

316L

Fe-based Alloy Powder for Additive Manufacturing 90/45 µm, Gas Atomized Designed for LMD

Chemical composition similar to DIN 1.4404, UNS S31603, X2CrNiMo17-12-2

DESCRIPTION

316L is a gas atomized stainless steel alloy powder engineered for additive manufacturing (AM). This material is a low carbon austenitic stainless steel alloy comprising of chromium, nickel, and molybdenum, providing superior corrosion resistance compared to 304L, while maintaining good mechanical properties.

This material has a wide range of applications across various industries due to its range of properties. It is well-suited for applications that require a combination of strength, ductility, and resistance to pitting and corrosion in harsh environments, therefore finding its place in many general engineering applications.

KEY PROPERTIES

- High corrosion resistance
- Excellent ductility
- Resistance to pitting
- Resistance to corrosion, oxidizing, and reducing environments

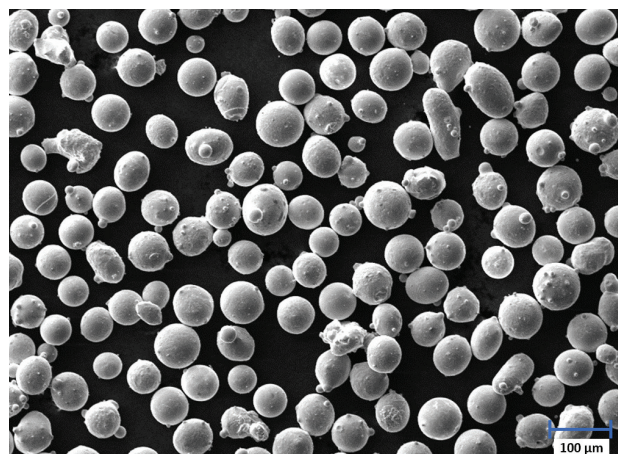
APPLICATIONS

- Marine and naval components
- Pressure vessels and storage tanks
- Offshore oil and gas equipment
- Pulp and paper machinery
- General engineering applications

POWDER CHEMICAL COMPOSITION

Element	Min. (wt%)	Max. (wt%)
Fe	Bal.	Bal.
Cr	16.0	18.0
Ni	10.0	14.0
Mo	2.0	3.0
Mn	-	2.0
Si	-	1.0
C	-	0.02

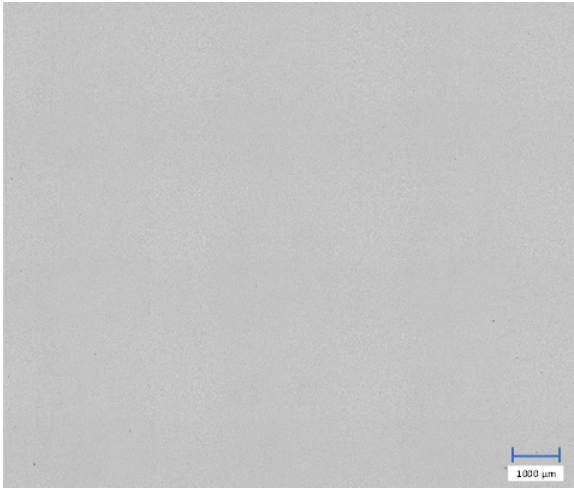
SEM IMAGE



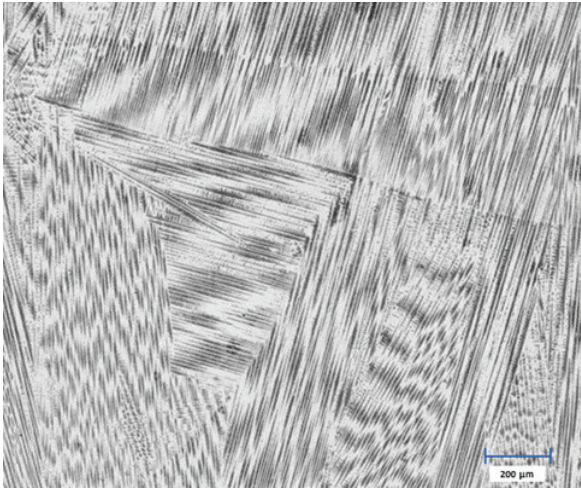
POWDER PROPERTIES (ISO 4490, ISO 3923-1)

Particle Size Distribution (µm)	Hall Flow (s/50g)	Apparent Density (g/cm³)
45 – 90	13.8	4.42

MICROGRAPHS



Polished Surface



Microstructure

PHYSICAL PROPERTIES (ISO 3369)

Average Defect Percentage (%)	Density (g/cm³)
< 0.10	> 7.91

MECHANICAL PROPERTIES (ISO 6892-1)

Orientation	Ultimate Tensile Strength (MPa)	0.2% Yield Strength (MPa)	Elongation at break (%)
Horizontal	666 ± 6	363 ± 12	34 ± 5
Vertical	607 ± 14	269 ± 4	47 ± 1

HARDNESS (ISO 6507-1)

HV _{0.3}
175

MELTING POINT

Celsius (°C)	Fahrenheit (°F)
1371 - 1399	2500 - 2550

PROCESS INFORMATION:

The properties reported in this Technical Data Sheet are applicable to Makino AM powders tested and distributed by Makino and processed on Makino LMD machine utilizing parameters in accordance with relevant operating guidelines (inclusive of setup conditions and maintenance). The properties are obtained by following recommended protocols. Further information regarding the methods used by Makino can be provided upon inquiry.

DISCLAIMER:

The data and information provided represent, to the best of our knowledge, standard or average values and do not constitute guarantees for upper and lower limit parameters. The recommended applications for the material disclosed are exclusively for illustrative purposes that help the reader to conduct their independent assessments. These suggestions are not intended to be expressed or implied warranties of suitability for the specified applications or any other purposes. The information included may be subject to change at any time without prior notification.

CONTACT US:

Our Safety Datasheet (SDS) is available upon request. For more information or support please contact Makino at sales-am@makino.com.sg or visit www.makino.com.sg