Subject: Drift HV to Radiator connection
Posted by Clemens Adler on Thu, 23 Sep 2004 07:23:27 GMT
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Hello chamber builders,
We closed one of the chambers that Oleg, Sascha and me built last year in November. I noticed 2 things:

1. obvioulsy we forgot to remove the semiconductive shielding around the HV cable core (the black stuff around the core isolation). This might lead to leak currents from the core to the shielding of the cable. In this case I could not measure the resistance, i.e. it is at least much higher than the resistance of the field cage, therefore leak curents would hopefully be negligible.
However, I would like to remind everybody involved, that this covering is conductive and has to be removed, especially at the Anode HV cables.

2. The copper foil, that is glued onto the Radiator, was coming off a bit on one side. I.e. the silver epoxy alone does not really create a reliable seal. I would propose to seal the edges of this copper strip with some real epoxy (just a little at the corners, so that we don't get any charge build-up).
Or does anyone think that this would be a problem.

The other thing I'm not so sure about is the long term gas tighness of silver epoxy. So far we 'repair' scratches in the Radiator surface with silver epoxy, to make sure that the radiator surface is gas tight. If the silver epoxy is not keeping tight on the long term, this might create serious deterioration of chamber performance.
Does anyone have experience with this?

thanks for any advice,
Clemens

Subject: Re: Drift HV to Radiator connection
Posted by Harald Appelshaeuser on Thu, 23 Sep 2004 09:36:19 GMT
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Hi Clemens,

1. indeed this shielding is a tricky thing. we fell into the same trap with the very first proto we built in hd (sorry that i didnt communicate this well enough)

2. it seems to me that this copper strip is a weak point in the design. i dont see a problem with tiny drops of epoxy to improve the stability but maybe somebody has a good idea for a more reliable solution?

Harry

Subject: Re: Drift HV to Radiator connection
Posted by fateev on Mon, 06 Dec 2004 13:49:13 GMT
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Hello, Clemens
The other thing I'm not so sure about is the long term gas tighness of silver epoxy. So far we 'repair' scratches in the Radiator surface with silver epoxy, to make sure that the radiator surface is gas tight. If the silver epoxy is not keeping tight on the long term, this might create serious deterioration of chamber performance.
Does anyone have experience with this?
I have a question about gas tight. We remove only Al mylar foil and sand a little black carbon plastic. may be this carbon plastic provides anough good gas tight?

Oleg

Subject: Re: Drift HV to Radiator connection
Posted by Clemens Adler on Mon, 06 Dec 2004 13:58:12 GMT
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Hello Oleg,
according to Hannes the Radiator surface should still be gas tight even with some scratches. He gave a piece of Radiator which was already a bit damaged (little scratches, as far as I know) to GSI (some year ago) and they tested it and it was still gas tight. Maybe he can comment about this.

cheers,
Clemens

Subject: Re: Drift HV to Radiator connection
Posted by Chilo Garabatos on Tue, 25 Jan 2005 15:42:53 GMT
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Hi Oleg and Clemens,
maybe I can comment of the scratch test: we (Georgios) put this damaged radiator -to which we added some more nasty scratches made with a swiss knife- in a two volume box; we flushed the 'drift' side with argon and the other was kept closed with air. We analysed the air side for days and weeks with a gas chrmatograph and saw no sign of argon.
Two more comments:
-What is this 'red glue'? (I hope it is not fast Technicol).
-Herbert and I had electrical shocks when touching the radiator outer side together with the alu frame when the chamber had volts.
It seems that this side needs to be grounded. Any comment on this?
Regards,
Chilo

Subject: Re: Drift HV to Radiator connection

Posted by Clemens Adler on Tue, 25 Jan 2005 16:06:31 GMT
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Hi Chilo,

The only red glue we use is Technicoll 8266/67 which is used for glueing the wires onto the wiring frame. Is there a Problem with that?

Concerning the shocks you got, I'm a bit surprised, I never experienced anything like this. In principle there is (should be) 5 cm of highly isolating material between the drift cathode and the outer surface. I don't know whether there is any likelyhood of this thing charging up over some time. The only thing I could imagine is that maybe somehow the glue would contain too much humidity to allow leak currents, but this would be very unlikely over this distance...
In any case, it will not hurt to put a piece of this 3M copper shielding tape to ground this side.

cheers,
Clemens

Subject: Re: Drift HV to Radiator connection
Posted by Chilo Garabatos on Tue, 25 Jan 2005 16:57:51 GMT
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Hi Clemens,

The only red glue we use is Technicoll 8266/67 which is used for glueing the wires onto the wiring frame. Is there a Problem with that?
I think probably yes. The 'slow curing' version of Technicol was tested with a mass chromatograph years ago; the result was 'bad'. I wouldn't put it in contact with the gas.

About the radiator outer surface being floating, I think what happens is the following: the chambers are tested here in a rather dry atmosphere, so if one puts -2000 V on the other side, the outer surface will tend to charge up with positive ions until it screens the drift field. It would only discharge when something connects it to ground. Do you think that a ground connection of this should be specified in the manual? This has saved our fingers.
Regards,
Chilo

Subject: Re: Drift HV to Radiator connection
Posted by Clemens Adler on Tue, 25 Jan 2005 17:19:13 GMT
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Hi Chilo,
the technicoll is only used to fix the wires on the winding frame between the time the winding has finished and until the wires are glued onto the chamber, therefore this glue will not go into the chamber, so I guess it should be OK. BTW this glue was a recommendation from the GSI Detektor Lab, as far as I know they used it all the time for this application. But I think it is unlikely that some of it will creep onto the wires and go into the chamber.

It's probably a good suggestion to put a recommendation into the testing manual to ground the

radiator outer surface when applying high voltage. Just in case I'll inform the chamber builders that there might be some risk.

thanks,
Clemens

Subject: Re: Drift HV to Radiator connection
Posted by Chilo Garabatos on Mon, 14 Feb 2005 17:52:04 GMT
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Dear Clemens and all,
How about modifying the filter for the drift HV so that when one puts 2 kV there are 2 kV at the electrode javascript: insertTag(document.post_form.msg_body, '', ' '); ?
I spoke to Mircea and he agrees in putting a resistor there which is small enough to make a negligible deltaV. Not to have it like this is unusual and weird, I think.
Regards,
Chilo

Subject: Re: Drift HV to Radiator connection
Posted by Clemens Adler on Tue, 15 Feb 2005 08:15:03 GMT
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Hi Chilo,
then you were more successful than me, when I tried to get Mircea to agree that a resistor with negligible voltage drop could be used . Sure if this is possible it would be a great help. The current design just leads to continuos problems and confusion.
Maybe Mircea could send what he has in mind.
cheers,
Clemens
