WELDING PRODUCTS

VANGUARD STEEL LTD.

This is

VANGUARD STEEL LTD.

at your service

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- ABRASIVES
- WELDING CONSUMABLES

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WARNINGS

Protect yourself and others, read and understand this information

Fumes and gases

Welding and cutting should only be performed in a properly ventilated environment. There are a number of options that should be used to make sure to keep your head out of the fume plumes which include adequate ventilation, repositioning of the work, the operators head or both.

Adequate ventilation keeps exposure to airborne contaminants below allowable/safe limits. This can consist of the use of natural ventilation, mechanical ventilation, fixed or moveable exhaust hoods, or local exhaust at the arc. There are a number of factors to ensure proper ventilation for welding cells/fab shops:

- Workspace volume
- Number of welders
- Consumables used (mild steel, hardfacing, stainless, etc.)
- Material welded (always make sure to including paint or plating)
- Workspace configuration
- Welding process and current
- Allowable levels (TLV, PEL, etc.)
- Natural airflow

A technically qualified company/person should determine the ventilation requirements. The use of an approved respirator should be used when ventilation is neither adequate nor practical.

Arc rays

Ultraviolet radiation (UV) is generated by the electric arc in the welding process. Skin exposure to UV can result in severe burns, in many cases without prior warning. UV radiation can also damage the lens of the eye. Many arc welders are aware of the condition known as “arc-eye,” a sensation of sand in the eyes. This condition is caused by excessive eye exposure to UV. Exposure to ultraviolet rays may also increase the skin effects of some industrial chemicals (coal tar and cresol compounds, for example).

Exposure to infrared radiation (IR), produced by the electric arc and other flame cutting equipment may heat the skin surface and the tissues immediately below the surface. Except for this effect, which can progress to thermal burns in some situations, infrared radiation is not dangerous to welders.

Exposure of the human eye to intense visible light can produce adaptation, pupillary reflex, and shading of the eyes. Such actions are protective mechanisms to prevent excessive light from being focused on the retina. In the arc welding process, eye exposure to intense visible light is prevented for the most part by the welder’s helmet. However, some individuals have sustained retinal damage due to careless “viewing” of the arc. At no time should the arc be observed without eye protection.

The use of proper/approved protective eye wear, ear wear and clothing should be used at all times when welding or cutting.

Electric shock

Electric shock is a risk commonly associated with electric resistance and electric arc welding. The risk of shock can be caused due to improper grounding of the welding equipment (direct contact ground with energized lead) or from contact with the welding lead (moist gloves, clothing, damp floor and/or humidity in the air). Confined work spaces create greater risk for electric shock; regular inspection of all welding cells can reduce the risk of shock.

Proper Storage

After manufacturing Bonarc stainless steel electrodes are packaged in re-sealable plastic bags, then inserted in plastic sleeves. These plastic sleeves provide protection from damage and moisture.

When stored under normal conditions the electrodes will very slowly pick up moisture.

5-15°C (41-59°F) - Relative humidity ≤ 60%
15-25°C (59-77°F) - Relative humidity ≤ 50%
> 25°C (> 77°F) - Relative humidity ≤ 40%

If the electrodes have been stored in cold locations, they should be allowed to reach the same temperate as their surroundings before the protective packaging is removed.

Stainless Steel covered electrodes should be removed from the plastic containers and stored in heated cabinets of 120-150°C (248-302°F) if they have been re-dried, removed from the plastic bag and/or plastic sleeve. Once removed from the bag/plastic sleeve they should be electrically heated to a minimum 70°C (158°F) prior to use.

Re-drying of covered electrodes
Prior to leaving the factory the humidity level of all Bonarc stainless steel electrodes are verified. If during storage the electrodes do pick up moisture/humidity re-drying of the electrodes is an easy method to correct this “issue”.

Bonarc stainless steel electrode should be re-dried prior to use at between 300 - 350°C for 30 to 60 minutes. No more than four layers of electrodes should be dried at a time.

For best results the following steps should be taken

1. Remove water, rust, oil and all other foreign matters from the groove prior to welding
2. Weaving width should be within 2-1/2 times the diameter of the electrode
3. Keep the arc as short as possible

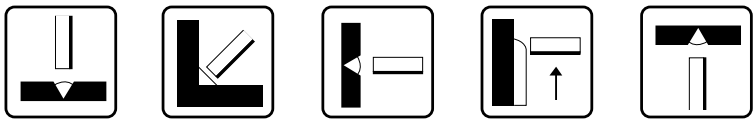
Welding position

F – Flat
HF – Horizontal Fillets
VU – Vertical Up
OH – Over Head

AWS E308L-16

CWB to CSA W48-14
AWS A 5.4-06 E308L-16

Suitable welding positions



Typical applications
Welding of low carbon 18% Chromium (Cr) – 8% Nickel (Ni) Stainless Steel (AISI 301, 302, 304, 304L, 304LN, 304H, 305, 308, 308L, 321, 347; ACI CF-3, CF-8, CF-8C, and CF-20).

Characteristics on usage
Excellent welding efficiency thanks to the extremely high deposition rate. The low carbon content minimizes the formation of chromium carbides reducing the potential of inter-granular corrosion. Smooth arc transfer and slag is self peeling for easy removal.

Inter-granular corrosion resistance is superior to E308–16 electrodes.

Typical chemical composition of all-weld-metal (%)

C	Si	Mn	P	S	Cr	Ni	Mo
0.03	0.73	0.65	0.028	0.012	18.86	10.07	0.21

Typical mechanical properties of all-weld-metal

Yield Strength		Tensile Strength		Elongation	Impact Value
430 MPa	62 ksi	600 MPa	87 ksi	44%	65J (-20C°)

Dimensions and recommended currents

Vanguard Code	Diameter		Length		Amperage	
	inches	mm	inches	mm	F & HF	VU & OH
6008 2009	5/64	2.0	9.8	250	40 - 50	35 - 45
6008 2409	3/32	2.4	11.8	300	50 - 80	45 - 60
6008 3209	1/8	3.2	13.8	350	80 - 100	70 - 90
6008 4009	5/32	4.0	13.8	350	110 - 150	90 - 130
6008 4809	3/16	5.0	13.8	350	140 - 180	---

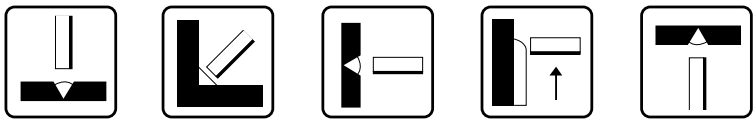
Standard packaging

Sleeve		Master Carton	
4.5 Kgs	10 Lbs	18 Kgs	40 Lbs

AWS E309L-16

CWB to CSA W48-14
AWS A 5.4-06 E 309L-16

Suitable welding positions



Typical applications
Welding of low carbon 22% Chromium (Cr) – 12% Nickel (Ni) Stainless Steel (AISI 304, 304L, 304LN, 308, 308L, 309, 309L, 321, 347; ACI CF-3, CF-8, CF-8C, CG-12, CH-8, CH-10, and CH-20), heat resisting casting and clad stainless steel. Also commonly used when joining dissimilar metals such as stainless steel to carbon or low alloy steels.

Characteristics on usage
The deposited weld metal has optimal ferrite levels to resist weld metal cracking. Good heat and corrosion resistance. Inter-granular corrosion resistance is superior to E309-16 electrodes.

Typical chemical composition of all-weld-metal (%)

C	Si	Mn	P	S	Cr	Ni	Mo
0.03	0.84	0.76	0.027	0.013	23.04	12.97	0.08

Typical mechanical properties of all-weld-metal

Yield Strength		Tensile Strength		Elongation
480 MPa	69 ksi	600 MPa	87 ksi	40%

Dimensions and recommended currents

Vanguard Code	Diameter		Length		Amperage	
	inches	mm	inches	mm	F & HF	VU & OH
6012 2009	5/64	2.0	9.8	250	40 - 50	35 - 45
6012 2409	3/32	2.4	11.8	300	50 - 80	45 - 60
6012 3209	1/8	3.2	13.8	350	80 - 100	70 - 90
6012 4009	5/32	4.0	13.8	350	110 - 150	90 - 130
6012 4809	3/16	5.0	9.8	250	140 - 180	---

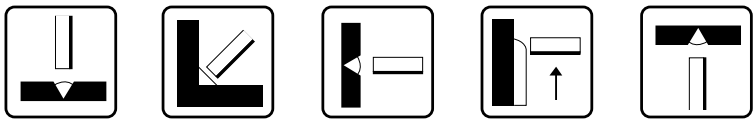
Standard packaging

Sleeve		Master Carton	
4.5 Kgs	10 Lbs	18 Kgs	40 Lbs

AWS E310-16

CWB to CSA W48-14
AWS A 5.4-06 E 310

Suitable welding positions



Typical applications
Welding of stainless steel of similar composition in cast and wrought forms, AISI (SUS) 310S, SCS 18 and clad side of 18% Chromium (Cr) – 8% Nickel (Ni) stainless clad steel. Scale resistant at extreme temperatures 196°C to 1200°C (320°F to 2200°F).

Used for high operating temperature stainless applications, multiple purpose austenitic, heat resistant stainless
Well suited where minimal heat input is required during welding. Commonly used when welding furnace parts, heat shields, ducting and 310/310S materials.

Characteristics on usage
The deposited weld metal has optimal ferrite levels to resist weld metal cracking.

Typical chemical composition of all-weld-metal (%)

C	Si	Mn	P	S	Cr	Ni	Mo
0.11	0.40	1.86	0.025	0.013	25.59	20.82	0.12

Typical mechanical properties of all-weld-metal

Yield Strength		Tensile Strength		Elongation
490 MPa	71 ksi	620 MPa	90 ksi	40%

Dimensions and recommended currents

Vanguard Code	Diameter		Length		Amperage	
	inches	mm	inches	mm	F & HF	VU & OH
	5/64	2.0	9.8	250	40 - 50	35 - 45
6016 2409	3/32	2.4	11.8	300	50 - 80	45 - 60
6016 3209	1/8	3.2	13.8	350	80 - 100	70 - 90
6016 4009	5/32	4.0	13.8	350	110 - 150	90 - 130
6016 4809	3/16	5.0	13.8	350	140 - 180	---

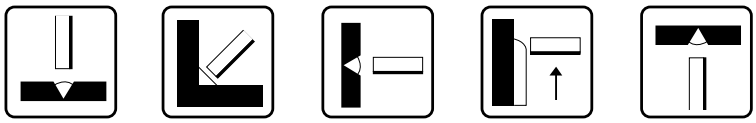
Standard packaging

Sleeve		Master Carton	
4.5 Kgs	10 Lbs	18 Kgs	40 Lbs

AWS E316L-16

CWB to CSA W48-14
AWS A 5.4-06 E 316L-16

Suitable welding positions



Typical applications
Welding of low carbon 18% Chromium (Cr) – 12% Nickel (Ni) - Molybdenum (Mo) Stainless steel, austenitic stainless steel which is required where heat treatment after welding is impossible. Suitable when welding the following grades of stainless AISI 316, 316L, 316N, 316Ti, 317, 317L, 318, 304, 304L, 308, 308L; ACI CF-3, CF-3M, CF-8, CF-8M, CF-12M and/or CG-8M.

Characteristics on usage
Optimum ferrite in the austenitic structure helps resist weld metal cracking. This electrode is extremely resistant to corrosion and inter-granular attack.

Typical chemical composition of all-weld-metal (%)

C	Si	Mn	P	S	Cr	Ni	Mo
0.03	0.75	0.80	0.028	0.011	17.95	11.71	2.60

Typical mechanical properties of all-weld-metal

Yield Strength		Tensile Strength		Elongation	Impact Value
390 MPa	56 ksi	570 MPa	82 ksi	43%	40J (-120C°)

Dimensions and recommended currents

Vanguard Code	Diameter		Length		Amperage	
	inches	mm	inches	mm	F & HF	VU & OH
6029 2009	5/64	2.0	9.8	250	40 - 50	35 - 45
6029 2409	3/32	2.4	11.8	300	50 - 80	45 - 60
6029 3209	1/8	3.2	13.8	350	80 - 100	70 - 90
6029 4009	5/32	4.0	13.8	350	110 - 150	90 - 130
6029 4809	3/16	5.0	13.8	350	140 - 180	---

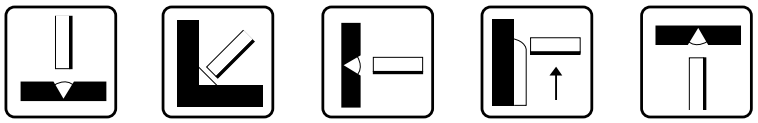
Standard packaging

Sleeve		Master Carton	
4.5 Kgs	10 Lbs	18 Kgs	40 Lbs

ER308L

CWB to CSA W48-14
AWS A 5.9-2010

Suitable welding positions



Typical applications
Welding of 18% Chromium (Cr) - 8% Nickel (Ni) austenite stainless steels. Used to weld base metals of similar composition such as AISI 201, 202, 205, 301, 302, 304, 305 and 308 as well as the low carbon grades.

Most commonly used grade of Tig wire.

Typical chemical composition of all-weld-metal (%)

	C	Mn	Si	S	P	Cr	Ni	Mo	Cu	Co	N	Nb	B
Minimum	---	1.50	0.30	---	---	19.50	9.50	---	---	---	---	---	---
Maximum	0.02	2.00	0.50	0.015	0.02	20.50	10.50	0.20	0.20	0.20	0.06	0.05	0.0018

Metal properties:
The following data is typical for non-heat treated weld metal from TIG welding with I1 DIN EN ISO 14175 as shielding gas.

Expected minimum mechanical properties of all weld metal

Temperature	20°C	-196°C
Yield strength, Rp 0,2	465 N/mm²	---
Yield strength, Rp 1,0	490 N/mm²	---
Tensile strength, Rm	630 N/mm²	---
Elongation, A5	35%	---
Reduction of area Z	60%	---
Impact energy, ISO – V	261J	59J

Vanguard Code	Diameter
6306 1200	1.2mm
6306 1600	1.6mm
6306 2400	2.4mm
6306 3200	3.2mm
6306 4000	4.0mm

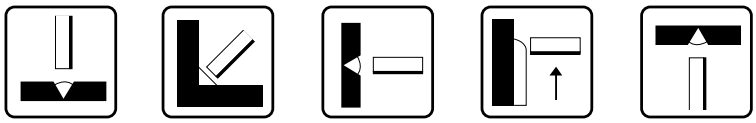
Welding parameters
The welding parameters for TIG welding depend on the wire diameter and the welding application.
Electrode negative and a shielded gas of argon or helium have to be used to avoid burn-up of the tungsten electrode.
Wall thickness: maximum is 20mm.
The highest operating temperature, in the short term range, as for base metal, but not higher than 350°C. Lowest operating temperature, as for base metal, but not lower than -196°C.
Resistance to intergranular corrosion proven in accordance with EN ISO 3651-2

Sizes and marking
Standard diameters: 1.2, 1.6, 2.4, 3.2 and 4.0mm (Tolerances on diameter : + 0,01 / - 0,04 mm)
Marking: Stamped with the grade on end
Sold in 5Kg Tubes

ER309L

CWB to CSA W48-14
AWS A 5.9-2012

Suitable welding positions



Typical applications
Welding of 22% Cr – 12% Nickel (Ni) Stainless Steel and dissimilar steels such as 304 to mild steel or low alloy steels, also used for joining dissimilar stainless steels such as 409 to itself or to 304L stainless

Austenitic stainless steel TIG rod, suitable for welding steels such as AISI 309. Also used to weld dissimilar steels and for buffer layers. The low carbon content reduces the possibility of intergranular carbide precipitation and there increases the resistance to intergranular corrosion. It has excellent high temperature oxidation resistance.

Typical chemical composition of all-weld-metal (%)

	C	Mn	Si	S	P	Cr	Ni	Mo	Cu	Co	N	Nb	B
Minimum	---	1.50	0.30	---	---	23.00	13.00	---	---	---	---	---	---
Maximum	0.02	2.00	0.50	0.015	0.02	24.00	14.00	0.30	0.20	0.20	0.06	0.05	0.003

Metal properties
The following data is typical for non-heat treated weld metal from TIG welding with I1 DIN EN ISO 14175 as shielding gas.

Expected minimum mechanical properties of all weld metal

Temperature	20°C
Yield strength, Rp 0,2	350 N/mm²
Yield strength, Rp 1,0	380 N/mm²
Tensile strength, Rm	520 N/mm²
Elongation, A5	30%
Impact energy, ISO – V	70J

Vanguard Code	Diameter
6309 1200	1.2mm
6309 1600	1.6mm
6309 2400	2.4mm
6309 3200	3.2mm
6309 4000	4.0mm

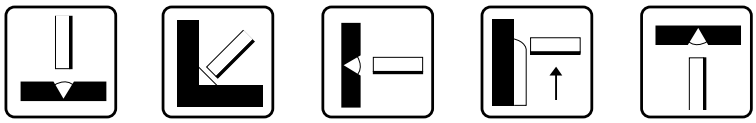
Welding parameters
The welding parameters for TIG welding depend on the wire diameter and the welding application.
Electrode negative and a shielded gas of argon or helium have to be used to avoid burn-up of the tungsten electrode.
Wall thickness: maximum is 20mm.
The highest operating temperature, in the short term range, as for base metal, but not higher than 350°C. Lowest operating temperature, as for base metal, but not lower than -196°C.
Resistance to intergranular corrosion proven in accordance with EN ISO 3651-2

Sizes and marking
Standard diameters: 1.2, 1.6, 2.4, 3.2 and 4.0mm (Tolerances on diameter : + 0,01 / - 0,04 mm)
Marking: Stamped with the grade on end
Sold in 5Kg Tubes

ER316L

CWB to CSA W48-14
AWS A 5.9-2012

Suitable welding positions



Typical applications
Austenitic stainless steel welding wire suitable to weld base metals of similar compositions like AISI 316 and AISI 316L. The low carbon content reduces the possibility of intergranular carbide precipitation and increases the resistance to intergranular corrosion. It is also suitable for welding steel that are stabilized with Titanium (Ti) or Niobium (Nb). Superior corrosion resistance compared to 308L.

Typical chemical composition of all-weld-metal (%)

	C	Mn	Si	S	P	Cr	Ni	Mo	Cu	Co	N	Nb	B
Minimum	---	1.50	0.30	---	---	18.00	12.00	2.50	---	---	---	---	---
Maximum	0.02	2.00	0.60	0.015	0.025	19.20	13.00	3.00	0.30	0.20	0.06	0.05	0.002

Metal properties
The following data is typical for non-heat treated weld metal from TIG welding with I1 DIN EN ISO 14175 as shielding gas.

Expected minimum mechanical properties of all weld metal

Temperature	20°C
Yield strength, Rp 0,2	465 N/mm²
Yield strength, Rp 1,0	505 N/mm²
Tensile strength, Rm	620 N/mm²
Elongation, A5	35%
Reduction of area Z	64%
Impact energy, ISO – V	222J

Vanguard Code	Diameter
6318 0900	0.9mm
6318 1200	1.2mm
6318 1600	1.6mm
6318 2400	2.4mm
6318 3200	3.2mm
6318 4000	4.0mm

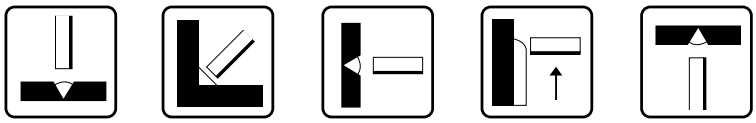
Welding parameters
The welding parameters for TIG welding depend on the wire diameter and the welding application.
Electrode negative and a shielded gas of argon or helium have to be used to avoid burn-up of the tungsten electrode.
Wall thickness: maximum is 20mm.
The highest operating temperature, in the short term range, as for base metal, but not higher than 350°C. Lowest operating temperature, as for base metal, but not lower than -196°C.
Resistance to intergranular corrosion proven in accordance with EN ISO 3651-2

Sizes and marking
Standard diameters: 0.9, 1.2, 1.6, 2.4, 3.2 and 4.0mm (Tolerances on diameter : + 0,01 / - 0,04 mm)
Marking: Stamped with the grade on end
Sold in 5Kg Tubes

ER347

AWS A 5.9-2012

Suitable welding positions



Typical applications
Austenitic stainless steel welding wire stabilized with Niobium, suitable for welding Chromium (Cr) - Nickel (Ni) stainless parent metals of similar composition stabilized with either Niobium, Titanium or Tantalum (type AISI 347, AISI 321).

Characteristics on usage
The addition of Niobium (Nb) reduces the possibility of intergranular Chromium (Cr) carbide precipitation and therefore increases the resistance to intergranular corrosion. The low Silicone (Si) content reduces the hot crack sensitivity.

Typical chemical composition of all-weld-metal (%)

	C	Mn	Si	S	P	Cr	Ni	Mo	Cu	Co	N	Nb	B
Minimum	0.02	1.20	0.30	---	---	19.00	9.00	---	---	---	---	12xC	---
Maximum	0.06	1.80	0.60	0.015	0.025	20.00	10.00	0.30	0.30	0.30	0.060	0.85	0.003

Vanguard Code	Diameter
6325 1600	1.6mm
6325 2400	2.4mm
6325 3200	3.2mm
6325 4000	4.0mm

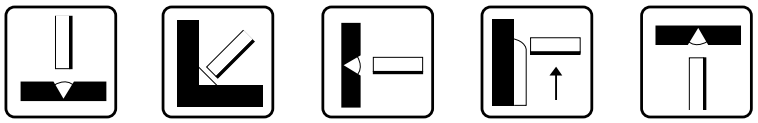
Welding parameters
The welding parameters for TIG welding depend on the wire diameter and the welding application.
Electrode negative and a shielded gas of argon or helium have to be used to avoid burn-up of the tungsten electrode.
Wall thickness: maximum is 20mm.
The highest operating temperature, in the short term range, as for base metal, but not higher than 350°C. Lowest operating temperature, as for base metal, but not lower than -196°C.
Resistance to intergranular corrosion proven in accordance with EN ISO 3651-2

Sizes and marking
Standard diameters: 1.6, 2.4, 3.2 and 4.0mm (Tolerances on diameter : + 0,01 / - 0,04 mm)
Marking: Stamped with the grade on end
Sold in 5Kg Tubes

ER308L HiSil

CWB to CSA W48-14
AWS A 5.9/A5.9M:2012

Suitable welding positions



Typical applications
Austenitic stainless steel welding wire suitable when welding base metals of similar compositions like AISI 304 and AISI 304L.

Characteristics on usage
The addition of Silicon (Si), allows for higher welding speed than 308 and/or 308L wires due to the improved wetting of the weld metal while also offering more fluid welds and cleaner beads. The deposited weld metal has optimal ferrite levels to resist weld metal cracking. If the dilution by the base metal produces a low ferrite or fully austenitic weld, the crack sensitivity of the weld is somewhat higher than that of a lower Silicone (Si) content weld metal.

Typical chemical composition of all-weld-metal (%)

	C	Mn	Si	S	P	Cr	Ni	Mo	Cu	Co	N	Nb	B
Minimum	---	1.50	0.65	---	---	19.50	10.00	---	---	---	---	---	---
Maximum	0.023	2.04	1.00	0.015	0.025	20.50	11.00	0.30	0.30	0.20	0.06	0.05	0.003

The following data is typical for non-heat treated weld metal from MIG welding with argon +3% oxygen as shielded gas.

Expected minimum mechanical properties of all weld metal

Temperature	20°C	-110°C	-196°C
Yield strength, Rp 0,2	390 N/mm²	---	---
Yield strength, Rp 1,0	415 N/mm²	---	---
Tensile strength, Rm	570 N/mm²	---	---
Elongation, A5	35%	---	---
Reduction of area Z	40%	---	---
Impact energy, ISO – V	140J	84J	59J

Vanguard Code	Description
6207 0800	0.8mm x 15kg
6207 0900	0.9mm x 15kg
6207 1200	1.2mm x 15kg
6207 1600	1.6mm x 15kg

Recommended welding parameters

Diameter (mm)	Wire Feed (m/mm)	Current (A)	Voltage (V)	Gas (l/min)
0.8	4 - 8	40 - 120	15 - 19	12
0.9	4 - 8	60 -140	15 - 21	12

Spray Arc welding

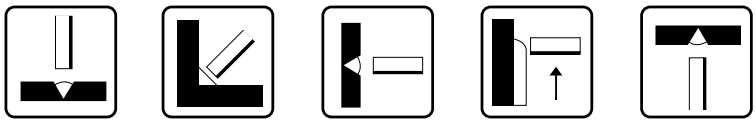
0.9	6 - 12	140 - 220	23 - 28	18
1.2	5 - 9	180 - 260	24 - 29	18
1.6	3 - 5	230 - 350	24 - 30	18

Available on 15kg spools, also available in 120 and 250kg drums (Pail Packs)

ER309L HiSil

CWB to CSA W48-14
AWS A 5.9/A5.9M:2012

Suitable welding positions



Typical applications
Austenitic stainless steel welding wire suitable to weld different metals such as AISI 304 to carbon steels or similar steels in wrought and cast form. It can also be used to weld AISI 304 and base metals of similar compositions under severe corrosion conditions requiring a higher alloy weld metal.

Characteristics on usage
The addition of Silicon (Si), improves both the bead appearance and ease of welding. The welding beads are extremely smooth and the lower Carbon (C) content reduces the risk of intergranular carbide precipitation. If the dilution by the base metal produces a low ferrite or fully austenitic weld, the hot cracking sensitivity of the weld is higher than that of the 309L.

Typical chemical composition of all-weld-metal (%)

	C	Mn	Si	S	P	Cr	Ni	Mo	Cu	Co	N	Nb	B
Minimum	---	1.50	0.65	0.005	---	23.00	13.00	---	---	---	---	---	---
Maximum	0.02	2.00	1.00	0.015	0.02	24.00	14.00	0.30	0.20	0.20	0.06	0.05	0.003

The following data is typical for non-heat treated weld metal from MIG welding with argon +3% oxygen as shielded gas.

Expected minimum mechanical properties of all weld metal

Temperature	20°C	-60°C
Yield strength, Rp 0,2	460 N/mm²	---
Yield strength, Rp 1,0	610 N/mm²	---
Elongation, A5	35%	---
Reduction of area Z	52%	---
Impact energy, ISO – V	117J	102J

Vanguard Code	Description
6212 0800	0.8mm x 15kg
6212 0900	0.9mm x 15kg
6212 1200	1.2mm x 15kg
6212 1600	1.6mm x 15kg

Recommended welding parameters

Diameter (mm)	Wire Feed (m/mm)	Current (A)	Voltage (V)	Gas (l/min)
0.8	4 - 8	40 - 120	15 - 19	12
0.9	4 - 8	60 -140	15 - 21	12

Spray Arc welding

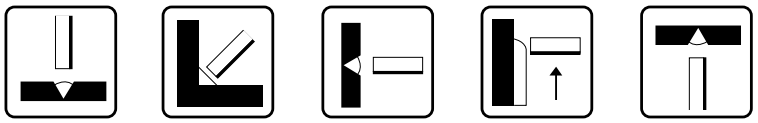
0.9	6 - 12	140 - 220	23 - 28	18
1.2	5 - 9	180 - 260	24 - 29	18
1.6	3 - 5	230 - 350	24 - 30	18

Available on 15kg spools, also available in 120 and 250kg drums (Pail Packs)

ER316L HiSil

CWB to CSA W48-14
AWS A 5.9/A5.9M:2012

Suitable welding positions



Typical applications
Austenitic stainless steel welding wire suitable when welding base metals of similar compositions like AISI 316 and AISI 316L.

Characteristics on usage
Equivalent to 316L but this wire has a higher Silicon (Si) content which improves the arc stability, the bead appearance and ease of welding. If the dilution by the base metal produces a low ferrite or fully austenitic weld, the crack sensitivity of the weld is somewhat higher than that of a lower Silicone content weld metal. 316LHiSil has a superior corrosion resistance than 308LHiSil.

Typical chemical composition of all-weld-metal (%)

	C	Mn	Si	S	P	Cr	Ni	Mo	Cu	Co	N	Nb	B
Minimum	---	1.50	0.65	0.005	---	18.00	11.00	2.50	---	---	---	---	---
Maximum	0.03	2.00	1.00	0.015	0.03	20.00	14.00	3.00	0.30	0.30	0.06	0.05	0.003

Expected minimum mechanical properties of all weld metal

Temperature	20°C	-110°C	-196°C
Yield strength, Rp 0,2	450 N/mm²	---	---
Yield strength, Rp 1,0	490 N/mm²	---	---
Tensile strength, Rm	630 N/mm²	---	---
Elongation, A5	32%	---	---
Impact energy, ISO – V	152J	110J	53J

Vanguard Code	Description
6217 0800	0.8mm x 15kg
6217 0900	0.9mm x 15kg
6217 1200	1.2mm x 15kg
6217 1600	1.6mm x 15kg

Recommended welding parameters

Diameter (mm)	Wire Feed (m/mm)	Current (A)	Voltage (V)	Gas (l/min)
0.8	4 - 8	40 - 120	15 - 19	12
0.9	4 - 8	60 -140	15 - 21	12

Spray Arc welding

0.9	6 - 12	140 - 220	23 - 28	18
1.2	5 - 9	180 - 260	24 - 29	18
1.6	3 - 5	230 - 350	24 - 30	18

Available on 15kg spools, also available in 120 and 250kg drums (Pail Packs)

NOTES ON USAGE

General information

1. Flux cored wire is softer than solid Mig wire so you must always be sure not to over tighten the rollers in the wire feeder
2. When flat butt welding use the back-step process for maximum penetration stability. When horizontal and over-head welding use the straight sequence, this will ensure a good flat bead appearance.
3. When welding horizontal fillets to primer coated plate you are likely to encounter blow- hole defects such as pitting and gas holes. To avoid this always ensure to select the correct wire and use the appropriate welding parameters.
4. When welding is performed using excessive heat and/or welding currents you may lower the mechanical properties of the weld metal.
5. Welding using excessive heat also tends to reduce the impact values.
6. Cold cracks are caused by diffusible hydrogen; to prevent this it is necessary to remove the diffusible hydrogen by selecting the proper pre-heat and interpass temperature (this is dependent on the welding process). Normally as the tensile strength becomes higher it is better to apply a higher pre-heat and interpass temperature.
7. Rust, oil and dirt can cause welding defects such as pitting and blowholes, to prevent this the work surface should be thoroughly cleaned before welding.
8. To minimize cracking of hard surfacing the following steps should be taken in the order shown:

A. Preparation of the base metal
B. Heat and temperature control
C. Penetration
D. Welding distortion
E. Underlaying

Welding power source

Use a DC power source with constant voltage or a polarity DCEP inverter type welding power source. Ordinary currents should be used and the pulse switch should be turned off. The use of certain pulse arc power sources can create excessive spatter.

Shielding gas

For general applications the recommended shielding gas is CO_2. Argon - CO_2 mixtures with 20 – 50% CO_2 can also be used but when compared with CO_2 porosity (pit, blowhole) is more likely to occur. The proper flow rate of the shielding gas is 20 – 50 liters/minute.

Mixed gases

1. When using mixed gases (Ar + 80% CO_2) for spray transfer welding, the voltage should be lowered (1~2). The use of an excessively low arc voltage may generate a large sound in spray arc welding with mixed gas, it makes for a shallower welding depth and it may cause welding defects for low shielding power.
2. When you use shorter wire extension you should be able to achieve better bead shape and welding depth.
3. Always make sure to use the appropriate welding conditions, high heat input of over welding condition make limited heating, base metal easily deform.

Wire extension

Keep the wire extension at about 15mm for 0.9mm diameter wire and 15 -20mm for 1.2 to 1.6mm wire diameters. The use of a shorter wire extension may cause pit and worm-tracking porosity. Please note that the wire extension when welding with Argon-CO_2 mixtures should be 5mm longer than when using straight CO_2.

Protection against wind

When wind velocity at the vicinity of an arc is more than 1m/second, blowhole is more likely to occur and dissolution of nitrogen into the weld metal may deteriorate slag removal and decrease the ferrite content of the weld metal, thereby causing hot cracking. To prevent these problems from occurring use and adequate shielding gas flow rate and a welding screen.

Welding fumes

Flux-cored wires generate higher levels of welding fumes when compared to solid wires. To protect welders from harmful welding fumes proper air extraction and an appropriate respirators are required.

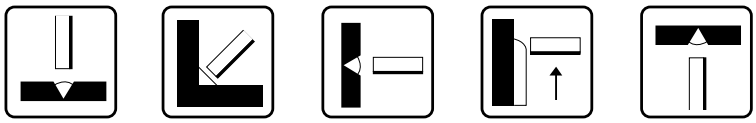
Storage of wire

Once a flux cored wire is unpacked the wire should be stored in an area of low humidity, taking the appropriate preventative measures against dew fall water and dust. If not properly stored the wire can pick up moisture which may cause pitting and worm tracking when welding.

ER308LT-1/4

CWB to CSA W48-14
Classification: E308LT1-1 and E308T1-4
AWS A5.22/A5.22M:2012

Suitable welding positions



Typical applications
Welding of low carbon 18% Chromium (Cr) - 8% Nickel (Ni) austenitic stainless steel (AISI 304, 304L, 304LN, ASTM A157 Gr. C9; A320 Gr. B8C or D). Used extensively in the fabrication of stainless steel structures, pressure vessels, tanks used in dairy, pulp and paper, textile dyeing, refinery and chemical equipment

Characteristics on usage
- Excellent weldability and low crack susceptibility
- Titania type flux core with self-detaching slag
- Low spatter generation
- Very good weld soundness of the weld-metal

Typical chemical composition of all-weld-metal (%)

C	Si	Mn	Cr	Ni
0.03	0.60	1.20	20.30	10.50

Expected minimum mechanical properties of all weld metal

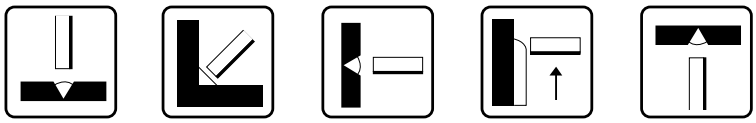
Yield Strength		Tensile Strength		Elongation	Impact Value
440 MPa	64 ksi	570 MPa	82 ksi	39%	65J (-40°C)

Vanguard Code	Description
6291 0900	0.9mm x 15kg
6291 1200	1.2mm x 15kg
6291 1600	1.6mm x 15kg

ER309LT-1/4

CWB to CSA W48-14
Classification: E309LT1-1 and E309T1-4
AWS A5.22/A5.22M:2012

Suitable welding positions



Typical applications
Welding of 22% Chromium (Cr) -12% Nickel (Ni) austenitic Stainless Steel (AISI 309), multi-material welding with Stainless Steel/Carbon Steel. Used extensively in the fabrication of type 309 stainless steel structures, furnace parts, high temperature containers

Characteristics on usage
- Excellent weldability
- Superior heat and corrosion resistance
- Powerful penetration spray arc transfer
- Low spatter generation and self-releasing slag
- Very good weld soundness of the weld-metal

Typical chemical composition of all-weld-metal (%)

C	Si	Mn	Cr	Ni
0.03	0.60	1.12	23.70	13.20

Expected minimum mechanical properties of all weld metal

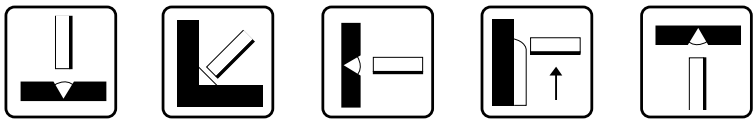
Yield Strength		Tensile Strength		Elongation	Impact Value
430 MPa	62 ksi	560 MPa	81 ksi	37%	45J (-30°C)

Vanguard Code	Description
6292 0900	0.9mm x 15kg
6292 1200	1.2mm x 15kg
6292 1600	1.6mm x 15kg

ER316LT-1/4

CWB to CSA W48-14
Classification: E316LT1-1 and E316T1-4
AWS A5.22/A5.22M:2012

Suitable welding positions



Typical applications
Welding of low carbon 18% Chromium (Cr) – 12% Ni – 2% Molybdenum (Mo) Stainless Steel. The low carbon content of this wire provides very good resistance to most types of corrosion of the weld metal (AISA 316L, 316Ti). Used extensively in the fabrication of stainless steel structures, pressure vessels, tanks in dairy, pulp and paper, textile dyeing, refinery and chemical equipment.

Characteristics on usage
- Excellent weldability and low crack susceptibility
- Titania type flux core with self-detaching slag
- Low spatter generation
- Very good weld soundness of the weld-metal

Typical chemical composition of all-weld-metal (%)

C	Si	Mn	Cr	Ni	Mo
0.03	0.60	1.15	19.50	12.70	2.40

Expected minimum mechanical properties of all weld metal

Yield Strength		Tensile Strength		Elongation	Impact Value
420 MPa	61 ksi	560 MPa	81 ksi	38%	38J (-105°C)

Vanguard Code	Description
6294 0900	0.9mm x 15kg
6294 1200	1.2mm x 15kg
6294 1600	1.6mm x 15kg

Pure Tungsten (Color Code Green)
This electrode contains at least 99.5% tungsten and delivers all of the properties associated with tungsten such as superior conductivity, durability, and performance. Pure tungsten offers good arc stability for AC sine wave welding on deal for welding of aluminum and magnesium. NOT used for DC welding

Zirconated Tungsten (Color Code Brown)
This electrode can handle higher amperage levels and work well with both transformer and inverter power sources, making them an excellent alternative to the green pure tungsten electrodes for magnesium and aluminum alloys.

2% Thoriated Tungsten (Color Code Red)
This is the most widely used electrode, it is extremely long lasting and highly durable and these electrodes are a staple in DC welding applications. 2% Thoriated Tungsten is best for copper alloys, nickel alloys, titanium alloys, and non-corroding steels.

Thorium is radioactive; always ensure to follow all warnings, instructions, and the Material Safety Data Sheet (MSDS) for its use

V3 (Rare Earth - E3 Equivalent) Tungsten (Color Code Purple)
The innovative Rare Earth Mix electrode is excellent substitute for 2% Thoriated tungsten. It offers the same high performance properties without the risks associate with Thorium.

V3 Tungsten is ideal when welding aluminum alloys, magnesium alloys, titanium alloys, nickel alloys, copper alloys, low-alloyed steels, and non-corrosive steels

2% Ceriated (Rare Earth) Tungsten (Color Code Grey)
This Rare Earth tungsten contains a minimum of 97.30% tungsten and 1.80 to 2.20% Cerium; it offers extreme ease of striking an arc with lower amperages, and extraordinary performance with regard to DC welding applications.

2% Ceriated Tungsten is well suited for titanium alloys, copper alloys, magnesium alloys, aluminum alloys, and nickel alloys, non-corroding steels, and low-alloyed steels. Very good replacement for balled pure tungsten for AC welding on aluminum, as it provides approximately 30-40% more current carrying capacity than the pure tungsten of the same diameter.

1.5% Lanthanated (Rare Earth) Tungsten (Color Code Gold)
This Rare Earth tungsten electrode has excellent arc starting, a low burn off rate, very good arc stability and excellent re-ignition characteristics. It work well on AC or DC electrode negative with a pointed end, or it can be balled for use with AC sine wave power sources.

1.5% Lanthanated tungsten also maintains a sharpened point well, which is an advantage when welding steel and stainless steel on DC or the AC from square wave power sources. Much like 2% Ceriated tungsten this tungsten allow the arc to be started and maintained at lower AC voltages (compared to Pure Tungsten). It is also has a higher current carrying capacity of approximately 50% than the pure tungsten of the same diameter.

AUTOMATIC WELDING HELMETS

Features

- Solar Power Cell Design with Replaceable Batteries
- Fully Automatic Power On/Off
- Can be used for MIG/MAG, TIG and ARC welding and Plasma Cutting
- Cutting and Grinding Feature on Shade 4
- Plasma Cutting Shade 5-9
- Normal Welding Shade 9-13
- 4 Premium Sensors
- Testing Button with Battery Indicator
- Power OFF Delay in Dark Environments
- Knob to Adjust the Delay Time and Sensitivity
- Cheater Lens Compatible
- Hard Hat Adaptor (optional/special order)
- Very light design, only 450 grams (1 Pound)
- Meet requirements of ANSI Z87+ and CAN/CSA Z94.3
- Patented Smart Chip Technology
- Two year warranty on Auto Darkening Filter/Cartridge

Specifications

Viewing Area: 94 x 36.5mm (3.70 x 1.44”)
Cartridge Size: 110 x 90 x 9mm (4.33 x 3.54 x 0.35”)
Light State: Shade DIN 4
Dark State: Shade DIN 5-9 / 9-13
Switching Time Light to dark: 0.00004 seconds (1/25,000)
Helmet Material: High Impact Polyamide Nylon

Vanguard Code	Description
76007800	VGD 7800AD Automatic Welding Helmet - Black
76007801	VDG 7800AD Automatic Welding Helmet - Red Flames
76007802	VDG 7800AD Automatic Welding Helmet - Green Skulls
76007001	Hard Hat Adaptor (for Fibre Metal Helmets)
76007110	Magnifying/Cheater Lenses 1.00 Optical Power
76007112	Magnifying/Cheater Lenses 1.25 Optical Power
76007115	Magnifying/Cheater Lenses 1.50 Optical Power
76007117	Magnifying/Cheater Lenses 1.75 Optical Power
76007120	Magnifying/Cheater Lenses 2.00 Optical Power
76007122	Magnifying/Cheater Lenses 2.25ptical Power
76007125	Magnifying/Cheater Lenses 2.50 Optical Power
760078001	Exterior lens - 10 Pcs/Pack
760078002	Interior lens - 10 Pcs/Pack
760078003	Replacement Head Gear
760078004	Cartridge Frame

ALUMINUM FILLER METAL CHART

Base Metal	201 206 224	319 333 354 355 C355	356 A356 357 A357 413 443 A444	511 512 513 514 535	7004 7005 7039 710 712	6009 6010 6070	6005 6051 6063 6101 6151 6201 6351 6951	5456	5454	5154 5254	5086	5083	5052 5652	5005 5050	3004 Alc- 3004	2219	2014 2036	1100 3003 Alc- 3003	1060 1070 1080 1350
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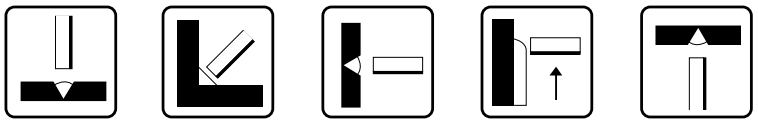
6009 6010 6070	4145	4145 4047 4043	4043 4145 4047	4043	4043	4043 4145 4047													
7004 7005 7039 710 712	-	4043 4047	4043 4047 5183	5356 5183 5554	5356 5183 5556														
511 512 513 514 535	-	-	4043 5183 5356	5356 5183 5554															
356 A356 357 A357 413 443 A444	4145	4145 4047 4043	4043 4047																
319 333 354 355 C355	4145 2319	4145 4047 4043																	
201 206 224	2319 4145																		

ER4043

CWB to CSA W48
AWS A 5.10
Classification ER4043, R4043

Suitable welding positions



Typical applications
4043 is 5% silicon all position aluminum welding wire, used to weld heat treatable alloys such as 6XXX base metals and cast alloys. The silicon within this alloy results in improved fluidity (wetting action) yielding a less crack sensitive bright weld bead. Commonly uses include fabricating bicycles, trucks, trailers, automotive parts and equipment.

Maximum chemical composition of all-weld-metal (%)

Al	Mn	Fe	Cu	Zn	Be	Si	Mg	Ti	Other
Remainder	0.05	0.80	0.30	0.10	0.0008	4.5-6.0	0.05	0.20	*

* Other elements have a maximum of 0.05 and the other elements cannot exceed 0.015 in total

Typical mechanical properties of all-weld-metal

Melting Range		Tensile Strength	Yield Strength	Elongation (in 2")	Density	Post Anodized Color
574 - 632° C	1065 - 1170° F	21 – 33,000 psi	10 - 27,500 psi	5 – 12%	0.097 Lbs/cu in	Gray

MIG welding procedures; DCEP

Wire Diameter (inches)	WFS ipm	Amps	Volts	Consumption (lb/100ft)	Argon (cfh)
0.030	480 – 625	60 – 175	15 – 24	0.65 – 1.25	25 - 30
0.035	450 – 750	70 – 185	15 – 27	1.0 – 4.25	30 – 35
0.045	330 – 500	125 – 260	20 – 29	1.0 – 4.25	35 – 45

TIG welding procedures; ACHF with pure or zirconiated hemisphere shaped tungsten

Base Thickness (inches)	Filler Wire Size	Tungsten Diameter	Amps	Consumption (lb/100ft)	Gas Cup Size	Argon (cfh)
1/16"	1/16"	1/16"	60 – 80	0.75	3/8"	20
3/32"	3/32"	3/32"	85 – 120	1.00	3/8"	20
1/8"	3/32"	3/32"	125 – 160	1.50	3/8"	20
3/16"	1/8"	1/8"	190 – 220	4.5 - 6	7/16"	25

MIG standard packaging and part numbers

Diameter		Vanguard Code	
inches	mm	0.454 Kg / 1 Lb	7.27 Kg / 16 Lb
0.030	0.8	6520 0108	6520 1508
0.035	0.9	6520 0109	6520 1509
0.045	1.2	6520 0112	6520 1512

* Additional diameters & packaging sizes (spools and/or Drums/Pail Packs) available upon request. Minimum order quantity may apply

TIG standard packaging and part numbers

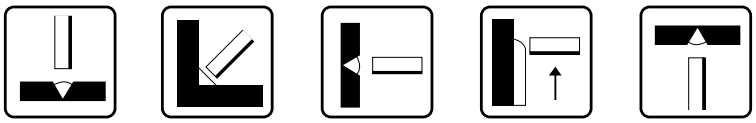
Diameter		Vanguard Code
inches	mm	4.54 Kg / 10 Lb
1/16	1.6	6570 1016
3/32	2.4	6570 1024
1/8	3.2	6570 1032
3/16	4.8	6570 1048

* Additional diameters & packaging sizes available upon request. Minimum order quantity may apply

ER5356

CWB to CSA W48
AWS A 5.10
Classification ER5356, R5356

Suitable welding positions



Typical applications
5356 is 5% magnesium all position non-heat treatable aluminum welding wire, used to weld 5XXX series alloys. Commonly welding applications include boats, ships, bicycles, trucks, pressure vessels, automotive parts and equipment.

Maximum chemical composition of all-weld-metal (%)

Al	Mn	Fe	Cu	Zn	Be	Si	Mg	Ti	Cr	Other
Remainder	0.05-0.20	0.40	0.10	0.10	0.0008	0.25	4.5-5.5	0.05-0.20	0.06-0.20	*

* Other elements have a maximum of 0.05 and the other elements cannot exceed 0.015 in total

Typical mechanical properties of all-weld-metal

Melting Range		Tensile Strength	Yield Strength	Elongation (in 2")	Density	Post Anodized Color
571 - 635° C	1060 - 1175° F	29 – 45,000 psi	12 – 30,000 psi	10 – 18%	0.096Lbs/cu in	White

MIG welding procedures; DCEP

Wire Diameter (inches)	WFS ipm	Amps	Volts	Consumption (lb/100ft)	Argon (cfh)
0.030	480 – 625	60 – 175	15 – 24	0.65 – 1.25	25 – 30
0.035	450 – 750	70 – 185	15 – 27	1.0 – 4.25	30 – 35
0.045	330 - 500	125 - 260	20 - 29	1.0 – 4.25	35 - 45

TIG welding procedures; ACHF with pure or zirconiated hemisphere shaped tungsten

Base Thickness (inches)	Filler Wire Size	Tungsten Diameter	Amps	Consumption (lb/100ft)	Gas Cup Size	Argon (cfh)
1/16"	1/16"	1/16"	60 – 80	0.75	3/8"	20
3/32"	3/32"	3/32"	85 – 120	1.00	3/8"	20
1/8"	3/32"	3/32"	125 – 160	1.50	3/8"	20
3/16"	1/8"	1/8"	190 – 220	4.5 - 6	7/16"	25

MIG standard packaging and part numbers

Diameter		Vanguard Code	
inches	mm	0.454 Kg / 1 Lb	7.27 Kg / 16 Lb
0.030	0.8	6530 0108	6530 1508
0.035	0.9	6530 0109	6530 1509
0.045	1.2	6530 0112	6530 1512

* Additional diameters & packaging sizes (spools and/or Drums/Pail Packs) available upon request. Minimum order quantity may apply

TIG standard packaging and part numbers

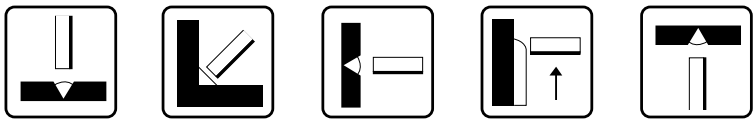
Diameter		Vanguard Code
inches	mm	4.54 Kg / 10 Lb
1/16	1.6	6580 1016
3/32	2.4	6580 1024
1/8	3.2	6580 1032
3/16	4.8	6580 1048

* Additional diameters & packaging sizes available upon request. Minimum order quantity may apply

E6010

CWB to CSA W48-14
Classification: E4310
AWS/ASME A5.1 - 04 E6010

Suitable welding positions



Typical applications
Covering is low hydrogen, iron powder; common of welding applications include 71 ksi (490 MPa) class high tensile strength steels found in structural steels for buildings, bridge construction, storage tank fabrication, ship building, industrial and mining machinery fabrication.

Characteristics on usage
- Excellent penetration with good fusion makes this electrode the preferred choice for pipeline welding
- High ductility root weld
- Low slag volume and easy slag removal
- Very good bead appearance
- Re-dry the electrode at 70-80°C for 30-60 minutes prior to use

Typical chemical composition of all-weld-metal (%)

C	Si	Mn	P	S	Cr	Ni	Mo
0.11	0.36	0.63	0.015	0.013	0.03	0.02	0.01

Minimum typical mechanical properties of all-weld-metal

Yield Strength		Tensile Strength		Elongation	Impact Value
420 MPa	61 ksi	500 MPa	72 ksi	29%	40J (-30°C)

Dimensions and recommended currents

Vanguard Code	Diameter		Length		Amperage	
	inches	mm	inches	mm	F & HF	VU & OH
6178 2400	3/32	2.6	13.8	350	50 – 80	40 - 70
6178 3200	1/8	3.2	13.8	350	70 - 110	60 - 100
6178 4000	5/32	4.0	13.8	350	110 - 150	90 - 130
---	3/16	5.0	13.8	350	160 - 200	140 - 170

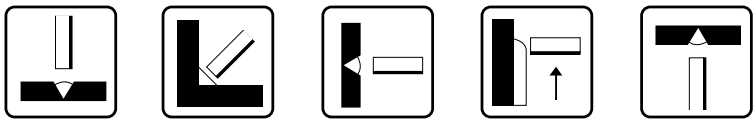
Standard packaging

Sleeve		Master Carton		Pallet	
4.5 Kgs	10 Lbs	22.5 Kgs	50 Lbs	1,260 Kgs	2,780 Lbs

E6011

CWB to CSA W48-14
Classification: E4311
AWS/ASME A5.1 - 04 E6011

Suitable welding positions



Typical applications
Covering is high cellulose type; common applications include welding of storage tanks, pipe, pressure vessel fittings, steel sheets, piping and ship construction.

Characteristics on usage
- Excellent all position general construction electrode designed for both DC and AC current
- Very good electrode when welding in poor grove fit up and vertical-down, all position welding of pipe
- Slightly higher slag volume than E6010 electrodes, good bead appearance
- High ductility root weld and easy slag removal
- Produces good mechanical properties, meets X-ray requirements
- Re-dry the electrode at 70-80°C for 30-60 minutes prior to use

Typical chemical composition of all-weld-metal (%)

C	Si	Mn	P	S	Cr	Ni	Mo
0.08	0.31	0.58	0.017	0.018	0.03	0.02	0.01

Minimum typical mechanical properties of all-weld-metal

Yield Strength		Tensile Strength		Elongation	Impact Value
410 MPa	59 ksi	500 MPa	72 ksi	24%	40J (-30°C)

Dimensions and recommended currents

Vanguard Code	Diameter		Length		Amperage	
	inches	mm	inches	mm	F & HF	VU & OH
6180 2400	3/32	2.6	11.8	300	50 - 80	40 - 70
6180 3200	1/8	3.2	13.8	350	70 - 110	70 - 100
6180 4000	5/32	4.0	13.8	350	110 - 150	90 - 130
6180 5000	3/16	5.0	13.8	350	160 - 200	140 - 170

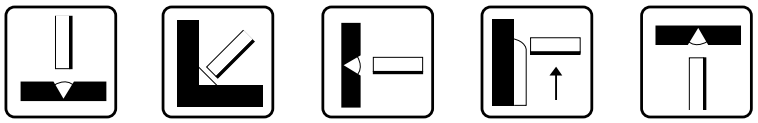
Standard packaging

Sleeve		Master Carton		Pallet	
4.5 Kgs	10 Lbs	22.5 Kgs	50 Lbs	1,260 Kgs	2,780 Lbs

E6013

CWB to CSA W48-14
Classification: E4313
AWS/ASME A5.1 - 04 E6013

Suitable welding positions



Typical applications
Covering is high titania type; common welding applications include light to medium construction (in all position) and pipe welding, very good operator appeal. Welding of steel sheet structures, light structural steel, automobile bodies and machinery guards.

Characteristics on usage
- Excellent strike and re-striking properties
- Very good slag removal, arc transfer and bead appearance without undercut
- Re-dry the electrode at 70-100°C for 30-60 minutes prior to use

Typical chemical composition of all-weld-metal (%)

C	Si	Mn	P	S	Cr	Ni	Mo
0.06	0.35	0.40	0.02	0.011	0.03	0.02	0.01

Minimum typical mechanical properties of all-weld-metal

Yield Strength		Tensile Strength		Elongation	Impact Value
430 MPa	62 ksi	490 MPa	71 ksi	28%	60J (0°C)

Dimensions and recommended currents

Vanguard Code	Diameter		Length		Amperage	
	inches	mm	inches	mm	F & HF	VU & OH
6182 2400	3/32	2.6	13.8	350	60 - 80	60 - 90
6182 3200	1/8	3.2	13.8	350	80 - 130	80 - 110
6182 4000	5/32	4.0	15.7	400	130 - 180	90 - 140
---	3/16	5.0	15.7	400	160 - 220	120 - 190
---	1/4	6.0	20.0	450	210 - 280	---

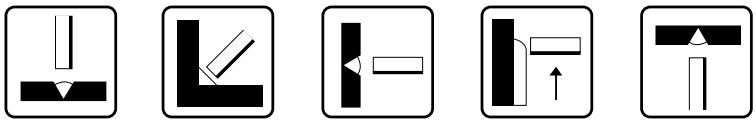
Standard packaging

Sleeve		Master Carton		Pallet	
4.5 Kgs	10 Lbs	22.5 Kgs	50 Lbs	1,260 Kgs	2,780 Lbs

E7014

CWB to CSA W48-14
Classification: E4914
AWS/ASME A5.1 - 04 E7014

Suitable welding positions



Typical applications
Covering is iron powder, Titania type; common welding applications include fillet welding of structural steels for buildings, bridge, ship structures and general structures.

Characteristics on usage
- Very good striking and re-striking properties
- Excellent slag removal and good bead appearance
- Quiet and stable arc
- Re-dry the electrode at 120-150°C for 30 - 60 minutes prior to use

Typical chemical composition of all-weld-metal (%)

C	Si	Mn	P	S	Cr	Ni	Mo
0.08	0.41	0.73	0.02	0.014	0.03	0.02	0.01

Minimum typical mechanical properties of all-weld-metal

Yield Strength		Tensile Strength		Elongation	Impact Value
470 MPa	68 ksi	550 MPa	80 ksi	30%	50J (0°C)

Dimensions and recommended currents

Vanguard Code	Diameter		Length		Amperage	
	inches	mm	inches	mm	F & HF	VU & OH
6184 2400	3/32	2.6	13.8	350	60 - 100	50 - 90
6184 3200	1/8	3.2	13.8	350	90 - 140	80 - 130
6184 4000	5/32	4.0	13.8	350	140 - 200	110 - 170
6184 4800	3/16	5.0	13.8	350	190 - 240	150 - 200
---	1/4	6.0	20.0	450	250 - 310	---

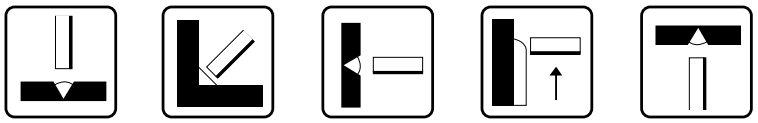
Standard packaging

Sleeve		Master Carton		Pallet	
4.5 Kgs	10 Lbs	22.5 Kgs	50 Lbs	1,260 Kgs	2,780 Lbs

E7018

CWB to CSA W48-14
Classification: E4918
AWS/ASME A5.1 - 04 E7018

Suitable welding positions



Typical applications
Covering is low hydrogen, iron powder; common of welding applications include 71 ksi (490 MPa) class high tensile strength steels found in structural steels for buildings, bridge construction, storage tank fabrication, ship building, industrial and mining machinery fabrication.

Characteristics on usage
- Very good striking and re-striking properties
- Excellent usability with direct current applications
- Excellent mechanic properties and radiographic soundness
- Good bead appearance and slag removal
- Re-dry the electrode at 300-400°C for 60-120 minutes prior to use

Typical chemical composition of all-weld-metal (%)

C	Si	Mn	P	S	Cr	Ni	Mo
0.07	0.61	0.87	0.015	0.011	0.03	0.02	0.01

Minimum typical mechanical properties of all-weld-metal

Yield Strength		Tensile Strength		Elongation	Impact Value
480 MPa	69 ksi	570 MPa	82 ksi	30%	70J (-30°C)

Dimensions and recommended currents

Vanguard Code	Diameter		Length		Amperage	
	inches	mm	inches	mm	F & HF	VU & OH
6188 2400	3/32	2.6	11.8	300	60 - 100	50 - 80
6188 3200	1/8	3.2	13.8	350	90 - 130	80 - 120
6188 4000	5/32	4.0	13.8	350	130 - 180	110 - 170
6188 5000	3/16	5.0	13.8	350	200 - 250	160 - 210
6188 6400	1/4	6.0	17.7	450	250 - 310	---

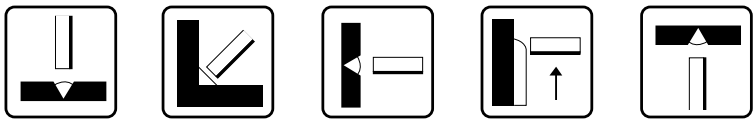
Standard packaging

Sleeve		Master Carton		Pallet	
4.5 Kgs	10 Lbs	22.5 Kgs	50 Lbs	1,260 Kgs	2,780 Lbs

E7018-1

CWB to CSA W48-14
Classification: E4918-1-H8
AWS/ASME A5.1 - 04 E7018-1

Suitable welding positions



Typical applications
Covering is low hydrogen, iron powder; common of welding applications include structural steels for buildings, bridge construction, storage tanks fabrication, ship building, and industrial and mining machinery fabrication., fabrication and repair of liquefied petroleum gas storage tanks

Characteristics on usage
- Excellent impact value at -46°C (-51°F)
- Very good striking and re-striking properties
- Excellent usability with direct current applications
- Excellent mechanical properties and radiographic soundness
- Good bead appearance and slag removal
- Re-dry the electrode at 300 - 400°C for 60 - 120 minutes prior to use

Typical chemical composition of all-weld-metal (%)

C	Si	Mn	P	S	Cr	Ni	Mo
0.07	0.58	1.38	0.013	0.012	0.03	0.15	0.01

Minimum typical mechanical properties of all-weld-metal

Yield Strength		Tensile Strength		Elongation	Impact Value
510 MPa	74 ksi	590 MPa	85 ksi	32%	75J (-45°C)

Dimensions and recommended currents

Vanguard Code	Diameter		Length		Amperage	
	inches	mm	inches	mm	F & HF	VU & OH
6189 2400	3/32	2.6	11.8	300	70 - 100	60 - 90
6189 3200	1/8	3.2	13.8	350	90 - 130	85 - 120
6189 4000	5/32	4.0	13.8	350	150 - 190	110 - 160
6189 5000	3/16	5.0	13.8	350	160 - 220	130 - 180
---	1/4	6.0	17.7	450	180 - 230	---

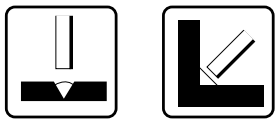
Standard packaging

Sleeve		Master Carton		Pallet	
4.5 Kgs	10 Lbs	22.5 Kgs	50 Lbs	1,260 Kgs	2,780 Lbs

E7024

CWB to CSA W48-14
Classification: E4924
AWS/ASME A5.1 - 04 E7024

Suitable welding positions



Typical applications
Covering is iron powder, titania type. Used for flat and horizontal fillet welding of structural steels for buildings, bridge, ship structures and general structures.

Characteristics on usage
- Designed for high efficiency single pass and multiple pass welding
- Very good striking and re-striking properties
- Excellent slag removal and good bead appearance
- Quiet and stable arc
- Re-dry the electrode at 120-150°C for 30 - 60 minutes prior to use

Typical chemical composition of all-weld-metal (%)

C	Si	Mn	P	S	Cr	Ni	Mo
0.08	0.35	0.78	0.02	0.014	0.03	0.02	0.01

Minimum typical mechanical properties of all-weld-metal

Yield Strength		Tensile Strength		Elongation	Impact Value
480 MPa	69 ksi	570 MPa	82 ksi	28%	50J (0°C)

Dimensions and recommended currents

Vanguard Code	Diameter		Length		Amperage
	inches	mm	inches	mm	F & HF
6190 2400	3/32	2.6	11.8	300	60 - 90
6190 3200	1/8	3.2	13.8	350	100 - 150
6190 4000	5/32	4.0	13.8	350	140 - 190
6190 4800	3/16	5.0	13.8	350	200 - 250
---	1/4	6.0	17.7	450	260 - 300

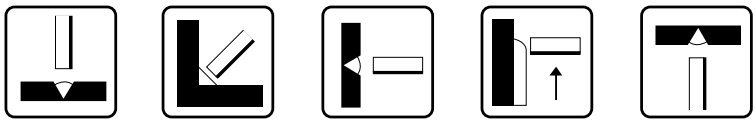
Standard packaging

Sleeve		Master Carton		Pallet	
4.5 Kgs	10 Lbs	22.5 Kgs	50 Lbs	1,260 Kgs	2,780 Lbs

11018-M

AWS/ASME A5.5 : E11018-M

Suitable welding positions



Typical applications

Covering is low hydrogen, iron powder type for welding of low alloy high strength steels having tensile properties of about740 - 790 MPa such as HY80, etc.

Characteristics on usage

- Excellent mechanical properties especially in notch toughness
- Very good operational performance in all position
- Good bead appearance and easy slag removal
- Good impact value at -51°C
- Re-dry the electrode at 300 - 400°C for 60 - 120 minutes prior to use

Typical chemical composition of all-weld-metal (%)

C	Si	Mn	P	S	Cr	Ni	Mo
0.08	0.41	1.49	0.015	0.012	0.25	1.86	0.35

Minimum typical mechanical properties of all-weld-metal

Yield Strength		Tensile Strength		Elongation	Impact Value
730 MPa	106 ksi	830 MPa	120 ksi	22%	45J (-50°C)

Dimensions and recommended currents

Vanguard Code	Diameter		Length		Amperage	
	inches	mm	inches	mm	F & HF	VU & OH
6195 2400	3/32	2.6	13.8	350	50 - 100	40 - 90
6195 3200	1/8	3.2	13.8	350	90 - 130	80 - 120
6195 4000	5/32	4.0	15.7	400	130 - 180	110 - 160
6195 5000	3/16	5.0	15.7	400	180 - 240	140 - 200
---	1/4	6.0	17.7	450	240 - 320	---

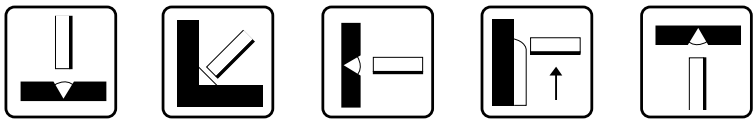
Standard packaging

Sleeve		Master Carton		Pallet	
4.5 Kgs	10 Lbs	22.5 Kgs	50 Lbs	1,260 Kgs	2,780 Lbs

E8018-C3

CWB to CSA W48-14
Classification: E5518-C3
AWS/ASME A5.5 - 06 E8018-C3

Suitable welding positions



Typical applications
Covering is low hydrogen, iron powder type for welding of 1% nickel (Ni) steel and high tensile strength steels for commercial and military applications where good impact properties is required.

Characteristics on usage
- Fast, efficient metal transfer in all positions
- Excellent deposited weld metal with both AC and DC power source
- Re-dry the electrode at 300-400°C for 30-60 minutes prior to use

Typical chemical composition of all-weld-metal (%)

C	Si	Mn	P	S	Cr	Ni	Mo
0.07	0.45	0.91	0.013	0.012	0.02	1.03	0.01

Minimum typical mechanical properties of all-weld-metal

Yield Strength		Tensile Strength		Elongation	Impact Value
530 MPa	77 ksi	600 MPa	87 ksi	28%	60J (-40°C)

Dimensions and recommended currents

Vanguard Code	Diameter		Length		Amperage	
	inches	mm	inches	mm	F & HF	VU & OH
6186 2400	3/32	2.6	13.8	350	60 - 95	60 - 90
6186 3200	1/8	3.2	13.8	350	90 - 130	80 - 120
6186 4000	5/32	4.0	15.7	400	135 - 180	110 - 170
6186 5000	3/16	5.0	15.7	400	190 - 240	150 - 200

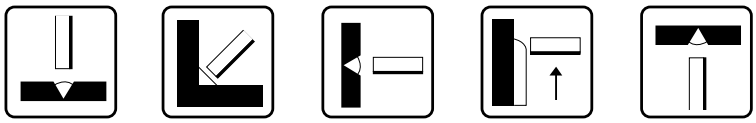
Standard packaging

Sleeve		Master Carton		Pallet	
4.5 Kgs	10 Lbs	22.5 Kgs	50 Lbs	1,260 Kgs	2,780 Lbs

RG-45

Classification: RG45
AWS/ASME A5.2

Suitable welding positions



Typical applications
Recommended for oxyacetylene welding, RG-45 is a copper coated gas welding rod that is used for welding ordinary low carbon steel up to 1/4” thick. It is recommended where ductility and machinability are most important.

Characteristics on usage
Produces high quality welds which are ductile and free of porosity. This rod is excellent for steel sheets, plates, pipes, castings and structural shapes. No flux required

Typical chemical composition of all-weld-metal (%)

C	Si	Mn	P
0.07	0.58	1.38	0.013

Typical mechanical properties of all-weld-metal

Tensile Strength		Elongation
500 MPa	72 ksi	17%

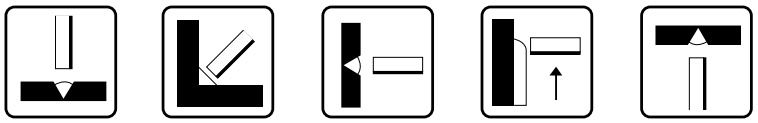
Vanguard Code	Diameter
6374 1600	1.6mm
6374 2400	2.4mm
6374 3200	3.2mm

Sizes and marking
Standard diameters:1.6, 2.4, 3.2 and 4.0mm (Tolerances on diameter : + 0,01 / - 0,04 mm)
Marking : Stamped with the heat, grade and diameter on both ends
Sold in 5 Kg Tubes

ER70S-2

CWB to CSA W48-14
Classification: ER48S-2 (ER70S-2)
AWS/ASME A5.18/A5.18M:2005

Suitable welding positions



Typical applications
For mild steel and 490MPa tensile strength steel welding of pipes, offshore drilling rigs and structural steels, etc...

Characteristics on usage
- Triple deoxidizer (aluminum, titanium and zirconium)
- Superior quality welds with minimum porosity, even over rust and mill scale
- X-Ray quality welds over most surface conditions
- Suitable for welding all grades of steel

Typical chemical composition of all-weld-metal (%)

C	Si	Mn	P	S
0.07	0.54	1.18	0.015	0.011

Typical mechanical properties of all-weld-metal

Yield Strength		Tensile Strength		Elongation	Impact Value
490 MPa	71 ksi	570 MPa	82 ksi	29%	180J (-30°C)

Dimensions and recommended currents

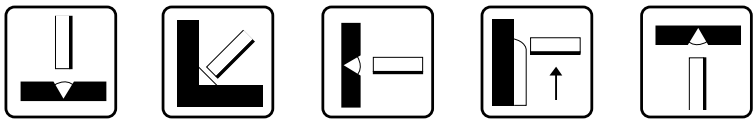
Vanguard Code	Diameter		Amperage (A)	Voltage (V)
	inches	mm		
---	0.9	0.035	50 - 80	10 - 12
---	1.2	0.045	70 - 120	10 - 12
6375 1600	1.6	0.062	90 - 170	11 - 16
6375 2400	2.4	0.094	100 – 200	13 - 20
6375 3200	3.2	0.125	120 - 250	13 - 22

Sizes and marking
Standard diameters: 1.2, 1.6, 2.4, 3.2 and 4.0mm (Tolerances on diameter : + 0.01 / - 0.04mm)
Marking : Stamped with heat, grade and diameter on both ends
Sold in 5 Kg Tubes

ER70S-6

CWB to CSA W48-14
Classification: B-G 49A 3 C1 S6 (B-G 49A 3 C G6)
AWS/ASME A5.18/A5.18M:2005

Suitable welding positions



Typical applications
Mild steel wire for welding of mild steel and 490MPa tensile strength materials. Widely used in the fabrication of auto parts, truck bodies, heavy equipment and farm implements. Also commonly used for HVAC duct work, structural applications, pipes, steel castings or forgings, shaft build-ups and general shop fabrications.

Characteristics on usage
- Excellent mechanical and toughness properties in low temperature conditions
- High silicone content ensures a highly fluid weld pool and excellent wetting
- Very low spatter generated
- Well suited for sheet metal applications that require a high welding current without burn through

Typical chemical composition of all-weld-metal (%)

C	Si	Mn	P	S
0.07	0.65	1.18	0.01	0.009

Typical mechanical properties of all-weld-metal

Yield Strength		Tensile Strength		Elongation	Impact Value
480 MPa	70 ksi	550 MPa	80 ksi	32%	120J (-30°C)

Dimensions and recommended currents

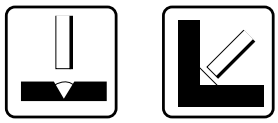
Vanguard Code	Diameter		Amperage (A)	Voltage (V)
	mm	inches		
---	0.9	0.035	50 - 80	10 - 12
6377 1200	1.2	0.045	70 - 120	10 - 12
6377 1600	1.6	0.062	90 - 170	11 - 16
6377 2400	2.4	0.094	100 - 200	13 - 20
6377 3200	3.2	0.125	120 - 250	13 - 22

Sizes and marking
Standard diameters: 1.2, 1.6, 2.4, 3.2 and 4.0mm (Tolerances on diameter : + 0.01 / - 0.04mm)
Marking: Stamped with heat, grade and diameter on both ends
Sold in 5 Kg Tubes

ER70S-2

CWB to CSA W48-14
Classification: ER48S-2 (ER70S-2)
AWS/ASME A5.18/A5.18M:2005

Suitable welding positions



Typical applications
High strength welding of low alloy steels, common welding applications include root pass pipe welding, small diameter pipe and tubing, sheet metal applications, repairs of mild and low alloy steel, auto parts and repair, structural steel, ship building, bridge construction and repair.

Characteristics on usage
- Triple deoxidizer (aluminum, titanium and zirconium)
- Superior quality welds with minimum porosity, even over rust and mill scale
- X-Ray quality welds over most surface conditions
- Suitable for welding all grades of steel
- Precision wound

Typical chemical composition of all-weld-metal (%)

C	Si	Mn	P	S	Ti	Al
0.07	0.67	1.20	0.015	0.011	0.07	0.08

Typical mechanical properties of all-weld-metal

Yield Strength		Tensile Strength		Elongation	Impact Value
490 MPa	71 ksi	550 MPa	80 ksi	29%	80J (-30°C)

Dimensions and recommended currents

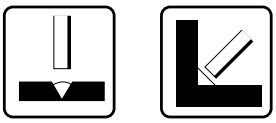
Vanguard Code	Diameter		Amperage (A)	Voltage (V)
	mm	inches		
6903 2009	0.9	0.035	70 - 250	14 - 25
6903 2012	1.2	0.045	100 - 350	16 - 34
6903 2016	1.6	0.062	120 - 450	16 - 38

Available packaging
Mig Wire 20 Kg Spools, 25 Kg Coils and/or 300 Kg Drums
Not all available packaging are standard stock items

ER70S-3

CWB to CSA W48-14
Classification: B-G 49A 3 C1 S3 (B-G 49A 3 C G3)
AWS/ASME A5.18/A5.18M:2005

Suitable welding positions



Typical applications
High strength welding of low alloy steels, common welding applications include root pass pipe welding, small diameter pipe and tubing, sheet metal applications, repairs of mild and low alloy steel, auto parts production and repair, structural steel, ship building, bridge construction and repair.

Characteristics on usage
- Triple deoxidizer (aluminum, titanium and zirconium)
- Superior quality welds with minimum porosity, even over rust and mill scale
- X-Ray quality welds over most surface conditions
- Suitable for welding all grades of steel
- Precision wound

Typical chemical composition of all-weld-metal (%)

C	Si	Mn	P	S
0.07	0.67	1.20	0.015	0.011

Typical mechanical properties of all-weld-metal

Yield Strength		Tensile Strength		Elongation	Impact Value
430 MPa	62 ksi	520 MPa	75 ksi	33%	90J (-20°C)

Dimensions and recommended currents

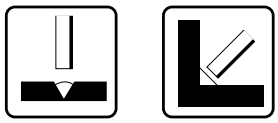
Vanguard Code	Diameter		Amperage (A)	Voltage (V)
	mm	inches		
6905 2009	0.9	0.035	70 - 250	14 - 25
6905 2012	1.2	0.045	100 - 350	16 - 34
6905 2016	1.6	0.062	120 - 450	16 - 38

Available packaging
Mig Wire 20 Kg Spools, 25 Kg Coils and/or 300 Kg Drums
Not all available packaging are standard stock items

ER70S-6

CWB to CSA W48-14
Classification: B-G 49A 3 C1 S6 (B-G 49A 3 C G6)
AWS/ASME A5.18/A5.18M:2005

Suitable welding positions



Typical applications
Mild steel wire for welding of mild steel and 490MPa tensile strength materials. Widely used in the fabrication of auto parts, truck bodies, heavy equipment and farm implements. Also commonly used for HVAC duct work, structural applications, pipes, steel castings or forgings, shaft build-ups and general shop fabrications.

Characteristics on usage
- Excellent mechanical and toughness properties in low temperature conditions
- High silicone content ensures a highly fluid weld pool and excellent wetting
- Very low spatter generated
- Well suited for sheet metal applications that require a high welding current without burn through
- Mig wire spools are precision wound

Typical chemical composition of all-weld-metal (%)

C	Si	Mn	P	S
0.07	0.67	1.20	0.015	0.011

Typical mechanical properties of all-weld-metal

Yield Strength		Tensile Strength		Elongation	Gas Mixture	Impact Value
450 MPa	65 ksi	550 MPa	80 ksi	30%	100% CO^2	70J (-30°C)
480 MPa	70 ksi	580 MPa	84 ksi	28%	AR +20% CO^2	80J (-30°C)

Dimensions and recommended currents

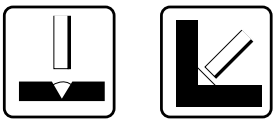
Vanguard Code & Package Size			Diameter		Amperage (A)	Voltage (V)
5 Kg	15/20 Kg	300 Kg	mm	inches		
6910 0506	6910 2006	- - -	0.6	0.023	70 - 80	14 - 18
6910 0508	6910 2008	6910 0308	0.8	0.030	70 - 200	14 - 20
6910 0509	6910 2009	6910 0309	0.9	0.035	70 - 250	14 - 25
---	6910 2012	6910 0312	1.2	0.045	100 - 350	16 - 34
---	---	6910 0314	1.4	0.052	120 - 400	16 - 36
---	6910 2016	6910 0316	1.6	0.062	120 - 450	16 - 38

Available packaging
Mig Wire 5 and 20 Kg Spools and/or 300 Kg Drums
Not all available packaging are standard stock items

ER70S-6

CWB to CSA W48-14
Classification: B-G 49A 3 C1 S6 (B-G 49A 3 C G6)
AWS/ASME A5.18/A5.18M:2005

Suitable welding positions



Typical applications
Mild steel wire for welding of mild steel and 490MPa tensile strength materials. Widely used in the fabrication of auto parts, truck bodies, heavy equipment and farm implements. Also commonly used for HVAC duct work, structural applications, pipes, steel castings or forgings, shaft build-ups and general shop fabrications.

Characteristics on usage
- Excellent mechanical and toughness properties in low temperature conditions
- High silicone content ensures a highly fluid weld pool and excellent wetting
- Very low spatter generated
- Well suited for sheet metal applications that require a high welding current without burn through
- Mig wire spools are precision wound

Typical chemical composition of all-weld-metal (%)

C	Si	Mn	P	S
0.07	0.86	1.53	0.012	0.007

Typical mechanical properties of all-weld-metal

Yield Strength		Tensile Strength		Elongation	Gas Mixture	Impact Value
450 MPa	65 ksi	550 MPa	80 ksi	30%	100% CO^2	70J (-30°C)
480 MPa	70 ksi	580 MPa	84 ksi	28%	AR +20% CO^2	80J (-30°C)

Dimensions and recommended currents

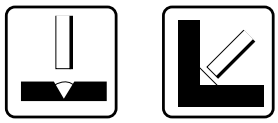
Vanguard Code & Package Size				Diameter		Amperage (A)	Voltage (V)
1 Kg	5 Kg	20 Kg	250 Kg	mm	inches		
6910 0106V	6910 0506V	---	---	0.6	0.023	50 - 120	9 - 14
6910 0108V	6910 0508V	6910 2008V	---	0.8	0.030	60 - 250	12 - 24
6910 0109V	69100509V	6910 2009V	6910 0259V	0.9	0.035	70 - 250	14 - 25
---	---	6910 2012V	6910 0212V	1.2	0.045	100 - 350	16 - 34
---	---	6910 2016V	---	1.6	0.062	70 - 250	14 - 25

Available packaging
Mig Wire 1, 5 and 20 Kg Spools and/or 250 Kg Drums
Not all available packaging are standard stock items

ER100S-1

CWB to CSA W48-14
Classification: ER69S-1 (ER100S-1)
AWS/ASME A5.28/A5.28M:2005

Suitable welding positions



Typical applications
For butt and fillet welding of machineries, heavy equipment and pressure vessels.

Characteristics on usage
- Stable weldability on high welding current
- Very good weld appearance due to low spatter with mixture gas

Typical chemical composition of all-weld-metal (%)

C	Si	Mn	P	S	Ni	Mo
0.05	0.26	1.54	0.008	0.006	2	0.35

Typical mechanical properties of all-weld-metal

Yield Strength		Tensile Strength		Elongation	Impact Value
700 MPa	101 ksi	760 MPa	110 ksi	20%	70J (-20°C)
720 MPa	104 ksi	780 MPa	113 ksi	22%	130J (-50°C)

Dimensions and recommended currents

Vanguard Code	Diameter		Amperage (A)	Voltage (V)
	mm	inches		
---	0.9	0.035	70 - 250	14 - 25
6920 2012	1.2	0.045	100 - 350	16 - 34
---	1.6	0.062	120 - 450	16 - 38

Available packaging
Mig Wire 20 Kg Spools and/or 300 Kg Drums
Not all available packaging are standard stock items

As the appearance and properties of the deposited weld metal varies broadly in accordance with the welding conditions, select the welding conditions carefully.

Tourch angle

If it is leaned to opposite to welding direction
1. Weld metal width becomes narrow.
2. Reinforcement of welds becomes high.
3. Penetration becomes deep.

Wire diameter

If it is too large
1. Spatter loss becomes high.
2. Arc becomes unstable.
3. Penetration becomes shallow.

Shielded gas

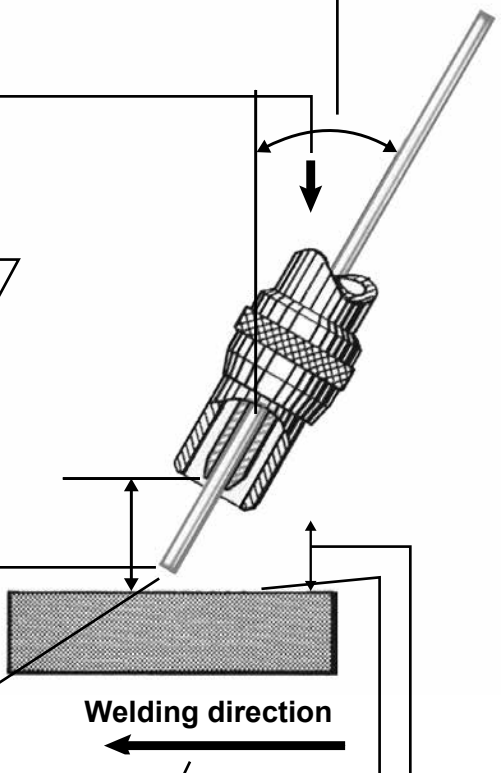
If the gas flow is little or the wind is strong, porosity appears. The transfer mode of molten drop varies in accordance with the type of gas.

Distance between tip and base metal

It becomes long (wire feeding speed is fixed)
1. Welding current decreases.
2. Arc length becomes long.
3. Penetration becomes shallow.

Nozzle height

If it is too high
1. Porosity appears if it is too low.
2. Nozzle is prone to clogged with spatters.
3. Long time welding is impossible.
4. It is difficult to see the welding line.



Welding current

If it becomes high
1. Weld metal width becomes wide.
2. Reinforcement of welds becomes high.
3. Spatter loss becomes low.

Surface of base plate

IIf much oil and rust are on it, porosity appears.

Arc length (Voltage)

If it becomes long
1. Weld metal width becomes wide.
2. Reinforcement of welds becomes low.
3. Penetration becomes shallow.
4. The undercuts are prone to appear.

Welding speed

If it becomes high
1. Weld metal width becomes narrow.
2. Reinforcement of welds becomes low.
3. Penetration becomes shallow.
4. The undercuts are prone to appear.

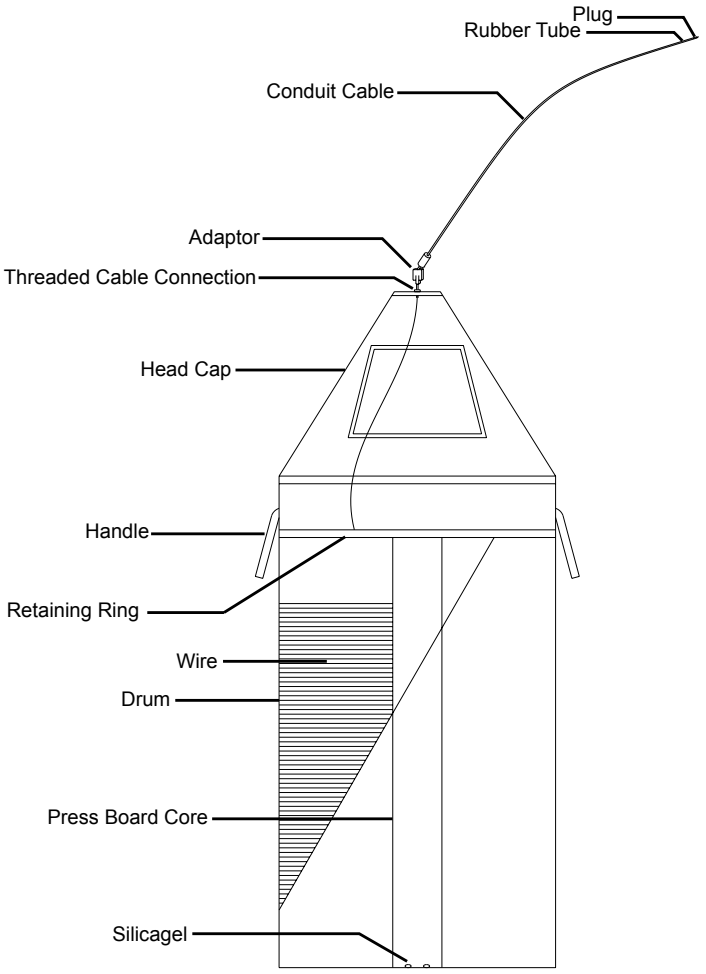
PAIL PACK INFORMATION

Improved welds
The carefully balanced helix, cast and column strength of the Bonarc pail pack system prevents the wire vibration found when using spooled or coiled wire.

Cost efficient
Pail pack systems increase cell productivity by reducing downtime created by frequent spool or coil changeover. Pail packs also offer the additional benefit of reduced wear on both tips and liners.

Robotic applications
Bonarc pail pack systems are ideal for both robotic and piece work cells.

With 20% more wire per drum than most competitors pail packs while still using the existing cell foot print companies are able to increase productivity without any major changes to their existing welding set up.



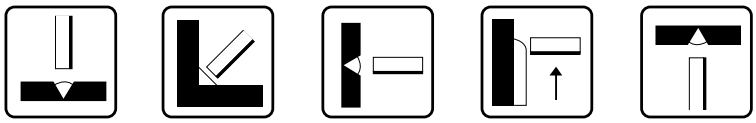
Available wire diameter and pail pack details

Wire Diameter		Weight		Dimensions (Diameter x Height)	
mm	inches	Kgs	Lbs (approx.)	mm	inches
0.8	0.030	200, 250	440, 550	507 x 820	20 x 32.30
0.9	0.035	200, 250, 300	440, 550, 660	507 x 820	20 x 32.30
1.0	0.040	200, 250, 300	440, 550, 660	507 x 820	20 x 32.30
1.2	0.045	250	550	507 x 820	20 x 32.30
		350, 400	660, 881	660 x 820	26 x 32.30
		450	991	660 x 870	26 x 34.25
1.4	0.052	250	550	507 x 820	20 x 32.30
		350, 400	660, 881	660 x 820	26 x 32.30
		450	991	660 x 870	26 x 34.25
1.6	0.062	350, 400	660, 881	660 x 820	26 x 32.30
		450	991	660 x 870	26 x 34.25

E71T-GS

CWB to CSA W48-14
Classification: E491T14S-AZ-CS3 (E491T-GS)
AWS/ASME A5.36/A5.36M:2016

Suitable welding positions



Typical applications
Commonly used for home workshop welder, automobile body shop for door or body repairs and it is also used for sheet metal duct work on lap and butt joints.

NOTE: E71T-GS does contain fluoride compounds, so greater attention to proper ventilation is required especially when being used to weld galvanized steel.

Characteristics on usage
- Designed for single pass fillet and lap welding on galvanized or carbon steel
- Can be used on materials as thin as 20 gauge, without burn-through
- Smooth arc action with very little spatter
- Travel speed is fast, penetration is good and easy slag removal
- Commonly used on small portable 110 volt welding machines

Typical chemical composition of all-weld-metal (%)

C	Si	Mn	P	S	Al
0.10	0.12	0.53	0.014	0.006	1.23

Typical mechanical properties of all-weld-metal

Yield Strength		Tensile Strength		Elongation
489 MPa	71 ksi	520 MPa	75 ksi	22%

Dimensions and recommended currents

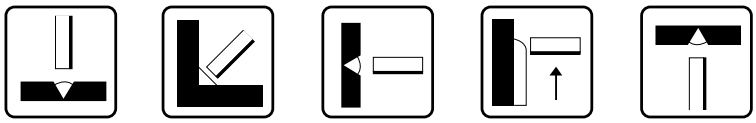
Vanguard Code & Package Size			Diameter		Amperage (A)		Voltage (V)	
0.9 Kg	4.5 Kg	15 Kg	mm	inches	F & HF	VU & OH	F & HF	VU & OH
6952 0108	6952 0508	---	0.8	0.030	80 - 120	100 - 160	16 - 20	15 - 18
6952 0109	6952 0509	---	0.9	0.035	80 - 120	100 - 160	16 - 20	15 - 18
6952 0112	6952 0512	6952 1512	1.2	0.045	140 - 200	120 - 160	17 - 20	16 - 18
---	---	---	1.6	0.062	180 - 260	160 - 220	19 - 22	17 - 20

Available packaging
Mig Wire 0.09, 4.5 Kg Spools – 0.045” also stocked on 15 Kg Spools
Not all available packaging are standard stock items

E71T-1/9M

CWB to CSA W48-14
Classification: E491T1-C1A3-CS1-H8 (E491T-9-H8)
E491T1-M20A3-CS1-H8 (E491T-9M-H8)
AWS/ASME A5.36/A5.36M:2016

Suitable welding positions



Typical applications
Gas shielded flux cored welding wire that can be used for all-position welding. It is intended for semi-automatic and automatic single and multiple pass welding of 490 MPa high tensile steel. Engineered to yield weld-metal mechanical properties down to temperature of -30°C (-20°F), with gas mixtures of Argon + 20% CO^2 to 100% CO^2.

Commonly used when welding of structural steels, bridge building, construction equipment, ship building, farm machinery, and general carbon steel fabrications.

Characteristics on usage
- Titania type flux cored wire for all-position welding
- Excellent mechanical properties
- X-Ray quality welds
- Good impact at low temperatures
- Excellent usability, very stable arc
- Easy slag removal, very little spatter generated and smooth bead shape

Typical chemical composition of all-weld-metal (%)

C	Si	Mn	P	S
0.04	0.55	1.25	0.015	0.012

Typical mechanical properties of all-weld-metal

Yield Strength		Tensile Strength		Elongation	Impact Value	
520 MPa	75 ksi	580 MPa	84 ksi	29%	70J (0°C)	55J (-20°C)

Dimensions and recommended currents

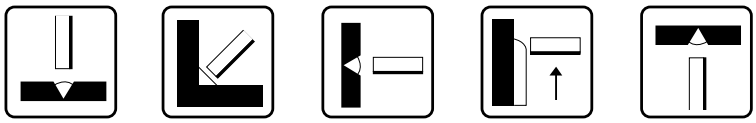
Vanguard Code & Package Size		Diameter		Amperage (A)			Voltage (V)		
20 Kg	300 Kg	mm	inches	F & HF	VU	OH	F & HF	VU	OH
6950 2012	---	1.2	0.47	200 - 280	180 - 240	150 - 230	24 - 29	24 - 28	22 - 26
6950 2013	---	1.3	0.51	220 - 340	200 - 260	160 - 230	24 - 31	25 - 28	23 - 26
6950 2016	6950 0316	1.6	0.62	240 - 380	220 - 260	170 - 240	24 - 33	25 - 28	22 - 28

Available packaging
20 Kg Spools, 25 Kg Coils and/or 300 Kg Pail Packs
Not all available packaging are standard stock items

E71T-1M

CWB to CSA W48-14
Classification: T49 0 T1-1CA-U H10
AWS/ASME A5.20-07

Suitable welding positions



MADE IN THE USA

Typical applications
Gas shielded flux cored welding wire that can be used for all-position welding. It is intended for semi-automatic and automatic single and multiple pass welding of 490 MPa high tensile steel. Engineered to yield weld-metal mechanical properties down to temperature of -30°C (-20°F), with gas mixtures of Argon + 20% CO^2 to 100% CO^2.

Commonly used when welding of structural steels, bridge building, construction equipment, ship building, farm machinery, and general carbon steel fabrications.

Characteristics on usage
- Titania type flux cored wire for all-position welding
- Excellent mechanical properties
- X-Ray quality welds
- Good impact at low temperatures
- Excellent usability, very stable arc
- Easy slag removal, very little spatter generated and smooth bead shape

Typical chemical composition of all-weld-metal (%)

C	Si	Mn	P	S
0.04	0.55	1.25	0.015	0.011

Typical mechanical properties of all-weld-metal

Yield Strength		Tensile Strength		Elongation	Impact Value	
520 MPa	75 ksi	580 MPa	84 ksi	29%	70J (0°C)	55J (-20°C)

Dimensions and recommended currents

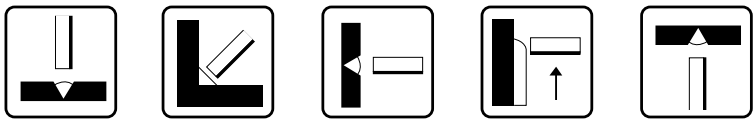
Vanguard Code & Package Size		Diameter		Amperage (A)			Voltage (V)		
20 Kg	300 Kg	mm	inches	F & HF	VU	OH	F & HF	VU	OH
6950 2012U	---	1.2	0.047	200 - 280	180 - 240	150 - 230	24 - 29	24 - 28	22 - 26
---	---	1.4	0.052	220 - 340	200 - 260	160 - 230	24 - 31	25 - 28	23 - 26
---	---	1.6	0.062	240 - 380	220 - 260	170 - 240	24 - 33	25 - 28	22 - 28

Available packaging
20 Kg Spools, 25 Kg Coils and/or 250 Kg Pail Packs
Not all available packaging are standard stock items

E71T-LF

CWB to CSA W48-14
Classification: E491T1-C1A2-CS1-H8 (E491T-1-H8)
E491T1-M21A2-CS1-H8 (E491T-1M-H8)
AWS/ASME A5.36/A5.36M:2016

Suitable welding positions



Typical applications
Gas shielded flux cored welding wire that can be used for all-position welding. It is intended for semi-automatic and automatic single and multiple pass welding of 490 MPa high tensile steel. Engineered to yield weld-metal mechanical properties down to temperature of -30°C (-20°F), with gas mixtures of Argon + 20% CO^2 to 100% CO^2.

Commonly used when welding of structural steels, bridge building, construction equipment, ship building, farm machinery, and general carbon steel fabrications.

Characteristics on usage
- Low fume/smoke
- Titania type flux cored wire for all-position welding
- Excellent mechanical properties
- X-Ray quality welds
- Good impact at low temperatures
- Excellent usability, very stable arc
- Easy slag removal, very little spatter generated and smooth bead shape

Typical chemical composition of all-weld-metal (%)

C	Si	Mn	P	S
0.03	0.38	1.35	0.015	0.010

Typical mechanical properties of all-weld-metal

Yield Strength		Tensile Strength		Elongation	Impact Value
520 MPa	75 ksi	570 MPa	83 ksi	28%	80J (-20°C)

Dimensions and recommended currents

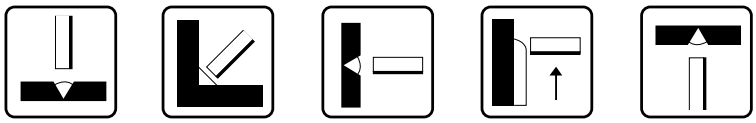
Vanguard Code & Package Size		Diameter		Amperage (A)			Voltage (V)		
15 Kg	20 Kg	mm	inches	F & HF	VU	OH	F & HF	VU	OH
6951 1509	---	0.9	0.035	---	---	---	---	---	---
---	6951 2012	1.2	0.047	200 - 280	180 - 240	150 - 230	24 - 29	24 - 28	22 - 26
---	---	1.4	0.052	220 - 340	200 - 260	160 - 230	24 - 31	25 - 28	23 - 26
---	6951 2016	1.6	0.062	240 - 380	220 - 260	170 - 240	24 - 33	25 - 28	22 - 28

Available packaging
15 and/or 20 Kg Spools, 25 Kg Coils and/or 300 Kg Pail Packs
Not all available packaging are standard stock items

E70C-6M

CWB to CSA W48-14
Classification: E490T15-M21A3-CS1-H8 (E492C-6M-H8)
AWS/ASME A5.36/A5.36M:2016

Suitable welding positions



Typical applications
Designed for welding 71 ksi high tensile steel using Argon/CO^2 covering gas. Typical applications include welding of structural steels, bridge building, heavy duty truck frames, construction equipment, ship building, fabrication of racking farm machinery, and general carbon steel fabrications.

Characteristics on usage
- Very good Charpy V notch toughness at low temperatures
- Good penetration and excellent welding characteristics
- Excellent product for fillet welding
- High tolerance to rust, primer and mill scale (compared to E70C-3M)
- Designed for semi-automatic and automatic single and multiple pass welding
- Slag quantity is almost the same as solid wire (ER70S-6) which allows for multiple pass welding to be performed without having to remove the slag

Typical chemical composition of all-weld-metal (%)

C	Si	Mn	P	S
0.04	0.60	1.50	0.014	0.010

Typical mechanical properties of all-weld-metal

Yield Strength		Tensile Strength		Elongation	Impact Value
480 MPa	70 ksi	540 MPa	78 ksi	29%	55J (-30°C)

Dimensions and recommended currents

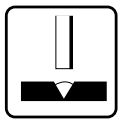
Vanguard Code & Package Size	Diameter		Amperage (A)	Voltage (V)
20 Kg	mm	inches		
6915 2012	1.2	0.045	160 - 300	24 - 32
6915 2014	1.4	0.052	180 - 360	25 - 35
6915 2016	1.6	0.062	260 - 460	27 - 36

Available packaging
20 Kg Spools and/or 300 Kg Pail Packs
Not all available packaging are standard stock items

E70C-6M

CWB to CSA W48-14
Classification: T49 2 T15-0MA H5
AWS/ASME A5.18-07

Suitable welding positions



MADE IN THE USA

Typical applications
Designed for welding 71 ksi high tensile steel using Argon/CO^2 covering gas. Typical applications include welding of structural steels, bridge building, heavy duty truck frames, construction equipment, ship building, fabrication of racking farm machinery, and general carbon steel fabrications.

Characteristics on usage
- Very good Charpy V notch toughness at low temperatures
- Good penetration and excellent welding characteristics
- Excellent product for fillet welding
- High tolerance to rust, primer and mill scale (compared to E70C-3M)
- Designed for semi-automatic and automatic single and multiple pass welding
- Slag quantity is almost the same as solid wire (ER70S-6) which allows for multiple pass welding to be performed without having to remove the slag

Typical chemical composition of all-weld-metal (%)

C	Si	Mn	P	S
0.04	0.70	1.50	0.014	0.013

Typical mechanical properties of all-weld-metal

Yield Strength		Tensile Strength		Elongation	Impact Value	
480 MPa	70 ksi	540 MPa	78 ksi	29%	65J (-0°C)	55J (-20°C)

Dimensions and recommended currents

Vanguard Code & Package Size		Diameter		Amperage (A)	Voltage (V)
20 Kg	227 Kg	mm	inches		
6915 2012U	6915 2512U	1.2	0.045	160 - 340	24 - 32
---	---	1.4	0.052	200 - 380	25 - 33
---	---	1.6	0.062	240 - 420	26 - 35

Available packaging
20 Kg Spools and/or 250 Kg Pail Packs
Not all available packaging are standard stock items

CHEMICAL TREATMENT OF STAINLESS STEEL

Antox offer an extensive range of pickling products for the surface treatment of stainless steels. Their innovative and strong chemical processes create a scale-free surface while at the same time improving the chemical resistance of your stainless steel substrates.

Stainless steels can be found in all walks of life, is it increasingly being used for visible parts such as façades, windows, doors and kitchens. Their excellent corrosion resistance is based on a passive layer – a chrome oxide layer that forms spontaneously provided the chrome content of the stainless steel is higher than 12 %. A metallically clean, smooth surface is one of the prerequisite for formation of a protective passive layer.

Chemical processes for metallically clean surfaces

The protective passive layer may be damaged during the processing of stainless steels by drilling, turning, milling, bending, welding or heat treatment. The Antox technology ensures that your metal surfaces are protected from disturbing influences such as temperature-related oxidation and discoloration, metal deposition and organic impurities – without changing their surface structure.

To ecologically and economically remove the individual impurities, we offer an extensive technology portfolio under the trade name Antox. Our stainless steel pickling products improve the corrosion resistance by

- allowing a simple removal of contaminants
- achieving a metallically clean surface
- supporting the formation of a new protective passive layer

All Antox stainless steel pickling products are free from hydrochloric acid and chlorides.

Antox line of pickling products:

- Degreasers and Cleaners
- Spray pickling agent
- Pickling cleaners
- Neutralizing paste
- Stainless steel surface care products
- Pickling Paste
- Bath pickling agent
- Pickling and polishing paste
- Passivating agents
- Tools (brushes, manual spray pickling device and pickling pumps)

Industries where these products are used:

- Architectural applications i.e. façades, railings, windows, doors
- Kitchen equipment, kitchen utensils and stainless steel tanks
- Stainless steel tanks and piping for pharmaceutical, agricultural, petrochemical and food applications

Stainless steel grades and pickling difficulty

AISI	DIN EN	Code Name	C %	Cr %	Ni %	Mo %	Others in %	Pickling
304	1.4301	X5CrNi1810	0.07	17 - 19	8.5 - 10.5	---	N < 0.11	Good
---	1.4305	X10CrNiS189	0.12	17 - 19	8 - 10	---	S 0.15 - 0.36	Difficult
304L	1.4306	X2CrNi911	0.03	18 - 20	10 - 12	---	N < 0.11	Good
321	1.4541	X6CrNiTi1810	0.08	17 - 19	9 - 12	---	Ti < 0.7	Good
316	1.4401	X5CrNiMo17122	0.07	16.5 - 18.5	10 - 13	2 - 2.5	---	Good
316L	1.4404	X2CrNiMo17122	0.03	16.5 - 18.5	10 - 13	2 - 2.5	N < 0.11	Good
316Ti	1.4571	X6CrNiMo17122	0.08	16.5 - 18.5	10.5 - 13.5	2 - 2.5	Ti < 0.7	Good
316L	1.4435	X2CrNiMoN18143	0.03	17 - 19	12.5 - 19	2.5 - 3	N < 0.11	Good
S 31726	1.4439	X2CrNiMoN17135	0.03	16.5 - 18.5	12.5 - 14.5	4 - 5	N < 0.12 – 0.22	Average
N 08904	1.4539	X1CrNiMoCu25205	0.02	19 - 21	24 - 26	4 - 5	N < 0.15	Average

CLEANING AND DEGREASING

Aclean 400 (Slight Alkaline) Components treated with oil and formed or deep-drawn parts should be degreased using alkaline cleaners such as Aclean 400 rather than an acid based cleaner (Antox 75E). Aclean 400 should be diluted with water (the ratio is 1:5), this product is applied using a hand sprayer or a high-pressure sprayer.

If using a high-pressure sprayer Aclean 400 should be added by means of a metering pump (10 Kg of Aclean 400 being dissolved with 100 litres of cold water). A concentration level of 0.5 – 1% is required at the lance tip. The exposure time is 5 – 20 minutes. The treated material/components should then be washed with fresh water, preferably using a high pressure, warm water cleaning machine (please see disposal of waste found on page 60).

Antox 75E Surface Cleaner requires no premixing and it is applied directly to the dry work surface by means of a brush or hand held pickling sprayer. The chemical composition of this product will degrease and brighten special steel surfaces while also removing surface rust and contamination.

The exposure time of this chemical is between 15 – 30 minutes. The treated surface must then be washed with cold water (please see disposal of waste found on page 60). You can visually tell if the material is clean by pouring water on the material, if the water has a uniform wetting action the component is clean and ready to pickle

Ready to pickle

Standard packaging and Vanguard code

Jar Size (Kg)	Master Carton Quantity	Aclean 400	Antox 75E
1	6	7230 1001	7203 0001
5	---	---	7203 0005

* Additional Jar sizes available upon request, minimum order quantity may apply

Reaction times and yield

The reaction time is dependent on the degree of weld burn, the ambient air and material temperatures. The optimal pickling temperature is around 18 -22° C. You should avoid using picking paste in direct sunlight as the pickling paste may dry prematurely.

	Reaction Time in Minutes				Approximate Yield for 1 Kg	
	Rust & Acid-Resistant Steel, Stainless Steel	Nickel & Nickel Alloys	Titanium & Alloys	Aluminum	Square Meters	Square Feet
Aclean 400	30 - 90	5 - 10	5 - 10	5 - 10	20 - 25	215 - 269
Antox 75E	20 - 30	5 - 20	5 - 10	---	20 - 25	215 - 269

PICKLING PASTE PRODUCTS (Manual Application)

Antox 71E Plus is more like a liquid than a paste and it can be easily applied using an acid resistant brush. The viscosity of Antox 71E has been optimized to offer excellent cost efficient consumption; it also provides a positive influence on the hydrogen ion (H-ion) migration ensuring fast pickling results. Antox 71E Plus is particularly well suited when removing tarnish that is created by welding or high alloyed specialty steels such as 904L (European Steel Grade 1.4539).

Antox 71E Extra is thicker and more paste like when compared to Antox 71E Plus, it is also easy to apply using an acid resistant brush. Antox 71E Extra contains about 10% more hydrofluoric acid than Antox 71E Plus and it is an excellent product for “strong” tarnish on high alloyed specialty steels. When pickling low-alloy specialty steels, it is recommended that you perform a preliminary test to determine the proper exposure period. This will prevent over-pickling which can weaken the material or welding seam, thus reducing the tensile strength.

Antox 21E Plus (Reduced Nitric Fumes) compared to conventional pickling pastes Antox 21E Plus has much lower nitric acid content and it releases a minimal amount of nitrous gas. It not only reduces its environmental impact, but thanks to the lower nitrous gas releases it makes working with this product more comfortable. Antox 21E Plus is particularly well suited for stainless steels such as 304 and 304L (European Steel Grade 1.4301 and 1.4306). When used on higher alloyed steels a second application maybe required.

Antox 3D is formulated to produce a clear thixotropic pickling paste which is classed as non-toxic; it can be easily applied using an acid resistant brush. It is used to remove weld burn on polished surfaces of corrosion and acid-resistant stainless steels, nickel alloys and aluminum. Antox 3D does not dull the surface or leave white halo marks when used on light MIG/TIG.

Standard packaging and Vanguard code

Jar Size (Kg)	Master Carton Quantity	Antox 71E Plus	Antox 71E Extra	Antox 21E Plus	Antox 3D
2	6	7201 0002	7201 1002	7201 2002	7201 5002
5	---	7201 0010	7201 1010	---	---

* Additional Jar sizes available upon request, minimum order quantity may apply

Reaction times and yield

The reaction time is dependent on the degree of weld burn, the ambient air and material temperatures. The optimal pickling temperature is around 18 -22° C. You should avoid using picking paste in direct sunlight as the pickling paste may dry prematurely.

	Reaction Time in Minutes				Approximate Yield for 1 Kg	
	Rust & Acid-Resistant Steel, Stainless Steel	Nickel & Nickel Alloys	Titanium & Alloys	Aluminum	Square Meters	Square Feet
Antox 71E Plus	15 - 60	5 - 20	5 - 20	---	50 - 80	164 - 262
Antox 71E Extra	15 - 60	5 - 20	5 - 20	---	50 - 80	164 - 262
Antox 21E Plus	15 - 90	---	---	---	50 - 80	164 - 262
Antox 3D	10 - 60	5 – 20	2 - 10	2 - 10	70 - 130	229 - 426

* Additional Jar sizes available upon request, minimum order quantity may apply

SPRAY PICKLING PRODUCTS

Antox 73E Plus is used for the removal of welding flakes and built-up paints, old damaged passive layers, abrasion and built-up carbon steel, extraneous oxides and traces of handling and damages after thermal or mechanical processing of surfaces and welds in one working operation. It will unify the appearance of the surface. For austenitic materials.

Antox 23E Plus compared to conventional spray pickling pastes Antox 23E Plus has a much lower nitric acid content and it releases a minimal amount of nitrous gas (up to 90% less nitric fumes than conventional pickling products), which makes it considerably easier to work.

Antox 23E Plus is particularly well suited for stainless steels such as 304 and 304L (European Steel Grade 1.4301 and 1.4306). When used on higher alloyed steels a second application maybe required.

Standard packaging and Vanguard code

Jar Size (Kg)	Master Carton Quantity	Antox 73E Plus	Antox 23E Plus
10	---	7202 0010	7202 2010
20	---	7202 0020	---

* Additional Jar sizes available upon request, minimum order quantity may apply

Reaction times and yield

The reaction time is dependent on the degree of weld burn, the ambient air and material temperatures. The optimal pickling temperature is around 18 -22° C. You should avoid using picking paste in direct sunlight as the pickling paste may dry prematurely.

	Reaction Time in Minutes				Approximate Yield for 1 Kg	
	Rust & Acid-Resistant Steel, Stainless Steel	Nickel & Nickel Alloys	Titanium & Alloys	Aluminum	Square Meters	Square Feet
Antox 73E Plus	15 - 60	5 - 20	5 - 20	---	4 - 6	43 - 64.5
Antox 23E Plus	30 - 90	---	---	---	4 - 6	43 - 64.5

BATH PICKLING PRODUCTS

Antox 80E Pickling of stainless steel with the bath/dip process is the best method for obtaining a chemically pure uniform surface because the bath temperature can be adjusted and monitored.

Antox 80 E can be used for pickling both low and high-alloyed special steels. It does however attack machining steel DIN EN 1.4305. Different make-up concentrations can be used to adjust the pickling bath to the prevailing situation. It is mixed with water in the ratio 1:1. If mixed with de-ionized water (< 10 mS) in the ratio 1:3, the resulting solution corresponds with the regulations of KWU TLV 9026 01/03.

Acid content and iron concentration should be checked regularly and the ideal bath temperature is between 18 - 22 °C. The baths should be heated only in exceptional cases, up to 40°C maximum because heating creates higher emission levels. Before pickling, the special steel surface should be free from oils and fats. The exposure period largely depends on the above-mentioned bath conditions. In case of doubt, a preliminary trial should be carried out to determine the appropriate exposure period.

Standard packaging and Vanguard code

Jar Size (Kg)	Antox 80E
5	7204 0005
20	7204 0020

* Additional Jar sizes available upon request, minimum order quantity may apply

Reaction times and yield

The reaction time is dependent on the degree of weld burn, the ambient air and material temperatures. The optimal pickling temperature is around 18 -22° C. You should avoid using picking paste in direct sunlight as the pickling paste may dry prematurely.

	Reaction Time in Minutes				Approximate Yield for 1 Kg	
	Rust & Acid-Resistant Steel, Stainless Steel	Nickel & Nickel Alloys	Titanium & Alloys	Aluminum	Square Meters	Square Feet
Antox 80E	15 - 60	5 - 20	5 - 20	---	4	43

NEUTRALIZING PASTE

Antox NP is used to neutralise pickling pastes that contain hydrofluoric and nitric acids. The neutralizing paste is applied directly on top of the pickling paste before it is washed off. The pickling paste will start to bubble when in contact with the Antox NP.

To achieve complete neutralisation use equal quantities of Antox NP to that of the pickling paste. The reaction is finished when the bubbling can no longer be seen.

The use of neutralizing paste not only stops the reaction but also ensures that the pickling paste is not washed onto other areas of the job where it may cause corrosion. It also results in a solution approximately Ph7. It must be mixed well before use as it settles when stored.

Standard packaging and Vanguard code

Jar Size (Kg)	Master Carton Quantity	Antox NP	Approximate Yield for 1 Kg	
			Running Meters	Running Feet
2	6	7206 0002	50 - 80	164 - 262

* Additional Jar sizes available upon request, minimum order quantity may apply

PASSIVATING SOLUTION

Antox 90E passivating solution accelerates the formation of the chrome oxide protective layer on stainless steel after pickling or mechanical finishing. This solution meets the requirements detailed in ASTM A380-06 & A967-05. Although this layer will form naturally in air it can take anything up to 14 days for complete surface protection.

The solution can be applied by acid resistant brushes, immersion in a bath or by using a chemical resistant spray unit such as the Antox hand operated sprayer. Antox 90E is ready to use and is applied undiluted to the dry surface. If used in a bath/dip application it can be diluted 1:1 but reaction times will increase.

The reaction time is dependent on the ambient air and the material temperature. The optimal pickling temperature is around 18 -22° C. Work routines should be avoided in direct sunlight due to the hazard of premature drying

Standard packaging and Vanguard code

Jar Size (Kg)	Antox 90E	Reaction Time in Minutes	Approximate Yield for 1 Kg	
		Rust & Acid-Resistant Steel, Stainless Steel	Square Meters	Square Feet
5	7205 0005	20 - 30	20 - 25	215 - 269
30	7205 0030			

* Additional Jar sizes available upon request, minimum order quantity may apply

PASTE FOR CLEANING & POLISHING OF STAINLESS STEEL

Antox 2001T contains a minimal amount of HF/Nitric acid. It was designed primarily for field applications when pickling/passivating small areas of stainless steel. It is a highly effective cleaning paste used for the gentle removal of tarnish marks, oxidation, rust spots, graffiti, adhesive residues, etc.

It works very quickly, leave the shine on the work surface with no dulling and it is very easy to use, and you simply rub on, wipe off and rinse with water. Suitable for use on all Chrome-Nickel Stainless Steels.

Contents of kit:

- Antox 2001 Paste (0.4Kg Jar)
- Two applicator sticks
- White abrasive pad
- Felt pad
- Latex gloves

Reaction times and yield

The reaction time is dependent on the degree of weld burn, the ambient air and material temperatures. The optimal pickling temperature is around 18 -22° C. You should avoid using picking paste in direct sunlight as the pickling paste may dry prematurely.

Standard packaging and Vanguard code

Jar Size (Kg)	Antox 90E	Reaction Time in Minutes		Approximate Yield for 1 Kg	
		Rust & Acid-Resistant Steel, Stainless Steel	Shiny Stainless Steel Surfaces	Running Meters	Running Feet
0.40	7207 2001K	10 - 15	1 - 3	80 - 100	262 - 328

* Additional Jar sizes available upon request, minimum order quantity may apply

PICKLING TOOLS

Vanguard Code	Description	Quantity
7250 0005	Acid Resistant Brush, Straight 1/2”	---
7250 0000	Acid Resistant Brush, Angled 1/2”	---
7250 0006	Acid Resistant Brush, Round 3/4"	---
7250 0004	Acid Resistant Brush, Straight 1”	---
7250 0003	Acid Resistant Brush, Angled 1”	---
7250 0001	Acid Resistant Brush, Straight	1 /12
7250 0002	Acid Resistant Brush, Angled	1 /12

* Not all sizes of brush are standard stock items

MANUAL SPRAY UNITS

1.5L Manual Spray Unit
(Acid Resistant)

5L Manual Spray Unit
(Acid Resistant)
7260 1050

PRODUCT WARNINGS

Notes on hazards and suggestions for safety precautions

Pickling pastes contains hydrofluoric acid and nitric (azotic) acid; this is extremely toxic when inhaled or swallowed. If contact with the skin occurs, immediate application of **Calcium Gluconate gel** will stop the reaction and neutralize the acid burn.

Work routines should be carried out in a well-ventilated area. Store also in a well-ventilated enclosure (the cans should be tightly closed). Breathing apparatus should be used when ventilation facilities are insufficient. Appropriate protective goggles; gloves and clothing should always be worn whilst working.

Thorough rinsing with water should treat any contact with the eyes and thereafter a doctor should be consulted. Contaminated and soaked protective clothing should be immediately changed. A doctor should be consulted if nausea is experienced (the doctor should be shown the notes on safety precautions, the product notes or the product label). These products should not be accessible by children. The products are only intended for commercial and industrial use.

Disposal of waste

Neither pickling paste nor the rinsing water may be disposed of in the public sewers in an untreated state. The waste water is acidic and contains alloy residue solids from the treated metal. Appropriate treatment should be carried out in a suitable neutralization plant or disposal undertaken via a licensed waste disposal enterprise. All local waste water public sewerage regulations are to be observed.

Disclaimer

The information is provided to the best of our knowledge and conscience and conforms to the laboratory and field experience at the time of going to press. However, it must only be regarded as non-binding guidelines which have to be adapted to requirements. Since the use of our products lies beyond our control, we can only accept liability for the perfect standard quality at the time of delivery.
Consequential losses will only be recognized if this was expressly agreed before use in writing, stating the warranted characteristics.

For more information or for current MSDS sheets please visit our website **http://vanguardsteel.com**