



# PP30 Pyroreactor Overhaul

At 1750 run hours Maintenance is performed on the following items:

## Pyroreactor Inspection

## Repair/Replace: Pyroreactor

**CAUTION: Only do this on cool, well vented system**

1. Empty reactor of all feedstock and biochar.
2. Disconnect all electrical and sensor attachments (feedstock switch, pressure cables, thermocouples, etc...)
3. Disconnect cyclone to PGHX gas line on the cyclone side.
4. Disconnect Exhaust to Air intake HX
5. Remove bolts holding pyroreactor to cowling
6. If no access to a forklift
  - a. Empty hopper of all feedstock.
  - b. Unbolt all hopper to drying bucket bolts
  - c. Remove hopper
  - d. Unbolt all drying bucket to pyroreactor bolts and nuts
  - e. Remove drying bucket (**CAUTION:** Auger can be sharp so wear protective gloves)
  - f. You will need at least 2 people to lift the reactor out of the cowling
    - i. May need a mallet to loosen
    - ii. Can also try to shimmy it out by rocking back and forth
  - g. Once out place on side on a cardboard surface
7. If access to a forklift
  - a. Set forks to width of the drying bucket
  - b. Place 2"x4" wood on the forks about 3' in length
  - c. Set them under the hopper bolts and lift up a bit until putting tension on the hopper
  - d. Secure the hopper to the forks with rope or ratchet straps
  - e. Secure pyroreactor to the forks with rope or ratchet straps
  - f. Once everything is secure using the forklift, lift the reactor out of the cowling.

8. Once removed can access the airlines and annulus
9. Inspect for damage to the airlines and ceramic hearth.
  - a. If airlines are damaged it can possibly be repaired.
  - b. If ceramic hearth is damaged the reactor needs to be replaced

## Feed System Inspection

### Check / Replace: Feedstock Auger

1. Unplug feedstock auger from power
2. Remove bolts and nuts from feedstock auger assembly to drying bucket
3. Pull the feedstock auger out through the back
4. Check the length of the auger
  - a. If < 19" it needs to be replaced
  - b. If the end has thinned too much
    - i. If its too thin there is a chance it could break off and go into the pyroreactor. Replace auger.
  - c. For damage elsewhere on the auger
5. If the auger needs to be replaced then:
  - a. Using a 9/64" hex tool, loosen the shaft coupler
  - b. Pull the auger out of the bearing and shaft coupler
    - i. May need PB blaster or penetrating oil to slip the auger out
    - ii. If it is not coming off easily the assembly can be take apart and a hammer and metal rod smaller than the diameter of the shaft can be used to remove the old auger.
6. Once the auger is removed simply slip the new one through the bearing and into the shaft coupler. Tighten down and re install onto drying bucket

### Replace: Feedstock Switch

1. Unplug the feedstock switch
2. Using a pipe wrench unscrew switch from the top of the pyroreactor
3. Remove completely from the reactor
4. Install a new feedstock switch
5. Plug into power
6. Turn on unit and test it by letting the feedstock auger run and then manually press the switch through the viewport on top of the reactor
  - a. If it turns off then the feedstock switch is ready to be used

## Thermocouple Replacement

Replace: 1/16" - 24" L Thermocouple Kit (Tred and Trst)

1. Using a small crescent wrench unscrew the thermocouples from the reactor
2. Get new compression fittings and add teflon tape to it
3. Slip the new thermocouples into the fittings but do not tighten down yet
4. Trying not to bend the rod insert the thermocouple into the reactor weldment until it wont go any more
5. Screw in the compression fitting to the reactor and once secure tighten down the compression cap to seal the thermocouple

## Graphite Rope Inspection

Check / Replace: Pyroreactor to Cyclone

1. Remove nuts holding cyclone to pyroreactor
2. Check the graphite rope for wear
  - a. If it looks damaged or too flattened - replace gasket
3. If it need to be replaced then:
  - a. Using a knife remove the old graphite rope
  - b. Take the roll of graphite rope and run it along the crevice, pressing in as you move along
  - c. Once the rope is made it all the way around cut the end and fit the hole rope into the crevice
  - d. Apply graphite paste and install cyclone to pyroreactor

Check / Replace: Pyroreactor to Drying Bucket

1. Empty Hopper and drying bucket of feedstock
2. Remove Hopper from the drying bucket by removing bolts and nuts at flange
3. After hopper is removed, unbolt drying bucket from pyroreactor, save nuts top nuts for last
  - a. Might need two people to remove
4. Once removed inspect graphite rope at flange connection for wear.
  - a. If it looks damaged or too flattened it is needing to be replaced
5. If it need to be replaced then:
  - a. Using a knife remove the old graphite rope

- b. Take the roll of graphite rope and run it along the crevice, pressing in as you move along
- c. Once the rope is made it all the way around cut the end and fit the hole rope into the crevice
- d. Apply graphite paste and install drying bucket to pyroreactor

## Gasket Inspection

### Replace Drying Bucket Bottom Plate Gasket

1. Remove all air lines connected to the bottom plate
2. Remove all bolts and nuts
3. Take plate off of drying bucket and remove old gasket
4. Place new gasket on and install onto drying bucket
5. Put all bolts and nuts back on and connected all airlines

### Replace: Hopper Puff Lid Gasket

1. Remove hopper lid
2. Unscrew bolts holding spring bar
3. Remove spring and puff lid
4. On the puff lid you will see an orange gasket, remove it and replace with a new one
  - a. Make sure it seats all the way down in the crevice
5. Reinstall puff lid, spring and spring bar with bolts and nuts

### Replace: Hopper to Drying Bucket Gasket

1. Empty the hopper and drying bucket of feedstock
2. Remove the hopper by taking off all bolts and nuts
  - a. **CAUTION: Hopper is heavy will need 2 people to help remove**
3. Take the old gasket off and discard following site guidelines
4. Install new gasket. Check orientation fits on flange
5. Install hopper with bolts and nuts

## Exhaust V-band Clamp Inspection

Remove all exhaust v-bands that are attached to the pyroreactor and replace with new ones