# Quality Assurance Checklist



THIS FORM CAN BE USED AS A CHECKLIST TO CONTROL THE SEQUENCE OF QUALITY ASSURANCE ACTIVITIES TO BE PEFORMED ON LCLS HARDWARE, SYSTEMS OR PROCESSES, OR ATTACHED TO LCLS HARDWARE AS A QUALITY ASSURANCE TRAVELER.

| | | |
|---|---|---|
| System or Component Name: *LCLS Undulator Main Assembly* | | |
| Part/Drawing Number: *L143-112000* | Revision: 05 | Serial Number: 36 |
| Manufacturer: | | Purchase Order Number: |

Special Instructions:

***This checklist is to be completed prior to the acceptance of LCLS Undulator Main Assemblies***

**Quality Assurance Tasks (attach continuation sheets if additional steps are required)**

| Seq No. | Task Description<br>*Inform the LCLS Technical Lead if a task cannot be competed or a requirement met | Completed by/Date* | Requirement Met | Requirement Not Met* |
|---|---|---|---|---|
| 1 | *Confirm that the drawing revisions on the attached Bill of Materials is correct.* | CL | ☒ | ☐ |
| 2 | *Confirm that the supplier is working to the same drawing revisions as on the attached Bill of Materials.* | | ☒ | ☐ |
| 3 | *Perform visual inspection of the completed assembly for workmanship and correctness.* | CL | ☒ | ☐ |
| 4 | *Perform visual inspection of the completed assembly for correct the following markings on the Strongback:* L143-11200-05<br>SA-381-001-35<br>Assy Rev No<br>(Not: the serial numbers of the assembly and Strongback should be identical) | Feb 1, 2007 | ☒ | ☐ |
| 5 | *Perform visual inspection of the completed assembly for correct the following markings on the Magnet Structure Assemblies:*<br>• *Upper Left Magnet Structure Assemblies: L-143-110800-assembly no.* 36<br>• *Upper Right Magnet Structure Assemblies: L143-111200-assembly no.* 36<br>• *Upper Middle Magnet Structure Assemblies: L143-111000-1,2,3-assembly no.* 36<br>• *Lower Left Magnet Structure Assemblies: 143-110900-assembly serial no.* 36<br>• *Lower Right Magnet Structure Assemblies: L143-111300-assembly serial no.* 36<br>• *Lower Middle Magnet Structure Assemblies: L143-111100-1,2-3-assembly no.* | Feb 1, 2007 | ☒ | ☐ |
| 6 | *Verify correct gap size along the entire undulator length using contactor's go/no-go gages.* | ET or CL | ☒ | ☐ |
| 7 | *Verify correct gap size along the entire undulator length using calibrated gage blocks.* | ET | ☐ | ☐ |
| 8 | *Check the peak field at each magnet location using a portable Hall probe.*<br>MAG Lot 35 | SS or IV | ☐ | ☐ |
| 9 | *Perform or witness the inspection of the 60.00 mm width of the mounting pads.* | | ☒ | ☐ |
| 10 | *Verify that the following quality assurance documentation has been completed by the contractor:*<br>• *ANL Acceptance Criteria Listings E5-026046, E5-020020, E5-069069*<br>• *LCLS Inspection/Acceptance Report for LCLS Magnets*<br>• *LCLS Inspection/Acceptance Report for Supplier Inspection form for LCLS Magnet Assemblies*<br>• *Magnet Sort List*<br>• *Photographs showing correct magnet serial numbers and orientation*<br>• *ANL Supplier Disposition Reports documenting any noncomformance to specifications drawings or other contract requirements* | Feb 1, 2007 | ☒ | ☐ |

| | | | | |
|---|---|---|---|---|
| **11** | *Verify that the magnet photographs of the magnet sub assemblies are in agreement with the magnet sort list.* | Feb 2, 2007 [illegible] | ☒ | ☐ |
| **12** | *Review the shipping container for changes since the last undulator shipment and that that mounting feet will be used to prevent rotation of the assembly while in transit.* | [illegible] 3-15-07 | ☒ | ☐ |
| **13** | *Confirm that contractor has shock and temperature monitoring devices available for shipment of the undulator assembly. Check that the shock and temperature monitoring devices were calibrated within 1 year of initial receipt and then once every 12 months thereafter.* | [illegible] 3-15-07 | ☒ | ☐ |
| **14** | *Obtain a copy of the supplier quality assurance records* | [illegible] 3-15-07 | ☒ | ☐ |
| **15** | *Obtain the required ANL signatures on Acceptance Criteria Listings E5-164018, E5-026046, E5-069069.* | Feb 2, 2007 [illegible] | ☒ | ☐ |
| **16** | *Forward supplier quality assurance records and the completed traveler form to LCLS QA Coordinator Tom Barsz. B401, C4219* | [illegible] 3-15-07 | ☒ | ☐ |

**LCLS Task Leader Pre-Approval:** _____ **Date:** _____

**LCLS QA Coordinator Pre-Approval:** _____ **Date:** _____

**Optional Approver Comments:**

**Distribute completed traveler to:** **Responsible Engineer, Task Leader, LCLS Quality Assurance Coordinator, Chief Engineer**

**Other:** _____

**Enter notes, quality improvement, or lessons-learned issues resulting from this activity below.**

| Title5 | Title4 | Name | Keyword | Revision | Version |
|---|---|---|---|---|---|
| MAGNET CLAMP | UPPER LEFT MAGNET STRUCTURE | 1143-110104.drw | PF-381-000-31 | 00 | 12 |
| POLE | | 1143-110105.drw | PF-381-000-32 | 03 | 1 |
| MAGNET | | 1143-110106.drw | PF-381-000-33 | 04 | 0 |
| LAST POLE | | 1143-110107.drw | PF-381-000-94 | 02 | 4 |
| DIVING BOARD | UPPER LEFT MAGNET STRUCTURE | 1143-110108.drw | PF-381-000-95 | 00 | 2 |
| BRACKET 1 | | 1143-110109.drw | PF-381-001-27 | 02 | 2 |
| BRACKET 2 | | 1143-110110.drw | PF-381-001-28 | 02 | 1 |
| SCREW | | 1143-110111.drw | PF-381-001-32 | 00 | 1 |
| HORIZONTAL FIELD SHIM | | 1143-110112.drw | PF-381-001-33 | 00 | 0 |
| HORIZONTAL FIELD SHIM HANDLE | | 1143-110113.drw | | 00 | 0 |
| SCREEN | | 1143-110114.drw | PF-381-001-29 | 01 | 0 |
| STOPPER | | 1143-110115.drw | PF-381-001-30 | 01 | 0 |
| SPACER | | 1143-110119.drw | PF-381-000-99 | 00 | 1 |

| | | | | | |
|---|---|---|---|---|---|
| | | l143-110143.drw | | 01 | 0 |
| | | l143-110144.drw | | 00 | 1 |
| | | l143-110145.drw | | 00 | 1 |
| STRONGBACK MACHINING | UNDULATOR MAGNET ASSEMBLY | l143-110700.drw | PF-381-000-86 | 08 | 0 |
| STRONGBACK FORGING | UNDULATOR MAGNET ASSEMBLY | l143-110701.drw | PF-381-000-87 | 00 | 10 |
| WEDGED SPACER | | l143-110702.drw | PF-381-001-31 | 04 | 0 |
| PEAK FIELD SHIM | | l143-110703.drw | PF-381-001-05 | 02 | 2 |
| SPACER | | l143-110704.drw | PF-381-001-06 | 00 | 2 |
| UPPER LEFT MAG. STRUCTURE ASSEMBLY | UPPER LEFT MAGNET STRUCTURE | l143-110800.drw | SA-381-000-54 | 03 | 0 |
| BASE | UPPER LEFT MAGNET STRUCTURE | l143-110801.drw | PF-381-000-55 | 00 | 12 |
| LOWER LEFT MAG. STRUCTURE ASSEMBLY | LOWER LEFT MAGNET STRUCTURE | l143-110900.drw | SA-381-000-56 | 02 | 0 |
| BASE | LOWER LEFT MAGNET STRUCTURE | l143-110901.drw | PF-381-000-57 | 00 | 9 |
| UPPER MIDDLE MAG. STRUCTURE ASSEMBLY | UPPER MIDDLE MAGNET STRUCTURE | l143-111000.drw | SA-381-00058 | 03 | 0 |
| BASE | UPPER MIDDLE MAGNET STRUCTURE | l143-111001.drw | PF-381-000-59 | 02 | 0 |
| LOWER MIDDLE MAG. STRUCTURE ASSEMBLY | LOWER MIDDLE MAGNET STRUCTURE | l143-111100.drw | SA-381-000-88 | 02 | 0 |

| | | | | | |
|---|---|---|---|---|---|
| BASE | LOWER MIDDLE MAGNET STRUCTURE | l143-111101.drw | PF-381-000-89 | 02 | 0 |
| BASE | LOWER MIDDLE MAGNET STRUCTURE | l143-111101.prt | PF-381-000-89 | 02 | 1 |
| UPPER RIGHT MAG. STRUCTURE ASSEMBLY | UPPER RIGHT MAGNET STRUCTURE | l143-111200.drw | SA-381-000-90 | 03 | 0 |
| BASE | UPPER RIGHT MAGNET STRUCTURE | l143-111201.drw | PF-381-000-55 | 00 | 4 |
| LOWER RIGHT MAG. STRUCTURE ASSEMBLY | LOWER RIGHT MAGNET STRUCTURE | l143-111300.drw | SA-381-000-92 | 02 | 0 |
| BASE | LOWER RIGHT MAGNET STRUCTURE | l143-111301.drw | PF-381-000-93 | 00 | 6 |
| MAIN ASSEMBLY | | l143-112000.drw | SA-381-001-35 | 05 | 1 |

Drawing revisions verified by: _____ Date:_____

Not Required Fields



# ARGONNE NATIONAL LABORATORY

# ACCEPTANCE CRITERIA LISTING

1. DISTRIBUTION:

**INSPECTION REQUIRED:** ☑

4. ORIGINATOR'S NAME & DIVISION: Glen Lawrence/XFD 5. PHONE: 2-9298 6. DATE: 06/13/2005

9. FOR INSPECTION, DELIVER TO BLDG. NO.: DIVISION: XFD ATTN.: G. Lawrence

10. AFTER INSPECTION, DELIVER TO BLDG. NO.: SLAC DIVISION: LCLS ATTN.:

11. REFERENCES AND/OR REMARKS:

Item may be inspected by LCLS QA at Contractor site prior to shipment with follow-up inspection at receiving site. First Articles from each of the two contractors are to be shipped to ANL/APS to be magnetically shimmed and characterized in the APS Magnet Measurement room. The 38 remaining units shall be shipped directly to SLAC to be magnetically shimmed and characterized in the LCLS Magnet Measurement room.

15. ORIGINATOR OF PLAN: Glen Lawrence DATE: 06/13/2005

16. PLAN REVIEWED/APPROVED BY: DATE: 00/00/0000

17. QAR CONCURRENCE WITH PLAN: DATE: 00/00/0000

3. ACL NO.: E5-164018 LINE NBR: 1

7. PART NO. & NAME: L143-112000 LCLS Undulator Main Assy. 8. QUANTITY: 2

| 12. STEP NO. | 13. INSPECTION/TEST REQUIREMENT | 14. INSPECTION TEST LOCATION | 18. ACCEPTED BY OR NONCONFORMANCE REPORT NO. | 19. DATE |
|---|---|---|---|---|
| 1 | Inspect shipping container for evidence of damage or rough handling | eceiving / Inspectic SLAC | | |
| 2 | Inspect shipping sensors for record of temperature variations and shock/g loads in x,y and z during shipping | eceiving / Inspectic SLAC | | |
| 3 | Review all required certifications for compliance and completeness | actor Fac. or Rec. ANL | JFS | Feb 1, 2007 |
| 4 | Visual inspection of Undulator Assy for shipping damage | eceiving / Inspectic SLAC | | |
| 5 | Visual inspection of Undulator Assy for completeness to print, including all loose parts | actor Fac. or Rec. ANL | JFS | Feb 1, 2007 |

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# ACCEPTANCE CRITERIA LISTING

| 12. STEP NO. | 13. INSPECTION/TEST REQUIREMENT | 14. INSPECTION TEST LOCATION | 18. ACCEPTED BY OR NONCONFORMANCE REPORT NO. | 19. DATE |
|---|---|---|---|---|
| 6 | Verify Undulator gap using Go-NoGo gauge | Contractor Facility ANL | [illegible] | 02/01/07 ET |

Not Required Fields



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# ACCEPTANCE CRITERIA LISTING

1. DISTRIBUTION:

**INSPECTION REQUIRED:** ☑

4. ORIGINATOR'S NAME & DIVISION: Glen Lawrence/XFD 5. PHONE: 2-9298 6. DATE: 01/25/2005

9. FOR INSPECTION, DELIVER TO BLDG. NO.: N/A DIVISION: ATTN.:

10. AFTER INSPECTION, DELIVER TO BLDG. NO.: NA DIVISION: ATTN.:

11. REFERENCES AND/OR REMARKS:

The Magnet Poles are to be delivered to the Undulator Assembly Contractors by the Machining Contractor. Undulator Assembly Contractor shall inspect the Magnet Poles prior to acceptance. ANL shall review all Certifications and Machining Contractor's reported measurements & optionally perform on-site inspections.

15. ORIGINATOR OF PLAN: Glen Lawrence DATE: 01/27/2005

16. PLAN REVIEWED/APPROVED BY: DATE: 00/00/0000

17. QAR CONCURRENCE WITH PLAN: DATE: 00/00/0000

3. ACL NO.: E5-026046 LINE NBR: 1

7. PART NO. & NAME: L143-110105 Upper Magnet Structure Pole 8. QUANTITY: 192

| 12. STEP NO. | 13. INSPECTION/TEST REQUIREMENT | 14. INSPECTION TEST LOCATION | 18. ACCEPTED BY OR NONCONFORMANCE REPORT NO. | 19. DATE |
|---|---|---|---|---|
| 1 | Visual inspection of parts for shipping damage | ulator Assy Contra | Hi Tech | |
| 2 | Check that parts were "bagged and tagged" with serial no.'s and part no.'s (ANL & SLAC) per SOW L143-00031, Section 4.1.3 | ulator Assy Contra | Hi Tech | |
| 3 | Check that parts were marked with serial numbers per SOW section 4.1.3. | ulator Assy Contra | Hi Tech | |
| 4 | Check that accompanying certifications have correct part serial numbers | ulator Assy Contra | Hi Tech | |
| 5 | Check the material certification for compliance with ASTM A801, Type 1 | tor Assy Contracto | Hi Tech | |

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# ACCEPTANCE CRITERIA LISTING

| 12. STEP NO. | 13. INSPECTION/TEST REQUIREMENT | 14. INSPECTION TEST LOCATION | 18. ACCEPTED BY OR NONCONFORMANCE REPORT NO. | 19. DATE |
|---|---|---|---|---|
| 6 | Check the anneal certification for compliance with AMS-A801, or a specified material supplier's annealing schedule. | tor Assy Contracto | [illegible] | 02/01/07 |
| 7 | Check that the machining Contractor's certified dimensional measurements are in compliance with the drawing | ANL | [illegible] | 02/01/07 TB |
| 8 | Verify the critical dimensions as listed in the SOW, Section 4.5.2 are in compliance with the drawing | ulator Assy Contra | HiTech | |

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# ACCEPTANCE CRITERIA LISTING

1. DISTRIBUTION:

**INSPECTION REQUIRED:** ☑

4. ORIGINATOR'S NAME & DIVISION: Glen Lawrence/XFD 5. PHONE: 2-9298 6. DATE: 03/10/2005

9. FOR INSPECTION, DELIVER TO BLDG. NO.: 401 DIVISION: XFD ATTN.: Glen Lawrence

10. AFTER INSPECTION, DELIVER TO BLDG. NO.: 401 DIVISION: XFD ATTN.: Glen Lawrence

11. REFERENCES AND/OR REMARKS:

Most of the magnets will be drop shipped directly to the Undulator Assembly Contractor, who will only perform limited physical inspection of the parts as they are highly magnetized. A sampling from each lot will be sent to ANL for verification of the magnetic field properties.

15. ORIGINATOR OF PLAN: Glen Lawrence DATE: 02/07/2005

16. PLAN REVIEWED/APPROVED BY: DATE: 00/00/0000

17. QAR CONCURRENCE WITH PLAN: DATE: 00/00/0000

**3. ACL NO.: E5-069069 LINE NBR: 1**

7. PART NO. & NAME: L143-110106 Upper Left Magnet Structure 8. QUANTITY: 192

| 12. STEP NO. | 13. INSPECTION/TEST REQUIREMENT | 14. INSPECTION TEST LOCATION | 18. ACCEPTED BY OR NONCONFORMANCE REPORT NO. | 19. DATE |
|---|---|---|---|---|
| 1 | Visual inspection of parts for shipping damage | ulator Ass'y Contra | | |
| 2 | Visual inspection of parts for surface chips and pits | ulator Ass'y Contra | | |
| 3 | Dimensional check of part for conformance to the drawing | ulator Ass'y Contra | | |
| 4 | Review vendor certified test data agrees with SOW requirements | APS Bldg 401 | JFS | Feb 1, 2007 |
| 5 | Review Vendor sort list for agreement with sort procedure. | APS Bldg 401 | Shigeki Sasaki | SS |

# ARGONNE NATIONAL LABORATORY

# ACCEPTANCE CRITERIA LISTING

| 12. STEP NO. | 13. INSPECTION/TEST REQUIREMENT | 14. INSPECTION TEST LOCATION | 18. ACCEPTED BY OR NONCONFORMANCE REPORT NO. | 19. DATE |
|---|---|---|---|---|
| 6 | On random sampling, inspect magnetic field with magnetic visualization film for magnetic defects. | APS Magnet Grou | Shigemi Sasaki SS | |
| 7 | On random sampling, confirm Magnetic Moment magnitude and vector components agree with vendor reports | APS Magnet Grou | Shigemi Sasaki SS | |
| 8 | On radom sampling, verify the magnet s demagnetization and thermal stability. | APS Magnet Grou | Shigemi Sasaki SS | |

Not Required Fields



## ARGONNE NATIONAL LABORATORY

# ACCEPTANCE CRITERIA LISTING

1. DISTRIBUTION:

**INSPECTION REQUIRED:** ☑

4. ORIGINATOR'S NAME & DIVISION: Glen Lawrence/XFD 5. PHONE: 2-9298 6. DATE: 01/20/2005

9. FOR INSPECTION, DELIVER TO BLDG. NO.: N/A DIVISION: ATTN.:

10. AFTER INSPECTION, DELIVER TO BLDG. NO.: NA DIVISION: ATTN.:

11. REFERENCES AND/OR REMARKS:

Strongbacks are to be delivered to undulator assembly contractor by machining contractor. Undulator assembly contractor shall inspect strongback prior to acceptance. Argonne National Laboratory shall review all certification and machining vendor's reported measurements and optionally on-site inspections

15. ORIGINATOR OF PLAN: Glen Lawrence DATE: 01/20/2005

16. PLAN REVIEWED/APPROVED BY: DATE: 00/00/0000

17. QAR CONCURRENCE WITH PLAN: DATE: 00/00/0000

3. ACL NO.: E5-020020 LINE NBR: 1

7. PART NO. & NAME: L143-110700 LCLS Undulator Strongback 8. QUANTITY: 40

| 12. STEP NO. | 13. INSPECTION/TEST REQUIREMENT | 14. INSPECTION TEST LOCATION | 18. ACCEPTED BY OR NONCONFORMANCE REPORT NO. | 19. DATE |
|---|---|---|---|---|
| 1 | Visual inspection of part for shipping damage. A) Were critical surfaces protected per SOW L143-00030 Section 4.1.4? B) Is there any visible damage? | lulator Ass'y Contra | | |
| 2 | Check Strongback is marked with serial number & part no.'s (ANL and SLAC) per SOW Section 4.1.3 | lulator Ass'y Contra | | |
| 3 | Check all accompanying Certifications have correct part serial number. | lulator Ass'y Contra | | |
| 4 | Check Material Certification for compliance with ASTM B381-03, Grade F | ıtor Ass'y Contractc | | |
| 5 | Check Forging Annealing Certification for annealing conformance to AMS-H-81200A, Table V, commercial Pure, Bars & Forgings, including Note 8 | ıtor Ass'y Contractc | | |

Not Required Fields



## ARGONNE NATIONAL LABORATORY

# ACCEPTANCE CRITERIA LISTING

| 12. STEP NO. | 13. INSPECTION/TEST REQUIREMENT | 14. INSPECTION TEST LOCATION | 18. ACCEPTED BY OR NONCONFORMANCE REPORT NO. | 19. DATE |
|---|---|---|---|---|
| 6 | Check Rough Machining Anneal Certification for annealing conformance to AMS 2801B section 3.2.9 | ıtor Ass'y Contract | | |
| 7 | Check the strongback contractor's reported dimensional measurements against the part drawing. | ırgonne National La | [signature] | 2/16/07 TB |
| 8 | Verify the strongback critical dimensions as listed in the SOW section 4.5.2 are in compliance with the print. | lulator Ass'y Contra | | |

Maglot 35

14:25

AIR 70°F
21.5°C

Date 17 feb 07 Device# 36 Start Time_____ Start Temperature_____

| Slot | Value | Slot | Value | Slot | Value | Slot | Value | Slot | Value |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | 51 | -1.26 | 101 | -1.27 | 151 | -1.27 | 201 | -1.26 |
| 2 | 0.[illegible].74 | 52 | +1.26 | 102 | +1.27 | 152 | +1.27 | 202 | +1.26 |
| 3 | -1.21 | 53 | -1.27 | 103 | -1.27 | 153 | -1.27 | 203 | -1.26 |
| 4 | +1.28 | 54 | +1.26 | 104 | +1.27 | 154 | +1.26 | 204 | +1.26 |
| 5 | -1.26 | 55 | -1.26 | 105 | -1.26 | 155 | -1.26 | 205 | -1.26 |
| 6 | +1.27 | 56 | +1.26 | 106 | +1.26 | 156 | +1.26 | 206 | +1.26 |
| 7 | -1.26 | 57 | -1.26 | 107 | -1.26 | 157 | -1.26 | 207 | -1.27 |
| 8 | +1.27 | 58 | +1.26 | 108 | +1.27 | 158 | +1.26 | 208 | +1.26 |
| 9 | -1.26 | 59 | -1.26 | 109 | -1.27 | 159 | -1.26 | 209 | -1.26 |
| 10 | +1.26 | 60 | +1.27 | 110 | +1.27 | 160 | +1.26 | 210 | +1.27 |
| 11 | -1.27 | 61 | -1.26 | 111 | -1.27 | 161 | -1.27 | 211 | -1.26 |
| 12 | +1.26 | 62 | +1.26 | 112 | +1.27 | 162 | +1.26 | 212 | +1.26 |
| 13 | -1.26 | 63 | -1.27 | 113 | -1.26 | 163 | -1.27 | 213 | -1.25 |
| 14 | +1.26 | 64 | +1.26 | 114 | +1.27 | 164 | +1.26 | 214 | +1.26 |
| 15 | -1.26 | 65 | -1.27 | 115 | -1.27 | 165 | -1.26 | 215 | -1.26 |
| 16 | +1.26 | 66 | +1.27 | 116 | +1.27 | 166 | +1.27 | 216 | +1.26 |
| 17 | -1.26 | 67 | -1.27 | 117 | -1.27 | 167 | -1.26 | 217 | -1.27 |
| 18 | +1.26 | 68 | +1.27 | 118 | +1.27 | 168 | +1.27 | 218 | +1.26 |
| 19 | -1.27 | 69 | -1.26 | 119 | -1.27 | 169 | -1.26 | 219 | -1.26 |
| 20 | +1.27 | 70 | +1.26 | 120 | +1.26 | 170 | +1.26 | 220 | +1.26 |
| 21 | -1.27 | 71 | -1.26 | 121 | -1.26 | 171 | -1.26 | 221 | -1.27 |
| 22 | +1.26 | 72 | +1.26 | 122 | +1.26 | 172 | +1.26 | 222 | +1.25 |
| 23 | -1.26 | 73 | -1.27 | 123 | -1.26 | 173 | -1.26 | 223 | -1.28 |
| 24 | +1.27 | 74 | +1.26 | 124 | +1.26 | 174 | +1.26 | 224 | +1.22 |
| 25 | -1.26 | 75 | -1.25 | 125 | -1.26 | 175 | -1.27 | 225 | -0.75 |
| 26 | +1.27 | 76 | +1.27 | 126 | +1.27 | 176 | +1.27 | | |
| 27 | -1.27 | 77 | -1.26 | 127 | -1.27 | 177 | -1.26 | | |
| 28 | +1.27 | 78 | +1.27 | 128 | +1.27 | 178 | +1.26 | | |
| 29 | -1.27 | 79 | -1.26 | 129 | -1.26 | 179 | -1.26 | | |
| 30 | +1.26 | 80 | +1.27 | 130 | +1.26 | 180 | +1.26 | | |
| 31 | -1.26 | 81 | -1.27 | 131 | -1.28 | 181 | -1.26 | | |
| 32 | +1.27 | 82 | +1.27 | 132 | +1.27 | 182 | +1.26 | | |
| 33 | -1.27 | 83 | -1.26 | 133 | -1.27 | 183 | -1.27 | | |
| 34 | +1.26 | 84 | +1.27 | 134 | +1.27 | 184 | +1.27 | | |
| 35 | -1.27 | 85 | -1.27 | 135 | -1.27 | 185 | -1.27 | | |
| 36 | +1.27 | 86 | +1.27 | 136 | +1.27 | 186 | +1.26 | | |
| 37 | -1.26 | 87 | -1.27 | 137 | -1.27 | 187 | -1.27 | | |
| 38 | +1.26 | 88 | +1.27 | 138 | +1.26 | 188 | +1.26 | | |
| 39 | -1.25 | 89 | -1.27 | 139 | -1.27 | 189 | -1.26 | | |
| 40 | +1.26 | 90 | +1.26 | 140 | +1.27 | 190 | +1.27 | | |
| 41 | -1.27 | 91 | -1.27 | 141 | -1.27 | 191 | -1.27 | | |
| 42 | +1.26 | 92 | +1.27 | 142 | +1.27 | 192 | +1.27 | | |
| 43 | -1.26 | 93 | -1.27 | 143 | -1.27 | 193 | -1.27 | | |
| 44 | +1.26 | 94 | +1.27 | 144 | +1.26 | 194 | +1.26 | | |
| 45 | -1.27 | 95 | -1.27 | 145 | -1.27 | 195 | -1.27 | | |
| 46 | +1.26 | 96 | +1.27 | 146 | +1.25 | 196 | +1.26 | | |
| 47 | -1.26 | 97 | -1.26 | 147 | -1.26 | 197 | -1.26 | | |
| 48 | +1.26 | 98 | +1.27 | 148 | +1.26 | 198 | +1.27 | | |
| 49 | -1.26 | 99 | -1.26 | 149 | -1.26 | 199 | -1.26 | | |
| 50 | +1.27 | 100 | +1.26 | 150 | +1.26 | 200 | +1.27 | | |

End Temperature 21.8 C

End Time 14:45

Hall Probe S/N___
01231053/
01340076/

Signatures: