3March2016

**Extraction 4N –Gimbal, Pipe, Valve**

The installation includes installing three parts:

1. Gimbal – attached to tank and to pipe. It has an alignment dimple at tank-side-flange
2. Pipe- attached to gimbal and to valve. Pre-install gimbal and transfer the alignment dimple to the pipe’s gimbal-side-flange.
3. Valve-attached to pipe. Install with its rectangular port facing DOWN\* and mechanism facing away from tank. \*After discussion with BM, ED, RK & DJ it was decided to install rectangular port facing down to ensure the valve does not interfere with RH Bridge operation. This means that the valve may have to be unbolted from the pipe for servicing.

Procedure for installation (rev4) RK

1. Remove tank port blank off (done 29Feb2016)
2. Rest the RH clamp onto the neck of the cyclotron port. (done 29Feb2016)
3. Inspect the seal surface of cyclotron flange – polishing was necessary and covered with plastic sheet (done 29Feb2016)
4. Dry test fit mating angled flange to Extr’n tank side flange without gimbal. Fits ok (done 1Mar2016)
5. Assemble the pipe & gimbal with metal seal from RK. Align the dimple mark (thick end) of the tank side Gimbal flange 13o clockwise from the top when looking down-stream away from the tank and tighten the gimbal-to-pipe joint.
6. Leak check. Helium leak tight (done 1Mar2016)
7. Prepare RH clamp to set clamp opening. (done 1Mar2016)
8. Run the pipe & Gimbal through the hole of the yoke to determine position of the longitudal center of pipe vs longitudal center of hole through yoke. Adjust the pipe center using the screws/lock nuts at the legs of pipe. (done 1Mar2016)
9. Run the gimbal and pipe through the hole of the yoke in preparation for tank flange-to-gimbal joint installation. Seal from RK. Check for rough alignment using a 3.95”OD pipe.\* the 3 legs were adjusted a few times so that 3.95” OD pipe nicely slipped thru Gimbal section past the tank wall. (done 1Mar2016)
10. Remove Gimbal and pipe from Magnet yoke to install metal seal into the Gimbal flange.

A spot of Vacuum grease at 3 places on the OD of the metal seal was added to hold seal in the flange groove. Increased the outboard vertical leg by 0.010”. (done 2Mar2016)

1. Install GimbaI and pipe into the magnet yoke part way to install the RH Clamp Ears TEC0080 on Gimbal Flange. \*The RH clamp ears have to be removed off the Gimbal flange to fit thru the magnet yoke.
2. Install the RH clamp – RK will give torque values (start with 20 Ft-Lbs, leak check, proceed to 30Ft-Lbs max if req’d) ***\*The RH clamp did not close equally when tightening. The upper clamp was open more than the bottom clamp while resting on the flange clamp ears. The clamp ears were removed off the Gimbal flange to tighten the RH Clamp properly.*** Used the light weight dual drive clamp tool (from Diagnostics group) to initially drive the RH clamp down then each clamp screw were tighten to about 22Ft-Lbs (done 2Mar2016)
3. Move RH Shadow Shield NE10A away from Extr’n 4 area inside the tank. (done 22Feb2016)
4. Check for the alignment using a 3.95”OD pipe. Added 0.062” shim under the outboard vertical leg so that the 3.95 OD pipe slipped thru the Gimbal bellows section after installing the RH Clamp. (done 2Mar2016)
5. Install in-tank blank in preparation for leak check. Tank port was wet wiped with Methanol with special tool before installing the blanking plate. (done 2Mar2016)
6. Install valve. (done 2Mar2016)
7. Blank off valve and leak check the installation Helium leak tight (done 2Mar2016)
8. Open\* valve and install a blank for gate protection. (done 2Mar2016)

\* Yuri recommends to leave valve open with no controls for this installation.

1. Remove in the tank blank. (done 2Mar2016)