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| Traveler Title | C75 Cavity Pair Final Assembly Dimensional Inspection | | | |
| Traveler Abstract | This traveler details the steps for dimensional and visual inspection for a cavity pair assembly. | | | |
| Traveler ID | ER5C-INSP-CPR | | | |
| Traveler Revision | R3 | | | |
| Traveler Author | A. DeKerlegand | | | |
| Traveler Date | 5-Jan-24 | | | |
| NCR Informative Emails | ashleya,kdavis,areilly | | | |
| NCR Dispositioners | forehand,gciovati,fischer,kdavis | | | |
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| Approval Names | A. DeKerlegand | G. Ciovati | A. McEwen | T. Reilly |
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| Approval Dates |  |  |  |  |
| Approval Title | Author | Reviewer | 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. | | | |
| [JL0041172](https://misportal.jlab.org/jlabDocs/documents/versions/134544/download) - C75 Cryomodule Cavity Pair Dogleg Assembly |  |  |  |  |
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| Revision Note |  |
| R1 | Initial release of this Traveler. |
| R2 | Beam tube flanges average added. Reference only added to certain dimensions. |
| R3 | Dropdown box added to specify if CMM1 or CMM2 was used for inspection. Some dimensions have been made reference only. Visual inspection step added to the traveler with a file upload box for pictures. |

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| Step No. | Instructions | Data Input |
| 1 | Enter Cavity Pair Assembly Serial Number | [[CPRSN]] <<CPRSN>> |
| 2 | Record cavity pair internal pressure. If the cavity pair does not have a vacuum gauge please skip this step. | [[CPR\_Tech]] <<SRF>>  [[CPRPressure]] <<FLOAT>>  [[CPRPressure\_time]] <<TIMESTAMP>>  [[CPRPressure\_comment]] <<COMMENT>> |
| 3 | Specify in drop down box which coordinate measuring machine will be used for this inpection. | [[MachineID]] {{CMM1,CMM2}} <<SELECT>> |
| 4 | Visual inspection. Check cavity pair for any damage. If any scratches are present in seal path of dogleg flanges or if the ceramics are damaged generate a NCR. Pictures should be taken of pair to document current state of it. Carefully place a straightedge with kapton tape on top of two dogleg flanges to verify no gross deviations exist. If gross deviation exist generate a NCR.  Visual okay? | [[Visual\_Tech]] <<SRF>>  [[VisualDamage]] <<YESNO>>  [[VisualComment]] <<COMMENT>>  [[VisualInspFiles]] <<FILEUPLOAD>> |
| 5 | Make sure there is a spacer installed to provide a gap between the end cell holders and cavity endgroups. Clearance is needed for nuts to adjust beamtube true position of beamline. If no spacer exist contact the cleanroom assembly lead tech for guidance on sliding pair to add a gap for clearance.  Place cavity pair onto CMM with vacuum gauge located in Y+ end of CMM granite. Centerline of pair should line-up with CMM center. Make sure that cavity pair is correctly located/centered on fixture and locked down. Then install inner adapter support onto fixture, leaving adjustment screws backed off. Lastly, remove cleanroom cell holders. Adjust and level dogleg flanges as needed with set screws on the side of endgroups. | [[CMM\_SRF]] <<SRF>>  [[CMM\_timestamp]] <<TIMESTAMP>>  [[CMM\_comment]] <<COMMENT>> |

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| **Step No** | **Instructions** | | | | **Data Inputs** |
| 6 | ***AS FOUND INSPECTION***  Please see diagram below for traveler documentation purposes, this coordinate system follows setup in accelerator tunnel (this is not the CMM part coordinate system). The Z-axis following the cavity pair centerline. +Z runs towards the left cavity. The X-axis is perpendicular to the FPC flange face. +X runs outwards from the cavity centerline towards the FPC flange face. Measure and record the following "as-found" dimensions using the coordinate measuring machine. Datum locations are located in four places on rail (strongback fixture). Create alignment to Datums B and C on cavity pair drawing. Reminder - use proper CMM PC-DMIS program for coordinate machine (CMM1 or CMM2). Measure the cavity pair and then record as found results in pansophy.  **NOTE – if any dimensions are grossly out of tolerance for “as found” inspection generate a NCR.** | | | | [[CMM\_Coord\_SRF]] <<SRF>>  [[CMM\_Coord\_timestamp]] <<TIMESTAMP>>  [[CMM\_Coord\_comment]] <<COMMENT>> |
| **Drawing Number** | **Description** | **Drawing Value** | **Tolerance** | **Measured Value** | **Within Tolerance** |
| JL0041172 | True Position of left cavity beam tube flange (FPC end). | Reference only | n/a | [[MeasuredValue1]] <<FLOAT>> | [[Tolerance1]] <<YESNO>> |
| JL0041172 | True Position of left cavity beam tube flange (field probe end). | Reference only | n/a | [[MeasuredValue2]] <<FLOAT>> | [[Tolerance2]] <<YESNO>> |
| JL0041172 | True Position of right cavity beam tube flange (FPC end). | Reference only | n/a | [[MeasuredValue3]] <<FLOAT>> | [[Tolerance3]] <<YESNO>> |
| JL0041172 | True Position of right cavity beam tube flange (field probe end). | Reference only | n/a | [[MeasuredValue4]] <<FLOAT>> | [[Tolerance4]] <<YESNO>> |
| JL0041172 | FPC beamtubes true position. Average of both beamtube flanges. | Reference only | n/a | [[MeasuredValue5]] <<FLOAT>> | [[Tolerance5]] <<YESNO>> |
| JL0041172 | True Position of left End Dish conflat flange | Reference only | n/a | [[MeasuredValue6]] <<FLOAT>> | [[Tolerance6]] <<YESNO>> |
| JL0041172 | True Position of right End Dish conflat flange | Reference only | n/a | [[MeasuredValue7]] <<FLOAT>> | [[Tolerance7]] <<YESNO>> |

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| **Step No** | **Instructions** | | | **Data Inputs** | |
| 7 | Adjust position of cavity end flanges to meet the true position tolerances. | | | [[CMM\_Transfer\_SRF]] <<SRF>>  [[CMM\_Transfer\_timestamp]] <<TIMESTAMP>>  [[CMM\_Transfer\_comment]] <<COMMENT>> | |
| 8 | ***FINAL INSPECTION***  Re-measure and record the final dimensions using the coordinate measuring machine.  ***Final dimensions shown below. Note – NCR not required for reference only dimensions.*** | | | [[CMM\_Transfer\_SRF\_Final]] <<SRF>>  [[CMM\_Transfer\_timestamp\_Final]] <<TIMESTAMP>>  [[CMM\_Transfer\_comment\_Final]] <<COMMENT>> | |
| **Drawing Number** | **Description** | **Drawing Value** | **Tolerance** | **Measured Value** | **Within Tolerance** |
| JL0041172 | True Position of left cavity beam tube flange (FPC end). | Reference only | n/a | [[MeasuredValue8]] <<FLOAT>> | [[Tolerance8]] <<YESNO>> |
| JL0041172 | True Position of left cavity beam tube flange (field probe end). | .010 | Max. | [[MeasuredValue9]] <<FLOAT>> | [[Tolerance9]] <<YESNO>> |
| JL0041172 | True Position of right cavity beam tube flange (FPC end). | Reference only | n/a | [[MeasuredValue10]] <<FLOAT>> | [[Tolerance10]] <<YESNO>> |
| JL0041172 | True Position of right cavity beam tube flange (field probe end). | .010 | Max. | [[MeasuredValue11]] <<FLOAT>> | [[Tolerance11]] <<YESNO>> |
| JL0041172 | True Position. Average of Fpc beamtubes | .010 | Max. | [[MeasuredValue12]] <<FLOAT>> | [[Tolerance12]] <<YESNO>> |
| JL0041172 | True Position of left End Dish conflat flange | .030 | Max. | [[MeasuredValue13]] <<FLOAT>> | [[Tolerance13]] <<YESNO>> |
| JL0041172 | True Position of right End Dish conflat flange | .030 | Max. | [[MeasuredValue14]] <<FLOAT>> | [[Tolerance14]] <<YESNO>> |
| JL0041172 | Overall Length | 70.100-70.340 | Reference only | [[MeasuredValue15]] <<FLOAT>> | [[Tolerance15]] <<YESNO>> |
| JL0041172 | Left Window Height to Datum A | 16.068 | + - .005 | [[MeasuredValue16]] <<FLOAT>> | [[Tolerance16]] <<YESNO>> |
| JL0041172 | Right Window Height to Datum A | 16.068 | + - .005 | [[MeasuredValue17]] <<FLOAT>> | [[Tolerance17]] <<YESNO>> |
| JL0041172 | Window height from beamttube - Left | 9.728 | Reference only | [[MeasuredValue18]] <<FLOAT>> | [[Tolerance18]] <<YESNO>> |
| JL0041172 | Window height from beamttube - Right | 9.728 | Reference only | [[MeasuredValue19]] <<FLOAT>> | [[Tolerance19]] <<YESNO>> |
| JL0041172 | Window location from end of cavity-Left | 31.360-31.500 | n/a | [[MeasuredValue20]] <<FLOAT>> | [[Tolerance20]] <<YESNO>> |
| JL0041172 | Window location from end of cavity-Right | 31.360-31.500 | n/a | [[MeasuredValue21]] <<FLOAT>> | [[Tolerance21]] <<YESNO>> |
| JL0041172 | Window to Window Distance | 7.342-7.370 | n/a | [[MeasuredValue22]] <<FLOAT>> | [[Tolerance22]] <<YESNO>> |
| JL0041172 | Window to Window Flatness | .02 | Max. | [[MeasuredValue23]] <<FLOAT>> | [[Tolerance23]] <<YESNO>> |

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| **Drawing Number** | **Description** | **Drawing Value** | **Measured Value** |
| JL0041172 | Dish to Dish Distance | 62.000-62.280 Reference only | [[MeasuredValue24]] <<FLOAT>> |
| JL0041172 | Left End Dish conflat flange location(X) | .000 Reference only | [[MeasuredValue25]] <<FLOAT>> |
| JL0041172 | Left End Dish conflat flange location(Y) | .000 Reference only | [[MeasuredValue26]] <<FLOAT>> |
| JL0041172 | Right End Dish conflat flange location(X) | .000 Reference only | [[MeasuredValue27]] <<FLOAT>> |
| JL0041172 | Right End Dish conflat flange location(Y) | .000 Reference only | [[MeasuredValue28]] <<FLOAT>> |
| **Step No** | **Instructions** | | **Data Inputs** |
| 9 | Install the dogleg window interface CMM test plate carefully on top of the dogleg flanges. Then install at least 4 bolts in the corners of each window. If any issues arise or the bolt holes do not line-up create a NCR. | | [[PlateFitsOk]] <<YESNO>>  [[CMM2\_SRF]] <<SRF>>  [[CMM2\_timestamp]] <<TIMESTAMP>>  [[CMM2\_comment]] <<COMMENT>> |
| 10 | Upload any additional data files as necessary. | | [[AdditionalfilesFinal]] <<FILEUPLOAD>> |