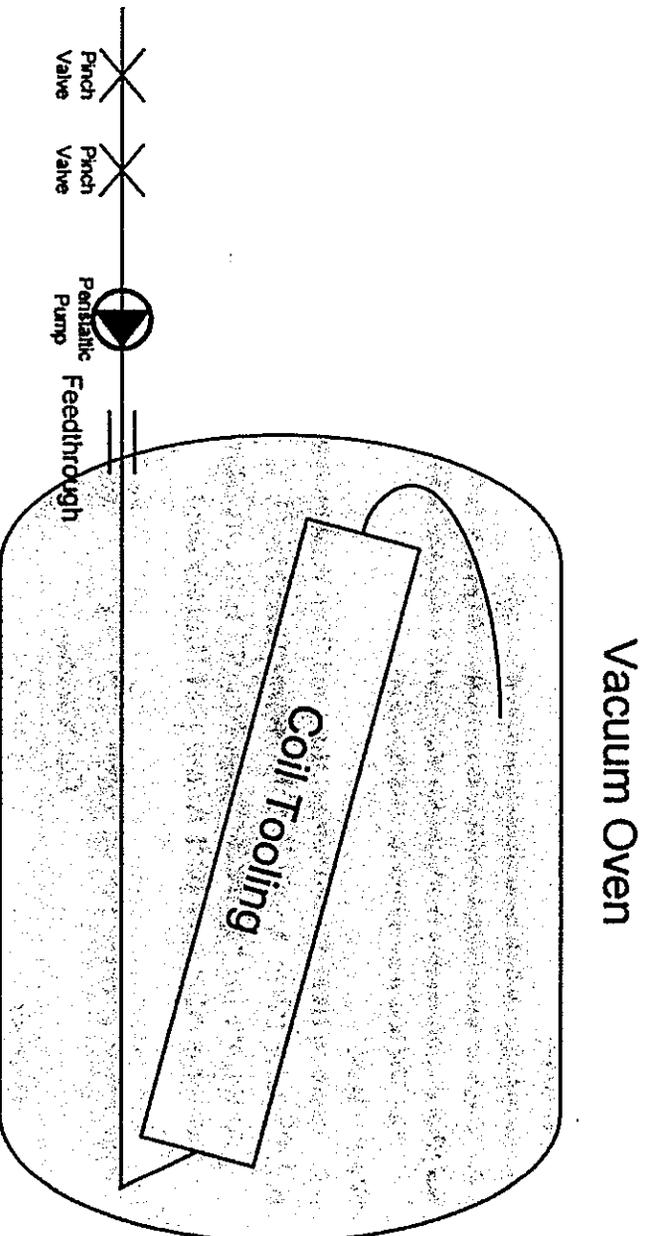


QXF Impregnation Procedure Draft

S. Krave

3/18/2016

1. Coil Insertion into Oven



- 1.1. Place Coil in Vacuum oven on stand with RE first in.
 - 1.2. Attach instrumentation and heater wiring.
 - 1.3. Insert train into bore.
 - 1.4. Insert feedthrough/tube assembly into vacuum feedthrough
 - 1.5. Run 1/8" epoxy feedthrough/epoxy line to RE of coil. Trim to minimum required length.
 - 1.6. Add Overflow Line to coil using 3/4" clear Tygon tubing. Line should be >36" continuous upward slope to peak of tube. Position drain bucket below.
2. External Preparation
 - 2.1. Route 1/8" ID Clear Tygon Tube to location of mixing tank. Keep length relatively short (<15').
 - 2.2. Place 2 pinch clamps near end of tubing to allow evacuation during pumping.
 - 2.3. Place (but don't yet install Peristaltic pump) to verify clearance.
 - 2.4. Grease Vacuum door if required.
 - 2.5. Install Convector Gage on Door
 - 2.6. Close Oven Door
 3. Verify Equipment Status
 - 3.1. Test All thermocouples and verify logging.
 - 3.2. Briefly fire heaters to verify function.

- 3.3. Verify view of Epoxy Overflow.
- 3.4. Verify Epoxy Mixing Tank is clean.
- 3.5. Verify Epoxy Tank Heat Control.
- 3.6. Verify Epoxy Tank Mixing motor function.
- 3.7. Verify valve functions on Epoxy Mixing tank.
 - 3.7.1. Vacuum Ball Valve
 - 3.7.2. Bottom Feed Ball Valve
 - 3.7.3. Tank Bleed Valve
- 4. Coil Outgassing
 - 4.1. Start Cold traps on Vacuum Oven
 - 4.2. Start Pumps
 - 4.3. Begin outgas heat cycle
- 5. Preheat Epoxy
 - 5.1. Record Epoxy batch number and expiration Date
 - 5.2. Weigh components A and B and verify quantity to pot coil.
 - 5.3. Place components A and B into small oven in IB2 and set to preheat overnight before use at 50C. There is a program for this function.
- 6. Epoxy Mixing
 - 6.1. Ensure coil is at desired temperature and Oven Vacuum is still good
 - 6.2. Preheat Parts A and B only, separately, to 50°C overnight. Be sure to remove container lid before heating. Record time preheat begins. Measure and record weights of epoxy part A and part B preheated.

Turn
Exhaust
FAN
ON

Time Epoxy Preheat Began: ~~13:30~~ 13:30 3/22/16

	Lot Number	Weight
Part A:	7344-071	19.35 kg
Part B:	7344-071	17.40 kg

Technician: Steven Krave Date: 4/27/2015

* Place scale under tank after Part A & B Have been measured out

- 6.3. Place Mixing tank on portable scale and record empty weight with and without lid.

Reference:
 Tank without lid = XX.XX kg 37.7
 Tank with lid = XX.XX kg 61.45
 Empty Mixing Tank 1 Weight: ~~33.5 kg~~ 61.45 Kg

Technician: Lawrence Kaminskas Date: 4/27/2015

6.4. Verify tank bottom feed valve is closed. Mix 10 kg of part A with 9 kg of part B for 5 minutes in Mixing Tank. Record the actual quantities mixed. **Note: Ensure to optimize mixing paddle placement for each volume of epoxy being mixed.**

	Lot Number	Weight
Part A:	XXX	10 kg
Part B:	XXX	9 kg

Technician: Lawrence Kaminskas
Date: 4/27/2015

6.5. In a Separate vessel (clean aluminum bread pan) measure 150 Grams of part C.

	Lot Number	Weight
Part C:	XXX	0.150 kg

Technician: Lawrence Kaminskas
Date: 4/27/2015

6.6. Add pre-mixed C to the mixing Tank with pre-mixed Parts A and B. Record weight of the Tank #1 with mixed epoxy.

Tank 1 Weight (With Epoxy): ~~91.56~~ kg 91.55 kg
Technician: Lawrence Kaminskas
Date: 4/27/2015

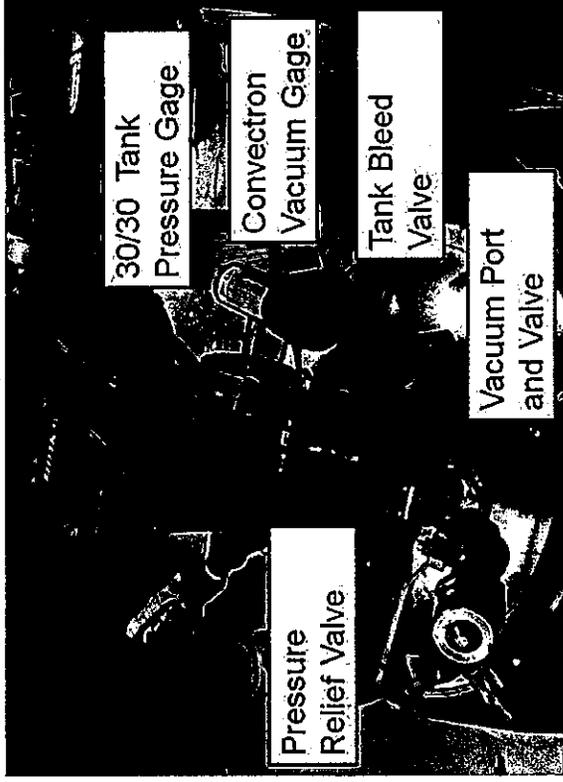
6.7. Mix and heat epoxy for 30 min. Open tank bleed valve during first stage of mixing to prevent tank pressurization. Record the date and time when epoxy mixing began. Temperature control should be set at 50°C and should have second independent readout for verification.

Mixing Start Time: 7:41
Technician: Lawrence Kaminskas
Mixing Start Date: 4/27/2015
Date: 4/27/2015

6.8. While stirring the Epoxy, maintain 50°C and start outgassing of epoxy for 1 hour. Record outgassing start time. Record vacuum achieved in the tank 1 at the end of outgassing. Call the engineer if the pressure exceeds 1.5 Torr. Measure Tank Pressure from Convector Gage on Manifold.

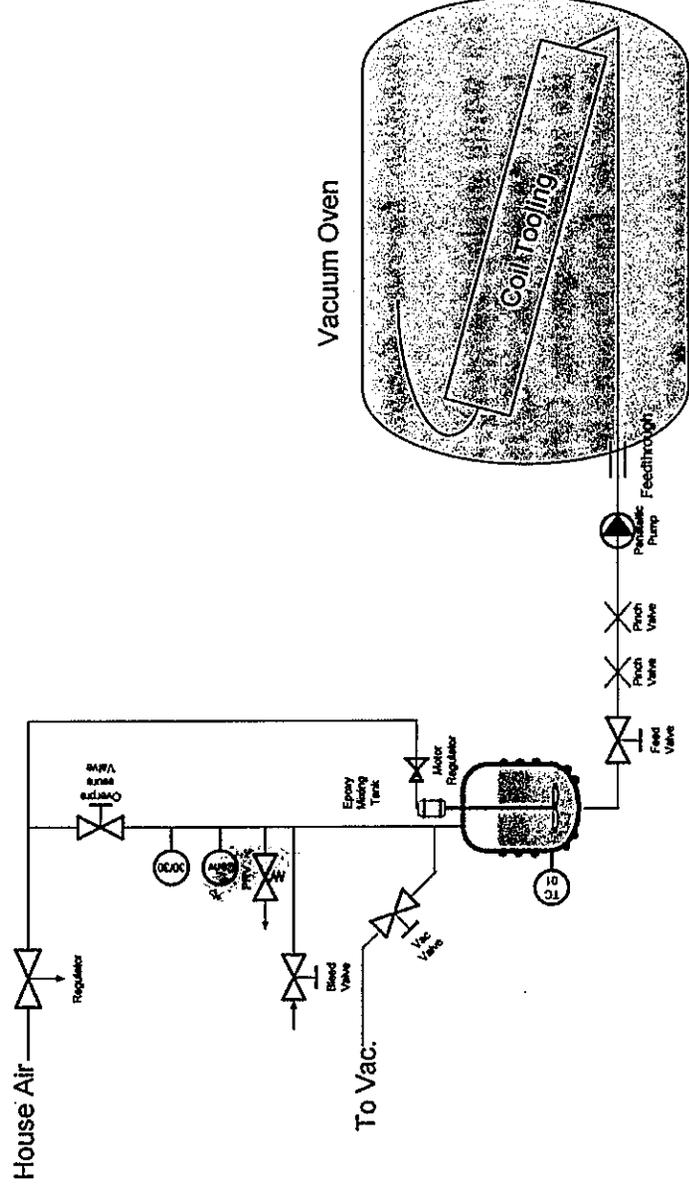
Outgassing Start Time: 7:55
Vacuum Pressure Achieved: 1 Torr
Technician: Lawrence Kaminskas
8. Epoxy Impregnation

8.1. Close Tank Vacuum Valve, disconnect mixing tank heaters, and slowly open tank bleed valve.



8.2. Transport tank to vacuum oven. Connect bottom 1/8" hose barb to epoxy line, add hose clamp. Do not connect mixing or heating systems.

8.3. Route 1/8" ID Tubing through Peristaltic Pump. Configuration will be as below. House air and Vacuum will be disconnected.



8.4. Slowly remove pinch Valves to bleed remaining air from the line. Watch vacuum oven pressure to verify that it does recovers quickly.

- 8.5. After vacuum recovers, open mixing tank feed valve and allow epoxy to flow to peristaltic pump. Verify no bubbles visible in feed line Record Time. 09:26 Record Oven Pressure. 20.8 mTorr ~~25.80~~ 87.80 STRESSED / PRIMMED @ 15
- 8.6. Energize Pump set at ~~25~~ 20 ml/minute. Record Time 09:26 → PARGE Tube,
- 8.7. Record Tank weight at start of fill. 91.55 Kg
- 8.8. Record Tank weight every 30 minutes until fill is complete and epoxy is visible at coil outlet.

Time	Weight (kg)
09:56	90.90
10:26	90.40
10:56	89.80
11:26 11:10 (EPOXY FLOW)	89.55
11:56 12:40 (SHUT DOWN)	87.90
12:26	
12:56	
13:26	
13:56	

- 8.9. Record Time Epoxy is Visible 11:10 * and Tank Weight FLOWED BEFORE WE SAW 89.55 *
- 8.10. Continue filling until epoxy drains into overflow bucket. Record Time Epoxy begins draining 11:20 and Tank Weight 89.35
- 8.11. Shut down vacuum pumps. Continue flowing epoxy via peristaltic pump. Crack open vacuum oven vent valve and slowly let to atmosphere. Monitor epoxy level in overflow tube to ensure that the level does not recede back into tooling. If it does, stop venting and contact a responsible authority.
- 8.12. When vacuum has been completely released, shut off peristaltic pump. Open door and mark epoxy level on overflow tube with timestamp. Record Time 13:10 and Tank Weight 87.80
- 8.13. Initiate Cure Cycle. Observe epoxy level in overflow for next ~1/2 hour. Change should be less than 1/2". If level changes greater than 1/2" contact responsible authority.
9. Clean Up
- 9.1. Clamp off 1/8" ID Epoxy Line with two Pinch Valves located near feedthrough. Close Tank Feed valve.
- 9.2. Cut Epoxy line between

NO HEAT ON THE TANK WHEN YOU HAVE NO MIXING IN THE TANK

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