

Customized design – produced in series: GROHE is ushering in a new era in fittings' production with 3D metal printing

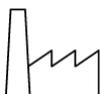
GROHE AG

www.grohe.com

GROHE is a leading global brand for holistic bathroom solutions and kitchen fittings and employs more than 6,500 employees altogether in 150 countries – 2,600 of those are in Germany. Since 2014, GROHE has been part of the strong market portfolio of LIXIL, a leading Japanese manufacturer of trendsetting water technologies and building fittings. In order to provide "Pure Freude an Wasser" ("Pure delight in water"), each GROHE product is based on the brand values of quality, technology, design and sustainability. Renowned highlights such as GROHE Eurosmart or the GROHE thermostat series as well as trendsetting innovations like the GROHE Blue water system emphasize the far-reaching competence of the brand. Focused on the needs of the customers, GROHE creates intelligent, life-enhancing and sustainable product solutions which offer relevant added value – and which bear the "Made in Germany badge of quality: R&D and design activities are firmly anchored as an integrated process at the German site. GROHE takes its corporate responsibility very seriously and relies on a resource-friendly value chain. Since April 2020, the sanitary ware brand manufactures CO₂-neutrally throughout the world. In addition, GROHE has also set itself the target of using plastic-free product packaging by 2021.&



NUMBER OF EMPLOYEES
6,500



INDUSTRY
Fittings and
sanitary ware



SITE
Hemer (Germany)

APPLICATIONS

- 3D printing in metal (laser metal fusion)

TRUMPF PRODUCTS

- TruPrint 3000

At the ISH 2019, the world's leading trade fair for water, heating and air conditioning, GROHE presented two fittings manufactured by 3D metal printing as the first of the leading sanitary ware brands in Europe. To do so, GROHE collaborated with TRUMPF to develop the 3D technology further – ushering in a new era in fittings' production, in which customization and freedom in design play the starring roles. GROHE Icon 3D fittings are manufactured at the LIXIL EMENA production site in Hemer with the TruPrint 3000 in laser metal fusion (LMF) processes. As well as the fittings, additive manufacturing opens up completely new opportunities for GROHE in prototype production and tool manufacturing for zinc and plastic injection molding for interior cooling channels.

Challenge

The main challenge in developing customized and innovative fittings' designs was to preserve the quality for which GROHE is known worldwide and to implement it in a 3D metal print product. The focus was to maintain the water purity, meaning that the powder material used must comply with the drinking water ordinance and must be appropriately qualified for additive manufacturing. Furthermore, thermal deformation must be taken into consideration even before manufacturing. In addition, any post-processing that could be required must be reduced to a minimum due to the high surface requirements.

Solution

GROHE's design and development team has looked very closely at 3D metal printing for many years and has built up a great deal of expertise in the technology and material qualification. In January 2018, they finally decided on two of the TRUMPF TruPrint 3000 medium-format machine. To develop the bathroom fittings, they developed their own procedure with a specific formula for the metal powder qualified for the brand. GROHE acquired their own patents in view of the drinking water ordinance required.



"We are stepping into the future of product design with GROHE Icon 3D as we can now create designs that do not seem attainable at first."

Paul Flowers
Chief Design Officer LIXIL

Implementation

The two designs of the GROHE Icon 3D fittings are produced in small series with a machine runtime of 6,000 hours a year; to do so, the TruPrint 3000 runs at full capacity in three-shift operation. There is room for two fittings in the TruPrint 3000 in each printing process; they are built up in approximately 4,700 layers, each layer 0.06 mm thick, made of stainless steel or a brass alloy. The walls are 1 to 1.5 mm thick; the melting point is minimum 1400 °C. After printing, the component is mechanically processed on a CNC milling machine. Then the manual sanding and fine brushing processes are carried out as the final steps in surface finishing. While a conventional manufacturing process requires 4.5 months from the design of the water equipment to component assembly, all development and manufacturing steps required for 3D printing can be carried out in just 52 hours.

Forecast

The 3D metal printing procedure initiates a change in thinking at GROHE in relation to product development and manufacturing. It means designs can be reimagined and customization requests can be implemented efficiently for architectural projects, for example. Additive manufacturing is also interesting in terms of sustainability: the resource-friendly method only uses as much material as it actually needs. Components such as drains and grips can be manufactured so that they are significantly thinner, therefore saving material. There is a weight reduction of approximately 55% with the 3D print variant of the GROHE Allure Brilliant fitting compared to its similar predecessor in brass. "The 'additive spark' is catching fire throughout the entire organization at the moment", says Thorsten Schollenberger, Vice President of Industrial Engineering, EHS & Sustainability, at GROHE. Schollenberger reports that there are several workshops at GROHE aimed at finding new products and applications

which can be printed on the basis of new materials. He also says that the brand has similar projects in place to utilize 3D printing for tool manufacturing.

Find out more about TRUMPF products

TruPrint 3000

The TruPrint 3000 is a universal medium-format machine with industrial part and powder management, designed for flexible series production of complex, metal components using 3D printing. The machine is ideal for use in job shops when combined with the industrial part and powder management.

[To the product](#)

Industrielles Teile- und Pulvermanagement

Optimize the way you handle powder and components with TRUMPF products for industrial part and powder management such a silo, unpacking station, and vacuum conveyor. This means you can achieve additive series production that is industry ready and cost effective, and make the most of noticeably shorter throughput times – just like our customer, MBFZ toolcraft GmbH.

[To the product](#)

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