

m4p type36-CTE

Fe-base for Laser Powder Bed Fusion

Description, properties and applications

m4p type36-CTE is a nickel-iron alloy with an exceptionally low **coefficient of thermal expansion** in the temperature range from -100°C to 200°C. This property makes the material ideal for applications requiring high **dimensional accuracy under changing temperatures**. m4p type36-CTE is a metal powder that was developed for use in laser-based additive manufacturing and thus extends the application possibilities of the so-called “**CTE - coefficient of thermal expansion materials**” for modern processing technologies. In conventional processing, the name “Invar36” has established on the market, whereby the name derives from “invariable” and refers to the low **thermal expansion**.

With a nickel content of around 36%, the specific ratio of nickel and iron results in a microstructure that is responsible for the material’s stable **thermophysical properties**. Invar 36 is often used in **precision instruments, watches, laser components** and **cryogenics**, as it maintains dimensional stability even at extremely low temperatures.

Powder characteristics

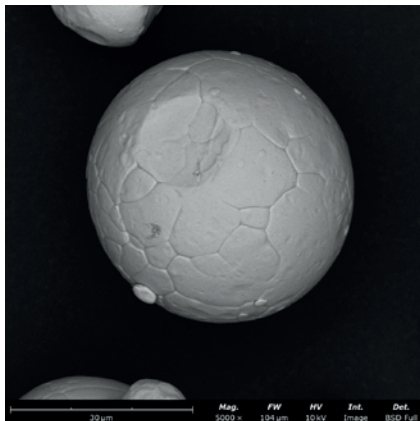


Image: SEM image of an m4p type36-CTE powder particle

Chemical analysis [wt%]

Element	Min	Max
C		0.10
Si		0.35
Mn		0.50
Cr		0.50
Co		0.50
Ni	35.0	37.0
Fe	Base	

Other limited elements: O, N, P, S

Additive manufacturing and material characteristics

(rel. density >99.9%; volume rate 11.1 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]	CTE [10E-6/K]
as-built Sample orientation ↕ ↔	400 - 500	325 - 400	24 - 40	100 - 150	0.2 - 0.6 (-30 - 110°C)

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