

Test report no.: 74423/07

Customer: ELASTRON KIMYA San. ve Tic. A.S.
Inonu mah. Genclik cad. Tem yani 2. Kisim
41400 Gebze / KOCAELI
TURKEY

Production site: 41400 Gebze / KOCAELI
TURKEY

Order: Testing of the material properties of an extruded thermoplastic tape in accordance with RAL-GZ 716/1, Quality and Test Specifications for Plastic Windows, Section II - Extruded Seals, Table 2, Product Class IV, Edition August 2000.

E-mail of: 2007-01-17

Ref.: Mr. Serif Erdogan

Test samples received: 2007-01-26

Test period: 2007-02-12 to 2007-07-27

The test report comprises 8 pages.

Würzburg, 2008-03-04
Rs/ste

i. V.

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DAP-IS-2005.00



1. Order

By its E-mail of January 17, 2007 ELASTRON KIMYA San. ve Tic. A.S., Inonu mah. Gencilik cad. Tem yani 2. Kisim, 41400 Gebze / KOCAELI, TURKEY, placed an order with the SKZ - TeConA GmbH for testing the material properties of an extruded thermo-plastic tape in accordance with RAL-GZ 716/1, Quality and Test Specifications for Plastic Windows, Section II - Extruded Seals, Table 2, Product Class IV, Edition August 2000.

2. Test material

On January 26, 2007 the SKZ received the following samples for testing:

approx. 8 m extruded flat profile (20 x 2.0) mm

Material designation:	ELASTRON EV 541.701
Basic formulation:	TPV (EPDM/PP)
Manufacturer of mix /	ELASTRON KIMYA San. ve Tic. A.S.
Production site:	ELASTRON KIMYA San. ve Tic. A.S. Inonu mah. Gencilik cad. Tem yani 2. Kisim, 41400 Gebze / KOCAELI, TURKEY

Product class:	IV (interior and exterior)
Tested colour:	grey

3. Test procedure

The tests listed below were carried out according to the Quality and Test Specifications for Extruded Sealing Profiles for Plastic Windows, RAL-GZ 716/1, Section II, Table 2, Product Class IV (for all applications, interior and exterior), Quality Requirements for **Thermoplastic** Materials, Edition August 2000.

If not indicated otherwise, preconditioning and testing was carried out at a standard atmosphere of 23/50-2 in accordance with DIN EN ISO 291.

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3.1 Test specimen

Material properties were tested on specimen taken out of an extruded flat profile. For testing Compression set and change in Shore hardness A on temperature variation specimen were taken out of a pressed plaque.

To get such a plaque 4 layers of the flat tape were stacked and pressed to (6.3 ± 0.3) mm under following parameters:

Tool temperature:	170 °C
Pressure:	90 bar
Time:	15 min
Cooling time approx.:	25 min
Temperature for taking out:	80 °C

3.2 Density (Test Specification 3.1.1)

The density was determined on three test specimens in accordance with DIN EN ISO 1183-1, Method A.

3.3 IRHD hardness (Test Specification 3.1.2)

The test was carried out in accordance with DIN ISO 48 using a ball diameter of 0.4 mm.

3.4 Tensile strength and elongation at break (Test Specification 3.1.3)

The test was carried out in accordance with DIN 53504 on five S2 test specimens. The specimens were taken from the extruded flat profile in extrusion direction. The testing speed was 200 mm/min.

3.5 Compression set (Test Specification 3.1.4)

The test was carried out in accordance with DIN ISO 815, using the sample shape B. The samples were taken from pressed plaques (see 3.1). Sandwiched between two talc-dusted steel plates these samples were compressed by 25 % of the original height and aged for 22 hours at a temperature of -25 °C, 23 °C and 70 °C.

At the end of the ageing period the samples were released and allowed to recover on a wooden plate (30 ± 3 min) at a standard atmosphere of 23/50. Afterwards the thickness of the samples was measured once more.

Regarding the test at -25 °C, however, recovery and measurement took place at test temperature.



3.6 Behaviour after thermal ageing (Test Specification 3.1.5)

Artificial thermal ageing was carried out in accordance with DIN 53508 in a laboratory oven with forced ventilation at 100 °C for a period of 7 days. Subjected to this test were test specimens used for determining the IRHD hardness and S2 tensile test pieces used for determining the elongation at break and tensile strength.

After thermal ageing the test specimens were visually checked for changes (e.g. cracks or sticky surfaces).

3.7 Determination of change in Shore hardness when exposed to temperature change (Test Specification 3.1.6)

The test was carried out in accordance with DIN 53505 on the pressed plaque (see 3.1).

Shore-A hardness was measured at a standard atmosphere of 23/50 as well as after ageing the test specimens for 22 h at a temperature of -10 °C.

3.8 Behaviour after exposure to ozone (Test Specification 3.1.7)

The test was carried out in accordance with DIN 53509, Part 1. Three test pieces with the dimensions 150 x 20 x 2 mm were subjected to the following test conditions: temperature 40 °C, ozone concentration: 50 ppm, time of exposure: 96 h, elongation: 20 %. (This test was not carried out at the SKZ.)

3.9 Behaviour after artificial weathering (Test Specification 3.1.8)

The test for the determination of weathering fastness and resistance was carried out in accordance with RAL-GZ 716/1, Section I, Test Methods.

The procedure of the artificial weathering was carried out according to DIN EN 513, procedure 1, simulation of a moderate climate zone (M).



Parameters of the weathering device

Test apparatus:	XENOTEST® BETA LM
Light source:	Xenon-arc source
Filter:	terrestrial daylight simulation
Operation:	non-alternating mode
Black standard temperature:	60 ± 3 °C
White standard temperature:	40 - 45 °C
Relative humidity:	65 ± 5 %
Spray cycle:	18 min water spray, 102 min dry cycle
Irradiance E_{UV} (300 - 400) nm:	60 ± 2 W/m ²
Irradiation dose (300 - 800) nm:	8 GJ/m ²
Exposure period:	4080 h
Start:	2007-02-02
End:	2007-07-25

3.9.1 Weathering fastness

Subsequent to artificial weathering the change in colour was determined visually by comparing the weathered with the non-weathered specimens, using the grey scale according to ISO 105-A02. In addition, the weathered specimen surfaces were checked for changes (e.g. blistering or crack formation). The samples were evaluated by putting them under a microscope (laying flat) and by means of a tenfold magnification.

Requirement:

After artificial weathering the colour amendment must not be larger than level 3 corresponding to the grey scale according to ISO 105-A02.

There must not be any bubbles or cracks on the surface weathered.

3.9.2 Weathering resistance

After artificial weathering S2 test specimens were punched out of the weathered and non-weathered flat profiles and subjected to a tensile test according to DIN 53504 with a take-off speed of 200 mm/min in order to determine the elongation at break.

Requirement:

After artificial weathering the elongation at break must not be lower than the value of 200 %.



3.10 Contact discolouration (Test Specification 3.1.9)

The test was carried out in accordance with ISO 3865, Method A1, using three test pieces with the dimensions 120 x 20 x 2 mm. A contact surface pressure of 0.7 N/cm² was exerted on each of the flat profile sections sandwiched between the visible surfaces of two white PVC-U frame profile sections with a 10 mm distance from the edge. This test set-up was aged in a laboratory oven with air circulation at 70 °C for a period of 24 h.

The visual assessment was made by comparing the frame profile surfaces after contact ageing with a reference section not previously aged, using the grey scale according to ISO 105-A03.

3.11 Loss of weight (Test Specification 3.1.10)

The test was carried out in accordance with DIN EN ISO 176, Method A, on three test specimens, 75 x 20 x 2 mm in size, in direct contact with activated charcoal (with a granular size of 2 to 4 mm). Prior to and after ageing the test specimens in activated charcoal (28 days at 70 °C), the weight was determined accurate to 0.001 g and the loss of weight ascertained.

3.12 Compatibility (Test Specification 3.1.11)

The compatibility was determined on five test specimens made from frame profile material (PVC-U, colour white) with an E-modulus of 2870 N/mm². With the aid of steel radii (r = 300 mm) the test specimens, 100 x 20 x 3 mm, were clamped in such a way that the outer visible surface was subjected to a tensile stress in bending of 15 N/mm². Flat profile sections of the sealing material, 100 x 20 x 2 mm in size, were pressed against the surfaces exposed to tensile stress in bending. One test specimen was aged which was not subjected to tensile stress in bending but against which also a sealing test specimen was pressed.

The test specimens were aged at 23 °C for period of 28 days. With a magnifying glass (tenfold magnification) the contact surfaces of the window profiles were visually examined for crack formation after 2, 4, 8, 14 and 28 days.

