

Electrical connections on the Outer Thermal Enclosures

Valencia 19 September 2006

- Overview

Each OTE consists of a single cylinder of 8 mm thickness **Airex®** foam approximately 1.9m long and 1.2 m diameter. On the inner radius, a thin layer of **25 microns aluminised Kapton®** will be bonded to the foam. On the outer radius, a layer of **43 microns copper backed kapton** will be bonded to the foam.

Attached to the main cylinder are the Front and Rear flange.

The Rear flange is made from a 5mm thickness **Airex®** core. Bonded to it at both side of the outermost edge of the flange are placed carbon fibre rings. Everything is covered on the back side with **aluminised kapton** film and with **copper kapton** foil on the front side, cut into finger-like extensions beyond the cylinder and folded over the outward facing surface of the flange and bonded to it.

The Front Flange projects to the inner radius of the cylinder and it's made of circumferential segments of CFRP.

- Electrical connections

One major functionality of the OTE is to provide a Faraday shield for the SCT, shielding the Modules from electromagnetic noise originating from the proton beams. So, all conductive layers have to be connected.

The outer and inner layers are made of two sheets of material as they were not wide enough to cover the OTE. So connections have to be done not only from the inner to the outer layer but within sheets themselves and also to the Rear Flange.

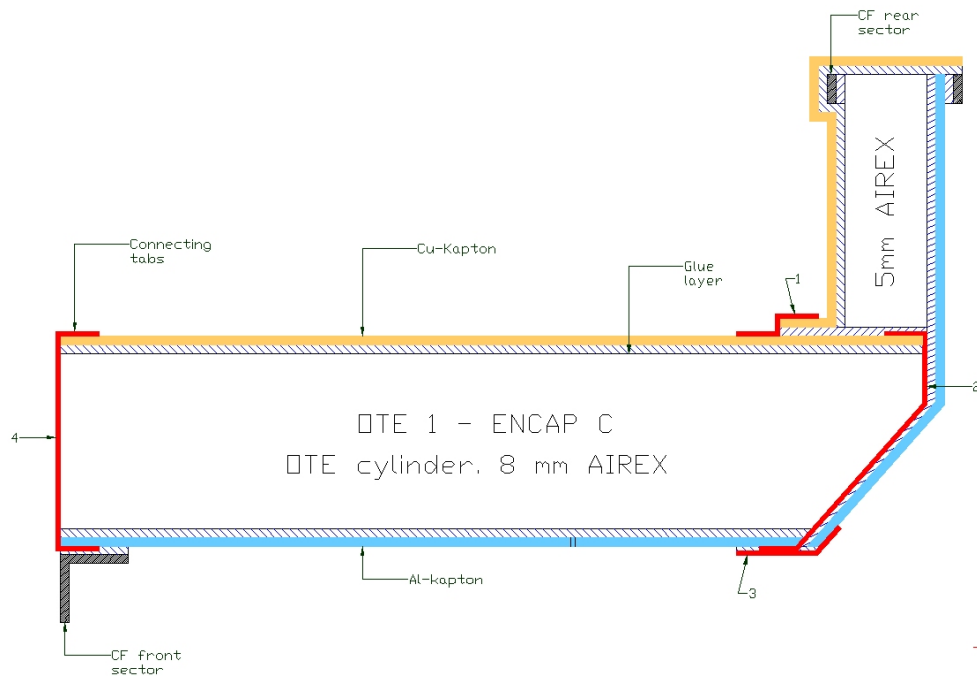
The two Outer sheets of Cu kapton on the cylinder has been soldered to connect them. To connect the other layers some Cu tabs has been added.

There are two different tabs designs:

1. The connection is made by using TRA-DUCT BA 2902, electrically conductive glue (the same as for the Endcap modules) and non conductive glue Araldite 2011 to fix it on the OTE.
2. The connection is made by using a chrome teathed strip soldered to the tab and also with non conductive glue Araldite 2011 to fix it on the OTE.

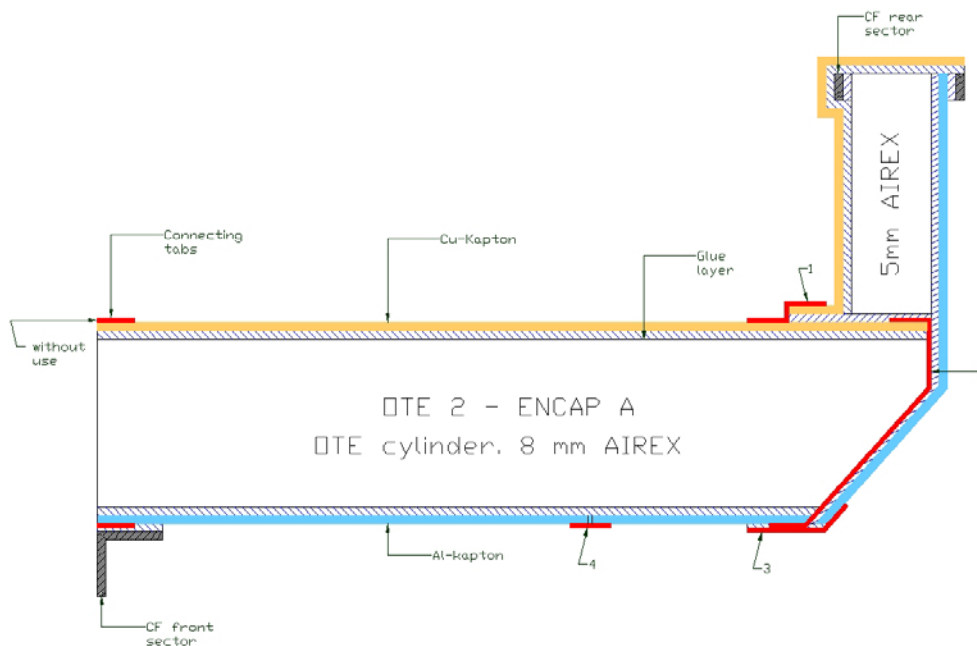
Following there is a sketch with the tabs used on each OTE :

o OTE 1- End Cap C



- a) Tabs n° 1, 2 & 4 are from the type (1) design.
- b) Tab n° 3 is from the type (2) design.

o OTE 2- End Cap A



- a) All tabs are from the type (2) design.
- b) The tabs on the Front Flange labelled as “without use” were cut at CERN and tab n° 4 were placed instead of them.

o Others

Some bubbles did appear on the inner aluminium swing that needed to be repaired. It was done by removing the loose material and replacing it by a few pieces glued to the surface. To have them connected a type (2) tab was also glued on the junction.

- References

Some documents are relevant:

- 1- **Soldadura.doc**. It describes how the soldering of the Cu-kapton layer was made
- 2- **Test Ground**. it compares electrical conductivity between tab type (1) and (2). *Note: document is in Spanish.*
- 3- **Medidas OTE 1**. It summarises the electrical measurements on OTE 1 for Endcap C. *Note: document is in Spanish.*