

All tests included in this report are implemented according to ISO 9001

Certified Management system of BBRI

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## TEST REPORT

|                   |  |                    |   |
|-------------------|--|--------------------|---|
| <b>Laboratory</b> | <b>ROOF AND FAÇADES ELEMENTS – CAR</b> | <b>O/Reference</b> | DE-CAR-0169 (DE651XP322)<br>CAR-19-183 (CAR 18247)<br>Page 1 of 5 |
|-------------------|--|--------------------|---|

|                            |   |                                      |              |
|----------------------------|---|--------------------------------------|--------------|
| <b>Requested by</b>        | Profilsa Plastik Sanayi ve Ticaret A.S.<br>Ikitelli USB Ekvop San. SIT. C6 Blok Nv. 361-363<br>Basaksehir/Istanbul<br>Turkey<br>Tel.:+90 212 671 92 72 Fax: +90 212 671 92 02 |                                      |              |
| <b>Date of the request</b> | 2018/11/19  | <b>Identification of the samples</b> | S2019-15-002 |
|                            |   | <b>Reception of the samples</b>      | 2018/12/03   |
| <b>Date of the report</b>  | 2019/04/09  |                                      |              |
| <b>Tests</b>               | Measurement of the c, T and Q values on aluminium profiles with thermal barrier before and after ageing   |                                      |              |
| <b>Reference</b>           | European Standard EN 14024 «Metal profile with thermal barrier» - Version 2005  |                                      |              |

*This report contains 5 pages; it may only be reproduced in its entirety. Each page of the original report has been stamped (in red) by the laboratory and initialled by the head of laboratory. The results and findings are only valid for the tested samples.*

- No sample
- Sample(s) submitted to a destructive test
- Sample(s) to be removed from our laboratories 30 calendar days after sending of the report, unless a written request is received by the demander of the test



Ir. V. Detremmerie  
Head of Laboratory



Ir. B. Michaux  
Head of Division

## 1 Introduction

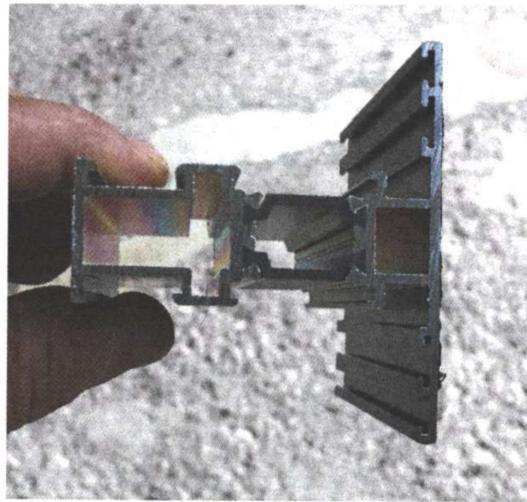
On request of Profilsa Plastik Sanayi ve Ticaret A.S. represented by Ali Gürbag, BBRI carried out some tests in order to measure the tensile strength  $Q$ , the shear strength  $T$  and the elasticity constant  $c$  according to EN 14024 (2005). The results of these tests are given in the present report.

## 2 Description of the samples

The samples, aluminium window profiles, were delivered at BBRI Test Centre on 3 December 2018 under the registration number S2019-15-002. The composition and dimensions of the samples are given here below.

### 2.1 Composition of the samples

The schematic representation of the samples is shown in the different figures below.



*Figure 1: Cross view of the sample*

### 2.2 Dimensions of the samples

Length of the received profiles: 100 mm (cTQ)

### 2.3 Description of the samples

The description of the samples is given by the requestor

- Profile number: Not communicated
  - Thermal break: PA 24002, material PA66GF25, 2mm (thickness of cavities wall)
  - Surfacing: varnished after strutting



### 3 Description of the tests

#### 3.1 cTQ

The measurement of the T and Q values and the calculation of the c value for the profiles with thermal barrier are implemented according to the European standard NBN EN 14024 - version 2005.

According to the request, the following measurements should be done:

- Measurement of T and calculation of c
 

|                          |                                     |
|--------------------------|-------------------------------------|
| LT                       | <input checked="" type="checkbox"/> |
| RT                       | <input checked="" type="checkbox"/> |
| HT                       | <input checked="" type="checkbox"/> |
| Temperature category TC1 | <input type="checkbox"/>            |

|                    |     |                                     |
|--------------------|-----|-------------------------------------|
| - Measurement of Q | LT  | <input checked="" type="checkbox"/> |
|                    | RT  | <input checked="" type="checkbox"/> |
|                    | HT  | <input checked="" type="checkbox"/> |
|                    | TC2 | <input checked="" type="checkbox"/> |
- After ageing: measurement of T, c, Q, Δh, f, A<sub>2</sub> according to the ageing method
 

|          |                                     |
|----------|-------------------------------------|
| Method 1 | <input checked="" type="checkbox"/> |
| Method 2 | <input type="checkbox"/>            |
| Method 3 | <input type="checkbox"/>            |
- Performance after immersion in water (§ 5.2.2)
- Performance after exposure to humidity (§ 5.2.3)
- Testing for brittleness (§ 5.2.5)

With

LT : Lower temperature LT  
 RT : Room temperature  
 HT : High temperature HT  
 n : Quantity of sample  
 Δh : Residual deformation after ageing method 1  
 f : Residual deformation after ageing method 2  
 A<sub>2</sub> : Creep factor

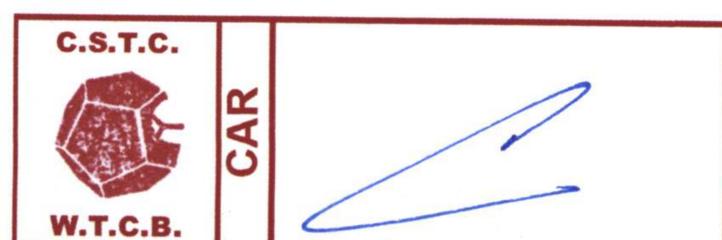
#### Calculation of T<sub>c</sub> and Q<sub>c</sub>

On the measured values, the characteristic values are calculated according to the equation:

$$X_c = \text{AVG} - T_{0,05 p} \text{ STD}$$

with AVG : average  
 STD : standard deviation  
 n : quantity of sample

|                     |       |      |
|---------------------|-------|------|
| n                   | 5     | 10   |
| T <sub>0,05 p</sub> | 2.375 | 2.02 |



#### 4 Results of the tests

##### 4.1 Profile (reference not disclosed, see picture)

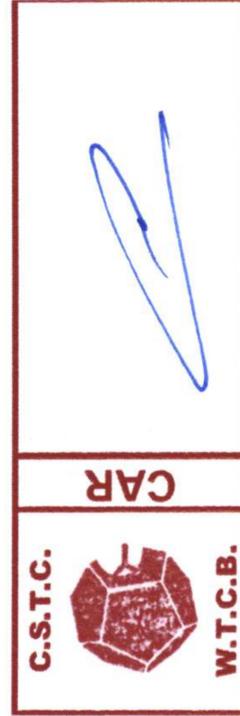
###### 4.1.1.1 Type Varnished after strutting

The c values are calculated values.

| Sample Nr. | RT                                     |  | RT                                     |  | TC2  |  | TC2                                    |  | TC2                                    |  | TC2                                    |  | TC2  |  | 5.2.3                                  |  | 5.2.5                                  |   | OLD M1                                  |   | OLD M1 |  |
|------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|---|---|---|--------|--|
|            | T <sup>N</sup> <sub>RT</sub><br>(N/mm) | C <sup>N</sup> <sub>RT</sub><br>(N/mm <sup>2</sup> ) | Q <sup>N</sup> <sub>RT</sub><br>(N/mm) | T <sup>N</sup> <sub>HT</sub><br>(N/mm) | C <sup>N</sup> <sub>HT</sub><br>(N/mm <sup>2</sup> ) | Q <sup>N</sup> <sub>HT</sub><br>(N/mm) | T <sup>N</sup> <sub>LT</sub><br>(N/mm) | C <sup>N</sup> <sub>LT</sub><br>(N/mm <sup>2</sup> ) | Q <sup>N</sup> <sub>LT</sub><br>(N/mm) | T <sup>N</sup> <sub>RT</sub><br>(N/mm) | Q <sup>N</sup> <sub>RT</sub><br>(N/mm) | T <sup>N</sup> <sub>HT</sub><br>(N/mm) | C <sup>N</sup> <sub>HT</sub><br>(N/mm <sup>2</sup> ) | Q <sup>N</sup> <sub>HT</sub><br>(N/mm) | T <sup>N</sup> <sub>LT</sub><br>(N/mm) | C <sup>N</sup> <sub>LT</sub><br>(N/mm <sup>2</sup> ) | Q <sup>N</sup> <sub>LT</sub><br>(N/mm) | Q <sup>N</sup> <sub>-10°C</sub><br>(N/mm) | Q <sup>M1</sup> <sub>LT</sub><br>(N/mm) | Q <sup>M1</sup> <sub>HT</sub><br>(N/mm) |        |  |
| 1          | 40.76                                  | 49.52  | 80.19                                  | 39.61                                  | 32.1   | 62.1                                   | 53                                     | 84.81  | 77.59                                  | 60.09                                  | 47.21                                  | 81.95                                  | 67.22  |  |  |  |  |   |   |   |        |  |
| 2          | 47.06                                  | 57.59  | 83.15                                  | 40.73                                  | 32.08  | 59.35                                  | 56.16                                  | 79.74  | 74.17                                  | 57.59                                  | 49.62                                  | 69.21                                  | 64.90  |  |  |  |  |   |   |   |        |  |
| 3          | 48.52                                  | 60.78  | 82.08                                  | 38.99                                  | 31.62  | 55.99                                  | 64.07                                  | 87.79  | 76.02                                  | 59.59                                  | 53.62                                  | 69.51                                  | 62.61  |  |  |  |  |   |   |   |        |  |
| 4          | 47.4                                   | 56.88  | 80.79                                  | 42.84                                  | 33.48  | 56.29                                  | 59.71                                  | 83.6   | 79.99                                  | 55.67                                  | 53.19                                  | 75.09                                  | 64.05  |  |  |  |  |   |   |   |        |  |
| 5          | 49.04                                  | 64.32  | 87.25                                  | 39.87                                  | 30.57  | 59.24                                  | 66.62                                  | 90.63  | 74.3                                   | 52.85                                  | 45.34                                  | 78.41                                  | 63.75  |  |  |  |  |   |   |   |        |  |
| 6          | 47.36                                  | 60.69  | 81.93                                  | 34.88                                  | 32.16  | 55.34                                  | 55.26                                  | 81.35  | 79.73                                  | 57.67                                  | 45.65                                  | 79.41                                  | 64.38  |  |  |  |  |   |   |   |        |  |
| 7          | 47.88                                  | 62.03  | 84.37                                  | 33.83                                  | 31.77  | 60.23                                  | 61.4                                   | 89.65  | 80.41                                  | 59.77                                  | 48.09                                  | 84.46                                  | 59.29  |  |  |  |  |   |   |   |        |  |
| 8          | 55.68                                  | 61.48  | 85.55                                  | 39.74                                  | 32.49  | 53.19                                  | 66.72                                  | 90.5   | 78.18                                  | 54.15                                  | 49.86                                  | 67.86                                  | 61.60  |  |  |  |  |   |   |   |        |  |
| 9          | 46.96                                  | 60.8   | 85.4                                   | 37.5                                   | 31.53  | 60.78                                  | 55.18                                  | 80.44  | 62.81                                  | 57.18                                  | 47.53                                  | 69.93                                  | 63.59  |  |  |  |  |   |   |   |        |  |
| 10         | 41.43                                  | 62.49  | 86.65                                  | 41.29                                  | 32.09  | 54.11                                  | 56.66                                  | 86.77  | 77.86                                  | 54.53                                  | 58.34                                  | 65.89                                  | 63.94  |  |  |  |  |   |   |   |        |  |
| AVG        | 47.21                                  | 59.66  | 83.73                                  | 38.93                                  | 31.99  | 57.66                                  | 59.48                                  | 85.53  | 76.11                                  | 56.91                                  | 49.85                                  | 74.17                                  | 63.53  |  |  |  |  |   |   |   |        |  |
| STD        | 4.12                                   | 4.18   | 2.46                                   | 2.80                                   | 0.74   | 3.06                                   | 5.01                                   | 4.16   | 5.17                                   | 2.54                                   | 4.10                                   | 6.54                                   | 2.09   |  |  |  |  |   |   |   |        |  |
|            | T <sup>N</sup> <sub>RT</sub>           | Q <sup>N</sup> <sub>RT</sub>                         | T <sup>N</sup> <sub>HT</sub>           | Q <sup>N</sup> <sub>HT</sub>           | T <sup>N</sup> <sub>LT</sub>                         | Q <sup>N</sup> <sub>LT</sub>           | Q <sup>N</sup> <sub>-10°C</sub>        | Q <sup>M1</sup> <sub>LT</sub>                        | Q <sup>M1</sup> <sub>HT</sub>          |  |  |  |  |  |  |  |  |   |   |   |        |  |
|            | 38.90                                  | 78.75  | 33.27                                  | 51.49                                  | 49.37  | 65.67                                  | 41.57                                  | 60.95  | 59.31                                  |  |  |  |  |  |  |  |  |   |   |   |        |  |

Table 1

The measured thicknesses after ageing Method1 are given on Table 1.



| M1         | Measured thicknesses [mm] |       |       |       |       |       |       |       |       |       | AVG   |
|------------|---------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Sample Nr. | 1                         | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    |       |
| New        | 68.93                     | 69.01 | 68.97 | 68.97 | 69.01 | 69.03 | 68.98 | 69.00 | 69.01 | 69.04 | 69.00 |
| Old        | 69.29                     | 69.28 | 69.31 | 69.31 | 69.33 | 69.28 | 69.29 | 69.32 | 69.31 | 69.29 | 69.30 |
| $\Delta h$ |                           |       |       |       |       |       |       |       |       |       | -0.3  |

*Table 1: results after ageing*

