

From: Lionel Duband [duband@drfmc.ceng.cea.fr]
Sent: 05 February 2003 13:15
To: Griffin, DK (Doug) ; Sawyer, EC (Eric) ; Chris Brockley-Blatt (E-mail); Goizel, A (Anne-Sophie) ; Heys, SC (Sam) ; Matt Griffin (E-mail); Peter Hargrave (E-mail); Adam Woodcraft (E-mail); Swinyard, BM (Bruce) ; Delderfield, J (John) ; Berend Winter (E-mail); Orlowska, AH (Anna) ; Bradshaw, TW (Tom)
Cc: Long, JA (Judy)
Subject: Re: SPIRE Level-0 Strap (SPIRE-RAL-NOT-001514)

Hi Doug,

I quickly went thru your note and I am not sure I understand everything. Some quick feedback.

You are talking about producing liquid helium in there - fine - except you'll have to worry about the pressure at room T (sealed system). One way to manage this would be then to have a buffer volume filled with activated charcoal : the buffer is sized to limit the pressure at room T to some "decent" limit. At low T the charcoal is used to generate the adequate pressure (saturated vapour pressure) to produce the liquid. Could work but need some power to keep the charcoal hot. (why charcoal : because it is much better than just an increase of the buffer T to play on the density and thus pressure) Also you would need some material to contain your liquid and provide the electrical isolation, but since you don't care about the conductance of this material you could use some fairly thick stuff (you need to be leak tight).

The other possibility could be simply to use a gas gap heat switch, except the OFF position is not an issue. You can get very high ON conductance (just have to make it big enough, and use ^3He instead of ^4He). The only issue is again the material for the external tubing : non metallic and leaktight, plus the joint of this material with the copper ends : soldering, gluing, etc...

In the past we have tested titanium - ceramic - titanium joint : we made two - one was fine, the second one (which actually Tom has) was leaking (note : those were used at room T, would require qualification at low T).

The advantage of the switch is that I am pretty confident you can get the required conductance, it will use less power than the liquid solution, you don't have to worry about pressure (can be charged at 0.1 Mpa).

In addition since you don't care about the off position, you can integrate in there some isolating spacer to guarantee the electrical isolation.

Finally it is gravity independant.

Boy, sounds like I am selling something there.

Cheers

Lionel

Obviously they are on your list, but you should talk to Tom and Anna. I can send you directions.....

At 10:59 +0000 5/02/03, Griffin, DK (Doug) wrote:

