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APPROVED BY: \_\_\_\_\_

Technical Executive

DESCRIPTION: QP2018 Manufacture 788 Armature Coils Rev 0.doc

DOCUMENT No: QP2018

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**1. Purpose**

To provide a Quality Procedure Manual that explains all responsibilities, documents, steps and quality checks relevant to Manufacturing of 788 armature coils

**2. Scope**

This is a Quality Procedure Manual to guide employees to manufacture 788 Armature coils

**3. Responsibilities**

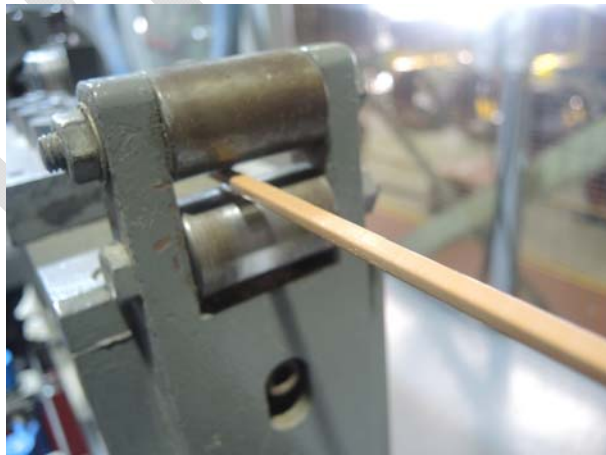
Operations Executive, Workshop Manager, Senior Supervisor, Supervisor and Operator

**4. Cutting line**

- Measure bare wire using a Micrometre and confirm to spec 6.00mm x 3.65mm.
- Fit the spool into the spool holder.



- Thread the conductor through the first set of guide rollers.



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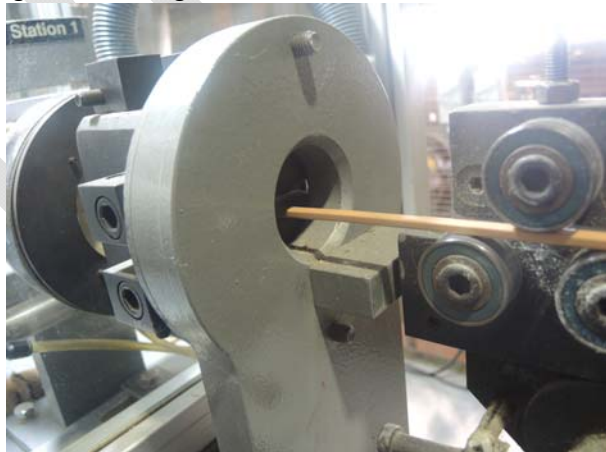
- Thread the conductor through the first set of horizontal straightening rollers.



- Thread the conductor through the first set of vertical straightening rollers.



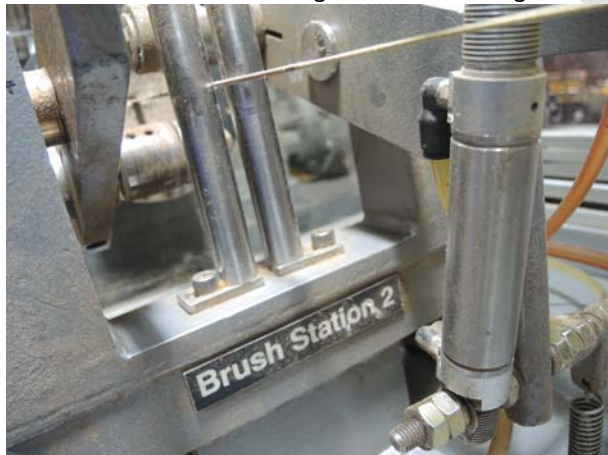
- Thread the conductor through first hole in glass.



- Thread the conductor through the second set of guide rollers and then pass through the first set of brushes.



- Thread the conductor through the third set of guide rollers and then pass through the second set of brushes.



- Thread the conductor through the second hole in the glass.



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- Thread the conductor through tractor belts



- Thread the conductor through the guillotine end to the middle of the cutting edge of the guillotine.



- Switching on the air and **Close** the bleeder valve and **Open** the air valve
- Switch "ON" Main isolator, the tractor belt will now clamp the conductor.
- Switch "ON" control box isolator.



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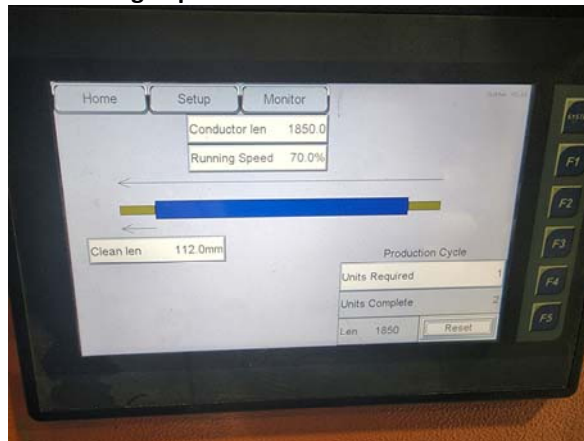
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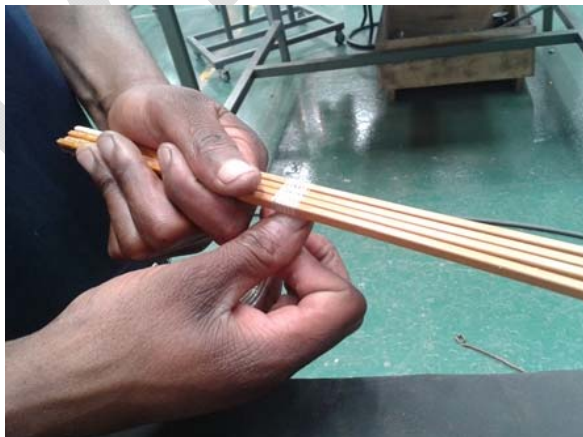
- Ensure cutting line program is correct for 788 armature coils.
- **Bar length:** 1850mm      **Cleaning depth:** 112mm      **368 conductors per set**



- Cut conductor to length. Clean both ends of conductor and ensure there are 368 conductors per set
- Remove all Polyimide from leads and visually check fusing of polyamide to copper.  
Note: Clean each conductor using Acetone to remove copper dust/shavings.



- Stack together 2 set of 4 conductors.



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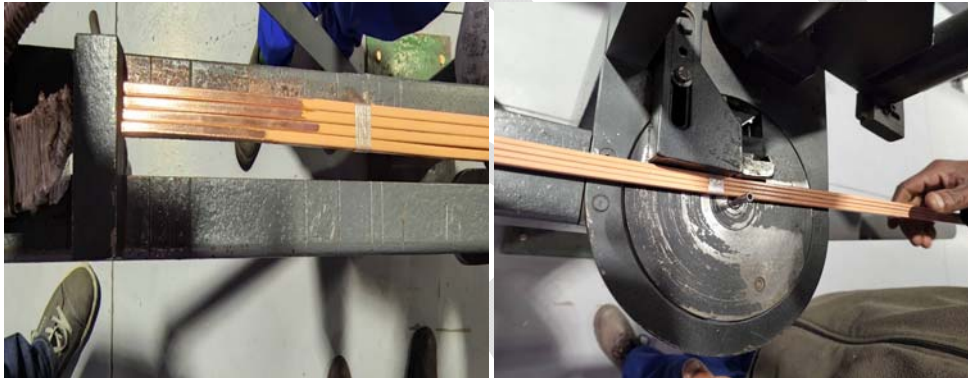
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### 5. Evolute bending

- Set the stop to the correct position (Length 925mm) to centre of pin.



- Place the stack into the evolute bender against the stopper and ensure that the bender guides are set at the width of the stack.



- Ensure that the top guide is set to the height of the stack and lock it into position using the Cam lever.

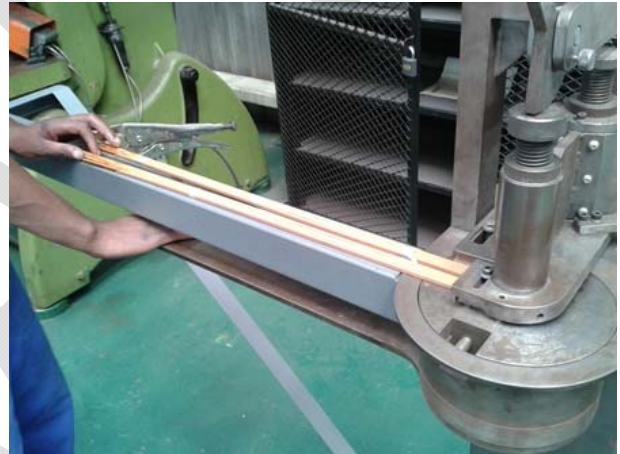


- Lock the cam lever using the pin.



PIN

- Use the evolve bender handle to bend the coil into a u-shape.



6. Throw out jig.

- Place the coil into the throw-out former and install the locking pin.

LOCKING  
PIN



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- Start bending simultaneously against stops in the throw out jig for 788 armature coils.



- Remove coils from throw out jig, remove the tape and open the evolude slightly.  
**Note:** This is to ensure there is a gap for the knuckle to fit when forming the coil on the former.



- Tape sacrificial tape on the legs of the coil.



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7. Coil former

a. Bottoms

- Place the coil into the former and clamp the evolude. Bend the bottom rear arm down, clamp it down to hold it in position.



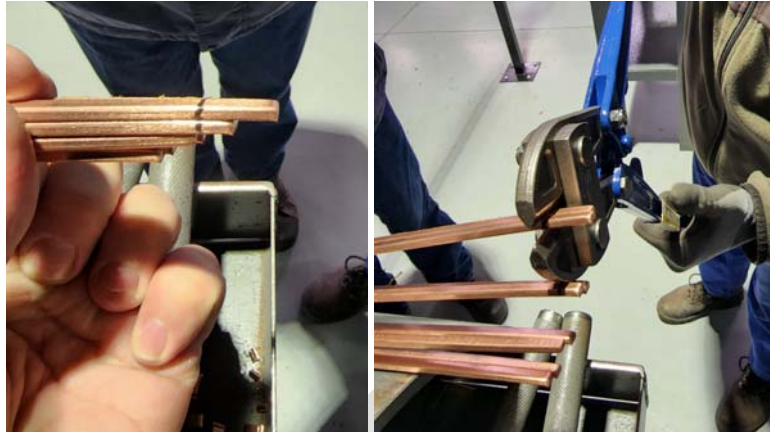
- Install the bending tool then bend the bottom leg rear corner.



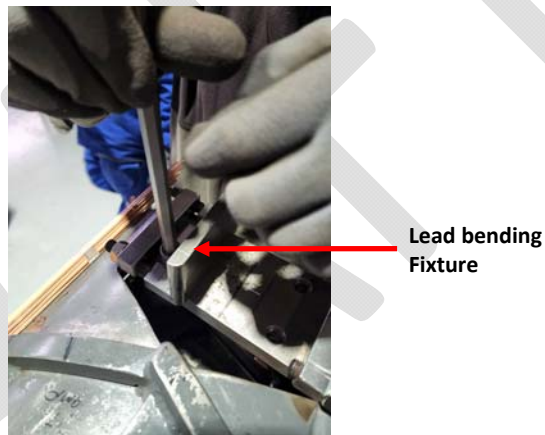
- Clamp the bottom slot portion of the coil using clamping plate and cam.



- Mark and cut leads all same length.



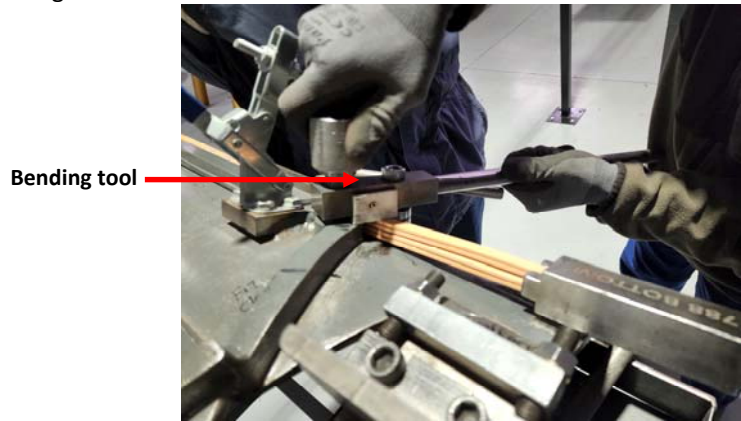
- Install the lead bending fixture.



- Install the bottom leads into the bottom forming jig.



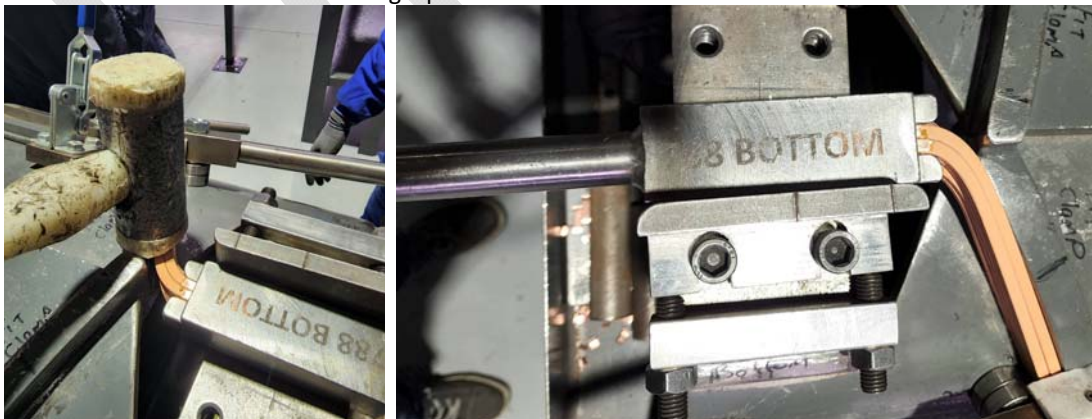
- Install the bending tool.



- Lift the bottom lead forming jig over the lead bending fixture while bending the bottom leg front corner.



- Bend the coil leads and knock down using a plastic mallet.



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- Remove the bottom lead forming jig from the coil leads.



b. Tops

- Bend the Top rear arm down; clamp it down to hold it in position. Install the bending tool.

Bending tool



- Using the bending tool, bend the Top leg rear corner.



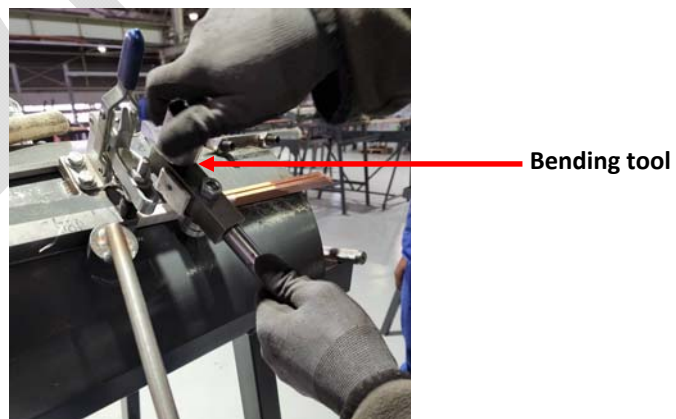
- Clamp the Top slot portion of the coil using clamping plate and cam.



- Remove and install the lead bending fixture for the tops.



- Install the bending tool.



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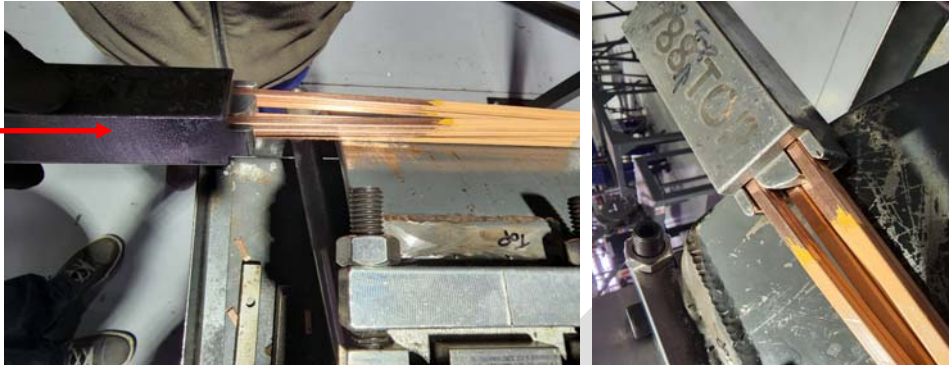
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- Install the Top leads into the Top forming jig.

Top forming jig



- Lift the Top lead forming jig over the lead bending fixture while bending the Top leg front corner.



- Bend the coil leads and knock down using a plastic mallet.



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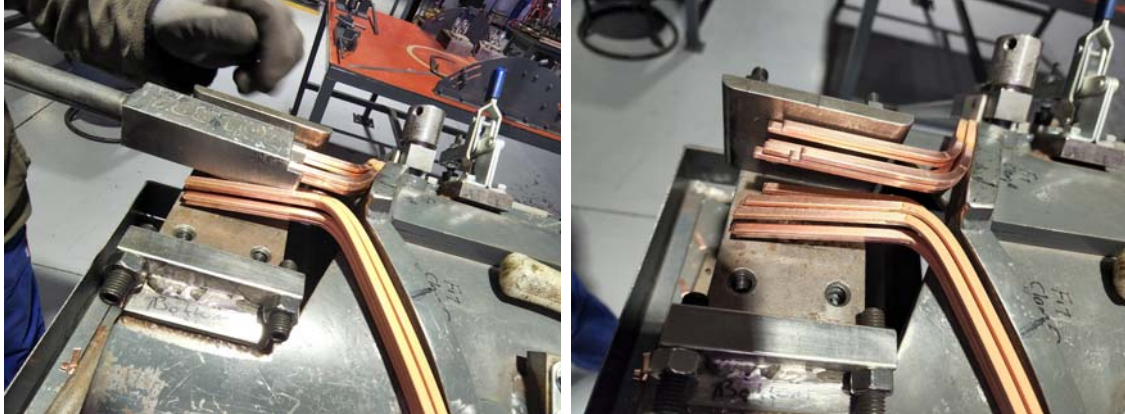
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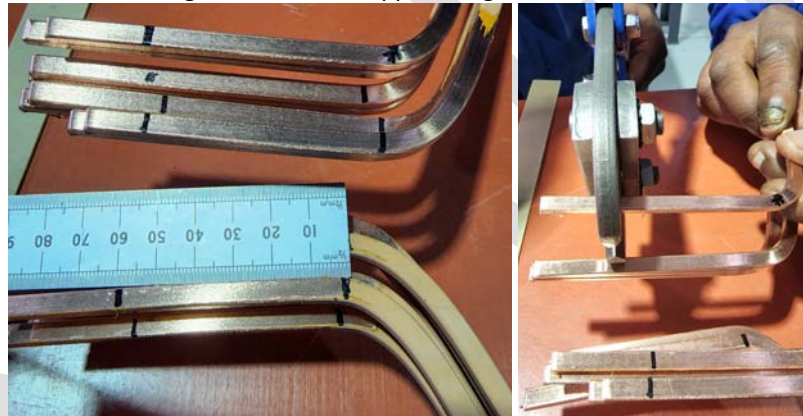
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- Remove the Top lead forming jig from the coil leads.



### 9. Swaging Leads

- Mark lead length 60mm to be swaged. Cut excess copper using bolt cutter.



- Switch the swaging machine on.



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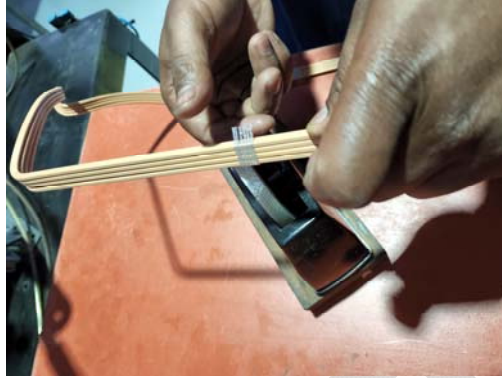
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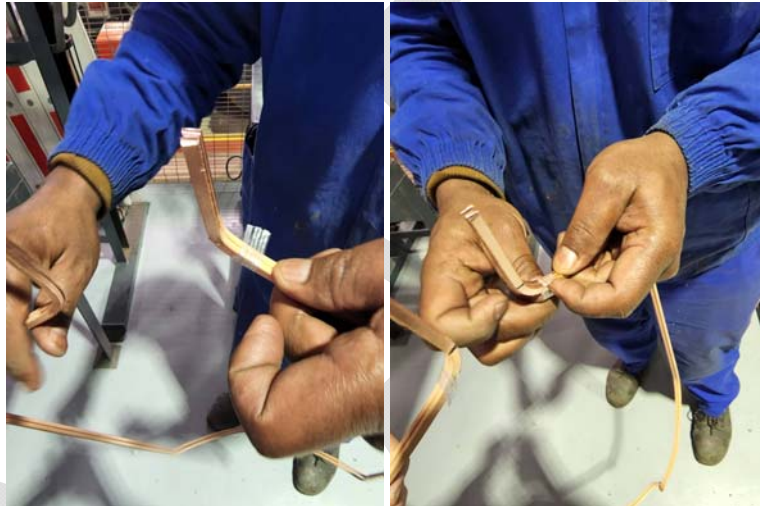
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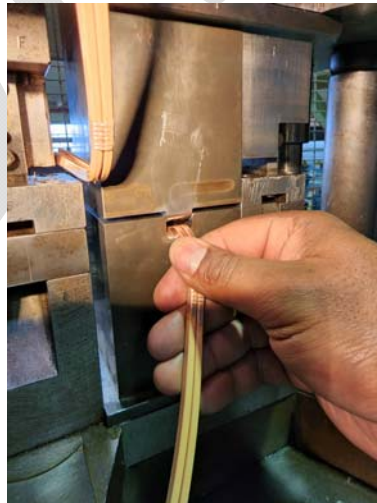
- Separate and remove scotch tape before swaging.



- Tape the coils in pairs before swaging at from bend near the leads.



- Insert the lead into the 788 swaging tool.



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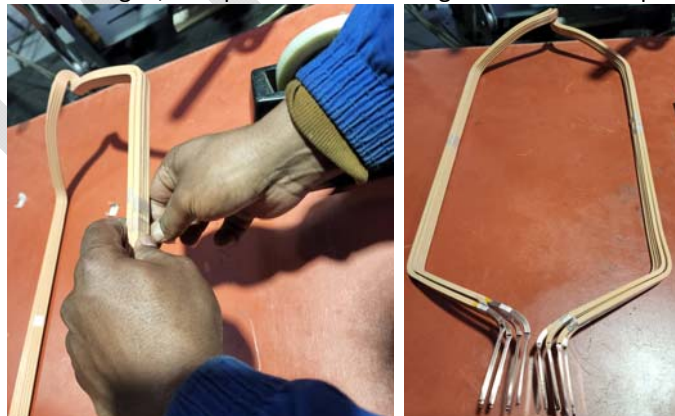
- Depress the foot pedal to start swaging until the top die is compressed and touching the bottom die. Allow the pressure to go to maximum (6000Kpa).



- Release the foot pedal and remove the swaged lead. Check and measure the swaged coil lead using a Vernier. **Note:** Swaged size is 2.60mm x 15.00mm



- Repeat this process for all the leads of the coil.
- Once the coil leads have been swaged, re-tape all conductors together to form a complete coil.





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## QUALITY PROCEDURE

DATE: 19-08-2022

COMPILED BY: Technical Department

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### 10. Taping coils

- Clean each conductor using Acetone.
  - Inspect conductors for mechanical damage. Repair all damaged areas using Kapton tape.
  - Tape lead 1 layer ½ lap Kapton tape
  - Tape lead 1 layer ½ lap Nomex strip
  - Tape leads 1 layer catch lap glass tape
  - Tape evolude 1 layers ½ lap with Kapton tape. Conductors as Pairs
  - Tape evolude 1 layers ½ lap with Kapton tape. Conductors as 4
  - Tape 1 layer ½ lap Yellow glass tape
  - Tape outer evolude & 4 corners 1 layer ½ lap Kapton 1<sup>st</sup> set conductors
  - Tape inner evolude & 4 corners 1 layer ½ lap Kapton 2<sup>nd</sup> set conductors
  - Insert 1 piece Nomex strip both sides
  - Insert 1 piece Kapton strip both sides
  - Tape 1 layer ½ lap Kapton from leads to evolude
  - Insert 2 off insulation caps on the left and right side of the coil
  - Tape complete coil 1 layer ½ lap with yellow glass tape
  - Repeat taping for remainder coils
- 
- Do the Inter-turn test on the coils to ensure that coils are electrically insulated from each other.
  - Stamp coils to ensure that they have been electronically tested.
  - Stack coils in box and book into stock.

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