

## 6.1 Abrasion resistance test

For this purpose the following tests are going to be considered:

Either Taber Test or as an equivalent the package of Sand Drop Test, Car Wash Test and Wiper Test

Note: The Wiper Test is on development and is planned to be finished in 2014.

### 6.1.1 Taber Test

6.1.1.1 former 6.1.1

6.1.1.2 former 6.1.2

6.1.1.3 former 6.1.3

6.1.1.4 former 6.1.4

### 6.1.2 Sand Drop Test

Indices of difficulty and test method

6.1.2.1 A sand drop equipment as described in ECE-R22 Annex 10, Figure 1 is used. Three kilograms of natural quartz (silica) sand of grain size 0,5/0,7mm are used up to ten times. The samples are mounted on a turntable which is inclined 45° to the vertical direction and rotates with 250±10 rpm. The sand drops vertically through a gravity tube with a drop height of 1650 mm onto the sample

The group agreed to C/P the text of paragraph 7.8.3.1. of UN R22 with some modification:

Par. 7.8.3.1 with following modifications:

Par. 7.8.3.1.1: Test pieces: Three flat pieces 50mm x 50mm of each type.

Par. 7.8.3.1.2: Conditioning of the test pieces: (23+-2) Deg C and (50+-5) % rH for minimum 48 hours.

Par. 7.8.3.1.3.2: Instead of luminous transmittance and light diffusion, the initial haze shall be measured according to ECE-R43, Annex 3, Par. 4.4.3 (using a hazemeter according to ECE-R43, Annex 3, Pars. 4.1.3 to 4.1.5).

Par. 7.8.3.1.3.5: Instead of the light diffusion, the haze after abrasion shall be measured using a hazemeter according to ECE-R43 (as above).

6.1.2.2 Three ~~flat or curved~~ square test pieces, taken from the flattest part of the windshield included within zone A, of 50 mm for each type of surface shall be conditioned to (23±2)°C, (50±5)% rH for 48 hours and subjected to testing at ambient temperature

**Commentaire [OF1]:** Agreed in principle, following the definition of current R43, in order to avoid a differential of sand drop angle. "taking it from the flattest part of the windshield including zone A".

6.1.2.3 Initial haze and haze after abrasion shall be measured concerning Annex 3, paragraph 4

#### 6.1.2.4 Interpretation of results

The safety glass pane shall be considered satisfactory if **the initial haze, measured according to Annex 3, paragraph 4, does not exceed 1%, and, with respect to abrasion resistance, the increase of haze as a result of abrasion of the test piece does not exceed 5%.**

6.1.2.5 A set of samples for approval shall be considered satisfactory if all samples meet the requirements

#### 6.1.3 Car Wash Test

**Commentaire [OF2]:** Description of the apparatus from doc IGPG-03-02

##### 6.1.3.1 Indices of difficulty and test method

A car wash equipment as described in ISO 20566 is used. The samples are fixed with the outside surface up onto a supporting plate by using a double-faced adhesive tape. Carry out **10 washing operations (10 double passes)** using the to-and-fro pattern of movement. Rinse the wash test sample and clean it with a suitable solvent (isopropyl alcohol) and dry it off for 30 min.

**Commentaire [OF3]:** Reason for only 10 cycles: The number of cycles seems not that important, rather the nature and quantity of abrasive sand. If we were to decide to change this value, the group would have to conduct an additional round robin test.

6.1.3.2 Three flat or curved samples **taken from the flattest part of the windshield included within zone A**, of size 50 mm x 100 mm shall be conditioned to  $(23\pm 2)^{\circ}\text{C}$ ,  $(50\pm 5)\%$  rH for the least **24 48** hours and subjected to testing at ambient temperature

6.1.3.3 Initial haze and haze after abrasion shall be measured concerning Annex 3 paragraph 4

##### 6.1.3.4 Interpretation of results

The safety glass pane shall be considered satisfactory if **the initial haze, measured according to Annex 3, paragraph 4, does not exceed 1%, and with respect to abrasion resistance if the increase of haze as a result of abrasion of the test piece does not exceed 2%**

6.1.3.5 A set of samples for approval shall be considered satisfactory if all samples meet the requirements