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| Traveler Title | Pair Assembly Preparation for Turnover |
| Traveler Abstract | The following procedure is to detail the steps taken to transfer a cavity pair from the RF test stand back into the strong-back fixture and prepare it for turnover |
| Traveler ID | C75-CLNRM-CPR-ASSY-TOVR |
| Traveler Revision  | R2 |
| Traveler Author | C. Dreyfuss |
| Traveler Date | 22-Jul-21 |
| NCR Informative Emails | Giavanti,Forehand,Davis |
| NCR Dispositioners | Forehand,Davis |
| D3 Emails | Dreyfuss |
| Approval Names | C. Dreyfuss | D. Forehand | K. Davis |  |
| Approval Signatures |  |  |  |  |
| Approval Dates | 30 July 2021 | 30 July 2021 | 30 July 2021 |  |
| Approval Title | Author | Reviewer | Project Manager |  |

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| References | List and Hyperlink all documents related to this traveler. This includes, but is not limited to: safety (THAs, SOPs, etc), drawings, procedures, and facility related documents. |
| [C75 Ionized Nitrogen Cleaning Procedure](https://jlabdoc.jlab.org/docushare/dsweb/Get/Document-212167/CP-C75-CPR-CLN-ION-R1.pdf) |  |  |  |  |
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| Revision Note |  |
| R1R2 | Initial release of this Traveler.Added Convectron gauge install removed ION pump install steps. |

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| Step No. | Instructions | Data Input |
| 1 | Record the cavity pair #Operators login : | [[CPSN]] <<CPSN>>[[Technician1]] <<SRF>>[[Technician2]] <<SRF>>[[StartDate]] <<TIMESTAMP>>[[Comment]] <<COMMENT>> |
| 2 | **Preparation for Assembly Steps:****The following is a list of components that must be cleaned as per the UHV Cleaning Procedure and placed in the pass through for this assembly:****Convectron gauge manifold components and hardware:*** 1 pcs. Convectron Convectron Gauge (yellow)
* 1 pcs. 1.33” mini CF metal seal valve
* 1 pc. 2 3/4" CF Tee
* 1 pc. 2 ¾” CF Blank
* 3 pcs. 2 3/4" CF to 1.33” CF mini reducer
* 12 pcs. 1/4-28x 1 1/4" lg 12 point silver plated bolts
* 12 pcs. 1/4-28 SS nuts
* 6 pcs. 1/4-28x 1” lg 12 point silver plated bolts
* 2 pcs. 2 3/4" CF copper gaskets
* 4 pcs. 1.33” mini CF gaskets
 | [[Technician1]] <<SRF>>[[Technician2]] <<SRF>>[[Date]] <<TIMESTAMP>>[[Comment]] <<COMMENT>> |
| 3 | **Preparation for Assembly:** * Clean the handles and upper shelf of a clean room cart by wiping it down with an isopropyl alcohol soaked clean room wiper and ionized nitrogen. Place two clean room wipers on the cart. Wipe one stainless steel perforated tray with isopropyl alcohol soaked wipers and clean with ionized nitrogen. Wipe the wet bench table top with isopropyl alcohol soaked wipers and clean with ionized nitrogen.
* Remove convectron gauge assembly hardware from the plastic bags, place it into the clean stainless steel tray and place the tray onto the clean room cart.
* Remove the 2 3/4" CF tee and reducer flanges from their containers and visually inspect each knife edge seal path. It should be smooth and free of scratches and dings. Contact the supervisor if there are any discrepancies. Carefully place the components on the clean room cart wipes. Clean each vacuum component with ionized nitrogen and place them onto the wipers on the clean room cart.
 | [[Technician1]] <<SRF>>[[Technician2]] <<SRF>>[[FieldName]] <<TIMESTAMP>>[[Comment]] <<COMMENT>> |
| 4 | **Assemble the Convectron Gauge manifold:*** Clean the hardeware and fasteners for the convectron gauge manifold manifold as per the [C75 Ionized Nitrogen Cleaning Procedure](https://jlabdoc.jlab.org/docushare/dsweb/Get/Document-212167/CP-C75-CPR-CLN-ION-R1.pdf)
* At the assembly workbench, clamp the CF tee into the holding fixture.
* Assemble the convectron gauge ont the 2 ¾ to 1.33 mini conflate reducer, then assemble tha preassembly onto the CF tee using a cleaned CF gasket and appropriate hardware. Tighten the hardware. Blow out the assembly ie with [C75 Ionized Nitrogen Cleaning Procedure](https://jlabdoc.jlab.org/docushare/dsweb/Get/Document-212167/CP-C75-CPR-CLN-ION-R1.pdf). Open the valve and clean the inside of the valve through both ports, then close the valve and clean the inside of the valve through both ports. Assemble the valve onto the ion pump tee assembly using a cleaned CF gasket and appropriate hardware. Tighten the hardware and clean the assembly ie with [C75 Ionized Nitrogen Cleaning Procedure](https://jlabdoc.jlab.org/docushare/dsweb/Get/Document-212167/CP-C75-CPR-CLN-ION-R1.pdf).
* Cover the open port on the valve with cleaned CF blanks and gasket.(gasket can be a used one) Secure with two bolts each and tighten by hand. Clean the assembly ie with [C75 Ionized Nitrogen Cleaning Procedure](https://jlabdoc.jlab.org/docushare/dsweb/Get/Document-212167/CP-C75-CPR-CLN-ION-R1.pdf).
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| 5 | **Preparation steps to remove the cavity pair from the test stand:*** Ensure the cavity test stand is inserted into the vertical attachment (VAA) portion of the clean room.
* Record cavity pair pressure before closing the lower gate valve.
* **Close the gate valve on the lower cavity and signal to operator outside the clean room to bleed up the test stand.**
* Stage a tall stainless steel table, strong-back with aluminum standoff cylinders and the lift tilt cart in the vertical attachment room.
* Ensure the strong-back fixture is the same serial # used during the cavity pair assembly. This can be checked by looking in the cavity pair assembly traveler.
* Lock the strong back pillow blocks in place using five clamp blocks. Put four on the lower cavity side of each pillow block. Place one clamp block on the upper cavity side of one of the pillow blocks. Ensure each clamp block is tight.
 | [[Technician1]] <<SRF>>[[Technician2]] <<SRF>>[[FieldName]] <<TIMESTAMP>>[[Comment]] <<COMMENT>>[[CavityPairPressure]] <<SCINOT>>  |
| 6 | **Preparation steps to remove the cavity pair from the test stand:*** Remove the top section of each cavity holding collar.
* If not already completed, install the aluminum tooling under the strong-back rails that allow the tilt cart to grab the strong-back. Ensure all hardware is tight.
* Roll the tilt cart lifting arms under the strong-back and install the four clamping dogs in place. Tighten the clamping dogs.
* **The tilt cart arms must be aligned parallel with the strong-back lifting plate. “The clamping dogs must be tight”**
* Remove the test stand aluminum angle brackets. Insert the screws back into the stand so the hardware doesn't get lost.
* Disconnect RF cables and position out of the way for the cavity transfer.
* **Do not remove connector savers**
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| 7 | **Lift, tilt and install the strong-back onto the cavity:****2 persons required for this task*** Raise the strong-back about 1" above the stainless steel table and roll the table out of the way. Raise and tilt the strong-back until the strong-back is vertical. Position the strong-back until the center lifting plate it is slightly above the center-line of the inner adapter of the cavity to be removed.
* Pull the two swing pins and swing the strong-back out 90 degrees.

**Stand clear when raising and swinging the strong-back**. * Move the tilt cart so the strong-back fixture in aligned with the cavity. Lower the tilt cart so the center of the strong-back is aligned with the center of the inner adapter of the cavity.
* Position each strong-back cavity support collar so it is ready to accept the cavity pair, lock the pillow blocks in place. Install two small can’t twist clamps at the test stand location that is supporting the cavity pair. This is to prevent the cavity from slipping out of the test stand during transfer.
* One person shall steady the cart during the cavity transfer.
* Remove the test stand cavity retention plates. Slide the cavity into the strong-back fixture. Install the cavity support fixture collars to capture the cavity. Tighten all hardware.
 | [[Technician1]] <<SRF>>[[Technician2]] <<SRF>>[[FieldName]] <<TIMESTAMP>>[[Comment]] <<COMMENT>> |
| 8 | **Remove the cavity from the test stand:****If the clamping blocks are not tight the cavity could move unexpectedly.*** Raise the cavity slightly, remove the can’t teist clamps installed at the previous step and roll the tilt cart back freeing the cavity from the test stand.
* Pull the two swing pins and swing the strong-back in 90 degrees.
* Tilt and lower the cavity back into the horizontal position.
* Place the cavity with strong-back fixture on the tall stainless steel table and remove the tilt cart. Center the strong back on the stainless table.
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| 9 | **Install the Convectron Gauge Manifold:*** Retrieve the Convectron Gauge manifold. Clean the outside of the manifold i.e. with [C75 Ionized Nitrogen Cleaning Procedure](https://jlabdoc.jlab.org/docushare/dsweb/Get/Document-212167/CP-C75-CPR-CLN-ION-R1.pdf).
* Clean inside of the Convectron Gauge manifold assembly i.e. with [C75 Ionized Nitrogen Cleaning Procedure](https://jlabdoc.jlab.org/docushare/dsweb/Get/Document-212167/CP-C75-CPR-CLN-ION-R1.pdf).
* Verify that the gate valve on the lower cavity is closed.
* Wipe the 2 3/4" CF blank and gate valve with and isopropyl soaked wiper. Clean the area around the valve with ionized nitrogen. Remove the CF cover flange from the gate valve on the lower cavity. Clean the inside of the gate valve as per the Ionized Nitrogen Cleaning with Particle Counter procedure.

**DO NOT OPEN THE VALVE**.Install the Convectron Gauge manifold to the cavity pair using a nitrogen cleaned CF gasket. Install and tighten the CF hardware | [[Technician1]] <<SRF>>[[Technician2]] <<SRF>>[[FieldName]] <<TIMESTAMP>>[[Comment]] <<COMMENT>> |
| 10 |  **Connect Convectron Gauge Manifold to Vacuum Station and Leak Test:*** Ensure the turbo station is bleed-up to nitrogen.
* Carefully loosen and remove the 2 3/4 conflat hardware on the vacuum pump-down line and remove CF blank and used gasket.
* Carefully loosen and remove the 2 3/4 conflat hardware on the end of the cavity valve manifold.
* Inspect conflat knife edges for dings or scratches, repair if needed.
* Assemble the pump-down line to the cavity valve with a nitrogen gas cleaned CF gasket and tighten hardware.
* Evacuate the Convectron Gauge manifold and leak test all connections.
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| 11 | **Leak Test Dog-leg windows:*** Ensure the turbo pump pressure is below 1e-7 mbar.
* Open the lower cavity gate valve of the pair so the pair is being pumped.
* Record cavity pair pressure.
* Using a piece of red tape fill the top hat with Helium and close the port off with tape to leak test the dog-leg windows, when the windows are leak tight upload the leak test data file.
 | [[Technician1]] <<SRF>>[[Technician2]] <<SRF>>[[FieldName]] <<TIMESTAMP>>[[MetaFile]] <<FILEUPLOAD>>[[Comment]] <<COMMENT>> [[CavityPairPressure]] <<SCINOT>> |
| 12 | **Remove the top-hat assemblies:*** Remove all top hat to dogleg bolt hardware and place in a stainless tray
* Using the nylon tipped jacking screw, carefully break indium seal and remove the top hats.
* Top hat assy’s must remain in the clean room for use on the next cavity pair assembly
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| 13 | **Disconnect the Turbo Station:****While bleeding up the turbo station monitor the cavity pressure. If the cavity pressure starts rising when bleeding up the pump, close the nitrogen inlet, turn on the turbo station and contact your supervisor.*** **Close the 1.33 mini conflate valve and the opposite end cavity valve.**
* Open the nitrogen inlet valve enough to hear the pop-off relief vibrate.
* Turn the pump control main power switch to the off position, wait 5 minutes
* Slowly open the nitrogen line mini valve and watch the cold cathode gauge pressure rise. Wait until the gauge pressure reads Atmosphere.
* After the turbo is at atmosphere disconnect the pump-down line from the cavity valve and cover each port with a clean CF blank and clean gasket. Secure flanges in place with two bolts each.
* Put tape over the Convectron Gauge isolation angle valve to prevent tampering.
* Record cavity pair pressure
 | [[Technician1]] <<SRF>>[[Technician2]] <<SRF>>[[FieldName]] <<TIMESTAMP>>[[Comment]] <<COMMENT>> |
| 14 | **Prepare the cavity pair for CMM measurements:*** Install three stainless steel end dish support brackets to each end dish on the pair.
* Cover the outside flanges of each cavity gate valve with vinyl tape to prevent particles from being trapped between the CF flanges. Do the same with the CF blank at the metal seal angle valve on the Convectron Gauge manifold.
 | [[Technician1]] <<SRF>>[[Technician2]] <<SRF>>[[FieldName]] <<TIMESTAMP>>[[Comment]] <<COMMENT>> |
| 15 | **Transport Cavity Pair to CMM:*** The cavity pair is now ready for the next step, CMM alignment.
* Record pair pressure.
 | [[Technician1]] <<SRF>>[[Technician2]] <<SRF>>[[FieldName]] <<TIMESTAMP>>[[Comment]] <<COMMENT>> [[CavityPairPressure]] <<SCINOT>> |