2023 **STATE HIGHWAY**
CERTIFICATES OF CONFORMANCE

FLUX CORED WIRES AND STICK ELECTRODES

ESAB WELDING & CUTTING PRODUCTS

We hereby certify that the results provided 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 facilities.

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

Justine Smith

Justine Smith Quality Specialist

2023 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

The ESAB Group Electrode	AWS Classification	AWS Specification
Atom Arc 7018	E7018H4R	AWS A5.1: 2012
Atom Arc 7018-1	E7018-1H4R	AWS A5.1: 2012
Atom Arc 7018 Acclaim	E7018H4R	AWS A5.1: 2012
Atom Arc 8018	E8018-C3H4R	AWS A5.5: 2014
Atom Arc 9018	E9018-MH4R	AWS A5.5: 2014
Atom Arc T	E11018-MH4R	AWS A5.5: 2014
Coreweld C6	E70C-6M	AWS A5.18: 2017
Dual Shield R-70 Ultra	E70T-1C-DH8/T-1M/T-9C-DH8/T-9M	AWS A5.20: 2005
Dual Shield II 70T12-H4	E71T-1MJH4/T-12MJH4	AWS A5.20: 2005
Dual Shield 7100 Ultra	E71T-1C-DH8/T-1M/T-9C-DH8/T-9M	AWS A5.20: 2005
Dual Shield 7100LC	E71T-1C-DH8/T-1M/T-9C-DH8/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-1CJ/T-12CJ	AWS A5.20: 2005
Dual Shield 70 Ultra Plus	E71T-IM/T-9M	AWS A5.20: 2005
Dual Shield 700X	E70T-1C	AWS A5.20: 2005
Dual Shield 710X	E71T-1C-DH8/T-1M/T-9C-DH8/T-9M	AWS A5.20: 2005
Dual Shield 710-M	E71T-1C/T-1M-DH8/T-9C/T-9M-DH8	AWS A5.20: 2005
Dual Shield II 712X	E71T-1MJH8/T-12MJH8	AWS A5.20: 2005
ESAB 71	E71T-1C/1M/9C/9M	AWS A5.20: 2005
Dual Shield II 80Ni1H4	E81T1-Ni1M-JH4	AWS A5.29: 2010
Dual Shield 810X-Ni1	E81T1-Ni1C-JH8	AWS A5.29: 2010

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,** is the same classification, manufacturing process, and material requirements as the electrodes tested below. All tests required by **Specification Specification AWS A5.1:2012** were performed in conformance with this specification, and the above electrode met all the requirements. The electrodes were marked in conformance with **AWS A5.1:2012.** The chemistry and mechanical properties of the deposited weld metal were as follows:

Size: 1/8"
Test Date: 9/13/2023
Test Number: 2-64101-00
Moisture (RC-412): (P) .115
Concentricity: 2%
X-Rays: Satisfactory
Diffusible Hydrogen: 2.4 ml/100 gr.
Atmospheric Temperature: 69 Deg.
Relative Humidity: 18%

Chemical Analysis:

Carbon:	.05
Manganese:	1.05
Silicon:	.40
Phosphorus:	.011
Sulfur:	.010
Chromium:	.06
Nickel:	.06
Molybdenum:	.02
Vanadium:	.01
Copper:	.12

Full	Split	Triple	Quad	Volts	Amps	
---	6	---	----	23.4	140	DC+

Test Results	**As Welded**
Yield:	**66,012**
Tensile:	**80,463**
Elongation (2")%:	**34**.0
Reduction of Area:	77.0

Charpy V-Notch Impacts Tested @ -20 Deg. F.
Ft. Lbs. 86-100-85-99-102 Ave = 94.4

Fillets: OK Vertical / Overhead

Atom Arc 7018 is manufactured in the USA, and the steel used in this product is melted and processed in the USA.
Product complies with "Buy America"

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

By: Justine Smith
J. Smith, Quality Specialist

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1500 Karen Lane
Hanover, PA 17331

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This is to certify that **ATOM ARC 7018** Classification **E7018H4R,** is the same classification, manufacturing process, and material requirements as the electrodes tested below. All tests required by **Specification Specification AWS A5.1:2012** were performed in conformance with this specification, and the above electrode met all the requirements. The electrodes were marked in conformance with **AWS A5.1:2012.** The chemistry and mechanical properties of the deposited weld metal were as follows:

Size:	1/4"
Test Date:	10/19/2024
Test Number:	2-64429-00
Moisture (RC-412):	(P) .091 / (E) .384%
Concentricity:	2%
X-Rays:	Satisfactory

Chemical Analysis:

Carbon:	.04
Manganese:	1.07
Silicon:	.38
Phosphorus:	.013
Sulfur:	.012
Chromium:	.06
Nickel:	.05
Molybdenum:	.01
Vanadium:	.01
Copper:	.14

Full	Split	Triple	Quad	Volts	Amps	
---	9	---	----	24	335	DC+

Test Results	**As Welded**
Yield:	66,055
Tensile:	**79**,184
Elongation (2")%:	32.0
Reduction of Area:	75.0

Charpy V-Notch Impacts Tested @ -20 Deg. F.
Ft. Lbs. 31-75-111-117-70 Ave = 80.8

Fillets: OK Horizontal

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J. Smith / Quality Specialist

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Size:	5/32"
Test Date:	3/20/2023
Test Number:	2-63835-00
Moisture (RC-412):	(P) .085 / (E) .275%
Concentricity:	2%
X-Rays:	Satisfactory

Chemical Analysis:

Carbon:	.05
Manganese:	1.08
Silicon:	.38
Phosphorus:	.018
Sulfur:	.013
Chromium:	.06
Nickel:	.06
Molybdenum:	.02
Vanadium:	.01
Copper:	.12

Full	Split	Triple	Quad	Volts	Amps	
---	8	---	----	23.0	180	DC+

Test Results	**As Welded**
Yield:	**65,511**
Tensile:	80,210
Elongation (2")%:	30.0
Reduction of Area:	**73**.0

Charpy V-Notch Impacts Tested @ -20 Deg. F.
Ft. Lbs. 116-101-110-122-127 Ave = 115.2

Fillets: OK Vertical / Overhead

Atom Arc 7018 is manufactured in the USA, and the steel used in this product is melted and processed in the USA.
Product complies with "Buy America"

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J. Smith Quality Specialist

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This is to certify that **ATOM ARC 7018** Classification **E7018H4R,** is the same classification, manufacturing process, and material requirements as the electrodes tested below. All tests required by **Specification Specification AWS A5.1:2012** were performed in conformance with this specification, and the above electrode met all the requirements. The electrodes were marked in conformance with **AWS A5.1:2012.** The chemistry and mechanical properties of the deposited weld metal were as follows:

Size: 3/32"
Test Date: 2/19/2023
Test Number: 2-63919-00
Moisture (RC-412): (P) .071 / (E) .156%
Concentricity: 2%
X-Rays: Satisfactory
Diffusible Hydrogen: 1.5 ml/100 gr.
Atmospheric Temperature: 71 Deg.
Relative Humidity: 14%

Chemical Analysis:

Carbon:	.06
Manganese:	1.08
Silicon:	.37
Phosphorus:	.014
Sulfur:	.009
Chromium:	.09
Nickel:	.06
Molybdenum:	.02
Vanadium:	.01
Copper:	.06

Full	Split	Triple	Quad	Volts	Amps	
---	6	---	----	23.0	97	DC+

Test Results	**As Welded**
Yield:	**73,677**
Tensile:	**87,881**
Elongation (2")%:	**30**.0
Reduction of Area:	77.0

Charpy V-Notch Impacts Tested @ -20 Deg. F.
Ft. Lbs. 85-106-102-118-114 Ave = 105.0

Fillets: OK Vertical / Overhead

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J. Smith, Quality Specialist

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This is to certify that **ATOM ARC 7018** Classification **E7018H4R,** is the same classification, manufacturing process, and material requirements as the electrodes tested below. All tests required by **Specification Specification AWS A5.1:2012** were performed in conformance with this specification, and the above electrode met all the requirements. The electrodes were marked in conformance with **AWS A5.1:2012.** The chemistry and mechanical properties of the deposited weld metal were as follows:

Size: 3/16"
Test Date: 2/28/2023
Test Number: 2-63836-00
Moisture (RC-412): (P) .101 / (E) .267
Concentricity: 2%
X-Rays: Satisfactory

Chemical Analysis:

Carbon:	.06
Manganese:	.97
Silicon:	.43
Phosphorus:	.012
Sulfur:	.013
Chromium:	.07
Nickel:	**.07**
Molybdenum:	.02
Vanadium:	.01
Copper:	.12

Full	Split	Triple	Quad	Volts	Amps	
	7		----	23.0	240	DC+

Test Results	**As Welded**
Yield:	**65,181**
Tensile:	**79,217**
Elongation (2")%:	**31**.0
Reduction of Area:	**74**.0

Charpy V-Notch Impacts Tested @ -20 Deg. F.
Ft. Lbs. 49-107-90-33-81 Ave = 72.0

Fillets: OK Horizontal

Atom Arc 7018 is manufactured in the USA, and the steel used in this product is melted and processed in the USA.
Product complies with "Buy America"

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J. Smith / Quality Specialist

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CERTIFICATE OF CONFORMANCE TO REQUIREMENTS FOR WELDING ELECTRODES

This is to certify that **ATOM ARC 7018-1** Classification **E7018-1H4R,** is the same classification, manufacturing process, and material requirements as the electrodes tested below. All tests required by **Specification AWS A5.1:2012** were performed in conformance with this specification, and the above electrode met all the requirements. The electrodes were marked in conformance with **AWS A5.1:2012.** The chemistry and mechanical properties of the deposited weld metal were as follows:

Size:	3/16"
Test Date:	7/1/2023
Test Number:	2-63842-00
Moisture (RC-412):	(P) .070 / (E) .185%
Concentricity:	2%
X-Rays:	Satisfactory

Chemical Analysis:

Carbon:	.06
Manganese:	1.21
Silicon:	.42
Phosphorus:	.012
Sulfur:	.002
Chromium:	.06
Nickel:	.05
Molybdenum:	.02
Vanadium:	.01
Copper:	.14

Full	Split	Triple	Quad	Volts	Amps	
---	7	---	----	22.7	235	DC+

Test Results	**As Welded**
Yield:	**65,942**
Tensile:	80,2624
Elongation (2")%:	**30.0**
Reduction of Area:	71.0

Charpy V-Notch Impacts Tested @ -50 Deg. F.
Ft. Lbs. 85-20-79-25-26 Ave = 47

Fillets: OK Horizontal

Atom Arc 7018-1 is manufactured in the USA and the steel used in the product is melted and processed in the USA.
Product complies with "Buy America"

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

By: Justini Smith
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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 is the same classification, manufacturing process, and material requirements as the electrodes tested below. All tests required by **Specification AWS A5.1:2012** were performed in conformance with this specification, and the above electrode met all the requirements. The electrodes were marked in conformance with **AWS A5.1:2012.** The chemistry and mechanical properties of the deposited weld metal were as follows:

Size: 3/32"
Test Date: 7/16/22
Test Number: 2-63997-00
Moisture (RC-412): (P) .058 / (E) .137%
Concentricity: 2%
X-Rays: Satisfactory
Diffusible Hydrogen: 1.4 ml/100 gr.
Atmospheric Temperature: **70** Deg.
Relative Humidity: 25%

Chemical Analysis:

Carbon:	.06
Manganese:	**1.05**
Silicon:	.47
Phosphorus:	.013
Sulfur:	.012
Chromium:	.07
Nickel:	.05
Molybdenum:	.02
Vanadium:	.01
Copper:	.13

Full	Split	Triple	Quad	Volts	Amps	
---	6	----	----	23.3	100	DC+

Test Results	**As Welded**
Yield:	70,596
Tensile:	84853
Elongation (2")%:	30.0
Reduction of Area:	78.0

Charpy V-Notch Impacts Tested @ -40 Deg. F.
Ft. Lbs. 120-121-98-120-122 Ave = 116.2

Fillets: OK Vertical / Overhead

Atom Arc 8018 is manufactured in the USA and the steel used in this product is melted and processed in the USA.
Product Complies with "Buy America"

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

By: Justine Smith
J. Smith Quality Specialist

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CERTIFICATE OF CONFORMANCE TO REQUIREMENTS FOR WELDING ELECTRODES

This is to certify that **ATOM ARC 7018 Acclaim** Classification **E7018H4R,** is the same classification, manufacturing process, and material requirements as the electrodes tested below. All tests required by **Specification AWS A5.1:2012** were performed in conformance with this specification, and the above electrode met all the requirements. The electrodes were marked in conformance with **AWS A5.1:2012** The chemistry and mechanical properties of the deposited weld metal were as follows:

Size: 1/8"
Test Date: 3/24/2023
Test Number: 2-63837-00
Moisture (RC-412): (P) .066 / (E) .141%
Concentricity: 2%
X-Rays: Satisfactory

Chemical Analysis:

Carbon:	.04
Manganese:	.78
Silicon:	.32
Phosphorus:	.017
Sulfur:	.012
Chromium:	.06
Nickel:	.06
Molybdenum:	.02
Vanadium:	.01
Copper:	.13

Full	Split	Triple	Quad	Volts	Amps	
---	7	---	----	23.0	140	DC+

Test Results	**As Welded**
Yield:	68,307
Tensile:	**81**,569
Elongation (2")%:	31.0
Reduction of Area:	**75**.0

Charpy V-Notch Impacts Tested @ -20 Deg. F.
Ft. Lbs. 112-125-190-115-113 Ave = 131

Fillets: OK Vertical / Overhead

Atom Arc 7018 Acclaim is manufactured in the USA and the steel used in the products is melted and processed in the USA. Product Complies with "Buy America"

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

By: Justine Smith
Justine Smith Quality Specialist

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CERTIFICATE OF CONFORMANCE TO REQUIREMENTS FOR WELDING ELECTRODES

This is to certify that **ATOM ARC 7018 Acclaim** Classification **E7018H4R,** is the same classification, manufacturing process, and material requirements as the electrodes tested below. All tests required by **Specification AWS A5.1:2012** were performed in conformance with this specification, and the above electrode met all the requirements. The electrodes were marked in conformance with **AWS A5.1:2012** The chemistry and mechanical properties of the deposited weld metal were as follows:

Size:	5/32"
Test Date:	3/12/2023
Test Number:	2-63918-00
Moisture (RC-412):	(P) .07 / (E) .19%
Concentricity:	2%
X-Rays:	Satisfactory

Chemical Analysis:

Carbon:	.06
Manganese:	1.02
Silicon:	.43
Phosphorus:	.014
Sulfur:	.012
Chromium:	.07
Nickel:	.06
Molybdenum:	.02
Vanadium:	.01
Copper:	.13

Full	Split	Triple	Quad	Volts	Amps	
---	8	---	----	23.0	180	DC+

Test Results	**As Welded**
Yield:	65,428
Tensile:	**78,936**
Elongation (2")%:	**31**.0
Reduction of Area:	78.0

Charpy V-Notch Impacts Tested @ -20 Deg. F.
Ft. Lbs. 101-25-104-109-79 Ave = 83.6

Fillets: OK Vertical / Overhead

Atom Arc 7018 Acclaim is manufactured in the USA and the steel used in the products is melted and processed in the USA. Product Complies with "Buy America"

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

By: Justine Smith
Justine Smith Quality Specialist

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 7018-1** Classification **E7018-1H4R,** is the same classification, manufacturing process, and material requirements as the electrodes tested below. All tests required by **Specification AWS A5.1:2012** were performed in conformance with this specification, and the above electrode met all the requirements. The electrodes were marked in conformance with **AWS A5.1:2012.** The chemistry and mechanical properties of the deposited weld metal were as follows:

Size: 3/32"
Test Date: 11/20/23
Test Number: 2-64497-00
Moisture (RC-412): (P) .072 / (E) .147%
Concentricity: 2%
X-Rays: Satisfactory
Diffusible Hydrogen: 1.7 ml/100 gr.
Atmospheric Temperature: 70 Deg.
Relative Humidity: 19%

Chemical Analysis:

Carbon:	.06
Manganese:	1.43
Silicon:	.47
Phosphorus:	.013
Sulfur:	.013
Chromium:	.05
Nickel:	.05
Molybdenum:	.03
Vanadium:	.01

Full	Split	Triple	Quad	Volts	Amps	
---	6	---	----	24.2	100	DC+

Test Results	**As Welded**
Yield:	**70,014**
Tensile:	**84,430**
Elongation (2")%:	27.0
Reduction of Area:	78.0

Charpy V-Notch Impacts Tested @ -50 Deg. F.
Ft. Lbs. 52-101-54-94-98 Ave = 79.8

Fillets: OK Vertical / Overhead

Atom Arc 7018-1 is manufactured in the USA and the steel used in the product is melted and processed in the USA.
Product complies with "Buy America"

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

By: Justine Smith
J. Smith Quality Specialist

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Hanover, PA 17331

CERTIFICATE OF CONFORMANCE TO REQUIREMENTS FOR WELDING ELECTRODES

This is to certify that **ATOM ARC 8018** Classification **E8018-C3H4R,** as supplied is the same classification, manufacturing process, and material requirements as the electrodes tested below. All tests required by **Specification AWS A5.5:2014** were performed in conformance with this specification, and the above electrode met all the requirements. The electrodes were marked in conformance with **AWS A5.5:2014.** The chemistry and mechanical properties of the deposited weld metal were as follows:

Size: 3/32"
Test Date: 7/16/23
Test Number: 2-64099-00
Moisture (RC-412): (P) .05 / (E) .13%
Concentricity: 2%
X-Rays: Satisfactory
Diffusible Hydrogen: 1.94ml/100 gr.
Atmospheric Temperature: **69** Deg.
Relative Humidity: 18%

Chemical Analysis:

Carbon:	.05
Manganese:	**1.00**
Silicon:	.34
Phosphorus:	.013
Sulfur:	.009
Chromium:	.06
Nickel:	.90
Molybdenum:	.13
Vanadium:	.01
Copper:	.14

Full	Split	Triple	Quad	Volts	Amps	
---	6	----	----	23.0	95	DC+

Test Results	**As Welded**
Yield:	83,748
Tensile:	94396
Elongation (2")%:	30.0
Reduction of Area:	76.0

Charpy V-Notch Impacts Tested @ -40 Deg. F.
Ft. Lbs. 105-89-100-88-100 Ave = 96.4

Fillets: OK Vertical / Overhead

Atom Arc 8018 is manufactured in the USA and the steel used in this product is melted and processed in the USA.
Product Complies with "Buy America"

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J. Smith Quality Specialist

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This is to certify that **ATOM ARC 8018** Classification **E8018-C3H4R,** as supplied is the same classification, manufacturing process, and material requirements as the electrodes tested below. All tests required by **Specification AWS A5.5:2014** were performed in conformance with this specification, and the above electrode met all the requirements. The electrodes were marked in conformance with **AWS A5.5:2014.** The chemistry and mechanical properties of the deposited weld metal were as follows:

Size: 3/16"
Test Date: 6/17/23
Test Number: 2-63995-00
Moisture (RC-412): (P) .084 / (E) .176%
Concentricity: 2%
X-Rays: Satisfactory
Diffusible Hydrogen: 3.2 ml/100 gr.
Atmospheric Temperature: **70** Deg.
Relative Humidity: **25%**

Chemical Analysis:

Carbon:	.05
Manganese:	1.04
Silicon:	.23
Phosphorus:	.014
Sulfur:	.015
Chromium:	.05
Nickel:	.97
Molybdenum:	.13
Vanadium:	.01
Copper:	.12

Full	Split	Triple	Quad	Volts	Amps	
---	7	----	----	23.0	237	DC+

Test Results	**As Welded**
Yield:	70,059
Tensile:	82,981
Elongation (2")%:	29.0
Reduction of Area:	72.0

Charpy V-Notch Impacts Tested @ -40 Deg. F.
Ft. Lbs. 100-95-94-71-110 Ave = 94.0

Fillets: OK Horizontal

Atom Arc 8018 is manufactured in the USA and the steel used in this product is melted and processed in the USA.
Product Complies with "Buy America"

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J. Smith/Quality Specialist

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This is to certify that **ATOM ARC 8018** Classification **E8018-C3H4R,** as supplied is the same classification, manufacturing process, and material requirements as the electrodes tested below. All tests required by **Specification AWS A5.5:2014** were performed in conformance with this specification, and the above electrode met all the requirements. The electrodes were marked in conformance with **AWS A5.5:2014.** The chemistry and mechanical properties of the deposited weld metal were as follows:

Size:	5/32"
Test Date:	5/02/23
Test Number:	2-63986-00
Moisture (RC-412):	(P) .070 / (E) .142%
Concentricity:	2%
X-Rays:	Satisfactory

Chemical Analysis:

Carbon:	.05
Manganese:	1.19
Silicon:	.44
Phosphorus:	.014
Sulfur:	.013
Chromium:	.06
Nickel:	.90
Molybdenum:	.13
Vanadium:	.01
Copper:	.12

Full	Split	Triple	Quad	Volts	Amps	
---	8	----	----	23.0	181	DC+

Test Results	**As Welded**
Yield:	79,190
Tensile:	90,718
Elongation (2")%:	28.0
Reduction of Area:	71.0

Charpy V-Notch Impacts Tested @ -40 Deg. F.
Ft. Lbs. 80-66-65-93-89 Ave = 78.6

Fillets: OK Vertical / Overhead

Atom Arc 8018 is manufactured in the USA and the steel used in this product is melted and processed in the USA.
Product Complies with "Buy America"

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Hanover, PA 17331

CERTIFICATE OF CONFORMANCE TO REQUIREMENTS FOR WELDING ELECTRODES

This is to certify that **ATOM ARC 9018** Classification **E9018-MH4R,** is the same classification, manufacturing process, and material requirements as the electrodes tested below. All tests required by **Specification AWS A5.5:2014** were performed in conformance with this specification, and the above electrode met all the requirements. The electrodes were marked in conformance with **AWS A5.5:2014.** The chemistry and mechanical properties of the deposited weld metal were as follows:

Size: 3/32"
Test Date: 3/23/2023
Test Number: 2-63834-00
Moisture (RC-412): (P) .059 / (E) .130%
Concentricity: 2%
X-Rays: Satisfactory
Diffusible Hydrogen: 1.3 ml/100 gr.
Atmospheric Temperature: 68 Deg.
Relative Humidity: 15%

Chemical Analysis:

Carbon:	.05
Manganese:	.98
Silicon:	.30
Phosphorus:	.014
Sulfur:	.014
Chromium:	.06
Nickel:	1.57
Molybdenum:	.28
Vanadium:	.01
Copper:	.11

Full	Split	Triple	Quad	Volts	Amps	
---	5	1	---	22.0	92	DC+

Test Results	**As Welded**
Yield:	86,299
Tensile:	96,199
Elongation (2")%:	**25**.0
Reduction of Area:	**63**.0

Charpy V-Notch Impacts Tested @ -60 Deg. F.
Ft. Lbs. 60-78-73-94-84 Ave = 77.8

Fillets: OK Vertical / Overhead

Atom Arc 9018 is manufactured in the USA and the steel used in this product is melted and processed in the USA.
Product Complies with "Buy America"

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

By: Justine Smith
Justine Smith Quality Specialist

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 9018** Classification **E9018-MH4R**, is the same classification, manufacturing process, and material requirements as the electrodes tested below. All tests required by **Specification AWS A5.5:2014** were performed in conformance with this specification, and the above electrode met all the requirements. The electrodes were marked in conformance with **AWS A5.5:2014.** The chemistry and mechanical properties of the deposited weld metal were as follows:

Size:	5/32"
Test Date:	11/05/23
Test Number:	2-64495-00
Moisture (RC-412):	(P) .086 / (E) .187%
Concentricity:	2%
X-Rays:	Satisfactory

Chemical Analysis:

Carbon:	.04
Manganese:	**1 06**
Silicon:	.30
Phosphorus:	.012
Sulfur:	.011
Chromium:	.09
Nickel:	1.62
Molybdenum:	.30
Vanadium:	.01
Copper:	.12

Full	Split	Triple	Quad	Volts	Amps	
-	3	5	---	23	182	DC+

Test Results	As Welded
Yield:	**88,220**
Tensile:	97,833
Elongation (2")%:	25.0
Reduction of Area:	**67**.0

Charpy V-Notch Impacts Tested @ -60 Deg. F.
Ft. Lbs. 78-68-64-65-69 Ave = 68.8

Fillets: OK Vertical / Overhead

Atom Arc 9018 is manufactured in the USA and the steel used in this product is melted and processed in the USA.
Product Complies with "Buy America"

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

By: Justine Smith
j. Smith Quality Specialist

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 A5.5:2014** were performed in conformance with this specification, and the above electrode met all the requirements. The electrodes were marked in conformance with **AWS A5.5:2014.** The chemistry and mechanical properties of the deposited weld metal were as follows:

Size: 5/32"
Test Date: 1/13/2023
Test Number: 2-63921-00
Moisture (RC-412): (P) .089 / (E) .135%
Concentricity: 2%
X-Rays: Satisfactory

Chemical Analysis:

Carbon:	.05
Manganese:	1.53
Silicon:	.23
Phosphorus:	.010
Sulfur:	.012
Chromium:	.25
Nickel:	1.99
Molybdenum:	.37
Vanadium:	.01
Copper:	.14

Full	Split	Triple	Quad	Volts	Amps	
1	1	6	----	23.5	185	DC+

Test Results	As Welded
Yield:	**102,297**
Tensile:	111,772
Elongation (2")%:	24.0
Reduction of Area:	67.0

Charpy V-Notch Impacts Tested @ -60 Deg. F.
Ft. Lbs. 58-56-49-51-56 Ave = 54

Fillets: OK Vertical / Overhead

Atom Arc T is manufactured in the USA
and the steel used in this product is melted
and processed in the USA.
Product Complies with "Buy America"

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

By: Justine Smith
J. Smith / Quality Specialist

3SAB 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 A5.5:2014** were performed in conformance with this specification, and the above electrode met all the requirements. The electrodes were marked in conformance with **AWS A5.5:2014.** The chemistry and mechanical properties of the deposited weld metal were as follows:

Size: 3/32"
Test Date: 04/28/2023
Test Number: 2-63843-00
Moisture (RC-412): (P) .061 / (E) .124%
Concentricity: 2%
X-Rays: Satisfactory
Diffusible Hydrogen: 1.5 ml/100 gr.
Atmospheric Temperature: 68 Deg.
Relative Humidity: 15%

Chemical Analysis:

Carbon:	.04
Manganese:	1.59
Silicon:	.28
Phosphorus:	.013
Sulfur:	.003
Chromium:	.30
Nickel:	**2.07**
Molybdenum:	.42
Vanadium:	.01
Copper:	.14

Full	Split	Triple	Quad	Volts	Amps	
1	2	3	----	24.2	100	DC+

Test Results	**As Welded**
Yield:	**110,594**
Tensile:	120,413
Elongation (2")%:	22.0
Reduction of Area:	**67**.0

Charpy V-Notch Impacts Tested @ -60 Deg. F.
Ft. Lbs. 39-45-39-49-51 Ave = 44.6

Fillets: OK Vertical / Overhead

Atom Arc T is manufactured in the USA and the steel used in this product is melted and processed in the USA.
Product Complies with "Buy America"

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

By: Justine Smith
J. Smith /Quality Specialist

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 A5.5:2014** were performed in conformance with this specification, and the above electrode met all the requirements. The electrodes were marked in conformance with **AWS A5.5:2014.** The chemistry and mechanical properties of the deposited weld metal were as follows:

Size: 3/16"
Test Date: **11/12/2023**
Test Number: 2-64157-00
Moisture (RC-412): (P) .069 / (E) .134%
Concentricity: 2%
X-Rays: Satisfactory
Diffusible Hydrogen: **3.3** ml/100 gr
Atmospheric Temperature: 72 Deg.
Relative Humidity: 25%

Chemical Analysis:

Carbon:	.06
Manganese:	1.62
Silicon:	.38
Phosphorus:	.013
Sulfur:	.016
Chromium:	.25
Nickel:	1.92
Molybdenum:	.39
Vanadium:	.01
Copper:	.13

Full	Split	Triple	Quad	Volts	Amps	
	8		----	23	240	DC+

Test Results	**As Welded**
Yield:	103388
Tensile:	112,318
Elongation (2")%:	22.0
Reduction of Area:	60.0

Charpy V-Notch Impacts Tested @ -60 Deg. F.
Ft. Lbs. 55-54-46-50-48 Ave = 50.6

Fillets: OK Horizontal

Atom Arc T is manufactured in the USA
and the steel used in this product is melted
and processed in the USA.
Product complies with "Buy America"

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

By:_____
J. Smith Quality Specialist

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% CO_2

Test Date: 4/18/24
Test Number: 2-64100-00
Travel Speed: **11.6** IPM
Diffusible Hydrogen: 1.7 ml/100 gr.
Atmospheric Temperature: 69 Deg.
Relative Humidity: 18%
X-Rays: Satisfactory

Chemical Analysis:

Carbon:	.04
Manganese:	1.55
Silicon:	.76
Phosphorus:	.009
Sulfur:	.015
Chromium:	.03
Nickel:	.02
Molybdenum:	.02
Vanadium:	.01
Copper:	.07

Full	**Split**	**Triple**	**Quad**	**Volts**	**Amps**	
	7	---	---	26.5	290	DC+

Test Results	**As Welded**
Yield:	72,123
Tensile:	845980
Elongation (2")%:	29.0
Reduction of Area:	62.0

Charpy V-Notch Impacts Tested @ -20 Deg. F.
Ft. Lbs. **49**-36-54-48-40 Ave = 45.4

Coreweld C6 is manufactured in the USA and the steel used in this product is melted and processed in the USA.
Product complies with "Buy America"

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

By: Justine Smith
J. Smith Quality Specialist

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 710X** Classification **E71T-1C/T-1M/T-9C/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% CO_2

Diameter: 1/16"
Test Date: 11/11/24
Test Number: 2-64160-00
Travel Speed: 12.0 IPM
X-Rays: Satisfactory

Chemical Analysis:

Carbon:	.03
Manganese:	1.55
Silicon:	.69
Phosphorus:	.011
Sulfur:	**.007**
Chromium:	.03
Nickel:	.41
Molybdenum:	**<.01**
Vanadium:	.02
Copper:	.02

Full	Split	Triple	Quad	Volts	Amps	
	7	---	---	26.0	273	DC+

Test Results	**As Welded**
Yield:	84,373
Tensile:	93,206
Elongation (2")%:	26.0
Reduction of Area:	63.0

Charpy V-Notch Impacts Tested @ 0 Deg. F.
Ft. Lbs. **65-66-54-68-53** Ave = 61.2

Charpy V-Notch Impacts Tested @ -20 Deg. F.
Ft. Lbs. **44-46-19-57-61** Ave = 45.4

Fillets: OK VERTICAL / OVERHEAD

Dual Shield 710X is manufactured in the USA and the steel used in this product is melted and processed in the USA.
Product complies with "Buy America"

Shielding Gas: 100% CO_2

Diameter: 1/16"
Test Date: 12/15/2024
Test Number: 2-64161-00
Travel Speed: 12.0 IPM
X-Rays: Satisfactory

Chemical Analysis:

Carbon:	.03
Manganese:	1.27
Silicon:	.52
Phosphorus:	.012
Sulfur:	.008
Chromium:	.03
Nickel:	.41
Molybdenum:	<.01
Vanadium:	.02
Copper:	.02

Full	Split	Triple	Quad	Volts	Amps	
1	8	---	--	27.0	273	DC+

Test Results	**As Welded**
Yield:	75,744
Tensile:	**85,821**
Elongation (2")%:	**27**.0
Reduction of Area:	**69**.0

Charpy V-Notch Impacts Tested @ 0 Deg. F.
Ft. Lbs. **94**-98-91-86-92 Ave = 92.2

Charpy V-Notch Impacts Tested @ -20 Deg. F.
Ft. Lbs. **94**-99-82-43-100 Ave = 83.6

Fillets: OK VERTICAL / OVERHEAD

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

By: Justine Smith
J. Smith Quality Specialist

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 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% CO_2

Diameter: 1/16"
Test Date: 11/12/2024
Test Number: 2-64158-00
Travel Speed: **11.6** IPM
X-Rays: Satisfactory
Diffusible Hydrogen: 5.9
Atmospheric Temperature: 70 Deg.
Relative Humidity: 20%

Chemical Analysis:

Carbon:	.03
Manganese:	1.23
Silicon:	.48
Phosphorus:	.017
Sulfur:	.008
Chromium:	.05
Nickel:	.01
Molybdenum:	.01
Vanadium:	.02
Copper:	.03

Full	Split	Triple	Quad	Volts	Amps	
	7	---	---	26	288	DC+

Test Results **As Welded**

Yield:	73,540
Tensile:	82,908
Elongation (2")%:	29.0
Reduction of Area:	74.0

Charpy V-Notch Impacts Tested @ 0 Deg. F.
Ft. Lbs. **38**-109-115-122-153 Ave = 107.4

Charpy V-Notch Impacts Tested @ -20 Deg. F.
Ft. Lbs. **90**-114-110-92-98 Ave = 100.8

Fillets: OK VERTICAL / OVERHEAD

Dual Shield 710X-M is manufactured in the USA and the steel used in this product is melted and processed in the USA.
Product complies with "Buy America"

Shielding Gas: 100% CO_2

Diameter: 1/16"
Test Date: 11/12/2024
Test Number: 2-65159-00
Travel Speed: 11.4 IPM
X-Rays: Satisfactory

Chemical Analysis:

Carbon:	.03
Manganese:	1.23
Silicon:	.48
Phosphorus:	.017
Sulfur:	.008
Chromium:	.05
Nickel:	.01
Molybdenum:	.01
Vanadium:	.02
Copper:	.03

Full	Split	Triple	Quad	Volts	Amps	
1	7	---	--	27	285	DC+

Test Results **As Welded**

Yield:	65,972
Tensile:	75,053
Elongation (2")%:	30.0
Reduction of Area:	73.0

Charpy V-Notch Impacts Tested @ 0 Deg. F.
Ft. Lbs. **44**-123-49-41-139 Ave = 79.2

Charpy V-Notch Impacts Tested @ -20 Deg. F.
Ft. Lbs. **53**-69-36-108-108 Ave = 74.8

Fillets: OK VERTICAL / OVERHEAD

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

By: Justine Smith
J. Smith Quality Specialist

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

CERTIFICATE OF CONFORMANCE TO REQUIREMENTS FOR WELDING ELECTRODES

This is to certify that **ESAB 71** Classification **E71T-1C-DH8/T-1M-D/T-9C-DH8/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% CO_2

Diameter: 1/16"
Test Date: 10/30/2023
Test Number: 2-64395-00
Travel Speed: **12.4** IPM
X-Rays: Satisfactory

Chemical Analysis:

Carbon:	.02
Manganese:	1.43
Silicon:	.76
Phosphorus:	.012
Sulfur:	.010
Chromium:	.04
Nickel:	.01
Molybdenum:	.01
Vanadium:	.02
Copper:	.04

Full	Split	Triple	Quad	Volts	Amps	
8	1	---		30.5	247	DC+

Test Results **As Welded**

Yield:	90,798
Tensile:	95,252
Elongation (2")%:	26.0
Reduction of Area:	66.0

Charpy V-Notch Impacts Tested @ 0 Deg. F.
Ft. Lbs. **46**-77-61-64-60 Ave = 62.2

Charpy V-Notch Impacts Tested @ -20 Deg. F.
Ft. Lbs. **44**-47-38-44-32 Ave = 41.0

Fillets: OK VERTICAL-UP/OVERHEAD

Dual Shield 71 Ultra is manufactured in the USA and the steel used in this product is melted and processed in the USA.
Product complies with "Buy America"

Shielding Gas: 100% CO_2

Diameter: 1/16"
Test Date: 6/30/2023
Test Number: 2-65154-00
Travel Speed: 11.71 IPM
Diffusible Hydrogen: 5.4 ml/100 gr.
Atmospheric Temperature: 70
Relative Humidity: 25%
X-Rays: Satisfactory

Chemical Analysis:

Carbon:	.03
Manganese:	1.14
Silicon:	.52
Phosphorus:	.014
Sulfur:	.009
Chromium:	.03
Nickel:	.01
Molybdenum:	<.01
Vanadium:	.01
Copper:	.04

Full	Split	Triple	Quad	Volts	Amps	
1	6	---	--	37.5	244	DC+

Test Results **As Welded**

Yield:	75,980
Tensile:	**82,988**
Elongation (2")%:	**28**.0
Reduction of Area:	**70**.0

Charpy V-Notch Impacts Tested @ 0 Deg. F.
Ft. Lbs. **32**-52-31-48-71 Ave = 46.8

Fillets: OK VERTICAL-UP/OVERHEAD

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

By: Justine Smith
J. Smith Quality Specialist

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 7100 ULTRA** Classification **E71T-1C-DH8/T-1M-D/T-9C-DH8/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% CO_2

Diameter: 1/16"
Test Date: 06/13/2023
Test Number: 2-63838-00
Travel Speed: **13.8** IPM
X-Rays: Satisfactory

Chemical Analysis:

Carbon:	.03
Manganese:	1.52
Silicon:	.67
Phosphorus:	.018
Sulfur:	.010
Chromium:	.05
Nickel:	.02
Molybdenum:	.01
Vanadium:	.02
Copper:	.05

Full	Split	Triple	Quad	Volts	Amps	
7	2	---		27.5	282	DC+

Test Results	**As Welded**
Yield:	83,483
Tensile:	91,776
Elongation (2")%:	28.0
Reduction of Area:	69.0

Charpy V-Notch Impacts Tested @ 0 Deg. F.
Ft. Lbs. **87**-101-94-92-101 Ave = 95

Charpy V-Notch Impacts Tested @ -20 Deg. F.
Ft. Lbs. **97**-69-68-76-79 Ave = 77.8

Fillets: OK VERTICAL-UP/OVERHEAD

Dual Shield 7100 Ultra is manufactured in the USA and the steel used in this product is melted and processed in the USA.
Product complies with "Buy America"

Shielding Gas: 100% CO_2

Diameter: 1/16"
Test Date: 6/13/2023
Test Number: 2-63839-00
Travel Speed: 11.1 IPM
Diffusible Hydrogen: 5.2 ml/100 gr.
Atmospheric Temperature: 68
Relative Humidity: 15%
X-Rays: Satisfactory

Chemical Analysis:

Carbon:	.03
Manganese:	1.46
Silicon:	.64
Phosphorus:	.021
Sulfur:	.013
Chromium:	.04
Nickel:	.02
Molybdenum:	<.01
Vanadium:	.01
Copper:	.03

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

Test Results	**As Welded**
Yield:	78,727
Tensile:	**98,460**
Elongation (2")%:	**26**.0
Reduction of Area:	**66**.0

Charpy V-Notch Impacts Tested @ 0 Deg. F.
Ft. Lbs. **33**-58-30-42-35 Ave = 39.6

Charpy V-Notch Impacts Tested @ -20 Deg. F.
Ft. Lbs. **35**-33-34-34-29 Ave = 33.0

Fillets: OK VERTICAL-UP/OVERHEAD

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

By: Justine Smith
J. Smith Quality Specialist

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 7100 LC** Classification **E71T-1C/T-1M/T-9C/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% CO_2

Diameter: 1/16"
Test Date: 6/6/23
Test Number: 2-63903-00
Travel Speed: 11.2 IPM
X-Rays: Satisfactory

Chemical Analysis:

Carbon:	.04
Manganese:	1.41
Silicon:	.62
Phosphorus:	.017
Sulfur:	.008
Chromium:	.05
Nickel:	.01
Molybdenum:	.01
Vanadium:	.02
Copper:	.05

Full	Split	Triple	Quad	Volts	Amps	
1	6	---	---	28.0	281	DC+

Test Results **As Welded**

Yield:	81,664
Tensile:	91,676
Elongation (2")%:	28.0
Reduction of Area:	72.0

Charpy V-Notch Impacts Tested @ 0 Deg. F.
Ft. Lbs. **75**-87-67-56-51 Ave = 67.2

Charpy V-Notch Impacts Tested @ -20 Deg. F.
Ft. Lbs. **57**-53-40-38-17 Ave = 41

Fillets: OK VERTICAL UP / OVERHEAD

Dual Shield 7100 LC is manufactured in the USA and the steel used in this product is melted and processed in the USA.
Product complies with "Buy America"

Shielding Gas: 100% CO_2

Diameter: 1/16"
Test Date: 6/6/23
Test Number: 2-63904
Travel Speed: **12.7** IPM
X-Rays: Satisfactory

Chemical Analysis:

Carbon:	.03
Manganese:	1.15
Silicon:	.45
Phosphorus:	.016
Sulfur:	.007
Chromium:	.04
Nickel:	.01
Molybdenum:	.01
Vanadium:	.02
Copper:	.07

Full	Split	Triple	Quad	Volts	Amps	
1	7	--	--	27.0	275	DC+

Test Results **As Welded**

Yield:	77,689
Tensile:	85,588
Elongation (2")%:	**26**.0
Reduction of Area:	**68**.0

Charpy V-Notch Impacts Tested @ 0 Deg. F.
Ft. Lbs. 39-52-47-37-37 Ave = 42.4

Charpy V-Notch Impacts Tested @ -20 Deg. F.
Ft. Lbs. 30-29-20-22-26 Ave = 25.4

Fillets: OK VERTICAL UP / OVERHEAD

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

By: Justine Smith
J. Smith Quality Specialist

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1500 Karen Lane
Hanover, PA 17331

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% CO_2

Diameter: 1/16"
Test Date: 4/27/2023
Test Number: 2-63844-00
Travel Speed: **10.7** IPM
X-Rays: Satisfactory

Chemical Analysis:

Carbon:	.04
Manganese:	.98
Silicon:	.33
Phosphorus:	.017
Sulfur:	.012
Chromium:	.03
Nickel:	.01
Molybdenum:	.01
Vanadium:	.01
Copper:	.04

Full	Split	Triple	Quad	Volts	Amps	
1	6		---	27.5	283	DC+

Test Results	**As Welded**
Yield:	63,660
Tensile:	73,240
Elongation (2")%:	31.0
Reduction of Area:	74.0

Charpy V-Notch Impacts Tested @ 0 Deg. F.
Ft. Lbs. **35**-106-73-29-121 Ave = 72.8

Charpy V-Notch Impacts Tested @ -20 Deg. F.
Ft. Lbs. **26**-25-20-24-41 Ave = 27.2

Fillets: OK VERTICAL-UP / OVERHEAD

Dual Shield II 70 Ultra is manufactured in the USA and the steel used in this product is melted and processed in the USA.
Product complies with "Buy America"

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

By: Justin Smith
J. Smith / Quality Specialist

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% CO_2

Diameter: 1/16"
Test Date: 3/02/23
Test Number: 2-63920-00
Travel Speed: 9.1 IPM
X-Rays: Satisfactory

Chemical Analysis:

Carbon:	.04
Manganese:	1.15
Silicon:	.72
Phosphorus:	.012
Sulfur:	.006
Chromium:	.04
Nickel:	.01
Molybdenum:	.01
Vanadium:	.02
Copper:	.08

Full	Split	Triple	Quad	Volts	Amps	
1	6	---	---	27	301	DC+

Test Results	**As Welded**
Yield:	76,254
Tensile:	85,809
Elongation (2")%:	28.0
Reduction of Area:	69.0

Charpy V-Notch Impacts Tested @ 0 Deg. F.
Ft. Lbs. **87**-78-102-90-105 Ave = 92.4

Charpy V-Notch Impacts Tested @ -20 Deg. F.
Ft. Lbs. **95**-52-98-46-68 Ave = 78.8

Fillets: OK VERTICAL-UP / OVERHEAD

Dual Shield 70 Ultra Plus is manufactured in the USA and the steel used in this product is melted and processed in the USA.

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

By: Justine Smith
J. Smith Quality Specialist

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% CO_2

Diameter: 1/16"
Test Date: 4/30/23
Test Number: 2-63999-00
Travel Speed: 11.8 IPM
X-Rays: Satisfactory

Chemical Analysis:

Carbon:	.03
Manganese:	1.69
Silicon:	.54
Phosphorus:	.013
Sulfur:	.019
Chromium:	.04
Nickel:	.02
Molybdenum:	.01
Vanadium:	.01
Copper:	.03

Full	**Split**	**Triple**	**Quad**	**Volts**	**Amps**
1	7	---	--	27.0	290 DC+

Test Results	**As Welded**
Yield:	76,553
Tensile:	84,666
Elongation (2")%:	28.0
Reduction of Area:	**72**.0

Charpy V-Notch Impacts Tested @ 0 Deg. F.
Ft. Lbs. 101-109-95-97-93 Ave = 99

Fillets: OK HORIZONTAL

Dual Shield 700X is manufactured in the USA and the steel used in this product is melted and processed in the USA
Product complies with "Buy America"

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

By: Justine Smith
J. Smith Quality Specialist

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 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% CO_2

Diameter: 1/16"
Test Date: 11/13/2023
Test Number: 2-64012-00
Travel Speed: 12.1 IPM
Diffusible Hydrogen: 5.2 ml/100 gr.
Atmospheric Temperature: 71 Deg.
Relative Humidity: 18%
X-Rays: Satisfactory

Chemical Analysis:

Carbon:	.05
Manganese:	1.24
Silicon:	.40
Phosphorus:	.013
Sulfur:	.010
Chromium:	.04
Nickel:	.01
Molybdenum:	.01
Vanadium:	.02
Copper:	.03

Full	Split	Triple	Quad	Volts	Amps	
1	7	---	---	26.5	299	DC+

Test Results	**As Welded**
Yield:	84,856
Tensile:	88,832
Elongation (2")%:	28.0
Reduction of Area:	73.0

Charpy V-Notch Impacts Tested @ 0 Deg. F.
Ft. Lbs. **122**-121-134-128-132 Ave = 127.4

Charpy V-Notch Impacts Tested @ -20 Deg. F.
Ft. Lbs. **101**-112-104-108-122 Ave = 109.4

Charpy V-Notch Impacts Tested @ -40 Deg. F.
Ft. Lbs. **97**-98-102-103-94 Ave = 98.8

Fillets: OK VERTICAL-UP / OVERHEAD
Dual Shield II 712X is manufactured in the USA, and the steel used in this product is melted and processed in the USA. Product complies with "Buy America"

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

By: Justine Smith
J. Smith Quality Specialist

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 80-Ni1H4** Classification **E81T1-Ni1M-JH4,** is the same classification, manufacturing process, and material requirements as the electrodes tested below. All tests required by **Specification AWS A5.29:2010** were performed in conformance with this specification, and the above electrode met all the requirements. The electrodes were marked in conformance with **AWS A5.29:2010.** The chemistry and mechanical properties of the deposited weld metal were as follows:

Shielding Gas: 75% AR/25% CO_2

Diameter: 1/16"
Test Date: 03/15/2023
Test Number: 2-63917-00
Travel Speed: 12.3 IPM
Diffusible Hydrogen: **2.0** ml/100 gr.
Atmospheric Temperature: 71 Deg.
Relative Humidity: 14%
X-Rays: Satisfactory

Chemical Analysis:

Carbon:	.06
Manganese:	1.19
Silicon:	.32
Phosphorus:	.015
Sulfur:	.009
Chromium:	.05
Nickel:	.87
Molybdenum:	.01
Vanadium:	.02
Copper:	.05

Full	Split	Triple	Quad	Volts	Amps	
1	6	---	---	27	300	DC+

Test Results	**As Welded**
Yield:	81639
Tensile:	89,614
Elongation (2")%:	26.0
Reduction of Area:	74.0

Charpy V-Notch Impacts Tested @ -20 Deg. F.
Ft. Lbs. **103**-106-102-104-103 Ave = 103.6

Charpy V-Notch Impacts Tested @ -60 Deg. F.
Ft. Lbs. **81**-55-74-65-66 Ave = 68.2

Fillets: OK VERTICAL-UP/OVERHEAD

Dual Shield II 80Ni1H4 is manufactured in the USA and the steel used in this product is melted and processed in the USA.
Product complies with "Buy America"

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

By: Justine Smith
Justine Smith Quality Specialist

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-JH8,** is the same classification, manufacturing process, and material requirements as the electrodes tested below. All tests required by **Specification AWS A5.29:2010** were performed in conformance with this specification, and the above electrode met all the requirements. The electrodes were marked in conformance with **AWS A5.29:2010.** The chemistry and mechanical properties of the deposited weld metal were as follows:

Shielding Gas: 100% CO_2

Diameter: 1/16"
Test Date: 03/15/2023
Test Number: 2-64086-00
Travel Speed: 11.7 IPM
Diffusible Hydrogen: 8.3 ml/100 gr
Atmospheric Temperature: 71 Deg.
Relative Humidity: 18%
X-Rays: Satisfactory

Chemical Analysis:

Carbon:	.04
Manganese:	.95
Silicon:	.43
Phosphorus:	.016
Sulfur:	.011
Chromium:	.03
Nickel:	.93
Molybdenum:	.01
Vanadium:	.02
Copper:	.03

Full	Split	Triple	Quad	Volts	Amps	
1	7	---	---	27.0	271	DC+

Test Results	**As Welded**
Yield:	82,207
Tensile:	89,683
Elongation (2")%:	27.0
Reduction of Area:	71.0

Charpy V-Notch Impacts Tested @ -20 Deg. F.
Ft. Lbs. **34**-34-32-52-22 Ave = 34.8

Charpy V-Notch Impacts Tested @ -40 Deg. F
Ft. Lbs. **23**-26-30-31-24 Ave = 26.8

Dual Shield 810X-Ni1 is manufactured in the USA, and the steel used in this product is melted and proccessed in the USA.
Product complies with "Buy America"

Fillets: OK VERTICAL-UP/OVERHEAD

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

By: Justine Smith
Justine Smith Quality Specialist

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 70T-12H4** Classification **E71T-1MJH4/T-12MJH4** is of the same classification, manufacturing process and material requirements as the electrodes tested and reported 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% CO_2
Diameter: 1/16"
Test Date: 11/18/232
Test Number: 2-64496-00
Travel Speed: 12.4 IPM
Diffusible Hydrogen: 1.2 ml/100 gr.
Atmospheric Temperature: 70
Relative Humidity: 19%
X-Rays: Satisfactory

Chemical Analysis:

Carbon:	.05
Manganese:	1.17
Silicon:	.36
Phosphorus:	.019
Sulfur:	.009
Chromium:	.07
Nickel:	.01
Molybdenum:	.01
Vanadium:	.02
Copper:	.04

Full	Split	Triple	Quad	Volts	Amps	
1	7	---	---	27.0	298	DC+

Test Results	**As Welded**
Yield:	74,661
Tensile:	83,208
Elongation (2")%:	28.0
Reduction of Area:	73.0

Charpy V-Notch Impacts Tested @ 0 Deg. F.
Ft. Lbs. 149-144-172-151-136 Ave = 150

Charpy V-Notch Impacts Tested @ 20 Deg. F.
Ft. Lbs. 137-121-122-120-139 Ave = 127.8

Charpy V-Notch Impacts Tested @ -40 Deg. F.
Ft. Lbs. **116**-114-126-120-117 Ave = 118.6

Fillets: OK VERTICAL-UP / OVERHEAD

Dual Shield II 70T-12H4 is manufactured in the USA and the steel used in this product is melted and processed in the USA.
Product Complies with "Buy America"

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

By: Justine Smith
J. Smith Quality Specialist