



The Bright World of Metals 2027

21–25 June / Düsseldorf / Germany



Metals Industry Powers Ahead: The Bright World of Metals Showcases Technologies Transforming the Industry

The metals industry faces the challenge of making its energy-intensive processes more climate-friendly while remaining economically viable. Electrification offers promising solutions, from induction furnaces in foundries to electric technologies for industrial process heat. Which technologies are proving their worth in practice, and where do their limitations lie? These questions concern the entire value chain and will be addressed by GIFA, METEC, THERMPROCESS and NEWCAST in Düsseldorf from 21 to 25 June 2027.

Steel, aluminium, copper and other non-ferrous metals have something in common: primary metals are extracted from ores through chemical processes such as reduction or smelting, while secondary metals are recovered by melting scrap. The metals are then heated and shaped by casting, rolling or forging. Heat treatment processes such as hardening, tempering and annealing give the finished products their required properties.

Whether melting or heating, process heat in foundries and steelworks still comes predominantly from fossil fuels such as coal, oil and natural gas. Electrifying process heat using low-carbon electricity generated from renewable sources or, in some countries, nuclear power is a major route towards decarbonising the metals industries, alongside the potential future use of green hydrogen. It is also a shared focus of the four Düsseldorf trade fairs that make up The Bright World of Metals 2027.

According to RWTH Aachen University, industrial process heat accounts for around 25 per cent of global CO₂ emissions. Approximately half of these emissions arise from processes requiring temperatures above 1,000 degrees Celsius. Decarbonising process heat is therefore a priority for metals producers, with direct electrification competing against hydrogen-based solutions.



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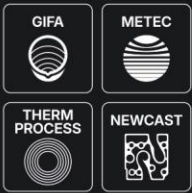
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Hydrogen has one decisive advantage: existing installations can largely be retained. Retrofitting burners in gas-fired industrial furnaces to run on hydrogen instead of fossil fuels such as natural gas requires substantial modifications to burner technology, but is technically feasible. In terms of energy efficiency, however, the case for direct electrification is compelling. Rather than producing hydrogen from renewable electricity with significant conversion losses and subsequently burning it, it makes more sense to use the electricity directly. Moreover, green hydrogen is not yet available to many industrial operators.

The largest sources of CO₂ emissions include conventional processes such as the blast-furnace route in crude steel production and the coke-fired cupola process used by iron foundries. These are key topics at the leading international trade fairs GIFA, METEC, THERMPROCESS and NEWCAST.

GIFA: Electrification Is the Backbone of Transformation

While the electric arc furnace (EAF) is increasingly becoming the key melting unit in steelmaking, iron foundries can pursue a route towards climate neutrality through electric induction melting, as the forthcoming GIFA will demonstrate. Given the considerably smaller production volumes of iron foundries compared with steelworks, induction furnaces from leading exhibitors such as ABP Induction and Otto Junker are a better alternative than EAFs. Furnace manufacturers complement their portfolios with digital tools and AI solutions. For example, foundry operator Siempelkamp, working with ABP technology and its digitalisation partner Zorc, has completed Germany's first comprehensive digitalisation of a melting operation.

Electricity is the number one energy source driving transformation in the foundry industry. Since February 2025, an induction crucible furnace system operating at medium frequency has been in service at the Th. Schultz iron foundry in Warendorf. The project marks the foundry's complete transition to electric melting technology. Electrification is central to its transformation plan for decarbonisation and improved energy



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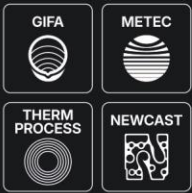
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efficiency. However, overloaded power grids and a lack of grid connections pose problems for many foundries in rural areas. The Leda foundry in East Frisia made headlines this summer. To cut CO₂ emissions, the company wants to switch its melting operations from gas to induction furnaces. Yet it has been waiting for years for the high-capacity electricity connection it needs from its local distribution network operator, one of around 850 in Germany. Leda is far from the only case where distribution networks have not been sufficiently expanded.

Fritz Winter in Stadtallendorf, Hesse, has made greater progress. Germany's largest iron foundry has replaced the smaller of its two coke- and natural-gas-fired cupola furnaces with two new electric Duomelt crucible furnaces from ABP, creating Europe's largest induction melting installation of its kind. Nevertheless, the company intends to retain its larger cupola furnace. Unlike induction furnaces, which require high-grade, expensive scrap, cupola furnaces can also process considerably cheaper, readily available lower-grade recycled scrap. For large foundries such as Fritz Winter, decarbonisation is therefore not just a question of economics, but also of raw material availability. Hydrogen and carbon capture, utilisation and storage (CCUS) could also enable climate-neutral operation of cupola furnaces.

NEWCAST: Award-Winning Innovations

Foundries such as Fritz Winter have demonstrated for years, through innovations in lightweight construction, that traditional iron castings remain highly relevant in an innovation-driven industry. At NEWCAST, the internationally leading forum for cast product innovations, the iron foundry from Stadtallendorf received the 2023 NEWCAST Award in the lightweight construction category for a new low-emission brake disc designed to meet the Euro 7 standard.



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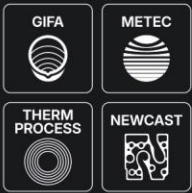
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METEC: Hydrogen Complements Electrification

Alongside low-carbon electricity, hydrogen has a role to play in transforming the steel industry because of the chemistry involved. Direct reduction of iron ore to direct reduced iron (DRI), using hydrogen as a CO₂-free reducing agent, replaces the coal-based blast-furnace route to iron production. The DRI can then be processed directly into steel in an electric arc furnace (EAF). Where lower-grade DRI feedstocks are used, it can instead be melted in an electric smelting furnace (ESF) before further processing in a basic oxygen converter. Steelmakers such as Salzgitter are pursuing hydrogen-based direct reduction combined with EAF technology, while competitors such as thyssenkrupp Steel favour direct reduction followed by an ESF and converter. Leading plant manufacturers and METEC exhibitors such as SMS group, Primetals and Tenova offer technologies for the steel industry's transformation. Their portfolios also include induction heating systems for long and flat products during downstream processing, providing a lower-carbon alternative to gas-fired equipment.

THERMPROCESS: Operational Flexibility and Economic Viability

Most thermal processes in the non-ferrous metals industry can be electrified relatively easily at process temperatures below 500°C. Even in steel rolling mills, induction heating of sheet and billets is increasingly becoming a lower-carbon alternative to fossil-gas-fired furnaces. The situation is different in forging operations such as Dirostahl in Remscheid. Germany's largest open-die forge produces forgings weighing up to 35,000 kg each. Heating these heavy forging blanks to 1,200°C over a period of several days currently requires natural-gas burners.

THERMPROCESS exhibitors such as WS-Wärmeprozessestechnik therefore also offer climate-conscious solutions for processes that cannot dispense with gas firing. Their portfolios include recuperators, additively manufactured burners and the expertise needed to retrofit industrial burners in the steel industry. This also covers technologies for green gases such as renewably produced hydrogen and biogas.



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In the transition to climate neutrality, natural gas can only serve as a bridging fuel, while green hydrogen is likely to remain scarce and expensive for the foreseeable future. The latest projects therefore aim to electrify even high-temperature processes. Dirostahl, for example, is collaborating with the start-up Hyperheat. The Offenbach-based innovator replaces natural-gas burners in industrial furnaces with electric heating systems. This allows companies either to electrify their process heat completely or to operate hybrid systems, switching flexibly between electricity and natural gas according to price.

The extent to which electrification has already progressed in metallurgy and foundry operations, and the technical, economic and infrastructure challenges that remain, will also be discussed at ANKIROS 2026 in Istanbul. The preview of GIFA, METEC, THERMPROCESS and NEWCAST presented there will point the way to Düsseldorf: from 21 to 25 June 2027, the four trade fairs will bring together solutions from across the metallurgical value chain, from metal production and foundry technology to thermal processing and finished cast products.

Further information:

<https://www.gifa.com/en/>

<https://www.metec.com/en/>

<https://www.thermprocess-expo.com/en/>

<https://www.newcast.com/en/>

Latest industry news:

www.linkedin.com/showcase/the-bright-world-of-metals

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