Norbert Frank

From: Norbert Frank
Sent: 24 May 2012 15:43
To: Ian Crotty; Paola Tropea
Cc: Salvatore Buontempo
Subject: RE: RE4, first level cooling validation

Hi Ian,

Regarding your test setup:

- I'd put an addition needle valve, an analog pressure gauge and a safety valve on the circuit (bottle-> isolation 1/4" valve -> pressure release valve -> needle valve -> analog pressure gauge, safety valve, dig. pressure sensor -> test circuit

Regarding the test procedure:

- I'd put 20 bars on the pressure regulator, open the isolation valve and then raise the pressure only by opening a needle valve (this kind of valve for example 40.40.30.660.1). This allows one to stop raising the pressure very quickly, to regulate the pressure without the regulator on the bottle itself and to be isolate to the volume of the bottle during these 5/10s plateau.
- by opening the needle valve and closing the isolation valve, one can depressurize the system and you can restart the second cycle.

Regarding leak rate measurement:

From leak rate and sensitivity, calculation of time

Volume	liters	0.14	
Leak rate		mbar*l/s	5.00E-04
Sensitivity		mbar	2.5
Time	s	700	
Time	h	0	
DeltaP	mbar	2.5	

- typical values for sensitivity of sensor vs time: take 3 to 4 times the time needed to have a DP =sensitivity. Either you take a better instrument (sensitivity better than 1 mbar) or you take a longer time (3 to 4 times longer than 700 sec)
- One comment regarding these theoretical values above. My experiences have shown that it is very hard to qualify a circuit in terms of leak rate within such a short period of measurement, in addition under these conditions (high pressure and very small volume, no temp. recording in a room without air-condition). But you will be able to select the leaky ones. That what I can suggest is to do some additional test measurements at 15bars (max possible pressure) in parallel with our leak test bench including temperature measurement in order to have an better understanding.

Just an addition comment. To avoid tighten and untighten several times the ferrule union on the copper pipe of the chamber cooling circuit, you could possibly mount temporary stainless steel double unions and in order to leave them connected with the chamber until the final connection in the detector?

I guess it's already planned, I think you should add some safety rules in the future operation instruction, for example to wear ear plugs while going up to 20 bars for the first time (better during all the test) and also not to stand too closed to the test setup at least while pressurizing at the very beginning.

Cheers,

Norbert

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-----Original Message-----
From: Ian Crotty
Sent: 21 May 2012 10:25
To: Paola Tropea; Norbert Frank
Cc: Salvatore Buontempo
Subject: Re: RE4, first level cooling validation

Hello Paola and Norbet

I tallked to Norbet and he suggested I forward the document to him. I hope this is agreable to you ?

Norbet could you please have a look at our suggestion for doing our first level (of perhaps 3) of QA for our cooling of RPCs.

Cheers Ian
On Fri, 13 Apr 2012, Ian Crotty wrote:

>
> Dear Paola
>
> Could I ask you to please look through the document that we will use
> with our colleagues in India, who will produce the cooling pipes that
> will sit ontop of our chamber mechanics, to validate this component.
>
> The proposed method is rather simple with no temperature correction,
> instead relying on a rapid measurement(few hundred seconds) done with
> a high resolution (20 bit).
>
> Further checks will be performed as the chambers and super-module are
> put together, terminating with water.
>
> I have had a number of useful discussions with Norbet and Jerome.
>
> Please make any suggestions and corrections you see fit.
>
> Thanks Ian
>
> http://rpc-cms-re4-upscope.web.cern.ch/rpc-cms-re4-upscope/RPC/Chamber
> %20production/Components/Mechanics/Cooling/Procedure/
>

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