SISO internal test. Date: 11-06-2015

Test subject : 15.06.290-0 + 15.06.291-0

Standard : Internal

Ordered by : DTP

Done by : AS

Purpose : Stress test of hinge.

Test:
The test is a simple test straining the hinge in a static open position.

The question that needs answers are - what happens when we strain the hinge with more than our recommended strain of 5 kg. / hinge.

What is the weakest point of the hinge?
Will it snap break or just deform, where will it deform if so?

2nd. Issue is the adhesive UV joint of hinge and glass.
Calculations show that the size of the glue area (24,50 x 26,50 mm.) by far exceeds the needed demands to withstand the weight of an 5 kg. load – but how will it perform when tested physically?

Theoretically shear strength of the glue joint:
(24,5 x 26,5) x 17 N/mm² = 11037 N = approx. 1100 kg.

Size of the glued area in mm.

Data on the used glue states that the shear strength is between 17 – 23 N/mm² when combined together with steel and glass.

This means that even with 10 as a factor of safety the glued joint can withstand more than 100 kg. in shear strength.

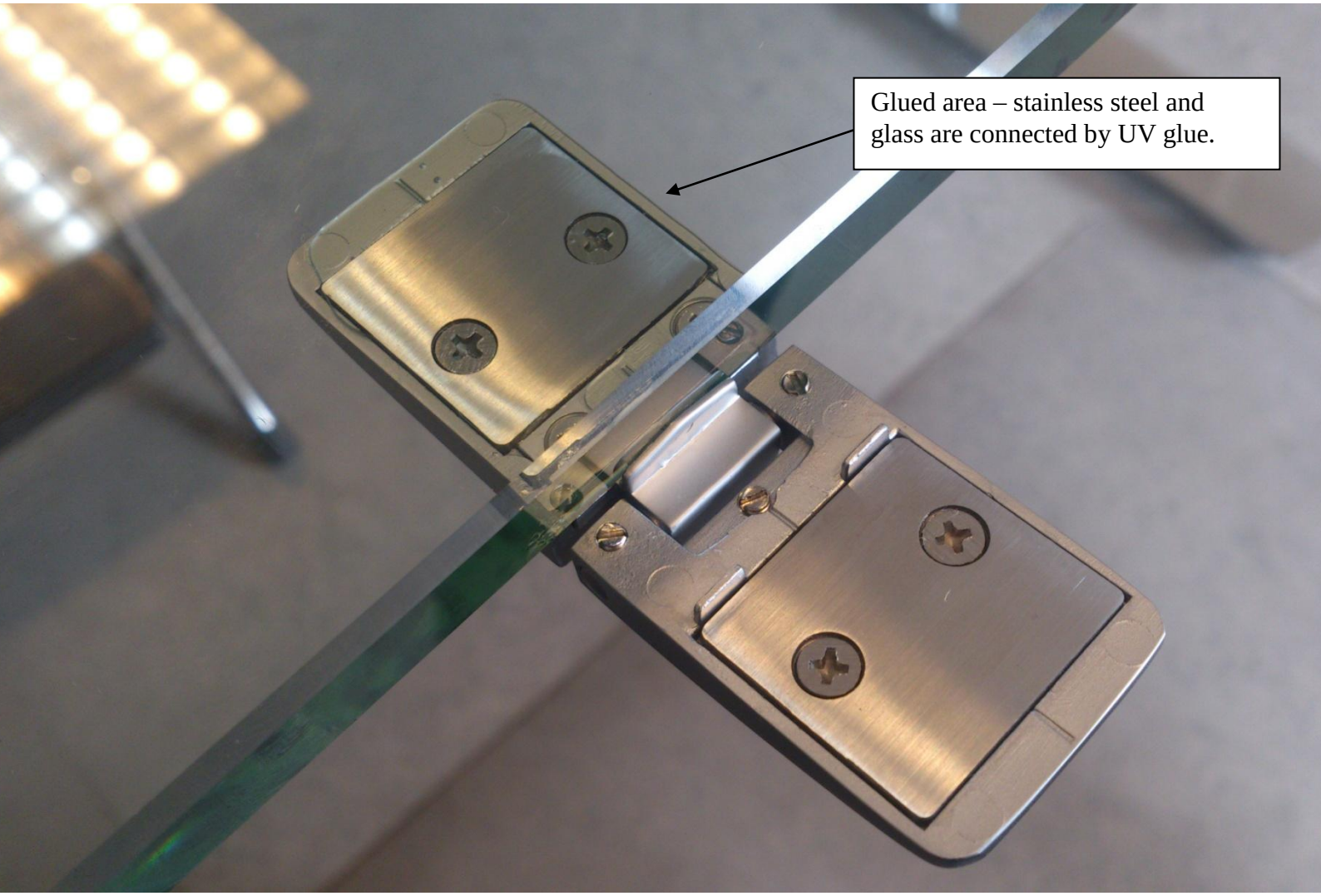
Equipment:

Initially a cleaning of the surfaces that needed to be joined by UV adhesive was performed. The cleaning was done using a cloth together with "99% Isopropyl Alkohol".

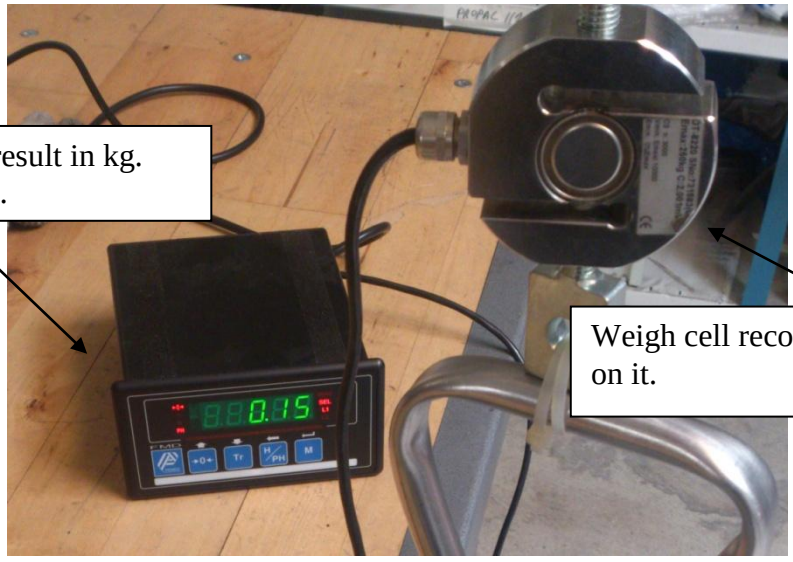
The UV adhesive used in the test is a Cyberbond product – name:
"U 3050 UV adhesive"

Data on the glue:
http://www.cyberbond.de/uploads/media/TDS__U_3050.pdf

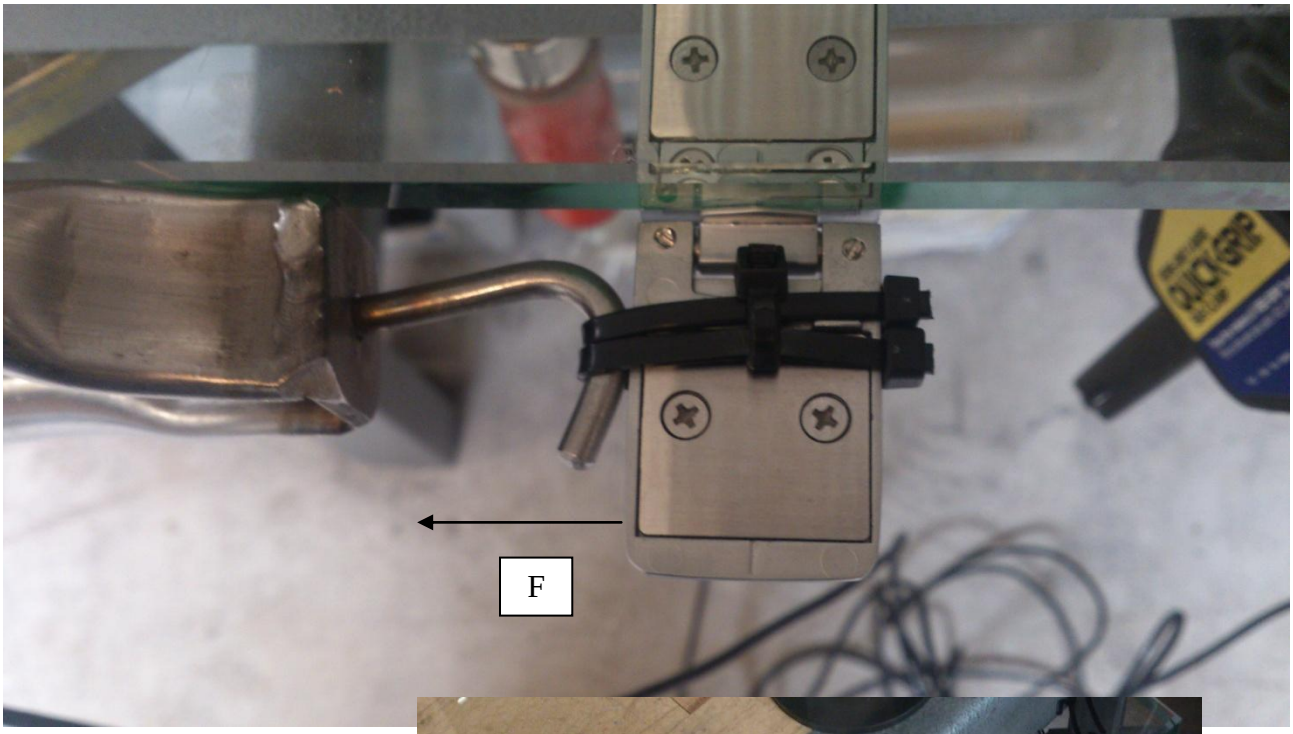
The hinge is glued onto a 12 mm. glass plate – picture below shows the result.
The curing of the glue has been done by an appropriate UV light – wave length nm 380

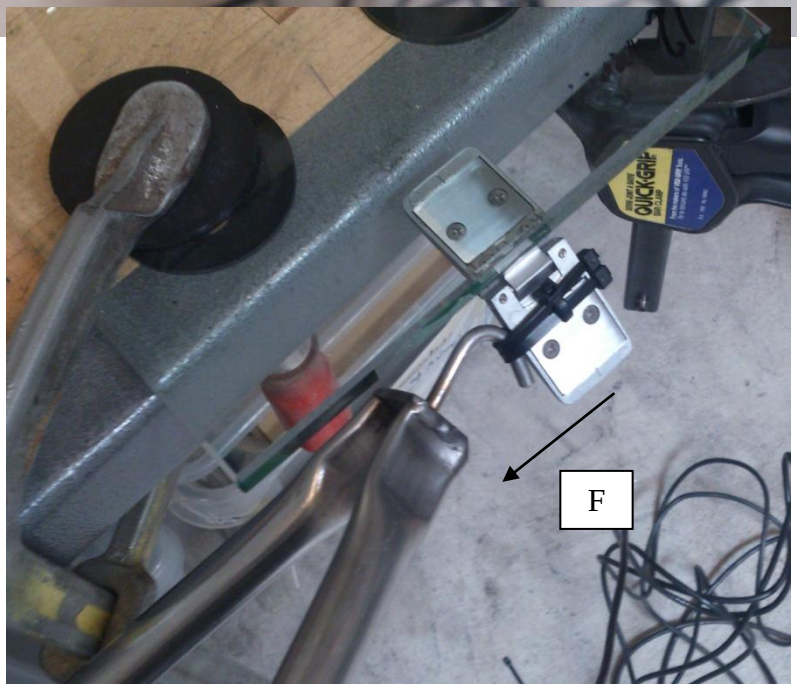


To measure the strain put on the hinge a weigh cell is used with a display, set on peak hold.
Peak hold means that the highest result/force will remain on the display.



Connection of the hinge and the weigh cell are done by a hook and a couple of strong plastic strips. The Force (F) direction is linear and shown on the photo by arrow indicator.

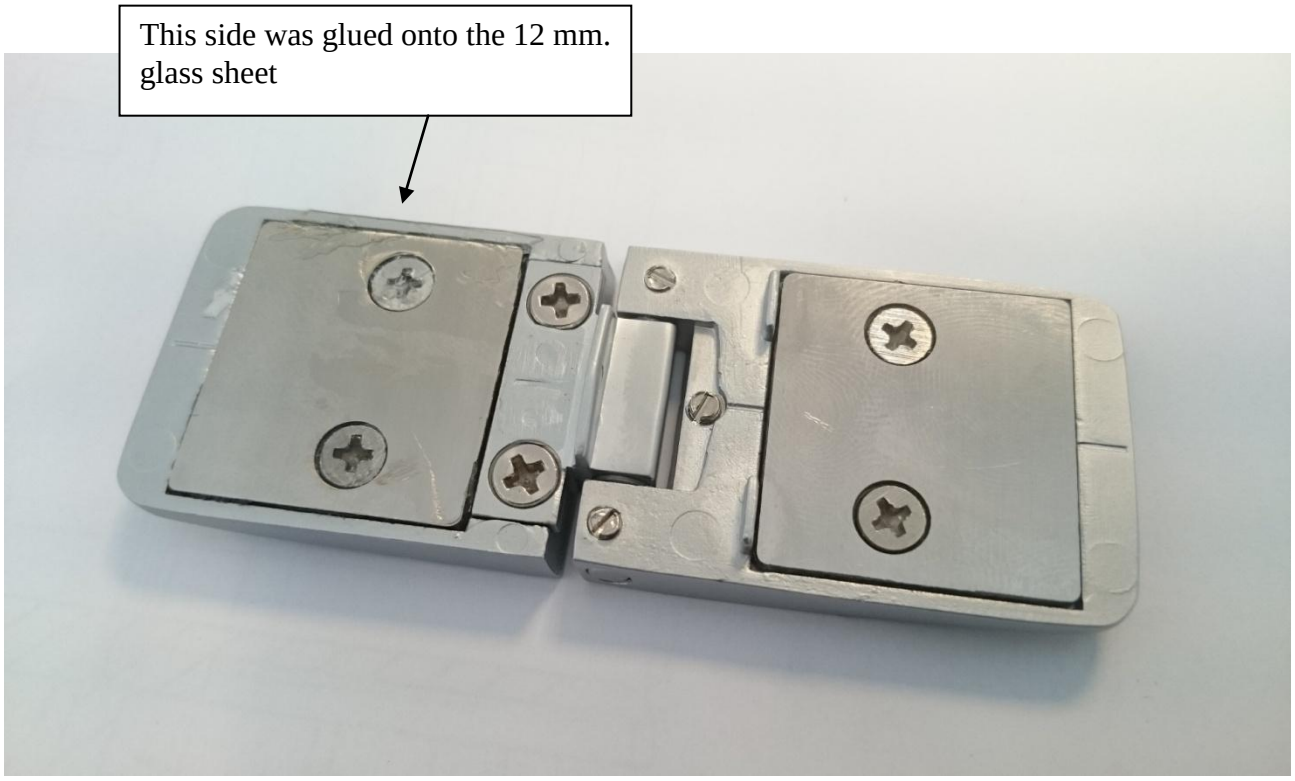


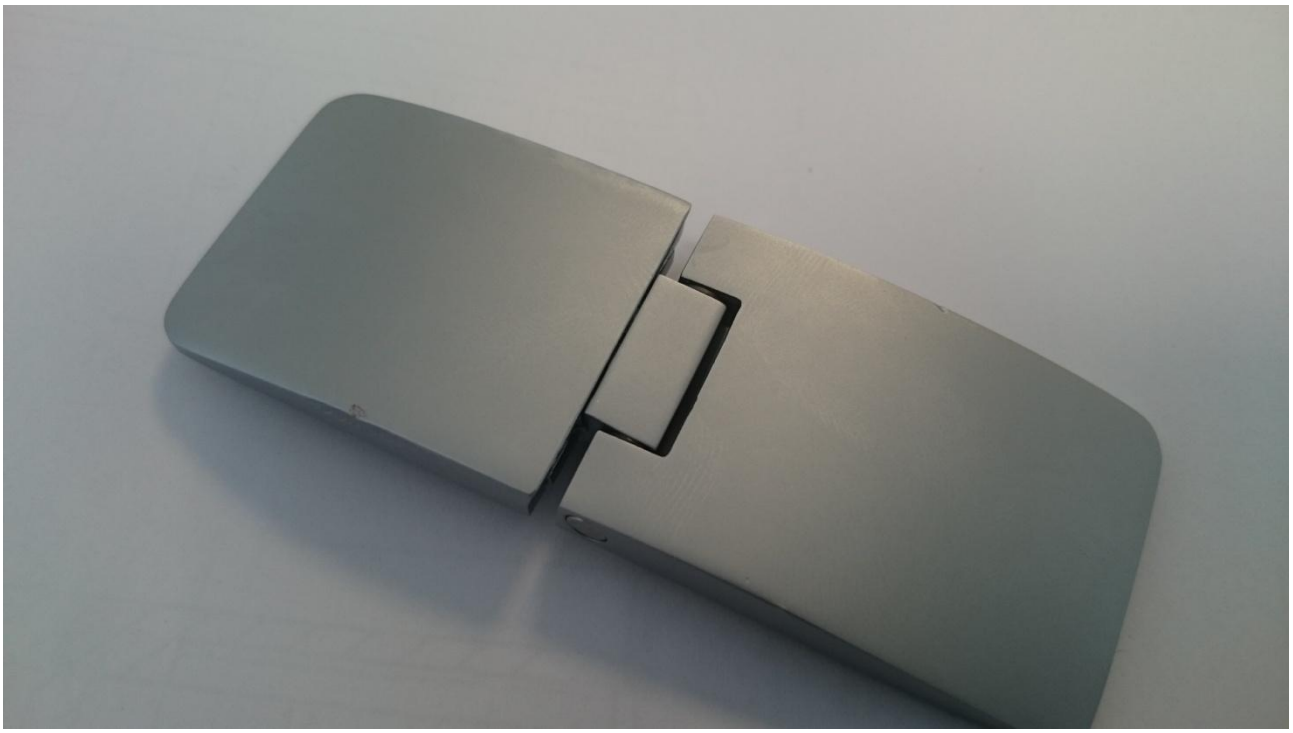


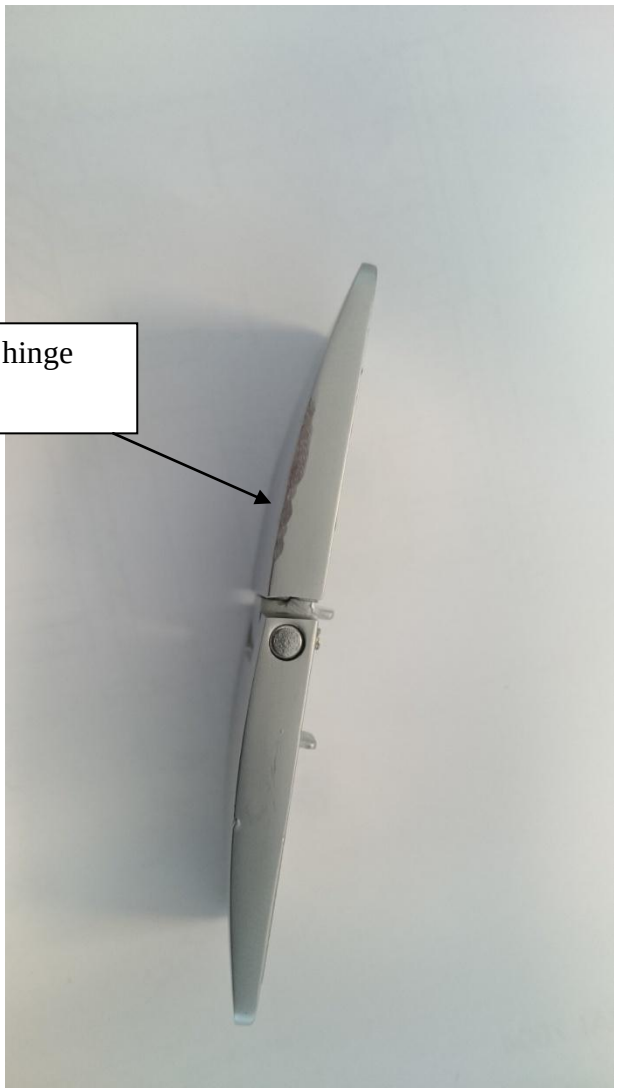
Conclusion:

After pulling with a force of 50 kg. the hinge is still intact and no deformation, noises or changes within the function of the hinge are to be detected.
The test stopped as we reached 50 kg. as this is the pull force limit.

Pictures show the hinge after the test:







Dents / marks came from removing the hinge off the glass sheet. (done by hammer)