

# WELDING WIRE & COVERED ELECTRODES PRODUCT GUIDE



# TECHALLOY®

## Customer Satisfaction is our Primary Goal

### QUALITY

We know that the quality of our products is the single most important factor in choosing a supplier. We have tightly controlled specifications and use stable, well documented manufacturing processes to provide product you can trust.

### AVAILABILITY

We offer a full line of stainless steel and nickel based welding wires and coated electrodes. From the standard grades to the more specialized products we stock what you require for immediate delivery. We are a leading supplier to the petrochemical, power generation, chemical/pharmaceutical, paper & pulp and marine industries.

### TECHNICAL SUPPORT

As a leading supplier to many complex industries and a company which got its start in 1919, we have a wealth of application know how. Now, as part of the Lincoln Electric Company we have unsurpassed welding process know how and field sales support. We welcome the opportunity to assist you.



### Manufacturing Plant and Sales Office

2310 Chesapeake Avenue  
Baltimore, MD 21222-4098  
T: (800) 638-1458  
P: (410) 633-9300  
F: (410) 633-2033

### Warehouse

3453 N. Sam Houston Pkwy  
West, Suite 750  
Houston, TX 77086  
P: (281) 820-3592  
F: (713) 466-7425

## CERTIFICATIONS

- ISO 9001
- ASME Section III Certification
- American Bureau of Shipping (ABS)
- Canadian Welding Bureau (CWB)
- Military Qualified Products
- TUV (Germany)
- Brazil Welding Foundation (FBTS)

### AMERICAN BUREAU OF SHIPPING

TECHALLOY® 308	TECHALLOY® 310	TECHALLOY® 413	TECH-ROD® 2594
TECHALLOY® 308L	TECHALLOY® 316	TECHALLOY® 625	TECH-ROD® 112
TECHALLOY® 309	TECHALLOY® 316L	TECHALLOY® 2594	
TECHALLOY® 309L	TECHALLOY® 347		

### CANADIAN WELDING BUREAU

TECHALLOY® 308/308L	TECHALLOY® 316/316L	TECHALLOY® 2209	TECHALLOY® 276
TECHALLOY® 308LHS	TECHALLOY® 316LHS	TECHALLOY® 208	TECHALLOY® 622
TECHALLOY® 309/309L	TECHALLOY® 317L	TECHALLOY® 413	TECHALLOY® 617
TECHALLOY® 309LHS	TECHALLOY® 320LR	TECHALLOY® 418	
TECHALLOY® 310	TECHALLOY® 347	TECHALLOY® 625	
TECHALLOY® 312	TECHALLOY® 630	TECHALLOY® 606	
TECH-ROD® 112	TECH-ROD® Weld A	TECH-ROD® 276	
TECH-ROD® 122	TECH-ROD® 182		

### MILITARY QUALIFIED PRODUCT LIST

TECHALLOY® 308	TECHALLOY® 347	TECH-ROD® 308-16
TECHALLOY® 308L	TECHALLOY® 410	TECH-ROD® 308L-16
TECHALLOY® 309	TECHALLOY® 413	TECH-ROD® 309-16
TECHALLOY® 309L	TECHALLOY® 418	TECH-ROD® 310-16
TECHALLOY® 310	TECHALLOY® 606	TECH-ROD® 182
TECHALLOY® 316	TECHALLOY® 625	TECH-ROD® 190
TECHALLOY® 316L		

## PACKAGING OPTIONS

Packaging	Master Packaging	GMAW	GTAW	SAW	SMAW
10 lb (4.5 kg) Spool	4 Spools / 40 lb (18.1 kg) Box	A			
33 lb (15 kg) Plastic Spool	1 Spool / 33 lb (15 kg) Box	A			
33 lb (15 kg) Wire Spool	1 Spool / 33 lb (15 kg) Box	S			
55 lb (25 kg) Wire Coil	1 Coil / 55 lb (25 kg) Box			S	
60 lb (27.2 kg) Spool	1 Spool / 60 lb (27.2 kg) Box	A			
60 lb (27.2 kg) Coil	1 Coil / 60 lb (27.2 kg) Box			A	
10 lb (4.5 kg) Tubes (36 in)	3 Tubes / 30 lb (13.6 kg) Box		M		
50 lb (22.6 kg) Bulk (36 in)	60 Cartons / Skid		M		
250 lb (113.4 kg) Reel	3 Reels / Skid	A			
500 lb (227 kg) Reel	3 Reels / Skid	A			
250 lb (113.4 kg) TECH PAK®	2 Paks / Skid	A			
500 lb (227 kg) TECH PAK®	2 Paks / Skid	A			
500 lb (227 kg) Pay-Off Pak	4 Paks / Skid			A	
8 lb (3.6 kg) Poly Tube	3 Tubes / 24 lb (10.8 kg) Box				M
10 lb (4.5 kg) Poly Tube	3 Tubes / 30 lb (13.6 kg) Box				M

S – Standard Packaging; M – Master Packaging; A - Available on Request (may vary by alloy and diameter)

# TECHALLOY® Welding Consumables

## LOW ALLOY STEEL WELDING WIRES

### TECHALLOY® 4130

TECHALLOY® 4130 is a high strength, low alloy welding wire for joining steels of similar chemical composition, as well as for overlays where moderate hardness is required. This wire can be used for TIG, MIG, and submerged arc welding applications. A preheat and interpass temperature of not less than 400°F (204°C) is required during welding.

### TECHALLOY® AK-10 (AWS A5.28 ER100S-G)

TECHALLOY® AK-10 is a low alloy steel welding wire developed for welding high strength steels with adequate ductility at low temperatures. The hardness of the undiluted weld will be less than 235 BHN. The requirement of preheat and interpass temperatures should be determined taking base plate chemistry and thickness into consideration. This grade can also be used for submerged arc welding where its relevant classification is AWS A5.23 EG.



## STAINLESS STEEL WELDING WIRES

### TECHALLOY® 307 (ISO 14343-A 18 8 Mn)

TECHALLOY® 307 is an austenitic stainless steel solid wire used extensively in automotive exhaust system applications as well as joining dissimilar stainless steels.

### TECHALLOY® 308/308H (AWS A5.9 ER308/308H)

TECHALLOY® 308/308H is used for TIG, MIG, and submerged arc welding of 304 and 304H stainless steels. The higher carbon content gives higher strength at elevated temperatures with some sacrifice in corrosion resistance.

### TECHALLOY® 308/308L (AWS 5.9 ER308L)

TECHALLOY® 308/308L is used for TIG, MIG, and submerged arc welding of type 304 stainless steel. The carbon content has been held to a maximum of 0.03% to reduce the possibility of intergranular carbide precipitation. This filler metal is the most popular grade among stainless steels, used for general purpose applications where corrosion conditions are moderate. It should not be used for mild steel to stainless joining applications.

### TECHALLOY® 308LHS (AWS A5.9 ER308LSi)

TECHALLOY® 308LHS is a stainless steel welding wire for MIG welding. This wire is used to primarily weld equipment made with 304 type stainless steel. The potential welding speed is higher than 308L due to improved wetting of weld metal due to higher silicon content.

### TECHALLOY® 309/309L (AWS A5.9 ER309/309L)

TECHALLOY® 309/309L is used for the welding of similar alloys in wrought or cast form. It is mostly used for welding dissimilar materials such as mild steel to stainless steel, as well as for a barrier layer in stainless overlays.

### TECHALLOY® 309LHS (AWS A5.9 ER309LSi)

TECHALLOY® 309LHS is of the same composition as TECHALLOY® 309L, with higher silicon content to improve the bead appearance and increase welding ease. The alloy is used for mild steel to stainless joining applications. Excellent contour of the weld minimizes the need for grinding.

### TECHALLOY® 309LMo (ISO 14343-A 23 12 2 L)

This product is similar to 309L except for the addition of 2.0 to 3.0 percent molybdenum to increase its pitting corrosion resistance in halide-containing environments. The primary application for this filler metal is surfacing of base metals to improve their resistance to corrosion. The 309LMo is used to achieve a single-layer overlay with a chemical composition similar to that of a 316L stainless steel. It is also used for the first layer of multilayer overlays with filler metals such as 316L or 317L stainless steel.

### TECHALLOY® 310 (AWS A5.9 ER310)

TECHALLOY® 310 is used for the welding of stainless steels of similar composition in wrought or cast form. The weld deposit is fully austenitic and calls for low heat during welding. This filler metal can be used for dissimilar welding and works well in severe corrosive environments such as paper mill machinery.

### **TECHALLOY® 312** (AWS A5.9 ER312)

TECHALLOY® 312 can be used to weld cast alloys of similar composition and weld dissimilar metals, especially if one of them is a stainless steel high in nickel. This alloy gives a two-phase weld deposit with substantial amounts of ferrite in an austenitic matrix. Even with considerable dilution by austenite-forming elements, such as nickel, the microstructure remains two-phase and thus highly resistant to weld metal cracks and fissures. Applications should be limited to service temperature below 800°F (427°C) to avoid formation of secondary brittle phases.

### **TECHALLOY® 316/316L** (AWS A5.9 ER316L)

TECHALLOY® 316/316L is used to weld wrought and cast forms of similar composition. The presence of molybdenum increases its creep resistance at elevated temperatures and pitting resistance in the presence of chlorides. The lower ferrite level of this nominal composition reduces the rate of corrosion in certain media and is suitable for use at cryogenic temperatures.

### **TECHALLOY® 316LHS** (AWS A5.9 ER316LSi)

TECHALLOY® 316LHS is similar to 316L, with higher silicon content for optimum ease and speed in MIG welding and smooth bead appearance. This alloy is intended for joining 316 type stainless steels.

### **TECHALLOY® 317L** (AWS A5.9 ER317L)

TECHALLOY® 317L is used for welding stainless steels with similar composition or 316/316L type materials. Due to its higher molybdenum content, this alloy offers high resistance to pitting and crevice corrosion. Low carbon makes the weld metal less susceptible to inter-granular corrosion.

### **TECHALLOY® 320LR** (AWS A5.9 ER320LR)

TECHALLOY® 320LR has a composition similar to ER320, except that carbon, silicon, phosphorus and sulfur levels are kept at lower levels as well as the niobium and manganese being specified at a narrower range. The low melting residuals are limited in this alloy to reduce the possibility of micro-fissuring. It is for this reason that this alloy is often used for welding Type 320 stainless steels.

### **TECHALLOY® 330** (AWS A5.9 ER330)

TECHALLOY® 330 is used to weld cast and wrought material of similar chemical composition. The weld metal provides excellent heat and scale resistance up to 1800°F (982°C). However, high sulfur environments may adversely affect elevated temperature performance. This being a fully austenitic alloy, low heat input is necessary.

### **TECHALLOY® 347** (AWS A5.9 ER347)

TECHALLOY® 347 is a niobium stabilized stainless steel welding wire used to weld Types 321 and 347. The addition of niobium reduces the possibility of chromium carbide precipitation and consequent intergranular corrosion.

### **TECHALLOY® 385** (AWS A5.9 ER385)

TECHALLOY® 385 is used for welding materials of similar chemical composition which are used for fabrication of equipment and vessels for the handling of sulfuric acid and other media containing chloride. This filler metal may also find applications for joining Type 317L material where improved corrosion resistance in specific media is needed. In order to reduce the propensity for fissuring and hot cracking, the low melting constituents such as carbon, silicon and phosphorus are controlled to lower levels in this alloy.

### **TECHALLOY® 409Nb** (AWS A5.9 ER409Nb)

TECHALLOY® 409Nb is a ferritic stainless steel welding wire used to weld Type 409 and 409Ti base materials. The addition of niobium improves corrosion resistance and promotes a ferritic microstructure. For the best results, welding must be done at a low heat input procedure and is not recommended for multi-pass applications.

### **TECHALLOY® 410** (AWS A5.9 ER410)

TECHALLOY® 410 is used to weld Types 403, 405, 410 and 416. It is also used for welding overlay on carbon steels to resist corrosion, erosion and abrasion. This material, being of the air hardening type, calls for preheating of the joint to 350°F (177°C) before welding. It is suitable for use against corrosion from atmosphere, fresh water, and mild acids.

### **TECHALLOY® 410NiMo** (AWS 5.9 ER410NiMo)

TECHALLOY® 410NiMo is used primarily to weld cast and wrought material of similar chemical composition. Preheating and inter-pass temperatures of not less than 300°F (149°C) are required. Post-weld heat treatment should not exceed 1150°F (621°C), as higher temperatures may result in hardening. Extra low carbon provides better protection against cracks and increased ductility over 410 filler metal.



# TECHALLOY® Welding Consumables

## TECHALLOY® 630 (AWS A5.9 ER630)

TECHALLOY® 630 is a precipitation hardening stainless steel used for welding materials of similar chemical composition such as 17-4 and 17-7. Can be used in the as welded condition or in the heat treated condition to obtain higher strength. Mechanical properties of this alloy are greatly influenced by the heat treatment.

## TECHALLOY® 2209 (AWS A5.9 ER2209) (DUPLEX)

TECHALLOY® 2209 is a filler metal designed to weld 22% chromium duplex stainless steels such as UNS S31803 and S32205. The weld metal poses a high tensile and yield strength. This grade has very good resistance to stress corrosion cracking and pitting corrosion with typical pitting resistance equivalent number (PREN) of 35-36. The wire's chemical composition results in a lower ferrite content than the base metal for improved weld ability.

## TECHALLOY® 2594 (AWS A5.9 ER2594) (SUPER DUPLEX)

TECHALLOY® 2594 provides matching chemistry and mechanical property characteristics to wrought super duplex alloys such as 2507 and Zeron® 100, as well as to super duplex casting alloys (ASTM A890). The welding wire is over alloyed 2-3% in Nickel to provide the optimum ferrite/austenite ratio in the finished weld. This structure results in high tensile/yield strength and superior resistance to SCC and pitting corrosion.

## STAINLESS STEEL COVERED ELECTRODES

### TECH-ROD® 308/308L (AWS A5.4 E308L-16)

TECH-ROD® 308/308L is a low carbon electrode used to weld 304L and 347. The weld deposit contains a maximum of 0.04% carbon which minimizes the formation of chromium carbides, and subsequent susceptibility to intergranular corrosion. The weld deposit, with controlled ferrite, gives excellent notch toughness at -320°F (-196°C).

### TECH-ROD® 309/309L (AWS A5.4 E309L-16)

TECH-ROD® 309L electrodes give a weld deposit similar to 309, with reduced carbon levels (.04% max) that offers increased resistance to inter-granular corrosion. Type 309L is ideal for joining stainless steels to themselves or to carbon or low alloy steels. TECH-ROD® 309L is preferred to TECH-ROD® 309 for cladding over carbon or low alloy steels, as well as dissimilar joints, which undergo heat treatment.

### TECH-ROD® 310 (AWS A5.4 E310-16)

TECH-ROD® 310 electrodes are used for welding stainless steels of similar composition in cast and wrought forms. The weld deposit is fully austenitic, and as such, calls for minimum heat input during welding.

### TECH-ROD® 312 (AWS A5.4 E312-16)

TECH-ROD® 312 electrodes are used for welding wrought and cast alloys of similar composition as well as for welding dissimilar metals. The weld deposits exhibit high tensile strength and offer some resistance to abrasion.

### TECH-ROD® 316/316L (AWS A5.4 E316L-16)

The weld deposit of TECH-ROD® 316L electrodes is similar to that of type 316, except carbon levels are limited to a maximum of 0.04%. Precise control of the carbon content in TECH-ROD® 316/316L electrodes provides a weld deposit matching the corrosion resistant qualities of type 316/316L stainless steel. The low carbon content reduced the possibility of carbide precipitation and consequent inter-granular corrosion.

### TECH-ROD® 317/317L (AWS A5.4 E317L-16)

The weld deposit of TECH-ROD® 317L is similar to that of type 317, except the carbon content is limited to a minimum of 0.04%. In addition to the resistance to pitting and crevice corrosion, the deposit made with this consumable offers good resistance to inter-granular corrosion.

### **TECH-ROD® 320LR** (AWS A5.4 E320LR-16)

TECH-ROD® 320LR is similar in composition to E320, with carbon, silicon, phosphorus and sulfur controlled to lower limits and niobium and manganese kept to a narrower range. This composition is designed to reduce the possibility of micro-fissuring; however, low heat input is advisable for welding.

### **TECH-ROD® 330** (AWS A5.4 E330-16)

TECH-ROD® 330 electrodes are used to weld wrought and cast forms of stainless steels of similar chemical compositions, which offer good heat and scale resistance to 1800°F (980°C). However, high sulfur environments adversely affect the high temperature performance. The heat input has to be kept to a minimum during welding to avoid the possibility of micro-fissuring.

### **TECH-ROD® 347** (AWS A5.4 E347-16)

TECH-ROD® 347 electrodes are niobium stabilized stainless steel electrodes used for the welding of types 347 and 321 stainless and stainless clad steels. The niobium content is approximately ten times the carbon content and when this product is used to weld stabilized type 347 and 321 parent metals, it reduces intergranular corrosion under severe operation conditions.

### **TECH-ROD® 385** (AWS A5.4 E385-16) (904L)

TECH-ROD® 385 is used for welding materials of similar chemical composition (UNS Number N08904). These materials are used in fabrication of equipment and vessels for handling and storage of sulfuric acid and phosphoric acid. The weld metal is fully austenitic and, as such, the low melting constituents such as carbon, silicon and phosphorus should be kept low. Welding must be done with low heat input, using a stringer bead technique.

### **TECH-ROD® 410** (AWS A5.4 E410-16)

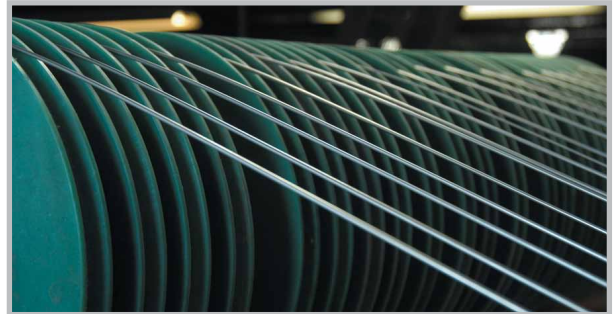
TECH-ROD® 410 is designed to weld stainless steels of similar chemical composition as well as to overlay carbon steels to impart corrosion, erosion and abrasion resistance. This material, being an air-hardening type, calls for a pre-heat and inter-pass temperature of not less than 400°F (200°C) during welding.

### **TECH-ROD® 410NiMo** (AWS A5.4 E410NiMo-16)

TECH-ROD® 410NiMo is designed to weld materials of similar chemical composition in cast and wrought forms. Preheat and inter-pass temperatures of not less than 300°F (150°C) are recommended during welding. Post-weld heat treatment should not exceed 1150°F (620°C) as higher temperatures may result in hardening.

### **TECH-ROD® 630** (AWS A5.4 E630-16)

TECH-ROD® 630 is a precipitation hardening steel covered electrode used for welding materials of similar chemical composition such as 17-4 and 17-7. Can be used in the as welded condition or in the heat treated condition to obtain higher strength. Mechanical properties of the alloy are greatly influenced by the heat treatment.



### **TECH-ROD® 2209** (AWS A5.4 E2209-16) (DUPLEX GRADE)

TECH-ROD® 2209 is used to weld duplex stainless steels such as UNS Number N31803. The welds offer excellent resistance to stress corrosion, cracking and pitting. The microstructure of the weld metal consists of austenite and ferrite. The ferrite content of the weld metal will be lower than the ferrite content of type 2205 base metal. The welding of duplex stainless steels calls for controlled parameters to achieve specified mechanical and corrosion resistant properties.

### **TECH-ROD® 2594** (AWS A5.4 ER2594-16) (SUPER DUPLEX)

TECH-ROD® 2594 is a super-duplex grade electrode that provides matching chemistry and mechanical property characteristics to wrought super-duplex alloys such as 2507 and Zeron® 100, as well as to super-duplex casting alloys (ATSM A890). The electrode is over-alloyed 2-3% in nickel to provide the optimum ferrite/austenite ratio in the finished weld. This structure results in high tensile and yield strengths and superior resistance to SCC and pitting corrosion.



# TECHALLOY® Welding Consumables

## NICKEL & NICKEL ALLOY WELDING WIRES

### TECHALLOY® 55

TECHALLOY® 55 is used for TIG and MIG welding of cast iron. This filler metal is extensively employed to overlay cast iron rolls. It is also used to repair castings. The weld metal of TECHALLOY® 55 is harder than that of TECHALLOY® 99. However, the machining can be accomplished by using carbide tipped tools. A preheat and inter-pass temperature of 350°F (175°C) minimum is recommended during welding, without which the weld and heat affected zones could develop cracks.

### TECHALLOY® 99 (AWS A5.15 ERNiC)

TECHALLOY® 99 is used for TIG and MIG welding of cast iron. This wire is extensively employed to repair gray iron castings. It can also be used for overlay and buildup. However, dilution from the casting influences the mechanical properties of the metal. The welds are easily machinable. A preheat and inter-pass temperature of 350°F (175°C) minimum is recommended during welding.

### TECHALLOY® 208 (AWS A5.14 ERNi-1) FM 61

TECHALLOY® 208 is used for TIG, MIG and SAW welding of nickel 200 or 201. This filler metal is also employed for overlay on steel as well as repairing cast iron castings. It can also be used for dissimilar joints between nickel or nickel alloys to stainless or ferritic steels.

### TECHALLOY® 276 (AWS A5.14 ERNiCrMo-4)

TECHALLOY® 276 is used for welding of materials of similar chemical composition (UNS Number N10276), as well as dissimilar materials of nickel base alloys, steels and stainless steels. This wire can also be used for cladding steel with nickel-chromium-molybdenum weld metal. This alloy, due to its high molybdenum content, offers excellent resistance to stress corrosion cracking, pitting and crevice corrosion.

### TECHALLOY® 413 (AWS A5.7 ERCuNi) FM 67

TECHALLOY® 413 is used for TIG, MIG and oxy-fuel welding of 70/30, 80/20 and 90/10 copper-nickel alloys. This filler metal can be used for MIG overlay on steel after a first layer with Nickel 208 (Filler Metal 61). Dissimilar welding applications include joining copper-nickel alloys to Nickel 200 or nickel-copper alloys.

### TECHALLOY® 418 (AWS A5.14 ERNiCu-7) FM 60

TECHALLOY® 418 is used for TIG or MIG welding of copper alloys (ASTM B127, B163, B164 and B165 UNS Number N04400). This filler metal can be used for MIG overlay on steel after a first layer with nickel 208 (Filler Metal 61). Dissimilar welding applications include joining Monel® alloys to Nickel 200 and copper-nickel alloys. This product is widely used in marine applications because of its good resistance to the corrosive effects of seawater and brackish waters.

### TECHALLOY® 606 (AWS A5.14 ERNiCr-3) FM 82

TECHALLOY® 606 is used for TIG, MIG and SAW welding of base materials such as ASTM B163, B166, B167 and B168— alloys which have UNS Number N06600. Its ability to apply to applications ranging from cryogenic to high temperatures makes this alloy one of the most used in the nickel family. This filler metal can also be used for dissimilar welding applications between various nickel alloys and stainless or carbon steels, as well as for overlaying.

### TECHALLOY® 617 (AWS A5.14 ERNiCrCoMo-1)

TECHALLOY® 617 is used for TIG, MIG and SAW welding of nickel-chrome-cobalt-molybdenum alloys, as well as between themselves and dissimilar metals such as stainless, carbon or low alloy steels. This filler wire can also be used for overlay welding where similar chemical composition is desired. The weld metal provides optimum strength and oxidation resistance from 1500°F (815°C) up to 2100°F (1150°C).





### **TECHALLOY® 622** (AWS A5.14 ERNiCrMo-10)

TECHALLOY® 622 is an alloy with chromium, molybdenum, and tungsten as the principal alloying elements. It is used to weld alloys of similar composition as well as dissimilar joints between nickel-chromium-molybdenum alloys and stainless or carbon or low alloy steels. It can also be used for cladding overlay as well as spraying applications. TECHALLOY® 622 offers excellent corrosion resistance in oxidizing as well as reducing media in a wide variety of chemical process environments. It offers an outstanding resistance to stress corrosion cracking, pitting and crevice corrosion.

### **TECHALLOY® 625/625HWT** (AWS A5.14 ERNiCrMo-3)

TECHALLOY® 625 (Low Iron) is used for TIG, MIG and SAW welding of nickel-chromium-molybdenum alloys. TECHALLOY® 625HWT is a product with the same chemical and mechanical properties (Weld Metal) but with slightly different wire characteristics suited to the hot wire TIG process. This filler metal may be used for cladding and welding dissimilar base metals such as Ni/Cr/Mo alloys to stainless and carbon steels. The Ni/Cr/Mo alloy system provides excellent resistance to oxidizing and reducing environments. The high molybdenum content provides good stress, pitting and crevice corrosion resistance.

### **TECHALLOY® 718** (AWS A5.14 ERNiFeCr-2)

TECHALLOY® 718 is used for TIG welding alloys 718, 706 and X-750. It is mainly used for welding high strength aircraft components and liquid rocket components involving cryogenic temperatures. High heat input processes such as MIG welding often result in micro-fissuring. This alloy can be age hardened to higher strengths.

### **TECHALLOY® 825** (AWS A5.14 ERNiFeCr-1)

TECHALLOY® 825 is used for TIG, MIG and SAW welding of nickel-chromium-molybdenum copper alloys. This can also be used to overlay cladding where similar chemical composition is required.

## **NICKEL & NICKEL ALLOY COVERED ELECTRODES**

### **TECH-ROD® 55** (AWS A5.15 ENiFe-CI)

TECH-ROD® 55 is used for welding of cast irons to themselves as well as for joining cast irons to mild steels. It is also employed for the repair of castings. The welds are moderately hard and require carbide tipped tools for machining. A preheat and interpass temperature of not less than 350°F (177°C) is required during welding.

### **TECH-ROD® 99** (AWS A5.15 ENi-CI)

TECH-ROD® 99 is designed for welding of gray iron castings to themselves as well as joining them to mild steel. It is also used extensively to repair castings. The welds are quite machinable. A preheat and interpass temperature of not less than 350°F (177°C) is recommended during welding.

### **TECH-ROD® 112** (AWS A5.11 ENiCrMo-3)

TECH-ROD® 112 is a covered electrode which is used to weld nickel-chromium-molybdenum alloys. It is also used extensively in overlay cladding where similar chemical composition is required on the clad side. Its applications include dissimilar joints between nickel-chromium-molybdenum alloys to stainless steels, carbon or low alloy steels. These electrodes are used in applications where the temperature ranges from cryogenic up to 1800°F (982°C). The deposit chemistry is similar to a 625 solid wire.

### **TECH-ROD® 112LFe** (AWS A5.14 ENiCrMo-3)

TECH-ROD® 112LFe is a low iron version of the standard Tech-Rod® 112 covered electrode which is used to weld nickel-chromium-molybdenum alloys. It is used extensively in overlay cladding where similar chemical composition is required on the clad side. These electrodes are used in applications where the temperature ranges from cryogenic up to 1800°F (982°C). The deposit chemistry is similar to a 625 solid wire and is certified to contain less than 1% Iron (Fe) in an undiluted application.



# TECHALLOY® Welding Consumables

## NICKEL & NICKEL ALLOY COVERED ELECTRODES

### **TECH-ROD® 117** (AWS A5.11 ENiCrCoMo-1)

TECH-ROD® 117 is a covered electrode which is used for welding nickel-chromium-cobalt-molybdenum alloys (UNS Number N06617). This electrode can also be used for overlay cladding where similar composition is required. The deposited weld metal provides optimum strength and oxidation resistance above 1500°F (816°C) and up to 2100°F (1149°C), especially when welding on base metals of nickel-iron-chromium alloys.

### **TECH-ROD® 122** (AWS A5.11 ENiCrMo-10)

TECH-ROD® 122 electrodes are used for welding of nickel-chromium-molybdenum alloys as well as for overlay cladding on carbon, low alloy or stainless steels. They are also used for dissimilar joints between nickel-chromium-molybdenum alloys and stainless, carbon or low alloy steels. TECH-ROD® 122 offers excellent corrosion resistance in oxidizing as well as reducing media in a wide variety of chemical process environments. It offers an outstanding resistance to stress corrosion cracking, pitting and crevice corrosion. It is similar to 276 with higher chromium content.

### **TECH-ROD® 141** (AWS A5.11 ENi-1)

TECH-ROD® 141 is used for welding of cast and wrought forms of commercially pure nickel. These electrodes can also be used for surfacing as well as dissimilar welding between nickel and steel or stainless steel.

### **TECH-ROD® 182** (AWS A5.11 ENiCrFe-3)

TECH-ROD® 182 electrodes are used for welding of nickel-chromium-iron alloys to themselves and for dissimilar welding between nickel-chromium-iron alloys and steels or stainless steels. The applications include surfacing as well as clad side welding. High manganese of this weld deposit reduces the possibility of micro-fissures but reduces creep strength which limits its usage up to 900°F (482°C).

### **TECH-ROD® 187** (AWS A5.6 ECuNi)

TECH-ROD® 187 is a copper-nickel electrode for shielded metal arc welding of wrought or cast alloys of similar composition as well as 80/20 and 90/10 Cu/Ni alloys. It is also used for the clad side of copper-nickel clad steels. This filler metal is widely used in marine applications because of its good resistance to the corrosive effects of sea water.

### **TECH-ROD® 190** (AWS A5.11 ENiCu-7)

TECH-ROD® 190 is used for welding nickel-copper alloys to themselves and to steel. They also can be used for overlay welding as well as for welding of clad steels where nickel-copper surfacing is required. Dissimilar welding applications including joining nickel 200 to copper-nickel alloys.

### **TECH-ROD® 276** (AWS A5.11 ENiCrMo-4)

TECH-ROD® 276 is used for welding materials of similar composition. This low carbon, nickel-chromium-molybdenum filler metal can also be used for dissimilar welding between nickel base alloys and stainless steels, as well as for surfacing and cladding. Due to high molybdenum content, this alloy offers excellent resistance to stress corrosion cracking and pitting and crevice corrosion.

### **TECH-ROD® Weld A** (AWS A5.11 ENiCrFe-2)

TECH-ROD® Weld A electrodes are used for welding of nickel-chromium-iron alloys to themselves as well as for dissimilar welding between various nickel alloys and carbon or stainless steels. These electrodes can also be used to overlay cladding where a similar composition is needed. These electrodes have wide applications ranging from cryogenic temperature up to 1500°F (816°C).





**TECHALLOY®** – A Lincoln Electric Company  
2310 Chesapeake Ave • Baltimore, MD • 21222-4098 • U.S.A.  
Phone: +1.410.633.9300 • [www.techalloy.com](http://www.techalloy.com)