

Annex

Review of Exemption 8(i) Annex II to Directive 2000/53/EC (ELV)

Saint-Gobain Sekurit contribution to the stakeholder consultation

As requested by Öko-Institut, the Saint-Gobain Sekurit contribution to the review process shall be given by answering the questionnaire:

Is there any evidence that the lower melting points of the proposed lead-free indium-based solders would require the continuation of the exemption after 31 December 2011? If you provide test results, please explain the background of the tests, in particular how the test conditions relate to real life conditions.

Glass manufacturers validate new products always against specifications defined by car manufacturers, and very often these specifications are based on accelerated ageing tests. According to our understanding such tests are always developed by car manufacturers in such a way that their results are relevant and representative for real life behavior.

Based on the discussions with car manufacturers and ACEA, Saint-Gobain Sekurit believes today that for the validation of glazing with lead-free solders the following specifications will be decisive whether or not new products can be accepted by a majority of car manufacturers:

Test Description	Specification
Temperature cycling test according to DIN EN ISO 16750-4-H section 5.3.1.2	-40°C to +105°C, Humidity not controlled (dry), Electrical current loading with 14V(+/- 0.2) starting at end of low temperature phase - 60 cycles (20 days)
Heat soak test according to DIN EN ISO 16750-4-K section 5.1.2.2	Glass at 105°C Electrical current loading with 14V(+/- 0.2) throughout the test. 6N mechanical load to soldering joints during heat storage. 96 hours
High temperature storage test	Temperature: 120°C; No mechanical load and no electrical load during the test. 24 hours
Long term test without mechanical load	Glass at 105°C, Electrical current loading with 14V(+/- 0.2) throughout the test, no mechanical load on connector. 500 hours
Heat shock test (water splash) according to DIN EN ISO 16750-4-H. Splash water following section 5.4.2	Heat glass to 105°C and keep at this temperature for 1 hour Remove from oven and within 20 seconds pour 3 litres of water at 23 +/- 5°C onto the outside face (not on the connectors).
High Humidity test: constant climate following DIN EN ISO 6270-2-CH	Storage at: 80°C, 96 - 100% RH, After 10 hours, 14V applied for 15 minutes (chamber 85°C) then switched off, applied again after 24 hours and repeated until the end of the test. No mechanical load on connectors, no voltage applied. 500 hours.
Glass washing liquid test	Immersion in washing liquid consisting of 89,5 %vol% water 20 %vol% ethanol 10 %vol% isopropanol 0.09 Weight % sodium lauryl sulphate 0.5 weight % ethylene glycol
Salt Spray Test according to DIN EN ISO 9227 (ISO 50021)	5% salt solution, 35°C. No voltage applied, no mechanical load applied. 96 hours

Tests according to these specs that were conducted with In-based alternatives since the last review have provided negative results. Consequently we must conclude that no In-based solution is known.

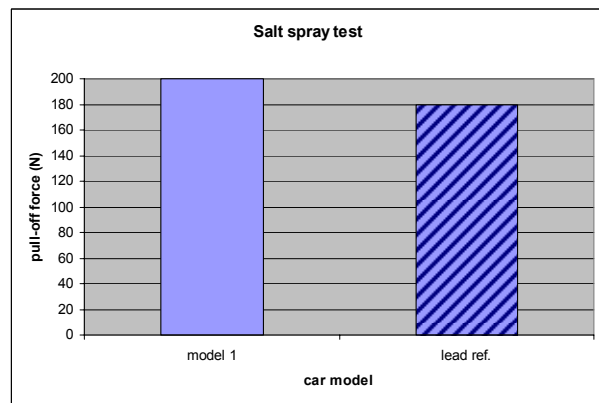
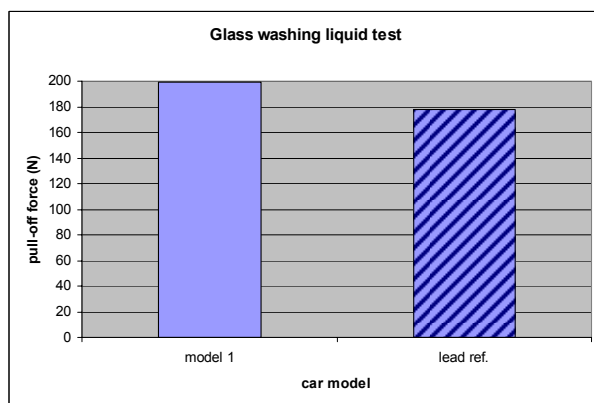
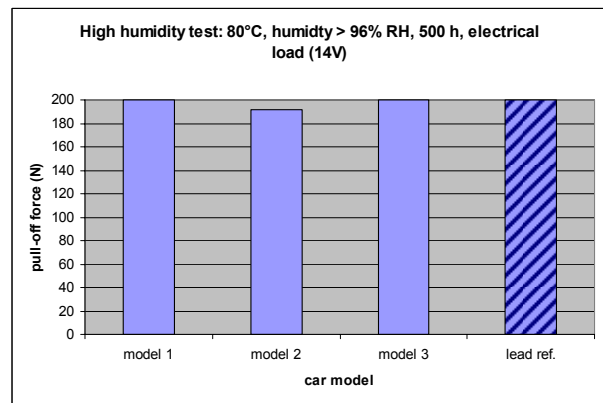
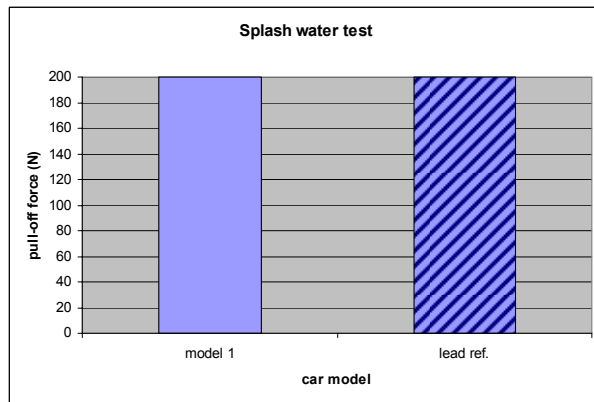
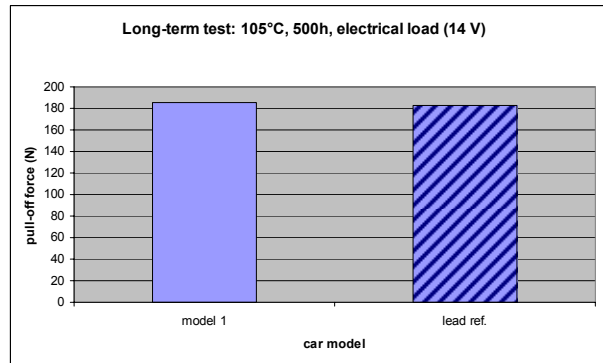
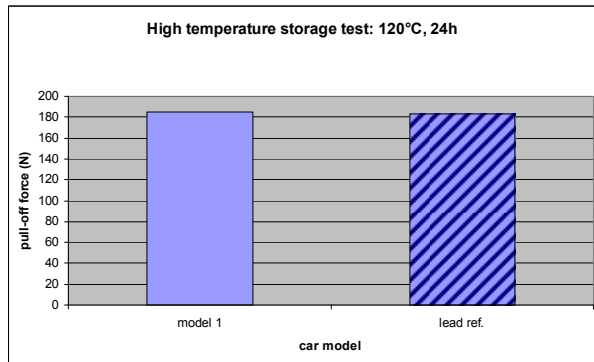
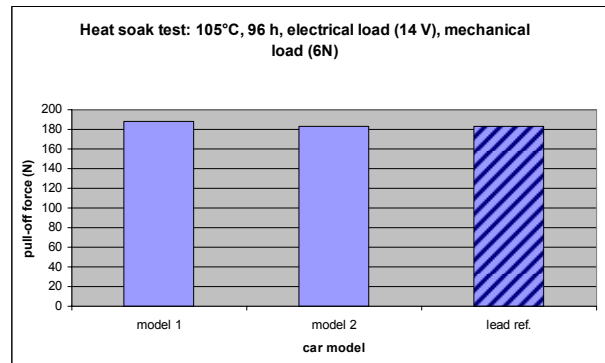
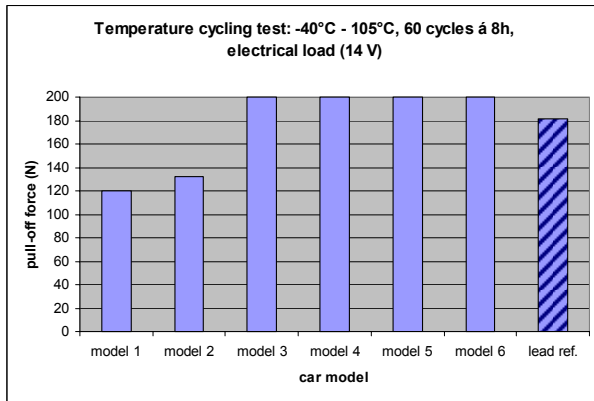
Is there any evidence that the use of lead-containing solders is unavoidable for other reasons than the low melting point of the indium-based lead-free solders?

We do not believe that in the mid-term the use of lead-containing solders is unavoidable. However, due to the negative results explained above, Saint-Gobain Sekurit has decided to pursue development of non-In-based alternatives. This seemed the more promising route to develop solutions meeting the car manufacturers' specifications.

For the first solution, the so-called "flexible bridge connector" (cf. picture), this development has been finalized successfully. We can state that a variety of glazing models have been manufactured with this technology, and in all cases the test requirements mentioned above are passed.



The following test results have been obtained with the "flexible bridge" connector. Requirement is in every case that after the test the pull-off force must be equal or superior to 50N for heating grid connectors and equal or superior to 10N for antenna connector. A bar reaching up to 200N in the graphs actually means that the pull-off force was greater than 200N. All eight tests defined in the table above have been passed successfully.



The next step in our development for this product is now industrialization in our manufacturing plants.

In parallel to this industrialization of the “flexible connector”, we continue to develop other connector geometries (rigid bridge, small antenna bridge, multipole) often employed by the car manufacturers. Based on the current experience we are confident that this development can be finalized successfully. First test results for these solutions can be made available beginning 2012, and prototypes for car manufacturer evaluation mid 2012 (cf. roadmap below). If car manufacturers should consider that further connector geometries are absolutely required, Saint-Gobain Sekurit is ready to evaluate them in the 2nd development phase.

Which applications covered by exemption 8i require the continued use of lead-containing solders?

Once the solutions developed by Saint-Gobain Sekurit have been industrialized and validated by the car manufacturers, there is in our understanding no reason to continue the use of lead-containing solders.

If applicable, please provide an alternative wording of exemption 8i and/or a new date for the expiry of the exemption.

Saint-Gobain Sekurit can only take responsibility for the development and the validation of solutions according to car manufacturer specifications. For the corresponding part of the full vehicle development cycle, our roadmap is as follows:

Flexible connector	Lab development of product and process	finalized
	Availability of prototype parts for car manufacturer testing	Since July 2011
	Industrialization	September 2011 - December 2012

Rigid heating connector	Lab development of product and process	Until June 2012
Small bridge for antenna	Availability of prototype parts for car manufacturer testing	From July 2012 on
Multipole for antenna	Industrialization	July 2012 - December 2013

The resultant development time for the full vehicle should be discussed directly between European Commission and car manufacturers, since Saint-Gobain Sekurit is not fully aware of the car manufacturer's time scale for vehicle integration.