

P900

GMP F3816-50

General Information & Applications

High-nitrogen alloy steel (HNS) is characterized by outstanding corrosion resistance, high toughness, and high strength.

HNS are therefore the ideal solution for components subject to high corrosion stress in plant engineering for the chemical, food, and pharmaceutical industries, for components in the automotive and aerospace sectors, or for special applications where conventional austenitic steels cannot be used due to their often low strength combined with challenging environmental conditions.

In addition, the very low nickel content allows for application in areas with biocompatibility requirements, such as medical technology, the jewelry and consumer goods sector, and the food industry. The high final strength in combination with the degree of purity achieved enables excellent polishing results with high resistance to mechanical damage caused by scratches or high point loads, for example.

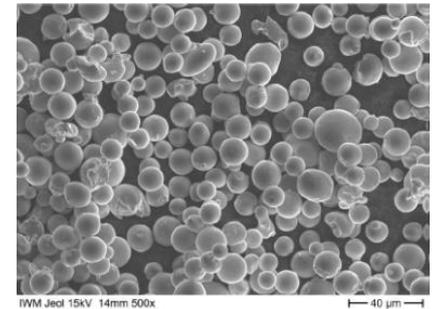
Georgsmarienhütte metal powder made from high-nitrogen alloy steel (HNS) analogous to the industry designation P900 in accordance with DIN EN 1.3816 (X8CrMnN19-19), preferred for processing via powder metallurgy or additive manufacturing.

Physical Properties (Solid Steel)

Density (25 °C)	7.7 g/cm ³
Thermal Expansion Coefficient 25 - 200 °C	16.5 10 ⁻⁶ K ⁻¹
Thermal Expansion Coefficient 25 - 400 °C	17.5 10 ⁻⁶ K ⁻¹
Specific Heat Capacity	500 Jkg ⁻¹ K ⁻¹
Thermal Conductivity	15 Wm ⁻¹ K ⁻¹
Young's Modulus	195 GPa
PREN (Pitting Resistance Equivalent Number)*	35 (25-37)
MARC (Measure of Alloying for Resistance to Corrosion)*	32 (19-34)

*(Reference 1.4404 / AISI 316L: PREN: 23 - 28; MARC: 20 - 24)

Appearance



Powder Properties

Particle Size Distribution (nominal)	µm	15 - 45	MPIF05, ASTM B214, ISO 4497
Flowability (Hall)	s/50 g	< 25	MPIF03, ASTM B213, ISO 4490
Apparent Density	g/cm ³	4.2 - 4.5	MPIF04, ASTM B212, ISO 3923/1
Tap Density	g/cm ³	4.5 - 4.7	ASTM B257, ISO 3953

Chemical Composition

Element	Fe	C	Si	Mn	Cr	Mo	V	Nb	P	S	Ni	N
Content in wt.-% min	Bal.			17	17							0.50
Content in wt.-% max	Bal.	0.15	1	20	120	0.50	0.20	0.25	0.05	0.03	<0.3	1.00

Mechanical Properties (in processed condition, z-direction, averaged)

Condition	Tensile Strength	Yield Strength	Elongation	Hardness	Fatigue Strength ¹	Impact Energy
	MPa	MPa	%	HV10	MPa	J
PBF-LB as-built	1030	850	25	330	-	15
Wärmebehandelt ²	980	750	28	300	320	60
HIP + WB	970	660	42	290	460	90

¹: Rotation-bending mode; R = -1; survival probability 50% | ²: Temperature: 1080 °C, Time: 20 min