

m4p Ni-718

Ni base for laser-based powder bed fusion

Description, properties and application

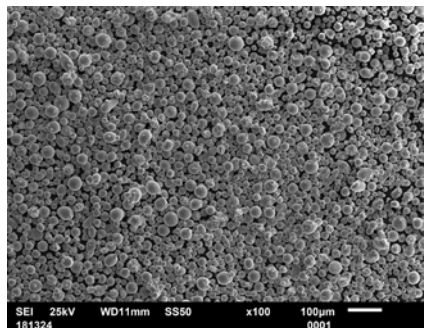
m4p™ Ni-718 is a metal powder with the main alloying elements nickel-chromium-iron-molybdenum. The additional contents of niobium, titanium and aluminum allow the opportunity for precipitation hardening.

The material is used in aerospace, chemical industry, many areas in power generation and energy conversion such as engine and power plant technology. In addition, the exceptionally versatile and advantageous properties of the material should be emphasized:

- high corrosion resistance to many media (high Cr and Mo contents),
- high oxidation resistance (up to 980 °C),
- high temperature resistance up to 700 °C,
- high creep resistance and good fatigue behavior even at high temperatures,
- precipitation hardenable.

For applications in chloride- and sulfide-containing media in the oil-producing industry, **Ni-718API** is standardized material variant. The special suitability of this material is primarily due to a tighter limitation of the carbon and niobium contents.

Powder characteristics



Chemical analysis [wt%]

| Element | m4p™ Ni-718 | | m4p™ Ni-718API | |
|---------|-------------|------|----------------|------|
| | Min | Max | Min | Max |
| C | <0,08 | | <0,045 | |
| Si | <0,35 | | <0,35 | |
| Mn | <0,35 | | <0,35 | |
| Co | <1,0 | | <1,0 | |
| Cr | 17,0 | 21,0 | 17,0 | 21,0 |
| Ni | 50,0 | 55,0 | 50,0 | 55,0 |
| Mo | 2,8 | 3,3 | 2,8 | 3,3 |
| Ti | 0,6 | 1,25 | 0,8 | 1,15 |
| Al | 0,3 | 0,7 | 0,4 | 0,6 |
| Nb | 4,7 | 5,5 | 4,87 | 5,2 |
| Fe | Balance | | Balance | |

other limited elements: B, Cu, S, P, O, N, Ta

Material characteristics

(>99,9% rel. density; volume rate 15,2 cm³/h; layer thickness 40µm; EOS M290)

Mechanical properties

| | Tensile strength Rm [N/mm²] | Yield strength Re [N/mm²] | Elongation at break A ₅ [%] |
|--|-----------------------------|---------------------------|--|
| as-built | 940 | 620 | 27 |
| heat-treated (precipitation hardening) | 1300 | 1050 | 10 |

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