

# STEEL INNOVA TION





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# WHO WE ARE

LABEA is a highly qualified team of engineers specialized in the steel world. LABEA combines the experience of the founder, Mikel Mendiola, with over 25 years of experience in technical management positions in the steel world, with the enthusiasm and expertise of a young but very experienced team.

An exceptional human team using the latest technology in the market in an exclusive workshop for control and development of own products.

# WHAT WE DO

We find solutions to technical problems in the steel world, based on four basic premises:



THE SAFETY OF THE PEOPLE WHO PRODUCE STEEL.



EFFICIENCY OF ITS PROCESSES.



SAVINGS, ESPECIALLY ENERGETIC ONES.



ENVIRONMENTAL CARE.



# HOW WE DO

Through the creation of completely new equipment or modernization of existing equipment (REVAMPINGS)  
Simple equipment, easy to use.  
Reliable equipment that do not require maintenance  
In short, equipment designed to suit customer needs.

# FIELDS OF ACTION

1

SCRAP YARD

2

ELECTRIC ARC FURNACE

3

LADLE FURNACE

4

CONTINUOUS CASTING





# SCRAP YARD



## SCRAP CLEANING MACHINE

The increasing amount of non-ferrous materials in scrap (land, stones, plastic, non-ferrous metals, etc.) shows how necessary it is to clean this scrap before it is introduced into the furnace.

With the scrap cleaning machine LABESCRAP, we mainly try to reduce our clients' energy consumption and to improve the quality of their steel.

The scrap cleaning machine LABESCRAP is a reliable machine with a robust and safe design for these heavy duty tasks, occupying the minimum space.

### Characteristics:

- Productivity: 60-100 ton/hour depending on the scrap density, surrounding scrap handling means, etc.
- Extent of separation: 6-12% based on users' experience with the machine.
- Suitable for HMS and Shredder scrap.

### Advantages:

- Energy consumption: reduction of 30-35 kwh/ton of steel.
- Power on time: reduction of 2-3 minutes/heat.
- Better steel quality thanks to a reduced presence of metals (Cu, Sn, Zn).
- Lime consumption: reduction of 8-10 kg/ton of steel.
- Amortisation time: less than a year.





# LADLE PREHEATERS

The ladle heaters have two objectives: to dry the refractory element of the new ladles, and to heat the ladles every time they are about to receive the steel from the furnace. Proper drying requires a certain temperature and a correct pre-heating cycle which allows the penetration of heat into the rear side of the refractory element. During the heating process before every heat, the heat application cycle is less strict than in the drying, the temperature reached by the ladle refractory element being the most important aspect. The higher this is, the less temperature the steel will lose.

## OXYGEN-GAS HEATERS

## LAST MINUTE BURNER

## OXYGEN-GAS HEATERS

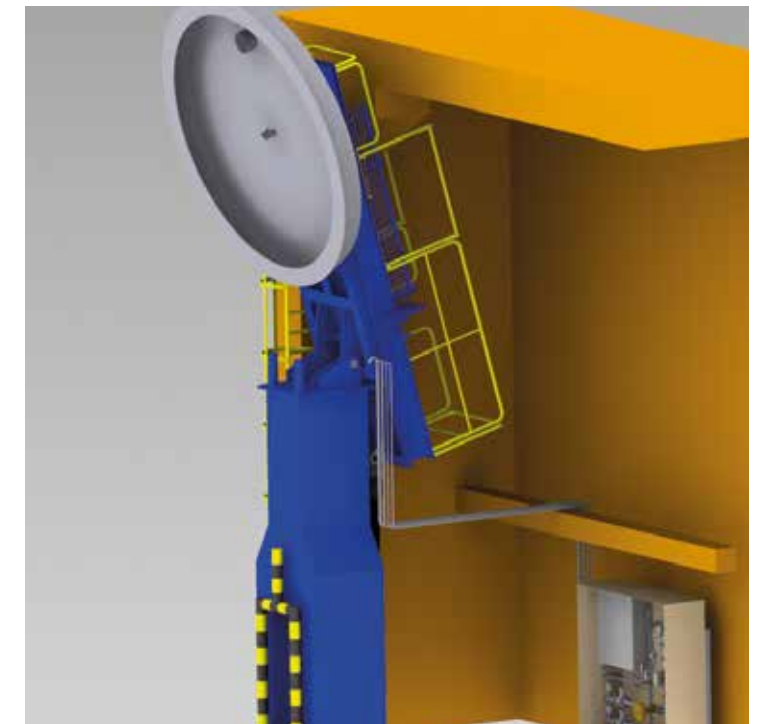
Due to the increase in fuel prices and the cost derived from fuel emissions, LABEA has developed the LABEHEATER heaters using oxygen combustion, allowing a saving of 40% in fuel consumption, therefore reducing emissions by 40%. For this reason, in addition to the complete heaters, LABEA has adapted the combustion of multiple heaters so they can work with oxygen-gas.

### Characteristics:

- Horizontal heaters usually used to heat ladles.
- Vertical heaters to heat or dry and with different movements depending on the client's needs (vertical, rotating, etc.).
- Up to 2MW power.
- Free union of the arm and cover for better coupling of the cover on the ladle.
- Ease of use by means of a screen that controls the machine.
- Power adjustment by stages for proper drying.

### Advantages:

- 40% fuel saving.
- 40% CO<sub>2</sub> reduced emissions.
- Reduced dioxin generation (NO<sub>x</sub>).
- No fans required.
- The ladle can reach higher temperatures thanks to a higher temperature of the oxygen flame.
- Ease of use, reliability, no maintenance needed.





# LAST MINUTE BURNER

One of the main characteristics of the oxygen-gas combustion used by Labea in their equipment, besides the fuel savings and reduced emissions, is the possibility of reaching higher temperatures in the ladle refractory element thanks to the higher temperature of the oxygen flame.

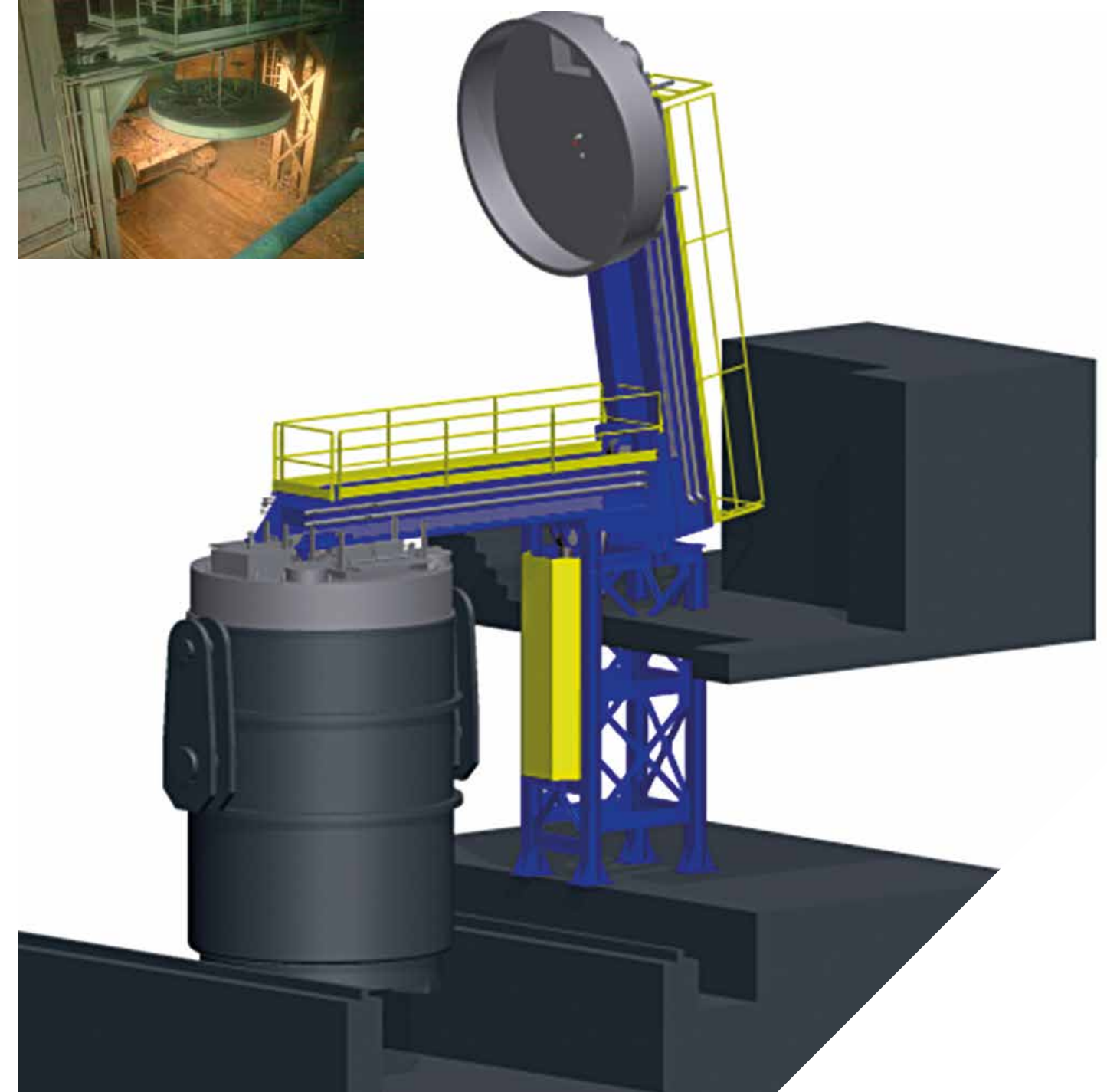
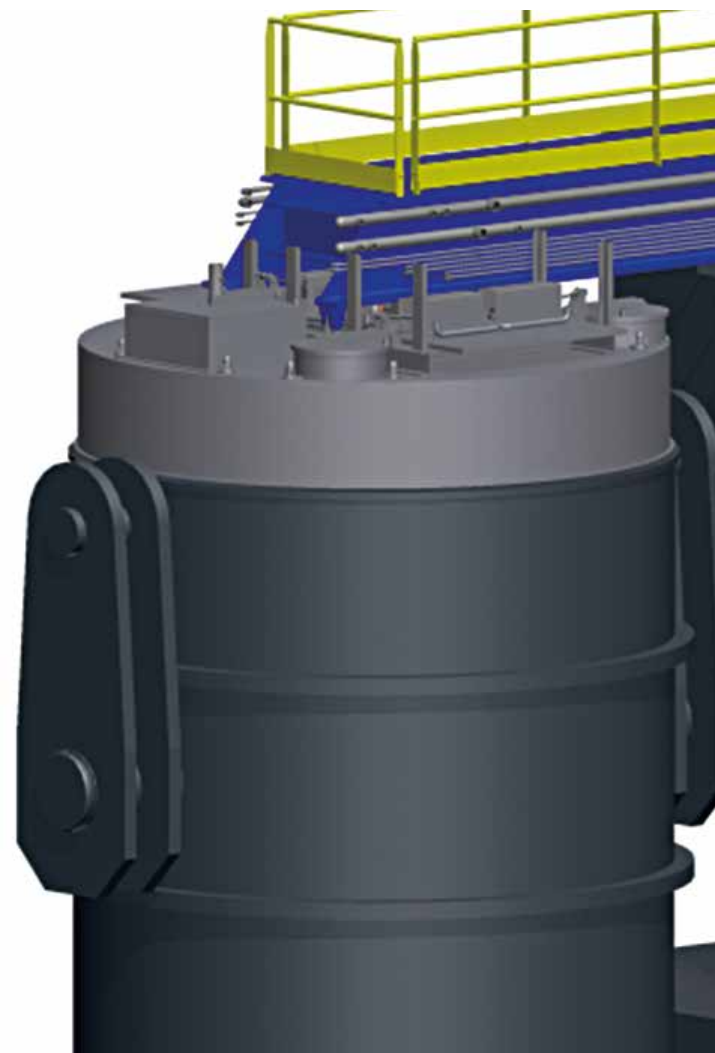
This is why Labea has developed the LABEHEATER\_ last minute heater, which is placed near the furnace to heat the ladle at high temperature seconds before receiving the liquid steel from the furnace. This way, the tapping temperature is reduced, thus saving energy.

## Characteristics:

- Vertical heaters very close to the furnace to heat at high temperatures and with different movements depending on the client's needs (vertical, rotating, etc.).
- Up to 3 MW power.
- High refractory temperatures thanks to the oxygen-gas combustion.
- Free union of the arm and cover for better coupling of the cover on the ladle.
- Ease of use by means of a screen that controls the whole machine.
- Easy maintenance.

## Advantages:

- Reduced tapping temperature of the steel in the furnace.
- Energy saving in the furnace.
- 40% fuel saving.
- 40% CO<sub>2</sub> reduced emissions.
- Reduced dioxin generation (NOx).
- No fans required.
- The ladle can reach higher temperatures thanks to a higher temperature of the oxygen flame.
- Ease of use, reliability, no maintenance needed.







# ADITIVES

CARBON INJECTION

LIME INJECTION

AUTOMATIC ADITIVES DOSING SYSTEM

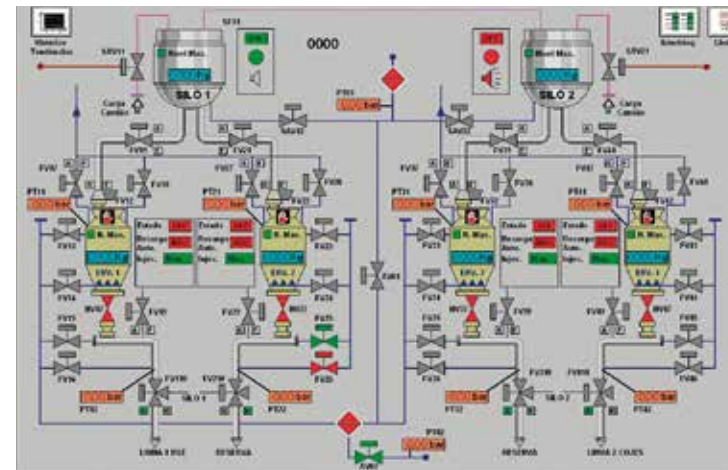
EBT FILLING



# CARBON INJECTION

The LABECARBON Coal Pneumatic Transport Equipment aims to satisfy the metallurgical needs of the steel manufacturing process by means of a controlled coal/graphite flow and adjusted air consumption with the objective of generating optimum foaming slag.

The system is formed by a silo whose dimensions are adjustable according to the client's needs (from 40 m<sup>3</sup> to 100 m<sup>3</sup>) and a pressurized dispenser of 1000 l, 1500 l, 2000 l, 2500 l or 5000 l. The coal is injected through the furnace walls via refrigerated copper panels.



## Characteristics:

- Automatically adjustable graphite flow, up to 10-90 kg/min.
- Silo automatic air cleaning filter. Pressure/under-pressure safety valve.
- Silo and dispenser fluidised cone.
- Continuous control of the dispenser's pressure.
- Used air flow control.
- Anticlog system in the transport line.
- Weighing system.
- Anti-abrassive curves in layout.

## Advantages:

- Good generation of foaming slag.
- Injected graphite flow control.
- Optimal consumption of compressed air.
- Removal of clogs in the transport line by means of an anticlog system.
- Good ergonomics, a totally automatic piece of equipment adapted to the production process.
- Ease of use, reliability, no maintenance needed.

# LIME INJECTION

The LABELIME Lime Pneumatic Transport Equipment aims to satisfy the metallurgical needs of the steel manufacturing process with the objective of desulphurising and achieving a more basic slag which is less damaging for the refractory.

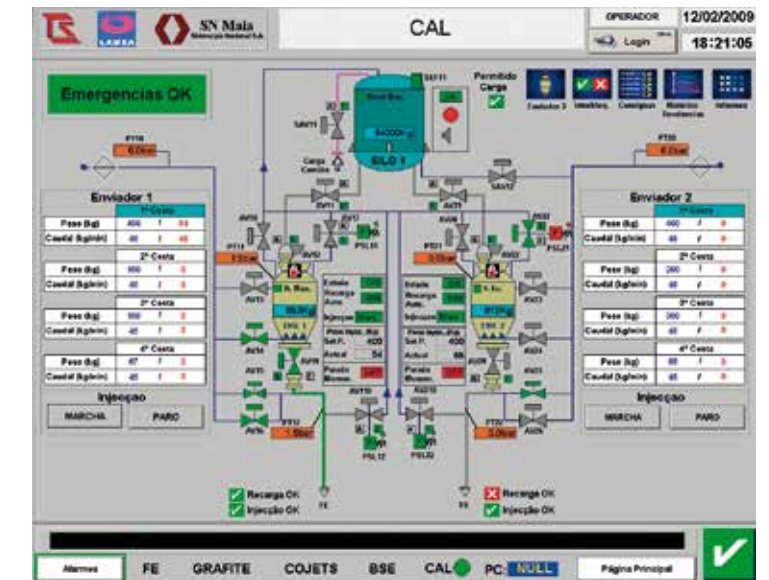
The system is formed by a silo whose dimensions are adjustable according to the client's needs (from 40 m<sup>3</sup> to 100 m<sup>3</sup>) and a sending element of 1000 l, 1500 l, 2000 l, 2500 l or 5000 l.

## Characteristics:

- The system's characteristics are the following ones.
- Automatically adjustable lime flow, up to 250 kg/min.
- Silo automatic air-cleaning filter. Pressure/under-pressure safety valve.
- Silo fluidised cone and sending element.
- Continuous control of the sending element pressure.
- Used air flow control.
- Anticlog system in the transport line.
- Weighing system.
- Anti-wear corners in layout.

## Advantages:

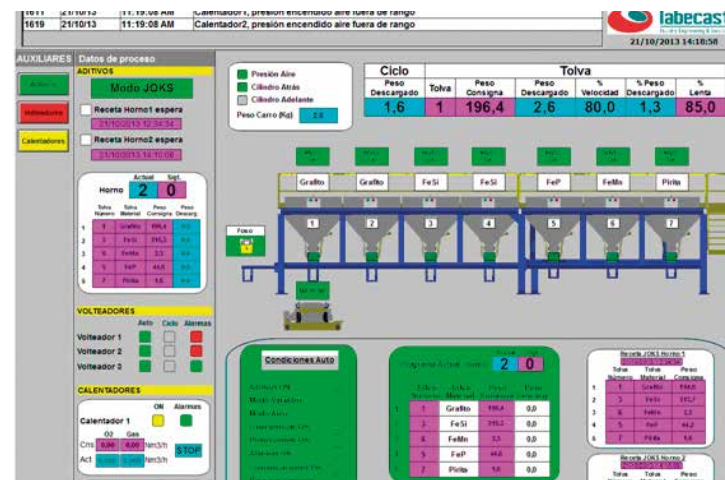
- Slag with the desired basicity level.
- Injected lime flow control.
- Optimal consumption of compressed air.
- Removal of clogs in the transport line by means of an anticlog system.
- Good ergonomics, a totally automatic piece of equipment adapted to the production process.
- Ease of use, reliability, no maintenance needed.





# AUTOMATIC ADITIVES DOSING SYSTEM

In steel plants, it is necessary to add a recipe of ferro-alloy in the furnace to achieve a correct chemical composition of the final steel. In order to do that, LABEA has developed an additive storage system, LABEADS, which automatically carries out the recipes of these ferro-alloys, quickly and precisely.

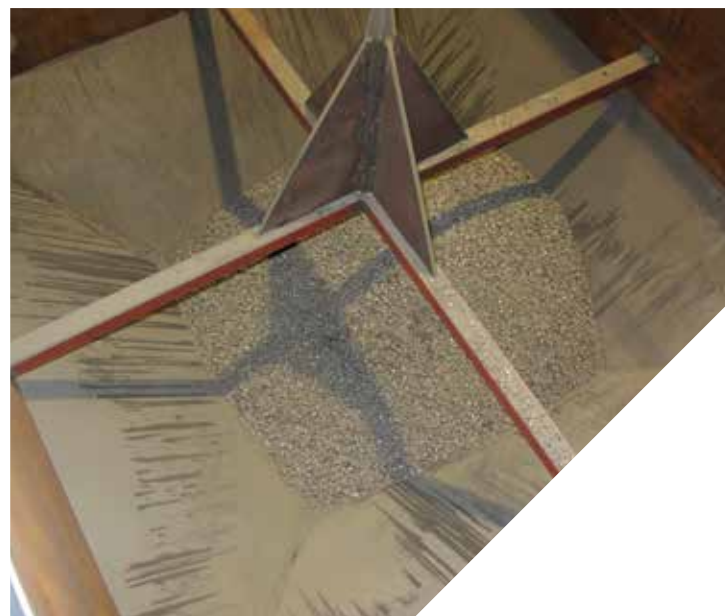


## Characteristics:

- Robust additive storage bins
- Light indicator and on screen warning of minimum level of additive in the bin
- Quick response
- Accuracy in the recipe weighting

## Advantages:

- Easy to use machine via a touch screen
- Access to all information, alarms and history through the touch screen
- Ease of use, reliability, no maintenance needed.



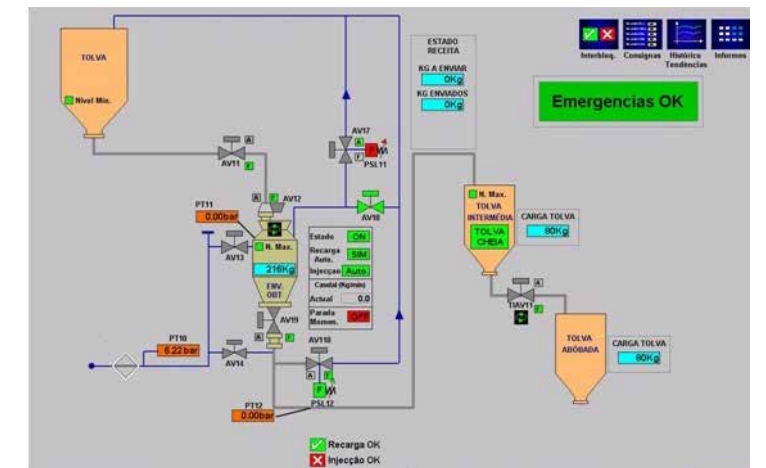
# EBT FILLING

The automatic EBT filling equipment by refractory sand avoids the presence of operators in a dangerous area and adjusts the refractory sand consumption to the state of the EBT hole.

The system comprises a pneumatic dispenser, an intermediate hopper and a final hopper attached to the furnace roof.

Refractory sand is transported pneumatically to an intermediate hopper located in the rear part of the EBT. When the roof is opened to load the scrap baskets, the material is unloaded from the intermediate hopper to the roof hopper.

Once the heat is finished, the material on the roof hopper is discharged into the EBT.





# OXYGEN INJECTION

OXYGEN INJECTION

NITROGEN INJECTION

HIGH SPEED PANELS AND INYECTORS

## OXYGEN INJECTION

LABEA was one of the first companies to start using coherent injection technology in 1999. With this technology we created our injectors-burners (LABEJET).

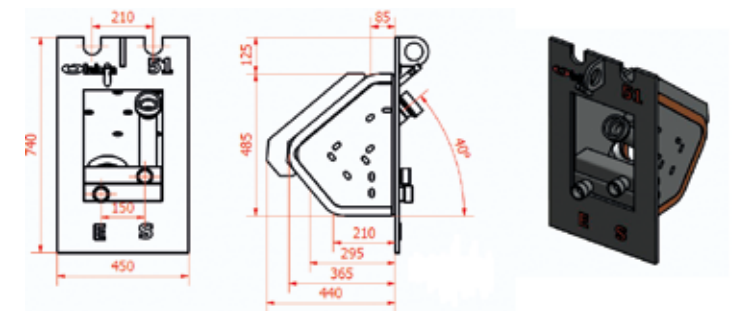
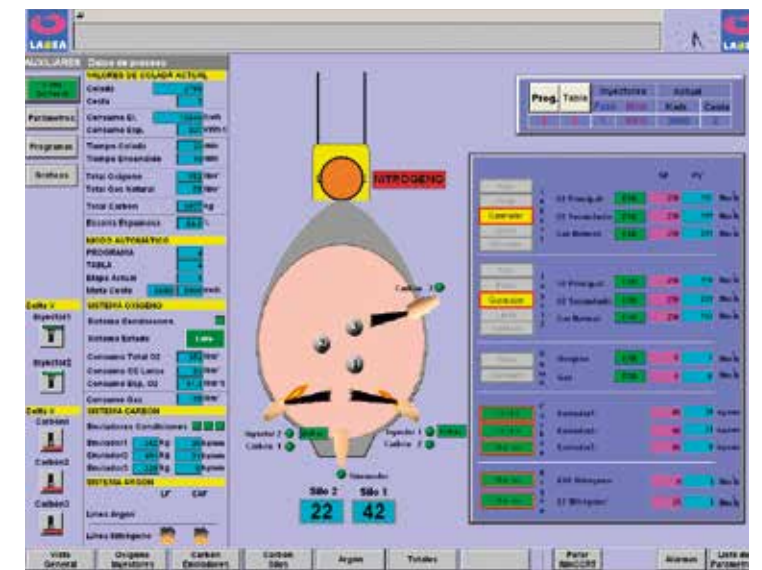
Since then, over 40 furnaces around the world trust our technology. Almost ten of them have produced more than one million tons annually, being among the most efficient furnaces in the world.

### Characteristics:

- SIMPLE, robust, reliable equipment designed to facilitate and minimise maintenance.
- Maximum coherent length, that is, high oxygen efficiency and strong dart penetration in the liquid steel bath.
- Minimum slag splashing to walls and arc.
- Easy and quick replacement of the injector (10 minutes).

### Advantages:

- Oxygen use efficiency.
- Little maintenance.
- Reliability and simplicity.





# NITROGEN INJECTION

It is a case of substituting natural gas with nitrogen while the LBEJET injectors are working in lance and pilot modes.

Currently, a gas flow is maintained in the pilot mode so the injector holes do not get blocked. In lance mode, the gas becomes a lining for the oxygen dart maintaining coherence and allowing the oxygen to enter the steel bath at great speed. The increase in natural gas prices has made the substitution of natural gas by another inert gas an interesting option in these two phases.



## Operation:

Operation is automatic. When the program reaches the pilot and lance modes, the natural gas cut-off valve will close and the nitrogen lines will open. The same alarms will be programmed for nitrogen (minimum pressure, maximum pressure, etc.) as those currently existing for the oxygen and natural gas lines.

## Advantages:

- Completely automatic
- Reduction of CO<sub>2</sub> emissions
- Reduced dioxin generation (NO<sub>x</sub>).
- Ease of use, reliability, no maintenance needed

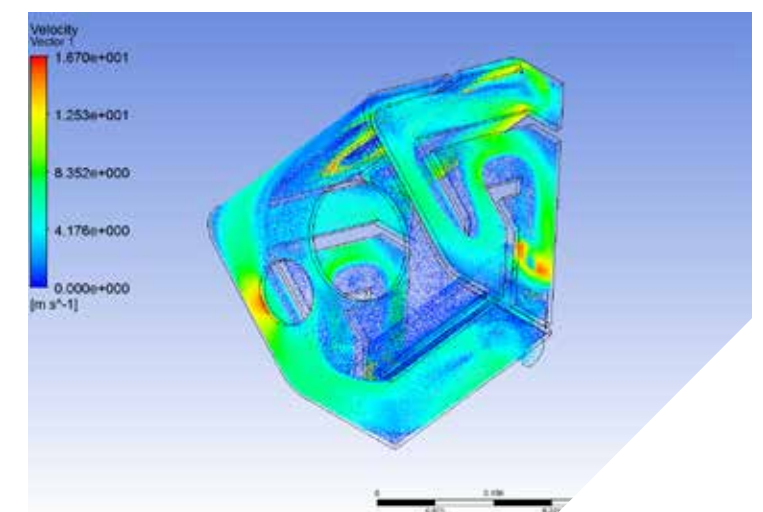
# HIGH SPEED PANELS AND INJECTORS

Labea's systems LABEOXY, LABECARBON-LABELIME require the placement of oxygen, carbon and lime injectors respectively in the interior part of the furnace walls. Therefore optimally cooled robust injectors are necessary, as well as robust refrigerated panels to protect injectors. LABEA has developed a wide range of panels and injectors that fulfill these requirements and are compatible to competitor's chemical energy addition systems.



## Advantages:

- Adapted to customer's needs.
- Valid for all LABEOXY-LABELIME-LABECARBON systems as well as for any other system
- We are continuously checking and improving the cooling circuit design by means of CFD ANSYS flow simulation and heat transfer program.

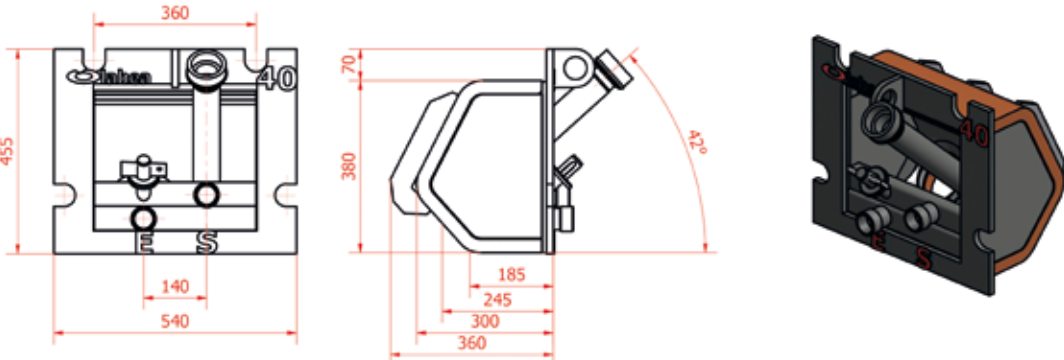




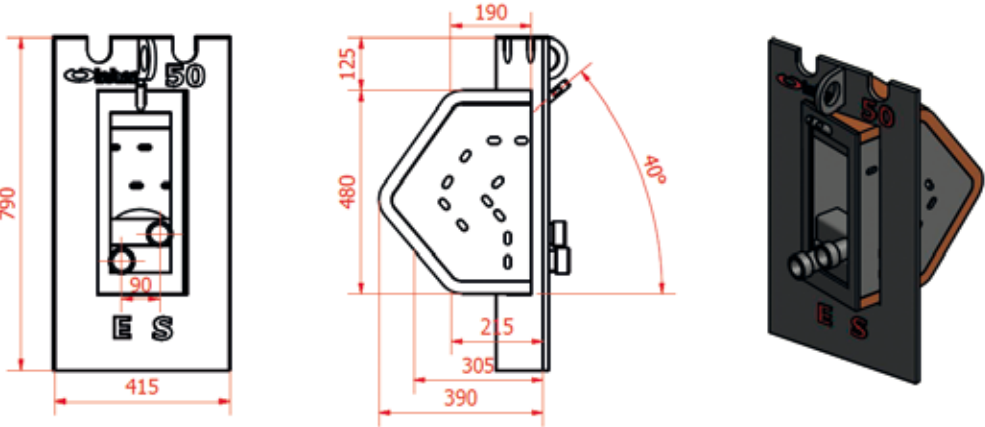
PANELS

NUM. PIPES EAF PANEL	PAV TYPE	MEASUREMENT	COMPATIBLE INJECTOR
4 TUBOS	40	40°, 380x420, Cu CH30	4T
5 TUBOS	50	40°, 480x200, Cu CH30	5T
	51	40°, 485x330, Cu CH30	
6 TUBOS	60	40°, 600x330, Cu CH30	6T
7 TUBOS	71	40°, 680x330, Cu CH30	7T
8 TUBOS	80	40°, 755x225, Cu CH30	8T

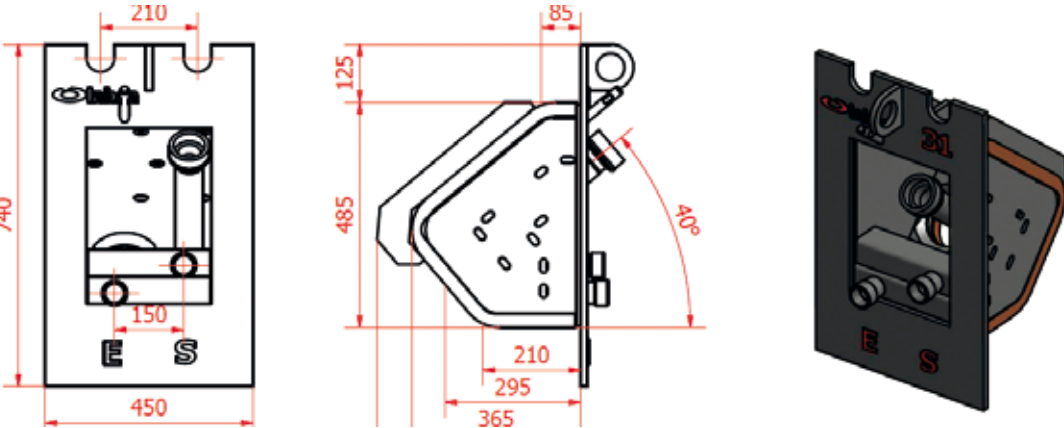
PAV 40



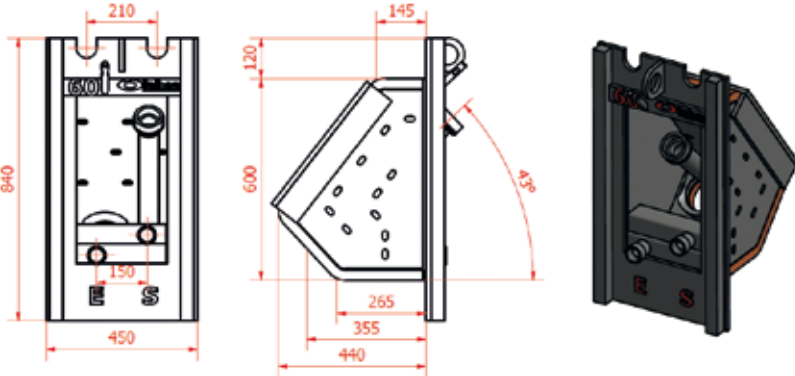
PAV 50



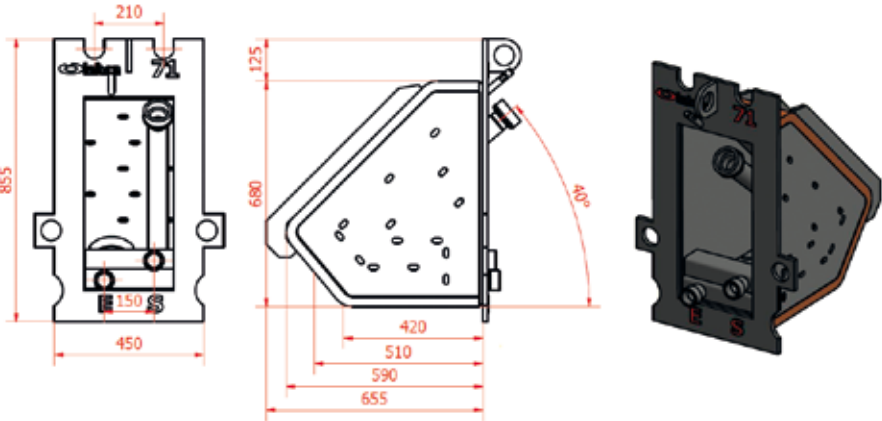
PAV 51



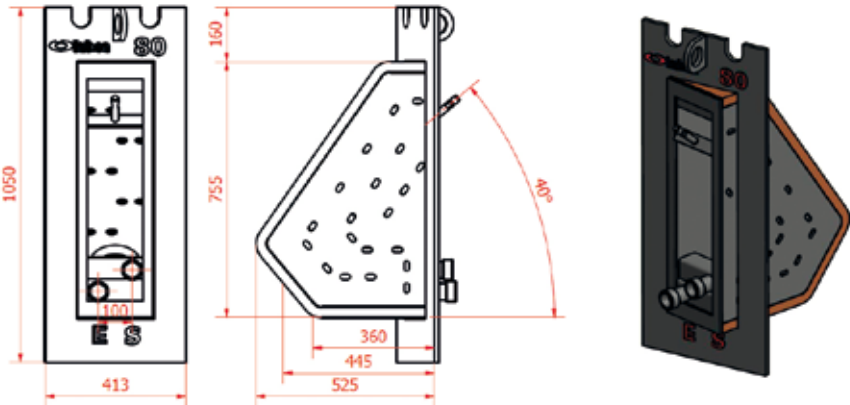
PAV 60



PAV 71



PAV 80







# MANIPULATORS

EAF AUTOMATIC TEMPERATURE MEASUREMENT  
AND SAMPLING EQUIPMENT

LF AUTOMATIC TEMPERATURE MEASUREMENT  
AND SAMPLING EQUIPMENT

WATER COOLED LANCES

CONSUMABLE LANCES

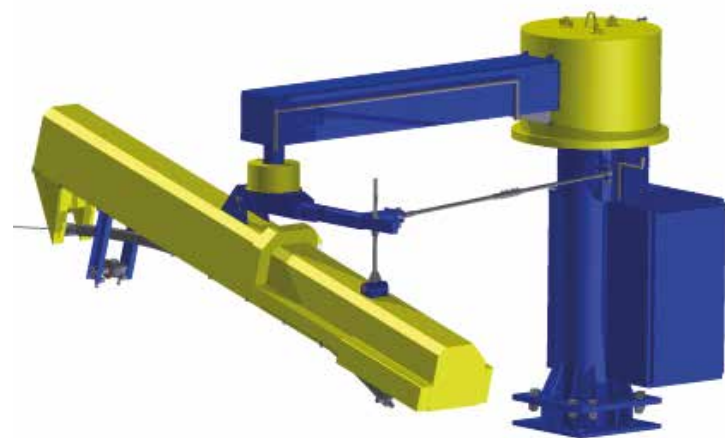
6 AXIS ROBOT

AUTOMATIC ARGON COUPLING



## EAF AUTOMATIC TEMPERATURE MEASUREMENT AND SAMPLING EQUIPMENT

The LABETEMP manipulator has been developed to take the temperature and sample of the liquid steel for its chemical analysis through the slag door. This is done through the deslagging door and with the furnace operating at all times. The equipment is anchored to the fixed platform on any side of the door, allowing space in front of the door when it is not in operation. Also, the process is completely automatic and safety is improved because there is no operator in front of the door.



### Characteristics:

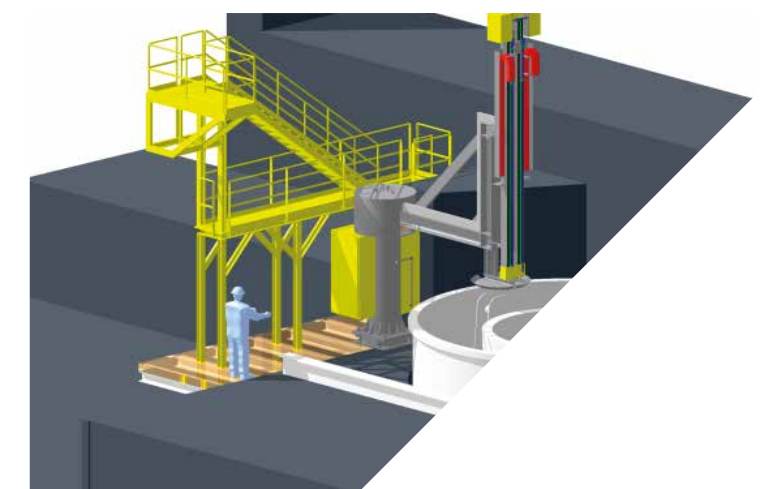
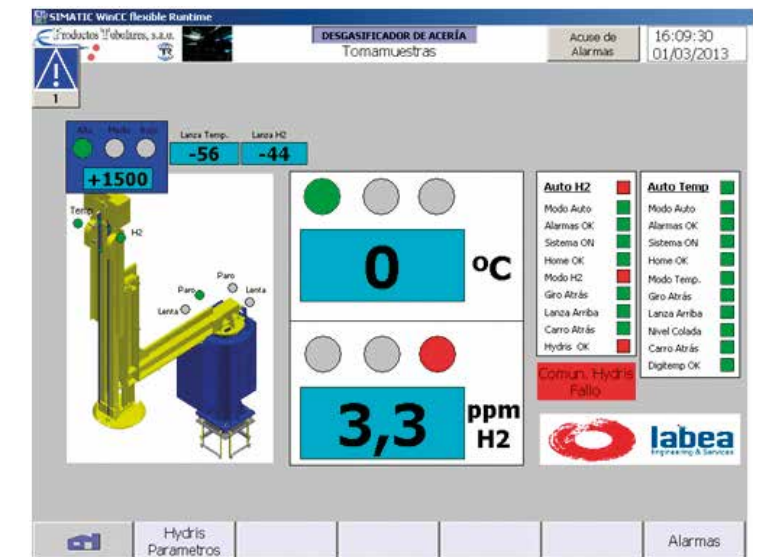
- Refrigerated lance for improved durability.
- Quick lance connection for easy replacement.
- Superparabolic movement for better entrance of the lance in the bath.
- Automatic operation from the EAF cab.
- Adapted to any type of commercial cartridge.

### Advantages:

- Totally safe since there is no operator in front of the door.
- Automatic operation from the EAF cab.
- It works while the furnace is on.
- It works with the oxygen and coal injection system on.
- Angle repetitiveness and insertion depth increase the measurement reliability.
- Easy maintenance.
- Touch screen with historic registers, alarms, process status, etc.

## LF AUTOMATIC TEMPERATURE MEASUREMENT AND SAMPLING EQUIPMENT

The LABETEMP\_straight manipulator has been developed to take the temperature of the liquid steel bath and a sample for later chemical analysis through the arc in refining furnaces and vacuum units. This is done through the arc and with the furnace operating at all times. The process is completely automatic, thus increasing the reliability of the sample and improving safety, as no one needs to be near the furnace. The equipment can include two moving heads to take the temperature and sample simultaneously in EAF furnaces, or to take hydrogen simultaneously in vacuum units.



### Characteristics:

- Refrigerated lance for improved durability.
- Quick lance connection for easy replacement.
- Automatic operation from the control station.
- Adapted to any type of commercial cartridge.
- Double moving head.

### Advantages:

- Totally safe since the operator is away from the furnace area.
- Automatic operation from the LF cab.
- It works while the furnace is on.
- Angle repetitiveness and insertion depth increase the measurement reliability.
- Easy maintenance.
- Touch screen with historic registers, alarms, process status, etc.



## WATER COOLED LANCES

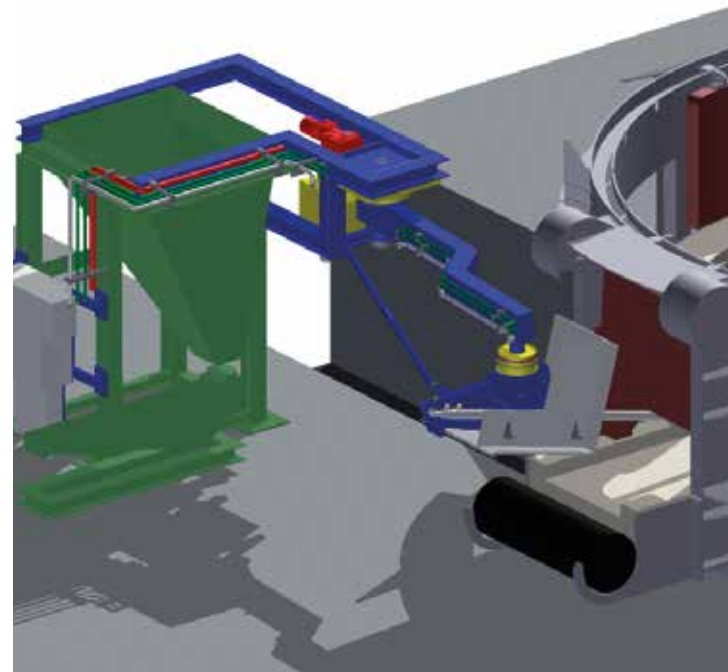
It works on the furnace door to clear slag. It injects oxygen at supersonic speed. The lance is supported and moved by a manipulator anchored to the platform or onto another surrounding rigid structure. The set can be placed at a distance on either side of the door. By twisting the arm, the lance is positioned over the slag tunnel so that the generated oxygen dart melts the trapped slag. Besides the oxygen lance, the machine can incorporate an additional coal lance for the generation of foaming slag.

### Characteristics:

- Use of  $O_2$  for decarburisation and generation of slag.
- Possibility of an additional coal lance for the generation of slag.
- Remote control from the furnace room or by radio control.
- Robust precise equipment.
- Water-refrigerated protection shields to protect the equipment from radiation and splashes.
- Lance manipulator movement by electric motors.
- Easy removal of lances with quick connections at the back.
- Easy repair of lances by steel to steel welding.
- Easy maintenance.

### Advantages:

- Quick insertion of lances in the tunnel.
- increased  $O_2$  injection time.
- Increased productivity.
- Repetitive and homogeneous results.
- The oxygen speed when coming out of the nozzle helps quick decarburisation.



## CONSUMABLE LANCES

It works on the furnace door to clear slag by injecting oxygen at supersonic speed through a consumable tube. The lance is supported and moved by a manipulator anchored to the platform or onto another surrounding rigid structure. The set can be placed at a distance on either side of the door. By twisting the arm, the lance is positioned over the slag tunnel so that the generated oxygen dart melts the trapped slag.

Besides the oxygen lance, the machine can incorporate an additional coal lance for the generation of foaming slag, and another oxygen lance.

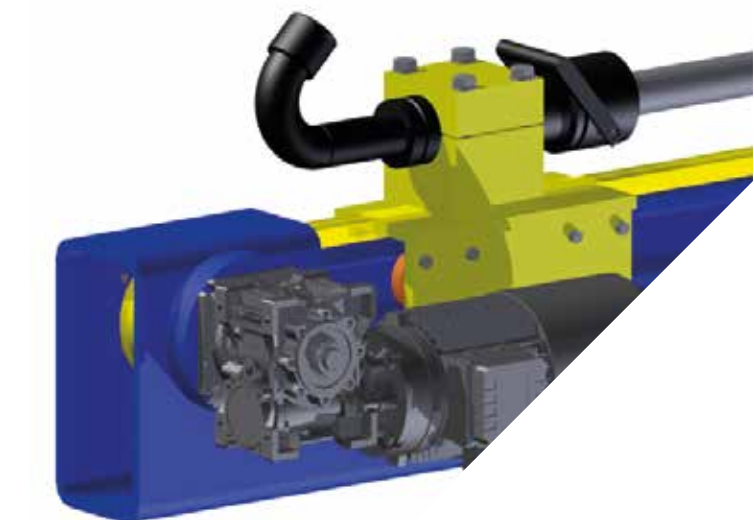
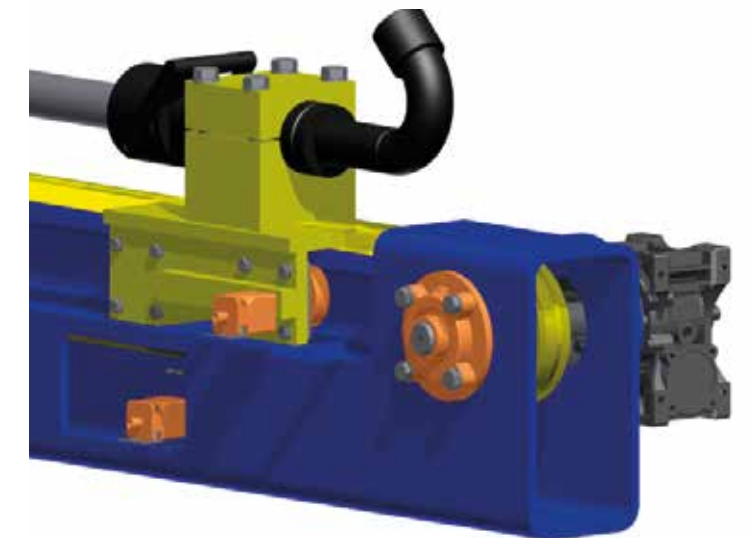
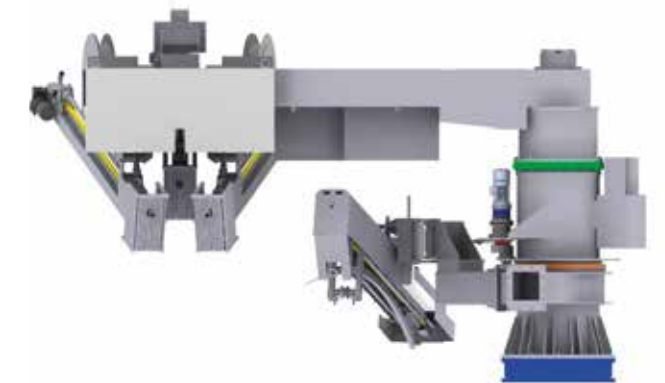
This machine can be combined with the sample-taking and temperature-measuring LABETEMP to make better use of the space.

### Characteristics:

- Use of  $O_2$  for decarburisation and generation of slag.
- Possibility of an additional coal lance for the generation of slag.
- Remote control from the furnace room or by radio control.
- Robust precise equipment.
- Water refrigerated protection shields to protect the equipment from radiation and splashes.
- Easy removal of lances with quick connections at the back.
- Easy maintenance.

### Advantages:

- Quick insertion of lances in the tunnel.
- increased  $O_2$  injection time.
- Increased productivity.
- Repetitive and homogeneous results.
- The oxygen speed when coming out of the nozzle helps quick decarburisation.
- The amount of  $O_2$  used for the formation of foaming slag is optimised by injecting it below the slag but on top of the bath.





## 6 AXIS ROBOT

LABEROB is the adaptation of a conventional 6-axis robot to the steel industry environment to carry out certain tasks automatically and in a versatile way.

### Characteristics:

- The LABEROB functions are:
- Temperature measuring and sample taking in EAF and LF.
- Filling of the ladle nozzle.
- Other tasks to be defined with the client.

### Advantages:

- The system's advantages are:
- Tasks carried out quickly and flexibly.
- Operators' safety, eliminating unpleasant tasks.
- Better process quality, eliminating the possibility of human error.



## AUTOMATIC ARGON COUPLING

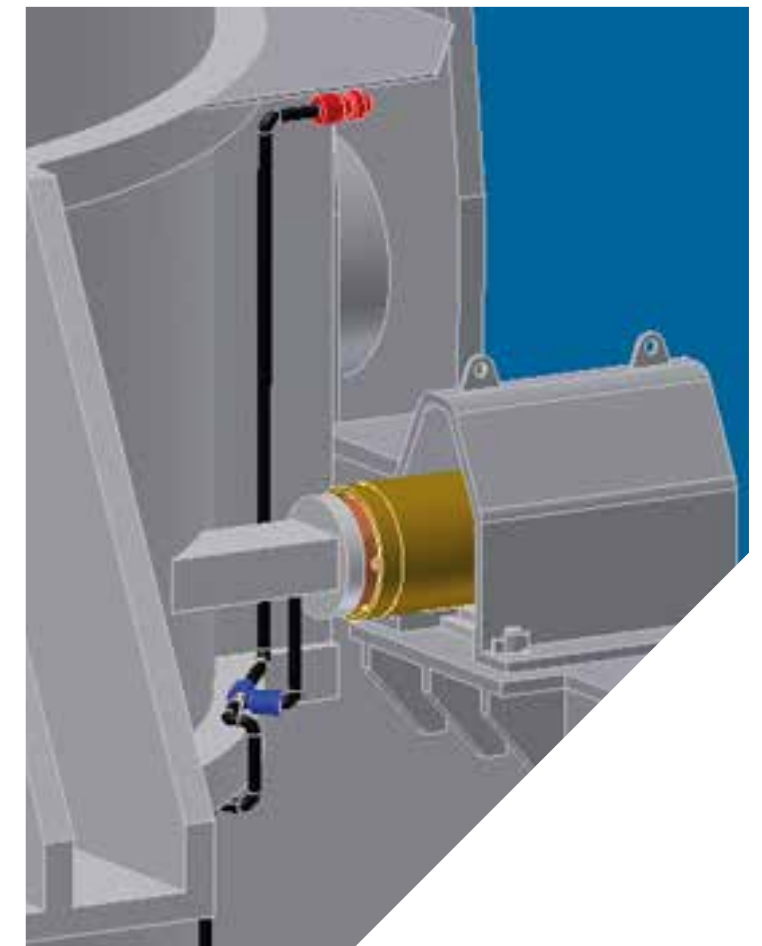
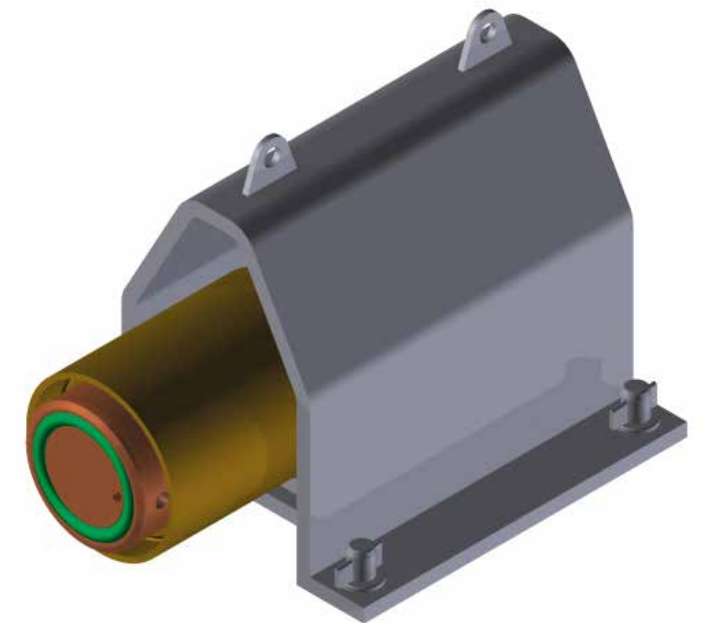
Argon stirring aims to homogenise temperature and analyse of the the steel bath. The manual connection of the argon hose is a risky job, as the operator needs to get close to a ladle full of liquid steel and is exposed to high temperatures, dirt and furnace slag spills. LABEA has developed a piece of equipment which carries out this job automatically.

LABARGON has been developed for the quick coupling of argon, in a safe and reliable way and with no maintenance needed. The difference between this equipment and other existing systems on the market is that the cylinder reaches out for the ladle and not the other way round. In other pieces of equipment, the coupling is made while putting the ladle on the moving head. The whole ladle weight touches the joint, so joint consumption is high (up to three times per shift, sometimes).

However, our equipment remains hidden in the moving head until the ladle is positioned and still in it. At that time, the cylinder extends and couples against the plate welded to the ladle. Thus, the joint is untouched and joint consumption is reduced to a minimum.

### Advantages:

- No more joint problems.
- Quick coupling.
- System reliability.
- Staff safety.
- Easy maintenance.





# FURNACES

LF-EAF

ELECTRODES REGULATION

ELECTRODE CLAMPS

LADLE CARS

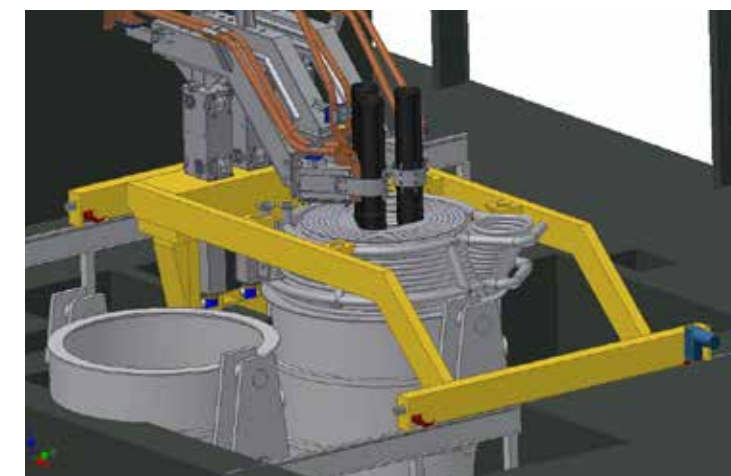
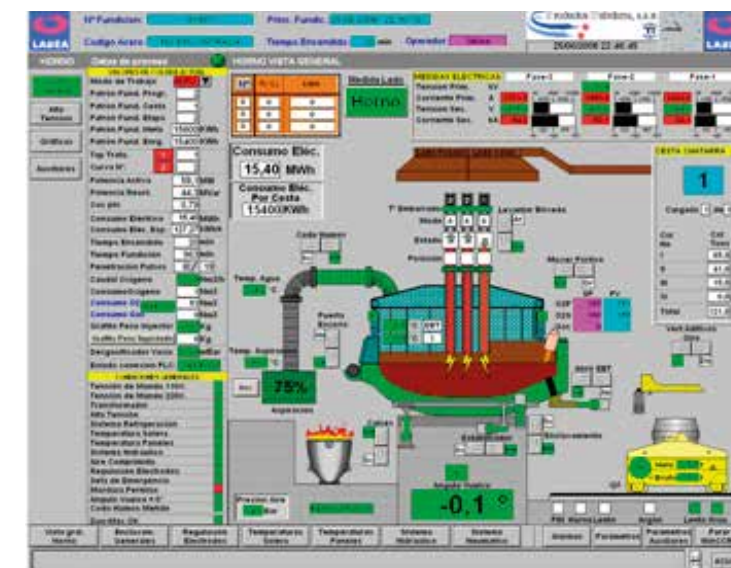
WATER-COOLED PIECES

LF-EAF

LABEA furnaces (EAF) and ladle furnaces (LF) have been designed following the criteria provided by our 25-year experience using similar equipment.

## Characteristics:

- This criteria only admit simple solutions because we know that complicated and sophisticated solutions are not practical in steel plants.
- Robust criteria in our equipment because we know how difficult and demanding the steel manufacturing process is.
- Criteria to design parts which are easily detachable and interchangeable with their spares, such as our clamping devices, because we know how difficult and costly maintenance is during short production stops.
- Resource optimisation and efficiency criteria, such as our low impedance circuits, because we know how important it is to save, drop by drop, in steel manufacturing processes that use a lot of resources and energy.
- Criteria of minimum environmental impact, such as our combustion equipment, and addition of chemical energy, because steel production can be very aggressive.
- Criteria of personnel safety, such as our EBT closure, because we know that risk is present in some routine process operations.





## ELECTRODES REGULATION

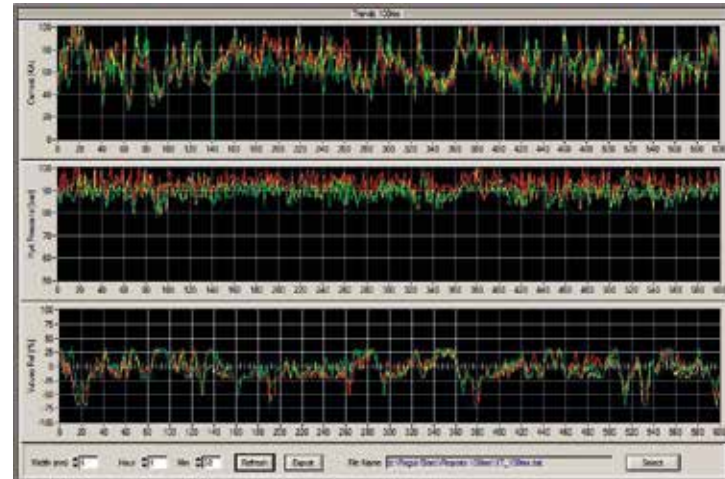
ELARC is a recently developed electrode regulation which is equipped with the latest electronic components

### Characteristics:

- Simple and reliable measurement, mainly at the transformer's primary voltage.
- High speed calculation and execution of the commands.
- Several logic criteria:  $Z = k$ .  $I = k$ .  $W = k$ .
- Special logic for reducing electrode breakages.
- Automatic modification of the set points for correcting deviations

### Advantages:

- Simple installation.
- Reports available per heat, per basket, instantaneous information for the analysis of particular events.
- Much information for taking decisions.
- Simple access to the information.
- Comfortable change of set points.
- ELARC obtains a powerful application with minimal deviations from the set point, and thus diminishes the radiation index to the refractory and the consumption of electrodes.
- Very competitive price

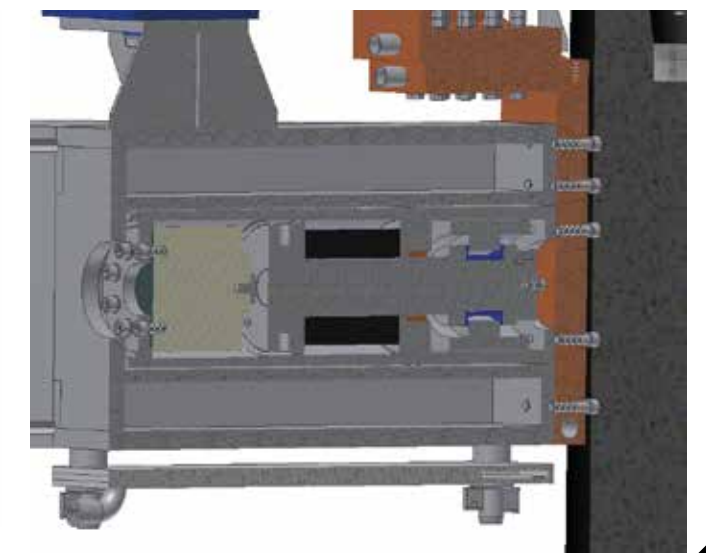
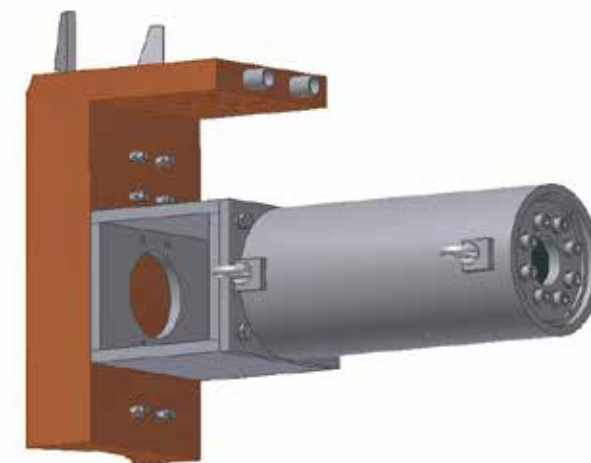
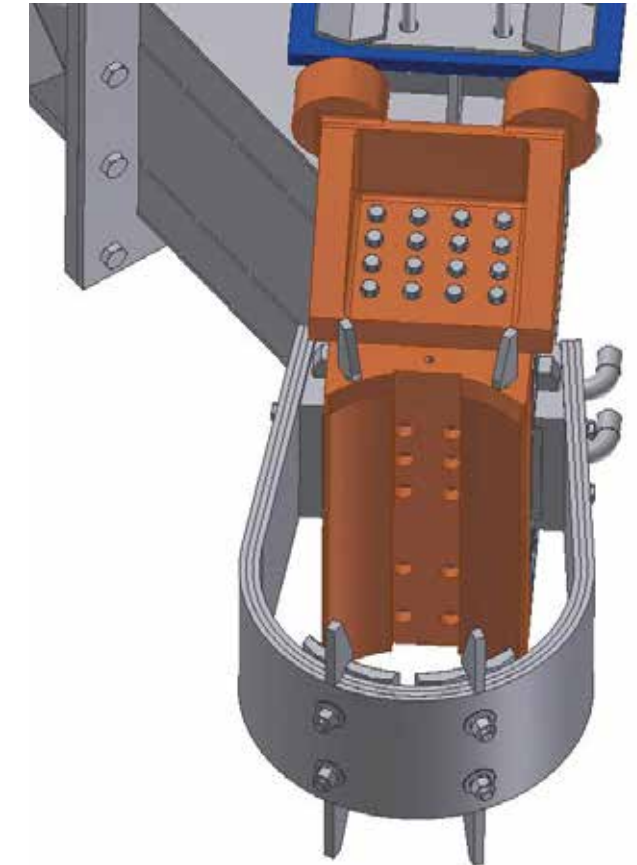


## ELECTRODE CLAMPS

In Labea we have designed our own model of electrode clamps which are operating successfully on multiple clients. Its main advantages are:

### Advantages:

- Fast change clamps. The replacement of the conductive copper plate consists in loosening and tightening a few screws. In 20 minutes, the operation can be performed.
- Fast change electrode tightening Kit. The clamping system (springs, cylinder, etc) is a kit that is extracted and changed all together. All checks, adjustments and repairs of these elements must be carried out in the mechanical shop, not on the ladle furnace. The change can be performed in one hour.





## LADLE CARS

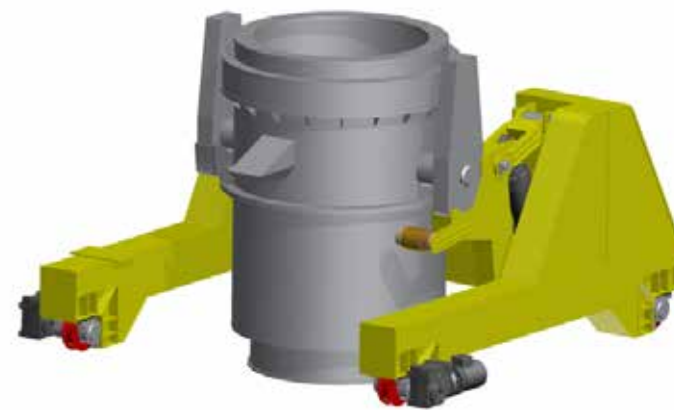
The ladle cars are used in different applications within steel mills: primarily to carry the ladle during the tap and transporting it to the ladle furnace, but also for transfers between different industrial buildings and other applications.

The cars LABEA has developed are specifically designed for the needs of the steel industry and are resistant to the high temperatures and dusty atmospheres they are exposed to.



### Characteristics:

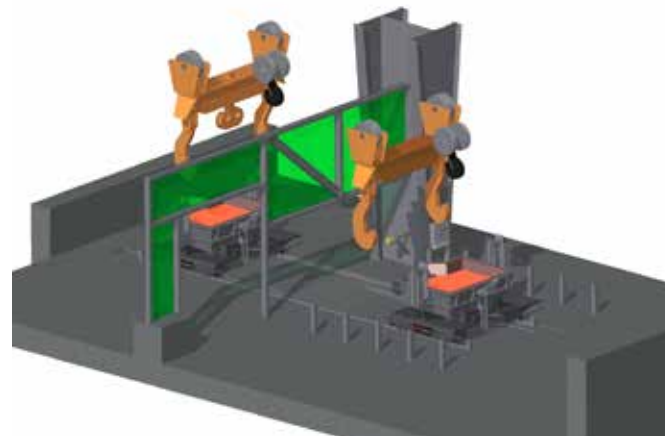
- Specifically designed for the transport of ladles with steel at over 1300°C.
- Easy maintenance.
- LABARGON automatic carbon blowing system.



### U type ladle:

For the transport of the ladle between the EAF and the LF, LABEA has developed a car that can place the ladle on the floor and then take it without using the crane.

- The car cannot be damaged by overflow or perforations during refining. LESS MAINTENANCE AND SPARE PARTS.
- The car is free and with an empty ladle on the way between the LF and the EAF in case it is needed for security reasons. SAFETY.
- EAF tapping is not delayed due to delays in the LF. PRODUCTIVITY.



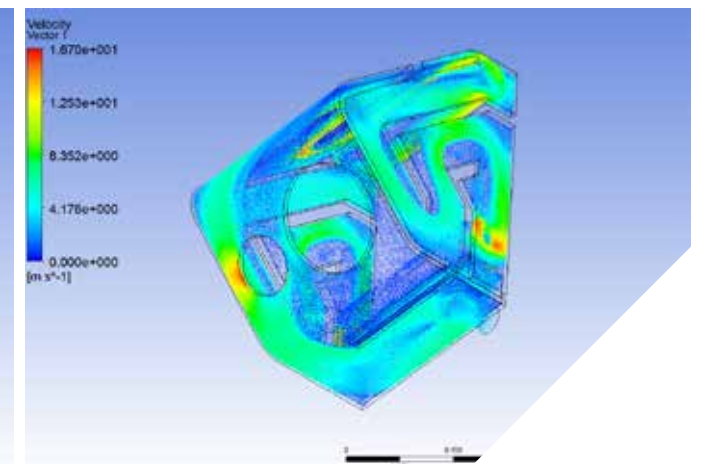
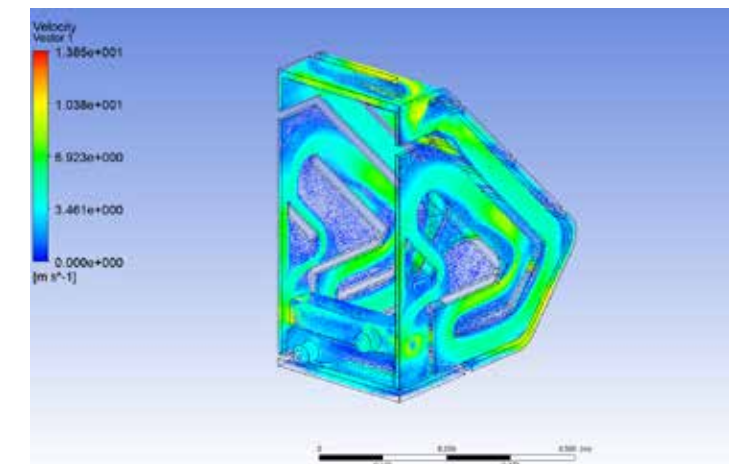
## WATER-COOLED PIECES

In steel mills many different elements must be water cooled to survive temperatures they are exposed to: wall tube panels in the furnace or combustion chamber, copper lances for injections, electrode tiles and many others...

The manufacture of our own oxygen injections panels and injectors has made us copper welding specialists offering maximum durability and guarantee on all types of copper cooling spare parts.

We also have experience in the design and optimization of refrigerating circuits and we test them with fluid simulation programs.

We always employ the most suitable materials for each application: carbon steel, copper, stainless steel and COR-TEN steel.







# CONTINUOUS CASTING

BILLET MARKING

HYDRAULIC MOLD OSCILLATION

HEAD AND TILE BILLET DEBURRER

RHOMBUS MEASUREMENT AND  
TUBE DIAMETER MEASUREMENT



# BILLET MARKING

Steel production must ensure operators safety and carry a correct traceability of their products. LABEA has developed a robotic cell for billet or slab marking at high temperature with paint during production and in a safe manner.

## Characteristics:

- High performance robot with a single paint nozzle.
- Maximum billet temperature up to 1000 ° C
- New non-toxic paint. Consumption adjusted to needs.
- Designed to communicate with the client PLC.
- Cycle time: less than 30 sec.
- Instant verification of correct writing by computer vision.

## Advantages:

- Avoid traceability errors.
- Improves workers safety reducing manual tasks.
- High visibility of the mark.
- Great flexibility and reliability.
- Easy maintenance.
- Payback period: less than one year.



# HYDRAULIC MOLD OSCILLATION

The mold oscillation is a need for continuous casting, but it also creates marks on the billet surface with a significant influence on the surface quality. They are also a frequent cause of cross cracks.

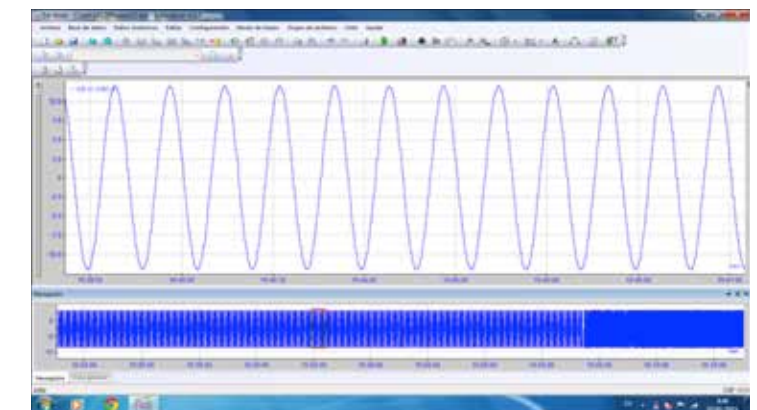
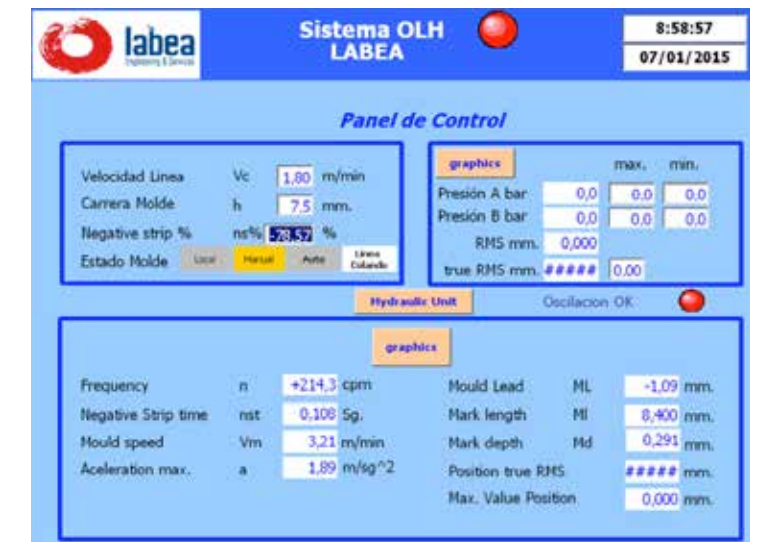
The oscillation of the continuous casting mold should be adjusted according to the quality of the steel type, the dust used for tapping and the casting speed. To minimize the depth of oscillation marks, it is essential to optimize parameters such as stroke and frequency of oscillation.

## Characteristics:

- PLC Controlled hydraulic mold oscillation.
- It is not necessary to add new fast reading module.
- Inverters are not needed for oscillation frequency control.
- No mechanical change is needed to change the mold stroke.
- The system is fully integrated into the continuous casting.

## Advantages:

- Automatic calculation of oscillation values (function of the line speed and mold stroke).
- Changing the stroke and oscillation frequency is possible without having to stop the line.
- HMI display and parameter changing.
- Online real time sinusoid display.
- Historical data registration for later study.





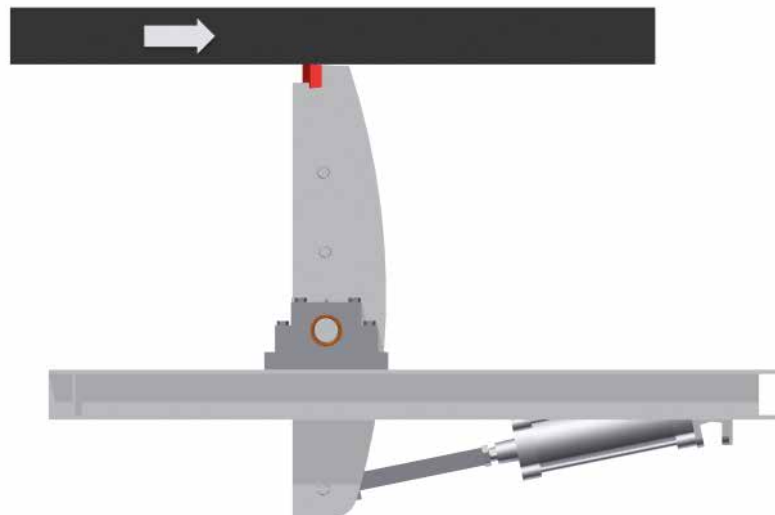
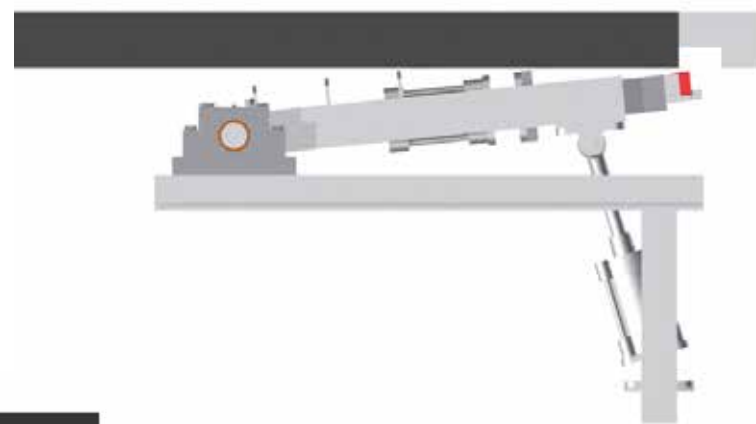
## HEAD AND TAIL BILLET DEBURRER

Continuous casting oxygen cutting often leaves drops stuck to the lower face of the billet which finally transform into a burr and become a lamination problem.

LABEA has resolved this problem by removing these burrs both at the head and tail of the billet, using appropriate tools in each case.

### Advantages:

- It is essential for some qualities
- Completely automatic

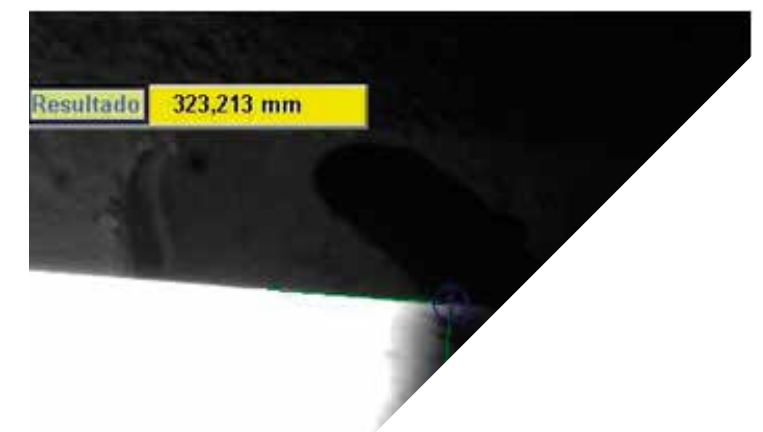
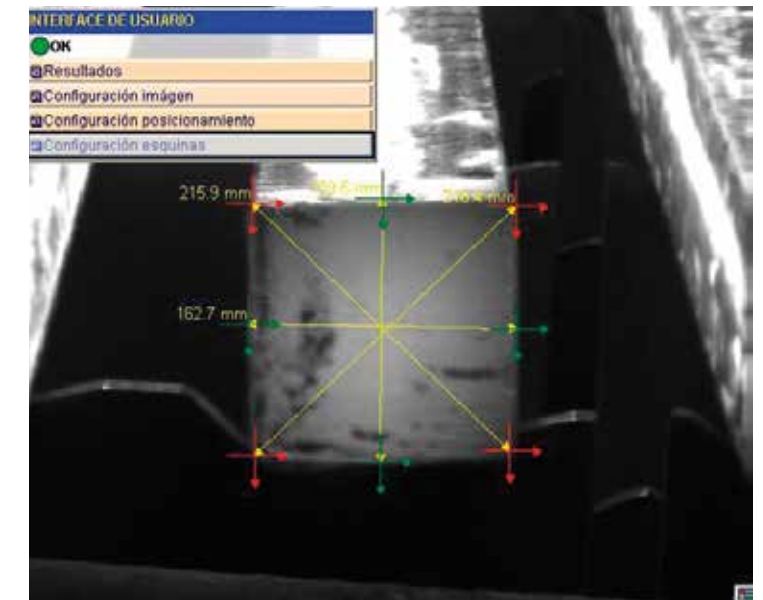


## RHOMBUS MEASUREMENT AND TUBE DIAMETER MEASUREMENT

LABEA has developed an application for measurement of rhombus on billet. This information is obtained by taking pictures several metres away from the billet. By treating the image, the billet corners are observed and the distance between them can be measured precisely. This method can also be used to measure the diameter of tubes in steel plants.

### Advantages:

- **MEASURING WITHOUT PHYSICAL CONTACT.** The measurement will not be affected although the billet might be red hot.
- **SAFE AND EASY MAINTENANCE** The camera can be located up to 6m away. It can be used without stopping production.
- **BILLET HISTORY RECORD.**
- **ERGONOMICS AND GOOD INFORMATION.** Configurable rhombus tolerance alarms can be integrated in other interfaces to facilitate the operator's work.
- **A SINGLE PIECE OF EQUIPMENT FOR ALL BILLETS.** Depending on where it will be installed, a single piece of equipment can be enough for all billets.





# LABEAHOSE



## LABEAHOSE

LABEA HOSES WITH MAXIMUM  
RESISTANCE TO ABRASION

### PRESSURE HOSE.

#### Applications:

- Sand blasting
- Pulverised iron blasting
- Cement clinker
- Pulverised coke
- Pulverised coal
- Pulverised lime

#### Characteristics:

- Great resistance to abrasion.
- Good flexibility, equivalent to a rubber hose for general use.
- Can be used bent.

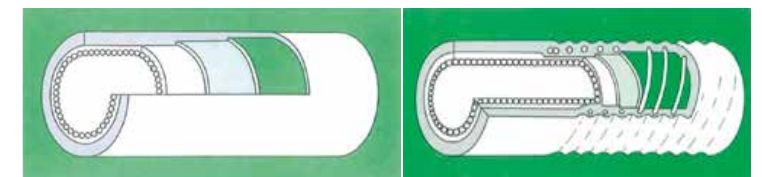
### SUCTION HOSE.

#### Applications:

- Grain (pneumatic transport)
- Concrete (pressure injection)
- Caustic lime

#### Characteristics:

- Fine ceramic grains are used for the internal coating.
- Great resistance to abrasion.
- Good flexibility, equivalent to a rubber hose for general use.
- The internal steel wire spiral prevents the hose collapsing due to suction.
- Appropriate for transport of mineral waste, sands, ferruginous sands, etc. which are mixed with water by suction and/or discharge.
- If necessary, it is advisable to complete the hose using clamps and integrated type connectors placed at the end of the hose.



USE	PNEUMATIC TRANSPORT OF GRAPHITE IN A STEEL PLANT.	JET SHOT IN A FOUNDRY.
TRANSPORTED MATERIAL	Coke (3-5 mm)	Iron balls. Diameter: 1-2 mm
TRADITIONAL RUBBER HOSE USEFUL LIFE	1 month	2 months
<b>SPECIAL LABEHOSE HOSE USEFUL LIFE</b>	In use after 10 months (24 hours/ day, 25 days/ month)	Not affected by abrasion for 10 months.



# LABEHOOK

## AUTOMATIC CRANE HOOK

## AUTOMATIC CRANE HOOK



The magnet attracts the ring.

Adjust the lifting hook.

And elevate the load.

The patented LABEA automatic crane hook is equipped with a magnet on its lower section.

When the magnet is close to the load, it attracts and positions the sling. The user pushes the control button, the hook closes, catches the ring and lifts the load without any additional handling.

The system works with cable slings, chains slings, master links, textile slings and even bigbags. Using the new and patented LABEA automatic hook, you will pick up and release loads remotely, avoiding any handling and traveling.

The LABEA hook system brings you the safest and most productive working method ever.



HOOK MODEL	EVO 5				EVO 10			EVO 20	
WORKING LOAD LIMIT	5.000 KG				10.000 KG			20.000 KG	
OPTION	--	B10	B20	L	--	B20	L	--	L



# SERVICES

GENERAL ASSESSMENT

TELEASSISTANCE

LABEMASTER

AIR COMPRESSORS OPTIMIZATION

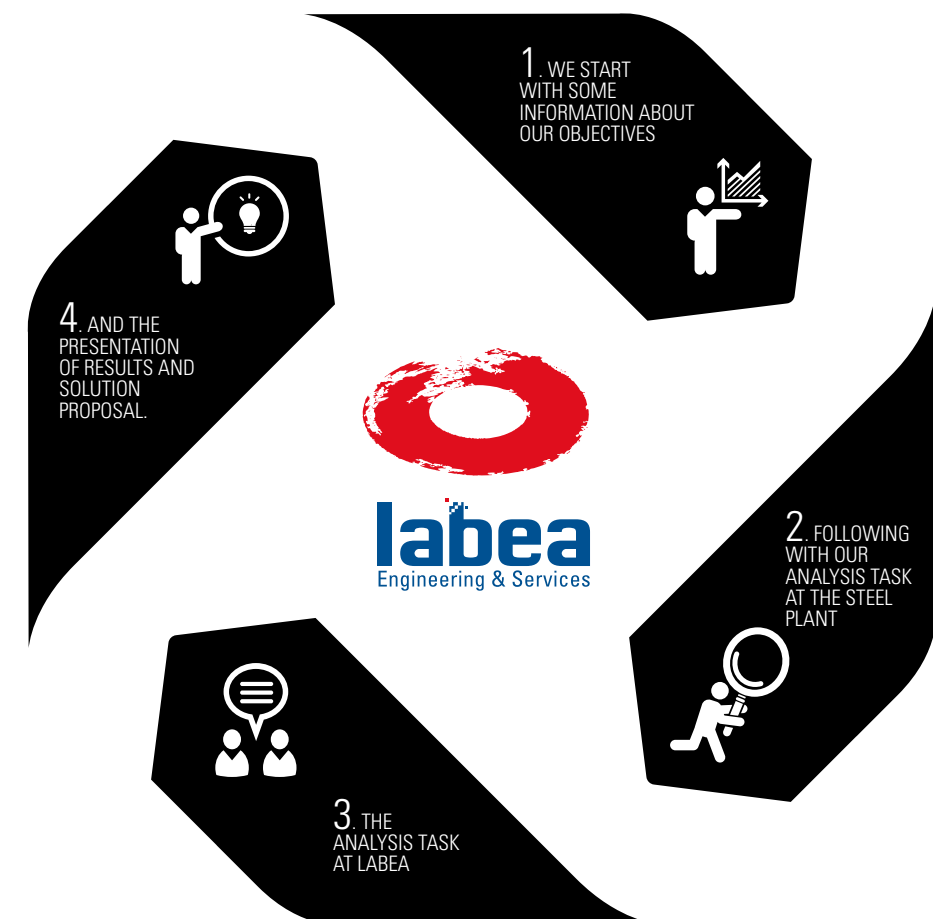
WATER PUMPS OPTIMIZATION

## GENERAL ASSESSMENT

Our full name is LABEA Ingeniería y Servicios S.A., and the word “services” is there for a reason, because we add to our engineering activity some consultancy services which will help those who trust us.

Help to diagnose a problem, to quantify it, to measure times, to analyse bottlenecks, to assess the efficiency of the current processes, or to compare possible alternatives... A myriad of technical or organisation fields which we make available to our clients and friends:

- Our experience, after 25 years of manufacturing steel;
- The impartiality and objectivity achieved by being external agents;
- The dedication and time that our clients cannot give to tasks other than those demanded by all aspects of daily management.



From there, LABEA might have finished its relevant work or continue, depending on the client's specific needs.

We are requested in multiple fields, but the two most in demand are improvement in the use of energy and productivity increase.

To do this, we have developed a detailed methodology which offers a quick and precise response.

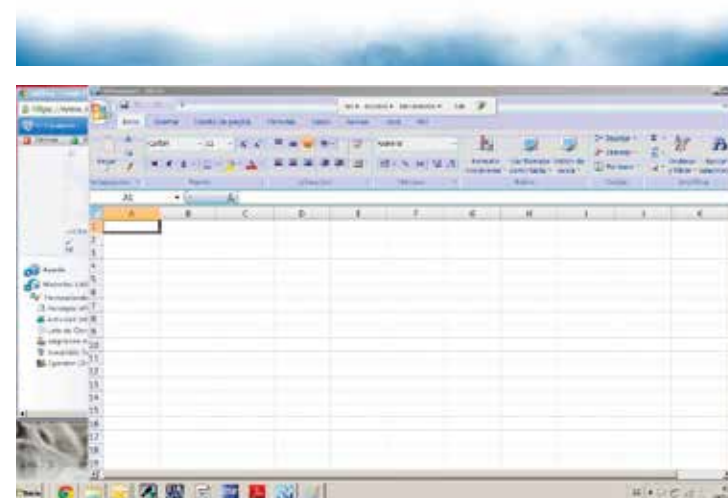
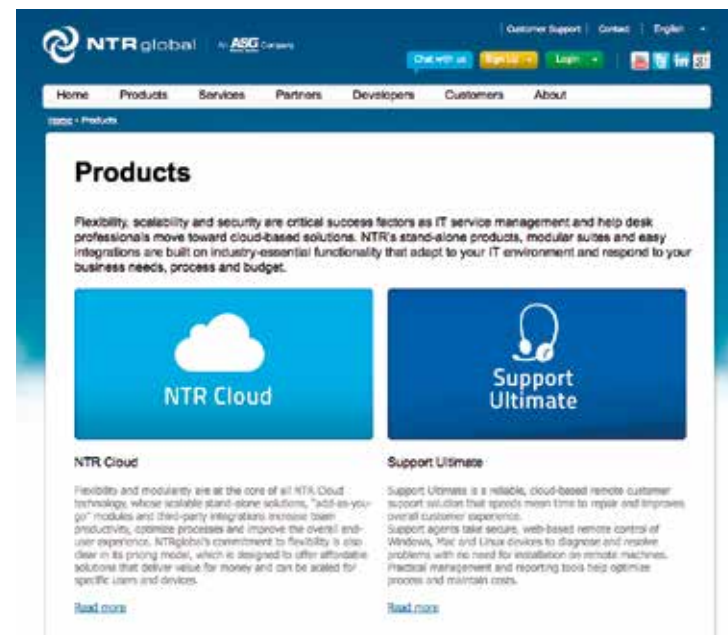


# TELEASSISTANCE

LABEA offers its clients a helpline service at all its premises to respond rapidly and efficiently to issues arising where the machine has been placed. Wherever the client requires, and never without his consent, the LABEA technicians will take control of the machine to offer a quick response anywhere in the world.

## Advantages:

- Quick response anywhere in the world.
- Access to the whole process information for correct problem diagnostics.
- Permission required from the client for the connection - PRIVACY.



# LABEMASTER

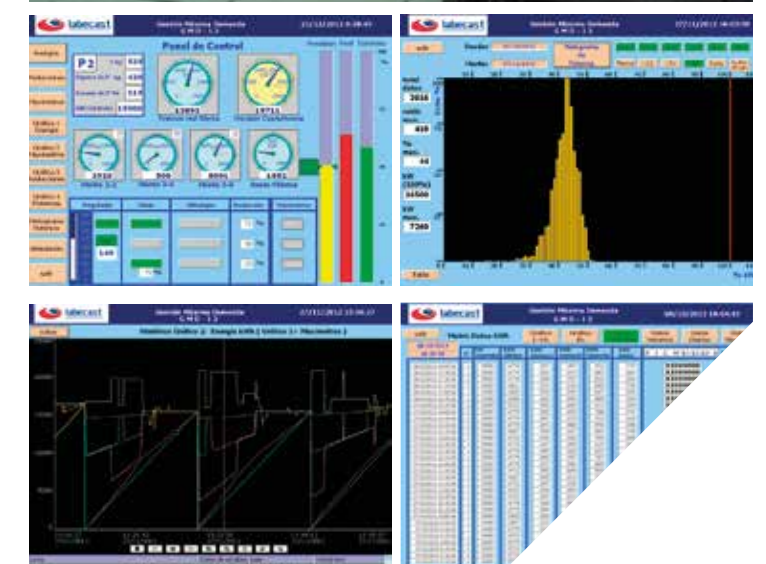
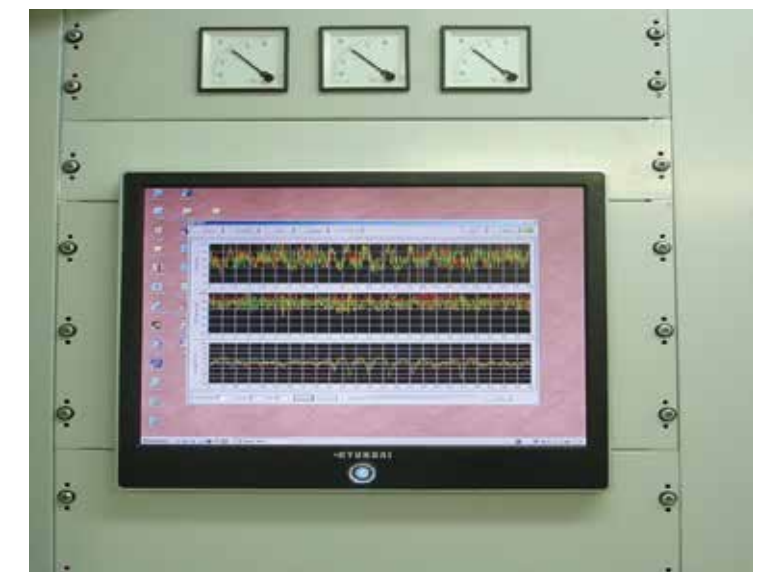
Steer your Foundry production having intelligent energetic judgment  
LABEMASTER manage the scheduled production to reach a clear target:

$$\text{ENERGETIC COST} + \text{PROCESS STOPPING COST} = \text{MINIMUM}$$

Intelligent tool (hardware + software) that:

## Advantages:

- Reduce to maximum the electric contracted power.
- Minimize electric consumption, analyzing trends.
- Schedule the Plant production with minimal energetic consumption criterion.
- Create and store historical information about charges and consumptions.
- Is very easy to customize to each particular case.
- Present a very short ROI.



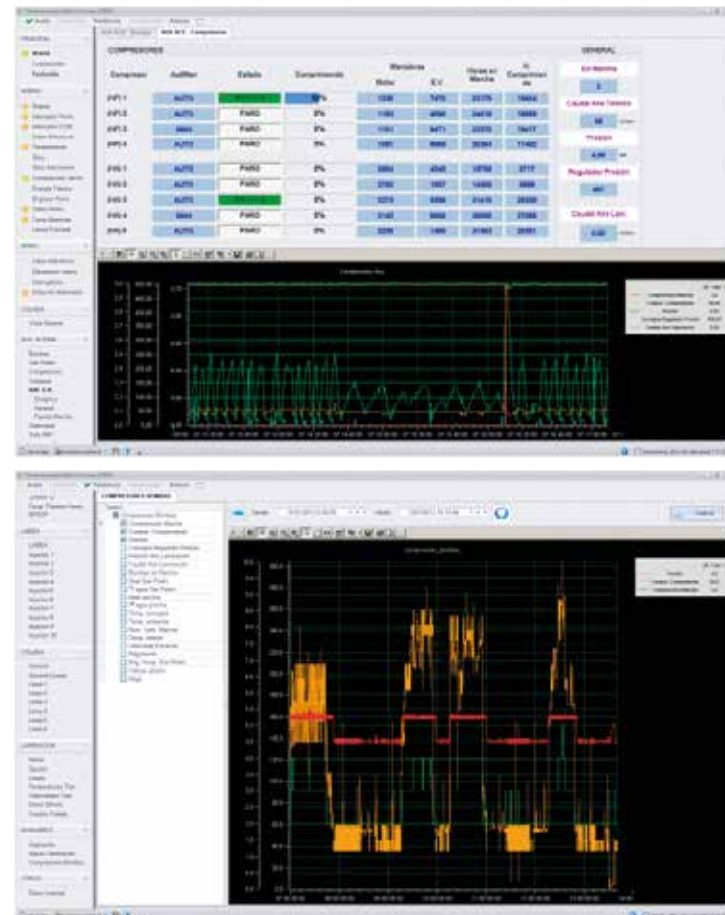


# AIR COMPRESSORS OPTIMIZATION

The system guarantees sequential control at the compressor start-up and stop, so all of them work equitably regulating the process variants.

## Characteristics:

- It maintains the pressure stable, without speed variators, so we can reduce the pressure set point to the level allowed by the process, thus saving kWh.
- It can control an air station: up to 24 comp.
- There is not a spare compressor; all of them work equally. This guarantees that when a compressor fails, any of the ones stopped can substitute it automatically.
- It keeps the sequence order both for start-up and stop. This order is modified with the manual manoeuvres.
- The drives to be controlled can be starters or variators already in service.
- It also regulates the process variants: Pressure, flow, level.
- Ideal system to guarantee efficient preventive maintenance of the installation, as the same workload is applied to all pumps with time.
- Possibility of manual start-ups and stops, and back to automatic without stopping the sequence.
- Register of number of start-ups, working times, number of suction and discharge valve manoeuvres, etc.
- Process variant curves: Pressure, flow, level, no. of active pumps, and register of all system anomalies and those of the pump drives, with date and time.
- Robust and guaranteed system for many years, which has been updated over time.



# WATER PUMPS OPTIMIZATION

The system guarantees a sequential control at the pump start-up and stop, so all of them work equitably regulating the process variants.

## Characteristics:

- A pumping station can be controlled: up to 24 pumps.
- There is not a spare pump; all of them work equally. This guarantees that when a pump fails, any of the ones stopped can substitute it automatically.
- It keeps the sequence order both for start-up and stop.
- The drives to be controlled can be starters or variators already in service.
- It also regulates the process variants: Pressure, flow, level.
- Ideal system to guarantee efficient preventive maintenance of the installation, as the same workload is applied to all pumps with time.
- Possibility of manual start-ups and stops, and back to automatic without stopping the sequence.
- Register of number of start-ups, working times, number of suction and discharge valve manoeuvres, etc.
- Process variant curves: Pressure, flow, level, no. of active pumps, etc.
- Register of all system anomalies and those of the pump drives, with date and time.
- Robust and guaranteed system for many years, which has been updated over time.





# REFE- RENCES

ARCELOR MITTAL ACB (ACERÍA COMPACTA DE BIZKAIA)	SPAIN	2001 2003 2003 2004	CARBON/LIME INJECTION SISTEMA DE INYECCIÓN DE OXÍGENO LABEJET LADLE COVER ALUMINIUM ADDITION SYSTEM IN THE LADLE
ARCELOR MITTAL BERGARA	SPAIN	2004 2008	LABEJET OXYGEN INJECTION SYSTEM LABETEMP AUTOMATIC SAMPLING AND TEMPERATURE MEASUREMENT SYSTEM
ARCELOR MITTAL MADRID	SPAIN	2004 2007 2009 2010 2011	LABEJET OXYGEN INJECTION SYSTEM LABETEMP AUTOMATIC SAMPLING AND TEMPERATURE MEASUREMENT SYSTEM LABETEMP AUTOMATIC SAMPLING AND TEMPERATURE MEASUREMENT SYSTEM SCRAP CLEANING MACHINE 4 LADLE PREHEATERS
ARCELOR MITTAL OLABERRÍA	SPAIN	2003 2003 2004 2004 2012	LABEJET OXYGEN INJECTION SYSTEM LABETEMP AUTOMATIC SAMPLING AND TEMPERATURE MEASUREMENT SYSTEM LABETEMP AUTOMATIC SAMPLING AND TEMPERATURE MEASUREMENT SYSTEM AUTOMATIC SOLIDS ADDITION SYSTEM DOOR CLEANING OXYGEN LANCE
ARCELOR MITTAL ZARAGOZA	SPAIN	2002 2011	LABEJET OXYGEN INJECTION SYSTEM LABETEMP AUTOMATIC SAMPLING AND TEMPERATURE MEASUREMENT SYSTEM
ARCELOR MITTAL ZUMARRAGA	SPAIN	2001 2009 2009 2010 2013 2014	LABEJET OXYGEN INJECTION SYSTEM REVAMPING OF LADLE FURNACE INJECTION OF NITROGEN INSTEAD OF NATURAL GAS IN ELECTRIC ARC FURNACE EAF ELECTRODES REGULATION SYSTEM 3 LADLE PREHEATERS 2 LADLE PREHEATERS
ACEROS INOXIDABLES OLARRA	SPAIN	2007	LADLE PREHEATERS
ALPA S.A. (RIVA)	FRANCE	2002 2002	LABEJET OXYGEN INJECTION SYSTEM CARBON/LIME INJECTION
AMPO	SPAIN	2006	AUTOMATIC SOLIDS ADDITION SYSTEM
AMSTEEL 1 (LION GROUP)	MALAYSIA	2009	SCRAP CLEANING MACHINE

ANN JOO STEEL BERHAD	MALAYSIA	2008	SCRAP CLEANING MACHINE
ARCELOR HUTA WARSZAWA	POLAND	2006	CARBON/LIME INJECTION
ARCELOR MITTAL GIJÓN	SPAIN	2013	4 LADLE PREHEATERS
ARCELOR MITTAL VANDERBIJLPARK	SOUTH AFRICA	2007	ELECTRODES REGULATION
AZA GERDAU	CHILE	2013	AUTOMATIC ARGON COUPLING
CAF	SPAIN	2002 2007 2008	AUTOMATIC SOLIDS ADDITION SYSTEM LABEJET OXYGEN INJECTION SYSTEM LABETEMP AUTOMATIC SAMPLING AND TEMPERATURE MEASUREMENT SYSTEM
CALINSA	SPAIN	2005	SOLIDS CONVEING
CELSA BARCELONA	SPAIN	2001 2008 2010 2011 2004	LABEJET OXYGEN INJECTION SYSTEM 6 LADLE PREHEATERS 2 LADLE PREHEATERS 2 LADLE PREHEATERS LABETEMP AUTOMATIC SAMPLING AND TEMPERATURE MEASUREMENT SYSTEM
		2004 2007 2008	CARBON/LIME INJECTION ELECTRODES REGULATION INJECTION OF NITROGEN INSTEAD OF NATURAL GAS IN ELECTRIC ARC FURNACE
CELSA FRANCE	FRANCE	2004 2008 2003 2006 2007 2007 2013	LABEJET OXYGEN INJECTION SYSTEM LADLE PREHEATERS LABETEMP AUTOMATIC SAMPLING AND TEMPERATURE MEASUREMENT SYSTEM CARBON/LIME INJECTION ELECTRODES REGULATION AUTOMATIC ARGON COUPLING SCRAP CLEANING MACHINE
CELSA HUTA OSTROWIEC	POLAND	2005 2006 2009 2012 2013	LABEJET OXYGEN INJECTION SYSTEM SCRAP CLEANING MACHINE CARBON/LIME INJECTION ELECTRODES REGULATION 2 LADLE PREHEATERS
CELSA UK (CELSA)	UK	2003 2009	LABEJET OXYGEN INJECTION SYSTEM LADLE PREHEATERS
COLAKOGLU	TURKEY	2006 2006	LABETEMP AUTOMATIC SAMPLING AND TEMPERATURE MEASUREMENT SYSTEM DOOR CLEANING
CORRUGADOS AZPEITIA (GRUPO ALFONSO GALLARDO)	SPAIN	2007 2008 2008 2007 2009 2009 2010	LABEJET OXYGEN INJECTION SYSTEM 2 LADLE PREHEATERS LABETEMP AUTOMATIC SAMPLING AND TEMPERATURE MEASUREMENT SYSTEM CARBON/LIME INJECTION LAST MINUTE LADLE PREHEATER-INTERMEDIATE STATION REVAMPING LF ELECTRODES REGULATION



CORRUGADOS GETAFE (GRUPO ALFONSO GALLARDO)	SPAIN	2001	LABEJET OXYGEN INJECTION SYSTEM
		2002	LABETEMP AUTOMATIC SAMPLING AND TEMPERATURE MEASUREMENT SYSTEM
		2007	CARBON INJECTION
		2009	AUTOMATIC ARGON COUPLING
ENGINEERING STEEL BELGIUM	BELGIUM	2009	ELECTRODES REGULATION
GERDAU AMERISTEEL	USA	2008	ELECTRODES REGULATION
GLOBAL STEEL WIRE (GRUPO CELSA)	SPAIN	1999	LABEJET OXYGEN INJECTION SYSTEM
		2007	2 LADLE PREHEATERS
		2008	2 LADLE PREHEATERS
		2003	LABETEMP AUTOMATIC SAMPLING AND TEMPERATURE MEASUREMENT SYSTEM
		2004	BILLET DEBURRER
		2004	SCRAP CLEANING MACHINE
		2000	CARBON/LIME INJECTION
		2009	CROMITE INJECTION
GERDAU (AZKOITIA)	SPAIN	2004	CARBON/LIME INJECTION
		2007	LADLE PREHEATERS
GSB LEGAZPIA	SPAIN	2004	CARBON/LIME INJECTION
		2006	LADLE PREHEATERS
HELLENIC HALYVOURGIA	GREECE	2007	LABEJET OXYGEN INJECTION SYSTEM
		2011	SCRAP CLEANING MACHINE
HES HENNINGSDORF (RIVA GROUP)	GERMANY	2005	LABEJET OXYGEN INJECTION SYSTEM
HSW-HSJ (ZLOMREX GROUP)	POLAND	2009	LABEJET OXYGEN INJECTION SYSTEM
		2009	CARBON/LIME INJECTION
ISPAT GRANDANGE (ISPAT)	FRANCE	2002	LABEJET OXYGEN INJECTION SYSTEM
ITON SEINE, S.A. (RIVA GROUP)	FRANCE	2002	LABEJET OXYGEN INJECTION SYSTEM
		2002	CARBON/LIME INJECTION
IZMIR DEMIRCELIK SANAYI A.S.	TURKEY	2010	MÁQUINA DE LIMPIEZA DE CHATARRA
JIANSU SHAGAN GROUP CO., LTD	CHINA	2004	LABETEMP AUTOMATIC SAMPLING AND TEMPERATURE MEASUREMENT SYSTEM
		2012	LABETEMP AUTOMATIC SAMPLING AND TEMPERATURE MEASUREMENT SYSTEM
JINDAL STEEL POWER LIMITED	INDIA	2011	SCRAP CLEANING MACHINE
KROMAN CELIK	TURKEY	2001	LABEJET OXYGEN INJECTION SYSTEM
MEGASA SIDERÚRGICA (MEGASA)	SPAIN	2011	ELECTRODES REGULATION
		2006	SCRAP CLEANING MACHINE
MEGASTEEL (LION GROUP)	MALAYSIA	1999	LABEJET OXYGEN INJECTION SYSTEM
NERVACERO (CELSA)	SPAIN	2008	SCRAP CLEANING MACHINE
		2003	CARBON/LIME INJECTION
PRODUCTOS TUBULARES (TUBOS REUNIDOS)	SPAIN	2008	LABEJET OXYGEN INJECTION SYSTEM
		2007	REVAMPING EAF FURNACE
		2007	ELECTRODES REGULATION
		2011	TUBE DIAMETER MEASUREMENT CAMERA
		2012	HYDROGEN SAMPLING AND TEMPERATURE MEASUREMENT SYSTEM

PSA (PEUGEOT-CITROËN)	FRANCE	2008	ELECTRODES REGULATION
S.A.M MONTEREAU (RIVA)	FRANCE	2001	LABEJET OXYGEN INJECTION SYSTEM
SAN ZENO ACCIAI-DUFFERCO	ITALY	2004	LABEJET OXYGEN INJECTION SYSTEM
		2004	CARBON/LIME INJECTION
SIDENOR BASAURI	SPAIN	2002	LABEJET OXYGEN INJECTION SYSTEM
		2012	LABETEMP AUTOMATIC SAMPLING AND TEMPERATURE MEASUREMENT SYSTEM
		2006	CARBON/LIME INJECTION
SIDERMES	SPAIN	2011	ELECTRODES REGULATION
SIDERÚRGICA DEL TURBIO	VENEZUELA	2002	CARBON/LIME INJECTION
		2008	LABEJET OXYGEN INJECTION SYSTEM
		2008	CARBON/LIME INJECTION
		2008	AUTOMATIC ARGON COUPLING
SIDERÚRGICA SEVILLANA (RIVA)	SPAIN	1999	LABEJET OXYGEN INJECTION SYSTEM
SMS DEMAG (CELSA BARCELONA)	SPAIN	2003	LABEJET OXYGEN INJECTION SYSTEM
SMS DEMAG (URAL STEEL)	RUSSIA	2006	LABEJET OXYGEN INJECTION SYSTEM
SMS DEMAG (CELSA MANUFACTURING)	UK	2006	LABEJET OXYGEN INJECTION SYSTEM
SN MAIA (MEGASA)	PORTUGAL	2000	LABEJET OXYGEN INJECTION SYSTEM
		2005	CARBON INJECTION
		2009	LIME INJECTION
		2012	CORTEN STEEL ASPIRATION DUCT
		2013	REFRACTORY DUST INJECTION IN EBT
SN SEIXAL (MEGASA)	PORTUGAL	2008	ELECTRODES REGULATION IN EAF
SOUTHERN STEEL BERHAD	MALAYSIA	2004	LABEJET OXYGEN INJECTION SYSTEM
		2008	ELECTRODES REGULATION
		2012	LABEJET OXYGEN INJECTION SYSTEM
		2010	LABETEMP AUTOMATIC SAMPLING AND TEMPERATURE MEASUREMENT SYSTEM
		2009	SCRAP CLEANING MACHINE
SOUTHERN STEEL COMPANY	VIETNAM	2013	SCRAP CLEANING MACHINE
SOVEL, S.A. (SIDENOR)	GREECE	2005	SCRAP CLEANING MACHINE
THEP VIET STEEL CORP	VIETNAM	2010	SCRAP CLEANING MACHINE
TUBOS REUNIDOS	SPAIN	2000	LABEJET OXYGEN INJECTION SYSTEM
		2006	2 LADLE PREHEATERS
		2008	1 LADLE PREHEATER
		2010	1 LADLE PREHEATER
		2010	AUTOMATIC SAMPLING AND LADLE NOZZLE FILLING
		2013	AUTOMATIC ARGON COUPLING



# SIMPLIFYING THINGS MEANS PROGRESS

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