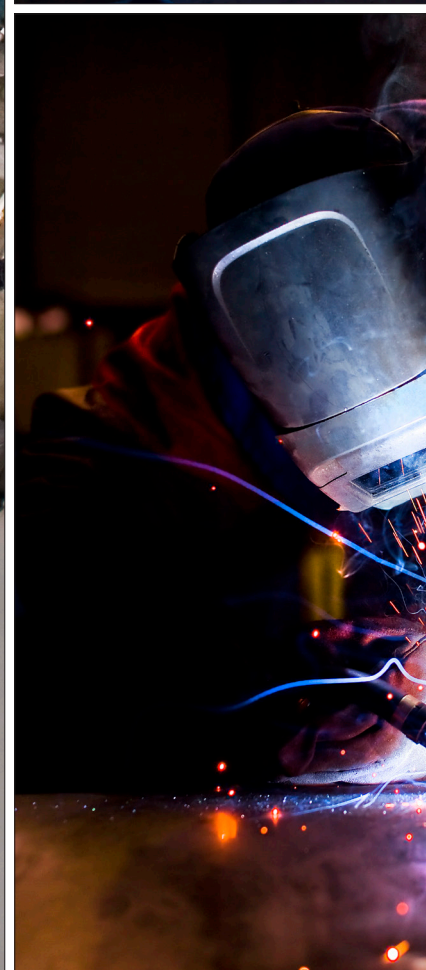
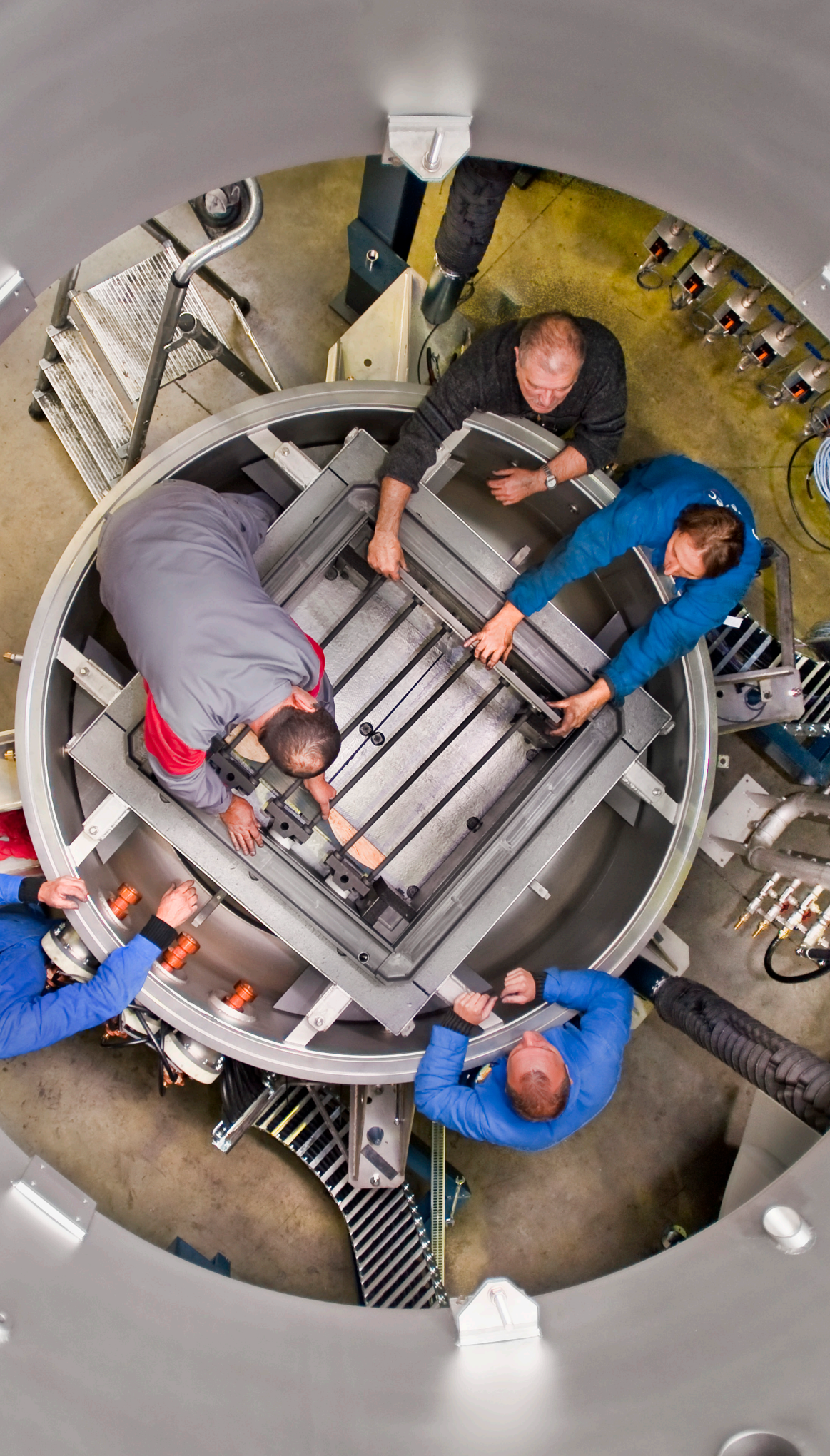
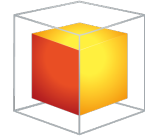


ECM
TECHNOLOGIES

AUTOMOTIVE APPLICATIONS
MODULAR FURNACES





Expert in heat treatment solutions, the ECM group, founded in 1928, is recognized all over the world for its innovations, technologies, processes, solutions and services. Since 1991, with its patented Infracarb process and its modular concept of low pressure carburizing installations (ICBP), ECM Technologies has strengthened its position as the leader in this market with more than 1400 heating cells in production around the world.

ECM Technologies' furnaces meet the needs of all industrial sectors, in particular the automotive and aerospace industries, and improve the performance of the parts produced thanks to a clean, safe and efficient heat treatment.





Automotive Applications

The automotive sector is the historical market of the ECM group and offers many technical and technological opportunities for both manufacturers and suppliers.

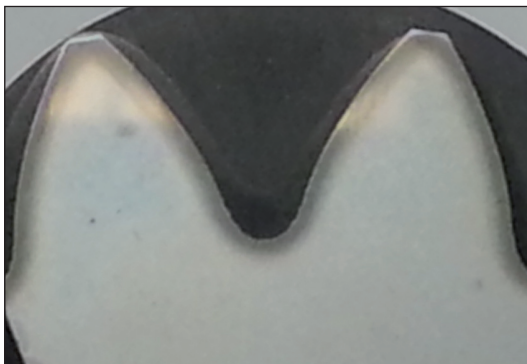
The innovation is constant and ecological awareness takes the lead in the buying decision process ; the ICBP range of furnaces offers the actors in the automotive market, flexible and adapted solutions to their problems.

Process quality, distortion control, core hardness, cleaner processes, integration into production lines, reduced time cycles, modularity, are just some of the many customer requirements that the ICBP range meets for various automotive applications : internal combustion engines, electric and hybrid cars, trucks, buses, tractors, bikes.





Low Pressure Carburizing in the Automotive Industry



Carburizing depth on treated parts

Carburizing is the process of hardening the surface of a metal by diffusing elements into the surface of the material to form a thin layer of a harder alloy. Combined with a quenching operation, case hardening allows the mechanical properties of the component to be modified to suit the application.

For more than 30 years and with its patented low pressure carburizing (LPC) process, ECM Technologies has been the reference partner of many car manufacturers.

The ECM Technologies' offer stands with the structural changes in the automotive market with the strong development of electric vehicles and the adoption of low carbon processes : ICBP systems respond to these challenges.

ECM Technologies' solutions offer many advantages from a metallurgical point of view. Treated parts have improved properties with no oxidation, good depth and core hardness, excellent aesthetics and improved wear and fatigue resistance ; excellent for transmission system parts.

These heat treatment operations guarantee a very good control of distortions as well as a high repeatability of the process.

The use of vacuum allows electrical heating at higher temperature and therefore eliminates the use of endogas generator, which makes ICBP low carbon production tools in line with environmental standards. Higher temperature treatments also make possible shorter, more efficient cycle times and therefore an optimised energy consumption : up to 40% energy savings.

The ICBP Furnaces are also adapted for many heat treatment processes. They can handle several processes with the possibility to have nitriding, nitrocarburizing, carbonitriding, sintering, brazing or hardening operations on the same installation which make the ICBP modular and multi-processes installations.



High reduction of heat
treatment operations
carbon footprint :
up to 80%
cut in
CO2 emissions



ICBP - Low Pressure Carburizing Systems



1. ICBP Flex 2. ICBP Nano 3. ECO 4. ICBP Jumbo

More than
280
Installations

More than
1400
Cells

ECO

The ECO Furnace is a double chamber installation including a furnace and an integrated oil or gas quenching cell. It is a compact installation that aims at replacing sealed quench furnaces or IQ furnaces for hardening or carburizing operations.

NANO

ICBP® Nano is the compact solution from the LPC furnaces range of ECM Technologies. The ICBP® Nano can be easily integrated into production lines and allows to cut down the time of the cycle while simplifying flows in between machining and heat treating.

FLEX

The ICBP® Flex is the most innovative and popular vacuum carburizing furnace solution of the ECM range. Based on a tunnel concept, the Flex is a robust, reliable and yet simple solution. These assets make it a reference on the market, illustrated by its wide diffusion of over 200 systems in production around the world.

JUMBO

The ICBP® Jumbo, articulated around a central shuttle, keeps all of the compact and modular qualities of the ICBP® Flex. The Jumbo goes further in terms of volume and number of parts treated in a low pressure carburizing installation.



Automotive Applications : Key Parts



GEARS & SHAFTS

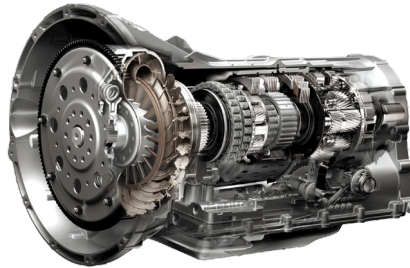


STEERINGS

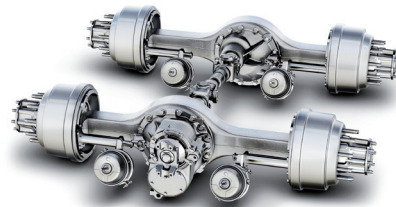


COMMONRAILS
SYSTEMS

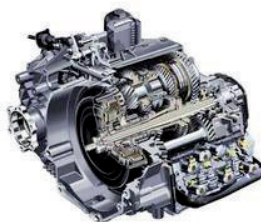




TRANSMISSIONS



AXLES



GEARS BOXES

Non exhaustive list
Some of our references in automotive industry to follow



ICBP FLEX Oil Quenching - Electric vehicle



ICBP Flex with oil quenching cell in a small pit

- Modular concept to adapt to production flows allowing investment phasing
- Reduced downtime when adding cells or during maintenance operations
- Heat treatment of shafts and gears for electric transmissions systems

The ICBP® Flex modular and compact architecture is based on a tunnel concept. It is designed to meet the highest demands in terms of part processing quality and productivity. It can be geared with an oil quenching and / or gas quenching equipment, as well as several heating cells depending on the required production capacity.

The ECM process makes a difference when strain or shock resistance is of importance, e.g. to increase torque in new generation gearboxes, such as electric vehicle systems. Low-pressure carburizing followed by oil quenching operation can meet this need and achieve the desired core hardness of the carburized parts.

This installation main advantage is to benefit from an optimised oil quenching cell. Indeed, the pit reduced to 500mm depth, lowers civil engineering costs while maintaining the same quenching quality.

Highlights

- Improved metallurgical properties
- Reduced oil quenching pit

Around
4000
transmissions
every day

so
1.3M
transmissions
every year



Application : electric transmissions systems components



ICBP JUMBO Gas Quenching & Robotics - Trucks

ICBP Jumbo



This installation was designed for a truck manufacturer. The main requirement for this machine was to guarantee a high capacity in terms of volumes. The ICBP Jumbo meets this need ; in this case the treatment of shafts for gearboxes. ECM has also completed its offer with its robotics expertise, which makes it a unique partner for a robotized heat treatment line.



Automated control

The ICBP® Jumbo, based on a central shuttle concept, keeps all of the compact and modular properties of the ICBP® Flex, but goes further in terms of volume and number of parts treated in a low pressure carburizing installation.

Once the parts have been carburized and quenched, a robot places them in a control station that checks any possible rare distortion. If they are conform, the robot will place them in the appropriate boxes. The workstation becomes then completely automated and autonomous, in a compact production space.

Highlights

- Big parts heat treatment
- Automated distortions control
- Ergonomic and compact workstation

Around
350 000
shafts every year



ROBOTICS &
AUTOMATION



Application : Trucks transmissions components



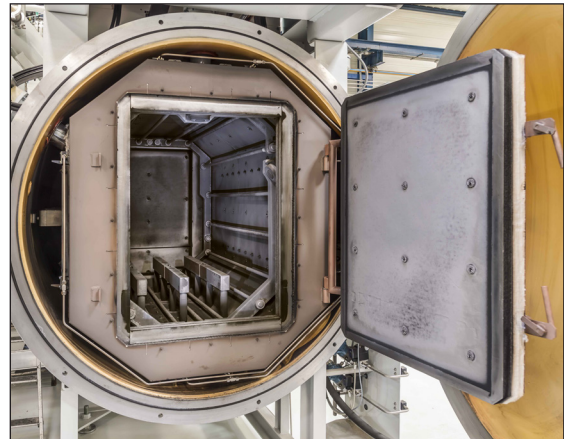
ECO Gas Quenching - Motorcycle

ECO furnace with gas quenching



This installation was designed for a motorcycle manufacturer. The ECO furnace is the appropriate solution for a low carbon footprint treatment and lower production volumes.

The low pressure carburizing treatment followed by gas quenching improves the metallurgical properties of these motorcycle gearbox parts : a better resistance to fatigue and wear with optimal distortion control.



Heating cell

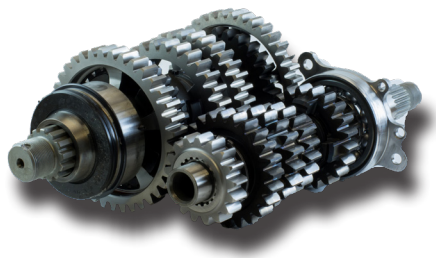
The ECO range of furnaces supports the industrial ecological transition by allowing a strong reduction of the environmental impact of heat treatment operations. This is particularly enabled thanks to :

- No endo gas generator
- Higher temperature treatments that reduce cycle times
- No carbonated gas used for carburizing operations
- Electrical heating system

Highlights

- Low carbon footprint solution
- Integration and safety within the workshop

Around
13 500
gear boxes
every year



Motorcycle gearbox
(non representative picture)



Application : motorcycle
gearbox parts



ICBP NANO & Robotics - Sensitive Parts



- Hydraulic systems components
- Bulk heat treatment
- Loads treated in small batches
- Vacuum carburizing followed by gas quenching
- Excellent reproducibility



Cell loading

The ICBP® Nano is directly integrated into the production line and allows you to reduce cycle times by simplifying production flows between machining and heat treatment. The footprint of this installation has been reduced to its minimum thanks to the superposition of treatment cells. Each cell is independently controlled, allowing for different temperatures, gas injections and heat treatment recipes.

The ICBP® Nano has been designed to maximize its compatibility with robotics, making easy and autonomous the bulk parts treatment in this case.

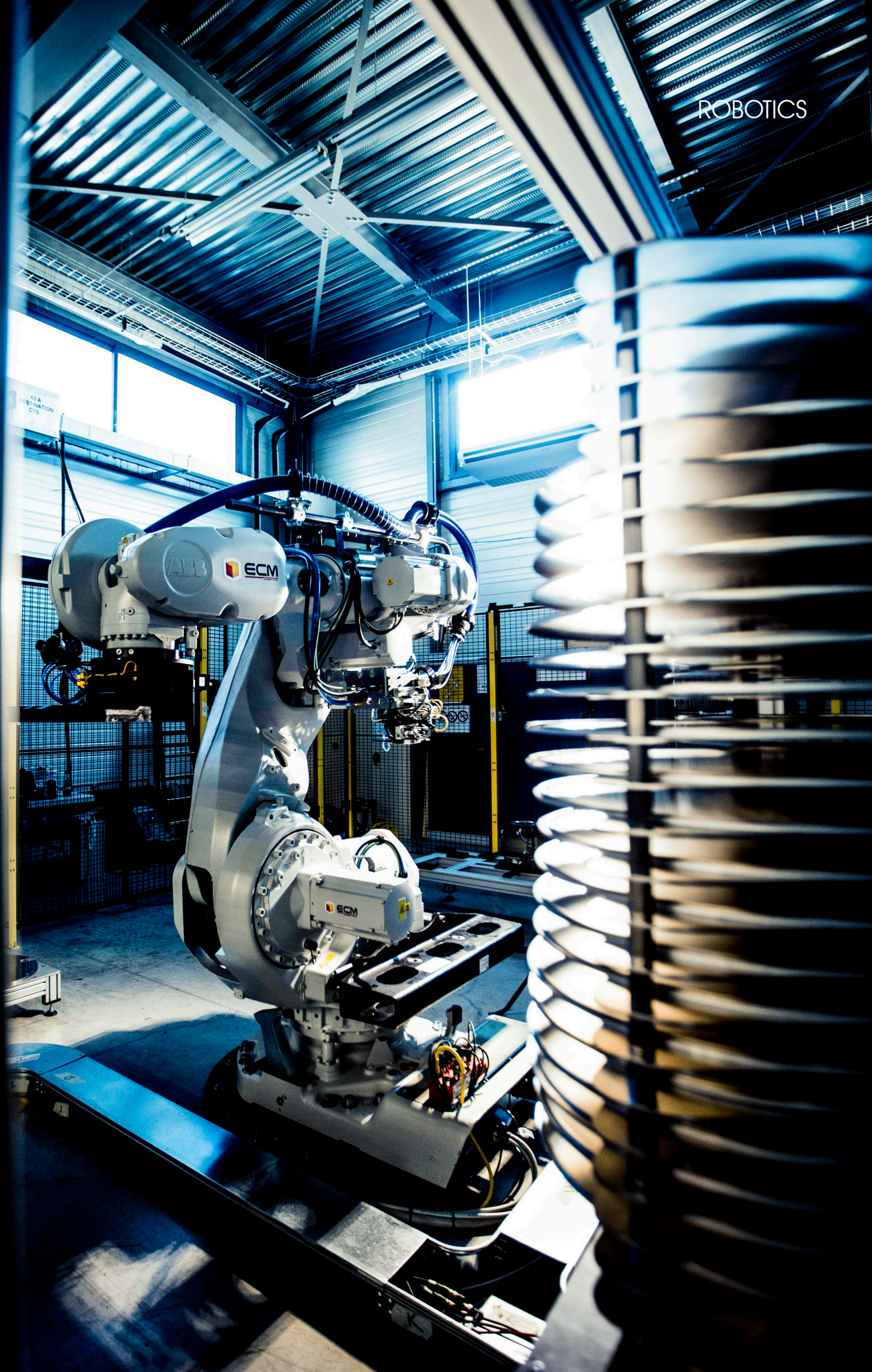
Highlights

- Bulk treatment
- Automated and robotized installation
- Direct integration in the production line

1 charge of
50 Kg
treated
every
7 minutes



Small parts & automated bulk treatment in the production lines



Industry 4.0 & Robotics

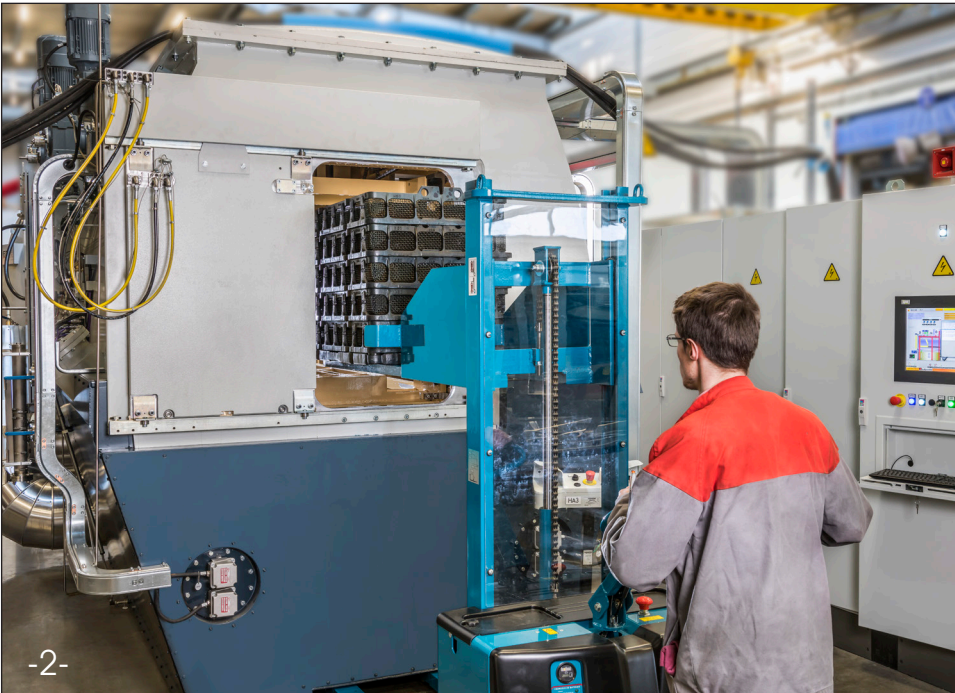
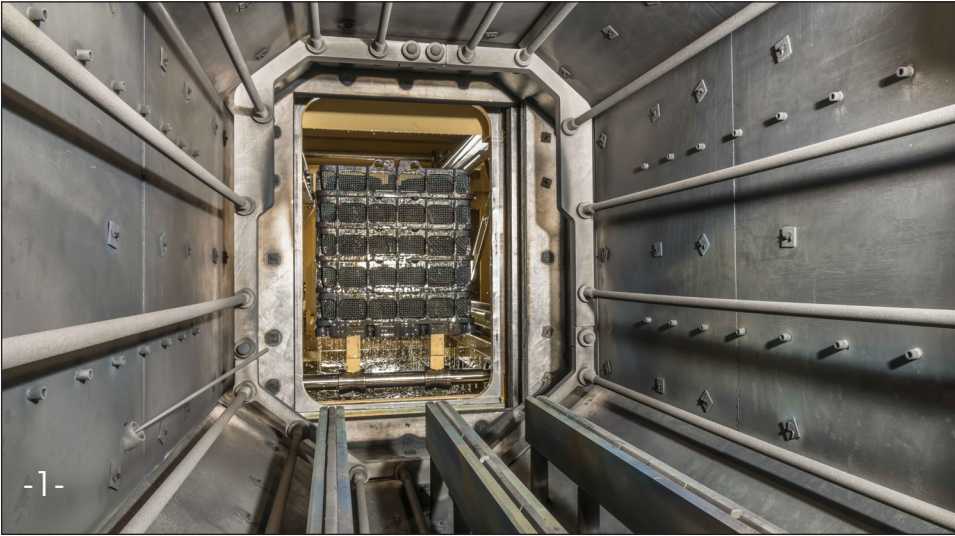
ECM Robotics

is a division of the ECM Group dedicated to the integration and management of all kinds of robots for several purposes.

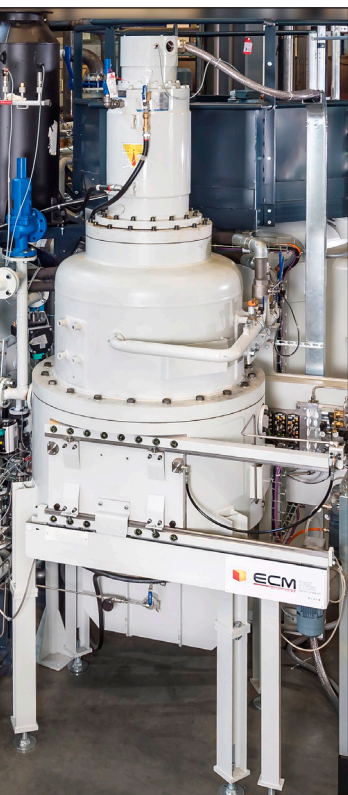
Its know how and services allow to supply fully automated and robotized heat treatment lines. ECM Technologies is then the unique contact for the integration of thermal processes.

Advantages

- Capacity to integrate robotics & automation in existing lines as well as in new projects
- Already more than 90 international references in various industries
- Skills to use all kind of robots and leading edge technologies :
 - Polyarticular, parallel & scara
 - Collaborative integration
 - Vision systems
 - Vision tracking
 - AMR



1. Oil Quenching cell 2. ECO Furnace loading 3. ICBP Nano 4. ICBP Nano loading 5. ICBP Flex



-4-



-5-



ECM
TECHNOLOGIES



- Headquarters
- Subsidiaries
- ▼ Commercial and After sales service agent



STELLANTIS



上海汽车变速器有限公司
SHANGHAI AUTOMOBILE GEAR WORKS

Non - exhaustive references list

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