

Product Type: Quantum Arc D2  
 Classification: ER80S-D2 ER90S-G  
 Specifications: A5.28/SFA 5.28, A-2,F-6  
 Diameter Tested:  
 Date Tested: 06/15/07  
 Date Generated: 9/4/2007

This is to certify that the product named above and supplied on the referenced order number is of the same classification, manufacturing process, and material requirements as the material which was used for the test that was concluded on the date shown, the results of which are shown below. All tests required by the specifications shown for classification were performed at that time and the material tested met all requirements. It was manufactured and supplied by the Quality System Program of Hobart Brothers, which meets the requirements of ISO9000, ANSI/AWS A5.01, and other specification and Military requirements, as applicable.

### Test Settings

| Shielding Medium | Amps / Polarity | Volts | WFS in/min (m/min) | ESO in(mm) | Preheat F(C) | Interpass F(C) | Travel Speed in/min(cm/min) |
|------------------|-----------------|-------|--------------------|------------|--------------|----------------|-----------------------------|
| 100% CO2         | 300 / DCEP      | 29    | 450 (11.4)         | 7/8 (22)   | 325(163)     | 325(163)       | 13 (33)                     |

### Mechanical Properties - Tensile

| Shielding Medium | Ref. No. | Testing Conditions | Ult. Tensile Strength psi (MPa) | Yield Strength psi (MPa) | Elong.% in 2" |
|------------------|----------|--------------------|---------------------------------|--------------------------|---------------|
| 100% CO2         | PA5391   | As Welded          | 93,000 ( 638 )                  | 79,000 ( 547 )           | 22            |

### Mechanical Properties - Impact

| Shielding Medium | Ref. No. | Testing Conditions | Temp. F (C) | Individuals ft.lb.(J) | Avg. ft.lb.(J) | Type           |
|------------------|----------|--------------------|-------------|-----------------------|----------------|----------------|
| 100% CO2         | PA5391   | As Welded          | -20 (-29)   | 39,40,43 (53,54,58)   | 41 ( 55 )      | Charpy-V-Notch |

| Ref.No. | Radiographic Inspection | Fillet Weld Test |  |            |            |
|---------|-------------------------|------------------|--|------------|------------|
| PA5391  | Conforms                | Horizontal :     |  | Overhead : | Vertical : |

### Chemical Analysis

| Shielding Medium / Ref. No | C    | Mn   | P     | S     | Si   | Cu   | Cr | V | Ni   | Mo   | Al | Ti | Nb | Co | B | W | Sn | Fe | Sb | N | Mg | Zn | Be |  |
|----------------------------|------|------|-------|-------|------|------|----|---|------|------|----|----|----|----|---|---|----|----|----|---|----|----|----|--|
| NONE / CA55176             | 0.10 | 1.66 | 0.011 | 0.005 | 0.60 | 0.32 |    |   | 0.08 | 0.44 |    |    |    |    |   |   |    |    |    |   |    |    |    |  |



Robert Bombin, Process Engineer



Chris Mullenhour, Process Engineer

Certification and Limited Warranty - Data for the above supplied product are those obtained when welded and tested in accordance with the above specification. All tests for the above classification were satisfied. Other tests and procedures may produce different results. Hobart Brothers produces welding consumables under continuing quality assurance programs audited and approved by the American Bureau of Shipping ("ABS").