



316L-SEMI F20-UHP

Quick Facts

This Alloy is a modified 316L version an austenitic stainless steel, a low carbon version of 316 and is melted as AOD, AOD + VAR, or VIM + VAR or ESR + VAR. The low carbon helps to improve weldability as compared to the standard 316 as well as improved corrosion resistance! This version is called UHP (ultra-high purity). It can be used for manufacturing of components for general purpose and high purity chemical (gas or liquid) distribution systems in semiconductor manufacturing facilities.

Typical Applications

- General Clean Room Fittings
- Valves
- UHP pressure Sensors
- Metal UHP sealings
- Welding fittings

Stock Range

We stock a comprehensive range of Flat Bars and Round Bars.

Flat Bars with a thickness between 19mm – 45mm and various width, we are cutting to size.

Round Bars from OD 5mm up to 40mm.

We are offering as well:

General forgings

Blocks

Primarily manufactured in Europe,



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relevant Specifications

- SEMI F20-UHP
- AISI or SUS 316L
- EN 10277 class 3, surface
- EN 10308,
- ASTM A 276-Rev.2016, ASTM A 479/A, 479M Rev. 2016
- ASTM E112 Rev. 2013, ASTM E45 Rev. 2013, ASTM A262 practice E Rev. 2015

Material may also be supplied against Customer specifications, subject to enquiry!

Melting Practices

- Our material is ESR/VAR melted,
- acc. to ASTM A 276 / EN 10 088-3,



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Chemical Analysis

This Alloy is a modified 316L version an austenitic stainless steel, and can be melted as AOD, AOD + VAR, or VIM + VAR.

Chemical Composition, %

	C	Si	Mn	P	S	Cr	Ni	Mo	Cb	Ti	Al	N	Cu	Nb	Se	Ca
Min	-	-	-	-	-	17.00	12.00	2.50	4.75	-	-	-	-	-	-	-
Max	0.03	1.00	2.00	0.03	0.01	18.00	-	3.00	5.5	0.02	0.01	0.10	0.30	0.05	0.02	0.02

Mechanical Properties

OD 5.00mm up to 12.70mm	h9 tolerance,
OD 12.70mm and above	k12 tolerance,
Straightness	2.00 mm/m
Surface depth	acc. to EN 10277, class 3
Grain Size	acc. to ASTM E112 ≤ 5
General standard	EN 10088-3, ASTM A 276

	Tensile Strength (MPA)	Yield Strength (0.2% offset), (MPA) min.	Elongation in 2" or 4D min%	Reduction of Area	Hardness, (mid radius)	Grain Size
Round Bars	675 - 875	> 260	>20	> 20	> 200 HB	≤ 5
Flat Bars	350 - 700	> 260	>20	> 20	> 200 HB	≤ 5



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Machinability

To be advised

Material Conditions, general

SEMI F20 defines the metallurgical cleanliness requirements and material composition of 316L stainless steel for use in manufacturing of components for general purpose, high purity, and ultra-high purity chemical (gas or liquid) distribution systems.

It defines the requirements for 316L stainless steel bar, forgings, and extruded shapes as specified in ASTM A 276, plate stock as specified in ASTM A 240, and tubing as specified in ASTM A 269 and ASTM A 632, for use in the manufacture of components used in general purpose and high purity chemical (gas or liquid) distribution systems in semiconductor manufacturing facilities.

As far as we know the first SEMI F20 was published in 1995. From the history we know that manufactures are capable to achieve the purity last time by using VIM and VAR melting processes.

Since in the past mostly American manufacturers are supplied such grades, the industry got used to it, using VIM/ VAR material.

As a result, everybody was using VIM/VAR material even though it was not defined as a method or process to achieve the purity.

However, during the last decades technologies developed other processes achieving same or better results in purity. The alternate processes are AOD, AOD + VAR, or in combination with VIM + VAR or ESR + VAR.

Our manufacturer has proven many times that the ESR/VAR sometimes ESR/VAR/VAR melting leads to exactly same, sometimes even better results. AMS can guarantee, that we are capable of supplying SEMI F20 316L UHP material in full compliance with the current standards.

Corrosion Resistance

316L-SEMI F20-UHP has an excellent corrosion resistance. The low carbon content effectively reduces the susceptibility to intergranular corrosion. The presence of molybdenum enhances the resistance to oxidizing acids as well as to pitting corrosion.