

LHCb Glue

<https://cds.cern.ch/record/2229009/files/LHCb-PUB-2016-026.pdf>

Detector/conditions differences:

Si-Si gluing rather than Si-CF

The integrated luminosity at LHCb is lower: over next 10 years they plan for 50 fb¹, for which the inner regions of the sensors will receive a dose of 8x10¹⁵ MeV neq/cm² or 400 MRad. The tests they have done used radiation up to a fluence between 6 and 8 × 10¹⁵ MeV neq/cm².

The VELO operates in vacuum, so they have an even greater need for the glue to be thermally conductive.

Adhesives tested:

Araldite 2011: curing schedule: 10 h @23 C. This proved strongest. It is a better thermal conductor than the 3M tape but not as good as Stycast.

Stycast 2850FT: 24 h @ 25C. Tests were not totally conclusive but this glue appears to be most fragile. It is also the best thermal conductor.

3M 9461P (double side adhesive tape): requires thermal cycling to set? This tape is also used by the NA62 experiment. The stress tests showed that the sample moved under stress during the first week but then stabilized.

Overall conclusions.

"Irradiated samples of all three adhesives, Stycast 2850FT, Araldite 2011 and 3M 9461P have shown no displacement under a shear force of 10 N, which is more than sufficient for the VELO upgrade."

They suggest possibly mixing dots of Araldite and Stycast, to achieve strength (from araldite) and better thermal conductivity from stycast.