

**STEFANO AVENATI BASSI
SALES & PROPOSAL MANAGER
FATA EPC**

**4TH IIAC IRAN INTERNATIONAL
ALUMINIUM CONFERENCE
OLYMPIC HOTEL
TEHRAN, IRAN
11-12 MAY 2016**

DANIELI FATA HUNTER ALUMINIUM CASTING, FOIL ROLLING, COIL COATING AND TENSION LEVELING TECHNOLOGY

**DANIELI
PASSION TO INNOVATE
AND PERFORM
IN THE METALS INDUSTRY**



1. **CONTINUOUS CASTING
TECHNOLOGY**
2. **FOIL ROLLING TECHNOLOGY**
3. **COIL COATING TECHNOLOGY**
4. **TENSION LEVELING
TECHNOLOGY**
5. **MELTING, HEATING AND HEAT
TREATMENT TECHNOLOGIES**

The world's first continuous strip caster for aluminium was built by Joseph I. Hunter, founder of Hunter Engineering in 1954.

Since then, Danieli Fata Hunter has been leading the industry by continuously improving the casting technology with 161 continuous casting lines supplied in 31 countries.



CASTER CLASSIC

Production rate up to 1.4 t/m/h

Roll Diameter [mm]	675	700
Max strip width [mm]	1320	1500
Roll Force [tons]	650	750

SUPERCASTER®

Production rate up to 1.6 t/m/h

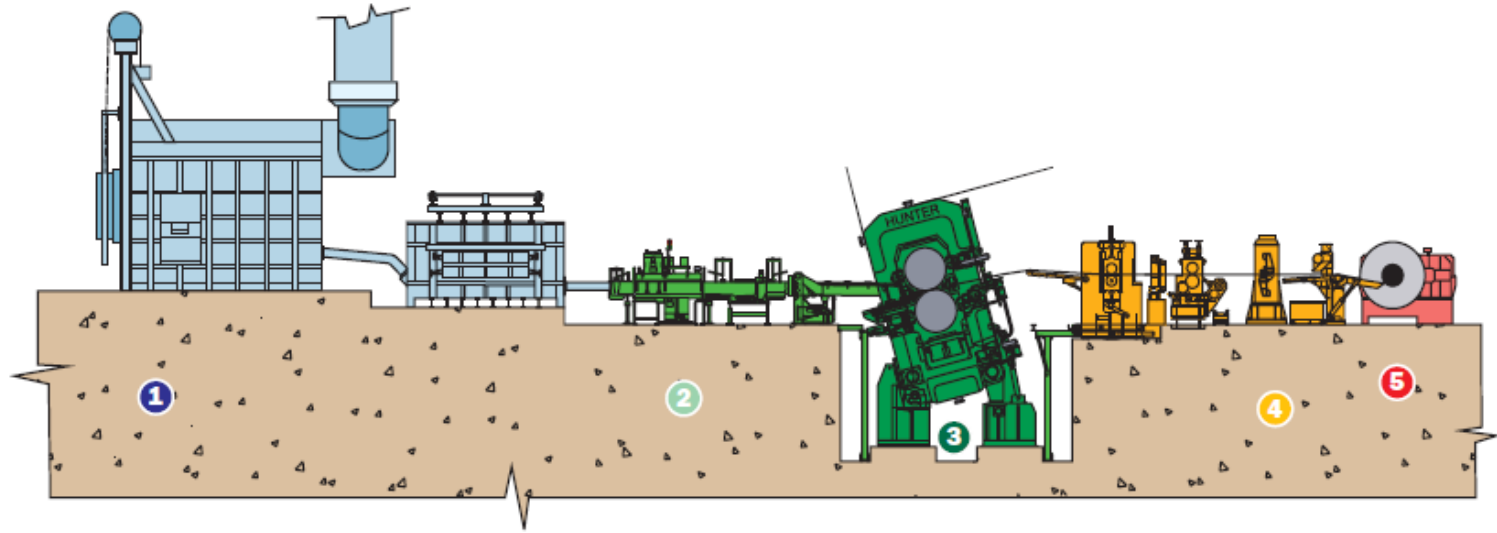
Roll Diameter [mm]	940	1003	1150
Max strip width [mm]	1500	1676	2000
Roll Force [tons]	1818	2045	2500

SUPERCASTERPLUS®

Production rate 1.7 to 3.2 t/m/h

Roll Diameter [mm]	1003	1150	1220
Max strip width [mm]	2400	2400	2400
Roll Force [tons]	2500	3000	3400





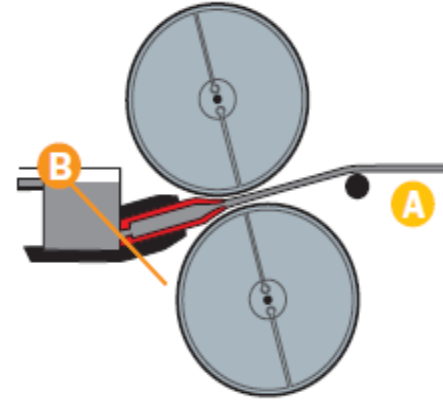
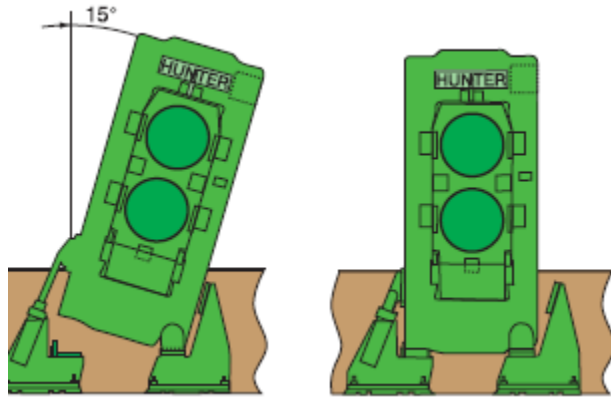
Melting and holding furnaces provide the metal to the casting machine.

Metal degassing and filtration assure high quality standards.

The casting machine is the heart of the line with water cooled rolls, the load cylinders and the molten metal feeding tip.

Pinch rolls, edge trimmer, shear and passline roll are used to properly control the metal and the casting operations.

The winder and the exit coil car allow to produce tightly wound coils suitable to the rolling process.

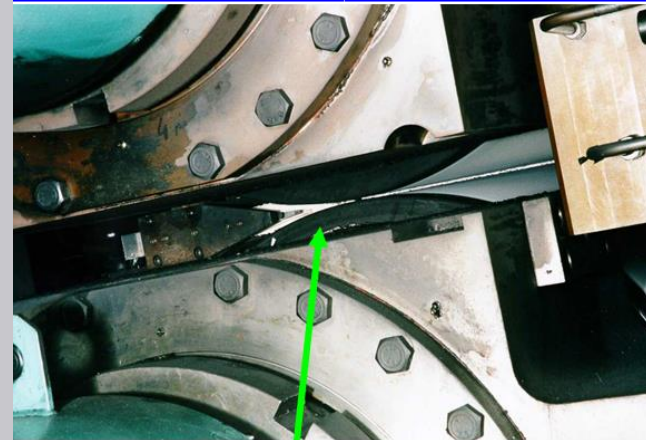
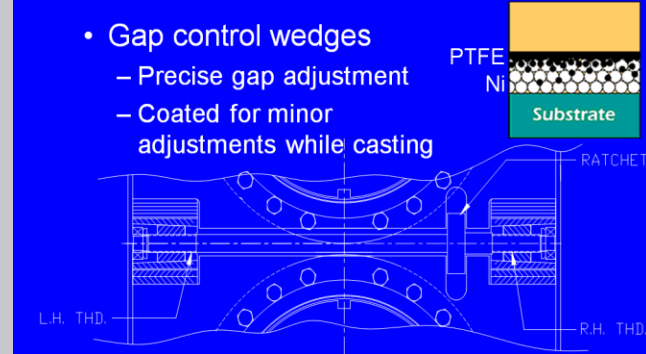


The 15° configuration that was first used on the Standard Tilt in 1970 is still used today on all FATA Hunter casters to provide quality and operating advantages unmatched by other machines:
15° Tilt back design allows easier set-up and higher sheet quality

Ripple free casting due to precise metal pressure control and smooth flow
With the tilt-up caster configuration, head pressure, alloy and speed can be precisely coordinated
Carefully controlled headbox level keeps the pressure low at the tip orifice

- > Gauge is controlled by mechanical wedges or Hydraulic Gap Technology developed from rolling mills.
- > Comprehensive control package
- > The strip profile is maintained by means of the combination of mechanical ground crown and in-line controlled thermal bending of the rolls.

- Gap control wedges
 - Precise gap adjustment
 - Coated for minor adjustments while casting



Hydraulic Gap Control:
Chocks not confined by wedges

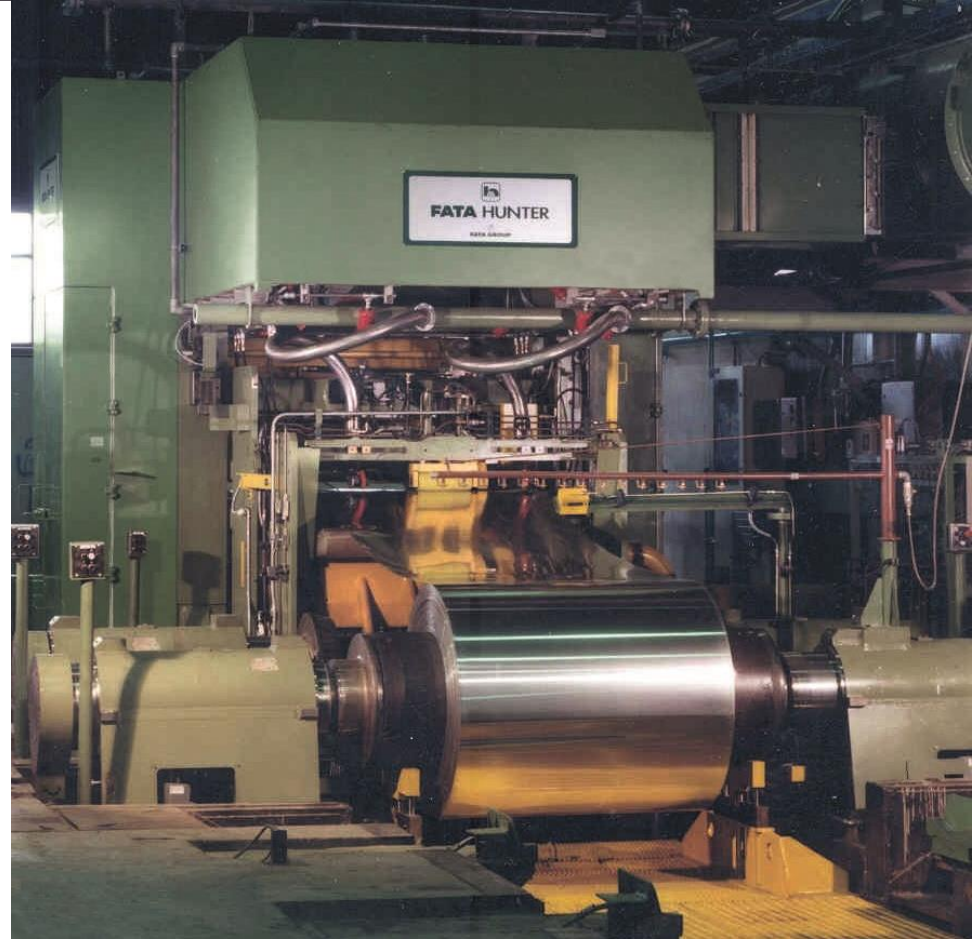
Danieli Fata Hunter's milestones in the aluminium foil rolling industry:

- > **IN 1961:** supply of the 1st Foil Rolling Mill to Alcan Canada Products, Ltd
- > **IN 1966:** supply of a 2000 mm wide strip Foil Rolling Mill to RJR Archer, Inc. (today Norandal)
- > **IN THE late 70's:** development of the new concept Hydraulic Gap Control Rolling Mills
- > **in 1995:** development of a proprietary fully integrated automation package for the aluminium rolling industry (the hSystem®)



Today, Danieli Fata Hunter Foil Rolling Mills roll strip and thin gauge aluminium foil for the most prestigious aluminium companies in the world.

Danieli fata hunter has supplied
101 foil rolling mills In 25 countries.



The Danieli Fata Hunter design includes different type of foil mills, for different gauges. The selection of the foil mill type is depending on the final product gauges and the total foil mills output.

UNIVERSAL FOIL ROLLING MILL

Reference gauge 0.6 mm to 2 x 6 μm (double pass)

ROUGHING FOIL ROLLING MILL

Reference gauge 0.6 mm to 10-12 μm (single pass)

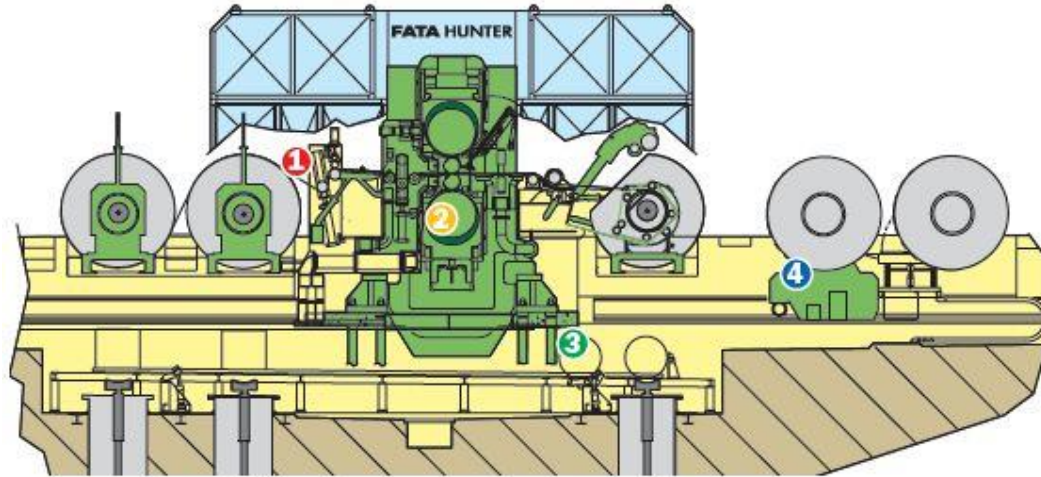
INTERMEDIATE FOIL ROLLING MILL

Reference gauge 0.35 mm to 2 x 6 μm (double pass)

FINISHING FOIL ROLLING MILL

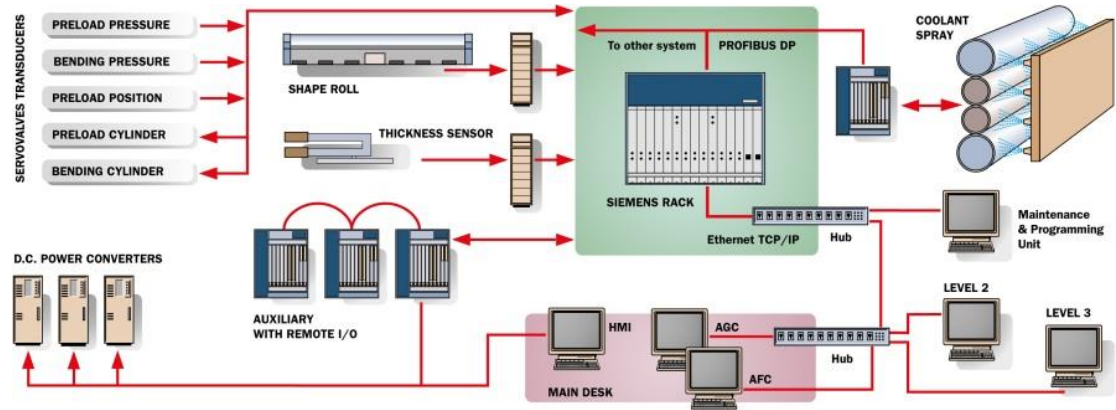
Reference gauge 0.1 mm to 2 x 6 μm (double pass)





- > Mill design unidirectional, 4-Hi Rolling Mill, non-elevated pass-line
- > “Hydraulic Gap Control” Mill - AGC
- > Speed/tension control
- > Rolled material: AA 1XXX, 8XXX, 3003, for fin stock, flexible packaging and industrial applications

Automation (AGC, AFC and Level 2 functions) is performed by the proprietary hSystem®.



The Continuous Coil Coating Process was developed by Joseph Hunter in the late 1930's. Originally applied to Aluminium strips (venetian blinds) the process was later extended to steel strips.

The original design solutions were improved in several areas, in some cases leading to the awarding of patents:

- > 1981: Paint Line Flotation Oven**
- > 1987: Indirect Fired Oven System**
- > 1998: Roll Coating System (Single Slide Coater)**



Over the years, Danieli Fata Hunter has installed coil coating lines at some of the most renowned Aluminium and Steel producers in the world.

Overall, Danieli FATA Hunter has sold
137 Coil Coating Lines in 28 countries.



Main components of a Coating Line:

- > Terminal Equipment
- > Cleaning Equipment
- > Conversion Equipment (conventional or dry-in-place)
- > Coaters
- > Ovens
- > Air Coolers and Water Quenches

For all these items, Danieli FATA Hunter has in-house expertise and design solutions to match even the most demanding requirements.



Danieli Fata Hunter can supply coil coating lines for all the applications:

- › Construction Material (siding, roofing)
- › Architectural for interiors Office Furniture
- › Transportation
- › Domestic and Industrial Appliances
- › Food Containers
- › Beverage Cans

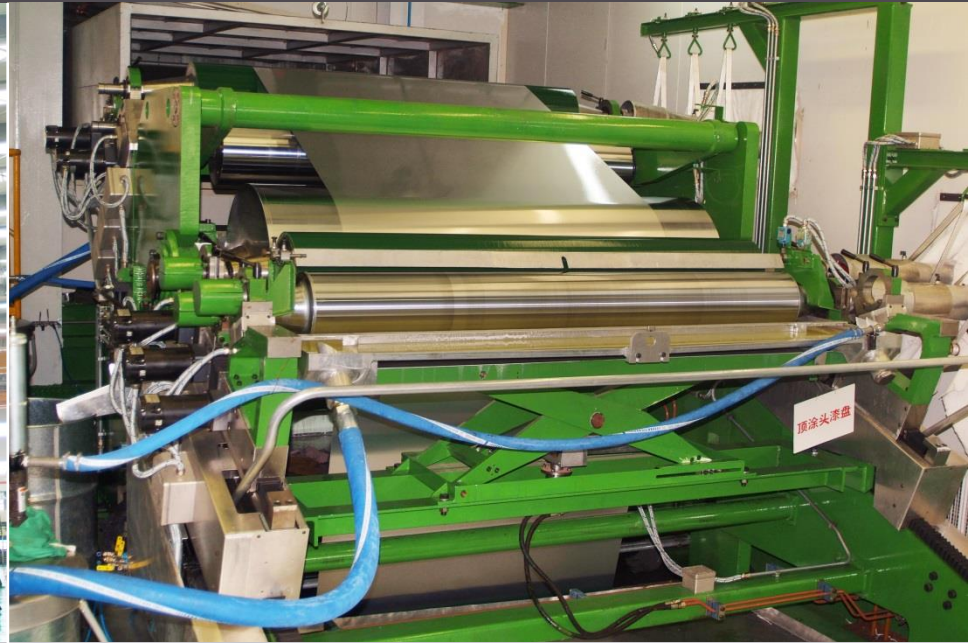
Actual specifications may vary depending on specific applications:

- › Strip thickness: between 0.15 mm and 2.50 mm
- › Strip width: up to 2,000 mm
- › Process speed:
 - › up to 180 - 200 m/min (general products)
 - › up to 300 m/min (Aluminium Can Stock)





**CAN STOCK CCL AT NANSHAN LIGHT ALLOYS
ENTRY SECTION**



**CAN STOCK CCL AT NANSHAN LIGHT ALLOYS
COATER**



**CAN STOCK CCL AT NOVELIS DO BRASIL
EXIT SECTION**



**CAN STOCK CCL AT NOVELIS DO BRASIL
OVEN AND AIR COOLER**



**CAN STOCK CCL AT NOVELIS DO BRASIL
COATER**



**CAN STOCK CCL AT NOVELIS DO BRASIL
OVERVIEW**

- > Strip Leveling was initially developed as a pure-stretch process by Joseph Hunter, with the first Stretch Leveler built in 1958.
- > DANIELI FATA HUNTER SUPPLIED **77 TENSION LEVELING LINES** FOR Steel and Aluminium applications (Can Stock, Appliances and Construction Grade material) **IN 26 COUNTRIES.**



- > **Material of perfect flatness at lowest possible price**
- > **Defects to eliminate: Wavy edges, long center, center/side buckles, cross-bow, coil set, twist and camber**
- > **Constant properties of incoming material for downstream process - homogeneous internal stress distribution**
- > **No slow-down or downtime due to bad flatness**



Main components of a TENSION Leveling Line:

- > Entry / Exit Equipment
- > Cleaning Equipment (optional)
- > Tension Bridles
- > Tension Leveler (Amplifier)

For all these items, Danieli FATA Hunter has in-house expertise and design solutions to match even the most demanding requirements.

Actual specifications may vary depending on specific applications:

- > Strip thickness: 0.15 - 3.50 mm
- > Strip width: up to 2,200 mm
- > Process speed: up to 450 m/min





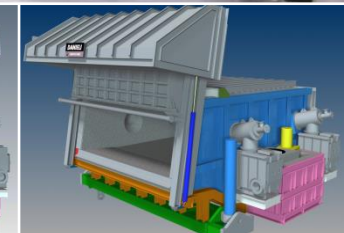
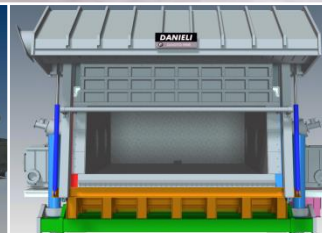
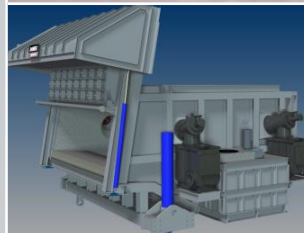
**CLEANING EQUIPMENT
AT NANSHAN LIGHT ALLOYS**



**ENTRY SECTION AND CLEANING EQUIPMENT
AT NANSHAN LIGHT ALLOYS**

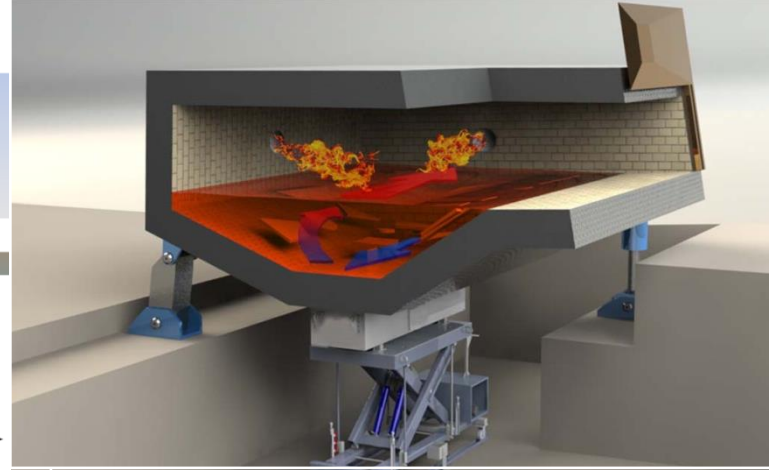
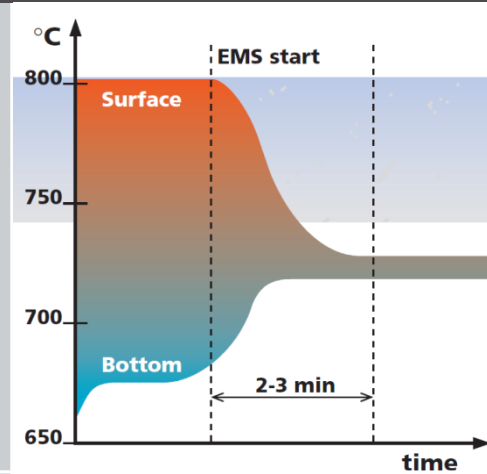
MAIN FEATURES

- > Dry-hearth melting for process flexibility with scrap charging.
- > A Tilting system for precise metal pouring to suite specific casting requirements.
- > Weighting cells and a laser system to monitor the quantity and level of molten aluminium poured into the launder system at the final casting line.
- > Proper refractory insulation with high alumina content for minimizing thermal dispersions and maintenance requirements.
- > Melting phase with the option of a regenerative burner system to maximize combustion efficiency up to 85%.
- > Uniform temperature pattern to achieve higher melt rates and thus avoid hot spots and thermal NOx.
- > Fully automated process control to ensure repeatability of process parameters.



ELECTRO-MAGNETIC STIRRER

- > Excellent chemical and temperature homogeneity.
- > Minimized dross formation.
- > Improving of heat transfer: difference between top and bottom decreases to less than 5°C in about 2-3 minutes after the start of the stirrer.



EMP SYSTEM (ELECTRO-MAGNETIC-PUMP)

- > Vertical flow patterns: all charged material is instantly submerged in molten metal minimizing the possibility for losses through oxidation.
- > Light gauge scrap (chips) and alloy additions can be charged with the furnace door closed, improving cycle time efficiency.



FURNACES PORTFOLIO

- > Pusher or pit type reheating and homogenizing furnaces for slabs
- > Rapid billet heating furnace
- > Homogenizing furnaces with a dedicated cooling chamber for billets
- > Heat treatment furnaces for coils and foils
- > Solubilization and ageing furnaces for automotive/aerospace components
- > Furnaces can be completely integrated with an automatic handling system
- > Heat-treating furnaces comply with AMS 2750E standards



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