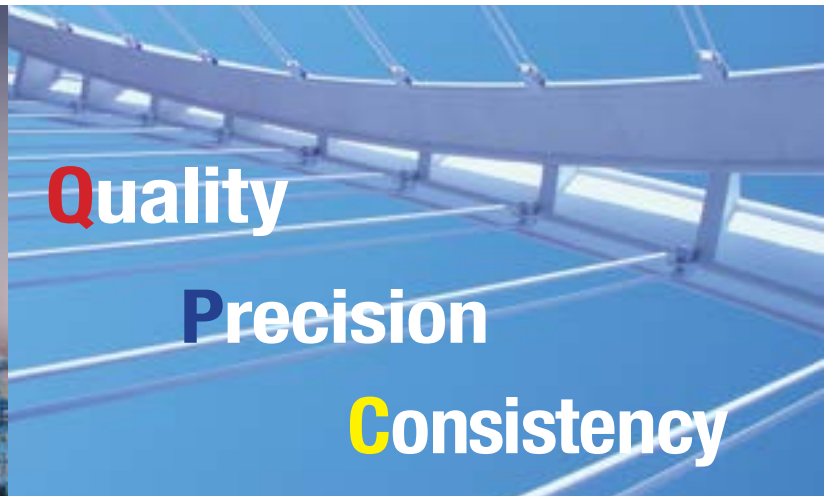




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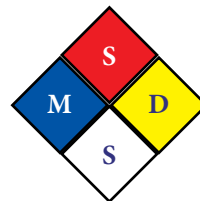
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# AMERICAN FILLER METALS

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## Stainless Steel Coated Electrodes

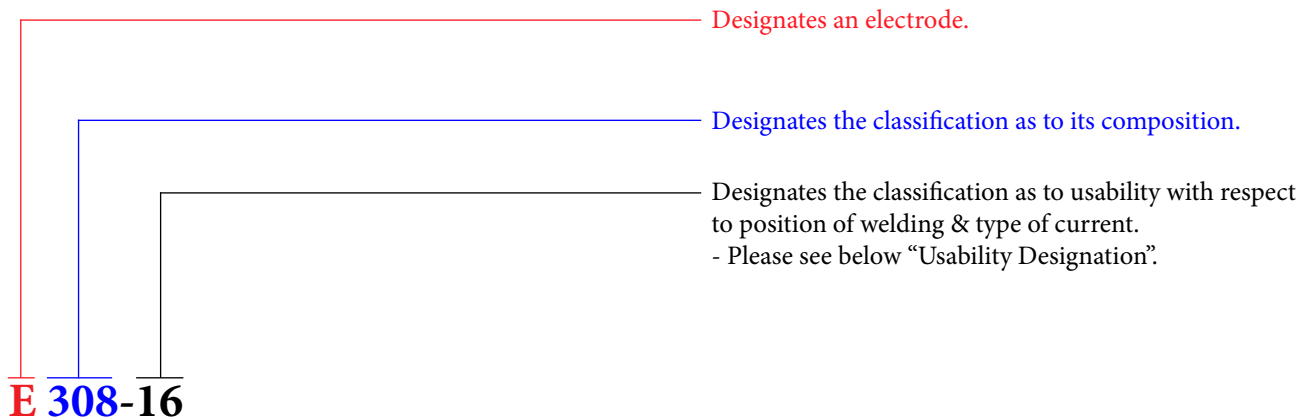
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## Order of Mandatory Classification Designators

AWS/SFA A5.4



- *Welding Current*
  - DCEP** - Direct **C**urrent **E**lectrode **P**ositive (DC, Reverse Polarity)
  - DCEN** - Direct **C**urrent **E**lectrode **N**egative (DC, Straight Polarity)

### Usability Designation

#### Usability Designation -15.

The electrodes are usable with dcep (electrode positive) only.

While use with alternating current is sometimes accomplished, they are not intended to qualify for use with this type of current.

Electrode sizes 5/32 in [4.0 mm] and smaller may be used in all positions of welding.

#### Usability Designation -16.

The covering for these electrodes generally contains readily ionizing elements, such as potassium, in order to stabilize the arc for welding with alternating current.

Electrode sizes 5/32 in [4.0 mm] and smaller may be used in all positions of welding.

#### Usability Designation -17.

The covering of these electrodes is a modification of the -16 covering in that considerable silica replaces some of the titania of the -16 covering.

Since both the -16 and the -17 electrode coverings permit ac operation, both covering types were classified as -16 in the past because there was no classification alternative until the 1992 revision of AWS A5.4.

However, the operational differences between the two types have become significant enough to warrant a separate classification.

## AFM E308-16

AWS/SFA A5.4

### Description:

AFM E308-16 is used for welding austenitic stainless of 18/8 types such as AISI 201, 202, 204, 301, 302, 304, 305, and 308.

### Recommended Amperage (DC+):

Dia. (inch)	3/32"	1/8"	5/32"	3/16"
Dia. (mm)	2.4 mm	3.2 mm	4.0 mm	4.8 mm
Length	12"	14"	14"	14"
AMPS	50 ~ 80	70 ~ 110	100 ~ 140	130 ~ 180

### Chemical Composition Requirements for Undiluted Weld Metal (%):

C	Cr	Ni	Mo	Mn
0.08	18.00 ~ 21.00	9.00 ~ 11.00	0.75	0.50 ~ 2.50
Si	P	S	Cu	
1.00	0.04	0.03	0.75	

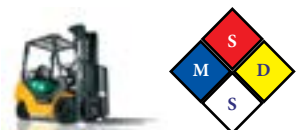
All values are considered maximum, unless otherwise noted.

### All-Weld-Metal Tension Test Requirements:

Tensile Strength	psi	80,000
	MPa	550
Elongation	(%)	35

### Standard Packaging:

All sizes are packaged in 10 Lb containers.  
4 containers per 40 Lb Master Carton.



## AFM E308H-16

AWS/SFA A5.4

### Description:

AFM E308H-16 is the same as AFM E308-16 except that the allowable carbon content has been restricted to the higher portion of the E308 range.

Carbon content in the range of 0.04 ~ 0.08 provides higher tensile and creep strengths at elevated temperatures.

AFM E308H-16 is used for welding Type 304H base metal.

### Recommended Amperage (DC+):

Dia. (inch)	3/32"	1/8"	5/32"	3/16"
Dia. (mm)	2.4 mm	3.2 mm	4.0 mm	4.8 mm
Length	12"	14"	14"	14"
AMPS	50 ~ 80	70 ~ 110	100 ~ 140	130 ~ 180

### Chemical Composition Requirements for Undiluted Weld Metal (%):

C	Cr	Ni	Mo	Mn
0.04 ~ 0.08	18.00 ~ 21.00	9.00 ~ 11.00	0.75	0.50 ~ 2.50
Si	P	S	Cu	
1.00	0.04	0.03	0.75	

All values are considered maximum, unless otherwise noted.

### All-Weld-Metal Tension Test Requirements:

Tensile Strength	psi	80,000
	MPa	550
Elongation	(%)	35

### Standard Packaging:

All sizes are packaged in 10 Lb containers.

4 containers per 40 Lb Master Carton.



## AFM E308L-16

AWS/SFA A5.4

### Description:

AFM E308L-16 has the same composition of the weld metal of AFM E308-16, except for the restricted carbon content.

The 0.04 percent maximum carbon content of weld metal deposited by AFM E308L-16 reduces the possibility of intergranular carbide precipitation and thereby increases the resistance to intergranular corrosion without the use of stabilizers such as columbium (niobium) or titanium.

A carbon content of 0.04 percent maximum has been shown to be adequate in weld metal, even though it is recognized that similar base metal specifications require a 0.03 percent limitation. This low carbon alloy, however, is not as strong at elevated temperature as the columbium-stabilized alloys or 304H.

### Recommended Amperage (DC+):

Dia. (inch)	3/32"	1/8"	5/32"	3/16"
Dia. (mm)	2.4 mm	3.2 mm	4.0 mm	4.8 mm
Length	12"	14"	14"	14"
AMPS	50 ~ 80	70 ~ 110	100 ~ 140	130 ~ 180

### Chemical Composition Requirements for Undiluted Weld Metal (%):

C	Cr	Ni	Mo	Mn
0.04	18.00 ~ 21.00	9.00 ~ 11.00	0.75	0.50 ~ 2.50
Si	P	S	Cu	
1.00	0.04	0.03	0.75	

All values are considered maximum, unless otherwise noted.

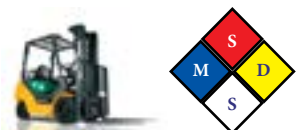
### All-Weld-Metal Tension Test Requirements:

Tensile Strength	psi	75,000
	MPa	520
Elongation	(%)	35

### Standard Packaging:

All sizes are packaged in 10 Lb containers.

4 containers per 40 Lb Master Carton.





## AFM E309-16

AWS/SFA A5.4

### Description:

AFM E309-16 is commonly used for welding similar alloys in wrought or cast form. It is used for welding dissimilar metals, such as joining Type 304 to carbon steel, welding the clad side of Type 304 clad steels, and applying stainless steel sheet linings to carbon steel shells. Occasionally, AFM E309-16 is used to weld Type 304 and similar base metals where severe corrosion conditions exist requiring higher alloy weld metal.

### Recommended Amperage (DC+):

Dia. (inch)	3/32"	1/8"	5/32"	3/16"
Dia. (mm)	2.4 mm	3.2 mm	4.0 mm	4.8 mm
Length	12"	14"	14"	14"
AMPS	50 ~ 80	70 ~ 110	100 ~ 140	130 ~ 180

### Chemical Composition Requirements for Undiluted Weld Metal (%):

C	Cr	Ni	Mo	Mn
0.15	22.00 ~ 25.00	12.00 ~ 14.00	0.75	0.50 ~ 2.50
Si	P	S	Cu	
1.00	0.04	0.03	0.75	

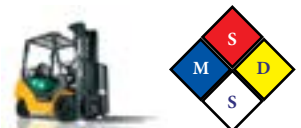
All values are considered maximum, unless otherwise noted.

### All-Weld-Metal Tension Test Requirements:

Tensile Strength	psi	80,000
	MPa	550
Elongation	(%)	30

### Standard Packaging:

All sizes are packaged in 10 Lb containers.  
4 containers per 40 Lb Master Carton.



## AFM E309L-16

AWS/SFA A5.4

### Description:

AFM E309L-16 has the same composition of weld metal deposited by AFM E309-16 electrodes, except for the restricted carbon content.

The 0.04 percent maximum carbon content of these weld deposits reduces the possibility of intergranular carbide precipitation and thereby increases the resistance to intergranular corrosion without the use of stabilizers such as columbium (niobium) and titanium.

AFM E309L-16 is not as strong at elevated temperature as the columbiumstabilized alloys or high carbon content AFM E309-16 deposits.

### Recommended Amperage (DC+):

Dia. (inch)	3/32"	1/8"	5/32"	3/16"
Dia. (mm)	2.4 mm	3.2 mm	4.0 mm	4.8 mm
Length	12"	14"	14"	14"
AMPS	50 ~ 80	70 ~ 110	100 ~ 140	130 ~ 180

### Chemical Composition Requirements for Undiluted Weld Metal (%):

C	Cr	Ni	Mo	Mn
0.04	22.00 ~ 25.00	12.00 ~ 14.00	0.75	0.50 ~ 2.50
Si	P	S	Cu	
1.00	0.04	0.03	0.75	

All values are considered maximum, unless otherwise noted.

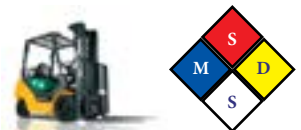
### All-Weld-Metal Tension Test Requirements:

Tensile Strength	psi	75,000
	MPa	520
Elongation	(%)	30

### Standard Packaging:

All sizes are packaged in 10 Lb containers.

4 containers per 40 Lb Master Carton.



## AFM E309Nb-16

AWS/SFA A5.4

### Description:

AFM E309Nb-16 has the same composition of weld metal deposited by AFM E309-16, except for the addition of columbium (niobium) and a reduction in the carbon limit. The columbium (niobium) provides resistance to carbide precipitation and thus increases intergranular corrosion resistance and also provides higher strength in elevated temperature service. AFM E309Nb-16 electrodes are used also for welding Type 347 clad steels or for the overlay of carbon steel.

E309Nb-XX was formerly named E309Cb-XXw.

The change was made conform to the worldwide uniform designation of the element nobium.

### Recommended Amperage (DC+):

Dia. (inch)	3/32"	1/8"	5/32"	3/16"
Dia. (mm)	2.4 mm	3.2 mm	4.0 mm	4.8 mm
Length	12"	14"	14"	14"
AMPS	50 ~ 80	70 ~ 110	100 ~ 140	130 ~ 180

### Chemical Composition Requirements for Undiluted Weld Metal (%):

C	Cr	Ni	Mo	Mn
0.12	22.00 ~ 25.00	12.00 ~ 14.00	0.75	0.50 ~ 2.50
Si	P	S	Cu	Nb (Cb) + Ta
1.00	0.04	0.03	0.75	0.70 ~ 1.00

All values are considered maximum, unless otherwise noted.

### All-Weld-Metal Tension Test Requirements:

Tensile Strength	psi	80,000
	MPa	550
Elongation	(%)	30

### Standard Packaging:

All sizes are packaged in 10 Lb containers.

4 containers per 40 Lb Master Carton.



## AFM E309Mo-16

AWS/SFA A5.4

### Description:

AFM E309Mo-16 has the same composition of weld metal deposited by AFM E309-16, except for the addition of molybdenum and a small reduction in the carbon limit.

It is used for welding Type 316 clad steels or for the overlay of carbon steels.

### Recommended Amperage (DC+):

Dia. (inch)	3/32"	1/8"	5/32"	3/16"
Dia. (mm)	2.4 mm	3.2 mm	4.0 mm	4.8 mm
Length	12"	14"	14"	14"
AMPS	50 ~ 80	70 ~ 110	100 ~ 140	130 ~ 180

### Chemical Composition Requirements for Undiluted Weld Metal (%):

C	Cr	Ni	Mo	Mn
0.12	22.00 ~ 25.00	12.00 ~ 14.00	2.00 ~ 3.00	0.50 ~ 2.50
Si	P	S	Cu	
1.00	0.04	0.03	0.75	

All values are considered maximum, unless otherwise noted.

### All-Weld-Metal Tension Test Requirements:

Tensile Strength	psi	80,000
	MPa	550
Elongation	(%)	30

### Standard Packaging:

All sizes are packaged in 10 Lb containers.

4 containers per 40 Lb Master Carton.



## AFM E309LMo-16

AWS/SFA A5.4

### Description:

AFM E309LMo-16 has the same composition of weld metal deposited by AFM E309Mo-16, except for the restricted carbon content.

The lower carbon content of the weld metal reduces the possibility of intergranular corrosion.

E309LMo-XX was formerly named E309MoL-XX.

### Recommended Amperage (DC+):

Dia. (inch)	3/32"	1/8"	5/32"	3/16"
Dia. (mm)	2.4 mm	3.2 mm	4.0 mm	4.8 mm
Length	12"	14"	14"	14"
AMPS	50 ~ 80	70 ~ 110	100 ~ 140	130 ~ 180

### Chemical Composition Requirements for Undiluted Weld Metal (%):

C	Cr	Ni	Mo	Mn
0.12	22.00 ~ 25.00	12.00 ~ 14.00	2.00 ~ 3.00	0.50 ~ 2.50
Si	P	S	Cu	
1.00	0.04	0.03	0.75	

All values are considered maximum, unless otherwise noted.

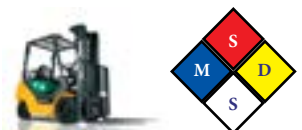
### All-Weld-Metal Tension Test Requirements:

Tensile Strength	psi	75,000
	MPa	520
Elongation	(%)	30

### Standard Packaging:

All sizes are packaged in 10 Lb containers.

4 containers per 40 Lb Master Carton.



## AFM E310-16

AWS/SFA A5.4

### Description:

AFM E310-16 is used for welding type 310 stainless steel. The weld deposit exhibits the same chemical analysis and oxidation resistance as the base plate metal.

### Recommended Amperage (DC+):

Dia. (inch)	3/32"	1/8"	5/32"	3/16"
Dia. (mm)	2.4 mm	3.2 mm	4.0 mm	4.8 mm
Length	12"	14"	14"	14"
AMPS	50 ~ 80	70 ~ 110	100 ~ 140	130 ~ 180

### Chemical Composition Requirements for Undiluted Weld Metal (%):

C	Cr	Ni	Mo	Mn
0.08 ~ 0.20	25.00 ~ 28.00	20.00 ~ 22.50	2.00 ~ 3.00	1.00 ~ 2.50
Si	P	S	Cu	
0.75	0.03	0.03	0.75	

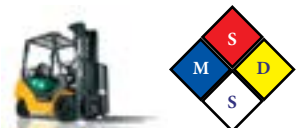
All values are considered maximum, unless otherwise noted.

### All-Weld-Metal Tension Test Requirements:

Tensile Strength	psi	80,000
	MPa	550
Elongation	(%)	30

### Standard Packaging:

All sizes are packaged in 10 Lb containers.  
4 containers per 40 Lb Master Carton.



## AFM E312-16

AWS/SFA A5.4

### Description:

AFM E312-16 was originally designed to weld cast alloys of similar composition. They have been found to be valuable in welding dissimilar metals, high in nickel. AFM E312-16 gives a two-phase weld deposit with substantial amounts of ferrite in an austenitic matrix. Even with considerable dilution by austenite-forming elements, such as nickel, the microstructure remains two-phase and thus highly resistant to weld metal cracks and fissures. Applications should be limited to service temperature below 800°F (420°C) to avoid formation of secondary brittle phases.

### Recommended Amperage (DC+):

Dia. (inch)	3/32"	1/8"	5/32"	3/16"
Dia. (mm)	2.4 mm	3.2 mm	4.0 mm	4.8 mm
Length	12"	14"	14"	14"
AMPS	50 ~ 80	70 ~ 110	100 ~ 140	130 ~ 180

### Chemical Composition Requirements for Undiluted Weld Metal (%):

C	Cr	Ni	Mo	Mn
0.15	28.00 ~ 32.00	8.00 ~ 10.50	0.75	0.50 ~ 2.50
Si	P	S	Cu	
1.00	0.04	0.03	0.75	

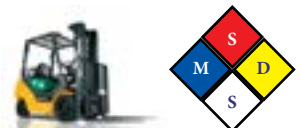
All values are considered maximum, unless otherwise noted.

### All-Weld-Metal Tension Test Requirements:

Tensile Strength	psi	95,000
	MPa	660
Elongation	(%)	22

### Standard Packaging:

All sizes are packaged in 10 Lb containers.  
4 containers per 40 Lb Master Carton.



## AFM E316-16

AWS/SFA A5.4

### Description:

AFM E316-16 is used for welding Type 316 and similar alloys.

They have been used successfully in certain applications involving special base metals for high-temperature service.

The presence of molybdenum provides creep resistance at elevated temperatures.

### Recommended Amperage (DC+):

Dia. (inch)	3/32"	1/8"	5/32"	3/16"
Dia. (mm)	2.4 mm	3.2 mm	4.0 mm	4.8 mm
Length	12"	14"	14"	14"
AMPS	50 ~ 80	70 ~ 110	100 ~ 140	130 ~ 180

### Chemical Composition Requirements for Undiluted Weld Metal (%):

C	Cr	Ni	Mo	Mn
0.08	17.00 ~ 20.00	11.00 ~ 14.00	2.00 ~ 3.00	0.50 ~ 2.50
Si	P	S	Cu	
1.00	0.04	0.03	0.75	

All values are considered maximum, unless otherwise noted.

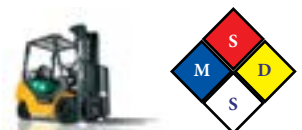
### All-Weld-Metal Tension Test Requirements:

Tensile Strength	psi	75,000
	MPa	520
Elongation	(%)	30

### Standard Packaging:

All sizes are packaged in 10 Lb containers.

4 containers per 40 Lb Master Carton.





## AFM E316H-16

AWS/SFA A5.4

### Description:

AFM E316H-16 is used for welding 316H base metal. It is the same as AFM E316-16 except that the allowable carbon content has been restricted to the higher portion of the E316 range. Carbon content in the range of 0.04 to 0.08 provides higher tensile and creep strengths at elevated temperatures.

### Recommended Amperage (DC+):

Dia. (inch)	3/32"	1/8"	5/32"	3/16"
Dia. (mm)	2.4 mm	3.2 mm	4.0 mm	4.8 mm
Length	12"	14"	14"	14"
AMPS	50 ~ 80	70 ~ 110	100 ~ 140	130 ~ 180

### Chemical Composition Requirements for Undiluted Weld Metal (%):

C	Cr	Ni	Mo	Mn
0.04 ~ 0.08	17.00 ~ 20.00	11.00 ~ 14.00	2.00 ~ 3.00	0.50 ~ 2.50
Si	P	S	Cu	
1.00	0.04	0.03	0.75	

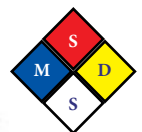
All values are considered maximum, unless otherwise noted.

### All-Weld-Metal Tension Test Requirements:

Tensile Strength	psi	75,000
	MPa	520
Elongation	(%)	30

### Standard Packaging:

All sizes are packaged in 10 Lb containers.  
4 containers per 40 Lb Master Carton.



## AFM E316L-16

AWS/SFA A5.4

### Description:

AFM E316L-16 has the same composition as AFM E316-16, except for the restricted carbon content. The 0.04 percent maximum carbon content of weld metal deposited by these electrodes reduces the possibility of intergranular carbide precipitation and thereby increases the resistance to intergranular corrosion without the use of stabilizers such as columbium (niobium) or titanium.

AFM E316L-16 is used principally for welding low carbon, molybdenum-bearing austenitic alloys. Tests have shown that 0.04 percent carbon limit in the weld metal gives adequate protection against intergranular corrosion in most cases.

AFM E316L-16, however, is not as strong at elevated temperatures as Type 316H.

### Recommended Amperage (DC+):

Dia. (inch)	3/32"	1/8"	5/32"	3/16"
Dia. (mm)	2.4 mm	3.2 mm	4.0 mm	4.8 mm
Length	12"	14"	14"	14"
AMPS	50 ~ 80	70 ~ 110	100 ~ 140	130 ~ 180

### Chemical Composition Requirements for Undiluted Weld Metal (%):

C	Cr	Ni	Mo	Mn
0.04	17.00 ~ 20.00	11.00 ~ 14.00	2.00 ~ 3.00	0.50 ~ 2.50
Si	P	S	Cu	
1.00	0.04	0.03	0.75	

All values are considered maximum, unless otherwise noted.

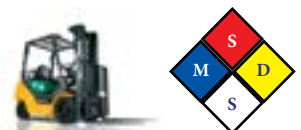
### All-Weld-Metal Tension Test Requirements:

Tensile Strength	psi	70,000
	MPa	490
Elongation	(%)	30

### Standard Packaging:

All sizes are packaged in 10 Lb containers.

4 containers per 40 Lb Master Carton.



## AFM E317L-16

AWS/SFA A5.4

### Description:

AFM E317L-16 is usually used for welding alloys of similar composition and are utilized in severely corrosive environments (such as those containing halogens) where crevice and pitting corrosion are of concern.

The 0.04 percent maximum carbon content of weld metal deposited by these electrodes reduces the possibility of intergranular carbide precipitation and thereby increases the resistance to intergranular corrosion without the use of stabilizers such as columbium (niobium) or titanium.

AFM E317L-16, however, is not as strong at elevated temperatures as the columbium (niobium)-stabilized alloys or the standard Type 317 weld metal with a higher carbon content.

### Recommended Amperage (DC+):

Dia. (inch)	3/32"	1/8"	5/32"	3/16"
Dia. (mm)	2.4 mm	3.2 mm	4.0 mm	4.8 mm
Length	12"	14"	14"	14"
AMPS	50 ~ 80	70 ~ 110	100 ~ 140	130 ~ 180

### Chemical Composition Requirements for Undiluted Weld Metal (%):

C	Cr	Ni	Mo	Mn
0.04	18.00 ~ 21.00	12.00 ~ 14.00	3.00 ~ 4.00	0.50 ~ 2.50
Si	P	S	Cu	
1.00	0.04	0.03	0.75	

All values are considered maximum, unless otherwise noted.

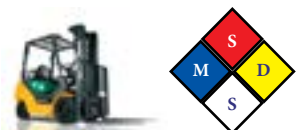
### All-Weld-Metal Tension Test Requirements:

Tensile Strength	psi	75,000
	MPa	520
Elongation	(%)	30

### Standard Packaging:

All sizes are packaged in 10 Lb containers.

4 containers per 40 Lb Master Carton.



## AFM E320-16

AWS/SFA A5.4

### Description:

AFM E320-16 is primarily used to weld base metals of similar composition, such as alloy 20, for applications where resistance to severe corrosion is required for a wide range of chemicals including sulfuric and sulfurous acids and their salts.

They can be used to weld both castings and wrought alloys of similar composition without postweld heat treatment.

### Recommended Amperage (DC+):

Dia. (inch)	3/32"	1/8"	5/32"	3/16"
Dia. (mm)	2.4 mm	3.2 mm	4.0 mm	4.8 mm
Length	12"	14"	14"	14"
AMPS	50 ~ 80	70 ~ 110	100 ~ 140	130 ~ 180

### Chemical Composition Requirements for Undiluted Weld Metal (%):

C	Cr	Ni	Mo	Mn
0.07	19.00 ~ 21.00	32.00 ~ 36.00	2.00 ~ 3.00	0.50 ~ 2.50
Si	P	S	Cu	Nb (Cb) + Ta
0.60	0.04	0.03	3.00 ~ 4.00	8 x C Min. 1.00 Max.

All values are considered maximum, unless otherwise noted.

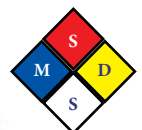
### All-Weld-Metal Tension Test Requirements:

Tensile Strength	psi	80,000
	MPa	550
Elongation	(%)	30

### Standard Packaging:

All sizes are packaged in 10 Lb containers.

4 containers per 40 Lb Master Carton.



## AFM E320LR-16

AWS/SFA A5.4

### Description:

AFM E320LR-16 weld metal deposits have the same basic composition as that deposited by AFM E320-16; however, the elements of C, Si, P, and S are specified at lower maximum levels, and Cb (Nb) and Mn are controlled within narrower ranges.

These changes reduce the weld metal fissuring (while maintaining the corrosion resistance) frequently encountered in fully austenitic stainless steel weld metals.

Consequently, welding practices typically used to deposit ferrite-containing austenitic stainless steel weld metals can be used.

AFM E320LR-16 has a lower minimum tensile strength than AFM E320-16.

### Recommended Amperage (DC+):

Dia. (inch)	3/32"	1/8"	5/32"	3/16"
Dia. (mm)	2.4 mm	3.2 mm	4.0 mm	4.8 mm
Length	12"	14"	14"	14"
AMPS	50 ~ 80	70 ~ 110	100 ~ 140	130 ~ 180

### Chemical Composition Requirements for Undiluted Weld Metal (%):

C	Cr	Ni	Mo	Mn
0.03	19.00 ~ 21.00	32.00 ~ 36.00	2.00 ~ 3.00	1.50 ~ 2.50
Si	P	S	Cu	Nb (Cb) + Ta
0.30	0.020	0.015	3.00 ~ 4.00	8 x C Min. 0.40 Max.

All values are considered maximum, unless otherwise noted.

### All-Weld-Metal Tension Test Requirements:

Tensile Strength	psi	75,000
	MPa	520
Elongation	(%)	30

### Standard Packaging:

All sizes are packaged in 10 Lb containers.

4 containers per 40 Lb Master Carton.



## AFM E330-16

AWS/SFA A5.4

### Description:

The nominal composition of the weld metal is 35 Ni, 15.5 Cr. AFM E330-16 is commonly used where heat-and scale-resisting properties above 1800°F (980°C) are required.

However, highsulfur environments may adversely effect performance at elevated temperature.

Repairs of defects in alloy castings and the welding of castings and wrought alloys of alloy 330 are the most common applications.

### Recommended Amperage (DC+):

Dia. (inch)	3/32"	1/8"	5/32"	3/16"
Dia. (mm)	2.4 mm	3.2 mm	4.0 mm	4.8 mm
Length	12"	14"	14"	14"
AMPS	50 ~ 80	70 ~ 110	100 ~ 140	130 ~ 180

### Chemical Composition Requirements for Undiluted Weld Metal (%):

C	Cr	Ni	Mo	Mn
0.18 ~ 0.25	14.00 ~ 17.00	33.00 ~ 37.00	0.75	1.00 ~ 2.50
Si	P	S	Cu	
1.00	0.04	0.03	0.75	

All values are considered maximum, unless otherwise noted.

### All-Weld-Metal Tension Test Requirements:

Tensile Strength	psi	75,000
	MPa	520
Elongation	(%)	30

### Standard Packaging:

All sizes are packaged in 10 Lb containers.

4 containers per 40 Lb Master Carton.



## AFM E347-16

AWS/SFA A5.4

### Description:

The nominal composition of this weld metal is 19.5 Cr, 10 Ni with Cb (Nb) or Cb (Nb) plus Ta added as a stabilizer.

Either of these additions reduces the possibility of intergranular chromium carbide precipitation and thus increases resistance to intergranular corrosion.

AFM E347-16 is usually used for welding alloys 347 and 321.

It is commonly used where maximum resistance to corrosion is required.

### Recommended Amperage (DC+):

Dia. (inch)	3/32"	1/8"	5/32"	3/16"
Dia. (mm)	2.4 mm	3.2 mm	4.0 mm	4.8 mm
Length	12"	14"	14"	14"
AMPS	50 ~ 80	70 ~ 110	100 ~ 140	130 ~ 180

### Chemical Composition Requirements for Undiluted Weld Metal (%):

C	Cr	Ni	Mo	Mn
0.08	18.00 ~ 21.00	9.00 ~ 11.00	0.75	0.50 ~ 2.50
Si	P	S	Cu	
1.00	0.04	0.03	0.75	

All values are considered maximum, unless otherwise noted.

### All-Weld-Metal Tension Test Requirements:

Tensile Strength	psi	75,000
	MPa	520
Elongation	(%)	30

### Standard Packaging:

All sizes are packaged in 10 Lb containers.

4 containers per 40 Lb Master Carton.



## AFM E385-16

AWS/SFA A5.4

### Description:

AFM E385-16 is used primarily for welding Type 904L materials for the handling of sulphuric acid and many chloride-containing media.

AFM E385-16 also may be used to join Type 317L material where improved corrosion resistance in specific media is needed.

It can also be used for joining Type 904L base metal to other grades of stainless. The elements C, Si, P and S are specified at lower maximum levels to minimize weld metal hot cracking and fissuring (while maintaining corrosion resistance) frequently encountered in fully austenitic weld metals.

### Recommended Amperage (DC+):

Dia. (inch)	3/32"	1/8"	5/32"	3/16"
Dia. (mm)	2.4 mm	3.2 mm	4.0 mm	4.8 mm
Length	12"	14"	14"	14"
AMPS	50 ~ 80	70 ~ 110	100 ~ 140	130 ~ 180

### Chemical Composition Requirements for Undiluted Weld Metal (%):

C	Cr	Ni	Mo	Mn
0.03	19.50 ~ 21.50	24.00 ~ 26.00	4.20 ~ 5.20	1.00 ~ 2.50
Si	P	S	Cu	
0.90	0.03	0.02	1.20 ~ 2.00	

All values are considered maximum, unless otherwise noted.

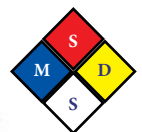
### All-Weld-Metal Tension Test Requirements:

Tensile Strength	psi	75,000
	MPa	520
Elongation	(%)	30

### Standard Packaging:

All sizes are packaged in 10 Lb containers.

4 containers per 40 Lb Master Carton.





## AFM E410-16

AWS/SFA A5.4

### Description:

This 12 Cr alloy is an air-hardening steel. Preheat and postheat treatments are required to achieve welds adequate ductility for many engineering purposes. AFM E410-16 is most commonly used to weld alloy 410, but also 403, 405, 414, 416 and 420 alloys. It is also used for surfacing of carbon steels to resist corrosion, erosion, or abrasion.

### Recommended Amperage (DC+):

Dia. (inch)	3/32"	1/8"	5/32"	3/16"
Dia. (mm)	2.4 mm	3.2 mm	4.0 mm	4.8 mm
Length	12"	14"	14"	14"
AMPS	50 ~ 75	80 ~ 115	115 ~ 160	150 ~ 210

### Chemical Composition Requirements for Undiluted Weld Metal (%):

C	Cr	Ni	Mo	Mn
0.12	11.00 ~ 13.50	0.70	0.75	1.00
Si	P	S	Cu	
0.90	0.04	0.03	0.75	

All values are considered maximum, unless otherwise noted.

### All-Weld-Metal Tension Test Requirements:

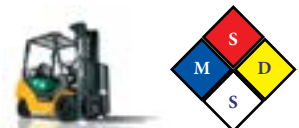
Tensile Strength	psi	75,000
	MPa	450
Elongation	(%)	20

### Heat Treatment:

Heat to 1350 to 1400°F(730 to 760°C), hold for one hour, furnace cool at a rate of 100°F(60°C) per hour to 600°F(315°C) and air cool to ambient.

### Standard Packaging:

All sizes are packaged in 10 Lb containers. 4 containers per 40 Lb Master Carton.



## AFM E410NiMo-16

AWS/SFA A5.4

### Description:

AFM E410NiMo-16 is used for welding ASTM CA6NM castings or similar materials, as well as light gage Type 410, 410S, and 405 base metals.

Weld metal deposited by AFM E410NiMo-16 is modified to contain less chromium and more nickel than weld metal deposits by AFM E410-16.

The objective is to eliminate ferrite in the microstructure, as ferrite has a deleterious effect on mechanical properties of this alloy. Final postweld heat treatment should not exceed 1150°F (620°C).

Higher temperatures may result in rehardening due to untempered martensite in the microstructure after cooling to room temperature.

### Recommended Amperage (DC+):

Dia. (inch)	3/32"	1/8"	5/32"	3/16"
Dia. (mm)	2.4 mm	3.2 mm	4.0 mm	4.8 mm
Length	12"	14"	14"	14"
AMPS	50 ~ 75	80 ~ 115	115 ~ 160	150 ~ 210

### Chemical Composition Requirements for Undiluted Weld Metal (%):

C	Cr	Ni	Mo	Mn
0.06	11.00 ~ 12.50	4.00 ~ 5.00	0.40 ~ 0.70	1.00
Si	P	S	Cu	
0.90	0.04	0.03	0.75	

All values are considered maximum, unless otherwise noted.

### All-Weld-Metal Tension Test Requirements:

Tensile Strength	psi	110,000
	MPa	760
Elongation	(%)	15

### Heat Treatment:

Heat to 1100 to 1150°F (595 to 620°C), hold for one hour, and air cool to ambient.

### Standard Packaging:

All sizes are packaged in 10 Lb containers.

4 containers per 40 Lb Master Carton.



## AFM E2209-16

AWS/SFA A5.4

### Description:

AFM E2209-16 is used primarily to weld duplex stainless steels which contain approximately 22 percent of chromium (grade 2205).

Weld metal deposited by AFM E2209-16 has “duplex” microstructure consisting of an austenite-ferrite matrix. It combines increased tensile strength with improved resistance to pitting corrosive attack and to stress corrosion cracking.

### Recommended Amperage (DC+):

Dia. (inch)	3/32”	1/8”	5/32”	3/16”
Dia. (mm)	2.4 mm	3.2 mm	4.0 mm	4.8 mm
Length	12”	14”	14”	14”
AMPS	50 ~ 80	80 ~ 120	100 ~ 160	150 ~ 210

### Chemical Composition Requirements for Undiluted Weld Metal (%):

C	Cr	Ni	Mo	Mn
0.04	21.50 ~ 23.50	8.50 ~ 10.50	2.50 ~ 3.50	0.50 ~ 2.00
Si	P	S	N	Cu
1.00	0.04	0.03	0.08 ~ 0.20	0.75

All values are considered maximum, unless otherwise noted.

### All-Weld-Metal Tension Test Requirements:

Tensile Strength	psi	100,000
	MPa	690
Elongation	(%)	20

### Standard Packaging:

All sizes are packaged in 10 Lb containers.

4 containers per 40 Lb Master Carton.



## AFM E2553-16

AWS/SFA A5.4

### Description:

AFM E2553-16 is primarily used to weld duplex stainless steels which contain approximately 25 percent of chromium.

Weld metal deposited by AFM E2553-16 has “duplex” microstructure consisting of an austenite-ferrite matrix. It combines increased tensile strength with improved resistance to pitting corrosive attack and to stress corrosion cracking.

### Recommended Amperage (DC+):

Dia. (inch)	3/32”	1/8”	5/32”	3/16”
Dia. (mm)	2.4 mm	3.2 mm	4.0 mm	4.8 mm
Length	12”	14”	14”	14”
AMPS	50 ~ 75	80 ~ 115	115 ~ 160	150 ~ 210

### Chemical Composition Requirements for Undiluted Weld Metal (%):

C	Cr	Ni	Mo	Mn
0.06	24.00 ~ 27.000	6.50 ~ 8.50	2.90 ~ 3.90	0.50 ~ 1.50
Si	P	S	N	Cu
1.00	0.04	0.03	0.10 ~ 0.25	1.50 ~ 2.50

All values are considered maximum, unless otherwise noted.

### All-Weld-Metal Tension Test Requirements:

Tensile Strength	psi	100,000
	MPa	760
Elongation	(%)	15

### Standard Packaging:

All sizes are packaged in 10 Lb containers.

4 containers per 40 Lb Master Carton.



## AFM E2594-16

AWS/SFA A5.4

### Description:

Superduplex grade 2594 electrodes provide matching chemistry and mechanical property characteristics to wrought superduplex alloys such as 2507 and Zeron 100 as well as superduplex casting alloys (ASTM A890). The welding wire is overalloyed 2 - 3 percent in Nickel to provide the optimum ferrite/austenite ratio in the finished weld. This structure results in high tensile/yield strength and superior resistance to SCC and pitting corrosion.

### Typical Chemical Composition (%):

C	Mn	Si	Fe	Cr	Ni
0.02	1.00	1.00	Bal.	25.50	9.25
Cu	Mo	S / P	N	PREN	
0.50	3.90	0.01 / 0.025	0.250	40 Min.	

All values are considered maximum, unless otherwise noted.

### Typical Mechanical Properties of Weld Metal:

Tensile Strength	psi	130,000
	MPa	900
Yield Strength	psi	101,000
	MPa	695
Elongation 4 D	(%)	31
Reduction of Area	(%)	50
Impact @ 20 ° C	>	27 J
Hardness HRC*		28 ~ 30

\* Meets NACE MRO 175w

### Standard Packaging:

All sizes are packaged in 10 Lb containers.  
4 containers per 40 Lb Master Carton.

