



NATIONAL STANDARD

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

Customer Requested Test Report

Product: **NS 102 CU/ NS 102 PLUS**
Classification: **ER 90S-D2**
Specification: **AWS A5.28/A5.28M:2005**
Test completion date: **October 28th, 2015**

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 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, ANSI/AWS 5.18, and CWB.

Operating Parameters	AWS/ASME Requirements	Data and Test Results
Electrode Size (in.)	.045"	.045"
Polarity	DCEP	DCEP
Shielding Gas (per AWS A5.32)	Argon/1-5% O2	98%Ar/2%O2
Voltage (volts)	27.0-32.0	32.0
Wire Feed Speed (in/min)	450	453
Travel Speed (in/min)	12-14	13.7
Current (amps)	300-360	305
Average heat input (kJ/in)	N/A	38.8
Contact tip to work distance (in.)	0.75" +/- 0.125"	0.75"
Passes/Layers	NA	12/6
Preheat Temp. °F	>60	RT
Interpass Temp. °F	300+/-25	311

Test Assembly Material:	A36, A370/E23
Radiographic Test:	Acceptable
Fillet Weld Test:	N/A
Tensile Condition:	OD- 0.498"
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)	90.0	98.7
Yield Strength, 0.2% offset (ksi)	78.0	84.4
% Elongation	17	27.0
%ROA	e	57.0
Average CVN impact properties ft·lbf @ -20°F	20	49.3

Chemical Composition of the Weld Deposit (Weight %)											
Element	C%	Mn%	Si%	P%	S%	Cr%	Ni%	Mo%	V%	Al%	Cu%
AWS/ASME Requirements	0.07-0.12	1.60-2.10	0.50-0.80	0.025	0.025	-----	0.15	0.40-0.60	-----	-----	0.50
Results	0.11	1.82	0.66	0.016	0.012	0.070	0.07	0.52	0.00	-----	0.08

Kimars Mahmoodi
Kimars Mahmoodi, Quality Assurance Manager Date 10/28/15