



# Braze Test Specification

## R418

Braze Procedure Specification followed: 18-R78 Revision 1

### Manual Torch Brazing Process

#### Base Metal

Limited to P-300 Materials  
Fitting/Tube Size:  
4 1/8" O.D., Type ACR (4.125" O.D.)  
Tube Material: ASTM B280 Seamless Tube (0.110" wall)  
Fitting Material: ASME B16.22 Stop Coupling (0.096" wall)

#### Brazing Filler Metal

SFA-5.8 BCuP 2 through 7 permitted  
F Number: 103  
Product Form: Round, Square or Rectangular Rod

#### Flow Position

All Positions  
Face fed filler metal

#### Joint Design

Joint Type: Socket (Tube/Fitting)  
Joint Clearance: 0.001" to 0.010"  
Overlap Length: 2.16" minimum

#### Brazing Flux, Fuel Gas, or Atmosphere

Brazing flux is not permitted  
Acetylene, Natural, Propane or MAPP® Gas is permitted  
Internal Purge using Oil Free Dry Nitrogen at 5 to 10 CFH

#### Post Braze Heat Treatment

Post braze heat treatment is not permitted

### Brazing Preparation, Assembly, Technique and Sectioning

- Tube shall be cut with a clean sharp tubing cutter at not less than 6" in length. Couplings may be either roll stop or dimple stop compliant with ASME B16.22 Standard.
- Deburr the interior edge of the cut tube end with a clean tool. Do not beat tube into fitting. Tubes should fit into coupling without force.
- Visually inspect the interior of each tube for obstructions and debris before assembly. Protect the joint from contamination.
- Method of pre-cleaning: Non-shedding abrasive pads and/or clean Stainless-Steel wire brush to remove all oxides in the brazing area followed by wiping with a clean lint-free white cloth. Do not groove the surfaces while cleaning.
- Index horizontal position assembly by notching a defined "V" to indicate "Top of Tube" with a clean tool. Index mark should be placed in the brazing jig at Brazer's left-twelve o'clock position prior to brazing horizontal position.
- All Vertical brazing must be performed in the VERTICAL UPFLOW position.
- Brazing shall take place within 8 hours after cleaning and assembly of the test coupons.
- Purge all tubing with oil free dry nitrogen at 5 to 10 CFH flow rate while brazing and until cool to the touch.
- Use a neutral to slightly reducing flame if using oxy/acetylene.
- Torch Tip Size: (Optional) 7 or 30, use of Rosebud permitted.
- Post Brazing Cleaning: All completed joints shall be washed with a water-soaked cloth, followed by brushing with a stainless-steel hand wire brush to remove any residue for inspection.
- Inside of the tube shall exhibit no oxidation or flaking.
- The completed braze test assembly shall be visually examined for cleanliness and the presence of brazing filler metal all around the joint at the interface between the socket and the tube. Internal and external surfaces shall be free of excessive braze metal or erosion of base metal.
- Completed assembly should be sectioned into straps or quarters as follows; Horizontal Joints must be cut at 45 degrees off top brazed position. Vertical Joints may be cut from any degree location. Sectioning should result in two sets of 1/2" wide straps or two quarters of assembly removed at 180 degrees apart. Straps or quarters should be lightly polished with a 120 Grit Flap Disc along brazement without excessive removal of base metal.
- The sectioned components of entire assembly must be identified with Brazer's First Initial, Last Name and Last 4 digits of Social Security Number. Each Joint shall be identified with braze position. "H" for Horizontal and "V" for Vertical and submitted to NITC Southern Regional Office, 2540 Severn Ave., Suite 200, Metairie, LA 70002 along with completed documentation.
- **NO BENDING, FLATTENING, DISTORTION or GRINDING allowed on sectioned assemblies.**



# Brazer Qualification Record

In Compliance with ASME Boiler & Pressure Vessel Code Section IX and  
ASME B31.5 Refrigeration Piping and Heat Transfer Components Standard

## R418

Name of Brazier: \_\_\_\_\_ Last 4 digits of SSN#,  
NITC ID # or UA ID #: \_\_\_\_\_

Braze Test Date: \_\_\_\_\_ Braze Procedure Specification followed: **18-R78 Rev.1**

### Brazing Qualification Limits

| Brazing Variables            | Actual Values                       | Ranges Qualified                    |
|------------------------------|-------------------------------------|-------------------------------------|
| Brazing Process              | Manual Torch                        | Manual Torch                        |
| Method of Cleaning           | 3M Pad, Cloth Wipe, SS Wire Brush   | 3M Pad, Cloth Wipe, SS Wire Brush   |
| Base Metals P-Number         | P-300                               | P-300                               |
| First Base Metal Thickness   | 0.110"                              | 0.055" to 0.220"                    |
| Second Base Metal Thickness  | 0.096"                              | 0.048" to 0.192"                    |
| Joint Type                   | Socket                              | Socket & Lap                        |
| Joint Clearance              | 0.001" to 0.010"                    | 0.001" to 0.010"                    |
| Joint Overlap Length         | 2.16"                               | 2.70" maximum                       |
| Internal Purge Gas           | Oil Free Dry Nitrogen @ 5 to 10 CFH | Oil Free Dry Nitrogen @ 5 to 10 CFH |
| First Brazing Flow Position  | Horizontal                          | All Flow Positions                  |
| Second Brazing Flow Position | Vertical Up                         |                                     |
| Filler Metal Product Form    | Face Fed Rod                        | Face Fed Rod                        |
| Filler Metal Specification   | BCuP 5                              | All BCuP Series Rod                 |
| Filler Metal F-Number        | F-103                               | F-103                               |

### Examination Results

Visual Examination of Completed Braze Assembly (QB-141.6): Acceptable (no signs of flaking or internal oxidation)

Test Lab Sectioning Test Results (QB-181): Acceptable

**We certify that the statements in this record are correct and that the test coupons were prepared, brazed, and tested in accordance with requirements of NFPA 99 and Section IX of the ASME Code.**

\_\_\_\_\_  
NITC Representative/Authorized Testing Representative Name

\_\_\_\_\_  
NITC Representative/Authorized Testing Representative Signature

\_\_\_\_\_  
Date:

\_\_\_\_\_  
Manufacturer or Contractor Company Name  
and Representative Name Printed

\_\_\_\_\_  
Manufacturer/Contractor Representative Signature

\_\_\_\_\_  
Date:

\_\_\_\_\_  
National ITC Corporation  
Certified Test Lab Company Name

\_\_\_\_\_  
Certified Test Lab Representative Signature

\_\_\_\_\_  
Date:

**The undersigned contractor hereby adopts this Brazer Qualification Record and accepts the responsibility for construction of brazements performed by the Brazier in accordance with the Contractor's Braze Procedure Specifications.**

\_\_\_\_\_  
Manufacturer or Contractor Company Name  
and Representative Name Printed

\_\_\_\_\_  
Manufacturer/Contractor Representative Signature

\_\_\_\_\_  
Date: