

m4p StrengthAl

High-strength aluminum alloy for PBF

Description, properties and applications

m4p™ StrengthAl is a high-performance Al-alloy with special focus on highest strengths. Additive manufactured components made of m4p™ StrengthAl achieve an exceptionally **high specific strength** that withstand a comparison with titanium materials. The sophisticated metallurgy of this aluminum alloy – in combination with an elaborate melt treatment – results in a metal powder that have been developed for **additively manufactured high-performance applications** in motorsport and aviation.

m4p™ StrengthAl is characterized by highest achievable yield strength which can be set almost twice as high as in direct comparison to the common aluminum alloy AlSi10Mg. Hence, this results in a particularly high importance for lightweight construction and means that **weight-optimized applications** from general mechanical engineering or sports can also be realized by m4p™ StrengthAl. In as-built state, medium strengths with **very good strain values** are going to be achieved. In order to set the highest possible strength, a heat treatment is required, thus the formability of the material will be slightly reduced. The heat treatment phase is a precipitation process, which requires an aging cycle at elevated temperatures. For decorative surface effects on additively manufactured components made of m4p™ StrengthAl, an anodizing process can be added.

Powder characteristics



Chemical analysis [wt%]

Element	Mg / Si / Sc
Al	Base

further limited elements are Ti / Zr / Mn / Cr

Motocross-Linkage
made of m4p™ StrengthAl

Material characteristics

(>99,8% rel. density; volume rate 11cm³/h; layer thickness 30µm; EOS M290)

Mechanical properties (room temperature)

	Tensile strength Rm [N/mm²]	Yield strength Rp0.2 [N/mm²]	Elongation at break A ₅ [%]	Fatigue strength [MPa]
As-built - Z	350	280	23	-
Heat-treated - Z	470	430	15	145

Mechanical properties (150°C)

	Tensile strength Rm [N/mm²]	Yield strength Rp0.2 [N/mm²]	Elongation at break A ₅ [%]
Heat-treated - Z	313	304	20

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