DØ SOLENOID UPGRADE PROJECT

Chimney open issues

D-ZERO ENGINEERING NOTE # 3823.111 EN-354

Oct. 4, 1993

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INTRODUCTION

In the process of developing a design for the design report, many side questions or comments arose which were not completely answered or investigated because the work was outside the scope of developing a base design. I have pored over my meeting notes and tried to list all such chimney "open issues" in this engineering note.

ISSUES

1. Is a 3" bending radius through the chimney acceptable? RRR for aluminum goes up as strain goes up. Will the copper separate from the aluminum stabilizer at the bend?

Comment: Some investigation was done. A pure aluminum stabilizer can take a bend radius of 1". A response from Akira said that based on experience a safe bending radius should be 10 times larger than the thickness or width. My gut feeling is that the bending of the conductor thru the chimney won't be a problem.

2. I measured only 2 1/2" gap between the ECS and CC at the outer edge of the vacuum vessels. This needs to be 3" for our chimney.

Comment: I've mentioned this to D-Zero people, Herme Stredde, Jim Christenson.

3. What is the resonant frequency of our chimney? The silicon tracker which mounts inside won't want vibration from fluid flow, vacuum pump.

4. It might be desirable to model the G-10 spiders with IDEAS to check the heat load.

5. Is vibration a concern for the LN2 pipes as 2ø fluid flows through them?

Comment (from R.L. Schmitt): "Vibration of the LN2 lines is probably only a concern if velocity is very high."

6. Where and how will the vacuum jacket be supported by the outside world?

Comment: The obround section will be supported off the face of the CC. The chimney section upward to the control dewar can be supported off the cryo bridge.

7. Is the electrical noise from the turbomolecular pump O.K.?

Comment: The turbo pump is mounted outside the detector and should be alright. Comment (from R.L. Schmitt): "A turbo pump is installed on the bottom of the CDF control dewar. Detectors are within a few feet. The experiment could tell you if there is a noise problem, but they have not mentioned it to us."

8. G-10 supports for the chimney piping were not included in the 11/92 conductance calculations.

Comment: The conductance calculations will have to be revisited and redone if quantitative numbers are going to appear in the design report.

9. Is it possible for leak diagnosis to tell if the leak is in the control dewar or solenoid? (If a leak occurred.)

Comment: a diagnostic port will be in the chimney at the solenoid. However this does not necessarily allow full diagnosis if a leak occurred. Comment (from R.L. Schmitt): " It would require at least one additional port on the magnet for time of flight tests. Even then it would indicate a general location."

10. What is pumpdown time?

Comment: Could be calculated, see issue number 8 also. I don't think it would take more than a few days.

11. What is the acceptable clamping deflection of the obround section against the CC curvature? Is it considered part of the fabrication process?

12. How long does the conductor field splice have to be? How is it done?

Comment: There is adequate space/length in the section thru the pig trough. About 2 meters. I have a copy of the Hitachi splice procedures for CDF. The splice will be left to the solenoid manufacturers.

13. Can turbo pump be changed out with the iron closed?