



CREATING THE CONTINUOUSLY WELDED TRACK

TRADITION MEETS MODERNITY



YOUR PARTNER FOR RAILS

ELEKTRO-THERMIT GMBH & CO. KG – BUILDING THE FUTURE TOGETHER

Rail travel has many advantages: it is fast, convenient and environmentally friendly. With our globally unique portfolio we ensure that high-speed, cargo and heavy haul trains, in addition to trams and metro trains, travel safely on continuously welded rails with minimum wear. Our products and services range from THERMIT® welding to innovative metrology through to training at our factory or on-site.

At our Halle (Saale) site, around 160 highly qualified staff work in the areas of research and development, production, sales and service. Our common goal: to satisfy every demand from our customers with innovation, efficiency, reliable service, flexibility and the utmost in quality.

As the largest subsidiary in the Goldschmidt Thermit Group we are the expert partners for train companies and transport operations around the globe. Elektro-Thermit GmbH & Co. KG is the Center of Competence of THERMIT® for the Group. This is where all the ongoing developments relating to the THERMIT® product take place, in collaboration with our customers and rail manufacturers.

We look forward to a successful working relationship with you – now and in the future.

Management of Elektro-Thermit GmbH & Co. KG

Every year, approximately 1 million THERMIT® portions leave our factory, manufactured to the strictest quality benchmarks. Our expertise coupled with the latest technology ensures that processes are reliable and that every aspect of our aluminothermic welding can be reproduced. In this respect, numerous certifications to international standards are testament to our expertise. As Q1 supplier for the German railways, Deutsche Bahn AG, and with a quality management system conforming to ISO 9001:2015, we satisfy the most stringent requirements. We focus on the environmental compliance and sustainability of our work with our environmental management system, which is certified in accordance with ISO 14001.

In addition, digitalisation is at the forefront of our activities: using the GOLDSCHMIDT DIGITAL APP and associated digital data sources, the entire welding process and subsequent fine grinding can be documented from start to finish – meaning that, for us, Rail 4.0 is a reality.



THE HISTORY OF THE THERMIT® PROCESS: ONE OF THE INVENTIONS OF THE CENTURY

The history of THERMIT® welding began on 13 March 1895 with the granting of the imperial patent no. 96317 - "Process for manufacturing metals and alloys thereof". On behalf of the Theodor Goldschmidt company in Essen, Prof. Hans Goldschmidt succeeded in developing the reduction of metal oxides with aluminium powder so that it was technically viable. This was a technical revolution that was quickly adopted as a welding technology by the rail industry.

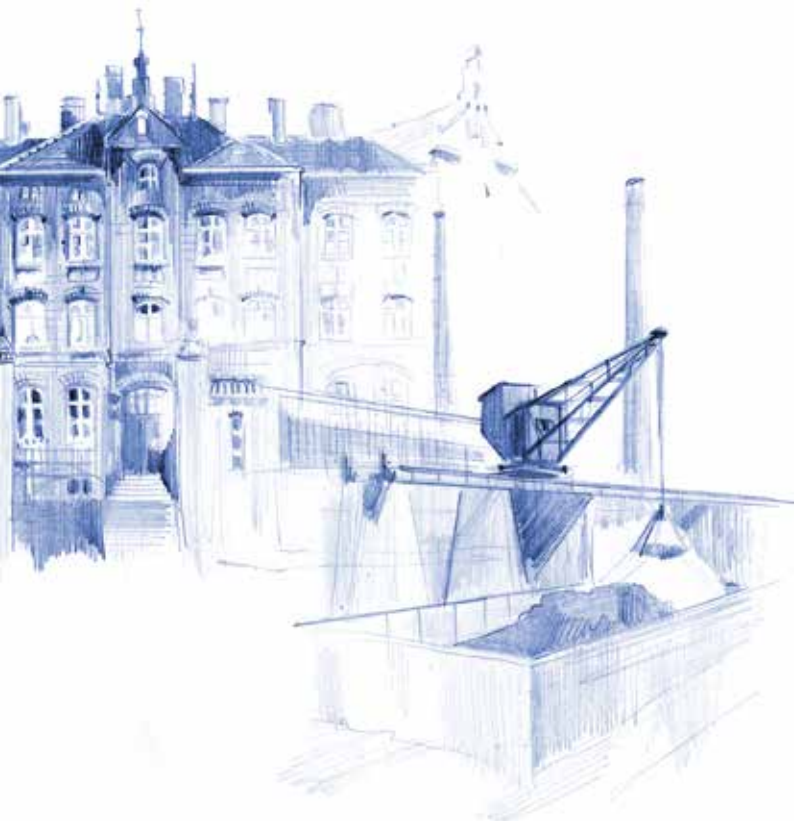
Travelling by train was still quite a bumpy business well into the 20th century. Rails were joined solely by fishplates. It was only with the advent of the THERMIT® process that continuously welded rails

were made possible. The General Thermit Company was founded in 1900 to market the THERMIT® process and to register the THERMIT® brand name.

The first welded rails were produced in 1899 on behalf of the Essen tram company and in 1902 for the Hungarian national railway. By the time of the First World War, the THERMIT® process was used by privately owned railways and tram companies in particular. Elektro-Thermit GmbH was founded in Berlin-Tempelhof in 1919. Its goal: to introduce aluminothermic and electric rail welding to the German national railway.



WHERE TRADITION AND MODERNITY MEET



Following the Second World War, THERMIT® production, which had been transferred to Halle Ammendorf during the war, was rebuilt in Essen, and Elektro-Thermit GmbH was founded in 1949.

In 1990, Goldschmidt AG bought the THERMIT® business in Halle Ammendorf from the privatisation agency. Under the name Elektro-Thermit GmbH & Co. KG, based in Halle, the site saw further development over the years that followed. The automated Thermit operation and state-of-the-art mould and crucible production are unique worldwide.



A PROCESS THAT IS GOING TO CAUSE MANY CHANGES IN FUTURE TOO



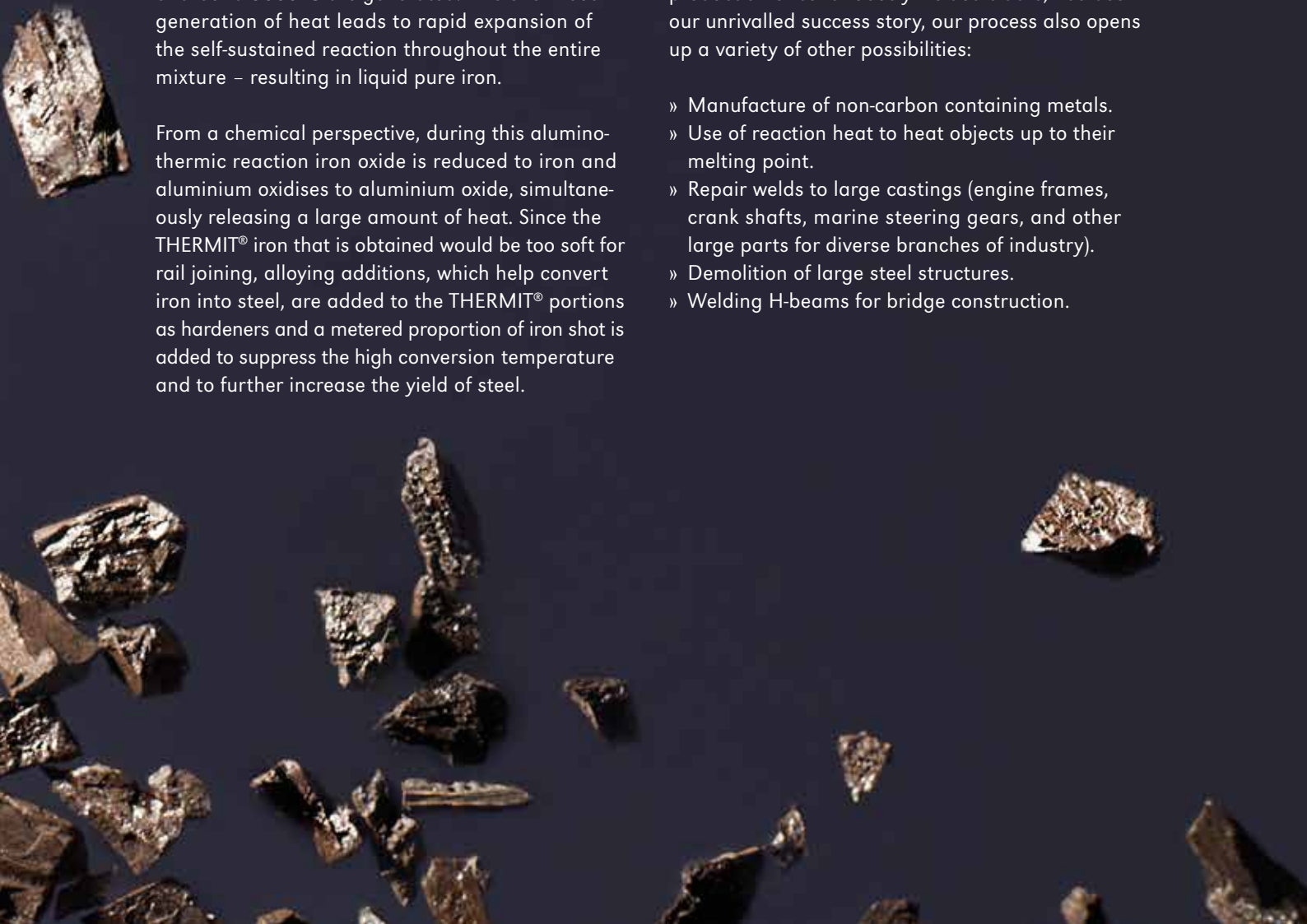
THERMIT® – CHEMISTRY AND EFFECT

THERMIT® is a mixture of granulate aluminium and metal oxide that has a strong exothermal reaction after initial ignition. With iron oxide, temperatures of around 3000°C are generated. This enormous generation of heat leads to rapid expansion of the self-sustained reaction throughout the entire mixture – resulting in liquid pure iron.

From a chemical perspective, during this aluminothermic reaction iron oxide is reduced to iron and aluminium oxidises to aluminium oxide, simultaneously releasing a large amount of heat. Since the THERMIT® iron that is obtained would be too soft for rail joining, alloying additions, which help convert iron into steel, are added to the THERMIT® portions as hardeners and a metered proportion of iron shot is added to suppress the high conversion temperature and to further increase the yield of steel.

For you as the user, the versatility of THERMIT® is particularly advantageous. Although the welding together of tram and railway tracks, and thus the production of continuously welded tracks, has been our unrivalled success story, our process also opens up a variety of other possibilities:

- » Manufacture of non-carbon containing metals.
- » Use of reaction heat to heat objects up to their melting point.
- » Repair welds to large castings (engine frames, crank shafts, marine steering gears, and other large parts for diverse branches of industry).
- » Demolition of large steel structures.
- » Welding H-beams for bridge construction.





Our patented THERMIT® welding process enables you to solve any technical issue relating to the welding of rails: from flat bottom and grooved rails to crane and conductor rails, even where the rails are of different profiles or qualities and all this largely without interrupting operation of the railways. The unmatched benefits: optimisation of the time, material and staff required and utmost quality, excellent reliability and availability of the track.

EXCELLENTLY POSITIONED – FOR THE LONG TERM

INNOVATION AND OUTSTANDING QUALITY FROM A SINGLE SOURCE

As a process supplier for aluminothermic welding, we develop, manufacture and supply all components that are needed for the THERMIT® welding process. We will provide you with welding compound (THERMIT® portions), fire-proof moulds, crucibles and a wide range of machines and devices for the execution and subsequent grinding of the weld for technical acceptance.

And new standards in terms of quality, safety, transparency and efficiency are placing increased demands on the construction and upkeep of modern railway tracks. In the future, it will no longer be possible to envisage a construction site without digital networking, control and monitoring of devices and highly complex processes. We are facing up to these

challenges, offering you solutions for the digitalisation of work processes in aluminothermic welding and the corresponding devices with digital interfaces. To implement these digital systems in the welding process, you need convenient, reliable direct access to databases with reference values for a wide range of welding processes.



A FORCE TO DEPEND UPON IN FUTURE TOO

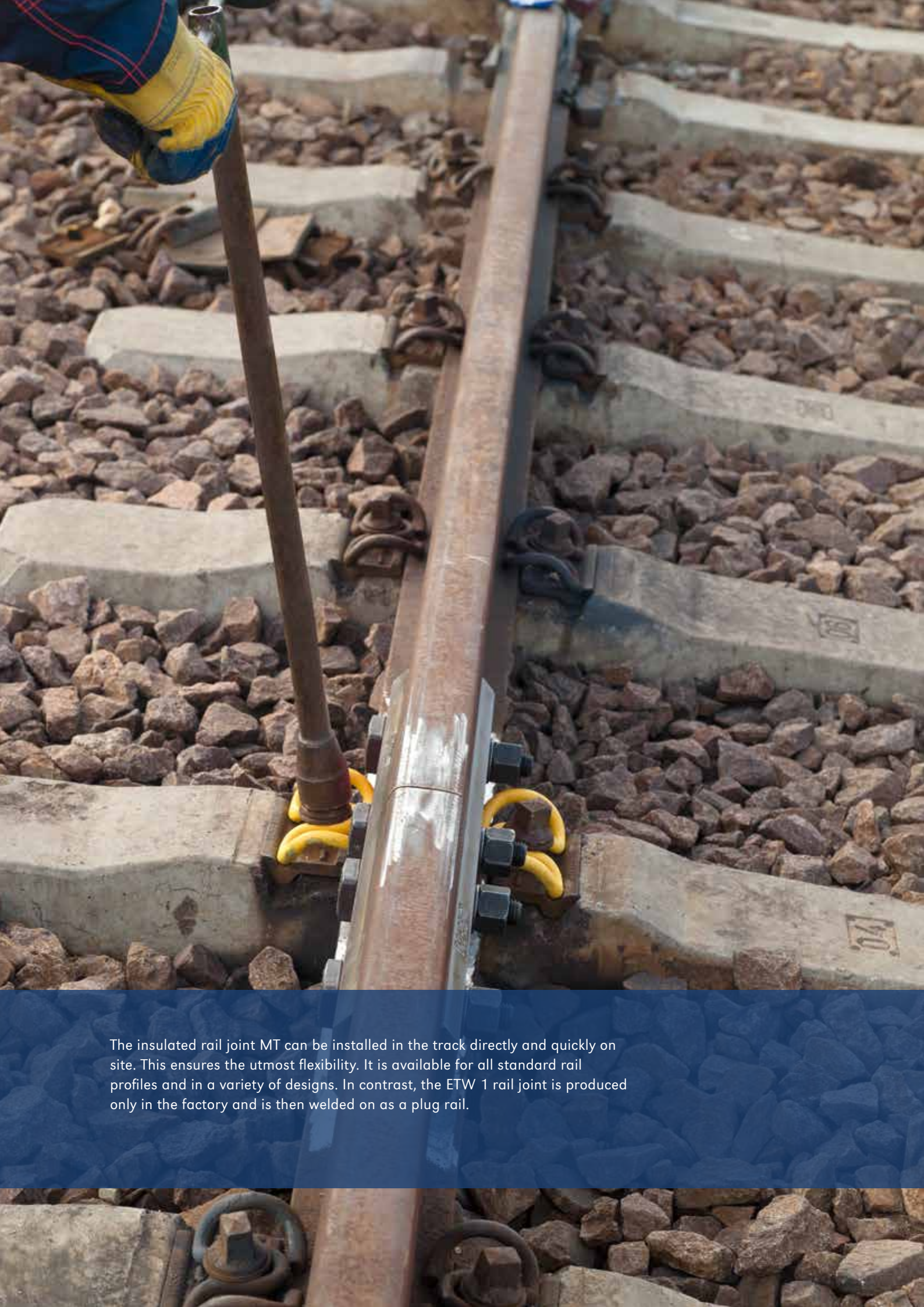
OUTSTANDING SAFETY, LASTING DURABILITY – INSULATED RAIL JOINTS MT AND ETW 1

Insulated rail joints are used to determine the train position. They are crucial for safe and reliable signal control, as today's signal and safety systems are primarily based on track circuits. Here, the rails function as the electric conductor. At the boundary points between these track circuits, the rails are interrupted by insulated rail joints. This means that the signal block sections of the tracks are isolated from one another. At the same time, the insulated rail joints ensure connection of the rails without conducting electricity.

Together with Deutsche Bahn, we developed the first insulated rail joint back in 1970; in spite of high

loads, these are durable in meeting all the requirements expected of continuous track. Today, our patented insulated rail joints MT and ETW 1 are used on large and small railways around the world.

The two variants differ in the way in which forces are absorbed and in their installation and production, but when it comes to safety, reliability and durability, they are both outstanding under any conditions. Our insulated rail joints are approved and used successfully worldwide.



The insulated rail joint MT can be installed in the track directly and quickly on site. This ensures the utmost flexibility. It is available for all standard rail profiles and in a variety of designs. In contrast, the ETW 1 rail joint is produced only in the factory and is then welded on as a plug rail.



We are a reliable partner offering a broad range of technical measurement services. We offer everything from instruments for rail measurement, including longitudinal profiles and surface condition, to geometry and condition of the tracks.

A SAFE FUTURE REQUIRES PRECISION

MEASUREMENT PRODUCTS FOR YOUR SAFETY

With our electronic straight-edges, we can supply you with devices for the measurement of the evenness and straightness of the rails without interventions in the track. The actual states are documented via app. Our devices offer the option for reading off the measured values directly following the measurement, saving the results and further processing and documentation using a PC or smartphone/tablet.

This is how we enable to ensure the best possible quality, maximum track availability and safety, and preventive and verifiable maintenance. These are powerful arguments which also make sense from the perspective of profitability.

Precisely because we see unrestricted safety on the tracks and the reliability of the rails as tasks for the future, our innovative focus is directed toward the continued development of our measuring instruments and processes. Alongside outstanding quality and the latest in technology, key aspects include, in particular, excellent ease of use and functionality at all times of year.

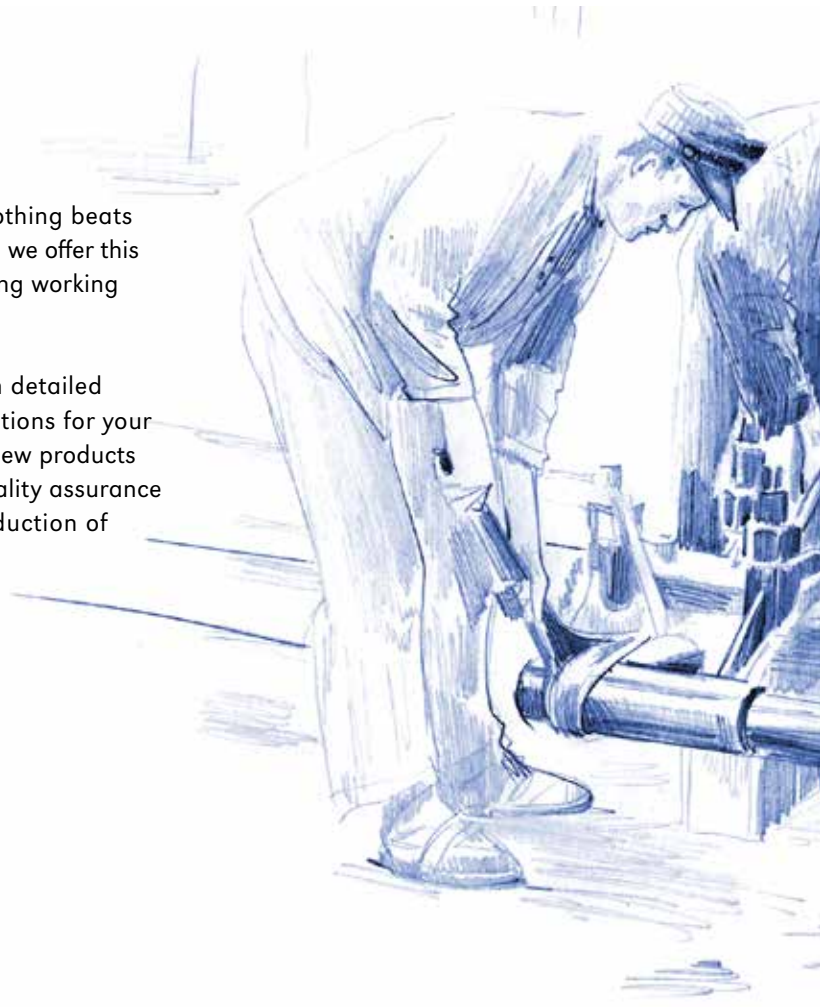


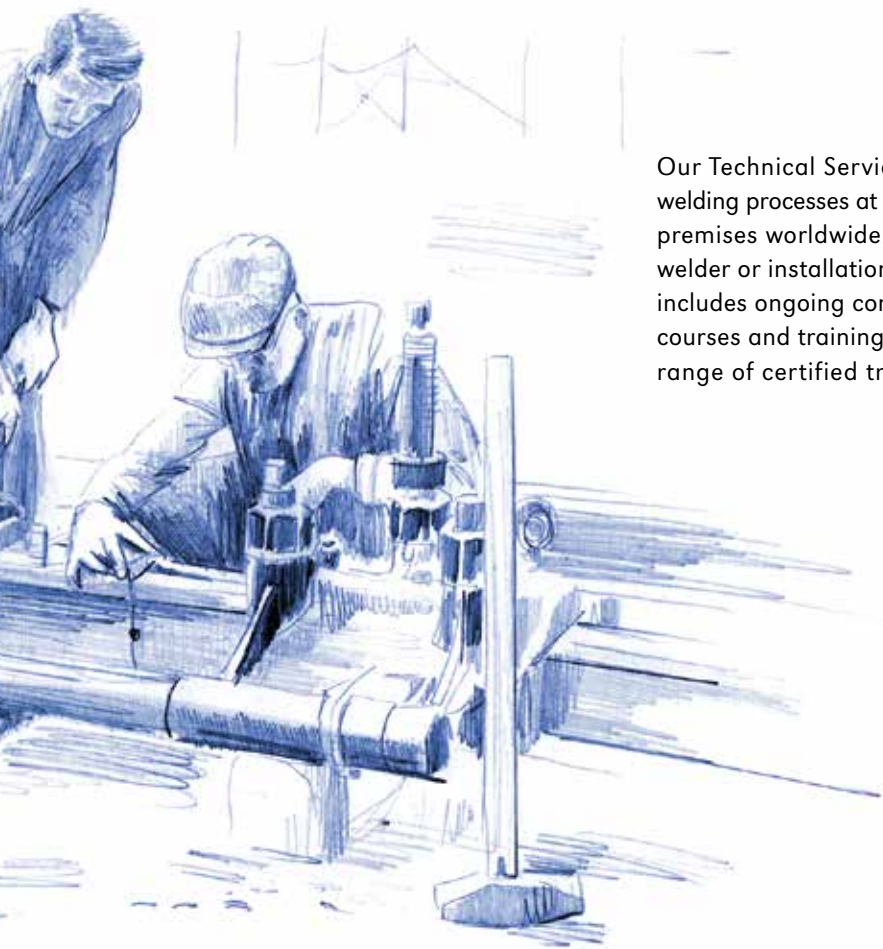
EVEN CLOSER IN FUTURE

ALWAYS WORKING FOR YOU – OUR TECHNICAL SERVICE

No matter what is possible in the modern world, nothing beats expert, personal service on site. As a global company, we offer this virtually anywhere in the world, in a close and trusting working relationship.

Experienced application engineers provide you with detailed advice and training. We support you in finding solutions for your problems on the track and with the introduction of new products and processes. Our portfolio of services includes quality assurance of the execution of THERMIT® welds and the introduction of improvements with short response times.





Our Technical Service offers training courses on all THERMIT® welding processes at our training site in Halle (Saale) or on customer premises worldwide. In addition to basic training as THERMIT® welder or installation technician for insulated rail joints, this also includes ongoing competency assessments, further training courses and training of welding coordinators. We work with a range of certified training partners within Germany and abroad.



© 2018 / Elektro-Thermit GmbH & Co. KG
Pictures: Elektro-Thermit GmbH & Co. KG M., Nies-AGENTUR FORMAT78 GMBH
Graphic: AGENTUR FORMAT78 GMBH