



# NATIONAL STANDARD

National Standard, LLC  
3602 N. Perkins Road  
Stillwater, OK 74075

## Certificate of Conformance

Product: **NS 101 CU / NS 101 Plus CU**  
Classification: **ER 70S-3**  
Specification: **AWS A5.18/A5.18M:2005**  
Test completion date: **July 18, 2016**  
Heat Number: **Typical Results**

This is to certify that the product named above and referenced on the sales invoice number is of the same classification, manufacturing process, and raw material requirements as the electrode which was used for the tests conducted on the date shown, the results of which are displayed below. All tests required by the specifications required for classification were performed at that time the product tested met all the requirements. The Electrode was manufactured and supplied in accordance with the Quality System Program of National Standard Company, located in Stillwater, Oklahoma, U.S.A. This Quality System Program meets the requirements of ISO 9001:2008, AWS A5.18/ASME SFA5.18, and CWB.

Operating Parameters	AWS A5.18 Requirements	Data and Test Results
Electrode Size (in.)	.045"	.045"
Polarity	DCEP	DCEP
Shielding Gas (per AWS A5.32)	100% CO <sub>2</sub>	100% CO <sub>2</sub>
Voltage (volts)	27.0-31	30.9
Wire Feed Speed (in/min)	450 in/min ± 5%	443.5
Travel Speed (in/min)	12-14	12.6
Current (amps)	260-290	278
Average heat input (kJ/in)	N/A	40.9
Contact tip to work distance (in.)	0.75" ± 0.125"	0.625"
Passes/Layers	N/A	12/7
Preheat Temp. °F	>60	70
Interpass Temp. °F	300 ± 25	300 ± 25

Test Assembly Material:	ASTM A36, A370/E23
Radiographic Test:	Acceptable
Fillet Weld Test:	N/A
Tensile Condition:	OD- 0.498", Aged at 210°F up to 48 hours
Radiograph:	Pass

**General Note:**  
Mechanical and/or Chemical testing were conducted in accordance with the following standard test procedure: ASTM A370/E23, ASTM E8. The attached results should not be assumed to be the expected results in a particular application. Results will differ depending on many factors, such as temperature, weld procedure, plate chemistry, welding method, and fabrication. It is advised to users to confirm by qualification testing the suitability of any welding before use in their applications.

### Mechanical Properties of the Weld Deposit (As-welded condition)

Tensile Strength (ksi)	70 min	76.1
Yield Strength, 0.2% offset (ksi)	58 min	59.2
% Elongation in 2 inches	22 min	32
%ROA	N/A	70
Average CVN impact properties	20 ft.lbf @ -20°F	86.6 ft.lbf @ -20°F

### Chemical Composition of the Weld Deposit (Weight %)

Element	C%	Mn%	Si%	P%	S%	Cr%	Ni%	Mo%	V%	Al%	Cu%
AWS/ASME Requirements	0.06-0.15	0.90-1.40	0.45-0.75	0.025 Max	0.035 Max	.15 Max	.15 Max	.15 Max	.03	-----	.5% max
Results	.11	1.11	.54	.017	.019	.033	.045	.011	0	.002	.155

National Standard certifies this material to be free from mercury and mercury compound contamination.

*Sarang Muley*

Sarang Muley, Process Engineer

Date 8/25/16