

Coreshield® 8 Helps AGRA Certify Welders for a Critical Job

Barry “Bear” and Brett Dunn of AGRA Foundations discovered what a difference more user-friendly wire can make. With their company responsible for running all the welding specs on California’s San Rafael-Richmond bridge project, the Dunns’ first challenge was to certify welders for the job.

“We replaced another brand wire we had been using with Coreshield 8 and we are extremely pleased with the results. We found the ESAB wire made it easier for welders to achieve the desired results,” says Bear Dunn.

In fact, using Coreshield 8, AGRA was able to quickly certify 14 welders for the job. The Coreshield wire’s certification for seismic applications is also crucial for this project, which involves retrofits on a bridge across San Francisco Bay in order to bring it up to FEMA specs.

“Nearly everything used on the project comes from ESAB,” adds welding foreman Bear Dunn.

- “Bear” and Brett Dunn
AGRA Foundations

The most productive tools in the welding industry today.

Dual Shield® Coreshield®

Higher Deposition
+ Wider operating range
+ Faster travel speeds

Improved Efficiency
+ Easy slag removal
+ Limited clean-up

Ease of Use
+ Shorter training time
+ Easier to qualify

Extended Exposures
+ Fewer change outs
+ Less waste



ESAB Delivers the names to know and trust.



Atom Arc®

Low Hydrogen Cover Electrodes: America's first low hydrogen-covered electrodes now includes over 35 different low-alloy types. Atom Arc remains the standard by which all other covered electrodes are measured.



Dual Shield®

Gas-Shielded Flux Cored Wires: Introduced to the market in 1957, Dual Shield products have become synonymous with quality and productivity. The Dual Shield family has grown to include over 60 types of flux cored wires developed to meet your welding requirements.



Coreshield®

Self-Shielded Flux Cored Wires: Coreshield welding wires are designed to meet the most stringent of structural welding codes. ESAB has developed a family of self-shielded flux cored wires for welding applications that range from thin steel sheet to heavy structural plate.



Spoolarc®

MIG & Submerged Arc Wires: Spoolarc premium solid wires are the brand of choice for many of the largest fabricators in North America. For over 40 years, Spoolarc has been used by some of the most well known companies in welding fabrication to make products as common as the car you drive or the building you work in, or products as exotic as nuclear submarines or even the space shuttle launch pad.



OK Flux

Submerged Arc Fluxes: Utilizing global manufacturing capacity, ESAB is able to provide a range of submerged arc fluxes, bonded or fused, active or neutral to meet your needs. OK Fluxes are designed to provide smooth, stable performance, even at extremely high welding currents.

Example: Coreshield 8 (E71T-8D)

Seismic Certified	AWS A5.20:2005		FEMA 353 Specifications		D1.8 Specifications		D1.8 "Intermix"
	Standard Requirements	"D" Designator Requirements	AWS A5.20:2005 Requirements	Part 1 Appendix A Requirements	AWS A5.20:2005 Requirements	Annex A Requirements	Annex B Requirements
Low Heat Input (kJ/in)							
<3/32 Diameter	♦	25-32	♦	Aim* 30	♦	30 ± 20% (24-36)	♦
≥3/32 Diameter	♦	35-42	♦	Aim* 30	♦	30 ± 20% (24-36)	♦
High Heat Input (kJ/in)							
<3/32 Diameter	♦	78-85	♦	Aim* 80	♦	80 ± 20% (64-96)	♦
≥3/32 Diameter	♦	78-85	♦	Aim* 80	♦	80 ± 20% (64-96)	♦
Mechanical Properties							
UTS (psi) minimum		70,000	70,000	70,000	70,000	70,000	♦
YS (psi) minimum		58,000	58,000	58,000	58,000	58,000	♦
Elongation (%) minimum		22	22	22	22	22	♦
Impact Properties							
CVN (ft-lbs) minimum †		40 @ +70°F	20 @ 0°F	40 @ +70°F	20 @ 0°F	40 @ +70°F	20 @ 0°F
CVN (ft-lbs) minimum with Lowest Anticipated Service Temperature ††							
≥ 50°F	♦	♦	♦	♦	♦	40 ft-lbs @ +70°F	40 ft-lbs @ +70°F
0°F	♦	♦	♦	♦	♦	40 ft-lbs @ +20°F	40 ft-lbs @ +20°F
-20°F	♦	♦	♦	♦	♦	40 ft-lbs @ 0°F	40 ft-lbs @ 0°F
-40°F	♦	♦	♦	♦	♦	40 ft-lbs @ -20°F	40 ft-lbs @ -20°F
Joint (AWS)	(45°, 1/2" RO)	(45°, 1/2" RO)	(45°, 1/2" RO)	(45°, 1/2" RO)	(45°, 1/2" RO)	(45°, 1/2" RO) or (20°, 5/8" RO)	(45°, 1/2" RO) or (20°, 5/8" RO)
Preheat	60°F min		60°F min		60°F min		♦
Interpass	300° ± 25°F		300° ± 25°F		300° ± 25°F		♦
Preheat (Low HI)		70° ± 25°F		*Aim 70° ± 25°F		120°F max	♦
Preheat (High HI)		300° ± 25°F		*Aim 300° ± 25°F		250°F max	♦
Interpass (Low HI)		200° ± 25°F		*Aim 200° ± 50°F		250°F max	♦
Interpass (High HI)		500° ± 50°F		*Aim 500° ± 50°F		450°F max	♦



Coreshield 6 is an E70T-6 self-shielded flux-cored wire designed for flat and horizontal welds requiring Charpy V-notch properties. Engineered for demand critical structural welds, Coreshield 6 is a high productivity, high deposition gasless flux cored wire. This self-shielded wire is ideal for single or multiple pass weld applications in addition to providing high deposition rates, low spatter, and good penetration. Because of its stiffer weld puddle, Coreshield 6 offers exceptional multi-pass weld stacking characteristics, produces excellent bead appearance and X-ray quality weld deposits.

Coreshield 6 is tested and certified to meet the new AWS A5.20 'D' designation requirements, making this self-shielded wire an excellent choice for demand critical welds when FEMA 353, D1.1 or D1.8 Seismic Supplement is utilized.

Maximize Your Productivity & Minimize Your Cost Certified Performance

- Meets demand critical requirements
- Meets most lowest anticipated service temperature applications
- Improved performance over existing products
- Surpasses Extended Exposure requirements
- Crack resistant in critical applications

Improved Productivity

- Higher deposition rate
- Wider operating range
- Faster travel speeds
- Meet construction time-tables
- Better Cost Efficiency

Improved Welder Appeal

- More forgiving than traditional wires
- Simplifies training and qualification
- Better Arc Control
- Self-releasing slag
- Limited clean-up

Outstanding Inspection Results

- Minimal Post Weld Work
- Lowers reject & repair rates

AWS 5.20 "D" Designator Testing Results

Size (in.)	3/32"	
Shielding Gas	Self-shielded	
Heat Input Range (kJ/in)	High 78-85	Low 35-42
Position	1G	1G
Heat Input (kJ/in)	82.7	41
Current (amps)	520	340
WFS (in/min)	300	160
Voltage (volts)	29.6	24.9
Travel Speed (in/min)	11.2	12.4
Pass / Layer	1F, 2S	1F, 2S, 3T
Tensile Strength (ksi)	75.7	90.6
Yield Strength (ksi)	58.1	77.9
Elongation (%)	30	25
Impact Temperature (°F)	70	70
Impact Results (ft-lbs)	60, 58, 60, 54, 49	56, 53, 54, 53, 52
Minimum Required (ft-lbs)	40	40
Average Impact (ft-lbs)	56	54

Typical Mechanical Properties

Shielding Gas : Self-shielded	As Welded
Yield Strength, ksi (MPa)	67 (465)
Tensile Strength, ksi (MPa)	85 (590)
Elongation % in 2"	26

Typical Charpy V-Notch Impact Properties

Testing Temperature	Ft.-lbs (J)
-20°F (-29°C)	31 (42)

Typical Undiluted Weld Metal Analysis

Shielding Gas : Self-shielded	%
Carbon (C)	0.12
Manganese (Mn)	0.5
Silicon (Si)	0.2
Phosphorus (P)	0.005
Sulfur (S)	0.008
Nickel (Ni)	0.4
Aluminum (Al)	0.7



CORESHIELD® 6

Typical Welding Parameters

Diameter	Amperage (amps)	Voltage (volts)	WFS (ipm)	Dep. Rate (lbs/hr)	Efficiency Rate %	ESO*
5/64"	275	22	150	6.4	78.1%	1 in.
	325	23	200	8.5	79.6%	1 in.
	390	24	300	12.2	80.2%	1 in.
	475	27	400	16.3	80.3%	1 in.
	535	29	500	20.7	81.2%	1 in.
	600	31	600	25.7	81.7%	1 in.
3/32"	265	22	100	6.1	78.7%	1 in.
	365	23	150	9.3	79.8%	1 in.
	415	23	200	12.5	80.9%	1 in.
	530	26	300	19	81.8%	1 in.
	615	29	400	25.8	81.8%	1 in.

*Electrical Stick Out (ESO) can vary, data above is based on 1 in. ESO.

Extended Exposure Results

Product	Diameter	Shielding Gas	Test Conditions	Exposure Time	Hydrogen
Coreshield 6	5/64"	n/a	80°F at 80% humidity	6 days (144 hrs)	12.4 ml/100g
Coreshield 6	3/32"	n/a	80°F at 80% humidity	6 days (144 hrs)	10.4 ml/100g

AWS D1.8/D1.8M:2005, Annex D requirement: <16 ml/100g after 72 hour exposure at 80°F, 80% humidity

Recommended Storage and Reconditioning

ESAB cartons and plastic bags are proven acceptable protection for standard Coreshield 6 welding wires when stored under proper conditions. The recommended conditions are temperatures below 75°F and atmospheric humidity levels below 60%. Recondition coils and metal spools at 300°F for 6-8 hours; re-bake plastic spools at 125°F for 24 hours. Storage temperatures should not exceed the reconditioning temperatures. The plastic bags should always be removed when storing or reconditioning at elevated temperatures.

For more information on Recommended Storage and Reconditioning for this product and more, please refer to page 35.



ANNEX B: INTERMIX CVN

Annex B: Intermix CVN Testing of Filler Metal Combinations AWS D1.8/D1.8M:2005, Structural Welding Code – Seismic

	Root	Fill	Root	Fill	Root	Fill
Electrode	Atom Arc 7018	Dual Shield 710X	Atom Arc 7018	Coreshield 6	Atom Arc 7018	Coreshield 8
Lot No.	4A307B02	82875	4A307B02	83407	4A307B02	83414
Diameter In.	1/8	3/32	1/8	3/32	1/8	5/64
Shielding Gas	N/A	100 % CO2	N/A	N/A	N/A	N/A
Polarity	DCEP	DCEP	DCEP	DCEP	DCEP	DCEN
Current (amps)	140	368	140	365	140	290
Voltage (volts)	23	30	23.5	26.2	23.5	22.4
WFS (in./min)	N/A	255	N/A	160	N/A	200
ESO (in.)	½	¾ to 1	½	1	½	¾
TS (in./min.)				11		10
Pass/Layer	2 Split	5 Split	2 Split	4 Split	2 Split	5 Split

Mechanical Properties

Tensile Strength (ksi)	89.3	81.0	88.7
Yield Strength (ksi)	79.2	67.0	73.4
Elongation (%)	27.5	27.0	30.0
% Reduction of Area	66.3	64.7	63.9

Charpy V-Notch (ft.-lbs.)

Testing Temp. 70°F	91, 89, 75, 66, 82	60, 60, 62, 62, 61	73, 80, 75, 75, 70
Avg ft.-lbs	81	61	75
Testing Temp. 0°F	43, 30, 47, 43, 45	44, 45, 54, 45, 43	39, 46, 49, 44, 51
Avg ft.-lbs	42	46	76

Testing Conditions

Test No.	B1-2603-08-2952	B1-2601-08-2952	B1-2600-08-2952
Joint	20 Deg / 5/8 RO	20 Deg / 5/8 RO	20 Deg / 5/8 RO
Welding Position	1G (Flat)	1G (Flat)	1G (Flat)
Steel Plate (in)	3/4 x 15 x 12 ASTM A285	3/4 x 15 x 13.5 ASTM A131	3/4 x 15 x 13.5 ASTM A131
Steel Backer (in)	3/8 x 1 x 17 ASTM A36	3/8 x 1 x 17 ASTM A36	3/8 x 1 x 17 ASTM A36
Preheat (°F)	70	70	70
Interpass (°F)	300	300	300

Acceptance Criteria – All Welds: For all welds governed by code B7, the required CVN toughness average value shall be at least 20 ft.-lbs at 0°F.

Acceptance Criteria – Demand Critical Welds: For Demand Critical welds the required notch toughness average value shall be at least 40 ft.-lbs at 70°F.



ANNEX B: INTERMIX CVN

Annex B: Intermix CVN Testing of Filler Metal Combinations AWS D1.8/D1.8M:2005, Structural Welding Code – Seismic

	Root	Fill	Root	Fill	Root	Fill
Electrode	Coreshield 6	Coreshield 8	Dual Shield 710X	Coreshield 8	Dual Shield R-70 Ultra	Coreshield 6
Lot No.	83407	83414	82898	83414	82875	83407
Diameter In.	3/32	5/64	1/16	5/64	3/32	3/32
Shielding Gas	N/A	N/A	100% CO2	N/A	N/A	N/A
Polarity	DCEP	DCEN	DCEP	DCEN	DCEP	DCEP
Current (amps)	365	285	280	300	350	375
Voltage (volts)	26.2	22.4	28	21.5	27	25.2
WFS (in/min)	160	200	260	170	140	160
ESO (in.)	3/4 to 1	1	5/8	3/4 to 1	1	1
TS (in./min.)		9.2				9.4
Pass/Layer	1 Split	5 Split	2 Split	5 Split	1 Full	4 Split

Mechanical Properties

Tensile Strength (ksi)	85.9	86.2	82.4
Yield Strength (ksi)	69.0	70.8	66.9
Elongation (%)	31.5	27.0	28.0
% Reduction of Area	66.1	59.4	64.0

Charpy V-Notch (ft.-lbs.)

Testing Temp. 70°F	79, 76, 73, 74, 69	82, 78, 78, 81, 82	59, 58, 57, 56, 57
Avg ft.-lbs	74	80	57
Testing Temp. 0°F	50, 44, 39, 47, 45	55, 57, 47, 56, 54	40, 31, 32, 37, 34
Avg ft.-lbs	45	54	35

Testing Conditions

Test No.	B1-2604-08-2952	B1-2605-08-2952	B1-2606-08-2952
Joint	20 Deg / 5/8 RO	20 Deg / 5/8 RO	45 Deg / 1/2 RO
Welding Position	1G (Flat)	1G (Flat)	1G (Flat)
Steel Plate (in)	3/4 x 15 x 17 ASTM A131	3/4 x 15 x 12 ASTM A285	3/4 x 15 x 14 ASTM A131
Steel Backer (in)	3/8 x 1 x 17 ASTM A36	3/8 x 1 x 17 ASTM A36	3/8 x 1 x 17 ASTM A36
Preheat (°F)	70	70	70
Interpass (°F)	300	300	300

Acceptance Criteria – All Welds: For all welds governed by code B7, the required CVN toughness average value shall be at least 20 ft.-lbs at 0°F.

Acceptance Criteria – Demand Critical Welds: For Demand Critical welds the required notch toughness average value shall be at least 40 ft.-lbs at 70°F.



CORESHIELD® 6

ESAB Welding & Cutting Products

Certificate of Conformance
AWS A5.20 D1.8 / FEMA 353



Product: Coreshield 6
AWS Classification: AWS 5.20; E70T-6D
Specifications: AWS D1.8/D1.8M:2005
Diameter: 3/32 in (2.4 mm)

Heat: 83407
Lot: 83407

Order Number:
Customer PO:
Test Number: B12538072410
245471000A
Test Completed: 12/15/2007
Date Generated: 8/28/2008

This document certifies that the produced named above and supplied on the referenced order is of the same classification, manufacturing process and material requirements as the material which was used for the test that was concluded on the date shown, the results of which are shown below. All tests required by the specifications shown for classification were performed at the time and the material tested met all requirements. It was manufactured and supplied by the Quality System Program of The Esab Group Inc., which is certified to ISO9001 and meets the requirements of ANSI/AWS A5.01, and other specification and military requirements, as applicable.

Test Settings	FEMA 353 Spec.	Low Heat Input	High Heat Input
Heat Input : kJ/in	65.7	41.0	82.7
Shielding Gas	Self-Shielded	Self-Shielded	Self-Shielded
Current (amps)	403	340	520
WFS : in (cm) per min.	200 (508)	160 (406.4)	300 (762)
Polarity	DCEP	DCEP	DCEP
Voltage (volts)	27.1	24.9	29.6
ESO : in. (cm)	1 (2.5)	1 (2.5)	1 (2.5)
Weld Position	1G	1G	1G
Pass / Layer Sequence	1F,4S	1F,2S,3T	1F,2S
PH/IPT : °F (°C)	300 (148) / 400 (204)	70 (21) / 250 (76)	300 (148) / 450 (232)
TS : in./min. (cm/min.)	10.0 (25.4)	12.4 (31.5)	11.2 (28.4)
Mechanical Properties			
Testing Conditions	As Welded	As Welded	As Welded
Tensile Strength : ksi (MPa)	80.5 (555)	90.6 (624)	75.7 (521)
Yield Strength : ksi (MPa)	64.5 (444)	77.9 (537)	58.1 (400)
Elongation % in 2 inches	30	25	30
Charpy-V-Notch Impacts			
Testing Conditions	As Welded	As Welded	As Welded
Temperature : °F (°C)	70 (21)	70 (21)	70 (21)
Individual Results : Ft.-lbs. (J)	56,53,58,56,56 (75, 71, 78, 75, 75)	56,53,54,53,52 (75, 71, 73, 71, 70)	60,58,60,54,49 (81, 78, 81, 73, 66)
Average : Ft.-lbs. (J)	55 (75)	53 (72)	56 (76)

This product satisfies the requirements of AWS D1.8/D1.8M:2005, Annex D after exposure for 6 days at 80°F, 80% humidity.

The Esab Group Inc. quality system is audited and certified by ABS, ASME, LR and the U.S. Department of Defense.



By:
K. Wildasin, Supervisor, Quality Assurance Services



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CORESHIELD® 8



Coreshield 8 is an all-position self-shielded flux cored wire designed to weld critical demand structural applications while maintaining excellent arc characteristics and high welder appeal. With its fast-freezing slag that supports the molten metal during welding, Coreshield 8 is ideal for out-of-position welding in structural fabrication and other heavy duty applications. Applications include bridge and building fabrication, plate and tubular welding, hull and stiffener welding in ship construction.

Coreshield 8 is tested and certified to meet the new AWS A5.20 'D' designation requirements, making this self-shielded wire an excellent choice for demand critical welds when FEMA 353, D1.1 or D1.8 Seismic Supplement is utilized.

Maximize Your Productivity & Minimize Your Cost Certified Performance

- Meets demand critical requirements
- Meets most lowest anticipated service temperature applications
- Improved performance over existing products
- Surpasses Extended Exposure requirements
- Crack resistant in critical applications

Improved Productivity

- Higher deposition rate
- Wider operating range
- Faster travel speeds
- Meet construction time-tables
- Better Cost Efficiency

Improved Welder Appeal

- More forgiving than traditional wires
- Simplifies training and qualification
- Better Arc Control
- Self-releasing slag
- Limited clean-up

Outstanding Inspection Results

- Minimal Post Weld Work
- Lowers reject & repair rates

AWS 5.20 "D" Designator Testing Results

Size (in.)	5/64"	
Shielding Gas	Self-shielded	
Heat Input Range (kJ/in)	High 78-85	Low 25-32
Position	3G	1G
Heat Input (kJ/in)	84.8	31.1
Current (amps)	250	305
WFS (in/min)	145	190
Voltage (volts)	21.9	23.5
Travel Speed (in/min)	3.9	13.8
Pass / Layer	2F, 3S	1F,1S,1T,3Q
Tensile Strength (ksi)	82.8	87.7
Yield Strength (ksi)	68.1	73.5
Elongation (%)	22	27
Impact Temperature (°F)	70	70
Impact Results (ft-lbs)	73,76,73,71,72	68,65,59,69,68
Minimum Required (ft-lbs)	40	40
Average Impact (ft-lbs)	73	66

AWS 5.20 D1.8 Testing Results

Size (in.)	5/64"	
Shielding Gas	Self-shielded	
Heat Input Range (kJ/in)	High 64-96	Low 24-36
Position	3G	1G
Heat Input (kJ/in)	70.5	34.7
Current (amps)	275	250
WFS (in/min)	145	190
Voltage (volts)	22	22
Travel Speed (in/min)	5.2	9.5
Pass / Layer	2F,3½ S	1F,3S,3T
Tensile Strength (ksi)	82.0	85.9
Yield Strength (ksi)	65.2	74.0
Elongation (%)	29	24
Impact Temperature (°F)	70	70
Impact Results (ft-lbs)	72,72,70,69,68	71,75,71,67,68
Minimum Required (ft-lbs)	40	40
Average Impact (ft-lbs)	70	70
Impact Temperature (°F)	0	0
Impact Results (ft-lbs)	48,43,38,38,44	46,39,37,38,44
Minimum Required (ft-lbs)	40	40
Average Impact (ft-lbs)	42	41

Product Data SheetCOR-1032
 Seismic CertificationCERT-1002
 Seismic Brochure COR-1049B



STORAGE & RECONDITIONING AWS / D1.5 & D1.8

Flux Cored Wires

Traditionally, Dual Shield flux cored wires have not required special storage requirements. Since the core ingredients are protected from the atmosphere by a metal sheath, moisture absorption occurs at a much slower rate than with covered electrodes. However in recent years, the increased use of low alloy high strength steels has caused some specifications to address hydrogen in flux cored electrodes. ESAB Seismic Certified™ filler metals satisfy AWS D1.8/D1.8M:2005, Annex D requirements.

ESAB cartons and plastic bags are proven acceptable protection for standard Dual Shield and Coreshield welding wires when stored under proper conditions. The recommended conditions are temperatures below 75°F and atmospheric humidity levels below 60%. Storage temperatures should not exceed the recommended reconditioning temperatures. The plastic bags should always be removed when storing or reconditioning at elevated temperatures. Dual Shield II products have low weld metal hydrogen content in the as-manufactured condition, but only hermetically sealed packages will eliminate exposure related moisture pickup.

Reconditioning Flux Cored Wires

Wire Type	Package Type	Temperature °F (°C)	Duration (hrs)
Dual Shield	Coils, fiber spools or metal spools	300 (149)	6-8
Coreshield 6 Coreshield 8	Coils, fiber spools or metal spools	300 (149)	6-8

* Cored wire on plastic spools cannot be reconditioned and storage temperatures should not exceed 125°F.

Covered Electrodes

All covered electrodes in unopened and undamaged hermetically sealed containers can be stored in a dry environment for extended periods of time. After a container has been opened, ESAB recommends the electrodes should be stored as noted below. When reconditioning electrodes, they should be placed in the drying oven such that they are stacked no more than four layers high. The recondition time starts when the electrodes have reached the recommended temperature.

Covered Electrode Type	Open Container Storage °F (°C)	Reconditioning °F (°C)
Sureweld – Mild Steel		
10P, 10P Plus, 710P, 810P	Ambient air	Do Not Recondition
SW-14, SW-75	Ambient air	Do Not Recondition
SW-612, SW-15, 6013LV	100-150 (40-65)	½ hr. @ 250 (120)
SW-15 IP, 7024	100-150 (40-65)	1 hr. @ 250 (120)
70 LA-2	225-300 (105-150)	1 hr. @ 700 (370)
Atom Arc – Low Hydrogen Mild Steel		
7018, 7018-1, 7018 AC, 7018-M, 7018-SR, 7028	225-300 (105-150)	1 hr. @ 700 (370) *
Atom Arc – Low Hydrogen Low Alloy		
7018, 8018, 9018, 10018, 10718, 11018, 12018	225-300 (105-150)	1 hr. @ 700 (370) *
Arcaloy – Stainless		
300-Series Lime (-15)	225-300 (105-150)	1 hr. @ 500 (260)
300-Series AC-DC (-16)	225-300 (105-150)	1 hr. @ 400 (205)
300-Series Plus (-17)	225-300 (105-150)	2 hr. @ 650 (345)
410-16, 410NiMo-16	225-300 (105-150)	2 hr. @ 650 (345)

*AWS D1.5 Bridge Welding Code specifies that low-hydrogen covered electrodes shall be re-dried at 450°F to 500°F for a minimum of two hours (AWS D1.5M/D1.5:2008, clause 4.5.2.1). Atom Arc products will meet these reconditioning requirements.



CORESHIELD® 8 NI-2



CORESHIELD® 8

ESAB Welding & Cutting Products

Certificate of Conformance
AWS A5.20 D1.8 / FEMA 353

Product: Coreshield 6
AWS Classification: AWS 5.20; E70T-6D
Specifications: AWS D1.8/D1.8M:2005
Diameter: 3/32 in (2.4 mm)

Heat:
Lot: 83407

Order Number:
Customer PO:
Test Number: B12538072410
245471000A
Test Completed: 12/15/2007
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Test Settings	FEMA 353 Spec.	Low Heat Input	High Heat Input
Heat Input : kJ/in	65.7	41.0	82.7
Shielding Gas	Self-Shielded	Self-Shielded	Self-Shielded
Current (amps)	403	340	520
WFS : in (cm) per min.	200 (508)	160 (406.4)	300 (762)
Polarity	DCEP	DCEP	DCEP
Voltage (volts)	27.1	24.9	29.6
ESO : in. (cm)	1 (2.5)	1 (2.5)	1 (2.5)
Weld Position	1G	1G	1G
Pass / Layer Sequence	1F,4S	1F,2S,3T	1F,2S
PH/IPT : °F (°C)	300 (148) / 400 (204)	70 (21) / 250 (76)	300 (148) / 450 (232)
TS : in./min. (cm/min.)	10.0 (25.4)	12.4 (31.5)	11.2 (28.4)
Mechanical Properties			
Testing Conditions	As Welded	As Welded	As Welded
Tensile Strength : ksi (MPa)	80.5 (555)	90.6 (624)	75.7 (521)
Yield Strength : ksi (MPa)	64.5 (444)	77.9 (537)	58.1 (400)
Elongation % in 2 inches	30	25	30
Charpy-V-Notch Impacts			
Testing Conditions	As Welded	As Welded	As Welded
Temperature : °F (°C)	70 (21)	70 (21)	70 (21)
Individual Results : Ft.-lbs. (J)	56,53 ,58 ,56 ,56 (75, 71, 78, 75, 75)	56,53 ,54 ,53 ,52 (75, 71, 73, 71, 70)	60,58 ,60 ,54 ,49 (81, 78, 81, 73, 66)
Average : Ft.-lbs. (J)	55 (75)	53 (72)	56 (76)

This product satisfies the requirements of AWS D1.8/D1.8M:2005, Annex D after exposure for 6 days at 80°F, 80% humidity.
The Esab Group Inc. quality system is audited and certified by ABS, ASME, LR and the U.S. Department of Defense.



By: *K. Wildasin*
K. Wildasin, Supervisor, Quality Assurance Services

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Typical Mechanical Properties

Shielding Gas : Self-shielded	As Welded
Yield Strength, ksi (MPa)	67 (465)
Tensile Strength, ksi (MPa)	82 (565)
Elongation % in 2"	24

Typical Charpy V-Notch Impact Properties

Testing Temperature	Ft.-lbs (J)
40°F (4°C)	65 (85)
-20°F (-29°C)	30 (41)

Typical Welding Parameters

Diameter	Amperage (amps)	Voltage (volts)	WFS (ipm)	Dep. Rate (lbs/hr)	Efficiency Rate %	ESO*
1/16"	150	21	120	3.1	75.8	3/4 in.
	175	22	150	4.1	75.9	3/4 in.
	200	23	190	5.2	75.9	3/4 in.
	240	24	230	5.8	74.7	3/4 in.
	275	25	300	7.6	74.9	3/4 in.
	300	26	340	9.7	77.4	3/4 in.
0.072"	150	21	75	2.6	74.5	3/4 in.
	180	22	95	3.5	78.5	3/4 in.
	225	23	125	4.5	77.9	3/4 in.
	275	24	170	6.1	77.6	3/4 in.
	325	25	220	8.0	77.8	3/4 in.
	370	26	300	11.2	80.0	3/4 in.
5/64"	150	21	70	2.8	77.1	3/4 in.
	200	22	105	4.4	79.1	3/4 in.
	250	23	135	5.6	78.2	3/4 in.
	300	24	175	7.2	78.8	3/4 in.
	350	25	230	9.5	78.9	3/4 in.
	375	25	270	11.3	79.9	3/4 in.
	400	26	300	12.5	80.7	3/4 in.

* Electrical Stick Out (ESO) can vary, data above is based on 3/4 in. ESO.

Extended Exposure Results

Product	Diameter	Shielding Gas	Test Conditions	Exposure Time	Hydrogen
Coreshield 8	0.072"	n/a	80°F at 80% humidity	5 days (120 hrs)	8.7
Coreshield 8	1/16"	n/a	80°F at 80% humidity	6 days (144 hrs)	6.8
Coreshield 8	5/64"	n/a	80°F at 80% humidity	7 days (168 hrs)	9.9

AWS D1.8/D1.8M:2005, Annex D requirement: <16 ml/100g after 72 hour exposure at 80°F, 80% humidity

Recommended Storage and Reconditioning

ESAB cartons and plastic bags are proven acceptable protection for standard Coreshield 8 welding wires when stored under proper conditions. The recommended conditions are temperatures below 75°F and atmospheric humidity levels below 60%. Recondition coils and metal spools at 300°F for 6-8 hours; re-bake plastic spools at 125°F for 24 hours. Storage temperatures should not exceed the reconditioning temperatures. The plastic bags should always be removed when storing or reconditioning at elevated temperatures.

For more information on Recommended Storage and Reconditioning for this product and more, please refer to page 35.

The Esab Group Inc. quality system is audited and certified by ABS, ASME, LR and the U.S. Department of Defense.



CORESHIELD® 8



CORESHIELD® 8 NI-2

ESAB Welding & Cutting Products

Certificate of Conformance
AWS A5.20 D1.8 / FEMA 353

Product: Coreshield 8
AWS Classification: AWS A5.20; E71T-8D
Specifications: AWS D1.8/D1.8M:2005
Diameter: 5/64 in (2.0 mm)

Heat: 84011
Lot: 84011

Order Number:
Customer PO:
Test Number: B12826082410
B12540072900
Test Completed: 12/15/2007
Date Generated: 8/28/2008

This document certifies that the produced named above and supplied on the referenced order is of the same classification, manufacturing process and material requirements as the material which was used for the test that was concluded on the date shown, the results of which are shown below. All tests required by the specifications shown for classification were performed at the time and the material tested met all requirements. It was manufactured and supplied by the Quality System Program of The Esab Group Inc., which is certified to ISO9001 and meets the requirements of ANSI/AWS A5.01, and other specification and military requirements, as applicable.

Test Settings	Low Heat Input	High Heat Input
Heat Input : kJ/in	34.7	70.5
Shielding Gas	Self-Shielded	Self-Shielded
Current (amps)	250	275
WFS : in (cm) per min.	190 (482.6)	145 (368.3)
Polarity	DCEN	DCEN
Voltage (volts)	22.0	22.0
ESO : in. (cm)	3/4 (1.9)	3/4 (1.9)
Weld Position	1G	3G
Pass / Layer Sequence	1F,3S,3T	2F,3 1/2S
PH/IPT : °F (°C)	70 (7) / 250 (3)	300 (277) / 450 (3)
TS : in./min. (cm/min.)	9.5 (24.1)	5.2 (13.2)

Mechanical Properties	As Welded	As Welded
Testing Conditions	As Welded	As Welded
Tensile Strength : ksi (MPa)	85.9 (592)	82.0 (565)
Yield Strength : ksi (MPa)	74.0 (510)	65.2 (449)
Elongation % in 2 inches	24	29

Charpy-V-Notch Impacts	As Welded	As Welded
Testing Conditions	As Welded	As Welded
Temperature : °F (°C)	70 (21)	70 (21)
Individual Results : Ft.-lbs. (J)	71,75 ,71 ,67 ,68 (96, 101, 96, 90, 92)	72,72 ,70 ,69 ,68 (97, 97, 94, 93, 92)
Average : Ft.-lbs. (J)	70 (95)	70 (95)
Temperature : °F (°C)	0 (-17)	0 (-17)
Individual Results : Ft.-lbs. (J)	46,39 ,37 ,38 ,44 (62, 52, 50, 51, 59)	48,43 ,38 ,38 ,44 (65, 58, 51, 51, 59)
Average : Ft.-lbs. (J)	40 (55)	42 (57)

This product satisfies the requirements of AWS D1.8/D1.8M:2005, Annex D after exposure for 7 days at 80°F, 80% humidity.
The Esab Group Inc. quality system is audited and certified by ABS, ASME, LR and the U.S. Department of Defense.



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Typical Welding Parameters

Diameter	Amperage (amps)	Voltage (volts)	WFS (ipm)	Dep. Rate (lbs/hr)	Efficiency Rate %	ESO*
5/64"	170	20	65	2.8	71	3/4 in.
	190	22	80	3.4	72	3/4 in.
	230	24	100	4.7	73	3/4 in.

Extended Exposure Results

Condition Prior	Hydrogen Coupon #1 (ml/100g)	Hydrogen Coupon #2 (ml/100g)	Hydrogen Coupon #3 (ml/100g)	Hydrogen Coupon #4 (ml/100g)	Average (ml/100g)
Prior	5/64"	n/a	80°F at 80% humidity	6 days (144 hrs)	12.4 ml/100g
After 72 hrs @ 80°F/80%RH	3/32"	n/a	80°F at 80% humidity	6 days (144 hrs)	10.4 ml/100g

Condition	C	Mn	Si	P	S	Ni	Mo	Al
High HI *	0.06	1.35	0.22	0.006	0.004	2.39	0.016	1.0
Low HI *	0.06	1.31	0.18	0.006	0.004	2.34	0.014	1.09
Chem Pad	0.05	1.37	0.17	0.0058	0.004	2.45	0.02	0.98

* Results Taken From Plates' Tensile Bolt



CORESHIELD® 8 NI-2



DUAL SHIELD® 7100 LC



Coreshield 8 Ni-2* is a self-shielded flux cored wire designed to produce welds with outstanding impact toughness at temperatures as low as -40°F (-40°C). It is suitable for all position welding and is especially suited for making root passes. It should be run on straight polarity (electrode negative)

AWS 5.20 "D" Designator Testing Results

Size (in.)	5/64*	
Shielding Gas	N/A	
Heat Input Range (kJ/in)	High 78-85	Low 35-42
Position	3G	1G
Heat Input (kJ/in)	84.19	31.7
Current (amps)	178	285
WFS (in/min)	80	185
Voltage (volts)	21.6	24.5
Travel Speed (in/min)	2.74	13.2
Pass / Layer	2F, 3S	1F,1S,1T, 1Qd,1Qt,H
Tensile Strength (ksi)	89.8	95.6
Yield Strength (ksi)	73.1	87.0
Elongation (%)	27	24
Impact Temperature (°F)	70	70
Impact Results (ft-lbs)	114,97,96, 107,107	105,111,116, 116,96
Minimum Required (ft-lbs)	40	40
Average Impact (ft-lbs)	104	109
Additional Impact Results (ft-lbs) @ 0°F**	48,32,68, 63,73	93,82,63, 55,105
Additional Impact (ft-lbs) @ 0°F	51	80

*Testing was done on 5/64 Coreshield 8 Ni-2: Lot Number 86167 TR 3117
 ** Anticipated Service Temperature of -20°F

Typical Mechanical Properties

Shielding Gas : N-A	As Welded
Yield Strength, ksi (MPa)	73.4 (506)
Tensile Strength, ksi (MPa)	87 (600)
Elongation % in 2"	30

* HI was 57.6 kJ/in Tested to AWS A5.29

Typical Charpy V-Notch Impact Properties

Testing Temperature	Ft.-lbs (J)
-20°F (-29°C)	31 (42)

Typical Undiluted Weld Metal Analysis

Shielding Gas : N-A	%
Carbon (C)	0.06
Manganese (Mn)	1.27
Silicon (Si)	0.18
Phosphorus (P)	0.005
Sulfur (S)	0.004
Nickel (Ni)	2.1
Molybdenum (Mo)	0.02
Aluminum (Al)	1.0

Product Data SheetCOR-1048
 Seismic CertificationCERT-1013
 Seismic Brochure COR-1049B



Dual Shield 7100 LC is an all-position flux cored wire for general purpose welding. This welding wire operates with outstanding operator appeal mainly due to its easily controlled arc, improved operation at lower current levels, minimal spatter and easily removed slag. Although dual-classified for use with mixed gas, 100% CO2 shielding gas is recommended for demand critical weld applications or where restraint is high.

Dual Shield 7100 LC is tested and certified to meet the new AWS A5.20 'D' designation requirements, making this gas-shielded wire an excellent choice for demand critical welds when FEMA 353, D1.1 or D1.8 Seismic Supplement is utilized.

Maximize Your Productivity & Minimize Your Cost Certified Performance

- Meets demand critical requirements
- Meets most lowest anticipated service temperature applications
- Improved performance over existing products
- Surpasses Extended Exposure requirements
- Crack resistant in critical applications

Improved Productivity

- Higher deposition rate
- Wider operating range
- Faster travel speeds
- Meet construction time-tables
- Better Cost Efficiency

Improved Welder Appeal

- More forgiving than traditional wires
- Simplifies training and qualification
- Better Arc Control
- Self-releasing slag
- Limited clean-up

Outstanding Inspection Results

- Minimal Post Weld Work
- Lowers reject & repair rates

AWS 5.20 "D" Designator Testing Results

Size (in.)	1/16"	
Shielding Gas	100% CO2	
Heat Input Range (kJ/in)	High 78-85	Low 25-32
Position	3G	1G
Heat Input (kJ/in)	80.2	31.6
Current (amps)	195	300
WFS (in/min)	150	260
Voltage (volts)	24.0	27.0
Travel Speed (in/min)	3.5	15.4
Pass / Layer	2F, 2S	9S
Tensile Strength (ksi)	73.7	90.7
Yield Strength (ksi)	62.1	81.8
Elongation (%)	32	26.5
Impact Temperature (°F)	70	70
Impact Results (ft-lbs)	156, 497, 198, 208, 234	106, 130, 125, 131, 131
Minimum Required (ft-lbs)	40	40
Average Impact (ft-lbs)	199	125

Typical Mechanical Properties

Shielding Gas : 100% CO2	As Welded
Yield Strength, ksi (MPa)	79 (545)
Tensile Strength, ksi (MPa)	89 (615)
Elongation % in 2"	23

Typical Charpy V-Notch Impact Properties

Testing Temperature	Ft.-lbs (J)
-0°F (-18°C)	68 (92)
-20°F (-29°C)	41 (56)

Typical Undiluted Weld Metal Analysis

Shielding Gas : 100% CO2	%
Carbon (C)	0.03
Manganese (Mn)	1.4
Silicon (Si)	0.5
Phosphorus (P)	0.010
Sulfur (S)	0.010

Product Data SheetCOR-1033
 Seismic CertificationCERT-1003
 Seismic Brochure COR-1049B



DUAL SHIELD® 7100 LC

Typical Welding Parameters

Diameter	Amperage (amps)	Voltage (volts)	WFS (ipm)	Dep. Rate (lbs/hr)	Efficiency Rate %	ESO
0.045"	145	24	200	3.6	81.2%	5/8 in.
	190	26	300	5.4	81.4%	5/8 in.
	235	28	400	7.3	82.5%	5/8 in.
	265	29	500	9.3	82.8%	5/8 in.
	305	30	600	11.3	83.7%	5/8 in.
0.052"	145	25	150	3.4	74.3%	3/4 in.
	180	26	200	4.5	74.6%	3/4 in.
	235	28	300	7.0	78.2%	3/4 in.
	285	29	400	9.8	81.3%	3/4 in.
	230	30	500	12.2	82.3%	3/4 in.
	370	30	600	14.7	82.7%	3/4 in.
1/16"	195	24	150	4.5	73.7%	3/4 in.
	285	26	250	8.1	79.4%	3/4 in.
	320	28	300	9.7	79.9%	3/4 in.
	345	30	350	11.5	80.7%	3/4 in.
	385	32	400	13.4	82.6%	3/4 in.
445	33	500	16.7	82.8%	3/4 in.	

Extended Exposure Results

Product	Diameter	Shielding Gas	Test Conditions	Exposure Time	Hydrogen
Dual Shield 7100 LC	0.045"	100% CO2	80°F at 80% humidity	7 days (168 hrs)	11.9
Dual Shield 7100 LC	0.052"	100% CO2	80°F at 80% humidity	5 days (120 hrs)	10.3
Dual Shield 7100 LC	1/16"	100% CO2	80°F at 80% humidity	30 days (720 hrs)	12.9

AWS D1.8/D1.8M:2005, Annex D requirement: <16 ml/100g after 72 hour exposure at 80°F, 80% humidity

Recommended Storage and Reconditioning

ESAB cartons and plastic bags are proven acceptable protection for standard Dual Shield 7100 LC welding wires when stored under proper conditions. The recommended conditions are temperatures below 75°F and atmospheric humidity levels below 60%. Recondition coils and metal spools at 300°F for 6-8 hours; re-bake plastic spools at 125°F for 48 hours minimum. Storage temperatures should not exceed the reconditioning temperatures. The plastic bags should always be removed when storing or reconditioning at elevated temperatures.

For more information on Recommended Storage and Reconditioning for this product and more, please refer to page 35.

The Esab Group Inc. quality system is audited and certified by ABS, ASME, LR and the U.S. Department of Defense.



SPOOLARC 81 & OK FLUX 10.71

ESAB Welding & Cutting Products

Certificate of Conformance
AWS A5.17 D1.8 / FEMA 353



Product: Spoolarc 81 / OK Flux 10.71
AWS Classification: AWS A5.17; F7A5-EM12K
Specifications: AWS D1.8/D1.8M:2005
Diameter: 3/32 in (2.4 mm)

Heat: 181052 (CONTROL NO. 050108173)
Lot: SF622503 (CONTROL NO. 2114)

Order Number:
Customer PO:
Test Number: 080522-2AW
080523-2AW
Test Completed: 5/23/2008
Date Generated: 8/28/2008

This document certifies that the produced named above and supplied on the referenced order is of the same classification, manufacturing process and material requirements as the material which was used for the test that was concluded on the date shown, the results of which are shown below. All tests required by the specifications shown for classification were performed at the time and the material tested met all requirements. It was manufactured and supplied by the Quality System Program of The Esab Group Inc., which is certified to ISO9001 and meets the requirements of ANSI/AWS A5.01, and other specification and military requirements, as applicable.

Test Settings	Low Heat Input	High Heat Input
Heat Input : kJ/in	33.4	70.0
Shielding Gas	-	-
Current (amps)	350	450
WFS : in (cm) per min.	90 (228.6)	110 (279.4)
Polarity	DCEP	DCEP
Voltage (volts)	27.0	29.0
ESO : in. (cm)	3/8 (.9)	1 (2.5)
Weld Position	1G	1G
Pass / Layer Sequence	4S, 1T, 2Q, 1S	5S
PH/IPT : °F (°C)	120 (48) / 250 (121)	250 (121) / 450 (232)
TS : in./min. (cm/min.)	17.0 (43.1)	11.0 (27.9)

Mechanical Properties	Low Heat Input	High Heat Input
Testing Conditions	As Welded	As Welded
Tensile Strength : ksi (MPa)	88.0 (606)	76.5 (527)
Yield Strength : ksi (MPa)	77.0 (530)	61.5 (424)
Elongation % in 2 inches	28	35
Charpy-V-Notch Impacts		
Testing Conditions	As Welded	As Welded
Temperature : °F (°C)	0 (-17)	0 (-17)
Individual Results : Ft.-lbs. (J)	60,74 ,65 ,72 ,69 (81, 100, 88, 97, 93)	97,91 ,119 ,134 ,97 (131, 123, 161, 181, 131)
Average : Ft.-lbs. (J)	68 (92)	107 (145)

Extended exposures not required for submerged arc welding process as defined in AWS D1.8/D1.8M:2005.
The Esab Group Inc. quality system is audited and certified by ABS, ASME, LR and the U.S. Department of Defense.



By: 
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SPOOLARC 81 & OK FLUX 10.71

Recommended Storage and Reconditioning

Unopened flux bags must be stored in maintained storage conditions as follows: temperature 68°F (+/- 18°F) and relative humidity as low as possible (not exceeding 60% max.) Fluxes shall not be stored longer than 3 years. The content of unprotected flux hoppers must, after an 8 hours shift, be placed in a drying cabinet or heated flux hopper at a temperature of 300°F (+/- 45°F). Remaining flux from unopened bags must be placed at a temperature of 300°F (+/- 45°F).

Moisture and oil must be removed from the compressed air if used in the re-cycling system. Addition of new flux must be done with the proportion of at least one part new flux to one part re-cycled flux. Foreign material, such as mill-scale and slag, must be removed by a suitable system, such as sieving or magnetic separator.

When handled and stored as above, the ESAB fluxes can normally be used straight away. In severe applications, stipulated by the applicable material specifications, re-drying of the flux is recommended. Furthermore, if the flux has somehow picked up moisture, re-drying can return the flux to its original moisture content. Re-drying shall be performed as follows: agglomerated fluxes re-dry at 570°F (+/- 45°F) for 2-4 hours and fused fluxes re-dry at 390°F (+/- 90°F) for 2-4 hours. Re-drying must be done either in equipment that turns the flux so that the moisture can evaporate easily or in an oven on shallow plates with a flux height not exceeding 2 inches (5 cm). Re-dried flux not immediately used must be stored at 300°F (+/- 45°F) before use.

For more information on Recommended Storage and Reconditioning for this product and more, please refer to page 35.



DUAL SHIELD® 7100 LC

ESAB Welding & Cutting Products

Certificate of Conformance
AWS A5.20 D1.8 / FEMA 353



Product: Dual Shield 7100 LC
AWS Classification: AWS A5.20; E71T-1CDH8/T-9CDH8
Specifications: AWS D1.8/D1.8M:2005
Diameter: 1/16 in (1.6 mm)
Heat:
Lot: 83588

Order Number:
Customer PO:
Test Number: B12578072952
B12579072952
Test Completed: 12/15/2007
Date Generated: 8/28/2008

This document certifies that the produced named above and supplied on the referenced order is of the same classification, manufacturing process and material requirements as the material which was used for the test that was concluded on the date shown, the results of which are shown below. All tests required by the specifications shown for classification were performed at the time and the material tested met all requirements. It was manufactured and supplied by the Quality System Program of The Esab Group Inc., which is certified to ISO9001 and meets the requirements of ANSI/AWS A5.01, and other specification and military requirements, as applicable.

Test Settings	Low Heat Input	High Heat Input
Heat Input : kJ/in	30.1	80.2
Shielding Gas	100% CO2	100% CO2
Current (amps)	265	195
WFS : in (cm) per min.	210 (533.4)	150 (381)
Polarity	DCEP	DCEP
Voltage (volts)	27.7	24.0
ESO : in. (cm)	5/8 (1.6)	5/8 (1.6)
Weld Position	1G	3G
Pass / Layer Sequence	1F,2S,2T,2Q	2F,2S
PH/IPT : °F (°C)	70 (21) / 200 (93)	300 (148) / 500 (260)
TS : in./min. (cm/min.)	14.6 (37.0)	3.5 (8.8)
Mechanical Properties		
Testing Conditions	As Welded	As Welded
Tensile Strength : ksi (MPa)	82.5 (568)	73.7 (508)
Yield Strength : ksi (MPa)	76.2 (525)	62.1 (428)
Elongation % in 2 inches	27	32
Charpy-V-Notch Impacts		
Testing Conditions	As Welded	As Welded
Temperature : °F (°C)	70 (21)	70 (21)
Individual Results : Ft.-lbs. (J)	106,130 ,125 ,131 ,131 (143, 176, 169, 177, 177)	156,197 ,198 ,208 ,234 (211, 267, 268, 282, 317)
Average : Ft.-lbs. (J)	124 (168)	198 (269)

This product satisfies the requirements of AWS D1.8/D1.8M:2005, Annex D after exposure for 30 days at 80°F, 80% humidity. The Esab Group Inc. quality system is audited and certified by ABS, ASME, LR and the U.S. Department of Defense.



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DUAL SHIELD® 7100 ULTRA



Dual Shield 7100 Ultra is an all-position E71T-9 flux cored welding wire developed for higher deposition rates and improved welding productivity. Like many other Dual Shield products, Dual Shield 7100 Ultra operates in a wider parameter range and generates less welding fumes than many similar welding wires. The low spatter levels and easy slag removal minimizes post weld cleanup. Dual Shield 7100 Ultra can be used with either 100% CO2 or 75% Ar/25% CO2. This versatility in gas selection provides the fabricator greater flexibility in choosing both wire and gas. Applications include railcar and earth moving equipment, as well as general structural steel fabrication.

Dual Shield 7100 Ultra is tested and certified to meet the new AWS A5.20 'D' designation requirements, making this gas-shielded wire an excellent choice for demand critical welds when FEMA 353, D1.1 or D1.8 Seismic Supplement is utilized.

Maximize Your Productivity & Minimize Your Cost Certified Performance

- Meets demand critical requirements
- Meets most lowest anticipated service temperature applications
- Improved performance over existing products
- Surpasses Extended Exposure requirements
- Crack resistant in critical applications

Improved Productivity

- Higher deposition rate
- Wider operating range
- Faster travel speeds
- Meet construction time-tables
- Better Cost Efficiency

Improved Welder Appeal

- More forgiving than traditional wires
- Simplifies training and qualification
- Better Arc Control
- Self-releasing slag
- Limited clean-up

Outstanding Inspection Results

- Minimal Post Weld Work
- Lowers reject & repair rates

AWS 5.20 "D" Designator Testing Results

Size (in.)	1/16"		1/16"	
Shielding Gas	100% CO2		75% Ar / 25% CO2	
Heat Input Range (kJ/in)	High 78-85	Low 25-32	High 78-85	Low 25-32
Position	3G	1G	3G	1G
Heat Input (kJ/in)	85.0	29.3	81.2	28.0
Current (amps)	200	270	212	290
WFS (in/min)	150	210	160	240
Voltage (volts)	24.0	27.5	25.1	26.0
Travel Speed (in/min)	3.4	15.2	3.9	16.1
Pass / Layer	2F, 2S	1F, 2S, 2T, 2Q	2F, 2S	1F, 3S, 4T
Tensile Strength (ksi)	77.4	88.0	88.6	101.3
Yield Strength (ksi)	67.0	80.4	81.6	94.4
Elongation (%)	30.5	27	28	22
Impact Temperature (°F)	70	70	70	70
Impact Results (ft-lbs)	155, 127, 139, 127, 124	119, 113, 107, 111, 105	114, 122, 125, 124, 127	100, 99, 91, 72, 82
Minimum Required (ft-lbs)	40	40	40	40
Average Impact (ft-lbs)	134	111	122	89

Product Data SheetCOR-1034
 Seismic Certification - 75% Ar/25% CO2.....CERT-1004
 Seismic Certification - 100% CO2CERT-1005
 Seismic Brochure COR-1049B



SPOOLARC 81 & OK FLUX 10.71



The Spoolarc 81 and OK Flux 10.71 combination is excellent for use in general structural welding, bridge fabrication, heavy equipment fabrication, and line pipe welding. OK Flux 10.71 is a neutral, bonded flux intended primarily for multi-pass butt and fillet welding of carbon and low alloy steels. It combines outstanding welding performance with excellent weld properties. OK Flux 10.71 is suitable for use with AC and DC, single and multi-wire systems at currents up to 1000 amps. The Spoolarc 81 and OK Flux 10.71 combination is tested and certified to meet the new AWS D1.8 requirements, making it an excellent choice for demand critical welds when FEMA 353, D1.1 or D1.8 Seismic Supplement is utilized.

Maximize Your Productivity & Minimize Your Cost Certified Performance

- Meets demand critical requirements
- Meets most lowest anticipated service temperature applications
- Improved performance over existing products
- Crack resistant in critical applications

Improved Productivity

- Meet construction time-tables
- Better Cost Efficiency

Improved Welder Appeal

- Self-releasing slag
- Limited clean-up

Outstanding Inspection Results

- Minimal Post Weld Work
- Lowers reject & repair rates

AWS 5.20 D1.8/D1.8M:2005 Testing Results

Size (in.)	3/32"	
Shielding Gas	Submerged Arc Welding	
Heat Input Range (kJ/in)	High 78-85	Low 35-42
Position	1G	1G
Heat Input (kJ/in)	70.0	33.4
Current (amps)	450	350
WFS (in/min)	110	90
Voltage (volts)	29.0	27.0
Travel Speed (in/min)	11.0	17.0
Pass / Layer	5S	4S, 1T, 2Q, 1S
Tensile Strength (ksi)	76.5	88.0
Yield Strength (ksi)	61.5	77.0
Elongation (%)	35	28
Impact Temperature (°F)	0	0
Impact Results (ft-lbs)	97, 91, 119, 134, 97	60, 74, 65, 72, 69
Minimum Required (ft-lbs)	40	40
Average Impact (ft-lbs)	107	68

Typical Mechanical Properties

	As Welded
Yield Strength, ksi (MPa)	73 (505)
Tensile Strength, ksi (MPa)	86 (590)
Elongation % in 2"	28

Typical Charpy V-Notch Impact Properties

Testing Temperature	Ft.-lbs (J)
-50°F (-46°C)	25 (34)

Typical Undiluted Weld Metal Analysis

	As Welded %
Carbon (C)	0.07
Manganese (Mn)	1.5
Silicon (Si)	0.5
Phosphorus (P)	0.020
Sulfur (S)	0.011

Product Data SheetCOR-1039
 Seismic CertificationCERT-1012
 Seismic Brochure COR-1049B



SPOOLARC 75 & OK FLUX 10.71



ESAB Welding & Cutting Products

Certificate of Conformance
AWS A5.20 D1.8 / FEMA 353

Product: Spoolarc 75 / OK Flux 10.71

AWS Classification: AWS A5.23; F8A4 - ENi1K-Ni1
Specifications: AWS D1.8/D1.8M:2005
Diameter: 3/32 in (2.4 mm)

Heat: 075011 (CONTROL NO. 031008173)
Lot: (low heat input) SF622503
Lot: (high heat input) SF815503

Order Number:
Customer PO:
Test Number: 080528-1AW
081204-1AW
Test Completed: 5/28/2008
Date Generated: 12/4/2008

This document certifies that the produced named above and supplied on the referenced order is of the same classification, manufacturing process and material requirements as the material which was used for the test that was concluded on the date shown, the results of which are shown below. All tests required by the specifications shown for classification were performed at the time and the material tested met all requirements. It was manufactured and supplied by the Quality System Program of The Esab Group Inc., which is certified to ISO9001 and meets the requirements of ANSI/AWS A5.01, and other specification and military requirements, as applicable.

Test Settings	Low Heat Input	High Heat Input
Heat Input : kJ/in	33.4	71.2
Shielding Gas	-	-
Current (amps)	350	450
WFS : in (cm) per min.	90 (228.6)	110 (279.4)
Polarity	DCEP	DCEP
Voltage (volts)	27.0	29.0
ESO : in. (cm)	3/8 (.9)	1 (2.5)
Weld Position	1G	1G
Pass / Layer Sequence	4S, 1T, 2Q, 1S	5S
PH/IPT : °F (°C)	120 (48) / 250 (121)	250 (121) / 450 (232)
TS : in./min. (cm/min.)	17.0 (43.1)	11.0 (27.9)

Mechanical Properties	As Welded	As Welded
Testing Conditions	As Welded	As Welded
Tensile Strength : ksi (MPa)	92.5 (638)	86.5 (596)
Yield Strength : ksi (MPa)	81.0 (558)	71.5 (493)
Elongation % in 2 inches	26	26

Charpy-V-Notch Impacts	As Welded	As Welded
Testing Conditions	As Welded	As Welded
Temperature : °F (°C)	0 (-17)	0 (-17)
Individual Results : Ft.-lbs. (J)	75,57 ,67 ,69 ,74 (101, 77, 90, 93, 100)	94,69 ,90 ,84 ,76 (127, 93, 122, 113, 103)
Average : Ft.-lbs. (J)	68 (92)	82 (111)

Extended exposures not required for submerged arc welding process as defined in AWS D1.8/D1.8M:2005.
The Esab Group Inc. quality system is audited and certified by ABS, ASME, LR and the U.S. Department of Defense.



By:
Winifred Stewart, Materials Standards Specialist

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DUAL SHIELD® 7100 ULTRA

Typical Mechanical Properties

Shielding Gas : 100% CO2	As Welded
Yield Strength, ksi (MPa)	75 (515)
Tensile Strength, ksi (MPa)	85 (585)
Elongation % in 2"	26

Typical Charpy V-Notch Impact Properties

Testing Temperature	Ft.-lbs (J)
-0°F (-18°C)	43 (58)
-20°F (-29°C)	25 (34)

Typical Undiluted Weld Metal Analysis

Shielding Gas : 100% CO2	%
Carbon (C)	0.02
Manganese (Mn)	1.4
Silicon (Si)	0.5
Phosphorus (P)	0.010
Sulfur (S)	0.013

Typical Welding Parameters

Diameter	Amperage (amps)	Voltage (volts)	WFS (ipm)	Dep. Rate (lbs/hr)	Efficiency Rate %	ESO
0.045"	140	24	200	3.6	77.8%	5/8 in.
	192	25	300	5.5	79.3%	5/8 in.
	230	27	400	7.4	81.8%	3/4 in.
	275	28	500	9.6	83.1%	3/4 in.
	308	30	600	11.8	84.5%	3/4 in.
0.052"	150	23	150	3.6	75.8%	3/4 in.
	190	24	200	4.9	77.8%	3/4 in.
	250	25	300	7.7	81.7%	3/4 in.
	300	27	400	10.3	82.5%	3/4 in.
	345	28	500	13.3	84.7%	3/4 in.
1/16"	375	30	600	16.2	88.5%	3/4 in.
	195	24	150	5.5	85.0%	3/4 in.
	290	25	250	9.2	86.5%	3/4 in.
	325	26	300	10.9	85.9%	3/4 in.
	352	27	350	13.1	88.1%	3/4 in.
	382	28	400	14.7	86.8%	3/4 in.
	455	30	500	18.3	87.1%	3/4 in.

Size 0.035" is available however is not currently certified for seismic or critical demand applications.

Shielding Gas : 75% Ar / 25% CO2	As Welded
Yield Strength, ksi (MPa)	78 (540)
Tensile Strength, ksi (MPa)	88 (605)
Elongation % in 2"	26

Typical Charpy V-Notch Impact Properties

Testing Temperature	Ft.-lbs (J)
-0°F (-18°C)	42 (57)
-20°F (-29°C)	35 (47)

Typical Undiluted Weld Metal Analysis

Shielding Gas : 75% Ar / 25% CO2	%
Carbon (C)	0.03
Manganese (Mn)	1.6
Silicon (Si)	0.6
Phosphorus	0.010
Sulfur (S)	0.012

Extended Exposure Results

Product	Diameter	Shielding Gas	Test Conditions	Exposure Time	Hydrogen
Dual Shield 7100 Ultra	0.045"	100% CO2	80°F at 80% humidity	5 days (120 hrs)	7.6 ml/100g
Dual Shield 7100 Ultra	0.052"	100% CO2	80°F at 80% humidity	5 days (120 hrs)	8.0 ml/100g
Dual Shield 7100 Ultra	1/16"	100% CO2	80°F at 80% humidity	7 days (168 hrs)	7.6 ml/100g
Dual Shield 7100 Ultra	0.045"	75%Ar/25% CO2	80°F at 80% humidity	5 days (120 hrs)	7.0 ml/100g
Dual Shield 7100 Ultra	0.052"	75%Ar/25% CO2	80°F at 80% humidity	5 days (120 hrs)	10.5 ml/100g
Dual Shield 7100 Ultra	1/16"	75%Ar/25% CO2	80°F at 80% humidity	7 days (168 hrs)	8.8 ml/100g

AWS D1.8/D1.8M:2005, Annex D requirement: <16 ml/100g after 72 hour exposure at 80°F, 80% humidity

Recommended Storage and Reconditioning

ESAB cartons and plastic bags are proven acceptable protection for standard Dual Shield 7100 Ultra welding wires when stored under proper conditions. The recommended conditions are temperatures below 75°F and atmospheric humidity levels below 60%. Recondition coils and metal spools at 300°F for 6-8 hours; re-bake plastic spools at 125°F for 48 hours minimum. Storage temperatures should not exceed the reconditioning temperatures. The plastic bags should always be removed when storing or reconditioning at elevated temperatures.

For more information on Recommended Storage and Reconditioning for this product and more, please refer to page 35.



The Spoolarc 75 and OK Flux 10.71 combination is an excellent choice for bridge and structural fabrication. This combination provides a 1% nickel deposit which is designed to weld weathering steels such as ASTM A588 or A709 Grade 345W or other carbon and low alloy steels where improved low temperature impact toughness is desired. OK Flux 10.71 is a neutral, bonded flux making this flux wire combination suitable for multi-pass butt and fillet welds. Spoolarc 75 and OK Flux 10.71 can be used in single or multi-wire systems using AC and DC and currents up to 1,000 amps.

The Spoolarc 75 and OK Flux 10.71 combination is tested and certified to meet the new AWS D1.8 requirements making it an excellent choice for demand critical welds when FEMA 353, D1.1, or D1.8 Seismic Supplement is utilized.

AWS 5.23 D1.8/D1.8M:2005 Testing Results

Size (in.)	3/32"	
Shielding Gas	Submerged Arc Welding	
Heat Input Range (kJ/in)	High	Low
Position	1G	1G
Heat Input (kJ/in)	71.2	33.4
Current (amps)	450	350
WFS (in/min)	110	90
Voltage (volts)	29.0	27.0
Travel Speed (in/min)	11.0	17.0
Pass / Layer	5S	4S, 1T, 2Q, 1S
Tensile Strength (ksi)	86.5	92.5
Yield Strength (ksi)	71.5	81.0
Elongation (%)	26	26
Impact Temperature (°F)	0	0
Impact Results (ft-lbs)	94, 69, 90, 84, 76	75, 57, 67, 69, 74
Minimum Required (ft-lbs)	40	40
Average Impact (ft-lbs)	83	70

Typical Mechanical Properties

	As Welded
Yield Strength, ksi (MPa)	78 (540)
Tensile Strength, ksi (MPa)	91 (625)
Elongation % in 2"	28

Typical Charpy V-Notch Impact Properties

Testing Temperature	Ft.-lbs (J)
-40°F (-40°C)	43 (58)

Typical Undiluted Weld Metal Analysis

	As Welded %
Carbon (C)	0.07
Manganese (Mn)	1.70
Silicon (Si)	0.70
Phosphorus (P)	0.016
Sulfur (S)	0.012
Nickel (Ni)	0.90



DUAL SHIELD® R-70 ULTRA



ESAB Welding & Cutting Products

Certificate of Conformance
AWS A5.20 D1.8 / FEMA 353

Product: Dual Shield R-70 Ultra
AWS Classification: AWS A5.20; E70T-1CDH8/T-9CDH8
Specifications: AWS D1.8/D1.8M:2005
Diameter: 3/32 in (2.4 mm)
Heat:
Lot: 82875

Order Number:
Customer PO:
Test Number: B12551072952
 B12552072952
Test Completed: 12/15/2007
Date Generated: 2/11/2010

This document certifies that the produced named above and supplied on the referenced order is of the same classification, manufacturing process and material requirements as the material which was used for the test that was concluded on the date shown, the results of which are shown below. All tests required by the specifications shown for classification were performed at the time and the material tested met all requirements. It was manufactured and supplied by the Quality System Program of The Esab Group Inc., which is certified to ISO9001 and meets the requirements of ANSI/AWS A5.01, and other specification and military requirements, as applicable.

Test Settings	Low Heat Input	High Heat Input
Heat Input : kJ/in	40.2	79.3
Shielding Gas	100% CO2	100% CO2
Current (amps)	325	470
WFS : in (cm) per min.	150 (381)	220 (558.8)
Polarity	DCEP	DCEP
Voltage (volts)	27.0	27.0
ESO : in. (cm)	3/4 (1.9)	3/4 (1.9)
Weld Position	1G	1G
Pass / Layer Sequence	1F,2S,3T	2F,2S
PH/IPT : °F (°C)	70 (21) / 225 (107)	300 (148) / 450 (232)
TS : in./min. (cm/min.)	13.1 (33.2)	9.6 (24.3)
Mechanical Properties		
Testing Conditions	As Welded	As Welded
Tensile Strength : ksi (MPa)	85.2 (587)	79.9 (550)
Yield Strength : ksi (MPa)	75.7 (521)	64.7 (446)
Elongation % in 2 inches	26	30
Charpy-V-Notch Impacts		
Testing Conditions	As Welded	As Welded
Temperature : °F (°C)	70 (21)	70 (21)
Individual Results : Ft.-lbs. (J)	57,51 ,54 ,41 ,62 (77, 69, 73, 55, 84)	72,79 ,66 ,70 ,66 (97, 107, 89, 94, 89)
Average : Ft.-lbs. (J)	53 (71)	70 (95)

This product satisfies the requirements of AWS D1.8/D1.8M:2005, Annex D after exposure for 3 days at 80°F, 80% humidity. The Esab Group Inc. quality system is audited and certified by ABS, ASME, LR and the U.S. Department of Defense.



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DUAL SHIELD® 7100 ULTRA



ESAB Welding & Cutting Products

Certificate of Conformance
AWS A5.20 D1.8 / FEMA 353

Product: Dual Shield 7100 Ultra
AWS Classification: AWS A5.20; E71T-1MD/T-9MD
Specifications: AWS D1.8/D1.8M:2005
Diameter: 1/16 in (1.6 mm)
Heat:
Lot: 82782

Order Number:
Customer PO:
Test Number: B12547072952
 B12548072952
Test Completed: 12/15/2007
Date Generated: 8/28/2008

This document certifies that the produced named above and supplied on the referenced order is of the same classification, manufacturing process and material requirements as the material which was used for the test that was concluded on the date shown, the results of which are shown below. All tests required by the specifications shown for classification were performed at the time and the material tested met all requirements. It was manufactured and supplied by the Quality System Program of The Esab Group Inc., which is certified to ISO9001 and meets the requirements of ANSI/AWS A5.01, and other specification and military requirements, as applicable.

Test Settings	Low Heat Input	High Heat Input
Heat Input : kJ/in	28.0	81.2
Shielding Gas	75%Ar / 25%CO2	75%Ar / 25%CO2
Current (amps)	290	212
WFS : in (cm) per min.	240 (609.6)	160 (406.4)
Polarity	DCEP	DCEP
Voltage (volts)	26.0	25.1
ESO : in. (cm)	5/8 (1.6)	5/8 (1.6)
Weld Position	1G	3G
Pass / Layer Sequence	1F,3S,4T	2F,2S
PH/IPT : °F (°C)	70 (21) / 225 (107)	300 (148) / 488 (253)
TS : in./min. (cm/min.)	16.1 (40.8)	3.9 (9.9)
Mechanical Properties		
Testing Conditions	As Welded	As Welded
Tensile Strength : ksi (MPa)	101.3 (698)	88.6 (610)
Yield Strength : ksi (MPa)	94.4 (650)	81.6 (562)
Elongation % in 2 inches	22	28
Charpy-V-Notch Impacts		
Testing Conditions	As Welded	As Welded
Temperature : °F (°C)	70 (21)	70 (21)
Individual Results : Ft.-lbs. (J)	100,99 ,91 ,72 ,82 (135, 134, 123, 97, 111)	114,122 ,125 ,124 ,127 (154, 165, 169, 168, 172)
Average : Ft.-lbs. (J)	88 (120)	122 (165)

This product satisfies the requirements of AWS D1.8/D1.8M:2005, Annex D after exposure for 7 days at 80°F, 80% humidity. The Esab Group Inc. quality system is audited and certified by ABS, ASME, LR and the U.S. Department of Defense.



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DUAL SHIELD® 7100 ULTRA

ESAB Welding & Cutting Products

Certificate of Conformance
AWS A5.20 D1.8 / FEMA 353



Product: Dual Shield 7100 Ultra
AWS Classification: AWS A5.20; E71T-1CDH8/T-9CDH8
Specifications: AWS D1.8/D1.8M:2005
Diameter: 1/16 in (1.6 mm)

Heat:
Lot: 82782

Order Number:
Customer PO:
Test Number: B12545072952
B12546072952
Test Completed: 12/15/2007
Date Generated: 8/28/2008

This document certifies that the produced named above and supplied on the referenced order is of the same classification, manufacturing process and material requirements as the material which was used for the test that was concluded on the date shown, the results of which are shown below. All tests required by the specifications shown for classification were performed at the time and the material tested met all requirements. It was manufactured and supplied by the Quality System Program of The Esab Group Inc., which is certified to ISO9001 and meets the requirements of ANSI/AWS A5.01, and other specification and military requirements, as applicable.

Test Settings	Low Heat Input	High Heat Input
Heat Input : kJ/in	29.3	85.0
Shielding Gas	100% CO2	100% CO2
Current (amps)	270	200
WFS : in (cm) per min.	210 (533.4)	150 (381)
Polarity	DCEP	DCEP
Voltage (volts)	27.5	24.0
ESO : in. (cm)	5/8 (1.6)	1/2 (1.3)
Weld Position	1G	3G
Pass / Layer Sequence	1F,2S,2T,2Q	2F,2S
PH/IPT : °F (°C)	70 (21) / 225 (107)	275 (135) / 450 (232)
TS : in./min. (cm/min.)	15.2 (38.6)	3.4 (8.6)
Mechanical Properties		
Testing Conditions	As Welded	As Welded
Tensile Strength : ksi (MPa)	88.0 (606)	77.4 (533)
Yield Strength : ksi (MPa)	80.4 (554)	67.0 (461)
Elongation % in 2 inches	27	30
Charpy-V-Notch Impacts		
Testing Conditions	As Welded	As Welded
Temperature : °F (°C)	70 (21)	70 (21)
Individual Results : Ft.-lbs. (J)	119,113 ,107 ,111 ,105 (161, 153, 145, 150, 142)	155,127 ,139 ,127 ,124 (210, 172, 188, 172, 168)
Average : Ft.-lbs. (J)	111 (150)	134 (182)

This product satisfies the requirements of AWS D1.8/D1.8M:2005, Annex D after exposure for 7 days at 80°F, 80% humidity.
The Esab Group Inc. quality system is audited and certified by ABS, ASME, LR and the U.S. Department of Defense.



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DUAL SHIELD® R-70 ULTRA

ESAB Welding & Cutting Products

Certificate of Conformance
AWS A5.20 D1.8 / FEMA 353



Product: Dual Shield R-70 Ultra
AWS Classification: AWS A5.20; E70T-1CDH8/T-9CDH8
Specifications: AWS D1.8/D1.8M:2005
Diameter: 1/16 in (1.6 mm)

Heat:
Lot: 82388

Order Number:
Customer PO:
Test Number: B12549072952
B12550072952
Test Completed: 12/15/2007
Date Generated: 8/28/2008

This document certifies that the produced named above and supplied on the referenced order is of the same classification, manufacturing process and material requirements as the material which was used for the test that was concluded on the date shown, the results of which are shown below. All tests required by the specifications shown for classification were performed at the time and the material tested met all requirements. It was manufactured and supplied by the Quality System Program of The Esab Group Inc., which is certified to ISO9001 and meets the requirements of ANSI/AWS A5.01, and other specification and military requirements, as applicable.

Test Settings	Low Heat Input	High Heat Input
Heat Input : kJ/in	29.0	81.6
Shielding Gas	100% CO2	100% CO2
Current (amps)	240	320
WFS : in (cm) per min.	210 (533.4)	310 (787.4)
Polarity	DCEP	DCEP
Voltage (volts)	27.5	28.5
ESO : in. (cm)	5/8 (1.6)	3/4 (1.9)
Weld Position	1G	1G
Pass / Layer Sequence	1F,2S,2S,2Q	1F,3S
PH/IPT : °F (°C)	70 (21) / 225 (107)	300 (148) / 450 (232)
TS : in./min. (cm/min.)	13.6 (34.5)	6.7 (17.0)
Mechanical Properties		
Testing Conditions	As Welded	As Welded
Tensile Strength : ksi (MPa)	93.1 (641)	85.5 (589)
Yield Strength : ksi (MPa)	84.5 (582)	71.5 (492)
Elongation % in 2 inches	24	27
Charpy-V-Notch Impacts		
Testing Conditions	As Welded	As Welded
Temperature : °F (°C)	70 (21)	70 (21)
Individual Results : Ft.-lbs. (J)	61,58 ,47 ,51 ,51 (82, 78, 63, 69, 69)	53,61 ,57 ,60 ,68 (71, 82, 77, 81, 92)
Average : Ft.-lbs. (J)	53 (72)	59 (81)

This product satisfies the requirements of AWS D1.8/D1.8M:2005, Annex D after exposure for 3 days at 80°F, 80% humidity.
The Esab Group Inc. quality system is audited and certified by ABS, ASME, LR and the U.S. Department of Defense.



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Typical Welding Parameters

Diameter	Amperage (amps)	Voltage (volts)	WFS (ipm)	Dep. Rate (lbs/hr)	Efficiency Rate %	ESO
0.045"	145	28	200	3.7	76.1%	5/8 in.
	190	29	300	5.6	7.7%	5/8 in.
	225	29	400	7.6	82.1%	5/8 in.
	255	32	500	9.6	81.5%	5/8 in.
	300	33	600	11.6	83.9%	5/8 in.
0.052"	140	25	150	3.9	78.5%	3/4 in.
	180	26	200	5.1	78.9%	3/4 in.
	250	34	300	7.4	78.9%	3/4 in.
	300	35	400	10.3	84.3%	3/4 in.
	340	36	500	13.4	85.0%	3/4 in.
1/16"	390	35	600	16.1	85.6%	3/4 in.
	195	26	150	5.0	77.9%	3/4 in.
	265	28	250	8.7	82.5%	3/4 in.
	325	30	300	10.6	84.5%	3/4 in.
	365	31	350	12.4	84.2%	3/4 in.
5/64"	385	31	400	14.1	84.4%	3/4 in.
	450	33	500	17.7	84.7%	3/4 in.
	170	27	125	6.5	79.9%	1 in.
	200	27	150	8.0	82.5%	1 in.
	235	28	200	10.8	83.8%	1 in.
3/32"	280	29	250	13.6	84.5%	1 in.
	320	30	300	16.2	84.4%	1 in.
	220	27	100	8.4	87.7%	1 in.
	290	27	150	12.7	86.9%	1 in.
	350	28	200	16.9	86.3%	1 in.
3/32"	410	29	250	21.1	86.0%	1 in.
	475	32	300	25.0	84.8%	1 in.

Extended Exposure Results

Product	Diameter	Shielding Gas	Test Conditions	Exposure Time	Hydrogen
Dual Shield R-70 Ultra	3/32"	100% CO2	80°F at 80% humidity	5 days (120 hrs)	10.9
Dual Shield R-70 Ultra	5/64"	100% CO2	80°F at 80% humidity	5 days (120 hrs)	6.4
Dual Shield R-70 Ultra	1/16"	100% CO2	80°F at 80% humidity	3 days (72 hrs)	6.2
Dual Shield R-70 Ultra	0.045"	100% CO2	80°F at 80% humidity	3 days (72 hrs)	8.5

AWS D1.8/D1.8M:2005, Annex D requirement: <16 ml/100g after 72 hour exposure at 80°F, 80% humidity

Recommended Storage and Reconditioning

ESAB cartons and plastic bags are proven acceptable protection for standard Dual Shield R-70 Ultra welding wires when stored under proper conditions. The recommended conditions are temperatures below 75°F and atmospheric humidity levels below 60%. Recondition coils and metal spools at 300°F for 6-8 hours; re-bake plastic spools at 125°F for 48 hours minimum. Storage temperatures should not exceed the reconditioning temperatures. The plastic bags should always be removed when storing or reconditioning at elevated temperatures.

For more information on Recommended Storage and Reconditioning for this product and more, please refer to page 35.

The Esab Group Inc. quality system is audited and certified by ABS, ASME, LR and the U.S. Department of Defense.



Dual Shield 710X is an all-position flux cored wire for general purpose welding. It provides outstanding operator appeal with an easily controlled arc, improved operation at both lower and higher current levels, minimal spatter and easily removed slag. Dual Shield 710X is designed primarily to be used with 100% CO2 gas mix, especially for applications where weld joint restraint is high. Applications include railcars, barges, civil construction, light equipment and general fabrication.

Dual Shield 710X is tested and certified to meet the new AWS A5.20 'D' designation requirements, making this gas-shielded wire an excellent choice for demand critical welds when FEMA 353, D1.1 or D1.8 Seismic Supplement is utilized.

Maximize Your Productivity & Minimize Your Cost Certified Performance

- Meets demand critical requirements
- Meets most lowest anticipated service temperature applications
- Improved performance over existing products
- Surpasses Extended Exposure requirements
- Crack resistant in critical applications

Improved Productivity

- Higher deposition rate
- Wider operating range
- Faster travel speeds
- Meet construction time-tables
- Better Cost Efficiency

Improved Welder Appeal

- More forgiving than traditional wires
- Simplifies training and qualification
- Better Arc Control
- Self-releasing slag
- Limited clean-up

Outstanding Inspection Results

- Minimal Post Weld Work
- Lowers reject & repair rates

AWS 5.20 "D" Designator Testing Results

Size (in.)	1/16"	
Shielding Gas	100% CO2	
Heat Input Range (kJ/in)	High 78-85	Low 25-32
Position	3G	1G
Heat Input (kJ/in)	83.5	31.6
Current (amps)	220	300
WFS (in/min)	165	260
Voltage (volts)	25.5	27.0
Travel Speed (in/min)	4.0	15.4
Pass / Layer	1F, 4S	9S
Tensile Strength (ksi)	76.6	90.7
Yield Strength (ksi)	65.4	81.8
Elongation (%)	32	26
Impact Temperature (°F)	70	70
Impact Results (ft-lbs)	134, 153, 137, 141, 143	106, 101, 108, 112, 116
Minimum Required (ft-lbs)	40	40
Average Impact (ft-lbs)	142	109

Typical Mechanical Properties

Shielding Gas : 100% CO2	As Welded
Yield Strength, ksi (MPa)	75 (520)
Tensile Strength, ksi (MPa)	87 (625)
Elongation % in 2"	28

Typical Charpy V-Notch Impact Properties

Testing Temperature	Ft.-lbs (J)
-0°F (-18°C)	57 (77)
-20°F (-29°C)	49 (66)

Typical Undiluted Weld Metal Analysis

Shielding Gas : 100% CO2	%
Carbon (C)	0.03
Manganese (Mn)	1.4
Silicon (Si)	0.5
Phosphorus (P)	0.007
Sulfur (S)	0.009
Nickel (Ni)	0.4

Product Data SheetCOR-1035
 Seismic CertificationCERT-1006
 Seismic BrochureCOR-1049B



DUAL SHIELD® 710X

Typical Welding Parameters – Vertical Up

Diameter	Amperage (amps)	Voltage (volts)	WFS (ipm)	Dep. Rate (lbs/hr)	Efficiency Rate %	ESO
0.045"	126	22	160	2.8	81%	3/4 in.
	140	23	190	3.3	81%	3/4 in.
	154	23	220	3.9	81%	3/4 in.
	167	24	250	4.5	82%	3/4 in.
	180	24	280	5.1	82%	3/4 in.
	193	25	310	5.6	82%	3/4 in.
	205	26	340	6.2	83%	3/4 in.
	217	26	370	6.8	83%	3/4 in.
	228	27	400	7.4	83%	3/4 in.
0.052"	153	24	160	4.0	81%	3/4 in.
	159	24	170	4.3	81%	3/4 in.
	166	25	180	4.5	81%	3/4 in.
	172	25	190	4.8	81%	3/4 in.
	178	25	200	5.0	81%	3/4 in.
	184	25	210	5.3	81%	3/4 in.
	190	26	220	5.5	81%	3/4 in.
	196	26	230	5.8	82%	3/4 in.
	201	26	240	6.0	82%	3/4 in.
1/16"	207	26	250	6.3	82%	3/4 in.
	149	23	100	2.8	80%	3/4 in.
	168	24	120	3.5	80%	3/4 in.
	187	24	140	4.2	80%	3/4 in.
	205	25	160	4.9	80%	3/4 in.
	223	25	180	5.6	80%	3/4 in.
	240	25	200	6.3	80%	3/4 in.
	257	26	220	7.0	81%	3/4 in.
	273	26	240	7.7	81%	3/4 in.
289	26	260	8.4	81%	3/4 in.	

Extended Exposure Results

Product	Diameter	Shielding Gas	Test Conditions	Exposure Time	Hydrogen
Dual Shield 710X	0.045"	100% CO2	80°F at 80% humidity	5 days (120 hrs)	15.0
Dual Shield 710X	0.052"	100% CO2	80°F at 80% humidity	7 days (120 hrs)	12.1
Dual Shield 710X	1/16"	100% CO2	80°F at 80% humidity	30 days (720 hrs)	10.9

AWS D1.8/D1.8M:2005, Annex D requirement: <16 ml/100g after 72 hour exposure at 80°F, 80% humidity

Recommended Storage and Reconditioning

ESAB cartons and plastic bags are proven acceptable protection for standard Dual Shield 710X welding wires when stored under proper conditions. The recommended conditions are temperatures below 75°F and atmospheric humidity levels below 60%. Recondition coils and metal spools at 300°F for 6-8 hours; re-bake plastic spools at 125°F for 48 hours minimum. Storage temperatures should not exceed the reconditioning temperatures. The plastic bags should always be removed when storing or reconditioning at elevated temperatures.

For more information on Recommended Storage and Reconditioning for this product and more, please refer to page 35.

The Esab Group Inc. quality system is audited and certified by ABS, ASME, LR and the U.S. Department of Defense.



DUAL SHIELD® R-70 ULTRA



Dual Shield R-70 Ultra is a low-fuming, high-deposition E70T-9 flux cored wire. This flux cored welding wire produces smoother arc characteristics and lower welding fumes than many competitive flux cored wires. Dual Shield R-70 Ultra is also designed to have a greater tolerance of mill scale and surface oxides. The notch toughness in the as welded condition is also improved. Bead contour is flat to slightly convex and slag coverage is complete. Dual Shield R-70 Ultra wire is designed for flat/horizontal single or multi-pass applications on low or medium carbon steels using 100% CO2 shielding gas. Areas of application include railcar, heavy equipment, and general fabrication.

Dual Shield R-70 Ultra is tested and certified to meet the new AWS A5.20 'D' designation requirements, making this gas-shielded wire an excellent choice for demand critical welds when FEMA 353, D1.1 or D1.8 Seismic Supplement is utilized.

Maximize Your Productivity & Minimize Your Cost Certified Performance

- Meets demand critical requirements
- Meets most lowest anticipated service temperature applications
- Improved performance over existing products
- Surpasses Extended Exposure requirements
- Crack resistant in critical applications

Improved Productivity

- Higher deposition rate
- Wider operating range
- Faster travel speeds
- Meet construction time-tables
- Better Cost Efficiency

Improved Welder Appeal

- More forgiving than traditional wires
- Simplifies training and qualification
- Better Arc Control
- Self-releasing slag
- Limited clean-up

Outstanding Inspection Results

- Minimal Post Weld Work
- Lowers reject & repair rates

AWS 5.20 "D" Designator Testing Results

Size (in.)	1/16"		3/32"	
Shielding Gas	100% CO2		100% CO2	
Heat Input Range (kJ/in)	High 78-85	Low 25-32	High 78-85	Low 35-42
Position	1G	1G	1G	1G
Heat Input (kJ/in)	81.6	29.0	79.6	40.2
Current (amps)	320	240	270	325
WFS (in/min)	310	210	220	150
Voltage (volts)	28.5	27.5	27.0	27.0
Travel Speed (in/min)	6.7	13.6	9.6	13.1
Pass / Layer	1F, 3S	1F, 2S, 2S, 2Q	2F, 2S	1F, 2S, 3T
Tensile Strength (ksi)	85.5	93.1	79.9	85.2
Yield Strength (ksi)	71.5	84.5	64.7	75.7
Elongation (%)	27	24	30	26
Impact Temperature (°F)	70	70	70	70
Impact Results (ft-lbs)	53, 61, 57, 60, 68	61, 58, 47, 51, 51	72, 79, 66, 70, 66	57, 51, 54, 41, 62
Minimum Required (ft-lbs)	40	40	40	40
Average Impact (ft-lbs)	60	54	71	53

Typical Mechanical Properties

Shielding Gas : 100% CO2	As Welded
Yield Strength, ksi (MPa)	70 (485)
Tensile Strength, ksi (MPa)	82 (565)
Elongation % in 2"	26

Typical Charpy V-Notch Impact Properties

Testing Temperature	Ft.-lbs (J)
-0°F (-18°C)	28 (38)
-20°F (-29°C)	25 (34)

Typical Undiluted Weld Metal Analysis

Shielding Gas : 100% CO2	%
Carbon (C)	0.02
Manganese (Mn)	1.4
Silicon (Si)	0.5
Phosphorus (P)	0.014
Sulfur (S)	0.008

Product Data SheetCOR-1038
 Seismic Certification - 100% CO2 1/16CERT-1010
 Seismic Certification - 100% CO2 3/32CERT-1011
 Seismic BrochureCOR-1049B



DUAL SHIELD® II 81-K2

ESAB Welding & Cutting Products

Certificate of Conformance
AWS A5.29 D1.8 / FEMA 353



Product: Dual Shield II 81-K2
AWS Classification: AWS A5.29; E81T1-K2CD
Specifications: AWS D1.8/D1.8M:2005
Diameter: 1/16 in (1.6 mm)

Heat: 84620
Lot:

Order Number:
Customer PO:
Test Number: B12964082952
B12964082952
Test Completed: 12/15/2007
Date Generated: 8/28/2008

This document certifies that the produced named above and supplied on the referenced order is of the same classification, manufacturing process and material requirements as the material which was used for the test that was concluded on the date shown, the results of which are shown below. All tests required by the specifications shown for classification were performed at the time and the material tested met all requirements. It was manufactured and supplied by the Quality System Program of The Esab Group Inc., which is certified to ISO9001 and meets the requirements of ANSI/AWS A5.01, and other specification and military requirements, as applicable.

Test Settings	Low Heat Input	High Heat Input
Heat Input : kJ/in	30.4	81.7
Shielding Gas	100% CO2	100% CO2
Current (amps)	268	218
WFS : in (cm) per min.	215 (546.1)	170 (431.8)
Polarity	DCEP	DCEP
Voltage (volts)	28.1	24.7
ESO : in. (cm)	5/8 (1.6)	5/8 (1.6)
Weld Position	1G	3G
Pass / Layer Sequence	1F, 4S, 3T	1F, 3S
PH/IPT : °F (°C)	70 (21) / 225 (107)	300 (148) / 488 (253)
TS : in./min. (cm/min.)	14.9 (37.8)	4.0 (10.1)
Mechanical Properties		
Testing Conditions	As Welded	As Welded
Tensile Strength : ksi (MPa)	90.6 (624)	82.8 (570)
Yield Strength : ksi (MPa)	86.8 (598)	71.0 (489)
Elongation % in 2 inches	28	29
Charpy-V-Notch Impacts		
Testing Conditions	As Welded	As Welded
Temperature : °F (°C)	70 (21)	70 (21)
Individual Results : Ft.-lbs. (J)	122,132 ,129 ,128 ,134 (165, 178, 174, 173, 181)	133,131 ,144 ,128 ,125 (180, 177, 195, 173, 169)
Average : Ft.-lbs. (J)	129 (174)	132 (179)

This product satisfies the requirements of AWS D1.8/D1.8M:2005, Annex D after exposure for 3 days at 80°F, 80% humidity. The Esab Group Inc. quality system is audited and certified by ABS, ASME, LR and the U.S. Department of Defense.



By: *K. Wildasin*
K. Wildasin, Supervisor, Quality Assurance Services



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DUAL SHIELD® 710X

ESAB Welding & Cutting Products

Certificate of Conformance
AWS A5.20 D1.8 / FEMA 353



Product: DUAL SHIELD 710X
AWS Classification: AWS A5.20; E71T-1CD/T-9CD
Specifications: AWS D1.8/D1.8M:2005
Diameter: 1/16 in (1.6 mm)

Heat: 82672
Lot:

Order Number:
Customer PO:
Test Number: B12541072952
B12542072952
Test Completed: 12/15/2007
Date Generated: 8/28/2008

This document certifies that the produced named above and supplied on the referenced order is of the same classification, manufacturing process and material requirements as the material which was used for the test that was concluded on the date shown, the results of which are shown below. All tests required by the specifications shown for classification were performed at the time and the material tested met all requirements. It was manufactured and supplied by the Quality System Program of The Esab Group Inc., which is certified to ISO9001 and meets the requirements of ANSI/AWS A5.01, and other specification and military requirements, as applicable.

Test Settings	Low Heat Input	High Heat Input
Heat Input : kJ/in	31.6	83.5
Shielding Gas	100% CO2	100% CO2
Current (amps)	300	220
WFS : in (cm) per min.	260 (660.4)	165 (419.1)
Polarity	DCEP	DCEP
Voltage (volts)	27.0	25.5
ESO : in. (cm)	5/8 (1.6)	5/8 (1.6)
Weld Position	1G	3G
Pass / Layer Sequence	9S	1F, 4S
PH/IPT : °F (°C)	70 (21) / 225 (107)	300 (148) / 450 (232)
TS : in./min. (cm/min.)	15.4 (39.1)	4.0 (10.1)
Mechanical Properties		
Testing Conditions	As Welded	As Welded
Tensile Strength : ksi (MPa)	90.7 (625)	76.6 (528)
Yield Strength : ksi (MPa)	81.8 (563)	65.4 (450)
Elongation % in 2 inches	26	32
Charpy-V-Notch Impacts		
Testing Conditions	As Welded	As Welded
Temperature : °F (°C)	70 (21)	70 (21)
Individual Results : Ft.-lbs. (J)	106,101 ,108 ,112 ,116 (143, 136, 146, 151, 157)	134,153 ,137 ,141 ,143 (181, 207, 185, 191, 193)
Average : Ft.-lbs. (J)	108 (147)	141 (191)

This product satisfies the requirements of AWS D1.8/D1.8M:2005, Annex D after exposure for 30 days at 80°F, 80% humidity. The Esab Group Inc. quality system is audited and certified by ABS, ASME, LR and the U.S. Department of Defense.



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DUAL SHIELD® II 80-Ni1H4



Dual Shield II 80-Ni1H4 is an all position low-hydrogen welding wire that provides excellent low temperature toughness in both the as welded and/or stress relieved conditions when used with 75% Ar / 25% CO2. Dual Shield II 80-Ni1H4 produces diffusible Hydrogen levels of <4mL/100g over a wide range of welding parameters. Applications include petrochemical equipment, bridge fabrication, offshore oil construction, ship fabrication railcar, and heavy machinery.

Dual Shield II 80-Ni1H4 is tested and certified to meet the new AWS A5.20 'D' designation requirements, making this gas-shielded wire an excellent choice for demand critical welds when FEMA 353, D1.1 or D1.8 Seismic Supplement is utilized.

Maximize Your Productivity & Minimize Your Cost Certified Performance

- Meets demand critical requirements
- Meets most lowest anticipated service temperature applications
- Improved performance over existing products
- Surpasses Extended Exposure requirements
- Crack resistant in critical applications

Improved Productivity

- Higher deposition rate
- Wider operating range
- Faster travel speeds
- Meet construction time-tables
- Better Cost Efficiency

Improved Welder Appeal

- More forgiving than traditional wires
- Simplifies training and qualification
- Better Arc Control
- Self-releasing slag
- Limited clean-up

Outstanding Inspection Results

- Minimal Post Weld Work
- Lowers reject & repair rates

AWS 5.20 "D" Designator Testing Results

Size (in.)	1/16"	
Shielding Gas	75% Ar / 100% CO2	
Heat Input Range (kJ/in)	High 78-85	Low 25-32
Position	3G	1G
Heat Input (kJ/in)	79.0	31.0
Current (amps)	210	292
WFS (in/min)	160	230
Voltage (volts)	25.3	27.0
Travel Speed (in/min)	4.0	14.9
Pass / Layer	2F, 3S	1F, 3S, 5T
Tensile Strength (ksi)	84.6	91.3
Yield Strength (ksi)	72.9	87.2
Elongation (%)	30.5	29.0
Impact Temperature (°F)	70	70
Impact Results (ft-lbs)	166, 153, 176, 161, 158	115, 116, 119, 117, 121
Minimum Required (ft-lbs)	40	40
Average Impact (ft-lbs)	163	118

Typical Mechanical Properties

Shielding Gas : 75% Ar / 100% CO2	As Welded
Yield Strength, ksi (MPa)	79 (545)
Tensile Strength, ksi (MPa)	89 (615)
Elongation % in 2"	28

Typical Charpy V-Notch Impact Properties

Testing Temperature	Ft.-lbs (J)
-20°F (-29°C)	110 (149)
-40°F (-40°C)	84 (114)

Typical Undiluted Weld Metal Analysis

Shielding Gas : 75% Ar / 100% CO2	%
Carbon (C)	0.05
Manganese (Mn)	1.2
Silicon (Si)	0.3
Phosphorus (P)	0.014
Sulfur (S)	0.009
Nickel (Ni)	0.9

Product Data SheetCOR-1036
 Seismic CertificationCERT-1007
 Seismic BrochureCOR-1049B



DUAL SHIELD® II 81-K2

ESAB Welding & Cutting Products

Certificate of Conformance
 AWS A5.29 D1.8 / FEMA 353



Product: Dual Shield II 81-K2
AWS Classification: AWS A5.29; E81T1-K2MD
Specifications: AWS D1.8/D1.8M:2005
Diameter: 1/16 in (1.6 mm)
Heat:
Lot: 84620

Order Number:
Customer PO:
Test Number: B12932082952
 B12931082952
Test Completed: 12/15/2007
Date Generated: 8/28/2008

This document certifies that the produced named above and supplied on the referenced order is of the same classification, manufacturing process and material requirements as the material which was used for the test that was concluded on the date shown, the results of which are shown below. All tests required by the specifications shown for classification were performed at the time and the material tested met all requirements. It was manufactured and supplied by the Quality System Program of The Esab Group Inc., which is certified to ISO9001 and meets the requirements of ANSI/AWS A5.01, and other specification and military requirements, as applicable.

Test Settings

Heat Input : kJ/in	30.9
Shielding Gas	75%Ar / 25%CO2
Current (amps)	273
WFS : in (cm) per min.	210 (533.4)
Polarity	DCEP
Voltage (volts)	27.3
ESO : in. (cm)	5/8 (1.6)
Weld Position	1G
Pass / Layer Sequence	1F, 5S, 2T
PH/IPT : °F (°C)	70 (21) / 225 (107)
TS : in./min. (cm/min.)	14.5 (36.8)

Low Heat Input

Heat Input : kJ/in	30.9
Shielding Gas	75%Ar / 25%CO2
Current (amps)	273
WFS : in (cm) per min.	210 (533.4)
Polarity	DCEP
Voltage (volts)	27.3
ESO : in. (cm)	5/8 (1.6)
Weld Position	1G
Pass / Layer Sequence	1F, 5S, 2T
PH/IPT : °F (°C)	70 (21) / 225 (107)
TS : in./min. (cm/min.)	14.5 (36.8)

High Heat Input

Heat Input : kJ/in	81.1
Shielding Gas	75%Ar / 25%CO2
Current (amps)	224
WFS : in (cm) per min.	170 (431.8)
Polarity	DCEP
Voltage (volts)	25.1
ESO : in. (cm)	5/8 (1.6)
Weld Position	3G
Pass / Layer Sequence	1F, 3S
PH/IPT : °F (°C)	300 (148) / 450 (232)
TS : in./min. (cm/min.)	4.2 (10.6)

Mechanical Properties

Testing Conditions	As Welded	As Welded
Tensile Strength : ksi (MPa)	97.8 (674)	84.0 (579)
Yield Strength : ksi (MPa)	90.8 (626)	70.9 (488)
Elongation % in 2 inches	24	29

Charpy-V-Notch Impacts

Testing Conditions	As Welded	As Welded
Temperature : °F (°C)	70 (21)	70 (21)
Individual Results : Ft.-lbs. (J)	90,96 ,91 ,94 ,94 (122, 130, 123, 127, 127)	132,125 ,125 ,124 ,128 (178, 169, 169, 168, 173)
Average : Ft.-lbs. (J)	93 (126)	126 (171)

This product satisfies the requirements of AWS D1.8/D1.8M:2005, Annex D after exposure for 3 days at 80°F, 80% humidity. The Esab Group Inc. quality system is audited and certified by ABS, ASME, LR and the U.S. Department of Defense.



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DUAL SHIELD® II 81-K2



DUAL SHIELD® II 80-Ni1H4



Typical Welding Parameters

Diameter	Amperage (amps)	Voltage (volts)	WFS (ipm)	Dep. Rate (lbs/hr)	Efficiency Rate %	ESO
0.045"	150	28	200	4.2	86%	5/8 in.
	210	29	300	6.3	86%	3/4 in.
	250	30	400	8.5	87%	3/4 in.
	290	33	500	10.7	87%	3/4 in.
	330	34	600	12.7	87%	3/4 in.
0.052"	155	25	150	4.4	87%	3/4 in.
	245	28	250	7.3	86%	3/4 in.
	310	33	350	10.2	85%	3/4 in.
	360	36	450	13.3	85%	3/4 in.
	430	37	600	17.6	87%	3/4 in.
1/16"	190	27	150	6.1	87%	3/4 in.
	300	30	250	10.2	87%	3/4 in.
	365	33	300	12.3	86%	3/4 in.
	410	33	350	14.0	88%	3/4 in.
	450	33	400	16.1	87%	3/4 in.
	500	39	500	20.1	87%	3/4 in.

Extended Exposure Results

Product	Diameter	Shielding Gas	Test Conditions	Exposure Time	Hydrogen
Dual Shield II 81-K2	1/16"	100% CO2	80°F at 80% humidity	3 days (72 hrs)	13.1 ml/100g
Dual Shield II 81-K2	1/16"	75%Ar/25% CO2	80°F at 80% humidity	3 days (72 hrs)	15.5 ml/100g

AWS D1.8/D1.8M:2005, Annex D requirement: <16 ml/100g after 72 hour exposure at 80°F, 80% humidity

Recommended Storage and Reconditioning

ESAB cartons and plastic bags are proven acceptable protection for standard Dual Shield 7100 Ultra welding wires when stored under proper conditions. The recommended conditions are temperatures below 75°F and atmospheric humidity levels below 60%. Recondition coils and metal spools at 300°F for 6-8 hours; re-bake plastic spools at 125°F for 48 hours minimum. Storage temperatures should not exceed the reconditioning temperatures. The plastic bags should always be removed when storing or reconditioning at elevated temperatures.

For more information on Recommended Storage and Reconditioning for this product and more, please refer to page 35.

Typical Welding Parameters

Diameter	Amperage (amps)	Voltage (volts)	WFS (ipm)	Dep. Rate (lbs/hr)	Efficiency Rate %	ESO
0.035"	130	22	288	3.2	85%	5/8 in.
	150	25	384	4.3	85%	5/8 in.
	200	27	576	6.5	85%	5/8 in.
	250	30	784	8.9	86%	5/8 in.
	300	33	1008	11.7	86%	5/8 in.
0.045"	150	28	200	4.2	86%	5/8 in.
	210	29	300	6.3	86%	3/4 in.
	250	30	400	8.5	87%	3/4 in.
	290	33	500	10.7	87%	3/4 in.
	330	34	600	12.7	87%	3/4 in.
0.052"	155	25	150	4.4	87%	3/4 in.
	245	28	250	7.3	86%	3/4 in.
	310	33	350	10.2	85%	3/4 in.
	360	36	450	13.3	85%	3/4 in.
	430	37	600	17.6	87%	3/4 in.
1/16"	190	27	150	6.1	87%	3/4 in.
	300	30	250	10.2	87%	3/4 in.
	365	33	300	12.3	86%	3/4 in.
	410	33	350	14.0	88%	3/4 in.
	450	33	400	16.1	87%	3/4 in.
	500	39	500	20.1	87%	3/4 in.
5/64"	250	26	112	6.4	85%	3/4 in.
	350	28	176	10.5	85%	3/4 in.
	450	31	258	14.8	85%	3/4 in.

Sizes 0.035" and 5/64" are available however are not currently certified for seismic or critical demand applications.

Extended Exposure Results

Product	Diameter	Shielding Gas	Test Conditions	Exposure Time	Hydrogen
Dual Shield 7100 Ultra	0.045"	75%Ar/25% CO2	80°F at 80% humidity	6 days (144 hrs)	4.7 ml/100g
Dual Shield 7100 Ultra	0.052"	75%Ar/25% CO2	80°F at 80% humidity	7 days (168 hrs)	4.0 ml/100g
Dual Shield 7100 Ultra	1/16"	75%Ar/25% CO2	80°F at 80% humidity	6 days (144 hrs)	4.0 ml/100g

AWS D1.8/D1.8M:2005, Annex D requirement: <16 ml/100g after 72 hour exposure at 80°F, 80% humidity

Recommended Storage and Reconditioning

ESAB cartons and plastic bags are proven acceptable protection for standard Dual Shield II 80-Ni1H4 welding wires when stored under proper conditions. The recommended conditions are temperatures below 75°F and atmospheric humidity levels below 60%. Recondition coils and metal spools at 300°F for 6-8 hours; re-bake plastic spools at 125°F for 48 hours minimum. Storage temperatures should not exceed the reconditioning temperatures. The plastic bags should always be removed when storing or reconditioning at elevated temperatures.

For more information on Recommended Storage and Reconditioning for this product and more, please refer to page 35.



DUAL SHIELD® II 80-Ni1H4



ESAB Welding & Cutting Products

Certificate of Conformance
AWS A5.29 D1.8 / FEMA 353

Product: Dual Shield II 80-Ni1H4
AWS Classification: AWS A5.29; E81T1-Ni1MJDH4
Specifications: AWS D1.8/D1.8M:2005
Diameter: 1/16 in (1.6 mm)
Heat:
Lot: 81628

Order Number:
Customer PO:
Test Number: B12599082952
B12598082952
Test Completed: 12/15/2007
Date Generated: 8/28/2008

This document certifies that the produced named above and supplied on the referenced order is of the same classification, manufacturing process and material requirements as the material which was used for the test that was concluded on the date shown, the results of which are shown below. All tests required by the specifications shown for classification were performed at the time and the material tested met all requirements. It was manufactured and supplied by the Quality System Program of The Esab Group Inc., which is certified to ISO9001 and meets the requirements of ANSI/AWS A5.01, and other specification and military requirements, as applicable.

Test Settings	Low Heat Input	High Heat Input
Heat Input : kJ/in	31.0	79.0
Shielding Gas	75%Ar / 25%CO2	75%Ar / 25%CO2
Current (amps)	292	210
WFS : in (cm) per min.	230 (584.2)	160 (406.4)
Polarity	DCEP	DCEP
Voltage (volts)	27.0	25.3
ESO : in. (cm)	5/8 (1.6)	5/8 (1.6)
Weld Position	1G	3G
Pass / Layer Sequence	1F,3S,5T	2F,3S
PH/IPT : °F (°C)	70 (21) / 250 (121)	250 (121) / 488 (253)
TS : in./min. (cm/min.)	14.9 (37.8)	4.0 (10.1)
Mechanical Properties		
Testing Conditions	As Welded	As Welded
Tensile Strength : ksi (MPa)	91.3 (629)	84.6 (583)
Yield Strength : ksi (MPa)	87.2 (601)	72.9 (502)
Elongation % in 2 inches	29	30
Charpy-V-Notch Impacts		
Testing Conditions	As Welded	As Welded
Temperature : °F (°C)	70 (21)	70 (21)
Individual Results : Ft.-lbs. (J)	115,116 ,119 ,117 ,121 (155, 157, 161, 158, 164)	166,153 ,176 ,161 ,158 (225, 207, 238, 218, 214)
Average : Ft.-lbs. (J)	117 (159)	162 (220)

This product satisfies the requirements of AWS D1.8/D1.8M:2005, Annex D after exposure for 6 days at 80°F, 80% humidity.
The Esab Group Inc. quality system is audited and certified by ABS, ASME, LR and the U.S. Department of Defense.



By: *K. Wildasin*
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Seismic Certification CERT-1007



DUAL SHIELD® II 81-K2



Dual Shield II 81-K2 is an all-position flux cored electrode developed for low alloy high strength steels where low temperature impact toughness is required. This wire is an excellent choice for welding ASTM steels A302, A533 Class I and A537. Dual Shield II 81-K2 produces a smooth stable arc and low spatter levels using 100% CO2 shielding gas. Applications include ship building, offshore oilrigs, and heavy equipment construction.

Dual Shield II 81-K2 is tested and certified to meet the new AWS A5.20 'D' designation requirements, making this gas-shielded wire an excellent choice for demand critical welds when FEMA 353, D1.1 or D1.8 Seismic Supplement is utilized.

Maximize Your Productivity & Minimize Your Cost Certified Performance

- Meets demand critical requirements
- Meets most lowest anticipated service temperature applications
- Improved performance over existing products
- Surpasses Extended Exposure requirements
- Crack resistant in critical applications

Improved Productivity

- Higher deposition rate
- Wider operating range
- Faster travel speeds
- Meet construction time-tables
- Better Cost Efficiency

Improved Welder Appeal

- More forgiving than traditional wires
- Simplifies training and qualification
- Better Arc Control
- Self-releasing slag
- Limited clean-up

Outstanding Inspection Results

- Minimal Post Weld Work
- Lowers reject & repair rates

AWS 5.20 "D" Designator Testing Results

Size (in.)	1/16"		1/16"	
	100% CO2		75% Ar / 25% CO2	
Heat Input Range (kJ/in)	High 78-85	Low 25-32	High 78-85	Low 25-32
Position	3G	1G	3G	1G
Heat Input (kJ/in)	81.7	30.4	81.1	30.9
Current (amps)	218	268	224	273
WFS (in/min)	170	215	170	210
Voltage (volts)	24.7	28.1	25.1	27.3
Travel Speed (in/min)	4.0	14.9	4.2	14.5
Pass / Layer	1F, 3S	1F,4S,3T	1F, 3S	1F,5S,2T
Tensile Strength (ksi)	82.8	90.6	84.0	97.8
Yield Strength (ksi)	71.0	86.8	70.9	90.8
Elongation (%)	29	28	29	24
Impact Temperature (°F)	70	70	70	70
Impact Results (ft-lbs)	133, 131, 144, 128, 125	122, 132, 129, 128, 137	132, 125, 125, 124, 128	90, 96, 91, 94, 94
Minimum Required (ft-lbs)	40	40	40	40
Average Impact (ft-lbs)	132	130	127	93
Impact Results (ft-lbs)	104, 120, 85, 116, 106	119, 95, 111, 98, 95	108, 106, 103, 99, 90	76, 85, 73, 83, 85
Average Impact (ft-lbs)	106	104	101	80

Typical Mechanical Properties

Shielding Gas : 100% CO2	As Welded
Yield Strength, ksi (MPa)	82 (570)
Tensile Strength, ksi (MPa)	74 (515)
Elongation % in 2"	27

Typical Charpy V-Notch Impact Properties

Testing Temperature	Ft.-lbs (J)
-0°F (-18°C)	100 (136)
-20°F (-29°C)	89 (121)
-60°F (-51°C)	60 (81)

Typical Undiluted Weld Metal Analysis

Shielding Gas : 100% CO2	%
Carbon (C)	0.02
Manganese (Mn)	1.2
Silicon (Si)	0.5
Phosphorus (P)	0.013
Sulfur (S)	0.009
Nickel (Ni)	1.4

Product Data SheetCOR-1037
Seismic Certification - 75% Ar/25% CO2.....CERT-1008
Seismic Certification - 100% CO2CERT-1009
Seismic Brochure COR-1049B