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For additional information, “Typical Test Results” of Chemical and Mechanical Properties, Certification of Products, and Welding Data Procedures, contact Weldwire Company Customer Service.

Weldwire Company * 103 Queens Drive * King of Prussia, PA 19406 * Phone: 800-523-1266 * Fax: 610-265-1012

Aluminum Welding Wire & Electrodes

Specifications	Chemical Composition	Description
Alloy: WW1100 Class: ER1100 AWS: A5.10	Si = 0.95 max (including Iron) Fe = 0.95 max (including Iron) Cu = 0.05 - 0.20 Mn = 0.05 max Zn = 0.10 max Al = 99.0 min	Base materials which can be welded with this alloy are 1060, 1070, 1080, and 3003. This material can be used with the inert gas welding processes. It is essential that all Aluminum Alloys and welding wire are clean and free from contamination.
Alloy: WW4043(ER) Class: ER4043 AWS: A5.10	Si = 4.5 - 6.0 Fe = 0.8 max Cu = 0.30 max Mn = 0.05 max Mg = 0.05 max Zn = 0.10 max Ti = 0.20 max Al = Remainder Other = 0.15 max	ER4043 aluminum filler materials are silicon-aluminum types for welding of the following: 5154, 6052, 6053, 6082 and similar other silicon-aluminum alloys. This material can be used with the inert gas welding processes. It is essential that all aluminum alloys and welding filler wires are clean and free from contamination.
Alloy: WW4043(R) Class: R4043 AWS: A5.10	Si = 4.5 - 6.0 Fe = 0.8 max Cu = 0.30 max Mn = 0.05 max Mg = 0.05 max Zn = 0.10 max Ti = 0.20 max Al = Remainder Other = 0.15 max	This type of electrode can be used for welding of the following materials: 5454, 6052, 6063, 6082 and similar other silcon-aluminum alloys. In all cases an electrode that meets the test prescribed in A5.10 AWS specification can be used either as an electrode or a welding rod, but the reverse is not always true for a “R” classification aluminum “rod.” It is essential that all aluminum alloys and welding filler wires are clean and free from contamination.
Alloy: WW4043CTD Class: E4043 AWS: A5.3	Si = 4.5 - 6.0 Fe = 0.8 max Cu = 0.30 max Mn = 0.05 max Mg = 0.05 max Zn = 0.10 max Ti = 0.20 max Al = Remainder Be = 0.0008 max Other = 0.15 max	E4043CTD for arc welding aluminum, is a coated electrode with an extruded coating designed for production and maintenance welding of aluminum and aluminum alloys. Arc stabilities excellent, spatter and fuming are minimal. It is essential that all aluminum alloys and welding filler wires are clean and free from contamination.

Aluminum Welding Wire & Electrodes

Specifications	Chemical Composition	Description
Alloy: WW5183 Class: ER5183 AWS: A5.10	C = 0.40 max Fe = 0.40 max Cu = 0.10 max Mn = 0.50-1.0 Mg = 4.3-5.2 Cr = 0.05-0.25 Zn = 0.25 max Ti = 0.15 max Si = 0.40 max Al = Remainder	ER5183 can be used on type base materials 5083 and 5456. ER5183 is not recommended for sustained elevated temperature service. This material can be used with the inert gas arc welding processes. They can also be used with electron beam or oxyfuel gas welding processes. It is essential that all aluminum alloys and welding filler wires are clean and free from contamination.
Alloy: WW5356 Class: ER5356 AWS: A5.10	Si = 0.25 max Fe = 0.40 max Cu = 0.10 max Mn = 0.05-0.20 Mg = 4.5-5.5 Zn = 0.10 max Ti = 0.06-0.20 Al = Remainder Cr = 0.05-0.20 Other = 0.15 max	ER5356 aluminum filler materials are used mainly for welding aluminum of like composition. This type is also useful if color match is important after anodizing, if higher weld strengths are required or when extra ductility is helpful. This material can be used with the inert gas welding processes. It is essential that all aluminum alloys and welding filler wires are clean and free from contamination.
Alloy: WW5554 Class: ER5554 AWS: A5.10	C = 0.25 max Fe = 0.40 max Cu = 0.10 max Mn = 0.50-1.0 Mg = 2.4-3.0 Cr = 0.05-0.20 Zn = 0.25 max Ti = 0.05-0.20 Si = 0.25 max Al = Remainder	This material can be used to weld base materials types 5454 and 5456. All inert gas processes, electron beam and oxyfuel gas welding processes can be used. It is essential that all aluminum alloys and welding filler wires are clean and free from contamination.
Alloy: WW5556 Class: ER5556 AWS: A5.10	Si = 0.25 max Fe = 0.40 max Cu = 0.10 max Mn = 0.50 -1.0 Mg = 4.7-5.5 Cr = 0.05-0.20 Zn = 0.25 max Ti = 0.05-0.20 Al = Remainder	This material can be used to weld base material types 5454 and 5456. All inert gas processes, electron bead and oxyfuel gas welding processes can be used. It is essential that all aluminum alloys and welding filler wires are clean and free from contamination.

Specifications	Chemical Composition	Description
Alloy: WWCobalt #1 Coated Class: Cobalt Alloy #1 Coated Electrode AWS: A5.13 (ECoCr-C)	Typical = C = 2.1 Cr = 29.6 Fe = 2.3 Mn = 0.1 Mo = 0.1 Ni = 1.9 Si = 0.9 W = 12.1 Co = Balance	Type 1 is the highest hardness standard alloy in the group of cobalt alloys used for elevated temperature abrasive wear associated with corrosion. Deposits of this alloy have a large volume of chromium carbides that impart outstanding abrasive wear resistance. The addition of tungsten enhances high temperature hardness and matrix toughness for excellent adhesive and solid particle erosion wear resistance. It bonds well with all steels including stainless.
Alloy: WWCobalt #1 Flux Cored Class: Cobalt Alloy #1 Flux Cored Wire AWS: A5.21 (ERCoCr-C)	Typical = C = 2.6 Cr = 25.8 Fe = 3.6 Mn = 0.6 Mo = 0.1 Ni = 2.2 Si = 0.2 W = 11.2 Co = Balance	1M is the tubular wire version of the highest hardness standard cobalt alloy used with chromium carbides that impart outstanding abrasive wear resistance. The addition of tungsten enhances high temperature hardness and matrix toughness for excellent adhesive and solid particle erosion wear resistance. It bonds well with all weldable steels including stainless.
Alloy: WWCobalt #1 Bare Class: Cobalt Alloy #1 Bare Wire/Rod AWS: A5.13 (RCoCr-C)	Typical = C = 2.4 Cr = 31.0 Fe = 2.3 Mn = 0.06 Mo = 0.10 Ni = 2.2 Si = 1.2 W = 12.2 Co = Balance	Type #1 bare wire/rod has the highest hardness of the cobalt alloys and is used in elevated temperature wear applications. Machine with Carbide tools or ground. It bonds well with stainless and other weldable grade steels.
Alloy: WWCobalt #12 Bare Class: Cobalt Alloy #12 Bare Wire/Rod AWS: A5.13 (RCoCr-B)	Typical = C = 1.5 Cr = 30.4 Fe = 2.3 Mn = 0.06 Mo = 0.1 Ni = 2.2 Si = 1.3 W = 8.5 Co = Balance	Type 12 bare rod develops high hardness, abrasion resistance and good corrosion resistance. These properties make type 12 the choice for wood cutting saws and bars and for industrial cutting applications for carpet, plastics, paper and chemical industries. It is non-forgeable and can be machined with difficulty using carbide tools. Type 12 bonds well to all weldable grade steels, including stainless.

Specifications	Chemical Composition	Description
Alloy: WWCobalt #12 Coated Class: Cobalt Alloy #12 Coated Electrode AWS: A5.13 (ECoCr-B)	Typical = C = 1.3 Cr = 29.8 Fe = 3.3 Mn = 0.1 Mo = 0.1 Ni = 2.2 Si = 0.9 W = 3.3 Co = Balance	Type 12 coated electrodes provide excellent hot hardness and abrasion resistance and good corrosion resistance. These properties make type 12 well suited for wood cutting saws and bars and for industrial cutting applications for carpet, plastics, paper, and chemical industries. It bonds well to all steels, including stainless.
Alloy: WWCobalt #12 Flux Cored Class: Cobalt Alloy #12 Flux Cored Wire AWS: A5.21 (ERCoCr-B)	Typical = C = 1.4 Cr = 27.3 Fe = 3.9 Mn = 0.9 Mo = 0.1 Ni = 2.2 Si = 1.1 W = 8.3 Co = Balance	Cobalt 12 is the tubular fabricated wire version of a cobs alloy that produces a high hardness cobalt-chromium deposit for high temperature applications with good abrasive wear associated with corrosion. Chromium carbides contained in the deposit provide excellent resistance to many forms of chemical and mechanical degradation, including galling. It bonds well with all weldable steels, including stainless.
Alloy: WWCobalt #21 Bare Class: Cobalt Alloy #21 Bare Wire/Rod AWS: A5.21 (ERCoCr-E)	Typical = C = 0.24 Cr = 27.4 Fe = 1.7 Mm = 0.8 Mo = 5.4 Ni = 2.73 Si = 0.8 Co = Balance	Type 21 bare rod provides a low carbon austenitic type deposit with excellent work hardenable, high temperature strength and impart resistance. Good choice for valve trim on steam and fluid control valve bodies and seals. It bonds well to all weldwble steels, including stainless steel.
Alloy: WWCobalt #21 Coated Class: Cobalt Alloy #21 Coated Electrode AWS: A5.13 (ECoCr-E)	Typical = C = 0.2 Cr = 27.9 Fe = 3.4 Mn = 0.5 Mo = 5.2 Ni = 2.5 Si = 0.7 W = 0.7 Co = Balance	Cobalt #21 coated electrodes deposit a low carbon austenitic cobalt type alloy with excellent work hardenable high temperature, strength, and impart resistance. It is a good choice for valve trim and steam and fluid control valve bodies and seals. It bonds well to all weldable steels, including stainless.

Bare, Coated & Flux-cored Cobalt

Specifications	Chemical Composition	Description
Alloy: WWCobalt #21 Flux Cored Class: Cobalt Alloy #21 Flux Cored Wire AWS: A5.21 (ERCoCr-E)	Typical = C = 0.3 Cr = 27.4 Fe = 3.8 Mn = 0.7 Mo = 5.4 Ni = 2.4 Si = 0.5 W = 0.1 Co = Balance	Cobalt Alloy #21 flux-cored wire has excellent work hardenability, high temperature, strength, and impart resistance. Type 21 is a good choice for valve trim and fluid control valve bodies and seals. It bonds well to all weldable steels, including stainless.
Alloy: WWCobalt #6 Bare Class: Cobalt Alloy #6 Bare Wire/Rod AWS: A5.13 (RCoCr-A)	Typical = C = 1.3 Cr = 30.6 Fe = 1.0 Mn = 0.09 Mo = 0.1 Ni = 1.0 Si = 1.3 W = 5.5 Co = Balance	Cobalt #6 provides resistance to many forms of chemical and mechanical degradation over a wide temperature range. It bonds will with weldable grade steels, including stainless.
Alloy: WWCobalt #6 Coated Class: Cobalt Alloy #6 Coated Electrode AWS: A5.13 (ECoCr-A)	Typical = C = 1.1 Cr = 25.8 Fe = 3.2 Mn = 0.1 Mo = 0.1 Ni = 1.9 Si = 1.0 W = 4.5 Co = Balance	Type 6 coated electrodes produce a medium hardness cobalt-chromium deposit for high temperature applications with good abrasive wear and good impact resistance. Type 6 is the most versatile and widely used cobalt alloy with a good balance of abrasion and impact resistance. Chromium carbides contained in the deposit have excellent resistance to many forms of chemical and mechanical degradation, including galling and cavitation erosion. It bonds well with all weldable steels, including stainless.
Alloy: WWCobalt #6 Flux Cored Class: Cobalt Alloy #6 Flux Cored Wire AWS: A5.21 (ERCoCr-A)	Typical = C = 1.2 Cr = 28.1 Fe = 4.0 Mn = 0.9 Mo = 0.1 Ni = 2.5 Si = 0.6 W = 4.0 Co = Balance	Alloy #6 is the tubular wire version of a cobalt alloy that produces a medium hardness cobalt-chromium deposit for high temperature applications with good abrasive wear and good impact resistance. It is the most versatile and widely used cobalt alloy. Chromium carbides contained in the deposit provide excellent resistance to many forms of chemical and mechanical degradation, including calling and cavitation erosion. It bonds well with all weldable steels including stainless.

Chrome Moly Welding Wire

Specifications	Chemical Composition	Description
Alloy: WW80SB-2 Class: ER80SB-2 AWS: A5.28	C = 0.7-0.12 Cr = 1.20-1.50 Ni = 0.20 max Mn = 0.40-0.70 Si = 0.40-0.70 P = 0.025 max S = 0.025 max Mo = 0.40-0.65 Cu = 0.35 max Other = 0.50 max	ER80SB-2 is for gas metal arc and gas tungsten arc welding of 1 ¼ chrome, ½ moly steels used in high temperature applications. 300°F minimum preheat, interpass are recommended.
Alloy: WW80S-B6 Class: ER80S-B6 AWS: A5.28	C = 0.10 max Mn = 0.40-0.70 Si = 0.50 max P = 0.025 max S = 0.025 max Ni = 0.60 max Cr = 4.50-6.00 Mo = 0.45-0.65 Cu = 0.35 max (includes coating) Other = 0.50 max	This type material contains 4 to 6% chromium and about 0.50% molybdenum. It is used to weld materials of similar composition, usually in the form of pipe or tubing, for high temperature service applications, 350°F minimum preheat, interpass are recommended.
Alloy: WW80S-B8 Class: ER80S-B8 AWS: A5.28	C = 0.10 max Mn = 0.40-0.70 Si = 0.50 max P = 0.025 max S = 0.025 max Ni = 0.50 max Cr = 8.00-10.5 Mo = 0.80-1.2 Cu = 0.35 max (includes coating) Other = 0.50 max	This classification contains 8.0 to 10.5 % chromium and about 1.0% molybdenum. Classification is used for welding base material of similar composition, for high temperature service applications, 350°F minimum preheat, interpass are recommended.
Alloy: WW90SB-3 Class: ER90SB-3 AWS: A5.28	C = 0.07-0.12 Cr = 2.30-2.70 Ni = 0.20 max Mn = 0.40-0.70 Si = 0.40-0.70 P = 0.025 max S = 0.025 max Mo = 0.90-1.20 Cu = 0.35 max Other = 0.50 max	ER90SB-3 is for weldng 2 ¼ chrome, 1 moly steels, frequently piping in the petroleum industry and for elevated temperature service. Requires controlled preheat, interpass and post weld heat treatment.

Chrome Moly Welding Wire

Specifications	Chemical Composition	Description
Alloy: WW90S-B9 Class: ER90S-B9 AWS: A5.28	C = 0.07-0.13 Mn = 1.25 max Si = 0.15-0.30 P = 0.01 max S = 0.01 max N = 1.00 max Cr = 8.00-9.50 Mo = 0.80-1.10 V = 0.15-0.25 Al = 0.04 max Cu = 0.20 max (includes coating) Other = 0.50 max Note = Columbium 0.02-0.10%, Nitrogen 0.03-0.07% required	Material contains chromium 8.00 – 9.50% and molybdenum 0.80 – 1.10%. Classification is used for welding base material of similar composition. Requires controlled preheat, interpass and post weld heat treatment.
Alloy: WWEB-2 Class: EB-2 AWS: A5.23	C = 0.07-0.15 Cr = 1.00-1.75 Mn = 0.45-1.00 Si = 0.05-0.30 P = 0.025 max S = 0.030 max Mo = 0.45-0.65 Cu = 0.35 max	EREB-2 is for submerged arc welding of 1 ¼ chrome, ½ moly steels.
Alloy: WWEB-3 Class: EB-3 AWS: A5.23	C = 0.05-0.15 Cr = 2.25-3.00 Mn = 0.40-0.80 Si = 0.05-0.30 P = 0.025 max S = 0.025 max Mo = 0.90-1.10 Cu = 0.35 max	EREB-3 is for submerged arc welding of 2 ¼ chrome, 1 moly steels.
Alloy: WWEB-6 Class: EB-6 AWS: A5.23	C = 0.10 max Cr = 4.50-6.50 Mn = 0.35-0.70 Si = 0.05-0.50 P = 0.025 max S = 0.025 max Mo = 0.45-0.70 Cu = 0.35 max	This type wire is classified by the chemical composition of deposited weld metal in combination with a specific welding flux using the submerged welding process. The weld metal properties are obtained by the use of a properly selected flux and EB6 wire and knowing if the weldment is to be heat treated or as welded condition.

Chrome Moly Welding Wire

Specifications	Chemical Composition	Description
Alloy: WWEB-8 Class: EB-8 AWS: A5.23	C = 0.10 max Cr = 8.0-10.50 Mn = 0.30-0.65 Si = 0.05-0.50 P = 0.025 max S = 0.025 max Mo = 0.80-1.20 Cu = 0.35 max	This type wire is classified by the chemical composition of deposited weld metal in combination with a specific welding flux using the submerged welding process. The weld metal properties are obtained by the use of a properly selected flux and EB8 wire and knowing if the weldment is to be heat treated or as welded condition.
Alloy: WWEB-9 Class: EB-9 AWS: A5.23	C = 0.07-0.13 Cr = 8.0-10.0 Mn = 1.25 max Si = 0.30 max P = 0.010 max S = 0.010 max Mo = 0.80-1.10 Cu = 0.10 max Ni = 1.00 max V = 0.15-0.25 Nb = 0.02-0.10 N = 0.03-0.07 Al = 0.04 max	This type wire is classified by the chemical composition of deposited weld metal in combination with a specific welding flux using the submerged welding process. The weld metal properties are obtained by the use of a properly selected flux and EB9 wire and knowing if the weldment is to be heat treated or as welded condition.

Specifications	Chemical Composition	Description
Alloy: WWAluminum-BronzeA1 Class: ERCuAl-A1 AWS: A5.7	Cu = Remainder (including silver) Zn = 0.20 max Mn = 0.50 max Si = 0.10 max Al = 6.0-8.50 Pb = 0.02 max Others = 0.50 max	This filler metal is an iron free aluminum bronze. Recommended for use as an overlay material for wear resistant surfaces having relatively light loads. This alloy is not recommended for joining applications, since the deposit does have a tendency to be hot short.
Alloy: WWAluminum-BronzeA2 Class: ERCuAl-A2 AWS: A5.7	Cu = Remainder (including silver) Zn = 0.02 max Fe = 1.5 max Si = 0.10 max Al = 9.0-11.0 Pb = 0.02 max Others = 0.50 max	Can be used where welds on brass are required to have high tensile strength and be corrision resistance. Excellent alloy for joining manganese bronze castings and other aluminum bronze materials, malleable iron, steel and dissimilar metals.
Alloy: WWERCu Class: ERCu AWS: A5.7	Cu = 98.0 min (including silver) Sn = 1.0 max Mn = 0.5 max Si = 0.50 max P = 0.15 max Al = 0.01 max Pb = 0.02 max Others = 0.50 max	This Weld material is used fo fabricate deoxidized copper and repair weld copper castings. Can also be used to weld galvanized steel and deoxidized copper to mild steel where high strength joints are not required.
Alloy: WWLFB Bare Class: LBF Bare (Low Fuming Bronze) AWS: Nominal Chemistry	Cu = 58.0-62.0 Sn = 0.30-3.00 Fe = 1.50 max Al = 0.01 max Zn = balance Mn = 0.25 max Si = 0.30 max Pb = 0.05 max	Designed for repair and fabrication applications on steel, copper, copper alloys, nickel, and nickel alloys. Recommended procedure: Clean all areas to be joined or built-up thoroughly. Paint weld area with Welco 600 bronze brazing flux. Using a neutral flame, heat the part until the flux liquefies. The flux can also be applied directly to the rod, by heating the rod and dipping into the powered flux. Add a drop of the alloy and flow it out using the torch flame. If a large area is to be surfaced or a number of passes are required to restore the part to the original size, Nickel Silver flux coated rods should be used. There is no need to remove the flux between passes. The torch should be held at a low angle to prevent excessive heat build-up in the part. When working on cast iron, bonding qualities can be improved by first searing the surface with a strong oxidizing flame.

Specifications	Chemical Composition	Description
Alloy: WWLFB Coated Class: LBF Coated (Low Fuming Bronze) AWS: Nominal Chemistry	Cu = 58.0-62.0 Sn = 0.30-3.00 Fe = 1.50 max Al = 0.01 max Zn = Balance Mn = 0.25 max Si = 0.30 max Pb = 0.05 max	Designed for repair and fabrication applications on steel, copper, copper alloys, nickel, and nickel alloys. Recommended procedure: Clean all areas to be joined or built-up thoroughly. Paint weld area with Welco 600 bronze brazing flux. Using a neutral flame, heat the part until the flux liquefies. The flux can also be applied directly to the rod, by heating the rod and dipping into the powered flux. Add a drop of the alloy and flow it out using the torch flame. If a large area is to be surfaced or a number of passes are required to restore the part to the original size, Nickel Silver flux coated rods should be used. There is no need to remove the flux between passes. The torch should be held at a low angle to prevent excessive heat build-up in the part. When working on cast iron, bonding qualities can be improved by first searing the surface with a strong oxidizing flame.
Alloy: WWSilicon-Bronze Class: ERCuSi-A AWS: A5.7	Cu = 94 min (including silver) Zn = 1.5 max Sn = 1.5 max Fe = 0.5 max Si = 2.8-4.0 Al = .01 max Pb = 0.02 max Others = .50 max	Use for welding of silicon bronze copper, or aluminum bronze of low aluminum content. Can also be used for brazing malleable iron and light gage steel.

Flux Cored Stainless Electrodes

Specifications	Chemical Composition	Description
Alloy: WW2209T-1 Class: E2209T-X AWS: A5.22	C = 0.04 max Cr = 21.0-24.0 Ni = 7.5-10.0 Mo = 2.5-4.0 Mn = 0.5-2.0 Si = 1.0 max P = 0.04 max S = 0.03 max Cu = 0.50 max N = 0.08-2.0	This electrode is used to join duplex stainless steel base metals containing approximately 22 percent chromium. This alloy is one of the family of duplex stainless steel alloys. This alloy has good resistance to stress corrosion cracking. Following the chemical composition designation comes the letter "T" which signifies that the product is a flux cored electrode or rod. Following the "T" is a "1" or "0" indicating the recommended position of welding. The "1" or "0" following the "T" designates the following: "0" – designed to weld in the flat or horizontal position, "1" – designed to weld in all position. Following the position indicator and a dash, are the numerals "1", "3", "4", "5", or the letter "G". The numerals "1", "4", and "5" identify the shielding gas required for classification of the electrode. The number "3" signifies that an external shielding gas is not employed. The letter "G" signifies that the shielding medium, chemical composition and mechanical properties are not specified.
Alloy: WW2553T-1 Class: E2553T-X AWS: A5.22	C = 0.04 max Cr = 24.0-27.0 Ni = 8.5-10.5 Mo = 2.9-3.9 Mn = 0.5-1.5 Si = 0.75 max P = 0.04 max S = 0.03 max N = 0.10-0.20 Cu = 1.5-2.5	This electrode is used to join duplex stainless steel base material containing approximately 25% chromium. This alloy is one of the family of duplex stainless steel alloys. Has improved resistance to pitting corrosion and stress corrosion cracking. Following the chemical composition designation comes the letter "T" which signifies that the product is a flux cored electrode or rod. Following the "T" is a "1" or "0" indicating the recommended position of welding. The "1" or "0" following the "T" designates the following: "0" – designed to weld in the flat or horizontal position, "1" – designed to weld in all position. Following the position indicator and a dash, are the numerals "1", "3", "4", "5", or the letter "G". The numerals "1", "4", and "5" identify the shielding gas required for classification of the electrode. The number "3" signifies that an external shielding gas is not employed. The letter "G" signifies that the shielding medium, chemical composition and mechanical properties are not specified.
Alloy: WW308HT-1 Class: E308HT-X AWS: A5.22	C = 0.04-0.08 Cr = 18.0-21.0 Ni = 9.0-11.0 Mo = 0.50 max Mn = 0.5-2.5 Si = 1.0 max P = 0.04 max S = 0.03 max Cu = 0.50 max	The composition of this weld metal is the same as that of E308TX-X except for carbon content is in the high end of the range. Carbon provides higher tensile and creep strength at elevated temperatures. This material is used primarily for welding type 308H base metal. Following the chemical composition designation comes the letter "T" which signifies that the product is a flux cored electrode or rod. Following the "T" is a "1" or "0" indicating the recommended position of welding. The "1" or "0" following the "T" designates the following: "0" – designed to weld in the flat or horizontal position, "1" – designed to weld in all position. Following the position indicator and a dash, are the numerals "1", "3", "4", "5", or the letter "G". The numerals "1", "4", and "5" identify the shielding gas required for classification of the electrode. The number "3" signifies that an external shielding gas is not employed. The letter "G" signifies that the shielding medium, chemical composition and mechanical properties are not specified.
Alloy: WW308LT-1 Class: E308LT-X AWS: A5.22	C = 0.04 max Mn = 0.05-2.5 Si = 1.0 max P = 0.04 max Fe = Remainder S = 0.03 max Cr = 18.0-21.0 Ni = 9.0-11.0 Mo = 0.5 max Cu = 0.5 max	For welding types 301, 302, 304, 304L 308, and 308L. May be used for welding types 321 and 347 if service temperature does not exceed 500F (260C). Low carbon content minimizes carbide precipitation. Following the chemical composition designation comes the letter "T" which signifies that the product is a flux cored electrode or rod. Following the "T" is a "1" or "0" indicating the recommended position of welding. The "1" or "0" following the "T" designates the following: "0" – designed to weld in the flat or horizontal position, "1" – designed to weld in all position. Following the position indicator and a dash, are the numerals "1", "3", "4", "5", or the letter "G". The numerals "1", "4", and "5" identify the shielding gas required for classification of the electrode. The number "3" signifies that an external shielding gas is not employed. The letter "G" signifies that the shielding medium, chemical composition and mechanical properties are not specified.

Flux Cored Stainless Electrodes

Specifications	Chemical Composition	Description
Alloy: WW309LMOT-1 Class: E309LMOTX-X AWS: A5.22	C = 0.04 max Mn = 0.5-2.5 Si = 1.0 max P = 0.04 max S = 0.03 max Cr = 21.0-25.0 Ni = 12.0-16.0 Mo = 2.0-3.0 Cu = 0.50 max	The composition of this weld metal is the same as E309MOTX-X except for lower carbon content. Use these electrodes to join stainless steel to carbon and low alloy steels for services below 600F. Use for overlay. Ferrite is 20FN deposited. Following the chemical composition designation comes the letter "T" which signifies that the product is a flux cored electrode or rod. Following the "T" is a "1" or "0" indicating the recommended position of welding. The "1" or "0" following the "T" designates the following: "0" – designed to weld in the flat or horizontal position, "1" – designed to weld in all position. Following the position indicator and a dash, are the numerals "1", "3", "4", "5", or the letter "G". The numerals "1", "4", and "5" identify the shielding gas required for classification of the electrode. The number "3" signifies that an external shielding gas is not employed. The letter "G" signifies that the shielding medium, chemical composition and mechanical properties are not specified.
Alloy: WW309LT-1 Class: E309LT-X AWS: A5.22	C = 0.04 max Mn = 0.5-2.5 Si = 1.0 max P = 0.04 max Fe = Remainder S = 0.03 max Cr = 22.0-25.0 Ni = 12.0-14.0 Mo = 0.5 max Cu = 0.5 max	Designed for welding type 309 wrought, or cast forms, but used extensively for welding type 304 to mild or carbon steel. Also used for welding 304 clad sheets and for applying stainless steel sheet linings to carbon steel. Following the chemical composition designation comes the letter "T" which signifies that the product is a flux cored electrode or rod. Following the "T" is a "1" or "0" indicating the recommended position of welding. The "1" or "0" following the "T" designates the following: "0" – designed to weld in the flat or horizontal position, "1" – designed to weld in all position. Following the position indicator and a dash, are the numerals "1", "3", "4", "5", or the letter "G". The numerals "1", "4", and "5" identify the shielding gas required for classification of the electrode. The number "3" signifies that an external shielding gas is not employed. The letter "G" signifies that the shielding medium, chemical composition and mechanical properties are not specified.
Alloy: WW310T-1 Class: E310T-X AWS: A5.22	C = 0.20 max Cr = 25.0-28.0 Ni = 20.0-22.5 Mo = 0.50 max Mn = 1.0-2.5 Si = 1.0 max P = 0.03 max S = 0.03 max Cu = 0.50 max	The nominal composition of this weld metal is 26.5 Chromium and 21 Nickel. These electrodes are most often used to weld base metals of similar compositions. Following the chemical composition designation comes the letter "T" which signifies that the product is a flux cored electrode or rod. Following the "T" is a "1" or "0" indicating the recommended position of welding. The "1" or "0" following the "T" designates the following: "0" – designed to weld in the flat or horizontal position, "1" – designed to weld in all position. Following the position indicator and a dash, are the numerals "1", "3", "4", "5", or the letter "G". The numerals "1", "4", and "5" identify the shielding gas required for classification of the electrode. The number "3" signifies that an external shielding gas is not employed. The letter "G" signifies that the shielding medium, chemical composition and mechanical properties are not specified.
Alloy: WW312T-1 Class: E312T-X AWS: A5.22	C = 0.15 max Cr = 28.0-32.0 Ni = 8.0-10.5 Mo = 0.50 max Mn = 0.5-2.5 Si = 1.0 max P = 0.04 max S = 0.03 max Cu = 0.50 max	These electrodes most often are used to weld dissimilar metal compositions of which one component is higher in nickel. This alloy gives a two phase weld deposit with substantial amounts of ferrite in an austenite matrix. Following the chemical composition designation comes the letter "T" which signifies that the product is a flux cored electrode or rod. Following the "T" is a "1" or "0" indicating the recommended position of welding. The "1" or "0" following the "T" designates the following: "0" – designed to weld in the flat or horizontal position, "1" – designed to weld in all position. Following the position indicator and a dash, are the numerals "1", "3", "4", "5", or the letter "G". The numerals "1", "4", and "5" identify the shielding gas required for classification of the electrode. The number "3" signifies that an external shielding gas is not employed. The letter "G" signifies that the shielding medium, chemical composition and mechanical properties are not specified.

Flux Cored Stainless Electrodes

Specifications	Chemical Composition	Description
Alloy: WW316HT-1 Class: E316HX-X AWS: A5.22	C = 0.08 max Cr = 17.0-20.0 Ni = 11.0-14.0 Mo = 2.0-3.0 Mn = 0.5-2.5 Si = 1.0 max P = 0.04 max S = 0.03 max Cu = 0.50 max	Electrodes of this classification usually are used for welding similar alloys. These electrodes have been used successfully in applications involving special alloys for high-temperature service. Carbon content is the high range 0.04 to 0.08% as compared to E316LT-X. Following the chemical composition designation comes the letter "T" which signifies that the product is a flux cored electrode or rod. Following the "T" is a "1" or "0" indicating the recommended position of welding. The "1" or "0" following the "T" designates the following: "0" – designed to weld in the flat or horizontal position, "1" – designed to weld in all position. Following the position indicator and a dash, are the numerals "1", "3", "4", "5", or the letter "G". The numerals "1", "4", and "5" identify the shielding gas required for classification of the electrode. The number "3" signifies that an external shielding gas is not employed. The letter "G" signifies that the shielding medium, chemical composition and mechanical properties are not specified.
Alloy: WW316LT-1 Class: E316LT-X AWS: A5.22	C = 0.04 max Mn = 0.5-2.5 Si = 1.0 max P = 0.04 max Fe = Remainder S = 0.03 max Cr = 17.0-20.0 Ni = 11.0-14.0 Mo = 2.0-3.0 Cu = 0.5 max	The lower carbon content makes it possible to obtain resistance to intergranular corrosion without the use of stabilizers such as columbium or titanium. Low carbon alloy is not as strong as higher carbon at elevated temperature. Following the chemical composition designation comes the letter "T" which signifies that the product is a flux cored electrode or rod. Following the "T" is a "1" or "0" indicating the recommended position of welding. The "1" or "0" following the "T" designates the following: "0" – designed to weld in the flat or horizontal position, "1" – designed to weld in all position. Following the position indicator and a dash, are the numerals "1", "3", "4", "5", or the letter "G". The numerals "1", "4", and "5" identify the shielding gas required for classification of the electrode. The number "3" signifies that an external shielding gas is not employed. The letter "G" signifies that the shielding medium, chemical composition and mechanical properties are not specified.
Alloy: WW317LT-1 Class: E317LT-X AWS: A5.22	C = 0.04 max Mn = 0.5-2.5 Si = 1.0 max P = 0.04 max Fe = Remainder S = 0.03 max Cr = 18.0-21.0 Ni = 12.0-14.0 Mo = 3.0-4.0 Cu = 0.5 max	Recommended for welding type 317 stainless with a maximum of .04% carbon in the weld deposit. The higher molybdenum content, as compared to the type 316L, further reduces susceptibility to pitting corrosion. Used in the pulp and paper industry and in other severe corrosion applications involving sulfuric and sulfurous acids and their salts. Following the chemical composition designation comes the letter "T" which signifies that the product is a flux cored electrode or rod. Following the "T" is a "1" or "0" indicating the recommended position of welding. The "0" designed to weld in the flat or horizontal position, "1" designed to weld in all position. Following the position indicator and a dash, are the numerals "1", "3", "4", "5", or the letter "G". The numerals "1", "4", and "5" identify the shielding gas required for classification of the electrode. The number "3" signifies that an external shielding gas is not employed. The letter "G" signifies that the shielding medium, chemical composition and mechanical properties are not specified.
Alloy: WW347T-1 Class: E347T-X AWS: A5.22	C = 0.08 max Cr = 18.0-21.0 Ni = 9.0-11.0 Mo = 0.50 max Nb = 8xC min-1.0 max Mn = 0.5-2.5 Si = 1.0 max P = 0.04 max S = 0.03 max Cu = 0.50 max	This alloy is often referred to as a stabilized type 308 alloy. Electrodes of this classification usually are used for welding Chromium-Nickel steel base metals of similar composition stabilized with columbium or titanium. Following the chemical composition designation comes the letter "T" which signifies that the product is a flux cored electrode or rod. Following the "T" is a "1" or "0" indicating the recommended position of welding. The "1" or "0" following the "T" designates the following: "0" – designed to weld in the flat or horizontal position, "1" – designed to weld in all position. Following the position indicator and a dash, are the numerals "1", "3", "4", "5", or the letter "G". The numerals "1", "4", and "5" identify the shielding gas required for classification of the electrode. The number "3" signifies that an external shielding gas is not employed. The letter "G" signifies that the shielding medium, chemical composition and mechanical properties are not specified.

Flux Cored Steel

Specifications	Chemical Composition	Description
Alloy: WW71T-1 Class: E71T-1 AWS: A5.20	C = 0.18 max Mn = 1.75 max Si = 0.90 max S = 0.03 max P = 0.03 max Cr = 0.20 max Ni = 0.50 max Mo = 0.30 max V = 0.08 max Cu = 0.35 max Note = Cr, Ni, Mo, V, Al, Cu shall be reported only if intentionally added	E71T-1 is designed for welding mild and medium carbon steels in all positions. Shielding gas Co2 or 75% Argon / 25% Co2.
Alloy: WW71T-GS Class: E71T-GS AWS: A5.20	= not specified in ASME SFA A5.20	71T-GS is a self shielding all position flux cored welding wire for single pass applications. The use of DC straight polarity minimizes the risk of burn through. Is excellent on lap and fillet welds on thin mild steels.

Specifications	Chemical Composition	Description
Alloy: WWAlloyA Class: ENiCrFe-2 AWS: A5.11	C = 0.10 max Mn = 1.0-3.5 Fe = 12.0 max P = 0.03 max S = 0.02 max Si = 0.75 max Cu = 0.50 max Ni = 62.0 min Co = 0.12 max (when specified) Cr = 13.0-17.0 Nb = 0.5-3.0 (including incidental Cobalt) Mo = 0.5-2.50 Other = 0.50 max	Alloy 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. There is a large range of applications from cryogenic temperatures up to 1500F.
Alloy: WWC276 Class: ENiCrMo-4 AlloyC276 AWS: A5.11	C = 0.02 max Mn = 1.0 max Fe = 4.0-7.0 P = 0.04 max S = 0.03 max Si = 0.20 max Cu = 0.50 max Ni = Remainder (includes incidental Cobalt) Co = 2.5 max Cr = 14.5-16.5 Mo = 15.0-17.0 V = 0.35 max W = 3.0-4.5 Other = 0.50 max	Type C276 is used for welding materials of similar composition. Material can be used for dissimilar welding between nickel base alloys and stainless steels as well as for surfacing and cladding. Offers excellent resistance to stress corrosion, cracking, pitting and crevice corrosion.
Alloy: WWENiCrMo-2 Class: ENiCrMo-2 HasX Alloy X AWS: A5.11	C = 0.05-0.15 Mn = 1.0 max Fe = 17.0-20.0 P = 0.04 max S = 0.03 max Si = 1.0 max Cu = 0.50 max Ni = Remainder (includes incidental Cobalt) Co = 0.50-2.50 Cr = 20.5-23.0 Mo = 8.0-10.0 W = 0.20-1.0 Other = 0.50 max	Electrodes of the ENiCrMo-2 classification are used for welding nickel-chromium-molybdenum alloys, for the clad side of joints in steel clad with nickel-chromium-molybdenum alloy. Also for welding Cr-Mo alloys to steel and other nickel base alloys. These electrodes are normally used only in the flat position.
Alloy: WWNA022 Class: ENiCrMo-10 Alloy 22 AWS: A5.11	C = 0.02 max Mn = 1.0 max Fe = 2.0-6.0 P = 0.03 max S = 0.015 max Si = 0.20 max Cu = 0.50 max Ni = Remainder (includes incidental Cobalt) Co = 2.5 max Cr = 20.0-22.5 Mo = 12.5-14.5 V = 0.35 max W = 2.5-3.5	This welding product is used for matching composition filler material for welding C-22 alloy wrought or cast products. Can join stainless and nickel alloys or dissimilar corrosion resistant alloys and cladding. Suitable for most application in the as-welded condition.

Specifications	Chemical Composition	Description
Alloy: WWNA112 Class: ENiCrMo-3 Alloy 112 AWS: A5.11	C = 0.10 max Mn = 1.0 max Fe = 7.0 max P = 0.03 max S = 0.02 max Si = 0.75 max Cu = 0.50 max Ni = 55.0 min (includes incidental Cobalt) Co = 0.12 max (when specified) Cr = 20.0-23.0 Nb = 3.15-4.15 Mo = 8.00-10.0	Type 112 is an electrode which is used to weld nickel-chromium-molybdenum alloys. Its applications include dissimilar joints between nickel-chromium-molybdenum alloys to either stainless steels, carbon or low alloy steels. These electrodes are used in applications where the temperature ranges up to 1800F.
Alloy: WWNA117 Class: ENiCrCoMo-1 Alloy117 AWS: A5.11	C = 0.05-0.15 Mn = 0.30-2.5 Fe = 5.0 max P = 0.03 max S = 0.015 max Si = 0.75 max Cu = 0.50 max Ni = Remainder (includes incidental Cobalt) Co = 9.0-15.0 Cr = 21.0-26.0 Nb = 1.0 max Mo = 8.0-10.0 Other = 0.50	Type 117 electrode is used for welding of nickel-chromium-cobalt-molybdenum alloys. Can be used for overlay cladding when similar alloy is required. Weld metal provides optimum strength above 1500F up to 2100F.
Alloy: WWNA141 Class: ENi-1 Alloy 141 AWS: A5.11	C = 0.10 max Mn = 0.75 max Fe = 0.75 max P = 0.03 max S = 0.02 max Si = 1.25 max Cu = 0.25 max Ni = 92.0 (includes incidental cobalt) Al = 1.0 max Ti = 1.0-4.0 Other = 0.50	Type 141 is used for welding of cast and wrought forms of commercially pure nickel. This type of electrode can be used for dissimilar welding between nickel and steel or stainless steel.
Alloy: WWNA182 Class: ENiCrFe-3 Alloy 182 AWS: A5.11	C = 0.10 max Mn = 5.0-9.5 Fe = 10.0 max P = 0.03 max S = 0.015 max Si = 1.0 max Cu = 0.50 max Ni = 59.0 min (includes incidental Cobalt) Co = 0.12 max (when specified) Ti = 1.0 max Cr = 13.0-17.0 Nb = 1.0-2.5 Other = 0.50 max	Type 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. High manganese reduces creep strength which limits its usage up to 900F.

Specifications	Chemical Composition	Description
Alloy: WWNA190 Class: ENiCu-7 Alloy 190 AWS: A5.11	C = 0.15 max Mn = 4.0 max Fe = 2.5 max P = 0.02 max S = 0.015 max Si = 1.5 max Cu = Remainder Ni = 62.0-69.0 (includes incidental Cobalt) Al = 0.75 max Ti = 1.0 max Other = 0.50 max	Alloy 190 is used for welding materials of nickel-copper alloys to themselves such as ASTM B127, B163, B164, B165. Can be used for overlay of clad steels where nickel-copper surfacing is required. Dissimilar welding applications include joining nickel 200 and copper-nickel alloys.
Alloy: WWNickel 55 Class: ENiFe-CI AWS: A5.15	C = 2.0 max Mn = 2.5 max Si = 4.0 max S = 0.03 max Fe = Remainder Ni = 45.0-60.0 (includes incidental Cobalt) Cu = 2.5 max (includes incidental Silver) Al = 1.0 max Other = 1.0 max	Type Nickel 55 is used for welding of cast irons to themselves as well as for joining cast irons to mild steel, and also for repair to castings. Preheat and interpass of not less than 350F is required during welding.
Alloy: WWNickel 99 Class: ENi-CI AWS: A5.15	C = 2.0 max Mn = 2.5 max Si = 4.0 max S = 0.03 max Fe = 8.0 max Ni = 85.0 min (includes incidental Cobalt) Cu = 2.5 max (includes incidental Silver) Al = 1.0 max Other = 1.0 max	Type Nickel 99 electrode is designed for welding of gray iron castings to themselves as well as joining them to mild steels or stainless steels. Preheat and interpass temperature of not less than 350F is recommended during welding.
Alloy: WWNiMo-7 Class: ENiMo-7 AlloyB-2 AWS: A5.11	C = 0.02 max Mn = 1.75 max Fe = 2.25 max P = 0.04 max S = 0.03 max Si = 0.20 max Cu = 0.50 max Ni = Remainder (includes incidental Cobalt) Co = 1.0 max Cr = 1.0 max Mo = 26.0-30.0 W = 1.0 max Other = 0.50 max	These electrodes are used for welding nickel, molybdenum alloys and clad side of joints in steel clad with a Ni, Mo alloy and to other nickel base alloys. These electrodes normally are used in the flat position.

Specifications	Chemical Composition	Description
Alloy: WWNA82 Class: ERNiCr-3 Alloy 82 AWS: A5.14	Ni = 67.0 min (includes incidental Cobalt) C = 0.010 max Mn = 2.5-3.5 Fe = 3.0 max S = 0.015 max Si = 0.50 max Cu = 0.50 max Cr = 18.0-22.0 Ti = 0.75 max Nb = 2.0-3.0 P = 0.03 max Others = 0.50 max	For welding Inconel alloy 600 and Incoloy 800, overlaying on steel, and various dissimilar metal welding applications using the GMAW and GTAW processes.
Alloy: WWNA062 Class: ERNiCrFe-5 Alloy 62 AWS: A5.14	C = 0.08 max Mn = 1.0 max Fe = 6.0-10.0 P = 0.03 max S = 0.015 max Si = 0.35 max Cu = 0.50 max Ni = 70.0 min Cr = 14.0-17.0 Nb = 1.5-3.0 Others = 0.50 max	Used primarily for gas tungsten arc and gas metal arc matching composition base metals. Also used for welding Inconel 601 and Incoloy 800. Can be used to weld dissimilar metal combinations such as steel, stainless steel, Inconel, and Incoloy alloys.
Alloy: WWNA55 Class: ERNiFe-CI AWS: A5.15	Ni = 35.0-45.0 C = 0.50 max Mn = 10.0-14.0 Fe = Remainder S = 0.03 max Si = 1.0 max Cu = 2.5 max Al = 1.0 max Others = 1.0 max	ERNiFe-CI is for welding gray, ductile and Ni-resist cast irons to wrought alloys. Also, for high sulfur, phosphorus or lubricant –contaminated castings.
Alloy: WWNA60 Class: ERNiCu-7 Alloy 60 AWS: A5.14	Ni = 62.0-69.0 (includes incidental Cobalt) Cu = Remainder Ti = 1.5-3.0 Mn = 4.0 max Fe = 2.5 max C = 0.15 max Al = 1.25 max P = 0.02 max S = 0.015 max Si = 1.25 max Others = 0.50 max	A copper-nickel alloy base wire for GMAW and GTAW of Monel alloys 400 and 404. Also used for overlaying steel after first applying barrier of nickel 610.

Nickel Alloy (ER)

Specifications	Chemical Composition	Description
Alloy: WWNA61 Class: ERNi-1 Alloy 61 AWS: A5.14	Ni = 93.0 min (includes incidental Cobalt) C = 0.15 max Mn = 1.0 max Fe = 1.0 max S = 0.015 max Si = 0.75 Cu = 0.25 max Al = 1.5 max Ti = 2.0-3.5 P = 0.03 max Others = 0.50 max	For GMAW ans GTAW of nickel 200 and 201 and joining these alloys to stainless and carbon steels, and other nickel and copper-nickel base metals. Also used for overlaying steel.
Alloy: WWNA625 Class: ERNiCrMo-3 Alloy625 AWS: A5.14	Ni+Co = 58.0 min C = 0.10 max Fe = 5.0 max Nb = 3.15-4.15 S = 0.015 max Mn = 0.50 max P = 0.02 max Si = 0.50 max Mo = 8.0-10.0 Al = 0.40 max Cr = 20.0-23.0 Cu = 0.50 max Ti = 0.40 max Others = 0.50 max	Used primarily for gas tungsten arc and gas metal arc matching composition base metals. Also used for welding Inconel 601 and Incoloy 800. Can be used to weld dissimilar metal combinations such as steel, stainless steel, Inconel, and Incoloy alloys.
Alloy: WWNA67 (Copper Nickel) Class: ERCuNi Alloy 67 AWS: A5.14	Cu = Remainder Mn = 1.0 max Fe = 0.40-0.75 Si = 0.25 max Ni = 29.0-32.0 P = 0.02 max S = 0.01 max Pb = 0.02 max Ti = 0.20-0.50 Others = 0.50 max	For gas metal arc and gas tungsten arc welding 70/30, 80/20, ad 90/10 copper-nickel alloys. A barrier layer of nickel alloy 610 is recommended prior to overlaying steel with GMAW process.
Alloy: WWNA718 Class: ERNiFeCr-2 Alloy718 AWS: A5.14	C = 0.08 max Mn = 0.35 max Fe = Remainder P = 0.015 max S = 0.015 max Si = 0.35 max Cu = 0.30 max Ni = 50.0-55.0 (includes incidental Cobalt) Al = 0.20-0.80 Ti = 0.65-1.15 Cr = 17.0-21.0 Nb = 4.75-5.50 Mo = 2.80-3.30 Other = 0.50 max	718 filler metal is used of gas tungsten arc welding of Nickel-Chromium-Columbium-Molybdenum alloys. The weld metal will precipitation harder on heat treatments.

Specifications	Chemical Composition	Description
Alloy: WWNA99 Class: ERNi-CI AWS: A5.15	Ni = 90.0 min C = 1.0 max Mn = 2.5 max Fe = 4.0 max S = 0.03 max Si = 1.0 max Cu = 4.0 max Al = 1.0 max Others = 1.0 max	This classification is used for tig and mig welding of cast irons. Major use is the repair of gray iron castings. The welds are easily machinable.
Alloy: WWNiCrCoMo-1 Class: ERNiCrCoMo-1 Alloy617 AWS: A5.14	C = 0.05-0.15 Mn = 1.0 max Fe = 3.0 max P = 0.03 max S = 0.015 max Si = 1.0 max Cu = 0.50 max Ni = Remainder (includes incidental Cobalt) Co = 10.0-15.0 Al = 0.80-1.50 Ti = 0.60 max Cr = 20.0-24.0 Mo = 8.0-11.0 Others = 0.50 max	Filler metal of the ERNiCrCoMo-1 classification is used for welding nickel-chromium-cobalt-molybdenum base material using both the gas tungsten arc and gas metal arc process. Also other cast heat resisting alloys and dissimilar metals for high temperature service up to 2100F.
Alloy: WWNiCrMo-1 Class: ERNiCrMo-1 HasG AlloyG AWS: A5.14	C = 0.05 max Mn = 1.0-2.0 Fe = 18.0-21.0 P = 0.04 max S = 0.03 max Si = 0.10 max Cu = 1.5-2.5 Ni = Remainder Co = 2.5 max Cr = 21.0-23.5 Nb = 1.75-2.5 Mo = 5.5-7.5 W = 0.20 max Others = 0.50 max	Filler metal of this classification is used for welding nickel-chromium-molybdenum base material. Can use GTAW, GMAW, welding processed for cladding steel with the ERNiCrMo-1 weld material.
Alloy: WWNiCrMo-11 Class: ERNiCrMo-11 AlloyG-3 AWS: A5.14	C = 0.03 max Mn = 1.5 max Fe = 13.0-17.0 P = 0.04 max S = 0.02 max Si = 0.08 max Cu = 1.0-2.4 max Ni = Remainder (includes incidental Cobalt) Co = 5.0 max Cr = 28.0-31.5 Nb = 0.30-1.5 Mo = 4.0-6.0 W = 1.5-4.0 Others = 0.50 max	Filler metal of this classification is used for welding nickel-chromium-molybdenum base metal to themselves, to steel, to other nickel base alloys, and for cladding steel with nickel-chromium-molybdenum weld metal by the gas tungsten arc, gas metal arc, welding processes.

Nickel Alloy (ER)

Specifications	Chemical Composition	Description
Alloy: WWNiCrMo-2 Class: ERNiCrMo-2 Has X AWS: A5.14	Ni = Remainder C = 0.05-0.15 Mn = 1.0 max Fe = 17.0-20.0 P = 0.04 max S = 0.03 max Si = 1.0 max Cu = 0.50 max Co = 0.5-2.5 Cr = 20.5-23.0 Mo = 8.0-10.0 W = 0.2-1.0 Others = 0.50 max	ERNiCrMo-2 is a major nickel base high temperature alloy. Standard material for aircraft marine and industrial gas turbine engine combustors.
Alloy: WWNiCrMo-4 Class: ERNiCrMo-4 AlloyC-276 AWS: A5.14	C = 0.02 max Mn = 1.0 max Fe = 4.0-7.0 P = 0.04 max S = 0.03 max Si = 0.08 max Cu = 0.50 max Ni = Remainder (includes incidental Cobalt) Co = 2.5 max Cr = 14.5-16.5 Mo = 15.0-17.0 V = 0.35 max W = 3.0-4.5 Others = 0.50 max	Filler metal of this classification is used for welding nickel-chromium-molybdenum base metal to itself, to steel, to other nickel base alloys, and for cladding steel with nickel-chromium-molybdenum weld metal by the gas tungsten arc and gas metal arc process.
Alloy: WWNiCrMo-7 Class: ERNiCrMo-7 AlloyC-4 AWS: A5.14	C = 0.15 max Mn = 1.0 max Fe = 3.0 max P = 0.04 max S = 0.03 max Si = 0.08 max Cu = 0.50 max Ni = Remainder (includes incidental Cobalt) Co = 2.0 max Ti = 0.70 max Cr = 14.0-18.0 Mo = 14.0-18.0 W = 0.50 max Others = 0.50 max	Filler metal of this classification is used for welding nickel-chromium-molybdenum base metal to itself, to steel, to other nickel base alloys, and for cladding steel with nickel-chromium-molybdenum weld metal by the gas tungsten arc, gas metal arc processes.
Alloy: WWNiCrMo-8 Class: ERNiCrMo-8 AlloyG-2 AWS: A5.14	C = 0.03 max Mn = 1.0 max Fe = Remainder P = 0.03 max S = 0.03 max Si = 1.0 max Cu = 0.7-1.2 Ni = 47.0-52.0 Ti = 0.70-1.50 Cr = 23.0-26.0 Mo = 5.0-7.0 Others = 0.50 max	Filler metal of this classification is used for welding nickel-chromium-molybdenum base metal to itself, to steel, to other nickel base alloys, and for cladding steel with nickel-chromium-molybdenum weld metal by the gas tungsten arc, gas metal arc, processes.

Nickel Alloy (ER)

Specifications	Chemical Composition	Description
Alloy: WWNiCrMo-9 Class: ERNiCrMo-9 AlloyG-3 AWS: A5.14	C = 0.015 max Mn = 1.0 max Fe = 18.0-21.0 P = 0.04 max S = 0.03 max Si = 1.0 max Cu = 1.5-2.5 Ni = Remainder (includes incidental Cobalt) Co = 5.0 max Cr = 21.0-23.5 Nb = 0.50 max Mo = 6.0-8.0 max W = 1.5 max Others = 0.50 mas	Filler metal of this classification is used for welding nickel-chromium-molybdenum base metal to themselves, to steel, to other nickel base alloys, and for cladding steel with nickel-chromium-molybdenum weld metal by the gas tungsten arc, gas metal arc, welding processes.
Alloy: WWNiMo-3 Class: ERNiMo-3 Has W AWS: A5.14	Ni = Remainder C = 0.12 max Mn = 1.0 max Fe = 4.0-7.0 P = 0.04 max S = 0.03 max Si = 1.0 max Cu = 0.50 max Co = 2.5 max Cr = 4.0-6.0 Mo = 23.0-26.0 V = 0.60 max W = 1.0 max Others = 0.50 max	ERNiMo-3 is a Ni-24, Mo-6, Fe-5 Cr alloy that is excellent for welding dissimilar high temperature alloys. Major use is in aircraft engine repair and maintenance.

Stainless Metallizing Wire

Specifications	Chemical Composition	Description
Alloy: WWMetallizing Stainless Wire #1 Class: No #1 AWS: MIL-W-6712B, Stainless Steel 18-8,	C = 0.08 max P = 0.03 max S = 0.03 max Mn = 2.0 max Ni = 8.0 max Cr = 18.0 max Si = .075 max Fe = Balance	Stainless Metallizing Wire #1 can be sprayed with most metalizing guns, using only fuel gas. Use #1 wherever a corrosion and wear resistant stainless steel is required. Applications include shafts, value plugs, hydraulic rams. Since it is a high-shrink material, use grooves for coatings more than .030" thick, wherever there are edges. Parameters for spraying can be obtained from Spraying Instruction Manuals. Coatings may be machined or ground. Respiratory protection is recommended for spraying this material.
Alloy: WWMetallizing Stainless Wire #2 Class: No #2 AWS: MIL-W-6712B Stainless Steel	C = 0.35 max P = 0.02 max S = 0.02 max Mn = 0.35 max Ni = 0.50 max Cr = 13.0 max Si = 0.50 max Fe = Balance	Stainless Metallizing Wire #2 can be sprayed with most metalizing guns using any fuel gas. Use #2 wherever a hard coating is required, even where corrosion resistance is not necessary. It is high strength, high elongation and low shrink. Use on cylinder liners, pistons, valve stems, rams or crankshaft bearings. Parameters for spraying can be obtained from Spraying Instruction Manuals. Coatings may be machined or ground. Respiratory protection is recommended for spraying this material.
Alloy: WWMetallizing Stainless Wire #4 Class: No #4 AWS: MIL-W-6712B Stainless Steel, 17-2	C = 0.8 max P = 0.04 max S = 0.03 max Mn = 2.0 max Ni = 12.0 max Cr = 17.0 max Mo = 2.5 max Si = 1.0 max Fe = Balance	No #4 wire can be sprayed with most metalizing guns using any fuel gas. Use No #4 wherever a type 316 stainless is specified. Parameters for spraying can be obtained from Spraying Instruction Manuals. Coatings may be machined or ground. Respiratory protection is recommended for spraying this material.
Alloy: WWMetallizing Stainless Wire #5 Class: No #5 AWS: MIL-W-6712B Stainless Steel, 18-5	C = 0.15 max P = 0.06 max S = 0.03 max Mn = 8.50 max Ni = 5.00 max Cr = 18.0 max Si = 1.0 max Fe = Balance	No #5 can be sprayed with most metallizing guns using any fuel gas. Use on seal rings, casings, valve plugs. Use #5 for inside diameters where shrink is a problem or for thick coatings where other materials may crack. Parameters for spraying can be obtained from Spraying Instruction Manuals. Coatings may be machined or ground. Respiratory protection is recommended for spraying this material.

Specifications	Chemical Composition	Description
Alloy: WW2209-16 Class: E2209-16 AWS: A5.4	C = 0.04 max Cr = 21.5-23.5 Ni = 8.5-10.5 Mo = 2.5-3.5 Mn = 0.5-2.0 Si = 0.90 max P = 0.04 max S = 0.03 max N = 0.08-0.20 Cu = 0.75 max	Type E2209-16 is used to weld duplex stainless steels. Welds offer excellent resistance to stress corrosion, cracking and pitting.
Alloy: WW2553-16 Class: E2553-16 AWS: A5.4	C = 0.06 max Cr = 24.0-27.0 Ni = 6.5-8.5 Mo = 2.9-3.9 Mn = 0.5-1.5 Si = 1.0 max P = 0.04 max S = 0.03 max N = 0.10-0.25 Cu = 1.5-2.5	E2553-16 is a duplex austenitic-ferritic stainless steel with controlled ferrite. It can be used for joining duplex stainless to carbon or low alloy steel, and for cladding these steels.
Alloy: WW308-16 Class: E308-16 AWS: A5.4	C = 0.08 max Cr = 18.0-21.0 Ni = 9.0-11.0 Mn = 0.5-2.5 Si = 0.90 max P = 0.04 max S = 0.03 max Mo = 0.75 max Cu = 0.75 max	E308-16 is designed for welding of the following 18-8 stainless steel types: 301, 302, 304 and 308. The weld deposit has the proper chemical content and balance for satisfactory welding of type 308, and therefore is suitable for welding 18-8 types of lower alloy content. Sound weld metal and corrosion resistance equal to or greater that that of the parent metal are assured. Ground and polished welds cannot be distinguished from parent metal.
Alloy: WW308H-16 Class: E308H-16 AWS: A5.4	C = 0.04-0.08 Cr = 18.0-21.0 Ni = 9.0-11.0 Mo = 0.75 max Mn = 0.5-2.5 Si = 0.90 max P = 0.04 max S = 0.03 max	Type E308H-16 electrodes can be used in all the applications specified for type E308-16. In addition it can be used to weld type 304H and similar applications where creep strength is required.

Specifications	Chemical Composition	Description
Alloy: WW308L-16 Class: E308L-16 AWS: A5.4	C = 0.04 max Cr = 18.0-21.0 Ni = 9.0-11.0 Mn = 0.5-2.5 Si = 0.90 max P = 0.04 max S = 0.03 max Mo = 0.75 max Cu = 0.75 max	E308L-16 was developed for welding 304L. This electrode deposits a maximum of .04% carbon in the weld metal. Type 308L-16 is used extensively for the welding of chemical plant equipment, and may be used successfully for welding types 321 and 347 steels. E308L-16 minimizes the formation of chromium carbides in the weld metal.
Alloy: WW309-16 Class: E309-16 AWS: A5.4	C = 0.15 max Cr = 22.0-25.0 Ni = 12.0-14.0 Mn = 0.5-2.5 Si = 0.90 max P = 0.04 max S = 0.03 max Mo = 0.75 max Cu = 0.75 max	E309-16 is primarily intended for welding heat resistant austentic Cr-Ni steels of similar analysis such as AISI 309 or 309S. Also suitable for joining dissimilar metals such as 18Cr-8Ni stainless steel to mild steel and welding of clad surfaces of steel.
Alloy: WW309L-16 Class: E309L-16 AWS: A5.4	C = 0.04 max Cr = 22.0-25.0 Ni = 12.0-14.0 Mn = 0.5-2.5 Si = 0.90 max P = 0.04 max S = 0.03 max Mo = 0.75 max Cu = 0.75 max	Type E309L-16 is designed for welding heat resistant base metals of similar compositions, also to weld dissimilar materials and for stainless steel overlays on plain carbon or low-alloy steels. E309L-16 is preferred to E309-16 for cladding over carbon or low alloy steels, as well as dissimilar joints which undergo heat treatment.
Alloy: WW309MoL-16 Class: E309MoL-16 AWS: A5.4	C = 0.04 max Cr = 22.0-25.0 Ni = 12.0-14.0 Mo = 2.0-3.0 Mn = 0.5-2.5 Si = 0.90 max P = 0.04 max S = 0.03 max Cu = 0.75 max	Type E309MoL-16 is designed for applications requiring molybdenum with a standard 309 analysis except for a lower carbon limit. It is used primarily for welding type 316 clad steels, or welding molybdenum-containing austenitic stainless steel to carbon steel. Service temperature must be less than 600F (316C).

Specifications	Chemical Composition	Description
Alloy: WW310-16 Class: E310-16 AWS: A5.4	C = 0.08-0.20 Cr = 25.0-28.0 Ni = 20.0-22.5 Mn = 1.0-2.5 Si = 0.75 max P = 0.03 max S = 0.03 max Mo = 0.75 max Cu = 0.75 max	E310-16 electrodes were developed for the welding of type 310 stainless steel, weld deposit will exhibit the same chemical analysis and oxidation resistance as the base plate metal. E310-16 is considered a general purpose electrode for welding almost every analysis of carbon and alloy steel. Preheating to 300 to 500F produces strong crack-free welds in dissimilar steels.
Alloy: WW310CB-16 Class: E310CB-16 AWS: A5.4	C = 0.12 max Cr = 25.0-28.0 Ni = 20.0-22.0 Mo = 0.75 max Nb = 0.70-1.00 Mn = 1.0-2.5 Si = 0.75 max P = 0.03 max S = 0.03 max Cu = 0.75 max	Type E310CB-16 electrodes deposit weld metal that is similar in composition to that of type 310, with an addition of columbium and a reduction in carbon content. Electrodes are primarily used for welding steels clad with type 347.
Alloy: WW310H-16 Class: E310H-16 AWS: A5.4	C = 0.35-0.45 Cr = 25.0-28.0 Ni = 20.0-22.5 Mn = 1.0-2.5 Si = 0.75 max P = 0.03 max S = 0.03 max Mo = 0.75 max Cu = 0.75 max	E310H-16 electrodes are used to weld high alloy heat and corrosion resistant castings. This electrode is not recommended for service in high sulfur atmospheres.
Alloy: WW312-16 Class: E312-16 AWS: A5.4	C = 0.15 max Cr = 28.0-32.0 Ni = 8.0-10.5 Mn = 0.5-2.5 Si = 0.90 max P = 0.04 max S = 0.03 max Mo = 0.75 max Cu = 0.75 max	E312-16 electrodes were originally designed for the welding of high tensile alloys to high temperature heat-resisting alloys on turbo-jet engines. However, based upon performance, these electrodes have found wide acceptance for the welding of newly developed high yield steels and abrasion resisting steels and dissimilar steels. The weld deposit of E312-16 electrodes, “as welded,” has the highest tensile and yield strength of any stainless arc welding electrode commonly used today.

Specifications	Chemical Composition	Description
Alloy: WW316-16 Class: E316-16 AWS: A5.4	C = 0.08 max Cr = 17.0-20.0 Ni = 11.0-14.0 Mn = 0.5-2.5 Si = 0.90 max P = 0.04 max S = 0.03 max Mo = 2.0-3.0 Cu = 0.75 max	E316-16 electrodes are designed for the welding to type 316 chromium-nickel steel. This alloy contains 2% to 3% molybdenum is addition to sufficient chromium and nickel to render is austenitic. Molybdenum is added to increase the corrosion resistance of the alloy to a firm attack known as pitting, which is induced by such corrosive metals as sulfuric and sulfurous acids, sulfites, chloride and cellulose solutions.
Alloy: WW316H-16 Class: E316H-16 AWS: A5.4	C = 0.04-0.08 Cr = 17.0-20.0 Ni = 11.0-14.0 Mo = 2.0-3.0 Mn = 0.5-2.5 Si = 0.90 max P = 0.04 max S = 0.03 max Cu = 0.75 max	Type E316H-16 can be used in all the applications that E316-16 is used in. In addition, it can be used to weld type 316H where improved creep strength is required.
Alloy: WW316L-16 Class: E316L-16 AWS: A5.4	C = 0.04 max Cr = 17.0-20.0 Ni = 11.0-14.0 Mn = 0.5-2.5 Si = 0.90 max P = 0.04 max S = 0.03 max Mo = 2.0-3.0 Cu = 0.75 max	E316L-16 electrodes deposit type 316 with a maximum of .04% carbon in the weld deposit. This electrode is used for welding type 316L or type 318 steels. E316L-16 is widely used in the welding of chemical molding equipment.
Alloy: WW317-16 Class: E317-16 AWS: A5.4	C = 0.08 max Cr = 18.0-21.0 Ni = 11.0-14.0 Mn = 0.5-2.5 Si = 0.90 max P = 0.04 max S = 0.03 max Mo = 3.0-4.0 Cu = 0.75 max	Welding of dissimilar steel or carbon steel to stainless steel. Stringer bead technique recommended for flat, horizontal and overhead positions. Weaving bead technique for welding in vertical position.

Specifications	Chemical Composition	Description
Alloy: WW317L-16 Class: E317L-16 AWS: A5.4	C = 0.04 max Cr = 18.0-21.0 Ni = 12.0-14.0 Mn = 0.5-2.5 Si = 0.90 max P = 0.04 max S = 0.03 max Mo = 3.0-4.0 Cu = 0.75 max	E317L-16 electrodes are designed for welding 317L and 317, can be used for welding in all positions. The high molybdenum content reduces the susceptibility to pitting.
Alloy: WW320-16 Class: E320-16 AWS: A5.4	C = 0.07 max Cr = 19.0-21.0 Ni = 32.0-36.0 Mo = 2.0-3.0 Mn = 0.5-2.5 Si = 0.60 max P = 0.04 max S = 0.03 max Cu = 3.0-4.0 Nb = 8xC min-1.0 max	E320-16 electrodes are used to weld matching composition Cb/Mo base metal. This alloy provides resistance to serve corrosion, especially in sulfuric and sulfurous acids.
Alloy: WW320LR-16 Class: E320LR-16 AWS: A5.4	C = 0.03 max Cr = 19.0-21.0 Ni = 32.0-36.0 Mo = 2.0-3.0 Nb = 8xC min-0.40 max Mn = 1.50-2.50 Si = 0.30 max P = 0.02 max S = 0.015 max Cu = 3.0-4.0	Type E320LR-16 is similar in composition to type 320, with carbon, silicon, phosphorous, and sulfur controlled to lower limits and columbium and manganese kept to a narrower range. Low heat input is advisable for welding/
Alloy: WW330-16 Class: E330-16 AWS: A5.4	C = 0.18-0.25 Cr = 14.0-17.0 Ni = 33.0-37.0 Mo = 0.75 max Mn = 1.0-2.5 Si = 0.90 max P = 0.04 max S = 0.03 max Cu = 0.75 max	E330-16 is a fully austenitic stainless steel electrode used to weld matching composition wrought and cast alloys. Generally used for resistance to oxidation and carbonization at elevated temperatures.

Specifications	Chemical Composition	Description
Alloy: WW347-16 Class: E347-16 AWS: A5.4	C = 0.08 max Cr = 18.0-21.0 Ni = 9.0-11.0 Mo = 0.75 max Mn = 0.5-2.5 Si = 0.90 max P = 0.04 max S = 0.03 max Cu = 0.75 max Nb = 8xC min - 1.0 max	E347-16 is designed for the welding of AISI 347 or AISI 321 alloys. Columbium content acts as a stabilizer and prevents carbide precipitation.
Alloy: WW410-16 Class: E410-16 AWS: A5.4	C = 0.12 max Cr = 11.0-13.5 Ni = 0.70 max Mo = 0.75 max Mn = 1.0 max Si = 0.90 max P = 0.04 max S = 0.03 max Cu = 0.75 max	E410-16 electrodes are recommended for welding type 410 straight chromium steel. This alloy is used extensively for corrosion and oxidation resistance at elevated temperatures up to 1500F. Unlike the chromium-nickel stainless steels, this type is not subject to loss of corrosion resistance due to carbide precipitation.
Alloy: WW410NiMo-16 Class: E410NiMo-16 AWS: A5.4	C = 0.06 max Cr = 11.0-12.5 Ni = 4.0-5.0 Mo = 0.40-0.70 Mn = 1.0 max Si = 0.90 max P = 0.04 max S = 0.03 max Cu = 0.75 max	Type E410NiMo-16 is designed to weld materials of similar chemical composition in cast and wrought forms. Preheat and interpass temperature not less than 300F is recommended. Post weld heat treatment should not exceed 1150F.
Alloy: WW420-16 Class: E420-16 AWS: A5.4	C = 0.27 max Mn = 0.40 max Si = 0.38 max Cr = 12.7 max P = 0.021 max S = 0.024 max Fe = Balance	Type E420-16 is structured for surface applications on carbon steels for good resistance to abrasion. Preheat and Interpass of not less that 400F is recommended during welding, use slow cooling.

Specifications	Chemical Composition	Description
Alloy: WW430-16 Class: E430-16 AWS: A5.4	C = 0.10 max Cr = 15.0-18.0 Ne = 0.60 max Mo = 0.75 max Mn = 1.0 max Si = 0.90 max P = 0.04 max S = 0.03 max Cu = 0.75 max	The weld deposit of type E430-16 electrodes is highly resistant to chemical corrosion and to oxidation up to 300F (704C). It is recommended for welding type 430 steel and may be used for type 410 when the chromium content of the plate is on the high side.
Alloy: WW502-16 Class: E502-16 AWS: A5.4	C = 0.10 max Cr = 4.0-6.0 Ni = 0.40 max Mo = 0.45-0.65 Mn = 1.0 max Si = 0.90 max P = 0.40 max S = 0.03 max Cu = 0.75 max	For welding matching composition base metal, usually pipe. Preheat and post-weld heat treatment required.
Alloy: WW505-16 Class: E505-16 AWS: A5.4	C = 0.10 max Cr = 8.0-10.5 Ni = 0.40 max Mo = 0.85-1.20 Mn = 1.0 max Si = 0.90 max P = 0.04 max S = 0.03 max Cu = 0.75	A coated electrode for welding matching composition chrome-moly plate and piping. Preheat and post-weld heat treatment required. Preheat and Interpass of at least 300F is required.
Alloy: WWSuperblue Class: Not Specified AWS: Not Specified	= All purpose electrode	Superblue is noted for good weldability, easy slag removal, high tensile and yield strength and satisfactory elongation. Deposits are highly resistant to wear, cracking, impact corrosion and heat. For best results, bevel heavy sections. Use short arc. Run stringer beads for high alloy steels. Preheating to 400F is recommended. Peening helps relieve stress. Let each pass cool for fast slag cool-off.

Specifications	Chemical Composition	Description
Alloy: WW308SI Class: ER308SI AWS: A5.9	C = 0.08 max Cr = 19.5-22.0 Ni = 9.0-11.0 Mn = 1.0-2.5 Si = 0.65-1.00 P = 0.03 max S = 0.03 max Mo = 0.75 max Cu = 0.75 max	ER308SI is suitable for joining stainless steels of the 304 type and 347 type. This classification is the same as ER308 except for the higher silicon content. This improves the usability of the filler metal in the gas metal arc welding processes.
Alloy: WW2209 Class: ER2209 AWS: A5.9	C = 0.03 max Cr = 21.5-23.5 Ni = 7.5-9.5 Mo = 2.5-3.5 Si = 0.90 max P = 0.03 max S = 0.03 max N = 0.08-0.20 Cu = 0.75 max	Type ER2209 weld filler metal is intended to weld duplex stainless steels. The weld metal exhibits high tensile strength and improved resistance to stress, corrosion, cracking and pitting. The wire exhibits a lower ferrite.
Alloy: WW308 Class: ER308 AWS: A5.9	C = 0.08 max Cr = 19.5-22.0 Ni = 9.0-11.0 Mn = 1.0-2.5 Si = 0.30-0.65 P = 0.03 max S = 0.03 max Mo = 0.75 max Cu = 0.75 max	ER308 is used for TIG, MIG and submerged arc welding of unstabilized stainless steels such as Types 301, 302, 304, 305, 308. This filler metal is the most popular grade among stainless steels, used for general purpose applications where corrosion conditions are moderate.
Alloy: WW308H Class: ER308H AWS: A5.9	C = 0.04-0.08 Cr = 19.5-22.0 Ni = 9.0-11.0 Mn = 1.0-2.5 Si = 0.30-0.65 P = 0.03 max S = 0.03 max Mo = 0.50 max Cu = 0.75 max	ER308H is used for TIG, MIG, and submerged arc welding of unstabilized stainless steels such as Types 301, 302, 304, 305, 308.

Specifications	Chemical Composition	Description
Alloy: WW308L Class: ER308L AWS: A5.9	C = 0.03 max Cr = 19.5-22.0 Ni = 9.0-11.0 Mn = 1.0-2.5 Si = 0.30-0.65 P = 0.03 max S = 0.03 max Mo = 0.75 max Cu = 0.75 max	ER308L has the same analysis as type 308 except the carbon content has been held to a maximum of .03% to reduce the possibility of intergranular carbide precipitation. Ideal for welding Types 304L, 321, and 347 stainless steels. This is a suitable wire for applications at cryogenic temperatures.
Alloy: WW308LSI Class: ER308LSI AWS: A5.9	C = 0.03 max Cr = 19.5-22.0 Ni = 9.0-11.0 Mn = 1.0-2.5 Si = 0.65-1.00 P = 0.03 max S = 0.03 max Mo = 0.75 max Cu = 0.75 max	ER308LSI a stainless steel welding wire for MIG welding. This wire is used to weld equipment made with 304 and 308 stainless grades.
Alloy: WW309 Class: ER309 AWS: A5.9	C = 0.12 max Cr = 23.0-25.0 Ni = 12.0-14.0 Mn = 1.0-2.5 Si = 0.30-0.65 P = 0.03 max S = 0.03 max Mo = 0.75 max Cu = 0.75 max	ER309 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. For some applications, welding of straight chromium steels can be accomplished with this consumable.
Alloy: WW309L Class: ER309L AWS: A5.9	C = 0.03 max Cr = 23.0-25.0 Ni = 12.0-14.0 Mn = 1.0-2.5 Si = 0.30-0.65 P = 0.03 max S = 0.03 max Mo = 0.75 max Cu = 0.75 max	ER309L has the same qualities as 309 but with the lower carbon content deemed necessary in many chemical applications. ER309L is preferred over ER309 for cladding over carbon steel or low alloy steels, as weld as for dissimilar joints that undergo heat treatment.

Specifications	Chemical Composition	Description
Alloy: WW309LMO Class: ER309LMO AWS: A5.9	C = 0.03 max Cr = 23.0-25.0 Ni = 12.0-14.0 Mn = 1.0-2.5 Si = 0.30-0.65 P = 0.03 max S = 0.03 max Mo = 2.0-3.0 Cu = 0.75 max	This classification is the same as ER309MO except for a lower maximum carbon content (0.03%). The ER309LMO is used in the same type of applications as the ER309MO. In several layer welds, the low carbon ER309LMO is usually needed for the first layer in order to achieve low carbon contents in successive layers with filler metal such as ER316L or ER317L.
Alloy: WW309LSI Class: ER309LSI AWS: A5.9	C = 0.03 max Cr = 23.0-25.0 Ni = 12.0-14.0 Mn = 1.0-2.5 Si = 0.65-1.0 P = 0.03 max S = 0.03 max Mo = 0.75 max Cu = 0.75 max	ER309L Hi Sil is a high silicon version of the 309L. The higher silicon gives arc stability and exceptionally smooth bead appearance.
Alloy: WW310 Class: ER310 AWS: A5.9	C = 0.08-0.15 Cr = 25.0-28.0 Ni = 20.0-22.5 Mn = 1.0-2.5 Si = 0.30-0.65 P = 0.03 max S = 0.03 max Mo = 0.75 max Cu = 0.75 max	ER310 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 also be used for dissimilar welding.
Alloy: WW310HC Class: ER310H AWS:	C = 0.35-0.45 Cr = 25.0-28.0 Ni = 20.0-22.0 Mn = 1.0-2.5 Si = 0.75 max P = 0.03 max S = 0.03 max Mo = 0.75 max Cu = 0.75 max	ER310H is the same as ER310 except that the carbon is slightly higher. These wires are used primarily for welding or repairing high alloy heat and corrosion resistant castings of the same general composition. The alloy has high strength at temperatures over 1700F.

Specifications	Chemical Composition	Description
Alloy: WW312 Class: ER312 AWS: A5.9	C = 0.15 max Cr = 28.0-32.0 Ni = 8.0-10.5 Mn = 1.0-2.5 Si = 0.30-0.65 P = 0.03 max S = 0.03 max Mo = 0.75 max Cu = 0.75 max	ER312 is used to weld cast alloys of similar composition and is used to weld dissimilar metals and weld overlays. This alloy has very high ferrite. When welding similar cast alloys, limit welding to two or three layers only.
Alloy: WW316 Class: ER316 AWS: A5.9	C = 0.08 max Cr = 18.0-20.0 Ni = 11.0-14.0 Mn = 1.0-2.5 Si = 0.30-0.65 P = 0.03 max S = 0.03 max Mo = 2.0-3.0 Cu = 0.75	ER316 is recommended for welding AISI 316 stainless steel applications where high creep strength at elevated temperatures and resistance to pitting by corrosive liquids is needed. The presence of molybdenum increases its creep resistance at elevated temperatures.
Alloy: WW316H Class: ER316H AWS: A5.9	C = 0.04-0.08 Cr = 18.0-20.0 Ni = 11.0-14.0 Mn = 1.0-2.5 Si = 0.30-0.65 P = 0.03 max S = 0.03 max Mo = 2.0-3.0 Cu = 0.75 max	ER316H is used to weld wrought and cast forms of similar composition. The presence of molybdenum increases its creep resistance at elevated temperatures. The lower ferrite level of this nominal composition reduces the rate of corrosion in certain media and is suitable for use at cryogenic temperatures.
Alloy: WW316L Class: ER316L AWS: A5.9	C = 0.03 max Cr = 18.0-20.0 Ni = 11.0-14.0 Mn = 1.0-2.5 Si = 0.30-0.65 P = 0.03 max S = 0.03 max Mo = 2.0-3.0 Cu = 0.75 max	ER316L, This filler metal is primarily used for welding low carbon molybdenum-bearing austenitic alloys. This low carbon alloy is not as strong at elevated temperatures as ER316H.

Specifications	Chemical Composition	Description
Alloy: WW316LSI Class: ER316LSI AWS: A5.9	C = 0.03 max Cr = 18.0-20.0 Ni = 11.0-14.0 Mn = 1.0-2.5 Si = 0.65-1.00 P = 0.03 max S = 0.03 Mo = 2.0-3.0 Cu = 0.75 max	ER316LSI affords the same characteristics as 316L. The low carbon in the weld metal gives excellent assurance against intergranular corrosion. In addition, the Hi Sil allows better arc stability along with minimal post-weld grinding.
Alloy: WW317 Class: ER317 AWS: A5.9	C = 0.08 max Cr = 18.5-20.5 Ni = 13.0-15.0 Mn = 1.0-2.5 Si = 0.30-0.65 P = 0.03 max S = 0.03 max Mo = 3.0-4.0 Cu = 0.75 max	ER317 is recommended for welding austenitic acid-resistant steels. High molybdenum content provides a weld with improved resistance to general corrosion in most inorganic and organic acids and to pitting in chloride bearing solutions.
Alloy: WW317L Class: ER317L AWS: A5.9	C = 0.03 max Cr = 18.5-20.5 Ni = 13.0-15.0 Mn = 1.0-2.5 Si = 0.30-0.65 P = 0.03 max Mo = 3.0-4.0 Cu = 0.75 max	ER317L is used for welding stainless steels with similar composition. Due to its higher molybdenum content, thi8s alloy offers high resistance to pitting and crevice corrosion. Lower carbon makes the weld metal less susceptible to intergranular corrosion.
Alloy: WW320 Class: ER320 AWS: A5.9	C = 0.07 max Cr = 19.0-21.0 Ni = 32.0-36.0 Mo = 2.0-3.0 Mn = 2.5 max Si = 0.60 max P = 0.03 max S = 0.03 max Cu = 3.0-4.0 NB = 8 x C min - 1.0 max	ER320 is used to weld metals of similar composition in wrought and cast forms. The weld metal provides exceptionally good corrosion resistance to a wide range of chemical environments. This being a fully austenitic alloy, it requires low heat input during welding.

Specifications	Chemical Composition	Description
Alloy: WW320LR Class: ER320LR AWS: A5.9	C = 0.025 max Cr = 19.0-21.0 Ni = 32.0-36.0 Mo = 2.0-3.0 Mn = 1.5-2.0 Si = 0.15 max P = 0.015 max S = 0.02 max Cu = 3.0-4.0 Nb = 8 x C min - 0.40max	ER320LR has a composition similar to ER320, except that the carbon, silicon, phosphorus, and sulfur levels are kept at lower levels as well as the columbium and manganese being recommended or specified at a narrower range. Residuals are limited to reduce the possibility of micro fissuring. This alloy is often used for welding type 320 stainless steels.
Alloy: WW330 Class: ER330 AWS: A5.9	C = 0.18-0.25 Cr = 15.0-17.0 Ni = 34.0-37.0 Mo = 0.75 max Mn = 1.0-2.5 Si = 0.30-0.65 P = 0.03 max S = 0.03 max Cu = 0.75 max	ER330 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. However, high sulfur environments may adversely affect elevated temperature performance. This being a fully austenitic alloy, low heat input is necessary.
Alloy: WW347 Class: ER347 AWS: A5.9	C = 0.08 max Cr = 19.0-21.5 Ni = 9.0-11.0 Mn = 1.0-2.5 Si = 0.30-0.65 P = 0.03 max S = 0.03 max Mo = 0.75 max Cu = 0.75 max Nb = 10 x C min - 1.0 max	ER347 is recommended for welding AISI 347 and 321. The weld metal has good resistance to general corrosion. Columbium stabilization provides assurance against intergranular corrosion. ER347 is suitable for applications where welds are subjected to high temperatures above 750F.
Alloy: WW347SI Class: ER347SI AWS: A5.9	C = 0.08 max Cr = 19.0-21.5 Ni = 9.0-11.0 Mn = 1.0-2.5 Si = 0.65-1.0 P = 0.03 max S = 0.03 max Mo = 0.75 max Cu = 0.75 max Nb = 10 x C min - 1.0 max	ER347SI is a columbium stabilized stainless steel welding wire used to weld Types 321 and 347. Addition of columbium reduces the possibility of chromium carbide precipitation and consequent intergranular corrosion. This grade is recommended if the weld metal is to be subjected to high temperatures above 750F.

Specifications	Chemical Composition	Description
Alloy: WW409 Class: ER409 AWS: A5.9	C = 0.08 max Cr = 10.5-13.5 Ni = 0.60 max Mo = 0.50 max Mn = 0.80 max Si = 0.80 max P = 0.03 max S = 0.03 max Cu = 0.75 max Ti = 10 x C min - 1.5 max	The nominal composition of this weld metal is 12% Chromium with Ti added as a stabilizer. This material often is used to weld bare metal of similar composition.
Alloy: WW409CB Class: ER409CB AWS: A5.9	C = 0.08 max Cr = 10.5-13.5 Ni = 0.6 max Mo = 0.50 max Mn = 0.8 max Si = 1.0 max P = 0.04 max S = 0.03 max Cu = 0.75 max Nb = Nb = 10xC min - 0.75 max	ER409Cb is a ferritic stainless steel welding wire which is used to weld Type 409 and 409Ti base materials. Addition of columbium leads to a preferential reaction with carbon, saving chromium from forming carbides. This improves corrosion resistance, increases strength at high temperatures, and promotes ferritic micro-structure.
Alloy: WW410 Class: ER410 AWS: A5.9	C = 0.12 max Cr = 11.5-13.5 Ni = 0.60 max Mo = 0.75 max Mn = 0.60 max Si = 0.50 max P = 0.03 max S = 0.03 max Cu = 0.75 max	ER410 is used for welding types403, 405, 410, 414 and 416. Also an overlay on carbon steels for corrosion, erosion and abrasion resistance. A 350°F preheat is recommended before welding.
Alloy: WW410NiMo Class: ER410NiMo AWS: A5.9	C = 0.06 max Cr = 11.0-12.5 Ni = 4.0-5.0 Mo = 0.4-0.7 Mn = 0.60 max Si = 0.50max P = 0.03 max S = 0.03 max Cu = 0.75 max	ER410NiMo wire is used primarily to weld cast and wrought material of similar chemical composition. Recommend using preheat and interpass temperature of not less than 300F. Post-weld heat treatment should not exceed 1150F, as higher temperatures may result in hardening.

Specifications	Chemical Composition	Description
Alloy: WW420 Class: ER420 AWS: A5.9	C = 0.25-0.40 Cr = 12.0-14.0 Ni = 0.60 max Mo = 0.75 max Mn = 0.60 max Si = 0.50 max P = 0.03 max S = 0.03 max Cu = 0.75	ER420 This alloy is often used for surfacing applications which call for superior resistance to abrasion. It requires preheat and interpass temperatures of not less than 400°F, followed by slow cooling. Post weld heat treatment is used to temper the weld deposit.
Alloy: WW430 Class: ER430 AWS: A5.9	C = 0.10 max Cr = 15.5-17.0 Ni = 0.60 max Mo = 0.75 max Mn = 0.60 max Si = 0.50 max P = 0.03 max S = 0.03 max Cu = 0.75 max	ER430 is a ferritic stainless steel which offers good ductility in heat treated condition. In addition to the applications of welding similar alloys, it is also used for overlays and thermal spraying.
Alloy: WW502 Class: ER502 AWS: A5.9	C = 0.10 max Cr = 4.6-6.0 Ni = 0.60 max Mo = 0.45-0.65 Mn = 0.60 max Si = 0.50 max P = 0.03 max S = 0.03 max Cu = 0.75 max	ER502 is for welding 502 base metal, frequently tube or pipe. Preheating and post-weld treatment are required.
Alloy: WW505 Class: ER505 AWS: A5.9	C = 0.10 max Cr = 8.0-10.5 Ni = 0.50 max Mo = 0.8-1.20 Mn = 0.60 max Si = 0.50 max P = 0.03 max S = 0.03 max Cu = 0.75 max	ER505 is for welding tube or piping of similar composition. Preheating and post-weld heat treatment are required.

Specifications	Chemical Composition	Description
Alloy: WW630 Class: ER630 AWS: A5.9	C = 0.05 max Cr = 16.0-16.75 Ni = 4.5-5.0 Mo = 0.75 max Mn = 0.25-0.75 Si = 0.75 max P = 0.03 max S = 0.03 max Cu = 3.25-4.00 Nb = 0.15-0.30	ER630 classification is designed primarily for welding ASTM A564 type 630 and some other precipitation-hardening stainless steels. The composition is modified to prevent the formation of ferrite networks in the martensitic microstructure which has a great effect on mechanical properties. The weld metal may be used either as welded, welded and precipitation hardened, or welding and solution treated. Mechanical properties of this alloy are greatly influenced by the heat treatment.

Specifications	Chemical Composition	Description
Alloy: WW70S-2 Class: ER70S-2 AWS: A5.18	C = 0.07 max Mn = 0.90-1.40 Si = 0.40-0.70 P = 0.025 max S = 0.035 max Cu = 0.50 max (includes coating or residual copper) Ti = 0.05-0.15 Zr = 0.02-0.12 Al = 0.05-0.15	Type ER70S-2 is a triple deoxidized steel welding wire for tig and mig welding applications. For mig welding use Carbon Dioxide or Argon + Co2 or Argon +2% Oxygen as shielding gases. For tig welding use 100% Argon.
Alloy: WW70S-3 Class: ER70S-3 AWS: A5.18	C = 0.06-0.15 Mn = 0.90-1.40 Si = 0.45-0.75 P = 0.025 max S = 0.035 max Cu = 0.50 max (includes coating or residual copper)	Type ER70S-3 is a welding wire for tig and mig welding applications. Mig welding conducted with Carbon Dioxide or Argon + Co2 or Argon +2% Oxygen shielding gas. For tig welding use 100% Argon.
Alloy: WW70S-6 Class: ER70S-6 AWS: A5.18	C = 0.06-0.15 Mn = 1.40-1.85 Si = 0.80-1.15 P = 0.025 max S = 0.035 max Cu = 0.50 max (includes coating or residual copper)	Type ER70S-6 is a wire with higher levels of deoxidizers (Mn & Si) compared to other carbon steel wires. This wire is suitable for welding of steels with moderate amounts of scale or rust. Mig welding use Argon-Oxygen or Argon Co2. Tig welding use 100% Argon as shielding gases.
Alloy: WW80S-D2 Class: ER80S-D2 AWS: A5.28	C = 0.07-0.12 Mn = 1.60-2.10 Si = 0.50-0.80 P = 0.025 max S = 0.025 max Ni = 0.15 max Mo = 0.40-0.60 C = 0.50 max (includes coating or residual copper) Others = 0.50 max	Type ER80S-D2 filler metals contain a high level of deoxidizers (Mn & Si) to control porosity when welding with Co2 as the shielding gas, and molybdenum for increased strength.

Specifications	Chemical Composition	Description
Alloy: WWRG45 Class: RG45 AWS: A5.2	S = 0.04 max P = 0.04 max Al = 0.02 max Fe = Balance	RG45 welding rods are of a simple low carbon analysis. This welding rod may be used to join wrought iron. Welding rods of class RG are general purpose oxyfuel gas welding rods.

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Specifications	Chemical Composition	Description
Alloy: WW6AL-4V Class: ERTi-6AL-4V AWS: A5.16	C = 0.05 max O = 0.18 max H = 0.015 max N = 0.03 max Al = 5.5-6.7 Va = 3.4-4.5 Fe = 0.30 max Y = 0.005 max	This alloy is commonly referred to as “6-4” titanium and is probably the most widely used titanium alloy. This alloy is excellent for industrial fans, pressure vessels, aircraft components, and automotive parts. All automatic weld processes can be used. Titanium is a reactive metal that is sensitive to embrittlement by oxygen, nitrogen and hydrogen at temperatures above 500F. This can be provided by shielding the metal with high purity inert gas or in a chamber. Cleanliness of the joint is a major factorin producing porosity free welds. Protection of the wire at all times is required to assure cleanliness. Can be fusion welded to Zirconium, Tantalum, Nobium and Vanadium. Should not be fusion welded to Copper, Iron, Nickel, and Aluminum, as it will produce extremely brittle welds. Note: AWS now classifies this material as ERTi-5
Alloy: WW6AL-4V-5ELI Class: ERTi-6AL-4V-5ELI AWS: A5.16	C = 0.03 max O = 0.10 max H = 0.005 max N = 0.012 max Al = 5.5-6.5 Va = 3.5-4.5 Fe = 0.15 max Y = 0.005 max	Purer version of ERTi-5 (Extra low Interstitial) content, (which is lower oxygen content). Primary use in surgical implants, cryogenic vessels, and airframe components. Use all automatic weld processes. Titanium is a reactive metal that is sensitive to embrittlement by oxygen, nitrogen and hydrogen at temperatures above 500F. This can be provided by shielding the metal with high purity inert gas or in a chamber. Cleanliness of the joint is a major factorin producing porosity free welds. Protection of the wire at all times is required to assure cleanliness. Can be fusion welded to Zirconium, Tantalum, Nobium and Vanadium. Should not be fusion welded to Copper, Iron, Nickel, and Aluminum, as it will produce extremely brittle welds. Note: AWS now classifies this material as ERTi-5ELI
Alloy: WWCP-Ti Class: CP-Ti AWS: Specification does not exist	C = 0.08 max O = 0.18 max H = 0.005 max N = 0.05 max Fe = 0.20 max	This grade is referred to as commercially pure (CP). Typical uses are in sea water, heat exchanges, piping systems, aerospace industries. AMS specification 4951 encompasses all of the commercially pure welding wires. Titanium is a reactive metal that is sensitive to embrittlement by oxygen, nitrogen and hydrogen at temperatures above 500F. This can be provided by shielding the metal with high purity inert gas or in a chamber. Cleanliness of the joint is a major factorin producing porosity free welds. Protection of the wire at all times is required to assure cleanliness. Can be fusion welded to Zirconium, Tantalum, Nobium and Vanadium. Should not be fusion welded to Copper, Iron, Nickel, and Aluminum, as it will produce extremely brittle welds.
Alloy: WWERTi-1 Class: ERTi-1 AWS: A5.16	C = 0.03 max O = 0.10 max H = 0.005 max N = 0.015 max Fe = 0.10 max	This alloy is commonly referred to as a commercially pure titanium and is widely used for industrial applications. All automatic weld processes can be used. This grade also has some uses in the aerospace industry. Can be used in seawater, heat exchanges, piping systems. Titanium is a reactive metal that is sensitive to embrittlement by oxygen, nitrogen and hydrogen at temperatures above 500F. This can be provided by shielding the metal with high purity inert gas or in a chamber. Cleanliness of the joint is a major factorin producing porosity free welds. Protection of the wire at all times is required to assure cleanliness. Can be fusion welded to Zirconium, Tantalum, Nobium and Vanadium. Should not be fusion welded to Copper, Iron, Nickel, and Aluminum, as it will produce extremely brittle welds.

Titanium

Specifications	Chemical Composition	Description
Alloy: WWERTi-12 Class: ERTi-12 AWS: A5.16	C = 0.03 max O = 0.12 max H = 0.008 max N = 0.02 max Fe = 0.30 max Mo = 0.2-0.4 Ni = 0.6-0.9	Welds made using this filler metal offer improved corrosion resistance. Uses in industrial applications are similar to those of ERTi-2 materials. Titanium is a reactive metal that is sensitive to embrittlement by oxygen, nitrogen and hydrogen at temperatures above 500F. This can be provided by shielding the metal with high purity inert gas or in a chamber. Cleanliness of the joint is a major factorin producing porosity free welds. Protection of the wire at all times is required to assure cleanliness. Can be fusion welded to Zirconium, Tantalum, Nobium and Vanadium. Should not be fusion welded to Copper, Iron, Nickel, and Aluminum, as it will produce extremely brittle welds.
Alloy: WWERTi-15 Class: ERTi-15 AWS: A5.16	C = 0.03 max O = 0.10 max H = 0.005 max N = 0.015 max Al = 5.5-6.5 Fe = 0.15 max Mo = 0.5-1.5 Cb = 1.5-2.5 Ta = 0.5-1.5	This alloy has excellent resistance to salt water corrosion, good toughness. Can use on hulls, pressure vessels, etc. using materials of a matching composition. Titanium is a reactive metal that is sensitive to embrittlement by oxygen, nitrogen and hydrogen at temperatures above 500F. This can be provided by shielding the metal with high purity inert gas or in a chamber. Cleanliness of the joint is a major factorin producing porosity free welds. Protection of the wire at all times is required to assure cleanliness. Can be fusion welded to Zirconium, Tantalum, Nobium and Vanadium. Should not be fusion welded to Copper, Iron, Nickel, and Aluminum, as it will produce extremely brittle welds.
Alloy: WWERTi-2 Class: ERTi-2 AWS: A5.16	C = 0.03 max O = 0.10 max H = 0.008 max N = 0.02 max Fe = 0.20 max	This alloy is commonly referred to as a commercially pure titanium. Mechanical properties increased slightly from ERTi-1 grades. Widely used in industrial applications. All automatic weld processes can be used. This grade also has some uses in the aerospace industry. Can be used in seawater, heat exchanges, piping systems. Titanium is a reactive metal that is sensitive to embrittlement by oxygen, nitrogen and hydrogen at temperatures above 500F. This can be provided by shielding the metal with high purity inert gas or in a chamber. Cleanliness of the joint is a major factorin producing porosity free welds. Protection of the wire at all times is required to assure cleanliness. Can be fusion welded to Zirconium, Tantalum, Nobium and Vanadium. Should not be fusion welded to Copper, Iron, Nickel, and Aluminum, as it will produce extremely brittle welds.
Alloy: WWERTi-3 Class: ERTi-3 AWS: A5.16	C = 0.03 max O = 0.10-0.15 H = 0.008 max N = 0.02 max Fe = 0.20 max	This alloy is commonly referred to as a commercially pure titanium widely used in industrial applications. Can use all automatic weld processes. This grade also has some uses in the aerospace industry. Can be used in seawater, heat exchanges, piping systems. Titanium is a reactive metal that is sensitive to embrittlement by oxygen, nitrogen and hydrogen at temperatures above 500F. This can be provided by shielding the metal with high purity inert gas or in a chamber. Cleanliness of the joint is a major factorin producing porosity free welds. Protection of the wire at all times is required to assure cleanliness. Can be fusion welded to Zirconium, Tantalum, Nobium and Vanadium. Should not be fusion welded to Copper, Iron, Nickel, and Aluminum, as it will produce extremely brittle welds.

Titanium

Specifications	Chemical Composition	Description
Alloy: WWERTi-4 Class: ERTi-4 AWS: A5.16	C = 0.03 max O = 0.15-0.25 H = 0.008 max N = 0.02 max Fe = 0.30 max	This alloy is commonly referred to as a commercially pure titanium. Widely used in industrial applications. All automatic weld processes can be used. Can be used in seawater, heat exchanges, piping systems. Titanium is a reactive metal that is sensitive to embrittlement by oxygen, nitrogen and hydrogen at temperatures above 500F. This can be provided by shielding the metal with high purity inert gas or in a chamber. Cleanliness of the joint is a major factorin producing porosity free welds. Protection of the wire at all times is required to assure cleanliness. Can be fusion welded to Zirconium, Tantalum, Nobium and Vanadium. Should not be fusion welded to Copper, Iron, Nickel, and Aluminum, as it will produce extremely brittle welds.
Alloy: WWERTi-5 Class: ERTi-5 AWS: A5.16	C = 0.05 max O = 0.18 max H = 0.015 max N = 0.03 max Al = 5.5-6.7 Va = 3.5-4.5 Fe = 0.30 max Y = 0.005 max	This alloy is commonly referred to as “6-4” titanium and is probably the most widely used titanium alloy. This alloy is excellent for industrial fans, pressure vessels, aircraft components, and automotive parts. All automatic weld processes can be used. Titanium is a reactive metal that is sensitive to embrittlement by oxygen, nitrogen and hydrogen at temperatures above 500F. This can be provided by shielding the metal with high purity inert gas or in a chamber. Cleanliness of the joint is a major factorin producing porosity free welds. Protection of the wire at all times is required to assure cleanliness. Can be fusion welded to Zirconium, Tantalum, Nobium and Vanadium. Should not be fusion welded to Copper, Iron, Nickel, and Aluminum, as it will produce extremely brittle welds. Note: AWS previously classified this material as ERTi-6Al-4V
Alloy: WWERTi-5ELI Class: ERTi-5ELI AWS: A5.16	C = 0.03 max O = 0.10 max H = 0.005 max N = 0.012 max Al = 5.5-6.5 Va = 3.5-4.5 Fe = 0.15 max Y = 0.005 max	Purer version of ERTi-5 (Extra low Interstitial) content, (which is lower oxygen content). Primary use in surgical implants, cryogenic vessels, and airframe components. Use all automatic weld processes. Titanium is a reactive metal that is sensitive to embrittlement by oxygen, nitrogen and hydrogen at temperatures above 500F. This can be provided by shielding the metal with high purity inert gas or in a chamber. Cleanliness of the joint is a major factorin producing porosity free welds. Protection of the wire at all times is required to assure cleanliness. Can be fusion welded to Zirconium, Tantalum, Nobium and Vanadium. Should not be fusion welded to Copper, Iron, Nickel, and Aluminum, as it will produce extremely brittle welds. Note: AWS previously classified this material as ERTi-6Al-4V-1
Alloy: WWERTi-6 Class: ERTi-6 AWS: A5.16	C = 0.08 max O = 0.18 max H = 0.015 max N = 0.05 max Al = 4.5-5.8 Sn = 2.0-3.0 Fe = 0.50 max Y = 0.005 max	This material has good weldability, oxidation resistance, and stability and strength at elevated temperatures. Use on components where high elevated temperature strength is required. All automatic weld processes can be used. Titanium is a reactive metal that is sensitive to embrittlement by oxygen, nitrogen and hydrogen at temperatures above 500F. This can be provided by shielding the metal with high purity inert gas or in a chamber. Cleanliness of the joint is a major factorin producing porosity free welds. Protection of the wire at all times is required to assure cleanliness. Can be fusion welded to Zirconium, Tantalum, Nobium and Vanadium. Should not be fusion welded to Copper, Iron, Nickel, and Aluminum, as it will produce extremely brittle welds.

Specifications	Chemical Composition	Description
Alloy: WWERTi-7 Class: ERTi-7 AWS: A5.16	C = 0.03 max O = 0.10 max H = 0.008 max N = 0.02 max Fe = 0.20 max Pd = 0.12-0.25	Welds made using this alloy probably are the most corrosion resistant titanium welds used in industrial applications. Mechanical and physical properties are similar to those of ERTi-2. Titanium is a reactive metal that is sensitive to embrittlement by oxygen, nitrogen and hydrogen at temperatures above 500F. This can be provided by shielding the metal with high purity inert gas or in a chamber. Cleanliness of the joint is a major factorin producing porosity free welds. Protection of the wire at all times is required to assure cleanliness. Can be fusion welded to Zirconium, Tantalum, Nobium and Vanadium. Should not be fusion welded to Copper, Iron, Nickel, and Aluminum, as it will produce extremely brittle welds.
Alloy: WWERTi-9 Class: ERTi-9 AWS: A5.16	C = 0.03 max O = 0.12 max H = 0.008 max N = 0.02 max Al = 2.5-3.5 V = 2.0-3.0 Fe = 0.25 max Y = 0.005 max	These materials are often referred to as “half 6-4” because the major components are roughly half that found in ERTi-5. Primary use, to date, has been in welding hydraulic tubing and fittings for aircraft. Has the ability to maintain strength at elevated temperatures. Titanium is a reactive metal that is sensitive to embrittlement by oxygen, nitrogen and hydrogen at temperatures above 500F. This can be provided by shielding the metal with high purity inert gas or in a chamber. Cleanliness of the joint is a major factorin producing porosity free welds. Protection of the wire at all times is required to assure cleanliness. Can be fusion welded to Zirconium, Tantalum, Nobium and Vanadium. Should not be fusion welded to Copper, Iron, Nickel, and Aluminum, as it will produce extremely brittle welds.
Alloy: WWERTi-9ELI Class: ERTi-9ELI AWS: A5.16	C = 0.03 max O = 0.10 max H = 0.005 max N = 0.012 max Al = 2.5-3.5 V = 2.0-3.0 Fe = 0.20 max Y = 0.005 max	The reduced oxygen content of the ERTi-9ELI alloy results in slightly lower strength and improved toughness in comparison with weld metal from ERTi-9. Titanium is a reactive metal that is sensitive to embrittlement by oxygen, nitrogen and hydrogen at temperatures above 500F. This can be provided by shielding the metal with high purity inert gas or in a chamber. Cleanliness of the joint is a major factorin producing porosity free welds. Protection of the wire at all times is required to assure cleanliness. Can be fusion welded to Zirconium, Tantalum, Nobium and Vanadium. Should not be fusion welded to Copper, Iron, Nickel, and Aluminum, as it will produce extremely brittle welds.

Specifications	Chemical Composition	Description
Alloy: WW(Pure) Tungsten Class: EWP AWS: A5.12	Pure Tungsten (EWP) = minimum of 99.5 percent tungsten Contains no intentional alloying elements	Pure tungsten electrodes are used mainly with AC for welding aluminum and magnesium alloys. Can use DC, but does not provide arc initiation and arc stability as does the thoriated, ceriated, or lanthanated electrodes.
Alloy: WW1% Lanthanated Class: EWLa(1) AWS: A5.12	Lanthanum oxide (La_2O_3) = 1% referred to as Lanthana	Compared with pure tungsten, the lanthanum electrodes exhibit a reduced rate of vaporization or burn-off. Operate successfully with AC or DC
Alloy: WW2% Ceriated Class: EWCe AWS: A5.22	Cerium Oxide (CeO_2) = 2% referred to as ceria	Ceriated electrodes exhibit a reduced rate of vaporization or burn-off. EWCe-2 electrodes will operate successfully with AC welding.
Alloy: WW2% Thoriated Class: EWTH-2 AWS: A5.12	Thorium Oxide (ThO_2) = 2% called thoria	The thoria provides about 20 percent higher current-carrying capacity, longer life and resistance to contamination of the weld. Designed for DCEN applications, low level radioactive material. Note: If electrode grinding is used the dust might be ingested, special precautions relative to ventilation should always be considered.

Specifications	Chemical Composition	Description
Alloy: WWZirconiated Class: EWZr AWS: A5.12	Zirconium (ZrO2) = Contains small amount Zirconiated electrodes have welding characteristics that generally fall between those of pure and thoriated tungsten	Zirconiated electrodes are the tungsten electrode of choice for AC welding because of arc stability and starting characteristics of thoriated tungsten. EWZr-1 contains a small amount of Zirconium (Zr02) Has welding characteristics that generally fall between those of pure and thoriated tungsten.

HISTORY

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We are dedicated to providing our customers with what they want, when they want it. WELDWIRE is proud to be able to ship virtually any size order *immediately* from our huge on-site inventory.

INVENTORY

We carry an extensive selection of welding wire and electrodes including: stainless, nickel, aluminum, steel, chrome-moly and many other specialized alloys ranging in sizes from .020–.25" (1/4).
Our inventory is available in whatever form you desire, from mill and 60# coils, to 25#, 10# and 2# spools, to 36" tig wire. (Drums and reels are also available.)

COMMITMENT

To ensure operations and materials meet our exacting standards, WELDWIRE's QC department is headed by one of the most respected welding engineers in the country.
Our sales team has over 100 combined years of industry experience, guaranteeing the most personalized service in the business.

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