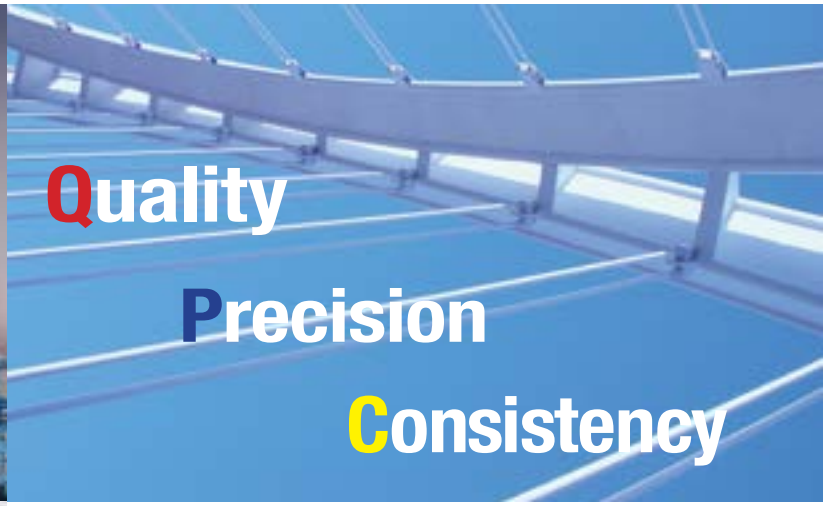
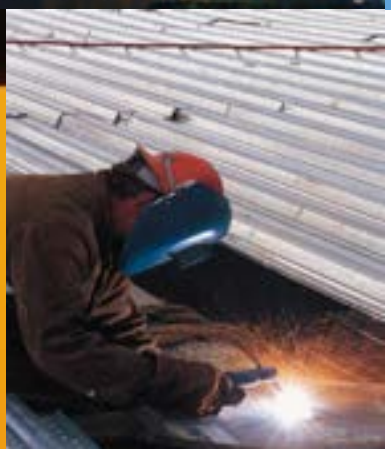
AMERICAN FILLER METALS





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Nickel

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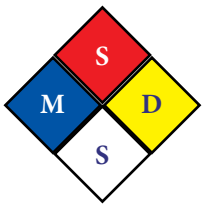

Material
Safety
Data
Sheet

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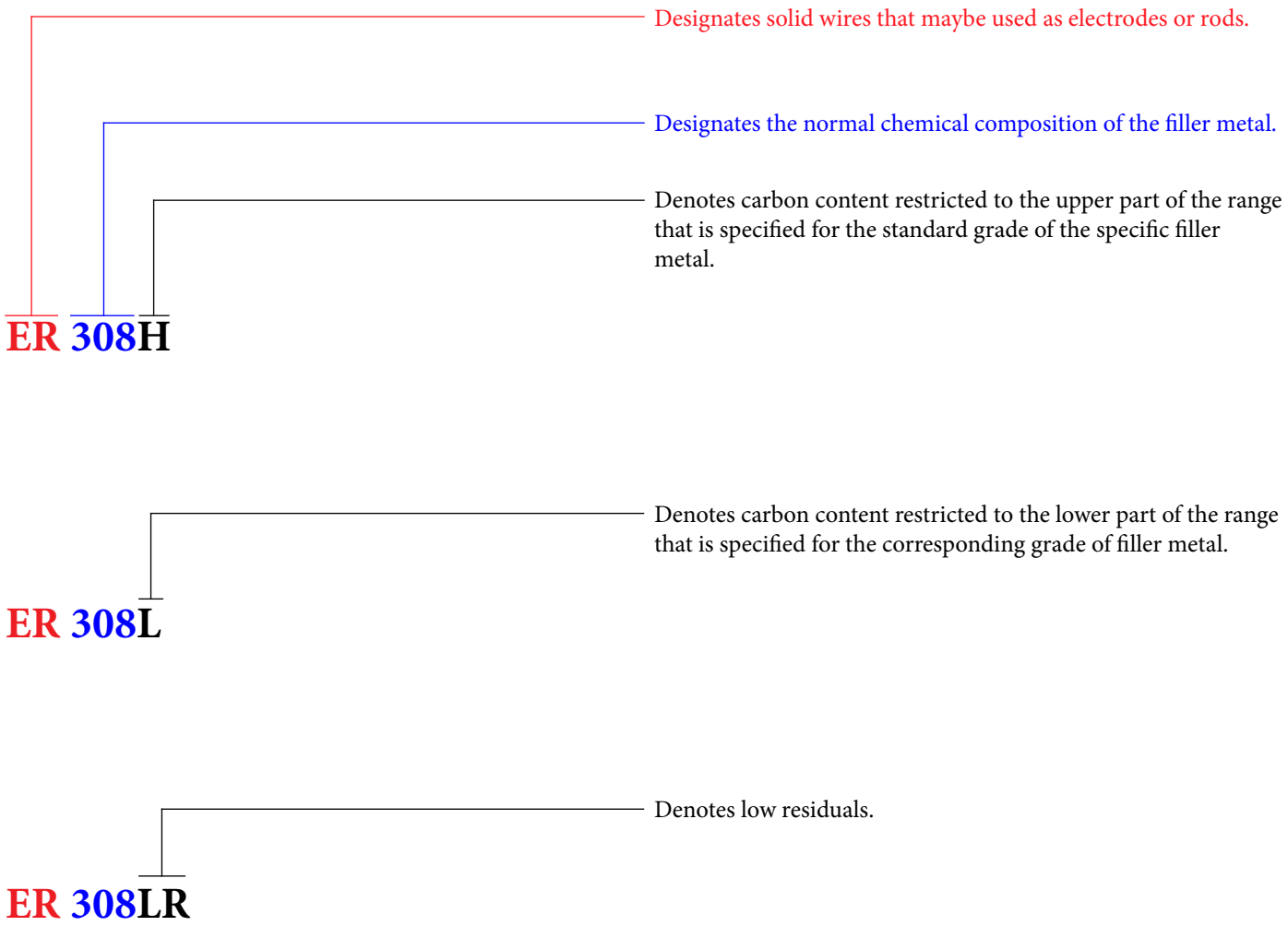
Stainless Steel Wires

Order of Mandatory Classification Designators

AWS/SFA A5.9



AFM ER308

AWS/SFA A5.9

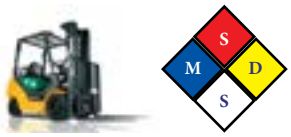
Description:

AFM ER308 is used for welding alloys 18-8, 19-9, and 20-10 such as AISI 201, 202, 204, 301, 302, & 304 grades.
It is most often used to weld base metals of similar composition, in particular, Type 304.

Chemical Composition Requirements for Undiluted Weld Metal (%):

C	Cr	Ni	Mo	Mn
0.08	19.50 ~ 22.00	9.00 ~ 11.00	0.75	1.00 ~ 2.50
Si	P	S	N	Cu
0.30 ~ 0.65	0.03	0.03	-	0.75

All values are considered maximum, unless otherwise noted.



AFM ER308H

AWS/SFA A5.9

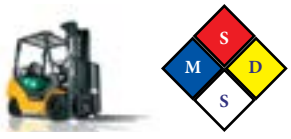
Description:

This classification is the same as **AFM ER308**, except that the allowable carbon content has been restricted to the higher portion of the 308 range.
Carbon content in the range of 0.04-0.08 provides higher strength at elevated temperatures
AFM ER308H is used for welding 304H base metal.

Chemical Composition Requirements for Undiluted Weld Metal (%):

C	Cr	Ni	Mo	Mn
0.04 ~ 0.08	19.50 ~ 22.00	9.00 ~ 11.00	0.50	1.00 ~ 2.50
Si	P	S	N	Cu
0.30 ~ 0.65	0.03	0.03	-	0.75

All values are considered maximum, unless otherwise noted.



AFM ER308L

AWS/SFA A5.9

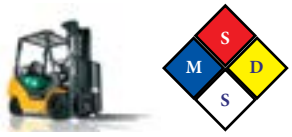
Description:

This classification is the same as **AFM ER308**, except for the carbon content.
Low carbon (0.03 percent max.) in **AFM ER308L** reduces the possibility of intergranular carbide precipitation. This increases the resistance to intergranular corrosion without the use of stabilizers such as columbium (niobium) or titanium.
Strength of **AFM ER308L**, however, is less than that of the columbium (niobium)-stabilized alloys or **AFM ER308H** at elevated temperatures.

Chemical Composition Requirements for Undiluted Weld Metal (%):

C	Cr	Ni	Mo	Mn
0.03	19.50 ~ 22.00	9.00 ~ 11.00	0.75	1.00 ~ 2.50
Si	P	S	N	Cu
0.30 ~ 0.65	0.03	0.03	-	0.75

All values are considered maximum, unless otherwise noted.



AFM ER308LSi

AWS/SFA A5.9

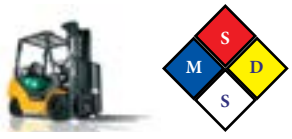
Description:

This classification is the same as **AFM ER308L**, except for the higher silicon content.
This improves the usability of the filler metal in the gas metal arc welding process.
If the dilution by the base metal produces a low ferrite or fully austenitic weld, the crack sensitivity of the weld is somewhat higher than that of a lower silicon content weld metal.

Chemical Composition Requirements for Undiluted Weld Metal (%):

C	Cr	Ni	Mo	Mn
0.03	19.50 ~ 22.00	9.00 ~ 11.00	0.75	1.00 ~ 2.50
Si	P	S	N	Cu
0.65 ~ 1.00	0.03	0.03	-	0.75

All values are considered maximum, unless otherwise noted.



AFM ER309

AWS/SFA A5.9

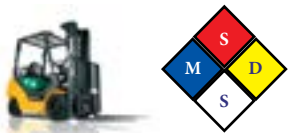
Description:

AFM ER309 is used to weld alloy 309.
Occasionally, it is used to weld Type 304 and similar base metals where severe corrosion conditions exist requiring higher alloy weld metal.
It is also used in dissimilar metal welds, 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.

Chemical Composition Requirements for Undiluted Weld Metal (%):

C	Cr	Ni	Mo	Mn
0.12	23.00 ~ 25.00	12.00 ~ 14.00	0.75	1.00 ~ 2.50
Si	P	S	N	Cu
0.30 ~ 0.65	0.03	0.03	-	0.75

All values are considered maximum, unless otherwise noted.



AFM ER309L

AWS/SFA A5.9

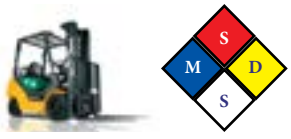
Description:

This classification is the same as **AFM ER309**, except for the carbon content. Low carbon (0.03 percent max.) in **AFM ER309L** reduces the possibility of intergranular carbide precipitation.
This increases the resistance to intergranular corrosion without the use of stabilizers such as columbium (niobium) or titanium.
Strength of **AFM ER309L**, however, may not be as great at elevated temperatures as that of the columbium (niobium)-stabilized alloys or **AFM ER309**.

Chemical Composition Requirements for Undiluted Weld Metal (%):

C	Cr	Ni	Mo	Mn
0.03	19.50 ~ 22.00	9.00 ~ 11.00	0.75	1.00 ~ 2.50
Si	P	S	N	Cu
0.30 ~ 0.65	0.03	0.03	-	0.75

All values are considered maximum, unless otherwise noted.



AFM ER309LSi

AWS/SFA A5.9

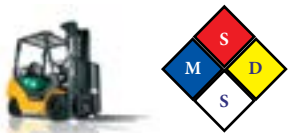
Description:

The classification is the same as **AFM ER309L**, except for higher silicon content.
This improves the usability of the filler metal in the gas metal arc welding processes.
If the dilution by the base metal produces a low ferrite or fully austenitic weld, the crack sensitivity of the weld is somewhat higher than that of a lower silicon content weld metal.

Chemical Composition Requirements for Undiluted Weld Metal (%):

C	Cr	Ni	Mo	Mn
0.12	23.00 ~ 25.00	12.00 ~ 14.00	0.75	1.00 ~ 2.50
Si	P	S	N	Cu
0.65 ~ 1.00	0.03	0.03	-	0.75

All values are considered maximum, unless otherwise noted.



AFM ER310

AWS/SFA A5.9

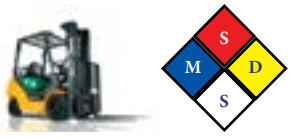
Description:

AFM ER310 is used for welding 310 stainless.
It is also used for welding 304 clad and stainless overlay on mild and carbon steels.
It provides high strength and scaling resistance at elevated temperatures.

Chemical Composition Requirements for Undiluted Weld Metal (%):

C	Cr	Ni	Mo	Mn
0.08 ~ 0.15	25.00 ~ 28.00	20.00 ~ 22.50	0.75	1.00 ~ 2.50
Si	P	S	N	Cu
0.30 ~ 0.65	0.03	0.03	-	0.75

All values are considered maximum, unless otherwise noted.



AFM ER312

AWS/SFA A5.9

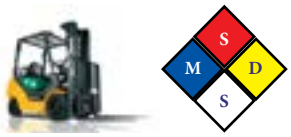
Description:

AFM ER312 was originally designed to weld cast alloys of similar composition.
It also has been found to be valuable in welding dissimilar metals such as carbon steel to stainless steel, particularly those grades high in nickel.
AFM ER312 gives a two-phase weld deposit with substantial percentages of ferrite in an austenite 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.

Chemical Composition Requirements for Undiluted Weld Metal (%):

C	Cr	Ni	Mo	Mn
0.15	28.00 ~ 32.00	8.00 ~ 10.50	0.75	1.00 ~ 2.50
Si	P	S	N	Cu
0.30 ~ 0.65	0.03	0.03	-	0.75

All values are considered maximum, unless otherwise noted.



AFM ER316

AWS/SFA A5.9

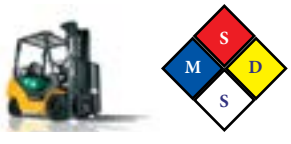
Description:

AFM ER316 is used for welding Type 316 and similar alloys.
It has been used successfully in certain applications involving special base metals for high-temperature service. The presence of molybdenum provides creep resistance at elevated temperatures and pitting resistance in a halide atmosphere.

Chemical Composition Requirements for Undiluted Weld Metal (%):

C	Cr	Ni	Mo	Mn
0.08	18.00 ~ 20.00	11.00 ~ 14.00	2.00 ~ 3.00	1.00 ~ 2.50
Si	P	S	N	Cu
0.30 ~ 0.65	0.03	0.03	-	0.75

All values are considered maximum, unless otherwise noted.



AFM ER316H

AWS/SFA A5.9

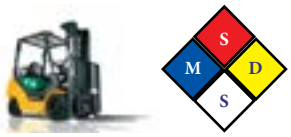
Description:

AFM ER316H is the same as **AFM ER316**, except that the allowable carbon content has been restricted to the higher portion of the 316 range.
Carbon content in the range of 0.04 to 0.08 wt.% provides higher strength at elevated temperatures.
It is used to weld 316H base metal.

Chemical Composition Requirements for Undiluted Weld Metal (%):

C	Cr	Ni	Mo	Mn
0.04 ~ 0.08	18.00 ~ 20.00	11.00 ~ 14.00	2.00 ~ 3.00	1.00 ~ 2.50
Si	P	S	N	Cu
0.30 ~ 0.65	0.03	0.03	-	0.75

All values are considered maximum, unless otherwise noted.



AFM ER316L

AWS/SFA A5.9

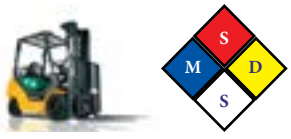
Description:

This classification is the same as **AFM ER316**, except for the carbon content. Low carbon (0.03 percent max.) in **AFM ER316L** reduces the possibility of intergranular chromium carbide precipitation and thereby increases the resistance to intergranular corrosion without the use of stabilizers such as columbium (niobium) or titanium.
It is primarily used for welding lowcarbon molybdenum-bearing austenitic alloys.
AFM ER316L, however, is not as strong at elevated temperature as the columbium (niobium)-stabilized alloys or Type ER316H.

Chemical Composition Requirements for Undiluted Weld Metal (%):

C	Cr	Ni	Mo	Mn
0.03	18.00 ~ 20.00	11.00 ~ 14.00	2.00 ~ 3.00	1.00 ~ 2.50
Si	P	S	N	Cu
0.30 ~ 0.65	0.03	0.03	-	0.75

All values are considered maximum, unless otherwise noted.



AFM ER316LSi

AWS/SFA A5.9

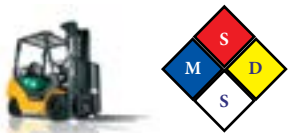
Description:

This classification is the same as **AFM ER316L**, except for the higher silicon content.
This improves the usability of the fill metal in the gas metal arc welding process.
If the dilution by the base metal produces a low ferrite or fully austenitic weld, the crack sensitivity is somewhat higher than that of a lower silicon content weld metal.

Chemical Composition Requirements for Undiluted Weld Metal (%):

C	Cr	Ni	Mo	Mn
0.04 ~ 0.08	18.00 ~ 20.00	11.00 ~ 14.00	2.00 ~ 3.00	1.00 ~ 2.50
Si	P	S	N	Cu
0.65 ~ 1.00	0.03	0.03	-	0.75

All values are considered maximum, unless otherwise noted.



AFM ER317L

AWS/SFA A5.9

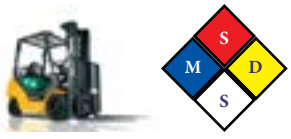
Description:

AFM ER317L is used to weld 316 and 317 base metals. Low carbon (0.03 percent max.) in **AFM ER317L** reduces the possibility of intergranular carbide precipitation.
This increases the resistance to intergranular corrosion without the use of stabilizers such as columbium (niobium) or titanium.
AFM ER317L, however, may not be as strong at elevated temperature as the columbium (niobium)-stabilized alloys or Type 317.

Chemical Composition Requirements for Undiluted Weld Metal (%):

C	Cr	Ni	Mo	Mn
0.03	18.50 ~ 20.50	13.00 ~ 15.00	3.00 ~ 4.00	1.00 ~ 2.50
Si	P	S	N	Cu
0.30 ~ 0.65	0.03	0.03	-	0.75

All values are considered maximum, unless otherwise noted.



AFM ER330

AWS/SFA A5.9

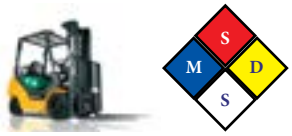
Description:

AFM ER330 is commonly used where heat and scale resisting properties above 1800°F (980°C) are required, except in high-sulphur environments, as these environments may adversely affect elevated temperature performance.
Repairs of defects in alloy castings and the welding of castings and wrought alloys of similar composition are the most common applications.

Chemical Composition Requirements for Undiluted Weld Metal (%):

C	Cr	Ni	Mo	Mn
0.18 ~ 0.25	15.00 ~ 17.00	34.00 ~ 37.00	0.75	1.00 ~ 2.50
Si	P	S	N	Cu
0.30 ~ 0.65	0.03	0.03	-	0.75

All values are considered maximum, unless otherwise noted.



AFM ER347

AWS/SFA A5.9

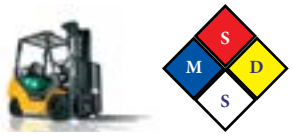
Description:

With the addition of Cb (Nb), the possibility of intergranular chromium carbide precipitation is reduced and thus susceptibility to intergranular corrosion.
AFM ER347 is usually used for welding alloys 321 and 347.
Although Cb (Nb) is the stabilizing element usually specified in ER347, it should be recognized that tantalum (Ta) is also present.
Ta and Cb (Nb) are almost equally effective in stabilizing carbon and in providing high-temperature strength.
If dilution by the base metal produces a low ferrite or fully austenitic weld metal, the crack sensitivity of the weld may increase substantially.

Chemical Composition Requirements for Undiluted Weld Metal (%):

C	Cr	Ni	Mo	Mn
0.08	19.00 ~ 21.50	9.00 ~ 11.00	0.75	1.00 ~ 2.50
Si	P	S	Cu	Nb + Ta
0.30 ~ 0.65	0.03	0.03	0.75	10 x C Min. / 1.00 Max.

All values are considered maximum, unless otherwise noted.



AFM ER347Si

AWS/SFA A5.9

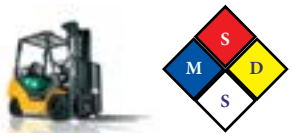
Description:

AFM ER347Si is the same as **AFM ER347**, except for the higher silicon content.
This improves the usability of the filler metal in the gas metal arc welding process.
If the dilution by the base metal produces a low ferrite or fully austenitic weld, the crack sensitivity of the weld is somewhat higher than that of a lower silicon content weld metal.

Chemical Composition Requirements for Undiluted Weld Metal (%):

C	Cr	Ni	Mo	Mn
0.08	19.00 ~ 21.50	9.00 ~ 11.00	0.75	1.00 ~ 2.50
Si	P	S	Cu	Nb + Ta
0.65 ~ 1.00	0.03	0.03	0.75	10 x C Min. / 1.00 Max.

All values are considered maximum, unless otherwise noted.



AFM ER320

AWS/SFA A5.9

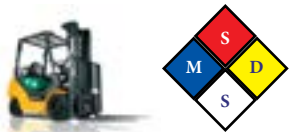
Description:

AFM ER320 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.

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	2.50
Si	P	S	Cu	Nb + Ta
0.60	0.03	0.03	3.00 ~ 4.00	8 x C Min. / 1.00 Max.

All values are considered maximum, unless otherwise noted.



AFM ER320LR

AWS/SFA A5.9

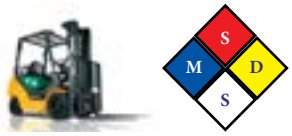
Description:

AFM ER320LR weld metal deposits have the same basic composition as that deposited by **AFM ER320**; 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 for austenitic stainless steel weld metals containing ferrite can be used in bare filler metal welding processes such as gas tungsten arc and gas metal arc.
AFM ER320LR has been used successfully in submerged arc overlay welding, but it may be prone to cracking when used for joining base metal by the submerged arc process.
AFM ER320LR has a lower minimum tensile strength than **AFM ER320**.

Chemical Composition Requirements for Undiluted Weld Metal (%):

C	Cr	Ni	Mo	Mn
0.025	19.00 ~ 21.00	32.00 ~ 36.00	2.00 ~ 3.00	1.50 ~ 2.00
Si	P	S	Cu	Nb + Ta
0.15	0.015	0.02	3.00 ~ 4.00	8 x C Min. / 1.00 Max.

All values are considered maximum, unless otherwise noted.



AFM ER385 (904L)

AWS/SFA A5.9

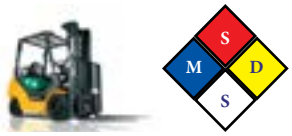
Description:

AFM ER385 is used primarily for welding of ASTM B625, B673, B674, and B677 (UNSN08904) materials for the handling of sulfuric acid and many chloride containing media.
It may also be used to join Type 317L material where improved corrosion resistance in specific media is needed.
AFM ER385 may be used for joining UNS N08904 base metals to other grades of stainless steel.
The elements C, S, P, and Si 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.

Chemical Composition Requirements for Undiluted Weld Metal (%):

C	Cr	Ni	Mo	Mn
0.025	19.50 ~ 21.50	24.00 ~ 26.00	4.20 ~ 5.20	1.00 ~ 2.50
Si	P	S	N	Cu
0.50	0.02	0.03	-	1.20 ~ 2.00

All values are considered maximum, unless otherwise noted.



AFM ER409Nb

AWS/SFA A5.9

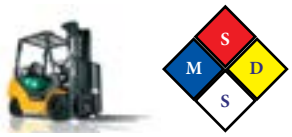
Description:

AFM ER409Nb is the same as ER409 except that niobium (columbium)is used instead of titanium to achieve similar results.
Oxidation losses across the arc are generally lower.
It is used to weld 409 stainless steel.
The greatest usage is for applications where thin stock is fabricated into exhaust system components.

Chemical Composition Requirements for Undiluted Weld Metal (%):

C	Cr	Ni	Mo	Mn
0.08	10.50 ~ 13.50	0.60	0.50	0.80
Si	P	S	Cu	Nb + Ta
1.00	0.04	0.03	0.75	10 x C Min. / 1.00 Max.

All values are considered maximum, unless otherwise noted.



AFM ER410

AWS/SFA A5.9

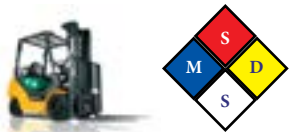
Description:

This 12 Cr alloy (wt.%) is an air-hardening steel.
Preheat and postheat treatments are required to achieve welds of adequate ductility for many engineering purposes.
AFM ER410 is used to welding 403, 405, 410, and 416 stainless.
It is also used for deposition of overlays on carbon steels to resist corrosion, erosion, or abrasion.

Chemical Composition Requirements for Undiluted Weld Metal (%):

C	Cr	Ni	Mo	Mn
0.12	11.50 ~ 13.50	0.60	0.75	0.60
Si	P	S	N	Cu
0.50	0.03	0.03	-	0.75

All values are considered maximum, unless otherwise noted.



AFM ER410NiMo

AWS/SFA A5.9

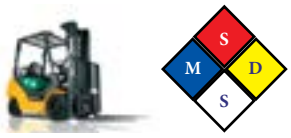
Description:

AFM ER410NiMo is primarily designed for welding ASTM CA6NM castings or similar material, as well as light gage 410, 410S, and 405 base metals.
AFM ER410NiMo is modified to contain less chromium and more nickel to eliminate ferrite in the microstructure as it has a deleterious effect on mechanical properties.
Final postweld heat treatment should not exceed 1150°F (620°C), as higher temperatures may result in rehardening due to untempered martensite in the microstructure after cooling to room temperature.

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	0.60
Si	P	S	N	Cu
0.50	0.03	0.03	-	0.75

All values are considered maximum, unless otherwise noted.



AFM ER420

AWS/SFA A5.9

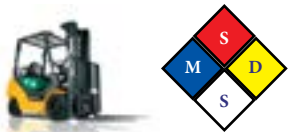
Description:

AFM ER420 is similar to **AFM ER410**, except for slightly higher chromium and carbon contents.
AFM ER420 is used for many surfacing operations requiring corrosion resistance provided by 12 percent chromium along with somewhat higher hardness than weld metal deposited by **AFM ER410**.
This increases wear resistance.

Chemical Composition Requirements for Undiluted Weld Metal (%):

C	Cr	Ni	Mo	Mn
0.25 ~ 0.40	12.00 ~ 14.00	0.60	0.75	0.60
Si	P	S	N	Cu
0.50	0.03	0.03	-	0.75

All values are considered maximum, unless otherwise noted.



AFM ER430

AWS/SFA A5.9

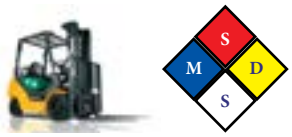
Description:

This is a 16 Cr (wt.%) alloy. The composition is balanced by providing sufficient chromium to give adequate corrosion resistance for the usual applications, and yet retain sufficient ductility in the heat-treated condition. (Excessive chromium will result in lower ductility.)
Welding with **AFM ER430** usually requires preheating and postweld heat treatment.
Optimum mechanical properties and corrosion resistance are obtained only when the weldment is heat treated following the welding operation.

Chemical Composition Requirements for Undiluted Weld Metal (%):

C	Cr	Ni	Mo	Mn
0.10	15.50 ~ 17.00	0.60	0.75	0.60
Si	P	S	N	Cu
0.50	0.03	0.03	-	0.75

All values are considered maximum, unless otherwise noted.



AFM ER630

AWS/SFA A5.9

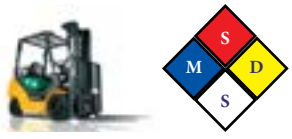
Description:

AFM ER630 is designed primarily for welding ASTM A564 Type 630 (alloy 17-4PH) and some other precipitation-hardening stainless steels.
The composition is modified to prevent the formation of ferrite networks in the martensitic microstructure which have a deleterious effect on mechanical properties.
Dependent on the application and weld size, the weld metal may be used either as-welded, welded and precipitation hardened, or welded, solution treated, and precipitation hardened.

Chemical Composition Requirements for Undiluted Weld Metal (%):

C	Cr	Ni	Mo	Mn
0.05	16.00 ~ 16.75	4.50 ~ 5.00	0.75	0.25 ~ 0.75
Si	P	S	Cu	Nb + Ta
0.75	0.03	0.03	0.75	0.15 ~ 0.30

All values are considered maximum, unless otherwise noted.



AFM ER2209

AWS/SFA A5.9

Description:

AFM ER2209 is used primarily to weld duplex stainless steels which contain approximately 22 percent of chromium such as UNS S31803 (alloy 2205).
Deposits have "duplex" microstructures consisting of an austenite-ferrite matrix.
AFM ER2209 is characterized by high tensile strength, resistance to stress corrosion cracking, and improved resistance to pitting.

Chemical Composition Requirements for Undiluted Weld Metal (%):

C	Cr	Ni	Mo	Mn
0.03	21.50 ~ 23.50	7.50 ~ 9.50	2.50 ~ 3.50	0.50 ~ 2.00
Si	P	S	N	Cu
0.90	0.03	0.03	0.08 ~ 0.20	0.75

All values are considered maximum, unless otherwise noted.

AFM ER2594

AWS/SFA A5.9

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 / W	S / P	N	PREN	
0.50	3.9 / 0.04	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	123,000
	MPa	850
Yield Strength	psi	94,000
	MPa	650
Elongation 4 D	(%)	28
Impact @ 20 ° C	>	27 J
Hardness HRC*		23 ~ 28

* Meets NACE MRO175

AFM Flux Coated Stainless Steel TIG

Applications:

AFM Flux Coated Stainless Steel TIG is used for butt welds in piping systems.
GTAW process has been recommended in welding of the first layer (root pass).
Conventional GTAW requires the use of Argon Gas for the back-bead shielding to prevent oxidation.
AFM Flux Coated Stainless Steel TIG can be used in place of the conventional GTAW process without the use of argon gas.
One of the advantages in using **AFM Flux Coated Stainless Steel TIG** is the ability to cut costs by not having to use Argon Gas.

Characteristics:

When **AFM Flux Coated Stainless Steel TIG** is melted and slag is produced, satisfactory back-beads are obtained while the slag protects the bead from being oxidized by the atmosphere.
The slag can then be easily removed as it would in the SMAW process.

Typical Chemical Composition (%):

Product	C	Si	Mn	P	S	Ni	Cr	Mo
AFM 308LFC	0.018	0.35	1.71	0.022	0.007	10.12	20.9	-
AFM 309LFC	0.025	0.37	1.76	0.021	0.006	13.14	23.6	-
AFM 316LFC	0.020	0.37	1.73	0.021	0.007	12.31	19.3	2.10

All values are considered maximum, unless otherwise noted.

Subject:
Using Flux Coated Stainless Steel TIG Wire for GTAW welding in accordance with the ASME Boiler & Pressure Vessel Code.

AFM Flux Coated Stainless Steel TIG is not included in the AWS and ASME specilications, however, it can be qualified for Code use.
ASME B & PV Code, Section IX, Welding & Brazing Qualilications, permits the usc of any filler metal as long as it is defined by the Code or in the welding procedure specification (WPS).
The user may specify the filler metal by a chemical composition range.
This range tnay be determined by any of the following:

- from the chemical analysis of the weld deposit taken from the procedure qualification test coupon or,
- from the chemical composition as reported by the manufacturer's or supplier's certificate of compliance.

In lieu of an A-number designation, the nominal chetmical composition of the weld deposit shall be indicated on the WPS and on the procedure qualification record.
Designation on nominal chemical composition may also be accomplished by using the manufacturer's trade designation.
This procedure is discussed in ASME Sect ion IX, QW-404.5.

By satisfying the above mentioned criteria one may use flux coated GTAW filler metal for boilers (ASME Section 1), pressure vessels (ASME Section VIII), piping (ANSI/ASME B31.1), or a variety of weldments fabricated to numerous other national standards.

Welding Tips for Stainless Steel

I. (GTAW - Gas Tungsten Arc Welding)

When using stainless steels with the gas tungsten arc process, direct current electrode negative (dcen) is preferred.
For base metal up to 1/16 in. (1.6mm) thick, argon is the preferred shielding gas because there is less tendency to melt through these lighter thicknesses.
For greater thickness, or for automatic welding, mixtures of helium and argon are recommended because of the greater penetration and better surface appearance.
Argon gas for shielding may also be used and will give satisfactory results in most cases, but a somewhat higher amperage will be required.

II. (GMAW - Gas Metal Arc Welding)

When using the gas metal arc welding process in which the filler metal is employed as an electrode, direct current electrode positive (dcep) is most commonly used.
The shielding gas for spray transfer is usually argon, with or without minor additions of oxygen.
For short circuiting transfer, shielding gases composed of helium plus additions of oxygen and carbon dioxide often are used.
The minimum thickness that can be welded is approximately 1/8 to 3/16 in. (3.2 to 4.8mm).
However, thinner sections can be joined if a backing is used.
The higher silicon levels improve the washing and wetting behavior of the weld metal.
For instance, for increases from 0.30 to 0.65 percent silicon, the improvement is pronounced; for increases from 0.65 to 1.0 % silicon, further improvement is experienced but is less pronounced.

III. (SAW - Submerged Arc Welding)

For submerged arc welding, direct current electrode positive (dcep) or alternating current (ac) may be used.
Basic or neutral fluxes are generally recommended in order to minimize silicon pickup and the oxidation of chromium and other elements.
When welding with fluxes that are not basic or neutral, electrodes having a silicon content below the normal 0.30% minimum may be desired for submerged arc welding.
Such active fluxes may contribute some silicon to the weld metal.
In this case, the higher silicon does not significantly improve the washing and wetting action of the weld metal.ww

Welding Tips for Flux Coated Stainless Steel TIG Wires

If the pieces to be welded with AFM flux coated tig wire are thicker than 12 Ga, they must be beveled.
The amperage to be used will depend on the thickness of the weldment and diameter of the tungsten.

The gap between the two pieces to be joined must be at least as wide as the diameter of the flux coated tig wire being used.
The base materials that are being joined must also be tacked at enough places, so that the gap remains open.
If the gap "sucks" closed you will not succeed with ***AFM Flux Coated TIG Wire***.
The gap is very important in this process.

When the process is started always begin on a tack.
In using ***AFM Flux Coated TIG Wire***, you will see an orange puddle. and not the clear puddle as you would with bare stainless tig wire.
We recommend you use a keyhole technique with ***AFM Flux Coated TIG Wire***.
Do not dip the rod too fast, and you must usc the keyhole or you will not get the coverage on the backside.
If you dip too fast, the filler metal will lay and freeze on the top only.
The keyhole is also very important in this process.
Welding in all positions is possible with this wire. To weld out of' position with this wire, you will need to vary your amperage.