

Case report

Forge-SLM®-Hybrid



**Edelstahl
Rosswag**

ROSSWAG
engineering

The combination of forging and Selective Laser Melting (SLM®)
Potentials of additive manufacturing derived from more than 100 years
experience in forging technology

Rosswag Ltd.

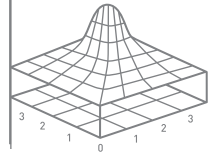
With more than 200 employees, the medium-sized family business Rosswag Ltd. is the largest free shape forge in Southern Germany. The business comprises the divisions Edelstahl Rosswag and Rosswag Engineering. For more than 100 years, the family business manufactures highly loadable freeshape forged parts for various areas such as power engineering, aerospace industry, power plant technology, pump construction, and the optical electronics industry.

In addition to the two departments Forging and Heat Treatment, the sections Machining with over 30 chipping machines, and Quality Assurance are important pillars of Rosswag Ltd. Thanks to the experiences of Edelstahl Rosswag, the Rosswag Engineering Division can expand the product portfolio offering engineering services and innovative manufacturing processes.

100 years materials experience for new solutions in generative manufacturing

The purchase of the Selective Laser Melting System SLM®280^{HL} in 2014 allows the manufacturing of near neat-shape metallic products and complements the forging operation. This step towards generative manufacturing both expands the existing product portfolio and also reduces in the long-term the effects from the substitution of forged parts. Rosswag has the aim to further expand the areas generative manufacturing and engineering services. Rosswag not only supports their customers as service provider but is a competent development partner with a holistic, in-house production chain offering their customers considerable added value.

The know-how in material sciences and materials engineering built-up over decades is now the foundation upon which the future department Generative Manufacturing will be based. Rosswag now plans the manufacturing of individual metal powder suitable for SLM® processing from the forging wastes as well as from the materials store, which contains over 400 materials, and comprises 6,000 tons. Rosswag is, therefore, capable to offer a unique process chain ranging from the production of high-quality metal powder to generative manufacturing, specific heat treatment, CNC post treatment, testing of mechanical-



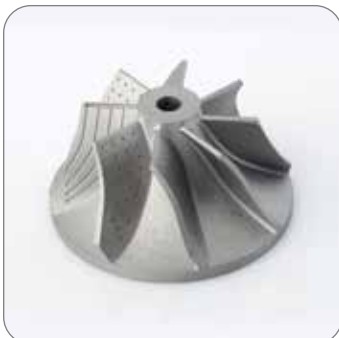
Free shape forged part



Heat treatment of SLM® parts



Cutting analysis of generatively manufactured parts



Impeller with channels for boundary layer control

technological characteristics in the in-house materials laboratory, to comprehensive quality assurance.

Forge-SLM®-Hybrid

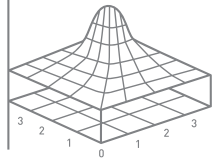
The combination of the two manufacturing processes Forging and Selective Laser Melting (SLM®) leads to new products, which can be manufactured efficiently despite their high complexity due to the innovative process chain.

Rosswag Engineering takes up the existing restrictions from both manufacturing processes and aims to increase the efficiency of the manufacturing processes by optimizing the process chain. For this purpose, the positive characteristics of both manufacturing processes are combined in the respective geometry elements.

From this combination, Rosswag Engineering developed an innovative process chain in which the advantages of the forming technology are combined complementarily with those of the generative manufacturing process. This, in turn, results in the resource and cost-efficient manufacturing of solid parts with complex, interior structures.

The basic idea is to manufacture solid component areas comprising a large proportion of materials volume in near neat-shape using a free shape forging process. This as yet unmachined part is highly loadable and has been forged according its fiber orientation. In the next step, this unmachined part is additively built-up in the SLM® system in order to add-on the complex structures such as the channels for boundary layer control that can be seen in the picture on the left.

The newly developed and optimized process chain also allows new constructive freedom with regard to complex geometries and interior structures.



Rosswag Ltd.

Forge-SLM®-Hybrid

- Combination of the two processes Forging and Selective Laser Melting (SLM®)
- 100 years materials experience for new solutions in generative manufacturing
- Manufacturing of parts comprising 400 different metals and special materials with highest quality, latest innovation and highest precision
- Development partner with a holistic manufacturing chain
- All services from one hand



SLM®280^{HL}

Please request our separate brochure



SLM® Metal Powder

Please request our separate metal powder brochure