

ORIGINAL THERMIT[®]

**THE BEST CHOICE FOR
YOUR RAILWAYS**



BENEFITS OF THERMIT® WELDING AT A GLANCE

- Continuous joining of almost all rail profiles and grades, e.g., old to new, grooved to flat-bottom
- Robust and durable, even under highest loads
- Maximum process reliability and quality
- Fast – short track closures, high track availability
- Cost-effective – minimal equipment requirements, low operating costs



FROM INVENTOR TO GLOBAL MARKET LEADER

Around the world high speed trains, freight trains, heavy haul trains, trams and subways glide smoothly over continuously welded track. As the inventor and global market and technological leader in the field of Thermit® welding, for over 125 years, Goldschmidt has set standards for continuously welded track.



RELIABLE CONNECTION

An efficient and reliable railway infrastructure is an integral part of all sustainable mobility concepts. This requires reliable and long-lasting railway tracks. The Original Thermit® welding process enables the continuous welding of rails in a large variety of profiles and grades. Goldschmidt develops, produces and delivers all the required materials, tools and equipment required to carry out welding.



INNOVATION AND HIGHEST QUALITY

Our target is to meet all the requirements of our customers with innovative and reliable products of the highest quality. Original Thermit® is manufactured according to the strictest quality standards. Using our expertise and modern engineering, Goldschmidt ensures process reliability and therefore the reproducible high quality of our Original Thermit® welds. Numerous certifications according to international standards underline our competence.

CUSTOMISED SOLUTIONS FOR EVERY CHALLENGE

Original Thermit® encompasses a range of welding processes that enable a safe, efficient and durable connection of different rail types. Each process is tailored to specific requirements and areas of application.



FLAT-BOTTOM RAIL WELDING

For high-speed, heavy-haul, and high-traffic routes, our processes ensure maximum reliability, short welding times, and high track availability – with consistently high quality, even for high-strength rail grades.



GROOVED RAIL WELDING

Ideal for urban networks and tramways. Thermit® welding enables rapid and precise joints, even between geometrically complex rail profiles and across different rail grades.



CRANE RAIL WELDING

Specifically developed for extreme loads – delivering high-precision, safe welds, even under demanding operational conditions.



HEAD REPAIR WELDING

For economical rail maintenance and targeted repair of rail heads. The Thermit® Head Repair process extends track service life and availability, is straightforward to apply, and always delivers high-quality results.



STEPS OF THE THERMIT® WELDING PROCESS

1. SET A GAP

A gap is set between the two rail ends which are to be joined by welding.

2. ALIGN THE RAIL ENDS

The rail ends are aligned such that the geometrical tolerances can be met after grinding the finished weld.

3. MOUNT THE CASTING MOULD

A refractory mould is secured around the weld gap and sealed.

4. PREHEATING

The refractory mould and sealant are dried using a preheating torch and at the same time the rail ends are preheated.

5. THERMIT® REACTION

The Thermit® reaction is initiated in the crucible.

6. CASTING

The liquid Thermit® steel runs into the refractory mould. Molten Thermit® steel pours in between the two rail ends which melt and fuse together in a welding process.

7. REMOVAL OF RESIDUE

After the Thermit® steel has solidified, weld residue is removed.

8. FINISH GRINDING

After the Thermit® weld has cooled down, a final grinding process is performed.

ORIGINAL THERMIT®

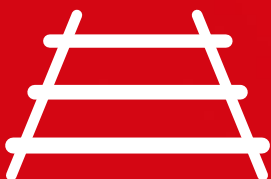
FACTS AND FIGURES

1895

With the granting of the imperial patent for Professor Hans Goldschmidt's invention of the aluminothermic process, the success story of Thermit® welding began. For more than a century, Thermit® has stood for the highest quality and innovation, and has shaped the ongoing development of modern rail infrastructure.



Thermit® is a mixture of aluminium granules and metal oxide which after an initial ignition has a strong exothermic reaction. With iron oxide this generates temperatures of approximately 3 000 °C. This enormous development of heat brings about a quick, self-propelled spread of the reaction throughout the whole mixture. The result is pure molten iron. However, for the joining of rails this Thermit® iron would still be too soft. Therefore, we add alloy additives to the Thermit® portion to produce steel with the right characteristics.



11 000 km

The length of track welded annually with Original Thermit® corresponds to roughly the distance from the North Cape to the Cape of Good Hope.

96 million

Thermit® portions

Continuously welded track is the key to efficient mobility and the guarantor of sustainable, safe and comfortable rail transport. With more than 90 million Original Thermit® portions sold since 1895, Goldschmidt has established itself as the global market leader.



Innovation

Goldschmidt is continuously refining the Thermit® welding process and taking it into the future with digital solutions such as Railstraight, Q-Weld, and efficient, battery-powered +S® equipment. These innovations ensure more flexible, precise, and sustainable processes in Thermit® welding. This way, the process will continue to offer maximum cost-efficiency and flexibility in the future.

Expertise

Goldschmidt guarantees the highest quality and reliability, certified to international standards and ensured by strictly monitored, validated processes. The Thermit® Centre of Competence is continuously further developing welding processes, while the Technology Innovation Centre rigorously tests and optimises them. This ensures your rail infrastructure is fully prepared for today's and tomorrow's demands.



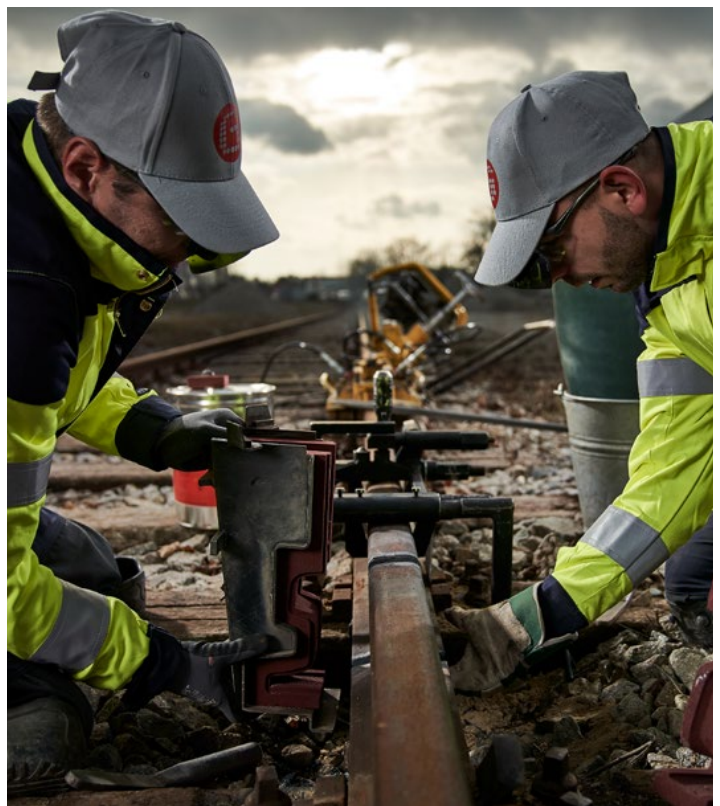
EXTENSIVE SERVICE – SUPPORT AT ALL TIMES

Remote support is valuable but cannot replace personal and competent service at a local level. As a company with global operations, Goldschmidt offers you a close and trusting cooperation – regardless of your location.

PASSING ON VALUABLE KNOWLEDGE



Goldschmidt offers training for all Thermit® welding processes at its own training facilities and at customer locations worldwide. In addition to basic training for Thermit® welders and installation technicians for insulated rail joints, we also offer routine examinations, advanced training and training for welding supervision personnel. Goldschmidt works closely together with recognized training partners around the world to maintain a consistently high quality. This enables the efficient training of numerous technical personnel worldwide from China and Europe to South America to become professional welders for the Original Thermit® process.



MUCH MORE THAN WELDING

Experienced application engineers at Goldschmidt support you worldwide with all aspects of track work and guide you through the introduction of new products and processes. This includes quality assurance for the execution of Thermit® welds and the inspection of your railway infrastructure and its maintenance.



GOLDSCHMIDT +S® – SUSTAINABILITY THAT DELIVERS

At Goldschmidt, +S® stands for putting sustainability into practice – for rail network operators and all teams working on the tracks. We believe modern rail networks thrive where technology, responsibility, and practical benefits meet. Goldschmidt +S® brings this vision to life: We integrate sustainable thinking into our developments, focusing on economy, ecology, and social responsibility, so that you and your teams can benefit from it every day.



THE +S® TRACK CONSTRUCTION MACHINE PORTFOLIO

Our innovative +S® machine portfolio is built to support welding teams and increase efficiency in track work.

The battery-powered and emission-free machines reduce noise, vibrations and physical strain on the operators.

Long-lasting, high-performance batteries from our partner EGO can be flexibly interchanged and charged – simplifying logistics and ensuring maximum flexibility on the track.

- **QUIET**
- **ERGONOMIC**
- **CLEAN**
- **DURABLE**
- **LOW MAINTENANCE**
- **RELIABLE**
- **FLEXIBLE**

SMALL SELECTION OF BIG PROJECTS

Due to its flexibility during daily operations, Thermit® welding has become an essential part of future-oriented railway projects. You too can benefit from the many benefits of this process and our extensive experience as the inventor.



QUALITY HAS NO LIMITS

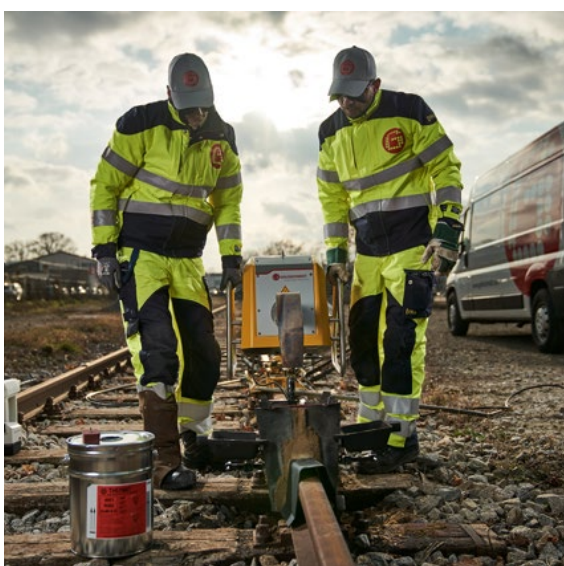
Using its international and experienced network of experts, Goldschmidt has the answer to all your questions when it comes to aluminothermic rail welding. Customers and business partners worldwide benefit from this global knowledge. High-speed trains, heavy load trains and light rail networks all run with low noise and low wear over continuously welded tracks welded with Original Thermit®. Here is a selection of projects.





MARMARAY TUNNEL

The Marmaray tunnel project joins the railway networks of Europe and Asia under the Bosphorus. The first trains went through the tunnel just one month after the final Thermit® weld was installed. The infrastructure project included the preparing of the 13.6 kilometre long tunnel, the extension and modernization of 63 kilometres of existing railway track, three new underground railway stations and the modernization of 37 further stations.



NEW SILK ROAD

Railway routes between China and Europe are being maintained and extended with Thermit®. The automated Smartweld Jet preheating torch is being used in the process. The torch has proven itself in the particularly difficult conditions of isolated areas and ensures an excellent quality and process reliability.



GERMAN REUNIFICATION PROJECT

On the high-speed rail route between Berlin and Nuremberg Goldschmidt supports the comfort of passengers and residents living close to the railway track through continuously welded tracks. Goldschmidt supplied all of the products required for the Thermit® welding process on Germany's largest track construction project.

