

RF Tuner Cone Assembly (PRFTA)						
333961 Rev. A						
by Sherry Baketz						
Series	Serial No.	Job No.	Task No.	Released By	Released Date	Status
PRFTA	PRFTA-CSA-071-0 PRFTA-CSA-072-0 PRFTA-CSA-073-0 PRFTA-CSA-074-0 PRFTA-CSA-075-0 PRFTA-CSA-076-0 PRFTA-CSA-077-0 PRFTA-CSA-078-0 PRFTA-CSA-079-0 PRFTA-CSA-080-0 PRFTA-CSA-081-0	508	2103A/2103A.2.1.6	Larry Mitcham	2/1/2016 9:07:50 AM	Closed

- [1.0 Abstract](#)
- [2.0 General Notes](#)
- [3.0 Required Materials and Tools Top](#)
- [4.0 Supporting Documentation](#)
- [5.0 Parts Kit List](#)
- [6.0 Dry Fit Assembly](#)
- [7.0 Preparation for Taping Cone](#)
- [8.0 <u>Epoxy Mixing</u> \(For Spraying\)](#)
- [9.0 Cone Spraying](#)
- [10.0 Epoxy Mixing \(For Assembly\)](#)
- [11.0 <u>Cone Assembly</u>](#)
- [12.0 <u>Production Complete </u>](#)

1.0 Abstract [Top](#)

1.1 This procedure/traveler is to be used for performing RF Tuner Cone Assembly Preparation

2.0 General Notes [Top](#)

- 2.1 Attach all appropriate memos, specific instructions, photographs, discrepancy reports and other documentation to this traveler.
- 2.2 Proper PPE must be worn at all times. Local mechanical ventilation is required during chemical handling. Minimum PPE required during use of Stycast 2850 Epoxy and Catalyst 11 include face shield, natural rubber gloves, Tyvek suit, and shoe covers. Optional PPE may include a rubber apron and rubber boots. Shower and eye washing equipment must be available at handling points.

Warning: Stycast 2850 Epoxy and Catalyst 11 are toxic, severe eye and skin irritants. Immediately irrigate eyes for at least 10 minutes, wash skin with soap and water in case of contact. Remove contaminated clothing and launder before reuse. Any contaminated leather items, i.e. shoes, must be discarded. Follow Spill and Leak Procedures in the MSDS in case of a spill. Do not allow to run into drains or waterways. Do not create vapor, aerosol, or airborne dust, i.e. no spraying, sanding or grinding outside approved workspace.

2.3 All persons handling the chemicals in this procedure are responsible for reading and becoming familiar with the applicable MSDS sheets before proceeding.

STYCAST 2850GT
http://apps.ellsworth.com/library/Library/MSDS/en/MSDS01586_en.pdf

CATALYST 11

http://apps.ellsworth.com/library/Library/MSDS/en/MSDS23974_en.pdf

TOLUENE

<http://www.esh.fnl.gov/MSDS/20000/20732.pdf>

Technician: **Ryan Montiel**

Date: **1/27/2016**

3.0 Required Materials and Tools [Top](#)

3.1 Required Materials/Tools for Cone spraying:

- 394837 Machined Aluminum Cone w/ brazed copper tube extensions
- Stycast 2850GT epoxy w/ Catalyst 11, Toluene (120g mixed epoxy per cone)
 - o Mixing ratios for spraying:
 - Stycast 2850GT Epoxy = 100 parts
 - Catalyst 11 = 5.5 parts
 - Toluene = 5.5 parts
- 1" W x .002" thk Kapton adhesive tape
- Gram scale with 2kg+ capacity
- Gravity feed paint sprayer (Harbor Freight model 67181) w/ quick disconnect
- Cone support spraying fixtures (see table below)
- Spray turn table (lazy susan)
- Heat Gun
- Large spray booth/hood for spraying cones
- Large heater/blower
- Variable speed electric drill for mixing
- 250 & 1000 ML plastic beakers
- Tyvek coveralls, boot covers (various sizes to fit)
- Disposable P95 Particulate masks with activated charcoal for nuisance vapor (3M P/N 8577)
- Nitrile gloves, chemical resistance gloves
- Safety glasses, goggles/face shield
- Paint brushes, mixing heads, putty knives, scrapers- various
- Plastic Herculite drop cloths, 2x6, 3x6, 4x6
- Air hose (50 ft. min.)
- Extension cord (50 ft. min.)
- Spray bottle of alcohol and box of Kimwipes
- Duct tape
- Garbage bag (bring all waste back to MI60)
- Screwdrivers

3.2 Required Materials/Tools for Cone assembly:

- 394837 Machined Aluminum Cone w/ brazed copper tube extensions, EPOXY COATED
- 394843 Copper-clad SS foil skin/sleeve
- Stycast 2850GT epoxy w/ Catalyst 11, Toluene (120g mixed epoxy per cone)
 - o Mixing ratios for assembly:
 - Stycast 2850GT Epoxy = 100 parts
 - Catalyst 11 = 5.3 parts
 - Toluene = 1 parts
- 1" W x .002" thk Kapton adhesive tape
- 4" W x .004" thk Kapton adhesive tape
- Silicon Plug with 4"Hose Clamp
- Digital Multimeter (Ohmmeter)
- Gram scale with 2kg+ capacity)

- turn table (lazy susan)
- Cone support and assembly fixtures
- Fume hood/filter for mixing epoxy
- Large heater/blower
- Variable speed drill for mixing
- 200, 600, 1000 ml plastic beakers, various
- Tyvek coveralls, boot covers
- Disposable p99 masks with activated charcoal for nuisance vapor
- Nitrile gloves, chemical resistance gloves
- Safety glasses, goggles/face shield
- Paint brushes, mixing heads, putty knives, scrapers- various
- Plastic drop cloths, 10x15

4.0 Supporting Documentation [Top](#)

4.1 Machine Cone Assembly (Drawings)

[F00496031 - Machine Cone Assembly](#)

[F00394930 - Cooling Cone Casting Machined](#)

[F00394843 - Foil Sector Assembly](#)

5.0 Parts Kit List [Top](#)

5.1 Attach the completed Parts Kit List to this traveler. Ensure that the serial number on the Parts Kit List matches the serial number on this traveler. Verify that the Parts Kit received is complete



Larry Mitcham --- 2/18/2016 2:18:31 PM

NO Parts kit items procured by MI-60

[Parts Kit Template](#)

Parts Kit List: [Upload File](#)

Process Engineering/Designee: **Larry Mitcham**

Date: 2/18/2016

6.0 Dry Fit Assembly [Top](#)

6.1 Engrave or stamp (if not already done) the Serial Number (PRFTA-CSA-###) on the cooling tube lead end of each Cooling Cone Casting Machined (F00496930)



Larry Mitcham --- 3/8/2016 2:46:49 PM

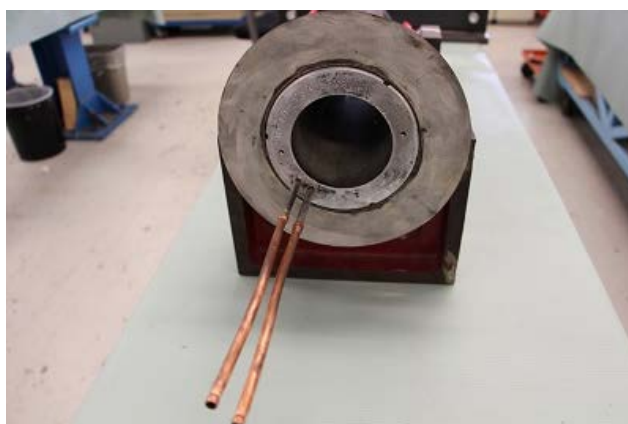
All 11 aluminum castings were stamped with 2 digit serial numbers only (ie: 71, 72, ..., 81).

Complete Serial number is added during Tuner final assembly



NOTE: Ensure that the Serial Numbers being stamped matches the Serial numbers of this traveler

6.2 Braze Cone Assembly Extensioin Tube Swagged x2 (F10036348) onto each Cooling Cone Casting Machined (F00394930)



6.3 Perform Flow and Hydrostatic test on each Cone Assembly ensure that there are no leaks and water flow of at least 2 GPM

NOTE: If a cone fails remove from batch and write a discrepancy report list the serial number of the fail cone in the report. Once removed the remaining cones in the lot can all be passed

☒ Pass

☐ Fail

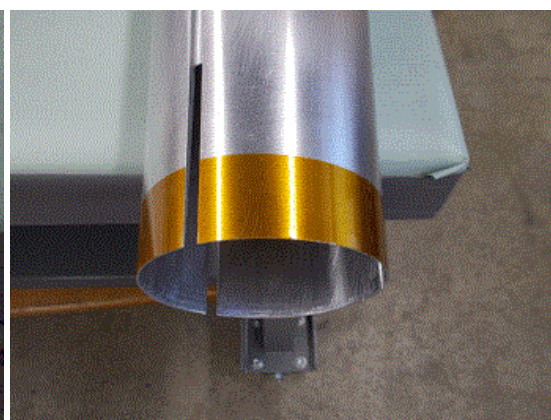
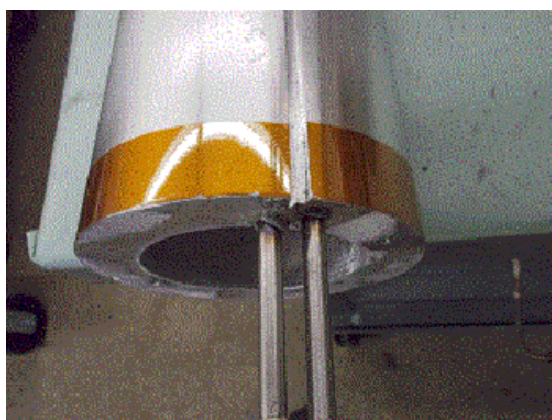
6.4 Fill casting voids with Stycast 2850 and catalyst 9 (fast curing). After curing, blend epoxy flush with surface

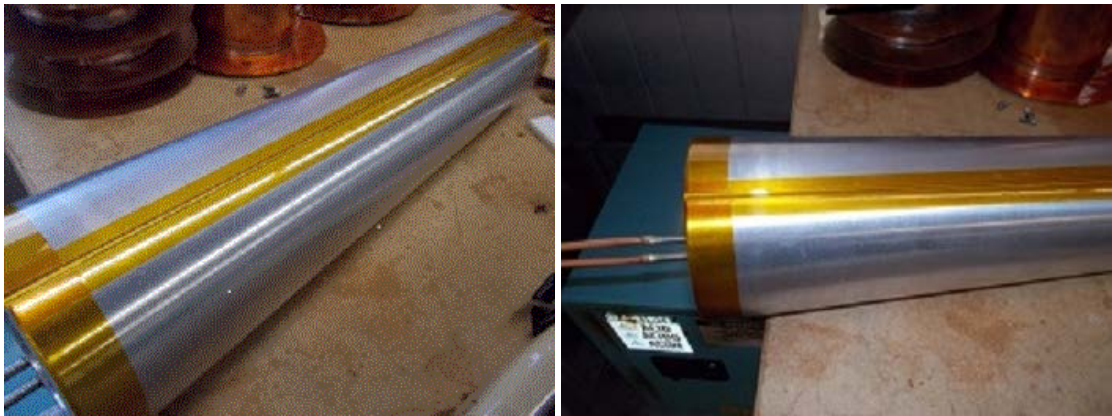
6.5 Deburr all edges

7.0 Preparation for Taping Cone [Top](#)

7.1 Verify the fit of each cone to each foil skin. Wipe down the outside of each aluminum cone to remove any loose grit or chips. Slide a copper clad foil skin over each aluminum casting to assure there is a proper fit. The skin should slide down each cone until the bases are flush. The fit should be snug but not binding.

7.2 By hand or with an air tool, mechanically clean the exterior of each aluminum cone with red scotch brite and wipe clean with alcohol. After cleaning, tape the top and bottom edges of each cone as indicated in the pictures. Tape each groove running the length of each cone. There should be no air pockets or wrinkles in the tape. The tape should slightly overhang the top and bottom edge and then be trimmed flush.



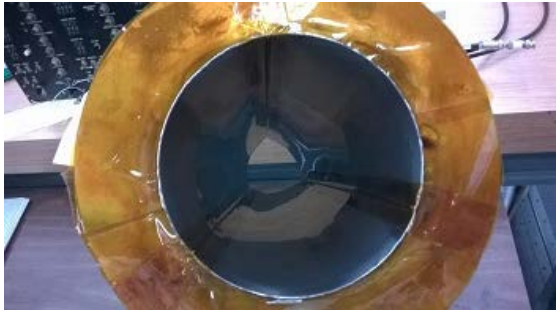
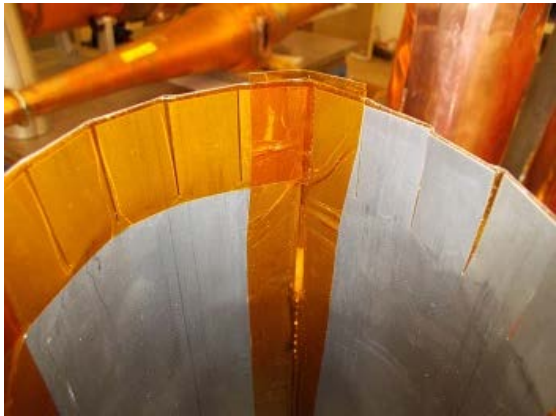
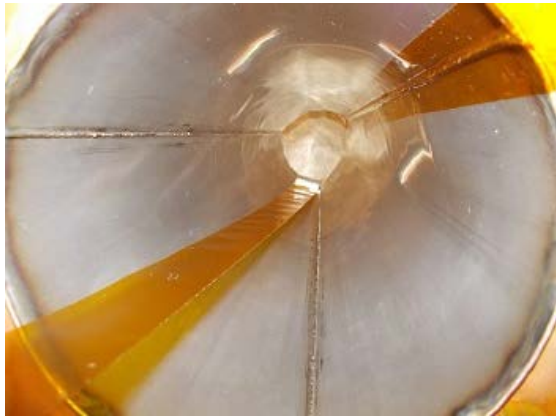


7.3 Copper Foil Preparation

7.3.1 Tin plate the fingers (outside) and top (cone side) of each copper foil and copper flange.



7.3.2 Inspect the copper foils for damage large dents, creases, pin holes, etc. Inspect the interior welds for large protrusions or material buildup. If defects are not excessive, the joints may be carefully dressed with a file. Tape copper foil as shown in illustration. All three interior seams, both sides of the flange, and the fingers/grooves must be taped as shown. Ensure tape has been pressed closely into welds, minimize trapped air under the taped seams.





7.4 Clean each Aluminum Cooling Cone, and each Copper-clad Foil Sector Assembly as well as the assembly fixture using approved methods. Avoid using Amines, Acids, Oxidizers, Polyamide resins and Alcohol. Place prepared inner Cooling Cone on fixture in assembly area.

Technician: **Sathapat Sukkert**

Date: **12/1/2015**

7.5 Verify that the condition of all Aluminum Cooling Cones and Copper Clad Foil Sector Assemblies are acceptable.

☒ OK to Proceed.

Responsible Authority/Designee: **Ryan Montiel**

Date: **12/18/2015**

8.0 Epoxy Mixing (For Spraying) [Top](#)

8.1 Gown up using Proper Protective Equipment



8.2 Ensure the Catalyst 11 has not crystallized during storage. If the Catalyst has crystallized, gently heat to 65°C until all crystals have dissolved. Allow to cool to room temperature.

Caution: Control the temperature and duration of heating to minimum necessary to dissolve crystals. Ensure the container is loosely covered to allow expanding air to escape. Use care not to inhale contents of bottle while checking for crystallization.

8.3 Prepare the Epoxy by power mixing at low speed as some filler settling is common during shipping and storage.



Technician: *Sathapat Sukkert*

Date: *2/2/2016*

8.4 Accurately weigh the epoxy and catalyst into a clean container in the recommended ratio. Record the Lot Numbers and Weight of each compound

NOTE: Stycast 2850 GT: Epoxy = 100 parts Catalyst 11 = 5.5 parts and Toluene=5.5 parts

.	Lot Number	Weight
Stycast 2850	<i>OX4K005239</i>	<i>1.25 kg</i>
Catalyst 11	<i>OX4G001314</i>	<i>0.069 kg</i>
Toluene	<i>SHBD8412V</i>	<i>0.069 kg</i>



8.5 Blend by hand, using a kneading motion, for 2-3 minutes scraping the sides and bottom of the container frequently.

Caution: Avoid high mixing speeds which will introduce air and heat into the mixture.

Technician: *Sathapat Sukkert*

Date: *2/2/2016*

9.0 Cone Spraying [Top](#)

9.1 Stage necessary equipment and materials close by the fume hood and spray booth. Lay out plastic sheeting around the booth and hood to catch incidental spills/drips. Each cone should be placed on a support stand. Wipe each cone with alcohol. This should be done shortly before spraying to remove dust and debris and facilitate epoxy adhesion. Spray a small quantity of solvent (alcohol) through the spray gun to clean it, remove any installed paint filter in the gun.



NOTE: Set compressor to proper setting for spray gun 50 - 70 PSI

9.2 Place Alumiinum cones in "Binks" machine. Aply thin layer sprayed upon cones while rotating to maintain consistency.



9.3 Visuallly inspect cones to ensure even coating around entire cone





9.4 Place cones in drying area for 24 hours using heater.



10.0 Epoxy Mixing (For Assembly) [Top](#)

10.1 Gown up using Proper Proctective Equipment



10.2 Ensure the Catalyst 11 has not crystallized during storage. If the Catalyst has crystallized, gently heat to 65°C until all crystals have dissolved. Allow to cool to room temperature.

Caution: Control the temperature and duration of heating to minimum necessary to dissolve crystals. Ensure the container is loosely covered to allow expanding air to escape. Use care not to inhale contents of bottle while checking for crystallization.

10.3 Prepare the Epoxy by power mixing at low speed as some filler settling is common during shipping and storage.



Technician: *Sathapat Sukkert*

Date: *2/3/2016*

10.4 Accurately weigh the epoxy and catalyst into a clean container in the recommended ratio. Record the Lot Numbers and Weight of each compound

NOTE: Stycast 2850 GT: Epoxy = 100 parts Catalyst 11 = 5.3 parts and Toluene= 1 part

	Lot Number	Weight
Stycast 2850	<i>OX1L005059</i>	<i>5.2 kg</i>
Catalyst 11	<i>OX4G001314</i>	<i>0.275 kg</i>
Toluene	<i>SHBD8412V</i>	<i>0.052 kg</i>



10.5 Blend by hand, using a kneading motion, for 2-3 minutes scraping the sides and bottom of the container frequently.

Caution: Avoid high mixing speeds which will introduce air and heat into the mixture.

Technician: *Sathapat Sukkert*

Date: *2/3/2016*

11.0 Cone Assembly [Top](#)

11.1 Apply a thin, even layer of Epoxy mixture on the exterior surface of each inner Cooling Cone and on the complete interior surface of each Foil Sector Assembly.



11.2 Carefully slide the Foil Sector Assembly onto the Cooling Cone without allowing the Foil Sector Assembly to scrape the Epoxy mixture from the Cooling Cone. The bottom edge of the Foil Sector Assembly and the Cooling cone should be flush. If tight, the Cooling Cone may extend out from the Foil Sector Assembly up to 3/16"

Note: Protect exterior, cooling tube, and "fingers" of Foil Sector Assembly, and interior of inner Cooling Cone from Epoxy mixture. Change gloves between Epoxy application and cone assembly if needed.

Note: Gentle warming of Epoxy will reduce viscosity, however will also shorten working life.



Technician: *Sathapat Sukkert*

Date: *2/3/2016*

11.3 Check for a short between the cone and skin using a multimeter. Resistance should be in the M-Ohm range or greater. The cone must be taken apart and re-inserted if a short is present. It may be necessary to re-apply epoxy in certain areas between the two parts.



11.4 Insert the cone plug by hand and tap into place. Clamp the plug in place just above the foil fingers on each *cone. Wipe off any excess epoxy from the plug and clamp.



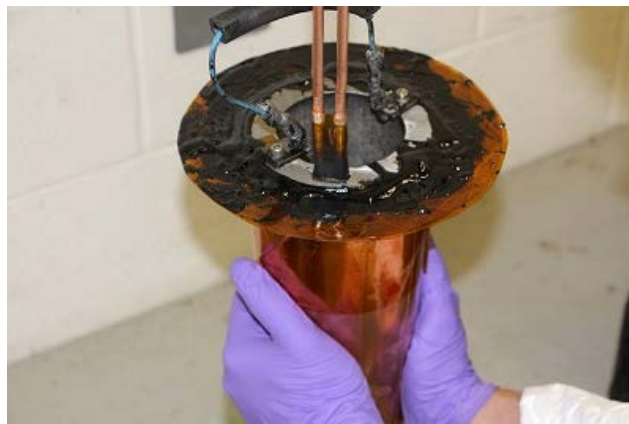
11.5 Bring the assembly under vacuum to eliminate air pockets in assembly. Back fill with additional Epoxy and repeat as necessary.



11.5.1 Each cone assembly should be placed in the vacuum vessel and evacuated at least three times. This is typically only done for about 1 minute each time. It will be necessary to backfill any epoxy removed from the joint from pulling vacuum.

11.5.2 In addition to evacuation, it may also be necessary to remove trapped pockets of air by manipulating the surface of the cone by hand.

11.5.3 Vacuum cycle / heat / manual massage the cone 3 times to get the air pockets out.



11.5.4 Once most of the air has been removed, and the joint appears to be fully stable (typically in the first couple of hours) the cones should be heated until cured. A lower heat over longer period of time is preferred to allow further de-aeration.

Technician: **Sathapat Sukkert**

Date: **2/4/2016**

11.6 Repeat steps 11.1 thru 11.5.4 for each Cone Assembly in the batch

11.7 Verify each Cone Assembly (496031)

NOTE: If there is a failure on any cone list the serial number and write discrepancy report and attach to this traveler

☒ OK to Proceed.

Responsible Authority/Designee: **Ryan Montiel**

Date: **2/9/2016**

12.0 Production Complete [Top](#)

12.1 Process Engineering verify that the Traveler is accurate and complete. This shall include a review of all steps to ensure that all operations have been completed and signed off. Ensure that all Discrepancy Reports and dispositions have been reviewed by the Responsible Authority for conformance before being approved.

Comments: **NONE**

Process Engineering/Designee: **Larry Mitcham**

Date: **3/9/2016**