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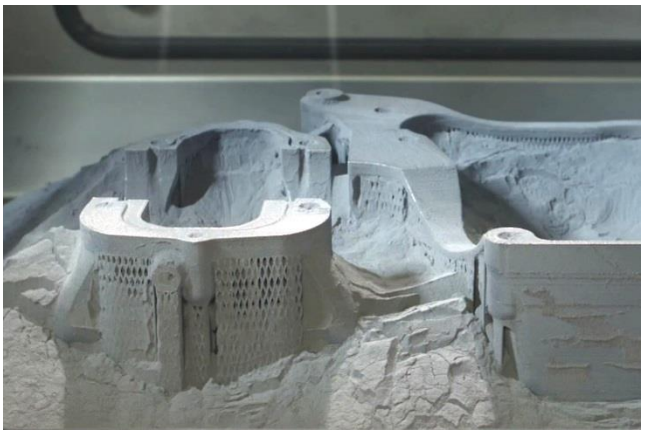
OPTIMAL PRESSURE INSIDE THE PROCESS CHAMBER

Safety Relief Valve AV 919 in Additive Manufacturing



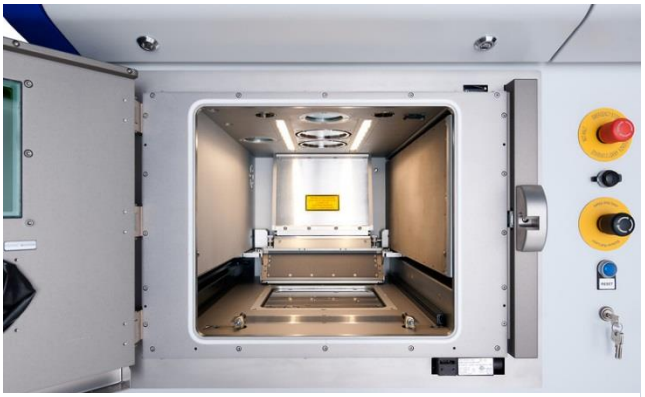
3D-printed component made of metal powder in the process chamber of the Selective Laser Melting Machine SLM 500 from SLM Solutions Group AG

Metals in 3D Printing: Selective Laser Melting

The range of 3D printing technologies, especially the range of processed materials, is growing continuously. Plastic mixtures are way out in front as they, for example, can be wound on a roll as thermoplastic fiber that can be liquefied easily and plot in final 3D shape. In the wide range of industrial applications, however, metal remains the actual desired material for additively manufactured components.

To handle metals in 3D printing, complex melting processes are needed. The material, e.g., stainless steel, cobalt chrome or titanium, is present in fine powder that is melted layer by layer with high-performance lasers and built up to final shape – a process called Selective Laser Melting.

SLM Solutions Group AG, headquartered in Lübeck, is a specialist for Selective Laser Melting and one of the leading manufacturers of 3D printers for metals. In their machines, the print is completely carried out under a protective gas atmosphere inside the process chamber. Moreover, the powder management—that is, the fully automated supply, removal and treatment of the metal powder—retains this controlled atmosphere.



Process chamber of the Selective Laser Melting Machine SLM280 2.0 of SLM Solutions Group AG

Perfect Atmosphere inside the Process Chamber: Controlled Print

At the beginning of the 3D print production, the process chamber is flooded with argon. While the machine's lasers operate, however, smoke gases are created, endangering optimal conditions on the working surface. To ensure a perfect melting process, therefore, the protective gas is continuously circulated and a constant compensation takes place. This could potentially

lead to an uncontrolled pressure increase in the process chamber, and the delicate glass optics of the lasers would be damaged. To prevent a pressure increase, highly sensitive Safety Relief Valves of the series AV 919 from WITT keep the chamber's pressure constant, opening exactly to the set opening pressure and closing immediately when nominal value is reached again. The atmosphere in the process chamber thus remains in the optimum ratio.

"The WITT Safety Relief Valve AV 919 is certainly only a small component of our machines. But without a blow-off valve manufactured exactly according to our individual requirements regarding material and low opening pressure, we could not control the pressure in the process chamber precisely enough," says Andreas Wiesner, Leader for process and material development at SLM Solutions Group AG.

For Andrew Smart, Head of Sales for Gas Safety Devices at WITT, this reflects the core competence of his team: "We design and manufacture small components with great effect. Complex applications and new technologies also require precision and reliability, which we take seriously. "

SLM Solutions Group AG uses the WITT Safety Relief Valve AV 919 made of aluminum with an opening pressure of 80 mbar. For further questions, please contact

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