

GMTN 2019 – Specialist article no. 6 / January 2019

Tremendous potential – environmental, economic and social sustainability in foundries

Foundries are one of the best examples of resource efficiency and sustainability. Because castings implement the recycling concept almost completely.

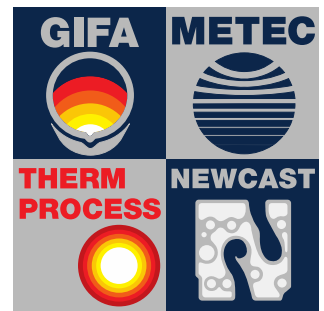
Once their life cycle is over, castings are recycled, i.e. they are melted down to manufacture a new casting. Old and new scrap metal is used to produce castings too. Iron and steel foundries buy about 3.5 million different scrap materials year in, year out. About 95 per cent of the sand required to make moulds is recycled as well. Modern processing systems make this possible. So the foundry industry deserves special credit where recycling is concerned.

Sustainability and resource efficiency

This energy-intensive industry has, in addition, always had a strong commitment to the objectives of sustainability and resource efficiency. Innovations in the product and process simulation field make it possible nowadays to manufacture cast components that satisfy the requirements of economically and environmentally sound lightweight structure production. Cesare Troglia, Technology and Innovation Division Manager at the German Foundry

Association (BDG), thinks that there are numerous significant ways to take account of the demands for sustainability and resource

minimisation in product development, in production and during



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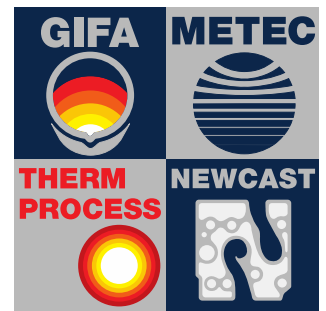
product life: “Cast components embody the basic idea behind the ecoMetals label outstandingly well.”

With the latter, the four Düsseldorf metallurgy trade fairs GIFA, METEC, THERMPROCESS and NEWCAST emphasise the importance of resource and energy efficiency, climate protection and innovative processes and products. Exhibitors who present products, solutions or process operations relating to at least one of these areas will once again be highlighted particularly strongly in Düsseldorf in June 2019 (25. to 29. June). “The USP of the four trade fairs GIFA, METEC, THERMPROCESS and NEWCAST is their coverage of almost the entire market – so sustainability is an issue that cannot be left out”, explains Friedrich Kehrer, Global Portfolio Director Metals and Flow Technology at Messe Düsseldorf GmbH. Visitors to the event can inform themselves about what the exhibitors are presenting at ecoMetals via a special brochure about this subject as well as online. There will also be guided tours – known as ecoTrails – specifically for all visitors who are interested.

A number of exhibitors are allowed to display the ecoMetals label in this context. Because many foundries are investing in manufacturing processes, are increasing vertical integration and are reducing resource consumption on an ongoing basis. One major feature of this process – and the driving force behind it – is the digitisation of production. This is creating enormous opportunities not only to improve one’s competitive position but also to implement sustainable strategies.

Saving time and money

Simulation and, to an increasing extent, 3D printing are making it possible not merely to produce highly complex parts but also to replace the energy-/resource-intensive and time-consuming trial and error method. The Leipzig team from GF Casting Solutions



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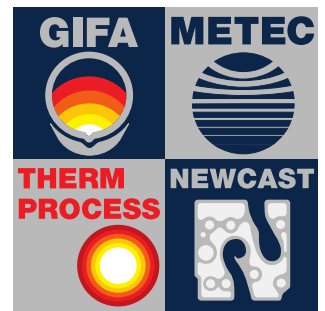
came to this conclusion too. Series production of sand cores by 3D printing started here in the summer of 2018. “The foundations for this were laid as long as two years ago”, reports Matthias Heinrich, Director of GF Casting Solutions Leipzig GmbH.

As part of the corporate strategy for 2020, the Leipzig location succeeded in persuading the division management to invest in a 3D series printer for sand cores by presenting a convincing concept. As a result, the location now acts not just as an innovation centre and supplier of prototypes to all the other foundries in the GF Division; it also manufactures in series. Heinrich explains: “The cold-curing phenolic 3D printer in Leipzig is the second of its kind in Germany and the first one in the country that is being used in series production”.

The advantages for customers: considerable time and money is saved in the production of prototypes and spare parts. In addition to this, process reliability is increased by the elimination of core assembly, while designers are enthusiastic about the unlimited design potential. There are many different application areas for the castings, which weigh between 100 and 1,000 kg. Heinrich lists them: “They are used in lorries, construction equipment, agriculture and forestry management, solar farms and wind turbines, rolling stock, machine manufacturing in general and hydraulics, our new product segment”.

Products with greater impact

BDG executive Troglia summarises: “Such technologies can help to save a great deal of time and energy when tooling is being built, particularly where prototypes and short series are concerned”. The progress that has been made with organic bonding agents and the use of inorganic bonding agents of the kind developed by, for example, foundry supplier ASK Chemicals also improves



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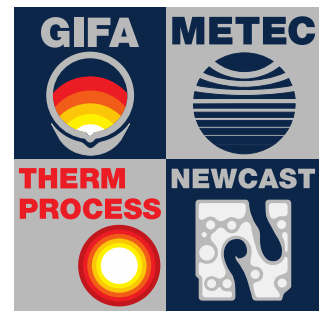
environmental performance. Dr Jens Müller, Research and Development Manager at ASK Chemicals, explains: “We are focussing primarily on increasing the impact of our products and on generating added value for our customers, as – for example – material input can be decreased and the total potential emissions can be reduced as a consequence.”

The company has succeeded in developing the first unmarked phenolic resin in the world for the cold box process in iron casting. A hazardous product is not therefore needed in this process. Müller adds: “There are other advantages apart from the environmental benefits: The particularly high reactivity of this new system makes it possible to reduce bonding agent and catalyst volumes in many cases.”

Inorganic bonding systems are becoming increasingly important in aluminium casting. ASK Chemicals is also noticing greater awareness of sustainable products. Müller thinks that “this is certainly driven by the fact that the general conditions in Europe particularly have become more demanding due to the implementation of relevant regulations” and is therefore delighted that product developments for protection of the environment are successful above and beyond this too: “Initially, no-one really believed that the technology of inorganic bonding systems would replace conventional processes. This may be attributable to the fact that there are technological and economic benefits in addition to the original environmental aspect. Now it is an established feature in lightweight metal permanent casting.”

Environmental, economic, social

Sustainability cannot, after all, always be considered solely at the environmental level. Elke Radtke, who is responsible for environmental protection as well as occupational health and safety at BDG, also thinks that “sustainability involves economic



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social action too. As an association, we provide information about the regulations that affect the foundry industry. Our observation is that legal regulations designed to protect the environment often fail in particular to take social and economic factors into sufficient account. Wherever appropriate, small and medium-sized companies especially also need to be able to adapt processes and take advantage of new technologies. Because operations that are not economic lead in the long run to failure, which in turn jeopardises jobs. That is not sustainable at the social level.”

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GIFA, METEC, THERMPROCESS, NEWCAST 2019

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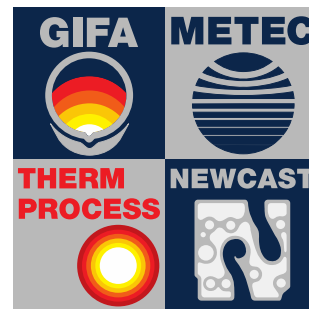
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