

## **TEST REPORT N°2012B VEC 16453-2**

Including 13 pages + 1 annex  
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Mons, November 30<sup>th</sup>, 2012

**REQUESTED BY :** **AGC Glass Europe - R&D Centre**  
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B-6040 Jumet  
Belgium

**REFERENCE OF THE REQUEST :** PO 450365340

**CONCERNED MANUFACTURER :** **AGC GLASS EUROPE**  
Chaussée de la Hulpe, 166  
1170 BRUXELLES  
BELGIUM


**NUMBER OF SAMPLES AND IDENTIFICATION :** **SMART-50 + DC 993**

**PURPOSE OF THE REQUESTED :** Tests according to EOTA – ETAG 002  
Mechanical Performances \*

**SAMPLES RECEIVED ON :** 14/08/2012

**TESTING DATE :** From 12/09/2012

**REMARKS :** \* Test under BELAC accreditation

 Notified body (Id.N°1174)  
**according to ART.18 of the « Construction Products Directive » CPD  
89/106/EEC**

**TECHNICAL REPORT**  
**ADHESION PERFORMANCES ACCORDING TO ETAG 002**  
**GUIDELINE**

**SAMPLES**

Samples were prepared by Dow Corning Belgium on 06/07/2012 (see annex 1)

**SMART-50 Tempered + DC-993 + SMART-50**

Batch A/B : N204051205/0006928019

Number of samples prepared : 90

**RESULTS**

The tests were conducted in compliance with the methods described in the "Guideline for European Technical Approval for Structural Sealant Glazing System (SSGS)" ETAG n° 002.

**Définitions :**

$K_x$  = Stiffness of the sample at x% elongation in the initial state

$K_{x,c}$  = Stiffness of the sample at x% elongation after conditioning  
 $= 100 \cdot \sigma_x / x$

$R_{u,5}$  = the characteristic breaking stress giving 75% confidence that 95% of the test result will be higher than this value  
 $= X_{mean} - \tau_{\alpha\beta} \cdot S$

S = standard deviation of the serie under consideration

$X_{mean,n}$  = the average breaking stress, either under tension or shear in the initial state

$X_{mean,c}$  = the average breaking stress, either under tension or shear after conditioning

$\Delta X_{mean} = X_{mean,c} / X_{mean,n}$

**Mechanical performances**

**5.1.4.1. INITIAL TESTS – INITIAL MECHANICAL STRENGTH**

**5.1.4.1.1. TENSION – RUPTURE\***

*a) Results for 10 samples conditioned at +23°C*

Sample number	Section (mm <sup>2</sup> )	Limited to 5% stretch. (N/mm <sup>2</sup> )	Limited to 10 % stretch. (N/mm <sup>2</sup> )	Limited to 15% stretch. (N/mm <sup>2</sup> )	Limited to 20% stretch. (N/mm <sup>2</sup> )	Limited to 25% stretch. (N/mm <sup>2</sup> )	Limit of breakage (N/mm <sup>2</sup> )	Stretch on breaking (%)	Type of breakage (*)
1	606	0.13	0.28	0.38	0.46	0.53	1.09	77	100C
2	608	0.12	0.27	0.36	0.44	0.51	1.11	80	100C
3	601	0.13	0.27	0.37	0.45	0.52	1.01	70	100C
4	594	0.17	0.31	0.40	0.48	0.55	1.07	73	100C
5	626	0.15	0.29	0.38	0.46	0.52	0.81	55	100C
6	618	0.14	0.28	0.38	0.46	0.53	0.96	66	100C
7	600	0.15	0.28	0.38	0.46	0.53	0.96	65	100C
8	586	0.14	0.30	0.40	0.48	0.55	1.07	72	100C
9	598	0.11	0.27	0.38	0.46	0.53	0.85	54	100C
10	597	0.16	0.30	0.40	0.48	0.55	0.92	59	100C
<b>Average</b>	<b>603</b>	<b>0.14</b>	<b>0.29</b>	<b>0.38</b>	<b>0.46</b>	<b>0.53</b>	<b>0.99</b>	<b>67</b>	
<b>Standard deviation</b>	<b>11</b>	<b>0.02</b>	<b>0.01</b>	<b>0.01</b>	<b>0.01</b>	<b>0.01</b>	<b>0.10</b>	<b>9</b>	
Minimum	586	0.11	0.27	0.36	0.44	0.51	0.81	54	
Maximum	626	0.17	0.31	0.40	0.48	0.55	1.11	80	

(\*) xC: x% cohesive

**Ru,5 = 0.78**

*b) Results for 5 samples conditioned at -20°C*

Sample number	Section (mm <sup>2</sup> )	Limited to 5% stretch. (N/mm <sup>2</sup> )	Limited to 10 % stretch. (N/mm <sup>2</sup> )	Limited to 15% stretch. (N/mm <sup>2</sup> )	Limited to 20% stretch. (N/mm <sup>2</sup> )	Limited to 25% stretch. (N/mm <sup>2</sup> )	Limit of breakage (N/mm <sup>2</sup> )	Stretch on breaking (%)	Type of breakage (*)
1	593	0.17	0.31	0.41	0.48	0.55	1.31	96	100C
2	604	0.16	0.28	0.39	0.47	0.54	1.05	76	100C
3	581	0.24	0.35	0.44	0.51	0.57	0.82	55	100C
4	594	0.22	0.34	0.42	0.49	0.56	1.21	85	100C
5	591	0.21	0.34	0.43	0.50	0.56	1.13	77	100C
<b>Average</b>	<b>593</b>	<b>0.20</b>	<b>0.32</b>	<b>0.42</b>	<b>0.49</b>	<b>0.56</b>	<b>1.10</b>	<b>78</b>	
<b>Standard deviation</b>	<b>9</b>	<b>0.03</b>	<b>0.03</b>	<b>0.02</b>	<b>0.02</b>	<b>0.01</b>	<b>0.19</b>	<b>15</b>	
Minimum	581	0.16	0.28	0.39	0.47	0.54	0.82	55	
Maximum	604	0.24	0.35	0.44	0.51	0.57	1.31	96	

(\*) xC: x% cohesive

$$R_{u,5} = 0.63$$

$$\Delta X_{\text{mean}} = 1.11$$

*c) Results for 5 samples conditioned at +80°C*

Sample number	Section (mm <sup>2</sup> )	Limited to 5% stretch. (N/mm <sup>2</sup> )	Limited to 10 % stretch. (N/mm <sup>2</sup> )	Limited to 15% stretch. (N/mm <sup>2</sup> )	Limited to 20% stretch. (N/mm <sup>2</sup> )	Limited to 25% stretch. (N/mm <sup>2</sup> )	Limit of breakage (N/mm <sup>2</sup> )	Stretch on breaking (%)	Type of breakage (*)
1	584	0.13	0.29	0.40	0.49	0.57	0.84	46	100C
2	603	0.14	0.30	0.41	0.50	0.57	0.88	50	100C
3	588	0.14	0.29	0.40	0.50	0.58	0.96	54	100C
4	592	0.15	0.31	0.42	0.51	0.58	0.88	48	100C
5	596	0.15	0.29	0.40	0.48	0.56	0.92	53	100C
<b>Average</b>	<b>592</b>	<b>0.14</b>	<b>0.30</b>	<b>0.41</b>	<b>0.50</b>	<b>0.57</b>	<b>0.90</b>	<b>50</b>	
<b>Standard deviation</b>	<b>7</b>	<b>0.01</b>	<b>0.01</b>	<b>0.01</b>	<b>0.01</b>	<b>0.01</b>	<b>0.05</b>	<b>3</b>	
Minimum	584	0.13	0.29	0.40	0.48	0.56	0.84	46	
Maximum	603	0.15	0.31	0.42	0.51	0.58	0.96	54	

(\*) xC: x% cohesive

$$R_{u,5} = 0.78$$

$$\Delta X_{\text{mean}} = 0.91$$

### 5.1.4.1.2. SHEAR – RUPTURE\*

a) Results for 10 samples conditioned at +23°C

Sample number	Section (mm <sup>2</sup> )	Limited to 5% stretch. (N/mm <sup>2</sup> )	Limited to 10 % stretch. (N/mm <sup>2</sup> )	Limited to 15% stretch. (N/mm <sup>2</sup> )	Limited to 20% stretch. (N/mm <sup>2</sup> )	Limited to 25% stretch. (N/mm <sup>2</sup> )	Limit of breakage (N/mm <sup>2</sup> )	Stretch on breaking (%)	Type of breakage (*)
1	608	0.02	0.04	0.08	0.10	0.13	0.98	179	100C
2	602	0.02	0.07	0.10	0.13	0.16	0.65	146	100C
3	591	0.03	0.07	0.10	0.13	0.15	0.66	129	100C
4	598	0.02	0.06	0.09	0.12	0.15	0.82	167	100C
5	590	0.03	0.08	0.11	0.14	0.16	0.84	148	100C
6	604	0.03	0.06	0.09	0.11	0.14	0.61	127	100C
7	592	0.03	0.08	0.11	0.14	0.17	0.73	131	100C
8	599	0.03	0.08	0.11	0.14	0.17	0.69	133	100C
9	622	0.01	0.04	0.06	0.10	0.13	0.68	140	100C
10	594	0.03	0.07	0.11	0.14	0.17	0.87	149	100C
<b>Average</b>	<b>600</b>	<b>0.03</b>	<b>0.07</b>	<b>0.10</b>	<b>0.13</b>	<b>0.15</b>	<b>0.75</b>	<b>145</b>	
<b>Standard deviation</b>	<b>10</b>	<b>0.01</b>	<b>0.02</b>	<b>0.02</b>	<b>0.02</b>	<b>0.02</b>	<b>0.12</b>	<b>17</b>	
Minimum	590	0.01	0.04	0.06	0.10	0.13	0.61	127	
Maximum	622	0.03	0.08	0.11	0.14	0.17	0.98	179	

(\*) xC: x% cohesive

**Ru,5 = 0.50**

*b) Results for 5 samples conditioned at -20°C*

Sample number	Section (mm <sup>2</sup> )	Limited to 5% stretch. (N/mm <sup>2</sup> )	Limited to 10 % stretch. (N/mm <sup>2</sup> )	Limited to 15% stretch. (N/mm <sup>2</sup> )	Limited to 20% stretch. (N/mm <sup>2</sup> )	Limited to 25% stretch. (N/mm <sup>2</sup> )	Limit of breakage (N/mm <sup>2</sup> )	Stretch on breaking (%)	Type of breakage (*)
1	610	0.03	0.09	0.12	0.15	0.18	1.02	190	100C
2	606	0.02	0.07	0.11	0.14	0.17	0.82	173	100C
3	604	0.03	0.08	0.12	0.15	0.18	0.85	160	100C
4	616	0.04	0.09	0.12	0.15	0.17	0.80	148	100C
5	585	0.04	0.08	0.12	0.15	0.18	1.03	193	100C
<b>Average</b>	<b>604</b>	<b>0.03</b>	<b>0.08</b>	<b>0.12</b>	<b>0.15</b>	<b>0.18</b>	<b>0.90</b>	<b>173</b>	
<b>Standard deviation</b>	<b>12</b>	<b>0.01</b>	<b>0.01</b>	<b>0.00</b>	<b>0.00</b>	<b>0.01</b>	<b>0.11</b>	<b>19</b>	
Minimum	585	0.02	0.07	0.11	0.14	0.17	0.80	148	
Maximum	616	0.04	0.09	0.12	0.15	0.18	1.03	193	

(\*) xC: x% cohesive

$$R_{u,5} = 0.63$$

$$\Delta X_{\text{mean}} = 1.20$$

*c) Results for 5 samples conditioned at +80°C*

Sample number	Section (mm <sup>2</sup> )	Limited to 5% stretch. (N/mm <sup>2</sup> )	Limited to 10 % stretch. (N/mm <sup>2</sup> )	Limited to 15% stretch. (N/mm <sup>2</sup> )	Limited to 20% stretch. (N/mm <sup>2</sup> )	Limited to 25% stretch. (N/mm <sup>2</sup> )	Limit of breakage (N/mm <sup>2</sup> )	Stretch on breaking (%)	Type of breakage (*)
1	565	0.04	0.08	0.12	0.16	0.19	0.72	110	100C
2	589	0.02	0.04	0.06	0.09	0.12	0.54	118	100C
3	598	0.02	0.04	0.07	0.11	0.14	0.49	93	100C
4	589	0.03	0.08	0.11	0.14	0.17	0.57	101	100C
5	584	0.03	0.07	0.11	0.14	0.17	0.60	125	100C
<b>Average</b>	<b>585</b>	<b>0.03</b>	<b>0.06</b>	<b>0.09</b>	<b>0.13</b>	<b>0.16</b>	<b>0.58</b>	<b>109</b>	
<b>Standard deviation</b>	<b>12</b>	<b>0.01</b>	<b>0.02</b>	<b>0.03</b>	<b>0.03</b>	<b>0.03</b>	<b>0.09</b>	<b>13</b>	
Minimum	565	0.02	0.04	0.06	0.09	0.12	0.49	93	
Maximum	598	0.04	0.08	0.12	0.16	0.19	0.72	125	

(\*) xC: x% cohesive

$$R_{u,5} = 0.36$$

$$\Delta X_{\text{mean}} = 0.77$$

#### 5.1.4.2. RESIDUAL MECHANICAL STRENGTH AFTER ARTIFICIAL AGEING

##### 5.1.4.2.1 IMMERSION IN WATER AT HIGH TEMPERATURE WITH SOLAR RADIATION\*

a) *Conditioning :*

- Duration : 2 x 21 days
- Water temperature : 45.0°C ± 0.5°C
- Conductivity of the water : 2.8 µs

b) *Results of the traction test after the artificial ageing :*

#### SMART-50 T UV exposed

*After 21 days :*

Sample number	Section (mm <sup>2</sup> )	Limited to 5% stretch. (N/mm <sup>2</sup> )	Limited to 10 % stretch. (N/mm <sup>2</sup> )	Limited to 15% stretch. (N/mm <sup>2</sup> )	Limited to 20% stretch. (N/mm <sup>2</sup> )	Limited to 25% stretch. (N/mm <sup>2</sup> )	Limit of breakage (N/mm <sup>2</sup> )	Stretch on breaking (%)	Type of breakage (*)
1	616	0.11	0.24	0.32	0.38	0.44	0.97	85	100C
2	585	0.17	0.29	0.36	0.42	0.47	1.07	90	100C
3	601	0.10	0.23	0.31	0.38	0.43	1.04	93	100C
4	609	0.11	0.24	0.32	0.39	0.44	1.06	93	100C
5	593	0.15	0.27	0.35	0.41	0.46	1.13	97	100C
<b>Average</b>	<b>601</b>	<b>0.13</b>	<b>0.25</b>	<b>0.33</b>	<b>0.40</b>	<b>0.45</b>	<b>1.05</b>	<b>92</b>	
<b>Standard deviation</b>	<b>12</b>	<b>0.03</b>	<b>0.03</b>	<b>0.02</b>	<b>0.02</b>	<b>0.02</b>	<b>0.06</b>	<b>4</b>	
Minimum	585	0.10	0.23	0.31	0.38	0.43	0.97	85	
Maximum	616	0.17	0.29	0.36	0.42	0.47	1.13	97	

(\*) xC: x% cohesive

$$\Delta X_{\text{mean}} = 1.06$$

*After 42 days :*

Sample number	Section (mm <sup>2</sup> )	Limited to 5% stretch. (N/mm <sup>2</sup> )	Limited to 10 % stretch. (N/mm <sup>2</sup> )	Limited to 15% stretch. (N/mm <sup>2</sup> )	Limited to 20% stretch. (N/mm <sup>2</sup> )	Limited to 25% stretch. (N/mm <sup>2</sup> )	Limit of breakage (N/mm <sup>2</sup> )	Stretch on breaking (%)	Type of breakage (*)
1	598	0.13	0.22	0.29	0.34	0.39	1.06	124	100C
2	589	0.13	0.22	0.29	0.34	0.39	1.04	122	100C
3	593	0.12	0.21	0.28	0.33	0.38	0.99	186	100C
4	616	0.13	0.22	0.28	0.33	0.38	0.97	133	100C
5	592	0.13	0.23	0.29	0.35	0.40	1.05	177	100C
<b>Average</b>	<b>598</b>	<b>0.13</b>	<b>0.22</b>	<b>0.29</b>	<b>0.34</b>	<b>0.39</b>	<b>1.02</b>	<b>148</b>	
<b>Standard deviation</b>	<b>11</b>	<b>0.00</b>	<b>0.01</b>	<b>0.01</b>	<b>0.01</b>	<b>0.01</b>	<b>0.04</b>	<b>31</b>	
Minimum	589	0.12	0.21	0.28	0.33	0.38	0.97	122	
Maximum	616	0.13	0.23	0.29	0.35	0.40	1.06	186	

(\*) xC: x% cohesive

$$\Delta X_{\text{mean}} = 1.03$$

### SMART-50 UV exposed

*After 21 days :*

Sample number	Section (mm <sup>2</sup> )	Limited to 5% stretch. (N/mm <sup>2</sup> )	Limited to 10 % stretch. (N/mm <sup>2</sup> )	Limited to 15% stretch. (N/mm <sup>2</sup> )	Limited to 20% stretch. (N/mm <sup>2</sup> )	Limited to 25% stretch. (N/mm <sup>2</sup> )	Limit of breakage (N/mm <sup>2</sup> )	Stretch on breaking (%)	Type of breakage (*)
1	595	0.15	0.27	0.35	0.41	0.47	1.09	94	100C
2	603	0.15	0.27	0.35	0.41	0.47	1.11	93	100C
3	601	0.16	0.27	0.35	0.41	0.47	1.09	92	100C
4	597	0.15	0.27	0.34	0.40	0.46	0.93	80	100C
5	605	0.13	0.24	0.31	0.37	0.43	1.10	103	100C
<b>Average</b>	<b>600</b>	<b>0.15</b>	<b>0.26</b>	<b>0.34</b>	<b>0.40</b>	<b>0.46</b>	<b>1.06</b>	<b>92</b>	
<b>Standard deviation</b>	<b>4</b>	<b>0.01</b>	<b>0.01</b>	<b>0.02</b>	<b>0.02</b>	<b>0.02</b>	<b>0.08</b>	<b>8</b>	
Minimum	595	0.13	0.24	0.31	0.37	0.43	0.93	80	
Maximum	605	0.16	0.27	0.35	0.41	0.47	1.11	103	

(\*) xC: x% cohesive

$$\Delta X_{\text{mean}} = 1.07$$



After 42 days :

Sample number	Section (mm <sup>2</sup> )	Limited to 5% stretch. (N/mm <sup>2</sup> )	Limited to 10 % stretch. (N/mm <sup>2</sup> )	Limited to 15% stretch. (N/mm <sup>2</sup> )	Limited to 20% stretch. (N/mm <sup>2</sup> )	Limited to 25% stretch. (N/mm <sup>2</sup> )	Limit of breakage (N/mm <sup>2</sup> )	Stretch on breaking (%)	Type of breakage (*)
1	597	0.12	0.22	0.28	0.34	0.39	0.96	118	100C
2	588	0.14	0.22	0.28	0.34	0.38	1.02	175	100C
3	598	0.13	0.23	0.29	0.35	0.40	1.04	166	100C
4	641	0.13	0.21	0.27	0.33	0.37	0.97	188	100C
5	601	0.13	0.22	0.28	0.33	0.38	1.04	204	100C
<b>Average</b>	<b>605</b>	<b>0.13</b>	<b>0.22</b>	<b>0.28</b>	<b>0.34</b>	<b>0.38</b>	<b>1.01</b>	<b>170</b>	
<b>Standard deviation</b>	<b>21</b>	<b>0.01</b>	<b>0.01</b>	<b>0.01</b>	<b>0.01</b>	<b>0.01</b>	<b>0.04</b>	<b>32</b>	
Minimum	588	0.12	0.21	0.27	0.33	0.37	0.96	118	
Maximum	641	0.14	0.23	0.29	0.35	0.40	1.04	204	

(\*) xC: x% cohesive

$$\Delta X_{\text{mean}} = 1.02$$

**5.1.4.2.2 HUMIDITY AND NaCl ATMOSPHERE\***

*a) Conditioning :*

- Duration : 480 hours
- NaCl concentration : 48.9 g/l
- pH : 6.6

*b) Results of the traction test after the artificial ageing :*

Sample number	Section (mm <sup>2</sup> )	Limited to 5% stretch. (N/mm <sup>2</sup> )	Limited to 10 % stretch. (N/mm <sup>2</sup> )	Limited to 15% stretch. (N/mm <sup>2</sup> )	Limited to 20% stretch. (N/mm <sup>2</sup> )	Limited to 25% stretch. (N/mm <sup>2</sup> )	Limit of breakage (N/mm <sup>2</sup> )	Stretch on breaking (%)	Type of breakage (*)
1	614	0.17	0.27	0.34	0.40	0.46	0.92	79	100C
2	628	0.17	0.27	0.34	0.41	0.46	0.98	89	100C
3	606	0.14	0.25	0.33	0.40	0.46	1.06	102	100C
4	588	0.17	0.27	0.35	0.41	0.47	0.87	78	100C
5	594	0.17	0.27	0.35	0.41	0.47	0.89	74	100C
6	632	0.16	0.26	0.34	0.40	0.46	1.00	91	100C
7	609	0.16	0.25	0.33	0.39	0.45	1.01	90	100C
8	592	0.16	0.26	0.33	0.40	0.46	1.05	95	100C
9	601	0.16	0.26	0.33	0.40	0.45	0.93	89	100C
10	622	0.17	0.26	0.34	0.40	0.45	0.99	89	100C
<b>Average</b>	<b>609</b>	<b>0.16</b>	<b>0.26</b>	<b>0.34</b>	<b>0.40</b>	<b>0.46</b>	<b>0.97</b>	<b>87</b>	
<b>Standard deviation</b>	<b>15</b>	<b>0.01</b>	<b>0.01</b>	<b>0.01</b>	<b>0.01</b>	<b>0.01</b>	<b>0.06</b>	<b>8</b>	
Minimum	588	0.14	0.25	0.33	0.39	0.45	0.87	74	
Maximum	632	0.17	0.27	0.35	0.41	0.47	1.06	102	

(\*) xC: x% cohesive

$$\Delta X_{\text{mean}} = 0.98$$

### 5.1.4.2.3 HUMIDITY AND SO<sub>2</sub> ATMOSPHERE\*

a) Conditioning :

- Duration : 20 cycles
- 0.2l SO<sub>2</sub>

b) Results of the traction test after the artificial ageing

Sample number	Section (mm <sup>2</sup> )	Limited to 5% stretch. (N/mm <sup>2</sup> )	Limited to 10 % stretch. (N/mm <sup>2</sup> )	Limited to 15% stretch. (N/mm <sup>2</sup> )	Limited to 20% stretch. (N/mm <sup>2</sup> )	Limited to 25% stretch. (N/mm <sup>2</sup> )	Limit of breakage (N/mm <sup>2</sup> )	Stretch on breaking (%)	Type of breakage (*)
1	611	0.18	0.30	0.38	0.45	0.51	1.01	77	100C
2	635	0.18	0.30	0.38	0.45	0.51	0.96	73	100C
3	604	0.16	0.28	0.37	0.44	0.50	1.16	95	100C
4	586	0.16	0.29	0.38	0.45	0.51	1.07	81	100C
5	591	0.17	0.29	0.38	0.45	0.51	0.84	61	100C
6	601	0.15	0.27	0.35	0.42	0.49	1.09	86	100C
7	596	0.14	0.28	0.37	0.44	0.51	1.12	87	100C
8	595	0.17	0.29	0.37	0.44	0.50	0.94	67	100C
9	594	0.19	0.30	0.39	0.46	0.52	0.90	65	100C
10	591	0.19	0.31	0.39	0.46	0.53	1.04	77	100C
<b>Average</b>	<b>600</b>	<b>0.17</b>	<b>0.29</b>	<b>0.38</b>	<b>0.45</b>	<b>0.51</b>	<b>1.01</b>	<b>77</b>	
<b>Standard deviation</b>	<b>14</b>	<b>0.02</b>	<b>0.01</b>	<b>0.01</b>	<b>0.01</b>	<b>0.01</b>	<b>0.10</b>	<b>11</b>	
Minimum	586	0.14	0.27	0.35	0.42	0.49	0.84	61	
Maximum	635	0.19	0.31	0.39	0.46	0.53	1.16	95	

(\*) xC: x% cohesive

$$\Delta X_{\text{mean}} = 1.02$$

#### 5.1.4.2.4 Facade cleaning product\*

a) *Conditioning :*

- Duration : 21 days
- Temperature : 44.0°C ± 0.6°C
- Cleaning product : Extran (5% on water)

b) *Results of the traction test after the artificial ageing :*

Sample number	Section (mm <sup>2</sup> )	Limited to 5% stretch. (N/mm <sup>2</sup> )	Limited to 10 % stretch. (N/mm <sup>2</sup> )	Limited to 15% stretch. (N/mm <sup>2</sup> )	Limited to 20% stretch. (N/mm <sup>2</sup> )	Limited to 25% stretch. (N/mm <sup>2</sup> )	Limit of breakage (N/mm <sup>2</sup> )	Stretch on breaking (%)	Type of breakage (*)
1	613	0.15	0.24	0.30	0.35	0.40	0.93	111	100C
2	588	0.14	0.23	0.29	0.35	0.40	1.01	124	100C
3	584	0.15	0.23	0.29	0.34	0.39	0.89	130	100C
4	597	0.15	0.24	0.31	0.36	0.41	1.03	125	100C
5	588	0.15	0.24	0.31	0.37	0.42	0.98	176	100C
6	607	0.15	0.24	0.31	0.36	0.41	0.96	119	100C
7	601	0.16	0.25	0.31	0.37	0.42	0.95	92	100C
8	616	0.14	0.22	0.29	0.34	0.39	0.91	111	100C
9	586	0.14	0.24	0.30	0.36	0.41	0.90	162	100C
10	601	0.16	0.24	0.31	0.36	0.41	0.98	96	100C
<b>Average</b>	<b>598</b>	<b>0.15</b>	<b>0.24</b>	<b>0.30</b>	<b>0.36</b>	<b>0.41</b>	<b>0.95</b>	<b>125</b>	
<b>Standard deviation</b>	<b>12</b>	<b>0.01</b>	<b>0.01</b>	<b>0.01</b>	<b>0.01</b>	<b>0.01</b>	<b>0.05</b>	<b>27</b>	
Minimum	584	0.14	0.22	0.29	0.34	0.39	0.89	92	
Maximum	616	0.16	0.25	0.31	0.37	0.42	1.03	176	

(\*) xC: x% cohesive

$$\Delta X_{\text{mean}} = 0.96$$

**SUMMARY**

ETAG GUIDELINE TEST NUMBER	TEST	TEST CONDITIO NS	CRITERIA				
			X <sub>mean</sub> Mpa	$\Delta X_{\text{mean}}$ $\geq 0.75$	K <sub>12.5</sub> For $0 \leq x\% \leq 12.5$ $0.5 \leq K_{x,c}/K_x \leq 1.10$	R <sub>u,5</sub>	TYPE OF BREAKAGE ( $\geq 90\% C$ )
5.1.4.1.1	Tension	+23°C	0.99	-	$\sigma_{12.5} = 0.31$ K <sub>12.5</sub> = 2.50	0.78	100C
		-20°C	1.10	1.11		0.63	100C
		+80°C	0.90	0.91		0.78	100C
5.1.4.1.2	Shear	+23°C	0.75	-		0.50	100C
		-20°C	0.90	1.20		0.63	100C
		+80°C	0.58	0.77		0.36	100C
5.1.4.2.1	H <sub>2</sub> O + UV SMART- 50 face at 45°C	500 h	1.06	1.07			100C
		1000 h	1.02	1.02	$\sigma_{12.5,c} = 0.24$ K <sub>12.5,c</sub> = 1.91 K <sub>12.5,c</sub> /K <sub>12.5</sub> = 0.77		100C
5.1.4.2.1	H <sub>2</sub> O + UV SMART- 50 T face at 45°C	500 h	1.05	1.06			100C
		1000 h	1.02	1.03	$\sigma_{12.5,c} = 0.24$ K <sub>12.5,c</sub> = 1.92 K <sub>12.5,c</sub> /K <sub>12.5</sub> = 0.77		100C
5.1.4.2.2	H <sub>2</sub> O + NaCl	480h	0.97	0.98			100C
5.1.4.2.3	H <sub>2</sub> O + SO <sub>2</sub>	20 cycles	1.01	1.02			100C
5.1.4.2.4	Cleaning product	21 days	0.95	0.96			100C

*x*C = *x*% cohesive

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