

NITC

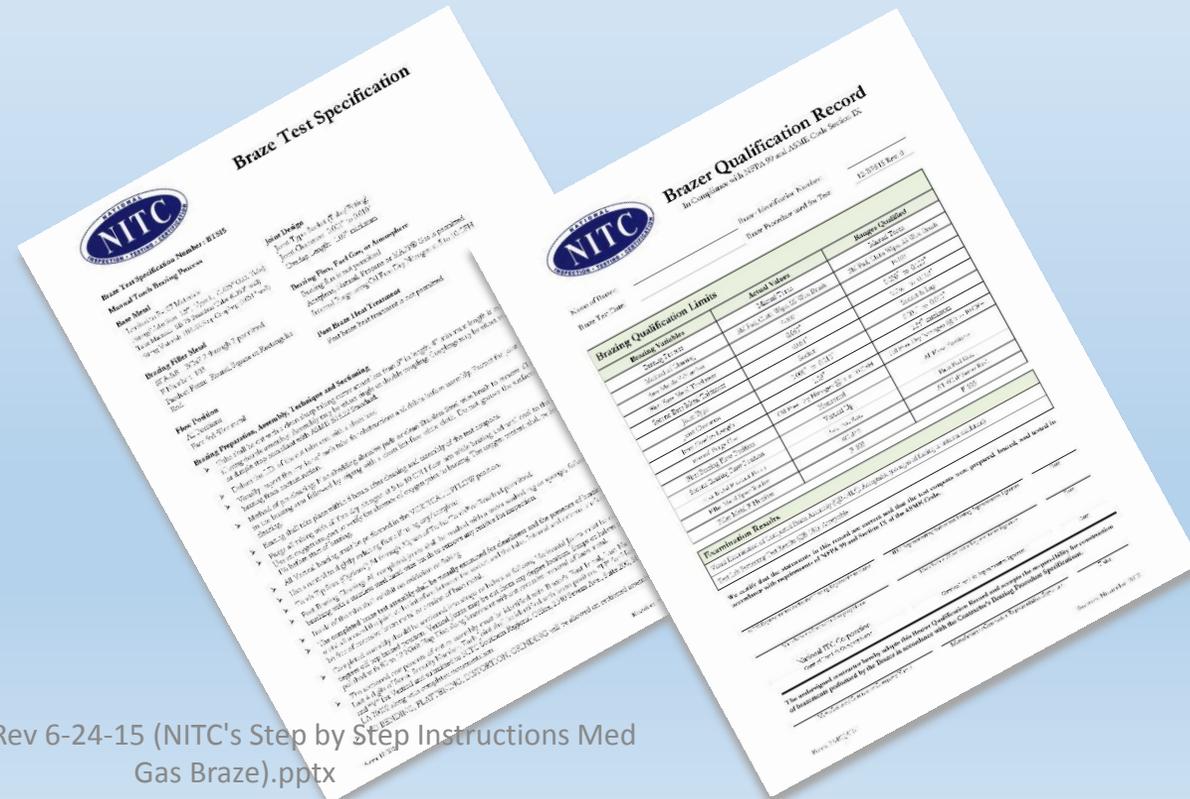
Step by Step Instructions for the
Medical Gas Braze Session

ASSE 6010 Installer
Practical Examination

The Braze Session

Required Documentation:

- Braze Test Instruction Sheet
- Brazer Qualification Record (BQR)



Notice of Legal Record

NITC Brazer Qualification Record (BQR)

The documents associated with the NITC Braze Session SHALL be treated as a legal document.

Information SHALL be typed or printed neatly.

If you make a mistake, start over with a fresh BQR. NEVER USE WHITEOUT

If someone signs in the wrong space, please use a single line to cancel and initial the mistake.

The Signature Dates are to be the same as the Braze Test Date.

The Brazer Information should be completed prior to the start of the session.

The BQR must be completed and submitted with the completed test coupons to NITC.

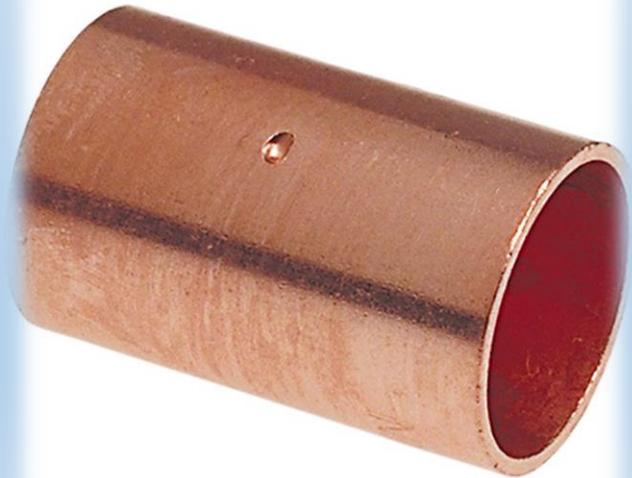
The BQR SHALL be protected from damage during the session and while in transit.

DO NOT - ROLL UP, PLACE INSIDE COUPON OR TUBE or FOLD Brazer Qualification Records.

The Braze Session

Required Materials:

- 1 ½” Type “L, ACR, or MedGas” Copper Tube Grade - ASTM B75
 - Minimum 3” Section of Copper Tube for single coupling
 - Minimum 4” Section of Copper Tube for double coupling
- 1 ½” Copper Solder Type Couplings ASME B16.22
 - May be either roll stop or dimple stop
 - Must have a minimum overlap of 1.09”
- BCuP Brazing Filler Metal Rods



The Braze Session

Required Tools and Equipment:

- Well lit and ventilated area to perform braze.
- Appropriate Test Stand to allow purging and positioning of assembly during session.
- Either Oxy/Acetylene or Turbo Type Torch capable of producing adequate heat for brazing.
- Regulated Nitrogen Purge Source and Flowmeter
- Oxygen Level Sensor for testing purge
- Fire Extinguisher within Close Proximity



Exhibit # 53 Rev 6-24-15 (NITC's Step by Step Instructions Med Gas Braze).pptx

The Braze Session

Required Tools and Equipment: (Continued)

- Appropriate PPE (Safety Glasses, Gloves, etc.)
- Spark Striker for lighting torch
- ScotchBrite[®] abrasive pad for cleaning
- Stainless Steel fitting brush for cleaning
- Half Round File for indexing/notching assembly
- Deburring Tool
- Clean Dry Lint Free Cloth for cleaning
- Clean Wet Rag for cleaning completed assembly
- Sharpie[®] Black permanent marker for Identification

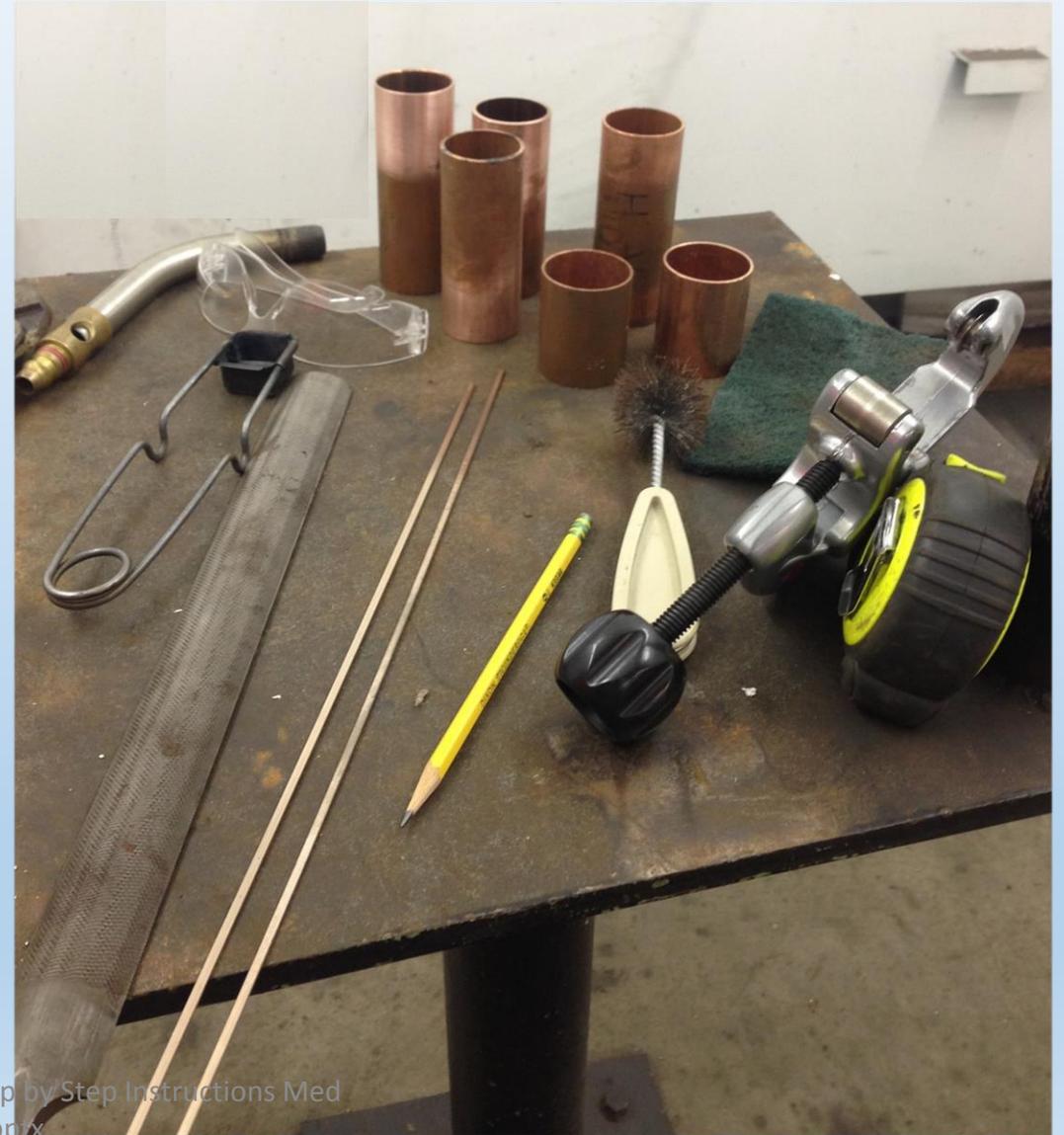


Exhibit # 53 Rev 6-24-15 (NITC's Step by Step Instructions Med Gas Braze).ppix

The Braze Session

Before you Begin your Braze;

Please note: This is a **Practical Exam** being performed in conjunction with your **ASSE 6010 Medical Gas Installer Certification**

This Exam or Test is to be performed in FULL compliance with ASME Section IX Boiler & Pressure Vessel Code, ASSE Standard 6000 and the NFPA 99 Healthcare Facilities Code

The Braze Session

Before you Begin your Braze; (Continued)

This test is to be supervised by a Company Representative and witnessed by another person who will be serving as the Authorized NITC Testing Representative.

Those individuals will be signing your Brazer Qualification Record as to witnessing the event and ensuring that the person acting as the Brazer is who they say they are and have performed the braze accordingly.

You shall not sign your own Brazer Qualification Record or serve as either the Company Representative or Proctor for anyone during the same session.

The Braze Session

Before you Begin your Braze; (Continued)

This is not the time to practice. NO BRAZE PRACTICE shall take place during the Braze Session.

You should be able to perform the braze session and successfully prove your ability to make sound joints.

During this session, and upon completion of you brazing an assembly, you may have it submitted to NITC or if for some reason you are not satisfied with it, discard it and braze another assembly.

However, the second assembly is the one that needs to be submitted.

Choosing the best one is not allowed.

The Braze Session

Before you Begin your Braze; (Continued)

As an ASSE 6010 Medical Gas System Installer, you will be installing piping that a person's life will be depending upon. It can not be stressed enough of the importance your role will be in this industry.

During this Braze Session, you will be demonstrating your ability to produce sound joints under the most ideal conditions. As you know, when it comes to conditions, it does not get any better than it does in the test booth.

For that reason, the Codes require you to qualify all four joints of the test specimen with a minimum 80% fill brazement and visually acceptable appearance.

Should you not succeed in achieving this qualification during your initial session, make time to practice, improve your technique and try again.

In the field; we should all do our best to do it right the first time, there may not be an opportunity for a second chance.

Remember, someone you love may depend on your installation to save their life.

The Braze Session

Decide on which type assembly you will be brazing.....
For this presentation, we will use the double coupling assembly.

Cut tubes using a clean tubing cutter. For the double coupling assembly, the tubes must be at least four inches (4") long.

Deburr Tubes using a sharp tool or Roller Type Deburrer making sure not to groove or scar interior of tubes.

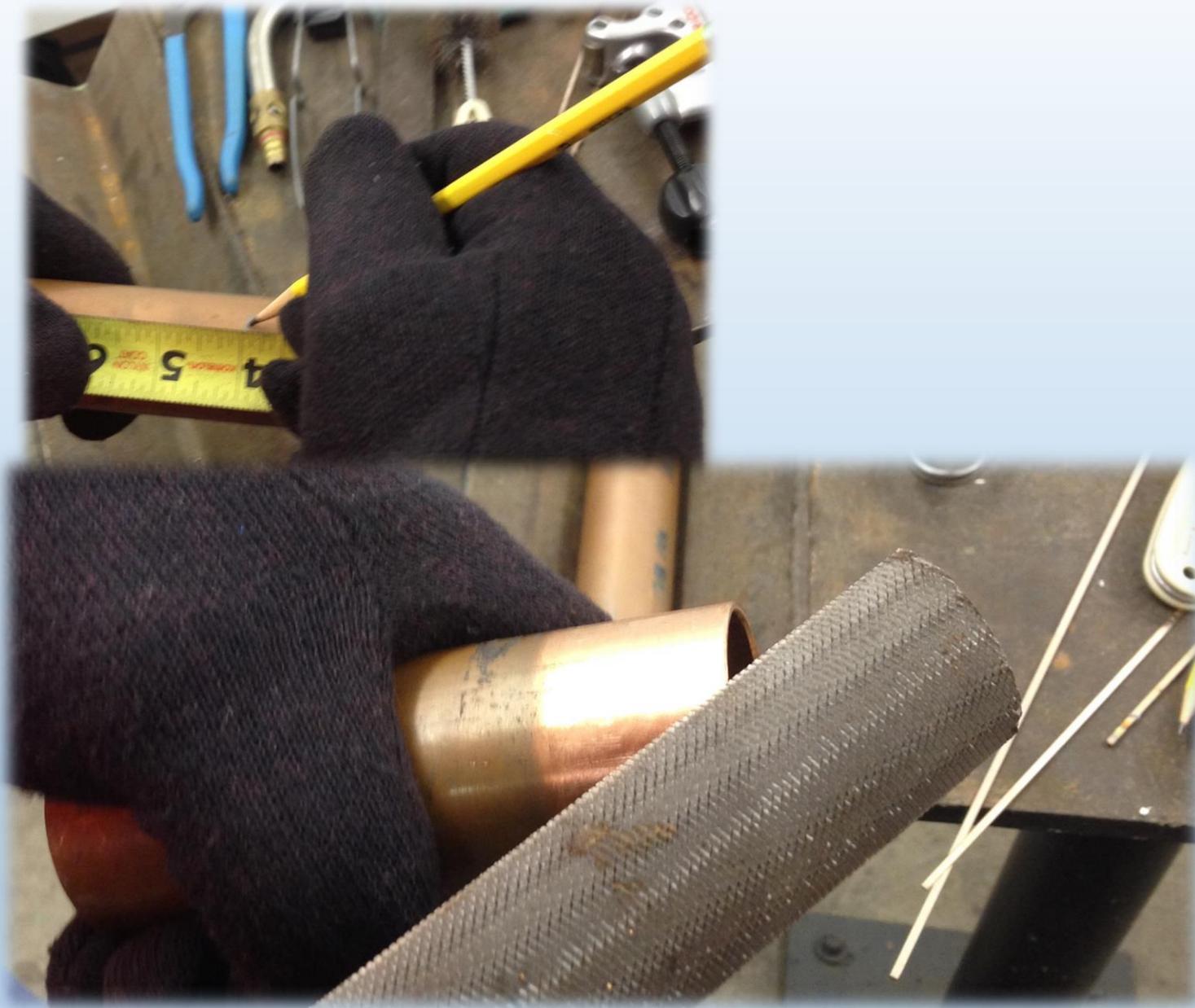


Exhibit # 53 Rev 6-24-15 (NITC's Step by Step Instructions Medical Gas Braze).pptx



Exhibit # 53 Rev 6-24-15 (NITC's Step by Step Instructions Med Gas Braze).pptx

The Braze Session

Clean all tubes and fittings using the ScotchBrite® Pad and Fitting Brush. **DO NOT USE SANDCLOTH**

Use file to remove any external edge or shoulder from tube that may have been left from cutter.

Tube should fit into fitting without any binding. **DO NOT BEAT TUBE INTO FITTING**

Complete assembling, taking care **not to touch** any part of area to be brazed with bare hands.

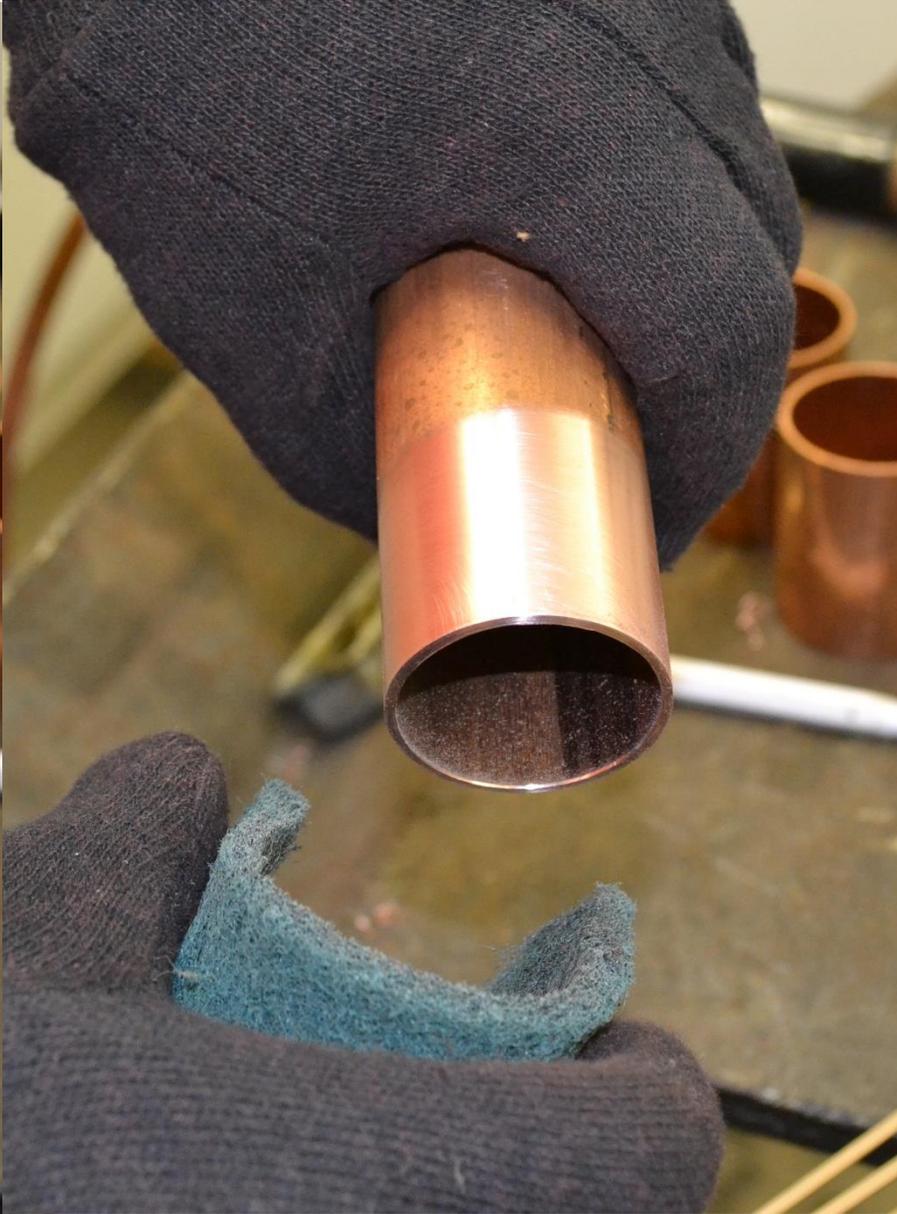
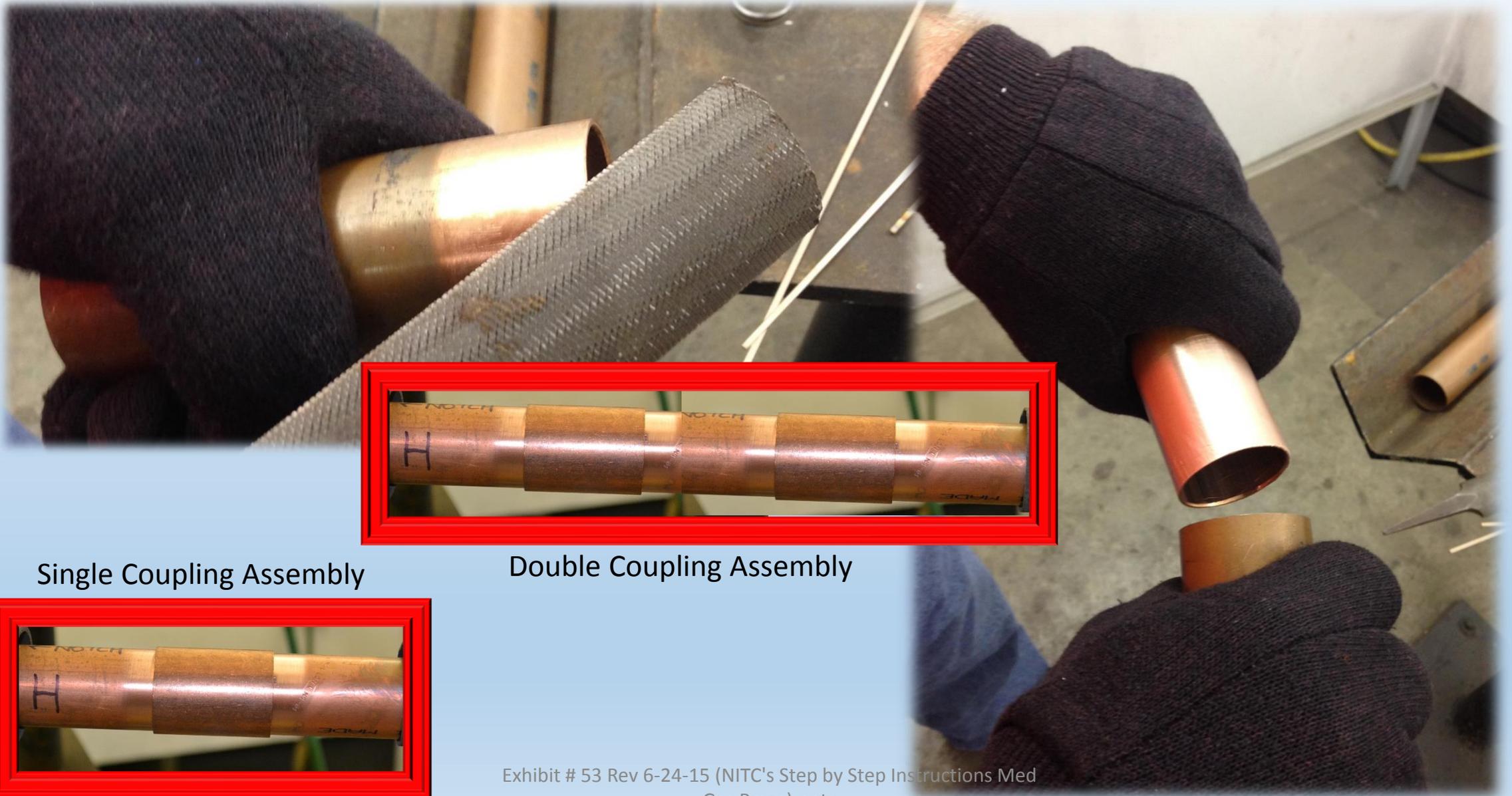


Exhibit # 53 Rev 6-24-15 (NITC's Step by Step Instructions Med Gas Braze).pptx



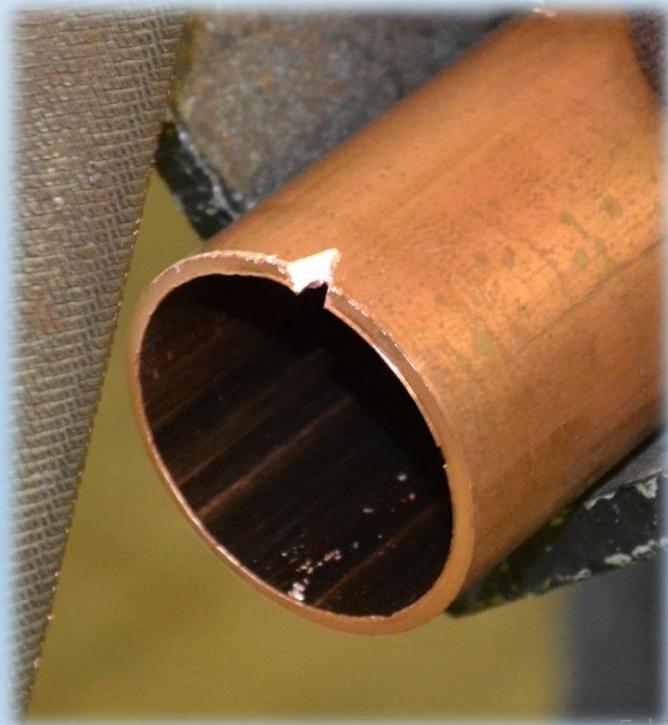
Double Coupling Assembly

Single Coupling Assembly



The Braze Session

Lay assembly on its side and make a small “V” shape (**notch**) on one end of tube. This will serve as an index to the horizontal position of the completed assembly.



The Braze Session

Check your BCuP rods for cleanliness. If they have been sitting around awhile open to the elements, they will probably have some oxidation on them. Use your ScotchBrite® Pad and lightly clean them up before using.

Place the clean rods within easy reach during brazing.

Move away any tools that will not be used during your braze.



Exhibit # 53 Rev 6-24-15 (NITC's Step by Step Instructions Med Gas Braze).pptx

TIME TO BEGIN YOUR BRAZE

Position Assembly into Test Stand in the Horizontal position with the index (notch) to your left.

Ensure your index mark “V” (notch) is at the top of the assembly.

Turn on Nitrogen Purge and set flowmeter for 5 to 10 CFH.

Use Oxygen Sensor to ensure Oxygen Level within assembly is below one percent (1%)

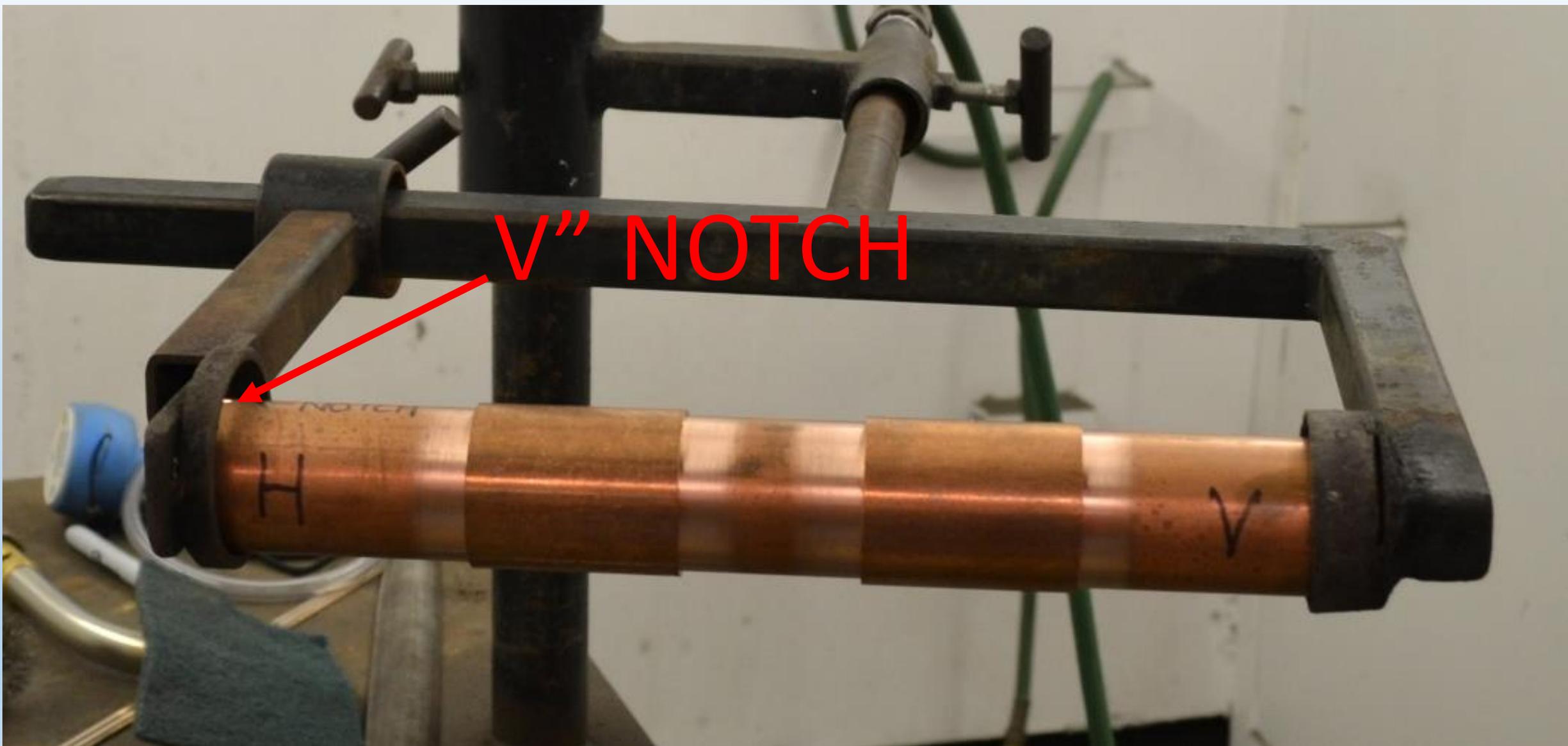
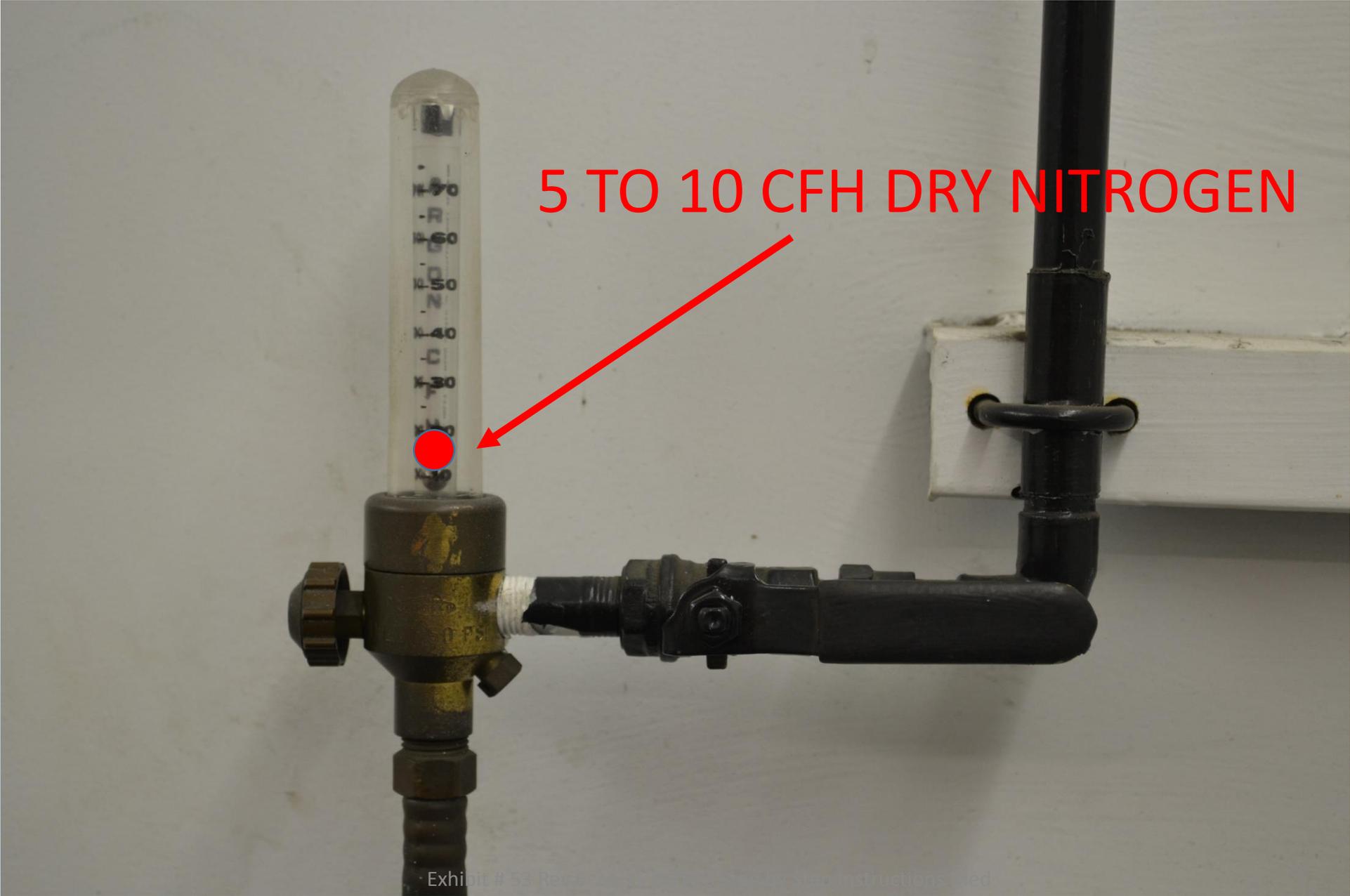


Exhibit # 53 Rev 6-24-15 (NITC's Step by Step Instructions Med Gas Braze).pptx



5 TO 10 CFH DRY NITROGEN



Exhibit # 53 Rev 6-24-15 (NITC's Step by Step Instructions Med Gas Braze).pptx

The Braze Session

- Verify the “V” index notch is positioned correctly.
- Are your clean BCuP rods within reach?
- Is there unrestricted access around test stand?
- Be sure to maintain a purge from start to finish.
- Ignite your torch and good luck!

The Braze Session

Starting with the coupling on the left side of the assembly, begin brazing the two (2) horizontal joints.

Upon completion, let the assembly cool until set. (MAINTAIN PURGE)

Rotate the assembly in test stand 90 degrees (90°) counter clockwise.

NOTE: BOTH VERTICAL JOINTS MUST BE BRAZED IN **UPFLOW POSITION**

Begin brazing the vertical upflow joint closest to the Horizontal joints.

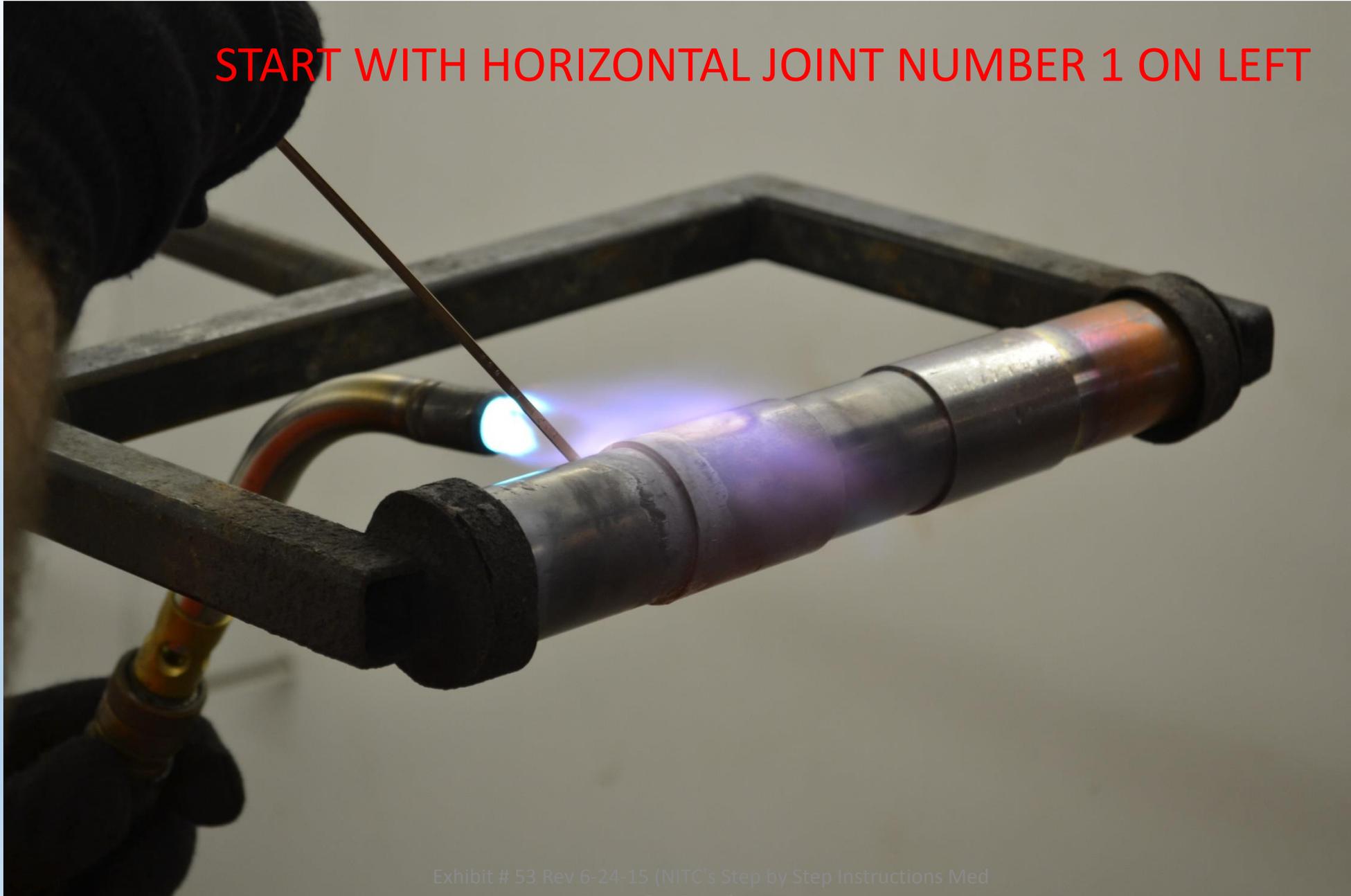
When completed, let assembly cool until set. (MAINTAIN PURGE)

Rotate assembly in test stand 180 degrees. (180°) either direction.

Braze the remaining vertical upflow joint using care to not upset the previous joint.

ADDING ADDITIONAL FILLER METAL TO THE PREVIOUSLY BRAZED VERTICAL UPFLOW JOINT WILL BE CONSIDERED AS **VERTICAL DOWNFLOW** BRAZING AND WILL RESULT IN FAILURE OF POSITION

START WITH HORIZONTAL JOINT NUMBER 1 ON LEFT

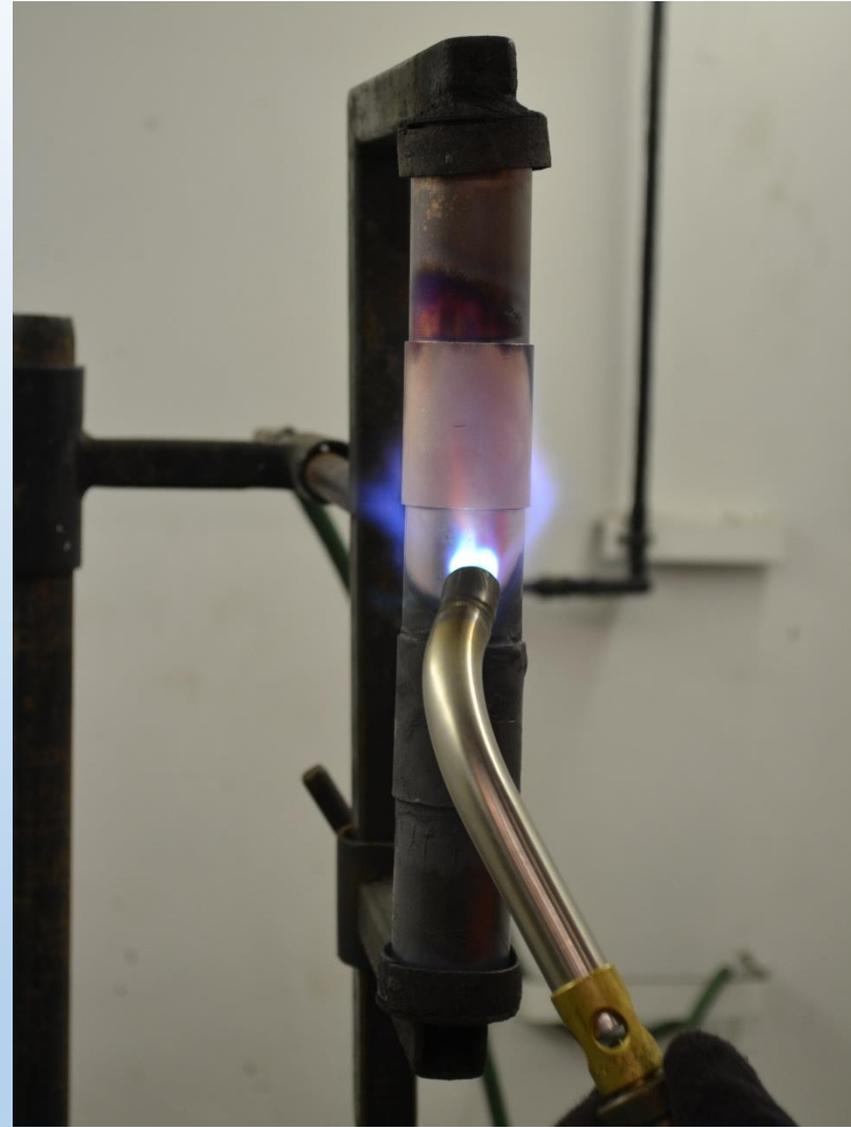


HORIZONTAL JOINTS 1 & 2 COMPLETED





ASSEMBLY ROTATED 90° CCW



VERTICAL UPFLOW NUMBER 1

**BE SURE TO
ROTATE ASSEMBLY 180°
BEFORE BRAZING VERTICAL
UPFLOW NUMBER 2**

VERTICAL UPFLOW NUMBER 1

VERTICAL UPFLOW NUMBER 2

The Braze Session

When brazing is completed, turn off torch and allow assembly to “Cool to Touch” before removing from purge.

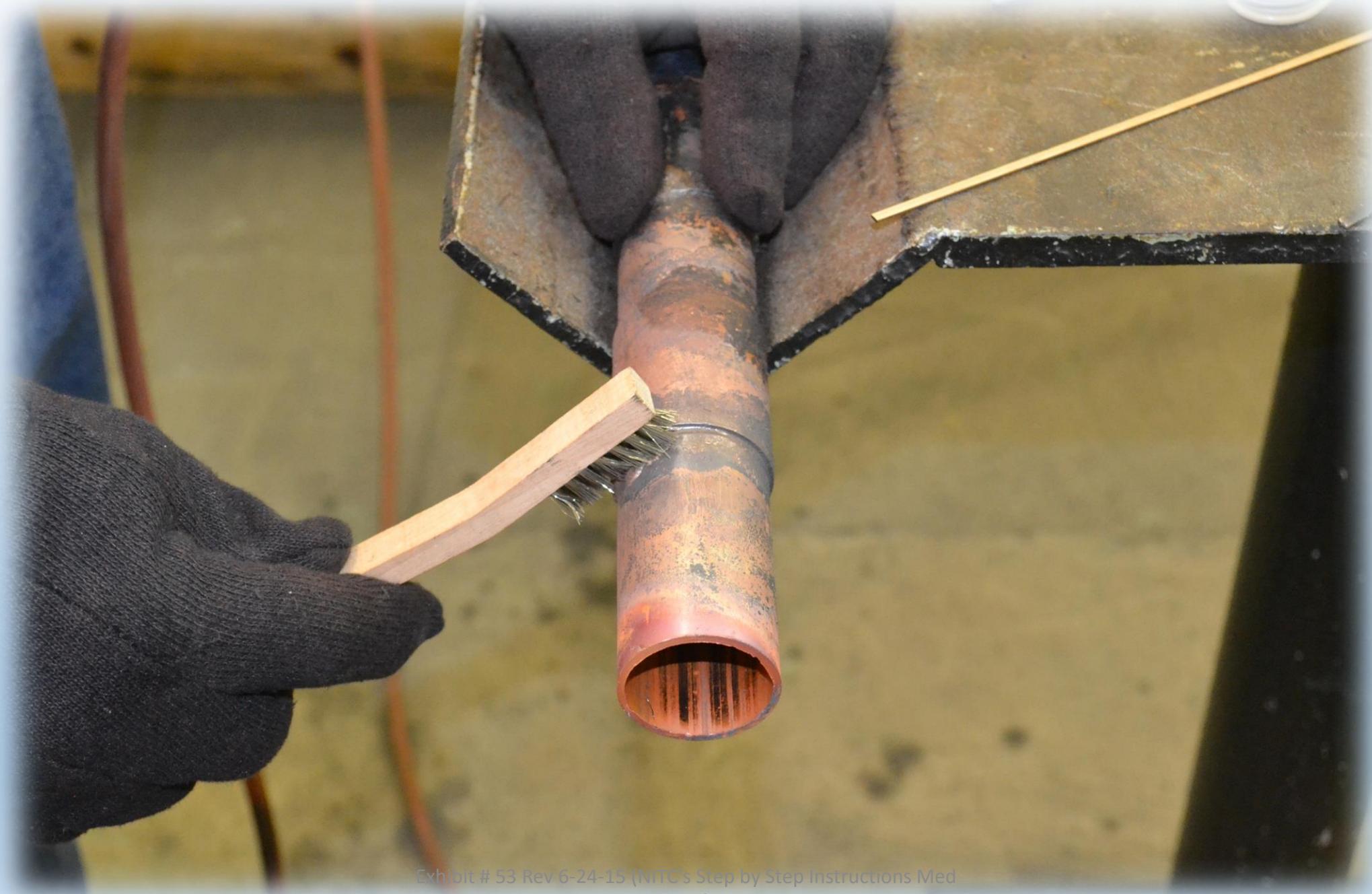
Clean outside of tube with Clean Wet Rag and Brush to remove residue for visual examination.

Mark Brazer Name and Last Four Digits of Social Security Number on Assembly for Identification.

Mark “H” on Horizontal end and “V” on Vertical end.



Exhibit # 53 Rev 6-24-15 (NITC's Step by Step Instructions Med Gas Braze).pptx



The Braze Session
Assembly may be cut in Half or a Strap may be removed.

If cutting in Half, be sure to make the cut at the forty-five degree (45°) location away from top of assembly (The top of the assembly is where you made the “V” with the file)

The cut should be centered lengthwise through the assembly forming two equal halves.



The Braze Session

If removing a Strap, the strap should be cut one quarter inch (1/4") above and below the forty-five degree (45°) location away from top of assembly. ("V" Index or notch)

The Strap must be a minimum of one half inch (1/2") in width. *Depending upon the type of saw that is being used, several cuts may be needed to accomplish the removal.* However, each piece of the assembly must be identified and submitted.

The Strap must have the braze position marked on each end and be identified with the Brazer name and last four (4) digits of Social Security Number.

H J.DOE 1234 ✓

H J.DOE 1234 ✓

The Braze Session

The Top Half of the Assembly or Strap may be polished with an 80 to 120 Grit Flap Disc along the area of the brazement.

Care should be taken to avoid removing excessive base metal.

Each Braze position will consist of four (4) views. Each view should reveal a minimum of eighty percent (80%) braze filler metal along the joint between the coupling and tube. (This is the area from the root to the cap of the coupling, aka the brazement)

Any area along the brazement, where a clear line of filler metal cannot be seen, shall be considered a void.



Exhibit # 53 Rev 6-24-15 (NITC's Step by Step Instructions Med Gas Braze).pptx



Exhibit # 53 Rev 6-24-15 (NITC's Step by Step Instructions Med Gas Braze).pptx



Exhibit # 53 Rev 6-24-15 (NITC's Step by Step Instructions Med Gas Braze).pptx

The Braze Session

Discontinuities which may cause **UNACCEPTABLE, VISUAL REJECTION** or **NON-CONFORMANT** results;

- Oxidation or Flaking within tubing (Insufficient Purge or Removed While Hot)
- Lack of Penetration (>20% Accumulative Void in Any View of Brazement or Any Void at Cap)
- Erosion of Base Metal (Melted Copper)
- Excessive Filler Metal (Internal/External)
- Cracks (Cracks in Brazement or Base Metal within Heat Affected Zone (HAZ))
- Unmelted Filler Metal
- Tube not Fully Inserted (Tube Should Be Inserted to Stop of Coupling)
- Tube Inserted Beyond Stop
- Coupon Less Than Three Inches (3" Min. for Single Coupling, 4" for Double)

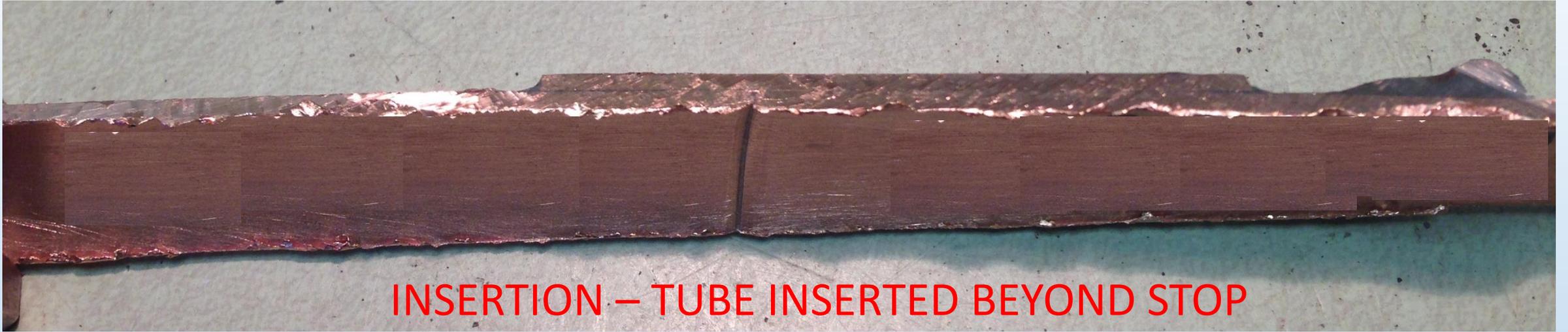
EXCESSIVE FILLER METAL



EROSION OF BASE METAL



EROSION OF BASE METAL



INSERTION – TUBE INSERTED BEYOND STOP



PENETRATION – VOID GREATER THAN 20%

CHANGE IN SPECIMEN PREPARTION

SPECIMENS ARE NO LONGER ALLOWED TO BE BENT, FLATTENED OR
DISTORTED IN ANY MANNER

YOU MAY CUT THE SPECIMENS FOLLOWING THE INSTRUCTIONS
PROVIDED WITHIN THIS PRESENTATION

IF YOUR FACILITY IS NOT EQUIPED TO PROPERLY CUT SPECIMENS,
PLEASE LET US KNOW, WE WILL PROVIDE THE CUTTING

YOU MAY POLISH THE SPECIMENS
GRINDING OF SPECIMENS OR EXCESSIVE REMOVAL OF BASE METAL
IS NOT ALLOWED

The Braze Session

Discontinuities which may cause **UNACCEPTABLE, VISUAL REJECTION** or **NON-CONFORMANT** results; (Continued)

- Non-Conformant Materials (Ex. Type “M” Copper, Coupling with <1.09” Overlap)
- Vertical Downflow (Vertical Brazed in Downflow Position)
- Horizontal Cut from Bottom (Sample Cut From Wrong Location)
- Coupon Preparation (Flattened, Bent, Distorted)
- Coupon Preparation (Excessive Base Metal Removed)
- Coupon Preparation (Incomplete Assembly, Pieces Missing)
- Coupon not Identified (No Name, ID, Position)
- Coupon not Submitted (Paperwork w/o Coupon, Loss Due to Damage in Transit, etc.)
- Coupon Submitted w/o Proper or Completed Paperwork (Missing, Damaged, etc.)

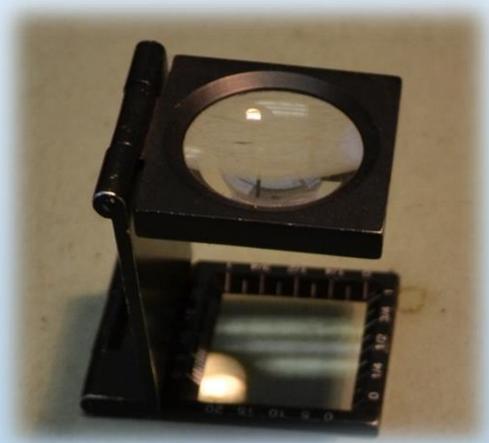
The Braze Session

Verify all;

- Coupons are identified and accounted for
- Paperwork is correct, completed, signed and dated

Packing

- Coupons should be wrapped in thin bubble wrap
- Tuck bubble wrap into ends of pipe to secure
- Place coupons together in sturdy container
- Place Paperwork in an envelope above Coupons within same Container, place bubble wrap below Paperwork to prevent damage to documents during transit
- Tape outside of container securely to prevent unintentional opening during transit.



The Braze Session

Ship container via UPS or USPS to:

**National ITC Corporation
Southern Regional Office
2540 Severn Ave., Suite 200
Metairie, LA 70002
Attn: Janel Mezzic
Phone: 504-885-0748**



Exhibit # 53 Rev 6-24-15 (NITC's Step by Step Instructions Med Gas Braze).pptx

The Braze Session

Questions about the NITC Practical Exam?

Metairie Office: 504-885-0748

Or Toll Free:

888-234-6834