

# Eccobond 45

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**Foreword:** The aim of those tests was to find the right deposition procedure with regards to the module glue requirements, and to test the module removability with such compound.

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**Modifications:**

**Corrections:**

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## 1. Glue applicability

The purpose of those tests was to verify the applicability of the Eccobond 45 glue, with regards to the glue deposition requirements.

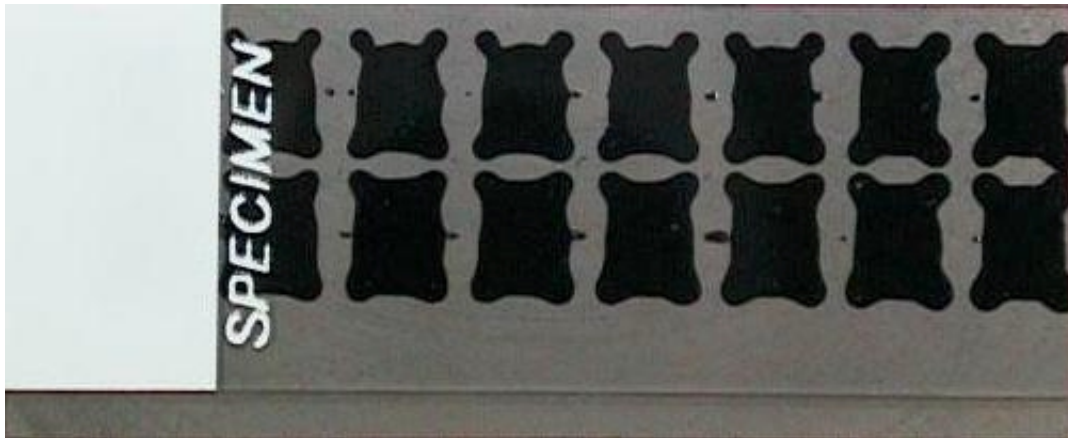
Eccobond 45 is a controlled flexible epoxy adhesive, which cures at ambient temperature. Several formulations of flexibilities are available by changing the ratio Eccobond 45 and Catalyst 15.

On the furnisher data sheet there is no reference about the glue thermal conductivity, it is not apparently its main functionality (this is at least the first data we would expect for a thermal conductive glue).

The mixing ratios retained is 100/150 (Eccobond 45 / Catalyst 15), in order to use the flexible version of this glue. During the first tests made at CPPM with this glue, the 100/100 mixing ratio was used, this version is as viscous as the CGL7018, and therefore the same deposition was successfully used. Meanwhile the 100/100 ratio remain quasi-impossible to remove on a stove.

With the 100/150 ratio, this glue is more liquid, several techniques was used in order to find the most efficient deposition (line deposition, small cross, cross).

Finally the proper deposition technique appears to be the same than for the CGL7018, the realisation conditions will be more detailed and explained bellow.



This result is satisfactory, except some variations of the glue expansion which are due to the eventual misalignment between the robot head and the set up. Meanwhile the new robot version (which should be available by June) was designed to avoid this problem.

## 2. Module removability

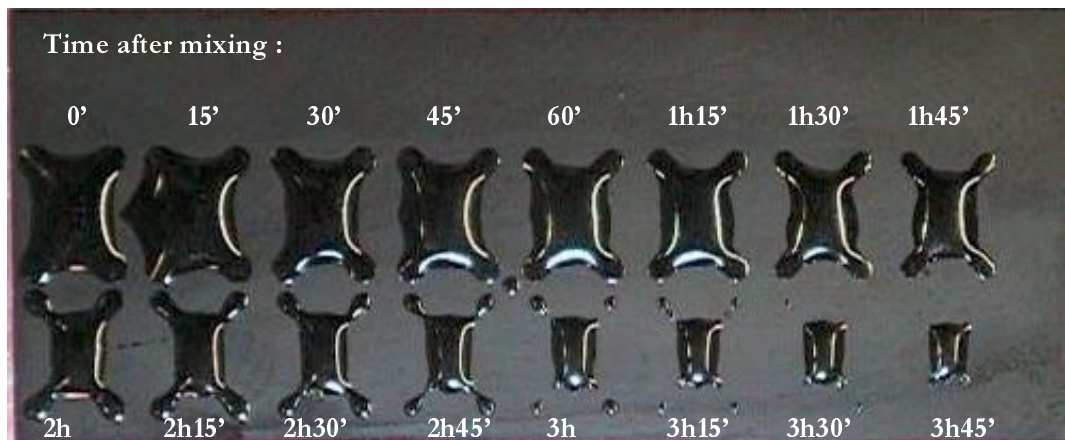
The module resolvability was tested. The results shows that with the 150/100 ratio to remove a module is possible but, as for all the other compounds, not trivial.

### 3. Potting life

The potting life at ambient temperature after mixture is 3 hours (furnisher data).

While testing different depositions techniques, it appears that the viscosity change significantly during the potting life period.

A simple test was done which consist to make one cross deposition without changing any parameters (p ressure, deposition speed, needle diameter, needle height, shape of the deposition ...) every 15'. The results obtained have shown a quasi-linear variation of the glue viscosity.



The glue deposition device which actually equips the robot is not designed to take into account an eventual variation of the viscosity with the time.

The proper cross deposition shown in the above chapter was done with a 2h old glue.

Many solutions exist to solve this problem:

- To change the actual glue dispenser (pressure dispenser) and choose a volumetric dispenser (motorized dispenser)
- To foresee a time traceability of the glue during the detector assembly

The fist solution, which seems to solve this problem for any kind of glues, involves large design modifications of the robot and an additional complexity.

The second solution does not require any changes of the tooling, but requires a safe traceability procedure during the production. We decide to work in this way in order to control its feasibility.

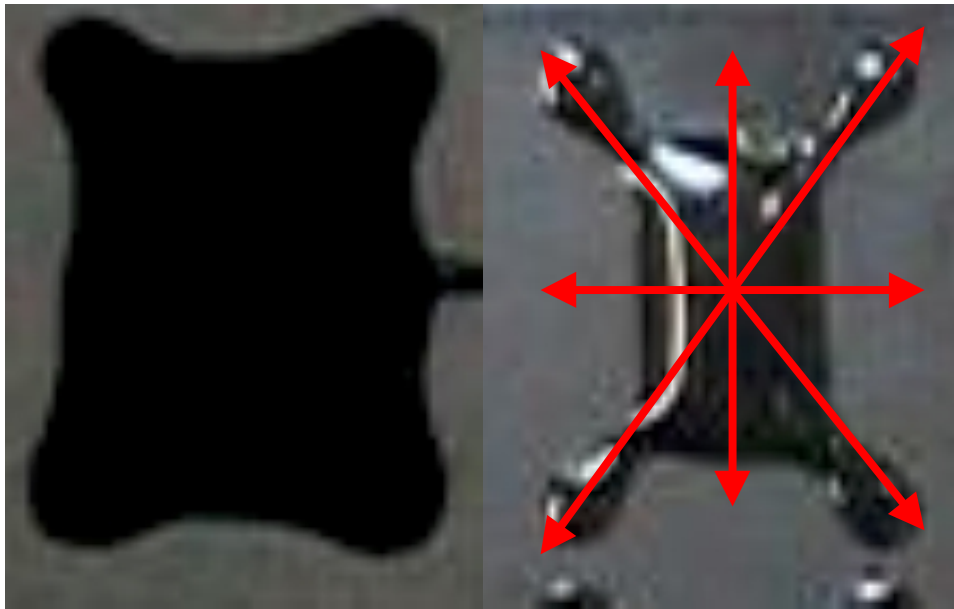
#### 4. Glue traceability

The main observation that can be done on the above picture is that the glue does not change significantly within a time period of 45'.

In our deposition case we found out that the proper characteristic of the glue was after 2h. Therefore we have a time window of 45' for the glue applicability.

An other test was done, to control if the glue storage in a freezer after the mixing, would reduce its ageing. After 64h30' in a freezer the glue remains usable. The comparison of the cross deposition with the deposition made each 15', we found out that 64h in a freezer would be equivalent to one hour of ageing at ambient temperature. This result shows that preparing the glue for one or several days of assembly is possible. We will study it more carefully to establish the storage procedure requirements.

#### 5. Why the “cross” deposition?



On those two pictures taken with a fixed camera with the same zoom and the same resolution, we can observe that the glue expansion during deposition is mainly done in vertical and horizontal directions and not in diagonal ones, as shown in the below picture which is a superposition of the two above ones.



Therefore this technique permit us to control easily the glue expansion, and to guarantee a optimal chip cool down.

## **6. Conclusion**

The applicability of the Eccobond glue is very good, with regard to the attention we have to take with its age. Compare with our experience of the CGL7018, the repeatability is also more easy to reach with eccobond than CGL.

The next test will be the stave assembly with ECCOBON, NE4445, and CGL, to perform a thermal control.