

m4p type59-HR

Fe-base for Laser Powder Bed Fusion

Description, properties and applications

m4p type59-HR is a **heat-resistant** steel alloy for **application temperatures of up to 1050°C** in normal atmospheres. The **austenitic** iron-nickel-chromium alloy is stabilized by very fine **carbide precipitates**, resulting in high microstructural stability (**high-temperature strength**). At the same time, the requirements of laser-based, additive manufacturing were taken into account during material development, so that despite the high cooling rates due to the process, the alloy is easy to process, **insensitive to cracking** and has a low tendency to become brittle in the typically critical temperature range of 600-900°C.

High chromium contents in combination with high nickel contents produce strong oxide layers, which ensure the material's high **resistance to scaling** even under varying temperature stresses and at the same time provide high corrosion resistance (especially against **carburization** and in nitrogen-containing atmospheres). The excellent performance properties up to the high temperature range make the material ideal for applications in the **automotive industry** in particular, but also in **power generation** and the **chemical industry**.

Powder characteristics

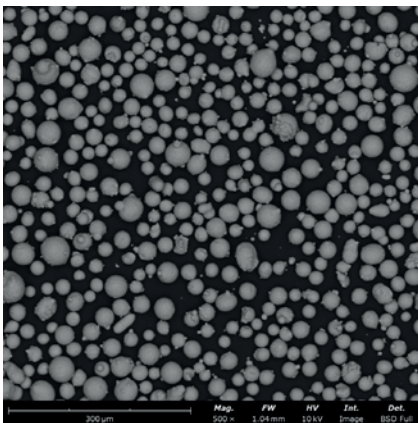


Image: SEM image of an m4p type59-HR powder

Chemical analysis [wt%]

Element	Min	Max
C	0.05	0.15
Si	0.50	1.50
Mn	<2.00	
Cr	19.0	21.0
Ni	31.0	33.0
Nb	0.50	1.50
Fe	Base	

Other limited elements: O, N, Mo, Cu, P, S

Additive manufacturing and material characteristics

(rel. density >99.9%; volume rate 14.7 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 ↑ ↔	670 - 880	460 - 710	31 - 39	140 - 225

GERMANY

m4p material solutions GmbH · Germany
Mittelweg 13, 39130 Magdeburg
T +49 391 72149-40
E sales@metals4printing.com

AUSTRIA / INTERNATIONAL

m4p material solutions GmbH · Austria
Gewerbestraße 4, 9181 Feistritz i. R.
T +43 4228 93053-0
E sales@metals4printing.com

www.metals4printing.com