







GF-ELTI is an Italian industrial corporation with an international presence, operating in the production of Plants for the Steel Industry. Founded in 1966, the Company was originally devoted to the production of Industrial Burners and, thanks to its great innovative spirit and pioneering vision, in 1976 the core business was expanded to include the design and manufacture of Industrial Furnaces. The inborn attitude to Research & Development activities brought to the creation of a Business Spin-off dedicated to Heat Treatment Services on third-party products, which empowers product and process experimentation aimed at granting Quality, Efficiency and Results. Engineering, Construction, Commissioning and Service are the milestone of GF-ELTI's way of doing business which, together with its highly qualified and experienced staff, dedicates care and attention to the development of innovative projects in full respect of the environment.

# Quality, R&D and Sustainability

GF-ELTI QUALITY MANAGEMENT SYSTEM PLACES CONTEXT ANALYSIS, CONTINUOUS DEVELOPMENT AND SUSTAINABILITY AT THE HEART OF ITS OPERATIONAL PROCESSES.

Complying with International Standards on Quality,
Safety and the Environment is of fundamental importance
for GF-ELTI, therefore it is certified and operates in full
compliance with the most important international reference
Standards.



Environmental

Management System

#### UNI EN ISO 9001

Quality Management System of Company's Internal Processes

#### ■ UNI ISO 45001

Workplace Health and Safety Management System

#### ■ UNI EN 9100

Quality Management System for Aerospace and Defence Sectors

#### ABS

(American Bureau of Shipping) Naval and Off-Shore Industry International Standards for Heat Treatment Processes

#### NADCAP

Heat Treatment Certification Program for Aerospace and Defence Sectors

#### API 6A

Oil & Gas Industry International Standard for Heat Treatments and Temperature Uniformity Test Management

#### ASTM A991

International Standard for Temperature Uniformity Test Management on Heat Treatment Furnaces for Steel Products

#### **AMS 2750**

International Standards on Pyrometric Requirements for Heat Treatment Instrumentation, Equipment and Furnaces

#### NORSOK M-650

Oil & Gas Industry International Standard for Heat Treatments



# RESEARCH AND DEVELOPMENT

**SUSTAINABILITY** 



THE OPTIMISATION AND
EFFICIENCY OF EACH PHASE
OF THE PRODUCTION PROCESS
ARE THE MAIN OBJECTIVE
OF THE COMPANY'S
CONSTANT RESEARCH AND
DEVELOPMENT ACTIVITY.

Over the years, GF-ELTI's team of experts has developed a wide range of Innovative Solutions able to respond to Markets and Customer several needs. The collaboration with Universities and Research Institutes, as well as with Customer and Supplier R&D Centres, has enabled the development of value-added products and the improvement of production processes. GF-ELTI has its own Laboratory to carry out Tests and Research on heat-treated products, offering valid support both to the Customer and to all production activities.

GF-ELTI'S CULTURE
OF SUSTAINABILITY IS
ORIENTED TO THREE
MAIN AREAS.



Every choice in business and relations with its stakeholders is inspired by the principles of Corporate Social Responsibility and is aimed at achieving corporate well-being. The enhancement of **Human Resources**, the awareness of employees to issues such as **Health** and **Safety** in the workplace, as well as the welfare project combined with the **Promotion and Protection of the Territory** increase the value of GF-ELTI's sustainable policy.





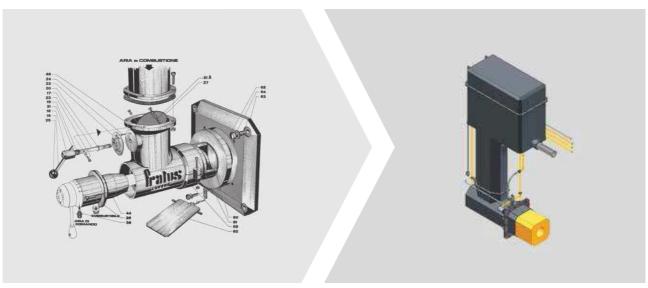
The Company's history begins in **1966** in a small workshop specialised in the design and construction of the first **Automatic Naphtha-run Burners**: this technology, unknown at the time, immediately received

PROTOCOLLO nº 24612 A MAY! CAMERA DI COMMERCIO INDUSTRIA E AGRICOLTURA BERGAMO VERBALE DI DEPOSITO PER BREVETTO D'INVENZIONE INDUSTRIALE L'anno 1956 il giorno medici del mese di dicembre alle see nove a minuti 00 di matemalisi iteliana con sele in LOVESE (Bergamo) misene.

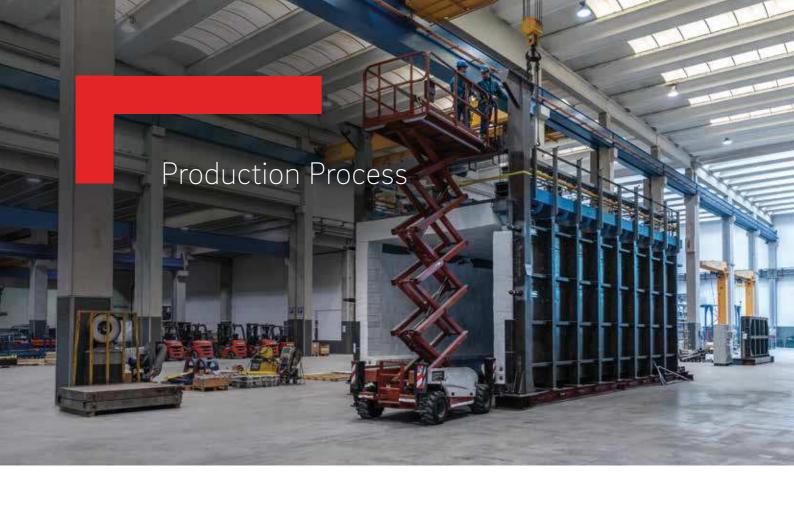
Vic. Resiconale di sele di legge a BESSANO

Via. A.locatelli a. 7 pressa meni
ha precentate a me sumancina. Spec Iteliana 1. - Domanda, in bollo da L. 400, di BREVETTO PER INVENZIONE INDUSTRIALE avente per TITOLO " FERFEZIONAMENTI AI DISPOSITIVI BRUCIATORI AUTOMATICI DI COMBUSTIBILI LIQUIDI PER USO INDUSTRIALE " 4. - Anacidadeana lenera d'incarica, Africanacidadeana Biometria de partire e trademente delimente.
Asiminatario de A American di vernamento fiul e/c post. n. 1/11770 inteniato al 1º Ufficio I. G. E. Roma) di Itre 10.500, we corese dell'Ufficio Possile di Borginato. in data 15.12.66 n. 077 her 400 rmesso dall'Ufficia Post da Bergano 10. Descrizione riascuntiva. La domanda, le descrimini ed i disegni sopraelencari sono euri fernari da L. richiedeux 8 e da m mati e bollati col timbro d'Ufficio. IL DEPOSITANTE Pas Dr. PIERLUIGI PAVONI P. . . / ILANGRETANO GENERALE F.m. Suglielmo Tinaglia

an Industrial Patent and has been a springboard towards the design and production of more complex Industrial Plants. Then, in the '60-'70s, the Company develops the Automatic Gas-run Burners characterized by innovative digital management technique, nowadays still of relevant performance value. The further R&D efforts, stimulated by the energetic crisis of the '70-'80s, bring to the development of a high performance Regenerative Burner that will receive international certifications from Gas De France and TÜV Germany. Nowadays, with decarbonisation activities being a primary global goal, GF-ELTI develops industrial burners run with Hydrogen or with a blend of H<sub>2</sub> - CH<sub>4</sub>, together with innovative control and safety systems. Thanks to its experience GF-ELTI today has developed various Industrial Burners and Plants, entirely designed on the specific industrial process needs. GF-ELTI burners are developed and manufactured to comply with the Best Available Techniques (BAT Reference) in terms of Safety, Efficiency and Environmental Emissions.



■ The evolution of GF-ELTI Burners



# PRELIMINARY ACTIVITIES

- Customer GF-ELTI Contact
- Video Conference Call, Meetings and Field Inspections
- Feasibility Studies
- Technical and Commercial Proposal
- Project Discussion and Approval
- Order









- Design, Engineering Development,3D Simulation validated with F.E.M. Analysis
- Manufacturing of Plant Components and GF-ELTI Thermic Equipment
- Modular Prefabrication
- Check of Project Data Compliance
- Hot and Cold Tests
- Equipment Acceptance
- Disassembly, Packing and Shipping









**■** Bogie Furnace for Heat Treatments



#### **GF-ELTI OPERATES IN 2 RELATED BUSINESSES**

#### INDUSTRIAL TURNKEY EQUIPMENT

#### **HEAT TREATMENT SERVICES**

GF-ELTI's structure and its qualified staff work daily to turn Customer's ideas and needs into Tailor-Made Equipment Solutions that are the benchmark in terms of performance, consumption and emissions. The entire production chain lies within the Company: from the management of the Customer's request to the shipment.

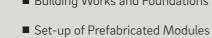
At the Customer's premises, GF-ELTI takes care of the installation of the Equipment, from assembly to start-up, as well as Customer's personnel training. The After-Sales Service guarantees the technical reliability of the Equipment over time: remotely online as far as possible or through on-site interventions. The Customer can turn to it for any operational need: maintenance planning, emergency interventions, supply of spare parts, assistance with Plant performance re-certification, revamping or whatever is necessary.

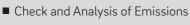






- Building Works and Foundations
- Equipment Start-up
- Hot and Cold Tests
- Check of Performance Compliance
- Turnkey Equipment Delivery









- Regular Servicing
- Remote Assistance
- Equipment Re-certifications
- Spare Parts Supply
- Revamping

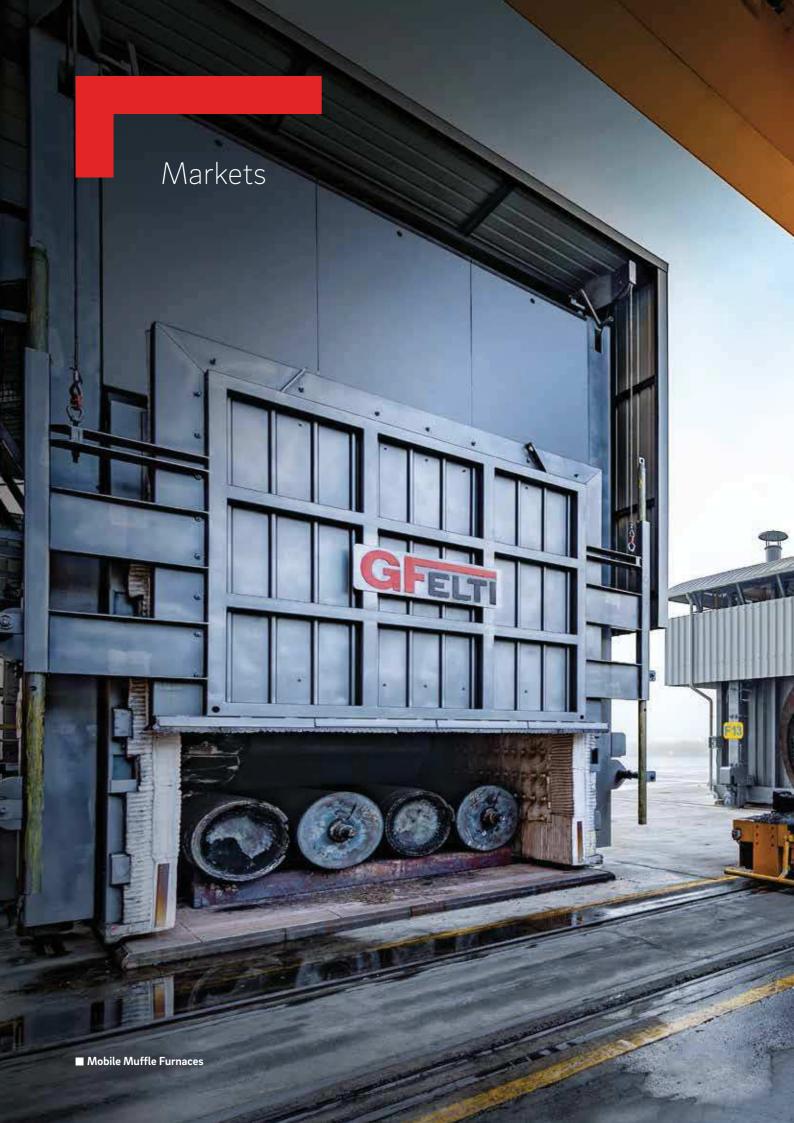








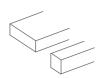








# GF-ELTI IS ABLE TO DEVELOP TAILOR-MADE SOLUTIONS FOR THE TRANSFORMATION PROCESS OF THE FOLLOWING COMMODITIES:



Blooms, Billets, Slabs



Forged Products



Pipes and Tubes



Railway Wheels and Axles



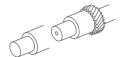
Castings



Flanges and Valves



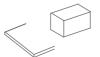
Joints, Fittings and Curves



Rolling Cylinders and Rotors



Ingots



Sheets and Flat Rolled Products



Coils



Bars



Ferrules



# THE PLANTS PRODUCED TODAY BY GF-ELTI MEET THE DIFFERENT PRODUCTION, COMBUSTION AND HEATING REQUIREMENTS FOR THE FOLLOWING MARKETS:

#### **STEELWORKS**

- Reheating / Drying Ladle up to 400 Ton
- Reheating / Drying Torpedo Ladle
- Eco-friendly Box for Ladle Drying
- High Efficiency Afterburner
- Tundish Reheating / Drying System
- Snorkel Reheating Furnace C.C.M.
- Blast Furnace Channel Reheating
- Ingot Moulds and Shells Preheating Device
- EAF Bath Oxidation System
- Fluid Injector for O<sub>2</sub> CH<sub>4</sub> C Ca EAF

#### **ROLLING MILLS**

- Pusher Furnace Unilateral / Bilateral Reheating
- Walking Beam Furnace Bilateral Reheating
- Walking Hearth Furnace Unilateral Reheating
- Rotary Hearth Furnace
- Static Chamber Furnace
- Automatic Service Machine for Commodity Loading / Unloading
- Energy Recovery from Chimneys

#### **FORGING**

- Fixed Hearth Furnace
- Rotary Hearth Furnace
- Bogie Furnace
- Mobile / Fixed Muffle Furnace
- Pit Furnace
- Automatic Opening / Closing Manipulator

#### **HEAT TREATMENTS**

- Bell / Double Combinable Bell Furnace
- Fixed Hearth Furnace
- Bogie Furnace
- Walking Beam Furnace
- Roller Hearth Furnace
- Roller Hearth Furnace with Controlled Atmosphere
- Chain Furnace
- Pit Furnace
- Automatic Opening / Closing Manipulator
- Vertical Furnace
- Electric Reheating Furnace
- Static Chamber Furnace

#### **QUENCHING SYSTEMS**

- Radial / Tangential /Differential Quenching System
- Thermic Drying System
- Vertical / Horizontal Spray Cooling System
- Quenching Head / Tunnel (Sprayer)
- Cooling Tank with Forced Agitation
- Tank with Platforms and Forced Agitation
- Tank with Rotating Platform
- Heat Treatment Tank Preheating
- Cooling Fluids Agitation System via Mixer
- Product Transfer Manipulator

#### **AUXILIARY SYSTEMS**

- Controlled Cooling Station
- Handling and Conveyor for Product Transfer
- Product Transport System and Lifting Platform
- Mould Heating Furnace for Aluminium Extrusion
- Gaseous Fuel Decompression Station
- Light Alloy Melting Furnace
- Furnace for Agglomeration Lines
- Device for Hardness Measurement "Valtulini HBW"
- Furnace for Dynamic Stability Verification
- Thermocouple Certification Furnace

## Markets

### **STEELWORKS**

- Reheating / Drying Ladle up to 400 Ton
- Reheating / Drying Torpedo Ladle
- Eco-friendly Box for Ladle Drying
- High Efficiency Afterburner
- Tundish Reheating / Drying System
- Snorkel Reheating Furnace C.C.M.
- Blast Furnace Channel Reheating
- Ingot Moulds and Shells Preheating Device
- EAF Bath Oxidation System
- Fluid Injector for O<sub>2</sub> CH<sub>4</sub> C Ca EAF



■ Vertical Ladle Reheating Systems

Since the 1960s, GF-ELTI has been producing Steelworks and Foundries Systems for Tundish and Ladle reheating and drying, as well as Plants dedicated to the combustion of polluting fumes and vapours generated by the various steel production processes. These Systems are equipped with GF-ELTI Auto-Recuperative Burners characterized by high energy efficiency, low emissions into the atmosphere and low fuel consumption. Thanks to its competitive costs and reduced delivery times, today GF-ELTI is able to satisfy its Customer's needs all over the world.



■ Vertical Ladle Reheating System



#### **ROLLING MILLS**

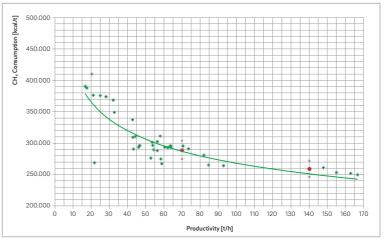
- Pusher FurnaceUnilateral / Bilateral Reheating
- Walking Beam Furnace Bilateral Reheating
- Walking Hearth Furnace Unilateral Reheating
- Rotary Hearth Furnace
- Static Chamber Furnace
- Automatic Service Machine for Commodity Loading / Unloading
- Energy Recovery from Chimneys

Over the years GF-ELTI has designed, manufactured and installed new Reheating Furnaces and, at the same time, has carried out important revamping activities on technologically outdated plants in terms of thermic efficiency and emissions into the environment. All the Furnaces installed have been realized and conceived according to the still current Modular Prefabrication Technique. Their beating hearth is the combustion system, characterized by Regenerative **Technology** and advanced self-adaptive control systems. The use of mathematical and thermo-fluid dynamics modelling systems, combined with the latest generation of PLCs and HMIs, as well as with interactive control-management software, makes it possible to obtain top quality operational and performance results. The acknowledgments obtained by International Research Centres and Customer loyalty are the best confirmation of GF-ELTI Plants' performances.

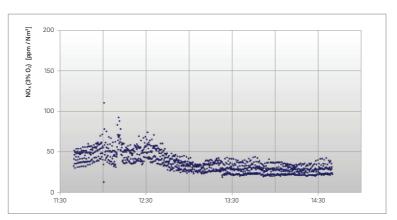
...The plant has been running very well, around 19,000 Tons yesterday and 7,100 Tons tonight.

Well, the GF-ELTI furnace recently installed is excellent and we are currently recording optimal performances...

- A Customer -



■ Reference Consumptions of a Reheating Walking Beam Furnace



■ Emission measured at the chimney on a Rolling Mill Reheating Furnace equipped with Regenerative Burners

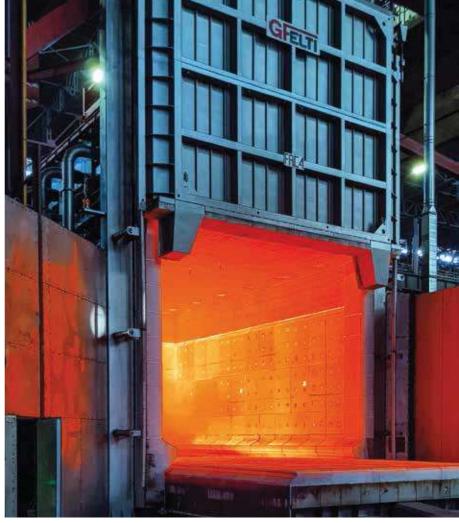
## Markets

#### **FORGING**

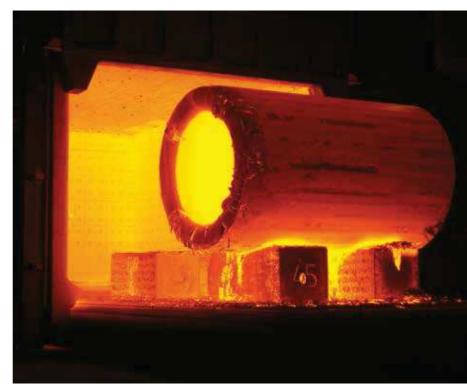
- Fixed Hearth Furnace
- Rotary Hearth Furnace
- Bogie Furnace
- Mobile / Fixed Muffle Furnace
- Pit Furnace
- Automatic Opening / Closing Manipulator

GF-ELTI designs and manufactures
Forging Furnaces (from 2 up to 1,000
Tons of net charge) according to the
Modular Prefabrication Technique. The
peculiarities of GF-ELTI Forging Furnaces
recognized by the Customers are:

- extremely low energy consumption compared to traditional technologies;
- heating and cooling rapidity;
- optimal combustion thanks to the retroactive control of the oxygen concentration in the furnace chamber;
- full automatic furnace management;
- excellent thermic insulation and temperature uniformity of both furnace chamber and charge even at low temperatures;
- refractory stability to sudden and repeated thermic shock;
- limited maintenance interventions; Furthermore the digital management technique of the **Regenerative Burner** allows to keep  $NO_x$  emission below the European market reference parameters, despite of the high preheating temperatures of the comburent and the resulting flame temperature over 2,000 °C.



**■** Bogie Furnace for Forging



**■** Bogie Furnace for Forging



#### **HEAT TREATMENTS**

- Bell / Double Combinable Bell Furnace
- Fixed Hearth Furnace
- Bogie Furnace
- Walking Beam Furnace
- Roller Hearth Furnace
- Roller Hearth Furnace with Controlled Atmosphere
- Chain Furnace
- Pit Furnace
- Automatic Opening / Closing Manipulator
- Vertical Furnace
- Electric Reheating Furnace
- Static Chamber Furnace

Thanks to the experience gained throughout the management of its Heat Treatment Division and of its Furnace Fleet equipped with state-of-the-art technologies, GF-ELTI represents the best partner for the supply of tailor-made and turnkey **Heat Treatment** Plants. The furnaces can be completed with Quenching Tanks and Semi-Automatic Manipulators designed and developed by GF-ELTI to handle the products in a semi-automatic way. GF-ELTI provides the Customer with an Automated, Repeatable, Efficient and Safe Process, able to give the product high quality standards, integrating the Plants with control and management systems that meet Industry 4.0 requirements. All Heat Treatment Furnaces are designed and manufactured in compliance with CE Regulations and Industry Standards such as: API 6A, AMS 2750, ASTM A991, NORSOK M-650, NADCAP and ABS.



**■** Heat Treatment System



■ Walking Beam Heat Treatment Line for Railway Axles

## Markets

#### **QUENCHING SYSTEMS**

- Radial / Tangential / Differential Quenching System
- Thermic Drying System
- Vertical / Horizontal Spray Cooling System
- Quenching Head / Tunnel (Sprayer)
- Cooling Tank with Forced Agitation
- Tank with Platforms and Forced Agitation
- Tank with Rotating Platform
- Heat Treatment Tank Preheating
- Cooling Fluids Agitation System via Mixer
- Product Transfer Manipulator



■ Quenching Tank System for Tubes

The Quenching Systems are Plants used in the Heat Treatment process lines for the cooling of products. The quenching process develops dynamics that are difficult to control and involve variables such as time and temperature, which occur in fractions of a second. GF-ELTI Quenching Systems are the result of knowledge, experience and attention to detail, tested on industrial scale by processing and historicizing process data on a wide range of products and allowing complete control of the production process. GF-ELTI designs, produces and installs Quenching Systems together with its Heat Treatment Lines in order to supply not just a single Plant but a Complete Production Line.



■ Differential Quenching System for Railway Wheels

## **GFELTI**

#### **AUXILIARY SYSTEMS**

- Controlled Cooling Station
- Handling and Conveyor for Product Transfer
- Product Transport System and Lifting Platform
- Mould Heating Furnace for Aluminium Extrusion
- Gaseous Fuel Decompression Station
- Light Alloy Melting Furnace
- Furnace for Agglomeration Lines
- Device for Hardness Measurement "Valtulini HBW"
- Furnace for Dynamic Stability Verification
- Thermocouple Certification Furnace



■ Equipment for Rotary Heat Stability Tests on Forged Rotors

The Research and Development activities carried out by GF-ELTI over the years have made it possible to develop a series of Automatic and Semi-Automatic Plants to complement the Reheating and Heat Treatment Plants. These Systems make it possible to automate processes, thanks to the use of advanced technologies, in order to guarantee Repeatability, Reliability and Qualitative Standards speeding up production cycle times and increasing the Safety of operators. In this way GF-ELTI is able to offer Tailor-Made solutions, specifically developed with the precise intent to provide not only a Complete Plant, but also an Automated Process and a Guaranteed Result.



■ Automatic Plant with high productivity for Hardness Tests on Heat-Treated Products







THE HEAT TREATMENT DIVISION WAS FOUNDED IN 2000s WITH THE AIM OF REPRESENTING A QUALIFIED PARTNER IN THE STEEL INDUSTRY ABLE TO OFFER A 360° HEAT TREATMENT SERVICE THROUGH ITS OWN HIGH-PERFORMING PLANTS.

All the Furnaces installed in GF-ELTI are certified according to the most stringent International Sector Regulations and are covered by numerous Process and Product Patents. For these reasons GF-ELTI is included in the Manufacture Process Specifics (MPS) of the Industry Players as a recognised, certified and recommended heat treatment centre for the transformation of steel products. The Heat Treatment Division operates according to a certified Quality System that complies with UNI EN 9100, a standard that meets the requirements of the authorities and manufacturers of the Aerospace and Defence Sector. All the new Combustion Systems designed by the GF-ELTI R&D Center are tested and validated in-house before being marketed, in order to grant an additional reliability level. Each **Technological Revamping** represents a cutting-edge solution and an industry benchmark, stimulated by Customer's inputs and market analysis results.

**50,000+** 

800+
TON/Y CO2 NOT EMITTED
FROM THE HEAT TREATMENT

20+
PLANTS INSTALLED
IN-HOUSE

**DIVISION FURNACES** 

15+
THERMIC PROCESSES
FOR IN-HOUSE USE



# IN-HOUSE FURNACE FLEET

MAX Useful Charge Volume	Width: 5,000 mm
	Length: 15,000 mm
	Height: 3,000 mm
Useful Charge Volume for Vertical Heat Treatments	Ø 2,000 mm
	Height: 11,000mm
Charge Capacity	5 ÷ 200 Ton each furnace
Heat Treatments Available	Stress Relieving, Tempering, Annealing, Normalization, Ageing, Solubilisation, Quenching & Tempering, Spray Cooling, Nitriding, Normalization - Stress Relieving - Annealing in a controlled atmosphere
Quenching Fluid	Forced Air, Spray Cooling, Water, Polymer
MAX Working Temperature	1,200 °C
Quenching Transfer Time	< 40''
Reheating Gradient	≤ 100 °C/h Programmable
Cooling Gradient	≤ 50 °C/h Programmable
International certifications	API 6A, ASTM A991, AMS 2750, NADCAP, NORSOK M-650, ABS
Combustion Type	GF-ELTI Auto-Recuperative Burners
Controlled Atmosphere	$N_2 + H_2$
Temperature Uniformity Class	Class 2: $\pm$ 6 °C in the range of 540 - 760 °C
	Class 5: ± 14 °C in the range of 760 - 1,150 °C



GF-ELTI After-Sales Service guarantees the Technical Reliability and Efficiency of the Equipment over time. The experienced and qualified staff is able to work autonomously and reach the Plants installed worldwide, supporting the Customer for any Operational Need: maintenance planning, revamping activities, supply of spare parts and emergency interventions.

The main services offered are:

#### Scheduled Maintenance

Annual planning of maintenance activities aimed at monitoring the state of the Equipment and ensuring a prompt resolution of problems.

#### ■ Regular Servicing

Servicing carried out at the Customer's express request and managed in the shortest possible time.

#### ■ Remote Assistance

Online assistance with analysis of the specific requests for intervention in order to immediately identify and resolve Customer's needs.

#### **■** Equipment Re-Certifications

Specific tests in order to obtain the re-certification of the Plants, according to API 6A, AMS and ASTM regulations.

**EVERY YEAR** 

500+
SUPPLIES
OF SPARE PARTS

150+
MAINTENANCE SERVICES

85+
CUSTOMERS SERVED

50+
RE-CERTIFICATIONS
ON PLANTS



TODAY GF-ELTI HAS THE NECESSARY REQUIREMENTS
AND QUALIFICATIONS TO ACT AS A «ONE-STOP-PARTNER»
ABLE TO UNDERSTAND THE CUSTOMER'S NEEDS AND TRANSLATE
THEM INTO A COMPLETE PACKAGE OF PRODUCTS AND SERVICES.

