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GP-B Telescope
“Position Metering Tube on Baseplate Assembly”
P0374 Rev -

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POSITION METERING TUBE ON BASEPLATE ASSEMBLY

- for SUGP-B dwg#25091
- follows *Assemble Base Plate/Tertiary Mirror/Primary Mirror Assy...* (SUGP-B P0361) and *Determine Metering Tube Length* (P0364)
- also use *GP-B Telescope Image Divider Assembly (IDA) General Alignment and Bonding Procedures* (SUGP-B P0282) for procedures concerning safety; personnel; work area requirements; fixture cleaning and acceptance; flight part inspection, handling, storage, and cleaning; redline authority; and sign-off and recording requirements.

CAUTION:

- The flight parts used in this operation are heavy, delicate, and somewhat irreplaceable with multiple critical surfaces that can be easily damaged or contaminated by normal handling. Compliance with the above defined safe handling practices is critical.

CAUTION:

- If at any time during this procedure flight hardware is not live monitored, verify that all flight hardware is seismically secured and protected against airborne contamination. This precaution is especially important during this operation due to the size and dimensions of the Metering Tube.

WARNING:

- Some of the solvents, detergents, and/or bonding agents used in this procedure may be flammable, toxic, or reactive. Consult P0282 for information about specific chemicals.
- 1) Verify cleanliness of all fixturing.
 - 2) Clear a large area (~3'x3') on the class 100 laminar flow work bench and clean the surface with ethanol. Place two stacks of several (~5-10) large sheets of cleanroom wipes (VWR TWTX609) on the table top near the center of the bench.
 - 3) Remove the Baseplate/Tertiary Mirror/Primary Mirror Assembly ("Baseplate Assembly") from its assembly fixture (or storage if appropriate) and verify cleanliness of the bottom bonding surface by simple visual inspection. Remove any contaminants detectable per P0282 (this operation will require two personnel). Place the Baseplate Assembly, mirrored surfaces up, on one of the stacks of wipes.
 - 4) Using a bright light inspection process, verify the cleanliness of the top surfaces of both mirrors and the baseplate per P0282 (this step must be performed thoroughly and carefully since these critical surfaces will be difficult to access after the conclusion of this procedure).
 - 5) Remove the Metering Tube ("the Tube") from storage and place it vertically (access holes up) on the other stack of wipes. Verify cleanliness of the top and outside surfaces by simple visual inspection. Remove any contaminants per P0282. Invert the Tube (access holes down, now) on the same stack of wipes (dispose of top layer).

- 6) Using a bright light inspection process, verify the cleanliness of the bottom and inside surfaces of the Tube per P0282 (this step must be performed thoroughly and carefully since these surfaces will be difficult to access after the conclusion of this procedure).

- 7) Refer to SU dwg#25091 for clocking information between the Baseplate Assembly and Metering Tube. Functionally, these parts are radially symmetric, so precision clocking is not required. However, access and vent ports are located to minimize interference with future science instrument hardware, so coarse clocking ($\pm 5^\circ$, verified by visual inspection) is required.
- 8) During the bonding operation (step 9), the following steps must be executed:
 - 8.1) **This is a high risk operation! Both parts in this operation are large, heavy, extremely fragile, and difficult to replace. Extreme care must be used when placing the Tube on the Baseplate Assembly.**
 - 8.2) Begin step 9 by placing the bonding solution on the baseplate. The rest of steps 8 and 9 must be completed in a limited amount of time (less than 100 seconds recommended, 20-30 seconds is typical based upon experience.)
 - 8.3) One qualified flight part handler (per P0282) shall lift the Tube and rotate it with the assistance of a second qualified flight part handler such that it is reoriented with the access holes up. The first handler shall grasp the Tube firmly with both hands on the OD near the access ports.
 - 8.4) With the first handler lifting the Tube over the Baseplate Assembly, the second handler shall guide the bottom of the Tube by gently placing his hands on the OD of the bottom of the Tube while watching with his eyes near the level of the top of the Baseplate Assembly for any hazardous contacts between flight parts.
 - 8.5) The first handler shall slowly lower the Tube to within 1/2" of the Baseplate's top surface (well past the top of the Primary Mirror) while the second ensures that the metering tube does not contact the Primary Mirror.
 - 8.6) The second handler shall direct the first to tilt, rotate, and/or translate the Tube such that single point contact forces shall be minimized when the parts are brought together.
 - 8.7) The first handler shall continue lowering the Tube. When the parts are $\sim 1/10$ " apart, the second handler may use his fingertips on the OD's of both parts to maximize correct alignment and minimize force at the moment of contact (use care to prevent gloves from being pinched between bonding surfaces). **Carefully bring the parts into contact.**
- 9) Complete bonding the Metering Tube to the Baseplate Assembly using *Bonding Procedures for Fused-Quartz Components* (SUGP-B P0218). The parts should be concentrically aligned by touch.
- 10) Carefully monitor the bond interface area and make any adjustments as required within ~ 10 seconds. Due to the size and profile of this bond, it will probably set very quickly.
- 11) Monitor the bond for one hour before moving or securing any parts.
- 12) Carefully seismically secure the new assembly.
- 13) Allow bond to cure at least 48 hours before disturbing telescope.

Attachments: SUGP-B dwg#'s 25087, 25061, 25091

