

FULL LINE CATALOG

# Select-Arc Premium Welding Products

The Standard of Excellence in Tubular Welding Electrodes





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Thank you for your interest in Select-Arc, Inc. We are proud to offer the true standard of excellence in tubular welding electrodes, utilizing the latest in manufacturing equipment and technology.

Our commitment is to set the industry standard by providing the highest quality products, the best service and most value-added to our customers. To accomplish this, we have employed a team of what we believe to be

the most qualified people to design, manufacture and support our superior quality products. In fact, the quality and performance of our products are a direct result of the skill and experience of our employees. Our unprecedented growth and success are attributed to customers' recognition of the service, response and quality that we provide. The knowledge and experience of Select-Arc's team will continue to ensure the performance level of today's products and guarantee the performance level of future products.

Select-Arc offers a complete line of tubular welding electrodes, of exceptional quality, to fulfill customer needs and requirements. Our rigorous engineering and manufacturing standards ensure maximum quality in feedability, weldability and weld performance. You have my word on this.

We believe that we offer the best available quality, service and value in the industry. Try the Select line of tubular electrodes and experience for yourself why Select-Arc is, and will continue to be, **The Standard Of Excellence In Tubular Welding Electrodes.**

*Dale M. Stages*





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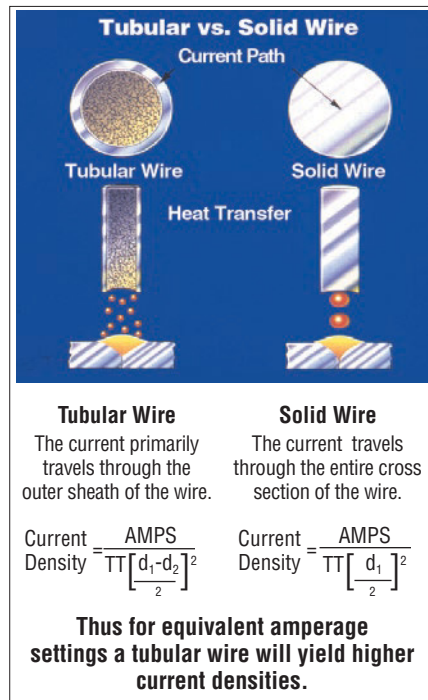
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## Technical Background and Manufacture

Tubular welding electrodes, originally referred to as flux cored wires, were introduced to the welding industry in 1956. These early products were manufactured in larger diameters, such as 3/32", 7/64" and 1/8". The manufacturing methods were the same, basically; as today; form steel strip into a U profile, fill it with fluxing and deoxidizing ingredients, close it into a round tube and draw it to finished size. There have been many innovations and technical advances in the manufacturing and processing of these products, which will be discussed later, but the concepts are still the same. The first shielding gas was carbon dioxide, as the blended gases were used strictly in GMAW and GTAW.



From the introduction of this process, the economic advantages were immediately obvious. Tubular wire has a current carrying cross sectional area of steel which is a fraction of that compared to solid wire. Because electrical current is only carried by the steel sheath, cored wire burns off much faster and easier than that of solid wire. Welding electrodes are melted by the electrical power, or  $I^2R$ ; the less cross sectional area, the more power per square inch is available to melt the electrode. Because the core ingredients do not conduct current, only the tube, or sheath, of the cored wire is absorbing current and melting the electrode. Combined with carbon dioxide shielding, which provides exothermic heating of the weld puddle as it dissociates, the melting characteristics and fluxing agents promote better penetration and greater tolerance of mill scale than previously attainable with solid wires. The fluxing action of the slag ingredients also eliminated the porosity and other subsurface defects usually encountered with solid wires when welding on heavy

plate sections and hot rolled steels. In addition to all these advantages, the faster burnoff of the tubular wires resulted in higher deposition rates than those achievable by solid wires. The sum total of these features produced lower welding costs per lb of weld metal than the welding industry had seen in the gas-shielded arc process.

There were other technical advantages as well. Fluxing agents and deoxidizers added to the core enable the designer to "tailor" the electrode to the application. For example, manganese can be increased or nickel added to enhance the toughness properties. Modifications can be made to the slag constituents to change the molten slag viscosity, hence changing the bead shape or allowing travel speed alterations. These types of changes are obviously not possible with solid wires.

Cored wire technology has continued to advance during the 50 years since its introduction. Select-Arc has pioneered many new advances in manufacturing technology; these include the areas of tube formation, feeding, drawing lubricants and baking. Our custom-designed tube mills form the strip with great precision and close it into a tube with a tightly butted seam and unmatched roundness. Flux feeders are engineered to meter the fill ingredients uniformly and precisely with minimum spillage. This is a tremendous aid to quality and efficiency, as there are minimal particles free to cling to the tube, and seam, acting as an abrasive grit which could harm the wire surface and the tube mill. The drawing equipment promotes rigid control of wire surface and diameter during the reduction process. These state of the art machines guard the wire surface integrity from tube closure to final sizing; the result is a tubular wire which feeds smoothly and exhibits superb electrical pickup. Baking of the drawn wire, to remove residual drawing lubricant, is performed in ovens with accurate temperature and time controls, assuring clean surfaces and a finished product with low weld metal diffusible hydrogen levels.

The dry mixes of core ingredients are weighed and mixed with equally impressive equipment and technology. Each raw material is specially sized for optimum blending ability. Weights are determined on calibrated scales, and each component of the mix is checked weighed after initial weigh-in. Mixing is done in blenders designed especially for dry ingredients of varied densities to ensure complete, homogenous blending. These mixes are then stored in containers which are engineered to prevent segregating while waiting to be utilized at the production line.

The combination of our technically advanced equipment, modern measuring instruments, efficient production techniques and skilled workers results in the production of the most consistent, highest quality tubular welding electrodes in the marketplace.



## Product Development

Technical, engineered products such as flux cored and metal cored electrodes are not very useful without a vigorous product development program behind them. Customer applications, new steel technologies, increased demands on weldments and environmental considerations all require constant upgrading of mature products and development of new products. These efforts invoke the talents of development engineers who have the metallurgical and chemical backgrounds to design slag systems and alloy types to satisfy market demands. Application engineers are necessary to convey customer needs and requests to the development people, to ensure that product designs and modifications are completed in a timely fashion. More importantly, the application engineers and welding technicians work in unison to make sure the products from the development group perform to customers' expectations.

The Select-Arc technical staff is available for more than research of technology and development of new and improved products. Our group of professionals is also capable of helping with metallurgical problems, welding difficulties and product performance issues. We spend a great deal of time and money visiting customers and learning what must be done to solve a problem, and then doing it. Our strength is not just realizing what the solution is, but responding in rapid fashion, with the right answer at the right time. That answer may be a technical report, an improved welding procedure, an improved welding electrode or a totally new welding electrode. The answer is provided in a timely manner.

## Quality

Quality is a way of life at Select-Arc. It is a corporate culture, not merely sets of books containing policies and procedures. We pride ourselves on striving to maintain the highest quality standards in the industry, not with slogans and pep rallies, but with training, educating, communicating, and paying attention to detail. To paraphrase a famous football coach, "quality is not a sometime thing, it is an all the time thing". Building quality into the product starts when raw materials arrive at the dock and continues up to loading finished product into trucks at the shipping dock.

*Select-Arc's commitment to quality is not limited to a superbly trained workforce and skilled management.*

A considerable investment in modern manufacturing equipment has been made, along with measurement devices to monitor key, in-process checkpoints. Important process variables such as fill percentage, wire diameter, strip dimensions, bake cycles and welding performance are scrutinized closely by production and quality personnel. Incoming

raw materials are checked carefully to verify compliance with purchase specifications. A sample of finished electrode from each mix is weld tested to ensure that welding performance, such as feedability, arc stability, bead geometry and any specification requirements conform to the appropriate standards.

The combination of these efforts helps us maintain the common goal of supplying the best quality in tubular electrodes to the welding industry. In addition, the Select-Arc Quality System is approved by ABS, CWB, NAVSEA, and is registered to ISO 9001. Facility surveys have been conducted by Lloyd's and DNV with no negative findings. These are possible because of the total commitment to quality shared by everyone in the company.

## Productivity

In every walk of life, in every business and in each profession, it is difficult to dispute the fact that time is money. There have been numerous studies performed over the years proving that filler metal cost is actually a very small portion of total welding costs. The time involved in depositing weld metal and in welding components is responsible for the lion's share of total welding cost. With this in mind, Select-Arc's applications group spends considerable time working on improving deposition rates, increasing travel speeds and reducing cycle times in the weld cell. Working closely with product development engineers, there are many case studies wherein products have been developed to deposit metal faster into a groove, travel up to 50 percent faster in a lap weld, and bridge gaps without burn-through to improve cycle times in a welding cell.

Deposition rates are important when dealing with groove welds and large fillet welds, especially on plate thicknesses of 3/4" and greater. The easier melting characteristics of tubular wire, discussed earlier, promote much higher deposition rates than solid wire or covered electrodes, which substantially reduces the time required to make these welds in comparison to the other processes. The nature of tubular wire melting, which is a steady stream of small, molten droplets, produces enhanced penetration into the throat and fusion into the sidewalls. Coupled with carbon dioxide shielding gas, which generates heat (its dissociation is exothermic) in the arc, the flux cored arc exhibits superior penetration which cannot be matched by solid wire or covered electrodes on heavier or scaled plate sections. The use of argon/carbon dioxide shielding gas blends with flux cored wire will help reduce welding fumes, increase deposition rates and still produce improved penetration depths compared to solid wire. There really is no way for solid wire to compete with the tubular wire process, wire for wire, in deposition rate increases. As current density increases, the solid wire gradually enters transi-

tion and the spray mode, but deposition rate increase is mostly linear. Tubular wire, conversely, reaches transition very quickly and increases exponentially with current density increases. The result is lower cost per pound of deposited weld metal than with solid wire or covered electrodes, due to the much higher amount of metal deposited per unit time.

Travel speeds are very important to welding cost when making fillet or lap welds on material ranging from moderate plate thicknesses down to sheet metal. On applications from truck frames to exhaust systems, the amount of time saved on these seemingly simple welds can add up to incredible cost savings. The productivity increases can lower the unit cost of products and improve profitability. In these applications, we have the option of selecting either flux cored or metal cored electrodes, depending on the type of weldment and the customer requirements. When the material to be welded is sheet metal and too thin for the penetration of flux cored electrodes, metal cored can make these welds look easy, with no burn through and no slag residue. For heavier plate thicknesses, where defect-free fillet welds are required, flux cored electrodes are available in many varieties. The gas-shielded grades produce the finest fillets with respect to bead shape and cosmetics, slag removal, and mechanical properties. There are several self-shielded types for specialized applications; fillet and lap welds on coated steels, lap welds on trailer frames at travel speeds of up to 120 ipm, and high deposition rate fillet and groove welds on heavy plate sections. In any event, Select-Arc has the right product to lower your welding costs with the proper combination of bead shape, travel speed and penetration.

There are times when poor fit up and gaps in the weld joint add a tremendous degree of difficulty to welding the part. In fact, the wrong electrode selection can make welding so difficult that reject rates will be astronomical. Select-Arc offers several unique metal cored electrodes that are designed to provide controlled penetration, with a very wide arc plasma, which combine to promote bridging of gaps and poor fit up with no burn through. In addition, travel speeds are greatly enhanced over conventional metal cored products. The cost savings here are very real and very significant; faster welding speeds, bridging gaps and poor fit up and controlled penetration result in increased productivity, lower welding cost, higher quality, and reduced reject rates. Improvements and ultimate savings such as these should not be ignored.

Training costs are much lower with tubular wires than with the GMAW and SMAW processes. This ease and rapidity of training not only reduce the training costs, but also allow the welders to become productive very quickly and start contributing to the company's bottom line.

The performance and proficiency of all

position, flux cored electrodes have saved a considerable amount in welding costs since their introduction more than thirty years ago. The deposition rates of these products are two to five times those of solid wires and covered electrodes. They also provide much better sidewall fusion and fewer subsurface defects than the other processes, reducing expensive rework costs, if not outright eliminating them. No process outperforms flux cored electrodes in all position welding, and no process offers less expensive cost per pound of weld deposit.

Another area where tubular wires offer significant cost reductions is that of joint design. The deep penetrating characteristics of tubular electrodes allow the use of tighter, hence smaller, joints than feasible with covered electrodes, saving considerable weld metal volume and cost. Coupled with the productivity savings from higher deposition

rates and the faster completion of the weldment, the total cost of welding is far less than with the use of covered electrodes. In addition, solid wires have long been plagued with subsurface porosity when applied to tight joint designs, due to the inability to allow gases to release. Metal cored wires have no problem in these narrower gap welds, as the pure spray transfer keeps the weld puddle molten for sufficient time to allow gases to escape the weld pool. Now a narrow joint can be welded with no slag entrapment, no subsurface porosity and minimal weld metal volume, adding up to huge cost savings when compared to welding with solid wire.

### Process Economics

Any hesitation to convert to tubular wires is usually caused by concern over the cost, which normally is higher than both covered

electrodes and solid wire. The cost of filler metal, however, is less than 10% of total welding cost; labor and overhead expenses account for approximately 80% of the total welding cost in a manufacturing operation. Obviously, this area of cost is where the only significant savings can be realized. Factoring in the higher deposition rates and electrode efficiencies, and the accompanying increases in productivity, the use of tubular welding electrodes should reduce labor and overhead costs, making them actually less expensive to use than covered or solid electrodes.

In order to demonstrate this realization of cost savings in a mathematical fashion, Select-Arc has constructed a format for calculating welding costs within a production operation. Following is an example of this Cost Calculator and how it functions.

Weld Metal Cost Comparison Worksheet		
	Old Process	New Process
<b>Essential Data</b>	Solid (1/16")	Select 70C-6 (1/16")
Amps - Volts	350-30	350-30
Deposition Efficiency	97%	97%
Deposition Rate (lb/hr)	11.50	15.00
Operating Factor (%)	50%	50%
Gas Flow (cfh)	40	40
Labor & Overhead	\$40.00	\$40.00
Electrode Cost/lb	\$1.40	\$1.80
<b>Cost Per Pounds of Weld Metal</b>		
Labor & Overhead = labor & overhead (cost per hour) / Deposition Rate x Operating Factor	40/5.75 = 6.96	40/7.5 = 5.33
Electrode = electrode cost/lb / deposition efficiency	1.40/.97 = 1.44	1.80/.97 = 1.86
Gas = gas flow rate (cfh) x gas cost (\$/cf) / deposition rate (lb/hr)	40 x .08 = 3.2/11.5 = .28	40 x .08 = 3.2/15 = .21
Total cost per pound deposited weld metal (sum of the above)	\$8.68	\$7.40
Total cost per 100 pounds deposited weld metal	\$868.00	\$740.00

### Fume Generation Rate Discussion

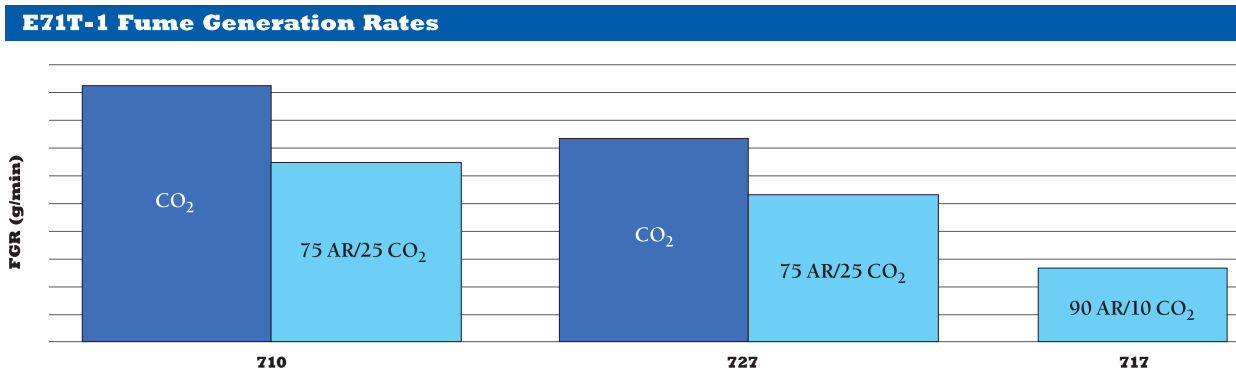
Welding fume is generated by the vaporization of the molten metal in the weld puddle. The temperatures produced by the melting of each particular filler metal determine the amount of vaporization which occurs, as do variables such as plate cleanliness, shielding gas composition, and the melting rate of the filler metal.

The use of high melting rates, reactive gas mixtures and low melting point additives in

the electrodes employed normally produce the higher fume generation rates. Conversely, the use of more inert gas blends, lower melting rates and more refractory additives can lower fume generation rates. The method for measuring fume generation rates is the AWS document F1.2, Laboratory Method for Measuring Fume Generation Rates and Total Fume Emission of Welding and Allied Processes. This document outlines the equipment and methodology for testing filler metals

among the various welding processes.

Select-Arc manufactures several flux cored and metal cored electrodes which have much lower fume generation rates than conventional products. In most cases, these products provide reductions in fume generation of 40 to 60 percent in direct comparisons. Even though Select-Arc has products with reduced fume emissions, we still recommend that systems be utilized in the workplace which provide adequate ventilation during welding.



## Diffusible Hydrogen Discussion

In 1986, an AWS task group developed and issued a specification for diffusible hydrogen determination, AWS A4.3-93, *Standard Methods for Determination of the Diffusible Hydrogen Content of Martensitic, Bainitic, and Ferritic Steel Weld Metal Produced by Arc Welding*. This standard allowed for hydrogen determination by both mercury immersion and gas chromatography, and established a consistent and reliable means of testing weld metal from filler metal and process combinations. The AWS A5 Committee on Filler Metals and Allied Materials then established optional designators, to be attached to electrode classifications, stating the maximum diffusible hydrogen levels of a filler metal or process. These designators are H2, H4, H8 and H16, representing diffusible hydrogen limits expressed in ml/100 g of deposited metal. It should be noted that 1 ml/100 g is roughly equivalent to 1 ppm.

Unfortunately, the definition of "low hydrogen" electrodes or processes is still quite nebulous. Even the lowest diffusible hydrogen levels can cause delayed cracking when higher strength steels, lack of preheat and poor welding procedures are employed in combination. Certain approval agencies have historically considered anything meeting H16 to be low hydrogen, while the U.S. Navy has mandated a maximum of 5.0 ml/100 g for low hydrogen applications. In general, most fabricators will accept H8 for carbon and ordinary strength steels; welding of higher strength and low alloy steels normally calls for H4 at the upper strength levels and H8 at the lower strength levels.

Select-Arc employs state of the art manufacturing equipment and techniques which, coupled with formulation technology, enable our line of small diameter (1/16" and smaller) and all position electrodes to easily meet the H8 category. Certain products can be processed to comply with the H4 requirements. Most of our metal cored products conform to H4 on a routine basis. Please consult with Select-Arc's technical specialists for specific information on the diffusible hydrogen capabilities of individual electrodes.

## Welding and Product Metallurgy

The first flux cored wires were made with a rutile-based slag system. These slag systems were highly acidic and produced relatively high oxygen levels in the weld metal. Welding performance was good but CVN toughness was marginal.

The next stage of development was the introduction of the "T5" electrode, which was a highly basic, lime-fluoride slag system. This was an attempt to duplicate the EXX18 fluxing system in a flux cored electrode. There were clearly discernable differences between the T1 and T5 electrodes; the T1 products exhibited a finer droplet transfer, spray to slightly globu-

lar in nature, while the T5 produced a quite globular transfer, with large droplets. Although the welder appeal of the T5 types was poor, the basic slag system yielded weld deposits extremely low in oxygen and various impurities, which produced superb CVN toughness properties.

The 1970's brought major advancements in flux cored wire technology. Slag systems of T1 electrodes were modified for higher basicity, improved weldability and enhanced mechanical properties. A key breakthrough occurred in 1972, when development of higher melting point T1 slags produced the first all position, flux cored electrodes. This capability allowed, for the first time, the use of flux cored wires in applications such as shipbuilding, water tower construction, pressure vessel fabrication and general fabrication requiring welding in all positions. At this point, however, the mechanical properties of these products were still not on a par with T5 or EXX18 electrodes. In the late 1970's, a major development in slag technology and metallurgy resulted in a quantum leap with respect to CVN toughness values. This breakthrough was a combination of microalloying and increased slag basicity of the T1 electrodes. Suddenly low temperature CVN impact values rivaling those of low hydrogen covered electrodes were achievable, along with the capability of welding in all positions. Congruently, low alloy electrodes were developed for welding chrome-moly, low temperature nickel-bearing and high strength, low alloy steels. Flux cored wire use in the marketplace began to greatly expand and its market share started to grow dramatically.

An entirely new type of tubular wire entered the marketplace in 1980, metal cored electrodes. These products contained only metallic ingredients in the core and, hence, acted more like solid wires in performance characteristics, e.g. less fume emission, no slag residue to clean and no spatter or smoke residue to remove from the weld area. In addition, metal cored wires exhibited many advantages over solid wires, such as increased width of penetration, the ability to bridge gaps and poor fit up areas, less spatter with the "lean" blends of argon/carbon dioxide and faster travel speeds. These products gained popularity very quickly and rapidly became a large portion of the tubular electrodes sold in the industry. By the late 1980's, metal cored wires were classified within AWS standards and were available as carbon and low alloy steel, stainless steel and hardfacing varieties.

*Today, Select-Arc offers  
a complete array of tubular  
products which reflect the latest,  
and the best, manufacturing  
technology.*

Our mixing equipment blends dry ingredients with utmost precision and homogeneity, virtually eliminating any possibility of segregation of powders within the mix. Select-Arc's tube forming mills are designed for high speed forming and closure of the strip into a tube, ensuring tight fit of the seam, which facilitates diameter reduction on the drawing machinery. Tight seam formation is quite important, as it prevents entry of lubricants or other hydrogen-bearing compounds into the core during drawing and sizing of the wire. The baking operation rid's the surface of any residual drawing compounds and renders the wire with just enough surface oxide to impart corrosion resistance. This manufacturing technology doesn't stand alone; our staff of development engineers have the metallurgical education and formulation experience to construct slag and alloy systems to suit any customer's needs. This combination of expertise leads to the finest line of flux cored and metal cored electrodes in today's welding industry.

Select-Arc's newest all position electrodes, such as Select 720HP, 721, 727, and 737, are formulated with microalloying and more slag basicity not seen before in E71T-1 products. Not only are the mechanical properties in the same realm as those of EXX18 electrodes, but the diffusible hydrogen levels are among the lowest in this classification of flux cored electrodes. These products combine superior welder appeal and performance with outstanding CVN toughness and low diffusible hydrogen levels, making them leaders in the industry.

Select-Arc has an equally impressive line of metal cored electrodes. Our newest, Select 70C-6LS, produces a weld bead with superb bead geometry and virtually no slag islands on the surface. Tie in and bead shape are exceptional; mechanical properties easily conform to AWS A5.18. Our line of metal cored, ferritic, stainless steel electrodes is among the best performing and dominant in the marketplace. As with our flux cored products, the Select-Arc metal cored line offers a complete selection of low alloy electrodes for welding nearly every grade of low alloy or high strength steels.

*The list of specialty products  
we manufacture is endless.*

It encompasses hardfacing, thermal spray, nickel based, cast iron and 300 series stainless electrodes. Send in a request through our sales department and we will be happy to tailor a product to your needs.



## Select-Arc Metal Cored Electrodes

Select-Arc's complete line of metal cored wires is the answer to a problem which has existed for years - how to combine the efficiencies of solid (GMAW) electrodes with the high productivity rates of flux cored (FCAW) electrodes. Metal cored wires offer all the advantages of solid wire; low fume generation rates, high efficiencies and no slag to remove or clean-up. Because of their unique tubular design, metal cored wires offer additional benefits such as improved sidewall fusion and reduction in "cold lap" which are common weld defects found in GMAW with solid wire. Additional benefits include; the ability to achieve pure spray transfer using 75%-80% argon/balance carbon dioxide shielding gas and faster travel speeds for a given fillet size.

Select-Arc's offering of metal cored wires ranks at the top in quality and performance. New technology in manufacturing equipment provides the ultimate in consistency of fill, diameter control and surface finish. These electrodes provide a smooth spray transfer, negligible spatter and a flat bead profile with virtually no slag islands. Minimal spatter and the absence of slag provide extremely high deposition efficiencies, 95-98%, resulting in high deposition rates and subsequently lower welding costs.

The tubular construction of metal cored electrodes is the cornerstone of reasons which account for the many advantages this product offers over solid, and in some instances, flux cored electrodes. Even though the fill ingredients are virtually all metallics, the core does not carry very much of the current. Nearly all the electrical current travels through the strip or the "tube". This creates a wider, slightly shallower path of penetration than solid wire which enhances fusion into the sidewalls and eliminates a condition known as "cold lap". In fact, the side wall fusion with metal cored

electrodes is nearly as good as with flux cored electrodes. Couple this with the extra deoxidizers which can be added to the core ingredients and metal cored electrodes offer a further advantage of welding over hot rolled material or descaled carbon steels with practically no subsurface porosity or defects of any kind. Solid wire is quite susceptible to subsurface defects, particularly on heavy plate sections. One attribute often overlooked is

the capability of metal cored electrodes to weld joints with poor fit up or with gaps, and experience minimal problems with burn through or arc outages. The same phenomenon, utilization of current density (attributable to the tubular nature of the wire), accounts for all these technical advantages.

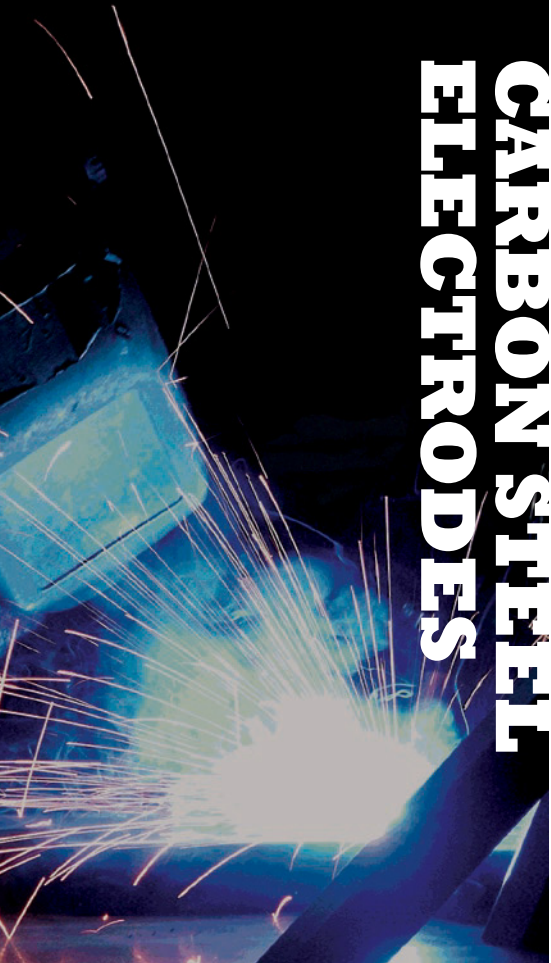
The biggest advantage of all, which metal cored offers over solid electrodes, is the most cost effective — productivity! For a given fillet size, solid wire exhibits a deep, narrow penetration nugget which not only increases the risk of cold lap but uses more weld metal than necessary to fill the joint. Metal cored wire, with a wider, shallower penetration pattern, uses less weld metal than solid wire for the same size fillet. If deposition rates are equal, and metal cored wire is usually higher,



the metal cored product will make more length of fillet per unit time than the solid electrode. Welding speeds up to 50% faster are achievable with metal cored electrodes, depending on the application. This certainly translates into big savings in welding costs due to the increased productivity.

Metal cored electrodes are equally advantageous in the world of high strength, low alloy steels or steels requiring good impact toughness at low temperatures. Adding alloys to the core is quite simple and makes possible the manufacture of small quantities; something not feasible with solid wires. Metal cored, low alloy composite wires also offer more consistency and homogeneity of product than solid electrodes. Lastly, there is so much flexibility when choosing low alloy, metal cored electrodes; a complete line of standard alloy types are available, and, in addition, special analyses products can be easily formulated.





# CARBON STEEL ELECTRODES



## GAS-SHIELDED TUBULAR Flat & Horizontal, Flux Cored

### Select 70TR

**CLASSIFICATIONS:** E70T-1C, E70T-1M, E70T-9C, E70T-9M per AWS A5.20, ASME SFA 5.20

**APPROVALS:** CWB E492T-9, 9M-H8 (CO<sub>2</sub>/C25), ABS 2YSA (CO<sub>2</sub>), 3/32" dia. – AWS 1.8 (seismic) – approved w/CO<sub>2</sub>

Select 70TR is intended for the single and multiple pass welding of carbon and certain low alloy steels in the flat and horizontal fillet positions. This E70T-1 electrode has a unique slag system which allows multiple weld beads to be stacked in a horizontal fillet with a minimum of "roll" or convexity.

**APPLICATIONS:** The bead geometry of Select 70TR is much flatter, with minimal roll, or better tie-in, at the toe of the fillet. Also, it is much easier to "stack" weld beads with Select 70TR when building up large horizontal fillets. The welding of structural carbon steels, where high deposition rates and superior penetration characteristics are preferred, is well suited for Select 70TR. It is an ideal choice for welding steels such as A36, A285, A515 and A516.

**DIAMETERS:** .045", 1/16", 5/64", 3/32"

**SHIELDING GASES:** 100% CO<sub>2</sub>, 75-80% Ar/balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**  
Flat and Horizontal



#### CHARACTERISTICS:

- Superior bead geometry delivers flat profile and minimizes "double beading".
- Extremely high welder appeal.
- Low spatter and easily removed slag.
- High deoxidation level facilitates welding over mill scale and rust.

#### TYPICAL MECHANICAL PROPERTIES:

	75%Ar/ CO <sub>2</sub>	25%CO <sub>2</sub>
Ultimate Tensile Strength (psi)	88,700	94,100
Yield Strength (psi)	74,400	81,100
Percent Elongation	24	24
CVN (ft•lb f) @ -20°F	31	30

#### TYPICAL DEPOSIT COMPOSITION:

Wt%	C	Mn	P	S	Si
CO <sub>2</sub>	.06	1.56	.006	.010	.58
75Ar/25CO <sub>2</sub>	.06	1.68	.007	.009	.70

### Select Super 70

**CLASSIFICATION:** E70T-1C per AWS A5.20, ASME SFA 5.20

Select Super 70 is designed for single and multiple pass welding of deep groove welds in the flat position, where a minimal volume of slag coverage is desired. This electrode has a higher deposition efficiency than conventional E70T-1 electrodes, hence, horizontal fillets will exhibit a convex bead profile.

**APPLICATIONS:** Select Super 70 is a good choice for deep groove weldments such as J-grooves, where slag removal between each pass can be a problem. The high deposition efficiencies of this product make it ideal for welding construction machinery, earthmoving equipment and other applications involving heavy plate welding in the flat position.

**DIAMETERS:** 1/16", 5/64", 3/32"

**SHIELDING GAS:** 100% CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**  
Flat and Horizontal



#### CHARACTERISTICS:

- High deposition efficiencies in the range of 88-92%.
- Thin slag removes easily and cleanly in a deep groove.
- Smooth arc transfer with low spatter.

#### TYPICAL MECHANICAL PROPERTIES:

	CO <sub>2</sub>
Ultimate Tensile Strength (psi)	83,000
Yield Strength (psi)	72,000
Percent Elongation	27
CVN (ft•lb f) @ 0°F	38

#### TYPICAL DEPOSIT COMPOSITION:

Wt%	C	Mn	P	S	Si
CO <sub>2</sub>	.04	1.30	.010	.010	.55

## GAS-SHIELDED TUBULAR Flat & Horizontal, Flux Cored

### Select 71

**CLASSIFICATIONS:** E70T-1C, E70T-9C per AWS A5.20, ASME SFA 5.20

**APPROVALS:** ABS E70T-1C, CWB E492T-9-H8 (CO<sub>2</sub>)

Select 71 is a carbon steel, flux cored electrode designed for the single and multiple pass welding of carbon and certain low alloy steels in the flat and horizontal passes.

**APPLICATIONS:** The high level of deoxidation in Select 71 facilitates welding over mill scale, rust and other contaminants. This makes Select 71 ideal for those applications involving the welding of structural carbon steels, where high deposition rates and superior penetration characteristics are preferred. This electrode is utilized for welding steels such as A36, A285, A515 and A516.

**DIAMETERS:** .045", .052", 1/16", 5/64", 3/32", 7/64", 1/8"

**SHIELDING GAS:** 100% CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**  
Flat and Horizontal



#### CHARACTERISTICS:

- High level of oxidation facilitates welding over mill scale, rust and other contaminants.
- Smooth welding arc over a broad range of amperage and voltage.
- Low spatter.

#### TYPICAL MECHANICAL PROPERTIES:

	CO <sub>2</sub>
Ultimate Tensile Strength (psi)	88,600
Yield Strength (psi)	73,000
Percent Elongation	24
CVN (ft•lb f) @ 0°F	34
@ -20°F	29

#### TYPICAL DEPOSIT COMPOSITION:

Wt%	C	Mn	P	S	Si
CO <sub>2</sub>	.06	1.56	.006	.010	.58

### Select 71A

**CLASSIFICATIONS:** E70T-1C, E70T-9C per AWS A5.20, ASME SFA 5.20

Select 71A is a carbon steel, flux cored electrode designed for the single and multiple pass welding of carbon and certain low alloy steels in the flat and horizontal positions. It provides smooth performance with superior bead shape and slag peeling

**APPLICATIONS:** Select 71A is a general purpose electrode with extremely high welder appeal. It has a stable arc, with low spatter, over a broad current range. This wire has excellent wetting characteristics, resulting in superior bead shape and the slag is typically self peeling. Select 71A is an ideal choice for welding plates such as ASTM A36, A285, A515 and A516 commonly found in earthmoving equipment, mining machinery, structural steel and railcar fabrication.

**DIAMETERS:** 1/16", 5/64", 3/32", 7/64", 1/8"

**SHIELDING GAS:** 100% CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**  
Flat and Horizontal



#### CHARACTERISTICS:

- High level of oxidation facilitates welding over mill scale, rust and other contaminants.
- Extremely smooth welding arc over a broad range of amperage and voltage.
- Quite low spatter.
- Slag removes very easily.

#### TYPICAL MECHANICAL PROPERTIES:

	CO <sub>2</sub>
Ultimate Tensile Strength (psi)	88,000
Yield Strength (psi)	74,000
Percent Elongation	23
CVN (ft•lb f) @ 0°F	32
@ -20°F	21

#### TYPICAL DEPOSIT COMPOSITION:

Wt%	C	Mn	P	S	Si
CO <sub>2</sub>	.06	1.28	.008	.011	.54

### Select 71P

**CLASSIFICATIONS:** E70T-1C, E70T-1M per AWS A5.20, ASME SFA 5.20, MIL 70T-1C per MIL-E-24403/1

**APPROVALS:** ABS 3YSA (92% Ar - 8% CO<sub>2</sub>), MIL 70T-1C per MIL-E-24403/1

Select 71P is a gas-shielded, flux cored electrode intended to weld over primers used in the shipbuilding industry. This electrode is multiple pass, for use in the flat position and horizontal fillets. The preferred shielding gas is carbon dioxide, but mixtures up to 92% argon - 8% carbon dioxide may be used.

**APPLICATIONS:** Select 71P is specially designed to weld over zinc-based and organic primers in the shipbuilding industry. The slag system and deoxidizers provide excellent resistance to the pitting which occurs when welding over primers used in shipbuilding, barge construction and offshore drilling platform fabrication. This electrode offers good welding performance, along with ease of slag removal and low spatter.

**DIAMETERS:** .045", .052", 1/16"

**SHIELDING GASES:** 100% CO<sub>2</sub>, 92% Ar/8% CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**  
Flat and Horizontal



#### CHARACTERISTICS:

- Porosity-free welds possible on primer coated steels.
- Smooth arc transfer with low spatter.
- Good mechanical properties.
- Easy slag removal.

#### TYPICAL MECHANICAL PROPERTIES:

	CO <sub>2</sub>	92%Ar/ 8%CO <sub>2</sub>
Ultimate Tensile Strength (psi)	86,700	89,100
Yield Strength (psi)	73,400	76,300
Percent Elongation	22	23
CVN (ft•lb f) @ 0°F	53	52

#### TYPICAL DEPOSIT COMPOSITION:

Wt%	C	Mn	P	S	Si
CO <sub>2</sub>	.04	1.40	.008	.007	.49
92Ar/8CO <sub>2</sub>	.04	1.58	.008	.007	.75



## Select 72

**CLASSIFICATION:** E70T-2C per AWS A5.20, ASME SFA 5.20

Select 72 contains a high level of deoxidizers that allow it to weld over heavier levels of rust and mill scale. This CO<sub>2</sub> gas-shielded, flux cored electrode is intended for the single pass welding of carbon steel in flat positions and horizontal fillets.

**APPLICATIONS:** Select 72 is designed for general steel plate fabrication weldments over mill scale, rust, or other mild contaminants.

**DIAMETERS:** 5/64", 3/32", 7/64", 1/8"

**SHIELDING GAS:** 100% CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Single pass electrode with good welder appeal when welding over rust and mill scale.
- Low spatter levels, with easily detachable slag.
- Excellent weld bead profile.

**TYPICAL MECHANICAL PROPERTIES:**

Transverse Tensile Strength (psi): 85,000  
(base metal fracture)  
Guided Bend Test: Meets AWS requirements

## Select Super 72

**CLASSIFICATION:** E70T-2C per AWS A5.20, ASME SFA 5.20

Select Super 72 is designed to provide clean, porosity-free welds on heavily oxidized steels and steels with certain glass coatings. This carbon steel, flux cored electrode is intended for single pass welding in the flat and horizontal positions. 100% CO<sub>2</sub> shielding gas is recommended.

**APPLICATIONS:** Select Super 72 is a superb selection for high speed welds on thin gauge carbon steels, particularly lap and butt welds. Typical applications include wheel and hub assemblies and hot water heater weldments, particularly the flue and bottom weldments.

**DIAMETERS:** .045", .052", 1/16", 5/64", 3/32", 7/64", 1/8"

**SHIELDING GAS:** 100% CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Fast travel speeds and good weld bead profiles.
- Complete coverage with very low slag volume.
- Smooth spray-like arc transfer with low splatter.

**TYPICAL MECHANICAL PROPERTIES:**

Transverse Tensile Strength (psi): 85,700  
(base metal fracture)  
Guided Bend Test: Meets AWS requirements

## Select 75

**CLASSIFICATIONS:** E70T-5C, E70T-5M per ANSI/AWS A5.20, ASME SFA 5.20

Select 75 is a flux cored electrode designed with a basic slag system which provides better mechanical properties and lower diffusible hydrogen levels in the weld deposit than E70T-1 electrodes. Select 75 is intended for single and multiple pass welding of carbon and certain low alloy steels where a minimum tensile strength of 70,000 psi and good low temperature notch toughness are required.

**APPLICATIONS:** Select 75 is an ideal choice for weldments involving difficult steels, such as high carbon and free-machining types. It is well suited for heavy section fabrications such as crane sections, heavy machine bases, boom assemblies and construction equipment. Typical steels welded with this electrode are ASTM A36, A285, A515 Gr. 70 and A516 Gr. 70.

**DIAMETERS:** .045", 1/16", 5/64", 3/32", 1/8"

**SHIELDING GASES:** 100% CO<sub>2</sub>, 75% Ar/25% CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Excellent weld metal properties.
- Slag removal and bead geometry similar to E7018 electrodes.
- Low diffusible hydrogen levels.

**TYPICAL MECHANICAL PROPERTIES:**

	75%Ar/ CO <sub>2</sub>	25%CO <sub>2</sub>
Ultimate Tensile Strength (psi)	81,400	87,000
Yield Strength (psi)	68,200	71,800
Percent Elongation	30	28
CVN (ft•lb f) @ -20°F	77	79

**TYPICAL DEPOSIT COMPOSITION**

Wt%	C	Mn	P	S	Si
CO <sub>2</sub>	.05	1.29	.009	.010	.44
75Ar/25CO <sub>2</sub>	.04	1.46	.008	.010	.57

## GAS-SHIELDED TUBULAR Flat & Horizontal, Flux Cored

### Select 97

**CLASSIFICATIONS:** E70T-1C, E70T-1M, E70T-9C, E70T-9M per AWS A5.20, ASME SFA 5.20

**APPROVALS:** ABS E70T-1C, CWB E492T-9-H8 (CO<sub>2</sub>)

Select 97 is intended for single and multiple pass welding of carbon steels where a minimum tensile strength of 70,000 psi is required. This electrode, which utilizes 100% carbon dioxide or 75% argon/25% carbon dioxide shielding gas, is specifically designed to reduce fumes.

**APPLICATIONS:** The lower fume generation rates of Select 97 render it well suited to welding indoors, or where less fume or smoke is desired. Select 97 can typically be applied in structural welds, steel fabrication and other general purpose weldments. Typically generates up to 30% less fume than conventional E70T-1C electrodes.

**DIAMETERS:** .045", .052", 1/16", 5/64", 3/32"

**SHIELDING GASES:** 100% CO<sub>2</sub>, 75% Ar/25% CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Emits lower fumes than conventional E70T-1C electrodes.
- Soft spray-like transfer with low spatter.
- Good welding characteristics.

**TYPICAL MECHANICAL PROPERTIES:**

	75%Ar/ CO <sub>2</sub> 25%CO <sub>2</sub>	
Ultimate Tensile Strength (psi)	82,000	89,000
Yield Strength (psi)	77,800	75,300
Percent Elongation	25	24
CVN (ft•lb f) @ -20°F	35	38

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si
CO <sub>2</sub>	.03	1.55	.010	.010	.50
75Ar/25CO <sub>2</sub>	.04	1.70	.007	.008	.40

## GAS-SHIELDED TUBULAR All Position, Flux Cored

### Encore

**CLASSIFICATIONS:** E71T-1C, E71T-1M, E71T-9C, E71T-9M, E71T-12C, E71T-12M per AWS A5.20, ASME SFA 5.20

**APPROVAL:** CWB E491T-9M-H8 (75Ar/25CO<sub>2</sub>)

Encore is a flux cored, gas-shielded electrode intended for single and multiple pass welding of carbon steels in all positions. This exceptional general purpose wire is a superb choice for welding where a minimum tensile strength of 70,000 psi is required.

**APPLICATIONS:** The combination of strength and toughness make Encore ideal for applications such as structural steel, farm machinery, construction equipment and railcar fabrication where the following steels may be employed; ASTM A131, A285, A515 Gr 70 and A516 Gr 70.

**DIAMETERS:** .045", .052", 1/16"

**SHIELDING GASES:** 100% CO<sub>2</sub>, 75-80% Ar/balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** All positions



**CHARACTERISTICS:**

- Provides consistent arc starting.
- Delivers a positive arc transfer that is smooth, stable and deeply penetrating.
- Fast freezing slag assures excellent out-of-position weldability.
- Unlike most E71T-1 electrodes, produces smooth, even and well washed horizontal fillets with a shiny surface and straight toe lines.

**TYPICAL MECHANICAL PROPERTIES:**

	75%Ar/ CO <sub>2</sub> 25%CO <sub>2</sub>	
Ultimate Tensile Strength (psi)	75,000	82,000
Yield Strength (psi)	65,000	70,000
Percent Elongation	31	32
CVN (ft•lb f) @ -20°F	50	45

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si
CO <sub>2</sub>	.05	1.20	.010	.010	.35
75Ar/25CO <sub>2</sub>	.05	1.45	.010	.010	.45

### Select 710

**CLASSIFICATIONS:** E71T-1C, E71T-1M per AWS A5.20, ASME SFA 5.20

Select 710 is an all position, flux cored electrode which is intended for the single and multiple pass welding of carbon and certain low alloy steels where a minimum tensile strength of 70,000 psi is required. Gas-shielding can be either 100% CO<sub>2</sub> or 75% Ar/25% CO<sub>2</sub>.

**APPLICATIONS:** Select 710 is a superb choice for the general purpose, flux cored welding of steels requiring a minimum of 70,000 psi tensile strength. Typical applications include structural steel, farm machinery, construction equipment and general carbon steel fabrication.

**DIAMETERS:** .035", .045", .052", 1/16"

**SHIELDING GASES:** 100% CO<sub>2</sub>, 75-80% Ar/ balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** All positions



**CHARACTERISTICS:**

- Deep penetration eliminates lack of fusion problems.
- Smooth and stable arc transfer with positive arc drive.
- Fast freezing slag removes easily.

**TYPICAL MECHANICAL PROPERTIES:**

	75%Ar/ CO <sub>2</sub> 25%CO <sub>2</sub>	
Ultimate Tensile Strength (psi)	86,700	88,000
Yield Strength (psi)	70,500	71,000
Percent Elongation	26	26
CVN (ft•lb f) @ 0°F	58	67

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si
CO <sub>2</sub>	.05	1.00	.008	.010	.74
75Ar/25CO <sub>2</sub>	.05	1.10	.010	.010	.85



## Select 717

**CLASSIFICATIONS:** E71T-1M, E71T-9M per AWS A5.20, ASME SFA 5.20

**APPROVAL:** CWB E491T-9M-H8 (75-80% Ar/Balance CO<sub>2</sub>)

Select 717 is a flux cored electrode specially developed to weld with high argon gas mixtures. Intended for single and multiple pass welding of carbon steels in all positions. The recommended shielding gas is argon with 5-25% carbon dioxide.

**APPLICATIONS:** Select 717 is best suited for situations where lower fume levels are required or higher out of position productivity is desired. Select 717 may be used to join steels such as ASTM A36, A515 Gr 70, A516 Gr70 and other fine grained steels. Typical applications include railcars, heavy equipment, structural fabrication and general plate fabrication.

**DIAMETERS:** .035", .045", .052", 1/16"

**SHIELDING GAS:** 75-95% Ar/balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** All positions



**CHARACTERISTICS:**

- Very smooth arc transfer with virtually no spatter.
- Exceptionally low fume generation.
- Maintains handling characteristics in higher argon mixtures.
- Quick freezing slag allows for very high deposition rates.

**TYPICAL MECHANICAL PROPERTIES:**

	75%Ar/ 25%CO <sub>2</sub>	95%Ar/ 5%CO <sub>2</sub>
Ultimate Tensile Strength (psi)	82,500	88,100
Yield Strength (psi)	69,700	76,000
Percent Elongation	27	26
CVN (ft•lb f) @ 0°F	76	97
@ -20°F	55	89

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si
75Ar/25CO <sub>2</sub>	.04	.97	.010	.010	.45
95Ar/5CO <sub>2</sub>	.04	1.12	.007	.010	.59

## Select 720

**CLASSIFICATIONS:** E71T-1C, E71T-1M, E71T-9C, E71T-9M, E71T-12C, E71T-12M per AWS A5.20, ASME SFA 5.20, MIL-71T-1 HYC, MIL-71T-1 HYM and MIL-71T-1C per MIL-E-24403/1

**APPROVALS:** ABS 3YSA; Lloyd's 3S, 3YS; DNV 3 YMS; CWB E491T-9, 9M-H8, MIL-71T-1 HYC, MIL-71T-1 HYM and MIL-71T-1C per MIL-E-24403/1, .045" & 1/16" dias. – AWS D1.8 (seismic) – approved in CO<sub>2</sub> and Ar/25CO<sub>2</sub>

Select 720 is a flux cored electrode intended for single and multiple pass welding of carbon steels in all positions. The preferred shielding gas is carbon dioxide; the use of 75-80% argon/balance carbon dioxide may produce somewhat higher tensile strength with no significant difference in CVN toughness.

**APPLICATIONS:** Select 720 is an ideal choice for those weldments requiring good CVN toughness and high welder appeal when joining steels such as ASTM A36, A515 Gr 70, A516 Gr 70 and other fine grained steels. Such applications are found in shipbuilding, offshore drilling structures, structural welds and general plate fabrication.

**DIAMETERS:** .035", .045", .052", 1/16", 5/64"

**SHIELDING GASES:** 100% CO<sub>2</sub>, 75-80% Ar/balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** All positions



**CHARACTERISTICS:**

- Superb welder appeal in all position weldments.
- Superior all position bead shape.
- Minimal spatter and low fume emission.
- Smooth spray transfer with fast freezing slag.
- Superior CVN toughness at certain subzero temperatures.

**TYPICAL MECHANICAL PROPERTIES:**

	75%Ar/ CO <sub>2</sub>	25%CO <sub>2</sub>
Ultimate Tensile Strength (psi)	84,000	88,100
Yield Strength (psi)	77,000	78,900
Percent Elongation	28	27
CVN (ft•lb f) @ 0°F	91	99
@ -20°F	95	88

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si
CO <sub>2</sub>	.05	1.25	.008	.010	.50
75Ar/25CO <sub>2</sub>	.05	1.39	.008	.009	.56

## Select 720A

**CLASSIFICATIONS:** E71T-1C, E71T-1M, E71T-9C, E71T-9M per AWS A5.20, SFA 5.20

**APPROVAL:** CWB E491T-9M-H8 (Arcal 211)

A carbon steel, flux cored electrode, Select 720A is intended for the single and multiple pass welding of carbon steels in all positions. Carbon dioxide is the recommended shielding gas, however, the use of 75-80% argon / balance carbon dioxide may produce somewhat higher tensile strength with no significant difference in CVN toughness.

**APPLICATIONS:** Select 720A is an ideal choice for those weldments requiring good CVN toughness and high welder appeal when joining steels such as ASTM A36, A515 Gr 70, A516 Gr 70 and other fine grained steels. These applications would include shipbuilding, offshore drilling structures, structural welds and general plate fabrication.

**DIAMETERS:** .035", .045", .052", 1/16"

**SHIELDING GASES:** 100% CO<sub>2</sub>, 75-80% Ar/ balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** All positions



**CHARACTERISTICS:**

- Delivers superior CVN toughness at subzero temperatures.
- Outstanding welder appeal over a broad range of welding parameters.
- Arc transfer is an extremely smooth spray with minimal spatter, even at low current levels.
- Provides superb puddle control.
- Fast freezing slag facilitates all position welding.
- Bead profile is quite flat with only minor convexity.

**TYPICAL MECHANICAL PROPERTIES:**

	75% Ar/ CO <sub>2</sub>	25% CO <sub>2</sub>
Ultimate Tensile Strength (psi)	83,000	86,500
Yield Strength (psi)	75,300	78,400
Percent Elongation	28	27
CVN (ft•lb f) @ -20°F	58	59

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si
CO <sub>2</sub>	.05	1.21	.008	.010	.38
75Ar/25CO <sub>2</sub>	.05	1.37	.008	.009	.42

## GAS-SHIELDED TUBULAR All Position, Flux Cored

### Select 720HP

**CLASSIFICATIONS:** E71T-1CJ, E71T-1MJ, E71T-9CJ, E71T-9MJ, E71T-12CJ, E71T-12MJ per AWS A5.20, ASME SFA 5.20

**APPROVALS:** ABS 3YSA (CO<sub>2</sub>/C25), Lloyd's 4YS (C25), DNV IV YMS (C25), CWB E491T-12MJ

Select 720HP is a premium, flux cored, gas-shielded electrode. It is designed for single and multiple pass welding of carbon steels in all positions.

**APPLICATIONS:** There are numerous applications for which Select 720HP is well suited, many of them previously reserved for EXX18 covered electrodes. This electrode excels in welding where requirements are stringent, such as offshore platforms and pipe systems, pressure vessels, oil and gas pipelines, petrochemical pipelines, structural steel, bridge fabrication and many others.

**DIAMETERS:** .035", .045", .052", 1/16", 5/64"

**SHIELDING GASES:** 100% CO<sub>2</sub>, 75-80% Ar/balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** All positions



#### CHARACTERISTICS:

- Excellent CVN toughness.
- Exceptional bead geometry.
- Low fume generation rates and diffusible hydrogen levels.
- Exceptional resistance to moisture pickup.
- Easily exceeds all "recommended requirements."

#### TYPICAL MECHANICAL PROPERTIES:

	75%Ar/ CO <sub>2</sub>	25%CO <sub>2</sub>
Ultimate Tensile Strength (psi)	81,500	88,000
Yield Strength (psi)	66,700	76,000
Percent Elongation	28	28
CVN (ft•lb f) @ 0°F	110	101
@ -20°F	95	85
@ -50°F	37	40

#### TYPICAL DEPOSIT COMPOSITION:

Wt%	C	Mn	P	S	Si	Ni
CO <sub>2</sub>	.06	1.30	.009	.009	.42	.39
75Ar/ 25CO <sub>2</sub>	.06	1.51	.009	.009	.47	.41

### Select 721

**CLASSIFICATIONS:** E71T-1M, E71T-9M per AWS A5.20, ASME SFA 5.20, MIL-71T-1 HYM per MIL-E-24403/1

**APPROVALS:** ABS 3YSA (C25), MIL-71T-1 HYM

Select 721 is an E71T-1M electrode designed to conform to MIL-71T-1-HYM per Mil-E-24403/1, with the added capability of being used with argon/carbon dioxide blends of up to 95% argon. This electrode is approved and listed on the Navy QPL.

**APPLICATIONS:** Although Select 721 was designed with Naval shipbuilding in mind, it is well suited to many other applications such as commercial shipbuilding, general steel fabrication, construction and farm equipment, structural steel and pressure vessel fabrication.

**DIAMETERS:** .035", .045", .052", 1/16"

**SHIELDING GAS:** 75-95% Ar/balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** All positions



#### CHARACTERISTICS:

- Outstanding welder appeal.
- Low fume generation rates and spatter.
- Good CVN toughness to -20° F
- Diffusible hydrogen levels within MIL spec of 5 ml/100 gr of weld metal.

#### TYPICAL MECHANICAL PROPERTIES:

	75%Ar/25%CO <sub>2</sub>
Ultimate Tensile Strength (psi)	78,100
Yield Strength (psi)	66,800
Percent Elongation	30
CVN (ft•lb f) @ -20°F	50

#### TYPICAL DEPOSIT COMPOSITION:

Wt%	C	Mn	P	S	Si	Ni
75Ar/ 25CO <sub>2</sub>	.06	1.09	.006	.007	.33	.44

### Select 727

**CLASSIFICATIONS:** E71T-1C, E71T-1M, E71T-9C, E71T-9M per AWS A5.20, ASME SFA 5.20

**APPROVALS:** ABS 3YSA (CO<sub>2</sub>/C25), DNV 3 YMS (CO<sub>2</sub>), .045" & 1/16" dias. – AWS D1.8 (seismic) – approved in CO<sub>2</sub> and Ar/25CO<sub>2</sub>

Select 727 was developed to provide improved deposition rates and enhanced welder appeal, compared to conventional electrodes. This electrode is intended for single and multiple pass welding of carbon steels and is designed for use with 100% carbon dioxide and 75-80% argon/balance carbon dioxide.

**APPLICATIONS:** The combination of strength and toughness make Select 727 ideal for welding carbon steels requiring a minimum tensile strength of 70,000 psi. Select 727 is superb for such applications as structural steel, farm machinery, construction equipment, railcar fabrication and shipbuilding, where the following steels may be employed: ASTM A131, A285, A515 Gr 70 and A516 Gr 70.

**DIAMETERS:** .035", .045", .052", 1/16"

**SHIELDING GASES:** 100% CO<sub>2</sub>, 75-80% Ar/balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** All positions



#### CHARACTERISTICS:

- Fast freezing slag facilitates all position capability.
- Superior bead geometry to conventional E71T-1 electrodes.
- Reduced fume emissions and spatter level.

#### TYPICAL MECHANICAL PROPERTIES:

	75%Ar/ CO <sub>2</sub>	25%CO <sub>2</sub>
Ultimate Tensile Strength (psi)	89,100	90,600
Yield Strength (psi)	78,100	82,700
Percent Elongation	26	25
CVN (ft•lb f) @ 0°F	85	70
@ -20°F	70	45

#### TYPICAL DEPOSIT COMPOSITION:

Wt%	C	Mn	P	S	Si
CO <sub>2</sub>	.05	1.39	.008	.010	.56
75Ar/25CO <sub>2</sub>	.05	1.61	.005	.010	.64



## GAS-SHIELDED TUBULAR Metal Cored

### Select 737

**CLASSIFICATIONS:** E71T-1MJ, E71T-9MJ, E71T-12MJ per AWS A5.20, ASME SFA 5.20.

**APPROVAL:** ABS 3YSA (C25)

A carbon steel electrode for single and multiple pass welding of carbon and certain low alloy steels, Select 737 is utilized where a minimum of 70,000 psi is required.

**APPLICATIONS:** The combination of weldability and good mechanical properties make Select 737 a fine choice for general purpose, flux cored welding. Typical applications include structural steel, farm machinery, construction equipment and general carbon steel fabrication.

**DIAMETERS:** .035", .045", .052", 1/16"

**SHIELDING GAS:** 75-90% Ar/ 10-25% CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** All positions



**CHARACTERISTICS:**

- Good arc drive.
- Very positive, smooth and stable arc transfer.
- Excellent mechanical properties.
- Fast freezing slag removes readily and cleanly.

**TYPICAL MECHANICAL PROPERTIES:**

	75%Ar/ 25%CO <sub>2</sub>	90%Ar/ 10%CO <sub>2</sub>
Ultimate Tensile Strength (psi)	84,400	90,300
Yield Strength (psi)	70,000	78,300
Percent Elongation	30	24
CVN (ft•lb f) @ -20°F	105	88
@ -40 F	100	74

**TYPICAL DEPOSIT COMPOSITION:**

WT%	C	Mn	P	S	Si
75Ar/25CO <sub>2</sub>	.06	1.50	.008	.010	.40
90Ar/10CO <sub>2</sub>	.07	1.53	.009	.009	.42

### Select 70C-3

**CLASSIFICATION:** E70C-3M-H4 per AWS A5.18, ASME SFA 5.18

Select 70C-3 is a premium metal cored electrode intended for single and multiple pass welding of carbon and certain low alloy steels, where a minimum tensile strength of 70,000 psi is required in the deposited weld metal.

**APPLICATIONS:** The versatility of Select 70C-3 makes it an ideal choice for those applications where solid wire is inadequate or the slag from flux cored wire is unwanted. Typical areas of appeal are propane and air compressor tanks, farm machinery frames and assemblies, heavy gauge sheet metal and general steel fabrication. The absence of slag and spatter residue facilitates painting after the welding operation is completed.

**DIAMETERS:** .035", .045", .052", 1/16", 5/64", 3/32"

**SHIELDING GAS:** 75-95% Ar/balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** All positions - .035"-1/16"



flat and horizontal - 5/64"-3/32"

**CHARACTERISTICS:**

- Increased productivity due to faster welding speeds.
- Very smooth spray transfer with virtually no spatter emission.
- Better fusion than solid wire.
- Elimination of cold lap.
- Slag-free welds enhance productivity.

**TYPICAL MECHANICAL PROPERTIES:**

	75%Ar/25%CO <sub>2</sub>
Ultimate Tensile Strength (psi)	81,000
Yield Strength (psi)	73,000
Percent Elongation	25
CVN (ft•lb f) @ 0°F	57

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si
75Ar/25CO <sub>2</sub>	.05	1.32	.010	.010	.54

### Endurance

**CLASSIFICATION:** E70C-6M-H4 per AWS A5.18, ASME SFA 5.18

A specially manufactured carbon steel, composite metal cored electrode for gas-shielded arc welding, Endurance provides unsurpassed feedability and arc starting capability, low residual slag and excellent operating characteristics. Endurance is intended for the single and multiple pass welding of carbon and certain low alloy steels, where a minimum tensile strength of 70,000 psi is required in the deposited weld metal.

**APPLICATIONS:** Endurance is ideally suited for robotic and other automated applications where consistency of feeding, arc starting and bead appearance are of primary importance. This electrode is utilized for general purpose welding but excels in higher demand situations such as in heavier sheet metal fabrication, automotive applications, structural work, pipe welding and the welding of water heaters.

**DIAMETERS:** .045", .052", 1/16"

**SHIELDING GAS:** 75-95% Ar/ balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** All positions



**CHARACTERISTICS:**

- Continuous, uninterrupted feeding and consistent arc starts under difficult conditions.
- Low slag formulation.
- Smooth, well washed beads with even edges and minimal silicon islands.
- Faster travel speeds and increased productivity over solid wires.
- Better sidewall fusion on heavy plate.
- Greater tolerance of rust and millscale.

**TYPICAL MECHANICAL PROPERTIES:**

	75%Ar/ 25%CO <sub>2</sub>	95%Ar/ 5%CO <sub>2</sub>
Ultimate Tensile Strength (psi)	79,000	87,000
Yield Strength (psi)	66,000	76,000
Percent Elongation	27	25
CVN (ft•lb f) @ -20°F	55	50
@ -40°F	30	25

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si
75Ar/25CO <sub>2</sub>	.06	1.30	.010	.010	.50
95Ar/5CO <sub>2</sub>	.05	1.44	.010	.010	.55

## GAS-SHIELDED TUBULAR Metal Cored

### Select 70C-6

**CLASSIFICATION:** E70C-6M-H4 per AWS A5.18, ASME SFA 5.18

**APPROVALS:** ABS 3YSA (w/75Ar/25CO<sub>2</sub>) - F/V/D; DNV 3YMS (w/75Ar/25CO<sub>2</sub>) - F/V/D; Lloyd's 2S, 2YS (w/75Ar/25CO<sub>2</sub>) - F; CWB E491C-6, 6M-H4 (CO<sub>2</sub>/C5)

Select 70C-6 provides higher manganese and silicon levels than Select 70C-3. Intended for single and multiple pass welding, Select 70C-6 delivers extra deoxidizers which allow this electrode to be used on higher levels of mill scale than can be tolerated by the E70C-3X class of metal cored product.

**APPLICATIONS:** Select 70C-6 is well suited to applications where higher manganese and silicon levels are essential, such as in the presence of heavy mill scale or mild contaminants, or when improved wetting of the weld bead is desired. This product excels in general purpose welding, but is equally superior in higher demand situations as in heavier sheet metal fabrication, structural work, pipe welding and welding of hot water heaters.

**DIAMETERS:** .035", .045", .052", 1/16", 5/64", 3/32", 7/64", 1/8"

**SHIELDING GAS:** 75-95% Ar/balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** All positions - .035"-1/16"



flat and horizontal - 5/64"-1/8"

#### CHARACTERISTICS:

- Higher manganese and silicon contents provide more deoxidation and a flatter bead geometry.
- Increased productivity, better sidewall fusion than ER70S-6 solid wire.
- Excellent for short circuit welding.

#### TYPICAL MECHANICAL PROPERTIES:

	75%Ar/ 25%CO <sub>2</sub>	95%Ar/ 5%CO <sub>2</sub>
Ultimate Tensile Strength (psi)	87,200	91,800
Yield Strength (psi)	78,900	80,700
Percent Elongation	25	24
CVN (ft•lb f) @ -20°F	46	51

#### TYPICAL DEPOSIT COMPOSITION:

Wt%	C	Mn	P	S	Si
75Ar/25CO <sub>2</sub>	.06	1.55	.010	.010	.66
95Ar/5CO <sub>2</sub>	.05	1.69	.010	.010	.81

### Select 70C-6LS

**CLASSIFICATION:** E70C-6M-H4 per AWS A5.18, ASME SFA 5.18

**APPROVALS:** ABS 3YSA, CWB E491C-6, 6M-H4 (CO<sub>2</sub>/C5), .045" dia. - AWS D1.8 (seismic) - approved in Ar/10CO<sub>2</sub>

Select 70C-6LS is a carbon steel, gas-shielded, composite metal cored electrode which produces substantially fewer slag islands than typical metal cored wires. Intended for single and multiple pass welding of carbon and certain low alloy steels, Select 70C-6LS is utilized where a minimum tensile strength of 70,000 psi is required.

**APPLICATIONS:** Select 70C-6LS is well suited to applications where better bead appearance and less postweld cleanup are desired. The absence of slag and spatter facilitates painting after welding. It can be used to weld sheet metal and thin plate and pipe. Typical applications would be thin walled tanks, certain structural steel and earthmoving equipment.

**DIAMETERS:** .035", .045", .052", 1/16"

**SHIELDING GAS:** 75-95% Ar/balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** All positions



#### CHARACTERISTICS:

- Minimizes "slag islands", reducing cleanup time.
- Outstanding weld bead appearance with excellent tie-in.
- Smooth spray arc transfer with virtually no spatter.
- Better sidewall fusion.
- Greater tolerance of mill scale and rust.

#### TYPICAL MECHANICAL PROPERTIES:

	75%Ar/25%CO <sub>2</sub>					
Ultimate Tensile Strength (psi)						81,500
Yield Strength (psi)						64,500
Percent Elongation						27
CVN (ft•lb f) @ -20°F						32

#### TYPICAL DEPOSIT COMPOSITION:

Wt%	C	Mn	P	S	Si
75Ar/25CO <sub>2</sub>	.05	1.54	.007	.010	.60

### Select 70C-7

**CLASSIFICATION:** E70C-6M-H4 per AWS A5.18, ASME SFA 5.18

**APPROVALS:** CWB E491C-6, 6M-H4(CO<sub>2</sub>/C5)

Select 70C-7 is ideal for those situations where lower spatter and fume levels than Select 70C-6 are desired. This composite metal cored electrode is primarily designed for horizontal fillet and flat position weldments.

**APPLICATIONS:** The exceptionally smooth arc and low spatter level of Select 70C-7 minimize postweld cleanup, making it ideal for weldments that are to be painted. The low fume levels (40% lower than conventional metal cored electrodes) reduce worker exposure in more difficult to ventilate areas. Typical applications would be car and truck frames, structural steels, trailers and earthmoving equipment.

**DIAMETERS:** .035", .045", .052", 1/16", 5/64", 3/32", 1/8"

**SHIELDING GAS:** 75-95% Ar/balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** All positions - .035"-1/16"



flat and horizontal - 5/64"-1/8"

#### CHARACTERISTICS:

- Less spatter, lower fumes than conventional E70C-6M electrodes.
- Soft spray arc transfer with a clean weld puddle.
- Exceptional bead geometry with low slag islands.
- Greater productivity achieved in comparison to ER70S-3 and ER70S-6 solid wires.

#### TYPICAL MECHANICAL PROPERTIES:

	75%Ar/25%CO <sub>2</sub>					
Ultimate Tensile Strength (psi)						79,100
Yield Strength (psi)						65,300
Percent Elongation						24
CVN (ft•lb f) @ -20°F						37

#### TYPICAL DEPOSIT COMPOSITION:

Wt%	C	Mn	P	S	Si
75Ar/25CO <sub>2</sub>	.03	1.70	.010	.009	.88

## Select 70C-8

**CLASSIFICATION:** E70C-6M-H4 per AWS A5.18, ASME SFA 5.18

Select 70C-8 is a carbon steel, composite metal cored electrode for gas-shielded arc welding of carbon steels. This electrode is intended for single and limited multiple pass welding of horizontal fillet and flat position weldments. Select 70C-8 has special deoxidation which makes it very effective when welding over heavy rust, mill scale, oils or other contaminants.

**APPLICATIONS:** Select 70C-8 is ideal for those difficult-to-weld items such as heavily rusted or scaled surfaces or when steel is coated with oil or paint. This is primarily a single pass electrode if used on clean surfaces due to the high level of deoxidizers. Strength levels and CVN toughness make this electrode well suited to weld both ordinary and fine grained carbon steels such as ASTM A36, A285, A516 Gr 70 and A515 Gr 70.

**DIAMETERS:** .045", .052", 1/16", 5/64", 7/64", 1/8"

**SHIELDING GAS:** 75-95% Ar/balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Welds over rust, mill scale, paint and other contaminants.
- Primarily a single pass electrode with limited multiple pass capability.
- Good mechanical properties.

**TYPICAL MECHANICAL PROPERTIES:**

	75%Ar/25%CO <sub>2</sub>
Ultimate Tensile Strength (psi)	90,000
Yield Strength (psi)	79,000
Percent Elongation	26
CVN (ft•lb f) @ -20°F	40

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si
75Ar/25CO <sub>2</sub>	.05	1.68	.010	.010	.74

## Select 70C-10

**CLASSIFICATION:** E70C-6M-H4 per AWS A5.18, ASME SFA 5.18

Select 70C-10 is a carbon steel, gas-shielded, composite metal cored electrode designed for arc welding at travel speeds far higher than attained with conventional metal cored products.

**APPLICATIONS:** Select 70C-10 is ideally suited for those applications which require higher travel speeds on thin gauge carbon steels. This product excels in the welding of automotive and truck frames, automotive cradle assemblies, farm machinery and other general purpose welding of light gauge components.

**DIAMETERS:** .045", .052", 1/16", 5/64", 3/32", 7/64", 1/8"

**SHIELDING GAS:** 75-95% Ar/balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Outstanding performance in high speed fillet and lap welds.
- Travel speeds far in excess of conventional metal cored electrodes.
- Handles poor fit-up.

**TYPICAL MECHANICAL PROPERTIES:**

	75%Ar/25%CO <sub>2</sub>
Ultimate Tensile Strength (psi)	84,000
Yield Strength (psi)	68,000
Percent Elongation	27
CVN (ft•lb f) @ -20°F	26

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si
75Ar/25CO <sub>2</sub>	.03	1.70	.003	.010	.75

## Select 70C-T

**CLASSIFICATION:** E70C-6M-H4 per AWS A5.18, ASME SFA 5.18

**APPROVALS:** Lloyd's 3S, 3YS, ABS 3YSA, DNV 3 YMS, CWB E491C-6, 6MJ-H4

A nickel bearing version of Select 70C-6, Select 70C-T is a composite metal cored electrode designed for single and multiple pass welding of carbon or certain low alloy steels requiring excellent CVN toughness at temperatures as low as -50°F.

**APPLICATIONS:** The excellent toughness of Select 70C-T makes it an ideal selection for welding fine grained steels and many low alloy steels such as ASTM A515 Gr 70, A516 Gr 70 and 1% Ni steels. These materials would be used in the fabrication of railcars, mining machinery, earthmoving equipment, pipeline material and fabrications utilized in cold climates.

**DIAMETERS:** .035", .045", .052", 1/16"

**SHIELDING GAS:** 75-95% Ar/balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** All positions



**CHARACTERISTICS:**

- Excellent low temperature toughness.
- True spray arc transfer with virtually no spatter.
- Superior bead profile with virtually no convexity.
- Deoxidizer content allows welding over mill scale with no surface porosity.
- Significant advantages over welding with solid wire.

**TYPICAL MECHANICAL PROPERTIES:**

	75%Ar/25%CO <sub>2</sub>
Ultimate Tensile Strength (psi)	88,900
Yield Strength (psi)	76,300
Percent Elongation	28
CVN (ft•lb f) @ -50°F	38

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si	Ni
75Ar/25CO <sub>2</sub>	.04	1.59	.010	.010	.69	.40



## SUBMERGED ARC

## FLUX CORED SELF-SHIELDED Flat and Horizontal

### Select-Arc Tubular Electrodes for Submerged Arc Welding

**Select-Arc manufactures a line of tubular electrodes specifically designed for submerged arc welding.** These electrodes produce higher deposition rates than solid electrodes of the same diameter when run under the same conditions. Typically, a 10-20% increase in deposition rate can be achieved depending on the current level used (deposition rate differences increase as the current is raised). They also produce a broader penetration pattern, allowing them to bridge gaps caused by poor fit-up, with less chance of burnthrough.

Select-Arc tubular, submerged arc electrodes may be used in single or multiple electrode setups with either AC or DC current.

#### **CARBON STEEL TUBULAR ELECTRODES FOR SUBMERGED ARC WELDING:**

Select-Arc produces a number of tubular, carbon steel, submerged arc electrodes for the welding of carbon steel. Each is designed to match the chemistry of the correspondingly named solid electrode and each may be directly substituted for that electrode. They work well with active or neutral submerged arc fluxes.

All Select-Arc tubular, carbon steel, submerged arc electrodes are classified as EC1 per AWS A5.17.

**EM12K-S** A manganese-silicon electrode for general fabrication. Its deposit chemistry approximates that of a solid wire EM12K electrode.

**EH12K-S** Contains higher levels of manganese and silicon in order to maintain mechanical property levels at higher heat inputs. Weld deposit strength levels will be higher than those made with EM12K-S. Its deposit chemistry approximates that of a solid wire EH12K electrode.

**EM13K-S** Contains higher silicon for improved performance over scaled plate. Its deposit chemistry approximates that of a solid wire EM13K electrode.

**EM14K-S** Contains titanium for improved notch toughness. Its deposit chemistry approximates that of a solid wire EM14K electrode.

Each electrode is available in diameters of 1/16" through 5/32".

### Select 73

**CLASSIFICATION:** E70T-3 per AWS A5.20, ASME SFA 5.20

*Select 73 is a self-shielded, flux cored electrode designed for single pass weldments on carbon steel. Use of this electrode is limited to horizontal fillet, lap welds, flat fillet and butt welds.*

**APPLICATIONS:** The unique welding characteristics of Select 73 make it perfect for applications involving high travel speeds (60-120 ipm) and lower penetration such as lap and butt welds on thin gauge steel plate, welding of truck or trailer frames and general purpose joining of light gauge carbon steel sheet and plate.

**DIAMETERS:** 5/64", 3/32", .120"

**SHIELDING GAS:** Self-shielded

**WELDING POSITIONS:**  
Flat and Horizontal



#### **CHARACTERISTICS:**

- Produces high speed, low penetration weldments.
- Extremely thin slag coverage adheres tightly.
- Semi-spray arc transfer with modest spatter levels.
- Operates on reverse polarity (DCEP).

#### **TYPICAL MECHANICAL PROPERTIES:**

Transverse Tensile Strength (psi): 84,000  
(Base metal fracture)  
Longitudinal Bend Test: Meets AWS requirements

## Select 73R

**CLASSIFICATION:** E70T-3 per AWS A5.20, ASME SFA 5.20

Select 73R is a self-shielded, carbon steel, flux cored electrode for single pass welding on thin gauge carbon steels. The fast freezing slag facilitates the use of this electrode in girth, or circumferential, welds.

**APPLICATIONS:** Select 73R has a special slag system allowing it to be used in circumferential, or roundabout, welds on thin gauge steels at relatively high travel speeds. The low penetration characteristics make it ideal for fillet, lap and butt welds, such as hot water heater flue and base welds, on light gauge steels.

**DIAMETERS:** 1/8", 5/32"

**SHIELDING GAS:** Self-shielded

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Smooth transfer, slightly globular to spray in nature.
- High speed, low penetration weldments.
- Ideal for circumferential weldments
- Slag exhibits complete coverage and detaches easily.
- Operates on reverse polarity (DCEP).

**TYPICAL MECHANICAL PROPERTIES:**

Transverse Tensile Strength (psi): 83,500  
(Base metal fracture)  
Longitudinal Bend Test: Meets AWS requirements

## Select 74

**CLASSIFICATION:** E70T-4 per AWS A5.20, ASME SFA 5.20

Select 74 is a self-shielded, flux cored electrode designed for use in the multiple pass welding of carbon steels. This electrode is intended for flat position welding of grooves and fillets and horizontal fillet welding with extremely high deposition rates.

**APPLICATIONS:** Select 74 is ideally suited for welding applications where gas-shielded electrodes may have problems, such as outdoors or in windy conditions. These would typically be light gauge steel plate fabrication or general purpose fabrication of carbon steels. Select 74 is also a good choice in poor fit up situations or when extended stickouts must be used in hard-to-reach areas.

**DIAMETERS:** 1/16", 5/64", 3/32", .120"

**SHIELDING GAS:** Self-shielded

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Extremely high deposition rates.
- Minimizes hot cracking on steels high in sulfur.
- Facilitates welding fillets with gaps or poor fit up better than E70T-1 electrodes.
- Very good slag detachment.
- Operates on reverse polarity (DCEP).

**TYPICAL MECHANICAL PROPERTIES:**

Ultimate Tensile Strength (psi) 87,800  
Yield Strength (psi) 65,000  
Percent Elongation 26

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si	Al
	.20	.50	.008	.003	.17	1.59

## Select 701

**CLASSIFICATION:** E71T-11 per AWS A5.20, ASME SFA 5.20

Select 701 is designed for those applications where the use of shielding gas is inappropriate and where CVN toughness is not of prime concern. This electrode is intended for semi-automatic and automatic welding of carbon steel in single pass and limited multiple pass applications.

**APPLICATIONS:** Select 701 is well suited for butt, lap, and fillet welds on steels from 16 gauge through 1/2". The versatility of Select 701 makes it an excellent selection for assembly and maintenance welding in all positions.

**DIAMETERS:** .045", 1/16", 5/64", 3/32"

**SHIELDING GAS:** Self-shielded

**WELDING POSITIONS:** All positions



**CHARACTERISTICS:**

- Very smooth arc.
- Exceptionally low spatter.
- Minimizes burn-through.
- Fast freezing slag facilitates welding.
- Operates on straight polarity (DCEN).

**TYPICAL MECHANICAL PROPERTIES:**

Ultimate Tensile Strength (psi) 89,400  
Yield Strength (psi) 66,600  
Percent Elongation 23

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si	Al
	.21	.30	.010	.010	.15	1.50

## FLUX CORED SELF-SHIELDED All Position

### Select 700GS

**CLASSIFICATIONS:** E71T-GS, E71T-14 per AWS A5.20, ASME SFA 5.20

The many positive characteristics of Select 700GS make it the smart choice for the “hobbyist” welder, as it works very well on the small 110 volt power source/ feeders which have become so popular. Select 700GS is designed for single pass welding of thin-gauge carbon steel, ranging from  $3/16$ " to 22 gauge. This electrode is intended to weld quite effectively over galvanized material and can be used on certain aluminized surfaces as well. Select 700GS requires no external gas-shielding and should be welded with DCEN (straight polarity).

**APPLICATIONS:** Select 700GS is the natural choice for applications such as lap and butt welds on galvanized sheet metal, repair of automobile sheet metal, welding ductwork and joining of galvanized roofing sheet metal.

**DIAMETERS:** .030", .035", .045", .052", 1/16"

**SHIELDING GAS:** Self-shielded

**WELDING POSITIONS:** All positions



#### CHARACTERISTICS:

- Performs well on galvanized material.
- Smooth and stable arc transfer with virtually no spatter emission.
- Soft arc transfer minimizes burn-through on thin gauge material.
- Good selection for use on popular 110 volt power sources.
- Operates on straight polarity (DCEN).

#### TYPICAL MECHANICAL PROPERTIES:

Transverse Tensile Strength (psi): 86,400  
(Base metal fracture)  
Guided Bend Test: Meets AWS requirements

## SOLID WIRE Copper-Coated Wire

### Select 70S-3

**CLASSIFICATION:** ER70S-3 per AWS/ANSI A5.18, ASME SFA 5.18

Select 70S-3 is a premium copper-coated, solid electrode, or MIG wire, designed for gas metal arc welding of a wide selection of carbon steels, such as sheet metal, plate and automotive components. This electrode should be used for welding steels in single or multiple pass applications with a yield strength range of 55,000-75,000 psi.

**APPLICATIONS:** Select 70S-3 is well suited for welding pipe, pressure vessels, steel buildings and sheet steel. The sheet steel applications are varied and include ventilation ductwork, air conditioner compressors and frames, steel furniture and many others. Care should be taken to avoid welding steel which has oil, mill scale or other contaminants.

**DIAMETERS:** .035", .045", .052", 1/16"

**SHIELDING GASES:** 100% CO<sub>2</sub>, 75-95% Ar/ balance CO<sub>2</sub>, 95-98% Ar/ balance O<sub>2</sub>, 30-50 cfh

**WELDING POSITIONS:** All positions



#### CHARACTERISTICS:

- Exceptional performance.
- Excellent feedability and welding characteristics.
- Contains moderate levels of manganese and silicon.

#### TYPICAL MECHANICAL PROPERTIES:

	CO <sub>2</sub>
Ultimate Tensile Strength (psi)	77,000
Yield Strength (psi)	64,100
Percent Elongation	29
CVN (ft•lb f) @ 0°F	66

#### WIRE COMPOSITION:

Wt%	C	Mn	P	S	Si	Cu
	.08	1.18	.009	.009	.53	.18

### Select 70S-6

**CLASSIFICATION:** ER70S-6 per AWS/ANSI A5.18, ASME SFA 5.18

This premium carbon steel, “MIG wire”, electrode is utilized for welding carbon steels with a yield strength range of 55,000-70,000 psi. Select 70S-6 is well suited for steels containing medium to high levels of mill scale and mild amounts of contaminants. The wire’s copper coating promotes excellent feeding characteristics.

**APPLICATIONS:** Select 70S-6 is a good selection for weldments requiring better tie-in and wetting than possible with a 70S-3 electrode. It is a terrific choice for welding pressure vessels, structural steel, pipe, steel buildings and automotive repair.

**DIAMETERS:** .035", .045", .052", 1/16"

**SHIELDING GASES:** 100% CO<sub>2</sub>, 75-95% Ar/ balance CO<sub>2</sub>, 95-98% Ar/ balance O<sub>2</sub>, 30-50 cfh

**WELDING POSITIONS:** All positions



#### CHARACTERISTICS:

- Has higher manganese and silicon for improved performance over scaled plate.
- Excellent feedability and welder appeal.
- Extremely stable and consistent arc transfer.
- Achieves high wire feed speeds without problems.

#### TYPICAL MECHANICAL PROPERTIES:

	CO <sub>2</sub>
Ultimate Tensile Strength (psi)	80,900
Yield Strength (psi)	68,100
Percent Elongation	28
CVN (ft•lb f) @ -20°F	44

#### WIRE COMPOSITION:

Wt%	C	Mn	P	S	Si	Cu
	.08	1.53	.009	.010	.88	.18



## SOLID WIRE Copper-Free Wire

### Select 70S-3NC

**CLASSIFICATION:** ER70S-3 per AWS/  
ANSI A5.18, ASME SFA 5.18

Select 70S-3NC is free of copper coating, hence the “NC” designator signifying “no copper”. This truly premium solid electrode, or “MIG” wire, is intended for gas metal arc welding of carbon steels which require a minimum yield strength of 50,000 psi. There is no copper to vaporize into the welding fume other than the trace amounts within the wire itself.

**APPLICATIONS:** Select 70S-3NC is ideally suited for welding on carbon steels that are clean or contain only light mill scale. This electrode is versatile enough for welding sheet steel or multi-pass on plate steel in the 55,000-75,000 psi yield strength range. Typical applications would be pipe welding, structural steel, general fabrication and steel buildings.

**DIAMETERS:** .035", .045", .052", 1/16"

**SHIELDING GASES:** 100% CO<sub>2</sub>, 75-95% Ar/ balance CO<sub>2</sub>, 95-98% Ar/ balance O<sub>2</sub>, 30-50 cfh

**WELDING POSITIONS:** All positions



**CHARACTERISTICS:**

- Copper-free “MIG” wire with excellent, virtually trouble-free feeding capability and superb welder appeal.
- Arc transfer that is stable and consistent.
- Performs well at high wire feed speeds.

**TYPICAL MECHANICAL PROPERTIES:**

	CO <sub>2</sub>
Ultimate Tensile Strength (psi)	75,900
Yield Strength (psi)	61,200
Percent Elongation	25
CVN (ft•lb f) @ 0°F	77

**WIRE COMPOSITION:**

Wt%	C	Mn	P	S	Si	Cu
	.08	1.20	.008	.010	.54	.04

### Select 70S-6NC

**CLASSIFICATION:** ER70S-6 per AWS/ANSI  
A5.18, ASME SFA 5.18

Select 70S-6NC contains higher amounts of manganese and silicon than a 70S-3 electrode, making it more tolerant to mill scale and mild contaminants. This premium solid, “MIG wire”, which contains no copper coating, is intended to weld steels in the 55,000-70,000 psi yield strength range.

**APPLICATIONS:** Select 70S-6NC is particularly well suited for welding steels, both plate and sheet, which contain medium to high levels of mill scale. It is a wise choice when improved toe wetting, bead profile and tie-in are required. Typical applications include welding of pipe, structural steel, sheet steel, pressure vessels and steel buildings.

**DIAMETERS:** .035", .045", .052", 1/16"

**SHIELDING GASES:** 100% CO<sub>2</sub>, 75-95% Ar/ balance CO<sub>2</sub>, 95-98% Ar/ balance O<sub>2</sub>, 30-50 cfh

**WELDING POSITIONS:** All positions



**CHARACTERISTICS:**

- Excellent feedability and weldability performance.
- Superb feeding over long conduit distances and at high wire feed speeds.
- Welding fume is virtually free of copper or its oxides.
- More tolerant to mill scale and mild contaminants.

**TYPICAL MECHANICAL PROPERTIES:**

	CO <sub>2</sub>
Ultimate Tensile Strength (psi)	84,100
Yield Strength (psi)	68,900
Percent Elongation	28
CVN (ft•lb f) @ -20°F	45

**WIRE COMPOSITION:**

Wt%	C	Mn	P	S	Si	Cu
	.08	1.54	.009	.010	.88	.04



**NICKEL BEARING**  
**Flat and Horizontal,**  
**Flux Cored**

**Select 81-Ni1**

**CLASSIFICATION:** E80T1-Ni1C, E80T1-Ni1M per AWS A5.29, ASME SFA 5.29

Select 81-Ni1 is a gas-shielded electrode intended for single and multiple pass horizontal fillet and flat position welding of carbon and low alloy steels requiring a minimum tensile strength of 80,000 psi and good CVN toughness at subzero temperatures.

**APPLICATIONS:** Select 81-Ni1 is the ideal selection for welding steels combining moderate tensile strength and excellent CVN toughness, such as ASTM A572 Gr60, A302, A575, and A734. These steels are used in mining machinery, offshore platforms, shipbuilding and earthmoving equipment.

**DIAMETERS:** 1/16", 5/64", 3/32"

**SHIELDING GAS:** 100% CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Offers moderate tensile strength weldments.
- Good subzero CVN values.
- Rutile slag system provides good welder appeal and bead geometry.

**TYPICAL MECHANICAL PROPERTIES:**

	75%Ar/ CO <sub>2</sub>	25%CO <sub>2</sub>
Ultimate Tensile Strength (psi)	86,400	88,700
Yield Strength (psi)	73,700	77,100
Percent Elongation	27	26
CVN (ft•lb f) @ -20°F	30	35

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si	Ni
CO <sub>2</sub>	.05	1.10	.010	.010	.25	.98
75Ar/ 25CO <sub>2</sub>	.05	1.19	.010	.010	.27	.96

**Select 81-Ni2**

**CLASSIFICATION:** E80T1-Ni2C per AWS A5.29, ASME SFA 5.29

Select 81-Ni2 is a low alloy steel, gas-shielded, flux cored wire intended for the welding of carbon and low alloy steels requiring a minimum tensile strength of 80,000 psi and good CVN toughness at subzero temperatures.

**APPLICATIONS:** Due to its good charpy v-notch toughness and tensile strength, Select 81-Ni2 is an excellent choice for welding steels such as ASTM A203, A572, A575 and A734 as well as steels containing 2% nickel. Typical applications for this electrode include offshore platform construction, earthmoving and mining machinery and shipbuilding.

**DIAMETERS:** 1/16", 5/64", 3/32"

**SHIELDING GAS:** 100% CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Exceptional low temperature CVN toughness due to 2-2 1/2% nickel in the weld deposit.
- Smooth spray transfer.
- Easily removed slag.
- Smooth, rippled bead profile.

**TYPICAL MECHANICAL PROPERTIES:**

	CO <sub>2</sub>
Ultimate Tensile Strength (psi)	89,300
Yield Strength (psi)	76,500
Percent Elongation	27
CVN (ft•lb f) @ -40°F	48

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si	Ni
CO <sub>2</sub>	.07	1.00	.010	.010	.29	2.23

## NICKEL BEARING All Position, Flux Cored

### Select 85-Ni3

**CLASSIFICATION:** E80T5-Ni3M per AWS A5.29, ASME SFA 5.29

Select 85-Ni3 is a low alloy, gas-shielded, flux cored electrode for single and multiple pass welding of certain HSLA steels. It provides a weld deposit that contains about 3.5% nickel to enhance low temperature toughness.

**APPLICATIONS:** Select 85-Ni3 is designed to weld 3% nickel steels that require a post-weld stress relief, a minimum of 80,000 psi tensile strength and excellent low temperature toughness. Applications include shipbuilding and tanks used for gas storage.

**DIAMETERS:** .045", .052", 1/16", 5/64", 3/32"

**SHIELDING GAS:** 75-80% Ar/ balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Basic slag system provides excellent low temperature toughness.
- Produces low diffusible hydrogen levels.
- Arc transfer is globular and the bead profile is convex.

**TYPICAL MECHANICAL PROPERTIES:**

	75%Ar/25%CO <sub>2</sub> SR @ 1150° for 1 Hr.	
Ultimate Tensile Strength (psi)	90,000	
Yield Strength (psi)	75,000	
Percent Elongation	23	
CVN (ft•lb f) @ -100°F	38	

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si	Ni
75Ar/	.05	1.30	.010	.010	.20	3.60
25CO <sub>2</sub>						

### Select 737Ni

**CLASSIFICATION:** E81T1-GM per AWS A5.29

This low alloy, flux cored, all position electrode is intended for welding low alloy steels where a minimum tensile strength of 80,000 psi is required.

**APPLICATIONS:** Select 737Ni is a superb choice for the flux cored welding of steels requiring good low temperature toughness and a minimum tensile strength of 80,000 psi. Typical applications include offshore pipe, mining machinery, earthmoving equipment and structural uses that demand excellent toughness.

**DIAMETERS:** .035", .045", .052", 1/16"

**SHIELDING GASES:** 75-80% Ar/20-25% CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Arc transfer is very positive, stable and smooth, with low spatter.
- Delivers good arc drive.
- Fast freezing slag removes readily and cleanly.

**TYPICAL MECHANICAL PROPERTIES:**

	75%Ar/25%CO <sub>2</sub>	
Ultimate Tensile Strength (psi)	89,400	
Yield Strength (psi)	78,000	
Percent Elongation	28	
CVN (ft•lb f) @ -20°F	80	
CVN (ft•lb f) @ -40°F	69	

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si	Ni
75Ar/	.07	1.60	.008	.007	.35	.85
25CO <sub>2</sub>						

### Select 810-Ni1

**CLASSIFICATIONS:** E81T1-Ni1C, E81T1-Ni1M per AWS A5.29, ASME SFA 5.29

Select 810-Ni1 is intended for single and multiple pass, all position welding on carbon and low alloy steels requiring good CVN toughness at subzero temperatures and tensile strength in excess of 80,000 psi.

**APPLICATIONS:** Typical steels welded with Select 810-Ni1 include ASTM A572, A302, A588 and A734. These steels are used in the fabrication of transmission poles, light poles, earthmoving and mining machinery and offshore platforms.

**DIAMETERS:** .045", .052", 1/16"

**SHIELDING GASES:** 100% CO<sub>2</sub>, 75-80% Ar/balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** All positions



**CHARACTERISTICS:**

- Good low temperature toughness.
- Spray-like arc transfer with low spatter.
- Fast freezing slag facilitates welding in all positions.
- Moderate slag volume with easy removal.

**TYPICAL MECHANICAL PROPERTIES:**

	75%Ar/ CO <sub>2</sub>		25%CO <sub>2</sub>
Ultimate Tensile Strength (psi)	83,500	90,600	
Yield Strength (psi)	76,900	76,100	
Percent Elongation	24	23	
CVN (ft•lb f) @ -20°F	30	53	

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si	Ni
CO <sub>2</sub>	.04	1.04	.010	.010	.44	1.00
75Ar/	.04	1.15	.010	.010	.47	.98
25CO <sub>2</sub>						



# NICKEL BEARING All Position, Flux Cored

## Select 820-Ni1

**CLASSIFICATIONS:** E81T1-Ni1C, E81T-Ni1M per AWS A5.29, ASME SFA 5.29, MIL-81T1-Ni1C and 81T1-Ni1M per MIL-E-24403/1

**APPROVALS:** ABS 4YSA, DNV 4 YMS (CO<sub>2</sub>), DNV 3YMS (C25), Lloyd's 3S, 3YS (All-CO<sub>2</sub>/C25), MIL-81T1-Ni1C and 81T1-Ni1M

Select 820-Ni1 is a gas-shielded, flux cored electrode designed for the all position, single and multiple pass welding of carbon and low alloy steels which require moderate tensile strength and good CVN toughness at subzero temperatures.

**APPLICATIONS:** Select 820-Ni1 is an excellent selection for welding those steels requiring good low temperature CVN toughness and moderate (80,000 psi minimum) tensile strength such as ASTM A203 GrA, A352 Cr LC1 and LC2, A572 and A734. These steels are used in offshore platform fabrication, mining machinery, earthmoving equipment and structural applications.

**DIAMETERS:** .045", .052", 1/16"

**SHIELDING GASES:** 100% CO<sub>2</sub>, 75-80% Ar/balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** All positions



### CHARACTERISTICS:

- Superior low temperature CVN toughness values.
- Smooth arc with very low spatter.
- Fast freezing characteristics facilitate all position welding.
- Smooth bead profile with minimum convexity.

### TYPICAL MECHANICAL PROPERTIES:

	75%Ar/ CO <sub>2</sub> 25%CO <sub>2</sub>	
Ultimate Tensile Strength (psi)	86,400	89,000
Yield Strength (psi)	73,700	80,000
Percent Elongation	27	24
CVN (ft•lb f) @ -40°F	90	94

### TYPICAL DEPOSIT COMPOSITION:

Wt%	C	Mn	P	S	Si	Ni
CO <sub>2</sub>	.03	1.15	.008	.008	.41	.91
75Ar/ 25CO <sub>2</sub>	.03	1.29	.009	.009	.50	.90

## Select 810-Ni2

**CLASSIFICATIONS:** E81T1-Ni2C, E81T1-Ni2M per AWS A5.29, ASME SFA 5.29, MIL-81T1-Ni2C and MIL-81T1-Ni2M per MIL-E-24403/1

**APPROVALS:** ABS 3YSA (CO<sub>2</sub>/C25), MIL-81T1-Ni2C and MIL-81T1-Ni2M

Select 810-Ni2 is an excellent selection for welding steels which require good CVN toughness and tensile strength in the range of 80,000-100,000 psi. Select 810-Ni2 is designed for single and multiple pass welding of carbon and certain low alloy steels in all positions.

**APPLICATIONS:** Select 810-Ni2 is a fine choice for welding steels such as ASTM A572, A575 and A734. Its combination of strength and CVN toughness makes Select 810-Ni2 ideal for applications such as offshore platform construction, shipbuilding, earthmoving and mining machinery.

**DIAMETERS:** .045", .052", 1/16", 5/64"

**SHIELDING GASES:** 100% CO<sub>2</sub>, 75-80% Ar/balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** All positions



### CHARACTERISTICS:

- Excellent low temperature CVN toughness.
- High welder appeal.
- Low spatter.

### TYPICAL MECHANICAL PROPERTIES:

	75%Ar/ CO <sub>2</sub> 25%CO <sub>2</sub>	
Ultimate Tensile Strength (psi)	87,000	90,000
Yield Strength (psi)	73,000	80,000
Percent Elongation	26	22
CVN (ft•lb f) @ -40°F	50	40

### TYPICAL DEPOSIT COMPOSITION:

Wt%	C	Mn	P	S	Si	Ni
CO <sub>2</sub>	.05	.83	.010	.010	.29	2.40
75Ar/ 25CO <sub>2</sub>	.04	.90	.010	.010	.30	2.40

## Select 820-Ni2

**CLASSIFICATIONS:** E81T1-Ni2C, E81T1-Ni2M per AWS A5.29, ASME SFA 5.29

Select 820-Ni2 is a premium low alloy steel, flux cored electrode which produces a weld deposit with 2.2-2.5% nickel. This wire is intended for the all position welding of carbon and certain low alloy steels which require good v-notch toughness and tensile strength in the 80,000-100,000 psi range.

**APPLICATIONS:** The combination of strength and CVN toughness makes Select 820-Ni2 ideal for applications such as offshore platform construction, earthmoving and mining machinery and shipbuilding. Typical steels would include ASTM A572, A575 and A734.

**DIAMETERS:** .045", .052", 1/16"

**SHIELDING GASES:** 100% CO<sub>2</sub>, 75-80% Ar/20-25% CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** All positions



### CHARACTERISTICS:

- Outstanding welder appeal.
- Provides superb puddle control and fast freezing slag.
- Excellent low temperature CVN toughness.
- Smooth spray arc transfer with minimal spatter.

### TYPICAL MECHANICAL PROPERTIES:

	75%Ar/ CO <sub>2</sub> 25%CO <sub>2</sub>	
Ultimate Tensile Strength (psi)	89,200	93,000
Yield Strength (psi)	77,000	81,500
Percent Elongation	29	26
CVN (ft•lb f) @ -40°F	40	45

### TYPICAL DEPOSIT COMPOSITION:

Wt%	C	Mn	P	S	Si	Ni
CO <sub>2</sub>	.03	1.10	.010	.008	.45	2.28
75 Ar/ 25CO <sub>2</sub>	.03	1.21	.010	.007	.57	2.33

**Select 80C-Ni1**

**CLASSIFICATION:** E80C-Ni1-H4 per AWS A5.28, ASME SFA 5.28

**APPROVAL:** DNV 4YMS (C25-Flat and HF)

Select 80C-Ni1 is a composite metal cored electrode for gas-shielded arc welding of certain low temperature or low alloy steels. This electrode is intended for single or multiple pass welding in horizontal fillets and the flat position.

**APPLICATIONS:** Select 80C-Ni1 is well suited for fine grained or low alloy steels requiring moderate tensile strength and good subzero CVN toughness such as ASTM A203, GrE, A302, A575 and A633. These steels are typically used in the fabrication of earthmoving machinery and buckets, offshore equipment and mining machinery.

**DIAMETERS:** .035", .045", .052", 1/16", 5/64"

**SHIELDING GASES:** 75-95% Ar/balance CO<sub>2</sub>, 95-98% Ar/balance O<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** Flat and Horizontal



**CHARACTERISTICS:**

- Excellent CVN toughness at subzero temperatures.
- Outstanding welder appeal.
- Virtually no spatter.
- Low in fume generation.
- Superb bead profile.

**TYPICAL MECHANICAL PROPERTIES:**

	98%Ar/ 2%O <sub>2</sub>	85%Ar/ 15%CO <sub>2</sub>
Ultimate Tensile Strength (psi)	92,500	87,000
Yield Strength (psi)	79,800	72,100
Percent Elongation	26	25
CVN (ft•lb f) @ -50°F	28	30

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si	Ni
98Ar/2O <sub>2</sub>	.03	1.45	.009	.010	.50	.95
85Ar/15CO <sub>2</sub>	.05	1.40	.009	.010	.53	.94

**Select 910-Ni2**

**CLASSIFICATIONS:** E91T1-Ni2C, E91T1-Ni2M per AWS A5.29, ASME SFA 5.29

Select 910-Ni2 is designed for single and multiple pass welding, in all positions, of certain low alloy steels and steels with low temperature CVN properties.

**APPLICATIONS:** Select 910-Ni2 is a fine choice for welding steels requiring low temperature CVN toughness such as the fine grained ASTM A516, A517 and A572 grades, as well as the nickel bearing steels such as ASTM A203, GrE, A302 and A633. Such steels are used in the fabrication of earthmoving machinery, mining equipment and oil storage tanks.

**DIAMETERS:** .045", .052", 1/16"

**SHIELDING GASES:** 100% CO<sub>2</sub>, 75-80% Ar/balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** All positions



**CHARACTERISTICS:**

- Good low temperature toughness.
- Smooth spray transfer with minimal spatter.
- Fast freezing slag promotes all position welding.
- Produces weld beads with excellent profile and minimum convexity.

**TYPICAL MECHANICAL PROPERTIES:**

	CO <sub>2</sub>	75%Ar/ 25%CO <sub>2</sub>
Ultimate Tensile Strength (psi)	96,000	104,300
Yield Strength (psi)	85,000	90,700
Percent Elongation	24	23
CVN (ft•lb f) @ -40°F	33	35

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si	Ni
CO <sub>2</sub>	.05	1.27	.010	.010	.40	2.50
75Ar/25CO <sub>2</sub>	.05	1.43	.010	.010	.54	2.55

**Select 937Ni**

**CLASSIFICATION:** E91T-GM per AWS A5.29

This all position, low alloy, flux cored electrode is designed to weld low alloy steels where a minimum tensile strength of 90,000 psi is required.

**APPLICATIONS:** When good low temperature toughness and a minimum tensile strength of 90,000 psi are needed, Select 937Ni represents an outstanding choice. Lack of fusion is not a problem due to this wire's deep penetrating characteristics. Typical applications include offshore structures, earthmoving machinery and other specialized structural uses requiring good low temperature toughness.

**DIAMETERS:** .045", .052", 1/16"

**SHIELDING GASES:** 75-80% Ar/20-25% CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** All positions



**CHARACTERISTICS:**

- Excellent mechanical properties.
- Very positive, smooth and stable arc transfer with low spatter emission.
- Fast freezing slag is easily removed.

**TYPICAL MECHANICAL PROPERTIES:**

	75%Ar/25%CO <sub>2</sub>
Ultimate Tensile Strength (psi)	99,600
Yield Strength (psi)	87,000
Percent Elongation	23
CVN (ft•lb f) @ -20°F	80
CVN (ft•lb f) @ -40°F	70
CVN (ft•lb f) @ -60°F	55

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si	Ni
75Ar/25CO <sub>2</sub>	.07	1.60	.008	.008	.20	2.60

## NICKEL BEARING Metal Cored

### Select 80C-Ni1LS

**CLASSIFICATION:** E80C-Ni1-H4 per AWS A5.28, ASME SFA A5.28

This low alloy steel, gas-shielded, composite metal cored electrode produces substantially fewer slag islands than typical metal cored wires. Select 80C-Ni1LS is intended for single and multiple pass welding in horizontal fillets and the flat position.

**APPLICATIONS:** In applications where better bead appearance and less postweld cleanup are desired, Select 80C-Ni1LS is the choice. The absence of slag and spatter, which facilitates painting after welding, makes this premium electrode ideal for fine grained or low alloy steels requiring moderate tensile strength and good subzero CVN toughness. These include ASTM A203, Gr E, A302, A575 and A633 – steels which are typically used in the fabrication of earthmoving machinery and buckets, offshore equipment and mining machinery.

**DIAMETERS:** .035", .045", .052", 1/16"

**SHIELDING GAS:** 75-95% Ar/balance CO<sub>2</sub>, 95-98% Ar/balance O<sub>2</sub>, 40-55 cfh

#### WELDING POSITIONS:

Flat and Horizontal



#### CHARACTERISTICS:

- Features a true spray transfer.
- Produces virtually no spatter and fewer slag islands as well as low fume generation.
- Superb bead profile with superior tie-in.
- Low in fume generation.
- Far fewer problems with lack of fusion, subsurface porosity and alloy segregation than with solid wires.

#### TYPICAL MECHANICAL PROPERTIES:

	98%Ar/ 2%O <sub>2</sub>	90%Ar/ 10%CO <sub>2</sub>
Ultimate Tensile Strength (psi)	92,500	88,700
Yield Strength (psi)	79,800	76,500
Percent Elongation	26	26
CVN (ft•lb f) @ -50°F	28	26

#### TYPICAL DEPOSIT COMPOSITION:

Wt%	C	Mn	P	S	Si	Ni
98Ar/2O <sub>2</sub>	.03	1.45	.009	.010	.50	.95
90Ar/ 10CO <sub>2</sub>	.04	1.38	.007	.009	.55	.94

## NICKEL BEARING Submerged Arc

### Select Ni1S

**CLASSIFICATIONS:** ECNi1 per AWS A5.23, ASME SFA 5.23. (Meets AWS A5.23, class F7A6-ECNi1-Ni1 when used with OP121TT Flux)

**APPROVAL:** ABS 3YM (Flat) w/Esab 10.62 flux

This metal cored, low alloy wire, intended for the single and multiple pass welding of carbon and low alloy steels, is used for submerged arc welding **only**. Select Ni1S contains 1% nickel to produce good low temperature toughness.

**APPLICATIONS:** Select Ni1S is designed for those applications where low temperature toughness is required such as offshore oil equipment, shipbuilding and other cold weather structural applications.

**DIAMETERS:** 3/32", 1/8", 5/32"

#### WELDING POSITIONS:

Flat and Horizontal



#### CHARACTERISTICS:

- Excellent low temperature toughness.
- Better bead control and higher deposition rates than solid wire.
- Broader and shallower penetration patterns.
- Reduced "burn-through" tendency.

#### TYPICAL MECHANICAL PROPERTIES:

	(with OP121TT Flux)
Ultimate Tensile Strength (psi)	79,700
Yield Strength (psi)	69,500
Percent Elongation	30
CVN (ft•lb f) @ -60°F	50

#### TYPICAL DEPOSIT COMPOSITION:

Wt%	C	Mn	P	S	Si	Ni
	.05	1.20	.010	.010	.35	.90

### Select 80C-Ni2

**CLASSIFICATION:** E80C-Ni2-H4 per AWS A5.28, ASME SFA 5.28

Select 80C-Ni2 is a composite metal cored electrode utilized for welding carbon and low alloy steels requiring 80,000 psi minimum tensile strength and good CVN toughness at subzero temperatures. Select 80C-Ni2 can be used in both single and multiple pass applications in the flat and horizontal positions.

**APPLICATIONS:** Good CVN values at lower temperatures make Select 80C-Ni2 an excellent choice for those applications where low temperature toughness is essential such as construction equipment, piping systems, shipbuilding and colder climate fabrications.

**DIAMETERS:** .035", .045", .052", 1/16"

**SHIELDING GASES:** 75-95% Ar/balance CO<sub>2</sub>, 95-98% Ar/balance O<sub>2</sub>, 40-55 cfh

#### WELDING POSITIONS:

Flat and Horizontal



#### CHARACTERISTICS:

- Excellent low temperature toughness.
- Superior penetration into sidewalls compared to solid wire.
- Smooth spray transfer with virtually no spatter.
- Low fume emission.

#### TYPICAL MECHANICAL PROPERTIES:

	SR-1 Hr. @ 1150°F 98%Ar/2%O <sub>2</sub>
Ultimate Tensile Strength (psi)	91,000
Yield Strength (psi)	72,000
Percent Elongation	25
CVN (ft•lb f) @ -80°F	25

#### TYPICAL DEPOSIT COMPOSITION:

Wt%	C	Mn	P	S	Si	Ni
98Ar/2O <sub>2</sub>	.04	1.30	.010	.010	.45	2.30



## NICKEL-MOLYBDENUM BEARING Flat and Horizontal, Flux Cored

### Select 91-K2

**CLASSIFICATION:** E90T1-K2C per AWS A5.29, ASME SFA 5.29

Select 91-K2 is a premium low alloy, gas-shielded, flux cored electrode designed for those applications requiring 90,000 psi minimum tensile strength and good low temperature toughness.

**APPLICATIONS:** Select 91-K2 is utilized for welding steel types which include HY-80, HY-100, ASTM A710 and other similar high strength, low alloy steels. These generally involve the fabrication of offshore platforms and leg assemblies, earthmoving machinery and specialized structural applications.

**DIAMETERS:** 1/16", 5/64", 3/32"

**SHIELDING GAS:** 100% CO<sub>2</sub>, 40-55 cfm

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Provides moderate to high tensile strength and good low temperature toughness.
- Produces a smooth arc transfer with a thin coverage of easily removed slag.
- Offers a smooth, rippled bead profile.

**TYPICAL MECHANICAL PROPERTIES:**

	CO <sub>2</sub>
Ultimate Tensile Strength (psi)	98,400
Yield Strength (psi)	88,700
Percent Elongation	24
CVN (ft•lb f) @ -0°F	46

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si	Ni	Mo
CO <sub>2</sub>	.05	1.05	.010	.010	.36	1.51	.18

### Select Ni2S

**CLASSIFICATION:** ECNi2 per AWS A5.23, ASME SFA 5.23

Select Ni2S is a metal cored, low alloy steel electrode for submerged arc welding **only** which contains 2-3% nickel to produce good low temperature toughness.

**APPLICATIONS:** Select Ni2S is ideal for applications involving the welding of carbon and certain low alloy steels where good low temperature toughness is required. These include offshore oil equipment, shipbuilding and other cold weather structural applications.

**DIAMETERS:** 3/32", 1/8", 5/32"

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Broader and slightly shallower penetration pattern reduces tendency for burn through on root passes or poorly fit-up joints.
- Cored wire design delivers higher deposition rates than solid wire when run on the same current.
- Provides good temperature toughness.

**TYPICAL MECHANICAL PROPERTIES:**

	(with OP121TT Flux)
Ultimate Tensile Strength (psi)	82,700
Yield Strength (psi)	71,300
Percent Elongation	30
CVN (ft•lb f) @ -60°F	61

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si	Ni
	.06	.74	.010	.010	.23	2.90

### Select Ni3S

**CLASSIFICATION :** ECNi3 per AWS A5.23, ASME SFA 5.23

This submerged welding arc **only** electrode contains nominally 3% nickel to produce good low temperature toughness.

**APPLICATIONS:** Select Ni3S is well suited for applications involving the welding of carbon and certain low alloy steels where good low temperature toughness is required. These include shipbuilding, offshore oil equipment and additional cold weather structural applications.

**DIAMETERS:** 3/32", 1/8", 5/32"

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Good low temperature toughness.
- Better bead control penetration than solid wire.
- Higher deposition rates than solid wire.
- Reduces tendency for burn through on root passes or poorly fit-up joints.

**TYPICAL MECHANICAL PROPERTIES:**

	SR-2.5 Hr. @ 1150°F (with OP121TT Flux)
Ultimate Tensile Strength (psi)	72,400
Yield Strength (psi)	56,800
Percent Elongation	34
CVN (ft•lb f) @ -150°F	72

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si	Ni
	.06	.74	.010	.010	.23	2.90

# NICKEL-MOLYBDENUM BEARING

## Flat and Horizontal, Flux Cored

### Select 95-K2

**CLASSIFICATION:** E90T5-K2C per AWS A5.29, ASME SFA 5.29

The outstanding mechanical properties of Select 95-K2, particularly the low temperature CVN values, make this an excellent choice for welding steels requiring a minimum of 90,000 psi tensile strength and good subzero CVN toughness. This basic electrode is designed for single and multiple pass welding of horizontal fillets and flat position weldments for specific low alloy steels.

**APPLICATIONS:** Select 95-K2 is well suited for steels such as HY-80, HY-100, ASTM A710 and A514. Typical applications would be the welding of aircraft carriers, submarines, oil exploration equipment, mobile cranes and earthmoving machinery.

**DIAMETERS:** .045", 1/16", 5/64", 3/32"

**SHIELDING GAS:** 100% CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Excellent low temperature CVN toughness.
- Extremely low diffusible hydrogen levels.
- High basicity, lime-fluoride slag.

**TYPICAL MECHANICAL PROPERTIES:**

	CO <sub>2</sub>
Ultimate Tensile Strength (psi)	95,800
Yield Strength (psi)	86,100
Percent Elongation	23
CVN (ft•lb f) @ -60°F	44

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si	Ni	Mo
CO <sub>2</sub>	.04	1.30	.009	.010	.50	1.75	.20

### Select 100-K3

**CLASSIFICATION:** E100T1-K3C per AWS A5.29, ASME SFA 5.29

Select 100-K3, with a minimum tensile strength of 100 Ksi and good CVN toughness levels, is a gas-shielded electrode for flux cored arc welding of certain high strength, low alloy steels. This electrode is intended for single and multiple pass welding in horizontal fillets and the flat position.

**APPLICATIONS:** Select 100-K3 is an excellent selection for welding steels such as A514 and HY-80. These steels are typically used in fabrications such as heavy crane assemblies, mining machinery and large earthmoving equipment.

**DIAMETERS:** .045", .052", 1/16", 5/64", 3/32"

**SHIELDING GAS:** 100% CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Good CVN toughness at lower temperatures.
- Exhibits good bead profiles with excellent slag detachment.
- Relatively low spatter levels.

**TYPICAL MECHANICAL PROPERTIES:**

	CO <sub>2</sub>
Ultimate Tensile Strength (psi)	105,700
Yield Strength (psi)	94,000
Percent Elongation	23
CVN (ft•lb f) @ 0°F	40

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	S	P	Si	Ni	Mo
CO <sub>2</sub>	.05	1.20	.010	.010	.30	1.75	.35

### Select 110-K3

**CLASSIFICATION:** E110T1-K3C per AWS A5.29, ASME SFA 5.29

Select 110-K3 is a low alloy steel, gas-shielded, flux cored electrode intended for single and multiple pass welding of certain high strength steels in horizontal fillets and the flat position. Arc transfer is a smooth spray and the weld bead exhibits clean slag removal with a finely rippled surface.

**APPLICATIONS:** Select 110-K3 is an excellent product to weld high strength steels such as HY-100 and ASTM A514. The weld deposit produces a minimum tensile strength of 110 Ksi with good subzero CVN toughness. These steels are found in earthmoving equipment buckets, offshore construction and cranes.

**DIAMETERS:** .045", .052", 1/16", 5/64", 3/32"

**SHIELDING GAS:** 100% CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Excellent mechanical properties.
- Spray transfer with low spatter.
- Weld composition matches that of E11018-M covered electrodes.

**TYPICAL MECHANICAL PROPERTIES:**

	All Weld Metal As Welded
	CO <sub>2</sub>
Ultimate Tensile Strength (psi)	116,000
Yield Strength (psi)	105,000
Percent Elongation	19
CVN (ft•lb f) @ 0°F	38

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si	Ni	Mo
CO <sub>2</sub>	.06	1.74	.010	.010	.33	1.91	.48

## NICKEL-MOLYBDENUM BEARING All Position, Flux Cored

### Select 115-K3

**CLASSIFICATION:** E110T5-K3C per AWS A5.29, ASME SFA 5.29

Select 115-K3 is a basic low alloy steel, gas-shielded, flux cored electrode for horizontal fillet and flat position welding of certain HSLA steels. This electrode is capable of single and multiple pass welding. The arc transfer is globular with a convex bead profile due to the nature of a basic slag system.

**APPLICATIONS:** Select 115-K3 produces weld metal with a minimum tensile strength of 110 Ksi, excellent low temperature CVN toughness and low diffusible hydrogen levels. These characteristics make 115-K3 an ideal selection for welding high strength, low alloy steels such as T-1, ASTM A514 and HY-100.

**DIAMETERS:** .045", .052", 1/16", 5/64", 3/32"

**SHIELDING GAS:** 100% CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Basic slag provides low diffusible hydrogen and excellent CVN toughness.
- Meets the same requirements as E11018-M covered electrodes.
- Well suited for welding HSLA steels in the 110-130 Ksi tensile range.

**TYPICAL MECHANICAL PROPERTIES:**

	CO <sub>2</sub>
Ultimate Tensile Strength (psi)	116,000
Yield Strength (psi)	104,000
Percent Elongation	20
CVN (ft•lb f) @ -60°F	39

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si	Ni	Mo
CO <sub>2</sub>	.04	1.64	.010	.010	.46	2.01	.46

### Select 812-K2

**CLASSIFICATION:** E81T1-K2M per AWS A5.29, ASME SFA 5.29

**APPROVALS:** ABS 4YSA, DNV 4 YMS (All-C25)

Select 812-K2 is intended for single and multiple pass welding of low alloy steels, in all positions, where moderate tensile strength and exceptional low temperature CVN values are required.

**APPLICATIONS:** Select 812-K2 is an excellent electrode for applications where all position capability, excellent mechanical properties and low diffusible hydrogen levels are required. This electrode is well suited to applications such as low temperature storage tanks, offshore drilling rigs, shipbuilding and construction machinery.

**DIAMETERS:** .045", .052", 1/16"

**SHIELDING GAS:** 75-80% Ar/balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** All positions



**CHARACTERISTICS:**

- Excellent CVN toughness values down to -75°F
- Positive, stable, easy to control arc.
- Low spatter emission.
- Slag freezes rapidly and offers complete coverage.

**TYPICAL MECHANICAL PROPERTIES:**

	75%Ar/25%CO <sub>2</sub>	
	As Welded	SR-3 Hr. @ 1150°F
Ultimate Tensile Strength (psi)	92,000	91,000
Yield Strength (psi)	84,000	78,900
Percent Elongation	24	25
CVN (ft•lb f) @ -20°F	114	
@ -50°F		58
@ -60°F	62	
@ -75°F	59	

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si	Ni
75Ar/25CO <sub>2</sub>	.06	1.20	.010	.010	.22	1.60

### Select 910-K2

**CLASSIFICATIONS:** E91T1-K2C, E91T1-K2M per AWS A5.29, ASME SFA 5.29

Select 910-K2 proves an ideal selection for weldments requiring 90,000 psi minimum tensile strength and good CVN toughness values. This gas-shielded, flux cored electrode is intended for single and multiple pass welding of certain low alloy steels in all positions.

**APPLICATIONS:** Typically, these involve the steels used in the fabrication of submarines, offshore platforms and leg assemblies, earthmoving machinery and specialized structural applications. These steels are usually types such as HY-80, HY-100, ASTM A710, A514 and other similar high strength steels.

**DIAMETERS:** .045", .052", 1/16"

**SHIELDING GASES:** 100% CO<sub>2</sub>, 75-80% Ar/balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** All positions



**CHARACTERISTICS:**

- Good subzero CVN toughness.
- Rutile based slag system facilitates all position welding.
- Exceptional weld bead geometry.
- Smooth spray arc transfer with low spatter.

**TYPICAL MECHANICAL PROPERTIES:**

	75%Ar/25%CO <sub>2</sub>	
	CO <sub>2</sub>	CO <sub>2</sub>
Ultimate Tensile Strength (psi)	103,400	105,000
Yield Strength (psi)	91,700	96,000
Percent Elongation	22	21
CVN (ft•lb f) @ 0°F	37	39

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si	Ni	Mo
CO <sub>2</sub>	.05	1.32	.010	.010	.51	1.64	.24
75Ar/25CO <sub>2</sub>	.04	1.40	.010	.010	.55	1.60	.27



**NICKEL-MOLYBDENUM BEARING**  
All Position, Flux Cored

**Select 920-K2**

**CLASSIFICATIONS:** E91T1-K2CJ, E91T1-K2MJ per AWS A5.29, ASME SFA 5.29

**APPROVAL:** ABS E91T1-K2C

This gas-shielded, flux cored electrode is intended for the welding of certain low alloy steels in all positions. The wire produces weld metal with improved low temperature toughness when compared to other electrodes of the same class.

**APPLICATIONS:** Select 920-K2 represents an outstanding choice when requirements necessitate 90,000 psi tensile strength and good subzero CVN toughness values. This electrode is utilized to weld HY-80, HY-100, ASTM A710, A514 and other similar high strength steels. These steels are used in the fabrication of naval vessels, offshore platforms and leg assemblies, earthmoving machinery and specialized structural applications.

**DIAMETERS:** .045", .052", 1/16"

**SHIELDING GASES:** 100% CO<sub>2</sub>, 75-80% Ar/balance CO<sub>2</sub>, 35-50 cfh

**WELDING POSITIONS:** All positions



**CHARACTERISTICS:**

- Exhibits a spray-like arc transfer with very little spatter.
- Provides a fast freezing slag which facilitates all position welding.
- Slag volume is moderate and easily removed.
- Produces good subzero CVN toughness.

**TYPICAL MECHANICAL PROPERTIES:**

	75%Ar/ CO <sub>2</sub> 25%CO <sub>2</sub>	
Ultimate Tensile Strength (psi)	93,500	101,000
Yield Strength (psi)	87,000	89,000
Percent Elongation	22	23
CVN (ft•lb f) @ -40°F	65	78
CVN (ft•lb f) @ -75°F	46	51

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si	Ni
CO <sub>2</sub>	.05	1.50	.010	.010	.21	1.90
75Ar/ 25CO <sub>2</sub>	.04	1.60	.010	.010	.25	1.90

**Select 101-K3C,-K3M**

**CLASSIFICATIONS:** E101T1-K3C, E101T1-K3M per AWS A5.29, ASME SFA 5.29

Select 101-K3C and Select 101-K3M are superb choices for those applications requiring 100 Ksi minimum tensile strength and good CVN toughness. These electrodes are intended for single and multiple pass, all position welding of low alloy steels.

**APPLICATIONS:** Select 101-K3C and Select 101-K3M are ideal for all position welding of steels such as HY-80, HY-100 and ASTM 514. These materials can be found in shipbuilding, offshore structures and crane fabrication.

**DIAMETERS:** .045", .052", 1/16"

**SHIELDING GASES:** Select 101-K3C (100% CO<sub>2</sub>), Select 101-K3M (75-80% Ar/balance CO<sub>2</sub>), 40-55 cfh

**WELDING POSITIONS:** All positions



**CHARACTERISTICS:**

- Excellent welder appeal in all positions.
- Ideal for all position welding of certain HSLA steels.
- Weld metal composition is similar to E10018-M.
- Outstanding low temperature toughness.

**TYPICAL MECHANICAL PROPERTIES:**

	101-K3C	101-K3M
	75%Ar/ CO <sub>2</sub> 25%CO <sub>2</sub>	
Ultimate Tensile Strength (psi)	106,500	113,700
Yield Strength (psi)	92,300	95,100
Percent Elongation	22	22
CVN (ft•lb f) @ 0°F	56	51
@ -20°F	45	48

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	Si	Ni	Mo
101-K3C	.06	1.38	.28	1.92	.41
101-K3M	.06	1.51	.34	1.81	.38

**Select 111-K3C,-K3M**

**CLASSIFICATIONS:** E111T1-K3C, E111T1-K3M per AWS A5.29, ASME SFA 5.29

**APPROVALS:** ABS E111T1-K3C (111-K3C only), E111T1-K3MJ (111-K3M only)

Select 111-K3C and Select 111-K3M are designed for single and multiple pass welding, in all positions, of specific high strength, low alloy steels wherein a minimum tensile strength of 110,000 psi is important.

**APPLICATIONS:** Both premium electrodes are ideal choices for matching the tensile strength of certain base metals such as ASTM A514 and HY-100. These steels are used in various fabrications such as cranes, trailers and boom assemblies.

**DIAMETERS:** .045", .052", 1/16"

**SHIELDING GASES:** Select 111-K3C (100% CO<sub>2</sub>), Select 111-K3M (75-80% Ar/balance CO<sub>2</sub>), 40-55 cfh

**WELDING POSITIONS:** All positions



**CHARACTERISTICS:**

- Produces high strength weldments with good low temperature CVN impact properties.
- Smooth, stable arc with low spatter emission.
- Uniform weld beads with excellent tie-in.

**TYPICAL MECHANICAL PROPERTIES:**

	111-K3C	111-K3M
	75%Ar/ CO <sub>2</sub> 25%CO <sub>2</sub>	
Ultimate Tensile Strength (psi)	125,200	126,900
Yield Strength (psi)	118,100	107,800
Percent Elongation	20	19
CVN (ft•lb f) @ 0°F	46	49
@ -20°F	39	37

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	Si	Ni	Mo
111-K3C	.05	2.00	.35	1.92	.55
111-K3M	.07	2.03	.38	1.99	.38

## NICKEL-MOLYBDENUM BEARING Metal Cored

### Select 101 SR

**CLASSIFICATION:** E101T1-GM per AWS/ANSI A5.29, ASME SFA 5.29.

**APPROVAL:** ABS E91T1-GC (C25)

This low alloy steel, all position electrode is designed for the single and multiple pass welding of quenched and tempered steels that require a postweld stress relief. Select 101 SR also produces excellent high strength properties in the as-welded condition. The preferred shielding gas is 75-80% argon / balance carbon dioxide.

**APPLICATIONS:** Select 101 SR is designed to weld oilfield components that require a postweld stress relief (not for postweld quench and temper treatments). It is an excellent choice for welding quenched and tempered steels such as 4130, 8630 and similar types. Select 101 SR's weld metal nickel contents of less than 1.0% meet NACE requirements. It is also useful for high strength, low alloy steels where 100 ksi minimum tensile strength and excellent toughness are required in the as-welded condition.

**DIAMETERS:** .045", .052", 1/16"

**SHIELDING GAS:** 75-80% Ar/balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** All positions



**CHARACTERISTICS:**

- Excellent low temperature toughness, as-welded and stress-relieved.
- Very positive, smooth and stable arc transfer.
- Fast freezing slag facilitates all position welding.
- Slag removes easily.

**TYPICAL MECHANICAL PROPERTIES:**

	75%Ar/25%CO <sub>2</sub>		
	SR-1 Hr.	SR-8 Hrs.	As @1150°F @1175°F
	Welded @ 1 Hr. @ 8 Hrs.		
Ultimate Tensile Strength (psi)	111,100	103,000	106,400
Yield Strength (psi)	98,700	94,000	99,100
Percent Elongation	19	22	22
CVN (ft•lb f)			
@ -20°F	65	36	
@ -25°F			22
@ -50°F	47		

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si	Ni	Mo
75Ar/25CO <sub>2</sub>	.06	1.40	.010	.007	.30	.85	.35

### Select 90C-M2

**CLASSIFICATION:** E90C-G-H4 per AWS A5.28, ASME SFA 5.28

Select 90C-M2 is a premium composite metal cored electrode intended for single and multiple pass welding of certain low alloy steels, in the flat and horizontal positions, where a minimum tensile strength of 90,000 psi is required in the deposited weld metal.

**APPLICATIONS:** Select 90C-M2 is excellent for joining low alloy, high strength steels such as HY-80, A710 and A514. These materials are used in shipbuilding, earthmoving equipment and mining machinery. Select 90C-M2 is an ideal choice for weldments where distortion must be minimized and de-slagging is not desirable.

**DIAMETERS:** .035", .045", .052", 1/16"

**SHIELDING GASES:** 95-98% Ar/balance O<sub>2</sub>, 75-95% Ar/balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Good low temperature toughness.
- Spray transfer with virtually no spatter.
- Increased productivity due to faster travel speeds.
- Enhanced sidewall fusion which eliminates cold-lap.

**TYPICAL MECHANICAL PROPERTIES:**

	98% Ar/2% O <sub>2</sub>	
Ultimate Tensile Strength (psi)	105,900	
Yield Strength (psi)	95,700	
Percent Elongation	17	
CVN (ft•lb f) @ -20°F	31	
@ -60°F	24	

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si	Ni	Mo
98Ar/2O <sub>2</sub>	.04	1.57	.010	.010	.29	2.07	.48

### Select 100C

**CLASSIFICATION:** E100C-G-H4 per AWS A5.28, ASME SFA 5.28

Select 100C is a composite metal cored electrode designed for single and multiple pass welding of some carbon and certain low alloy steels, in the flat and horizontal positions, where a minimum tensile strength of 100,000 psi is required in the deposited weld metal.

**APPLICATIONS:** Select 100C is well suited to joining low alloy, high strength steels such as HY-80, A710 and A514. These materials are used in shipbuilding, earthmoving equipment and mining machinery. An ideal choice for weldments where distortion must be minimized and de-slagging is not desirable.

**DIAMETERS:** .035", .045", .052", 1/16"

**SHIELDING GASES:** 95-98% Ar/balance O<sub>2</sub>, 75-95% Ar/balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Good low temperature toughness.
- Virtually no spatter emission.
- Pure spray arc transfer.
- Greater productivity and sidewall fusion than solid wire.

**TYPICAL MECHANICAL PROPERTIES:**

	98%Ar/2%O <sub>2</sub>	
Ultimate Tensile Strength (psi)	106,000	
Yield Strength (psi)	95,000	
Percent Elongation	18	
CVN (ft•lb f) @ -20°F	35	
@ -60°F	29	

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si	Ni	Mo
98Ar/2O <sub>2</sub>	.04	1.55	.010	.010	.32	2.07	.50





## NICKEL-CHROMIUM MOLYBDENUM BEARING Flat and Horizontal, Flux Cored

### Select 125-K4

**CLASSIFICATION:** E120T5-K4C per AWS A5.29, ASME SFA 5.29

Select 125-K4 is a basic low alloy steel, flux cored, gas-shielded electrode for single and multiple pass welding of HSLA steels requiring a minimum of 120 Ksi tensile strength. This electrode is intended for welding in horizontal fillets and the flat position using 100% carbon dioxide shielding gas. The arc transfer is globular and the bead shape is convex.

**APPLICATIONS:** Select 125-K4 is a good selection for welding steels such as HY-100 and ASTM A514. The low diffusible hydrogen levels minimize HAZ cracking and facilitate welding these various high strength materials. These materials are typically found in mining machinery, cranes and construction equipment.

**DIAMETERS:** .045", .052", 1/16", 3/32"

**SHIELDING GAS:** 100% CO<sub>2</sub>, 40-55 cfh

#### WELDING POSITIONS:

Flat and Horizontal



#### CHARACTERISTICS:

- Low diffusible hydrogen levels.
- Tensile strength meets 120 Ksi minimum.
- Meets the same requirements as E12018-M covered electrodes.
- Highly basic, lime-flouride slag system.

#### TYPICAL MECHANICAL PROPERTIES:

	CO <sub>2</sub>
Ultimate Tensile Strength (psi)	132,100
Yield Strength (psi)	116,000
Percent Elongation	15
CVN (ft•lb f) @ -60°F	33

#### TYPICAL DEPOSIT COMPOSITION:

Wt%	C	Mn	P	S	Si	Ni
CO <sub>2</sub>	.04	1.90	.010	.010	.42	2.27
	Cr	Mo				
	.57	.60				

### Select 4130LN

**CLASSIFICATION:** No AWS class.

Select 4130LN is a basic flux cored electrode designed to closely match the properties of certain low alloy, quench and tempered steels following post weld heat treatment. It is not recommended for as-welded applications. The basic slag system assures low weld metal hydrogen in the weld area, which is critical in preventing cracking in sensitive steels such as 4130.

**APPLICATIONS:** Select 4130LN is designed to weld 4130 as well as other steels of similar composition, such as 4140 and 8630. The deposit contains less than 1% nickel which makes Select 4130LN an ideal electrode for most oil field applications.

**DIAMETERS:** .045", 1/16"

**SHIELDING GAS:** 75% Ar/25% CO<sub>2</sub>, 40-55 cfh

#### WELDING POSITIONS:

Flat and Horizontal



#### CHARACTERISTICS:

- Contains less than 1% nickel in weld deposit.
- Prevents cracking in sensitive steels.
- Provides welding properties which closely match steel after postweld heat treatment.
- The arc transfer is globular.

#### TYPICAL MECHANICAL PROPERTIES:

	75%Ar/25%CO <sub>2</sub> SR-2 HR. @1200°F
Tensile Strength (psi)	116,000
Yield Strength (psi)	99,000
Percent Elongation	21
Percent Reduction of Area	55

75%Ar/25%CO<sub>2</sub>  
Austenitize 1625°F, Water Quench,  
Temper 1100°F, 1 Hr

Tensile Strength (psi)	125,000
Yield Strength (psi)	107,000
Percent Elongation	18
Percent Reduction of Area	58

#### TYPICAL DEPOSIT COMPOSITION:

Wt%	C	Mn	P	S	Si
75Ar/25CO <sub>2</sub>	.20	1.18	.008	.013	.70
	Ni	Cr	Mo		
	.80	.64	.21		

## NICKEL-CHROMIUM-MOLYBDENUM BEARING Metal Cored

### Select 110C-M2

**CLASSIFICATION:** E110C-G-H4 per AWS A5.28, ASME SFA 5.28

Select 110C-M2 is designed for those applications where the slag residue and fume emissions of flux cored electrodes are unwanted. This composite metal cored electrode is designed for single and multiple pass welding of low alloy steels, in the flat and horizontal positions, where a minimum tensile strength of 110,000 psi is required in the deposited weld metal.

**APPLICATIONS:** Select 110C-M2 is an ideal choice for joining low alloy, high strength steels such as HY-100 and A514. Earthmoving equipment, mining trucks and machinery and heavy equipment trailers are some areas where these steels may be utilized. Select 110C-M2 may also be used for overlay or surfacing in certain applications.

**DIAMETERS:** .035", .045", .052", 1/16"

**SHIELDING GASES:** 95-98% Ar/balance O<sub>2</sub>, 75-95% Ar/balance CO<sub>2</sub>, 40-55 cfh

#### WELDING POSITIONS:

Flat and Horizontal



#### CHARACTERISTICS:

- Exhibits superb welder appeal.
- Arc transfer is a pure spray.
- Virtually no spatter.
- Higher deposition rates than solid wire.

#### TYPICAL MECHANICAL PROPERTIES:

	98%Ar/2%O <sub>2</sub>
Ultimate Tensile Strength (psi)	115,600
Yield Strength (psi)	106,400
Percent Elongation	16
CVN (ft•lb f) @ -20°F	42
@ -60°F	28

#### TYPICAL DEPOSIT COMPOSITION:

Wt%	C	Mn	P	S	Si	Ni
98Ar/2O <sub>2</sub>	.03	1.71	.010	.010	.42	2.00
	Cr	Mo				
	.19	.55				

## NICKEL-CHROMIUM-MOLYBDENUM BEARING Metal Cored

### Select 110C-K4

**CLASSIFICATION:** E110C-K4 per AWS A5.28, ASME SFA A5.28

**APPROVAL:** CWB E76C-K4-H4

Select 110C-K4 is a low alloy steel, composite metal cored electrode designed for single and multiple pass welding of certain carbon and low alloy steels where a minimum tensile strength of 110,000 psi is needed in the deposited weld metal.

**APPLICATIONS:** Select 110C-K4 is an excellent choice for joining low alloy, high strength steels such as HY-80 and A514. Earthmoving equipment, mining trucks and machinery and heavy equipment trailers are some areas where these steels may be utilized. This electrode may also be used for overlay or surfacing in certain applications.

**DIAMETERS:** .035", .045", .052", 1/16"

**SHIELDING GAS:** 75-95% Ar/balance CO<sub>2</sub>, 98% Ar/2% O<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Provides exceptional mechanical properties and outstanding welder appeal.
- Arc transfer is pure spray with virtually no spatter emission.
- Minimal subsurface porosity.
- Faster travel speeds and greater productivity than solid wires.
- Eliminates "cold-lap".

**TYPICAL MECHANICAL PROPERTIES:**

	75%Ar/ 25%CO <sub>2</sub>	95%Ar/ 5%CO <sub>2</sub>
Ultimate Tensile Strength (psi)	116,600	118,900
Yield Strength (psi)	102,700	103,900
Percent Elongation	22	15
CVN (ft•lb f) @ -60°F	27	26

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si
75Ar/25CO <sub>2</sub>	.03	1.52	.007	.009	.66
	Cr	Ni	Mo		
	.59	2.16	.60		
	C	Mn	P	S	Si
95Ar/5CO <sub>2</sub>	.06	1.83	.008	.011	.66
	Cr	Ni	Mo		
	.61	2.15	.62		

## MANGANESE-MOLYBDENUM BEARING Flat and Horizontal, Flux Cored

### Select 105-D2

**CLASSIFICATION:** E100T5-D2M per AWS A5.29, ASME SFA 5.29

Select 105-D2 is a low alloy steel electrode with a basic slag system used to weld certain manganese-molybdenum steels and castings. This electrode is intended for single and multiple pass welding in horizontal fillets and the flat position.

**APPLICATIONS:** Select 105-D2 produces deposited weld metal of approximately 2% manganese and 0.50% molybdenum, used primarily to weld steels such as ASTM A302 GrB and castings such as ASTM A49, A291 and A735.

**DIAMETERS:** .045", .052", 1/16", 5/64", 3/32"

**SHIELDING GAS:** 75-80% Ar/20-25% CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Excellent low temperature CVN toughness.
- Basic slag provides weld metal with low levels of diffusible hydrogen.
- Weld deposit is suited well to match composition of manganese-molybdenum castings.
- An excellent replacement for E10018-D2 covered electrodes.

**TYPICAL MECHANICAL PROPERTIES:**

	98%Ar/2%O <sub>2</sub> , SR 2 Hour @ 1200°F	75%Ar/25%CO <sub>2</sub> , SR 1 Hour @ 1150°F
Ultimate Tensile Strength (psi)	108,000	102,600
Yield Strength (psi)	89,000	90,700
Percent Elongation	22	24
CVN (ft•lb f) @ -40°F	50	30

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si	Mo
75Ar/25CO <sub>2</sub>	.05	2.06	.010	.010	.45	.48

### Select 4130C

**CLASSIFICATION:** No AWS Class

Select 4130C is the metal cored version of Select 4130LN. This electrode is designed to match the properties of certain quench and tempered steels following post-weld heat treatment. It is not recommended for as-welded applications.

**APPLICATIONS:** Select 4130C is ideal for welding 4130, 4140, 8630 and similar alloy steels that are to be post-weld heat treated. The weld deposit contains less than 1% nickel making it suitable for most oilfield applications.

**DIAMETERS:** .045", 1/16"

**SHIELDING GAS:** 98% Ar/2% O<sub>2</sub>

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Provides weld metal properties that closely match those of certain quench and tempered steels in the heat treated condition.
- Smooth arc transfer with minimal spatter.
- Contains less than 1% nickel in the weld deposit.

**TYPICAL MECHANICAL PROPERTIES:**

	98%Ar/2%O <sub>2</sub> , SR 2 Hour @ 1200°F
Ultimate Tensile Strength (psi)	108,000
Yield Strength (psi)	89,000
Percent Elongation	22
CVN (ft•lb f) @ -40°F	50

98%Ar/2%O<sub>2</sub>, Austenitize @ 1650°F 1 Hr., Water Quench Temper 2 Hr. @ 1100°F

Ultimate Tensile Strength (psi)	132,000
Yield Strength (psi)	118,000
Percent Elongation	18
CVN (ft•lb f) @ -40°F	55

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	Si	P	S
Ar/2%O <sub>2</sub>	.21	1.32	.75	.006	.010
	Ni	Cr	Mo		
	.68	.65	.20		

## MANGANESE-MOLYBDENUM BEARING Metal Cored

## CARBON-MANGANESE BEARING Flat and Horizontal, Flux Cored

### Select 91-D3

**CLASSIFICATION:** E90T1-D3C per AWS A5.29, ASME SFA 5.29

Select 91-D3 is a gas-shielded, low alloy steel electrode intended to match the mechanical properties and corrosion resistance of certain pressure vessel steels. This electrode can be used for single and multiple pass welding in horizontal fillets and the flat position.

**APPLICATIONS:** Select 91-D3 is a manganese-molybdenum flux cored electrode which is well suited to weld steels such as ASTM A302 GrB and manganese-molybdenum castings such as ASTM A49, A291 and A735.

**DIAMETERS:** 1/16", 5/64", 3/32"

**SHIELDING GAS:** 100% CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Good welder appeal and excellent bead profile.
- Low spatter levels.
- High strength and corrosion resistance of deposit matches the appropriate steels.

**TYPICAL MECHANICAL PROPERTIES:**

	CO <sub>2</sub>
Ultimate Tensile Strength (psi)	96,000
Yield Strength (psi)	84,000
Percent Elongation	24
CVN (ft•lb f) @ -20°F	33

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si	Mo
CO <sub>2</sub>	.06	1.30	.010	.010	.38	.50

### Select 80C-D2

**CLASSIFICATION:** E90C-D2-H4 per AWS A5.28, ASME SFA 5.28

Select 80C-D2 is a composite metal cored electrode for single and multiple pass welding of certain high strength, low alloy steels where a minimum tensile strength of 90,000 psi is required in the deposited metal. This premium electrode provides a productivity-enhancing welding alternative to ER80S-D2 solid wires.

**APPLICATIONS:** Select 80C-D2 is perfect for those applications requiring weld metal which matches the mechanical properties of high strength, low alloy pressure vessel steels such as ASTM A302, GrB and HSLA steels and manganese molybdenum castings such as ASTM A49, A291 and A735.

**DIAMETERS:** .035", .045", .052", 1/16"

**SHIELDING GAS:** 75-95% Ar/balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Smooth, low spatter spray transfer.
- 30-50% faster travel speeds than corresponding solid wires for greater productivity.
- Elimination of cold lap.

**TYPICAL MECHANICAL PROPERTIES:**

	75%Ar/25%CO <sub>2</sub>
Ultimate Tensile Strength (psi)	93,000
Yield Strength (psi)	81,000
Percent Elongation	26
CVN (ft•lb f) @ -20°F	42

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si	Mo
75Ar/25CO <sub>2</sub>	.06	1.45	.010	.010	.54	.49

### Select 80

**CLASSIFICATION:** E80T-GC per AWS A5.29, ASME SFA 5.29.

A low alloy steel electrode for flux cored arc welding, Select 80 is intended for the single and multiple pass welding of carbon and certain low alloy steels.

**APPLICATIONS:** Select 80 is an ideal choice for welding steels such as ASTM A515, A516, A572 and other higher strength steels.

**DIAMETERS:** 5/64", 3/32"

**SHIELDING GAS:** 100% CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Meets 80 Ksi minimum tensile strength.
- Smooth arc transfer with low spatter.
- Slag removes easily.
- Welds well over mill scale and rust.

**TYPICAL MECHANICAL PROPERTIES:**

	CO <sub>2</sub>
Ultimate Tensile Strength (psi)	88,000
Yield Strength (psi)	75,000
Percent Elongation	25
CVN (ft•lb f) @ 0°F	48
@ -20°F	42

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si
CO <sub>2</sub>	.04	1.40	.010	.010	.83



**CARBON-MOLYBDENUM BEARING**  
Flat and Horizontal,  
Flux Cored

**Select 81-A1**

**CLASSIFICATION:** E80T1-A1C per AWS A5.29, ASME SFA 5.29

Select 81-A1 is a low alloy steel electrode intended for single and multiple pass welding of certain carbon-molybdenum steels where the addition of 1/2% molybdenum is required in the deposited weld metal.

**APPLICATIONS:** Select 81-A1 is well-suited for welding certain C-Mo steels used in the fabrication of boilers and pressure vessels such as ASTM A161, A204 and A302 Gr. A plate.

**DIAMETERS:** 1/16", 5/64", 3/32"

**SHIELDING GAS:** 100% CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Spray-like arc transfer with very low spatter.
- Exhibits minimum of convexity.
- Complete slag coverage with easy detachment.

**TYPICAL MECHANICAL PROPERTIES:**

	SR 1 Hr. @ 1150°F	
	CO <sub>2</sub>	
Ultimate Tensile Strength (psi)	90,300	
Yield Strength (psi)	79,600	
Percent Elongation	24	

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si	Mo
CO <sub>2</sub>	.05	.65	.010	.010	.45	.58

**CARBON-MOLYBDENUM BEARING**  
All Position, Flux Cored

**Select 810-A1**

**CLASSIFICATIONS:** E81T1-A1C, E81T1-A1M per AWS A5.29, ASME SFA 5.29

A low alloy steel electrode for flux cored arc welding. Select 810-A1 is intended for single and multiple pass welding, in all positions, of certain carbon-molybdenum steels where the addition of 1/2% molybdenum is required in the deposited weld metal.

**APPLICATIONS:** Select 810-A1 is ideally suited for welding certain C-Mo steels used in the fabrication of boilers and pressure vessels such as ASTM A161, A204 and A302 Gr. A plate and A335-P1 pipe.

**DIAMETERS:** .035", .045", .052", 1/16"

**SHIELDING GASES:** 100% CO<sub>2</sub>, 75-80% Ar/20-25% CO<sub>2</sub> 40-55 cfh

**WELDING POSITIONS:** All positions



**CHARACTERISTICS:**

- Quick freezing slag facilitates all position welding.
- Excellent fluxing action.
- Increased productivity – up to 3 times the deposition rate of covered electrodes – up to 2 times that of solid wire.

**TYPICAL MECHANICAL PROPERTIES:**

	SR 1 Hr. @ 1150°F	
	75%Ar/ CO <sub>2</sub>	25%CO <sub>2</sub>
Ultimate Tensile Strength (psi)	87,500	89,400
Yield Strength (psi)	74,300	74,400
Percent Elongation	30	31
CVN (ft•lb f) @ 72°F	48	54

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si	Mo
CO <sub>2</sub>	.07	.85	.011	.009	.28	.45
75Ar/ 25CO <sub>2</sub>	.07	.96	.011	.009	.35	.55

**CHROMIUM-MOLYBDENUM BEARING**  
Flat and Horizontal,  
Flux Cored

**Select 81-B2**

**CLASSIFICATION:** E80T1-B2C per AWS A5.29, ASME SFA 5.29

Select 81-B2 is a low alloy steel electrode for flux cored arc welding. This electrode is designed for single and multiple pass welding in the flat and horizontal positions of certain chromium-molybdenum steel and pipe grades, where 1 1/4% Cr and 1/2% Mo are required in the weld deposit.

**APPLICATIONS:** Select 81-B2 is an excellent selection to weld steels subject to high temperature service such as ASTM A387, Gr. 11 plate and A335 P11 pipe. These materials are employed in the fabrication of boilers, heat exchangers and pressure vessels.

**DIAMETERS:** .052", 1/16", 5/64", 3/32"

**SHIELDING GAS:** 100% CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Promotes spray-like arc transfer with very low spatter.
- Bead profile exhibits minimum of convexity.
- Resists creep and maintains strength at elevated temperatures.

**TYPICAL MECHANICAL PROPERTIES:**

	SR 1 Hr. @ 1275°F	
	CO <sub>2</sub>	
Ultimate Tensile Strength (psi)	91,000	
Yield Strength (psi)	81,500	
Percent Elongation	20	

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si	Cr	Mo
CO <sub>2</sub>	.06	.63	.010	.010	.57	1.20	.50

CARBON STEEL

LOW ALLOY

STAINLESS STEEL

NICKEL ALLOYS

HARDSURFACING

## Select 85-B2

**CLASSIFICATION:** E80T5-B2C per AWS A5.29, ASME SFA 5.29

Select 85-B2 is intended for single and multiple pass welding of certain chromium-molybdenum steels, plate and pipe requiring 1<sup>1</sup>/<sub>4</sub>% chrome and 1<sup>1</sup>/<sub>2</sub>% molybdenum in the weld deposit. The basic slag limits welding to horizontal fillets and the flat position.

**APPLICATIONS:** Select 85-B2 is a good choice for welding steels such as ASTM A387 Gr 11 plate and A335 Gr P11 pipe. These steels are used in high temperature applications requiring creep resistance. The basic slag imparts better CVN toughness than rutile slag electrodes when welding these steels, which are used in the construction of boilers, heat exchangers and pressure vessels.

**DIAMETERS:** .045", 1/16", 5/64", 3/32"

**SHIELDING GAS:** 100% CO<sub>2</sub>, 40-55 cfh

### WELDING POSITIONS:

Flat and Horizontal



### CHARACTERISTICS:

- Excellent mechanical properties with basic slag.
- Better CVN toughness than rutile-slag electrodes.
- Low weld metal hydrogen.

### TYPICAL MECHANICAL PROPERTIES:

SR 1 Hr. @ 1275°F

	CO <sub>2</sub>
Ultimate Tensile Strength (psi)	94,000
Yield Strength (psi)	82,000
Percent Elongation	25
CVN (ft•lb f) @ -20°F	40

### TYPICAL DEPOSIT COMPOSITION:

Wt%	C	Mn	P	S	Si	Cr	Mo
CO <sub>2</sub>	.06	.70	.010	.010	.40	1.25	.52

## Select 85-B2L

**CLASSIFICATION:** E80T5-B2LC per AWS A5.29, ASME SFA 5.29

Select 85-B2L is designed for single and multiple pass welding of certain chromium-molybdenum steels, plate and pipe requiring 1<sup>1</sup>/<sub>4</sub>% chromium and 1<sup>1</sup>/<sub>2</sub>% molybdenum in the weld deposit.

**APPLICATIONS:** Select 85-B2L is a good choice for welding thin-walled A335-P11 pipe and A213-T11 or A213-T22 tube in the as-welded condition or in applications where low hardness is required. The basic slag imparts better CVN toughness than rutile slag electrodes when welding these steels, which are used in the construction of boilers, heat exchangers and pressure vessels.

**DIAMETERS:** .052", 1/16", 5/64", 3/32"

**SHIELDING GAS:** 100% CO<sub>2</sub>, 40-55 cfh

### WELDING POSITIONS:

Flat and Horizontal



### CHARACTERISTICS:

- Excellent mechanical properties with basic slag.
- Low weld metal hydrogen.

### TYPICAL MECHANICAL PROPERTIES:

SR 1 Hr. @ 1275°F

	CO <sub>2</sub>
Ultimate Tensile Strength (psi)	89,000
Yield Strength (psi)	77,000
Percent Elongation	24

### TYPICAL DEPOSIT COMPOSITION:

Wt%	C	Mn	P	S	Si	Cr	Mo
CO <sub>2</sub>	.03	.70	.010	.010	.40	1.26	.48

## Select 91-B3

**CLASSIFICATIONS:** E90T1-B3C, E90T1-B3M per AWS A5.29, ASME SFA 5.29

Select 91-B3 is a low alloy steel electrode for single and multiple pass welding of certain high temperature, creep resistant materials in horizontal fillets and the flat position. The rutile slag system provides high welder appeal and good weld bead geometry.

**APPLICATIONS:** Select 91-B3 deposits weldments with a composition matching those of ASTM A387 Gr 22 plate and A335 P22 pipe steels. These materials are used in the fabrication of pressure vessels, boilers, heat exchangers and other applications involved with high temperature exposure and creep resistance.

**DIAMETERS:** .052", 1/16", 5/64", 3/32"

**SHIELDING GASES:** 100% CO<sub>2</sub>, 75% Ar/25% CO<sub>2</sub>, 40-55 cfh

### WELDING POSITIONS:

Flat and Horizontal



### CHARACTERISTICS:

- Rutile slag system provides good welder appeal and bead geometry.
- Deposit composition is nominally 2<sup>1</sup>/<sub>4</sub>% chrome and 1% molybdenum.
- Higher deposition rates than covered or solid electrodes.

### TYPICAL MECHANICAL PROPERTIES:

SR 1 Hr. @ 1275°F

	CO <sub>2</sub>	75%Ar/ 25%CO <sub>2</sub>
Ultimate Tensile Strength (psi)	105,500	108,400
Yield Strength (psi)	95,000	96,700
Percent Elongation	18	18

### TYPICAL DEPOSIT COMPOSITION:

Wt%	C	Mn	P	S	Si	Cr	Mo
CO <sub>2</sub>	.06	.70	.010	.010	.50	2.24	1.01
75Ar/ 25CO <sub>2</sub>	.07	.72	.010	.010	.57	2.45	1.14

# CHROMIUM-MOLYBDENUM BEARING All Position, Flux Cored

## Select 810-B2

**CLASSIFICATIONS:** E81T1-B2C, E81T1-B2M per AWS A5.29, ASME SFA 5.29

Select 810-B2 is a low alloy steel electrode designed for single and multiple pass welding, in all positions, of certain chromium-molybdenum steel plate and pipe where 1<sup>1</sup>/<sub>4</sub>% Cr and 1<sup>1</sup>/<sub>2</sub>% Mo are required in the weld deposit.

**APPLICATIONS:** Select 810-B2 is used to weld steels subject to high temperature service such as A387 Gr. 11 plate and A335 P11 pipe. These materials are used in the fabrication of boilers, heat exchangers and pressure vessels.

**DIAMETERS:** .035", .045", .052", 1/16"

**SHIELDING GASES:** 100% CO<sub>2</sub>, 75-80% Ar/balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** All positions



**CHARACTERISTICS:**

- Superb welder appeal with excellent mechanical properties.
- Low spatter emission.
- Fast freezing slag removes easily.
- Resists creep and maintains strength at elevated temperatures.

**TYPICAL MECHANICAL PROPERTIES:**

	SR 1 Hr. @ 1275°F	
	75%Ar/ CO <sub>2</sub>	25%CO <sub>2</sub>
Ultimate Tensile Strength (psi)	94,200	98,900
Yield Strength (psi)	84,200	85,200
Percent Elongation	20	22

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si	Cr	Mo
CO <sub>2</sub>	.07	.81	.010	.010	.60	1.31	.45
75Ar/	.09	.87	.010	.010	.60	1.32	.49
25CO <sub>2</sub>							

## Select 810-B2L

**CLASSIFICATIONS:** E81T1-B2LC, E81T1-B2LM per AWS A5.29, ASME SFA 5.29

Select 810-B2L is a premium low alloy steel electrode intended for single and multiple pass, all position welding of certain 1<sup>1</sup>/<sub>4</sub>% chromium and 1<sup>1</sup>/<sub>2</sub>% molybdenum steel plate and pipe, where lower carbon levels are required in the weld deposit.

**APPLICATIONS:** Select 810-B2L is specially designed to weld thin-walled A335-P11 pipe or tube and is well suited for use in the fabrication of pressure vessels, heat exchangers and boilers.

**DIAMETERS:** .045", .052", 1/16"

**SHIELDING GASES:** 100% CO<sub>2</sub>, 75% Ar/25% CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** All positions



**CHARACTERISTICS:**

- Smooth arc transfer.
- Low spatter emission.
- Fast freezing slag removes easily.
- Provides improved ductility and lower hardness over conventional, higher carbon grades.

**TYPICAL MECHANICAL PROPERTIES:**

	SR 1 Hr. @ 1275°F	
	75%Ar/ CO <sub>2</sub>	25%CO <sub>2</sub>
Ultimate Tensile Strength (psi)	82,800	86,400
Yield Strength (psi)	72,100	76,500
Percent Elongation	28	26

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si	Cr	Mo
CO <sub>2</sub>	.02	.79	.013	.007	.28	1.10	.49
75Ar/	.02	1.12	.014	.007	.39	1.15	.44
25CO <sub>2</sub>							

## Select 910-B3

**CLASSIFICATIONS:** E91T1-B3C, E91T1-B3M per AWS A5.29, ASME SFA 5.29

Specifically designed for welding materials subjected to high temperature service, Select 910-B3 provides single and multiple pass, all position welding of certain chromium-molybdenum steels.

**APPLICATIONS:** Select 910-B3 is utilized for welding materials such as A387 Gr. 22 plate and A335 P22 pipe.

**DIAMETERS:** .045", .052", 1/16"

**SHIELDING GASES:** 100% CO<sub>2</sub>, 75% Ar/25% CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** All positions



**CHARACTERISTICS:**

- 2<sup>1</sup>/<sub>4</sub>% Cr/1% Mo weld metal deposit.
- Increased deposition rates compared to covered and solid electrodes.
- Greater tolerance of mill scale and rust.
- Fast freezing slag which removes easily and cleanly.
- Low spatter emission.

**TYPICAL MECHANICAL PROPERTIES:**

	SR 1 Hr. @ 1275°F	
	75%Ar/ CO <sub>2</sub>	25%CO <sub>2</sub>
Ultimate Tensile Strength (psi)	102,100	105,300
Yield Strength (psi)	87,400	87,700
Percent Elongation	18	19

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si	Cr	Mo
CO <sub>2</sub>	.08	.51	.010	.010	.59	2.27	.99
75Ar/	.08	.54	.010	.010	.62	2.35	.98
25CO <sub>2</sub>							

## Select 910-B3L

**CLASSIFICATIONS:** E91T1-B3LC, E91T1-B3LM per AWS A5.29, ASME SFA 5.29

Select 910-B3L is a low alloy steel electrode intended for single and multiple pass, all position welding of certain 2<sup>1</sup>/<sub>4</sub>% chromium and 1% molybdenum steel plate and pipe, where lower carbon levels are required in the weld deposit.

**APPLICATIONS:** Select 910-B3L is well suited to weld thin-walled A335-P22 pipe for use in the as-welded condition or for applications where low hardness is necessary. These materials are used in the fabrication of boilers, heat exchangers and pressure vessels.

**DIAMETERS:** .045", .052", 1/16"

**SHIELDING GAS:** 100% CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** All positions



**CHARACTERISTICS:**

- Superb welder appeal and excellent mechanical properties.
- Smooth arc transfer with low spatter and fast freezing slag.
- Improved ductility and lower hardness than typical higher carbon grades.

**TYPICAL MECHANICAL PROPERTIES:**

	SR 1 Hr. @ 1275°F	
	CO <sub>2</sub>	
Ultimate Tensile Strength (psi)	94,200	
Yield Strength (psi)	81,400	
Percent Elongation	22	

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si	Cr	Mo
CO <sub>2</sub>	.03	.70	.010	.010	.30	2.20	1.03

## Select 810-B6

**CLASSIFICATION:** E81T1-B6M per AWS A5.29, ASME SFA 5.29

Select 810-B6 is a low alloy steel electrode intended for single and multiple pass, all position welding of certain chromium-molybdenum steels where a weld deposit of 5% chromium and 1/2% molybdenum is required.

**APPLICATIONS:** Select 810-B6 is specially designed for welding tube, pipe and plate subjected to high temperature service, such as A213-T5 and A335-P5.

**DIAMETERS:** .045", .052", 1/16"

**SHIELDING GAS:** 75-80% Ar/balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** All positions



**CHARACTERISTICS:**

- Smooth, stable arc transfer with low spatter emission.
- Fast freezing slag facilitates easy removal.
- Increased deposition rates over covered and stick electrodes.
- Greater tolerance of mill scale and rust.

**TYPICAL MECHANICAL PROPERTIES:**

	SR 2 Hr. @ 1375°F	
	75%Ar/25%CO <sub>2</sub>	
Ultimate Tensile Strength (psi)	89,000	
Yield Strength (psi)	71,200	
Percent Elongation	20	
CVN (ft•lb f) @ 70° F	60	

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si	Cr	Mo
75Ar/25CO <sub>2</sub>	.08	.47	.006	.010	.27	4.85	.56

## Select 810-B8

**CLASSIFICATION:** E81T1-B8M per AWS A5.29, ASME SFA 5.29

Select 810-B8 is an all position, flux cored electrode intended for single and multiple pass welding of 9 chromium and 1 molybdenum steels.

**APPLICATIONS:** Select 810-B8 is used to weld 9Cr-1Mo steels such as A335-P9 piping and A213-T9 tubing. Typical applications involve high temperature service in the petrochemical and petroleum industries.

**DIAMETERS:** .045", .052", 1/16"

**SHIELDING GAS:** 75-80% Ar/balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** All positions



**CHARACTERISTICS:**

- Uniform weld beads with good tie-in.
- Smooth and stable arc transfer.
- Greater tolerance for mill scale and rust.
- Increased deposition rates compared to covered and solid electrodes.
- Eliminates lack of fusion defects.

**TYPICAL MECHANICAL PROPERTIES:**

	SR 2 Hr. @1375°F	
	75%Ar/25%CO <sub>2</sub>	
Ultimate Tensile Strength (psi)	96,300	
Yield Strength (psi)	78,000	
Percent Elongation	20	

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si	Cr	Mo
75Ar/25CO <sub>2</sub>	.09	.50	.010	.010	.35	9.30	1.05



## CHROMIUM-MOLYBDENUM BEARING All Position, Flux Cored

### Select 910-B9

**CLASSIFICATION:** E91T1-B9M per AWS A5.29, ASME SFA 5.29

Designed for single and multiple pass welding of 9 chromium and 1 molybdenum steels, the Select 910-B9 all position, flux cored electrode contains small additions of niobium, vanadium and nitrogen to improve long term creep properties.

**APPLICATIONS:** Select 910-B9 is used to weld 9Cr-1Mo creep resistant steels, such as A387 Gr 91 plate; A335 P91 and A369-FP91 piping; A199-T91, A200-T91 and A213-T91 tubing; A182-F91 forgings; as well as fittings and castings of similar composition. Typical applications include power plant turbine casings, valves, headers and piping.

**DIAMETERS:** .045", .052", 1/16"

**SHIELDING GAS:** 75-80% Ar/balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** All positions



**CHARACTERISTICS:**

- Premium electrode for joining 9Cr-1Mo steels.
- Arc transfer is smooth and stable.
- Uniform weld bead with good tie-in.
- Eliminates lack of fusion defects, improves deposition rates over solid wire.

**TYPICAL MECHANICAL PROPERTIES:**

	75%Ar/25%CO <sub>2</sub>	
	SR 2 Hr. @ 1400°F	SR 4 Hr. @ 1400°F
Ultimate Tensile Strength (psi)	104,200	99,800
Yield Strength (psi)	84,200	81,900
Percent Elongation	20	21

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	Al	C	Cr	Mn	Mo	N
75Ar/25CO <sub>2</sub>	<.01	.10	9.00	.70	1.00	.04
Wt%	Nb	Ni	P	S	Si	V
	.04	.35	.010	.010	.25	.20

## CHROMIUM-MOLYBDENUM BEARING Metal Cored

### Select 80C-B2

**CLASSIFICATION:** E80C-B2-H4 per AWS/ANSI A5.28, ASME SFA 5.28

A metal cored, low alloy steel electrode, Select 80C-B2 is designed for both single and multiple pass welding of certain chromium and molybdenum steels.

**APPLICATIONS:** Select 80C-B2 is intended to weld materials such as ASTM A335-11 pipe and A387 Grade 11 plate. The weld metal is designed to withstand the high temperature service of the base materials.

**DIAMETERS:** .035", .045", .052", 1/16"

**SHIELDING GASES:** 75-95%Ar/balance CO<sub>2</sub>, 95-98%Ar/balance O<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Provides higher deposition rates and increased penetration.
- Greater deposit weld consistency than solid wire.
- Lower spatter and faster travel speeds mean reduced welding costs.

**TYPICAL MECHANICAL PROPERTIES:**

	98%Ar/2%O <sub>2</sub>	
	SR 1 Hr. @ 1150°F	
Ultimate Tensile Strength (psi)	87,000	
Yield Strength (psi)	70,300	
Percent Elongation	23	

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si	Cr	Mo
98Ar/2O <sub>2</sub>	.05	.65	.010	.010	.43	1.16	.56

### Select 90C-B3

**CLASSIFICATION:** E90C-B3-H4 per AWS A5.28, ASME SFA 5.28

Select 90C-B3 is alloyed with approximately 2 1/4% chromium and 1% molybdenum. This composite metal cored electrode, intended for single and multiple pass welding, produces a high strength weld deposit which is generally post weld treated. Care must be taken with welds which are used in the as-welded condition. Classification of this electrode is, therefore, in the postweld heat-treated condition.

**APPLICATIONS:** Select 90C-B3 is designed for welding the 2 1/4 Cr-1 Mo steels used in high temperature and pressure piping as well as pressure vessels. ASTM A387 - Grade 22 is a standard grade of steel used in many of these applications. Select 90C-B3 may also be used to weld Cr-Mo steels to carbon steel.

**DIAMETERS:** .035", .045", .052", 1/16"

**SHIELDING GASES:** 95-98% Ar/balance O<sub>2</sub>, 75-95% Ar/balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Greater tolerance for mill scale than solid wires.
- Enhanced welder appeal.
- Higher productivity due to faster travel speeds.

**TYPICAL MECHANICAL PROPERTIES:**

	75%Ar/25%CO <sub>2</sub>	
	SR 1 Hr. @ 1275°F	
Ultimate Tensile Strength (psi)	93,000	
Yield Strength (psi)	78,500	
Percent Elongation	22	

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si	Cr	Mo
75Ar/25CO <sub>2</sub>	.07	.91	.009	.010	.29	2.24	1.02

## WEATHERING STEEL All Position, Flux Cored

## WEATHERING STEEL Metal Cored

### Select 90C-B9

**CLASSIFICATION:** E90C-G-H4 per AWS A5.28, ASME SFA 5.28

Select 90C-B9 is a premium composite metal cored electrode intended for single and multiple pass welding of 9 chromium and 1 molybdenum steels. Select 90C-B9 contains small additions of niobium, vanadium and nitrogen to improve long term creep properties.

**APPLICATIONS:** Select 90C-B9 is used to weld 9Cr-1Mo creep resistant steels, such as A387 Gr 91 plate; A335-P91 and A369-FP91 piping; A199-T91, A200-T91 and A213-T91 tubing; A182-F91 forgings; fittings and castings of similar composition. Typical applications include power plant turbine casings, valves, headers and piping.

**DIAMETERS:** .045", .052", 1/16"

**SHIELDING GAS:** 75-95%Ar/balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Excellent welder appeal.
- Smooth, stable spray with minimal spatter.
- Greater productivity and sidewall fusion than solid wire.

**TYPICAL MECHANICAL PROPERTIES:**

	95%Ar/5%CO <sub>2</sub>	
	SR 1 Hr. @ 1375°F	SR 3 Hrs. @ 1375°F
Ultimate Tensile Strength (psi)	105,400	103,200
Yield Strength (psi)	88,400	84,100
Percent Elongation	18	18

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	Al	C	Cr	Mn	Mo	N
95Ar/5CO <sub>2</sub>	<.01	.10	9.00	.65	1.00	.04
	Nb	Ni	P	S	Si	V
	.04	.35	.010	.009	.35	.20

### Select 810-W

**CLASSIFICATIONS:** E81T1-W2C-H8, E81T1-W2M-H8 per AWS A5.29, ASME SFA 5.29

**APPROVALS:** CWB E81T1-W2C-H8, E81T1-W2M-H8

Select 810-W is a gas-shielded, flux cored, low alloy steel electrode for all position welding of weathering steels. This electrode is intended for single and multiple pass welding. Welder appeal is excellent with a spray transfer, thin slag which removes easily and cleanly and a smooth bead profile.

**APPLICATIONS:** Select 810-W contains alloy additions which match those of the "weathering" steels such as ASTM A588. This provides weld metal which matches the corrosion resistance and coloring of the weathering-type structural steels. These steels are commonly used in bridge construction and other structural components used in highway construction.

**DIAMETERS:** .045", .052", 1/16"

**SHIELDING GASES:** 100% CO<sub>2</sub>, 75-80% Ar/balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** All positions



**CHARACTERISTICS:**

- Matches coloring and corrosion resistance of weathering steels.
- All position welding capability.
- Good mechanical properties.

**TYPICAL MECHANICAL PROPERTIES:**

	75%Ar/ 25%CO <sub>2</sub>	
	CO <sub>2</sub>	25%CO <sub>2</sub>
Ultimate Tensile Strength (psi)	86,500	91,300
Yield Strength (psi)	71,200	78,800
Percent Elongation	25	24
CVN (ft•lb f) @ -20°F	31	28

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	Si	Ni	Cr	Cu
CO <sub>2</sub>	.06	.94	.41	.66	.53	.43
75AR/	.06	1.05	.49	.72	.57	.46
25CO <sub>2</sub>						

### Select 80C-W

**CLASSIFICATION:** E80C-W2-H4 per AWS A5.28, ASME SFA 5.28

**APPROVAL:** CWB E80C-W2-H8 (90% Ar/10% CO<sub>2</sub>)

Select 80C-W is designed for those applications requiring the coloration and corrosion resistance of the weathering type of structural steels. This composite metal cored electrode is intended for single and multiple pass welding in flat and horizontal positions.

**APPLICATIONS:** Structural steels, which require coloration and corrosion resistance such as ASTM A242 and A588, are used typically in bridges, transmission towers and poles and some building construction.

**DIAMETERS:** .035", .045", .052", 1/16"

**SHIELDING GAS:** 75-95% Ar/balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- "Weathering" coloration.
- Spatter emission is nearly nonexistent.
- Reduced risk of cold-lap on heavier plate or scaled areas.
- Less fume generation than flux cored electrodes.
- Easy slag removal and cleanup.

**TYPICAL MECHANICAL PROPERTIES:**

	75%Ar/25%CO <sub>2</sub>	
	75%Ar/25%CO <sub>2</sub>	75%Ar/25%CO <sub>2</sub>
Ultimate Tensile Strength (psi)	92,000	
Yield Strength (psi)	78,100	
Percent Elongation	24	
CVN (ft•lb f) @ -20°F	43	

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	Si	Ni	Cr	Cu
75Ar/25CO <sub>2</sub>	.06	1.20	.40	.63	.58	.65

## Flux Cored, Low Alloy Properties Summary Table

Product	AWS Class	Shielding Gas	As Welded/Stress Relieved	Tensile Strength (ksi)	Yield Strength (ksi)
<b>80 ksi Tensile Strength (Flat/Horizontal)</b>					
Select 80	E80T-GC	CO <sub>2</sub>	As Welded	88.0	75.0
Select 81-A1	E80T1-A1	CO <sub>2</sub>	SR 1 Hr @ 1150°F	90.3	79.6
Select 81-B2	E80T1-B2	CO <sub>2</sub>	SR 1 Hr @ 1275°F	91.0	81.5
Select 85-B2	E80T5-B2	CO <sub>2</sub>	SR 1 Hr @ 1275°F	94.0	82.0
Select 85-B2L	E80T5-B2L	CO <sub>2</sub>	SR 1 Hr @ 1275°F	89.0	77.0
Select 81-Ni1	E80T1-Ni1	CO <sub>2</sub>	As Welded	86.4	73.7
Select 81-Ni2	E80T1-Ni2	CO <sub>2</sub>	As Welded	89.3	76.5
Select 85-Ni3	E80T5-Ni3-H4	75% Ar/25% CO <sub>2</sub>	SR 1 Hr @ 1150°F	90.0	75.0
<b>80 ksi Tensile Strength (All Position)</b>					
Select 810-A1	E81T1-A1	75% Ar/25% CO <sub>2</sub> CO <sub>2</sub>	SR 1 Hr @ 1150°F	89.4 87.5	74.4 74.3
Select 810-B2	E81T1-B2	75% Ar/25% CO <sub>2</sub> CO <sub>2</sub>	SR 1 Hr @ 1275°F	98.9 94.2	85.2 84.2
Select 810-B2L	E81T1-B2L	75% Ar/25% CO <sub>2</sub> CO <sub>2</sub>	SR 1 Hr @ 1275°F	86.4 82.8	76.5 72.1
Select 810-B6	E81T1-B6	75% Ar/25% CO <sub>2</sub>	SR 2 Hr @ 1375°F	89.0	71.2
Select 810-B8	E81T1-B8	75% Ar/25% CO <sub>2</sub>	SR 2 Hr @ 1375°F	96.3	78.0
Select 737Ni	E81T1-GM	75% Ar/25% CO <sub>2</sub>	As Welded	89.4	78.0
Select 810-Ni1	E81T1-Ni1	75% Ar/25% CO <sub>2</sub> CO <sub>2</sub>	As Welded	90.6 83.5	76.1 76.9
Select 820-Ni1	E81T1-Ni1 MIL-81T1-Ni1	75% Ar/25% CO <sub>2</sub> CO <sub>2</sub>	As Welded	89.0 86.4	80.0 73.7
Select 810-Ni2	E81T1-Ni2 MIL-81T1-Ni2	75% Ar/25% CO <sub>2</sub> CO <sub>2</sub>	As Welded	90.0 87.0	80.0 73.0
Select 820-Ni2	E81T1-Ni2	75% Ar/25% CO <sub>2</sub> CO <sub>2</sub>	As Welded	93.0 89.2	81.5 77.0
Select 812-K2	E81T1-K2	75% Ar/25% CO <sub>2</sub>	As Welded SR 3 Hr @ 1150°F	92.0 91.0	84.0 78.9
Select 810-W	E81T1-W2	75% Ar/25% CO <sub>2</sub> CO <sub>2</sub>	As Welded	91.3 86.5	78.8 71.2
<b>90 ksi Tensile Strength (Flat/Horizontal)</b>					
Select 91-B3	E90T1-B3	75% Ar/25% CO <sub>2</sub> CO <sub>2</sub>	SR 1 Hr @ 1275°F	108.4 105.5	96.7 95.0
Select 91-D3	E90T1-D3	CO <sub>2</sub>	As Welded	96.0	84.0
Select 91-K2	E90T1-K2	CO <sub>2</sub>	As Welded	98.4	88.7
Select 95-K2	E90T5-K2	CO <sub>2</sub>	As Welded	95.8	86.1
<b>90 ksi Tensile Strength (All Position)</b>					
Select 910-B3	E91T1-B3	75% Ar/25% CO <sub>2</sub> CO <sub>2</sub>	SR 1 Hr @ 1275°F	105.3 102.1	87.7 87.4
Select 910-B3L	E91T1-B3L	CO <sub>2</sub>	SR 1 Hr @ 1275°F	94.2	81.4
Select 910-B9	E91T1-B9	75% Ar/25% CO <sub>2</sub>	SR 2 Hr @ 1400°F Sr 4 Hr @ 1400°F	104.2 99.8	84.2 81.9
Select 910-Ni2	E91T1-Ni2	75% Ar/25% CO <sub>2</sub> CO <sub>2</sub>	As Welded	104.3 96.0	90.7 85.0
Select 910-K2	E91T1-K2	75% Ar/25% CO <sub>2</sub> CO <sub>2</sub>	As Welded	105.0 103.4	96.0 91.7
Select 920-K2	E91T1-K2CJ, -K2MJ	75% Ar/25% CO <sub>2</sub> CO <sub>2</sub>	As Welded	101.0 93.5	89.0 87.0
Select 937Ni	E91T1-GM	75% Ar/25% CO <sub>2</sub>	As Welded	99.6	87.0

Elongation	CVN Impact Toughness (ft•lbs @ °F)	C	Mn	Si	Ni	Cr	Mo	Cu
25	48 @ 0°/42 @ -20°	0.04	1.40	0.83				
25		0.05	0.65	0.45			0.58	
20		0.06	0.63	0.57		1.20	0.50	
25	40 @ -20°	0.06	0.70	0.40		1.25	0.52	
24		0.03	0.70	0.40		1.26	0.48	
27	30 @ -20°	0.05	1.10	0.25	0.98			
27	48 @ -40°	0.07	1.00	0.29	2.23			
23	38 @ -100°	0.05	1.30	0.20	3.60			
31	54 @ 72°	0.07	0.96	0.35			0.55	
30	48 @ 72°	0.07	0.85	0.28			0.45	
22		0.09	0.87	0.60		1.32	0.49	
20		0.07	0.81	0.60		1.31	0.45	
26		0.02	1.12	0.39		1.15	0.44	
28		0.02	0.79	0.28		1.10	0.49	
20	60 @ 70°	0.08	0.47	0.27		4.85	0.56	
20		0.09	0.50	0.35		9.30	1.05	
28	70 @ -40°	0.07	1.60	0.35	0.85			
23	53 @ -20°	0.04	1.15	0.47	0.98			
24	30 @ -20°	0.04	1.04	0.44	1.00			
24	94 @ -40°	0.03	1.29	0.50	0.90			
27	90 @ -40°	0.03	1.15	0.41	0.91			
22	40 @ -40°	0.05	0.90	0.30	2.40			
26	50 @ -40°	0.04	0.83	0.29	2.40			
26	45 @ -40°	0.03	1.21	0.57	2.33			
29	40 @ -40°	0.03	1.10	0.45	2.28			
24	59 @ -75°	0.06	1.20	0.22	1.60			
25	58 @ -50°							
24	28 @ -20°	0.06	1.05	0.49	0.72	0.57		0.46
25	31 @ -20°	0.06	0.94	0.41	0.66	0.53		0.43
18		0.07	0.72	0.57		2.45	1.14	
18		0.06	0.70	0.50		2.24	1.01	
24	33 @ -20°	0.06	1.30	0.38			0.50	
24	46 @ 0°	0.05	1.05	0.36	1.51		0.18	
23	44 @ -60°	0.04	1.30	0.50	1.75		0.20	
19		0.08	0.54	0.62		2.35	0.98	
18		0.08	0.51	0.59		2.27	0.99	
22		0.03	0.70	0.30		2.20	1.03	
20		0.10	0.70	0.25	0.35	9.00	1.00	
21								
23	35 @ -40°	0.05	1.43	0.54	2.55			
24	33 @ -40°	0.05	1.27	0.40	2.50			
22	39 @ 0°	0.04	1.40	0.55	1.60		0.27	
22	37 @ 0°	0.05	1.32	0.51	1.64		0.24	
23	78 @ -40°, 51 @ -75°	0.04	1.60	0.25	1.90			
22	65 @ -40°, 46 @ -75°	0.05	1.50	0.21	1.90			
23	55 @ -60°	0.07	1.60	0.20	2.60			



**Flux Cored, Low Alloy Properties Summary Table (continued)**

Product	AWS Class	Shielding Gas	As Welded/Stress Relieved	Tensile Strength (ksi)	Yield Strength (ksi)
<b>100 ksi Tensile Strength (Flat/Horizontal)</b>					
Select 100-K3	E100T1-K3	CO <sub>2</sub>	As Welded	105.7	94.0
Select 105-D2	E100T5-D2	75% Ar/2%5 CO <sub>2</sub>	SR 1 Hr @ 1150°F	102.6	90.7
Select 4130LN	None	75% Ar/25% CO <sub>2</sub>	QT 1 Hr @ 1100°F SR 2 Hr @ 1200°F	125.0 116.0	107.0 99.0
<b>100 ksi Tensile Strength (All Position)</b>					
Select 101-K3C	E101T1-K3C	CO <sub>2</sub>	As Welded	106.5	92.3
Select 101-K3M	E101T1-K3M	75% Ar/25% CO <sub>2</sub>	As Welded	113.7	95.1
Select 101 SR	E101T1-GM	75% Ar/25% CO <sub>2</sub>	As Welded	111.1	98.7
<b>110 ksi Tensile Strength (Flat/Horizontal)</b>					
Select 110-K3	E110T1-K3	CO <sub>2</sub>	As Welded	116.0	105.0
Select 115-K3	E110T5-K3	CO <sub>2</sub>	As Welded	116.0	104.0
Select 115-K4	E110T5-K4	CO <sub>2</sub>	As Welded	117.3	104.7
<b>110 ksi Tensile Strength (All Position)</b>					
Select 111-K3C	E111T1-K3C	CO <sub>2</sub>	As Welded	125.2	118.1
Select 111-K3M	E111T1-K3M	75% Ar/25% CO <sub>2</sub>	As Welded	126.9	107.8
<b>120 ksi Tensile Strength (All Position)</b>					
Select 125-K4	E120T5-K4	CO <sub>2</sub>	As Welded	132.1	116.0

**Metal Cored, Low Alloy Properties Summary Table**

Product	AWS Class	Shielding Gas	As Welded/Stress Relieved	Tensile Strength (ksi)	Yield Strength (ksi)
<b>80 ksi Tensile Strength (Metal Core)</b>					
Select 80C-B2	E80C-B2	95-98% Ar/Bal O <sub>2</sub>	SR 1 Hr @ 1150°F	87.0	70.3
Select 80C-Ni1	E80C-Ni1	75-95% Ar Bal CO <sub>2</sub> 95-98% Ar/Bal O <sub>2</sub>	As Welded	87.0 92.5	72.1 79.8
Select 80C-Ni2	E80C-Ni2	95-98% Ar/Bal O <sub>2</sub>	SR 1 Hr @ 1150°F	91.0	72.0
Select 80C-W	E80C-W2	75-95% Ar/Bal CO <sub>2</sub>	As Welded	92.0	78.1
<b>90 ksi Tensile Strength (Metal Core)</b>					
Select 90C-B3	E90C-B3	75-95% Ar/Bal CO <sub>2</sub>	SR 1 Hr @ 1275°F	93.0	78.5
Select 90C-B9	E90C-G	75-95% Ar/Bal CO <sub>2</sub>	SR 1 Hr @ 1375°F SR 3 Hr @ 1375°F	105.4 103.2	88.4 84.1
Select 80C-D2	E90C-D2	75-95% Ar/Bal CO <sub>2</sub>	As Welded	93.0	81.0
Select 90C-M2	E90C-G	95-98% Ar/Bal O <sub>2</sub>	As Welded	105.9	95.7
<b>100 ksi Tensile Strength (Metal Core)</b>					
Select 100C	E100C-G	95-98% Ar/Bal O <sub>2</sub>	As Welded	106.0	95.0
Select 100C-K3	E100C-K3	75% Ar/25%CO <sub>2</sub>	As Welded	104.0	89.0
<b>110 ksi Tensile Strength (Metal Core)</b>					
Select 110C-M2	E110C-G	95-98% Ar/Bal O <sub>2</sub>	As Welded	115.6	106.4
Select 110C-K4	E110C-K4	75% Ar/25%CO <sub>2</sub>	As Welded	117.0	103.0
Select 4130C	—	98% Ar/2O <sub>2</sub>	QT 2 Hr @ 1100°F SR 2 Hr @ 1200°F	132.0 108.0	118.0 89.0
<b>120 ksi Tensile Strength (Metal Core)</b>					
Select 120C	E120C-G	95-98% Ar/Bal O <sub>2</sub>	As Welded	120.6	108.4

Elongation	CVN Impact Toughness (ft•lbs @ °F)	C	Mn	Si	Ni	Cr	Mo	Cu
23	40 @ 0°	0.05	1.20	0.30	1.75		0.35	
24	30 @ -40°	0.05	2.06	0.45			0.48	
29 18		0.20	1.18	0.70	0.80	0.64	0.21	
22	45 @ -20°	0.06	1.38	0.28	1.92		0.41	
22	48 @ -20°	0.06	1.51	0.34	1.81		0.38	
19	47 @ -50°	0.06	1.40	0.30	0.85		0.35	
19	38 @ 0°	0.06	1.74	0.33	1.91		0.48	
20	39 @ -60°	0.04	1.64	0.46	2.01		0.46	
21	40 @ -60°	0.05	1.63	0.43	2.01	0.28	0.46	
20	39 @ -20°	0.05	2.00	0.35	1.92		0.55	
19	37 @ -20°	0.07	2.03	0.38	1.99		0.38	
15	33 @ -60°	0.04	1.90	0.42	2.27	0.57	0.60	

Elongation	CVN Impact Toughness (ft•lbs @ °F)	C	Mn	Si	Ni	Cr	Mo	Cu
23		0.05	0.65	0.43		1.16	0.56	
25	30 @ -50°	0.05	1.40	0.53	0.94			
26	28 @ -50°	0.03	1.45	0.50	0.95			
25	25 @ -80°	0.04	1.30	0.45	2.30			
25	43 @ -20°	0.06	1.20	0.40	0.63	0.58		0.65
22		0.07	0.91	0.29		2.24	1.02	
18 18		0.10	0.65	0.35	0.35	9.00	1.00	
26	42 @ -20°	0.03	1.45	0.54			0.49	
18	24 @ -60°	0.04	1.57	0.29	2.07		0.48	
18	29 @ -60°							
27	39 @ -60°	0.04	1.54	0.65	1.87		0.41	
16	28 @ -60°	0.03	1.71	0.42	2.00	0.19	0.55	
22	27 @ -60°	0.03	1.52	0.66	2.16	0.59	0.60	
18 22		0.21	1.32	0.75	0.68	0.65	0.20	
16	28 @ -60°	0.05	1.65	0.34	2.24		0.93	

# STAINLESS STEEL ELECTRODES



## Technology

The welding of stainless steel typically requires some combination of product performance, deposit composition and deposit cosmetics. The specific application will determine the most critical characteristic resulting in the selection of the specific grade. As an example, Austenitic stainless steel is chosen for its corrosion resistance and mechanical properties. More specifically, there are grades of austenitic stainless steel which are resistant to various degrees of corrosive media while other grades offer improved corrosion resistance at elevated temperatures.

The same breadth of selection is available when considering mechanical properties. An example would be the Austenitic grades ability to provide excellent CVN impact properties at subzero temperatures.

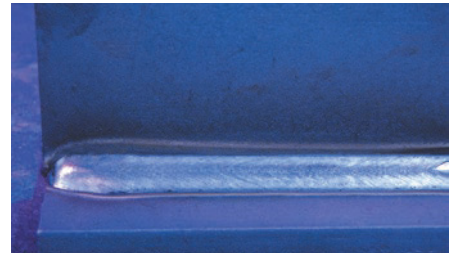
When welding these materials, the weld deposit must conform to the same properties and performance as the base material. The SelectAlloy™ series of Austenitic flux cored and metal cored electrodes are manufactured to meet the exacting requirements of the AWS A5.22 and A5.9 documents, respectively. Select-Arc manufactures a wide variety of austenitic grades as gas-shielded, flat and horizontal or all position flux cored electrodes, as self-shielded electrodes and as gas-shielded metal cored electrodes. Grades can be designed to meet specific requirements by working through the Select-Arc sales and application groups.

The ferritic stainless steel grades are used for applications requiring corrosion resistance along with moderate heat while the martensitic grades provide harder deposits for wear resistance. Select-Arc offers a variety of ferritic metal cored wires used for welding exhaust components, some offering the Titanium stabilization for smoother operation, while Niobium provides improved weld deposits for materials with traces of oil or other contaminants. The wide selection of Select-Arc grades allows manufacturers to select the proper product to match their base material and application.

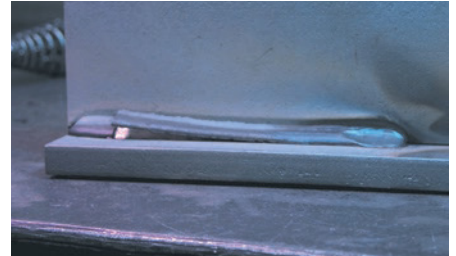
Martensitic stainless steel products are offered in both metal cored and flux cored wires for the power generation industry, where these products are typically utilized on 410 alloys such as turbine blades and forgings. Additional corrosion and pitting resistance are provided in the 410NiMo product offering which forms a martensitic microstructure upon cooling of the weld. These products are available in both flat/horizontal or all position wires.

## Quality

A quality product, such as stainless steel tubular wire, begins with quality manufacturing. The SelectAlloy stainless products are manufactured under a quality system certified to ISO 9001:2008. In addition, Select-Arc's quality system has been certified



*Horizontal fillet produced by Select 308L with CO<sub>2</sub> shielding gas. The bead is even and well-washed, with a finely rippled surface finish.*



*Free peeling slag from a weld made with Select 309L and CO<sub>2</sub> shielding gas.*

by ABS, CWB, NAVSEA, Lloyd's Registry and DNV. Meeting all these requirements is no easy feat, but Select-Arc's systems and people are up to the task. The highest quality stainless steel electrodes can only be made using the highest quality raw materials. All of the components, such as strip, minerals, alloy powders and fluxing agents, are procured using rigorous purchasing standards. Upon arrival at Select-Arc, these materials are inspected and scrutinized to assure compliance with all technical requirements. The raw materials are then converted to tubular welding wire using the most exacting manufacturing techniques and in-process checks. Nothing is left to chance; strip dimensions, fill percentages, alloy mix consistency, finished diameter and other process keys are checked continually and held to very strict tolerances. Finally, the finished wire is taken to the weld lab for final inspection, where the arc characteristics, bead cosmetics and slag removal are evaluated and must conform to the standards established during the development of the electrode. Prior to shipment, a chemical analysis of the weld deposit is performed for each mix of product to ensure compliance with AWS and internal standards.

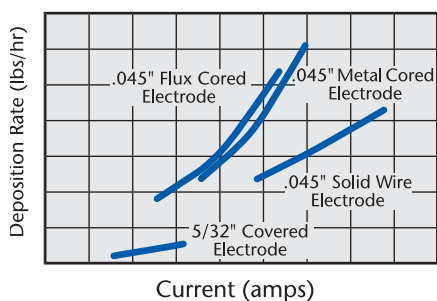
It takes effort, discipline and adherence to procedures to manufacture high quality, stainless steel tubular electrodes on a consistent basis. This is what Select-Arc does; every mix, every day. This dedication to excellence is not a sometime thing, it is a constant determination to make the best product in the industry. The SelectAlloy line of electrodes delivers; it delivers excellent feedability, superb welding characteristics, consistent deposit chemistry and the best overall performance in the marketplace.

## Productivity

In the manufacturing business, productivity is the key to profitability. When fabricating stainless steel, welding with covered electrodes or solid wire will not maximize productivity. Stick welding has very low deposition rates due to process limitations and results in reduced deposition efficiency due to “stub loss”. The deposition rates of solid wire are limited when welding out-of-position unless expensive pulsed power supplies and gases are used.

SelectAlloy flux cored electrodes are the perfect solution to the problem of how to increase productivity and reduce welding costs. The higher deposition rates shown below indicate the productivity improvements that tubular wires can provide to dramatically reduce overall welding costs. The smooth bead contour, easy peeling slag and minimal spatter reduce slag removal and grinding costs after welding, further reducing costs. Finally, the closely controlled weld deposit compositions and weld metal soundness provided by the SelectAlloy tubular wires eliminate the need for rework of welds, providing additional savings.

**Typical Deposition Rates for Various Stainless Steel Consumables**



The Select series of ferritic stainless steel, metal cored electrodes offers the same productivity advantages as the austenitic flux cored, but in a somewhat different manner. This product type offers the advantages of a solid wire, such as no slag to clean, with the productivity advantages of a tubular wire, such as higher deposition rates, the ability to bridge gaps, and faster travel speeds than solid wire. Difficult to weld components, such as exhaust systems with poor fit up, can be welded quite efficiently with the 400-series metal cored electrodes. There is also the advantage of less spatter than solid wire and less subsurface porosity, translating into substantial cost savings by not grinding spatter off the surface and not reworking or repairing welds.

## Metallurgy

Stainless steel alloys can be divided into five groups; austenitic, ferritic, martensitic, duplex (ferritic-austenitic) and precipitation

hardening. Austenitic stainless steels are generously alloyed; they typically contain from 16-26% chromium and up to 35% nickel. Their crystal structure is face centered cubic (fcc) and they are not magnetic in the annealed condition. These materials work harden rapidly when cold worked and become ferromagnetic in the cold worked condition. Austenitic stainless steels produce good Charpy V-notch toughness values at subzero, and cryogenic, temperatures, but the values will decline for material in the cold worked condition and will vary by the amount of cold working. Corrosion resistance is dependent on many factors, including the in-service corrosive environment, however, the chromium and nickel contents largely dictate the alloy performance. Chromium in the range of 17-20% or higher increases the passivation properties of the material, which forms the protective film. Nickel stabilizes the austenite, but starts to decrease the resistance to stress corrosion cracking (SCC) up to the 8-10% range; beyond that the resistance to SCC starts to increase and peaks at about 30% nickel. Last, but not least, the elevated temperature properties of the austenitic grades are quite exemplary, as the higher chromium and nickel contents help improve creep resistance and prevent oxidation and scaling.

Ferritic stainless steels are basically chromium-bearing alloys and have a body centered cubic (bcc) crystal structure. These are ferromagnetic materials which exhibit good strength and ductility at room temperature, but have poor strength at elevated temperatures compared to the austenitic grades. Chromium content ranges from 10.5-30%. In the case of exhaust system, or muffler, grades, additions of titanium or niobium may be employed to stabilize the microstructure during the heating and cooling process. The 400 series of ferritic alloys is used extensively in the fabrication of exhaust system components, as they are less expensive than the austenitic grades, are quite formable and have good corrosion resistance.

Martensitic stainless steels are alloyed with chromium and carbon, and form a distorted body centered cubic (bcc) crystal structure when hardened. These materials are magnetic and resistant to only mildly corrosive environments. The chromium range of these alloys is normally 10.5-18% and the carbon may exceed 1.20%. The higher carbon contents are usually used for applications requiring high hardnesses, such as knife edges. Nickel may be added to impart extra corrosion resistance to the lower carbon grades, for applications such as blades and vanes in power generation equipment. The combination of nickel and molybdenum ensure the transformation to martensite and bolster the pitting resistance along with corrosion resistance.

Duplex stainless steels contain a mixed microstructure of bcc ferrite and fcc

austenite. These alloys normally contain an equal amount of each, although the exact amount of each phase is determined by composition and heat treatment. Chromium and nickel are the principal alloying agents, but elements such as nitrogen, molybdenum, copper and silicon may be added for composition control and corrosion resistance. Duplex stainless steels have higher tensile and yield strengths than the austenitic types, as well as improved resistance to stress corrosion cracking. The higher strength levels also provide greater resistance to distortion during welding. The toughness of these materials is between that of the austenitic and ferritic types.

Precipitation hardening stainless steels are principally alloyed with chromium and nickel and contain precipitation hardening elements such as copper, aluminum or titanium. In the annealed condition, these grades may be either austenitic or martensitic. The annealed, austenitic microstructures can be transformed to martensite by conditioning heat treatments, sometimes at subzero temperatures. In most cases, these alloys attain high strength by precipitation hardening of the martensitic phase.

### Note about Stainless Steel Classifications

In early 2010 AWS issued a revised specification for cored stainless steel electrodes. This new edition of AWS A5.22 now includes classifications for both flux cored and metal cored electrodes. Metal cored electrodes were formerly classified under AWS A5.9, but they will not appear in the next edition of AWS A5.9. During the transition to this new specification, Select-Arc will list both specifications on its metal cored product descriptions and labels. There has been no change in the requirements of the classifications or in the Select-Arc formulations.



## AUSTENITIC Flat and Horizontal, Flux Cored

### SelectAlloy 308L

**CLASSIFICATIONS:** E308LT0-1, E308LT0-4 per AWS A5.22. (Also meets E308T0-1, E308T0-4 per AWS A5.22)

**APPROVAL:** CWB E308LT0-1/4 (CO<sub>2</sub>/C25)

This gas-shielded, flux cored, stainless steel electrode has a nominal weld metal composition of 20% chromium, 10% nickel and a maximum carbon content of 0.04%. SelectAlloy 308L's low carbon minimizes carbide precipitation and makes it more resistant to intergranular corrosion.

**APPLICATIONS:** SelectAlloy 308L is used in welded components in the chemical, paper, pharmaceutical and textile industries. It may be used to weld 301, 302, 304L, 308 and 308L stainless steel. Types 321 and 347 may also be welded as long as the service temperature does not exceed 500°F.

**DIAMETERS:** .035", .045", 1/16", 5/64", 3/32"

**SHIELDING GASES:** 100% CO<sub>2</sub>, 75-80% Ar/balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** Flat and Horizontal



**CHARACTERISTICS:**

- Produces finely rippled, even and well washed bead.
- Smooth arc transfer with minimal spatter.
- Freely peeling slag minimizes cleanup time.

**TYPICAL MECHANICAL PROPERTIES:**

	CO <sub>2</sub> *
Ultimate Tensile Strength (psi)	82,300
Yield Strength (psi)	58,700
Percent Elongation	38

\*Strength levels may be slightly higher with Ar/20-25% CO<sub>2</sub>

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	Si	Ni	Cr	N
CO <sub>2</sub>	.03	1.22	.63	10.40	20.10	.05

Ferrite Number (WRC, 1992) - 9

### SelectAlloy 308L CRYO

**CLASSIFICATION:** E308LT0-4 per AWS A5.22

Composed of 19% chromium, 10% nickel and a maximum carbon content of 0.04%, SelectAlloy 308L CRYO is a gas-shielded, flux cored, stainless steel electrode designed for cryogenic applications where good weld metal toughness is required.

**APPLICATIONS:** SelectAlloy 308L CRYO is utilized in the fabrication and repair of cryogenic components which require weld metal toughness at liquid nitrogen temperatures (-320°F).

**DIAMETERS:** .035", .045", 1/16"

**SHIELDING GAS:** 75-80% Ar/balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** Flat and Horizontal



**CHARACTERISTICS:**

- Produces a finely rippled, even and well washed bead.
- Arc transfer is smooth with minimal spatter.
- Slag peels freely.

**TYPICAL MECHANICAL PROPERTIES:**

	75% Ar/25% CO <sub>2</sub>
Ultimate Tensile Strength (psi)	79,800
Yield Strength (psi)	51,100
Percent Elongation	49
CVN@ -320°F (ft•lbs f)	23
Lateral Expansion @ -320°F (mils)	21

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	Si	Ni	Cr	N
75Ar/CO <sub>2</sub>	.02	1.50	.70	10.50	18.70	.05

Ferrite Number (WRC, 1992) - 4

### SelectAlloy 309L

**CLASSIFICATIONS:** E309LT0-1, E309LT0-4 per AWS A5.22. (Also meets E309T0-1, E309T0-4 per AWS A5.22)

**APPROVAL:** CWB E309LT0-1/4 (CO<sub>2</sub>/C25)

SelectAlloy 309L is a gas-shielded, flux cored, stainless steel electrode with a nominal weld composition of 24% chromium, 13% nickel and a maximum carbon content of 0.04%. Carbide precipitation is minimized and the weld metal more resistant to intergranular corrosion due to the wire's low carbon content.

**APPLICATIONS:** The welding of refinery and chemical processing equipment and furnace and auto exhaust parts is ideal for SelectAlloy 309L. This electrode is used to weld Type 309 stainless steel, to join carbon and low alloy steels to austenitic stainless steels, to weld 304 clad sheets and for the first layer cladding of carbon steel.

**DIAMETERS:** .035", .045", 1/16", 5/64", 3/32"

**SHIELDING GASES:** 100% CO<sub>2</sub>, 75-80% Ar/balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** Flat and Horizontal



**CHARACTERISTICS:**

- Smooth arc transfer with minimal spatter.
- Produces finely rippled, even and well washed bead.
- Minimizes cleanup time due to freely peeling slag.

**TYPICAL MECHANICAL PROPERTIES:**

	CO <sub>2</sub> *
Ultimate Tensile Strength (psi)	88,000
Yield Strength (psi)	69,200
Percent Elongation	32

\*Strength levels may be slightly higher with Ar/20-25% CO<sub>2</sub>

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	Si	Ni	Cr	N
CO <sub>2</sub>	.03	1.00	.67	13.20	24.60	.05

Ferrite Number (WRC, 1992) - 19

## SelectAlloy 312

**CLASSIFICATIONS:** E312T0-1, E312T0-4 per AWS A5.22

A gas-shielded, flux cored, stainless steel electrode, SelectAlloy 312 has a nominal weld metal composition of 30% chromium, 9% nickel and 0.1% carbon. This wire produces a two-phase weld metal with substantial ferrite in an austenitic matrix. The high level of ferrite makes the weld metal very resistant to cracking, even when highly diluted.

**APPLICATIONS:** SelectAlloy 312 is designed for the welding of dissimilar metals such as the joining of carbon steels to stainless steels high in nickel.

**DIAMETERS:** .035", .045", 1/16"

**SHIELDING GASES:** 100% CO<sub>2</sub>, 75-80% Ar/balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Provides a finely rippled, even and well washed bead.
- Delivers a smooth arc transfer with minimal spatter.
- Freely peeling slag minimizes cleanup time.

**TYPICAL MECHANICAL PROPERTIES:**

	CO <sub>2</sub> *
Ultimate Tensile Strength (psi)	117,000
Yield Strength (psi)	89,300
Percent Elongation	24

\*Strength levels may be slightly higher with Ar/20-25% CO<sub>2</sub>

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	Si	Cr	Ni	N
CO <sub>2</sub>	.09	1.00	.70	29.40	9.00	.05

Ferrite Number (WRC, 1992) - 65

## SelectAlloy 316L

**CLASSIFICATIONS:** E316LT0-1, E316LT0-4 per AWS A5.22. (Also meets E316T0-1, E316T0-4 per AWS A5.22)

**APPROVALS:** CWB E316LT0-1/4 (CO<sub>2</sub>/C25), ABS E316LT0-1, E316LT0-4

This gas-shielded, flux cored, stainless steel electrode is composed of 19% chromium, 12.5% nickel, 2.5% molybdenum and no more than 0.04% carbon. The molybdenum in SelectAlloy 316L improves resistance to pitting and provides increased creep resistance. Its low carbon content minimizes carbide precipitation and resists intergranular corrosion.

**APPLICATIONS:** SelectAlloy 316L finds wide usage in the pulp and paper industry, chemical and textile processing equipment, furnace parts and parts exposed to marine environments. It is used to weld Type 316 stainless and other similar alloys, such as ASTM A743 and A744, and Types CF-8M and CF-3M.

**DIAMETERS:** .035", .045", 1/16", 5/64", 3/32"

**SHIELDING GASES:** 100% CO<sub>2</sub>, 75-80% Ar/balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- A smooth arc transfer with minimal spatter.
- Produces a finely rippled, well washed bead.
- Handles marine environments.
- Minimizes cleanup time.

**TYPICAL MECHANICAL PROPERTIES:**

	CO <sub>2</sub> *
Ultimate Tensile Strength (psi)	82,000
Yield Strength (psi)	64,000
Percent Elongation	39

\*Strength levels will be slightly higher with Ar/20-25% CO<sub>2</sub>

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	Si	Ni	Cr	Mo	N
CO <sub>2</sub>	.03	1.02	.66	12.90	19.20	2.50	.05

Ferrite Number (WRC, 1992) - 6

## SelectAlloy 316L CRYO

**CLASSIFICATION:** E316LT0-4 per AWS A5.22

SelectAlloy 316L CRYO is a gas-shielded, flux cored, stainless steel electrode with a nominal weld metal composition of 18% chromium, 12.5% nickel, 2.5% molybdenum and a maximum carbon content of 0.04%. This wire is designed for cryogenic applications where good weld metal toughness is needed.

**APPLICATIONS:** SelectAlloy 316L CRYO is used in the fabrication and repair of cryogenic components in applications which require weld metal toughness at liquid nitrogen temperatures (-320°F).

**DIAMETERS:** .035", .045", 1/16"

**SHIELDING GAS:** 75-80% Ar/balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Produces a finely rippled, even and well washed bead.
- The arc transfer is smooth with minimal spatter.
- Cleanup is minimized due to the freely peeling slag.

**TYPICAL MECHANICAL PROPERTIES:**

	75% Ar/25% CO <sub>2</sub>
Ultimate Tensile Strength (psi)	82,000
Yield Strength (psi)	56,000
Percent Elongation	46
CVN@ -320°F (ft•lbs f)	21
Lateral Expansion @ -320°F (mils)	17

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	Si	Ni	Cr	Mo	N
75Ar/	.02	1.20	.70	12.00	17.90	2.40	.05
25CO <sub>2</sub>							

Ferrite Number (WRC, 1992) - 4

**AUSTENITIC**  
Flat and Horizontal,  
Flux Cored

**SelectAlloy 317L**

**CLASSIFICATIONS:** E317LT0-1, E317LT0-4 per AWS A5.22 (Also meets E317T0-1, E317T0-4 per AWS A5.22)

This gas-shielded, flux cored, stainless steel electrode offers a nominal weld metal composition of 19.5% chromium, 13% nickel, 3.5% molybdenum and a maximum carbon content of 0.04%. The higher level of molybdenum in SelectAlloy 317L improves resistance to pitting and provides increased creep resistance. Its low carbon content minimizes carbide precipitation and makes it more resistant to intergranular corrosion.

**APPLICATIONS:** SelectAlloy 317L delivers improved pitting resistance compared to 316L and is an excellent choice for applications involving solutions of sulfuric acid and sulfur bearing gases. Utilized to weld Types 316 and 317 stainless, SelectAlloy 317L finds wide application in the pulp and paper industry as well as in food and pharmaceutical processing equipment.

**DIAMETERS:** .035", .045", 1/16"

**SHIELDING GASES:** 100% CO<sub>2</sub>, 75-80% Ar/balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** Flat and Horizontal



**CHARACTERISTICS:**

- Provides improved pitting resistance.
- Increases creep resistance.
- Produces a smooth arc transfer with minimum spatter.
- Easy peeling slag reduces cleanup time.

**TYPICAL MECHANICAL PROPERTIES:**

	CO <sub>2</sub> *
Ultimate Tensile Strength (psi)	89,000
Yield Strength (psi)	68,000
Percent Elongation	33

\*Strength levels will be slightly higher with Ar/20-25% CO<sub>2</sub>

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	Si	Ni	Cr	Mo	N
CO <sub>2</sub>	.03	1.02	.62	12.70	19.50	3.30	.05

Ferrite Number (WRC, 1992) - 9

**AUSTENITIC**  
All Position, Flux Cored

**SelectAlloy 16-8-2-AP**

**CLASSIFICATION:** None available (meets EC 16-8-2 chemistry requirements of AWS A5.22)

A gas-shielded, flux cored, stainless steel electrode, SelectAlloy 16-8-2-AP is composed of 15.5% chromium, 8.5% nickel and 1.5% molybdenum.

**APPLICATIONS:** This electrode may be used to weld 16-8-2, 316 and 347 grades of stainless steel in high temperature piping systems. Due to its good hot ductility properties, SelectAlloy 16-8-2-AP is well suited for welding cat crackers, furnace parts and components utilized in the petrochemical, chemical processing and power generation industries.

**DIAMETERS:** .035", .045", 1/16"

**SHIELDING GASES:** 100% CO<sub>2</sub>, 75-80% Ar/20-25% CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** All positions



**CHARACTERISTICS:**

- Outstanding all position performance.
- Excellent slag peeling minimizes cleanup
- Very low spatter.
- Flat, well washed beads achieved with minimal weaving.

**TYPICAL MECHANICAL PROPERTIES:**

	CO <sub>2</sub> *
Ultimate Tensile Strength (psi)	86,000
Yield Strength (psi)	56,000
Percent Elongation	38

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	Si	Ni	Cr	Mo
CO <sub>2</sub>	.03	1.50	.70	8.50	15.50	1.50

Ferrite Number (WRC, 1992) - 3

**SelectAlloy 347**

**CLASSIFICATIONS:** E347T0-1, E347T0-4 per AWS A5.22

SelectAlloy 347 has a nominal weld metal composition of 19.50% chromium, 10% nickel and 0.6% columbium. This gas-shielded, flux cored, stainless steel electrode's columbium content forms a stable carbide, which reduces chromium carbide precipitation and makes the weld metal more resistant to intergranular corrosion.

**APPLICATIONS:** Used to weld Types 321, 347 and 348 stainless steel, SelectAlloy 347 welds furnace parts, pressure vessels, chemical tanks and automotive parts.

**DIAMETERS:** .035", .045", 1/16"

**SHIELDING GASES:** 100% CO<sub>2</sub>, 75-80% Ar/balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** Flat and Horizontal



**CHARACTERISTICS:**

- Produces a finely rippled, even and well washed bead.
- Freely peeling slag reduces cleanup time.
- Smooth arc transfer with minimal spatter.

**TYPICAL MECHANICAL PROPERTIES:**

	CO <sub>2</sub> *
Ultimate Tensile Strength (psi)	89,000
Yield Strength (psi)	61,000
Percent Elongation	36

\*Strength levels will be slightly higher with Ar/20-25% CO<sub>2</sub>

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	Si	Ni	Cr	N	Cb
CO <sub>2</sub>	.05	1.00	.70	10.20	19.90	.05	.70

Ferrite Number (WRC, 1992) - 8

## SelectAlloy 307-AP

**CLASSIFICATIONS:** E307T1-1, E307T1-4 per AWS A5.22

SelectAlloy 307-AP is a gas-shielded, flux cored, stainless steel electrode which is composed of a nominal weld metal of 19% chromium, 10% nickel, 4% manganese, 1% molybdenum and a carbon content of 0.08%. This wire's relatively high manganese content helps reduce the chance of weld metal cracking in dissimilar metal welding.

**APPLICATIONS:** SelectAlloy 307-AP is an excellent choice for joining difficult-to-weld steels, such as armor plate and hardenable steels, and for dissimilar metal joints, such as austenitic manganese steels to carbon steel forgings and castings.

**DIAMETERS:** .035", .045", 1/16"

**SHIELDING GASES:** 100% CO<sub>2</sub>, 75-80% Ar/ balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** All positions



### CHARACTERISTICS:

- Delivers superb performance characteristics in all positions.
- Spatter is low and slag peeling is easy.
- Achieves flat, well-washed beads with minimal weaving.

### TYPICAL MECHANICAL PROPERTIES:

	CO <sub>2</sub> *
Ultimate Tensile Strength (psi)	90,000
Yield Strength (psi)	59,000
Percent Elongation	39

\*Strength levels may be slightly higher with Ar/20-25% CO<sub>2</sub>

### TYPICAL DEPOSIT COMPOSITION:

Wt%	C	Mn	Si	Ni	Cr	Mo	N
CO <sub>2</sub>	.07	4.20	.70	10.0	19.40	1.10	.05

Ferrite Number (WRC, 1992) - 6

Select-Arc all position electrodes do not contain bismuth.

## SelectAlloy 308H-AP

**CLASSIFICATIONS:** E308HT1-1, E308HT1-4 per AWS A5.22. (Also meets E308T1-1, E308T1-4 per AWS A5.22)

SelectAlloy 308H-AP is a gas-shielded, flux cored, all position, stainless steel electrode with a nominal weld metal composition of 20% chromium, 10% nickel and a carbon content of .04-.08%. The higher carbon in this alloy makes it well suited for higher temperature use.

**APPLICATIONS:** SelectAlloy 308H-AP is utilized in the welding of components for the petrochemical industry. It may also be used to weld 304H and 347H.

**DIAMETERS:** .035", .045", 1/16"

**SHIELDING GASES:** 100% CO<sub>2</sub>, 75-80% Ar/balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** All positions



### CHARACTERISTICS:

- Superb all position performance qualities.
- Achieves flat, well washed beads with minimal weaving.
- Spatter is very low.
- Excellent slag peeling minimizes cleanup.

### TYPICAL MECHANICAL PROPERTIES:

	CO <sub>2</sub> *
Ultimate Tensile Strength (psi)	87,000
Yield Strength (psi)	64,500
Percent Elongation	42

\* Strength levels will be slightly higher with Ar/20-25% CO<sub>2</sub>

### TYPICAL DEPOSIT COMPOSITION:

Wt%	C	Mn	Si	Ni	Cr	N
CO <sub>2</sub>	.06	1.22	.67	10.40	20.30	.05

Ferrite Number (WRC, 1992) - 5

Select-Arc all position electrodes do not contain bismuth.

## SelectAlloy 308L-AP

**CLASSIFICATIONS:** E308LT1-1, E308LT1-4 per AWS A5.22. (Also meets E308T1-1, E308T1-4 per AWS A5.22)

**APPROVALS:** ABS E308LT1-1, E308LT1-4, CWB E308LT1-1/4, DNV NV308L (CO<sub>2</sub>)

SelectAlloy 308L-AP is a gas-shielded, flux cored, stainless steel electrode with a nominal weld metal composition of 20% chromium, 10% nickel and a maximum carbon content of 0.04%. The low carbon in this alloy minimizes carbide precipitation and makes it more resistant to intergranular corrosion.

**APPLICATIONS:** SelectAlloy 308L-AP finds wide application in the welding of components for the chemical, paper, textile and pharmaceutical industries. This wire may also be used to weld 301, 302, 304L, 308 and 308L stainless steel. Types 321 and 347 may also be welded as long as the service temperature does not exceed 500°F.

**DIAMETERS:** .035", .045", 1/16"

**SHIELDING GASES:** 100% CO<sub>2</sub>, 75-80% Ar/balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** All positions



### CHARACTERISTICS:

- Superb all position performance.
- Very low spatter.
- Excellent slag peeling minimizes cleanup.

### TYPICAL MECHANICAL PROPERTIES:

	CO <sub>2</sub> *
Ultimate Tensile Strength (psi)	83,000
Yield Strength (psi)	60,000
Percent Elongation	38

\* Strength levels will be slightly higher with Ar/20-25% CO<sub>2</sub>

### TYPICAL DEPOSIT COMPOSITION:

Wt%	C	Mn	Si	Ni	Cr	N
CO <sub>2</sub>	.03	1.22	.87	10.70	20.30	.05

Ferrite Number (WRC, 1992) - 9

Select-Arc all position electrodes do not contain bismuth.



## AUSTENITIC All Position, Flux Cored

### SelectAlloy 308L-AP CRYO

**CLASSIFICATION:** E308LT1-4 per AWS A5.22

SelectAlloy 308L-AP CRYO is a gas-shielded, flux cored, stainless steel electrode with a nominal weld metal composition of 18.5% chromium, 10% nickel and a maximum carbon content of 0.04%. It is designed for cryogenic applications where good weld metal toughness is required.

**APPLICATIONS:** SelectAlloy 308L-AP CRYO is utilized in the fabrication and repair of cryogenic components that require weld metal toughness at liquid nitrogen temperatures (-320°F).

**DIAMETERS:** .035", .045", 1/16"

**SHIELDING GAS:** Ar/20-25% CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** All positions



**CHARACTERISTICS:**

- Provides superb, all position performance characteristics.
- Achieves flat, well washed beads with minimal weaving.
- Produces very low spatter and excellent slag peeling.

**TYPICAL MECHANICAL PROPERTIES:**

	75% Ar/25% CO <sub>2</sub>					
Ultimate Tensile Strength (psi)	86,000					
Yield Strength (psi)	59,000					
Percent Elongation	50					
CVN (ft•lb f) @ -320°F	28					
Lateral Expansion @ -320°F (mils)	24					

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	Si	Cr	Ni	N
75Ar/25CO <sub>2</sub>	.03	1.20	.80	18.40	10.50	.05

Ferrite Number (WRC, 1992) - 3

Select-Arc all position electrodes do not contain bismuth.

### SelectAlloy 309H-AP

**CLASSIFICATIONS:** E309T1-1, E309T1-4 per AWS A5.22

SelectAlloy 309H-AP is a gas-shielded, flux cored, stainless steel electrode with a nominal weld metal composition of 24% chromium and 13% nickel with a carbon content of .04-.08%. The higher carbon in this all position alloy wire makes it suitable for higher temperature use.

**APPLICATIONS:** SelectAlloy 309H-AP is utilized to weld type 309 stainless steel where higher temperature strength is required. This electrode may also be used to join carbon and low alloy steels to austenitic stainless steels. SelectAlloy 309H-AP is well suited for refinery and chemical processing equipment welding.

**DIAMETERS:** .035", .045", 1/16"

**SHIELDING GASES:** 100% CO<sub>2</sub>, 75-80% Ar/ balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** All positions



**CHARACTERISTICS:**

- Superb all position performance.
- Achieves flat, well-washed beads with minimal weaving.
- Very low spatter with excellent slag peeling.
- Designed for high temperature use.

**TYPICAL MECHANICAL PROPERTIES:**

	CO <sub>2</sub> *					
Ultimate Tensile Strength (psi)	89,100					
Yield Strength (psi)	69,800					
Percent Elongation	35					

\*Strength levels will be slightly higher with Ar/20-25% CO<sub>2</sub>

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	Si	Ni	Cr	N
CO <sub>2</sub>	.07	1.20	.80	12.60	23.80	.05

Ferrite Number (WRC, 1992) - 9

Select-Arc all position electrodes do not contain bismuth.

### SelectAlloy 309L-AP

**CLASSIFICATIONS:** E309LT1-1, E309LT1-4 per AWS A5.22. (Also meets E309T1-1, E309T1-4 per AWS A5.22)

**APPROVALS:** ABS E309LT1-1, E309LT1-4, CWB E309LT1-1/4, DNV NV309L (CO<sub>2</sub>)

This all position electrode has a nominal weld metal composition of 24% chromium, 13% nickel and a maximum carbon content of 0.04%. SelectAlloy 309L-AP minimizes carbide precipitation and makes the weld metal more resistant to intergranular corrosion because of its low carbon content.

**APPLICATIONS:** SelectAlloy 309L-AP is utilized in welding refinery and chemical processing equipment as well as furnace and auto exhaust parts. It welds Type 309 stainless steel, joins carbon and low alloy steels and welds 304 clad sheets as well as the first layer cladding of carbon steel.

**DIAMETERS:** .035", .045", 1/16"

**SHIELDING GASES:** 100% CO<sub>2</sub>, 75-80% Ar/ balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** All positions



**CHARACTERISTICS:**

- Superb all position performance.
- Produces flat, well washed bead with minimal weaving.
- Very low spatter.
- Excellent slag peeling.

**TYPICAL MECHANICAL PROPERTIES:**

	CO <sub>2</sub> *					
Ultimate Tensile Strength (psi)	85,100					
Yield Strength (psi)	66,900					
Percent Elongation	38					

\*Strength levels will be slightly higher with Ar/20-25% CO<sub>2</sub>

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	Si	Ni	Cr	N
CO <sub>2</sub>	.03	.95	.80	12.50	24.20	.05

Ferrite Number (WRC, 1992) - 18

Select-Arc all position electrodes do not contain bismuth.

## SelectAlloy 309LCb-AP

**CLASSIFICATIONS:** E309LCbT1-1, E309LCbT1-4 per AWS A5.22

This all position, gas-shielded, flux cored electrode has a nominal weld metal composition of 23.5% chromium, 13% nickel, .8% columbium and a maximum carbon content of .04%. The columbium in SelectAlloy 309LCb-AP forms a stable carbide and makes the weld metal more resistant to intergranular corrosion.

**APPLICATIONS:** SelectAlloy 309LCb-AP is used to overlay carbon and low alloy steel. This electrode will produce a columbium stabilized first layer.

**DIAMETERS:** .035", .045", 1/16"

**SHIELDING GASES:** 100% CO<sub>2</sub>, 75-80% Ar/ balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** All positions



**CHARACTERISTICS:**

- Spatter is very low.
- Reduces cleanup time due to outstanding slag peeling.
- Minimal weaving required due to flat, well-washed beads.
- Resists intergranular corrosion.

**TYPICAL MECHANICAL PROPERTIES:**

	CO <sub>2</sub> *
Ultimate Tensile Strength (psi)	88,100
Yield Strength (psi)	59,900
Percent Elongation	34

\*Strength levels will be slightly higher with Ar/20-25% CO<sub>2</sub>

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	Si	Ni	Cr	N	Cb
CO <sub>2</sub>	.03	1.10	.80	12.30	23.60	.05	.80

Ferrite Number (WRC, 1992) - 15

Select-Arc all position electrodes do not contain bismuth.

## SelectAlloy 309LMo-AP

**CLASSIFICATIONS:** E309LMoT1-1, E309LMoT1-4 per AWS A5.22.

This gas-shielded, flux cored, all position, stainless steel electrode is nominally composed of 23% chromium, 13% nickel, 2.5% molybdenum and a maximum carbon content of .04%. The molybdenum provides increased resistance to pitting corrosion. The low carbon minimizes carbide precipitation and makes the weld metal more resistant to intergranular corrosion.

**APPLICATIONS:** SelectAlloy 309LMo-AP is designed for welding in the pulp and paper industry, chemical processing equipment and food and beverage equipment. It is used to join carbon and low alloy steels to molybdenum-containing austenitic stainless steels, for root passes in cladding applications and to join difficult-to-weld or dissimilar steels.

**DIAMETERS:** .035", .045", 1/16"

**SHIELDING GASES:** 100% CO<sub>2</sub>, 75-80% Ar/balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** All positions



**CHARACTERISTICS:**

- Achieves flat, well washed beads with minimal weaving.
- Produces very low spatter.
- Outstanding slag peeling reduces cleanup time.
- Exceptional all position performance.

**TYPICAL MECHANICAL PROPERTIES:**

	CO <sub>2</sub> *
Ultimate Tensile Strength (psi)	95,100
Yield Strength (psi)	72,000
Percent Elongation	34

\*Strength levels will be slightly higher with Ar/20-25% CO<sub>2</sub>

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	Si	Ni	Cr	Mo	N
CO <sub>2</sub>	.03	.95	.70	13.00	22.50	2.40	.05

Ferrite Number (WRC, 1992) - 18

Select-Arc all position electrodes do not contain bismuth.

## SelectAlloy 312-AP

**CLASSIFICATIONS:** E312T1-1, E312T1-4 per AWS A5.22

SelectAlloy 312-AP is a flux cored, stainless steel electrode designed with a weld metal composition of 30% chromium, 9% nickel and 0.1% carbon. This wire produces a two-phase weld metal with substantial ferrite in an austenitic matrix.

**APPLICATIONS:** SelectAlloy 312-AP is used for the welding of dissimilar metals, such as the joining of carbon steels to stainless steels high in nickel.

**DIAMETERS:** .035", .045", 1/16"

**SHIELDING GASES:** 100% CO<sub>2</sub>, 75-80% Ar/ balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** All positions



**CHARACTERISTICS:**

- High level of ferrite makes the weld metal very resistant to cracking, even when highly diluted.
- Superb all position electrode performance.
- Flat, well washed beads with minimal weaving.
- Spatter is very low.
- Slag peeling is excellent.

**TYPICAL MECHANICAL PROPERTIES:**

	CO <sub>2</sub> *
Ultimate Tensile Strength (psi)	114,000
Yield Strength (psi)	90,000
Percent Elongation	25

\*Strength levels will be slightly higher with Ar/20-25% CO<sub>2</sub>

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	Si	Ni	Cr	N
CO <sub>2</sub>	.10	.80	.70	8.70	29.50	.05

Ferrite Number (WRC, 1992) - 60

Select-Arc all position electrodes do not contain bismuth.

## AUSTENITIC All Position, Flux Cored

### SelectArc 316H-AP

**CLASSIFICATIONS:** E316HT1-1, E316HT1-4 per AWS A5.22 (Also meets E316T1-1, E316T1-4 per AWS 5.22)

This flux cored, stainless steel electrode has a nominal weld metal composition of 19% chromium, 12% nickel, 2.5% molybdenum and a carbon content of .04-.08%. The higher carbon content improves the elevated temperature strength. The presence of molybdenum augments resistance to pitting while providing increased creep resistance.

**APPLICATIONS:** SelectArc 316H-AP finds application in the pulp and paper industry, chemical and textile processing equipment, furnace parts and in parts exposed to marine environments. It is used to weld Type 316H stainless steel.

**DIAMETERS:** .035", .045", 1/16"

**SHIELDING GASES:** 100% CO<sub>2</sub>, 75-80% Ar/ balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** All positions



**CHARACTERISTICS:**

- Outstanding all position performance.
- Spatter is very low.
- Flat, well washed beads with minimal weaving.
- Excellent slag peeling reduces cleanup.

**TYPICAL MECHANICAL PROPERTIES:**

	CO <sub>2</sub> *
Ultimate Tensile Strength (psi)	84,000
Yield Strength (psi)	66,000
Percent Elongation	36

\*Strength levels will be slightly higher with Ar/20-25% CO<sub>2</sub>

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	Si	Ni	Cr	Mo	N
CO <sub>2</sub>	.06	1.35	.80	11.80	18.90	2.50	.05

Ferrite Number (WRC, 1992) - 4

Select-Arc all position electrodes do not contain bismuth.

### SelectArc 316L-AP

**CLASSIFICATIONS:** E316LT1-1, E316LT1-4 per AWS A5.22. (Also meets E316T1-1, E316T1-4 per AWS 5.22)

**APPROVALS:** ABS E316LT1-1, E316LT1-4, CWB E316LT1-1/4, DNV NV316L (CO<sub>2</sub>)

SelectArc 316L-AP is an all position electrode composed of 19% chromium, 12.5% nickel, 2.5% molybdenum and a maximum of 0.04% carbon. The molybdenum improves pitting resistance and provides increased creep resistance. The low carbon minimizes carbide precipitation which helps resist intergranular corrosion.

**APPLICATIONS:** SelectArc 316L-AP is utilized to weld Type 316 stainless and other similar alloys, such as ASTM A743 and A744, as well as Types CF-8M and CF-3M. It has broad applications in pulp and paper, textile and chemical processing equipment, furnace parts and parts exposed to marine environments.

**DIAMETERS:** .035", .045", 1/16"

**SHIELDING GASES:** 100% CO<sub>2</sub>, 75-80% Ar/balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** All positions



**CHARACTERISTICS:**

- Superb all position performance.
- Outstanding marine environment electrode.
- Excellent slag peeling and very low spatter.
- Produces minimal weaving.

**TYPICAL MECHANICAL PROPERTIES:**

	CO <sub>2</sub> *
Ultimate Tensile Strength (psi)	81,000
Yield Strength (psi)	63,000
Percent Elongation	39

\*Strength levels will be slightly higher with Ar/20-25% CO<sub>2</sub>

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	Si	Ni	Cr	Mo	N
CO <sub>2</sub>	.03	1.35	.80	12.30	18.90	2.50	.05

Ferrite Number (WRC, 1992) - 5

Select-Arc all position electrodes do not contain bismuth.

### SelectArc 316L-AP CRYO

**CLASSIFICATION:** E316LT1-4 per AWS A5.22

A gas-shielded, flux cored, stainless steel electrode, SelectArc 316L-AP CRYO has a nominal weld metal composition of 17.5% chromium, 13% nickel, 2.5% molybdenum and a maximum carbon content of 0.04%. This all position wire is designed for cryogenic applications where good weld metal toughness is needed.

**APPLICATIONS:** SelectArc 316L-AP CRYO is utilized in the fabrication and repair of cryogenic components which require weld metal toughness at liquid nitrogen temperatures (-320°F).

**DIAMETERS:** .035", .045", 1/16"

**SHIELDING GAS:** Argon/20-25% CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** All positions



**CHARACTERISTICS:**

- Superb performance characteristics in all positions.
- Very low spatter.
- Achieves flat, well washed beads with minimal weaving.
- Excellent slag peeling minimizes cleanup.

**TYPICAL MECHANICAL PROPERTIES:**

	75% Ar/25% CO <sub>2</sub>
Ultimate Tensile Strength (psi)	80,000
Yield Strength (psi)	57,000
Percent Elongation	45
CVN (ft•lb f) @ -320°F	27
Lateral Expansion @ -320°F (mils)	24
Hardness (HV10)	190

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	Si	Cr	Ni	Mo	N
75Ar/	.03	1.00	.60	17.50	12.90	2.50	.05
25CO <sub>2</sub>							

Ferrite Number (WRC, 1992) - 1

Select-Arc all position electrodes do not contain bismuth.

## SelectAlloy 317L-AP

**CLASSIFICATIONS:** E317LT1-1, E317LT1-4 per AWS A5.22 (Also meets E317T1-1, E317T1-4 per AWS A5.22)

This all position, stainless steel electrode has a nominal weld metal composition of 19.5% chromium, 13% nickel, 3.5% molybdenum and a maximum carbon content of .04%. SelectAlloy 317L-AP's higher level of molybdenum improves resistance to pitting and provides increased creep resistance.

**APPLICATIONS:** Containing a higher molybdenum content than 316L-AP gives SelectAlloy 317L-AP better resistance to pitting corrosion. This electrode offers excellent resistance to solutions of sulfuric acid and sulfur bearing gases. It is used to weld types 316 and 317 stainless. SelectAlloy 317L-AP is ideal for applications in the pulp and paper industry and for welding food and pharmaceutical equipment.

**DIAMETERS:** .035", .045", 1/16"

**SHIELDING GASES:** 100% CO<sub>2</sub>, 75-80% Ar/ balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** All positions



**CHARACTERISTICS:**

- Low carbon content minimizes carbide precipitation, maximizes resistance to intergranular corrosion.
- Resists pitting corrosion.
- Achieves flat, well-washed beads with minimal weaving.
- Produces very low spatter.
- Reduces cleanup due to exceptional slag peeling.

**TYPICAL MECHANICAL PROPERTIES:**

	CO <sub>2</sub> *
Ultimate Tensile Strength (psi)	90,000
Yield Strength (psi)	69,000
Percent Elongation	34

\*Strength levels will be slightly higher with Ar/20-25% CO<sub>2</sub>

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	Si	Ni	Cr	N	Mo
CO <sub>2</sub>	.03	.85	.75	12.50	18.90	.05	3.30

Ferrite Number (WRC, 1992) - 8

Select-Arc all position electrodes do not contain bismuth.

## SelectAlloy 347-AP

**CLASSIFICATIONS:** E347T1-1, E347T1-4 per AWS A5.22.

SelectAlloy 347-AP is a gas-shielded, flux cored, all position stainless steel electrode with a nominal weld metal composition of 19.5% chromium, 10% nickel and 0.5% columbium (niobium). The columbium forms a stable carbide which reduces chromium carbide precipitation and makes weld metal more resistant to intergranular corrosion.

**APPLICATIONS:** SelectAlloy 347-AP is utilized in the welding of furnace parts, pressure vessels, chemical tanks and automotive parts. It is also used to weld Types 321, 347 and 348 stainless steels.

**DIAMETERS:** .035", .045", 1/16"

**SHIELDING GASES:** 100% CO<sub>2</sub>, 75-80% Ar / balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** All positions



**CHARACTERISTICS:**

- Flat, well washed beads achieved with minimal weaving.
- Excellent slag peeling minimizes cleanup.
- Very low spatter.
- Outstanding all position performance.

**TYPICAL MECHANICAL PROPERTIES:**

	CO <sub>2</sub> *
Ultimate Tensile Strength (psi)	94,000
Yield Strength (psi)	63,000
Percent Elongation	35

\*Strength levels will be slightly higher with Ar/20-25% CO<sub>2</sub>

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	Si	Ni	Cr	N	Cb
CO <sub>2</sub>	.05	1.05	.70	10.10	19.60	.05	.55

Ferrite Number (WRC, 1992) - 8

Select-Arc all position electrodes do not contain bismuth.

## SelectAlloy 307T0-3

**CLASSIFICATION:** E307T0-3 per AWS A5.22

SelectAlloy 307T0-3 is a self-shielded, flux cored, stainless steel electrode designed with a nominal weld metal composition of less than 20.5% chromium, 10% nickel, 4% manganese and 1% molybdenum. The relatively high manganese content helps reduce the chances of weld metal cracking in dissimilar metal welding.

**APPLICATIONS:** Primarily used to weld armor plate, SelectAlloy 307T0-3 is also utilized to join carbon and low alloy steels to austenitic stainless steels and for the cladding of carbon steels.

**DIAMETERS:** .035", .045", 1/16", 3/32"

**SHIELDING GAS:** Self-shielded

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Ideal for surfacing or welding over gaps.
- Arc transfer is globular with low spatter.
- Produces a well washed bead.

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	Si	Ni	Cr	Mo	N*
	.10	4.20	.70	9.80	20.70	1.10	.10

Ferrite Number (WRC, 1992) - 4

\* The nitrogen levels in self-shielded stainless steel deposits can vary widely depending on the welding parameters used. Since nitrogen has a strong effect on the ferrite level (increasing nitrogen lowers the ferrite number), careful control of parameters is necessary to maintain ferrite levels.



## AUSTENITIC Self Shielded, Flux Cored

### Select Alloy 308LT0-3

**CLASSIFICATIONS:** E308LT0-3 per AWS A5.22 (Also meets E308T0-3 per AWS A5.22)

This self-shielded, flux cored, stainless steel electrode is designed with a nominal weld metal composition of 21% chromium and 10% nickel with a maximum carbon content of .03%. The low carbon in Select Alloy 308LT0-3 minimizes carbide precipitation and makes the weld metal more resistant to intergranular corrosion.

**APPLICATIONS:** Select Alloy 308LT0-3 is utilized for the cladding of carbon steels. This electrode may also be used to weld 301, 302, 304L, 308 and 308L stainless steel.

**DIAMETERS:** .035", .045", 1/16", 3/32"

**SHIELDING GAS:** Self-shielded

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Ideal for surfacing or welding over gaps.
- Arc transfer is globular with low spatter.
- Provides a flat, well washed bead.

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	Si	Ni	Cr	N*
	.03	1.10	.70	9.70	20.60	.10

Ferrite Number (WRC, 1992) - 7

\*The nitrogen levels in self-shielded stainless steel deposits can vary widely depending on the welding parameters used. Since nitrogen has a strong effect on the ferrite level (increasing nitrogen lowers the ferrite number) careful control of the parameters is necessary to maintain consistent ferrite levels.

### Select Alloy 309LT0-3

**CLASSIFICATIONS:** E309LT0-3 per AWS A5.22 (Also meets E309T0-3 per AWS A5.22)

This self-shielded, flux cored, stainless steel electrode has a nominal weld metal composition of 24% chromium and 13% nickel with a maximum carbon content of 0.03%. The low carbon maximizes carbide precipitation and makes the weld metal more resistant to intergranular corrosion.

**APPLICATIONS:** Select Alloy 309LT0-3 is utilized for the cladding of carbon steels. It may also be used to weld Type 309 stainless steel and to join carbon and low alloy steels to austenitic stainless steels.

**DIAMETERS:** .035", .045", 1/16", 3/32"

**SHIELDING GAS:** Self-shielded

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Produces an arc transfer that is globular, with low spatter.
- Well suited for surfacing or welding over gaps.
- Provides a flat, well washed bead.

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	Si	Ni	Cr	N*
	.03	1.10	.70	12.70	24.50	.10

Ferrite Number (WRC, 1992) - 13

\*The nitrogen levels in self-shielded stainless steel deposits can vary widely depending on the welding parameters used. Since nitrogen has a strong effect on the ferrite level (increasing nitrogen lowers the ferrite number), careful control of parameters is necessary to maintain consistent ferrite levels.

### Select Alloy 309T0-3

**CLASSIFICATION:** E309T0-3 per AWS A5.22

This lower cost, self-shielded, flux cored, stainless steel wire has a nominal weld metal composition of 24% chromium and 13% nickel with a maximum carbon content of 0.10%.

**APPLICATIONS:** Select Alloy 309T0-3 is used for the cladding of carbon steels, for the welding of Type 309 stainless steel and for the joining of carbon and low alloy steels to austenitic stainless steels where lower carbon levels are not required.

**DIAMETERS:** .045", 1/16", 3/32"

**SHIELDING GAS:** Self-shielded

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Produces a flat, well washed bead.
- Delivers an arc transfer that is globular with low spatter.
- Offers lower penetration than with gas-shielded wires, making it ideal for surfacing or welding over gaps.

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	Si	Ni	Cr	N*
	.04	1.30	.70	12.50	24.00	.10

Ferrite Number (WRC, 1992) - 10

\*The nitrogen levels in self-shielded stainless steel deposits can vary widely depending on the welding parameters used. Since nitrogen has a strong effect on the ferrite level (increasing nitrogen lowers the ferrite number), careful control of parameters is necessary to maintain consistent ferrite levels.

## SelectAlloy 316LT0-3

**CLASSIFICATIONS:** E316LT0-3 per AWS A5.22 (Also meets E316T0-3 per AWS A5.22)

SelectAlloy 316LT0-3 is a self-shielded, flux cored, stainless steel wire designed with a nominal weld metal composition of 19% chromium, 12.5% nickel, 2.5% molybdenum and a maximum carbon content of 0.03%. The presence of molybdenum improves resistance to pitting and provides increased creep resistance. In addition, the low carbon content minimizes carbide precipitation and makes it more resistant to intergranular corrosion.

**APPLICATIONS:** SelectAlloy 316LT0-3 is used to weld Type 316 stainless steel as well as for the cladding of carbon steels.

**DIAMETERS:** .035", .045", 1/16", 3/32"

**SHIELDING GAS:** Self-shielded

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Superb for surfacing or welding over gaps.
- Produces a flat, well washed bead.
- Provides a globular arc transfer with low spatter.

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	Si	Ni	Cr	Mo	N*
	.03	1.10	.70	12.30	19.20	2.50	.10

Ferrite Number (WRC, 1992) - 4

\*The nitrogen levels in self-shielded stainless steel deposits can vary widely depending on the welding parameters used. Since nitrogen has a strong effect on the ferrite level (increasing nitrogen lowers the ferrite number), careful control of parameters is necessary to maintain consistent ferrite levels.

## SelectAlloy 347T0-3

**CLASSIFICATION:** E347T0-3 per AWS A5.22

A self-shielded, flux cored, stainless steel electrode, SelectAlloy 347T0-3 has a nominal weld metal composition of 20% chromium, 10% nickel and 0.7% columbium. The columbium forms a stable carbide which reduces chromium carbide precipitation and makes the weld metal more resistant to intergranular corrosion.

**APPLICATIONS:** SelectAlloy 347T0-3 is designed to weld Types 321, 347 and 348 stainless steel. It may also be used for the cladding of carbon steels.

**DIAMETERS:** .035", .045", 1/16", 3/32"

**SHIELDING GAS:** Self-shielded

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Excellent for surfacing or welding over gaps.
- Produces a flat, well washed bead.
- Delivers a globular arc transfer with low spatter.

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	Si	Ni	Cr	Cb	N*
	.05	1.10	.70	10.00	20.00	.70	.10

Ferrite Number (WRC, 1992) - 5

\*The nitrogen levels in self-shielded stainless steel deposits can vary widely depending on the welding parameters used. Since nitrogen has a strong effect on the ferrite level (increasing nitrogen lowers the ferrite number), careful control of parameters is necessary to maintain consistent ferrite levels.

## SelectAlloy 16-8-2-C

**CLASSIFICATION:** EC16-8-2 (Also per AWS A5.9:2006)

SelectAlloy 16-8-2-C is a gas-shielded, metal cored, stainless steel electrode with a nominal composition of 15.5% chromium, 8.5% nickel and 1.5% molybdenum.

**APPLICATIONS:** SelectAlloy 16-8-2-C may be used to weld 16-8-2, 316 and 347 grades of stainless steel in high temperature piping systems. This electrode offers good ductility properties and is well suited for welding cat crackers, furnace parts and components used in the petrochemical, chemical processing and power generation industries. It is also ideally suited for making small butt, lap and fillet welds on thin material at elevated speeds.

**DIAMETERS:** .035", .045", 1/16"

**SHIELDING GASES:** Ar/1-2% O<sub>2</sub>, Ar/1-2% CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Operates with a smooth, spray arc transfer.
- Produces little or no slag and virtually no spatter.
- Delivers higher deposition rates and more controlled penetration than the equivalent solid wire.
- Runs at faster travel speeds.
- Handles poor fit-up better.

**TYPICAL MECHANICAL PROPERTIES:**

	98%Ar/2%O <sub>2</sub>
Ultimate Tensile Strength (psi)	88,600
Yield Strength (psi)	57,000
Percent Elongation	38

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	Si	Ni	Cr	Mo
98Ar/2O <sub>2</sub>	.03	1.60	.60	8.50	16.00	1.50

Ferrite Number (WRC, 1992) - 4

**SelectAlloy 307-C**

**CLASSIFICATION:** EC307 per AWS A5.22 (Also per AWS A5.9: 2006)

SelectAlloy 307-C is a composite, metal cored electrode for gas metal arc welding of stainless and certain types of other austenitic steels. The composite nature of this metal cored electrode provides higher deposition rates and faster travel speeds than those achieved by solid wires.

**APPLICATIONS:** SelectAlloy 307-C is a superb choice for joining austenitic stainless to ferritic stainless or carbon steel, ferritic to ferritic stainless or other dissimilar metals. This electrode is widely utilized in welding automotive exhaust systems as well as armor plate, austenitic manganese steel, dissimilar steels and as a buttering layer prior to hardsurfacing.

**DIAMETERS:** .035", .045", 1/16"

**SHIELDING GASES:** Ar/1-2% O<sub>2</sub>, Ar/1-2% CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Quite resistant to hot cracking.
- Stable arc transfer transitions easily to spray.
- Higher deposition rates and faster travel speeds than solid wire.
- Bridges gaps and poor fit up areas well.

**TYPICAL MECHANICAL PROPERTIES:**

	98%Ar/2%O <sub>2</sub>				
Ultimate Tensile Strength (psi)	94,000				
Yield Strength (psi)	68,000				
Percent Elongation	40				

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si
98Ar/2O <sub>2</sub>	.09	4.50	.010	.008	.60
	Ni	Cr	Mo	Cu	
	9.40	20.50	1.10	.24	

Ferrite Number (WRC, 1992) - 12

**SelectAlloy 307EU-C**

**CLASSIFICATION:** No AWS class. Conforms to European Standard EN12073, Class T 18 8 Mn M M.

Designed to provide higher deposition rates and faster travel speeds than solid electrodes, the composite, metal cored SelectAlloy 307EU-C is intended for the gas metal arc welding of stainless and certain types of other austenitic steels. This wire may also be used to weld armor steels and ferritic stainless steels in certain applications.

**APPLICATIONS:** SelectAlloy 307EU-C is an excellent choice for welding automotive exhaust systems, especially when joining austenitic stainless to ferritic stainless or carbon steel, ferritic to ferritic stainless or other dissimilar metals within the exhaust system. European auto manufacturers often specify Type 307 to this specification.

**DIAMETERS:** .035", .045", 1/16"

**SHIELDING GASES:** Ar/1-2% O<sub>2</sub>, Ar/1-2% CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Resists hot cracking.
- Consistent deposit composition due to even distribution of core ingredients.
- Higher deposition rates and faster travel speeds than solid wire.
- Stable arc transfer transitions easily to spray.
- Bridges gaps and poor fit up areas well.

**TYPICAL MECHANICAL PROPERTIES:**

	98%Ar/2%O <sub>2</sub>				
Ultimate Tensile Strength (psi)	93,000				
Yield Strength (psi)	65,400				
Percent Elongation	40				

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si
98Ar/2O <sub>2</sub>	.08	7.20	.010	.008	.70
	Ni	Cr	Mo		
	8.00	19.00	.20		

Ferrite Number (WRC, 1992) - 5

**SelectAlloy 308L-C**

**CLASSIFICATIONS:** EC308 and EC308L per AWS A5.22 (Also per AWS A5.9: 2006)

**APPROVAL:** CWB EC308L

A gas-shielded, metal cored, stainless steel electrode, SelectAlloy 308L-C provides a nominal weld composition of 21% chromium, 10% nickel and a maximum carbon content of 0.03% to minimize carbide precipitation and resist intergranular corrosion.

**APPLICATIONS:** SelectAlloy 308L-C is ideally suited for making small butt, lap and fillet welds on thin material at elevated travel speeds. It may be used to weld 301, 302, 304L, 308 and 308L grades of stainless as well as Types 321 and 347 (as long as the service temperature does not exceed 500°F). Typical applications are in-welded components for the chemical, paper, textile and pharmaceutical industries and food service equipment.

**DIAMETERS:** .035", .045", 1/16"

**SHIELDING GASES:** Ar/1-2% O<sub>2</sub>, Ar/1-2% CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Higher deposition rates and more controlled penetration than solid wire.
- Operates at higher travel speeds and handles poor fit up.
- Provides a smooth, spray arc transfer.
- Produces little or no slag and virtually no spatter.

**TYPICAL MECHANICAL PROPERTIES:**

	98%Ar/2%O <sub>2</sub>				
Ultimate Tensile Strength (psi)	82,600				
Yield Strength (psi)	57,000				
Percent Elongation	38				

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	Si	Ni	Cr	N
98Ar/2O <sub>2</sub>	.025	1.75	.50	9.90	20.90	.05

Ferrite Number (WRC, 1992) - 7

## SelectAlloy 308LSi-C

**CLASSIFICATION:** EC308LSi per AWS A5.22 (Also per AWS A5.9: 2006)

**APPROVAL:** CWB EC308LSi

SelectAlloy 308LSi-C features a weld metal composition of 20% chromium, 10% nickel, .8% silicon and a maximum carbon content of .03%. This metal cored electrode's higher silicon content level improves bead wetting and its low carbon content minimizes carbide precipitation, making it more resistant to intergranular corrosion.

**APPLICATIONS:** SelectAlloy 308LSi-C is designed for making small butt, lap and fillet welds on thin material at elevated travel speeds. This wire is utilized to weld 301, 302, 304L, 308 and 308L grades of stainless. Standard applications for SelectAlloy 308LSi-C include in-welded components for the chemical, paper, textile and pharmaceutical industries and food service equipment.

**DIAMETERS:** .035", .045", 1/16"

**SHIELDING GASES:** Ar/1-2% O<sub>2</sub>, Ar/1-2% CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Offers higher deposition rates and more controlled penetration than the equivalent solid wire.
- Produces smooth, well washed beads.
- Operates at higher travel speeds.
- Handles poor fit up.
- Provides a smooth, spray arc transfer.

**TYPICAL MECHANICAL PROPERTIES:**

	98%Ar/2%O <sub>2</sub>	
Ultimate Tensile Strength (psi)	89,900	
Yield Strength (psi)	63,000	
Percent Elongation	42	

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	Si	Ni	Cr	N
98Ar/2O <sub>2</sub>	.02	1.40	.80	10.30	20.00	.05

Ferrite Number (WRC, 1992) - 14

## SelectAlloy 309L-C

**CLASSIFICATIONS:** EC309 and EC309L per AWS A5.22 (Also per AWS A5.9: 2006)

**APPROVAL:** CWB EC309L

SelectAlloy 309L-C's low carbon content minimizes carbide precipitation and makes the weld metal more resistant to intergranular corrosion. This gas-shielded, metal cored, stainless steel electrode is composed of 24% chromium, 13% nickel and no more than 0.03% carbon.

**APPLICATIONS:** SelectAlloy 309L-C is used to weld Type 309 stainless steel, to join carbon and low alloy steels, to weld 304 and for the first layer cladding of carbon steel. This wire is designed for welding refinery and chemical processing equipment and furnace and auto exhaust parts.

**DIAMETERS:** .035", .045", 1/16"

**SHIELDING GASES:** Ar/1-2% O<sub>2</sub>, Ar/1-2% CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Higher deposition rates and travel speeds than solid wire.
- Smooth spray arc transfer.
- Produces virtually no spatter and little or no slag.
- Handles poor fit up.

**TYPICAL MECHANICAL PROPERTIES:**

	98%Ar/2%O <sub>2</sub>	
Ultimate Tensile Strength (psi)	84,000	
Yield Strength (psi)	64,200	
Percent Elongation	35	

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	Si	Ni	Cr	N
98Ar/2O <sub>2</sub>	.03	1.50	.50	12.30	23.80	.05

Ferrite Number (WRC, 1992) - 17

## SelectAlloy 309LSi-C

**CLASSIFICATION:** EC309LSi per AWS A5.22 (Also per AWS A5.9: 2006)

**APPROVAL:** CWB EC309LSi

This metal cored, stainless steel electrode is composed of 24% chromium, 13% nickel and 0.8% silicon with a maximum carbon content of .03%. The higher silicon level improves bead wetting while the lower carbon content minimizes carbide precipitation and makes the weld metal more resistant to intergranular corrosion.

**APPLICATIONS:** SelectAlloy 309LSi-C is utilized in the welding of refinery and chemical processing equipment as well as furnace and auto exhaust parts. This electrode welds Type 309 stainless steel and may be used to join carbon and low alloy steels to austenitic stainless steels.

**DIAMETERS:** .035", .045", 1/16"

**SHIELDING GASES:** Ar/1-2% O<sub>2</sub>, Ar/1-2% CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Produces smooth, well washed beads.
- Ideally suited for making small butt, lap and fillet welds on thin material at elevated travel speeds.
- Produces little or no slag and virtually no spatter.
- Handles poor fit-up.
- Offers higher deposition rates than equivalent solid wire.

**TYPICAL MECHANICAL PROPERTIES:**

	98%Ar/2%O <sub>2</sub>	
Ultimate Tensile Strength (psi)	87,000	
Yield Strength (psi)	66,200	
Percent Elongation	39	

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	Si	Ni	Cr	N
98Ar/2O <sub>2</sub>	.03	1.40	.80	12.80	23.90	.05

Ferrite Number (WRC, 1992) - 15



## AUSTENITIC Metal Cored

### SelectAlloy 310G-C

**CLASSIFICATION:** No AWS class

SelectAlloy 310G-C has a modified 310 chemistry with a nominal composition of 26% chromium, 20% nickel and 5% manganese. The addition of manganese in this gas-shielded, metal cored, stainless steel electrode reduces the tendency for hot cracking of this highly austenitic alloy.

**APPLICATIONS:** SelectAlloy 310G-C is used to weld 310 stainless steel, as well as 410 and 430 stainless steels when preheating or postweld heat treatments are not possible. This electrode is utilized when elevated temperatures are involved such as with equipment for heat treating, chemical and food processing.

**DIAMETERS:** .045", 1/16"

**SHIELDING GASES:** Ar/1-2% O<sub>2</sub>, Ar/1-2% CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Ideal for making small butt, lap and fillet welds on thin material.
- Operates at higher travel speeds.
- Handles poor fit-up.
- Offers higher deposition rates and more controlled penetration than the equivalent solid wire.
- Provides a smooth, spray arc transfer with low spatter and little or no slag.

**TYPICAL MECHANICAL PROPERTIES:**

	98%Ar/2%O <sub>2</sub>	
Ultimate Tensile Strength (psi)	87,000	
Yield Strength (psi)	64,200	
Percent Elongation	33	

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	Si	Ni	Cr	N
98Ar/ 2O <sub>2</sub>	.08	5.50	.50	19.90	25.80	.05

### SelectAlloy 312-C

**CLASSIFICATION:** EC312 per AWS A5.22 (Also per AWS A5.9: 2006)

With a nominal weld composition of 30% chromium, 9% nickel and 0.1% carbon, SelectAlloy 312-C produces a two-phase weld metal with substantial ferrite in an austenitic matrix. The high level of ferrite in this gas-shielded, metal cored, stainless steel electrode makes the weld metal very resistant to cracking, even when highly diluted.

**APPLICATIONS:** SelectAlloy 312-C is well suited for making small butt, lap and fillet welds on thin material at elevated speeds. This wire is used for the welding of dissimilar metals such as the joining of carbon steels to stainless steels high in nickel.

**DIAMETERS:** .035", .045", 1/16"

**SHIELDING GASES:** Ar/1-2% O<sub>2</sub>, Ar/1-2% CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Higher deposition rates, more controlled penetration than the equivalent solid electrode.
- Operates at high travel speed.
- Handles poor fit-up.
- Produces virtually no spatter and little or no slag.
- Provides a smooth, spray arc transfer.

**TYPICAL MECHANICAL PROPERTIES:**

	98%Ar/2%O <sub>2</sub>	
Ultimate Tensile Strength (psi)	114,000	
Yield Strength (psi)	87,200	
Percent Elongation	24	

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	Si	Ni	Cr	N
98Ar/ 2O <sub>2</sub>	.10	1.50	.50	9.30	29.80	.05

Ferrite Number (WRC, 1992) - 65

### SelectAlloy 316L-C

**CLASSIFICATIONS:** EC316 and EC316L per AWS A5.22. (Also per AWS A5.9: 2006)

**APPROVAL:** CWB EC316L

This gas-shielded, metal cored, stainless steel electrode has a nominal weld metal composition of 19% chromium, 12.5% nickel, 2.5% molybdenum and a maximum of 0.03% carbon. SelectAlloy 316L-C provides increased creep resistance and improves resistance to pitting, carbide precipitation and intergranular corrosion.

**APPLICATIONS:** Ideally suited for making small butt, lap and fillet welds on thin material at elevated travel speeds, SelectAlloy 316L-C is used to weld Type 316 stainless steel and other similar alloys such as ASTM A743 and A744 and Types CF-8M and CF-3M. SelectAlloy 316L-C is utilized in the pulp and paper industry, chemical and textile processing equipment, furnace parts and in parts exposed to marine environments.

**DIAMETERS:** .035", .045", 1/16"

**SHIELDING GASES:** 98% Ar/2% CO<sub>2</sub>, 98% Ar/2% O<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Minimal cleanup required due to little or no slag and virtually no spatter.
- Smooth spray arc transfer.
- Higher deposition rates and faster travel speeds than equivalent solid wire.
- Handles poor fit up.

**TYPICAL MECHANICAL PROPERTIES:**

	98%Ar/2%O <sub>2</sub>	
Ultimate Tensile Strength (psi)	82,900	
Yield Strength (psi)	63,100	
Percent Elongation	37	

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	Si	Ni	Cr	Mo	N
98Ar/ 2O <sub>2</sub>	.02	1.20	.50	12.30	18.40	2.30	.05

Ferrite Number (WRC, 1992) - 6

## SelectAlloy 316LSi-C

**CLASSIFICATION:** EC316LSi per AWS A5.22 (Also per AWS A5.9: 2006)

**APPROVAL:** CWB EC316LSi

SelectAlloy 316LSi-C is a gas-shielded, metal cored, stainless steel electrode with a nominal weld composition of 19% chromium, 12.5% nickel, 2.5% molybdenum, 0.8% silicon and a maximum carbon content of 0.03%. The presence of molybdenum improves resistance to pitting and provides increased creep resistance. The low carbon content minimizes carbide precipitation and makes it more resistant to intergranular corrosion. In addition, the augmented silicon content improves bead wetting and produces a cosmetically appealing weld.

**APPLICATIONS:** This wire is ideally suited for making small butt, lap and fillet welds on thin material at elevated travel speeds. It is utilized to weld Type 316 stainless and other similar alloys, such as ASTM A743, and A744, Types CF-8M and CF-3M. SelectAlloy 316LSi-C is widely used in the pulp and paper industry, chemical and textile processing equipment, furnace parts and in parts exposed to marine environments.

**DIAMETERS:** .035", .045", 1/16"

**SHIELDING GASES:** Ar/ 1-2% O<sub>2</sub>, Ar/ 1-2% CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Produces smooth, well washed beads.
- Offers higher deposition rates and more controlled penetration than the equivalent solid wire.
- Operates at higher travel speeds.
- Handles poor fit up.
- Provides a smooth, spray arc transfer.
- Produces little or no slag and virtually no spatter.

**TYPICAL MECHANICAL PROPERTIES:**

	98%Ar/2%O <sub>2</sub>	
Ultimate Tensile Strength (psi)	84,000	
Yield Strength (psi)	64,200	
Percent Elongation	36	

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	Si	Ni	Cr	Mo	N
98Ar/ 2O <sub>2</sub>	.02	1.20	.80	12.40	18.60	2.40	.05

Ferrite Number (WRC, 1992) - 6

## SelectAlloy 317L-C

**CLASSIFICATIONS:** EC317 and EC317L per AWS A5.22 (Also per AWS A5.9: 2006)

SelectAlloy 317L-C is designed with a nominal weld composition of 19.5% chromium, 14% nickel, 3.5% molybdenum and a maximum carbon content of .03%. This metal cored, stainless steel electrode delivers a higher level of molybdenum to improve resistance to pitting and provides increased creep resistance. The low carbon content of SelectAlloy 317L-C minimizes carbide precipitation and makes it more resistant to intergranular corrosion.

**APPLICATIONS:** Due to its exceptional resistance to pitting corrosion, SelectAlloy 317L-C is an excellent choice for applications involving solutions of sulfuric acid and sulfur bearing gases. Used to weld Types 316 and 317 stainless steel, Select-Alloy 317L-C is utilized in the pulp and paper industry as well as in food and pharmaceutical processing equipment.

**DIAMETERS:** .035", .045", 1/16"

**SHIELDING GASES:** Ar/1-2% O<sub>2</sub>, Ar/1-2% CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Ideally suited for making small butt, lap and fillet welds on thin material at elevated travel speeds.
- Handles poor fit-up.
- Higher deposition rates and more controlled penetration than equivalent solid wire.
- Virtually no spatter and little or no slag.

**TYPICAL MECHANICAL PROPERTIES:**

	98%Ar/2%O <sub>2</sub>	
Ultimate Tensile Strength (psi)	88,900	
Yield Strength (psi)	69,100	
Percent Elongation	34	

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	Si	Ni	Cr	Mo	N
98Ar/ 2O <sub>2</sub>	.02	1.40	.50	13.30	19.60	3.30	.05

Ferrite Number (WRC, 1992) - 8

## SelectAlloy 347-C

**CLASSIFICATION:** EC347 per AWS A5.22 (Also per AWS A5.9: 2006)

This gas-shielded, metal cored, stainless steel electrode has a nominal weld metal composition of 20% chromium, 10% nickel and 0.7% columbium. The columbium in SelectAlloy 347-C forms a stable carbide, which reduces chromium carbide precipitation and increases resistance to intergranular corrosion.

**APPLICATIONS:** Utilized to weld Types 321, 347 and 348 stainless steel, SelectAlloy 347-C finds wide application in the welding of furnace parts, pressure vessels, chemical tanks and automotive parts.

**DIAMETERS:** .035", .045", 1/16"

**SHIELDING GASES:** Ar/1-2% O<sub>2</sub>, Ar/1-2% CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Higher deposition rates and more controlled penetration than solid wire.
- Operates with a smooth, spray arc.
- Well suited for making small butt, lap and fillet welds on thin material at elevated travel speeds.
- Produces little or no slag and virtually no spatter.

**TYPICAL MECHANICAL PROPERTIES:**

	98%Ar/2%O <sub>2</sub>	
Ultimate Tensile Strength (psi)	92,900	
Yield Strength (psi)	63,100	
Percent Elongation	38	

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	Si	Ni	Cr	N	Cb
98Ar/ 2O <sub>2</sub>	.05	1.20	.47	10.00	20.10	.05	.70

Ferrite Number (WRC, 1992) - 9

## DUPLEX All Position, Flux Cored

### SelectAlloy 2209-AP

**CLASSIFICATIONS:** E2209T1-1, E2209T1-4 per AWS A5.22, ASME SFA 5.22

SelectAlloy 2209-AP is a flux cored electrode designed to weld duplex stainless steels of the 22Cr-9Ni-2Mo-N type. The weld deposit has a "duplex" microstructure of austenite and ferrite and normally gives ferrite in the range of 25-40 FN. Argon with 20-25% CO<sub>2</sub> is the recommended shielding gas.

**APPLICATIONS:** The all position SelectAlloy 2209-AP is designed to weld similar materials in the chemical and fertilizer industry, off-shore pipelines, sour gas lines, etc. It is used to weld 2205, 2304 and other similar types of duplex stainless steel.

**DIAMETERS:** .045", 1/16"

**SHIELDING GAS:** 75-80% Ar/20-25% CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** All positions



**CHARACTERISTICS:**

- Bead is shiny, smooth and silvery.
- Provides a stable, smooth arc with very low spatter.
- Superb performance in all positions.

**TYPICAL MECHANICAL PROPERTIES:**

	75%Ar/ 25%CO <sub>2</sub>	CO <sub>2</sub>
Ultimate Tensile Strength (psi)	113,000	110,400
Yield Strength (psi)	85,000	79,000
Percent Elongation	31	32
CVN (ft•lb f) @ -60°F	44	47

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	Si	Ni	Cr	Mo	N
75Ar/	.03	1.70	.80	9.10	22.10	2.70	.12
25CO <sub>2</sub>							

Ferrite Number (WRC, 1992) - 35

### SelectAlloy 2553-AP

**CLASSIFICATION:** E2553T1-4 per AWS A5.22, ASME SFA 5.22

A flux cored, all position electrode with a nominal composition of 25% chromium, 9.5% nickel, 3.5% molybdenum, 2% copper and 0.2% nitrogen, SelectAlloy 2553-AP is used to weld duplex stainless steels which contain approximately 25% chromium. It offers greater resistance to intergranular corrosion, pitting and stress corrosion cracking than 2209.

**APPLICATIONS:** The weld metal exhibits high strength with excellent corrosion resistance, especially to pitting attack from chlorides in sea water. SelectAlloy 2553-AP is well suited for welding similar materials in the chemical and fertilizer industries, offshore pipelines, sour gas lines, etc...

**DIAMETERS:** .045", 1/16"

**SHIELDING GAS:** 75-80% Ar/20-25% CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** All positions



**CHARACTERISTICS:**

- Superb all position performance.
- Smooth, stable arc with very low spatter.
- Bead is shiny, smooth and silvery in appearance.
- Slag removes easily.

**TYPICAL MECHANICAL PROPERTIES:**

	75%Ar/25%CO <sub>2</sub>
Ultimate Tensile Strength (psi)	124,000
Yield Strength (psi)	97,000
Percent Elongation	24

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	Si	Ni	Cr
75Ar/	.03	1.10	.70	9.50	25.40
25CO <sub>2</sub>		Mo	Cu	N	
	3.80	2.20	.20		

Ferrite Number (WRC, 1992) - 42

### SelectAlloy 2594-AP

**CLASSIFICATION:** E2594T1-4 per AWS A5.22. ASME SFA 5.22

This flux cored, all position electrode has a nominal composition of 25.5% chromium, 9.3% nickel, 3.5% molybdenum and 0.25% nitrogen. The Pitting Resistance Equivalent Number, given as Cr + 3.3\*(Mo+0.5W) + 16\*N, is equal or greater than 40. This semi-quantitative Number provides a measure of the resistance to pitting in aqueous environments containing chlorides.

**APPLICATIONS:** SelectAlloy 2594-AP electrodes are designed for welding duplex (2500 family) and super-duplex (wrought UNS S32750 and S32760 and cast UNS J93380 and J93404) materials in the chemical and fertilizer industries, energy generation, flue gas desulphurization, and for many offshore applications including piping systems, pumps, valves and heat exchangers.

**DIAMETERS:** .045", 1/16"

**SHIELDING GASES:** 75% Ar/25% CO<sub>2</sub>

**WELDING POSITIONS:** All positions



**CHARACTERISTICS:**

- Excellent all position performance.
- Provides a smooth, stable arc with very low spatter.
- Bead is shiny, smooth and silvery in appearance.
- Slag removes easily.
- Delivers better intergranular corrosion resistance.

**TYPICAL MECHANICAL PROPERTIES:**

	75%Ar/25%CO <sub>2</sub>
Ultimate Tensile Strength (psi)	124,000
Yield Strength (psi)	97,000
Percent Elongation	20

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	Si	Ni	Cr
75Ar/	.03	1.50	.70	9.60	25.40
25CO <sub>2</sub>		Mo	N	W	
	3.80	.24	.55		

Ferrite Number (WRC, 1992) - 48

PREN-43.5

## DUPLEX Metal Cored

### SelectAlloy 2209-C

**CLASSIFICATION:** EC2209 per AWS A5.22 (Also per AWS A5.9: 2006)

SelectAlloy 2209-C is a metal cored electrode designed to weld duplex stainless steels of 22Cr-9Ni-2Mo-N type. The weld deposit has a “duplex” microstructure of austenite and ferrite and normally gives ferrite in the range of 25-40 FN. This electrode delivers very good resistance to intergranular corrosion, pitting and to stress corrosion cracking in environments containing H<sub>2</sub>S and chlorides.

**APPLICATIONS:** SelectAlloy 2209-C is utilized for welding in the chemical and fertilizer industries, on offshore pipelines and on sour gas lines. This electrode welds 2205, 2304 and other similar types of duplex stainless steel.

**DIAMETERS:** .045", 1/16"

**SHIELDING GASES:** Ar/1-2% O<sub>2</sub>, Ar/1-2% CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Well suited for small butt, lap and fillet welds on thin material at elevated speeds.
- Operates with a smooth, spray arc transfer.
- Produces little or no slag and virtually no spatter.
- Handles poor fit-up.
- Offers higher deposition rates and more controlled penetration than the equivalent solid wire.

**TYPICAL MECHANICAL PROPERTIES:**

	98%Ar/2%O <sub>2</sub>						
Ultimate Tensile Strength (psi)	117,000						
Yield Strength (psi)	93,200						
Percent Elongation	25						

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	Si	Ni	Cr	Mo	N
98Ar/	.02	1.30	.70	8.40	22.50	3.10	.15
2O <sub>2</sub>							

Ferrite Number (WRC, 1992) - 40

## MARTENSITIC Flat and Horizontal, Flux Cored

### Select 410

**CLASSIFICATION:** E410T0-4 per AWS A5.22.

Select 410, which contains 12% chromium, is a flux cored electrode designed for single or multiple pass welding in the flat or horizontal positions. The weld deposit is air hardening and is normally heat-treated after welding.

**APPLICATIONS:** Select 410 is utilized to weld straight 410 stainless steel. It provides good corrosion and oxidation resistance up to 1200°F.

**DIAMETERS:** .045", 1/16", 3/32"

**SHIELDING GAS:** 75-80% Ar/20-25% CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Low spatter.
- Smooth spray arc transfer.
- Produces finely rippled bead.
- Self peeling slag minimizes cleanup time.

**TYPICAL MECHANICAL PROPERTIES:**

	75%Ar/25%CO <sub>2</sub> SR 1 Hr. @ 1375°F	
Ultimate Tensile Strength (psi)	78,000	
Yield Strength (psi)	45,000	
Percent Elongation	24	

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	Si	Cr
75Ar/25CO <sub>2</sub>	.07	.70	.50	12.80

### SelectAlloy 2594-C

**CLASSIFICATION:** EC2594 per AWS A5.22. ASME SFA 5.22

SelectAlloy 2594-C is a metal cored electrode having a nominal composition of 26% chromium, 9% nickel, 3% molybdenum, 0.6% tungsten and 0.25% nitrogen. The Pitting Resistance Equivalent Number is equal or greater than 40, making it an excellent choice for use in aqueous environments containing chlorides.

**APPLICATIONS:** SelectAlloy 2594-C is designed for welding duplex (2500 family) and super-duplex ( wrought UNS S32750 and S32760 and cast UNS J93380 and J93404) materials in the chemical and fertilizer industries, energy generation, flue gas desulphurization and for many offshore applications including piping systems, pumps, valves and heat exchangers.

**DIAMETERS:** .045", 1/16"

**SHIELDING GASES:** 98% Ar/2% O<sub>2</sub>

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Operates with a smooth, spray arc transfer.
- Produces little or no slag and virtually no spatter which minimizes cleanup.
- Offers higher deposition rates and more controlled penetration than the equivalent solid electrode.
- Operates at higher travel speeds.
- Handles poor fitup.

**TYPICAL MECHANICAL PROPERTIES:**

	98%Ar/2%O <sub>2</sub>	
Ultimate Tensile Strength (psi)	123,000	
Yield Strength (psi)	90,000	
Percent Elongation	29	

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	Si	Ni	Cr
75Ar/	.02	1.90	.60	8.90	25.80
25CO <sub>2</sub>		Mo	N	W	
	3.10	.25	.60		

Ferrite Number (WRC, 1992) - 49  
PREN-42



**MARTENSITIC**  
Flat and Horizontal,  
Flux Cored

**Select 410NiMo**

**CLASSIFICATION:** E410NiMoT0-1 per AWS A5.22.

This is a flux cored, gas-shielded electrode for welding martensitic stainless steel in the flat and horizontal positions. Select 410NiMo is nominally composed of 12% chromium, 4.5% nickel, 0.65% molybdenum and a maximum carbon content of .06%.

**APPLICATIONS:** This wire is primarily designed to weld ASTM CA6NM castings and certain 410 alloys, usually for blades and vanes in power generation equipment.

**DIAMETERS:** .045", 1/16", 3/32"

**SHIELDING GAS:** 100% CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Accurate and consistent deposit composition.
- Very good feedability.
- Excellent bead cosmetics.
- Smooth, stable arc transfer.
- Nearly self-peeling slag and low spatter residue.

**TYPICAL MECHANICAL PROPERTIES:**

	CO <sub>2</sub>	
	SR 1 Hr. @ 1125°F	
Ultimate Tensile Strength (psi)	128,000	
Yield Strength (psi)	107,000	
Percent Elongation	17	

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	Si	Ni	Cr	Mo
CO <sub>2</sub>	.03	.70	.50	4.70	12.20	.60

**MARTENSITIC**  
All Position, Flux Cored

**Select 410-AP**

**CLASSIFICATIONS:** E410T1-1, E410T1-4 per AWS A5.22

This flux cored, gas-shielded, stainless steel electrode contains 12% chromium. The weld deposit is air hardening and is normally heat-treated after welding.

**APPLICATIONS:** Select 410-AP is commonly used to weld straight 410 stainless steel. This electrode provides good corrosion and oxidation resistance up to 1200°F.

**DIAMETERS:** .045", 1/16"

**SHIELDING GASES:** 100% CO<sub>2</sub>, 75-80% Ar/balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** All positions



**CHARACTERISTICS:**

- Superb all position performance.
- Flat, well washed beads achieved with minimal weaving.
- Very low spatter.
- Slag peeling is excellent.

**TYPICAL MECHANICAL PROPERTIES:**

	SR 1 Hr. @ 1375°F	
	CO <sub>2</sub>	75%Ar/ 25%CO <sub>2</sub>
Ultimate Tensile Strength (psi)	96,700	91,900
Yield Strength (psi)	79,000	73,400
Percent Elongation	20	20

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	Si	Cr
CO <sub>2</sub>	.08	.70	.50	12.30
75Ar/25CO <sub>2</sub>	.08	.50	.57	11.50

**Select 410NiMo-AP**

**CLASSIFICATIONS:** E410NiMoT1-1, E410NiMoT1-4 per AWS A5.22.

Select 410NiMo-AP is a gas-shielded, flux cored, stainless steel electrode designed to weld martensitic stainless steels in all positions. It has a nominal weld metal composition of 12% chromium, 4.5% nickel, 0.6% molybdenum and a maximum carbon content of 0.06%.

**APPLICATIONS:** This electrode finds wide application in the power generation industry, especially with turbine blades and vanes. Select 410NiMo-AP is widely used for welding ASTM CA6NM castings as well as 410, 410S and 405 stainless steels.

**DIAMETERS:** .045", 1/16"

**SHIELDING GASES:** 100% CO<sub>2</sub>, 75-80% Ar/20-25% CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** All positions



**CHARACTERISTICS:**

- Very high welder appeal.
- Fast freezing slag facilitates welding in the vertical up and overhead positions.
- Produces low spatter and nearly self-removing slag.
- Impressive all position performance.

**TYPICAL MECHANICAL PROPERTIES:**

	SR 1 Hr. @ 1125°F	
	CO <sub>2</sub>	75%Ar/ 25%CO <sub>2</sub>
Ultimate Tensile Strength (psi)	126,000	132,100
Yield Strength (psi)	109,000	119,500
Percent Elongation	18	16

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	Si	Ni	Cr	Mo
CO <sub>2</sub>	.04	.71	.53	4.60	11.90	.54
75Ar/ 25CO <sub>2</sub>	.03	.72	.55	4.52	12.00	.60

## MARTENSITIC Metal Cored

### Select 410-C

**CLASSIFICATION:** EC410 per AWS A5.22  
(Also per AWS A5.9: 2006)

Select 410-C is a composite metal cored, martensitic stainless steel electrode designed to weld 410 stainless steel.

**APPLICATIONS:** Select 410-C is used to weld straight 410 stainless steel. Heat-treatment after welding is normally required.

**DIAMETERS:** .045", 1/16", 3/32"

**SHIELDING GAS:** Ar/1-2% O<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Ideal for small butt, lap and fillet welds on thin material at high travel speeds.
- Features a smooth, stable arc with low spatter residue.
- Produces smooth, well washed beads and easy peeling slag.

**TYPICAL MECHANICAL PROPERTIES:**

	98%Ar/2%O <sub>2</sub> SR 1 Hr. @ 1375°F	
Ultimate Tensile Strength (psi)	77,000	
Yield Strength (psi)	46,000	
Percent Elongation	23	

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	Si	Cr
98Ar/2O <sub>2</sub>	.07	.50	.40	12.90

### Select 410NiMo-C

**CLASSIFICATION:** EC410NiMo per AWS A5.22 (Also per AWS A5.9: 2006)

This composite metal cored electrode is utilized to weld ASTM CA6NM castings and certain 410 alloys.

**APPLICATIONS:** Select 410NiMo-C welds ASTM CA6NM castings as well as specific 410 alloys.

**DIAMETERS:** .045", 1/16"

**SHIELDING GAS:** 98% Ar/2% O<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Operates with a smooth, spray arc transfer.
- Produces little or no slag.
- Virtually no spatter minimizes cleanup.
- Offers higher deposition rates and more controlled penetration than equivalent solid wire.
- Provides higher travel speeds and handles poor fit-up.

**TYPICAL MECHANICAL PROPERTIES:**

	98%Ar/2%O <sub>2</sub> SR 1 Hr. @ 1125°F	
Ultimate Tensile Strength (psi)	109,500	
Yield Strength (psi)	94,400	
Percent Elongation	15	

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si
98Ar/2O <sub>2</sub>	.02	.50	.010	.010	.38
	Cr	Ni	Mo		
	11.90	4.29	.54		

## FERRITIC Metal Cored

### Select 409Cb

**CLASSIFICATION:** EC409Nb per AWS A5.22 (Also per AWS A5.9: 2006)

Select 409Cb is a composite metal cored, stainless steel electrode for gas-shielded arc welding. This product is intended for welding ferritic stainless steel sheet and thin gauge material where niobium (columbium) stabilization is preferred over titanium. Arc transfer is a smooth spray with minimal spatter; bead appearance is smooth and clean.

**APPLICATIONS:** Select 409Cb produces a ferritic stainless steel deposit which is ideal for welding thin gauge ferritic stainless in the fabrication of automotive exhaust systems. Typically, these components are manifolds, mufflers, catalytic converters and tubing. The tubular wire characteristics provide better performance on gaps and poor fit up than solid wires.

**DIAMETERS:** .045", .052", 1/16"

**SHIELDING GAS:** 98% Ar/2% O<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Bridges gaps and handles poor fit up better than solid wire.
- Faster travel speeds than solid wire.
- Smooth spray transfer with minimal spatter.
- Performs well when oil or other contaminants are present.

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si	Cr	Cb(Nb)
98Ar/ 2O <sub>2</sub>	.02	.60	.010	.010	.58	11.60	.66

## FERRITIC Metal Cored

### Select 409Ti

**CLASSIFICATION:** EC409 per AWS A5.22 (Also per AWS A5.9: 2006)

Select 409Ti is a composite metal cored electrode for gas-shielded arc welding of ferritic stainless steels. This wire is formulated to produce improved bead wetting, faster travel speeds and a superb ability to bridge gaps and joints with poor fit up.

**APPLICATIONS:** Select 409Ti is expressly designed for welding automotive exhaust systems, especially manifolds, mufflers, converters and other components. It excels in the welding of tubing to these other components, particularly where there are gaps or generally poor fit up.

**DIAMETERS:** .045", .052", 1/16"

**SHIELDING GAS:** 98% Ar/2% O<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Excels in bridging gaps and joints with poor fit up.
- Increases travel speeds for greater productivity.
- Enhances bead geometry.
- Extremely low spatter.

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si	Cr	Ti
98Ar/ 2O <sub>2</sub>	.02	.60	.010	.010	.69	11.90	.70

### Select 439Ti

**CLASSIFICATION:** EC439 per AWS A5.22 (Also per AWS A5.9: 2006)

Select 439Ti is a composite metal cored, stainless steel electrode for gas-shielded arc welding. This product is designed for welding ferritic stainless thin stock or sheet steel in the fabrication of automotive exhaust system components. The 439 alloys are higher in chromium than the 409 series in order to provide better heat and corrosion resistance. This particular grade is titanium stabilized.

**APPLICATIONS:** Select 439Ti is a titanium stabilized, 18% chromium stainless steel electrode intended to weld sheet metal and thin stock of similar composition. This material is primarily used in the fabrication of automotive exhaust systems subjected to higher temperatures and corrosion than the 409 series. Typical components to be welded are manifolds, mufflers, catalytic converters and exhaust tubing.

**DIAMETERS:** .045", .052", 1/16"

**SHIELDING GAS:** 98% Ar/2% O<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Handles poor fit up and gaps better than solid wire.
- Smooth arc with low spatter.
- Exceptionally good bead contour.
- Better heat and corrosion resistance than 409 types.

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si	Cr	Ti
98Ar/ 2O <sub>2</sub>	.02	.62	.010	.010	.56	17.90	.70

### Select 18CrCb-C

**CLASSIFICATION:** EC439Nb per AWS 5.22

A composite metal cored, stainless steel electrode, Select 18CrCb-C is intended for welding thin stock and sheet steel of similar ferritic stainless composition. Stabilization of the weld deposit is with columbium (niobium) and titanium.

**APPLICATIONS:** Select 18CrCb-C is an excellent choice to weld stainless steels of similar composition (18% Cr, 0.6% Cb) in the fabrication of automotive exhaust systems. Unlike solid wires, Select 18CrCb-C handles gaps and poor fit up quite effectively when welding components such as manifolds, mufflers, catalytic converters and tubing.

**DIAMETERS:** .045", .052", 1/16"

**SHIELDING GAS:** 98% Ar/2% O<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Handles gaps and poor fit up better than solid wire.
- Smooth arc transfer with low spatter.
- Excellent bead contour.

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	Si	Cr	Cb(Nb)	Ti
98Ar/ 2O <sub>2</sub>	.02	.66	.58	17.70	.56	.44

## Select 430L-Cb

**CLASSIFICATION:** No AWS Class

Normally used for single pass applications on thin sheet metal materials, Select 430L-Cb is a metal cored electrode designed for the welding of ferritic stainless materials. Select 430L-Cb's higher chromium content combined with the columbium (niobium) stabilization provides similar heat and corrosion resistance to the base metals which are welded.

**APPLICATIONS:** Select 430L-Cb is designed to weld heat resistant, corrosion resistant, ferritic stainless steels used in exhaust system components. Typical applications include manifolds, converters, mufflers and tubular components of automotive exhaust systems made of 430 grade materials.

**DIAMETERS:** .045", .052", 1/16"

**SHIELDING GAS:** 95-98%Ar/balance O<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Handles poor fit up and gaps, easier to weld than solid wire.
- Faster travel speeds, less burn through, less spatter means greater productivity.
- Easy transition to spray transfer.

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Cb(Nb)	Cr	Cu	Mn
98Ar/ 2O <sub>2</sub>	.02	.36	17.50	.06	.68
	Ni	P	S	Si	
	.02	.007	.010	.58	

## Select 430NbL

**CLASSIFICATION:** No AWS Class

Select 430NbL is a metal cored electrode designed for the welding of ferritic stainless steel materials used in automotive exhaust systems.

**APPLICATIONS:** Select 430NbL is utilized to weld heat and corrosion resistant, ferritic stainless steels used in exhaust system components including manifolds, converters, mufflers and tubular parts of automotive systems made of 430 grade materials.

**DIAMETERS:** .045", 1/16"

**SHIELDING GAS:** 80-95% Ar/balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- Specially formulated to produce tough, fine grained weld metal.
- Faster travel speeds, less burn through, reduced spatter means greater productivity.
- Handles poor fit up and gaps, easier to weld with than solid wire.

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	P	S	Si
90Ar/ 10O <sub>2</sub>	.03	.30	.007	.010	.60
	Cr	Cb(Nb)	Ti		
	17.80	.60	.10		





## Introduction

Nickel and its alloys comprise one of the most versatile groups of metals. They maintain excellent mechanical properties over a broad range of temperatures, from cryogenic to over 2,000°F. Their excellent corrosion resistance in many aqueous solutions and at high temperatures has led to wide use in marine, chemical processing and aerospace applications.

Most nickel-based welding consumables are designed to match the chemistry and properties of the base materials but they also find wide application in the welding of other materials, for cladding other structural materials and in the joining of dissimilar metals. Cast iron is often welded with nickel-based welding consumables. Nickel alloys are also used to weld 9% Ni steels used for cryogenic applications. Cr-Mo alloy steel boiler tubes are clad with Ni alloy to extend useful life. Nickel alloys are also utilized to join carbon and low alloy steels to nickel and to join low alloy steel to stainless steel.

## Metallurgy of Nickel and Nickel Alloys

Nickel and its alloys can be classified into three groups:

- Commercially pure nickel
- Solid solution alloys
- Precipitation hardened alloys

**Commercially pure nickels** nominally contain 99% nickel. They are relatively low in strength and are used mainly for their corrosion resistance and low electrical resistance in applications such as food processing equipment, in caustic environments and in electrical devices.

Welding materials for this class contain > 93% nickel with additions of aluminum and titanium to minimize the risk of weld metal porosity. One of the unique properties of these electrodes is their ability to absorb large amounts of other elements without the loss of strength and ductility. For this reason they are used to weld cast irons where there is high dilution. The weld metal tolerates the large pickup of carbon and iron without loss of ductility and will also be machineable.

**Solid solution alloys** of nickel are strengthened by the addition of substitutional alloys such as Co, Cr, Cu, Fe, Mo and W. Because the solubility of these elements in nickel is so high, a broad range of Ni alloy chemistries is possible. Each of these elements may also enhance other properties, such as corrosion resistance to specific environments or resistance to high temperature oxidation;

- The addition of copper to nickel has spawned a family of alloys that are highly resistant to salt water corrosion.

- Iron-Nickel alloys have low thermal expansion characteristics and are utilized in many precision instruments because of their dimensional stability over a range of temperatures. Fe-Ni welding electrodes, often with the addition of manganese, are used to weld cast iron because their low thermal expansion reduces the chances of cracking.

- Chromium additions of over 10% lead to the formation of a passive oxide layer on the metal surface that resists corrosion and high temperature oxidation. The Ni-Cr and Ni-Cr-Fe series of alloys have excellent high temperature properties.

- The addition of molybdenum and tungsten to Ni-Cr and Ni-Cr-Fe alloys improves the aqueous corrosion resistance. Both of these alloys are highly resistant to pitting and crevice corrosion.

Consumables for welding solid solution nickel alloys normally match the chemistry of the base materials, but may have small additions of Al or Ti to help control porosity. With suitable precautions most of these alloys are readily weldable.

**Precipitation hardened alloys** require an aging heat treatment to develop their properties. This heat treatment produces a fine distribution of particles in a nickel rich matrix. Additions of aluminum, titanium and niobium (columbium) are added to form the precipitates. These precipitates allow very high strength levels to be achieved, in excess of 200,000 psi. This class of alloy will also contain additions of other elements to achieve specific properties. Alloy 718, for example, has Al, Ti and Nb additions to form precipitates and Cr, Fe and Mo additions to provide high temperature oxidation resistance and strength. This alloy is used in gas turbine engines.

The welding of these alloys can be troublesome since they are susceptible to weld metal solidification cracking, liquation cracking in the HAZ or reheated weld metal and to strain-age (or reheat) cracking. Often alloys are welded in the solution annealed condition. The entire weldment is then given an annealing treatment followed by a lower temperature aging treatment to form the precipitates and achieve the desired strength level.

## General Weldability Considerations

Some general precautions should be taken when welding nickel and nickel alloys:

All surfaces should be thoroughly cleaned before welding. Surface oxides and grease can lead to weld metal porosity. The oxide is also

## NICKEL ALLOYS All Position, Flux Cored

refractory and unless removed from the plate surface or from previous weld passes it can lead to slag entrapment or lack of fusion. Wire brushing is not sufficient. Machining or abrasive grinding is required.

Nickel alloys are susceptible to solidification cracking. Convex bead shapes are preferred over concave beads. Deep narrow beads or wide shallow beads should be avoided. Avoid high travel speeds, high heat inputs and high joint restraint.

Some nickel alloys are susceptible to liquation cracking in the heat affected zone of the base metal. Although this is largely a function of composition and base metal microstructure, there is less chance of occurrence if heat inputs are lowered and joint restraint is reduced.

### Select-Arc Nickel Cored Electrodes

Select-Arc manufactures nickel-based, flux cored and metal cored electrodes in a separate, specially designed facility equipped with the latest in modern equipment and control devices. Each batch of powdered raw materials is adjusted by our engineering staff to match the strip chemistry and assure consistent deposit chemistry. Small batch sizes are utilized to assure better control. Wire from each batch is checked twice for performance and chemistry. All Select-Arc product comes with certified chemistries.

Select-Arc flux cored electrodes operate in all positions. They have significantly higher out-of-position deposition rates than stick electrodes or solid wires, using conventional power supplies. They produce even, well washed beads using either Ar-25%CO<sub>2</sub> or 100% CO<sub>2</sub>.

### SelectAlloy 82-AP

**CLASSIFICATION:** ENiCr3T1-1/4 per AWS A5.34

*This gas-shielded, flux cored, nickel-based electrode, which welds in all positions, has a nominal weld composition of 19% chromium, 3% manganese, 2.5% niobium with a nickel balance. SelectAlloy 82-AP is used for welding alloys 600, 601 and 800 to themselves, to the clad side of joints in steel clad with nickel-chromium-iron alloys and for the dissimilar welding of nickel-based alloys. It is also used for joining carbon steels to nickel alloys and for the surfacing of carbon steels.*

**APPLICATIONS:** Due to its excellent resistance to pitting and stress corrosion cracking in chloride contaminated environments, SelectAlloy 82-AP is ideal for welding in desalination plants. This electrode is also well suited for welding applications that span a wide range of temperatures, from cryogenic to elevated, such as piping, furnace equipment, petrochemical facilities and power generation plants.

**DIAMETERS:** .045", 1/16"

**SHIELDING GASES:** 100% CO<sub>2</sub>, 75-80% Ar/balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** All positions



#### CHARACTERISTICS:

- Significantly higher out-of-position rates than solid wires or covered electrodes.
- Superb all position performance characteristics.
- Flat, well washed beads achieved with minimal weaving.
- Slag peeling is excellent.
- Very low spatter.

#### TYPICAL MECHANICAL PROPERTIES:

	75% Ar/25% CO <sub>2</sub> *
Ultimate Tensile Strength (psi)	94,000
Yield Strength	54,000
Percent Elongation	43

\* Results with CO<sub>2</sub> are very similar.

#### TYPICAL DEPOSIT COMPOSITION:

Wt%	C	Mn	P	S	Cr
75Ar/25CO <sub>2</sub>	.03	2.80	.001	.002	19.00
	Ni	Fe	Nb		
	Bal	1.05	2.60		

### SelectAlloy C276-AP

**CLASSIFICATION:** ENiCrMo4T1-1/4 per AWS A5.34

*A gas-shielded, flux cored, nickel-based electrode, SelectAlloy C276-AP contains a nominal weld metal composition of 16% molybdenum, 15.5% chromium, 5.5% iron, 4% tungsten with a nickel balance and low carbon. This premium wire is primarily used for welding Ni-Cr-Mo to itself or to other nickel-based alloys as well as surfacing steel and for joining nickel-based alloys to steel.*

**APPLICATIONS:** SelectAlloy C276-AP delivers excellent resistance to crevice corrosion and pitting. This electrode is utilized in pipelines, pressure vessels, chemical processing plants, offshore oil and gas facilities and marine environments.

**DIAMETERS:** .045", 1/16"

**SHIELDING GASES:** 100% CO<sub>2</sub>, 75% Ar/25% CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** All positions



#### CHARACTERISTICS:

- Outstanding performance characteristics in all positions.
- Significantly higher deposition rates than those achieved with solid wires or covered electrodes.
- Flat, well washed beads can be produced with minimal weaving.
- Very low spatter and excellent slag peeling.

#### TYPICAL MECHANICAL PROPERTIES\*:

	CO <sub>2</sub>
Ultimate Tensile Strength (psi)	108,000
Yield Strength (psi)	64,000
Percent Elongation	42
CVN (ft•lb f) @-320°F	31

#### TYPICAL DEPOSIT COMPOSITION\*:

Wt%	C	Mn	Ni	Cr	Mo
CO <sub>2</sub>	.02	.40	Bal.	15.90	16.10
	Fe	W			
	6.00	4.10			

\* Results with 75% Ar/25% CO<sub>2</sub> are very similar.

## NICKEL ALLOYS

### All Position, Flux Cored

## SelectAlloy 622-AP

**CLASSIFICATION:** ENiCrMo10T1-1/4 per AWS A5.34

SelectAlloy 622-AP is a gas-shielded, flux cored, nickel-based electrode with a nominal weld metal composition of 21% chromium, 14% molybdenum, 3% tungsten with a nickel balance. This electrode is primarily utilized to weld Ni-Cr-Mo to itself or to other nickel-based alloys. SelectAlloy 622-AP is used for surfacing steel and for joining nickel-based alloys to steel.

**APPLICATIONS:** SelectAlloy 622-AP is designed to weld in offshore and marine environments, chemical and power generation equipment and petroleum refining. This premier electrode is also widely employed to clad steel when exceptional corrosion resistance is required.

**DIAMETERS:** .045", 1/16"

**SHIELDING GASES:** 100% CO<sub>2</sub>, 75-80% Ar/balance CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** All positions



### CHARACTERISTICS:

- Outstanding all position performance characteristics.
- Delivers notably higher out-of-position deposition rates than solid wires or covered electrodes.
- Flat, well washed beads achieved with minimal weaving.
- Spatter is very low and slag peeling is exceptional, reducing cleanup time.

### TYPICAL MECHANICAL PROPERTIES:

	75% Ar/25% CO <sub>2</sub> *	
Ultimate Tensile Strength (psi)	106,000	117,000
Yield Strength (psi)	67,000	68,000
Percent Elongation	30	39

\* Results with CO<sub>2</sub> are very similar.

### TYPICAL DEPOSIT COMPOSITION:

Wt%	C	Mn	Si	Ni	Cr
75Ar/25CO <sub>2</sub>	.02	.40	.20	Bal.	21.40
	Mo	Fe	W		
	13.80	5.20	3.30		

## NICKEL ALLOYS

### Metal Cored

## SelectAlloy 625-AP

**CLASSIFICATIONS:** ENiCrMo3T1-1/4 per AWS A5.34

SelectAlloy 625-AP is an all position, gas-shielded, flux cored electrode primarily used for welding alloys 625, 601, 802 and 9% nickel to themselves and to steel. It is also widely used for surfacing steel and for joining other nickel-based alloys to steel.

**APPLICATIONS:** SelectAlloy 625-AP, with its nickel-chromium-molybdenum weld deposit, makes it a smart choice for surfacing, producing a corrosion resistant deposit for harsh environments. This electrode is utilized to clad steel when exceptional corrosion resistant is required such as chloride-contaminated cooling water in heat exchangers as well as offshore and marine environments. SelectAlloy 625-AP is extensively used to join the 9% nickel steels utilized in LNG storage and conveyance equipment and join steel to nickel-base alloys.

**DIAMETERS:** .045", 1/16"

**SHIELDING GASES:** 100% CO<sub>2</sub>, 75-80% Ar/20-25% CO<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:** All positions



### CHARACTERISTICS:

- Excellent welder appeal.
- Well suited for all position welding.
- Provides shiny bead, free from slag with outstanding tie-up to base metal.

### TYPICAL MECHANICAL PROPERTIES:

	75% Ar/25% CO <sub>2</sub> *	
Ultimate Tensile Strength (psi)	117,000	117,000
Yield Strength (psi)	68,000	68,000
Percent Elongation	39	39
CVN (ft•lb f) @ -320°F	70	70

\* Results with CO<sub>2</sub> are very similar.

### TYPICAL DEPOSIT COMPOSITION:

Wt%	C	Mn	Si	Ni	Cr
75Ar/25CO <sub>2</sub>	.03	.15	.40	Bal.	21.50
	Mo	Fe	Nb		
	9.00	.60	3.80		

**CLASSIFICATION:** ERNiCrMo-3 per AWS A5.14

SelectAlloy 625-C is a nickel, chromium, molybdenum electrode primarily utilized for welding alloys 625, 601, 802 and 9% nickel using the gas metal arc and gas tungsten arc method of welding. This wire is also designed for welding NiCrMo to itself, to steel, to other nickel-based alloys and for cladding steel with NiCrMo weld metal and the clad side of joints in steel with NiCrMo alloy.

**APPLICATIONS:** SelectAlloy 625-C is an excellent choice for welding piping systems and reactor components in the power generation industry and for high temperature service in a variety of other engineering applications.

**DIAMETERS:** .035", .045", 1/16", 3/32"

**SHIELDING GAS:** 98% Ar/2% O<sub>2</sub>, 40-55 cfh

### WELDING POSITIONS:

Flat and Horizontal



### CHARACTERISTICS:

- Virtually immune to chloride-ion stress corrosion cracking.
- Resists corrosive attacks from other types of media.
- Offers good oxidation resistance.
- Provides moderate strengths and superior corrosion resistance from cryogenic to elevated temperatures (up to 1,800°F).

### TYPICAL MECHANICAL PROPERTIES:

	98% Ar/2% O <sub>2</sub>	
Ultimate Tensile Strength (psi)	110,000	110,000
Yield Strength (psi)	60,000	60,000
Percent Elongation	30	30

### TYPICAL DEPOSIT COMPOSITION:

Wt%	C	Mn	P	S	Si
98Ar/2O <sub>2</sub>	.01	.20	.002	.003	.40
	Ni	Cr	Mo	Al	Cu
	60.00	20.50	9.00	.20	.03
	Fe	Ti	Cb + Ta		
	1.30	.30	3.70		

## SelectAlloy 2216-C

**CLASSIFICATION:** Conforms to ECNiFeMn-CI per AWS A5.15

SelectAlloy 2216-C is a metal cored electrode designed for welding high strength cast irons. This wire is preferred for use with high strength nodular or spheroidal graphite cast irons, although it can generally be used with all other cast irons, and dissimilar joints between cast irons to steels.

**APPLICATIONS:** SelectAlloy 2216-C is an exceptional choice for welding automotive exhaust systems, catalytic converters and other critical areas that demand high strength at relatively higher temperatures with ease of fabrication. It is also well suited for joining cast irons to alloy and carbon steels.

**DIAMETER:** .045"

**SHIELDING GAS:** 98% Ar/2% O<sub>2</sub>, 40-55 cfh

**WELDING POSITIONS:**

Flat and Horizontal



**CHARACTERISTICS:**

- 41% nickel containing alloy with added stabilizers.
- Provides uniformly smooth bead with low spatter.
- Features good penetration and nice wash.
- Extremely tough and ductile wire for cast iron welding.

**TYPICAL MECHANICAL PROPERTIES:**

	98% Ar/2% O <sub>2</sub>
Ultimate Tensile Strength (psi)	94,800
Yield Strength (psi)	67,800
Percent Elongation	15

**TYPICAL DEPOSIT COMPOSITION:**

Wt%	C	Mn	Ni	Bal
98Ar/2O <sub>2</sub>	.36	11.84	41.04	Fe





# HARDSURFACING

## Select-Arc Hardsurfacing Products

Hardsurfacing encompasses a broad range of alloy compositions which are designed for a variety of applications. The basic concept is to deposit, by an arc welding process, an alloy onto a metallic component which resists wear more effectively than the base metal of the component. By doing so, you increase the component life. The hardsurfacing alloy may also be required to provide additional resistance to other conditions including impact, adhesion, corrosion, erosion or elevated temperatures.

### Reasons for Hardsurfacing

Metal components eventually wear out from use or break in service. Until the advent of buildup and hardsurface welding operations, the part was discarded and replaced with a new O.E.M. part. Initially, the idea was to reclaim the worn part by building up the worn area with welding and/or subsequent machining. This practice of reclaiming the worn component proved to be a significant cost savings over the purchase of a new component. Some time later, the concept of improving the life of a metal component by welding a more wear resistant alloy to the components surface evolved. Again, this proved to be a great value in reducing the cost of operation.

### Hardsurfacing does the following:

1. Reduces the cost of operation by reclaiming worn components at a fraction of the new O.E.M. price.
2. Increases the life of components by utilizing more wear-resistant alloys.
3. Reduces machinery downtime by increasing component life.

In conclusion, reclamation by the use of buildup and hardsurface welding reduces costs of operation, making you more competitive in your industry.

### Alloy, Hardness vs. Wear

One common misconception is that higher hardness in the weld deposit yields better wear-resistance. Greater hardness does not always equate to less wear and longer component life. Different alloys with similar hardness values can result in entirely differing wear-resistance properties. Typically, the volume density, or amount of carbide present in the alloy matrix, imparts the wear-resistant properties to the alloy deposit. Therefore, the greater the volume of carbide, the greater the wear-resistance of the alloy. In some cases, the most wear-resistant alloy is not always the best solution for the application. As carbide volume increases, the more crack sensitive and less impact resistant the deposit becomes. The choice of which hardsurfacing alloy to use is normally a compromise between wear-resistance and impact-resistance of the alloy for a given application.

### Surfacing Alloy Groups

Hardsurfacing and buildup alloys are generally broken down into broad groups. Some groups can be broken down into smaller, more specific groups, but this is unnecessary for the majority of the market.

### Buildup Alloys

The buildup group is composed of lower carbon, low alloy steels, similar in range of chemistry to the component being reclaimed. By arc welding, the component is rebuilt to near original dimensions prior to final hardsurfacing operations. Typically, these alloys are machinable and offer a good combination of hardness and toughness.

Consideration should be given to heat treating procedures when welding with these alloys to reduce residual stresses caused by the welding process, reducing the potential for cracking.

### Austenitic Alloys

Typically, austenitic steels exhibit very good toughness and strength under high impact conditions. As deposited, these alloys can be very ductile, yielding hardnesses in the range of 17 to 23 Rockwell C scale hardness (HRc). Under impact, the alloy microstructure deforms, or work hardens, resulting in a hard, tough surface layer. Hardness can be increased to a range of 44 to 54 HRc. Because of the initial ductility of the deposit, buildup depth is generally unlimited. Some of the austenitic group can be considered both buildup and hard-surfacing alloys due to their ability to be deposited as a very ductile alloy and then work harden in service. This work hardening property makes them an ideal choice for rebuilding manganese crusher parts where extreme impact with low abrasion is encountered.

### Martensitic Alloys

The martensitic group includes a wide variety of hardsurfacing and some buildup alloys. These alloys are generally considered a good choice for metal-to-metal wear-resistance. Weld deposits yield good impact and abrasion properties. These alloys are also termed "air hardenable" meaning that the cooling rate is directly related to final hardness. Faster cooling promotes formation of the martensitic structure. Care must be taken with regard to heat treatment procedures (preheat, interpass, postweld stress relief) to avoid residual stresses and cracking of the weld deposit.

### Carbide Containing Alloys

This group of alloys can include many different carbide forming elements either alone or in combination. Typically high in carbon content, the weld deposit is composed of single, primary

type carbides or multiple carbides (complex carbides) in an iron matrix. The design of these alloys is such to allow the matrix material to hold the carbides in place under impact/abrasion conditions. The carbide structures impart the wear-resistant properties to the deposit, but require the matrix material to be tough enough to endure the impact. High density carbide alloys are considered the best choice for high abrasion wear conditions with some impact. Carbide forming elements include boron, chromium, columbium (niobium), molybdenum, titanium, tungsten and vanadium. The deposits tend to stress relief, crack check and are limited in depth of deposit depending on specific application.



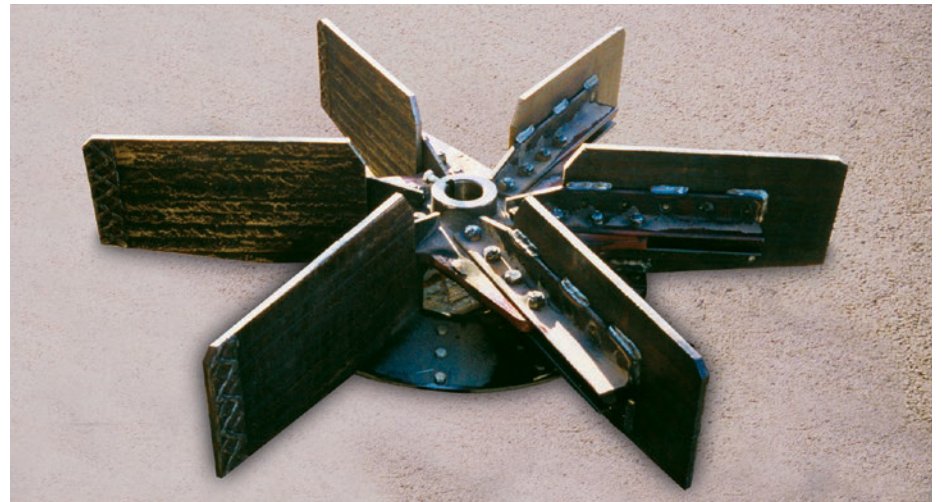
### Non-Ferrous Alloys

When discussing non-ferrous alloys used in the hardsurfacing industry, we are mainly referring to the cobalt and nickel based alloys. These alloys contribute additional properties including corrosion resistance, oxidation resistance, high temperature hardness, strength and creep resistance. Due to their higher cost over other iron based alloys, their use is limited to very specific applications where the additional material cost is justified.

Select-Arc has designed a line of hardsurfacing products which offer the highest level of metallurgical and welding performance. These cored wires are formulated to produce consistency of deposit composition and welding characteristics. From incoming inspection of alloy and mineral powders to the mixing operation to the fabrication of the wire, measures are in place to ensure that every pound of product meets specified performance criteria.

Rigorous checks of all raw materials are ongoing to verify that they conform to purchasing requirements. Dimensional requirements of steel are continuously monitored for accuracy and conformance. Fill percentages are checked every 600 pounds to ensure consistency throughout each mix of product. Chemical analysis is performed on

finished wire produced from each dry mix of every electrode. This translates into a deposit chemistry for every 1000-2000 lb. of manufactured wire. Weldability evaluations are conducted for wire samples representative of each dry mix; these evaluations are used to assess the arc characteristics, spatter levels, feedability, deposit appearance and overall welding performance of the electrode. These



actions are the result of a quality system which is designed to manufacture a cored welding electrode to meet customers' expectations; it is not to be confused with a quality manual containing slogans and platitudes which add nothing to the production of quality material.

Complimenting Select-Arc's premier quality reputation are three other factors which make us the right source for hardsurfacing tubular wires; modern and proprietary manufacturing equipment, superb customer and technical service, and a responsive and talented product development group. Wire manufactured on Select-Arc's state-of-the-art equipment is technologically superior to wire which has traditionally been fabricated and rolled to size with hydraulic rolling mills. Wire produced on our fabricating and drawing machinery is free of seam irregularities, slivers, fins and other surface imperfections associated with rolling

mills. Our mixing and feeding technology ensures the highest consistency throughout the blended mix, powder feeders and dispersion within the core of the wire. This uniform dispersion of core ingredients eliminates worries of alloy segregation which, in turn, maximizes the consistency of deposit composition, weld metal hardnesses, and resistance to abrasion, wear, corrosion or impact. Select-Arc's equipment can manufacture wire diameters from 5/32" down to 0.035" (for certain alloys). Each diameter is processed to provide smooth feeding characteristics and superb welder appeal.

Customer and technical services are essential to satisfying customer expectations, by means of proper internal and external communications. Information must be transferred accurately and promptly, and responses must be timely. Select-Arc prides itself on providing excellent customer service, accurate technical service and professional technical support. Select-Arc also has a staff of application specialists for assisting customers with welding and application problems. Their mission is to

provide solutions to problems and assistance in applying the proper product to specific welding situations. These specialists are available for training customers in the proper use of our products and the selection of the best welding electrode for each application.

It is not possible to develop, implement and expand a line of tubular hardsurfacing electrodes without a good product development team, and Select-Arc has one of the best in the industry. Our staff of engineers and technicians can react swiftly to customers' requests, whether they are development of new products or modifications to existing ones. Select-Arc's development engineers, all with metallurgical backgrounds, have the unique ability to formulate both the slag systems and alloy compositions that can be tailored to each customer's requirements.



## BUILD-UP AND JOINING WIRES

### SelectWear **BU**

**ALLOY GROUP:** Low Alloy Steel

SelectWear BU is a low alloy wire designed for buildup on carbon steels. BU has excellent compressive strength and resistance to cracking. Machinability is very good. Buildup thickness is generally unlimited with proper heat treatment procedures.

SelectWear BU-GV is a gas-shielded, all position, flux cored wire that may be used with CO<sub>2</sub> or Ar/CO<sub>2</sub> gas mixtures. It has excellent operating characteristics in vertical and overhead welding.

**APPLICATIONS:** Steel mill rolls, shafts, steel hammers, gear teeth, shovel pads

**DEPOSIT PROPERTIES:**

Chemistry: Fe-Mn-Cr  
Hardness (4 layers): Rc25-35  
Machinable  
Good crack resistance

AVAILABLE AS:	Diameters:
BU-FCG	.045", 1/16", 5/64", 3/32", 7/64", 1/8"
BU-FCO	.045", 1/16", 5/64", 7/64", 1/8"
BU-MCG	.035", .045", 1/16"
BU-S	7/64", 1/8", 5/32"
BU-GV	.045", 1/16"

#### Hardsurfacing Note:

Select-Arc hardsurfacing products come in a variety of forms to match the welding process being used. The designators following each product name indicate the operational characteristics of that particular electrode.

- FCG** Flux cored electrode for use with a shielding gas
- FCO** Flux cored electrode for use without a shielding gas
- MCG** Metal cored electrode for use with a shielding gas
- MCO** Metal cored electrode for use without a shielding gas
- S** Submerged arc electrode

### SelectWear **MN**

**ALLOY GROUP:** Austenitic Manganese

SelectWear MN is an austenitic manganese alloy designed for severe impact with moderate abrasion. MN yields a very tough, impact-resistant deposit which work hardens in use. Primarily utilized for buildup and repair of manganese steel components. Deposit thickness is generally unlimited and does not crack.

**APPLICATIONS:** Manganese rock crushing hammers and rolls, impactor bars, gyratory mantles, dredge components

**DEPOSIT PROPERTIES:**

Chemistry: Fe-Mn-Cr-C  
Hardness: As welded - Rc20, work hardens to Rc40-50  
Non-machinable  
Will not cross crack

AVAILABLE AS:	Diameters:
MN-FCG	.045", 1/16", 3/32", 7/64", 1/8"
MN-FCO	7/64"

### SelectWear **GP**

**ALLOY GROUP:** Austenitic Manganese

SelectWear GP is a premium grade austenitic manganese wire with a modified high chromium level. Utilized in the joining, repair and buildup of manganese steel parts. Weld deposits exhibit very good impact resistance. Sometimes used as a final layer of hardfacing in high impact applications with moderate wear. Buildup depth is generally unlimited.

**APPLICATIONS:** Manganese rock crushing hammers and rolls, impactor bars, gyratory mantles, dredge components

**DEPOSIT PROPERTIES:**

Chemistry: Fe-Cr-Mn-C  
Hardness: As welded - Rc22, work hardens to Rc45-52  
Machinable with carbide tools  
Will not cross crack

AVAILABLE AS:	Diameters:
GP-FCO	.045", 1/16", 5/64", 7/64", 1/8"





## METAL-TO-METAL WEAR

### SelectWear 423

**ALLOY GROUP:** Martensitic Stainless Steel

SelectWear 423 produces a deposit with improved resistance to thermal fatigue and corrosion as well as excellent wear resistance and high hot hardness.

**APPLICATIONS:** Steel mill caster rolls, table rolls

**CHEMISTRY:**

Carbon	0.15
Manganese	1.20
Silicon	0.40
Chromium	13.70
Nickel	2.50
Molybdenum	1.10
Niobium	0.20
Vanadium	0.20
Iron	Bal

**HARDNESS:** (HRC)

As Deposited	48
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**AVAILABLE AS:**

**Diameters:**

423-FCG	5/64", 3/32",
423-S*	3/32", 7/64", 1/8"

\* For use with neutral fluxes, such as Lincoln 801

## METAL-TO-EARTH WEAR

### SelectWear 44

**ALLOY GROUP:** Medium Alloy Carbide Steel

SelectWear 44 is an open arc wire designed to deposit chromium carbides in a semi-austenitic matrix. Alloy has good impact and abrasion properties. Weld deposit will stress relief cross crack.

**APPLICATIONS:** Dredge pump shells and components, crusher rolls, gyratory cones and mantles

**DEPOSIT PROPERTIES:**

Chemistry: Fe-Cr-Mo-C  
Hardness (3 layers): R<sub>C</sub>42-45  
Not machinable  
Will cross crack

**AVAILABLE AS:**

**Diameters:**

44-MCO	1/16", 7/64", 1/8"
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### SelectWear 50

**ALLOY GROUP:** Medium Chromium Carbide

SelectWear 50 is an open arc, medium chromium carbide alloy. Weld deposit exhibits resistance to both moderate wear and impact. Multiple pass applications are possible dependant on application. Deposit stress relieves itself by cross cracking.

**APPLICATIONS:** Rock crushing hammers and rolls, impactor bars, gyratory mantles, dredge components, augers, pug mill paddles

**DEPOSIT PROPERTIES:**

Chemistry: Fe-Cr-C  
Hardness (2 layers): R<sub>C</sub>50-54  
Not machinable  
Will cross crack

**AVAILABLE AS:**

**Diameters:**

50-MCO	.045", 1/16", 5/64", 7/64", 1/8"
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#### Hardsurfacing Note:

Select-Arc hardsurfacing products come in a variety of forms to match the welding process being used. The designators following each product name indicate the operational characteristics of that particular electrode.

- FCG** Flux cored electrode for use with a shielding gas
- FCO** Flux cored electrode for use without a shielding gas
- MCG** Metal cored electrode for use with a shielding gas
- MCO** Metal cored electrode for use without a shielding gas
- S** Submerged arc electrode

## SelectWear 57GW

**ALLOY GROUP:** Martensitic Tool Steel

SelectWear 57GW is an iron-based, martensitic alloy. It offers high hardness (Rc54-58) and good abrasion resistance combined with enhanced impact resistance. SelectWear 57GW is often used as a matrix for tungsten carbide particles that are dropped into its weld puddle. The deposit is ductile enough so that the tungsten carbide particles are less likely to be pulled out in service. The deposit is magnetic, will not cross check and is not readily machineable. This wire is designed to operate with argon/2% oxygen.

**APPLICATIONS:** Debarking knives, agricultural tillage, chisel plows, dredge components, earthmoving bucket lips, extruder screws

**DEPOSIT PROPERTIES:**

Chemistry: Fe-Cr-C  
Hardness (2 layers): Rc54-58  
Not machinable  
Will not cross crack

**AVAILABLE AS:**

57GW-MCG

**Diameter:**

1/16"

## SelectWear 58

**ALLOY GROUP:** Martensitic Tool Steel

SelectWear 58 is a martensitic alloy designed as a general purpose hardfacing wire. It is available in gas-shielded or open-arc versions. 58 offers high hardness with good balance between abrasion and impact resistance. It is an excellent choice for components that are required to maintain a sharp edge.

SelectWear 58-GV is a gas-shielded, all-position, flux cored wire version that may be used with either CO<sub>2</sub> or 75%Ar/25%CO<sub>2</sub> shielding. The specially designed slag system allows for easy use in vertical or overhead welding, with low spatter and fume.

**APPLICATIONS:** Debarking knives, agricultural tillage tools, chisel plows, dredge components, earthmoving bucket lips

**DEPOSIT PROPERTIES:**

Chemistry: Fe-Cr-Mo-V-C  
Hardness (2 layers): Rc56-60  
Not machinable, grinding only  
Will not cross crack

**AVAILABLE AS:**

58-FCO

58-MCG

58GV-FCG

**Diameters:**

.045", 1/16", 7/64", 1/8"

.035", .045, 1/16",  
7/64", 1/8"

045", 1/16"

## SelectWear 60HC

**ALLOY GROUP:** Chromium Carbide

SelectWear 60HC is designed to deposit an alloy composed of a high density of primary chromium carbides in an iron matrix. Most economical of hardfacing alloys in high wear applications. Deposit has high abrasion resistance with moderate resistance to impact. Deposit stress relieves itself by cross cracking. Can be utilized in hot wear applications up to 1,100°F.

**APPLICATIONS:** Grinding/Pulverizing rolls and table segments, wear plates, clad pipe, dredge pump shells and related components, hammers.

**DEPOSIT PROPERTIES:**

Chemistry: Fe-Cr-C  
Hardness (2 layers): Rc58-62  
Not machinable  
Will cross crack

**AVAILABLE AS:**

60HC-MCO

**Diameters:**

1/16", 5/64", 3/32",  
7/64", 1/8"

**SelectWear 60PW**

**ALLOY GROUP:** Chromium Carbide

SelectWear 60PW wire is similar to the 60HC but deposits an alloy composed of a higher density of primary chromium carbides and higher hardness than 60HC. Designed specifically for single and double pass overlay plate applications.

**APPLICATION:** Wear plate

**DEPOSIT PROPERTIES:**

Chemistry: Fe-Cr-C  
Hardness (2 layers): R<sub>C</sub>59-63  
Not machinable  
Will cross crack

**AVAILABLE AS:**

60PW-MCO

**Diameters:**

7/64", 1/8"

**SelectWear 63**

**ALLOY GROUP:** Complex Carbide

SelectWear 63 is an open arc wire used to yield a deposit of primary chromium carbides and secondary columbium carbides in a martensitic matrix. Weld deposit gives high abrasion resistance with moderate impact. Typical wear life increase of 33% over standard chromium carbide alloys. Designed for single and double pass overlay applications. Deposit will stress relief cross crack. Maintains hardness and wear resistance into 1200°- 1400°F range.

**APPLICATIONS:** Clad wear plate, slurry pipe, grinding rolls and table segments, aggregate screens, fan blades

**DEPOSIT PROPERTIES:**

Chemistry: Fe-Cr-Nb-C  
Hardness (2 layers): R<sub>C</sub>61-65  
Not machinable  
Will cross crack

**AVAILABLE AS:**

63-MCO

**Diameters:**

5/64", 7/64", 1/8"

**SelectWear 65**

**ALLOY GROUP:** Complex Carbide (High Temp)

SelectWear 65 is an open arc wire composed of a high density of primary chromium carbides with multiple secondary carbides. Designed specifically for single and double pass applications in high temperature environments. Weld deposit will stress relief cross crack. Maintains hardness and wear resistance into 1400° - 1500°F range.

**APPLICATIONS:** Clad wear plate, slurry pipe, cement furnace components, sinter plant parts, fan blades, mixer blades, screws

**DEPOSIT PROPERTIES:**

Chemistry: Fe-Cr-Nb-Mo-C  
Hardness (2 layers): R<sub>C</sub>61-65  
Not machinable  
Will cross crack

**AVAILABLE AS:**

65-MCO

**Diameters:**

3/32", 7/64", 1/8"

**Hardsurfacing Note:**

Select-Arc hardsurfacing products come in a variety of forms to match the welding process being used. The designators following each product name indicate the operational characteristics of that particular electrode.

- FCG** Flux cored electrode for use with a shielding gas
- FCO** Flux cored electrode for use without a shielding gas
- MCG** Metal cored electrode for use with a shielding gas
- MCO** Metal cored electrode for use without a shielding gas
- S** Submerged arc electrode

## SelectWear 600TIC

**ALLOY GROUP:** Titanium Carbide

SelectWear 600TIC is designed as a tubular, self-shielded wire for hardfacing applications. Deposit is composed of a martensitic steel matrix containing a high volume fraction of titanium carbides. 600TIC is best suited for applications involving extreme wear under high pressure.

**APPLICATIONS:** Roller presses, grinding/pulverizing rolls, dredge pump shells, rock crushing hammers

**DEPOSIT PROPERTIES:**

Chemistry: Fe-Cr-Ti-C  
Hardness (2 layers): Rc54-58  
Not machinable  
Will not cross crack

<b>AVAILABLE AS:</b>	<b>Diameters:</b>
600TIC-MCO	.045", 1/16", 7/64", 1/8"

## SelectWear Zucar

**ALLOY GROUP:** Chromium Carbide

SelectWear Zucar is a self-shielded electrode designed specifically to arc sugar cane crusher rolls.

**APPLICATION:** Sugar cane crusher rolls

**DEPOSIT PROPERTIES:**

Chemistry: Fe-Cr-C

**HARDNESS:** (HRC)

As Deposited 48

**AVAILABLE AS:**

ZUCAR-MCO

**Diameters:**

3/32", 1/8"



## Electrode Products Comparability Chart

AWS Class	Select-Arc	Corex	Esab	Hobart	Lincoln	Tri-Mark	Kobe
<b>Carbon Steel, Gas-Shielded Tubular (Flat &amp; Horizontal)</b>							
E70T-1	Select 70TR						
E70T-1	Select Super 70		Dual Shield 111-HD Dual Shield 87	Outershield 70-H			
E70T-1	Select 71	Flux Cor 2	Dual Shield 111-AC	FabCO RXR	Outershield 70	TM-RX7, TM-72	Frontiarc-701
E70T-1	Select 71A						
E70T-1	Select 71P		Dual Shield 111-RB			Premier 70	MX-200
E70T-2	Select 72		Dual Shield T63, SP			TM-73	
E70T-2	Select Super 72						
E70T-5	Select 75		Dual Shield T-75, T-5	FabCO 85	Outershield 75C	TM-55	
E70T-1	Select 97		Dual Shield R-70 Ultra	FabCO TR70			
<b>Carbon Steel, Gas-Shielded Tubular (All Position)</b>							
E71T-1	Encore			Hornet			Frontiarc 711
E71T-1	Select 710	Verti-Cor 1	Dual Shield 7000	FabCO 825	Outershield 71	TM-711M	
E71T-1	Select 717		Dual Shield 70 Ultra Plus			TM-910	
E71T-1	Select 720	Versatile 72	Dual Shield II 71 Ultra			Triple 8, TM-771	
E71T-1	Select 720A		Dual Shield 7100 LC				
E71T-1	Select 720HP		Dual Shield II 70T-12H4	XL-550	Outershield 712C, 712A80-H		
E71T-1	Select 721	Verti-Cor 70	Dual Shield II 70 Ultra	XL-525		TM-770	
E71T-1	Select 727	Versatile	Dual Shield 7100 Ultra	Excel-Arc 71	Outershield 71M	Triple 7	DW-50
E71T-1	Select 737		Dual Shield II 712X	Formula XL-525	UltraCore 712A80		
<b>Carbon Steel, Gas-Shielded Tubular (Metal Cored)</b>							
E70C-3	Select 70C-3						
E70C-6	Endurance			Matrix			
E70C-6	Select 70C-6	Metal-Cor 6	Coreweld 70	FabCO 86R	Metalshield MC-6	Metalloy 76	MXA-70C6
E70C-6	Select 70C-6LS	Metal-Cor Maxim			Metalshield MC-706	Metalloy Vantage	
E70C-6	Select 70C-7	Metal-Cor 6L	Coreweld C6		Metalshield MC-710XL	Metalloy 70X	
E70C-6	Select 70C-8						
E70C-6	Select 70C-10						
E70C-6	Select 70C-T						
<b>Carbon Steel, Flux Cored, Self-Shielded (Flat &amp; Horizontal)</b>							
E70T-3	Select 73	Self-Shield 3		Fabshield 55	Innershield NR-5	TM-33	
E70T-3	Select 73R		Coreshield 3 Si		Innershield NR-1	TM-33R	
E70T-4	Select 74	Self-Shield 4	Coreshield 40	Fabshield 4	Innershield NS-3M	TM-44	
<b>Carbon Steel, Flux Cored, Self-Shielded (All Position)</b>							
E71T-11	Select 701	Self-Shield 11	Coreshield 11	Fabshield 21B	Innershield NR-211-MP	TM-121	
E71T-GS	Select 700GS		Coreshield 15	Fabshield 23	Innershield NR-152	TM-123	
<b>Carbon Steel, Solid Wire, Copper-Coated</b>							
ER70S-3	Select 70S-3		Spoolarc 82	Quantum Arc 3	SuperArc L-50		
ER70S-6	Select 70S-6		Spoolarc 86	Quantum Arc 6	SuperArc L-56		MG-51T

Comparability Chart Continued Next Page

## Electrode Products Comparability Chart (continued)

AWS Class	Select-Arc	Corex	Esab	Hobart	Lincoln	Tri-Mark	Kobe
<b>Carbon Steel, Solid Wire, Copper-Free</b>							
ER70S-3	Select 70S-3NC			QCL-3	SuperGlide S3		
ER70S-6	Select 70S-6NC			QCL-6	SuperGlide S6		
<b>Low Alloy, Nickel Bearing (Flat &amp; Horizontal)</b>							
E80T1-Ni1	Select 81-Ni1		Dualshield 88-C3			TM-81N1	
E80T1-Ni2	Select 81-Ni2						
E80T5-Ni3	Select 85-Ni3						
<b>Low Alloy, Nickel Bearing (All Position)</b>							
E81T1-G	Select 737Ni						
E81T1-Ni1	Select 810-Ni1	Verti-Cor II Ni1	Dual Shield II 80-Ni1	Formula XL-8Ni1	Outershield 81Ni1-H	TM-811N1	
E81T1-Ni1	Select 820-Ni1				UltraCore 81Ni1A75-H, UltraCore 81Ni1C-H		
E81T1-Ni2	Select 810-Ni2	Verti-Cor 81Ni2	Dual Shield 8000-Ni2			TM-811N2	
E81T1-Ni2	Select 820-Ni2				UltraCore 81Ni2A75-H, UltraCore 81Ni2C-H		
E91T1-Ni2	Select 910-Ni2	Verti-Cor 91Ni2	Dual Shield 9000-C1			TM-911N2	
E91T1-G	Select 937Ni						
<b>Low Alloy, Nickel Bearing (Metal Cored)</b>							
E80C-Ni1	Select 80C-Ni1		Coreweld 80C-Ni1			Metalloy 80N1	
E80C-Ni1	Select 80C-Ni1LS						
E80C-Ni2	Select 80C-Ni2					Metalloy 80N2	
<b>Low Alloy, Nickel-Molybdenum Bearing (Flat &amp; Horizontal)</b>							
E90T1-K2	Select 91-K2	Flux-Cor 90K2	Dual Shield 98			TM-91K2	
E90T5-K2	Select 95-K2		Dual Shield T95-M			TM-95K2	
E100T1-K3	Select 100-K3		Dual Shield T-100			TM-101K3	
E110T1-K3	Select 110-K3		Dual Shield T-8			TM-111K3	
E110T5-K3	Select 115-K3		Dual Shield T-115	FabCO 115		TM-115	
<b>Low Alloy, Nickel-Molybdenum Bearing (All Position)</b>							
E81T1-K2	Select 812-K2		Dual Shield II 81-K2	FabCO 81K2-C	Outershield 81K2-H	TM-881K2	MXA 55T
E91T1-K2	Select 910-K2		Dual Shield 9100-K2	FabCO 91K2-C	Outershield 91K2-H	TM-991K2	
E91T1-K2	Select 920-K2						
E101T1-K3	Select 101-K3M		Dual Shield II 100				
E111T1-K3	Select 111-K3C					TM-1101K3-C	
E111T1-K3	Select 111-K3M		Dual Shield II 110	FabCO 110K3-M		TM-1101K3-M	
E101T1-G	Select 101 SR		Dual Shield II 100-D1				
<b>Low Alloy, Nickel-Molybdenum Bearing (Metal Cored)</b>							
E90C-G	Select 90C-M2	Metal Cor 90			Outershield MC900	Metalloy 90	
E100C-G	Select 100C					Metalloy 100	
E100C-K3	Select 100C-K3					Metalloy 100	
E120C-G	Select 120C						

Comparability Chart Continued Next Page

## Electrode Products Comparability Chart (continued)

AWS Class	Select-Arc	Corex	Esab	Hobart	Lincoln	Tri-Mark	Kobe
<b>Low Alloy, Nickel-Chromium-Molybdenum Bearing (Flat &amp; Horizontal)</b>							
E110T5-K4	Select 115-K4			FabCO 115			
E120T5-K4	Select 125-K4		Dual Shield T-125			TM-125K4	
	Select 4130LN		Dual Shield 4130-LN				
<b>Low Alloy, Nickel-Chromium-Molybdenum Bearing (Metal Cored)</b>							
E110C-G	Select 110C-M2		Coreweld 110		Metalshield MC-1100		
E110C-K4	Select 110C-K4	Metal Cor 110				Metalloy 110	
-	Select 4130C						
<b>Low Alloy, Manganese-Molybdenum Bearing (Flat &amp; Horizontal)</b>							
E100T5-D2	Select 105-D2		Dual Shield T-105D2			TM-105D2	
E90T1-D3	Select 91-D3		Dual Shield 150			TM-91D3	
<b>Low Alloy, Manganese-Molybdenum Bearing (Metal Cored)</b>							
E80C-G	Select 80C-D2		Coreweld 80-D2				
<b>Low Alloy, Carbon-Manganese Bearing (Flat &amp; Horizontal)</b>							
E80T-G	Select 80						
<b>Low Alloy, Carbon-Molybdenum Bearing (Flat &amp; Horizontal)</b>							
E80T1-A1	Select 81-A1		Dual Shield 78 Mo				
<b>Low Alloy, Carbon-Molybdenum Bearing (Metal Cored)</b>							
E81T1-A1	Select 810-A1		Dual Shield 7000-A1			TM-811A1	
<b>Low Alloy, Chromium-Molybdenum Bearing (Flat &amp; Horizontal)</b>							
E80T1-B2	Select 81-B2		Dual Shield 88-CM			TM-81B2	
E80T5-B2	Select 85-B2		Dual Shield T85-B2				
E80T5-B2L	Select 85-B2L						
E90T1-B3	Select 91-B3		Dual Shield 98-CM			TM-91B3	
<b>Low Alloy, Chromium-Molybdenum Bearing (All Position)</b>							
E81T1-B2	Select 810-B2		Dual Shield 8000-B2		Outershield 81B2-H	TM-811B2	DW-1CMA
E81T1-B2L	Select 810-B2L		Dual Shield 8000-B2L				
E91T1-B3	Select 910-B3		Dual Shield 9000-B3			TM-911B3	DW-2CMA
E91T1-B3L	Select 910-B3L		Dual Shield 9000-B3L				
E81T1-B6	Select 810-B6		Dual Shield B6				
E81T1-B8	Select 810-B8						
E91T1-B9	Select 910-B9		Dual Shield B9				
<b>Low Alloy, Chromium-Molybdenum Bearing (Metal Cored)</b>							
E80C-B2	Select 80C-B2		Coreweld 80-B2			Metalloy 80B2	
E90C-B3	Select 90C-B3		Coreweld 90-B3				
E90C-G	Select 90C-B9						
<b>Low Alloy, Weathering Steel (All Position)</b>							
E81T1-W2	Select 810-W		Dual Shield 8100-W			TM-811W	
<b>Low Alloy, Weathering Steel (Metal Cored)</b>							
E80C-W2	Select 80C-W		Coreweld W				

Comparability Chart Continued Next Page

**Electrode Products Comparability Chart (continued)**

AWS Class	Select-Arc	Corex	Esab	Hobart	Kobe	Lincoln	McKay	Trimark
<b>Stainless Steel, Austenitic (Flat &amp; Horizontal)</b>								
E308LT0-1/4	SelectAlloy 308L		ShieldBright 308L XTRA		DW-308L	UltraCore FC-308L	ChromaWeld 308L T0	
E308LT0-4	SelectAlloy 308L CRYO		Cryo-Shield 308L					
E309LT0-1/4	SelectAlloy 309L		ShieldBright 309L XTRA		DW-309L	UltraCore FC-309L	ChromaWeld 309L T0	
E312LT0-1/4	SelectAlloy 312				DW-312			
E316LT0-1/4	SelectAlloy 316L		ShieldBright 316L XTRA		DW-316L	UltraCore FC-316L	ChromaWeld 316L T0	
E316LT0-4	SelectAlloy 316L CRYO							
E317LT0-1/4	SelectAlloy 317L		ShieldBright 317L XTRA		DW-317L			
E347T0-1/4	SelectAlloy 347				DW-347			
<b>Stainless Steel, Austenitic (All Position)</b>								
–	SelectAlloy 16-8-2-AP							
E307T1-1/4	SelectAlloy 307-AP		ShieldBright 307					
E308HT1-1/4	SelectAlloy 308H-AP		ShieldBright 308		DW-308P			
E308LT1-1/4	SelectAlloy 308L-AP		ShieldBright 308L		DW-308LP	FCR 308L	ChromaWeld 308L T1	
E308LT1-1/4	SelectAlloy 308L-AP CRYO		Cryo-Shield 308L					
E309T1-1/4	SelectAlloy 309H-AP		ShieldBright 309H					
E309LT1-1/4	SelectAlloy 309L-AP		ShieldBright 309L		DW-309LP	UltraCore FCP-309L	ChromaWeld 309L T1	
E309LMoT1-1/4	SelectAlloy 309LMo-AP		ShieldBright 309LMo					
E309LCbT1-1/4	SelectAlloy 309LCb-AP							
E312T1-1/4	SelectAlloy 312-AP		ShieldBright 312					
E316T1-1/4	SelectAlloy 316H-AP		ShieldBright 316H					
E316LT1-1/4	SelectAlloy 316L-AP		ShieldBright 316L		DW-316LP	UltraCore FCP-316L	ChromaWeld 316L T1	
E316LT1-1/4	SelectAlloy 316L-AP CRYO							
E317LT1-1/4	SelectAlloy 317L-AP		ShieldBright 317L					
E347LT1-1/4	SelectAlloy 347-AP		ShieldBright 347					
<b>Stainless Steel, Austenitic (Self-Shielded)</b>								
E307T0-3	SelectAlloy 307T0-3							
E308LT0-3	SelectAlloy 308LT0-3		CoreBright 308L				ChromaInflux 308L-0	
E309LT0-3	SelectAlloy 309LT0-3		CoreBright 309L				ChromaInflux 309L-0	
E309T0-3	SelectAlloy 309T0-3							
E316LT0-3	SelectAlloy 316LT0-3		CoreBright 316L					
E347T0-3	SelectAlloy 347T0-3							
<b>Stainless Steel, Austenitic (Metal Cored)</b>								
–	SelectAlloy 16-8-2-C							
EC 307	SelectAlloy 307-C							
	SelectAlloy 307EU-C							
EC 308L	SelectAlloy 308L-C		Arcaloy MC308L					
EC 308LSi	SelectAlloy 308LSi-C						GoldCor 308L Si	
EC 309L	SelectAlloy 309L-C		Arcaloy MC309L					
EC 309LSi	SelectAlloy 309LSi-C						GoldCor 309L Si	
	SelectAlloy 310G-C							
EC 312	SelectAlloy 312-C							
EC 316L	SelectAlloy 316L-C		Arcaloy MC316L					
EC 316LSi	SelectAlloy 316LSi-C						GoldCor 316L Si	
EC 317L	SelectAlloy 317L-C							
EC 347	SelectAlloy 347-C							

Comparability Chart Continued Next Page



## Electrode Products Comparability Chart (continued)

AWS Class	Select-Arc	Corex	Esab	Hobart	Kobe	Lincoln	McKay	Trimark
<b>Stainless Steel, Duplex (All Position)</b>								
E2209T1-1/4	SelectAlloy 2209-AP		ShieldBright 2209		DW-2209			
E2553T1-4	SelectAlloy 2553-AP							
E2594T1-4	SelectAlloy 2594-AP							
<b>Stainless Steel, Duplex (Metal Cored)</b>								
EC2209-C	Select 2209-C							
EC2594-C	SelectAlloy 2594-C							
<b>Stainless Steel, Martensitic (Flat &amp; Horizontal)</b>								
E410T0-4	Select 410							
E410NiMoT0-1	Select 410NiMo							
<b>Stainless Steel, Martensitic (All Position)</b>								
E410T1-1	Select 410-AP		Arcaloy MC410					
E410NiMoT1-1	Select 410NiMo-AP		Arcaloy MC410NiMo				Influx 410NiMo1	
<b>Stainless Steel, Martensitic (Metal Cored)</b>								
EC410	Select 410-C							
EC410NiMo-C	Select 410NiMo-C							
<b>Stainless Steel, Ferritic (Metal Cored)</b>								
EC409Cb	Select 409Cb	Metal-Cor 409Cb	Arcaloy 409Cb					Metalloy 409Cb
EC439	Select 439Ti	Metal-Cor 439	Arcaloy 439	Fabloy 439				Metalloy 439
EC439Nb	Select 18CrCb-C		Arcaloy 18CrCb					Metalloy 18CrCb
	Select 430L-Cb							
	Select 430NbL							
<b>Nickel Alloys, Flux Cored (All Position)</b>								
ENiCr3T1-4	SelectAlloy 82-AP							
ENiCrMo4T1-1/4	SelectAlloy C276-AP							
ENiCrMo10T1-4	SelectAlloy 622-AP							
ENiCrMo3T1-1	SelectAlloy 625-AP							
<b>Nickel Alloys (Metal Cored)</b>								
ERNiCrMo3	SelectAlloy 625-C							
ECNiFeMn-CI	SelectAlloy 2216-C							

## Hardsurfacing Electrode Products Comparability Chart

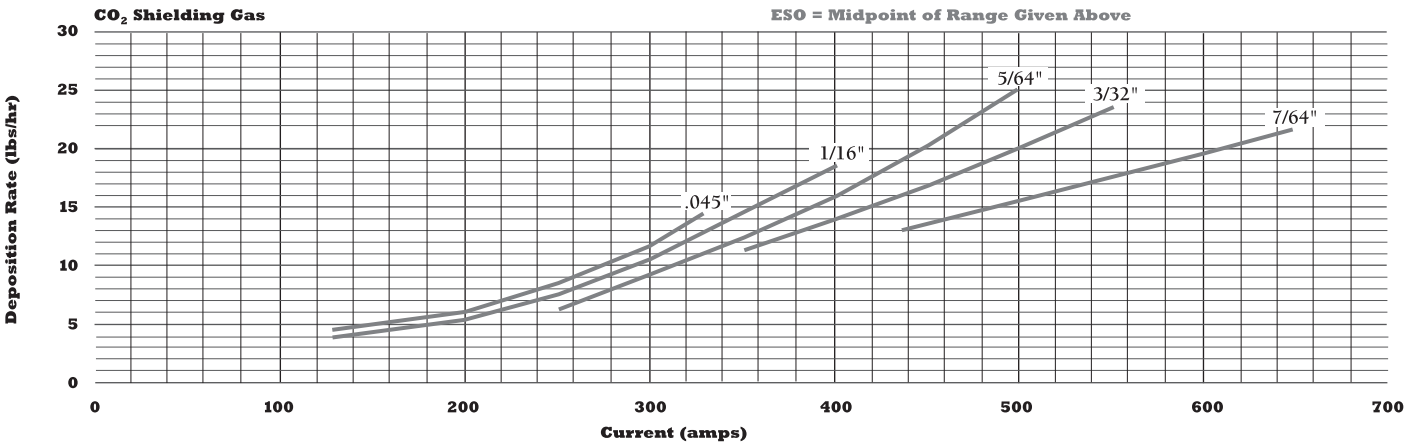
SelectWear	McKay	Lincoln	Stoody	Welding Alloys
<b>Build-Up &amp; Joining Wires</b>				
BU	BuildUp-0	33	BUILD-UP	T-0
MN	218-0	M	DYNAMANG	NM-0
GP	AP-0	15 CrMn	110-0	AP-0
<b>Metal-to-Metal Wear</b>				
42	242-0	40-0	105-0/G	R-0/G
52W	258-0/G	T&D	102-0/G	WLC-0/G
420-S	A250-S	420-S	420S	420-S
423-S	865-S	423L	423S	414MM-S
<b>Metal-to-Earth Wear</b>				
44	244-0	–	117-0	DP-0
50	240-0	50-0	121-0	MC-0
57GW				
58	260-0/G	55-0/G	965-0/G	L-0/G
60HC	255-0	60-0/65-0	100HC/HD	HC-0
60PW	–	65-0	–	HC-028
63	A43-0	–	143-0	CN-0
65	A45-0	–	145-0	CNV-0
600TIC-0	258TIC-0	–	600-0	TIC-0

**Recommended Welding Parameters:  
Carbon & Low Alloy Steel Electrodes - Flux Cored - Flat and Horizontal - CO<sub>2</sub> - DCEP**

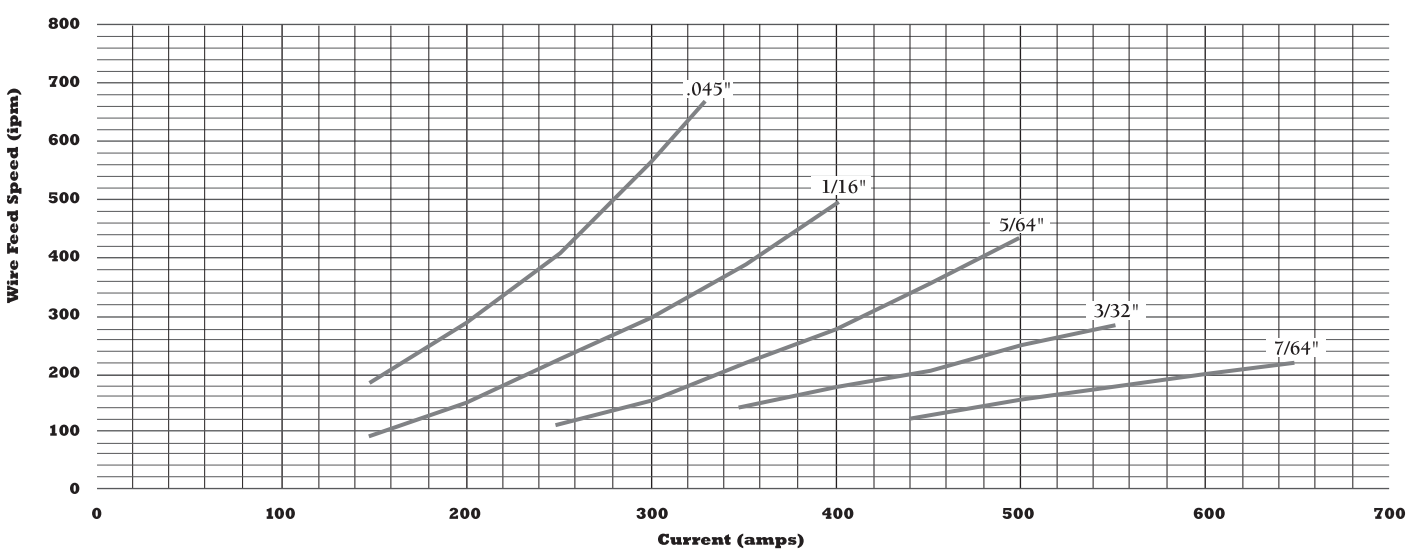
Diameter	Operating Range			Optimum			
	Amps	WFS (ipm)	Volts	Amps	WFS (ipm)	Volts	ESO
1/8"	450-800	75-180	30-36	600	125	32	3/4 - 1 1/4"
7/64"	375-700	80-240	28-36	550	150	30	3/4 - 1 1/4"
3/32"	300-550	110-270	26-34	425	180	29	3/4 - 1 1/4"
5/64"	280-430	140-300	26-33	390	250	29	3/4 - 1 1/4"
1/16"	150-400	130-500	22/34	330	330	29	1/2 - 1"
.045"	130-330	160-670	21/32	250	450	28	1/2 - 1"

**Flat and Horizontal Flux Cored Electrodes - Carbon & Low Alloy Steel**

**Deposition Rates**



**Wire Feed Speed vs. Current**



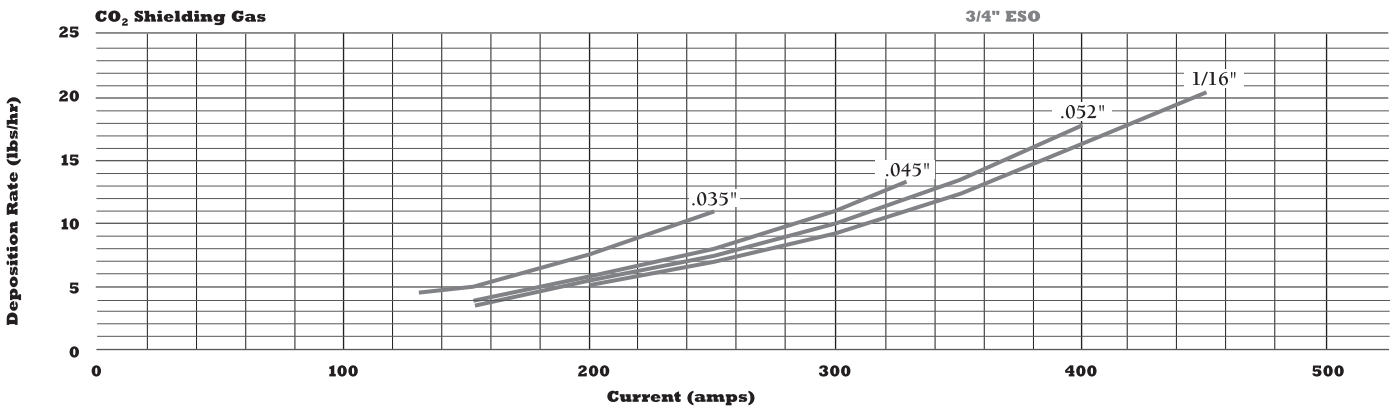
**Recommended Welding Parameters:  
Carbon & Low Alloy Steel Electrodes - Flux Cored - All Position - CO<sub>2</sub>\* - DCEP**

Diameter	Operating Range			Optimum			
	Position	Amps	Volts	Amps	WFS (ipm)	Volts	ESO
1/16"	Flat	150-400	22-34	330	330	29	1/2 - 1"
	Overhead	150-310	22-28	225	180	26	1/2 - 1"
	Vertical Up	150-280	22-27	225	180	25	1/2 - 1"
.052"	Flat	140-330	19-32	275	400	28	1/2 - 1"
	Overhead	150-290	21-28	200	245	26	1/2 - 1"
	Vertical Up	140-270	21-27	200	245	25	1/2 - 1"
.045"	Flat	130-300	21-32	250	450	28	1/2 - 1"
	Overhead	150-280	21-30	190	305	26	1/2 - 1"
	Vertical Up	130-260	21-29	190	305	25	1/2 - 1"
.035"	Flat	125-250	21-30	200	600	27	3/8 - 3/4"
	Overhead	115-220	21-28	175	490	25	3/8 - 3/4"
	Vertical Up	120-215	21-28	170	450	25	3/8 - 3/4"

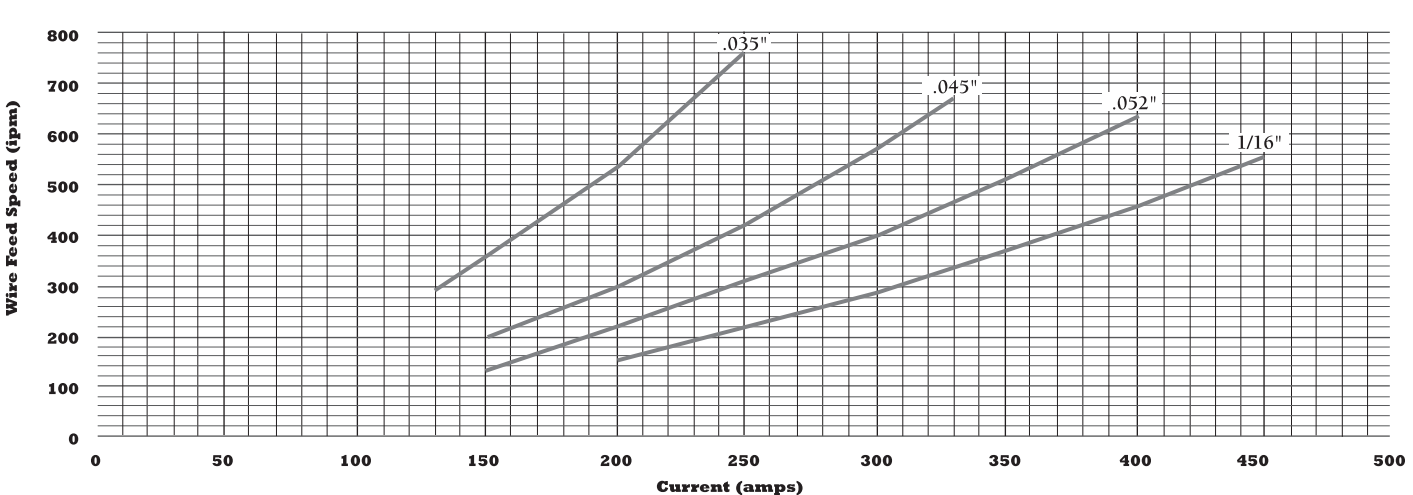
\* For Ar-25% CO<sub>2</sub> shielding gas reduce the voltage by 1 to 1.5 volts

**All Position Flux Cored Electrodes - Carbon & Low Alloy Steel**

**Deposition Rates**



**Wire Feed Speed vs. Current**



## Recommended Welding Parameters: Carbon and Low Alloy Steel Metal Cored - Argon/Carbon Dioxide - DCEP

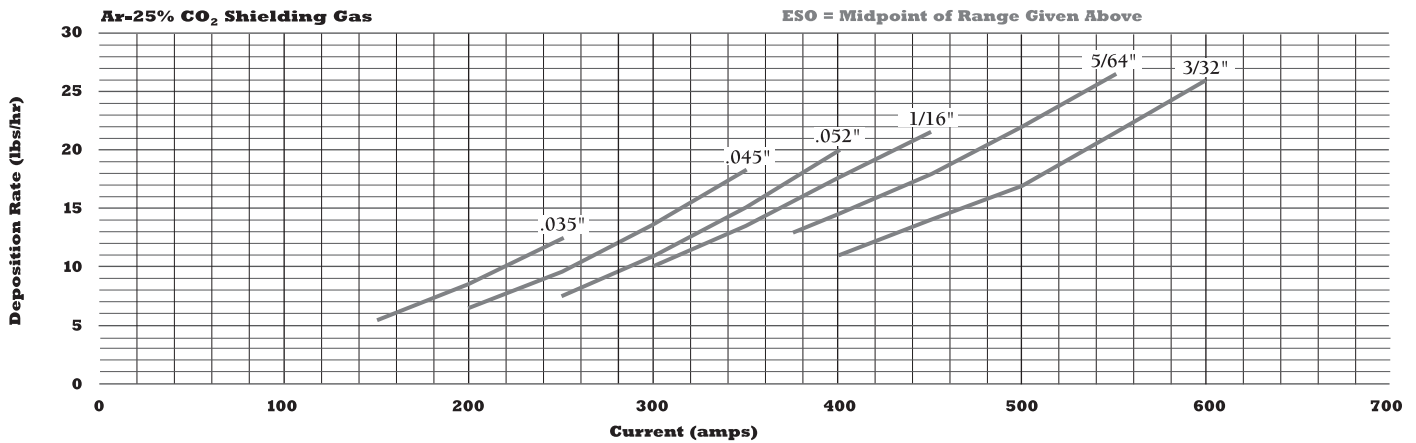
Diameter	Operating Range			Optimum			
	Amps	WFS (ipm)	Volts	Amps	WFS (ipm)	Volts	ESO
1/8"	450-625	95-145	26-32	500	100	28-29	1 - 1 1/4"
3/32"	400-600	125-250	28-36	420	165	29-30	1 - 1 1/4"
5/64"	350-550	170-350	27-36	450	245	29-30	1 - 1 1/4"
1/16"	240-520	175-500	26-37	360	300	29-30	3/4 - 1 1/4"
.052"	220-460	220-620	25-35	300	350	29-30	1/2 - 1"
.045"	180-330	240-600	27-33	255	410	29-30	1/2 - 1"
.035"	160-250	350-750	24-35	200	550	29-30	1/2 - 3/4"

### Typical Short Arc Parameters (for out-of-position welding)

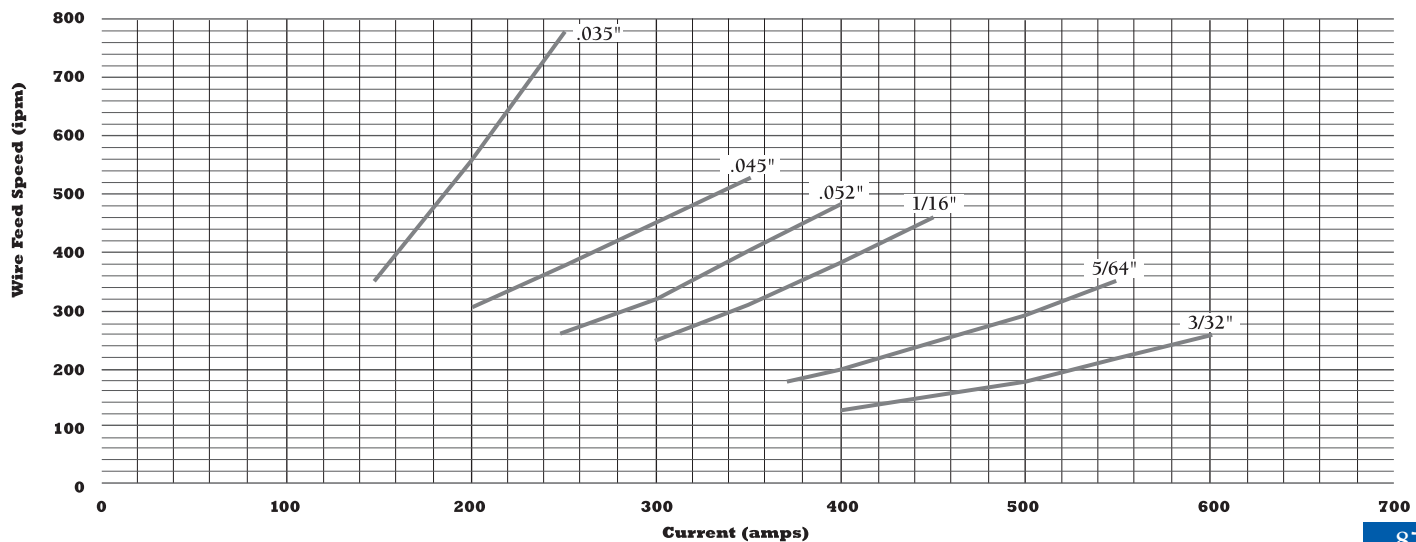
Diameter (in.)	Amps	WFS (ipm)	Volts
.035"	100	145	15-16
.045"	140	150	16-17
.052"	125	120	17-18

## Carbon and Low Alloy Steel

### Deposition Rates



### Wire Feed Speed vs. Current





**Recommended Welding Parameters: Carbon and Low Alloy Steel Flux Cored - Self-Shielded**

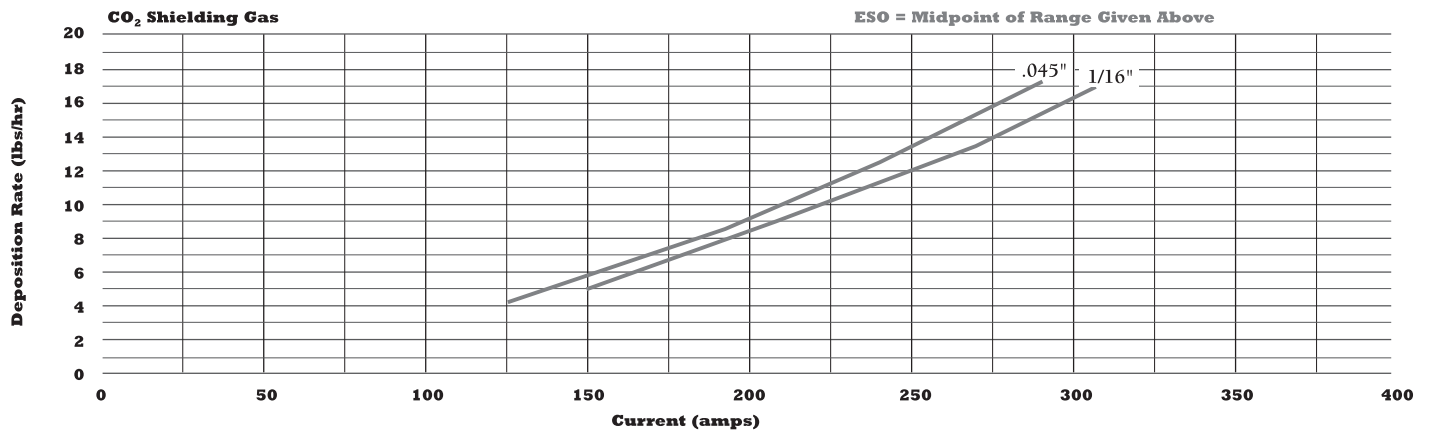
Diameter 701, 700GS	Operating Range			Optimum Flat & Horizontal			Optimum Vertical and OH		
	Amps DCEN	Volts	ESO	Amps	WFS (ipm)	Volts	Amps	WFS (ipm)	Volts
.030"	40-180	14-18	3/8 - 1/2"	125	215	15	100	170	15
.035"	60-220	14-19	3/8 - 1/2"	170	225	16	125	160	17
.045"	80-240	15-20	3/8 - 3/4"	200	190	17	170	155	17
1/16"	130-300	15-20	1/2 - 3/4"	250	110	18	170	90	16
5/64"	180-350	16-22	3/4 - 1"	300	75	18	–	–	–
3/32"	220-400	16-22	3/4 - 1"	325	65	19	–	–	–
<b>73</b>	<b>DCEP</b>	<b>Volts</b>	<b>ESO</b>	<b>Amps</b>	<b>WFS (ipm)</b>	<b>Volts</b>	<b>Amps</b>	<b>WFS (ipm)</b>	<b>Volts</b>
5/64"	300-450	24-28	1 - 1 1/4"	400	245	26	–	–	–
3/32"	350-500	25-29	1 - 1 1/4"	450	200	27	–	–	–
.120"	400-550	26-30	1 - 1 1/4"	500	145	28	–	–	–
<b>74</b>	<b>DCEP</b>	<b>Volts</b>	<b>ESO</b>	<b>Amps</b>	<b>WFS (ipm)</b>	<b>Volts</b>	<b>Amps</b>	<b>WFS (ipm)</b>	<b>Volts</b>
1/16"	175-260	28-31	1 3/4"	200	205	30	–	–	–
5/64"	200-350	28-34	2 3/4"	250	185	30	–	–	–
3/32"	250-400	28-33	2 3/4"	350	190	30	–	–	–
.120"	400-550	29-33	2 3/4"	450	135	31	–	–	–

**Recommended Welding Parameters:  
Flux Cored, Austenitic (3XX) & Duplex (2XXX) Stainless Steel - Flat & Horizontal**

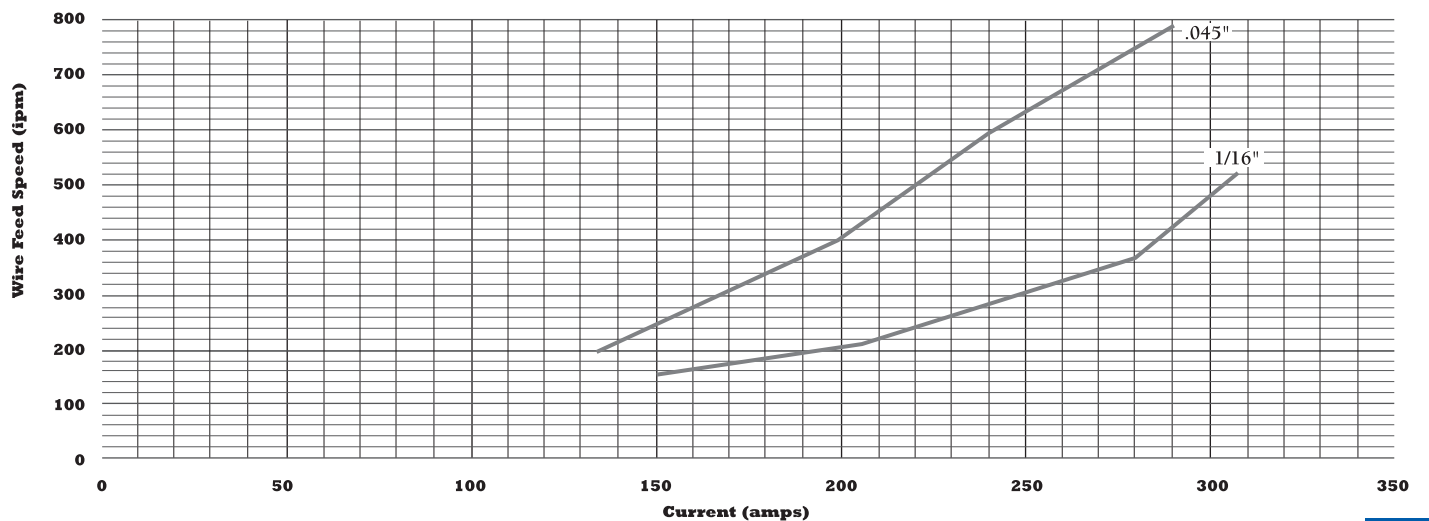
	WFS (ipm)	Amps	Volts	ESO
.035" Flat & Horizontal Flux Cored (CO <sub>2</sub> )*	200	75	22	1/2 - 5/8"
	300	105	24	1/2 - 5/8"
	400	125	26	1/2 - 5/8"
	550	155	27	1/2 - 5/8"
	650	165	29	1/2 - 5/8"
.045" Flat & Horizontal Flux Cored (CO <sub>2</sub> )*	200	120	25	5/8 - 3/4"
	335	170	27	5/8 - 3/4"
	440	200	29	5/8 - 3/4"
	780	290	35	5/8 - 3/4"
1/16" Flat & Horizontal Flux Cored (CO <sub>2</sub> )*	150	150	24	3/4 - 1"
	235	210	28	3/4 - 1"
	345	270	31	3/4 - 1"
	500	350	34	3/4 - 1"

\* When using Ar-25% CO<sub>2</sub> for flux cored arc welding lower the voltage by 2 volts

**Deposition Rates**



**Wire Feed Speed vs. Current**

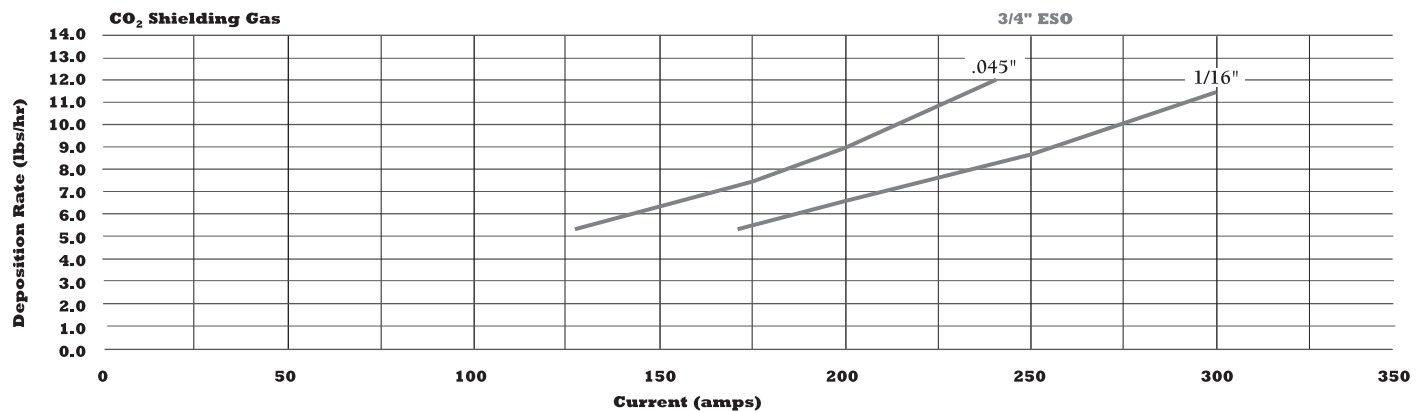


## Recommended Welding Parameters: Flux Cored, Austenitic (3XX-AP) & Duplex (2XXX-AP) Stainless Steel - All Position

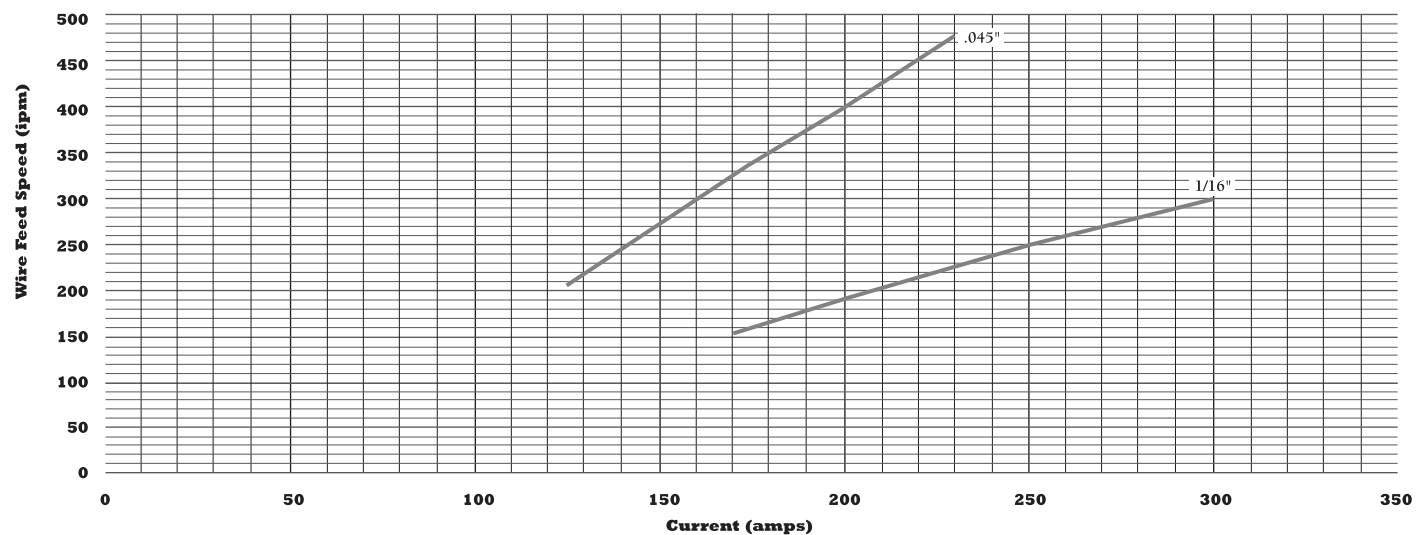
	WFS (ipm)	Amps	Volts	ESO
.035" All Position Flux Cored (CO <sub>2</sub> )*	300	110	25	3/4 - 1"
	500	150	26	3/4 - 1"
	600	165	27	3/4 - 1"
	700	175	28	3/4 - 1"
.045" All Position Flux Cored (CO <sub>2</sub> )*	250	130	24	5/8 - 3/4"
	300	160	26	5/8 - 3/4"
	425	200	28	5/8 - 3/4"
	780	270	34	5/8 - 3/4"
1/16" All Position Flux Cored (CO <sub>2</sub> )*	150	170	25	3/4 - 1"
	195	215	27	3/4 - 1"
	240	250	28	3/4 - 1"
	320	305	29	3/4 - 1"

\* When using Ar-25% CO<sub>2</sub> for flux cored arc welding lower the voltage by 2 volts

### Deposition Rates



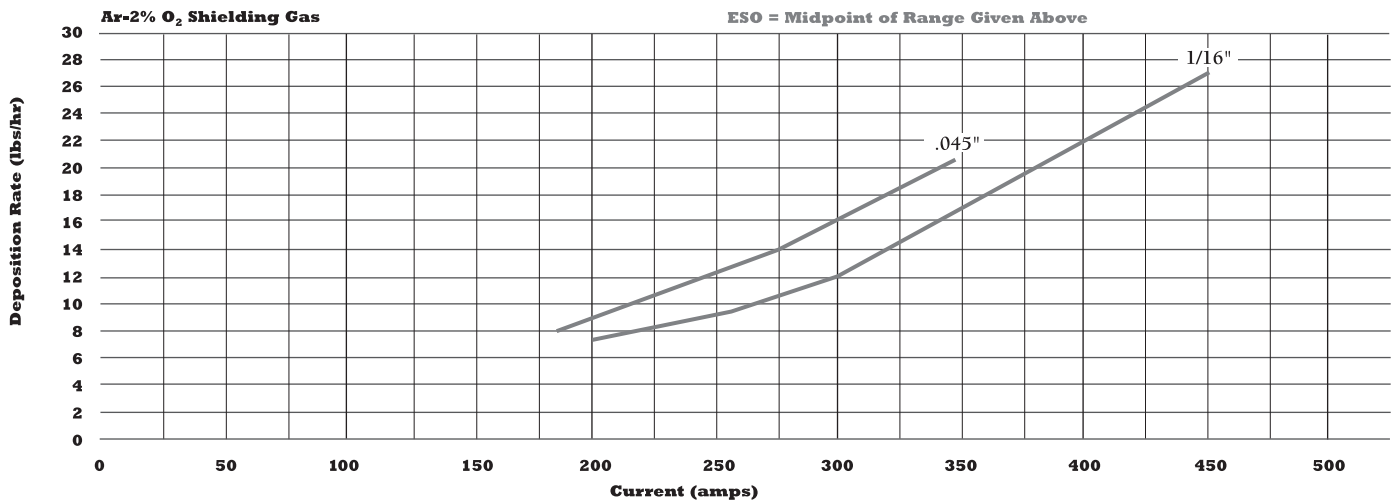
### Wire Feed Speed vs. Current



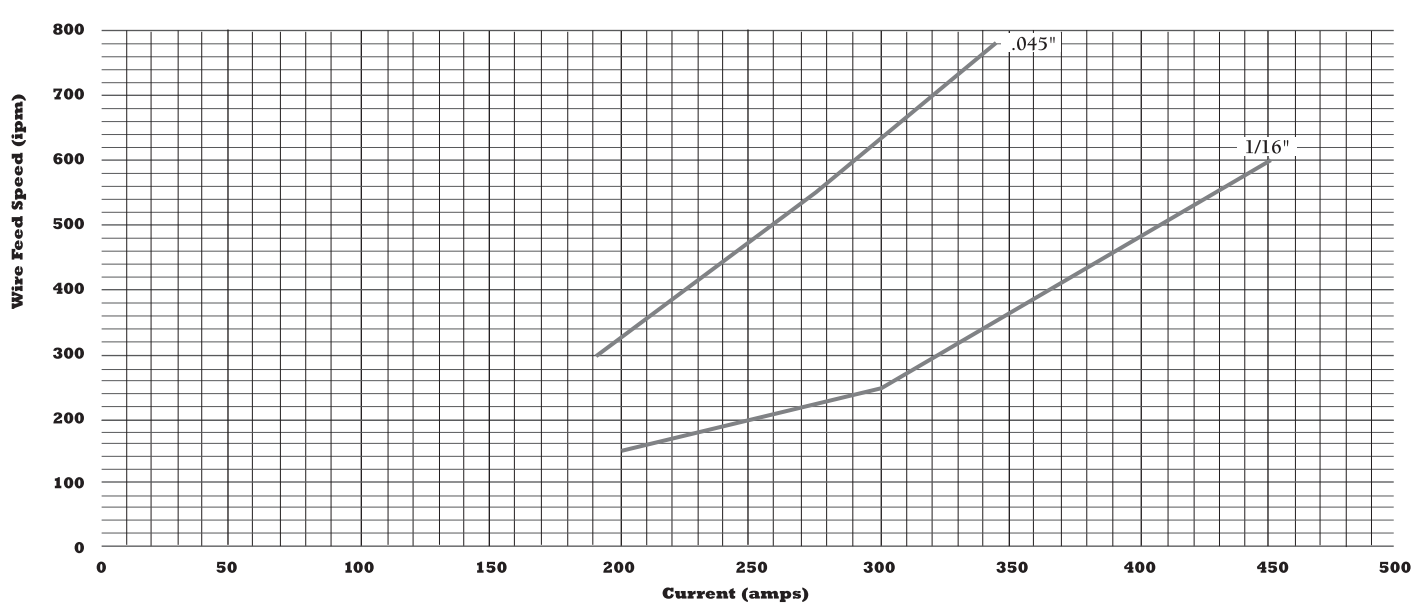
**Recommended Welding Parameters:  
Austenitic (3XX) & Duplex (2XXX) Stainless Steel - Metal Cored**

	WFS (ipm)	Amps	Volts	ESO
.045" Metal Cored (Ar-2%O <sub>2</sub> )	250	180	21	1/2 - 5/8"
	400	240	23	1/2 - 5/8"
	500	280	25	1/2 - 5/8"
	650	300	27.5	1/2 - 5/8"
1/16" Metal Cored (Ar-2%O <sub>2</sub> )	150	190	24	3/4 - 1"
	250	280	25	3/4 - 1"
	350	385	26	3/4 - 1"
	450	490	32	3/4 - 1"

**Deposition Rates**



**Wire Feed Speed vs. Current**





**Recommended Welding Parameters:  
Austenitic (3XXT0-3) Stainless Steel Electrodes - Self-Shielded**

Diameter	WFS (ipm)	Amperage	Voltage	ESO
.045"	180	100	24-26	5/8-3/4"
	240	125	24-27	5/8-3/4"
	300	145	25-28	5/8-3/4"
	400	170	27-30	5/8-3/4"
	500	190	29-31	5/8-3/4"
1/16"	150	126	27-30	3/4-1"
	200	155	29-32	3/4-1"
	250	190	28-31	3/4-1"
	300	215	30-33	3/4-1"
	350	240	31-33	3/4-1"
3/32"	135	250	25-27	1 1/4-1 1/2"
	180	300	27-29	1 1/4-1 1/2"
	225	350	28-30	1 1/4-1 1/2"
	300	400	29-31	1 1/4-1 1/2"
	340	450	29-31	1 1/4-1 1/2"

**Recommended Welding Parameters: Martensitic Stainless Steel Electrodes  
(410, 410NiMo) - Flux Cored - Flat and Horizontal - CO<sub>2</sub> - DCEP**

Diameter	Operating Range			Optimum			
	Amps	WFS (ipm)	Volts	Amps	WFS (ipm)	Volts	ESO
1/16"	150-400	130-500	22/34	330	330	29	1/2 - 1"
.045"	130-330	160-670	21/32	250	450	28	1/2 - 1"

**Recommended Welding Parameters: Martensitic Stainless Steel Electrodes  
(410-AP, 410NiMo-AP) - Flux Cored - All Position- CO<sub>2</sub>\* - DCEP**

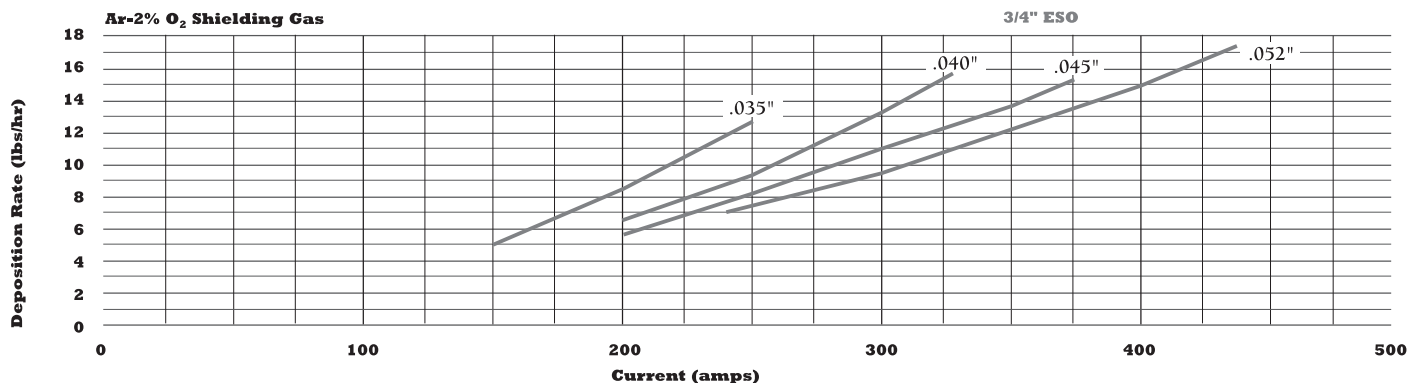
Diameter	Operating Range			Optimum			
	Position	Amps	Volts	Amps	WFS (ipm)	Volts	ESO
1/16"	Flat	150-400	22-34	330	330	29	1/2 - 1"
	Overhead	150-310	22-28	225	180	26	1/2 - 1"
	Vertical Up	150-280	22-27	225	180	25	1/2 - 1"
.045"	Flat	130-300	21-32	250	450	28	1/2 - 1"
	Overhead	150-280	21-30	190	305	26	1/2 - 1"
	Vertical Up	130-260	21-29	190	305	25	1/2 - 1"

\* For Ar-25% CO<sub>2</sub> shielding gas reduce the voltage by 1 to 1.5 volts

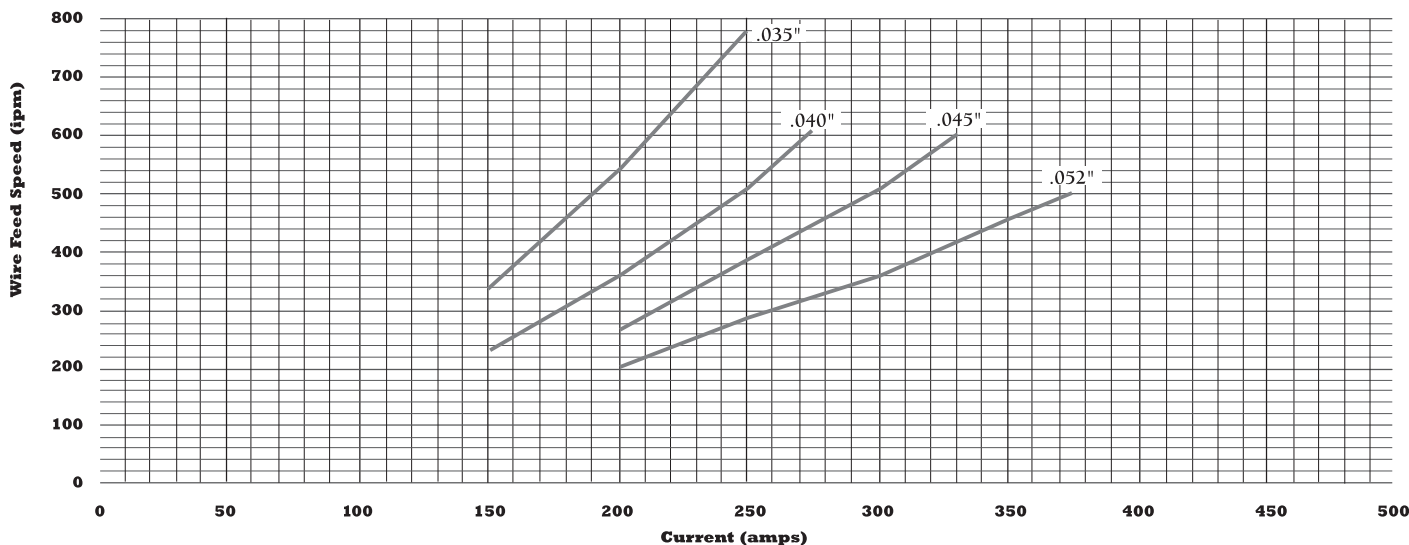
**Recommended Welding Parameters:  
Ferritic and Martensitic Stainless Steel (4XX Series) - Metal Cored - Argon/Oxygen - DCEP**

Diameter	Operating Range			Optimum			
	Amps	WFS (ipm)	Volts	Amps	WFS (ipm)	Volts	ES0
1/16"	230-520	160-500	22-31	360	300	26	3/4 - 1 1/4"
.052"	220-460	220-620	23-30	300	350	26	1/2 - 1"
.045"	180-330	240-600	22-28	255	410	26	1/2 - 1"
.035"	180-320	350-750	23-29	200	550	25	1/2 - 3/4"

**Deposition Rates**



**Wire Feed Speed vs. Current**



**Recommended Welding Parameters:  
Nickel Alloys, All Position - Flux Cored - CO<sub>2</sub> or 75% Argon/25%CO<sub>2</sub>**

Diameter	Position	Amperage	Optimum		Range	
			WFS	Voltage	Amperage	Voltage
.045"	Flat	190	400	27	125-215	24-28
	V-up/OH	155	320	24	125-175	23-26
1/16"	Flat	190	225	26	150-230	23-28
	V-up/OH	175	175	24	150-190	23-25

Use 1/2-5/8" Contact tip to work distance

## Current Approvals for Select-Arc Products

Product	ABS		Position(s)
	Gas	Grade	
70TR	CO <sub>2</sub>	2YSA	F
70C-6	Ar-25CO <sub>2</sub>	3YSA	F, V-down
70C-6LS	Ar-25CO <sub>2</sub>	3YSA	F
70C-T	Ar-25CO <sub>2</sub>	3YSA	F
71	CO <sub>2</sub>	E70T-1	H, F
71P	Ar-8CO <sub>2</sub>	3YSA	H, F
97	CO <sub>2</sub>	E70T-1	H, F
Encore	Ar-25CO <sub>2</sub>	3YSA	All
720	CO <sub>2</sub>	3YSA	All, V-down
720	Ar-25CO <sub>2</sub>	3YSA	All, V-down
720HP	Ar-25CO <sub>2</sub>	3YSA	All, V-down
721	Ar-25CO <sub>2</sub>	3YSA	All, V-down
727	CO <sub>2</sub>	3YSA	All
727	Ar-25CO <sub>2</sub>	3YSA	All
737	Ar-25CO <sub>2</sub>	3YSA	All
EM12KS	Various fluxes	F7A2-EC1	F
Ni1S	Esab 10.62 flux	3YM	F
812-K2	Ar-25CO <sub>2</sub>	4YSA	All
920-K2	CO <sub>2</sub>	E91T1-K2C	All
820-Ni1	CO <sub>2</sub>	4YSA	All
820-Ni1	Ar-25CO <sub>2</sub>	4YSA	All
810-Ni2	CO <sub>2</sub>	3YSA	All
810-Ni2	Ar-25CO <sub>2</sub>	3YSA	All
101 SR	Ar-25CO <sub>2</sub>	E91T1-GC	All
111K3-C	CO <sub>2</sub>	E111T1-K3C	All
111K3-M	Ar-25CO <sub>2</sub>	E111T1-K3MJ	All
308L-AP	CO <sub>2</sub>	E308LT1-1	All
308L-AP	Ar-25CO <sub>2</sub>	E308LT1-4	All
309L-AP	CO <sub>2</sub>	E309LT1-1	All
309L-AP	Ar-25CO <sub>2</sub>	E309LT1-4	All
316L-AP	CO <sub>2</sub>	E316LT1-1	All
316L-AP	Ar-25CO <sub>2</sub>	E316LT0-4	All
316L	CO <sub>2</sub>	E316LT0-1	H, F
316L	Ar-25CO <sub>2</sub>	E316LT0-4	H, F

Product	DNV		Position(s)
	Gas	Grade	
70C-6	Ar-25CO <sub>2</sub>	III YMS	F, V-down
70C-T	Ar-25CO <sub>2</sub>	III YMS	F
80C-Ni1	C25	IV YMS	F
720	CO <sub>2</sub>	III YMS	All
720	Ar-25CO <sub>2</sub>	III YMS	All
720HP	CO <sub>2</sub>	III YMS	All
720HP	Ar-25CO <sub>2</sub>	IV YMS	All
727	CO <sub>2</sub>	III YMS	All
812-K2	Ar-25CO <sub>2</sub>	IV YMS	All
820Ni1	CO <sub>2</sub>	IV YMS	All
820Ni1	Ar-25CO <sub>2</sub>	III YMS	All
308L-AP	CO <sub>2</sub>	NV308L	All
309L-AP	CO <sub>2</sub>	NV309L	All
316L-AP	CO <sub>2</sub>	NV316L	All

AWS D1.8 (Seismic Code)-formerly FEMA (Products are approved by Type, Diameter and Shielding Gas)		
Product	Diameter	Gas
70C-6LS	1/16"	Ar-10CO <sub>2</sub>
70TR	3/32"	Ar-25CO <sub>2</sub>
720	.045"	CO <sub>2</sub>
720	.045"	Ar-25CO <sub>2</sub>
720	.052"	CO <sub>2</sub>
720	1/16"	CO <sub>2</sub>
720	1/16"	Ar-25CO <sub>2</sub>
727	.045"	CO <sub>2</sub>
727	.045"	Ar-25CO <sub>2</sub>
727	.052"	CO <sub>2</sub>
727	1/16"	CO <sub>2</sub>
727	1/16"	Ar-25CO <sub>2</sub>

NOTE: Specially formulated tubular submerged arc wires are available on request.



## Current Approvals for Select-Arc Products

Product	Gas	Lloyd's Grade	Position(s)
70C-6	Ar-25CO <sub>2</sub>	2YS	F
70C-T	Ar-25CO <sub>2</sub>	3YS	F
720	CO <sub>2</sub>	3YS	F,Vup,HV,OH
720	Ar-25CO <sub>2</sub>	3YS	F,Vup,HV,OH
720HP	Ar-25CO <sub>2</sub>	4YS	F,Vup,HV,OH
820Ni1	CO <sub>2</sub>	3YS	F,Vup,HV,OH
820Ni1	Ar-25CO <sub>2</sub>	3YS	F,Vup,HV,OH

Product	Military Gas	Class
720	CO <sub>2</sub>	MIL-71T-1-HYC
720	CO <sub>2</sub>	MIL-71T-1C
720	Ar-25CO <sub>2</sub>	MIL-71T-1-HYM
721	Ar-25CO <sub>2</sub>	MIL-71T-1-HYM
820-Ni1	CO <sub>2</sub>	MIL-81T1-Ni1C
820-Ni1	Ar-25CO <sub>2</sub>	MIL-81T1-Ni1M
810-Ni2	CO <sub>2</sub>	MIL-81T1-Ni2C
810-Ni2	Ar-25CO <sub>2</sub>	MIL-81T1-Ni2M
71P	CO <sub>2</sub>	MIL-70T-1C



Product	CWB Gas	Grade
70C-6	CO <sub>2</sub> to Ar-5CO <sub>2</sub>	E491C-6,6M-H4
70C-6LS	CO <sub>2</sub> to Ar-5CO <sub>2</sub>	E491C-6,6M-H4
70C-7	CO <sub>2</sub> to Ar-5CO <sub>2</sub>	E491C-6,6M-H4
70C-T	Ar/20-25 CO <sub>2</sub>	E491C-6MJ-H4
70C-T	CO <sub>2</sub> to Ar-5CO <sub>2</sub>	E491C-6,6M-H4
80C-W	Ar-10CO <sub>2</sub>	E80C-W2-H4
110C-K4	Ar w/5 to25 CO <sub>2</sub>	E76C-K4-H4
70TR	CO <sub>2</sub> to Ar-25CO <sub>2</sub>	E492T-9,9M-H8
71	CO <sub>2</sub>	E492T-9-H8
Encore	CO <sub>2</sub>	E491T-9-H8
97	CO <sub>2</sub>	E492T-9-H8
701	-	E491T-11-H8
717	Ar/20-25 CO <sub>2</sub>	E491T-9M-H8
720	CO <sub>2</sub> to Ar-15CO <sub>2</sub>	E491T-9,9M-H4
720A	Arcal 211	E491T-9M-H8
720HP	CO <sub>2</sub> to Ar-25CO <sub>2</sub>	E491T-12J, 12MJ-H4
810-W	CO <sub>2</sub> to Ar-25CO <sub>2</sub>	E81T1-W2-H8
308L	CO <sub>2</sub> to Ar-25CO <sub>2</sub>	E308LT0-1/4
308L-AP	CO <sub>2</sub> to Ar-25CO <sub>2</sub>	E308LT1-1/4
308L-C	-	EC308L
308LSi-C	-	EC308LSi
309L	CO <sub>2</sub> to Ar-25CO <sub>2</sub>	E309LT0-1/4
309L-AP	CO <sub>2</sub> to Ar-25CO <sub>2</sub>	E309LT1-1/4
309L-C	-	EC309L
309LSi-C	-	EC309LSi
316L	CO <sub>2</sub> to Ar-25CO <sub>2</sub>	E316LT0-1/4
316L-AP	CO <sub>2</sub> to Ar-25CO <sub>2</sub>	E316LT1-1/4
316L-C	-	EC316L
316LSi-C	-	EC316LSi



## Measurement Conversion Table

To Convert From	To	Multiply By
<b>Length/Area/Volume/Flow</b>		
Inches (in)	Millimeters (mm)	25.4
Inches (in)	Centimeters (cm)	2.54
Square Inches (in <sup>2</sup> )	Square Centimeter (cm <sup>2</sup> )	6.45
Square Feet (ft <sup>2</sup> )	Square Meter (m <sup>2</sup> )	0.0929
Cubic Inches(in <sup>3</sup> )	Cubic Centimeter (cm <sup>3</sup> )	16.387
Cubic Feet (ft <sup>3</sup> )	Cubic Meter (m <sup>3</sup> )	0.2832
Cubic Feet per Hour (cfh)	Liters per Minute (l/min)	0.47
Millimeters (mm)	Inches (in)	0.0394
Centimeter (cm)	Inches (in)	0.3937
Square Centimeter (cm <sup>2</sup> )	Square Inches (in <sup>2</sup> )	0.155
Square Meters (m <sup>2</sup> )	Square Feet (ft <sup>2</sup> )	10.76
Cubic Centimeter (cm <sup>3</sup> ) or (cc)	Cubic Inches (in <sup>3</sup> )	0.061
Cubic Meters (m <sup>3</sup> )	Cubic Feet (ft <sup>3</sup> )	3.5311
Liters per Minute (l/min)	Cubic Feet per Hour (cfh)	2.12
<b>Pressure / Force / Weight</b>		
Pound (lb)	Kilogram (Kg)	0.4536
Pounds per Sq. inch (psi)	Megapascals (MPa)	0.6894x10 <sup>-2</sup>
Kilopounds per Sq.In. (KSI)	Megapascals (MPa)	6.894
Kilopounds per Sq.In. (KSI)	Kilograms per Sq.Millimeter (Kg/mm2)	0.689
Foot Pound (ft-lb)	Joule (J)	1.356
Kilograms (Kg)	Pounds (lb)	2.2046
Megapascal (Mpa)	Pounds per Sq. In.(psi)	145.05
Megapascal (Mpa)	Kilopounds per Sq. In. (KSI)	0.1451
Kilograms per Sq.millimeter (Kg/mm2)	Kilopounds per Sq. In. (KSI)	1.43
Joule (J)	Foot Pound (ft-lb)	0.7376
<b>Temperature</b>		
Fahrenheit (°F)	Celsius (°C )	(°F - 32 ) x 0.5556
Celsius (°C)	Fahrenheit (°OF )	(°C x 1.8 ) + 32

## Select-Arc Welding Electrode Packaging

Package Size	Pallet Net Weight lbs. (kg)	Pallet Dimensions (width x length)
10 lb. Spool (40 lbs. per box)	2,240 lbs. (1,016 kg) per skid	36" x 36"
15 lb. Spool (60 lbs. per box)	2,400 lbs. (1,089 kg) per skid	36" x 36"
25 lb. Spool	1,200 lbs. (544 kg) per skid	26" x 40"
33 lb. Spool	1,584 lbs. (718 kg) per skid	26" x 40"
33 lb. Spool	2,376 lbs. (1,078 kg) per skid	40" x 40"
45 lb. Spool	2,160 lbs. (980 kg) per skid	26" x 40"
50 lb. Spool	1,800 lbs. (816 kg) per skid	36" x 36"
50 lb. Coil	1,800 lbs. (816 kg) per skid	36" x 36"
60 lb. Coil	1,920 lbs. (871 kg) per skid	36" x 36"
250 lb. Select Track Drum	1,000 lbs. (455 kg) per skid	44" x 44" ①②
400 lb. Select Track Drum	1,600 lbs. (726 kg) per skid	44" x 44" ①②
500 lb. Select Track Drum	2,000 lbs. (907 kg) per skid	44" x 44" ①②
500 lb. Drum	2,000 lbs. (907 kg) per skid	49" x 49" ②
600 lb. Drum	2,400 lbs. (1,089 kg) per skid	49" x 49" ②
500 lb. Reel	1,500 lbs. (680 kg) per skid	30" x 39"
600 lb. Reel	1,800 lbs. (816 kg) per skid	30" x 39"
250 lb. Hex Drum	250 lbs. (114 kg) per skid	27" x 27"
400 lb. Hex Drum	400 lbs. (182 kg) per skid	27" x 27"
800 lb. Hex Drum	800 lbs. (363 kg) per skid	27" x 27"
900 lb. Hex Drum	900 lbs. (408 kg) per skid	27" x 27"

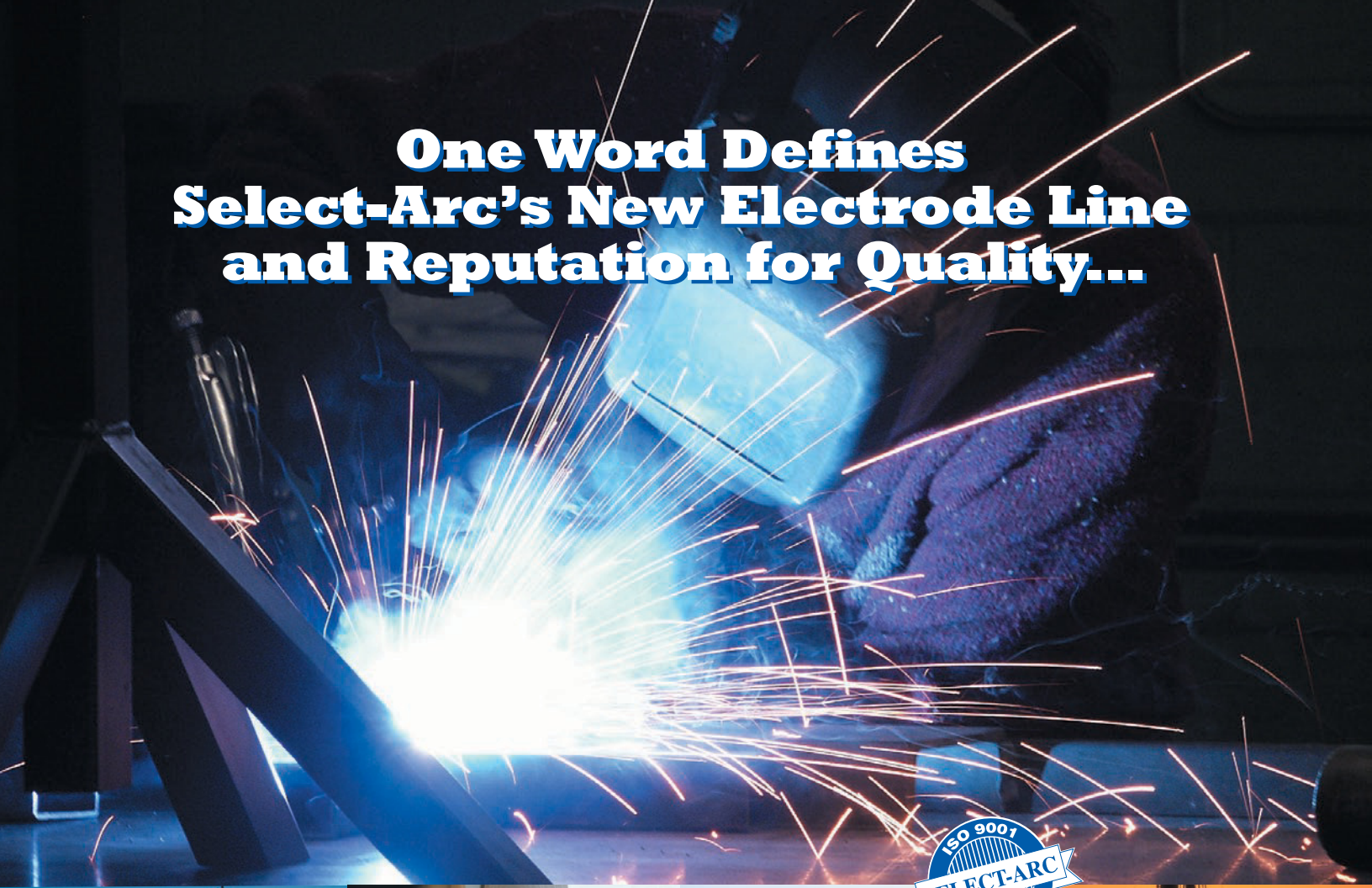
Freight is prepaid on all domestic shipments of 2,000 lbs. or more.

①Drum Dimensions: 20" x 31 1/4", 42 1/2 gallon drum.

②Drum Dimensions: 23" x 34", 61 gallon drum.



# One Word Defines Select-Arc's New Electrode Line and Reputation for Quality...



## Stainless.

Select-Arc, Inc. has earned an outstanding reputation in the industry as a manufacturer of premium quality tubular welding electrodes for carbon and low alloy steel welding.

Now Select-Arc has expanded its range of exceptional products with the introduction of a complete line of austenitic, martensitic and ferritic stainless steel electrodes. Both the new SelectAlloy and Select stainless steel wires deliver the superior feedability, superb welding

characteristics, consistent deposit chemistry and excellent overall performance you have come to expect from Select-Arc.

The chart below shows that SelectAlloy flux cored

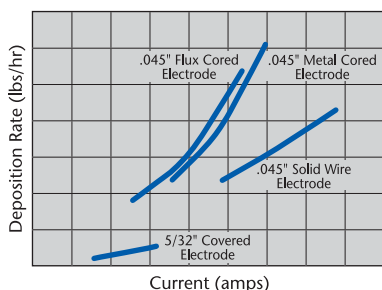
electrodes' higher deposition rates improve productivity and reduce welding costs.

SelectAlloy's smooth bead contour, easy peeling slag, minimal spatter, closely controlled weld deposit compositions and metal soundness deliver additional savings.

The Select 400 Series metal cored electrodes offer the same advantages as SelectAlloy and are ideally suited for difficult-to-weld applications, such as auto exhaust systems.

Discover for yourself the many benefits of specifying Select-Arc's new premium stainless steel electrodes. Call us today at **1-800-341-5215** or you can visit our website at [www.select-arc.com](http://www.select-arc.com) for more information.

**Typical Deposition Rates for Various Stainless Steel Consumables**



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Fax: (888) 511-5217  
[www.select-arc.com](http://www.select-arc.com)



# More Than 50 Low Alloy Electrodes to Meet Your Specs.



## Select-Arc Delivers

When your critical welding requirements demand a high quality, low alloy, gas-shielded, flux cored electrode, insist on specifying Select-Arc.

Select-Arc offers an expanding lineup of over 50 premium wires specially designed for welding low alloy and high strength steels. Whatever your application - from bridge construction to oil exploration equipment, pressure vessels to petroleum plants, mining machinery to submarines, and so many others - we can provide the

flat and horizontal or all position low alloy electrode that is ideally suited to handle your individual need.

Select-Arc's comprehensive selection of low alloy electrode grades includes:

- Nickel Bearing
- Nickel-Molybdenum Bearing
- Nickel-Molybdenum-Chromium Bearing
- Manganese-Molybdenum Bearing
- Carbon-Molybdenum Bearing
- Chromium-Molybdenum Bearing
- Weathering Steel

For more information on choosing the Select-Arc low alloy electrode that is just right for your specific welding requirement, call us today at **1-800-341-5215** or visit our website at **[www.select-arc.com](http://www.select-arc.com)**.





**The Standard of Excellence in Tubular Welding Electrodes**

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