

Material Product Data Sheet

Austenitic Stainless Steel Powder for Laser Cladding

Laser Cladding Products: MetcoClad 316L-SI

1 Introduction

MetcoClad™ 316L-SI is a gas atomized, nickel chromium stainless steel powder suitable for use with the laser cladding process. It is an austenitic-type stainless steel, similar to AISI Type 316L (UNS S31603), with a low carbon content that desensitizes the clad deposit to eliminate grain boundary carbide precipitation.

When applied using laser cladding, the properties are similar to, or better than, that of the bulk material because of the refined microstructure and low dilution during cladding. The clad offers good impact resistance at elevated temperatures and corrosion resistance in chloride environments. Molybdenum ensures good pitting and crevice resistance.

Silicon levels in MetcoClad 316L-SI are higher than AISI Type 316L. The higher silicon content acts as a fluxing agent that produces cleaner clad deposits. Please note that cladding parameters may have to be adjusted to accommodate the higher silicon content.

MetcoClad 316L-SI is recommended for corrosion overlay deposits on components used in the oil, gas and marine industries.

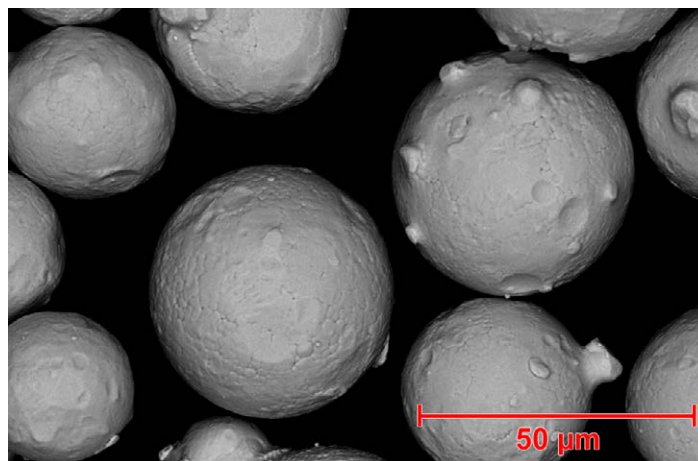
1.1 Typical Uses and Applications:

Typically used for laser cladding and laser-additive manufacturing applications, including:

- Heavy equipment
- Food equipment exposed to chloride environments
- Medical implants
- Hydraulic pumps and turbines
- Roll covers for printing machinery
- Shafts in marine applications
- Repair and build up of steel parts

Quick Facts

Classification	Alloy, iron-based
Chemistry	Fe 12Ni 17Cr 2.3Mo 2.3Si 1Mn 0.03C
Manufacture	Gas atomized
Morphology	Spheroidal
Service Temperature	≤ 900 °C (1650 °F)
Apparent Density	4.0 – 4.5 g/cm ³
Purpose	Corrosion protection, creep and stress-rupture resistance at elevated temperatures
Process	Laser Cladding



Typical Morphology of MetcoClad 316L-SI Powder

2 Material Information

2.1 Chemical Composition

Product	Weight Percent (nominal)							
	Fe	Ni	Cr	Mo	Si	Mn	C	Others
MetcoClad 316L-SI	Balance	12.0	17.0	2.5	2.3	1.0	0.03	≤ 0.5

2.2 Particle Size Distribution

Product	Nominal Range µm	Particle Size Distribution wt. %		
		+106 µm	-106 +44 µm	-44µm max
MetcoClad 316L-SI	-106 +44	5	90	5

Size analysis using sieve (ASTM B214).

2.3 Key Selection Criteria

MetcoClad 316L-SI is recommended for laser cladding or laser-additive manufacturing applications where deposits exhibiting the following characteristics are desired:

- Corrosion resistance in marine environments
- Resistance to pitting and cavitation
- Creep and stress rupture at elevated temperatures

MetcoClad 316L-SI can also be used for repair or buildup of steel parts.

2.4 Related Products

- Oerlikon Metco offers a number of nickel-based superalloy powders suitable for laser cladding deposits in corrosive media, to resist oxidation or to resist crevice corrosion and pitting (see datasheet DSMW-0002).
- For harder, tougher deposits where corrosion is less of a concern, MetcoClad 538F is recommended (see datasheet DSMW-0018).

3 Commercial Information

3.1 Ordering Information and Availability

Product	Order No.	Package Size	Availability	Distribution
MetcoClad 316L-SI	1079454	5 kg (approx. 11 lb)	Special Order	Global

3.2 Handling Recommendations

- Store in the original container in a dry location.
- Tumble contents prior to use to prevent segregation.
- Open containers should be stored in a drying oven to prevent moisture pickup.

3.3 Safety Recommendations

See the SDS 50-1600 (Safety Data Sheet) in the version localized for the country where the material will be used. SDS are available from the Oerlikon web site at www.oerlikon.com/metco (Resources – Safety Data Sheets).

Information is subject to change without prior notice.