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| **DUNE APA Final Check List Summary** |
| **Section A. Properties** |
| Frame PID Number | Input: D00300200001-00008-UK118 | APA PID Number | Input: D00300100002-00008-UK106-01-00-00 |
| APA Production Site | Select: Daresbury Laboratory | CERN Test Date (optional) | Click or tap to enter a date. |
| APA Tested at CERN? | Select:  | Departure Date from CERN (optional) | Click or tap to enter a date. |
| Departure date from production site | Click or tap to enter a date. | Arrival Date at Fermilab | Click or tap to enter a date. |
| Arrival date at CERN (optional) | Click or tap to enter a date. | Arrival Date at SURF | Click or tap to enter a date. |
| APA Configuration (Top or Bottom) | Select: Top |
| Temperature Sensor 1 | Type: Standard/Frame | PID#: STS 011 | Select Position Number (1-18, F1, F2): F1 |  |
| Temperature Sensor 2 | Type: Precision/Lar | PID#: P48487 | Select Position Number (1-18, F1, F2): 5 |  |
| Temperature Sensor 3 | Type: Precision/Lar | PID#: P48483 | Select Position Number (1-18, F1, F2): 14 |  |
| Temperature Sensor 4 | Type: Standard/Frame | PID#: STS 012 | Select Position Number (1-18, F1, F2): F2 |  |
| Manufacturer of Wire | Select:  |
| **Section B. Problematic Channels** |
| Problematic Channel #1 | Wire layer and side Select:  | Head board # - Pad #Input:  | Offline ChannelInput:  | FEMB-ASIC-ASIC Channel Input:  | Wire-Segment-Location (UV Plane only)Select:  | Problem-TypeSelect:  | Location Select:  | NCR-Number and UUIDInput:  |
| Problematic Channel #2 | Wire layer and side Select:  | Head board # - Pad #Input:  | Offline ChannelInput:  | FEMB-ASIC-ASIC Channel Input:  | Wire-Segment-Location (UV Plane only)Select:  | Problem-TypeSelect:  | Location Select:  | NCR-Number and UUIDInput:  |
| Problematic Channel #3 | Wire layer and side Select:  | Head board # - Pad #Input:  | Offline ChannelInput:  | FEMB-ASIC-ASIC Channel Input:  | Wire-Segment-Location (UV Plane only)Select:  | Problem-TypeSelect:  | Location Select:  | NCR-Number and UUIDInput:  |
| Problematic Channel #4 | Wire layer and side Select:  | Head board # - Pad #Input:  | Offline ChannelInput:  | FEMB-ASIC-ASIC Channel Input:  | Wire-Segment-Location (UV Plane only)Select:  | Problem-TypeSelect:  | Location Select:  | NCR-Number and UUIDInput:  |
| **Section C. Other Non-Conformances (Non-Channel Specific)** |
| Non-Conformance #1 | Description of NCR and how it affects performance:  | NCR-TypeSelect:  | Location Select:  | NCR-NumberInput:  |
| Non-Conformance #2 | Description of NCR and how it affects performance:  | NCR-TypeSelect:  | Location Select:  | NCR-NumberInput:  |
| **Section D. Tension Measurements (Attach Plots)** |
| Location of Tension Measurement | Select:  |
| Summary Tension Plots X-Layer | Minimum: // Mean: // Maximum: // RMS:  |
| Summary Tension Plots G-Layer | Minimum: // Mean: // Maximum: // RMS:  |
| Summary Tension Plots U-Layer | Minimum: // Mean: // Maximum: // RMS:  |
| Summary Tension Plots V-Layer | Minimum: // Mean: // Maximum: // RMS:  |
| Number of ~~re-tensioned and~~ replaced wires on each layer (factory only) | Input:  |
| List of wires falling outside tension specifications | Input:  |
| **Section E. Survey Measurements of frame** (Precision required 0.1 mm) |
| **Refer to Survey Measurement Document** | Input EDMS Number: EDMS 2795808 |
| **Width** deviations of completed APA from the longitudinal axis ([EDMS: 2816926,](https://edms.cern.ch/document/2816926/1) Figure 5) | Nominal dimension: 1150 mmDeviation from nominal: min max |
| **Height** deviations of completed APA from the traversal axis ([EDMS: 2816926,](https://edms.cern.ch/document/2816926/1) Figure 5) | Nominal dimension: 6085 mm Deviation from nominal: min max |
| **Frame survey results** | See table at the end of the document  |
| **Position deviation for Head tube connection interfaces holes** from the longitudinal axis:-for upper APA: yoke connection.-for bottom APA: assembly actuator and field cage support connection.([EDMS: 2816926,](https://edms.cern.ch/document/2816926/1) Figure 6) | HT hole #1Nominal: 575mmDeviation:  | HT hole #2Nominal: 575mmDeviation:  | HT hole #3Nominal: 575mmDeviation:  | HT hole #4Nominal: 575mmDeviation:  |
| **Position deviations** **of link nut plate holes** that support linkages used to support bottom APAs (Reference dimension from external foot tube surface up to center on nut plate hole). ([EDMS: 2816926,](https://edms.cern.ch/document/2816926/1) Figure 7) | Nut plate Left side:Nominal: 256.1mmDeviation:  | Nut plate Right side:Nominal: 256.1mmDeviation:  |
| **Position deviation for Foot tube vertical alignment pins holes** from the longitudinal axis.([EDMS: 2816926,](https://edms.cern.ch/document/2816926/1) Figure 4) | Alignment hole Left sideNominal: 575mmDeviation:  | Alignment hole Right sideNominal: 575mmDeviation:  |
| Confirmation of each bolt type and appropriate installation, measurement of each preload | Type of bolt 8757A360: M10-1.50 x 20 SHCS MODIFIED A2-70 SS SILVER PLATED | [x]  YES [ ]  NO | Type of bolt 8760090:M12-1.75 x 40 SHCS A2-70 SS SILVER PLATED | [x]  YES [ ]  NO |
| QTY:72 | [x]  YES [ ]  NO | QTY: 16  | [x]  YES [ ]  NO |
| Torque: 28.5NmRange of deviation | [x]  YES [ ]  NO | Torque: 51.5Nm Range of deviation  | [x]  YES [ ]  NO |
| **Section F. Survey Measurements of Completed APA** (Precision required 0.1 mm) |
| **Refer to Survey Measurement Document** | Input EDMS Number: EDMS  |
| Conduit and side tube PD holes alignment (visual inspection)([EDMS: 2816926,](https://edms.cern.ch/document/2816926/1) Figure 8) | [ ]  YES [ ]  NO |
| **Section G. Compliance Summaries** |  |
| Frame check boxes indicating all certification (EN1090 compliance, use of certified welders, weld-procedure qualifications, and material test reports) have been checked and uploaded to EDMS/HWDB | Check Frame Certifications: [x]  EN1090 Exc2 Compliance [x]  Certified Welders[x]  Weld-procedure Qualifications[x]  Welds Compliance[x]  Material Test Reports [x]  Other on EDMS | Certification verified by:EDMS number: | Input: G.MEDMS 2795808  | Date: | 31 August 2022 |
| Board check boxes indicating all certification (Geometry compliance and material test reports) have been checked and uploaded to EDMS/HWDB | Check Board Certifications:[x]  Geometry Compliance with Drawings[x]  Material Test Reports  | Certification verified by: | Input: G.M  | Date: | 20 April 2023 |
| Conduit check boxes indicating all certification (Geometry compliance with drawings, use of certified welders, weld-procedure qualifications, and material test reports) have been checked and uploaded to EDMS/HWDB | Check Conduit Certifications:[ ]  Geometry Compliance with Drawings[ ]  Certified Welders[ ]  Material Test Reports  | Certification verified by: | Input:  | Date: | Click or tap to enter a date. |
| Wire check boxes indicating all certification (Project requirements compliance and material test reports) have been checked and uploaded to EDMS/HWDB | Check Wire Certifications:[ ]  Project Requirements Compliance[ ]  Material Test Reports  | Certification verified by: | Input:  | Date: | Click or tap to enter a date. |
| Mesh Panels check boxes indicating all certification (Geometry compliance, welds compliance and material test reports) have been checked and uploaded to EDMS/HWDB | Check Mesh Panels Certifications:[x]  Geometry Compliance with Drawings[ ]  Certified Welders[ ]  Material Test Reports | Certification verified by: | Input: G.M  | Date: | 20 April 2023 |
| Report completed by: | Input: G.M  | Date: | 20 April 2023 |

Frame survey results:

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| Measurement | Tolerance | Data | Unit |
| Cross corner deviation | 2.0 (1.0 target) | 0.6 | mm |
| Straightness of left side | 1.5 (1.0 target) | 0.2 | mm |
| Straightness of right side | 1.5 (1.0 target) | 1.1 | mm |
| Overall flatness | 11.0 | 3.2 | mm |
| Overall bow | 11.0 | 1.8 | mm |
| Overall twist | 1.0 | 0.08 | mm/m |
| Twist zone 1 | 1.0 | 0.42 | mm/m |
| Twist zone 2 | 1.0 | 0.49 | mm/m |
| Twist zone 3 | 1.0 | 0.35 | mm/m |
| Twist zone 4 | 1.0 | 0.21 | mm/m |
| Twist zone 5 | 1.0 | 0.49 | mm/m |
| Fold Foot tube | 1.2 | -0.1 | mm |
| Fold Rib 1 | 1.2 | -0.3 | mm |
| Fold Rib 2 | 1.2 | -0.6 | mm |
| Fold Rib 3 | 1.2 | -0.02 | mm |
| Fold Rib 4 | 1.2 | 0.5 | mm |
| Fold Head tube | 1.2 | 0.7 | mm |