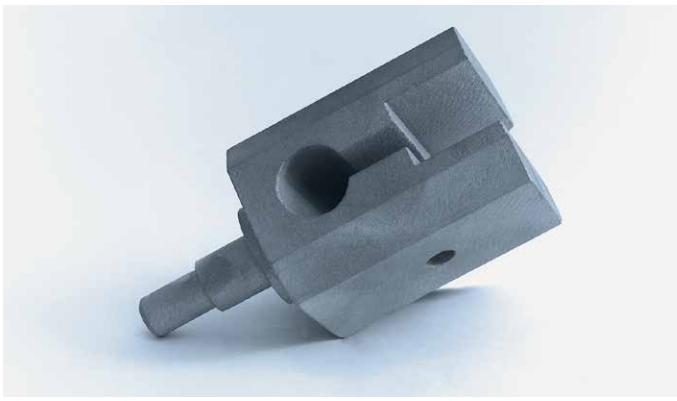

trimal®-05AM

Alloy for additive manufacturing

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trimal®-05AM
Alloy for additive manufacturing

The **trimal®-05AM** (AlSi10MnMg) alloy is used in additive manufacturing. Studies in cooperation with the Leipzig IWT in Bremen provided evidence that **trimal®-05AM** is particularly suitable for the selective laser melting (SLM) process. The exceptional atomizability guarantees maximum material yield. Outstanding mechanical properties allow a wide range of applications.

In the SLM process, a powder-based material is locally remelted in its entirety layer by layer using laser radiation, forming a solid material layer after solidification. The base plate is gradually lowered by one layer thickness and powder is applied and remelted again. The exceptional suitability of **trimal®-05AM** for additive manufacturing, in particular for the SLM process, has been demonstrated in a joint project with IWT Bremen. Suitable output parameters for the printing process can be provided on request. Powder particles in the range of 20–60 µm are recommended for outstanding mechanical properties.

Chemical composition

The following table shows a reference analysis for the described material in weight percent. Customer specifications may vary.

%	Si	Fe	Cu	Mn	Mg	Zn	Ti	Sr	o.e.	o.t.	other
Min.	9,8			0,5	0,2						Al
Max.	11,0	0,25	0,05	0,7	0,4	0,05	0,12	0,02	0,05	0,15	

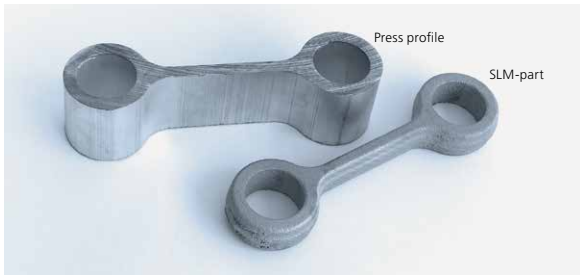
Mechanical properties

The following mechanical properties are based on a quasi-static tensile test at room temperature and are considered as reference values for the use of this alloy. Tensile specimens were tested in the directions 0°, 45° and 90°. Tests were carried out in as-print condition and after T6 heat treatment as it is used e.g. for gravity die-castings.

Temper	Yield Strength Rp0.2, MPa	Tensile Strength Rm, MPa	Elongation A %
As-Print	240–270	420–450	4–5
T6	230–250	290–310	7–11

Applications

Compared to conventional casting processes, SLM 3D printing eliminates the need for tools and molds. Another advantage is the high degree of geometrical freedom. This means that weight-optimized components with bionic structures, for example, can be produced comparatively inexpensively. **trimal®-05AM** can be used for (small) ultra-high-strength serial parts without subsequent heat treatment steps. Due to the mechanical properties, which are comparable to those of cast components after classic T6 heat treatment (cf. **trimal®-05**), the alloy's use for prototype production is also conceivable. Saving of cost-intensive die-casting moulds at an early stage of the development process of cast components could be an advantage.



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