

Thermal Turnkey Solutions For The Battery Industry From THERSER



Visit Us @ : www.therseruk.com

Company History

The THERSER Group has been building kilns, furnaces and associated automation since 1904

All sectors covered:

- **Battery Materials**
- **Aerospace**
- **Automotive**
- **Sintered Metals and Ceramics**

Turnkey solutions for sintering and calcination of Anode and Cathode materials

We have built 1000's of kilns worldwide for different sectors

Building a better future



R&D Test Kilns



Use our knowledge expertise during the development and optimization of thermal processes



Optimize your production processes



Continuous development and improvement of our products



Investment and reduction of operating costs by optimizing systems for a better-quality product



Risk reduction by pre-tests with original parts



Customer trial tests for optimising of products and processes



Building relationships throughout the process

Materials We Can Fire

- Battery powders
- Powder chemicals
- Ceramics
- Carbon fibers
- Heavy clay
- Aerospace
- Organic materials
- Powder metals



R & D Handling System



- Saggars De-stacking Unit
- Saggars Material Blade Press
- Raise Saggars Lift
- Full Saggars Weighing Unit
- Lower Saggars Lift
- Reject Saggars Station
- Saggars Cleaning Unit
- Empty Saggars Weighing Unit
- Loss In Weight Saggars Filling Unit
- Full Saggars Weighing Unit
- Levelling / Racking Unit
- Needling Unit
- Saggars Stacking Unit
- Refill Station

Automation And Control

The Saggur Handling System will be supervised and controlled using a safety rack mounted modular PLC control system complete with dual redundant Comms throughout interfacing using a Colour Touch Screen Operator Interface (HMI). These are manufactured to your requirement.

All process data including KPI's KPV's and zone power consumption data will be available for connection to a remote SCADA system as an option.



Turnkey Supply Of Pilot Plant RHK & SHS



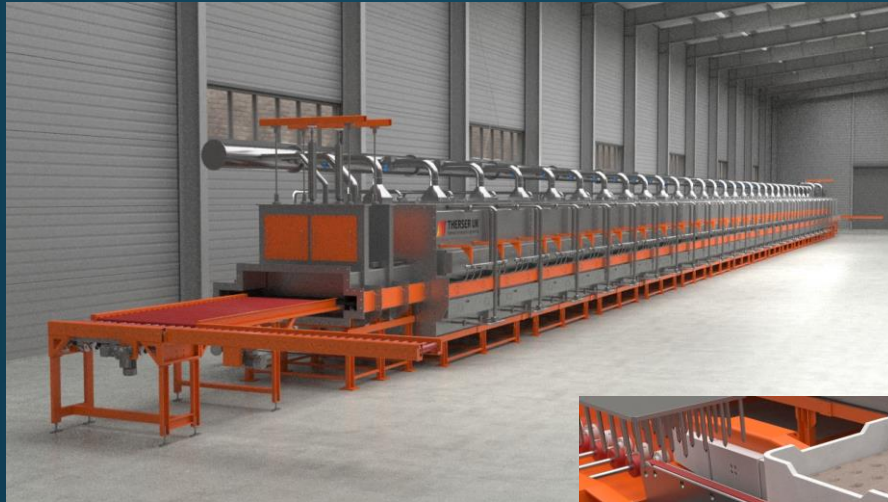
We Work In Partnership With Our Customers. What Does This Mean For You?

- Direct Communication to our team
- Customization and Flexibility
- Quality Control
- Faster Iterations and Time-to-Market
- Intellectual Property Protection
- Long-Term Support
- Cost Efficiency
- Confidentiality and Security



- Temperature control
- Atmospheric gases
- Changeable product through time
- All safety standard adhered to
- Power consumption measured
- Heat and cooling zone
- Uniform product output
- Process analysis
- Fully automated Saggur Handling System

To Commercial Scale Up



- Electrically fired solutions
- Made to your specification
- Atmospheric control
- PLC systems
- Made up to your building footprint
- Optimal 6 saggars wide 2 high, can be changed to your requirements.
- Inert gas atmospheres – Nitrogen (N₂) – (CO₂) Free Air – Oxygen (O₂) + Others
- High temperature uniformity
- Gas Tight
- Fully automated Saggars Handling System
- Low PPM values (30ppm)

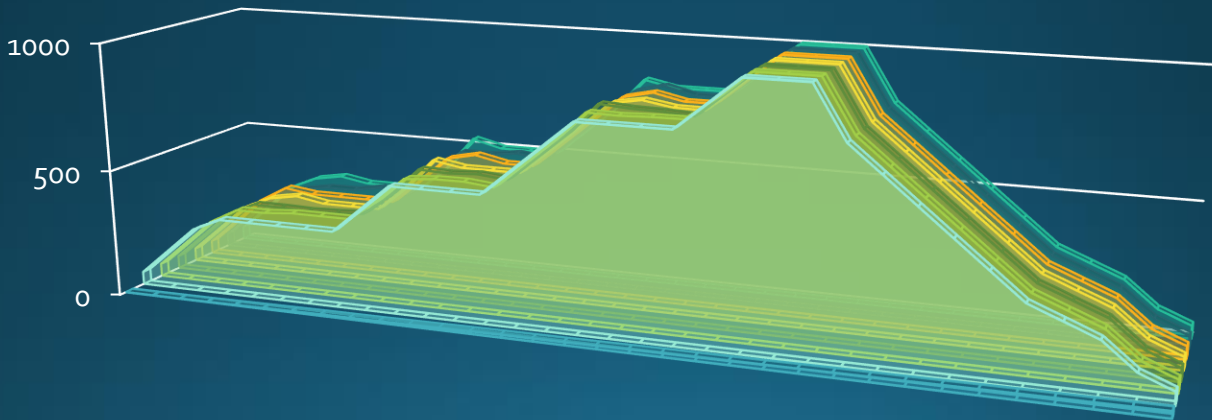
Customised RHK Solutions

THERSER partners you for your process solution



Working together to develop your process from Lab Scale to Commercial Scale-Up

Typical Firing Curve



To Suit Your Requirements

Temp 1 Temp 2 Temp 3 Temp 4 Temp 5 Temp 6 Temp 7

Process Gas Monitoring

Process Gases To Suit The Customer's Process

- Under 30ppm of O₂
- High Purity
- Mass Flow Control
- Inert Gas
- Gas tight kiln casing
- Nitrogen (N₂) – (CO₂) Free Air – Oxygen (O₂)
- High O₂ atmosphere > 99%



Why Choose THERSER For Your Next Project?

- 1000's of kilns delivered all over the world
- Offering turnkey solutions
- Working in partnership with you
- Made to your specification
- All with up-to-date technology
- We can offer product test fires – Battery Material, Aerospace, Automotive, Metals
- Provide CFD data
- Inhouse 3D modelling
- Design concepts
- Project managed
- High grade materials used or chosen by you
- Inhouse panel building
- Virtual reality tour of your project
- Fully bespoke automation systems
- Refractory solutions
- Fully compliant with all country specific regulations
- Quality checked
- Shipping all over the world
- Delivering on time
- Industry leaders
- Remote support from our engineering team
- Machinery onsite training
- Kiln servicing contracts
- Kiln spare parts





From The Planning Stage To Delivery

- **Planning:** During the planning stage, partners also identify the training needs of their teams to ensure everyone is equipped with the necessary skills and knowledge to support the partnership's objectives effectively.
- **Research and Analysis:** As part of the research and analysis phase, partners may assess the training requirements of their workforce and develop tailored training programs. This step is essential for seamless integration and understanding of the partnership's products or services.
- **Resource Allocation:** Adequate resources are allocated not only for the partnership's core operations but also for comprehensive training initiatives. This investment ensures that all employees involved in the partnership have the expertise to perform their roles optimally.
- **Execution and Implementation:** Partners collaborate closely during the installation phase, where they work together to deploy and set up the products or services offered by the partnership. Effective communication and coordination are critical during this stage to ensure a smooth installation process.
- **Commissioning:** After the installation is complete, commissioning follows. Partners test and validate the systems to ensure they function as intended, and any issues are promptly addressed.

From The Planning Stage To Delivery

- **Monitoring and Evaluation:** Partners continue to monitor the performance of the installed solutions and assess the effectiveness of the training provided. This ongoing evaluation helps in identifying areas for improvement and further collaboration.
- **After-Sales Support:** An essential aspect of the partnership circle is after-sales support. partners work together to provide customers with reliable support and assistance, addressing any concerns promptly and maintaining high levels of customer satisfaction.
- **Value Reinforcement:** Partners continuously reinforce the value of their collaboration by showcasing the benefits of their joint offerings and the exceptional after-sales support provided to customers.
- **Expanding Reach:** Satisfied with their partnership's success, partners may explore opportunities to expand their collaboration further, extending their combined offerings to a broader customer base.
- **Sustainability and Longevity:** Throughout the partnership's journey, both parties remain committed to maintaining high standards of service, ensuring the collaboration remains sustainable and long-lasting.





What We Offer

- **Thermal Process Review and Concept Development:** This stage involves a comprehensive assessment of the client's thermal processes and requirements. Based on the review, innovative concepts are developed to optimize efficiency, productivity, and quality.
- **Technical Proposal and Formal Quotation:** After understanding the client's needs, a detailed technical proposal is prepared, outlining the suggested solutions and associated costs, culminating in a formal quotation for the project.
- **Pre-Engineering to Full Engineering:** In this phase, initial pre-engineering is performed to lay the groundwork for the project. As the collaboration progresses, the team transitions to full-scale engineering, finalizing the project's specifications.
- **Computational Fluid Dynamics:** Computational Fluid Dynamics (CFD) simulations are used to study fluid flow and heat transfer within the system, optimizing performance and minimizing energy consumption.
- **Heat Up and Heat Transfer Thermal Analysis:** This analysis assesses the heating and heat transfer mechanisms, allowing for precise control of temperature profiles and uniformity within the thermal processes.
- **3D Modelling:** Utilizing advanced 3D modeling software, a detailed representation of the project is created, aiding visualization and improving design accuracy.
- **Full Refractory Solutions:** Comprehensive refractory solutions are offered, providing the appropriate materials and designs to withstand high temperatures and corrosive environments.
- **Electric Element Heating Systems:** Electric element heating systems are designed for projects that require precision heating control.

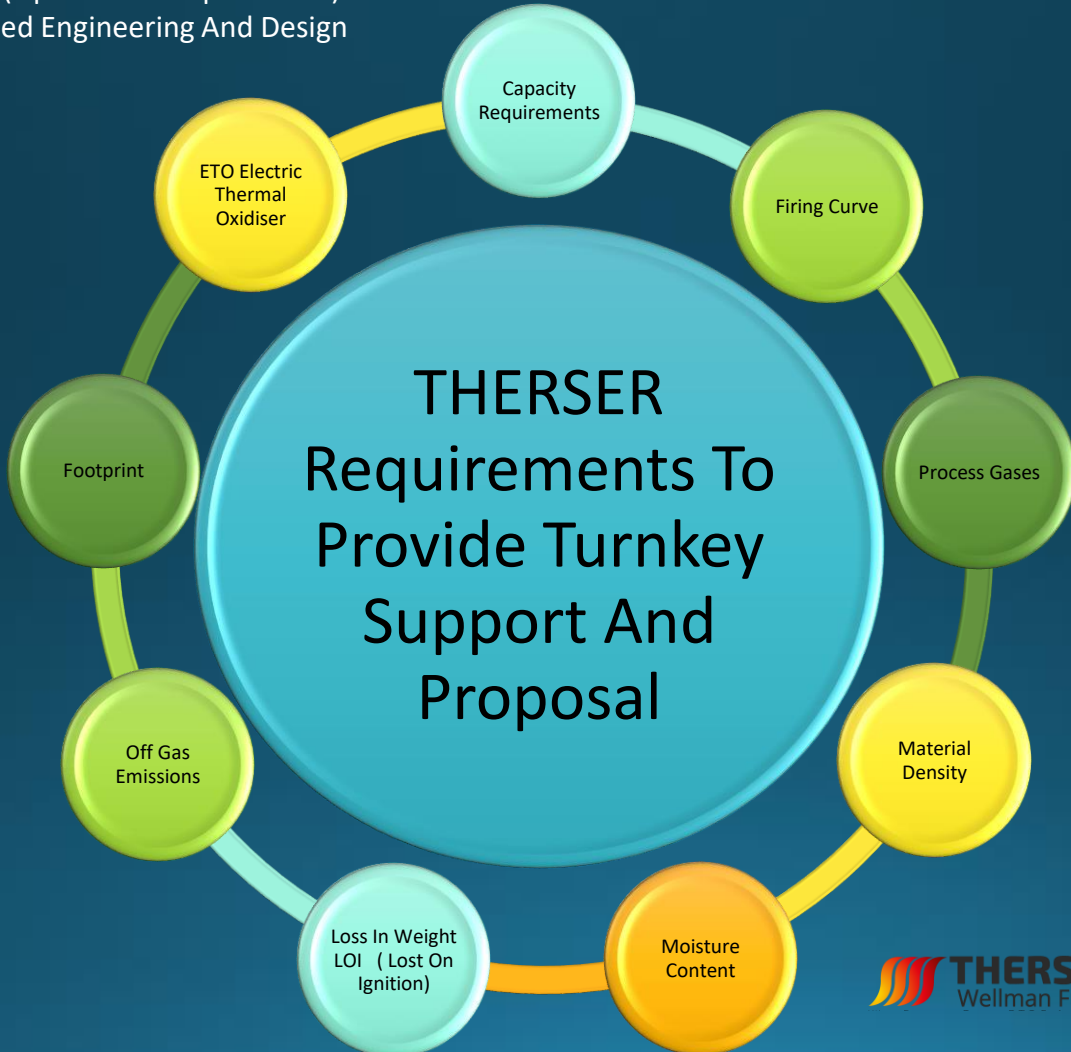
What We Offer

- **In-House Full Project Manufacturing Capability:** We design and manufacture your project which gives you full control of your design.
- **Fully Designed Saggar Handling Systems:** Saggar handling systems are carefully designed to safely transport and handle delicate ceramics or other heat-sensitive materials.
- **Virtual Reality Tours of Your Project:** Clients are offered virtual reality tours, allowing them to experience the project's layout and functionality before physical construction.
- **3 Off Electrically Fired Test Kilns, with Process Gas Options:** In-house test kilns are available for clients to conduct trials and optimize their products' firing processes.
- **CAD Drawing and Design:** Computer-Aided Design (CAD) drawings are provided, aiding in visualization and facilitating communication throughout the project.
- **Project Managed:** The entire project is meticulously managed, ensuring timelines are met, and resources are efficiently utilized.
- **Test Firings of Your Product:** The project includes test firings of the client's product, ensuring it meets the desired specifications and performance criteria.
- **In-House PLC Programming:** In-house Programmable Logic Controller (PLC) programming enables customized automation and control solutions.
- **In-House Panel Building:** The fabrication of electrical panels is done in-house, ensuring quality control and efficient integration of control systems.

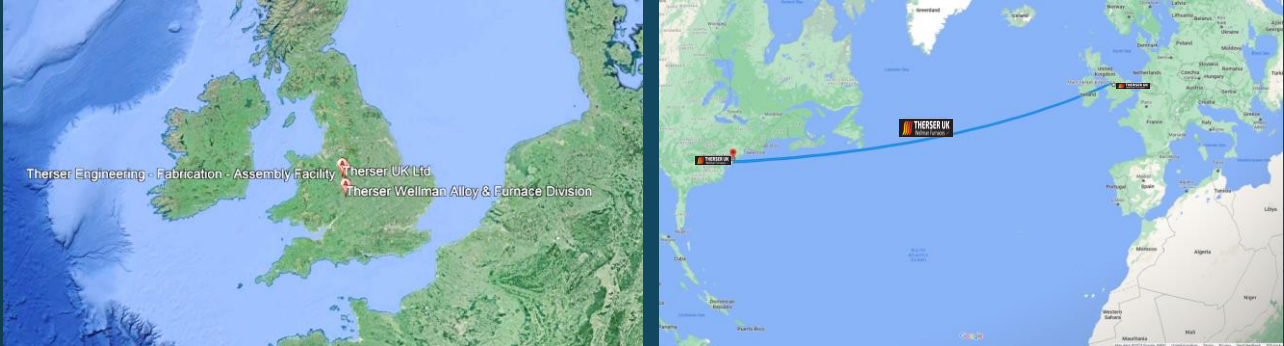
What THERSER Can Offer

1. Pre-FEED
2. FEED (Front End Engineering Design)
3. CAPEX (Capital Expenditure)
4. OPEX (Operational Expenditure)
5. Detailed Engineering And Design

The THERSER Group your partner from Planning to FID
(Financial Investment Decision)



Our Operational Offices



THERSER UK LTD MANUFACTURING CAPACITY

1:-Head Office/ R&D Centre

Walley Street Buildings, Burslem, Stoke-On-Trent, UK, ST6 2AH

2:-Engineering & Fabrication Works

Whittle Road, Meir, Stoke-on-Trent, Staffordshire, UK, ST3 7TU

3:-Project Assembly Hall

Unit 2, Dudson Business Park, Nile Street, Stoke on Trent, UK, ST6 2BA

4:-Furnace & Special Alloys Division

Unit 15 -16 Hale Trading Estate, Lower Church Lane, Tipton, UK, DY4 7PQ

5:-THERSER Inc

Newcastle, Delaware, USA

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