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BONDING INDEX PLATE TO SPACER

SCIENCE MISSION PROCEDURE

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1. SCOPE

This document provides the procedure used for bonding the Index Plates to Spacers for the GP-I Science Mission. Following the completion of this procedure, the successfully completed units proceed to a machining operation which add dowel holes to both the spacer and the index plates.

This procedure assumes that (1) precision cleaning of the individual index plates and spacers has been completed per procedure P0059, (2) the bonding material has been previously prepared per procedure P0218, (3) the Delrin fixtures used to hold the index plates and spacers during this process have been cleaned. The following operations are contained in this procedure:

- Bonding the index plate (P/N 23237-101) to spacer (P/N 23236-101)

1.1 Acronyms

The following acronyms are used in this document

QB	Quartz Block
IP	Index Plate
IP/S	Index Plate and Spacer Unit, bonded together
ITD	Integration and Test Director

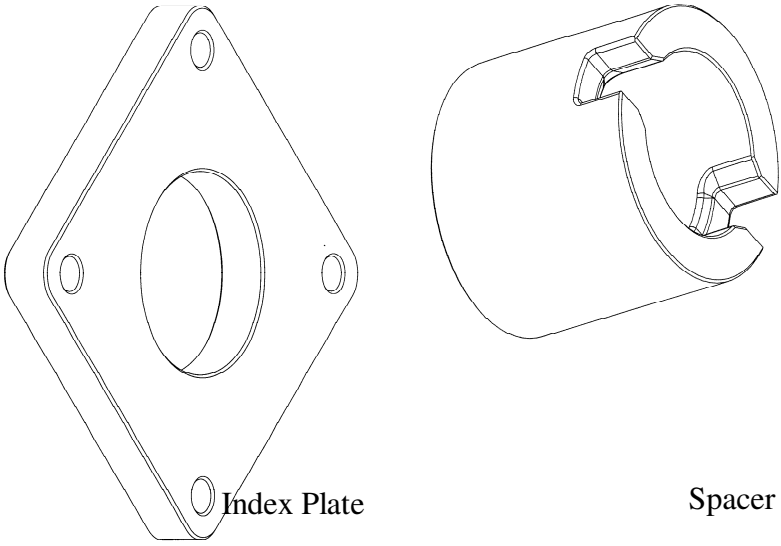

Figure 1. Index Plate and Spacer

2. REFERENCES

2.1 Procedures

- P0218 Bonding Procedure for Fused Quartz Components
- P0059 GP-B Contamination Control Plan
- P0080 Cryogenic Magnetic Screening Procedure
- P0057A GP-B Magnetic Control Plan, Science Mission

2.2 Drawings

- Bonded Assembly P/N 23238
- Spacer P/N 23236
- Index Plate P/N 23237
- Delrin Index Plate to Spacer Integration Fixture

3. GENERAL REQUIREMENTS

3.1 Environmental Requirements

This procedure will be conducted in the Stanford Class 1000 Telescope Cleanroom in the HEPL facility on a Class 100 flow clean bench.

3.1.1. Temperature and Humidity

Room Temperature: 68 °F ± 5 °F
Room Humidity: 45% ± 10%

3.1.2. Cleanliness Level

The Telescope Class 1000 clean room in the HEPL building where this procedure takes place shall be maintained at the cleanliness levels per Federal Standard 209D. The cleanroom bench shall be maintained at cleanliness level Class 100 per Federal Standard 209D.

3.1.3. Particulate Contamination

All parts and tools shall be cleaned using methods consistent with achieving Mil Spec Level 100 cleanliness. In addition, all parts shall be maintained at level 100 cleanliness per Procedure P0059. Take all necessary precautions to keep tools and handling equipment free of particulate

contamination. Tools to be sprayed with Freon from Pressure can (filtered to < 0.2 micron) prior to use, or when contaminated.

3.1.4. Magnetic Contamination

Parts to be handled are in Zones 1 and 2A. All parts shall be screened per Procedure P0057A. Take all necessary precautions to keep tooling and handling free of magnetic contamination. Tools that come in contact with these components must be of Beryllium Copper, Phosphor Bronze, ceramic, copper, brass, titanium, or appropriate plastics.

3.2 Test Personnel

3.2.1 Integration Test Director (ITD) and Bonding Engineer

The ITD shall be Jason Gwo or his delegate. The Bonding Engineer shall be Ken Bower. The ITD has overall responsibility for the implementation of this procedure.

3.2.2 Integration Engineer

The Integration Engineer providing the integration hardware shall be Doron Bardas or J. Efraín Alcorta. He shall provide the index plates, spacers, and integration fixtures. He shall determine which serial number of index plates and spacers are integrated together. He shall be present during this procedure.

3.2.2 Other Personnel

All engineers and technicians participating in this procedure are under the direction of the ITD. The ITD shall determine whether the person is qualified to participate in this procedure.

3.3 Safety

3.3.1. General

Special emphasis shall be placed on safety during all assembly and testing operations to prevent injury to personnel and/or damage to equipment. The ITD shall ensure that all personnel are aware of the specific personnel and hardware safety concerns indicated in the safety requirements cautions and warnings in the procedure.

3.3.2. Protective Garments

Minimum protective garments for personnel working in the clean rooms shall be the standard Tyvek clean room apparel for room classes from 10,000 to 1000.

3.3.3. Maximum Number of People in Cleanroom

Under normal operating conditions, there shall be no more than 5 people in the Class 1000 Cleanroom. This is to provide an efficient workspace. Exceptions must be for short periods only, and be approved by the ITD.

3.4. Quality Assurance

All assembly and testing shall be conducted on a formal basis to approved and released integration and test procedures. A Quality Assurance representative shall review and document

any discrepancy noted during integration or test, and approve its disposition. Upon completion o
each procedure, the QA representative will certify his/her concurrence that the effort was performed and accomplished in accordance with the prescribed instructions by signing and dating his/her approval line at the end of the procedure.

4. REQUIRED EQUIPMENT

Flight Hardware

Hardware	Part Number	Quantity
Spacer / Index Plate Assembly	23238-212	1
Index Plate	23237-201	1/assembly
Spacer	23236-301	1/assembly

Ground Support Equipment

Delrin Index Plate to Spacer Integration Fixture (4)
Center Alignment Plug
Corner Alignment Dowels (2)
A3200 Fiberlite 150 W fiber optics light source
CO_2 snow cleaner
Methanol CH_3OH (1 PPM residue after evaporation low acetone grade)
De-ionized Water 18 MΩ-cm Source and Dispenser
Polyester "Small Alpha" swabs

5. OPERATIONS

All data shall be recorded on separate IP/Spacer Bonding Data Sheets labeled by serial # of the combination, i.e. serial number of the index plate over (/) serial number of the spacer.

Record Start Date and Time of Index Plate / Spacer.
Record Serial Number of Spacer to be bonded.
Record Serial Number of Index Plate to be bonded.
Record preparation date of Bonding Solution and Expiration Date.

5.1 Cleanliness Check of Bonding Surfaces

5.1.1 Initially, use the CO_2 snow cleaner to blow large particles off the quartz parts.

5.1.2 Using a polyester swab, dipped in Methanol, clean all surfaces of Spacer.
Inspect and clean under A3200 Fiberlight. Carefully inspect for particles, and clean off with swab.

5.1.3 Perform water drop test on spacer to verify cleaning process. If water drop spreads, cleaning process is verified (including other all parts in this same batch).

5.1.4 Using the same procedure as in steps 5.1.1 and 5.1.2 above, clean all surfaces of Index Plate.

5.2 Fit Check on Fixture

5.2.1 Using a polyester swab, dipped in Methanol, clean posts of Fixture.
Inspect and clean under A3200 Fiberlite. Carefully inspect for particles, and clean off with swab.

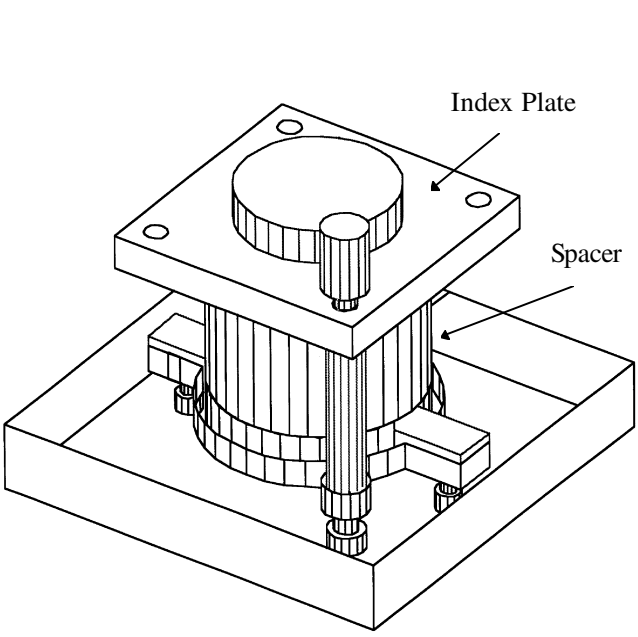

Figure 2. Index Plate and Spacer in bonding fixture

5.2.2 Place Spacer into center bore of fixture, with notch in Spacer mating with fixture center bar. Hold place Index Plate above Spacer, with two corners of Index Plate aligned with posts of Fixture. **(Do not allow IP to contact Spacer).** Place center plug over Index Plate and Spacer. Place dowels over Index Plate and Fixture posts. Accept if Index Plat and Spacer align properly with each other and fixture.

5.2.3 Disassemble.

5.3 Bond Index Plate onto Spacer

5.3.1 Place Spacer into center bore of fixture, with notch in Spacer mating with fixture center bar.

5.3.2 Place bonding solution on spacer, according to bonding procedure P0218.

The bonding solution will be prepared according to procedure P0218.

5.3.3 Place Index Plate carefully over spacer, with corner holes of the plate over the two posts of the fixture. Observe bond according to bonding procedure P0218.

5.3.4 Place GSE center plug dowel over the index plate and spacer holes to concentrically alig the index plate and spacer. Observe bond according to bonding procedure P0218.

5.3.5 Rotate the IP over the spacer back and forth approximately 10° to spread the bonding solution. Observe bond according to bonding procedure P0218.

5.3.6 Insert the two corner GSE dowel pins over the index plate and fixture to align clocking between the index plate to spacer

5.3.7 Visually inspect the bonding surfaces to check for air pockets.

Use the A3200 Fiberlite to inspect for fringe patterns. Accept if fringe pattern indicates a uniform bond.

5.3.8 Retain the bonded assembly in this configuration for at least one day.

Record Completion Date and Time of this IP/S unit.

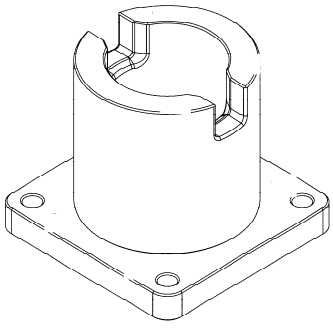

Figure 3. Index Plate and Spacer Bonded Together

5.3.9 Have all personnel identified in this procedure sign IP / Spacer Bonding Data Sheet.

6. DATA BASE ENTRY

The following data shall be entered into the GP-B Data Base:

1) Name, number, and revision of this procedure.

2) Date of successful completion of procedure for each IP / Spacer combination.

3) Serial numbers of the completed assemblies together with S/Ns of their components.

IP / Spacer Bonding Data Sheet

IP/ Spacer serial number: _____ / _____

Record Start Date and Time_____

Record Serial Number of Index Plate _____

Record Serial Number of Spacer_____

Record Preparation Date of Bonding Solution_____Expiration Date_____

Date and Time of Completion_____

Unit Completed: _____ Date_____
Bonding Engineer

_____ Date_____
Integration Engineer

Discrepancies with disposition if any:

Approved _____ Date_____

Integration Test Director

Procedure Completion

The results obtained in the performance of this procedure are acceptable.

Signed: _____ Date _____
Integration Systems Test Manager

The Information obtained under this assembly and test procedure is as represented and the documentation is correct.

Signed: _____ Date _____
GP-B QA Representative