



## 1. SCOPE

This technical specification has the objective to define the delivery conditions for Stainless steel according to the grade which is defined in point 5. The purpose of this specification is to define the metallurgical cleanliness requirements and material composition of 316L stainless steel Billets, Rounds Rectangular and square bars required for use in Semiconductor Industry. The finished goods are primarily used as sealing parts. Other applications consists of thin wall hollow stressed parts. This material is intended for subsequent fabrication processes such as forging fabrication and then after machining, mechanical polishing, TIG/AOW operation and electro polish.

## 2. Material Designation

X2CrNiMo18-14-3  
AISI 316L  
1.4435 modified

## 3. Manufacturing

The stainless steel shall usually be manufactured with primary melting process of Electric Arc Furnace( EAF) or Vacuum Induction Melting (VIM), with refining process of Argon Oxygen Decarburization(AOD) or Vacuum Oxygen Decarburization (VOD), followed by secondary melting process of Electro-slag Remelting (ESR) or Vacuum Arc Remelting (VAR) when needed.

## 4. General Requirements

Bar stock, forgings or extruded shapes furnished under this specification shall conform to the requirements of

ASTM A182/A182M,                    ASTM A276,                    ASTM A479/A479 M  
ASTM A484/A 484 M,            ASTM A 604/604M            ASTM A 262 Practice E,  
SEMI-F20-0706,                    AD2000-W0,AD2000-W2, AD2000-W10  
and the additional requirements of this specification.

*Where the requirements of this specification conflict with referenced specification, the requirements of this specification take precedence.*

## 5. Chemical composition (weight %)

	C	Si	Mn	P	S	Cr	Mo	Ni	Cu	Nb	Al	Ca	Ti
Min	0.015	0.400	-	-	0.005	16.500	2.300	12.000	-	-	-	-	-
Max	0.030	0.600	0.500	0.025	0.010	18.000	-	-	0.300	0.050	0.010	0.020	0.020

	Se	Co	N
Min	-	-	-



**Advance  
Materials  
Supplies**

*AMS-UltraClean-316L-SEMI F20 UHP-REV03*

*Date: 10/2022*

*Semiconductor Quality-general specification-*

Max	0.020	0.100	0.060
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**ADVANCE MATERIALS SUPPLIES PTE LTD (AMS)**, 501 Guillemard Road, Singapore 399840

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## 6. Mechanical Properties

According to ASTM A479-strain hardened level 2 or ASTM A276 condition S

## 7. Cleanliness

The inclusion content of the material shall be determined from representative samples of the material heat in accordance with ASTM E 45 Method A, but with ratings based on Plate III. Maximum allowable JK ratings at the billet stage are shown below.

TYPE	THIN	HEAVY
A	1.00	0.50
B	1.00	0.50
C	1.00	0.50
D	1.00	1.00

## 8. Metallurgy

Grain size per ASTM E112 shall be 6 or finer.

Intergranular corrosion test according to ASTM A 262 practice E.

Macro etch test to be conducted for one sample per heat / size , in accordance with ASTM A604/604 M.

## 9. Surface Condition

Smooth, bright, no corrosion points,

no rust,

no cracks,

no scores no surface defects,

100% eddy current according DIN EN 10277 CLASS 3,

## 10. Internal Defect(s)

State-of-the-art measures are to be taken in order to avoid the occurrence of macroscopic internal defects.

Delivery condition: no internal defects,

no cracks,

no blow holes,

no non-metallic inclusions.

100% ultrasonic test on bars according to DIN EN 10308 quality class 3.



### **11. Size(s), Length, Straightness,**

Sizes and shape will be defined by customers Purchase Order  
Length shall be defined by customer,  
AMS standard length is 3,000mm – 5,000mm random length,  
Standard Straightness 1.00mm/m

### **12. Delivery condition,**

Printed on bars or stamped on bar end (one side only), heat# and size (applies to bars above 1”)  
Bars are packed in wooden crates suitable for export,

### **13. Material Test Reports,**

Test certificate acc. to standards specified in the order complying to DIN EN 10204/3.1  
Heat number,  
Chemical composition,  
Grade,  
All further treatment,  
Quantity delivered,  
Inclusions test result,  
Material free of Mercury contamination statement & Material free of Radioactivity statement  
ROHS and REACH compliance,  
Results, third party test(s),

### **14. OTHERS,**

Please take note, SEMI F20 UHP is not defining mechanical properties! If not specified AMS will follow as mentioned in topic 6, properties will be according to ASTM A479-strain hardened level 2 or ASTM A276 condition S.

If no specification is given to AMS, we will supply material to our specification