



ALUMINUM ALLOY



Aluminum Cut Lengths and Spooled Wires are manufactured to meet the rigid requirements of AWS A5.10. Cleanliness, and wire temper are precisely controlled.

ALLOY 4043 (MIG)

Qualified to AWS A5.10 ER4043, ABS, ISO Designation AISi5. 4043 is an all position 5% silicon alloy used to weld heat treatable base alloys. It is most often used to weld the 6XXX series of alloys. The silicon addition improves puddle fluidity, producing an appealing bead profile. It is less crack sensitive on the 6XXX series than other welding alloys. Common applications are automotive parts, truck trailers, bicycles.



PN: 0404329
3/64" - 20# SPOOL

**USA
MADE IN**



PN: 04043E1POP
.030 - 1# SPOOL

Chemical Composition			AWS
Mn-0.05%	Si-4.5-6.0%	Cr-	A5.10
Cu-0.30%	Fe-0.8%	Ti-0.20%	
Zn-0.10%	Al-Rem	Mg-0.05%	
Others-0.15%			

Single values shown are maximum percentages

**PRODUCTION
PAKS
AVAILABLE**

PART NO.	SIZE
04043D1	.025" - 1# SPOOL
04043E1	.030" - 1# SPOOL
04043E5	.030" - 5# SPOOL
04043E13	.030" - 13# SPOOL
04043F1	.035" - 1# SPOOL
04043F5	.035" - 5# SPOOL
04043F6	.035" - 16# SPOOL
04043F1D	.035" - 150# PROD PAK
0404321	3/64" - 1# SPOOL
0404327	3/64" - 16# SPOOL
0404329	3/64" - 20# SPOOL
0404321D	.045" - 150# PROD PAK
0404337	1/16" - 16# SPOOL
0404339	1/16" - 20# SPOOL
0404357	3/32" - 16# SPOOL
04043E1POP	.030" - 1# SPOOL
04043F1POP	.035" - 1# SPOOL
0404321POP	3/64" - 1# SPOOL
0404331POP	1/16" - 1# SPOOL

ALLOY 5356 (MIG)

Alloy 5356 is an all position non - heat treatable MIG wire used to weld the 5XXX series alloys when 40,000 psi tensile strength is not a requirement. 5356 is a very good all purpose wire. It is the most widely used of all aluminum fillers metals. Common applications are welding of boats / ships, bicycles, trucks, pressure vessels and automotive parts. Qualified to AWS A5.10 ER5356.



PN: 0535629
3/64" - 20# SPOOL

**USA
MADE IN**



PN: 05356E1POP
.030 - 1# SPOOL

Chemical Composition			AWS
Mn-0.05-0.20%	Si-0.25%	Cr-0.05-0.20%	A5.10
Cu-.10%	Fe-0.40%	Ti-0.06-0.20%	
Zn-0.10%	Al-Rem	Mg-4.5-5.5%	
Others-0.15%			

Single values shown are maximum percentages

**PRODUCTION
PAKS
AVAILABLE**

PART NO.	SIZE
05356E1	.030" - 1# SPOOL
05356E5	.030" - 5# SPOOL
05356E6	.030" - 12# SPOOL
05356F1	.035" - 1# SPOOL
05356F5	.035" - 5# SPOOL
05356F6	.035" - 16# SPOOL
0535621	3/64" - 1# SPOOL
0535625	3/64" - 5# SPOOL
0535627	3/64" - 16# SPOOL
0535629	3/64" - 20# SPOOL
0535621D	3/64" - 150# PROD PAK
0535637	1/16" - 16# SPOOL
0535639	1/16" - 20# SPOOL
05356E1POP	.030" - 1# SPOOL
05356F1POP	.035" - 1# SPOOL
0535621POP	3/64" - 1# SPOOL
0535631POP	1/16" - 1# SPOOL

ALLOY 4043 (GTAW) (TIG)

Qualified to AWS A5.10 R4043, ABS, ISO Designation AISi5. 4043 is a 5% silicon alloy used to weld heat treatable base alloys. It is most often used to weld the 6XXX series of alloys. The silicon addition improves puddle fluidity, producing an appealing bead profile. It is less crack sensitive on the 6XXX series than other welding alloys. Common applications are automotive parts, truck trailers, bicycles. Also ideally suited for brazing thin aluminum sheet and tubing.

PN: 0404320
3/64" x 36"
10# PKG



**USA
MADE IN**

Chemical Composition			AWS
Mn-0.05%	Si-4.5-6.0%	Cr-	A5.10
Cu-0.30%	Fe-0.8%	Ti-0.20%	
Zn-0.10%	Al-Rem	Mg-0.05%	
Others-0.15%			

Single values shown are maximum percentages

PART NO.	SIZE
0404320	3/64" x 36" - 10# PKG
0404330	1/16" x 36" - 10# PKG
0404350	3/32" x 36" - 10# PKG
A404350	3/32" x 36" - 50# PKG
0404360	1/8" x 36" - 10# PKG
A404360	1/8" x 36" - 50# PKG
0404370	5/32" x 36" - 10# PKG
0404380	3/16" x 36" - 10# PKG
40433011POP	1/16" x 36" - 1#PKG
40435011POP	3/32" x 36" - 1#PKG
40436011POP	1/8" x 36" - 1# PKG
40433033POP	1/16" x 36" - 3#PKG
40435033POP	3/32" x 36" - 3#PKG
40436033POP	1/8" x 36" - 3# PKG

WELDING PRODUCTS



ALUMINUM ALLOY

ALLOY 5356 (GTAW) (TIG)

Alloy 5356 is an all position non-heat treatable TIG wire used to weld the 5XXX series alloys when 40,000 psi tensile strength is not a requirement. 5356 is a very good all purpose wire so it is the most widely used of all aluminum fillers metals. Common applications are welding of boats / ships, bicycles, tanks pressure vessels and automotive parts. Qualified to AWS A5.10 R5356.

PN: 0535630
1/16" x 36" - 10# BOX



**USA
MADE IN**

Chemical Composition			AWS
Mn-0.05-0.20%	Si-0.25%	Cr-0.05-0.20%	A5.10
Cu-.10%	Fe-0.40%	Ti-0.06-0.20%	
Zn-0.10%	Al-Rem	Mg-4.5-5.5%	
Others-0.15%			

Single values shown are maximum percentages

PART NO.	SIZE
0535620	3/64" x 36" - 10# PKG
0535630	1/16" x 36" - 10# BOX
0535650	3/32" x 36" - 10# BOX
0535670	5/32" x 36" - 10# BOX
A535650	3/32" x 36" - 50# PKG
0535660	1/8" x 36" - 10# BOX
53563011POP	1/16" x 36" - 1#PKG
53565011POP	3/32" x 36" - 1# PKG
53566011POP	1/8" x 36" - 1# PKG
53563033POP	1/16" x 36" - 3#PKG
53565033POP	3/32" x 36" - 3#PKG
53566033POP	1/8" x 36" - 3# PKG

RECOMMENDED WELDING PARAMETERS FOR ALUMINUM SPOOLED WIRES GMAW (MIG)

Spray Transfer: Shielding gas Argon is suggested for thicknesses up to 1". For thicknesses over 1", Argon / Helium mixtures should be considered.

Wire Diameter	Welding Current, Amperage	Arc Voltage	Wire Feed Speed, ipm
.025"	85 -180	20 -26	520 -750
.030"	95 -200	22 -28	470 -680
.035"	110 -220	22 - 28	350 -475
3/64"	130 -290	22 -28	235 -375
1/16"	160 -360	24 -30	180 -300

Settings based on Ar shielding gas

All aluminum containers have an identification label showing grade, size, weight and heat number. Conformance certifications can be furnished on request.

RECOMMENDED WELDING PARAMETERS FOR ALUMINUM CUT LENGTHS GTAW (TIG)

RECOMMENDED WELDING PARAMETERS FOR ALUMINUM CUT LENGTHS GTAW (TIG)

For manual AC welding, argon is generally preferred because the arc has good stability. On heavier sections, the addition of helium may be considered. Arc penetration will increase significantly, however, gas flow rates must be increased when helium is added.

Material Thickness	Tungsten, Pure or Zirconiated	Filler Diameter	Welding Current, Amperage	Arc Voltage, ACHF	Gas Cup	Argon
1/16"	1/16" - 3/32"	1/16" - 3/32"	70 - 100	15	3/8	20
1/8"	1/8" - 5/32"	1/18" - 5/32"	125 - 175	15	7/16	20
3/16"	5/32" - 3/16"	5/32" - 3/16"	170 - 225	15	7/16 - 1/2	25
1/4"	3/16" - 1/4"	3/16"	220 - 275	15	1/2	30
3/8"	1/4"	3/16" - 1/4"	330 - 380	15	5/8	35
1/2"	1/4"	1/4"	400 - 450	25	5/8	35

WELDING PARAMETERS COPPER WELDING ALLOY



GTAW (TIG) SUGGESTED WELD SETTINGS

Alloy	Material Thickness	Filler Diameter	Welding Current, (Amps DC)	Welding Current, (Amps AC)	Gas Cup	Argon, cfm	Tungsten
Aluminum Bronze A2	1/16"	1/16"	80-120	80-120	3/8" - 1/2"	15	1/16"
	3/32" - 1/8"	3/32"	145 - 205	145 - 195	7/16" - 1/2"	15	3/32"
	3/16"	3/32" - 1/8"	300 - 350	255 - 300	7/16" - 1/2"	20	1/8"
Deoxidized Copper	1/2"	1/8"	515 - 640	340 - 485	1/2"	25	3/16"
	1/16"	1/16"	70 - 150	70 - 150	3/8" - 1/2"	15	1/16"
	3/32" - 1/8"	3/32"	150 - 200	140 - 230	7/16" - 1/2"	15	3/32"
Phos Bronze	3/16" - 1/2"	3/32" - 1/8"	230 - 400	255 - 320	7/16" - 1/2"	20	1/8"
	1/16"	1/16"	100 - 120	100 - 120	3/8" - 1/2"	15	1/16"
	3/32" - 1/8"	3/32"	185 - 205	165 - 195	7/16" - 1/2"	15	3/32"
Silicon Bronze	3/16"	3/32" - 1/8"	300 - 350	255 - 300	7/16" - 1/2"	20	1/8"
	1/2"	1/8"	615 - 640	440 - 185	1/2"	25	3/16"
	1/16"	1/16"	70 - 150	70 - 150	3/8" - 1/2"	15	1/16"
Silicon Bronze	3/32" - 1/8"	3/32"	150 - 200	140 - 230	7/16" - 1/2"	15	3/32"
	3/16" - 1/2"	3/32" - 1/8"	230 - 400	225 - 320	7/16" - 1/2"	20	1/8"

GMAW (MIG) SUGGESTED WELD SETTINGS

Alloy	Wire Size	Welding Current, (Amps)	Arc Voltage	Wire Feed Speed
Aluminum Bronze A2	.035"	130 - 200	30	280 - 400
	.045"	185 - 245	30	200 - 300
	1/16"	250 - 400	40	150 - 210
Deoxidized Copper	.035"	145 - 185	30	400 - 440
	.045"	195 - 215	30	280 - 310
	1/16"	260 - 280	40	150 - 210
Phos Bronze	.030"	130 - 140	25	340 - 450
	.035"	140 - 160	30	280 - 400
	.045"	165 - 185	30	200 - 300
Silicon Bronze	1/16"	285 - 335	40	150 - 210
	.030"	130 - 150	25	460 - 500
	.035"	145 - 185	30	400 - 440
Silicon Bronze	.045"	195 - 215	30	280 - 310
	1/16"	260 - 280	40	150 - 210

COPPER WELDING ALLOY

HARRIS AMERICAN LOW FUMING BRONZE

Available Bare

Harris American Low Fuming Bronze is a copper/zinc alloy developed for braze welding steel, cast iron, and copper. Harris American LFB flows faster with less build up compared to #15 bronze. It can also be used for build up and overlay. Harris American Bronze flows easily with minimal fuming. Deposits can be machined and have excellent ductility. Harris bronze can be deposited using standard oxy-fuel torches, or with Harris Power Torch acetylene or Mapp® swirl tip equipment.

Flux - Use Harris 600 flux. Flux coated rods are pre-coated with a flexible, flux coating for convenience and deposition ease, (rods do not have to be continually dipped into the flux).

Procedure:

- Clean braze area. Heavy sections should be beveled
- Use a neutral flame, slightly preheat bare rod and dip it into the powder flux. Flux will adhere to the rod
- Use the flame to preheat the joint
- Harris American Bronze is applied with a "braze welding" technique. The process is similar to brazing as the base metal is not melted. Unlike brazing, the rod must be continually applied as you move down the joint
- Focus the flame on the part and heat until a dull red appears, then apply the rod, melting the rod with the flame to deposit a uniform bronze layer
- Remove flux residue with hot water and a wire brush

Features:

- Melting temperature: 1590° F - 1630° F

PART NO.	SIZE
HA01550	3/32" x 36" - 50# PKG
HA01560	1/8" x 36" - 50# PKG
HA01570	5/32" x 36" - 50# PKG SPECIAL ORDER
HA01580	3/16" x 36" - 50# PKG SPECIAL ORDER
HA01590	1/4" x 36" - 50# PKG SPECIAL ORDER
-	PRODUCTION PAKS SPECIAL ORDER



PN: HA01550
3/32" x 36" - 50# PKG

**PRODUCTION
PAKS
AVAILABLE**

**USA
MADE IN**

WELDING PRODUCTS



COPPER WELDING ALLOY

LOW FUMING BRONZE (FLUX COATED)

A low fuming bronze alloy for torch brazing.

Procedure:

- Clean braze area
- Remove all rust, oil and grease
- Heavy sections should be beveled
- The alloy should be applied by a brazing technique with a neutral flame
- When applying the bare rod, use a neutral flame with Harris 600 flux
- Flux residue should be removed by wire brushing with hot water



PN: 015FC30
1/16" x 18" - 5# PKG

USA
MADE IN

Features:

- Tensile strength - Up to 65,000 psi
- Brazing temperature range - 1670° F to 1750° F
- Flux coating provides excellent wetting action with no objectable fuming
- Porosity - free deposits
- Good machinability
- Color matches yellow brass

LOW FUMING BRONZE (BARE)

Procedure:

- Clean braze area
- Remove all rust, oil and grease
- Heavy sections should be beveled
- When applying the bare rod, use a neutral flame with Harris 600 flux
- The alloy should be applied by a brazing technique with a neutral flame
- Flux residue should be removed by wire brushing with hot water

Features:

- Tensile strength - Up to 65,000 psi
- Flux coating provides excellent wetting action with no objectable fuming
- Brazing temperature range - 1670° F to 1750° F
- Good machinability
- Porosity - free deposits
- Color matches yellow brass

Specifications: AWS A5.8 RBCuZn-C



PN: 00015310
1/16" x 36" - 10# PKG

USA
MADE IN

FC PART NO.	SIZE
015FC30	1/16" x 18" WHITE - 5# PKG
015FC50	3/32" x 36" - 10# PKG
015FC50B	3/32" x 36" - BLUE - 10# PKG
015FC60	1/8" x 36" - 10# PKG
015FC60B	1/8" x 36" - BLUE
015FC70	5/32" x 36" - 10# PKG SPECIAL ORDER
015FC80	3/16" x 36" - 10# PKG
015FC90	1/4" x 36" - 10# PKG
POP PART NO.	SIZE
015FC500POP	3/32" x 36" - 1# PKG
015FC600POP	1/8" x 36" - 1# PKG
015FC503POP	3/32" x 36" - 3# PKG
015FC603POP	1/8" x 36" - 3# PKG
015FC505POP	3/32" x 36" - 5# PKG
015FC605POP	1/8" x 36" - 5# PKG

BARE PART NO.	SIZE
00015310	1/16" x 36" - 10# PKG
0001530	1/16" x 36" - 50# PKG
00015510	3/32" x 36" - 10# PKG
0001550	3/32" x 36" - 50# PKG
00015610	1/8" x 36" - 10# PKG
0001560	1/8" x 36" - 50# PKG
0001570	5/32" x 36" - 50# PKG
00015810	3/16" x 36" - 10# PKG
0001580	3/16" x 36" - 50# PKG
00015910	1/4" x 36" - 10# PKG
0001590	1/4" x 36" - 50# PKG
0001595	5/16" x 36" - 50# PKG
00015A0	3/8" x 36" - 50# PKG
POP PART NO.	SIZE
00015300POP	1/16" x 36" - 1#PKG
00015500POP	3/32" x 36" - 1#PKG
00015600POP	1/8" x 36" - 1#PKG
00015303POP	1/16" x 36" - 3#PKG
00015503POP	3/32" x 36" - 3#PKG
00015603POP	1/8" x 36" - 3#PKG
00015305POP	1/16" x 36" - 5#PKG
00015505POP	3/32" x 36" - 5#PKG
00015605POP	1/8" x 36" - 5#PKG
00015805POP	3/16" x 36" - 5#PKG
00015905POP	1/4" x 36" - 5#PKG

SILICON BRONZE (GMAW) (MIG)

This copper-silicon alloy is used to weld similar composition base metals, brass, and to weld these copper alloys to steel. Silicon bronze is also frequently used in GMAW "brazing" of coated sheet steels.

Preheat: Silicon bronze base metals generally do not require preheat. Brass or copper base metals may require some preheat depending on copper content and thickness.

Shielding Gas: Argon

Specifications: AWS A5.7 ERCuSi-A

PN: 00SIB15
.025 - 10# SPOOL



Chemical Composition			AWS Class
Cu-Rem	Zn-1.0%	Sn-1.0%	ERCuSi-A
Mn-1.5%	Fe-0.5%	Si-2.8-4.0%	
P-	Al-0.01%	Pb-0.02%	
Others-0.05%			

*Single values shown are maximum percentages.

PRODUCTION PAKS
AVAILABLE

PART NO.	SIZE
00SIB15	.025" - 10# SPOOL
00SIBE2	.030" - 2# SPOOL
00SIBE5	.030" - 10# SPOOL
00SIBE8	.030" - 30# SPOOL
00SIBF2	.035" - 2# SPOOL
00SIBF5	.035" - 10# SPOOL
00SIBF8	.035" - 30# SPOOL
00SIBF2D	.035" - 250# PROD PAK
00SIBF5D	.035" - 500# PROD PAK
00SIBH5	.045" - 500# PROD PAK
00SIBH8	.045" - 30# SPOOL
00SIBH2D	.045" - 250# PROD PAK
0SIBH5DP	.045" - 500# PROD PAK SPECIAL ORDER
00SIB38	1/16" - 30# SPOOL
00SIB35D	.062" - 500# PROD PAK SPECIAL ORDER



COPPER-BASED WELDING FILLER METAL SELECTION CHART

Base Metal	Copper	Phosphor Bronze	Red Brass	Yellow Brass	Nickel Silver	Aluminum Bronze	Silicon Bronze	Copper / Nickel
Carbon & Low Alloy Steels	ALB-A2 (1000)	PHB ALB-A2 (400)	ALB-A2 PHB (500-600)	ALB-A2 (500-600)	ALB-A2 (500-600)	ALB-A2 (300)	ALB-A2 SIB (150)	ALB-A2 (150)
Cast Iron	ALB-A2 (1000)	PHB (400)	ALB-A2 PHB (500-600)	ALB-A2 (500-600)	ALB-A2 (500-600)	ALB-A2 (300)	ALB-A2 SIB (300)	ALB-A2 (150)
Copper / Nickel	ALB-A2 (1000)	PHB SIB (150)	ALB-A2 (150)	ALB-A2 SIB (150)	ALB-A2 SIB (150)	ALB-A2 (150)	ALB-A2 (150)	* (150)
Silicon Bronze	PHB (1000)	PHB SIB (150)	ALB-A2 SIB (150)	ALB-A2 SIB (150)	ALB-A2 SIB (150)	ALB-A2 (150)	SIB (150)	
Aluminum Bronze	ALB-A2 (1000)	ALB-A2 PHB (300-400)	ALB-A2 (500-600)	ALB-A2 (500)	ALB-A2 (500)	ALB-A2 (500)		
Nickel / Silver	SIB PHB (1000)	PHB (500-600)	PHB (500-600)	ALB-A2 (500-600)	ALB-A2 (500-600)			
Yellow Brass	SIB PHB (1000)	PHB (500-600)	PHB (500-600)	ALB-A2 (500-600)				
Red Brass	PHB (1000)	PHB (500)	PHB (400)					
Phosphor Bronze	PHB (1000)	PHB (400)						
Copper	DOC (1000)							

*Copper/Nickel filler wire is available upon request.

Where more than one filler metal is shown, the preferential selection appears first, a possible alternative second.

3SIB (GTAW) (TIG)

This copper-silicon alloy is used to weld similar composition base metals, brass, and to weld these copper alloys to steel. Silicon bronze is also frequently used in GTAW "brass welding" of coated sheet steels.

Preheat: Silicon bronze base metals generally do not require preheat. Brass or copper base metals may require some preheat depending on copper content and thickness.

Shielding Gas: Argon

Specifications: AWS A5.7 ERCuSi-A

GTAW: Use DC+ or AC current and a 2% thoriated tungsten



PN: 03SIB603POP
1/8" x 36" - 3# PKG

CUT LENGTHS PART NO. SIZE

03SIBF0	.035" x 36" - 10# PKG
03SIBH0	.045" x 36" - 10# PKG
03SIB30	1/16" x 36" - 10# PKG
A3SIB30	1/16" x 36" - 50#PKG
03SIB50	3/32" x 36" - 10# PKG
A3SIB50	3/32" x 36" - 50#PKG
03SIB60	1/8" x 36" - 10# PKG
A3SIB60	1/8" x 36" - 50#PKG
03SIB70	5/32" x 36" - 10# PKG
03SIB80	3/16" x 36" - 10# PKGS
03SIB90	1/4" x 36" - 10# PKG

POP PART NO. SIZE

03SIB301POP	1/16" x 36" - 1# PKG
03SIB303POP	1/16" x 36" - 3# PKG
03SIB501POP	3/32" x 36" - 1# PKG
03SIB503POP	3/32" x 36" - 3# PKG
03SIB601POP	1/8" x 36" - 1# PKG
03SIB603POP	1/8" x 36" - 3# PKG

ALUMINUM BRONZE A2 (GMAW/GTAW)

This versatile filler metal is used for joining aluminum bronze base metals, welding brass, steel and a variety of dissimilar metal applications.

Preheat: Generally not required unless welding high copper content base metals.

Shielding Gas: Argon

Specification: AWS A5.7 ERCuAl-A2

GTAW: Use DC+ or AC current and a 2% thoriated tungsten

Brinell Hardness (3000 kg. load) 130-150

PART NO. SIZE

0ALB1F8	.035" - 30# SPOOL
0ALB1H8	.045" - 30# SPOOL
0ALB138	1/16" - 30# SPOOL
0ALB2F8	.035" - 30# SPOOL
0ALB2H8	.045" - 30# SPOOL
0ALB238	1/16" - 30# SPOOL
0ALB258	3/32" - 30# SPOOL SPECIAL ORDER
3ALB230	1/16" x 36" -10# PKG
3ALB250	3/32" x 36" -10# PKG
3ALB260	1/8" x 36 -10# PKG

ALUMINUM BRONZE A1 (GMAW) (3 ALB GTAW)

This wire is designed for weld overlays for bearing and wear resistant surfaces. It is iron-free and is often used to protect parts exposed to salt water and certain acidic conditions. A1 aluminum bronze is not recommended for joining.

Preheat: Generally not required.

Shielding Gas: Argon

Specification: AWS A5.7 ERCuAl-A1

GTAW: Use DC+ or AC current and a 2% thoriated tungsten

Brinell Hardness (500 kg. load) 80-110

PN: 0ALB1F8

.035 - 30# SPOOL



Product	Chemical Composition			AWS Class
Aluminum Bronze A1	Cu-Rem Mn-0.50% P- Others-0.50%	Zn-0.20% Fe- Al-6.0-8.5%	Sn- Si-0.10% Pb-0.02%	ERCuAl-A1
Aluminum Bronze A2	Cu-Rem Mn- P- Others-0.50%	Zn-0.20% Fe-1.5% Al-8.5-11.0%	Sn- Si-0.10% Pb-0.02%	ERCuAl-A1



COPPER WELDING ALLOY

PART NO.	SIZE
OPHBCF8	.035" - 30# SPOOL
OPHBC8	.045" - 30# SPOOL



PHOS BRONZE (GMAW) (MIG)

This copper-tin alloy is used to weld copper-tin composition base metals, and to weld copper alloys, including brass to steel.

Preheat: Generally not required unless welding high copper content base metals.

Shielding Gas: Argon

Specification: AWS A5.7 ERCuSn-C

PHOS BRONZE (GTAW) (TIG)

For GTAW Welding

Preheat: Generally not required unless welding high copper content base metals.

Shielding Gas: Argon

Specification: AWS A5.7 ERCuSn-C

GTAW: Use DC+ or AC current and a 2% thoriated tungsten.

PART NO.	SIZE
03PHB30	1/16" x 36" - 10# PKG
03PHB50	3/32" x 36" - 10# PKG
03PHB60	1/8" x 36" - 10# PKG SPECIAL ORDER



Chemical Composition					
Mn- Sn-7.0-9.0%	Si- Fe-	P-0.10-0.35% Al-0.01%	Cu- Pb-0.02%	Rem Others-0.05%	Zn-0.20%
*Single values shown are maximum percentages.					

PART NO.	SIZE
00DOC8	.035" - 30# SPOOL
00DOC8	.045" - 30# SPOOL
00DOC38	1/16" - 30# SPOOL
00DOC58	3/32" - 30# SPOOL



DEOX COPPER (GMAW) (MIG)

Designed for welding applications on high copper content base metals. This alloy produces trouble free welds that are a good color match to copper and have high electrical conductivity. Deox copper welding wire can also be used to weld copper to steel.

Preheat: Copper base metals have high thermal conductivity so current and shielding gas must be selected to provide the highest heat input. Preheat temperature range from 700^o to 1000^o F, depending on the base metal thickness.

Shielding Gas: Argon shielding gas is frequently used, with argon/helium and pure helium sometimes selected for increased heat input.

Specification: AWS A5.7 ERCu

DEOX COPPER (GTAW) (TIG)

Preheat: Copper base metals have high thermal conductivity so current and shielding gas must be selected to provide the highest heat input. Preheat temperature range from 700^o to 1000^o F, depending on the base metal thickness.

Shielding Gas: Argon shielding gas is frequently used, with argon/helium and pure helium sometimes selected for increased heat input.

Specification: AWS A5.7 ERCu

GTAW: Use DC+ or AC current and a 2% thoriated tungsten.

PART NO.	SIZE
03DOC30	1/16" x 36" - 10# PKG
03DOC50	3/32" x 36" - 10# PKG
03DOC60	1/8" x 36" - 10# PKG
03DOC70	5/32" x 36" - 10# PKG
03DOC80	3/16" x 36" - 10# PKG

Chemical Composition					AWS Class
Mn-0.50%	Si-0.50%	P-0.15%	Cu-98.0 min	Sn-1.0%	ERCu
Fe-	Al-0.01%	Pb-0.02%	Others-0.05%		
*Single values shown are maximum percentages.					



COPPER WELDING ALLOY MILD STEEL



ALLOY 170

Available bare or flux coated. Harris Alloy 170 is a copper/zinc/nickel alloy developed for braze welding steel, and cast iron. It can also be used for brazing tungsten carbide to steel where higher joining temperature is not objectionable. The nickel addition provides hardness and strength compared to the standard bronze alloys. This characteristic makes it ideal for build up and overlay. Harris 170 flows easily and deposits can be machined. Harris 170 can be deposited using oxy-fuel torches. Flux coated rods are pre-coated with a flexible, flux coating for convenience and deposition ease.

Procedure:

- The process is similar to brazing as the base metal is not melted
- Unlike brazing the rod must be continually applied as you move down the joint
- Focus the flame on the part and heat until a dull red appears, then apply the rod, melting the rod with the flame to deposit a uniform braze layer along joint
- Clean the area to be brazed
- Apply with a "braze welding" technique
- Bevel heavier sections approximately 15°
- Flux with bare No. 170 use Harris 17 paste flux
- Use a neutral flame preheat and preheat joint
- Remove flux residue by wire brushing with hot water

PART NO.	SIZE
0017030	1/16" x 36" - 50# PKG
0017050	3/32" x 36" - 50# PKG
0017060	1/8" x 36" - 50# PKG
0017090	1/4" x 36" - 50# PKG SPECIAL ORDER
0017095	5/16" x 36" - 50# PKG
170F618B	1/8" x 18" - BLUE FLUX - 5#
170FC60	1/8" x 36" - Yellow FLUX - 10#
170FC80	3/16" x 36" - Yellow FLUX - 10#

Features:

- Melting temperature - 1720° F to 1800° F

Application:

- Maintenance, repair and fabrication applications, steel, copper and copper alloys, nickel and nickel alloys. Well suited for close-fit, strong "sweat" joints, bicycle frames and tubular furniture.

Specifications: AWS A5.8 RBCuZn-D

PN: 0017030
1/16" x 36" - 50# PKG



Chemical Composition

Cu-46%-50%	Ni-9%-11%	Mn-1.5% Max	Fe-1.5% Max
Si-3.5% Max	Ag-5.8%-6.0	Sn-3% Max	Zn Rem

MILD STEEL

ER70S-3 (GMAW) MIG

A general purpose welding wire for fabrication of mild steel. Contains silicon and manganese as deoxidizers. Usually used with 75/25 (argon/CO2) shielding gas or with higher contents of argon, such as 90/10. Can also be used with 100% CO2. Qualified to AWS A5.18 ER70S-3

Chemical Composition

C-0.06-0.15%	Mn-0.90-1.40%	Si-0.45-0.75%	S-0.035%	P-0.025%
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PN: E70S3E8
.030" - 33# SPOOL

PART NO.	SIZE
E70S3E8	.030" - 33# SPOOL
E70S3F9	.035" - 44# SPOOL
E70S3H8	.045" - 33# SPOOL

ER70S-6 (GMAW) MIG

A general purpose welding wire for fabrication of mild steel. Contains more deoxidizers than ER70S-3. The additional deoxidizers also provide better wetting, giving a flatter bead shape and the capability of faster travel speeds. Usually used with 75/25 (argon/CO2) shielding gas or with higher contents of argon, such as 90/10. Can also be used with 100% CO2. Conforms to AWS A5.18 ER70S-6.

Chemical Composition

C-0.06-0.15%	Mn-1.40-1.85%	Si-0.80-1.15%	S-0.035%	P-0.025%
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*Single values shown are maximum percentages.



PN: E70S612POP
.023" - 2# SPOOL

**PRODUCTION
PAKS
AVAILABLE**

PART NO.	SIZE
E70S612	.023" - 2# SPOOL
E70S615	.023" - 11# SPOOL
E70S618	.023" - 33# SPOOL
E70S6E2	.030" - 2# SPOOL
E70S6E5	.030" - 11# SPOOL
E70S6E8	.030" - 33# SPOOL
E70S6E9	.030" - 44# SPOOL
E70S6E5D	.030"-500# PROD PAK SPECIAL ORDER
E70S6F2	.035" - 2# SPOOL
E70S6F5	.035" - 11# SPOOL
E70S6F8	.035" - 33# SPOOL
E70S6F9	.035" - 44# SPOOL
E70S6F5D	.035" - 550# PROD PAK
E70S6H5	.045" - 11# SPOOL
E70S6H8	.045" - 33# SPOOL
E70S6H9	.045" - 44# SPOOL
E70S6H6	.045" - 60# COIL
E70S6H5D	.045" - 550# PROD PAK
POP PART NO.	SIZE
E70S612POP	.023" - 2# MS SPOOL
E70S615POP	.023" - 11# MS SPOOL
E70S6E2POP	.030" - 2# MS SPOOL
E70S6E5POP	.030" - 11# MS SPOOL
E70S6F2POP	.035" - 2# MS SPOOL
E70S6F5POP	.035" - 11# MS SPOOL
E70S6H2POP	.045" - 2# MS SPOOL
E70S6H5POP	.045" - 11# MS SPOOL



MILD STEEL / LOW ALLOY

ER70S-2 (GTAW) TIG

A premium, multiple deoxidized, wire. Produces high quality welds in most grades of carbon steels. ER70S-2 is a triple deoxidized wire which provides defect free weld deposits when properly used on most carbon steels. It is used especially for pipe welding. ER70S-2 Conforms to AWS A5.18 ER70S-2



PN: E70S2605POP
1/8" x 36" - 5# PKG

Chemical Composition		
C-.15%	Mn-0.90-1.40%	Si-0.45-0.70%
S-0.035%	P-0.025%	Ti-0.05-0.15%
Zr-0.02-0.12%	Al-0.05-0.15%	

PART NO.	SIZE
E70S2F0	.035" x 36" - 10# PKG
E70S2H0	.045" x 36" - 10# PKG
E70S230	1/16" x 36" - 10# PKG
E70S250	3/32" x 36" - 10# PKG
E70S260	1/8" x 36" - 10# PKG
E70S270	5/32" x 36" - 10# PKG
E70S2300POP	1/16" x 36" - 1# PKG
E70S2303POP	1/16" x 36" - 3# PKG
E70S2305POP	1/16" x 36" - 5# PKG
E70S2500POP	3/32" x 36" - 1# PKG
E70S2503POP	3/32" x 36" - 3# PKG
E70S2505POP	3/32" x 36" - 5# PKG
E70S2600POP	1/8" x 36" - 1# PKG
E70S2603POP	1/8" x 36" - 3# PKG
E70S2605POP	1/8" x 36" - 5# PKG

ER70S-3 (GTAW) TIG

A general purpose welding wire for fabrication of mild steel. Contains silicon and manganese as deoxidizers. Conforms to AWS A5.18 ER70S-3



PN: E70S330
1/16" x 36" - 10# PKG

Chemical Composition		
C-0.06-0.15%	Mn-0.90-1.40%	Si-0.45-0.75%
S-0.035%	P-0.025%	

PART NO.	SIZE
E70S330	1/16" x 36" - 10# PKGS
E70S350	3/32" x 36" - 10# PKGS
E70S360	1/8" x 36" - 10# PKGS

ER70S-6 (GTAW) TIG

A general purpose welding wire for fabrication of mild steel. Contains more deoxidizers than ER70S-3. The additional deoxidizers also provide better wetting, giving a flatter bead shape and the capability of faster travel speeds. Conforms to AWS A5.18 ER70S-6



PN: E70S6F0
.035 x 36" - 10# PKG

Chemical Composition			
C-0.06-0.15%	Mn-1.40-1.85%	Si-0.80-1.15%	S-0.035%
P-0.025%			

*Single values shown are maximum percentages.

PART NO.	SIZE
E70S6F0	.035" x 36" - 10# PKG
E70S6H0	.045" x 36" - 10# PKG
E70S630	1/16" x 36" - 10# PKG
E70S650	3/32" x 36" - 10# PKG
E70S660	1/8" x 36" - 10# PKG
E70S670	5/32" x 36" - 10# PKG
E70S6303POP	1/16" x 36" - 3# PKG
E70S6503POP	3/32" x 36" - 3# PKG
E70S6603POP	1/8" x 36" - 3# PKG
E70S6E8LW	.030" - 33# MS LEVEL WOUND
E70S6F8LW	.035" - 33# MS LEVEL WOUND
E70S6H8LW	.045" - 33# MS LEVEL WOUND

ER80S-D2 (GMAW) MIG

LOW ALLOY CR-MO WIRES FOR GMAW (MIG). Contains a high level of deoxidizers (Mn and Si), also Molybdenum for increased strength. Suitable for single and multi-pass welding of a variety of carbon and low alloy steels.

Procedure:

- DC+ reverse polarity
- Shielding gas - Argon
- Tungsten - 2% Thoriated

Specifications: AWS 5.28, ER80S-D2



PN: 80SD2H8
.045 - 33# SPOOL

Chemical Composition			
C-0.07-0.12%	Mn-1.60-2.10%	Si-0.50-0.80%	S-0.025%
P-0.025%	Ni-0.15%	Mo-0.40-0.60%	

PART NO.	SIZE
80SD2F8	.035" - 30# SPOOL
80SD2H8	.045" - 33# SPOOL

MILD STEEL / LOW ALLOY WELDING PARAMETERS



GTAW (TIG)

Welding is normally done with DC Straight Polarity (AC is sometimes used). Argon shielding is most commonly used but for deeper penetration, especially on thick plate, argon/helium mixes can be used.

MATERIAL THICKNESS	FILLER DIA.	WELDING CURRENT (AMPS)	GAS CUP	ARGON, cfm	TUNGSTEN DIAMETER
1/16"	1/16"	100 - 140	3/8"	20	1/16"
3/32"	1/6"	100 - 160	3/8"	20	1/16"
1/8"	1/6"	125 - 200	7/16"	20	3/32"
3/16"	3/32"	150 - 250	7/16"	25	3/32"
1/4"	1/8"	150 - 250	1/2"	25	1/8"
3/8"	1/8"	150 - 275	1/2"	25	1/8"
1/2"	1/8"	150 - 300	1/2"	25	1/8"

GMAW (MIG)

CO₂ shielding yields a short-circuiting transfer, 90/10 (Argon/CO₂) can give a short circuit transfer but is usually used in spray transfer

Short Circuit Transfer: SOLID GMAW - Using CO₂

WIRE SIZE	WELDING CURRENT (AMPS)	ARC VOLTAGE	WIRE FEED SPEED, IP
.023"	30 - 90	14 - 19	200 - 400
.030"	40 - 145	15 - 21	160 - 380
.035"	50 - 180	16 - 22	150 - 340
.045"	75 - 250	17 - 22	100 - 220

Spray Transfer: Using 90/10 (Ar/CO₂)

WIRE SIZE	WELDING CURRENT (AMPS)	ARC VOLTAGE	WIRE FEED SPEED, IP
.030"	135 - 230	24 - 28	390 - 670
.035"	165 - 300	24 - 28	360 - 520
.045"	200 - 375	24 - 30	210 - 390
1/16"	275 - 500	24 - 32	150 - 360
3/32"	300 - 600	24 - 33	75 - 125

ER80S-D2 (GTAW) LOW ALLOY

Contains a high level of deoxidizers (Mn and Si), also Molybdenum for increased strength. Suitable for single and multi-pass welding of a variety of carbon and low alloy steels.

Procedure:

- DC- straight polarity
- Shielding gas - Argon
- Tungsten - 2% Thoriated

Specifications: AWS 5.28, ER80S-D2

Chemical Composition						
C-0.07-0.12%	Mn-1.60-2.10%	Si-0.50-0.80%	S-0.025%	P-0.025%	Ni-0.15%	Mo-0.40-0.60%

ER80S-B2 (GTAW)

For welding 1/2 Cr-1/2 Mo, 1 Cr-1/2 Mo and 1 1/4 Cr-1/2 Mo steels for elevated temperatures and corrosive service; also used for joining dissimilar combinations of Cr-Mo and carbon steels.

Specifications: AWS 5.28, ER80S-B2

Chemical Composition						
C-0.07-0.12%	Mn-0.40-0.70%	Si-0.40-0.70%	S-0.025%	P-0.025%	Ni-0.20%	Cr-1.20-1.50
Mo-0.40-0.60%						

PART NO.	SIZE
80SD230	1/16" x 36" - 10# PKG
80SD250	3/32" x 36" - 10# PKG
80SD260	1/8" x 36" - 10# PKG



PN: 80SD230
1/16" x 36" - 10# PKG

PART NO.	SIZE
80SB230	1/16" x 36" - 10# PKG
80SB250	3/32" x 36" - 10# PKG
80SB260	1/8" x 36" - 10# PKG
80SB270	5/32" x 36" - 10# PKG
80SB630	1/16" x 36" - 10# PKG
80SB650	3/32" x 36" - 10# PKG



PN: 80SB230
1/16" x 36" - 10# PKG



MILD STEEL / LOW ALLOY

ER90S-B3 (GTAW)

For welding 2-1/4" Cr - 1 Mo Steels used for high pressure piping and pressure vessels; also used for joining dissimilar combinations of Cr-Mo and carbon steels.

Procedure:

- DC- straight polarity
- Shielding gas - Argon
- Tungsten - 2% Thoriated

Specifications: AWS 5.28, ER90S-B3

Chemical Composition				
C-0.07-0.12%	Mn-0.40-0.70%	Si-0.40-0.70%	S-0.025%	P-0.025%
Cr-0.20%	Ni-2.30-2.70%	Mo-0.90-1.20%		

PART NO.	SIZE
90SB350	3/32" x 36" - 10# PKG
90SB360	1/8" x 36" - 10# PKG
90SB3F8	.035" - 33# SPOOL
90SB3H8	.045" - 33# SPOOL



PN: 90SB350
3/32" x 36" - 10# PKG

4130 CHROME MOLY

Formulated to reduce weld metal hot cracking with good ductility. Particularly suited to thin, highly stressed joints. Use S.A.E. 4130 procedure in heat treatment.



PN: 0413030
1/16" x 36" - 10# PKG

PART NO.	SIZE
0413030	1/16" x 36" - 10# PKG
0413050	3/32" x 36" - 10# PKG
0413060	1/8" x 36" - 10# PKG SPECIAL ORDER

W1060 (RG45) SOLID WIRE (GTAW) OXY FUEL

A copper coated, low carbon steel rod which is widely used on mild steel. It offers good ductility and machinability.

Procedure:

- Use a neutral flame; however a very slight excess of acetylene assures the absence of an oxidizing flame which adversely influences weld quality
- Flux is not needed but "puddling" of the molten weld metal will bring any scale or impurities to the surface

Specifications: AWS A5.2, R45



PN: W1060510
3/32" x 36" - 10# PKG

Chemical Composition				
C-0.08%	Mn-0.05%	Si-0.10%	S-0.040%	P-0.035%
Cr-0.20%	Ni-0.30%	Mo-0.20%	Cu-0.30%	Al-0.02%

PART NO.	SIZE
W106030	1/16" x 36" - 50# PKG
W1060310	1/16" x 36" - 10# PKG
W106050	3/32" x 36" - 50# PKG
W1060510	3/32" x 36" - 10# PKG
W106060	1/8" x 36" - 50# PKG
W1060610	1/8" x 36" - 10# PKG
W106070	5/32" x 36" - 50# PKG
W1060710	5/32" x 36" - 10# PKG
W106080	3/16" x 36" - 50# PKG SPECIAL ORDER
W106090	1/4" x 36" - 50# PKG SPECIAL ORDER
W1060300POP	1/16" x 36" - 1# PKG
W1060303POP	1/16" x 36" - 3# PKG
W1060305POP	1/16" x 36" - 5# PKG
W1060500POP	3/32" x 36" - 1# PKG
W1060503POP	3/32" x 36" - 3# PKG
W1060505POP	3/32" x 36" - 5# PKG
W1060600POP	1/8" x 36" - 1# PKG
W1060603POP	1/8" x 36" - 3# PKG
W1060605POP	1/8" x 36" - 5# PKG

W1200 (RG60) SOLID WIRE (GTAW) OXY FUEL

A high strength, bright finish, steel welding rod. Use where minimum tensile strength of the steel does not exceed 60psi

Procedure:

- Use a neutral flame; however a very slight excess of acetylene assures the absence of an oxidizing flame which adversely influences weld quality
- Flux is not needed but "puddling" of the molten weld metal will bring any scale or impurities to the surface

Specifications: AWS A5.2, R60



PN: W1200310
1/16" x 36" - 10# PKG

Chemical Composition			
C-0.15%	Mn-0.90-1.40%	Si-0.10-0.35%	S-0.035%
P-0.035%	Cr-0.20%	Ni-0.30%	Mo-0.20%
Cu-0.30%	Al-0.02%		

PART NO.	SIZE
W120030	1/16" x 36" - 50# PKG
W1200310	1/16" x 36" - 10# PKG
W120050	3/32" x 36" - 50# PKG
W1200510	3/32" x 36" - 10# PKG
W120060	1/8" x 36" - 50# PKG
W120070	5/32" x 36" - 50# PKG
W1200710	5/32" x 36" - 10# PKG
W120080	3/16" x 36" - 50# PKG
W1200810	3/16" x 36" - 10# PKG
W120090	1/4" x 36" - 50# PKG
W1200300POP	1/16" x 36" - 1# PKG
W1200303POP	1/16" x 36" - 3# PKG
W1200305POP	1/16" x 36" - 5# PKG
W1200500POP	3/32" x 36" - 1# PKG
W1200503POP	3/32" x 36" - 3# PKG
W1200505POP	3/32" x 36" - 5# PKG
W1200600POP	1/8" x 36" - 1# PKG
W1200603POP	1/8" x 36" - 3# PKG
W1200605POP	1/8" x 36" - 5# PKG



E71T-1 FLUX CORED

E71T-1 is formulated to deposit x-ray quality welds in flat, vertical up, horizontal, or overhead positions. E71T-1 is designed for welding low carbon and mild steel, structural and pressure vessel grades.

E71T-1 flux core ingredients produce a fast freezing slag that facilitates out of position welds. Bead contour is flat to slightly convex. Slag is easy to remove and low spatter provides easy post weld cleaning. Conforms to AWS A5.20 E71T-1/E71-T-1M

Shielding Gas:

100% CO₂ or 75% Argon / 25% CO₂ mixture. Argon / CO₂ produces a spray type transfer that helps control the weld puddle in out of position applications.

PART NO.	SIZE
P71T1H3SP	.045" - 33# SPOOL
P71T1H50SP	.045" - 50# SPOOL
P71T1H6	.045" - 60# COIL
P71T1H9	.045" - 500# PROD PAK
P71T1K3SP	.052" - 33# SPOOL
P71T133SP	1/16" - 33# SPOOL
P71T136	1/16" - 60# COIL
P71T139	1/16" - 500# PROD PAK
P71T1KS	.052" - 60# COIL

**PRODUCTION
PAKS
AVAILABLE**

PN: P71T133SP
1/16" - 33# SPOOL



Product	Typical Chemical Composition			Shielding Gas
E71T-1M	C-0.09% S-0.009%	Mn-1.41% P-0.013%	Si-0.55% Fe-Rem	75% Ar / 25% CO ₂
E71T-1	C-0.08% S-0.009%	Mn-1.22% P-0.013%	Si-0.55% Fe-Rem	100% CO ₂

TEN GAUGE™ SELF-SHIELDING

Ten Gauge is a self shielding (no shielding gas needed) welding wire with exceptional arc stability, low spatter and excellent operator appeal. It can be used in most carbon steel applications and welds especially well on galvanized sheet. Ten Gauge can be used in all positions. It is especially popular for home workshops. Conforms to AWS A5.20 E-71T-GS

**USA
MADE IN**

PN: E71TGSE2
.030" - 2# SPOOL



PART NO.	SIZE
E71TGSE2	.030" - 2# SPOOL
E71TGSE2	.035" - 2# SPOOL
E71TGSE5	.035" - 10# SPOOL
E71TGSE5	.030" - 10# SPOOL
E71TGSE8	.030" - 25# SPOOL
E71TGSE8	.035" - 25# SPOOL
E71TGSE8	.045" - 10# SPOOL
E71TGSE8	.045" - 25# SPOOL
E71TGSE2POP	.030" - 2# SPOOL
E71TGSE5POP	.030" - 10# SPOOL
E71TGSE2POP	.035" - 2# SPOOL
E71TGSE5POP	.035" - 10# SPOOL
E71TGSE5POP	.045" - 10# SPOOL

DC straight polarity (DC-), No shielding gas required

WIRE SIZE	WELDING CURRENT (AMPS)	ARC VOLTAGE
.030"	40 - 100	14 - 16
.035"	100 - 130	16 - 18
.045"	140 - 160	18 - 20



MILD STEEL

TWENTY GAUGE™ METAL CORE

Twenty gauge is a metal cored welding wire with added ingredients to make it especially suited for welding very thin carbon steel sheet. Twenty Gauge is a small diameter cored wire that is perfect for the home workshop or auto body repair. Twenty Gauge was designed with the users of 120V welders in mind. It will weld on galvanized and lightly rusted steel in a wide range of thicknesses. Twenty Gauge will not burn-through on thin sheet metal. Use 75/25 (Argon/CO₂) Shielding Gas.

Features:

- No burn-through on thin sheet metal
- No slag
- No splatter
- Wide weld range of steel thickness 28 gauge to 3/16"
- Better weld appearance
- Excellent wetting
- Good tie-in
- Welds vertical down
- No cold lap

**USA
MADE IN**

PART NO.	SIZE	
TGE2	.030" - 2# SPOOL	SPECIAL ORDER
TGE3SP	.030" - 33# SPOOL	SPECIAL ORDER
TGE5	.030" - 10# SPOOL	



PN: TGE2
.030" - 2# SPOOL

DC reverse polarity (DC+), 75/25 shielding gas required

WIRE SIZE	WELDING CURRENT (AMPS)	ARC VOLTAGE
.030"	60 - 100	15 - 18

STICK ELECTRODES

6011 MILD STEEL ELECTRODES

A versatile, deep penetrating steel electrode with smooth, stable arc characteristics. It's used for the welding of mild steels, galvanized and some low alloy steels. The coating produces a forceful, spray-type arc, resulting in deep penetrating welds. The slag is thin and easily removable.

Applications:

Structural, ship building and repair, rail cars, piping, pressure vessel fittings, boilers, galvanized steel, general fabrication.

Features:

- Tensile strength - 72,900 psi
- Yield strength - up to 66,100
- Elongation in 2" - 29.6%
- All position
- Conforms to ANSI/AWS A5.1 & ASME SFA 5.1 E6011

DC reverse polarity (DC+), 75/25 shielding gas required

ELECTRODE DIAMETER	WELDING CURRENT (AMPS)	WELD POSITION
3/32"	50 - 80	FLAT
3/32"	40 - 70	VERTICAL UP & OVER HEAD
1/8"	70 - 110	FLAT
1/8"	60 - 100	VERTICAL UP & OVER HEAD
5/32"	110 - 160	FLAT
5/32"	90 - 140	VERTICAL UP & OVER HEAD

PART NO.	SIZE
60115010	3/32" x 12" - 10# PKG
6011505	3/32" x 12" - 5# PKG
60116010	1/8" x 14" - 10# PKG
6011605	1/8" x 14" - 5# PKG
60117010	5/32" - 10# PKG
6011705	5/32" - 5# PKG

Chemical Composition

C-.08%	Mn-.45%	Si-.18%	S-0.015%
P-.014%	Fe-REM		

Single values are maximum

PN: 6011705
5/32" - 5# PKG



6013 MILD STEEL ELECTRODES

A general purpose electrode for mild steel which produces a smooth, quiet, medium penetrating arc that is readily maintained with minimal spatter loss. The slag lifts easily, revealing a finely rippled bead contour. This quick freezing slag gives optimum performance in vertical-down welding. Ideally suited for general purpose welding, even with small AC power sources having low open-circuit voltage.

Applications:

Vehicles, ship building and repair, sheet metal, build-up of over machined and worn mild steel surfaces, general light fabrication.

Features:

- Tensile strength - up to 59,700 psi
- Yield strength - 67,700 psi
- Elongation in 2" - 25.6%
- All position
- Conforms to ANSI/AWS A5.1 & ASME SFA 5.1 E6013

ELECTRODE DIAMETER	WELDING CURRENT (AMPS)	WELD POSITION
3/32"	60 - 90	FLAT
3/32"	50 - 80	VERTICAL UP & OVER HEAD
1/8"	100 - 120	FLAT
1/8"	80 - 100	VERTICAL UP & OVER HEAD
5/32"	110 - 160	FLAT
5/32"	100 - 150	VERTICAL UP & OVER HEAD

PART NO.	SIZE	
60135010	3/32" - 10# PKG	
6013505	3/32" - 5# PKG	SPECIAL ORDER
60136010	1/8" - 10# PKG	
6013605	1/8" - 5# PKG	
60137010	5/32" - 10# PKG	SPECIAL ORDER
6013705	5/32" - 5# PKG	

Chemical Composition

C-.08%	Mn-.45%	Si-.18%	S-0.012%
P-.014%	Fe-REM		

Single values are maximum

PN: 6013705
5/32" - 5# PKG





7014 MILD STEEL ELECTRODES

An all position electrode for mild and low alloy steels with an iron powder covering. The iron powder yields a high deposition rate. The welds reflect smooth beads with fine ripples. It is particularly advantageous when poor fit-up exists. The slag is easily removed, often self-lifting.

Applications:

Heavy sheet metal, frames, shelving, general maintenance and fabrication.

Features:

- Tensile strength - up to 79,900 psi
- Yield strength - 67,700 psi
- Elongation in 2" - 29.4% minimum
- All position
- ANSI/AWS A5.1 & ASME SFA 5.1 E7014

Physical Properties

Density lbs/cu in .283

PART NO.	SIZE
70145010	3/32" - 10# PKG
7014505	3/32" - 5# PKG
70146010	1/8" - 10# PKG
7014605	1/8" - 5# PKG
7014705	5/32" - 5# PKG

PN: 7014505
3/32" - 5# PKG



Chemical Composition			
C-.12%	Mn-.68%	Si-.33%	S-0.012%
P-0.21%	Cr-.041%	Ni-0.053%	Mo-.002%
Cu-.012%	V-.023%	Fe-REM	
Single values are maximum			

ELECTRODE DIAMETER	WELDING CURRENT (AMPS)	WELD POSITION
3/32"	100 - 110	FLAT
3/32"	80 - 90	VERTICAL UP & OVER HEAD
1/8"	130 - 140	FLAT
1/8"	120 - 130	VERTICAL UP & OVER HEAD
5/32"	190 - 200	FLAT
5/32"	150 - 160	VERTICAL UP & OVER HEAD

7018 MILD STEEL ELECTRODES

A high deposition electrode for low and medium carbon steels. It is an efficient, iron powder, low hydrogen electrode with excellent mechanical properties; crack resistance; and X-ray quality welds. This electrode offers a quiet, stable, low penetration, spatter-free arc. The moderately heavy slag is easy to remove, revealing a bead with distinct ripples. Operator appeal is a plus factor.

Applications:

Ship hull construction, pressure vessels, boilers, piping, heavy duty equipment, general maintenance or production fabrication.

Features:

- Tensile strength - up to 79,900 psi
- Yield strength - 67,700 psi
- Elongation in 2" - 29.4% minimum
- All position
- Conforms to ANSI/AWS A5.1 & ASME SFA 5.1 E7018

PART NO.	SIZE
70185010	3/32" x 12" - 10# PKG
7018505	3/32" x 12" - 5# PKG
70186010	1/8" x 12" - 10# PKG
7018605	1/8" x 14" - 5# PKG
70187010	5/32" - 10# PKG
7018705	5/32" - 5# PKG

PN: 7018505
3/32" x 12" - 5# PKG



Chemical Composition			
C-0.08%	Mn-1.00%	Si-.60%	S-.011%
P-.021%	Fe-REM		
Single values are maximum			

ELECTRODE DIAMETER	WELDING CURRENT (AMPS)	WELD POSITION
3/32"	65 - 85	FLAT
3/32"	50 - 80	VERTICAL UP & OVER HEAD
1/8"	90 - 130	FLAT
1/8"	85 - 120	VERTICAL UP & OVER HEAD
5/32"	130 - 180	FLAT
5/32"	110 - 160	VERTICAL UP & OVER HEAD



WELDING PARAMETERS FOR CORED WIRE

ALLOY	WIRE SIZE	WELDING CURRENT (AMPS)	ARC VOLTAGE	WIRE FEED SPEED, ipm	WELD POSITION	SHIELDING GAS	WIRE STICKOUT
Flux Cored E71T-1 (C02) E71T-1M (75/25)	.035"	160	27	425	Vertical Up	C02	1/2"
	.035"	190	28	600	Horizontal	C02	1/2"
	.035"	150	26	320	Overhead	C02	1/2"
	.035"	150	25	320	Vertical Up	75 Ar / 25 C02	1/2"
	.035"	200	27	600	Horizontal	75 Ar / 25 C02	1/2"
	.035"	150	25	320	Overhead	75 Ar / 25 C02	1/2"
	.045"	210	26	300	Vertical Up	C02	5/8"
	.045"	240	29	380	Horizontal	C02	5/8"
	.045"	210	26	300	Overhead	C02	5/8"
	.045"	210	25	300	Vertical Up	75 Ar / 25 C02	5/8"
	.045"	275	27	430	Horizontal	75 Ar / 25 C02	5/8"
	.045"	210	25	300	Overhead	75 Ar / 25 C02	5/8"
	.052"	220	25	240	Vertical Up	C02	5/8"
	.052"	280	27	380	Horizontal	C02	5/8"
	.052"	215	26	240	Overhead	C02	5/8"
	.052"	210	24	240	Vertical Up	75 Ar / 25 C02	5/8"
	.052"	300	28	380	Horizontal	75 Ar / 25 C02	5/8"
	.052"	215	25	240	Overhead	75 Ar / 25 C02	5/8"
	1/16"	210	26	150	Vertical Up	C02	1/2"
1/16"	350	29	300	Horizontal	C02	1/2"	
1/16"	235	26	170	Overhead	C02	1/2"	
1/16"	240	25	170	Vertical Up	75 Ar / 25 C02	1/2"	
1/16"	350	28	300	Horizontal	75 Ar / 25 C02	1/2"	
1/16"	235	25	170	Overhead	75 Ar / 25 C02	1/2"	
Metal Cored E70C-6C E70C-6M	.035"	110	15.5 - 17	200	Vertical Up & Overhead	75 Ar / 25 C02	5/8"
	.035"	250	28	660	Horizontal	75 Ar / 25 C02	5/8"
	.045"	130	20	160	Vertical Up & Overhead	75 Ar / 25 C02	5/8"
	.045"	300	29	430	Horizontal	75 Ar / 25 C02	5/8"
	1/16"	150	17	100	Vertical Up & Overhead	75 Ar / 25 C02	3/4"
	1/16"	350	27	250	Horizontal	75 Ar / 25 C02	3/4"

STAINLESS STEEL GMAW (MIG)

Stainless Steel cut lengths and spooled wire are precisely produced to conform to the requirement of AWS A5.9. These products are subjected to rigid quality control throughout the manufacturing process with particular attention given to cleanliness, cast and helix of the finished product.

MIG 308

Most frequently used for base metals of similar composition. Used for welding metals of similar composition, especially 304.

Chemical Composition		
C-0.08%	Mn-1.0-2.5%	Si-0.30-0.65%
S-0.03%	P-0.03%	Cr-19.5-22.0%
Ni-9.0-11.0%	Mo-0.75%	Cu-0.75%
Fe-Rem		
Single values are maximum		



PN: 0030815
.025" - 10# SPOOL

PART NO.	SIZE
0030812	.025" - 2# SPOOL
0030815	.025" - 10# SPOOL
00308E2	.030" - 2# SPOOL
00308E5	.030" - 10# SPOOL
00308E8	.030" - 25# SPOOL
00308F2	.035" - 2# SPOOL
00308F5	.035" - 10# SPOOL
00308F8	.035" - 25# SPOOL
00308H8	.045" - 25# SPOOL



MIG 308L

Similar usage as 308, but the 0.03% maximum carbon content increases resistance to intergranular corrosion.

Chemical Composition		
C-0.03%	Mn-1.0-2.5%	Si-0.30-0.65%
S-0.03%	P-0.03%	Cr-19.5-22.0%
Ni-9.0-11.0%	Mo-0.75%	Cu-0.75%
Fe-Rem		
Single values are maximum		



PN: 308L15
.025" - 10# SPOOL

PART NO.	SIZE
0308L12	.025" - 2# SPOOL
0308L15	.025" - 10# SPOOL
0308L18	.025" - 25# SPOOL
0308LE2	.030" - 2# SPOOL
0308LE5	.030" - 10# SPOOL
0308LE8	.030" - 25# SPOOL
0308LF2	.035" - 2# SPOOL
0308LF5	.035" - 10# SPOOL
0308LF8	.035" - 25# SPOOL
0308LH8	.045" - 25# SPOOL
POP PART NO.	SIZE
0308L12POP	.025" - 2# S/S SPOOL
0308LE2POP	.030" - 2# S/S SPOOL
0308LF2POP	.035" - 2# S/S SPOOL
0308L15POP	.025" - 10# S/S SPOOL
0308LE5POP	.030" - 10# S/S SPOOL
0308LF5POP	.035" - 10# S/S SPOOL

MIG 308LSI

Similar usage as 308L, but the 0.65-1.00% silicon content improves wash and wetting behavior in the gas shielded welding processes.

Chemical Composition		
C-0.03%	Mn-1.0-2.5%	Si-0.65-1.00%
S-0.03%	P-0.03%	Cr-19.5-22.0%
Ni-9.0-11.0%	Mo-0.75%	Cu-0.75%
Fe-Rem		
Single values are maximum		



PN: 308LSE8
.030" - 25# SPOOL

PART NO.	SIZE
308LS12	.025" - 2# SPOOL
308LS15	.025" - 10# SPOOL
308LS18	.025" - 25# SPOOL
308LSE2	.030" - 2# SPOOL
308LSE5	.030" - 10# SPOOL
308LSE8	.030" - 25# SPOOL
308LSF2	.035" - 2# SPOOL
308LSF5	.035" - 10# SPOOL
308LSF8	.035" - 25# SPOOL
308LSH8	.045" - 25# SPOOL
308LS38	1/16" - 25# SPOOL

MIG 309

Used for welding similar alloys in wrought or cast form; occasionally used for welding 18-8 base metals when severe corrosion conditions exist, and, at times welding dissimilar steels.

Chemical Composition		
C-0.12%	Mn-1.0-2.5%	Si-0.30-0.65%
S-0.03%	P-0.03%	Cr-23.0-25.0%
Ni-12.0-14.0%	Mo-0.75%	Cu-0.75%
Fe-Rem		



PN: 00309F8
.035" - 25# SPOOL

PART NO.	SIZE
00309F8	.035" - 25# SPOOL
00309H8	.045" - 25# SPOOL

MIG 309L

Similar usage as 309, but the 0.03% maximum carbon content increases resistance to intergranular corrosion.

Used for welding similar alloys in wrought or cast form. Occasionally used for welding 18-8 base metals when severe corrosion conditions exist, and, at times, welding dissimilar steels. Packaged for portable welding machines.

Chemical Composition		
C-0.03%	Mn-1.0-2.5%	Si-0.30-0.65%
S-0.03%	P-0.03%	Cr-23.0-25.0%
Ni-12.0-14.0%	Mo-0.75%	Cu-0.75%
Fe-Rem		



PN: 0309LE5
.030" - 10# SPOOL

PART NO.	SIZE
0309LE2	.030" - 2# SPOOL
0309LE5	.030" - 10# SPOOL
0309LF2	.035" - 2# SPOOL
0309LF5	.035" - 10# SPOOL
0309LF8	.035" - 25# SPOOL
0309LH8	.045" - 25# SPOOL
POP PART NO.	SIZE
0309LE2POP	.030" - 2# S/S SPOOL
0309LF2POP	.035" - 2# S/S SPOOL
0309LE5POP	.030" - 10# S/S SPOOL
0309LF5POP	.035" - 10# S/S SPOOL



PN: 0309LE2POP
.030" - 2# SPOOL



STAINLESS STEEL GMAW (MIG)

MIG 309LSi

Similar usage as 309L, but the 0.65-1.00% silicon content improves wash and wetting behavior in the gas shielded welding processes.

Chemical Composition		
C-0.03%	Mn-1.0-2.5%	Si-0.65-1.00%
S-0.03%	P-0.03%	Cr-23.0-25.0%
Ni-12.0-14.0%	Mo-0.75%	Cu-0.75%
Fe-Rem		



PN: 309LSF8
.035" - 25# SPOOL

PART NO.	SIZE
309LSE8	.030" - 25# SPOOL
309LSF5	.035" - 10# SPOOL
309LSF8	.035" - 25# SPOOL
309LSH8	.045" - 25# SPOOL

MIG 310

For welding of base metals of similar composition.

Chemical Composition		
C-0.08-0.15%	Mn-1.0-2.5%	Si-0.30-0.65%
S-0.03%	P-0.03%	Cr-25.0-28.0%
Ni-20.2-22.5%	Mo-0.75%	Cu-0.75%
Fe-Rem		



PN: 00310F8
.035" - 25# SPOOL

PART NO.	SIZE
00310F8	.035" - 25# SPOOL
00310H8	.045" - 25# SPOOL

MIG 312

For welding of base metals of similar composition. Also used for welding dissimilar steel base metals.

Chemical Composition		
C-0.15%	Mn-1.0-2.5%	Si-0.30-0.65%
S-0.03%	P-0.03%	Cr-28.0-32.0%
Ni-8.0-10.5%	Mo-0.75%	Cu-0.75%
Fe-Rem		



PN: 00312H8
.045" - 25# SPOOL

PART NO.	SIZE
00312F8	.035" - 25# SPOOL
00312H8	.045" - 25# SPOOL

MIG 316

Usually used for welding similar alloys (containing about 2% molybdenum); also for high temperature service applications.

Chemical Composition		
C-0.08%	Mn-1.0-2.5%	Si-0.30-0.65%
S-0.03%	P-0.03%	Cr-18.0-20.0%
Ni-11.0-14.0%	Mo-2.0-3.0%	Cu-0.75%
Fe-Rem		



PN: 00316E5
.030" - 10# SPOOL

PART NO.	SIZE
00316E5	.030" - 10# SPOOL
00316F5	.035" - 10# SPOOL
00316F8	.035" - 25# SPOOL

MIG 316L

Similar usage as MIG 316 but the 0.03% maximum carbon increases resistance to intergranular corrosion. Used for welding steels alloyed with molybdenum. Packaged for portable welding machines.

Chemical Composition		
C-0.03%	Mn-1.0-2.5%	Si-0.30-0.65%
S-0.03%	P-0.03%	Cr-18.0-20.0%
Ni-11.0-14.0%	Mo-2.0-3.0%	Cu-0.75%
Fe-Rem		



PN: 0316L15
.025" - 10# SPOOL

PART NO.	SIZE
0316L12	.025" - 2# SPOOL
0316L15	.025" - 10# SPOOL
0316LE2	.030" - 2# SPOOL
0316LE5	.030" - 10# SPOOL
0316LE8	.030" - 25# SPOOL
0316LF2	.035" - 2# SPOOL
0316LF5	.035" - 10# SPOOL
0316LF8	.035" - 25# SPOOL
0316LH8	.045" - 25# SPOOL
0316L38	1/16" - 25# SPOOL



PN: 0316L12POP
.025" - 2# SPOOL

POP PART NO.	SIZE
0316L12POP	.025" - 2# S/S SPOOL
0316LE2POP	.030" - 2# S/S SPOOL
0316LF2POP	.035" - 2# S/S SPOOL
0316L15POP	.025" - 10# S/S SPOOL
0316LE5POP	.030" - 10# S/S SPOOL
0316LF5POP	.035" - 10# S/S SPOOL



MIG 316LSI

Similar usage as 316L, but the 0.65-1.00% silicon content improves wash and wetting behavior in the gas shielded welding processes.

Chemical Composition		
C-0.03%	Mn-1.0-2.5%	Si-0.65-1.00%
S-0.03%	P-0.03%	Cr-18.0-20.0%
Ni-11.0-14.0%	Mo-2.0-3.0%	Cu-0.75%
Fe-Rem		



PN: 316LS15
.025" - 10# SPOOL

PART NO.	SIZE
316LS15	.025" - 10# SPOOL
316LS18	.025" - 25# SPOOL
316LSE2	.030" - 2# SPOOL
316LSE5	.030" - 10# SPOOL
316LSE8	.030" - 25# SPOOL
316LSF2	.035" - 2# SPOOL
316LSF5	.035" - 10# SPOOL
316LSF8	.035" - 25# SPOOL
316LSH8	.045" - 25# SPOOL
316LS38	1/16" - 25# SPOOL

MIG 317L

Similar to 316L but with increased molybdenum which increases creep resistance.

Chemical Composition		
C-0.03%	Mn-1.0-2.5%	Si-0.30-0.65%
S-0.03%	P-0.03%	Cr-18.5-20.5%
Ni-13.0-15.0%	Mo-3.0-4.0%	Cu-0.75%
Fe-Rem		



PN: 0317LF8
.035" - 25# SPOOL

PART NO.	SIZE
0317LF8	.035" - 25# SPOOL

MIG 347

A columbium (niobium) stabilized alloy. The columbium increases resistance to intergranular corrosion.

Chemical Composition		
C-0.08%	Mn-1.0-2.5%	Si-0.30-0.65%
S-0.03%	P-0.03%	Cr-19.0-21.5%
Ni-9.0-11.0%	Mo-0.75%	Nb&Ta-10xCmin-1.0max
Cu-0.75%		
Fe-Rem		



PN: 00347E8
.030" - 25# SPOOL

PART NO.	SIZE
00347E8	.030" - 25# SPOOL
00347F8	.035" - 25# SPOOL
00347H8	.045" - 25# SPOOL

MIG 410

Used for welding alloys of similar compositions; also for overlays on carbon steels to resist corrosion, erosion or abrasion. Usually requires preheat and postheat treatments.

Chemical Composition		
C-0.12%	Mn-0.6%	Si-0.5%
S-0.03%	P-0.03%	Cr-11.5-13.5%
Ni-0.6%	Mo-0.75%	Cu-0.75%
Fe-Rem		



PN: 00410F8
.035" - 25# SPOOL

PART NO.	SIZE
00410F8	.035" - 25# SPOOL
00410H8	.045" - 25# SPOOL



STAINLESS STEEL FLUX CORED

STAINLESS FLUXCORE

Harris Products Group's flux cored stainless wires are precisely formulated for all position versatility with a smooth arc, good wetting and overall operator appeal. Products conform to AWS Specification A5.22

E308LT1-1

Is most frequently used for base metals of similar composition such as AISI Types 301, 302, 304, 305 and 308.



PN: 308LFCH8
.045" - 25# SPOOL

PART NO.	SIZE
308LFCF5	.035" - 10# SPOOL
308LFCF8	.035" - 25# SPOOL
308LFCH8	.045" - 25# SPOOL
308LFC38	1/16" - 25# SPOOL

Product	Chemical Composition					
E308LT1-1	C-0.04%	Mn-0.5-2.5%	Si-1%	S-0.03%	P-0.04%	Cr-18.0-21.0%
	Ni-9.0-11.0%	Mo-0.5%	Cu-0.5%	Fe-Rem		

E309LT1-1

Is most frequently used for welding similar alloys in wrought or cast form; occasionally, to weld Type 304 base metals when severe corrosion conditions exist; and, at times, welding dissimilar steels.



PN: 309LFCF8
.035" - 25# SPOOL

PART NO.	SIZE
309LFCF8	.035" - 25# SPOOL
309LFCH8	.045" - 25# SPOOL
309LFC38	1/16" - 25# SPOOL

Product	Chemical Composition					
E309LT1-1	C-0.04%	Mn-0.5-2.5%	Si-1%	S-0.03%	P-0.04%	Cr-22.0-25.0%
	Ni-12.0-14.0%	Mo-0.5%	Cu-0.5%	Fe-Rem		

E316LT1-1

Is most frequently used for welding similar alloys (containing about 2% molybdenum); also for high temperature service applications (the presence of molybdenum provides increased creep resistance at elevated temperatures).



PN: 316LFCH8
.045" - 25# SPOOL

PART NO.	SIZE
316LFCF8	.035" - 25# SPOOL
316LFCH8	.045" - 25# SPOOL

Product	Chemical Composition					
E316LT1-1	C-0.04%	Mn-0.5-2.5%	Si-1%	S-0.03%	P-0.04%	Cr-17.0-20.0%
	Ni-11.0-14.0%	Mo-2.0-3.0%	Cu-0.5%	Fe-Rem		



TIG 308

Most frequently used for base metals of similar composition.

Chemical Composition		
C-0.08%	Mn-1.0-2.5%	Si-0.30-0.65%
S-0.03%	P-0.03%	Cr-19.5-22.0%
Ni-9.0-11.0%	Mo-0.75%	Cu-0.75%
Fe-Rem		



PN: 0308T30
1/16" x 36" - 10# PKG

PART NO.	SIZE
0308TE0	.030" x 36" - 10# PKG
0308TF0	.035" x 36" - 10# PKG
0308TH0	.045" x 36" - 10# PKG
0308T30	1/16" x 36" - 10# PKG
0308T50	3/32" x 36" - 10# PKG
0308T60	1/8" x 36" - 10# PKG
0308T70	5/32" x 36" - 10# PKG
0308T80	3/16" x 36" - 10# PKG
POP PART NO.	SIZE
0308T305POP	1/16" x 36" - 5# PKG

TIG 308L

Similar usage as 308, but the 0.03% maximum carbon content increases resistance to intergranular corrosion.

Chemical Composition		
C-0.03%	Mn-1.0-2.5%	Si-0.30-0.65%
S-0.03%	P-0.03%	Cr-19.5-22.0%
Ni-9.0-11.0%	Mo-0.75%	Cu-0.75%
Fe-Rem		



PN: 308LT30
.045" x 36" - 10# PKG

PART NO.	SIZE
308LTE0	.030" x 36" - 10# PKG
308LTF0	.035" x 36" - 10# PKG
308LTH0	.045" x 36" - 10# PKG
308LT30	1/16" x 36" - 10# PKG
308LT50	3/32" x 36" - 10# PKG
308LT60	1/8" x 36" - 10# PKG
308LT70	5/32" x 36" - 10# PKG
308LT80	3/16" x 36" - 10# PKG
POP PART NO.	SIZE
308LT300POP	1/16" x 36" - 1# PKG
308LT500POP	3/32" x 36" - 1# PKG
308LT600POP	1/8" x 36" - 1# PKG
308LT303POP	1/16" x 36" - 3# PKG
308LT503POP	3/32" x 36" - 3# PKG
308LT603POP	1/8" x 36" - 3# PKG
308LT505POP	3/32" x 36" - 5# PKG

TIG 308LSi

Similar usage as the above, but the 0.65-1.00% silicon content improves wash and wetting behavior in the GTAW welding process.

Chemical Composition		
C-0.03%	Mn-1.0-2.5%	Si-0.65-1.0%
S-0.03%	P-0.03%	Cr-19.5-22.0%
Ni-9.0-11.0%	Mo-0.75%	Cu-0.75%
Fe-Rem		



PN: 308ST50
3/32" x 36" - 10# PKG

PART NO.	SIZE
308ST30	1/16" x 36" - 10# PKG
308ST50	3/32" x 36" - 10# PKG
308ST60	1/8" x 36" - 10# PKGS
POP PART NO.	SIZE
308ST3011POP	1/16" x 36" S/S - 1# PKG
308ST5011POP	3/32" x 36" S/S - 1# PKG
308ST6011POP	1/8" x 36 S/S - 1# PKG

TIG 309

Used for welding similar alloys in wrought or cast form; occasionally used for welding 18-8 base metals when severe corrosion conditions exist; and, at times, welding dissimilar steels.

Chemical Composition		
C-0.12%	Mn-1.0-2.5%	Si-0.30-0.65%
S-0.03%	P-0.03%	Cr-23.0-25%
Ni-12.0-14.0%	Mo-0.75%	Cu-0.75%
Fe-Rem		



PN: 0309T50
3/32" x 36" - 10# PKG

PART NO.	SIZE
0309T30	1/16" x 36" - 10# PKG
0309T50	3/32" x 36" - 10# PKG
0309T60	1/8" x 36" - 10# PKG

TIG 309L

The 309L grade is similar to 309 except for the lower carbon content, (.03% maximum) which reduces the possibility of carbide precipitation which can cause weld corrosion.

Chemical Composition		
C-0.03%	Mn-1.0-2.5%	Si-0.30-0.65%
S-0.03%	P-0.03%	Cr-23.0-25.0%
Ni-12.0-14.0%	Mo-0.75%	Cu-0.75%
Fe-Rem		



PN: 309LT30
.045" x 36" - 10# PKG

PART NO.	SIZE
309LTH0	.045" X 36" - 10# PKG
309LT30	1/16" x 36" - 10# PKG
309LT50	3/32" x 36" - 10# PKG
309LT60	1/8" x 36" - 10# PKG
309LT70	5/32" x 36" - 10# PKG
POP PART NO.	SIZE
309LT303POP	1/16" x 36" - 3# PKG
309LT503POP	3/32" x 36" - 3# PKG
309LT603POP	1/8" x 36" - 3# PKG



STAINLESS STEEL GTAW (TIG)

TIG 310

Most frequently used to weld base metals of similar composition.

Chemical Composition		
C-.08-.15%	Mn-1.0-2.5%	Si-.30-.65%
S-.03%	P-.03%	Cr-25.0-28%
Ni-20.0-22.5%	Mo-.75%	Cu-.75%
Fe-Rem		



PN: 0310T30
1/16" x 36"

PART NO.	SIZE
0310T30	1/16" x 36" - 10# PKG
0310T50	3/32" x 36" - 10# PKG

TIG 312

Most frequently used to weld base metals of similar composition. Also good for welding dissimilar steels.

Chemical Composition		
C-.15%	Mn-1.0-2.5%	Si-.30-.65%
S-.03%	P-.03%	Cr-28.0-32%
Ni-8.0-10.5%	Mo-.75%	Cu-.75%
Fe-Rem		



PN: 0312T30
1/16" x 36" - 10# PKG

PART NO.	SIZE
0312T30	1/16" x 36" - 10# PKG
0312T50	3/32" x 36" - 10# PKG
0312T60	1/8" x 36" - 10# PKG
0312TH0	.045" x 36" - 10# PKG

TIG 316

Usually used for welding similar alloys (containing about 2% molybdenum); also for high temperature service applications.

Chemical Composition		
C-.08%	Mn-1.0-2.5%	Si-.30-.65%
S-.03%	P-.03%	Cr-18.0-20.0%
Ni-11.0-14.0%	Mo-.75%	Cu-.75%
Fe-Rem		



PN: 0316T30
1/16" x 36" - 10# PKG

PART NO.	SIZE
0316TH0	.045" x 36" - 10# PKG
0316T30	1/16" x 36" - 10# PKG
0316T50	3/32" x 36" - 10# PKG
0316T60	1/8" x 36" - 10# PKG

TIG 316L

Used principally for welding molybdenum-bearing austenitic alloys containing 0.03% maximum carbon.

Chemical Composition		
C-.03%	Mn-1.0-2.5%	Si-.30-.65%
S-.03%	P-.03%	Cr-18.0-20.0%
Ni-11.0-14.0%	Mo-2.0-3.0%	Cu-.75%
Fe-Rem		



PN: 316LTE0
.030" x 36"

PART NO.	SIZE
316LTE0	.030" x 36" - 10# PKG
316LTF0	.035" x 36" - 10# PKG
316LTH0	.045" x 36" - 10# PKG
316LT30	1/16" x 36" - 10# PKG
316LT50	3/32" x 36" - 10# PKG
316LT60	1/8" x 36" - 10# PKG
316LT70	5/32" x 36" - 10# PKG
316LT80	3/16" x 36" - 10# PKG



PN: 316LT303POP
1/16" x 36" - 3# PKG

POP PART NO.	SIZE
316LT303POP	1/16" x 36" - 3# PKG
316LT503POP	3/32" x 36" - 3# PKG
316LT603POP	1/8" x 36" - 3# PKG

TIG 316LSI

Similar usage as 316L, but the 0.65-1.00% silicon content improves wash and wetting behavior in the gas shielded welding processes.

Chemical Composition		
C-.03%	Mn-1.0-2.5%	Si-.65-1.0%
S-.03%	P-.03%	Cr-18.0-20.0%
Ni-11.0-14.0%	Mo-2.0-3.0%	Cu-.75%
Fe-Rem		



PN: 316ST50
3/32" x 36"

PART NO.	SIZE
316ST30	1/16" x 36" - 10# PKG
316ST50	3/32" x 36" - 10# PKG
316ST60	1/8" x 36" - 10# PKG
POP PART NO.	SIZE
316ST3011POP	1/16" x 36" S/S - 1# PKG
316ST5011POP	3/32" x 36" S/S - 1# PKG
316ST6011POP	1/8" x 36" S/S - 1# PKG

TIG 317L

The alloy content is somewhat higher than for ER316, particularly in molybdenum. The 0.03% maximum carbon content increases resistance to intergranular corrosion due to carbide precipitation. Severe corrosion resistance to sulfuric and sulfurous acids and their salts.

Chemical Composition		
C-.03%	Mn-1.0-2.5%	Si-.30-.65%
S-.03%	P-.03%	Cr-18.5-20.5%
Ni-13.0-15.0%	Mo-3.0-4.0%	Cu-.75%
Fe-Rem		



PN: 317LT70
5/32" x 36" - 10# PKG

PART NO.	SIZE
317LT30	1/16" x 36" - 10# PKG
317LT50	3/32" x 36" - 10# PKG
317LT60	1/8" x 36" - 10# PKG
317LT70	5/32" x 36" - 10# PKG



TIG 347

A niobium (columbium) stabilized alloy. The niobium increases resistance to intergranular corrosion.

Chemical Composition		
C-.08%	Mn-1.0-2.5%	Si-.30-.65%
S-.03%	P-.03%	Cr-19.0-21.5%
Ni-9.0-11.0%	Mo-.75%	Nb&Ta-10xCmin-1.0max
Cu-.75%	Fe-Rem	



PN: 0347TH0
.045" x 36" - 10# PKG

PART NO.	SIZE
0347TF0	.035" x 36" - 10# PKG
0347TH0	.045" x 36" - 10# PKG
0347T30	1/16" x 36" - 10# PKG
0347T50	3/32" x 36" - 10# PKG
0347T60	1/8" x 36" - 10# PKG

TIG 410

Used for welding alloys of similar compositions; also for overlays on carbon steels to resist corrosion, erosion or abrasion. Usually requires preheat and postheat treatments.

Chemical Composition		
C-.12%	Mn-.6%	Si-.5%
S-.03%	P-.03%	Cr-11.5-13.5%
Ni-.6%	Mo-.75%	Cu-.75%
Fe-Rem		



PN: 0410T50
3/32" x 36" - 10# PKG

PART NO.	SIZE
0410T30	1/16" x 36" - 10# PKG
0410T50	3/32" x 36" - 10# PKG

ER630 (17-4PH)

The composition of this filler metal is designed primarily for welding ASTM A 564 Type 630 and some other precipitation - hardening stainless steels.

Chemical Composition		
C-.05%	Mn-.25-.75%	Si-.75%
S-.03%	P-.03%	Cr-16.0-16.75%
Ni-4.5-5.0%	Mo-.75%	Nb&Ta-15-0.30
Cu-3.25-4.00%	Fe-Rem	



PN: 174PH30
1/16" x 36"

PART NO.	SIZE
174PH30	1/16" x 36" - 10# PKG
174PH50	3/32" x 36" - 10# PKG

STAINLESS STEEL ELECTRODES

308L STAINLESS ELECTRODES

Applications:

Similar usage as 308, but the 0.04% maximum carbon content increases resistance to intergranular corrosion. Conforms to AWS A5.4.

Chemical Composition		
C-.04%	Mn-.5-2.5%	Si-.9%
S-.03%	P-.04%	Cr-18.0-21.0%
Ni-9.0-11.0%	Mo-.75%	Cu-.75%
Fe-Rem		



PN: 308L630
1/16" x 10 - 5# PKG

PART NO.	SIZE
308L630	1/16" x 10" - 5# PKG
308L650	3/32" x 12" - 10# PKG
308L660	1/8" x 14" - 10# PKG
308L670	5/32" x 14" - 10# PKG
308L680	3/16" x 14" - 10# PKG

309 STAINLESS ELECTRODES

Applications:

Used for welding similar alloys in wrought or cast form; occasionally used for welding Type 304 and similar base metals when severe corrosion conditions exist; and, at times, welding dissimilar steels. Conforms to AWS A5.4.

Chemical Composition		
C-.15%	Mn-.5-2.5%	Si-.9%
S-.03%	P-.04%	Cr-22.0-25.0%
Ni-12.0-14.0%	Mo-.75%	Cu-.75%
Fe-Rem		



PN: 3091650
3/32" x 12" - 10# PKG

PART NO.	SIZE
3091650	3/32" x 12" - 10# PKG
3091660	1/8" x 14" - 10# PKG
3091670	5/32" x 14" - 10# PKG



STAINLESS STEEL ELECTRODES

309L STAINLESS ELECTRODES

Applications:

Similar usage as 309, but the 0.04% maximum carbon content increases resistance to intergranular corrosion. Conforms to AWS A5.4.

Chemical Composition		
C-.04%	Mn-.5-2.5%	Si-.9%
S-.03%	P-.04%	Cr-22.0-25.0%
Ni-12.0-14.0%	Mo-.75%	Cu-.75%
Fe-Rem		



PN: 309L650
3/32" x 12" - 10# PKG

PART NO.	SIZE
309L650	3/32" x 12" - 10# PKG
309L660	1/8" x 14" - 10# PKG
309L670	5/32" x 14" - 10# PKG

310 STAINLESS ELECTRODES

Applications:

Most frequently used to weld base metals of similar composition. Conforms to AWS A5.4.

Chemical Composition		
C-.08%	Mn-1.0-2.5%	Si-.75%
S-.03%	P-.04%	Cr-25.0-28.0%
Ni-20.0-22.5%	Mo-.75%	Cu-.75%
Fe-Rem		



PN: 3101660
1/8" x 14" - 10# PKG

PART NO.	SIZE
3101650	3/32" x 12" - 10# PKG
3101660	1/8" x 14" - 10# PKG
3101670	5/32" x 14" - 10# PKG
3101680	3/16" x 14" - 10# PKG

312 STAINLESS ELECTRODES

Applications:

Most frequently used to weld cast alloys of similar composition and to weld dissimilar steels. Conforms to AWS A5.4.

Chemical Composition		
C-.15%	Mn-.5-2.5%	Si-.9%
S-.03%	P-.04%	Cr-28.0-32.0%
Ni-8.0-10.5%	Mo-.75%	Cu-.75%
Fe-Rem		



PN: 3121650
3/32" x 12" - 10# PKG

PART NO.	SIZE
3121650	3/32" x 12" - 10# PKG
3121660	1/8" x 14" - 10# PKG
3121670	5/32" x 14" - 10# PKG

316L STAINLESS ELECTRODES

Applications:

Used principally for welding molybdenum - bearing austenitic alloys containing 0.03% maximum carbon. Conforms to AWS A5.4.

Chemical Composition		
C-.04%	Mn-.5-2.5%	Si-.9%
S-.03%	P-.04%	Cr-17.0-20.0%
Ni-11.0-14.0%	Mo-2.0-3.0%	Cu-.75%
Fe-Rem		



PN: 316L630
1/16" x 10" - 5# PKG

PART NO.	SIZE
316L630	1/16" x 10" - 5# PKG
316L650	3/32" x 12" - 10# PKG
316L660	1/8" x 14" - 10# PKG
316L670	5/32" x 14" - 10# PKG
316L680	3/16" x 14" - 10# PKG

347 STAINLESS ELECTRODES

Applications:

A stabilized 18-8, 19-9 alloy that is not subject to intergranular corrosion due to carbide precipitation. Conforms to AWS A5.4.

Chemical Composition		
C-.08%	Mn-.5-2.5%	Si-.90%
S-.03%	P-.04%	Cr-18.0-21.0%
Ni-9.0-11.0%	Mo-.75%	Cb&Ta-8xCmin-1.00max
Cu-.75%	Fe-Rem	



PART NO.	SIZE
3471650	3/32" x 12" - 10# PKG

410 STAINLESS ELECTRODES

Applications:

Used for welding alloys of similar compositions; also for surfacing of carbon steels to resist corrosion, erosion or abrasion. Usually requires preheat and postheat treatments. Conforms to AWS A5.4.

Chemical Composition		
C-.12%	Mn-1%	Si-.9%
S-.03%	P-.04%	Cr-11.0-13.5%
Ni-.7%	Mo-.75%	Cu-.75%
Fe-Rem		



PART NO.	SIZE
4101660	1/8" x 14" - 10# PKG

STAINLESS STEEL FILLER METAL SELECTOR GUIDE



BASE METAL GRADE	442	430F	430	501	416	403	321	317	316L	316	314	310	309	304L	303	201	MILD STEEL
	446	430 FSE	431	502	418 SE	405 410 420 414	348 347					310S	309S		303 SE	202 301 302 302B 304 305 308	
201-202-301 302-302B-304 305-308	310 312 309	310 312 309	310 312 309	310 312 309	309 310 312	309 310 312	308	308	308	308	308	308	308	308	308	308	312 310 309
303 303SE	310 309 312	310 309 312	310 309 312	310 309 312	309 310 312	309 310 312	308	308	308	308	308	308	308	308	312 308-15	308	312 310 309
304L	310 309 312	310 309 312	310 309 312	310 309 312	309 310 312	309 310 312	308	308	308L	308	308	308	308	308L	308	308	312 310 309
309 309S	310 309 312	310 309 312	310 309 312	310 309 312	309 310 312	309 310 312	308	317 316 309	316	316	309	309	308	308	308	308	309 310 312
310 310S	310 309 312	310 309 312	310 309 312	310 309 312	310 309 312	310 309 312	309	317 316 309	316	316	310	310	309 310	309	309	309	310 309 312
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316	310 309 312	310 309 312	310 309 312	310 309 312	309 310 312	309 310 312	308	316	316	316	309 310 316	310 309 316	309 310 316	309 316	309 316	309 316	309 310 312
316L	310 309 312	310 309 312	310 309 312	310 309 312	310 309 312	310 309 312	308	316 317 308	316L	316	309 310 316	310 309 316	316 309	308 316	308 316	308 316	308 310 312
317	310 309 312	310 309 312	310 309 312	310 309 312	309 310 312	309 310 312	308	317	316 308	316 308	309 310 317	317 316 309	317 316 317	308 316 317	308 316 317	308 316 317	309 310 312
321 348 347	310 309 312	310 309 312	310 309 312	310 309 312	309 310 312	309 310 312	347 308	308 347	347 308	347 308	309 310 347	347 308	347 308L	347 308	347 308	347 308	309 310 312
403-405 410-420 414	310 309 312	310 309 312	310 309 312	310 309 312	309 310	410* 309**	309 310	309 310	309 310	309 310	310 309	310 309	309 310	309 310	309 310	309 310	309 310 312
416 416SE	310 309	310 309	310 309	310	410* 309** 310**	309 310 310**	309 310 312	309 310 312	309 310 312	309 310 312	309 310 312	310 309 312	309 310 312	309 310 312	309 310 312	309 310 312	309 310 312
501 502	310	310	310	502* 310**	310	310	310 309	310 309	310 309	310 309	310 309	310 309	310 309	310 309	310 309	310 309	310 312 309
430 431	310 309	310 309	430 310** 309**	310	310	310 309	310 309	310 309	310 309	310 309	310 309	310 309	310 309	310 309	310 309	310 309	310 309 312
430F 430FSE	310 309	410* 309	310 309	310 309	310 309 312	310 309 312	309 310 312	309 310 312	310 309 312	310 309 312	310 309 312	310 309 312	310 309 312	310 309 312	310 309 312	310 309 312	310 309 312
442 446	309 310	309 310 312	310 309 312	310 309 312	310 309 312	310 309 312	310 309 312	310 309 312	310 309 312	310 309 312	310 309 312	310 309 312	310 309 312	310 309 312	310 309 312	310 309 312	310 309 312

*Preheat

** No Preheat Necessary

The first numbers indicated first choice, subsequent numbers indicate second and third choice. This choice can vary with specific applications and individual job requirements.



WELDING PARAMETERS FOR STAINLESS STEEL

GTAW (TIG)

Argon is suggested for most GTAW (TIG) welding applications.

For Oxy-Acetylene welding, employ a neutral flame and use Stainflux

MATERIAL THICKNESS	WIRE SIZE	WELDING CURRENT (AMPS)	GAS CUP	ARGON, cfh	TUNGSTEN, THORIATED
1/16"	1/16"	80 - 120	3/8"	20	1/16"
3/32"	1/16"	100 - 130	3/8"	20	1/16"
1/8"	1/16"	120 - 150	7/16"	20	3/32"
3/16"	3/32"	150 - 250	7/16"	25	3/32"
1/4"	1/8"	200 - 350	1/2"	25	1/8"
1/2"	1/8"	235 - 375	1/2"	25	1/8"

GMAW (MIG), Short Circuit Transfer: 90% Helium + 7.5% Argon + 2.5% CO₂ has no effect on corrosion resistance; provides small heat-affected zone; no undercutting; and minimum distortion.

WIRE SIZE	WELDING CURRENT (AMPS)	ARC VOLTAGE	WIRE FEED SPEED, IPM
.030"	60-125	17-22	150-430
.035"	75-160	17-22	120-400
.045"	100-200	17-22	100-240

GMAW (MIG), Spray Transfer: 99% Argon - 1% Oxygen is predominantly used. This mixture improves arc stability; produces more fluid and controllable weld puddle with good bead contour. Undercutting is minimized on heavier sections. 98% Argon - 2% Oxygen provides better arc stability and welding speed than the 1% Oxygen mixture for thinner stainless steel materials.

WIRE SIZE	WELDING CURRENT (AMPS)	ARC VOLTAGE	WIRE FEED SPEED, IPM
.030"	160-225	24-28	440-650
.035"	180-300	24-29	430-500
.045"	200-450	24-30	220-400
1/16"	220-500	24-32	110-210
3/32"	250-600	24-32	50-80

FCAW

WIRE DIA.	WELD POSITION	TYPE OF JOINT	PLATE THICKNESS	AMPERAGE	VOLTAGE
.035"	Flat	Butt	1/8"	70-90	25-27
.035"	Flat	Butt	1/4"	120-130	26-29
.035"	Flat	Fillet	1/4"	110-130	26-29
.035"	Vertical Up	Butt & Fillet	3/8"	70-90	22-25
.035"	Horizontal	Butt	3/32"	100-120	24-27
.035"	Overhead	Fillet	3/8"	150-200	26-28
.045"	Flat	Butt	1/4"	180-200	29-32
.045"	Flat	Fillet	3/8"	170-200	28-32
.045"	Vertical Up	Butt & Fillet	3/8"	110-140	21-24
.045"	Horizontal	Butt	1/4"	150-180	26-30
.045"	Overhead	Fillet	3/8"	150-180	26-30
1/16"	Flat	Butt	1/4"	210-220	27-30
1/16"	Flat	Fillet	3/8"	220-250	27-31
1/16"	Vertical Up	Butt & Fillet	3/8"	130-160	21-24
1/16"	Horizontal	Butt	1/4"	150-200	27-30
1/16"	Overhead	Fillet	3/8"	150-200	27-30

Shielding gases for stainless steel flux cored welding wires:

HPG's flux cored stainless wires can be used with 100% CO₂ or a mixture of 75% Argon and 25% CO₂. Higher concentrations of Argon are sometimes used, but the wire has been qualified in 100% CO₂ and 75/25 only. If higher percentages of Argon are used, qualification would be required by the user. Argon mixtures offer a smoother arc and greater operator appeal.



NIC-L-WELD 59 ELECTRODES

Nickel-Iron alloy electrode (AC-DC). A general purpose, nickel-iron electrode for production, salvage and repair of all cast irons.

Procedure:

- Use AC or DC reverse polarity
- Vee out cracks
- Preheat heavy castings to approximately 400°F for best results
- Direct the arc upon deposited metal with the electrode at a slight angle in the direction of travel
- Lightly peen between passes and use a skip or back-step welding technique. Allow casting to cool slowly

Features:

- Conforms to AWS A5.15, ENiFeCl
- Close color match
- Good machinability

Classification	Chemical Composition							
ENi-Cl	C-2.0%	Mn-2.5%	Si-4.0%	S-0.03%	Ni-85min	Cu-2.5%	Al-1.0%	Fe-8.0%
ENi-Cl-A	C-2.0%	Mn-2.5%	Si-4.0%	S-0.03%	Ni-85min	Cu-2.5%	Al-1.0-3.0%	Fe-8.0%
ENiFe-Cl	C-2.0%	Mn-2.5%	Si-4.0%	S-0.03%	Ni-45-60%	Cu-2.5%	Al-1.0%	Fe-Rem

Application:

NIC-L-WELD 59 is suited to joining, filling and buildup of gray and alloyed cast irons. It can be used for fabrication and repair of pump housings, valves, castings, cast and malleable fittings, and for general repair of all cast irons. Deposits are machinable and have high strength.



PN: NLW5960
1/8" - 10# PKG

PART NO.	SIZE
NLW5950	3/32" - 10# PKG
NLW5960	1/8" - 10# PKG
NLW5970	5/32" - 10# PKG
NLW5980	3/16" - 10# PKG

WIRE SIZE	WELDING CURRENT (AMPS)
3/32"	50 - 80
1/8"	80 - 120
5/32"	110 - 140
3/16"	130 - 170

99 NICKEL (TIG)

GTAW alloy for cast iron. General purpose, high nickel alloy electrode for production and repair of cast iron.

Procedure:

- AC or DC reverse or straight polarity
- Hold a short arc
- Clean the weld area
- Run stringer beads
- Bevel breaks and cracks
- Skip or back-step weld
- Bevel deep enough so the first pass ties
- Peen to relieve stresses in the bottom of the crack
- Slow cool
- Preheating is typically not necessary
- Preheat heavy sections to approximately 400°F

Features:

- Excellent machinability
- All position
- Close color match

Chemical Composition				
C-3.00-3.50%	Mn-0.60-0.75%	Si-2.75-3.00%	S-0.10max%	
P-0.50-0.75	Ni-85min	Cu-2.5	Al-1.0	Other-1.0

Application:

Has excellent compatibility for cast iron. It yields clean, strong, ductile, easy machined deposits. The arc has the quiet stability provided by the inert gas process. 99 offers a smooth, even bead contour for joining, buildup and cladding. It can also be used for joining cast iron to steel.



PN: NI99T60
1/8" X 36" - 5# PKG

PART NO.	SIZE
NI99T30	1/16" x 36" - 5# PKG
NI99T50	3/32" x 36" - 5# PKG
NI99T60	1/8" x 36" - 5# PKG

WIRE SIZE	WELDING CURRENT (AMPS)
3/32"	30 - 70
1/8"	70 - 110

NIC-L-WELD 99 ELECTRODES (AC-DC)

A general purpose, high nickel electrode for production and repair of cast iron.

Procedure:

- Use AC or DC reverse or straight polarity. Clean the weld area
- Bevel breaks and cracks deep enough so the first pass ties in the bottom of the crack
- In most cases, preheating is not necessary, but heavy sections should be preheated to approximately 400°F
- Use a short arc. Stringer beads are recommended
- Skip or back-step weld and peen to relieve stresses. Allow the casting to cool slowly

Features:

- Conforms to AWS A5.15, ENiCl
- Close color match
- Excellent machinability

Chemical Composition				
C-2.0%	Mn-2.5%	Si-4.0%	S-0.03%	Fe-8.0

Application:

NIC-L-WELD 99 is for building up, joining, filling holes, breaks and cracks in all types of cast iron. It has very good out-of-position welding characteristics. Parts are frequently repaired without dismantling.



PN: NLW9960
1/8" - 10# PKG

PART NO.	SIZE
NLW9950	3/32" - 10# PKG
NLW9960	1/8" - 10# PKG
NLW9970	5/32" - 10# PKG
NLW9980	3/16" - 10# PKG

WIRE SIZE	WELDING CURRENT (AMPS)
3/32"	30 - 70
1/8"	70 - 110
5/32"	90 - 130
3/16"	110 - 160



SUPER MISSILEWELD

The ultimate electrode for welding steels with highest strength and maximum ductility (AC/DC) Assures non-cracking welds on "problem" steels such as high carbon steels; tool steels; stainless steels; spring steels; manganese steels; and dissimilar steels. Super Missileweld is particularly advantageous when the alloy content of the steel to be welded is known. This unique electrode is so versatile that its applications are virtually too multiple in number to specify. For years, it has been a maintenance and repair "stand-by" in every industry throughout the world.

Procedure:

- Use either AC or DC reverse polarity
- Clean weld area
- Bevel heavy sections
- For high carbon steels, a preheat of 400°F is recommended
- Hold a short arc
- Run stringer beads
- Peening will help relieve stresses
- Let each pass cool and slag will peel off easily

Features:

- Tensile strength - 108,000 psi
- Yield strength - 76,000 psi
- Reduction of area - 30%
- Charpy V notch - 75 ft/# @ room temperature
- Rockwell B hardness - 93 - 102 HRB
- Brinell hardness - 200 - 300 HB
- Elongation - 24%
- Frictional resistance - Excellent
- Abrasive resistance - Mild
- Will not respond to heat treatment

3SMW

A gas tungsten arc (TIG) form of Super Missileweld used for joining or overlay on a variety of ferrous metals.

PART NO.	SIZE
03SMW30	1/16" x 36" - 10# PKG
03SMW50	3/32" x 36" - 10# PKG
03SMW60	1/8" x 36" - 10# PKG
ULSMW60	1/8" x 14" - 10 PKG

WIRE SIZE	WELDING CURRENT (AMPS)
1/16"	800 - 120
3/32"	100 - 130
1/8"	120 - 150



PN: 03SMW30
1/16" x 36" - 10# PKG

PART NO.	SIZE
00SMW50	3/32" - 5# PKG
00SMW60	1/8" - 10# PKG
00SMW70	5/32" - 10# PKG



PN: 00SMW50
3/32" - 5# PKG

17 , 17FC

A high strength, thin flowing, Nickel silver brazing steel. Used in some cast iron, maintenance, and repair applications where close fitting joints are used. Used on drill bits and drill bit extensions, tubular steel, furniture repairs, milling cutters, and broaches. A substitute for silver braze alloys in high temperature applications.

Procedure:

- Clean braze area
- HARRIS 17 is usually used for a butt joint with little preparation except cleaning and grinding the surface
- Bevel heavier sections
- Use a neutral flame
- Hold the flame cone close to the joining area
- Use HARRIS 17 FLUX
- Remove flux residue with a wire brush and hot water

Features:

- Tensile strength - Up to 95,000 psi
- Solidus - 1690°F
- Liquidus - 1715°F
- Color - silvery

PART NO.	SIZE
0001730	1/16" x 18" - 5# PKG
017FC60	1/8" x 18" - 5# PKG



PN: 017FC60
1/8" x 18" - 5# PKG
17FC N/S Green



65 NICKEL IRON ELECTRODES

Premium nickel-iron alloy electrode (AC-DC). For gray and alloyed cast iron. 65 Nickel is for the repair of all types of cast iron. It yields dense, strong, yet totally machinable deposits. It is ideal for the repair of "Meehanite", "Ni-Resist", ductile iron and for the joining of cast iron to steel. Typical applications embody the repair of castings, housings, gear teeth, motor, machine bases, etc.

Procedure:

- Use AC or DC reverse polarity with a short arc. Prepare the weld joint by cleaning and beveling as required
- Use HARRIS CHAMFER ARC for grooving. Tack weld cracks and drill small holes at each end of cracks to stop further cracking
- Generally, preheating is not necessary, particularly on thin sections; however, preheat of 400°F - 500°F is suggested in the welding of heavier castings
- Stringer beads are preferred; however, slight weaving may be used
- Skip or back-step weld. Short deposits no longer than 1 1/2" are recommended
- Peen each bead while still hot to stress relieve. Allow casting to cool slowly

Features:

- Tensile strength - Up to 72,000 psi
- Spatter free, high-density, ductile deposits
- Good machinability - BHN 190-220
- Thin sections - Alternate choice
- Multiple passes - First choice
- Welding under restraint - First choice
- Close color match
- Ductility - First choice
- Thick sections - First choice
- Cast iron to steel - First choice

PART NO.	SIZE
0006550	3/32" - 5# PKG
0006560	1/8" - 5# PKG
0006570	5/32" - 5# PKG

WIRE SIZE	WELDING CURRENT (AMPS)
3/32"	30 - 70
1/8"	50 - 100
5/32"	75 - 125



PN: 0006550
3/32" - 5# PKG

Chemical Composition			
C-3.00-3.50%	Mn-0.60-0.75%	Si-2.75-3.00%	S-0.10max%
P-0.50-0.75	Ni-85min	Cu-2.5	Al-1.0
Other-1.0			

111 KASTWELD

A square oxy-fuel, high quality, low cost, cast iron welding rod. A precisely balanced ratio of silicon and carbon assures a fluid weld metal deposit with similar physical properties to gray cast iron. Kastweld deposits are easily machined and closely match the color of the base metal. It is excellent for cast iron fabrication; repairing foundry defects; and for filling in or building up new or worn castings. Conforms to AWS A5.15 grade RCI

Procedure:

- Adjust torch to a neutral flame
- Puddle the molten metal with flame to eliminate porosity
- Play the torch back over the welded area when finished to relieve strain
- Slow cool

Features:

- Fluid weld metal deposit
- Physical properties similar to gray cast iron
- Excellent machinability
- Color match

PART NO.	SIZE
0011180	3/16" - 50# SPECIAL ORDER
0011190	1/4" - 50#



PN: 0011190
1/4" RCI SPEC

Chemical Composition			
C-3.00-3.50%	Mn-0.60-0.75%	Si-2.75-3.00%	S-0.10max%
P-0.50-0.75	Ni-85min	Cu-2.5	Al-1.0
Other-1.0			

ALLOY 26

Alloy 26 features a precise combination of core wire and coating, providing high speed deposition of dense, machinable welds. Fabrication and repair of cast and wrought aluminum. Foundry defects, machining errors, and salvage work. It is widely used on sheets, tubes and extrusions. Also suited for torch applications.

Procedure:

- Clean weld area
- Bevel sections greater than 1/4"
- Preheat - 500° F is recommended on sections greater than 1/8"
- DC - reverse polarity
- Hold electrode in a vertical position
- Remove flux between passes
- Clean with hot water; add 10% sulfuric acid to water if additional cleaning is required

Features:

- Tensile strength - Up to 34,000 psi
- Good color match
- Good corrosion resistance
- Good electrical conductivity
- Machinable
- All position

PART NO.	SIZE
0002650	3/32" - 5# PKG
0002660	1/8" - 5# PKG
0002670	5/32" - 5# PKG

WIRE SIZE	WELDING CURRENT (AMPS)
3/32"	50 - 85
1/8"	85 - 135
5/32"	110 - 165



PN: 0002660
1/8" - 5# PKG



MAINTENANCE & REPAIR

TUF KUT

A composite rod which deposits hard carbide particles, providing the utmost resistance to abrasive wear.

Features:

- Maxtrix hardness - 220 BHN
- Carbide hardness - RA 88 to 91
- For best results, deposit on a thin layer of 17FC

PART NO.	SIZE
TFKUT90	3/16" x 14"



3AH

Harris 3AH tool steel is used to weld AISI A2 - A6 air hardening tool steels. Preheat the part to as high a temperature as is consistent with the final hardness requirements, preferably in the range of 300^o-1000^oF (250^o-538^oC). Post heat or temper the deposit as per the chart.

RC Hardness As Deposited	Preheat	Anneal	Harden	Post-Heat	Quench
48-52	300 ^o F to 1000 ^o F	1500 ^o F to 1600 ^o F	1750 ^o F to 1850 ^o F	300 ^o F to 1000 ^o F	Air

PART NO.	SIZE
003AH30	1/16" x 36" T/S TIG - 5# PKG



CUT ROD

Metal working electrode (AC-DC). For cutting and piercing any metal. Use with regular arc welding equipment. No air or oxygen required. Cut Rod cuts all metals and alloys including stainless steel, cast iron, aluminum, copper, brass & bronze. It is used for piercing holes, enlarging openings, trimming metals, removing frozen bolts, removing gates and risers, etc.

Procedure:

- Use AC or DC reverse polarity on regular welding machines
- For cutting, strike an arc at the point where cutting is to begin
- Once the arc is struck, maintain the electrode in contact with the work
- Use a continuous up and down "saw like" motion. Do not maintain an arc gap
- To pierce holes, hold the electrode vertical to the work. Once the arc is struck, push the electrode through the metal
- Rapidly remove the electrode once the hole is pierced. To enlarge the hole, move the electrode in a circular motion

Features:

- The special core wire in Cut Rod has a heat resistant coating which is nonconductive
- This enables you to operate the electrode at higher amps
- It creates a greater blasting action with faster cutting
- Economy is achieved by saving time, fuel and labor

PART NO.	SIZE
CTROD60	1/8" - 25# PKG
CTROD70	5/32" - 25# PKG
CTROD80	3/16" - 25# PKG

WIRE SIZE	WELDING CURRENT (AMPS)
3/32"	80 - 150
1/8"	170 - 300
5/32"	225 - 400
3/16"	250 - 450



PN: CTROD60
1/8" - 25# PKG

MAGNESIUM

Magnesium is welded using GTAW (TIG), welding processes. Harris offers TIG welding consumables in a variety of sizes. Since magnesium rapidly oxidizes when melted proper shielding gas coverage is important. Surfaces and edges adjacent to the weld should be cleaned prior to welding. Available in two grades, A261A and A292A. Conforms to AWS Specification A5.19.

PART NO.	SIZE
AZ61T30	1/16" x 36" - 3# PKG
AZ61T50	3/32" x 36" - 3# PKG
AZ61T60	1/8" x 36" - 3# PKG
AZ61T80	3/16" x 36" - 3# PKG
AZ92T30	1/16" x 36" - 3# PKG
AZ92T50	3/32" x 36" - 3# PKG
AZ92T60	1/8" x 36" - 3# PKG

PN: AZ61T30
1/16" X 36" - 3# PKG



WELDING PRODUCTS

Product	Chemical Composition									
AZ61A	Mn-0.15-.50%	Si-0.05%	Ni-0.005%	Cu-0.05%	Fe-0.005%	Mg-Rem	Zn-0.40-1.5%	Al-5.8-7.2%	Be-0.0002-0.0008%	Other-0.3%
AZ92A	Mn-0.15-.50%	Si-0.05%	Ni-0.005%	Cu-0.05%	Fe-0.005%	Mg-Rem	Zn-1.7-2.3%	Al-8.3-9.7%	Be-0.0002-0.0008%	Other-0.3%

GTAW (TIG) - For manual AC TIG welding, Argon is generally preferred because the arc has good stability. On welding heavier aluminum sections, the addition of Helium may be considered, and arc penetration will increase significantly; however, gas flow rates must be increased when Helium is added.

Filler Diameter	Direct Current (Amps, Straight Polarity, DCEN)	Direct Current (Amps, Reverse Polarity, DCEP)	Alternating Current (Amps, Unbalanced Wave)	Alternating Current (Amps, Balanced Wave)	Gas Cup
.010"	up to 15	-	up to 15	up to 15	1/4"
.020"	5 - 20	-	5 - 15	10 - 20	1/4"
.040"	15 - 80	-	10 - 60	20 - 30	3/8"
1/16"	70 - 150	10 - 20	50 - 100	30 - 80	3/8"
3/32"	150 - 250	15 - 30	100 - 160	60 - 130	1/2"
1/8"	250 - 400	25 - 40	150 - 210	100 - 180	1/2"
5/32"	400 - 500	40 - 55	200 - 275	160 - 240	1/2"
3/16"	500 - 750	55 - 80	250 - 350	190 - 300	5/8"

