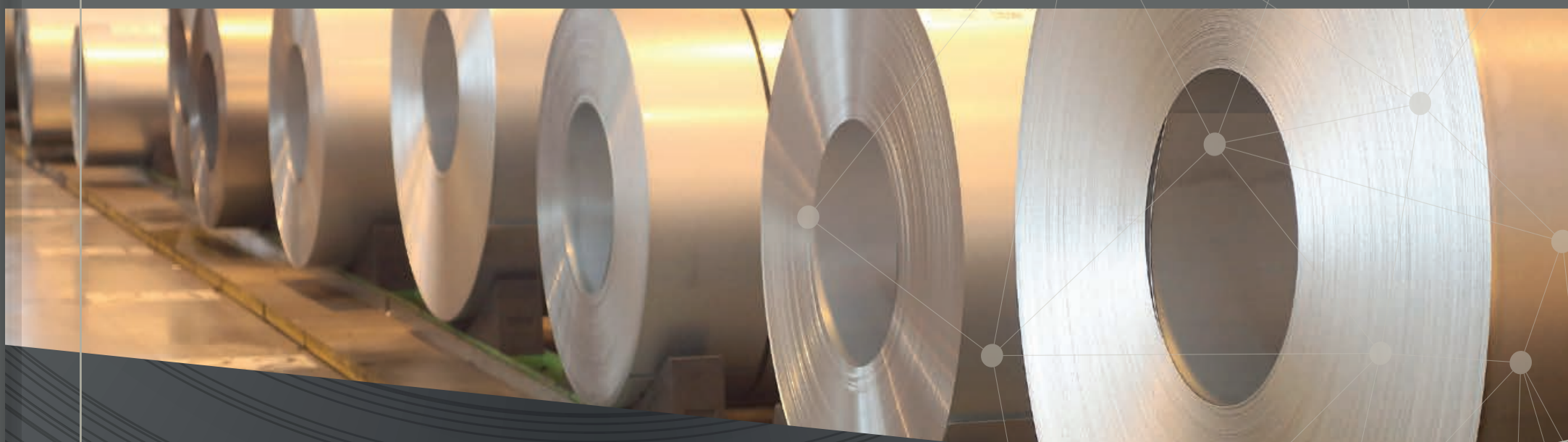
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Customer Technical Guide Flat Carbon Steels



Features Of The Products

MAIN PRODUCTS Steel Slabs Hot Rolled Coils Cold Rolled Coils Hot-Dip Galvanized Coils	Continuous Casting Hot Strip Mill Cold Strip Mill Hot-Dip Galvanizing Lines	Low Alloy Steel Shimabara Steel (BY, DVN, LR, ABS, GL, NK, KR, RINA) API Pipes HSLA - High Strength Low Alloy	AVAILABLE SIZES Continuous Casting Slabs Thicknesses 200, 225 and 250mm (7.87, 8.86 and 9.84 in) Widths 2100 to 2325 mm (81.5 to 91.5 in) Length 5,000 to 12,500mm (197 to 492 - Standard)	Hot Strip Mill Product Range Slabs 840 to 19.00 mm (0.055 to 0.748 in) Cold Strip Mill 0.25 to 2.05 mm (0.0145 to 0.080 in) Hot-Dip Galvanizing Lines 0.25 to 2.05 mm (0.009 to 0.080 in)
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*Depending on ArcelorMittal Tubarão analysis at time of size assortment presentation.

ArcelorMittal Tubarão

Coke Plant

SUPPLIER	AM Tubarão's COKE PLANT	SUNCOKE PLANT
START-UP	CAR STILL / ITALIAPIANTI July / 83	SUN COKE 2007
ANNUAL CAPACITY	1,700,000 mt (1,970,000 st)	1,553,595 mt (1,712,345 st)
OPERATIONAL DATA	Sets 3 x 49 = 147 ovens Height 6.5 m (21.3ft) Useful Volume 39.5 m ³ (1,395 ft ³) Useful Load 29 mt (32 st) Coking Time 16 hours Fuel 150% Operational Index 1.50%	4 x 30 = 820 ovens 5.3 m (17.4 ft) 52.2 m ³ (1,843 ft ³) 40 mt (44 st) 48 hours Coke oven gas (COG) 50%

MOYING COKE PLANT EQUIPMENT	COKE QUENCHING
Loading cars 3	CDQ Coke Dry-Quenching
Push Machines 3	2 Quenching cars
Ladder cars 3	2 Quenching towers
Electric locomotives 3	Tar Separation Plant
Pusher-charger machines -	Tar Electrostatic Precipitator unit
Door machines -	Ammonia Scrubbers
Flat bed cars -	Distiller and combustion
	Naphthalene Scrubber
	Biological Treatment Plant
	8 boilers produce 105 kg/cm ² of vapour at 540°C
	2 turbines and 3 generators produce 170 MW of power.

Sinter Plant

SUPPLIER	HITACHI SHIPBUILDING
START-UP	September/83
ANNUAL CAPACITY	6,500,000 mt (7,150,000 st)

DESIGN SPECIFICATION	BF#1	BF#2	BF#3
Inner Volume	4,415m ³ (156,000 ft ³)	1,550m ³ (54,700 ft ³)	3,617 m ³ (127,000 ft ³)
Effective Volume	3,707m ³ (130,000 ft ³)	1,374m ³ (48,500 ft ³)	3,126 m ³ (110,400 ft ³)
Heath Diameter	14m (46 ft)	8m (26 ft)	12.5m (41 ft)
Tuyeres (units)	38	22	34
Pig Iron Taphole (units)	4	2	4
Cooling	Slave cooler (808)	Slave cooler (317)	Slave cooler (582)
Approximate Height	110m (360ft)	65m (213 ft)	100m (328 ft)
Hot Stoves (koppers type)	4/external combustion chamber	3/internal combustion chamber + 1 with civil base	3/internal combustion chamber + 1 with civil base
Charging sys (Belt conveyor)	1	1	1
TORPED CARS Sets x Capacity	22 x 450 mt (496st)		

OPERATING FEATURES	BF#1	BF#2	BF#3
Average Daily Production	9,680 mt/day (10,670 st/day)	3,360 mt/day (3,700 st/day)	7,840 mt/day (8,640 st/day)
Coke Rate	330 kg/mt	315 kg/mt	330 kg/mt
Blast Flow	6,800 Nm ³ /min	3,000 Nm ³ /min (max)	5,600 Nm ³ /min
Blast Pressure	4,4 kg/cm ²	3,5 kg/cm ²	4,2 kg/cm ²
Blast Temperature	1,250°C	1,250°C	
Top Pressure	2,5 kg/cm ²	1,7 kg/cm ²	2,5 kg/cm ²
Oxygen injection	40 Nm ³ /mt	60 Nm ³ /mt	70 Nm ³ /mt
Blast Furnace Gas	1,380 Nm ³ /mt	1,350 Nm ³ /mt	1,350 Nm ³ /mt
Charges Per Day	222	180 (max)	214 (max)
Burden Mix	50% sinter, 40% pellets, 10% ore		
Slag Production	250 kg/mt	250 kg/mt	250 kg/mt
Slag Basicity	CaO/SiO ₂ = 1.25	1.25	1.25
PCI (Paul Wurth - Dense Phase)	150 kg/mt	180Kg/mt (start-up: April/96)	240 kg/t max
TRT (Kawasaki Heavy / Meiden)	17MW (start-up: Dec/96)		
Productivity	18,350 t/m ³ internal volume	8,150 t/m ³ internal volume	

OPERATIONAL DATA	BOF#1 and BOF#2	BOF#3
SUPPLIER	ITALPIANTI (ITALY)	SMS DEMAG
START-UP	November/83	2007
ANNUAL CAPACITY	5,000,000 mt (5,500,000 st)	2,500,000 mt (2,755,000 st)
FURNACE FEATURES	Type LD Converters Vessels 2 (two) Internal Volume 490m ³ Useful Volume 320m ³ Heat Size 315 mt (347.25 st) max Combined Blowing Basic Type Combined Blowing LD-Combined Blowing system with Ar/N ₂ Sublance KSC Gas cleaning system OG System Slag Retaining in the converter Tap hole (Mann.Demag) Full Automation Blowing Sonic Meter Slag Wash White Martins (Praxair)	LD Converter 1 (one) 539m ³ 398m ³ 315 mt (347.25 st) max Basic Type Daniel Cerus OG System Tap hole (Mann.Demag) Sonic Meter White Martins (Praxair)
OPERATIONAL DATA	Killed Steel 39 m ³ Oxygen Flow Rate 64,000 Nm ³ /h Equipment Skimmer 1 (one) Hot Metal Ladle 3 x 330 mt Steel Ladle 14 x 320 mt	Killed Steel 40 m ³ 75,000 Nm ³ /h 825,000 st/year 750,000 mt/year (825,000 st/year) 3 (three) 06 x 330 mt 4 x 320 mt

Secondary Steel Refining

FUNCTIONS	RH-KTB VACUUM	RH - VACUUM
	DEGASSER #1	DEGASSER #2
SUPPLIER	MANNESMANNDEMAG/KSC	VOEST ALPINE
START-UP	May/98	2007
ANNUAL CAPACITY	2,800,000 mt (3,080,000 st)	3,000,000 mt (3,300,000 st)
FUNCTIONS	-ULC Steel -De H -Cleanliness -Temperature adjustment -Inclusion shape control by Ca (wire injection) Additional station	-ULC Steel (Decarburization) -De H (Hydrogen removal) -Chemical adjustment -Temperature adjustment
TYPE	IR-UT (Injection Refining-up Temperature)	
SUPPLIER	VEC / SUMITOMO (JAPAN)	
START-UP	May / 95	
ANNUAL CAPACITY	2,400,000 mt (2,640,000 st)	
FUNCTIONS	Heating of low temperature tapped heats Narrow range chemical composition adjustment Molten steel homogenization Molten steel cleaning Steel desulfurization Inclusion shape control by Ca (wire injection) Cooling down overheated heats by scrap addition Alloy addition	

Continuous Casting Machines

SUPPLIER	CCM#1	CCM#2	CCM#3
FACILITY	Manesmann-Demag	Daniell Davy Distington	Marubeni-Steel Plantech-Dedini-Siemens
START-UP	Apr., 1995	Feb., 1998	Jul., 2007
REVMAP	Ago., 2012	Oct., 2019*	-
NUMBER OF STRANDS	2 (two)	2(two)	2 (two)
TYPE	Curve	Vertical - Curve	Vertical - Curve
UNBENDING	Progressive	Progressive	Progressive

Hot Metal Pre-Treatment

TORPED CAR DESULFURIZATION	KR-PROCESS DESULFURIZATION	
SUPPLIER	THYSSEN / KSC	PAUL WURTH / SMI
START-UP	Dec/88	Oct/2006
ANNUAL CAPACITY	4,800,000 mt (5,280,000 st)	8,100,000 mt (8,930,000 st)
PROCESS	ATH (Torped car)	KR (hot metal desulfurization in the ladle)
SETS	2 (two)	2 (two)
DESULFURIZATION AGENT	CaC ₂ /CaO	Line + Fluorspar

HOT METAL CHEMICAL ANALYSIS BY USING TORPED CAR DESULFURIZATION	Before De-S	After De-S
%C	4.5	4.5
%Mn	4.6	4.6
%P	0.43	0.43
%S	0.080	0.080
%Si	0.040	0.006
%Al	0.30	0.003
%Cu	1.430	0.30
Cycle Time	40min	1,430

HOT METAL CHEMICAL ANALYSIS BY USING KR-PROCESS DESULFURIZATION	Before De-S	After De-S
%C	4.5	4.5
%Mn	0.43	0.43
%P	0.075	0.075
%S	0.41	0.003
%Si	0.30	0.30
%Cu	1.370	1.320
Cycle Time	42min	1,370

Steelmaking Shop

SUPPLIER	BOF#1 and BOF#2	BOF#3
START-UP	ITALPIANTI (ITALY)	SMS DEMAG
ANNUAL CAPACITY	5,000,000 mt (5,500,000 st)	2,500,000 mt (2,755,000 st)

OPERATIONAL DATA	BOF#1 and BOF#2	BOF#3
STEEL TYPES	Killed Steel	Killed Steel
TOP TO TAP	39 m	40 m
OXYGEN FLOW RATE	64,000 Nm ³ /h	75,000 Nm ³ /h

Finishing Lines

SUPPLIER	SMDS DEMAG	ALSTOM
START-UP	Oct/2003	July/2003
NOMINAL CAPACITY	910 kt/year (1,003 st/year)	575.00 mt/year
MANUFACTURING DIMENSION LIMITS	Exit thickness 1,60 a 4,80mm (0.629 a 0,18 in) Strip Width 750 to 1875 mm (29.52 to 73.81) in Inside diameter 610 mm (24.01 in) Outside diameter 1200 a 2100 mm (47.24 to 82.67 in) Coil weight 23 mt (25.3 st)	Exit thickness Max. 40 mt (44.1 st) / average: 23 mt (25.3 st) Strip Width 1 laser welding machine (Miebach) with 12kW and Pre and Post heater 2x 40kW. Inside diameter 1 Stretch bending Unit. Outside diameter 2 Roll bending unit Coil weight 1 Flattening unit
EXIT THICKNESS	1,60 a 4,80mm (0.629 a 0,18 in)	1,60 a 4,80mm (0.629 a 0,18 in)
STRIP WIDTH	750 to 1875 mm (29.52 to 73.81) in	750 to 1875 mm (29.52 to 73.81) in
INSIDE DIAMETER	610 mm (24.01 in)	610 mm (24.01 in)
OUTSIDE DIAMETER	1200 a 2100 mm (47.24 to 82.67 in)	1200 a 2100 mm (47.24 to 82.67 in)
COIL WEIGHT	23 mt (25.3 st)	23 mt (25.3 st)

PRODUCT RANGE SIZES	MOULD	MANNESMANN DEMAG Ltds
Thickness*	MDL - Mannesmann Demag Ltds	SMS - Schloemann -Siemag Aktiengesellschaft KM - Kvaerner Metals
Width	700 to 880 mm (27.50 to 74.00 in)	4,000,000 mt (4,409,000 st) Carbon Steel
Coil Maximum Weight	40 mt (88,185 lb)	5,000 to 12,500 mm (196.85 to 492.12 in)

PRODUCTION TECHNOLOGIES	Automatic Gauge Control (AGC)	with hydraulic actuation
Automatic Profile and Shape Control with CVC (continuously variable crown) system and roll bending	Automatic Width Control (AWC)	Free Schedule Rolling - WRS (Work Roll Shift)
Automatic Jump Control (AJC)		
*Depending on ArcelorMittal Tubarão analysis at the time of the size assortment presentation		

Praia Mole Port

Located on the Brazilian Atlantic Coast, close to the steel mill, ArcelorMittal Tubarão has at its disposal one of the world's most efficient steel terminal. Praia Mole Port, which is partly owned by ArcelorMittal Tubarão, was especially designed and built for steel product exports.

Oceangoing Barge Terminal

FACILITIES	Coal Unloading Terminal	Steel Products Exporting Terminal
CAPACITY	Coal Terminal Two Vessels (170,000 / 250,000 DWT each) Two Vessels (70,000 DWT) or Three Vessels (37,000 DWT) Five Cranes (42 mt each - 46.2 st) Three Cranes (25 mt each - 27.5 st)	Loading Capacity 7.5 million mt/year (8.3 million st/year) Draft 13.5 m (44.3 ft)

Facilities

SUPPLIER	Equipment	Eber
START-UP	2003	
NOMINAL CAPACITY	536,12 mt/year	
MANUFACTURING DIMENSION LIMITS	Metallurgical length 45 m (147 ft) Width 750 to 1875 mm (29.53 to 73.82 in) Thickness 0.40 to 2.25 mm (0.016 to 0.088 in) Outside diameter 1100 to 2100 mm (43.31 to 82.68 in) Inside diameter 610 mm (24.01 in) Stack height max. 6000 mm (236.22 in) Stack weight max. 142 t	High convection 100% hydrogen 26 Workbases 13 Heating Bells 13 Cooling Bells 13 Cooling Bases Single Overhead Crane
COIL	Weight Max. - Entry: 34 mt (37.5 st) / Exit: 30 mt (33.1 st) 2 Pay off reals 1 Welding machine (supplier: Taylor Winfield) 1 Degree and rising section	
BASIC CONFIGURATION	1 Horizontal continuous annealing furnace (supplier: CMI/Thermine) 1 Zinc pot GI (capacity of 320 mt) (supplier: Inductotherm) 1 Zinc pot Al/Zn (capacity of 90 mt) (supplier: Inductotherm) 1 Aluminum pot Al/Si (capacity of 100 mt) (supplier: Inductotherm)	

SOFT REDUCTION

STEEL MOLD LEVEL CONTROL	No	Dynamic	Static
LADE SLAG DETECTION	Amepa	Amepa	Amepa
NOMINAL CAPACITY	1,800,000 t/year	2,600,000 t/year	3,000,000 t/year
METALLURGICAL LENGTH	30.5 m (99.2 ft)	35.2 m (114.4 ft)	33.0 m (108 ft)
CASTING RADIUS	10.5 m (34.4 ft)	9.01 m (29.4 ft)	10.0 m (32.8 ft)
TUNDISH CAPACITY	45 mt	60 mt	60 mt
STREAM CONTROL	Slide Gate	Slide Gate	Slide Gate
MOULD LENGTH	900 mm (35.4 in)	900 mm (35.4 in)	900 mm (35.4 in)
COOLING SYSTEM	Air Mist	Air Mist	Air Mist
SPRAY WIDTH CONTROL	No	Yes	Yes
ROLLS	Spitted	Spitted (two or three parts)	Three Split and Four Split
DUMMY BAR	Top Feed	Top Feed	Top Feed
SLAB THICKNESS	200, 225 and 250 mm (7.87, 8.85, 9.84 in)	200, 225 and 250 mm (7.87, 8.85, 9.84 in)	200, 225 and 250 mm (7.87, 8.85, 9.84 in)
SLAB WIDTH**	800 to 1,650mm (31.49 to 64.96 in)	1,050 to 2,300mm (41.33 to 90.55 in)	1,050 to 1,913 mm (41.53 to 75.31 in)
SLAB LENGTH	5,000 to 12,500mm (196.85 to 492.12 in)	5,000 to 12,500 mm (196.85 to 492.12 in)	5,000 to 12,500 mm (196.85 to 492.12 in)
SLAB MARKING	Brass Wire (Interstahl)	Brass Wire (Interstahl)	Brass Wire (Interstahl)

** CCM2 stopped in Aug., 2019 in reverb. Ramp up is scheduled for Oct./19
** Depending on ArcelorMittal Tubarão analysis at time of size assortment presentation.

Hot Strip Mill

SUPPLIER	MDL - Mannesmann Demag Ltds	SMS - Schloemann -Siemag Aktiengesellschaft KM - Kvaerner Metals
START-UP	Aug/2002	Aug/2002
ANNUAL NOMINAL CAPACITY	4,000,000 mt (4,409,000 st)	Carbon Steel

BASIC CONFIGURATION	Two Slab Reheating Furnaces	Single Reversing Roughing Mill Stand	Mandrel Less Coil Box	6 Stand Finishing Mill	Hair Pin Type Laminar Flow	Two Downcoolers
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COLD STRIP MILL	SUPPLIER	SMDS DEMAG	ALSTOM
START-UP	Oct/2003	July/2003	
NOMINAL CAPACITY	1,517 kt/year (1,730.629 st/year)	575.00 mt/year	
MANUFACTURING DIMENSION LIMITS	Exit thickness 0.37 to 2.25 mm (0.0145 to 0.088 in) Strip Width 750 to 1875 mm (29.52 to 73.81) in Inside diameter 610 mm (24.01 in) Outside diameter 1100 to 2100 mm (43.3 to 82.67 in) Max. 40 t (44.1 st) / Average: 22.5 t (24.8 st) 4 Stand Tandem Cold Mill (Continuous Quadron Mill) 4 strip tension measuring 2 strip speed measuring 3 strip thickness gauges 1 strip flatness measuring CVC system - Automatic control of alignment and - (continuously variable crown) system and roll bending Automatic gauge control (AGC), hydraulically actuated	Robotic system for dress cleaning on the zinc pot (supplier: Kuka) Surface inspection automatic system SIAS - (supplier: Siemens/Va) Welding inspection system TEMATE - (supplier: Innerspec) Welder machine with post heater system - (supplier: Taylor Winfield) Pre oxidizing system in the furnace	
EXIT THICKNESS	0.37 to 2.25 mm (0.0145 to 0.088 in)	0.37 to 2.25 mm (0.0145 to 0.088 in)	0.37 to 2.25 mm (0.0145 to 0.088 in)
STRIP WIDTH	750 to 1875 mm (29.52 to 73.81) in	750 to 1875 mm (29.52 to 73.81) in	750 to 1875 mm (29.52 to 73.81) in
INSIDE DIAMETER	610 mm (24.01 in)	610 mm (24.01 in)	610 mm (24.01 in)
OUTSIDE DIAMETER	1100 to 2100 mm (43.3 to 82.67 in)	1100 to 2100 mm (43.3 to 82.67 in)	1100 to 2100 mm (43.3 to 82.67 in)
COIL WEIGHT	22.5 mt (24.8 st)	22.5 mt (24.8 st)	22.5 mt (24.8 st)

AVAILABLE TECHNOLOGIES	Stroboscopic lighting auxiliary inspection system
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