

m4p Ni-X

Ni-base for Laser Powder Bed Fusion

Description, properties and applications

m4p™ Ni-X is a **high-alloy, vacuum-melted** and **argon atomized** metal powder with the main alloying elements nickel-chromium-molybdenum. m4p™ Ni-X corresponds in its composition to UNS N06002 (or: Hastelloy X, 2.4665, Inconel HX), whereby the alloy is characterized by its outstanding **strength characteristics** in combination with high **oxidation resistance up to temperatures of 1,200°C**. Developed for use in such extreme **high-temperature environments**, the material is one of the so-called **Superalloys**, making it a frequently used material in the **aerospace industry**.

Solid oxide layers at high temperatures coupled with excellent **resistance to general corrosion** and in particular **stress corrosion** open up numerous applications for the material in the **petrochemical** and **power generation industries** (gas turbines). The characteristic profile is rounded off by very good **weldability**, which is advantageous for both laser-based additive manufacturing and subsequent processing of additively manufactured components.

Powder characteristics

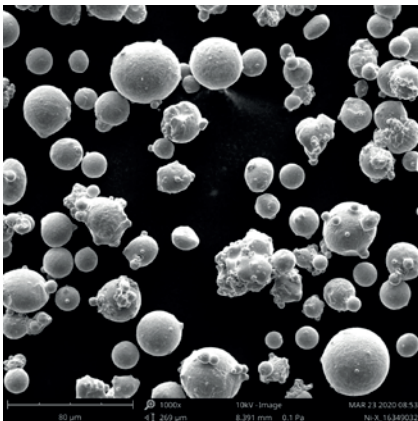


Image: SEM image of an m4p™ Ni-X powder

Chemical analysis [wt%]

Element	Min	Max
C	0.05	0.15
Si	<1.00	
Mn	<1.0	
Cr	20.5	23.0
Mo	8.00	10.0
Fe	17.0	20.0
W	0.20	1.00
Co	0.50	2.50
Ni	Base	

Other limited elements: B, Al, O, N, P, S

Additive manufacturing and material characteristics

(volume rate 15.3 cm³/h; layer thickness 40µm; EOS M290)

	Tensile strength Rm [N/mm ²]	Yield strength Rp0.2 [N/mm ²]	Elongation at break A ₅ [%]	Young´s modulus [GPa]
as-built Sample orientation ↕ ↔	620 - 770	490 - 590	31 - 47	150 - 195
heat-treated Sample orientation ↕ ↔	600 - 750	330 - 460	42 - 59	

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