

AFM NI-55

ENiFe-CI AWS/SFA A5.15
AC or DC+ (Reverse Polarity)

Description:

AFM NI-55 is designed for welding cast iron, malleable iron and ductile iron to themselves and other wrought alloys, including nickel alloys. A core wire chemistry of approximately 55% nickel and 45% iron produces weld deposits with much lower weld shrinkage stress which in turn reduces the possibility of weld or heat-affected zone cracking.

Applications:

AFM NI-55 is especially suited for welding heavy sections such as motor blocks, housings, machine parts, frames, defective castings and building up worn sections. Stringer deposits are generally harder to machine due to the dilution of the weld metal, however heavier beads and multiple layer welds will exhibit good machinability.

Chemical Composition Requirements for Undiluted Weld Metal:

C	2.0	Ni*	45-60
Mn	2.5	Cu**	2.5
Si	4.0	Al	1.0
S	.03	Total Other	1.0
Fe	BAL		

All values are considered maximum, unless otherwise noted.

*Nickel plus incidental cobalt.

**Copper plus incidental silver.

Typical Mechanical Properties of Undiluted Weld Metal:

Tensile Strength,psi	58,000-84,000
MPa	400-579
Elongation, (%)	6-18

Recommended Amperages:

Dia.	3/32	1/8	5/32	3/16
MM	2.4	3.2	4.0	4.8
Length	12"	14"	14"	14"
AC	55-65	70-85	110-125	135-150
DC+	50-70	70-95	100-130	135-170

AFM NI-55 is also available in a bare MIG and TIG wire. See page 24.

Packaging:

All sizes are packaged in 10 lb. containers-6 containers per 60 lb. master carton.

AFM NI-99

ENi-CI AWS/SFA A5.15
AC or DC+ (Reverse Polarity)

Description:

AFM NI-99 is designed for welding thin sections of cast iron to itself or to low alloy and carbon steels. This all-position electrode is used where maximum machinability is required. The weld deposits are "soft" and can be drilled, tapped, milled or shaped.

Applications:

AFM NI-99 is especially suited for repairing porous or cracked castings and can be used to weld cast iron to itself or dissimilar metals.

Chemical Composition Requirements for Undiluted Weld Metal:

C	2.0	Ni*	85 min.
Mn	2.5	Cu**	2.5
Si	4.0	Al	1.0
S	.03	Total Other	1.0
Fe	8.0		

All values are considered maximum, unless otherwise noted.

*Nickel plus incidental cobalt.

**Copper plus incidental silver.

Typical Mechanical Properties of Undiluted Weld Metal:

Tensile Strength, psi	40,000-65,000
MPa	276-448
Elongation, (%)	3-6

Recommended Amperages:

Dia.	3/32	1/8	5/32	3/16
MM	2.4	3.2	4.0	4.8
Length	12"	14"	14"	14"
AC	60-90	90-140	140-190	150-200
DC+	50-80	80-130	100-170	120-190

AFM NI-99 is also available in a bare MIG and TIG wire. See page 24.

Packaging:

All sizes are packaged in 10 lb. containers-6 containers per 60 lb. master carton.

AFM 112

AWS/SFA A5.11 ENiCrMo-3
DC+ (Reverse Polarity)

AFM 112 is designed for welding alloy 625 to itself and for joining many dissimilar nickel bearing alloys and iron-base metals. **AFM 112** is also recommended for welding nickel base alloys 600 and 601 and nickel-iron-chrome alloys 800 and 801. It also can be used for joining nickel based alloys 625, 718, X750 and 706 to 9% nickel steel and for overlaying carbon steel.

Chemical Composition Requirements for Undiluted Weld Metal:

C	0.10	Ni*	55.0 min.
Mn	1.0	Co	(a)
Fe	7.0	Cr	20.0 – 23.0
P	0.03	Nb+Ta	3.15 – 4.15
S	0.02	Mo	8.0 – 10.0
Si	0.75	Total Other	0.50
Cu	0.50		

All values are considered maximum, unless otherwise noted.

*Includes incidental cobalt.

- a. Cobalt – 0.12 maximum, when specified by the purchaser.

All-Weld-Metal Tension Test Requirements (min.):

Tensile Strength, psi	110,000
MPa	760
Elongation, (%)	30

Recommended Amperages:

Dia.	3/32	1/8	5/32	3/16
MM	2.4	3.2	4.0	4.8
Length	12"	14"	14"	14"
DC+	40-65	65-90	90-125	125-160

Packaging:

All sizes are packaged in 10 lb. containers-6 containers per 60 lb. master carton.

AFM 117

AWS/SFA A5.11 ENiCrCoMo-1
DC+ (Reverse Polarity)

AFM 117 is designed for use on nickel-chromium-cobalt-molybdenum alloys (alloy 617) to themselves and to steel and for surfacing steel with nickel-chromium-cobalt-molybdenum weld metal (alloy 600, 601, & 800). **AFM 117** is also used for applications where optimum strength and oxidation resistance is required above 1500°F up to 2100°F, especially when welding on base metals of nickel-iron-chromium alloys.

Chemical Composition Requirements for Undiluted Weld Metal:

C	0.05-0.15	Ni*	BAL
Mn	0.3-2.5	Co	9.0-15.0
Fe	5.0	Cr	21.0-26.0
P	0.03	Nb+Ta	1.0
S	0.015	Mo	8.0-10.0
Si	0.75	Total Other	0.50
Cu	0.50		

All values are considered maximum, unless otherwise noted.

* Includes incidental cobalt.

All-Weld-Metal Tension Test Requirements (min.):

Tensile Strength, psi	90,000
MPa	620
Elongation, (%)	25

Recommended Amperages:

Dia.	3/32	1/8	5/32	3/16
MM	2.4	3.2	4.0	4.8
Length	12"	14"	14"	14"
DC+	40-60	75-100	90-130	125-150

Packaging:

All sizes are packaged in 10 lb. containers-6 containers per 60 lb. master carton.

AFM 122

AWS/SFA A5.11 ENiCrMo-10
DC+ (Reverse Polarity)

AFM 122 is used for welding nickel-chromium-molybdenum alloys, for the welding of the clad side of joints in steel clad with nickel-chromium-molybdenum alloy, to steel and to their nickel-base alloys; and for joining nickel-chromium-molybdenum alloys. Typical specifications for the nickel-chromium-molybdenum base metals have UNS Number N06022.

Chemical Composition Requirements for Undiluted Weld Metal:

C	0.02	Ni*	BAL
Mn	1.0	Co	2.5
Fe	2.0-6.0	Cr	20.0-22.5
P	0.03	Mo	12.5-14.5
S	0.015	V	0.35
Si	0.2	W	2.5-3.5
Cu	0.50	Total Other	0.50

All values are considered maximum, unless otherwise noted.

* Includes incidental cobalt.

All-Weld-Metal Tension Test Requirements (min.):

Tensile Strength, psi	100,000
MPa	690
Elongation, (%)	25

Recommended Amperages:

Dia.	3/32	1/8	5/32	3/16
MM	2.4	3.2	4.0	4.8
Length	12"	14"	14"	14"
DC+	50-75	75-100	80-140	125-150

Packaging:

All sizes are packaged in 10 lb. containers-6 containers per 60 lb. master carton.

AFM 141

AWS/SFA A5.11 ENi-1
DC+ (Reverse Polarity)

AFM 141 is used for welding commercially pure nickel to itself, for overlaying nickel on steel, and for joining nickel to steel. **AFM 141** is commonly used in applications with nickel alloys 200 and 201.

Chemical Composition Requirements for Undiluted Weld Metal:

C	0.10	Cu	0.25
Mn	0.75	Ni*	92.0 min.
Fe	0.75	Al	1.0
P	0.03	Ti	1.0-4.0
S	0.02	Total Other	0.50
Si	1.25		

All values are considered maximum, unless otherwise noted.

*Includes incidental cobalt.

All-Weld-Metal Tension Test Requirements (min.):

Tensile Strength, psi	60,000
MPa	410
Elongation, (%)	20

Recommended Amperages:

Dia.	3/32	1/8	5/32	3/16
MM	2.4	3.2	4.0	4.8
Length	12"	14"	14"	14"
DC+	65-85	90-125	125-170	170-225

Packaging:

All sizes are packaged in 10 lb. containers-6 containers per 60 lb. master carton.

AFM 182

AWS/SFA A5.11 ENiCrFe-3
DC+ (Reverse Polarity)

AFM 182 is a coated electrode designed to weld nickel-chromium alloys, the clad side of nickel-chromium-iron clad steel and for welding iron and nickel-base alloy dissimilar metal combinations such as nickel 600, 601, and 800.

Chemical Composition Requirements for Undiluted Weld Metal:

C	0.10	Ni*	59.0 min.
Mn	5.0-9.5	Co	(a)
Fe	10.0	Ti	1.0
P	0.03	Cr	13.0-17.0
S	0.015	Nb+Ta	1.0-2.5**
Si	1.0	Total Other	0.50
Cu	0.50		

All values are considered maximum, unless otherwise noted.

a. Cobalt-0.12 maximum, when specified by the purchaser.

* Includes incidental cobalt.

** Tantalum-0.30 maximum, when specified by the purchaser.

All-Weld-Metal Tension Test Requirements (min.):

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

Recommended Amperages:

Dia.	3/32	1/8	5/32	3/16
MM	2.4	3.2	4.0	4.8
Length	12"	14"	14"	14"
DC+	40-65	65-95	95-125	125-165

Packaging:

All sizes are packaged in 10 lb. containers-6 containers per 60 lb. master carton.

AFM 187

AWS/SFA A5.6 ECuNi
DC+ (Reverse Polarity)

AFM 187 is an all position copper-nickel core electrode. AFM 187 is excellent for welding wrought or cast 70/30, 80/20, and 90/10 copper-nickel alloys and dissimilar applications of nickel-copper alloys.

Chemical Composition Requirements for Undiluted Weld Metal:

Mn	1.00-2.50	P	0.020
Fe	0.40-0.75	Pb	0.02
Si	0.50	Ti	0.50
Ni*	29.0-33.0	Total Other	0.50
Cu	BAL		

All values are considered maximum, unless otherwise noted.

* Includes cobalt.

All-Weld-Metal Tension Test Requirements (min.):

Tensile Strength, psi	50,000
MPa	350
Elongation, (%)	20

Recommended Amperages:

Dia.	3/32	1/8	5/32	3/16
MM	2.4	3.2	4.0	4.8
Length	12"	14"	14"	14"
DC+	60-85	70-120	100-145	130-190

Packaging:

All sizes are packaged in 10 lb. containers-6 containers per 60 lb. master carton.

AFM 190

AWS/SFA A5.11 ENiCu-7
DC+ (Reverse Polarity)

AFM 190 is an electrode designed to weld nickel-copper to itself, such as alloy 400 and 404. It is also used to overlay nickel-copper alloy on steel and to weld dissimilar nickel-copper alloys to steel.

Chemical Composition Requirements for Undiluted Weld Metal:

C	0.10	Cu	BAL
Mn	4.0	Ni*	62.0-69.0
Fe	2.5	Al	0.75
P	0.02	Ti	1.0
S	0.015	Total Other	0.50
Si	1.5		

All values are considered maximum, unless otherwise noted.

* Includes incidental cobalt.

All-Weld-Metal Tension Test Requirements (min.):

Tensile Strength, psi	70,000
MPa	480
Elongation, (%)	30

Recommended Amperages:

Dia.	3/32	1/8	5/32	3/16
MM	2.4	3.2	4.0	4.8
Length	12"	14"	14"	14"
DC+	55-75	75-110	110-150	150-190

Packaging:

All sizes are packaged in 10 lb. containers-6 containers per 60 lb. master carton.

AFM C276

AWS/SFA A5.11 ENiCrMo-4
DC+ (Reverse Polarity)

AFM C276 is used for welding low-carbon nickel-chromium-molybdenum alloy, for welding the clad side of joints in steel clad with low-carbon nickel-chromium-molybdenum alloy, and for welding low-carbon nickel-chromium-molybdenum alloy to steel and to other nickel-base alloys. AFM C276 electrodes normally are used only in the flat position.

Chemical Composition Requirements for Undiluted Weld Metal:

C	0.02	Ni*	BAL
Mn	1.0	Co	2.5
Fe	4.0-7.0	Cr	14.5-16.5
P	0.04	Mo	15.0-17.0
S	0.03	V	0.35
Si	0.2	W	3.0-4.5
Cu	0.50	Total Other	0.50

All values are considered maximum, unless otherwise noted.

* Includes incidental cobalt.

All-Weld-Metal Tension Test Requirements (min.):

Tensile Strength, psi	100,000
MPa	690
Elongation, (%)	25

Recommended Amperages:

Dia.	3/32	1/8	5/32	3/16
MM	2.4	3.2	4.0	4.8
Length	12"	14"	14"	14"
DC+	40-75	70-110	80-125	80-130

Packaging:

All sizes are packaged in 10 lb. containers-6 containers per 60 lb. master carton.

AFM A

AWS/SFA A5.11 ENiCrFe-2
DC+ (Reverse Polarity)

AFM A is an electrode used for welding nickel-chromium-iron alloys (alloy 800), 9% nickel steel, and a variety of dissimilar metal joints (involving carbon steel, stainless steel, nickel, and nickel-base alloys). The base metals can be wrought or cast (welding grade), or both. The electrodes may be used for applications at temperatures ranging from cryogenic to around 1800°F (980°C). However, for temperatures above 1500°F (820°C), weld metal produced by **AFM A** does not exhibit optimum oxidation resistance and strength.

Chemical Composition Requirements for Undiluted Weld Metal:

C	0.10	Ni*	62.0 min.
Mn	1.0-3.5	Co	(a)
Fe	12.0	Cr	13.0-17.0
P	0.03	Nb+Ta	0.5-4.0**
S	0.02	Mo	0.5-2.5
Si	0.75	Total Other	0.50
Cu	0.50		

All values are considered maximum, unless otherwise noted.

a. Cobalt-0.12 maximum, when specified by the purchaser.

* Includes incidental cobalt.

** Tantalum-0.30 maximum, when specified by the purchaser.

All-Weld-Metal Tension Test Requirements (min.):

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

Recommended Amperages:

Dia.	3/32	1/8	5/32	3/16
MM	2.4	3.2	4.0	4.8
Length	12"	14"	14"	14"
DC+	45-70	65-95	95-130	125-165

Packaging:

All sizes are packaged in 10 lb. containers-6 containers per 60 lb. master carton.