Delgado Community College
Purchasing Department
501 City Park Avenue, Bldg. 37
New Orleans, Louisiana 70119
(504) 762-3027

Invitation to Bid

Bid Name:
40006-222 – Welding Equipment Consumables

Due by & to be opened on:
April 18, 2025 at 2:00PM CST

Contact Person:
Adrienne Harris
Assistant Director Purchasing
(504) 762-3028

_____

NAME OF COMPANY

_____

ADDRESS

_____

CITY, STATE, ZIP

_____

PHONE NUMBER FAX NUMBER EMAIL

_____

SIGNATURE OF COMPANY REPRESENTATIVE

_____

NAME (PRINTED) & TITLE OF COMPANY REPRESENTATIVE

***** This form must be completed and submitted with your bid***

I. GENERAL INFORMATION

1. Any questions regarding this Invitation to Bid shall be in writing and shall be addressed to Adrienne Harris at the following address:

Delgado Community College
O'Keefe Administration Building
501 City Park Avenue, Building 37
New Orleans, La 70119
Email: aharri@dcc.edu
Fax: (504) 762-3089

Any additional information resulting from such inquiries shall be distributed to all bidders via addenda. The College will not be responsible for any other explanation of the documents.

2. Sealed bids may be submitted by mail or in person. Faxed or emailed Bids not accepted. Mailed bids and hand carried bids shall go to the address in item #1. If hand carried, Bids are to be delivered directly to the Purchasing Office. Do not leave on counter unattended. The bid name and number must be on the outside of the packaging, including any express mail packaging. Unidentified bids will not be accepted. Please note that express mail or USPS carriers may not deliver directly to 501 City Park Avenue. The bidder/proposer is solely responsible for ensuring that its courier service provider makes inside deliveries to 501 City Park Avenue.

3. Each bidder is solely responsible for the accuracy and completeness of its bid. Errors or omissions may be grounds for rejection, or may be interpreted in favor of the College.

4. Each bidder is solely responsible for the timely delivery of its bid. Delgado Community College will not be responsible for any delays in the delivery of bids, whether delayed in the mail, or for any reason whatsoever.

5. Only the issue of a purchase order or a signed acceptance of a proposal constitutes acceptance on the part of the College.

6. Assuming there is no prompt payment discount provision, payment will be made within 30 days from receipt of products in satisfactory condition, or within 30 days from receipt of invoice, whichever is later.

7. Proposer or bidder, contractor, etc. certifies, by signing and submitting a proposal for $25,000 or more, that their company, any subcontractors, or principals are not suspended or debarred by the General Services Administration (GSA) in accordance with the requirements in OMB Circular A-133. (A list of parties who have been suspended or debarred can be viewed via the internet at www.epls.gov .)

II. BID FORM
40006-222 – Welding Consumables

SCOPE OF WORK:

This solicitation is for a term contract for the provision and delivery of Welding Consumables for Delgado's Welding and Trade programs. **This is not a lump sum purchase or a one-time purchase of all items. The quantities listed below are annual estimates only**. Quantities may be increased or decrease based upon the number of students per class and will be ordered on an as needed basis. The successful bidder shall furnish and deliver, upon request, the materials to the following Delgado Community College locations:

- River City Campus, 709 Churchill Pkwy, Avondale, LA 70094
- Sidney Collier Site, 3727 Louisa Street, New Orleans, LA 70119

Consumables must work with the following equipment: Flextec 350S, S350 Powerwave, Lincoln System 5 Robotic Welding Arm, Torchmate 4800 Plasma Table

Notes:

- Additional locations may be added for programs expanded to other campuses.
- Each line bid must be in the unit of measurement specified.
- Unit price bid must include all shipping, freight and surcharges per unit.
- Bids must be signed and submitted on the bid form provided.

LIST OF ITEMS:

No.	Qty	UOM	Item & Model/Part No	Model/Brand Bid	Unit Price	Total Price	Delivery ETA
1)	**240**	**SPOOL**	33lb E71T-1-- 0.45 Flux Core Welding Wire Ultracore 71A85 (ED031663)				
2)	**40**	**SPOOL**	33lb ER70S-6-- 0.45 Mig Welding Wire (Superarc L-56) (ED032928)				
3)	**32**	**SPOOL**	16lb 5356 3/64" Aluminum Wire (Oxford Alloys)				
4)	**2**	**CAN**	33lb 308L 0.45 Stainless Steel Welding Wire				

No.	Qty	UOM	Item & Model/Part No	Model/Brand Bid	Unit Price	Total Price	Delivery ETA
5)	**2**	**CAN**	33lb 309L 0.45 Stainless Steel Welding Wire				
6)	**1000lbs**	**CAN**	1/8” Cans of 7018 Low Hydrogen Electrodes				
7)	**500lbs**	**CAN**	1/8” Cans of E6010 Electrodes				
8)	**500lbs**	**CAN**	1/8” Cans of 6010 Electrodes 5P+++(Lincoln)				
9)	**150lbs**	**CAN**	1/8” boxes of E6011 Electrodes				
10)	**500lbs**	**CAN**	3/32” Cans of E7018 Electrodes				
11)	**30lbs**	**CAN**	3/32” 308L-16 Stainless Steel (Stick Electrodes)				
12)	**30lbs**	**CAN**	3/32” 309L-16 stainless Steel (Stick Electrodes)				
13)	**30lbs**	**CAN**	1/8” 308L-16 Stainless Steel (Stick Electrodes)				
14)	**30lbs**	**CAN**	1/8” 309L-16 Stainless Steel (Stick Electrodes)				
15)	**600lbs**	**TUBE**	1/8” X 36” Tig Rods (ER70S2)				
16)	**100lbs**	**TUBE**	3/32” X 36” Tig Rods (ER70S2)				
17)	**100lbs**	**TUBE**	1/8” X 36” Stainless Steel Tig (ER308L)				
18)	**100lbs**	**TUBE**	1/8” X 36” Stainless Steel Tig (ER309L)				
19)	**50lbs**	**TUBE**	3/32” X 36” Stainless Steel Tig (ER308L)				
20)	**50lbs**	**TUBE**	3/32” X 36” Stainless Steel Tig (ER309L)				

No.	Qty	UOM	Item & Model/Part No	Model/Brand Bid	Unit Price	Total Price	Delivery ETA
21)	**50lbs**	**TUBE**	3/32" X 36" Stainless Steel Tig (ER316L)				
22)	**50lbs**	**TUBE**	1/8" X 36" Stainless Steel Tig (ER316L)				
23)	**20lbs**	**TUBE**	1/8" X 36" Aluminum Tig (ER5356)				
24)	**10LBS**	**TUBE**	3/32" X36" Aluminum Tig (ER5356)				
25)	**100**	**PKG**	1/8" Tungsten (Purple)				
26)	**100**	**BOX**	1/8" Collets(10N25)				
27)	**100**	**BOX**	1/8" Gas Lens Collets (10N25)				
28)	**30**	**BOX**	#10 Welding Cups (53N88)				
29)	**100**	**BOX**	#8 Welding Cups (54N14)				
30)	**50**	**BOX**	#7 Welding Cups (54N15)				
31)	**50**	**BOX**	#6 Welding Cups (54N16)				
32)	**50**	**BOX**	#5 Welding Cups (54N17)				
33)	**50**	**BOX**	1/8" Collet Bodies (10N28)				
34)	**60**	**BOX**	#8 Welding Cups (10N46)				
35)	**60**	**BOX**	#7 Welding Cups (10N47)				
36)	**60**	**BOX**	#6 Welding Cups (10N48)				
37)	**60**	**BOX**	#5 Welding Cups (10N49)				
38)	**50**	**PKG**	Long Back Caps (57Y02)				
39)	**50**	**PKG**	Tig Insulators (54N01)				
40)	**30**	**PKG**	Tig Heat Shields (18CG)				

No.	Qty	UOM	Item & Model/Part No	Model/Brand Bid	Unit Price	Total Price	Delivery ETA
41)	**50**	**PKG**	Nozzles (KP2742-1-62R)				
42)	**200**	**PKG**	0.45 Contact Tips (KP2744-045)				
43)	**200**	**PKG**	0.52 Contact Tips (KP2744-052)				
44)	**100**	**PKG**	3/64" Contact Tips (KP2744-364A)				
45)	**100**	**PKG**	Diffusers (KP2746-1-B25)				
46)	**50**	**PKG**	Insulators (KP2773-2-B25)				
47)	**200**	**BOX**	4-1/2" X 1/4" X 5/8"-11(Dewalt) (DW4523 Z) Metal Grinding				
48)	**100**	**BOX**	4-1/2" X 1/8" X 5/8"-11(Dewalt) (DW8435 Z) Pipeline Cutting and Grinding				
49)	**100**	**BOX**	4-1/2" X 3/32"X 5/8"11(Dewalt) (DW8751 Z) Metal Notching				
50)	**50**	**BOX**	4" X 5/8" -11 Steel Wire Wheels				
51)	**50**	**BOX**	4" X 5/8"-11 Stainless Steel Wire Wheels				
52)	**50**	**BOX**	4-1/2" X 5/8"-11 Flap Disk (Z60g)				
53)	**20**	**BOX**	4-1/2" X 5/8"-11 Flap Disk (Z120g)				
54)	**300**	**BOX**	Clear Lens (Standard Welding Shield)				
55)	**10**	**BOX**	Spatter Spray Cans				

No.	Qty	UOM	Item & Model/Part No	Model/Brand Bid	Unit Price	Total Price	Delivery ETA
56)	**6**	**BOX**	Boxes of Ear Plugs				
57)	**20**	**BOX**	Victor Torch Burning Tips 6700C2471) (#2)				
58)	**20**	**BOX**	Harris torch Burning Tips 1501240) (#2)				
59)	**15**	**BOX**	Flex Torch Body WEM17FV				
60)	**10**	**BOX**	2x3x5/8-11 Resin Cones-Rounded UPC #49021				

***Equivalent materials proposed must meet all criteria of the suggested brand; i.e. conformances, mechanical properties, deposit composition, operating procedures, diameters, packaging.*

TOTAL BID AMOUNT OF ALL LINE ITEMS_____

NOTE: All shipping, handling, setup, or any other charges necessary for the provision and delivery of these goods and/or services must be included in your bid. The College will not pay for any charges invoiced other than the unit price as stated on the bid.

By signing below, the Bidder agrees that he/she has carefully examined all bidding documents, has aclear understanding of the requirements and complies with all bid requirements, instructions, specifications, terms and conditions, and special conditions as stated in the Bid Documents.

Signature _____

Title_____

Company_____

III. REQUIREMENTS & INSTRUCTIONS

- Any questions arising from the specifications or and/or jobsite visit must be addressed in writing to the individual listed in Section I, General Information, Item 1. All questions must be submitted no later than **Friday, April 11, 2023 by 12:00PM CST**. A final 48-hour period after the issuance of the Addendum will be granted for questions that are directly related only to the answers provided in the Addendum.

  Any interpretation, correction or change of the Bidding Documents will be made by addendum. Interpretations, corrections or changes of the Bidding Documents made in any other manner will not be binding, and Bidders shall not rely upon such interpretations, corrections and changes. The Bidder must acknowledge all issued addenda by signing and returning with the bid or if the bid has already been submitted, per the instructions on the addenda. Failure to acknowledge addenda will render the bid informal and will cause its rejection.

  Bid Documents and Addenda may be downloaded from:
  https://wwwcfprd.doa.louisiana.gov/osp/lapac/dspBid.cfm?search=department&term=39

- Bids must be sealed with the **Bidder's name, along with the name and number of the bid clearly written on the front of the envelope**. If sending by express mail, the identifying information must be written on the outside of the envelope or package the Bid has been shipped in. Bids received without this information will be automatically rejected and disqualified. Proposers are solely responsible for ensuring that whatever method of delivery is used bids are delivered inside to Delgado Community College physical location, **directly** to the College's contact person in the **Purchasing Department by 2:00PM** no exceptions.

- This contract will be from the date of award through June 30, 2026.

- At the option of the College and with the agreement of the vendor, this contract may be renewed for two (2) additional twelve-month options, not to exceed thirty-six (36) months, at the same rates, terms and conditions.

  ***Escalation Clause;** Prior to any renewal term, the contractor may request a price increase for the renewal term based on documented increase costs. The price increase may not be greater than the Consumer Price Index (All Urban Consumers, Current Series) average increase for the prior 12 months. The College reserves the right to approve or disapprove the price increase.

  *All prices are firm and **cannot** be changed prior to the renewal of the contract.

- The quantities listed in the bid are estimated based upon previous usage and there are no minimum guarantees. The actual amount ordered will be based upon the needs of each respective program. Quantities may be less or greater.

  * The quantity should be arrived from the requested amount divided by the quantity package (can/spool) to get the actual can/spools per pound. Using the requested amount divided by the actual can/spool divided by the unit price to get the total for each,

- Unit prices must include shipping/handling/freight and/or surcharges. No separate charges or charges after the fact will be accepted.

- Bidder may offer equivalents to brands called for in the bid but they must meet the minimum specifications as stated in the bid and must work seamlessly with the existing equipment and curriculum.

- Vendor must state the brand/model he or she is bidding on each item. If bidding an equivalent, the Bidder must submit with the bid, documentation proving equivalency (see special conditions #5).

- Successful Bidder must be able to provide the materials within (7) days from the receipt of an order.

- The College may add or delete materials as needed at any time.

- In order for the vendor to get paid the assigned purchase order for this term contract **must** be on the invoice(s), quote(s), etc.

IV. SPECIAL CONDITIONS

1. Delgado Community College of the State of Louisiana is an equal opportunity employer and looks to its contractors, subcontractors, vendors, and suppliers to take affirmative action to effect this commitment in its operations.

All bids must be submitted on the form(s) furnished for this purpose and must be filled out in ink or typewritten and signed in ink. Do not erase, correct, or write over any prices or figurers necessary for the completion of this bid proposal. If any corrections are necessary, each must be initialed by bidder. Failure to comply with these requirements may cause your bid to be disqualified.

A response to a bid invitation is our only indication of your interest in college business. Failure to respond to six (6) consecutive bid invitations may cause your name to be removed from the bidders' list.

Effective September 1, 1991, in accordance with Act 1029 of the 1991 Regular Legislative Session, Delgado Community College will not be responsible for any sales tax, either state or local.

Effective August 15, 1997, in accordance with L.R.S. 39:1594 (Act 121), the person signing the bid must be:

a) A current corporate officer, partnership member or other individual specifically authorized to submit a bid as reflected in the appropriate records on file with the Secretary of State; or
b) An individual authorized to bind the vendor as reflected by an accompanying corporate resolution, certificate, or affidavit.

By signing the bid, the bidder certifies compliance with the above.

2. All deliveries shall be made FOB Destination to the College unless otherwise specified by the College. All freight charges are to be clearly stated on the bid form. The College will not be responsible for freight charges not clearly stated as a part of this bid.

3. Payment shall be made on a Net 30 basis from receipt of the invoice once the materials have been received.

4. Delgado Community College reserves the right to reject any and all bids and to waive any informality. It shall be distinctly agreed and understood that the price quoted must be a firm price, and not be subject to change at time of the shipment of goods or delivery of services.

5. All items delivered shall be subject to inspection as to grade and/or quality. If any item is inspected and fails to meet the specifications, the delivery already made will be held for the Vendor's disposition or returned to the Vendor via Freight Collect. If the Vendor fails to make satisfactory replacement within a reasonable time as determined by the College, the College reserves the right to cancel the item and to purchase it elsewhere.

6. If item(s) or services bid do not fully comply with specifications, including brand and/or product number, bidder must state in what respect the item(s)/services deviate. Failure to note exceptions on the bid form will not relieve the successful bidder from supplying the actual products or services requested.

7. The College reserves the right to award the above items on an all-or-none basis, and to reject any or all bids and to waive any informalities including technicalities in specifications that preclude competition.

8. Any manufacturer's names, trade names, brand names, or catalog numbers used in the specifications are for the purpose of describing and establishing general quality levels. Such references are not intended to be restrictive. Bids will be considered for any brand that meets or exceeds the quality of the specifications listed for any item. Vendor must state the brand/model he or she is bidding on each item.

   It shall be the sole responsibility of the Vendor to prove equivalency. Vendor shall submit with the bid all illustrations, descriptive literature, and specifications necessary to determine equivalency. Failure to do so may eliminate your bid from consideration. The decision of the College as to equivalency shall be final.

9. Bids must be submitted in a sealed envelope with the bidder's name, Louisiana license number, if applicable, and the name and number of the bid written on the front of the envelope. Bids received without this information will be disqualified.

   In accordance with R.S. 37:2163A, Contractors' Louisiana License number in the appropriate classification(s) must appear on the bid envelope submitted on all projects in the amount of $50,000 or more (and $1.00 or more if hazardous materials are involved.

10. Any questions arising from either the specifications and/or jobsite visit must be addressed in writing to the individual listed in Section I General Information and will be answered via an Addendum. All questions must be submitted no later than **Thursday, July 27, 2022 by 12:00PM CST .** A final 48-hour period after the issuance of the Addendum will be granted for questions that are directly related only to the answers provided in the Addendum. All addenda must be acknowledged by the bidder and submitted with the bid. Failure to do so will disqualify the bid.

    No addenda will be issued within a period of seventy-two (72) hours prior to the date set for the receipt of bids except an Addendum, if necessary, postponing the date of receipt of bids or cancelling the request for bids.

11. The above quantities are estimated to be the amounts needed. In the event a greater or lesser quantity is needed, the right is reserved by the College to increase or decrease the amount at the unit price stated in the bid.

12. If the Vendor fails to make delivery within a satisfactory time as determined by the College, the College reserves the right to cancel the item and to purchase it elsewhere, charging the increase in price and cost of handling, if any, to the Vendor making the original unsatisfactory or late delivery.

13. It shall be specifically agreed and understood that the Bidders may attend the Bid opening. They shall, whenever any award is considered, furnish specific samples for examination upon request by the College. It shall also be specifically agreed and understood that the decision of the College shall be final.

14. No information will be given out as to opinions concerning the ultimate outcome while consideration of the award is in progress.

15. The college reserves the right to cancel this contract upon thirty (30) days written notice for failure of the Vendor to deliver on time, for delivery of unsatisfactory merchandise, or for any unsatisfactory performance by the Vendor as determined by the College.

16. The successful bidder will furnish written factory instructions for the operation and maintenance of the materials purchased.

17. Successful bidder will be responsible for the unloading and placing of equipment and/or supplies in the receiving area designated by the College at each Campus.

18. In case of default by the Vendor, the College reserves the right to purchase any or all items in default on the open market, charging Vendor with any excessive costs. Should such charge(s) be assessed, no subsequent bids of the defaulting Vendor will be considered until the assessed charge(s) have been satisfied.

19. List of distributors: The Vendor signing the bid shall be designated as the Prime Vendor on any contract/agreement resulting from this bid. If additional Vendors are authorized to receive orders for items covered under this proposal, the Vendor must submit, with bid, a list of those additional authorized distributors.

20. Delivery is of the essence and the College reserves the right to award to that Vendor providing the earliest delivery date. The College also reserves the right to reject any Vendor who cannot make delivery within the timeframe specified in this bid.

21. For any jobs in which the commencement date is five (5) days beyond the notice to proceed and/or issuance of a purchase order, The College reserves the right to request and review material orders to ensure compliance with the requested completion and/or due dates as stated in the bid.

***** End of Special Conditions***

V. SPECIFICATIONS

FLUX-CORED GAS-SHIELDED (FCAW-G) WIRE

LINE 1

UltraCore® 71A85

Mild Steel, All Position • AWS E71T-1M-H8, E71T-9M-H8

Key Features

- Fast freezing slag for out-of-position welding
- Designed for welding with 75 - 85% Argon/ balance CO_2 shielding gas
- Premium arc performance and bead appearance
- Meets AWS D1.8 seismic lot waiver requirements

Conformances

AWS A5.20/A5.20M: 2005	E71T-1M-H8, E71T-9M-H8
ASME SFA-A5.20:	E71T-1M-H8, E71T-9M-H8
ABS:	3YSA H10
Lloyd's Register:	3YS H10
DNV Grade:	III YMS H10
CWB/CSA W48-06:	E491T-9M H8
EN ISO 17632-B:	T493T1-1MA-H10
FEMA 353	
AWS D1.8	

Typical Applications

- Shipbuilding
- Seismic structural fabrication
- General fabrication

Welding Positions

All

Shielding Gas

75% - 85% Argon / Balance CO_2
Flow Rate: 40 - 50 CFH

DIAMETERS / PACKAGING

Diameter in (mm)	15 lb (6.8 kg) Plastic Spool 60 lb (27.2 kg) Master Carton	33 lb (15 kg) Spool*	50 lb (22.7 kg) Fiber Spool	500 lb (227 kg) Accu-Trak® Drum
0.045 (1.1)	ED031885	ED031663	ED031847	ED032047
0.052 (1.3)	ED031886	ED031664	ED031848	ED032048
1/16 (1.6)	ED031887	ED031665	ED031849	ED032049

*Spool may be plastic or fiber.

MECHANICAL PROPERTIES[1] – *As Required per AWS A5.20/A5.20M: 2005*

	Yield Strength[2] MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Charpy V-Notch J (ft•lbf) @ -18°C (0°F)	Charpy V-Notch J (ft•lbf) @ -29°C (-20°F)
Requirements[4]					
AWS E71T-1M-H8,	400 (58) min.	480-655 (70-95)	22 min.	27 (20) min.	Not Specified
AWS E71T-9M-H8				Not Specified	27 (20) min.
Typical Results[3]					
As-Welded with 75%-85% Ar/balance CO_2	550-600 (80-88)	600-650 (87-94)	24 - 26	64-115 (47-85)	43-95 (32-70)

UltraCore® 71A85

(AWS E71T-1M-H8, E71T-9M-H8)

DEPOSIT COMPOSITION[1] – *As Required per AWS A5.20/A5.20M: 2005*

	%C	%Mn	%Si	%S	%P	Diffusible Hydrogen (mL/100g weld deposit)
Requirements[4] AWS E71T-1M-H8, E71T-9M-H8	0.12 max.	1.75 max.	0.90 max.	0.03 max.	0.03 max.	8.0 max.
Typical Results[3] As-Welded with 75%-85% Ar/balance CO_2	0.03-0.04	1.43-1.56	0.52-0.59	<0.01	0.01	6-8

TYPICAL OPERATING PROCEDURES

Diameter, Polarity Shielding Gas	CTWD[5] mm (in)	Wire Feed Speed m/min (in/min)	Voltage (volts)	Approx. Current (amps)	Melt-Off Rate kg/hr (lb/hr)	Deposition Rate kg/hr (lb/hr)	Efficiency (%)
0.045 in (1.1 mm), DC+ 75%-85% Ar/ balance CO_2	25 (1)	**All Position**					86-88
		4.4 (175)	21-26	125	1.8 (4.0)	1.6 (3.5)	
		6.4 (250)	22-27	150	2.6 (5.7)	2.3 (5.0)	
		7.6 (300)	23-28	165	3.1 (6.8)	2.7 (6.0)	
		8.9 (350)	23-29	190	3.6 (8.0)	3.2 (7.0)	
		10.2 (400)	25-30	205	4.1 (9.1)	3.6 (8.0)	
		11.4 (450)	26-31	225	4.7 (10.3)	4.1 (9.0)	
		Flat & Horizontal					
		12.7 (500)	27-32	245	5.2 (11.4)	4.5 (10.0)	
		14.0 (550)	28-33	265	5.7 (12.5)	5.0 (10.9)	
		15.2 (600)	28-34	280	6.2 (13.7)	5.4 (11.9)	
0.052 in (1.3 mm), DC+ 75%-85% Ar/ balance CO_2	25 (1)	**All Position**					86-88
		3.8 (150)	21-26	150	2.0 (4.5)	1.8 (3.9)	
		5.1 (200)	21-27	165	2.7 (6.0)	2.4 (5.2)	
		6.4 (250)	22-27	190	3.4 (7.5)	2.9 (6.5)	
		7.6 (300)	23-28	215	4.1 (9.0)	3.5 (7.8)	
		8.9 (350)	24-29	235	4.7 (10.5)	4.1 (9.1)	
		9.5 (375)	25-30	255	5.1 (11.2)	4.4 (9.8)	
		Flat & Horizontal					
		10.8 (425)	26-31	275	5.8 (12.7)	5.0 (11.1)	
		12.1 (475)	27-32	295	6.4 (14.2)	5.6 (12.4)	
		12.7 (500)	27-33	315	6.8 (15.0)	5.9 (13.0)	
1/16 in (1.6 mm), DC+ 75%-85% Ar/ balance CO_2	25 (1)	**All Position**					86-88
		3.2 (125)	20-25	185	2.4 (5.3)	2.1 (4.6)	
		4.4 (175)	21-26	215	3.3 (7.4)	2.9 (6.4)	
		5.1 (200)	22-27	235	3.8 (8.4)	3.3 (7.3)	
		5.7 (225)	23-28	265	4.3 (9.5)	3.7 (8.2)	
		6.4 (250)	24-29	285	4.8 (10.5)	4.2 (9.2)	
		7.6 (300)	25-30	315	5.7 (12.6)	5.0 (11.0)	
		Flat & Horizontal					
		8.3 (325)	26-31	335	6.2 (13.7)	5.4 (11.9)	
		8.9 (350)	27-32	365	6.7 (14.7)	5.8 (12.8)	
		10.2 (400)	28-33	385	7.6 (16.8)	6.6 (14.6)	

[1]Typical all weld metal. [3]Measured with 0.2% offset. [5]See test results disclaimer below. [4]As-Welded with 75%-85% Argon/Balance CO_2 [5]To estimate ESO, subtract 1/4 in (6.0 mm) from CTWD.
NOTE 1: FEMA and AWS D1.8 structural steel seismic supplement test data can be found on this product at www.lincolnelectric.com. NOTE 2: This product contains micro-alloying elements. Additional information available upon request.

CE

MIG (GMAW) WIRE

SUPERARC® L-56®

Mild Steel, Copper Coated • AWS ER70S-6 & EH11K

BUY AMERICA

KEY FEATURES

- High levels of manganese and silicon deoxidizers tolerate medium to heavy mill scale surfaces
- Excellent toe-wetting provides optimal bead appearance
- Copper coating provides superior arc-starting characteristics for long contact tip life
- Supports short-circuiting, globular, axial spray and pulsed spray transfer
- MicroGuard® Ultra provides superior feeding and arc stability

TYPICAL APPLICATIONS

- Medium to heavy mill scale base material
- Sheet metal to 380-485 MPa (55-70 ksi) yield strength material
- Automotive repair
- Robotic or hard automation
- Structural steel
- Pressure vessels

CONFORMANCES

AWS A5.18:	ER70S-6
ASME SFA-A5.18:	ER70S-6
AWS A5.17:	EH11K
ABS:	3YSA
Lloyd's Register:	3YS H5
DNV Grade:	III YMS
CWB/CSA W48-06:	ER49S-6
DB:	EN 440 G3Si1
TUV:	EN 440 G3Si1
EN ISO 14341-B:	G 49A 3 C S6
MIL-E-23765/1:	MIL-70S-6

WELDING POSITIONS

All

SHIELDING GAS

100% CO_2
75-95% Argon / Balance CO_2
95-98% Argon / Balance O_2
Flow Rate: 30-50 CFH

Diameter in (mm)	2 lb (1 kg) Plastic Spool 10 lb (4.5 kg) Master Carton	12.5 lb (5.7 kg) Plastic Spool	33 lb (15 kg) Plastic Spool	33 lb (15 kg) Steel Spool	44 lb (20 kg) Steel Spool
0.025 (0.6)	ED030583	ED015790			
0.030 (0.8)	ED030631	ED023334	ED032926		
0.035 (0.9)	ED030632	ED028676	ED032927	ED031411	ED025945
0.045 (1.1)		ED029042	ED032928	ED031412	ED025946

Diameter in (mm)	44 lb (20 kg) Fiber Spool	60 lb (27.2 kg) Coil	60 lb (27.2 kg) Fiber Spool	250 lb (113.4 kg) Accu-Trak® Drum
0.030 (0.8)				
0.035 (0.9)	ED021274, ED033704*		ED021275	ED029914
0.040 (1.0)	ED027384			
0.045 (1.1)	ED021276, ED033703*, ED033328**		ED021277, ED036730*	ED029915
0.052 (1.3)	ED021278, ED033705*		ED021279	ED029916
1/16 (1.6)		ED011666, ED033710*		

Diameter in (mm)	500 lb (227 kg) Accu-Trak® Drum	500 lb (227 kg) Accu-Pak® Box	500 lb (227 kg) Infinity-Pak	1000 lb (454 kg) Infinity-Pak
0.030 (0.8)	ED030771			
0.035 (0.9)	ED021056	ED032904	ED034394	ED036632
0.040 (1.0)	ED031937			
0.045 (1.1)	ED020532, ED036219**	ED032906, ED034248**		ED036633
0.052 (1.3)	ED020533	ED032907		
1/16 (1.6)	ED029225, ED033707*			

Diameter in (mm)	900 lb (408 kg) Accu-Pak® Box	1000 lb (454 kg) Accu-Trak® Drum	1000 lb (454 kg) Accu-Pak® Box	1000 lb (454 kg) Precise-Trak® Reel
0.035 (0.9)	ED032847, ED034429*	ED028827		ED033271
0.040 (1.0)		ED031032		
0.045 (1.1)		ED028828	ED032849, ED033706*	ED031616
0.052 (1.3)		ED029084	ED032850, ED033702*	ED031617
1/16 (1.6)		ED029085	ED032851	

*Buy America Product **Tested Material

MECHANICAL PROPERTIES[1] – *As Required per AWS A5.18*

	Yield Strength[2] MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Charpy V-Notch J (ft•lbf) @ -29°C (-20°F)	Charpy V-Notch J (ft•lbf) @ -40°C (-40°F)
Requirements - AWS ER70S-6 As-Welded with 100% CO_2	400 (58) min	485 (70) min	22 min.	27 (20) min.	Not Specified
MIL-70S-6 per MIL-E-23765/1 As-Welded with CO_2 and 98% Ar/2% O_2	380-550 (55-80)	485 (70) min	22 min	Not Specified	Not Specified
MIL-70S-6 per MIL-E-23765/1 Stress Relieved 1 hr. @ 621°C (1150° F) with CO_2 and 98% Ar/2% O_2	360 (52) min	485 (70) min	26 min	27 (20) min	Not Specified
Typical Results[3]					
As-Welded with 100% CO_2	440 (64)	560 (81)	29	71 (52)	61 (45)
Stress Relieved 1 hr. @ 621°C (1150°F)	395 (57)	510 (74)	29	95 (70)	68 (50)
As-Welded with 75% Ar/25% CO_2	460 (67)	565 (82)	27	82 (60)	72 (53)
Stress Relieved 1 hr. @ 621°C (1150°F)	415 (60)	540 (78)	31	140 (103)	122 (90)
As-Welded with 90% Ar/10% CO_2	470 (68)	580 (84)	28	119 (88)	78 (57)
Stress Relieved 1 hr. @ 621°C (1150°F)	440 (64)	550 (80)	32	183 (135)	156 (115)
As-Welded with 98% Ar/2% O_2	455 (66)	565 (82)	27	122 (90)	108 (80)
Stress Relieved 1 hr. @ 621°C (1150°F)	415 (60)	545 (79)	34	190 (140)	176 (130)

WIRE COMPOSITION[1] – *As Required per AWS A5.18*

	%C	%Mn	%Si	%S	%P
Requirements - AWS ER70S-6	0.06-0.15	1.40-1.85	0.80-1.15	0.035 max	0.025 max
Typical Results[3]	0.08-0.09	1.42-1.60	0.81-0.87	0.006-0.010	0.004-0.010
	%Cr	%Ni	%Mo	%V	%Cu (Total)[4]
Requirements - AWS ER70S-6	0.15 max	0.15 max	0.15 max	0.03 max	0.50 max
Typical Results[3]	0.01-0.05	≤ 0.04	≤ 0.01	< 0.01	0.17-0.22

TYPICAL OPERATING PROCEDURES

Diameter, Polarity Shielding Gas	CTWD[5] mm (in)	Wire Feed Speed m/min (in/min)	Voltage (volts)	Approx. Current (amps)	Melt-Off Rate kg/hr (lb/hr)
0.025 in (0.6 mm), DC+					
Short Circuit Transfer 100% CO_2	9-12 (3/8-1/2)	2.5 (100) 6.4 (250)	17 19	35 80	0.4 (0.9) 0.9 (2.0)
0.030 in (0.8 mm), DC+					
Short Circuit Transfer 100% CO_2	9-12 (3/8-1/2)	1.9 (75) 3.8 (150) 7.6 (300)	17 18 22	35 70 130	0.4 (0.9) 0.8 (1.8) 1.6 (3.6)
0.035 in (0.9 mm), DC+					
Short Circuit Transfer 100% CO_2[6]	9-12 (3/8-1/2)	2.5 (100) 3.8 (150) 6.4 (250)	18 19 22	80 120 175	0.7 (1.6) 1.1 (2.4) 1.8 (4.0)
Spray Transfer 90% Ar/10% CO_2	12-19 (1/2-3/4)	9.5 (375) 12.7 (500) 15.2 (600)	23 29 30	195 230 275	2.7 (6.0) 3.6 (8.0) 4.4 (9.6)
0.045 in (1.1 mm), DC+					
Short Circuit Transfer 100% CO_2[6]	12-19 (1/2-3/4)	3.2 (125) 3.8 (150) 5.1 (200)	19 20 21	145 165 200	1.5 (3.4) 1.8 (4.0) 2.5 (5.4)
Spray Transfer 90% Ar/10% CO_2	12-19 (1/2-3/4)	8.9 (350) 12.1 (475) 12.7 (500)	27 30 30	285 335 340	4.2 (9.2) 5.7 (12.5) 6.0 (13.2)
0.052 in (1.3 mm), DC+					
Spray Transfer 90% Ar/10% CO_2	12-19 (1/2-3/4)	7.6 (300) 8.1 (320) 12.3 (485)	30 30 32	300 320 430	4.8 (10.7) 5.2 (11.5) 7.8 (17.1)
1/16 in (1.6 mm), DC+					
Spray Transfer 90% Ar/10% CO_2	12-25 (1/2-1)	5.3 (210) 6.0 (235) 7.4 (290)	27 28 29	325 350 430	4.8 (10.7) 5.4 (12.0) 6.7 (14.8)

[1]Typical all weld metal. [2]Measured with 0.2% offset. [3]See test results disclaimer [4]Copper due to any coating on the electrode plus the copper content of the filler metal itself, shall not exceed the stated 0.50% max. [5]CTWD (Contact Tip to Work Distance). Subtract 1/4 in (6.4 mm) to calculate Electrical Stickout. [6]Procedures in these areas are procedures for short circuiting mode using 100% CO_2. When using 75% Argon, 25% CO_2 for short circuit transfer, reduce voltage by 1 to 2 volts.

CE STICK (SMAW) ELECTRODE

LINES 3 & 4

Excalibur® 7018 MR®

Mild Steel, Low Hydrogen • AWS E7018 H4R

Key Features

- Improved coating integrity
- Extreme bendability
- 60% less moisture pickup vs. competition
- Reduction of arc starting porosity
- Clear puddle and a smooth arc

Typical Applications

- Power generation
- Petrochemical
- Pressure vessels
- Pressure piping
- Mild steel

Conformances

AWS A5.1/A5.1M: 2004	E7018 H4R
ASME SFA-A5.1:	E7018 H4R
ABS:	3Y H5
Lloyd's Register:	3YM H5
DNV Grade:	3 YH5
GL:	3YH5
BV Grade:	3YHHH
CWB/CSA W48-06:	E4918

Welding Positions

All, except vertical down

DIAMETERS / PACKAGING

Diameter in (mm)	Length in (mm)	1 lb (0.5 kg) Plastic Tube 6 lb (2.7 kg) Master Carton	10 lb (4.5 kg) Easy Open Can 30 lb (13.6 kg) Master Carton	50 lb (22.7kg) Easy Open Can
3/32 (2.4)	14 (350)	ED032086	ED032588	ED028280
1/8 (3.2)	14 (350)	ED031468	ED032589	ED028281
5/32 (4.0)	14 (350)		ED032590	ED028282
3/16 (4.8)	14 (350)			ED028283
7/32 (5.6)	18 (450)			ED028917
1/4 (6.4)	18 (450)			ED028918

MECHANICAL PROPERTIES[1]

	Yield Strength[2] MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Charpy V-Notch J (ft•lbf) @ -29°C (-20°F)
Requirements - AWS E7018 H4R	400 (58) min.	490 (70) min.	22 min.	27 (20) min.
Typical Results[3] - As-Welded	430-510 (62-74)	510-605 (74-88)	25-37	121-332 (89-246)

DEPOSIT COMPOSITION[1]

	%C	%Mn	%Si	%P	%S	%Ni
Requirements - AWS E7018 H4R	0.15 max.	1.60 max.	0.75 max.	0.035 max.	0.035 max.	0.30 max.
Typical Results[3]	0.03-0.08	1.01-1.55	0.34-0.68	0.01-0.02	≤ 0.01	0.01-0.06

	%Cr	%Mo	%V	%Mn + Ni + Cr + Mo + V	Diffusible Hydrogen (mL/100g weld metal)
Requirements - AWS E7018 H4R	0.20 max.	0.30 max.	0.08 max.	1.75 max.	4.0 max.
Typical Results[3]	0.02-0.07	≤ 0.05	≤ 0.02	1.04-1.75	2-3

TYPICAL OPERATING PROCEDURES

	Current (Amps)					
Polarity[4]	3/32 in (2.4 mm)	1/8 in (3.2 mm)	5/32 in (4.0 mm)	3/16 in (4.8 mm)	7/32 in (5.6 mm)	1/4 in (6.4 mm)
DC+	70-110	90-160	130-210	180-300	250-330	300-400
AC	80-120	100-160	140-210	200-300	270-370	325-420

[1]Typical all weld metal. [2]Measured with 0.2% offset. [3]See test results disclaimer on pg. 18. [4]Preferred polarity is listed first.

* Extreme bendability apply to 3/32, 1/8 and 5/32 in. diameters.

STICK (SMAW) ELECTRODE

FLEETWELD® 5P+

Mild Steel, Cellulosic ▪ AWS E6010

KEY FEATURES

- High operator appeal and control
- Easy slag removal
- Standard in the pipe welding industry

WELDING POSITIONS

All

CONFORMANCES

AWS A5.1/A5.1M:	E6010
ASME SFA-A5.1:	E6010
ABS:	E6010
CWB/CSA W48-06:	E4310
TUV:	EN ISO 2560-A: E 42 3 C25

TYPICAL APPLICATIONS

- Cross country and in-plant pipe welding
- Steel with moderate surface contaminants
- Repair welding

DIAMETERS / PACKAGING

Diameter in (mm)	Length in (mm)	10 lb (4.5 kg) Easy Open Can 30 lb (13.6 kg) Master Carton	50 lb (22.7kg) Easy Open Can
3/32 (2.4)	12 (300)	ED032564	ED010283
1/8 (3.2)	14 (350)	ED032565	ED010278
5/32 (4.0)	14 (350)	ED032566	ED010285
3/16 (4.8)	14 (350)		ED010281

MECHANICAL PROPERTIES[1] – *As Required per AWS A5.1/A5.1M*

	Yield Strength[2] MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Charpy V-Notch J (ft•lbf) @-29°C (-20°F)
Requirements - AWS E6010	330 (48) min	430 (60) min	22 min	27 (20) min
Typical Results[3] - As-Welded	415-500 (60-73)	500-610 (73-88)	22-29	51-93 (38-69)

DEPOSIT COMPOSITION[1] – *As Required per AWS A5.1/A5.1M*

	%C	%Mn	%Si	%P	%S
Requirements - AWS E6010	0.20 max	1.20 max	1.00 max	Not Specified	Not Specified
Typical Results[3] - As-Welded	0.09-0.20	0.46-0.79	0.10-0.32	0.005-0.017	0.004-0.014
	%Ni	%Cr	%Mo	%V	
Requirements - AWS E6010	0.30 max	0.20 max	0.30 max	0.08 max	
Typical Results[3] - As-Welded	≤ 0.04	≤ 0.04	≤ 0.02	≤ 0.01	

TYPICAL OPERATING PROCEDURES

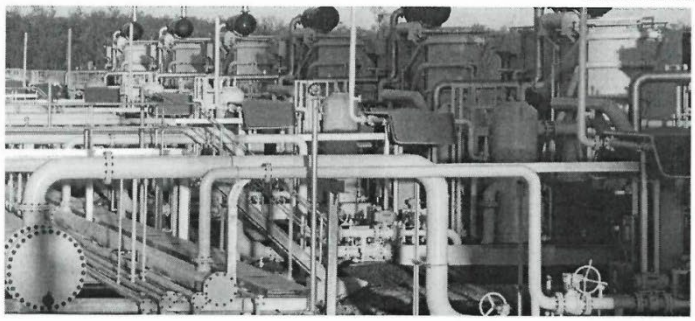
	Current (Amps)			
Polarity[4]	3/32 in (2.4 mm)	1/8 in (3.2 mm)	5/32 in (4.0 mm)	3/16 in (4.8 mm)
DC+	50-85	75-135	100-175	140-225
DC-	50-85	75-135	100-175	–

[1]Typical all weld metal. [2]Measured with 0.2% offset. [3]See test results disclaimer [4]Preferred polarity is listed first.

THE LINCOLN ELECTRIC COMPANY — STAINLESS STICK (SMAW) ELECTRODE

Excalibur® 308/308H-16, 308L-16

308/308H-16: AWS E308-16/E308H-16; 308L-16: AWS E308L-16



KEY FEATURES

- Q2 Lot® - Certificate showing actual deposit chemistry and calculated ferrite number (FN) available online
- Designed with low carbon levels to help eliminate carbide precipitation in high temperature service
- Flux coating provides smooth arc transfer and slag is self-peeling for easy removal
- Versatile electrode designed to weld several types of austenitic steels

APPLICATIONS

- A743 and A744 Type CF-8 cast material
- Type 304 stainless steels

WELDING POSITIONS

308/308H-16, 308L-16	All, except vertical down

CONFORMANCES

AWS A5.4/A5.4M: 2006:	
308/308H-16	E308-16, E308H-16
308L-16	E308L-16
ASME SFA-A5.4:	Same as AWS
ABS:	
308/308H-16	E308-16, E308H-16
308L-16	E308L-16
CWB/CSA W48-06:	
308/308H-16	E308-16, E308H-16
308L-16	E308L-16
MIL-E-22200/2:	
308/308H-16	MIL-308-16
308L-16	MIL-308L-16

DIAMETERS / PACKAGING

Diameter in (mm)	Length in (mm)	8 lb (3.6 kg) Easy Open Can 308/308H-16	8 lb (3.6 kg) Easy Open Can 308L-16
3/32 (2.4)	12 (300)	ED033083	ED033079

Diameter in (mm)	Length in (mm)	10 lb (4.5 kg) Easy Open Can 308/308H-16	10 lb (4.5 kg) Easy Open Can 308L-16
1/8 (3.2)	14 (350)	ED033084	ED033080
5/32 (4.0)	14 (350)	ED033085	ED033081
3/16 (4.8)	14 (350)	ED033086	ED033082

EXCALIBUR Stainless

Publication C6.5.5 I Issue Date 10/10

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LINCOLN ELECTRIC
THE WELDING EXPERTS®

THE LINCOLN ELECTRIC COMPANY

MECHANICAL PROPERTIES[1] – As Required per AWS A5.4/A5.4M: 2006

	Yield Strength[2] MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Ferrite Number
Requirements				
AWS E308-16, E308H-16	Not Specified	550 (80) min.	35 min.	Not Specified
AWS E308L-16	Not Specified	520 (75) min.	35 min.	Not Specified
Typical Performance[3]				
As-Welded				
308/308H-16	435 - 545 (63 - 79)	595 - 640 (86 - 93)	41 - 48	2 - 4
308L-16	370 - 420 (54 - 61)	540 - 595 (78 - 86)	50 - 55	8 - 9

DEPOSIT COMPOSITION[1] – As Required per AWS A5.4/A5.4M: 2006

	%C	%Cr	%Ni	%Mo	%Mn
Requirements					
AWS E308-16, E308H-16, E308L-16	0.04 - 0.08[4]	18.0 - 21.0	9.0 - 11.0	0.75 max.	0.5 - 2.5
Typical Performance[3]					
308/308H-16	0.05 - 0.06	19.7 - 20.3	9.9 - 10.1	0.03 - 0.07	0.7 - 0.8
308L-16	0.02 - 0.03	19.5 - 19.8	9.7 - 10.3	0.04 - 0.13	0.6 - 0.9

	%Si	%P	%S	%Cu
Requirements				
AWS E308-16, E308H-16, E308L-16	1.00 max.	0.04 max.	0.03 max.	0.75 max.
Typical Performance[3]				
308/308H-16	0.30 - 0.40	0.03	0.02	0.17
308L-16	0.29 - 0.36	0.03	0.02	0.10

[1] Typical all weld metal. [2] Measured with 0.2% offset. [3] See test results disclaimer below. [4] AWS Requirement for E308L-16 is 0.04% max. carbon.

TYPICAL OPERATING PROCEDURES

Polarity	Current (Amps) 3/32 in (2.4 mm)	1/8 in (3.2 mm)	5/32 in (4.0 mm)	3/16 in (4.8 mm)
308/308H-16, 308L-16 DC+/AC	40 - 70	60 - 100	90 - 140	120 - 185

NOTE: Preferred polarity is listed first.

Material Safety Data Sheets (MSDS) and Certificates of Conformance are available on our website at www.lincolnelectric.com

TEST RESULTS

Test results for mechanical properties, deposit or electrode composition and diffusible hydrogen levels were obtained from a weld produced and tested according to prescribed standards, and should not be assumed to be the expected results in a particular application or weldment. Actual results will vary depending on many factors, including, but not limited to, weld procedure, plate chemistry and temperature, weldment design and fabrication methods. Users are cautioned to confirm by qualification testing, or other appropriate means, the suitability of any welding consumable and procedure before use in the intended application.

CUSTOMER ASSISTANCE POLICY

The Lincoln Electric Company is manufacturing and selling high quality welding equipment, consumables, and cutting equipment. Our challenge is to meet the needs of our customers and to exceed their expectations. On occasion, purchasers may ask Lincoln Electric for information or advice about their use of our products. Our employees respond to inquiries to the best of their ability based on information provided to them by the customers and the knowledge they may have concerning the application. Our employees, however, are not in a position to verify the information provided or to evaluate the engineering requirements for the particular weldment. Accordingly, Lincoln Electric does not warrant or guarantee or assume any liability with respect to such information or advice. Moreover, the provision of such information or advice does not create, expand, or alter any warranty on our products. Any express or implied warranty that might arise from the information or advice, including any implied warranty of merchantability or any warranty of fitness for any customers' particular purpose is specifically disclaimed.

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Subject to Change – This information is accurate to the best of our knowledge at the time of printing. Please refer to www.lincolnelectric.com for any updated information.

LINCOLN ELECTRIC
THE WELDING EXPERTS®

Excalibur® 309/309L-16

Stainless • AWS E309-16, E309L-16

Typical Applications

- Joining stainless steel to mild or low alloy steel
- ASTM A240 Type 309S

Conformances

AWS A5.4/A5.4M: 2006	E309-16, E309L-16
ASME SFA-A5.4:	E309-16, E309L-16
ABS:	E309-16, E309L-16
CWB/CSA W48-06:	E309-16, E309L-16
MIL-E-22200/2:	MIL-309-16, MIL-309L-16

Welding Positions

All, except vertical down

Key Features

- Flux coating provides smooth arc transfer in all welding positions, except vertical down
- Designed for joining stainless steel to mild or low alloy steel
- Q2 Lot® - Certificate showing actual deposit composition and calculated ferrite number (FN) available online
- Designed with low carbon levels to help eliminate carbide precipitation in high temperature service

DIAMETERS / PACKAGING

Diameter in (mm)	Length in (mm)	8 lb (3.6 kg) Easy Open Can	10 lb (4.5 kg) Easy Open Can
3/32 (2.4)	12 (300)	ED033097	
1/8 (3.2)	14 (350)		ED033094
5/32 (4.0)	14 (350)		ED033095
3/16 (4.8)	14 (350)		ED033096

MECHANICAL PROPERTIES[1] – *As Required per AWS A5.4/A5.4M: 2006*

	Yield Strength[2] MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Ferrite Number
Requirements				
AWS E309-16	Not Specified	550 (80) min.	30 min.	Not Specified
AWS E309L-16	Not Specified	520 (75) min.	30 min.	Not Specified
Typical Performance[3] - As-Welded	455-470 (66-68)	580-585 (84-85)	38-47	10-18

DEPOSIT COMPOSITION[1] – *As Required per AWS A5.4/A5.4M: 2006*

	%C[4]	%Cr	%Ni	%Mo	%Mn
Requirements - AWS E309L-16	0.04 max.	22.0-25.0	12.0-14.0	0.75 max.	0.5-2.5
Typical Performance[3]	0.02-0.04	23.9-24.5	12.6-13.2	0.05-0.09	1.0-1.5
	%Si	%P	%S	%Cu	
Requirements - AWS E309L-16	1.00 max.	0.04 max.	0.03 max.	0.75 max.	
Typical Performance[3]	0.33-0.38	≤0.03	≤0.02	≤0.09	

TYPICAL OPERATING PROCEDURES

Polarity[5]	Current (Amps) 3/32 in (2.4 mm)	1/8 in (3.2 mm)	5/32 in (4.0 mm)	3/16 in (4.8 mm)
DC+	40-70	60-100	90-140	120-185
AC	40-70	60-100	90-140	120-185

IMPORTANT: SPECIAL VENTILATION AND/OR EXHAUST REQUIRED

Fumes from the normal use of some welding products can contain significant quantities of components - such as chromium and manganese - which can lower the 5.0 mg/m³ maximum exposure guideline for general welding fume. BEFORE USE, READ AND UNDERSTAND THE MATERIAL SAFETY DATA SHEET (MSDS) FOR THIS PRODUCT AND SPECIFIC INFORMATION PRINTED ON THE PRODUCT CONTAINER.

[1]Typical all weld metal. [2]Measured with 0.2% offset. [3]See test results disclaimer below. [4]AWS Requirement for E309-16 is 0.15% max. carbon. [5]Preferred polarity is listed first.

FLUX-CORED (FCAW-G) WIRE

ULTRACORE® 308L P

Stainless | AWS E308T1-1, E308T1-4, E308LT1-1, E308LT1-4

KEY FEATURES

- Precision layer wound winding delivers steady spool payoff and more consistent feeding
- Smooth arc action with minimal spatter reduces post-weld cleaning
- Polished weld bead appearance reduces post-weld brushing

WELDING POSITIONS

All Positions

RECOMMENDED FLUX

N/A

CONFORMANCES

AWS A5.22/A5.22M:2012 AWS E308T1-1, E308T1-4, E308LT1-1, E308LT1-4

TYPICAL APPLICATIONS

- 304L and other common 18/8 stainless steels
- Nitrogen bearing 304LN and titanium stabilized 321
- General fabrication including piping, tanks and pressure vessels

SHIELDING GAS

FCAW-G: 75% Ar/25% CO_2
100% CO_2

DIAMETERS / PACKAGING

Diameter in (mm)	33 lb (15 kg) Plastic Spool (Vacuum Sealed Foil Bag)
0.045 (1.1)	ED037125
1/16 (1.6)	ED037126

MECHANICAL PROPERTIES[1]

	Yield Strength[2] MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Ferrite Number
Requirements AWS E308LT1-1, E308LT1-4	Not Specified	520 (75) min	35 min	Not Specified
AWS E308T1-1, E308T1-4	Not Specifid	550 (80) min	35 min	Not Specified
Typical Results[3] As-Welded with 100% CO_2	386 (56)	566 (82)	40	7-11
As-Welded with 75% Ar/25% CO_2	393 (57)	572 (83)	39	8-12

[1] Typical all weld metal, DC+ [2] Measured with 0.2% offset [3] See test results disclaimer

DEPOSIT COMPOSITION[1]

	%C[4]	%Mn	%Si	%S	%P
Requirements AWS E308LT1-1 & E308LT1-4	0.04 max	0.5-2.5	1.0 max	0.03 max	0.04 max
Typical Results[3] As-Welded with 100% CO_2	≤0.03	1.2-1.3	0.6-0.7	≤ 0.01	≤ 0.02
As-Welded with 75% Ar/25% CO_2	≤0.03	1.4-1.5	0.7-0.8	≤ 0.01	≤ 0.02
	%Ni	%Cr	%Mo	%Cu	%Bi
Requirements AWS E308LT1-1 & E308LT1-4	9.0-11.0	18.0-21.0	0.75 max	0.75 max	—
Typical Results[3] As-Welded with 100% CO_2	9.5-9.9	18.0-18.6	≤ 0.20	≤ 0.25	0.01-0.02
As-Welded with 75% Ar/25% CO_2	9.7-9.9	18.5-19.0	≤ 0.20	≤ 0.25	0.01-0.02

[1] Typical all weld metal, DC+ [3] See test results disclaimer [4] Requirement for E316T1-1 and E316T1-4 is 0.08% max. carbon

TYPICAL OPERATING PROCEDURES

Diameter, Polarity, Shielding Gas in (mm)	CTWD[5] mm (in)	Wire Feed Speed/Voltage m/min (in/min)	Voltage (Volts)	Approx. Current (Amps)	Melt-Off Rate kg/hr (lb/hr)	Deposition Rate kg/hr (lb/hr)	Efficiency (%)
0.045 in (1.1 mm), DC+ 75% Ar/25% CO_2	19 (3/4)	5.1 (200)	22-24	130	2.0 (4.3)	1.5 (3.3)	76.7
	19 (3/4)	8.4 (330)	24-26	180	3.3 (7.2)	2.6 (5.7)	79.1
	19 (3/4)	11.2 (440)	26-28	220	4.3 (9.5)	3.5 (7.8)	82.1
1/16 in (1.6 mm), DC+ 75% Ar/25% CO_2	25 (1)	3.6 (140)	24-26	160	2.5 (5.6)	2.2 (4.8)	85.7
	25 (1)	5.0 (195)	24-26	200	3.5 (7.8)	3.0 (6.7)	85.8
	25 (1)	6.4 (250)	25-27	220	4.6 (10.1)	3.9 (8.6)	85.6

[5]To estimate ESO, subtract 1/4 in (6.0 mm) from CTWD. NOTE: Increase Voltage by 2V when using 100% CO_2

Safety Data Sheets (SDS) and Certificates of Conformance are available on our website at www.lincolnelectric.com

FUMES AND GASES can be hazardous to your health.

- Fumes from the normal use of this product contain significant quantities of potentially hazardous compounds. See consumable product label/insert.
- Keep your head out of the fumes.
- Use enough ventilation and local exhaust to keep fumes and gases from your breathing zone and the general area.
- An approved respirator should be used unless exposure assessments are below applicable exposure limits.

TEST RESULTS

Test results for mechanical properties, deposit or electrode composition and diffusible hydrogen levels were obtained from a weld produced and tested according to prescribed standards, and should not be assumed to be the expected results in a particular application or weldment. Actual results will vary depending on many factors, including, but not limited to, weld procedure, plate chemistry and temperature, weldment design and fabrication methods. Users are cautioned to confirm by qualification testing, or other appropriate means, the suitability of any welding consumable and procedure before use in the intended application.

CUSTOMER ASSISTANCE POLICY

The Lincoln Electric Company is manufacturing and selling high quality welding equipment, consumables, and cutting equipment. Our challenge is to meet the needs of our customers and to exceed their expectations. On occasion, purchasers may ask Lincoln Electric for information or advice about their use of our products. Our employees respond to inquiries to the best of their ability based on information provided to them by the customers and the knowledge they may have concerning the application. Our employees, however, are not in a position to verify the information provided or to evaluate the engineering requirements for the particular weldment. Accordingly, Lincoln Electric does not warrant or guarantee or assume any liability with respect to such information or advice. Moreover, the provision of such information or advice does not create, expand, or alter any warranty on our products. Any express or implied warranty that might arise from the information or advice, including any implied warranty of merchantability or any warranty of fitness for any customers' particular purpose is specifically disclaimed.

Lincoln Electric is a responsive manufacturer, but the selection and use of specific products sold by Lincoln Electric is solely within the control of, and remains the sole responsibility of the customer. Many variables beyond the control of Lincoln Electric affect the results obtained in applying these types of fabrication methods and service requirements.

Subject to Change – This information is accurate to the best of our knowledge at the time of printing. Please refer to www.lincolnelectric.com for any updated information.

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LINES 11 & 12

SUPERGLAZE® 5356

Aluminum • AWS ER5356

KEY FEATURES

- Aluminum-magnesium alloy for use on many weldable cast and wrought aluminum alloys
- Generally recommended for welding any 5XXX or 6XXX series aluminum alloys
- Excellent for color matching after anodizing
- Embossed on each end for easy identification after use

WELDING POSITIONS

All

CONFORMANCES

SFA/AWS A5.10/A5.10M: 2012 ER5356
ASME SFA-A5.10: ER5356

TYPICAL APPLICATIONS

- Architectural structures
- Armored vehicles
- Gun mount bases

DIAMETERS / PACKAGING

Diameter in (mm)	10 lb (4.5 kg) Carton
1/16 (1.6)	ED031108
3/32 (2.4)	ED031109
1/8 (3.2)	ED031110

WIRE COMPOSITION[1] – *As Required per SFA/AWS A5.10/A5.10M: 2012*

	%Al	%Si	%Fe	%Cu	%Mn	%Mg	%Cr	%Zn	%Ti	%Be
Requirements – AWS ER5356	Remainder	0.25 max	0.40 max	0.10 max	0.05-0.20	4.05-5.5	0.05-0.20	0.10 max	0.06-0.20	0.0003 max
Typical Performance[2]	Remainder	0.06	0.09	0.02	0.12	4.84	0.12	0.001	0.09	0.0002

[1]Typical all weld metal. [2]See test results disclaimer

SUPERGLAZE® 5356

LINE 13

Aluminum ▪ AWS ER5356

KEY FEATURES

- General purpose filler alloy for welding 5XXX series alloys
- The most widely used welding alloy

WELDING POSITIONS

All, except vertical down

SHIELDING GAS

100% Argon
Argon / Helium Mixtures
Flow Rate: 30 - 50 CFH

NOTE

- Typical Operating Procedures on pg. I-15 - I-16

CONFORMANCES

SFA/AWS A5.10:	ER5356
ASME SFA-A5.10:	ER5356
Lloyd's Register:	WB/I-1 S
DNV Grade:	5356
GL:	RAIMg4
BV Grade:	WB
CWB/CSA W48-06:	ER5356

TYPICAL APPLICATIONS

- Automotive bumpers and supports
- Structural frames in the shipbuilding industry
- Formed truck panels
- Railing Industry
- Power Industry
- Trailer Manufacturing

DIAMETERS / PACKAGING

Diameter in (mm)	1 lb (0.4 kg) Plastic Spool 20 lb (9.1 kg) Master Carton	16 lb (7.3 kg) Platic Spool	20 lb (9.1 kg) Plastic Spool	60 lb (27.2 kg) Mini-Drum	300 lb (136 kg) Accu-Pak® Box	300 lb (136 kg) Gem-Pak™ Box
0.035 (0.9)	ED030312	ED028385		ED036720	ED033178[a]	ED034722
3/64 (1.2)	ED030314		ED030282	ED036593	ED031826[b]	ED034550
1/16 (1.6)			ED030283	ED036721	ED030985[b]	ED034551

[a]This part number is Made-To-Order. [b]Wire payoff kit K2860-1 sold separately.

WIRE COMPOSITION[1] – *As Required per SFA/AWS A5.10*

	%Al	%Si	%Fe	%Cu	%Mn
Requirements - AWS ER5356	Remainder	0.25 max	0.40 max	0.10 max	0.05 - 0.20
Typical Results[2]	Remainder	0.05	0.09	0.03	0.12
	%Mg	%Cr	%Zn	%Ti	%Be
Requirements - AWS ER5356	4.50 - 5.50	0.05 - 0.20	0.10 max	0.06 - 0.20	0.0003 max
Typical Results[2]	4.90	0.08	< 0.01	0.15	0.0002

[1]Typical all weld metal. [2]See test results disclaimer

TIG (GTAW) CUT LENGTHS

LINCOLN® ER70S-2

Mild Steel, Copper Coated ▪ AWS ER70S-2

KEY FEATURES

- Contains zirconium, titanium, and aluminum in addition to silicon and manganese
- Produces x-ray quality welds over most surface conditions
- Recommended for TIG welding on all grades of steel
- Ink jet printing identification on entire length of electrode
- Q2 Lot* - Certificates showing actual wire chemistry available online

WELDING POSITIONS

All

CONFORMANCES

AWS A5.18:	ER70S-2
ASME SFA-A5.18:	ER70S-2
CSA W48 CLASSIFICATION	B-G 49A 3 CG2 (ER495-2)

TYPICAL APPLICATIONS

- Repairs on a variety of mild and low alloy steel
- Small diameter pipe and tubing
- Sheet metal applications
- Root pass pipe welding

Diameter In (mm)	10 lb (4.5 kg) Carton	5 lb (2.3 kg) Plastic Tube 20 lb (9.1 kg) Master Carton	10 lb (4.5 kg) Plastic Tube 30 lb (13.6 kg) Master Carton	50 lb (22.7 kg) Carton
1/16 (1.6)	ED033952*	ED034325	ED034328	ED034331
3/32 (2.4)	ED033953*	ED034326	ED034329	ED034332
1/8 (3.2)	ED033954*	ED034327	ED034330	ED034333
5/32 (4.0)			ED034810	

** Nuclear Tested Product*

WIRE COMPOSITION[1] – *As Required per AWS A5.18/A5.18M*

	%C	%Mn	%S	%Si	%P	%Cu	%Cr
Requirements - AWS ER70S-2	0.07 max	0.90-1.40	0.035 max	0.40-0.70	0.0025 max	0.50 max	(1)
Typical Results[2]	0.04	1.08	0.005	0.55	0.0003	0.20	0.08
	%Ni	%Mo	%V	%Al	%Ti	%Zr	
Requirements - AWS ER70S-2	(1)	(1)	(1)	0.05-0.15	0.05-0.15	0.02-0.12	
Typical Results[2]	0.08	0.08	< 0.002	0.08	0.10	0.07	

[1]Total 0.50% maximum, combined. [2]See test results disclaimer

CE

TIG (GTAW) CUT LENGTHS

LINCOLN® ER308/308L

Stainless ▪ AWS ER308, ER308L

KEY FEATURES

- Balanced chromium and nickel levels provide enough ferrite in the weld for high resistance to hot cracking
- Dual classification ensures the maximum carbon content is 0.03%
- Q2 Lot® - Certificate showing actual wire composition and calculated ferrite number (FN) available online
- 0.03% carbon content increases resistance to intergranular corrosion
- Ink jet printing identification on entire length of electrode

WELDING POSITIONS

All

CONFORMANCES

AWS A5.9/A5.9M:	ER308, ER308L
ASME SFA-A5.9:	ER308, ER308L
EN ISO 14343-B:	SS308L

TYPICAL APPLICATIONS

- Sheet metal on the corresponding stainless steel base metals
- High pressure piping and tubing

SHIELDING GAS

100% Argon

DIAMETERS / PACKAGING

Diameter In (mm)	1 lb (0.5 kg) Plastic Tube 10 lb (4.5 kg) Master Carton	10 lb (4.5 kg) Plastic Tube 30 lb (13.6 kg) Master Carton	10 lb (4.5 kg) Carton	50 lb (22.7 kg) Carton
1/16 (1.6)	ED025410	ED034439	ED025412	ED026655
3/32 (2.4)	ED025413	ED034440	ED025415	ED026656
1/8 (3.2)	ED025416	ED034441	ED025418	ED026657
5/32 (4.0)		ED036060		

WIRE COMPOSITION – *As Required per AWS A5.9/A5.9M*

	%C	%Cr	%Ni	%Mo	%Mn
Requirements - AWS ER308L	0.03[2] max	19.5 - 22.0	9.0 -11.0	0.75 max	1.0 - 2.5
Test Results[1]	0.02	20.2	9.2	0.03	1.6
	%Si	%P	%S	%Cu	Total Others
Requirements - AWS ER308L	0.30 - 0.65	0.03 max	0.03 max	0.75 max	0.50 max
Test Results[1]	0.44	0.02	0.02	0.11	0.03

[1]See test results disclaimer [2]Requirements for ER308 is 0.08% max. carbon.

IMPORTANT: SPECIAL VENTILATION AND/OR EXHAUST REQUIRED

Fumes from the normal use of some welding products can contain significant quantities of components - such as chromium and manganese - which can lower the 5.0 mg/m³ maximum exposure guideline for general welding fume.

BEFORE USE, READ AND UNDERSTAND THE SAFETY DATA SHEET (SDS) FOR THIS PRODUCT AND SPECIFIC INFORMATION PRINTED ON THE PRODUCT CONTAINER.

CE

TIG (GTAW) CUT LENGTHS

LINCOLN® ER309/309L

Stainless ▪ AWS ER309, ER309L

KEY FEATURES

- Q2 Lot® - Certificate showing actual wire composition and calculated ferrite number (FN) available online
- 0.03% carbon content increases resistance to intergranular corrosion
- Ink jet printing identification on entire length of electrode

WELDING POSITIONS

All

SHIELDING GAS

100% Argon

CONFORMANCES

AWS A5.9/A5.9M:	ER309, ER309L
ASME SFA-A5.9:	ER309, ER309L
EN ISO 14343-B:	SS309L

TYPICAL APPLICATIONS

- Sheet metal on the corresponding stainless steel base metals
- High pressure piping and tubing
- Use for welding dissimilar alloys in wrought or cast form
- Occasionally used for welding "18-8" base metals when severe corrosion conditions exist or dissimilar metals

DIAMETERS / PACKAGING

Diameter in (mm)	1 lb (0.5 kg) Plastic Tube 10 lb (4.5 kg) Master Carton	10 lb (4.5 kg) Plastic Tube 30 lb (13.6 kg) Master Carton
1/16 (1.6)	ED025419	ED034442
3/32 (2.4)	ED025422	ED034443
1/8 (3.2)	ED025425	ED034444

WIRE COMPOSITION – *As Required per AWS A5.9/A5.9M*

	%C	%Cr	%Ni	%Mo	%Mn
Requirements - AWS ER309L	0.03[2] max	23.0 - 25.0	12.0 - 14.0	0.75 max	1.0 - 2.5
Test Results[1]	0.02	23.7	13.9	0.04	1.8
	%Si	%P	%S	%Cu	Total Others
Requirements - AWS ER309L	0.30 - 0.65	0.03 max	0.03 max	0.75 max	0.50 max
Test Results[1]	0.51	0.02	0.01	0.05	0.06

[1]See test results disclaimer [2]Requirements for ER309 is 0.12% max. carbon.

IMPORTANT: SPECIAL VENTILATION AND/OR EXHAUST REQUIRED

Fumes from the normal use of some welding products can contain significant quantities of components - such as chromium and manganese - which can lower the 5.0 mg/m³ maximum exposure guideline for general welding fume.

BEFORE USE, READ AND UNDERSTAND THE SAFETY DATA SHEET (SDS) FOR THIS PRODUCT AND SPECIFIC INFORMATION PRINTED ON THE PRODUCT CONTAINER.

MIG (GMAW) WIRE

TECHALLOY® 413

Nickel ▪ AWS ERCuNi

KEY FEATURES

- This filler metal can be used for MIG overlay on steel after a first layer with Nickel 208
- Dissimilar welding applications include joining copper-nickel alloys to Nickel 200 or nickel-copper alloys
- Q2 Lot® -Certificate showing actual deposit composition available online

CONFORMANCES

AWS A5.7: ERCuNi
UNS C71580

TYPICAL APPLICATIONS

- Used for TIG and MIG and oxy-fuel welding of 70/30, 80/20 and 90/10 copper-nickel alloys

WELDING POSITIONS

All

SHIELDING GAS

MIG 75% Ar / 25% He
TIG 100% Ar

DIAMETERS / PACKAGING

Diameter in (mm)	MIG 33 lb (15 kg) Steel Spool	TIG 10 lb (4.5 kg) Tube 30 lb (13.6 kg) Master Carton
0.035 (0.9)	MG413035667	
0.045 (1.1)	MG413045667	
1/16 (1.6)	MG413062667	TG413062638
3/32 (2.4)		TG413093638
1/8 (3.2)		TG413125638

WIRE COMPOSITION[1] - *As Required per AWS A5.7*

	%Cu	%Mn	%Fe	%Si	%Ni
Requirements AWS ERCuNi	Remainder	1.0 max	0.40 - 0.75	0.25 max	29 - 32
Typcial Performance[2] Techalloy® 413	67.5	0.7	0.55	0.1	30

	%P	%Pb	%Ti	%Other
Requirements AWS ERCuNi	0.02 max	0.02 max	0.20 - 0.50	0.50 max
Typcial Performance[2] Techalloy® 413	0.006	0.003	0.25	<0.50

TYPICAL OPERATING PROCEDURES

Process	Diameter in (mm)	Voltage (volts)	Amperage	Gas
MIG	0.035 (0.9)	25-29	150-190	75% Argon / 25% Helium
	0.045 (1.1)	25-28	180-240	
	1/16 (1.6)	29-33	200-250	

[1]Typical all weld metal. [2]See test results disclaimer
Safety Data Sheets (SDS) are available on our website at www.lincolnelectric.com

CE

TIG (GTAW) CUT LENGTHS

LINCOLN® ER316/316L

Stainless ▪ AWS ER316, ER316L

KEY FEATURES

- The 2-3% molybdenum improves pitting corrosion resistance of the weld deposit
- Molybdenum grade increases corrosion resistance
- Use for high temperature service applications
- Q2 Lot® - Certificate showing actual wire composition and calculated ferrite number (FN) available online
- 0.03% carbon content increases resistance to intergranular corrosion
- Ink jet printing identification on entire length of electrode

CONFORMANCES

AWS A5.9/A5.9M:	ER316, ER316L
ASME SFA-A5.9:	ER316, ER316L
EN ISO 14343-B:	SS316L

TYPICAL APPLICATIONS

- Sheet metal on the corresponding stainless steel base metals
- High pressure piping and tubing
- Use for welding similar alloys containing approximately 2% molybdenum

WELDING POSITIONS

All

SHIELDING GAS

100% Argon

DIAMETERS / PACKAGING

Diameter In (mm)	1 lb (0.5 kg) Plastic Tube 10 lb (4.5 kg) Master Carton	10 lb (4.5 kg) Plastic Tube 30 lb (13.6 kg) Master Carton
1/16 (1.6)	ED025428	ED034445
3/32 (2.4)	ED025421	ED034446
1/8 (3.2)	ED025434	ED034447
5/32 (4.0)		ED036061

WIRE COMPOSITION – *As Required per AWS A5.9/A5.9M*

	%C	%Cr	%Ni	%Mo	%Mn
Requirements - AWS ER316L	0.03[2] max	18.0 - 20.0	11.0 - 14.0	2.0 - 3.0	1.0 - 2.5
Test Results[1]	0.02	18.7	11.8	2.3	1.7
	%Si	%P	%S	%Cu	Total Others
Requirements - AWS ER316L	0.30 - 0.65	0.03 max	0.03 max	0.75 max	0.50 max
Test Results[1]	0.52	0.02	0.01	0.10	0.30

[1] See test results disclaimer [2] Requirements for ER316 is 0.08% max. carbon.

IMPORTANT: SPECIAL VENTILATION AND/OR EXHAUST REQUIRED

Fumes from the normal use of some welding products can contain significant quantities of components - such as chromium and manganese - which can lower the 5.0 mg/m³ maximum exposure guideline for general welding fume.

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CE

FLUX-CORED (FCAW-G) WIRE

ULTRACORE® HD-C

Mild Steel, All Position • AWS E71T-9C-H8, E71T1-C1A2-CS1-H8

BUY AMERICA

KEY FEATURES

- High deposition rates, increase weld deposition exceeding 10 lbs/hr out-of-position
- Fast freezing slag for a flat bead shape and increased productivity in all positions, including vertical up
- Operators can set the machine on a single setting and weld in all positions
- Little or no pre-weld clean up required, weld over light rust, mill scale, and primer

WELDING POSITIONS

All

CONFORMANCES

AWS 5.20/A5.20M:	E71T-1C-H8, E71T-9C-H8
AWS A5.36:	E71T1-C1A2-CS1-H8
ABS:	3YSA H10
Lloyd's Register:	3YS H10
DNV:	III YMS H10
CWB/CSA W48-06:	E491T-9-H8
EN ISO 17632-B	T493T1-1CA-H10

TYPICAL APPLICATIONS

- Shipbuilding
- General fabrication

SHIELDING GAS

100% CO_2
Flow Rate: 40 - 50 CFH

DIAMETERS / PACKAGING

Diameter In (mm)	15 lb (6.8 kg) Plastic Spool 60 lb (27.2 kg) Master Carton	33 lb (15 kg) Spool**	50 lb (22.7 kg) Fiber Spool	50 lb (22.7 kg) Coil	500 lb (227 kg) Accu-Trak® Drum
0.045 (1.1)	ED033756	ED033755	ED033757		
0.052 (1.3)	ED033759	ED033758	ED033760		ED034376
1/16 (1.6)	ED033762	ED033761	ED033763	ED036529*	ED033785

*Buy America Product **Spool may be plastic or fiber.

MECHANICAL PROPERTIES[1]

	Yield Strength[2] MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Charpy V-Notch J (ft•lbf) @ -18°C (0°F)	Charpy V-Notch J (ft•lbf) @ -29°C (-20°F)
Requirements					
AWS E71T-1C-H8	400 (58) min	480-660 (70-95)	22 min	27 (20) min	Not Specified
AWS E71T-9C-H8				Not Specified	27 (20) min
Test Results[3] - As-Welded with 100% CO_2	540-560 (78-81)	590-610 (86-89)	27	37-111 (27-82)	31-85 (23-63)

[1]Typical all weld metal. [2]Measured with 0.2% offset. [3]See test results disclaimer

FLUX-CORED (FCAW-G) WIRE

DEPOSIT COMPOSITION[1]

	%C	%Mn	%Si
Requirements - AWS E71T-1C-H8, E71T-9C-H8	0.12 max	1.75 max	0.90 max
Test Results[3] - As-Welded with 100% CO_2	0.04-0.05	1.36-1.46	0.38-0.42
	%S	%P	Diffusible Hydrogen (mL/100g weld deposit)
Requirements - AWS E71T-1C-H8, E71T-9C-H8	0.03 max	0.03 max	8 max
Test Results[3] - As-Welded with 100% CO_2	0.01	0.01	4-6

TYPICAL OPERATING PROCEDURES

Diameter, Polarity Shielding Gas	CTWD[4] mm (in)	Wire Feed Speed m/min (in/min)	Voltage (Volts)	Approx. Current (Amps)	Melt-Off Rate kg/hr (lb/hr)	Deposition Rate kg/hr (lb/hr)	Efficiency (%)
0.045 in (1.1 mm), DC+ 100% CO_2	19 - 25 (3/4 - 1)	4.4 (175)	22-25	145	1.8 (3.9)	1.5 (3.4)	85 - 87
		6.4 (250)	23-28	185	2.5 (5.6)	2.2 (4.8)	
		7.6 (300)	24-30	215	3.1 (6.8)	2.6 (5.8)	
		8.9 (350)	25-31	235	3.6 (7.9)	3.1 (6.8)	
		10.2 (400)	27-32	255	4.1 (9.0)	3.5 (7.8)	
		11.4 (450)	28-33	280	4.6 (10.1)	4.0 (8.8)	
		12.7 (500)	27-33	300	5.1 (11.3)	4.4 (9.8)	
		14.0 (550)	28-33	315	5.6 (12.4)	4.9 (10.8)	
		15.2 (600)	30-35	335	6.1 (13.5)	5.3 (11.7)	
0.052 in (1.3 mm), DC+ 100% CO_2	19 - 25 (3/4 - 1)	3.8 (150)	22-25	155	2.1 (4.7)	1.7 (3.8)	81 - 85
		5.1 (200)	23-26	190	2.9 (6.3)	2.4 (5.2)	
		6.4 (250)	23-27	225	3.5 (7.8)	2.9 (6.5)	
		7.6 (300)	24-29	265	4.3 (9.4)	3.6 (7.9)	
		8.9 (350)	26-30	285	5.0 (11.0)	4.2 (9.2)	
		9.5 (375)	27-30	310	5.3 (11.7)	4.5 (9.9)	
		10.8 (425)	28-32	325	6.0 (13.3)	5.1 (11.2)	
		12.1 (475)	29-33	345	6.8 (14.9)	5.7 (12.6)	
		12.7 (500)	30-34	360	7.1 (15.6)	6.0 (13.3)	
1/16 in (1.6 mm), DC+ 100% CO_2	19 - 25 (3/4 - 1)	3.8 (150)	21-26	195	2.9 (6.4)	2.4 (5.3)	84 - 87
		4.4 (175)	22-27	245	3.4 (7.5)	2.9 (6.3)	
		5.1 (200)	22-27	260	3.9 (8.5)	3.3 (7.2)	
		5.7 (225)	23-28	290	4.4 (9.6)	3.7 (8.1)	
		6.4 (250)	24-29	310	4.8 (10.6)	4.1 (9.1)	
		7.6 (300)	25-30	330	5.8 (12.7)	4.9 (10.9)	
		8.3 (325)	25-30	365	6.3 (13.8)	5.4 (11.9)	
		8.9 (350)	26-30	390	6.7 (14.8)	5.8 (12.8)	
		10.2 (400)	27-31	405	7.7 (16.9)	6.7 (14.7)	

[1]Typical all weld metal. [2]Measured with 0.2% offset. [3]See test results disclaimer [4]As-Welded with 100% CO_2. [5]To estimate ESO, subtract 1/4 in (6.0 mm) from CTWD.

Material Safety Data Sheets (MSDS) and Certificates of Conformance are available on our website at www.lincolnelectric.com

TEST RESULTS

Test results for mechanical properties, deposit or electrode composition and diffusible hydrogen levels were obtained from a weld produced and tested according to prescribed standards, and should not be assumed to be the expected results in a particular application or weldment. Actual results will vary depending on many factors, including, but not limited to, weld procedure, plate chemistry and temperature, weldment design and fabrication methods. Users are cautioned to confirm by qualification testing, or other appropriate means, the suitability of any welding consumable and procedure before use in the intended application.

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FLUX-CORED (FCAW-G) WIRE

ULTRACORE® 309L P

Stainless | AWS E309T1-1, E309T1-4, E309LT1-1, E309LT1-4

KEY FEATURES

- Precision layer wound winding delivers steady spool payoff and more consistent feeding
- Smooth arc action with minimal spatter reduces post-weld cleaning
- Polished weld bead appearance reduces post-weld brushing

WELDING POSITIONS

All Positions

RECOMMENDED FLUX

N/A

CONFORMANCES

AWS A5.22/A5.22M:2012 AWS E309T1-1, E309T1-4, E309LT1-1, E309LT1-4

TYPICAL APPLICATIONS

- Buffer layers and clad steels – overlays on CMn, mild steel or low alloy steels
- Dissimilar joints – stainless types 410, 304L, 321, and 316L to mild and low alloy steels

SHIELDING GAS

FCAW-G: 75% Ar/25% CO_2
100% CO_2

DIAMETERS / PACKAGING

Diameter in (mm)	33 lb (15 kg) Plastic Spool (Vacuum Sealed Foil Bag)
0.045 (1.1)	ED037127
1/16 (1.6)	ED037128

MECHANICAL PROPERTIES[1]

	Yield Strength[2] MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Ferrite Number
Requirements AWS E309LT1-1, E309LT1-4	Not Specified	520 (75) min	30 min	Not Specified
AWS E309T1-1, E309T1-4	Not Specified	550 (80) min	30 min	Not Specified
Typical Results[3] As-Welded with 100% CO_2	434 (63)	565 (82)	33	—
As-Welded with 75% Ar/25% CO_2	450 (65)	593 (86)	33	—

[1] Typical all weld metal, DC+ [2] Measured with 0.2% offset [4] See test results disclaimer

DEPOSIT COMPOSITION[1]

	%C[4]	%Mn	%Si	%S	%P
Requirements AWS E309LT1-1 & E309LT1-4	0.04 max	0.5-2.5	1.0 max	0.03 max	0.04 max
Typical Results[3] As-Welded with 100% CO_2	≤0.03	1.0	0.8	≤ 0.01	≤ 0.02
As-Welded with 75% Ar/25% CO_2	≤0.03	1.0	0.9	≤ 0.01	≤ 0.02
	%Ni	%Cr	%Mo	%Cu	%Bi
Requirements AWS E309LT1-1 & E309LT1-4	12.0-14.0	22.0-25.0	0.75 max	0.75 max	—
Typical Results[3] As-Welded with 100% CO_2	12.8-13.2	23.6-23.9	≤ 0.20	≤ 0.25	0.01-0.02
As-Welded with 75% Ar/25% CO_2	12.9-13.3	23.9-24.1	≤ 0.20	≤ 0.25	0.01-0.02

[1] Typical all weld metal, DC+ [4] See test results disclaimer [4a] Requirement for E316T1-1 and E316T1-4 is 0.08% max. carbon

TYPICAL OPERATING PROCEDURES

Diameter, Polarity, Shielding Gas in (mm)	CTWD[B] mm (in)	Wire Feed Speed/Voltage m/min (in/min)	Approx. Current (Amps)	Melt-Off RateDeposition Rate Efficiency m/ (%)	Melt-Off Rate kg/hr (lb/hr)	Deposition Rate kg/hr (lb/hr)	Efficiency (%)
0.045 in (1.1 mm), DC+ 75% Ar/25% CO_2	19 (3/4)	5.1 (200)	22-24	130	2.1 (4.6)	1.7 (3.8)	82.6
	19 (3/4)	8.4 (330)	24-26	180	3.4 (7.4)	2.8 (6.1)	82.4
	19 (3/4)	11.2 (440)	26-28	220	4.5 (10)	3.7 (8.1)	81
1/16 in (1.6 mm), DC+ 75% Ar/25% CO_2	25 (1)	3.6 (140)	22-24	150	2.5 (5.6)	2.2 (4.8)	85.7
	25 (1)	5.0 (195)	24-26	190	3.6 (7.9)	3.0 (6.7)	84.8
	25 (1)	7.1 (280)	25-27	220	5.2 (11.4)	4.4 (9.6)	84.2

[B]*To estimate ESO, subtract 1/4 in (6.0 mm) from CTWD. NOTE: Increase Voltage by 2V when using 100% CO_2*

Safety Data Sheets (SDS) and Certificates of Conformance are available on our website at www.lincolnelectric.com

FUMES AND GASES can be hazardous to your health.

- Fumes from the normal use of this product contain significant quantities of potentially hazardous compounds. See consumable product label/insert.
- Keep your head out of the fumes.
- Use enough ventilation and local exhaust to keep fumes and gases from your breathing zone and the general area.
- An approved respirator should be used unless exposure assessments are below applicable exposure limits.

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LINCOLN ELECTRIC

Equivalent materials proposed must meet all criteria of the suggested brand; i.e. conformances, mechanical properties, deposit composition, operating procedures, diameters, packaging.

END OF BID DOCUMENTS