

# CLAS12 RICH ERR Comments

1. We encourage diligent completion of the mock assembly with rejected aerogel tiles to check stability with proposed wires and squares to keep them in place. Feedback from this process and test of rotating the assembly past the vertical orientation should then be incorporated in the installation plan.

A full-scale prototype of the first mirror holding the aerogel has been delivered and is being prepared for the aerogel assembling test.

2. Schedule for assembly is planned starting in October in the large clean room. This space will be vacated by the CLAS12 drift chambers if the torus remains on schedule. If there is a delay in clean room availability a fall back option is to begin assembly the critical MAPMT and electronics in a smaller clean space. Schedule must be watched so as to not impact completion and the time available for valuable cosmic testing.

To prevent conflicts with the revised Hall-B installation plan, the RICH mechanical structure will be delivered and assembled at JLab beginning of 2017 with no impact on the project schedule. The electronics design has been updated in summer 2016 to reduce some interference between digital outputs and analog inputs and minimize the pedestal widths. As a consequence the electronics production and assembling has been shifted by about 2 months and is now planned to start in December 2016. This would minimize the interference with Hall-B activity. To mitigate the delay, characterization and assembling procedures and tools are being developed on few pilot boards already produced with the upgraded design.

3. We suggest having a contingency in place to protect the aerogel with Nitrogen gas if air conditioning system fails during assembly in the large clean room. This failure was encountered more than once during the assembly of the Drift Chamber.

Nitrogen gas is a valuable option as we want to test the RICH Nitrogen line. Another solution, easy to implement and flexible in application, is to enclose the aerogel in a plastic envelope connected with one of the dry cabinets used for storage. This has been already successfully tested in Ferrara.

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4. Take special precautions on the plan to transport the counter down into Hall B and the rough ramp surface.

A detailed planning is ongoing with the Hall-B engineers. We plan to study the possible stresses on the RICH components and related mitigations with transport tests.

5. To visually inspect the status of the aerogel tiles after installation, we encourage a window be added to the RICH module which could be covered after verifying the successful installation.

We identify two possible locations for an access to the RICH internal volume after installation. The most effective inspection tool is under study.

6. Electronics communication with SSP boards is a critical item that needs Ben Raydo's attention. Coordination of Ben's workload is required to ensure the timely completion of this project.

Cody Dickover will develop the SSP communication protocol for RICH FPGA cooperating with Ben.

7. Hazards/mitigations associated with lifts should be evaluated.

In progress with Hall-B engineers.

8. If the collaboration is providing the laser to be used for survey, it should be reviewed by JLab Laser Safety Officer for acceptance into JLab program.

A THA and, whenever needed, an OSP is planned for each RICH assembling and installing operation.