Subject: Anode breaking
Posted by Clemens Adler on Wed, 28 Jul 2004 07:29:13 GMT
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Hello everybody,
Yesterday we noticed a Problem, that was never anticipated (I think).
By coincidence I noticed that after finishing the Anode wiring (gluing, soldering, cutting the wires) some Anode wired did not have contact anymore, while they were fine before cutting the wires (this I measured). Interestingly on this chamber the first few wires of each anode segment were broken between the soldering point and the glue.
This can be seen in the following picture:
www.physi.uni-heidelberg.de/~adler/TRD/pics/2004_07_27/IMG_0457.JPG
(right anode segment, first wire is broken).
We attribute this to the fact, that when cutting the wires (first on the side where the anodes are contacted), the chamber is pulled a bit to the opposite side, by the tension of the wires between winding frame and chamber. When cutting the wires, the chamber is turned a little bit, and the copper strip with solder is pulled a bit outwards, which breaks the first wires.

We looked at another chamber where the wire region was not filled with glue yet and we found that the 4 annode wires around the point where the HV cable was soldered were broken. This might have happened when soldering and pushing down the HV cable core into the solder, that the copper strip was displaced a little bit.

I guess both examples demonstrate that the joint of anodes to the solder is rather delicate, and I'm not sure what to do about it. One idea would be that before cutting the anode wires, on covvers the region where they are soldered with a bit of glue so everything there (wires, solder,copper strip) is well fixed. This however would require an additional day of glue curing. Another possibility would be to solder the wires before gluing and then when gluing make sure to cover the wires until the solder with glue. This I think will not be possible without shifting the wires (even if not touching they swimm on the solder and move probably very easily).

I would like to ask for any idea or sugggestion on this Problem, so we can find a satisfying common solution.

cheers,
Clemens

Subject: Re: Anode breaking
Posted by Harald Appelshaeuser on Wed, 28 Jul 2004 10:36:54 GMT
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Dear Clemens,

this is really a worrysome observation.
I think your theory makes sense, at least I have no other explanation.
Clearly, the distance between the gluing and the soldering point is very short which means the wire would break if it is stretched by only a little bit.
I had a brief discussion with the GSI people, they have never had this

problem before. Possibly, because the TPC chambers are much heavier and may not so easily be pulled away.
The first suggestion is, not to cut the wires from one side to the other but, starting from the center, cut the wires alternating towards both sides. Also, one shouldnt first cut all wires quickly and then remove the ends with the US-knife, but rather cut the wires carefully and one by one with the US-knife only (thats probably how you do it..).

Probably, the ultimate solution is to fix the chamber with respect to the transfer frame to make sure it cannot move. Dubna, did you make any such experience?

Regards, Harry

Subject: Re: Anode breaking
Posted by Clemens Adler on Mon, 16 Aug 2004 14:34:27 GMT
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Dear chamber builders,
we looked at several chambers and tested the anode connection. Unfortunately we have some more chambers where anode breaking was a problem. Therefore I belive that a test of the connection of the anode wires at a late stage (when really nothing can happen anymore, so consequently just before closing the chamber) is absolutly mandatory.
I belive that with the appropriate care this problem can be prevented (we managed to build the last 2 chambers without this problem), but still it should be checked in any case.
cheers,
Clemens

Subject: Re: Anode breaking
Posted by Clemens Adler on Thu, 19 Aug 2004 15:42:09 GMT
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hello,
and another update on the anode breaking problem.
of 8 Chambers, 6 Chambers are OK.
1 Chamber has 2 broken wires where the HV cable is soldered to the Anode segment contact strip,
1 Chamber has 2x2 broken wires at the beginning of the anode segment (chamber turning problem?!?).

One of the 8 good ones, was the one where we noticed the problem with many broken wires, where we replaced the whole anode grid.
So I guess we can prevent this happening when one is careful. Still I would think that a final test of thye Anode connection is necessary.

I repaired those unconnected wires, by pulling a piece of anode wire under the unconnected wires and their next connected neighbor and contacting with silver epoxy (see picture). Afterwards, of course covering everything with glue again for isolation. That is a bit tricky, but

significantly easier, that scraping away all the glue and starting to try to solder again.

cheers,
Clemens

File Attachments

1) IMG_0530.JPG, downloaded 2309 times

