

2012

STATE HIGHWAY

CERTIFICATES OF CONFORMANCE

FLUX CORED WIRES AND STICK ELECTRODES

ESAB WELDING & CUTTING PRODUCTS

We hereby certify that the results given on the following pages for welding rods, electrodes and filler metals are a true representation of the tests and results recorded as performed at our facility.

These welding rods, electrodes and filler metals meet the classification requirements of their respective AWS/ASME specifications as identified in the index.



Kay Wildasin
Supervisor, Q. A. Services

2012 STATE HIGHWAY CERTIFICATES OF CONFORMANCE INDEX

The certificates listed below serve to document that ESAB Welding & Cutting Products welding consumables conform to the referenced specifications.

<u>The Esab Group Electrode</u>	<u>AWS Classification</u>	<u>AWS Specification</u>
Atom Arc 7018	E7018H4R	AWS A5.1:2004
Atom Arc 7018-1	E7018-1H4R	AWS A5.1:2004
Atom Arc 7018 Acclaim	E7018H4R	AWS A5.1:2004
Atom Arc 8018	E8018-C3H4R	AWS A5.5:2006
Atom Arc 9018	E9018-MH4R	AWS A5.5:2006
Atom Arc T	E11018-MH4R	AWS A5.5:2006
Coreweld 70	E70C-6M	AWS A5.18:2005
Coreweld C6	E70C-6M	AWS A5.18:2005
Coreshield 8	E71T-8	AWS A5.20:2005
Dual Shield R-70 Ultra	E70T-1CH8/T-1M/T-9CH8/T-9M	AWS A5.20:2005
Dual Shield T75	E70T-5CJH4	AWS A5.20:2005
Dual Shield II 70T-12H4	E71T-1MJH4/T-12MJH4	AWS A5.20:2005
Dual Shield 7100 Ultra	E71T-1CH8/T-1M/T-9CH8/T-9M	AWS A5.20:2005
Dual Shield 7100LC	E71T-1CH8/T-1M/T-9CH8/T-9M	AWS A5.20:2005
Dual Shield II 70 Ultra	E71T-1M/T-12M	AWS A5.20:2005
Dual Shield II 71 Ultra	E71T-1C/T-12C	AWS A5.20:2005
Dual Shield 70 Ultra Plus	E71T-1M/T-9M	AWS A5.20:2005
Dual Shield 700X	E70T-1C	AWS A5.20:2005
Dual Shield 710X	E71T-1C/T-1M/T-9C/T-9M	AWS A5.20:2005
Dual Shield 710X-M	E71T-1c/T-1M/T-9C/T-9M-D	AWS A5.20:2005
Dual Shield II 711X	E71T-1C-J/T-12C-J	AWS A5.20:2005
Dual Shield II 712X	E71T-1MJH8/T-12MJH8	AWS A5.20:2005
Dual Shield 8100W	E81T1-W2C/W2M	AWS A5.29:2005
Dual Shield II 80Ni1H4	E81T1-Ni1MH4	AWS A5.29:2005
Dual Shield 810X-Ni1	E81T1-Ni1C	AWS A5.29:2005
Dual Shield 88-C3	E80T1-Ni1C	AWS A5.29:2005

ESAB Welding & Cutting Products
1500 Karen Lane
Hanover, PA 17331

CERTIFICATE OF CONFORMANCE TO REQUIREMENTS FOR WELDING ELECTRODES

This is to certify that **ATOM ARC 7018** Classification **E7018H4R**, as supplied under the above order number, is the same classification, manufacturing process, and material requirements as the electrodes tested below. All tests required by **Specification AWS A5.1:2004** were performed in conformance with this specification, and the above electrode met all the requirements. The electrodes were marked in conformance with **AWS A5.1:2004**. The chemistry and mechanical properties of the deposited weld metal were as follows:

Size: 3/32"
Test Date: 9/19/11
Test Number: 2-52073-00
Moisture (RC-412): (P) .10 / (E) .26%
Concentricity: 2%
Diffusible Hydrogen: 2.8 ml/100 gr.
Atmospheric Temperature: 74
Relative Humidity: 13%

Chemical Analysis:

Carbon: .05
Manganese: 1.06
Chromium: .03
Nickel: .02
Silicon: .34
Phosphorus: .012
Sulfur: .012
Molybdenum: .01
Vanadium: .01
Copper: .05

This is to certify that the original is duly authorized and signed.

By: K. Wildasin
K. Wildasin, Supervisor, Q.A. Services

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Size: 5/32"
Test Date: 1/17/12
Test Number: 2-52070-00
Moisture (RC-412): (P) .07 / (E) .19%
Concentricity: 2%
X-Rays: Satisfactory

Chemical Analysis:

Carbon: .05
Manganese: 1.22
Chromium: .06
Nickel: .05
Silicon: .42
Phosphorus: .014
Sulfur: .010
Molybdenum: .02
Vanadium: .01
Copper: .11

Full	Split	Triple	Quad	Volts	Amps	
---	8	---	----	23.1	181	DC+

Test Results

As Welded

Yield:	67,975
Tensile:	81,594
Elongation (2")%:	32.0
Reduction of Area:	74.6

Charpy V-Notch Impacts Tested @ -20 Deg. F.
Ft. Lbs. 146-166-102-127-88 Ave = 126

Fillets: OK Vertical / Overhead

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By: K. Wildasin
K. Wildasin, Supervisor, Q.A. Services

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Size: 3/16"
Test Date: 6/06/11
Test Number: 2-51092-00
Moisture (RC-412): (P) .10 / (E) .31%
Concentricity: 2%
X-Rays: Satisfactory

Chemical Analysis:

Carbon: .05
Manganese: 1.13
Chromium: .06
Nickel: .05
Silicon: .49
Phosphorus: .015
Sulfur: .015
Molybdenum: .02
Vanadium: .01
Copper: .13

Full	Split	Triple	Quad	Volts	Amps	
---	8	---	----	24.1	225	DC+

Test Results As Welded

Yield: 69,777
Tensile: 81,004
Elongation (2")%: 30.0
Reduction of Area: 72.0

Charpy V-Notch Impacts Tested @ -20 Deg. F.
Ft. Lbs. 90-100-99-88-183 Ave = 112

Fillets: OK Horizontal

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By: K Wildasin
K. Wildasin, Supervisor, Q.A. Services

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Size: 1/4"
Test Date: 4/08/11
Test Number: 2-50836-00
Moisture (RC-412): (P) .08 / (E) .19
Concentricity: 2%
X-Rays: Satisfactory
Diffusible Hydrogen: 3.5 ml/100 gr.
Atmospheric Temperature: 71
Relative Humidity: 13%

Chemical Analysis:

Carbon: .06
Manganese: 1.09
Chromium: .08
Nickel: .08
Silicon: .47
Phosphorus: .014
Sulfur: .015
Molybdenum: .03
Vanadium: .01
Copper: .14

Full	Split	Triple	Quad	Volts	Amps	
---	10	---	----	23.3	325	DC+

Test Results

As Welded

Yield:	68,268
Tensile:	81,393
Elongation (2")%:	29.0
Reduction of Area:	71.9

Charpy V-Notch Impacts Tested @ -20 Deg. F.
Ft. Lbs. 70-69-68-96-49 Ave = 70

Fillets: OK Horizontal

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By: 
K. Wildasin, Supervisor, Q.A. Services

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1500 Karen Lane
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CERTIFICATE OF CONFORMANCE TO REQUIREMENTS FOR WELDING ELECTRODES

This is to certify that **ATOM ARC 7018-1** Classification **E7018-1H4R**, as supplied under the above order number, is the same classification, manufacturing process, and material requirements as the electrodes tested below. All tests required by **Specification AWS A5.1:2004** were performed in conformance with this specification, and the above electrode met all the requirements. The electrodes were marked in conformance with **AWS A5.1:2004**. The chemistry and mechanical properties of the deposited weld metal were as follows:

Size: 3/32"
Test Date: 4/05/11
Test Number: 2-51320-00
Moisture (RC-412): (P) .06 / (E) .17%
Concentricity: 2%
Diffusible Hydrogen: 2.4 ml/100 gr.
Atmospheric Temperature: 69
Relative Humidity: 11%

Chemical Analysis:

Carbon: .04
Manganese: 1.27
Chromium: .05
Nickel: .06
Silicon: .41
Phosphorus: .013
Sulfur: .015
Molybdenum: .02
Vanadium: .01
Copper: .12

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This is to certify that **ATOM ARC 7018-1** Classification **E7018-1H4R**, as supplied under the above order number, is the same classification, manufacturing process, and material requirements as the electrodes tested below. All tests required by **Specification AWS A5.1:2004** were performed in conformance with this specification, and the above electrode met all the requirements. The electrodes were marked in conformance with **AWS A5.1:2004**. The chemistry and mechanical properties of the deposited weld metal were as follows:

Size: 5/32"
Test Date: 5/09/11
Test Number: 2-51587-00
Moisture (RC-412): (P) .09 / (E) .17%
Concentricity: 2%
X-Rays: Satisfactory

Chemical Analysis:

Carbon: .05
Manganese: 1.45
Chromium: .05
Nickel: .05
Silicon: .48
Phosphorus: .013
Sulfur: .012
Molybdenum: .02
Vanadium: .01

Full	Split	Triple	Quad	Volts	Amps	
---	8	---	----	22.2	168	DC+

Test Results

As Welded

Yield:	71,759
Tensile:	85,368
Elongation (2")%:	29.0
Reduction of Area:	73.9

Charpy V-Notch Impacts Tested @ -50 Deg. F.
Ft. Lbs. 97-145-78-114-82 Ave = 103

Fillets: OK Vertical / Overhead

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Size: 1/4"
Test Date: 4/14/11
Test Number: 2-50942-00
Moisture (RC-412): (P) .07 / (E) .26%
Concentricity: 2%
X-Rays: Satisfactory
Diffusible Hydrogen: 2.4 ml / 100 gr
Atmospheric Temperature: 69
Relative Humidity: 11%

Chemical Analysis:

Carbon: .05
Manganese: 1.30
Chromium: .08
Nickel: .08
Silicon: .47
Phosphorus: .014
Sulfur: .015
Molybdenum: .03
Vanadium: .01
Copper: .14

Full	Split	Triple	Quad	Volts	Amps	
---	11	---	----	24.0	325	DC+

Test Results

As Welded

Yield: 74,442
Tensile: 84,548
Elongation (2")%: 30.0
Reduction of Area: 70.2

Charpy V-Notch Impacts Tested @ -50 Deg. F.
Ft. Lbs. 43-40-56-60-37 Ave = 47

Fillets: OK Horizontal

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CERTIFICATE OF CONFORMANCE TO REQUIREMENTS FOR WELDING ELECTRODES

This is to certify that **ATOM ARC 7018 Acclaim** Classification **E7018H4R**, as supplied under the above order number, is the same classification, manufacturing process, and material requirements as the electrodes tested below. All tests required by **Specification AWS A5.1:2004** were performed in conformance with this specification, and the above electrode met all the requirements. The electrodes were marked in conformance with **AWS A5.1:2004**. The chemistry and mechanical properties of the deposited weld metal were as follows:

Size: 3/32"
Test Date: 12/19/11
Test Number: 2-51999-00
Moisture (RC-412): (P) .06 / (E) .14%
Concentricity: 2%
Diffusible Hydrogen: 1.8 ml/100 gr.
Atmospheric Temperature: 71
Relative Humidity: 15%

Chemical Analysis:

Carbon: .05
Manganese: 1.10
Chromium: .05
Nickel: .04
Silicon: .48
Phosphorus: .016
Sulfur: .011
Molybdenum: .02
Vanadium: .01
Copper: .09

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This is to certify that **ATOM ARC 7018 Acclaim** Classification **E7018H4R**, as supplied under the above order Number is the same classification, manufacturing process, and material requirements as the electrodes tested below. All tests required by **Specification AWS A5.1:2004** were performed in conformance with this specification, and the above electrode met all the requirements. The electrodes were marked in conformance with **AWS A5.1:2004**. The chemistry and mechanical properties of the deposited weld metal were as follows:

Size: 1/8"
Test Date: 12/27/11
Test Number: 2-52000-00
Moisture (RC-412): (P) .06 / (E) .14%
Concentricity: 2%
X-Rays: Satisfactory

Chemical Analysis:

Carbon: .04
Manganese: 1.02
Chromium: .06
Nickel: .05
Silicon: .45
Phosphorus: .015
Sulfur: .012
Molybdenum: .02
Vanadium: .01
Copper: .11

Full	Split	Triple	Quad	Volts	Amps	
---	6	---	----	22.8	141	DC+

Test Results

As Welded

Yield:	64,930
Tensile:	79,679
Elongation (2")%:	34.0
Reduction of Area:	77.7

Charpy V-Notch Impacts Tested @ -20 Deg. F.
Ft. Lbs. 121-121-111-97-113 Ave = 113

Fillets: OK Vertical / Overhead

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This is to certify that **ATOM ARC 7018 Acclaim** Classification **E7018H4R**, as supplied under the above order Number is the same classification, manufacturing process, and material requirements as the electrodes tested below. All tests required by **Specification AWS A5.1:2004** were performed in conformance with this specification, and the above electrode met all the requirements. The electrodes were marked in conformance with **AWS A5.1:2004**. The chemistry and mechanical properties of the deposited weld metal were as follows:

Size: 5/32"
Test Date: 12/27/11
Test Number: 2-52001-00
Moisture (RC-412): (P) .06 (E) .13%
Concentricity: 2%
X-Rays: Satisfactory

Chemical Analysis:

Carbon: .04
Manganese: 1.10
Chromium: .05
Nickel: .05
Silicon: .48
Phosphorus: .014
Sulfur: .010
Molybdenum: .02
Vanadium: .01
Copper: .10

Full	Split	Triple	Quad	Volts	Amps	
---	8	---	----	22.5	175	DC+

Test Results

As Welded

Yield:	69,406
Tensile:	82,783
Elongation (2")%:	29.0
Reduction of Area:	50.2

Charpy V-Notch Impacts Tested @ -20 Deg. F.
Ft. Lbs. 142-119-131-132-107 Ave = 126

Fillets: OK Vertical / Overhead

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This is to certify that **ATOM ARC 7018 Acclaim** Classification **E7018H4R**, as supplied under the above order Number is the same classification, manufacturing process, and material requirements as the electrodes tested below. All tests required by **Specification AWS A5.1:2004** were performed in conformance with this specification, and the above electrode met all the requirements. The electrodes were marked in conformance with **AWS A5.1:2004**. The chemistry and mechanical properties of the deposited weld metal were as follows:

Size: 3/16"
Test Date: 12/28/11
Test Number: 2-52002-00
Moisture (RC-412): (P) .06 / (E) .14%
Concentricity: 2%
X-Rays: Satisfactory

Chemical Analysis:

Carbon: .05
Manganese: 1.14
Chromium: .03
Nickel: .02
Silicon: .51
Phosphorus: .012
Sulfur: .010
Molybdenum: .01
Vanadium: .01
Copper: .04

Full	Split	Triple	Quad	Volts	Amps	
---	8	---	----	22.7	221	DC+

Test Results

As Welded

Yield: 68,331
Tensile: 80,035
Elongation (2")%: 34.0
Reduction of Area: 74.4

Charpy V-Notch Impacts Tested @ -20 Deg. F.

Ft. Lbs. 128-68-67-57-48 Ave = 74

Filletts: OK Horizontal

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CERTIFICATE OF CONFORMANCE TO REQUIREMENTS FOR WELDING ELECTRODES

This is to certify that **ATOM ARC 8018** Classification **E8018-C3H4R**, as supplied under the above order number, is the same classification, manufacturing process, and material requirements as the electrodes tested below. All tests required by **Specification AWS A5.5:2006** were performed in conformance with this specification, and the above electrode met all the requirements. The electrodes were marked in conformance with **AWS A5.5:2006**. The chemistry and mechanical properties of the deposited weld metal were as follows:

Size: 3/32"
Test Date: 1/11/12
Test Number: 2-52069-00
Moisture (RC-412): (P) .07 / (E) .12%
Concentricity: 2%
Diffusible Hydrogen: 1.6 ml/100 gr.
Atmospheric Temperature: 69
Relative Humidity: 14%

Chemical Analysis:

Carbon: .04
Manganese: 1.02
Chromium: .06
Nickel: .86
Silicon: .31
Phosphorus: .016
Sulfur: .013
Molybdenum: .14
Vanadium: .01
Copper: .13

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Size: 5/32"
Test Date: 2/07/11
Test Number: 2-50570-00
Moisture (RC-412): (P) .08 / (E) .15%
Concentricity: 2%
X-Rays: Satisfactory

Chemical Analysis:

Carbon: .04
Manganese: 1.17
Chromium: .02
Nickel: .96
Silicon: .28
Phosphorus: .010
Sulfur: .009
Molybdenum: .12
Vanadium: .01
Copper: .03

Full	Split	Triple	Quad	Volts	Amps	
---	8	----	----	23.7	180	DC+

Test Results As Welded

Yield: 75,353
Tensile: 85,445
Elongation (2")%: 27.0
Reduction of Area: 73.9

Charpy V-Notch Impacts Tested @ -40 Deg. F.
Ft. Lbs. 123-118-119-136-122 Ave = 124

Fillets: OK Vertical / Overhead

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CERTIFICATE OF CONFORMANCE TO REQUIREMENTS FOR WELDING ELECTRODES

This is to certify that **ATOM ARC 9018** Classification **E9018-MH4R**, as supplied under the above order number, is the same classification, manufacturing process, and material requirements as the electrodes tested below. All tests required by **Specification AWS A5.5:2006** were performed in conformance with this specification, and the above electrode met all the requirements. The electrodes were marked in conformance with **AWS A5.5:2006**. The chemistry and mechanical properties of the deposited weld metal were as follows:

Size: 3/32"
Test Date: 5/17/11
Test Number: 2-51062-00
Moisture (RC-412): (P) .11 / (E) .18%
Concentricity: 2%
Diffusible Hydrogen: 2.9 ml/100 gr.
Atmospheric Temperature: 74
Relative Humidity: 14%

Chemical Analysis:

Carbon: .04
Manganese: 1.00
Chromium: .04
Nickel: 1.72
Silicon: .27
Phosphorus: .011
Sulfur: .010
Molybdenum: .31
Vanadium: .01
Copper: .04

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1500 Karen Lane
Hanover, PA 17331

CERTIFICATE OF CONFORMANCE TO REQUIREMENTS FOR WELDING ELECTRODES

This is to certify that **ATOM ARC 9018** Classification **E9018-MH4R**, as supplied, is the same classification, manufacturing process, and material requirements as the electrodes tested below. All tests required by **Specification AWS A5.5:2006** were performed in conformance with this specification, and the above electrode met all the requirements. The electrodes were marked in conformance with **AWS A5.5:2006**. The chemistry and mechanical properties of the deposited weld metal were as follows:

Size: 5/32"
Test Date: 2/07/11
Test Number: 2-50572-00
Moisture (RC-412): (P) .08 / (E) .15%
Concentricity: 2%
X-Rays: Satisfactory

Chemical Analysis:

Carbon: .04
Manganese: 1.00
Chromium: .08
Nickel: 1.50
Silicon: .26
Phosphorus: .011
Sulfur: .010
Molybdenum: .28
Vanadium: .01
Copper: .07

Full	Split	Triple	Quad	Volts	Amps	
2	4	2	----	23.9	181	DC+

Test Results As Welded

Yield: 89,197
Tensile: 96,927
Elongation (2")%: 25.0
Reduction of Area: 67.4

Charpy V-Notch Impacts Tested @ -60 Deg. F.
Ft. Lbs. 55-63-52-54-71 Ave = 59

Fillets: OK Vertical / Overhead

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Size: 3/16"
Test Date: 2/09/11
Test Number: 2-50573-00
Moisture (RC-412): (P) .08 / (E) .14%
Concentricity: 2%
X-Rays: Satisfactory
Diffusible Hydrogen: 2.6 ml/100 gr.
Atmospheric Temperature: 71
Relative Humidity: 10%

Chemical Analysis:

Carbon: .04
Manganese: 1.12
Chromium: .06
Nickel: 1.67
Silicon: .31
Phosphorus: .010
Sulfur: .009
Molybdenum: .30
Vanadium: .01
Copper: .03

Full	Split	Triple	Quad	Volts	Amps	
----	8	----	----	24	232	DC+

Test Results	As Welded
Yield:	80.376
Tensile:	91,109
Elongation (2")%:	26.0
Reduction of Area:	73.6

Charpy V-Notch Impacts Tested @ -60 Deg. F.
Ft. Lbs. 75-77-98-60-67 Ave = 75

Fillets: OK Horizontal

This is to certify that the original is duly authorized and signed.

BY: K. Wildasin
K. Wildasin, Supervisor, Q.A. Services

ESAB Welding & Cutting Products
1500 Karen Lane
Hanover, PA 17331

CERTIFICATE OF CONFORMANCE TO REQUIREMENTS FOR WELDING ELECTRODES

This is to certify that **ATOM ARC T** Classification **E11018-MH4R**, as supplied under the above order number, is the same classification, manufacturing process, and material requirements as the electrodes tested below. All tests required by **Specification AWS A5.5:2006** were performed in conformance with this specification, and the above electrode met all the requirements. The electrodes were marked in conformance with **AWS A5.5:2006**. The chemistry and mechanical properties of the deposited weld metal were as follows:

Size: 3/32"
Test Date: 9/09/11
Test Number: 2-51576-00
Moisture (RC-412): (P) .10 / (E) .18%
Concentricity: 2%
Diffusible Hydrogen: 3.1 ml/100 gr.
Atmospheric Temperature: 72
Relative Humidity: 20%

Chemical Analysis:

Carbon: .04
Manganese: 1.48
Chromium: .30
Nickel: 2.08
Silicon: .27
Phosphorus: .011
Sulfur: .009
Molybdenum: .42
Vanadium: .01
Copper: .04

This is to certify that the original is duly authorized and signed.

By: K. Wildasin
K. Wildasin, Supervisor, Q.A. Services

ESAB Welding & Cutting Products
1500 Karen Lane
Hanover, PA 17331

CERTIFICATE OF CONFORMANCE TO REQUIREMENTS FOR WELDING ELECTRODES

This is to certify that **ATOM ARC T** Classification **E11018-MH4R**, as supplied, is the same classification, manufacturing process, and material requirements as the electrodes tested below. All tests required by **Specification AWS A5.5:2006** were performed in conformance with this specification, and the above electrode met all the requirements. The electrodes were marked in conformance with **AWS A5.5:2006**. The chemistry and mechanical properties of the deposited weld metal were as follows:

Size: 5/32"
Test Date: 10/20/11
Test Number: 2-51681-00
Moisture (RC-412): (P) .07 / (E) .17%
Concentricity: 2%
X-Rays: Satisfactory

Chemical Analysis:

Carbon: .06
Manganese: 1.68
Chromium: .27
Nickel: 2.08
Silicon: .29
Phosphorus: .012
Sulfur: .011
Molybdenum: .38
Vanadium: .01
Copper: .09

Full	Split	Triple	Quad	Volts	Amps	
1	2	3	----	24.0	180	DC+

Test Results

As Welded

Yield: 101,570
Tensile: 114,555
Elongation (2")%: 20.0
Reduction of Area: 53.0

Charpy V-Notch Impacts Tested @ -60 Deg. F.
Ft. Lbs. 40-45-44-42-42 Ave = 43

Fillets: OK Vertical / Overhead

This is to certify that the original is duly authorized and signed.

By: K. Wildasin
K. Wildasin, Supervisor, Q.A. Services

ESAB Welding & Cutting Products
1500 Karen Lane
Hanover, PA 17331

CERTIFICATE OF CONFORMANCE TO REQUIREMENTS FOR WELDING ELECTRODES

This is to certify that **ATOM ARC T** Classification **E11018-MH4R**, as supplied under the above order number, is the same classification, manufacturing process, and material requirements as the electrodes tested below. All tests required by **Specification AWS A5.5:2006** were performed in conformance with this specification, and the above electrode met all the requirements. The electrodes were marked in conformance with **AWS A5.5:2006**. The chemistry and mechanical properties of the deposited weld metal were as follows:

Size: 3/16"
Test Date: 10/28/11
Test Number: 2-51727-00
Moisture (RC-412): (P) .10 / (E) .18%
Concentricity: 2%
X-Rays: Satisfactory
Diffusible Hydrogen: 3.3 ml/100 gr
Atmospheric Temperature: 701
Relative Humidity: 14%

Chemical Analysis:

Carbon: .05
Manganese: 1.62
Chromium: .26
Nickel: 2.07
Silicon: .33
Phosphorus: .014
Sulfur: .012
Molybdenum: .42
Vanadium: .01
Copper: .09

Full	Split	Triple	Quad	Volts	Amps	
1	2	4	----	22.4	251	DC+

Test Results

As Welded

Yield: 110,000
Tensile: 121,288
Elongation (2")%: 23.0
Reduction of Area: 53.4

Charpy V-Notch Impacts Tested @ -60 Deg. F.

Ft. Lbs. 50-47-37-38-31 Ave = 41

Fillets: OK Horizontal

This is to certify that the original is duly authorized and signed.

By: K. Wildasin
K. Wildasin, Supervisor, Q.A. Services

ESAB Welding & Cutting Products
1500 Karen Lane
Hanover, PA 17331

CERTIFICATE OF CONFORMANCE TO REQUIREMENTS FOR WELDING ELECTRODES

This is to certify that **COREWELD 70** Classification **E70C-6M**, as supplied under the above order number, is the same classification, manufacturing process, and material requirements as the electrodes tested below. All tests required by **Specification AWS A5.18:2005** were performed in conformance with this specification, and the above electrode met all the requirements. The electrodes were marked in conformance with **AWS A5.18:2005**. The chemistry and mechanical properties of the deposited weld metal were as follows:

Shielding Gas: 75% AR/25% CO₂

Test Date: 4/14/11
Test Number: 2-50869-00
Travel Speed: 12.2 IPM
X-Rays: Satisfactory

Chemical Analysis:

Carbon:	.05
Manganese:	1.44
Chromium:	.04
Nickel:	.03
Silicon:	.59
Phosphorus:	.009
Sulfur:	.013
Molybdenum:	.02
Vanadium:	<.01
Copper:	.07

Full	Split	Triple	Quad	Volts	Amps
---	6	---	---	26.8	324 DC+

Test Results **As Welded**

Yield:	67,133
Tensile:	80,411
Elongation (2")%:	32.0
Reduction of Area:	67.8

Charpy V-Notch Impacts Tested @ -20 Deg. F.
Ft. Lbs. 25-33-25-25-24 Ave = 26

This is to certify that the original is duly authorized and signed.

By: K Wildasin
K. Wildasin, Supervisor, Q.A. Services

ESAB Welding & Cutting Products
1500 Karen Lane
Hanover, PA 17331

CERTIFICATE OF CONFORMANCE TO REQUIREMENTS FOR WELDING ELECTRODES

This is to certify that **COREWELD C6** Classification **E70C-6M**, as supplied under the above order number, is the same classification, manufacturing process, and material requirements as the electrodes tested below. All tests required by **Specification AWS A5.18:2005** were performed in conformance with this specification, and the above electrode met all the requirements. The electrodes were marked in conformance with **AWS A5.18:2005**. The chemistry and mechanical properties of the deposited weld metal were as follows:

Shielding Gas: 75% AR/25% CO₂

Test Date: 5/18/11

Test Number: 2-51044-00

Travel Speed: 10.9 IPM

Diffusible Hydrogen: 3.3 ml/100 gr.

X-Rays: Satisfactory

Chemical Analysis:

Carbon:	.04
Manganese:	1.56
Chromium:	.05
Nickel:	.03
Silicon:	.78
Phosphorus:	.009
Sulfur:	.015
Molybdenum:	.01
Vanadium:	.01
Copper:	.05

Full	Split	Triple	Quad	Volts	Amps	
1	6	---	---	26.8	299	DC+

Test Results

As Welded

Yield:	69,393
Tensile:	79,955
Elongation (2")%:	31.0
Reduction of Area:	72.4

Charpy V-Notch Impacts Tested @ -20 Deg. F.
Ft. Lbs. 42-13-36-57-39 Ave = 37

This is to certify that the original is duly authorized and signed.

By: K. Wildasin
K. Wildasin, Supervisor, Q.A. Services

ESAB Welding & Cutting Products
1500 Karen Lane
Hanover, PA 17331

CERTIFICATE OF CONFORMANCE TO REQUIREMENTS FOR WELDING ELECTRODES

This is to certify that **CORESHIELD 8**, Classification **E71T-8**, as supplied under the above order number, is the same classification, manufacturing process, and material requirements as the electrodes tested below. All tests required by **Specification AWS A5.20:2005** were performed in conformance with this specification, and the above electrode met all the requirements. The electrodes were marked in conformance with **AWS A5.20:2005**. The chemistry and mechanical properties of the deposited weld metal were as follows:

Diameter: 1/16"
Test Date: 9/28/11
Test Number: 2-51577-00
Travel Speed: 10.5 IPM
X-Rays: Satisfactory

Chemical Analysis:

Carbon:	.18
Manganese:	.47
Chromium:	.04
Nickel:	.02
Silicon:	.18
Phosphorus:	.007
Sulfur:	.003
Molybdenum:	.01
Aluminum:	.53
Vanadium:	.01
Copper:	.04

Full	Split	Triple	Quad	Volts	Amps	
---	2	4	---	24.3	293	DC+

Test Results

As Welded

Yield:	67,852
Tensile:	84,177
Elongation (2")%:	33.0
Reduction of Area:	64.1

Charpy V-Notch Impacts Tested @ -20 Deg. F.
Ft. Lbs. 22-25-24-26-24 Ave = 24

Fillets: OK VERTICAL-UP / OVERHEAD

This is to certify that the original is duly authorized and signed.

By: K. Wildasin
K. Wildasin, Supervisor, Q.A. Services

CERTIFICATE OF CONFORMANCE TO REQUIREMENTS FOR WELDING ELECTRODES

This is to certify that **DUAL SHIELD II 70T-12H4** Classification **E71T-1MJH4/T-12MJH4** as supplied under the above order number, is the same classification, manufacturing process, and material requirements as the electrodes tested below. All tests required by **Specification AWS A5.20:2005** were performed in conformance with this specification, and the above electrode met all the requirements. The electrodes were marked in conformance with **AWS A5.20:2005**. The chemistry and mechanical properties of the deposited weld metal were as follows:

Shielding Gas: 75% AR/25% CO₂
Diameter: 1/16"
Test Date: 3/09/11
Test Number: 2-51677-00
Travel Speed: 12.77 IPM
Diffusible Hydrogen: 2.1 ml/100 gr.
Atmospheric Temperature: 72
Relative Humidity: 12%
X-Rays: Satisfactory

Chemical Analysis:

Carbon: .04
Manganese: 1.20
Chromium: .04
Nickel: .03
Silicon: .41
Phosphorus: .012
Sulfur: .005
Molybdenum: .02
Vanadium: .02
Copper: .07

Full	Split	Triple	Quad	Volts	Amps
1	7	---	---	27.0	260 DC+

Test Results As Welded

Yield: 76,925
Tensile: 83,648
Elongation (2")%: 29.0
Reduction of Area: 75.3

Charpy V-Notch Impacts Tested @ 0 Deg. F.
Ft. Lbs. 125-131-113-113-113 Ave = 119

Charpy V-Notch Impacts Tested @ -40 Deg. F.
Ft. Lbs. 84-108-96-109-103 Ave = 83

Fillets: OK VERTICAL-UP / OVERHEAD

This is to certify that the original is duly authorized and signed.

By: K. Wildasin
K. Wildasin, Supervisor, Q.A. Services

CERTIFICATE OF CONFORMANCE TO REQUIREMENTS FOR WELDING ELECTRODES

This is to certify that **DUAL SHIELD R-70 ULTRA** Classification **E70T-1CH8/T-1M/T-9CH8/T-9M** as supplied under the above order number, is the same classification, manufacturing process, and material requirements as the electrodes tested below. All tests required by **Specification AWS A5.20:2005** were performed in conformance with this specification, and the above electrode met all the requirements. The electrodes were marked in conformance with **AWS A5.20:2005**. The chemistry and mechanical properties of the deposited weld metal were as follows:

Shielding Gas: 75% AR/25% CO₂

Diameter: 3/32"
Test Date: 4/14/11
Test Number: 2-50871-00
Travel Speed: 11.8 IPM
X-Rays: Satisfactory

Shielding Gas: 100% CO₂

Diameter: 3/32"
Test Date: 2/24/11
Test Number: 2-50721-00
Travel Speed: 10.97 IPM
Diffusible Hydrogen: 6.8 ml/100 gr.
Atmospheric Temperature: 70
Relative Humidity: 10%
X-Ray: Satisfactory

Chemical Analysis:

Carbon: .03
Manganese: 1.55
Chromium: .04
Nickel: .38
Silicon: .56
Phosphorus: .009
Sulfur: .010
Molybdenum: .01
Vanadium: .02
Copper: .05

Chemical Analysis:

Carbon: .03
Manganese: 1.21
Chromium: .04
Nickel: .37
Silicon: .40
Phosphorus: .011
Sulfur: .010
Molybdenum: .01
Vanadium: .01
Copper: .07

Full	Split	Triple	Quad	Volts	Amps
1	4	---	---	27	430 DC+

Full	Split	Triple	Quad	Volts	Amps
1	5	---	--	28.7	371 DC+

Test Results As Welded

Yield: 72,052
Tensile: 84,694
Elongation (2")%: 27.0
Reduction of Area: 63.7

Test Results As Welded

Yield: 65,215
Tensile: 76,918
Elongation (2")%: 28.0
Reduction of Area: 67.6

Charpy V-Notch Impacts Tested @ 0 Deg. F.
Ft. Lbs. 36-32-28-22-23 Ave = 28

Charpy V-Notch Impacts Tested @ 0 Deg. F.
Ft. Lbs. 44-41-41-54-45 Ave = 45

Charpy V-Notch Impacts Tested @ -20 Deg. F.
Ft. Lbs. 19-17-34-22-26 Ave = 24

Charpy V-Notch Impacts Tested @ -20 Deg. F.
Ft. Lbs. 50-15-17-32-55 Ave = 34

Filletts: OK HORIZONTAL

Filletts: OK HORIZONTAL

This is to certify that the original is duly authorized and signed.

By: K. Wildasin
 K. Wildasin, Supervisor, Q.A. Services

ESAB Welding & Cutting Products
1500 Karen Lane
Hanover, PA 17331

CERTIFICATE OF CONFORMANCE TO REQUIREMENTS FOR WELDING ELECTRODES

This is to certify that **DUAL SHIELD T-75** Classification **E70T-5CJH4** supplied under the above order number, is the same classification, manufacturing process, and material requirements as the electrodes tested below. All tests required by **Specification AWS A5.20:2005** were performed in conformance with this specification, and the above electrode met all the requirements. The electrodes were marked in conformance with **AWS A5.20:2005**. The chemistry and mechanical properties of the deposited weld metal were as follows:

Shielding Gas: 100% CO₂
Diameter: 1/16"
Test Date: 3/01/11
Test Number: 2-50722-00
Travel Speed: 11.1 IPM
Diffusible Hydrogen: 2.9 ml/100 gr.
Atmospheric Temperature: 70
Relative Humidity: 1%
X-Rays: Satisfactory

Chemical Analysis:

Carbon: .04
Manganese: 1.40
Chromium: .05
Nickel: .02
Silicon: .62
Phosphorus: .007
Sulfur: .010
Molybdenum: .01
Vanadium: <.01
Copper: .06

Full	Split	Triple	Quad	Volts	Amps
1	4	---	---	29.8	375 DC+

Test Results **As Welded**

Yield:	64,786
Tensile:	77,232
Elongation (2")%:	31.0
Reduction of Area:	74.1

Charpy V-Notch Impacts Tested @ -40 Deg. F.
Ft. Lbs. 72-49-100-58-31 Ave = 62

Fillets: OK HORIZONTAL

This is to certify that the original is duly authorized and signed.

By K. Wildasin
K. Wildasin, Supervisor, Q.A. Services

CERTIFICATE OF CONFORMANCE TO REQUIREMENTS FOR WELDING ELECTRODES

This is to certify that **DUAL SHIELD 7100 ULTRA** Classification **E71T-1CH8/T-1M/T-9CH8/T-9M** as supplied under the above order number, is the same classification, manufacturing process, and material requirements as the electrodes tested below. All tests required by **Specification AWS A5.20:2005** were performed in conformance with this specification, and the above electrode met all the requirements. The electrodes were marked in conformance with **AWS A5.20:2005**. The chemistry and mechanical properties of the deposited weld metal were as follows:

Shielding Gas: 75% AR/25% CO₂

Shielding Gas: 100% CO₂

Diameter: 1/16"
Test Date: 8/29/11
Test Number: 2-51476-00
Travel Speed: 10.6 IPM
X-Rays: Satisfactory

Diameter: 1/16"
Test Date: 5/18/11
Test Number: 2-51045-00
Travel Speed: 11.7 IPM
Diffusible Hydrogen: 5.4 ml/100 gr.
Atmospheric Temperature: 70
Relative Humidity: 11%
X-Rays: Satisfactory

Chemical Analysis:

Carbon: .02
Manganese: 1.66
Chromium: .05
Nickel: .02
Silicon: .76
Phosphorus: .010
Sulfur: .009
Molybdenum: .01
Vanadium: .02
Copper: .05

Chemical Analysis:

Carbon: .02
Manganese: 1.16
Chromium: .04
Nickel: .02
Silicon: .45
Phosphorus: .008
Sulfur: .010
Molybdenum: .01
Vanadium: .02
Copper: .05

Full	Split	Triple	Quad	Volts	Amps
1	6	---	---	26.2	295 DC+

Full	Split	Triple	Quad	Volts	Amps
1	6	---	--	26.8	296 DC+

Test Results As Welded

Yield: 85,243
Tensile: 90,357
Elongation (2")%: 24.0
Reduction of Area: 63.4

Test Results As Welded

Yield: 76,150
Tensile: 84,751
Elongation (2")%: 28.0
Reduction of Area: 72.0

Charpy V-Notch Impacts Tested @ 0 Deg. F.
Ft. Lbs. 36-36-34-34-42 Ave = 36

Charpy V-Notch Impacts Tested @ 0 Deg. F.
Ft. Lbs. 90-54-67-75-54 Ave = 68


Charpy V-Notch Impacts Tested @ -20 Deg. F.
Ft. Lbs. 24-27-21-27-32 Ave = 26

Charpy V-Notch Impacts Tested @ -20 Deg. F.
Ft. Lbs. 30-45-44-84-56 Ave = 52

Filletts: OK VERTICAL-UP/OVERHEAD

Filletts: OK VERTICAL-UP/OVERHEAD

This is to certify that the original is duly authorized and signed.

By: 
 K. Wildasin, Supervisor, Q.A. Services

CERTIFICATE OF CONFORMANCE TO REQUIREMENTS FOR WELDING ELECTRODES

This is to certify that **DUAL SHIELD 7100 LC** Classification **E71T-1CH8/T-1M/T-9CH8/T-9M** as supplied under the above order number, is the same classification, manufacturing process, and material requirements as the electrodes tested below. All tests required by **Specification AWS A5.20:2005** were performed in conformance with this specification, and the above electrode met all the requirements. The electrodes were marked in conformance with **AWS A5.20:2005**. The chemistry and mechanical properties of the deposited weld metal were as follows:

Shielding Gas: 75% AR/25% CO₂

Shielding Gas: 100% CO₂

Diameter: 1/16"
Test Date: 5/21/11
Test Number: 2-51046-00
Travel Speed: 11.9 IPM
X-Rays: Satisfactory

Diameter: 1/16"
Test Date: 4/14/11
Test Number: 2-50873-00
Travel Speed: 11.0 IPM
Diffusible Hydrogen: 7.6 ml/100 gr.
Atmospheric Temperature: 69
Relative Humidity: 11%
X-Rays: Satisfactory

Chemical Analysis:

Carbon: .03
Manganese: 1.57
Chromium: .04
Nickel: .03
Silicon: .74
Phosphorus: .012
Sulfur: .005
Molybdenum: .01
Vanadium: .03
Copper: .08

Chemical Analysis:

Carbon: .03
Manganese: 1.47
Chromium: .04
Nickel: .04
Silicon: .66
Phosphorus: .009
Sulfur: .005
Molybdenum: .01
Vanadium: .03
Copper: .08

Full	Split	Triple	Quad	Volts	Amps
1	6	---	---	27.9	302 DC+

Full	Split	Triple	Quad	Volts	Amps
1	6	--	--	25.3	313 DC+

Test Results As Welded

Yield: 79,687
Tensile: 91,132
Elongation (2")%: 27.0
Reduction of Area: 67.8

Test Results As Welded

Yield: 85,900
Tensile: 91,380
Elongation (2")%: 25.0
Reduction of Area: 57.4

Charpy V-Notch Impacts Tested @ 0 Deg. F.
Ft. Lbs. 84-101-70-90-55 Ave = 80

Charpy V-Notch Impacts Tested @ 0 Deg. F.
Ft. Lbs. 62-102-62-58-82 Ave = 73

Charpy V-Notch Impacts Tested @ -20 Deg. F.
Ft. Lbs. 33-52-79-77-59 Ave = 60

Charpy V-Notch Impacts Tested @ -20 Deg. F.
Ft. Lbs. 76-26-34-50-44 Ave = 46

Fillets: OK VERTICAL UP / OVERHEAD

Fillets: OK VERTICAL UP / OVERHEAD

This is to certify that the original is duly authorized and signed.

By K. Wildasin
 K. Wildasin, Supervisor, Q.A. Services

CERTIFICATE OF CONFORMANCE TO REQUIREMENTS FOR WELDING ELECTRODES

This is to certify that **DUAL SHIELD II 70 ULTRA** Classification **E71T-1M/T-12M**, as supplied under the above order number, is the same classification, manufacturing process, and material requirements as the electrodes tested below. All tests required by **Specification AWS A5.20:2005** were performed in conformance with this specification, and the above electrode met all the requirements. The electrodes were marked in conformance with **AWS A5.20:2005**. The chemistry and mechanical properties of the deposited weld metal were as follows:

Shielding Gas: 75% AR/25% CO₂

Diameter: 1/16"
Test Date: 6/06/11
Test Number: 2-51091-00
Travel Speed: 10.4 IPM
X-Rays: Satisfactory

Chemical Analysis:

Carbon: .03
Manganese: 1.05
Chromium: .04
Nickel: .04
Silicon: .43
Phosphorus: .011
Sulfur: .005
Molybdenum: .01
Vanadium: .02
Copper: .08

Full	Split	Triple	Quad	Volts	Amps
1	6		---	27	292 DC+

Test Results As Welded

Yield: 68,087
Tensile: 76,859
Elongation (2")%: 31.0
Reduction of Area: 78.0

Charpy V-Notch Impacts Tested @ 0 Deg. F.
Ft. Lbs. 20-125-85-29-28 Ave = 57

Charpy V-Notch Impacts Tested @ -20 Deg. F.
Ft. Lbs. 17-31-87-18-24 Ave = 35

Fillets: OK VERTICAL-UP / OVERHEAD

This is to certify that the original is duly authorized and signed.

By: K. Wildasin
K. Wildasin, Supervisor, Q.A. Services

ESAB Welding & Cutting Products
1500 Karen Lane
Hanover, PA 17331

CERTIFICATE OF CONFORMANCE TO REQUIREMENTS FOR WELDING ELECTRODES

This is to certify that **DUAL SHIELD 70 ULTRA PLUS** Classification **E71T-1M/T-9M**, as supplied under the above order number, is the same classification, manufacturing process, and material requirements as the electrodes tested below. All tests required by **Specification AWS A5.20:2005** were performed in conformance with this specification, and the above electrode met all the requirements. The electrodes were marked in conformance with **AWS A5.20:2005**. The chemistry and mechanical properties of the deposited weld metal were as follows:

Shielding Gas: 75% AR/25% CO₂

Diameter: 1/16"
Test Date: 1/17/12
Test Number: 2-52071-00
Travel Speed: 12.9 IPM
X-Rays: Satisfactory

Chemical Analysis:

Carbon: .03
Manganese: 1.12
Chromium: .06
Nickel: .02
Silicon: .70
Phosphorus: .010
Sulfur: .008
Molybdenum: .01
Vanadium: .02
Copper: .04

Full	Split	Triple	Quad	Volts	Amps
1	7	---	---	27	280 DC+

Test Results **As Welded**

Yield: 82,593
Tensile: 89,077
Elongation (2")%: 28.0
Reduction of Area: 71.4

Charpy V-Notch Impacts Tested @ 0 Deg. F.
Ft. Lbs. 109-116-121-119-110 Ave = 115

Charpy V-Notch Impacts Tested @ -20 Deg. F.
Ft. Lbs. 103-89-93-99-112 Ave = 99

Charpy V-Notch Impacts Tested @ -40 Deg. F.
Ft. Lbs. 28-44-103-91-79 Ave = 77

Fillets: OK VERTICAL-UP / OVERHEAD

This is to certify that the original is duly authorized and signed.

By: K. Wildasin
K. Wildasin, Supervisor, Q.A. Services

ESAB Welding & Cutting Products
1500 Karen Lane
Hanover, PA 17331

CERTIFICATE OF CONFORMANCE TO REQUIREMENTS FOR WELDING ELECTRODES

This is to certify that **DUAL SHIELD II 71 ULTRA** Classification **E71T-1CJ/T-12CJ**, as supplied is the same classification, manufacturing process, and material requirements as the electrodes tested below. All tests required by **Specification AWS A5.20:2005** were performed in conformance with this specification, and the above electrode met all the requirements. The electrodes were marked in conformance with **AWS A5.20:2005**. The chemistry and mechanical properties of the deposited weld metal were as follows:

Shielding Gas: 100% CO₂

Diameter: 1/16"

Test Date: 6/13/11

Test Number: 2-51090-00

Travel Speed: 11.5 IPM

X-Rays: Satisfactory

Chemical Analysis:

Carbon:	.04
Manganese:	.95
Chromium:	.05
Nickel:	.45
Silicon:	.27
Phosphorus:	.008
Sulfur:	.008
Molybdenum:	.01
Vanadium:	.02
Copper:	.04

Full	Split	Triple	Quad	Volts	Amps	
1	7	---	---	28	282	DC+

Test Results

As Welded

Yield:	73,278
Tensile:	80,360
Elongation (2")%:	28.0
Reduction of Area:	74.9

Charpy V-Notch Impacts Tested @ 0 Deg. F.
Ft. Lbs. 84-38-78-90-103 Ave = 79

Charpy V-Notch Impacts Tested @ -20 Deg. F.
Ft. Lbs. 24-60-72-38-82 Ave = 55

Charpy V-Notch Impacts Tested @ -40 Deg. F.
Ft. Lbs. 47-90-51-53-68 Ave = 62

Fillets: OK VERTICAL-UP / OVERHEAD

This is to certify that the original is duly authorized and signed.

By: K. Wildasin
K. Wildasin, Supervisor, Q.A. Services

ESAB Welding & Cutting Products
1500 Karen Lane
Hanover, PA 17331

CERTIFICATE OF CONFORMANCE TO REQUIREMENTS FOR WELDING ELECTRODES

This is to certify that **DUAL SHIELD 700X** Classification **E70T-1C**, as supplied under the above order number, is the same classification, manufacturing process, and material requirements as the electrodes tested below. All tests required by **Specification AWS A5.20:2005** were performed in conformance with this specification, and the above electrode met all the requirements. The electrodes were marked in conformance with **AWS A5.20:2005**. The chemistry and mechanical properties of the deposited weld metal were as follows:

Shielding Gas: 100% CO₂

Diameter: 1/16"
Test Date: 5/31/11
Test Number: 2-51047-00
Travel Speed: 9.8 IPM
X-Rays: Satisfactory

Chemical Analysis:

Carbon: .04
Manganese: 1.32
Chromium: .05
Nickel: .04
Silicon: .71
Phosphorus: .010
Sulfur: .009
Molybdenum: .01
Vanadium: .02
Copper: .09

Full	Split	Triple	Quad	Volts	Amps
1	6	---	--	26.9	260 DC+

Test Results As Welded

Yield:	69,484
Tensile:	81,364
Elongation (2")%:	30.0
Reduction of Area:	70.9

Charpy V-Notch Impacts Tested @ 0 Deg. F.
Ft. Lbs. 39-22-40-20-27 Ave = 30

Fillets: OK HORIZONTAL

This is to certify that the original is duly authorized and signed.

By: K. Wildasin
K. Wildasin, Supervisor, Q.A. Services

CERTIFICATE OF CONFORMANCE TO REQUIREMENTS FOR WELDING ELECTRODES

This is to certify that **DUAL SHIELD 710X** Classification **E71T-1C-DH8/T-1M/T-9C-H8/T-9M**, is the same classification, manufacturing process, and material requirements as the electrodes tested below. All tests required by **Specification AWS A5.20:2005** were performed in conformance with this specification, and the above electrode met all the requirements. The electrodes were marked in conformance with **AWS A5.20:2005**. The chemistry and mechanical properties of the deposited weld metal were as follows:

Shielding Gas: 75% AR/25% CO₂

Diameter: 1/16"
Test Date: 5/20/11
Test Number: 2-51048-00
Travel Speed: 12.2 IPM
X-Rays: Satisfactory

Shielding Gas: 100% CO₂

Diameter: 1/16"
Test Date: 5/20/11
Test Number: 2-51049-00
Travel Speed: 11.3 IPM
X-Rays: Satisfactory
Diffusible Hydrogen: 7.4
Atmospheric Temperature: 70
Relative Humidity: 11%

Chemical Analysis:

Carbon: .04
Manganese: 1.66
Chromium: .05
Nickel: .45
Silicon: .79
Phosphorus: .011
Sulfur: .006
Molybdenum: .02
Vanadium: .03
Copper: .09

Chemical Analysis:

Carbon: .03
Manganese: 1.36
Chromium: .04
Nickel: .45
Silicon: .57
Phosphorus: .011
Sulfur: .005
Molybdenum: .01
Vanadium: .03
Copper: .09

Full	Split	Triple	Quad	Volts	Amps
1	6	---	---	25.7	290 DC+

Full	Split	Triple	Quad	Volts	Amps
1	6	---	--	27.5	300 DC+

Test Results As Welded

Yield: 80,639
Tensile: 92,823
Elongation (2")%: 29.0
Reduction of Area: 72.7

Test Results As Welded

Yield: 79,121
Tensile: 86,928
Elongation (2")%: 27.0
Reduction of Area: 61.6

Charpy V-Notch Impacts Tested @ 0 Deg. F.
Ft. Lbs. 28-53-77-28-63 Ave = 50

Charpy V-Notch Impacts Tested @ 0 Deg. F.
Ft. Lbs. 44-47-57-36-35 Ave = 44


Charpy V-Notch Impacts Tested @ -20 Deg. F.
Ft. Lbs. 43-38-45-46-52 Ave = 45

Charpy V-Notch Impacts Tested @ -20 Deg. F.
Ft. Lbs. 30-34-19-46-25 Ave = 31

Fillets: OK VERTICAL / OVERHEAD

Fillets: OK VERTICAL / OVERHEAD

This is to certify that the original is duly authorized and signed.

By: 
 K. Wildasin, Supervisor, Q.A. Services

CERTIFICATE OF CONFORMANCE TO REQUIREMENTS FOR WELDING ELECTRODES

This is to certify that **DUAL SHIELD 710X-M** Classification **E71T-1C/T-1M-DH8/T-9C/T-9M-DH8**, is the same classification, manufacturing process, and material requirements as the electrodes tested below. All tests required by **Specification AWS A5.20:2005** were performed in conformance with this specification, and the above electrode met all the requirements. The electrodes were marked in conformance with **AWS A5.20:2005**. The chemistry and mechanical properties of the deposited weld metal were as follows:

Shielding Gas: 75% AR/25% CO₂
Diameter: 1/16"
Test Date: 8/26/11
Test Number: 2-51474-00
Travel Speed: 12.9 IPM
X-Rays: Satisfactory
Hydrogen: 7.3 ml/100 gr.
Atmospheric Temperature: 71
Relative Humidity: 17%

Shielding Gas: 100% CO₂
Diameter: 1/16"
Test Date: 8/29/11
Test Number: 2-51475-00
Travel Speed: 13.4 IPM
X-Rays: Satisfactory

Chemical Analysis:

Chemical Analysis:

Carbon: .03
Manganese: 1.12
Chromium: .04
Nickel: .03
Silicon: .47
Phosphorus: .012
Sulfur: .004
Molybdenum: .01
Vanadium: .02
Copper: .09

Carbon: .03
Manganese: .89
Chromium: .04
Nickel: .03
Silicon: .33
Phosphorus: .012
Sulfur: .003
Molybdenum: .01
Vanadium: .02
Copper: .09

Full	Split	Triple	Quad	Volts	Amps	
1	7	---	---	27	290	DC+

Full	Split	Triple	Quad	Volts	Amps	
1	7	---	--	26.2	285	DC+

Test Results As Welded

Test Results As Welded

Yield: 69,445
Tensile: 78,186
Elongation (2")%: 30.0
Reduction of Area: 75.4

Yield: 69,224
Tensile: 77,367
Elongation (2")%: 27.0
Reduction of Area: 74.1

Charpy V-Notch Impacts Tested @ 0 Deg. F.
Ft. Lbs. 25-19-66-65-104 Ave = 56

Charpy V-Notch Impacts Tested @ 0 Deg. F.
Ft. Lbs. 15-14-23-27-103 Ave = 155

Charpy V-Notch Impacts Tested @ -20 Deg. F.
Ft. Lbs. 87-67-31-28-47 Ave = 52

Charpy V-Notch Impacts Tested @ -20 Deg. F.
Ft. Lbs. 122-123-108-129-128 Ave = 122

Filletts: OK VERTICAL / OVERHEAD

Filletts: OK VERTICAL / OVERHEAD

This is to certify that the original is duly authorized and signed.

By: K. Wildasin
 K. Wildasin, Supervisor, Q.A. Services

CERTIFICATE OF CONFORMANCE TO REQUIREMENTS FOR WELDING ELECTRODES

This is to certify that **DUAL SHIELD II 711X** Classification **E71T-1C-JDH8/T-12C-JDH8** as supplied under the Above order number, is the same classification, manufacturing process, and material requirements as the electrodes tested below. All tests required by **Specification AWS A5.20:2005** were performed in conformance with this specification, and the above electrode met all the requirements. The electrodes were marked in conformance with **AWS A5.20:2005**. The chemistry and mechanical properties of the deposited weld metal were as follows:

Shielding Gas: 100% CO₂
Diameter: 1/16"
Test Date: 6/29/11
Test Number: 2-51205-00
Travel Speed: 12.6 IPM
X-Rays: Satisfactory
Diffusible Hydrogen: 7.1 ml/100 gr
Atmospheric Temperature: 72
Relative Humidity: 13%

Chemical Analysis:

Carbon: .04
Manganese: 1.52
Chromium: .06
Nickel: .45
Silicon: .58
Phosphorus: .011
Sulfur: .010
Molybdenum: .01
Vanadium: .03
Copper: .04

Full	Split	Triple	Quad	Volts	Amps
1	6	---	---	28	295 DC+

Test Results **As Welded**

Yield: 77,898
Tensile: 84,750
Elongation (2")%: 30.0
Reduction of Area: 70.0

Charpy V-Notch Impacts Tested @ 0 Deg. F.
Ft. Lbs. 68-85-66-61-80 Ave = 72

Charpy V-Notch Impacts Tested @ -20 Deg. F.
Ft. Lbs. 61-45-29-55-39 Ave = 46

Charpy V-Notch Impacts Tested @ -40 Deg. F.
Ft. Lbs. 64-37-40-66-46 Ave = 51

Fillets: OK VERTICAL-UP / OVERHEAD

This is to certify that the original is duly authorized and signed.

By: K. Wildasin
K. Wildasin, Supervisor, Q.A. Services

CERTIFICATE OF CONFORMANCE TO REQUIREMENTS FOR WELDING ELECTRODES

This is to certify that **DUAL SHIELD II 712X** Classification **E71T-1MJH8/T-12MJH8** as supplied under the above order number, is the same classification, manufacturing process, and material requirements as the electrodes tested below. All tests required by **Specification AWS A5.20:2005** were performed in conformance with this specification, and the above electrode met all the requirements. The electrodes were marked in conformance with **AWS A5.20:2005**. The chemistry and mechanical properties of the deposited weld metal were as follows:

Shielding Gas: 75% AR/25% CO₂

Diameter: 1/16"
Test Date: 5/31/11
Test Number: 2-51070-00
Travel Speed: 11.3 IPM
Diffusible Hydrogen: 6.3 ml/100 gr.
Atmospheric Temperature: 73
Relative Humidity: 13%

X-Rays: Satisfactory

Chemical Analysis:

Carbon: .04
Manganese: 1.15
Chromium: .05
Nickel: .02
Silicon: .36
Phosphorus: .008
Sulfur: .009
Molybdenum: .01
Vanadium: .02
Copper: .04

Full	Split	Triple	Quad	Volts	Amps
1	6	---	---	26.3	296 DC+

Test Results **As Welded**

Yield: 76,902
Tensile: 82,132
Elongation (2")%: 29.0
Reduction of Area: 73.0


Charpy V-Notch Impacts Tested @ 0 Deg. F.
Ft. Lbs. 104-107-99-92-84 Ave = 97

Charpy V-Notch Impacts Tested @ -20 Deg. F.
Ft. Lbs. 86-71-81-82-77 Ave = 79

Charpy V-Notch Impacts Tested @ -40 Deg. F.
Ft. Lbs. 39-26-24-31-64 Ave = 37

Fillets: OK VERTICAL-UP / OVERHEAD

This is to certify that the original is duly authorized and signed.

By: 
K. Wildasin, Supervisor, Q.A. Services

ESAB Welding & Cutting Products
1500 Karen Lane
Hanover, PA 17331

CERTIFICATE OF CONFORMANCE TO REQUIREMENTS FOR WELDING ELECTRODES

This is to certify that **DUAL SHIELD 810X-Ni1** Classification **E81T1-Ni1C**, as supplied under the above order number, is the same classification, manufacturing process, and material requirements as the electrodes tested below. All tests required by **Specification AWS A5.29:2005** were performed in conformance with this specification, and the above electrode met all the requirements. The electrodes were marked in conformance with **AWS A5.29:2005**. The chemistry and mechanical properties of the deposited weld metal were as follows:

Shielding Gas: 100% CO₂
Diameter: 1/16"
Test Date: 9/23/11
Test Number: 2-51579-00
Travel Speed: 11.5 IPM
X-Rays: Satisfactory

Chemical Analysis:

Carbon:	.04
Manganese:	1.21
Chromium:	.04
Nickel:	.96
Silicon:	.65
Phosphorus:	.010
Sulfur:	.008
Molybdenum:	.01
Vanadium:	.03
Copper:	.04

Full	Split	Triple	Quad	Volts	Amps
1	7	---	---	28	285 DC+

Test Results As Welded

Yield:	80,948
Tensile:	89,871
Elongation (2")%:	28.0
Reduction of Area:	71.0

Charpy V-Notch Impacts Tested @ -20 Deg. F.
Ft. Lbs. 61-67-52-50-55 Ave = 57

Fillets: OK VERTICAL-UP/OVERHEAD

This is to certify that the original is duly authorized and signed.

By: K. Wildasin
K. Wildasin, Supervisor, Q.A. Services

2SAB Welding & Cutting Products
 1500 Karen Lane
 Hanover, PA 17331

CERTIFICATE OF CONFORMANCE TO REQUIREMENTS FOR WELDING ELECTRODES

This is to certify that **DUAL SHIELD 8100 W** Classification **E81T1-W2C/W2M**, as supplied under the above order number, is the same classification, manufacturing process, and material requirements as the electrodes tested below. All tests required by **Specification AWS A5.29:2005** were performed in conformance with this specification, and the above electrode met all the requirements. The electrodes were marked in conformance with **AWS A5.29:2005**. The chemistry and mechanical properties of the deposited weld metal were as follows:

Shielding Gas: 75% AR/25% CO₂

Shielding Gas: 100% CO₂

Diameter: 1/16"
Test Date: 2/15/11
Test Number: 2-50650-00
Travel Speed: 11.56 IPM
X-Rays: Satisfactory

Diameter: 1/16"
Test Date: 2/18/11
Test Number: 2-50651-00
Travel Speed: 11.41 IPM
X-Rays: Satisfactory

Chemical Analysis:

Carbon: .05
Manganese: .93
Chromium: .59
Nickel: .58
Silicon: .70
Phosphorus: .011
Sulfur: .010
Molybdenum: .01
Vanadium: .02
Copper: .49

Chemical Analysis:

Carbon: .04
Manganese: .66
Chromium: .54
Nickel: .56
Silicon: .47
Phosphorus: .012
Sulfur: .011
Molybdenum: .01
Vanadium: .02
Copper: .46

Full	Split	Triple	Quad	Volts	Amps
1	7	---	---	27	305 DC+

Full	Split	Triple	Quad	Volts	Amps
1	7	---	--	28	300 DC+

Test Results As Welded

Yield: 83,871
Tensile: 92,644
Elongation (2")%: 27.0
Reduction of Area: 60.7

Test Results As Welded

Yield: 76,160
Tensile: 85,392
Elongation (2")%: 27.0
Reduction of Area: 65.9

Charpy V-Notch Impacts Tested @ -20 Deg. F.
Ft. Lbs. 38-37-32-43-34 Ave = 37

Charpy V-Notch Impacts Tested @ -20 Deg. F.
Ft. Lbs. 20-18-23-20-22 Ave = 21

Fillets: OK VERTICAL-UP/OVERHEAD

Fillets: OK VERTICAL-UP/OVERHEAD

This is to certify that the original is duly authorized and signed.

By: K. Wildasin
 K. Wildasin, Supervisor, Q.A. Services

CERTIFICATE OF CONFORMANCE TO REQUIREMENTS FOR WELDING ELECTRODES

This is to certify that **DUAL SHIELD II 80-Ni1H4** Classification **E81T1-Ni1MH4**, as supplied under the above order number, is the same classification, manufacturing process, and material requirements as the electrodes tested below. All tests required by **Specification AWS A5.29:2005** were performed in conformance with this specification, and the above electrode met all the requirements. The electrodes were marked in conformance with **AWS A5.29:2005**. The chemistry and mechanical properties of the deposited weld metal were as follows:

Shielding Gas: 75% AR/25% CO₂

Diameter: 1/16"

Test Date: 2/18/11

Test Number: 2-50652-00

Travel Speed: 11.8 IPM

Diffusible Hydrogen: 1.4 ml/100 gr.

Atmospheric Temperature: 70

Relative Humidity: 10%

X-Rays: Satisfactory

Chemical Analysis:

Carbon:	.03
Manganese:	.86
Chromium:	.03
Nickel:	.90
Silicon:	.52
Phosphorus:	.008
Sulfur:	.008
Molybdenum:	.01
Vanadium:	.02
Copper:	.04

Full	Split	Triple	Quad	Volts	Amps
1	7	---	---	27.0	297 DC+

Test Results As Welded

Yield:	74,358
Tensile:	84,207
Elongation (2")%:	30.0
Reduction of Area:	76.1

Charpy V-Notch Impacts Tested @ -20 Deg. F.
Ft. Lbs. 112-26-73-34-96 Ave = 68

Fillets: OK VERTICAL-UP/OVERHEAD

This is to certify that the original is duly authorized and signed.

By: K. Wildasin
K. Wildasin, Supervisor, Q.A. Services

CERTIFICATE OF CONFORMANCE TO REQUIREMENTS FOR WELDING ELECTRODES

This is to certify that **DUAL SHIELD 88-C3** Classification **E80T1-Ni1C**, as supplied under the above order number, is the same classification, manufacturing process, and material requirements as the electrodes tested below. All tests required by **Specification AWS A5.29:2005** were performed in conformance with this specification, and the above electrode met all the requirements. The electrodes were marked in conformance with **AWS A5.29:2005**. The chemistry and mechanical properties of the deposited weld metal were as follows:

Shielding Gas: 100% CO₂

Diameter: 5/64"

Test Date: 04/14/11

Test Number: 2-50839-00

Travel Speed: 10.95 IPM

X-Rays: Satisfactory

Chemical Analysis:

Carbon:	.08
Manganese:	1.12
Chromium:	.04
Nickel:	.91
Silicon:	.40
Phosphorus:	.008
Sulfur:	.011
Molybdenum:	.01
Vanadium:	.01
Copper:	.07

Full	Split	Triple	Quad	Volts	Amps	
1	6	---	---	29.2	310	DC+

Test Results

As Welded

Yield:	71,278
Tensile:	80,832
Elongation (2")%:	30.0
Reduction of Area:	72.1

Charpy V-Notch Impacts Tested @ -20 Deg. F.
Ft. Lbs. 83-47-45-35-29 Ave = 48

Fillets: OK HORIZONTAL

This is to certify that the original is duly authorized and signed.

By: K. Wildasin
K. Wildasin, Supervisor, Q.A. Services