



Performance

**Brazing Procedure Qualification (BPQ)**

██████████ – Niobium to Stainless Steel

<b>Brazing Operator's Name:</b> ██████████		<b>ID Number:</b> NWV-BRZ-001
<b>Testing Conditions and Ranges Qualified</b>		
Identification of BPS Followed During Brazing of Test Coupon: NWV-BPS-001		
Specification of First Test Coupon Base Metal: Niobium		
Specification of Second Test Coupon Base Metal: 304 Stainless Steel		
<b>Brazing Variables (QB-350)</b>	<b>Actual Values</b>	<b>Range Qualified</b>
Brazing Process(es)	Vacuum Furnace	Vacuum Furnace
Type of Brazing (Manual, Semi-Automatic, Automatic, Machine)	Automatic	Automatic
Vacuum Brazing: Vacuum Level	10 <sup>-5</sup>	10 <sup>-5</sup>
Base Metal: P-Number (N/A) Niobium to P-Number (102) Stainless Steel 304 <input checked="" type="checkbox"/> Plate <input type="checkbox"/> Pipe (Enter diameter)	N/A	N/A
Base Metal Thickness	0.110"	0.06 in. to 1.00 in.
Joint Type (Butt, Lap, Scarf, Socket, etc.)	Lap	Lap, Butt
If Lap or Socket, Overlap Length	0.44"	0.25 in. to 1.00 in.
Joint Clearance	0.001"	0.0005 in. to 0.005 in.
Filler Metal (SFA) Specification(s) (info only)	35 Au / 65 Cu	35 Au / 65 Cu; MFR. Part No. 1007
Filler Metal Classification(s) (info only)	N/A	N/A
Filler Metal/F-Number	N/A	N/A
Filler Metal Product Form	∅ 0.040 in. Wire	∅ 0.040 in. Wire
Brazing Flow Positions	Horizontal Flow	Flat Flow, Vertical Downflow; ± 45°

## Niowave Proprietary

<b>Testing and Results</b>				
Visual Examination of Completed Joint: Conforms			Date of Test: 8-13-2010	
<b>Mechanical Test</b>	<input checked="" type="checkbox"/> Peel(QB-462.3)	<input type="checkbox"/> Section (QB-462.4)	<input checked="" type="checkbox"/> Tension (QB-462.1)	
	<input type="checkbox"/> Transverse Bends(QB-462.2a)	<input type="checkbox"/> Longitudinal Bends(QB-462.2b)		
Test	Result			
Tension	Tensile Strength: 20.1 KSI			
Peel	Conforms			
Mechanical Tests Conducted By:			Company: Laboratory Testing, Inc.	
Specimens Evaluated By: Sherri L. Scheifele			Company: Laboratory Testing, Inc.	
Lab Test Number: BNL001-10-08-25591-1				
We certify that the statements in this record are correct and that the test coupons were prepared, brazed, and tested in accordance with the requirements of Section IX of the ASME BOILER AND PRSSURE VESSEL CODE.				
Manufacturer: Niowave, Inc.				
Certified By: Matt Winowski			Date: 8-18-2010	