

Test report no.: 81163/08-I

Customer: EGE-Profil A. S.
Atatürk Organize Sanayi Bölgesi
1003 Sokak No.: 5
35510 Cigli-Izmir
TURKEY

Order: Testing of resistance to weathering, classification S,
according to EN 12608: 2003 "Unplasticized polyvinylchloride (PVC-U) profiles for the fabrication of windows and doors - Classification, requirements and test methods".

E-Mail of: 2008-02-08 by: Ms Sebnem Vergote

Sample receipt: 2008-01-08

Test period: 2008-02-11 to 2008-11-24

This test report comprises 5 pages.

Würzburg, 2008-12-19
Rs/ste

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Dr. Anton Zahn



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1. Order

By its e-mail of February 8, 2008 the company EGE-Profil A. S., Atatürk Organize Sanayi Bölgesi, 1003 Sokak No.: 5, 35510 Cigli-Izmir, TURKEY instructed SKZ - TeConA GmbH to test resistance to weathering, classification S, according to EN 12608: 2003 "Unplasticized polyvinylchloride (PVC-U) profiles for the fabrication of windows and doors - Classification, requirements and test methods".

2. Test material

On January 8, 2008 SKZ - TeConA GmbH received following test material:

6 x 1 m window profile made of PVC-U, colour white

Profile manufacturer:	EGE-Profil A. S., 35510 Cigli-Izmir, TURKEY
Profile designation:	sash
Profile marking:	DECEUNICNK SIB 12602 1 05 12 07 I EN 12608 TS 5358
Formulation:	Ana profil compoundu-TPX
Stabilization:	CaZn

3. Test procedure

Following tests were performed according to EN 12608: 2003, item 5.8 resistance to weathering, climate zone S.

Unless otherwise noted all tests were carried out at standard atmosphere class 1 according to DIN EN ISO 291.

Usually we carry out tests according to standards for which we have an accreditation. The list of all standards for which we are accredited is shown on the homepage at www.skz.de.

3.1 Resistance to weathering

Testing of resistance to weathering (Charpy impact strength after artificial weathering and colour fastness) was performed according to DIN EN 513. Procedure of artificial weathering is based on the requirements according to DIN EN 513, procedure 2, simulation of a severe climate zone (S). Surface outside was irradiated.



Parameters of the weathering device:

Type of weathering device:	XENOTEST BETA LM
Light source:	Xenon-arc source
Filter:	Terrestrial daylight simulation
Black standard temperature:	65 ± 3 °C
White standard temperature:	45 - 50 °C
Relative humidity:	65 ± 5 %
Spray cycle:	6 min water spray, 114 min dry cycle
Irradiation energy E _{UV} (300 - 400) nm:	60 ± 2 W/m ²
Irradiation dose (300 - 800) nm:	12 GJ/m ²
Exposure period:	6101 h
Start:	2008-02-13
End:	2008-11-14

3.1.1 Charpy notched impact strength after artificial weathering

Charpy notched impact strength was tested on double notched samples according to DIN EN ISO 179-1/1fA, (notch base radius 0.25 mm), but with a residual width of (3 ± 0.1) mm on samples of the dimensions 50 x 6 mm x wall thickness. The test was carried out subsequent to artificial weathering on reference samples, which have been stored in the dark, as well as on weathered samples. During this test the weathered surface was subjected to tensile stress.

Requirement:

After artificial weathering Charpy notched impact strength of weathered samples shall not drop more than 40 % compared to the value of the unweathered samples.

3.1.2 Colour fastness

3.1.2.1 Visual assessment

Visual assessment was carried out according to ISO 4582 by using grey scale according to ISO 105-A03 and additionally the grey scale according to ISO 105-A02.



3.1.2.2 Colorimetric assessment

The colorimetric assessment of the samples was carried out by a spectrophotometer in wavelength range from 360 to 750 nm, standard light type D65, gloss inclusion, 10° standard observation. The colour distance ΔE^*_{ab} was determined according to ISO 7724-3.

Requirement:

After artificial weathering colour distance ΔE^*_{ab} between unweathered and weathered samples shall not be larger than 5 and colour distance Δb^* shall not be larger than 3.

4. Test results

4.1 Resistance to weathering

4.1.1 Charpy notched impact strength after artificial weathering

Sash profile, sample along the lines of 179-1/ 1fA (notch base radius 0.25 mm)				
reference sample (not weathered)		weathered sample		amendment in
\bar{x}	s	\bar{x}	s	%
83.1	0.6	80.0	0.7	-3.7
10 x P (partial break)		10 x P (partial break)		

\bar{x} = mean value s = standard deviation

4.1.2 Colour fastness

4.1.2.1 Visual assessment

Time of exposure	Dose of irradiation	Fastness grade according to ISO 105		Remark
		A02	A03	
4086 h	8 GJ/m ²	4	4 - 5	lighter, more blue, duller
6101 h	12 GJ/m ²	4	4 - 5	lighter, duller

On the surface neither stains, blisters, strips nor crack formations or anything that significantly damages the appearance were observed.

4.1.2.2 Colorimetric assessment

Absolute value before artificial weathering: $L^* = 94.8$ $a^* = -1.0$ $b^* = 2.1$
 Absolute value after artificial weathering: $L^* = 95.2$ $a^* = -0.8$ $b^* = 0.5$

Time of exposure	Dose of irradiation	Colour coordinates			Total colour distance Delta E^*_{ab}
		ΔL^*	Δa^*	Δb^*	
4086 h	8 GJ/m ²	0.5	0.2	-1.6	1.7
6101 h	12 GJ/m ²	0.4	0.2	-1.6	1.7

5. Assessment of test results

The requirement according to EN 12608: 2003 resistance to weathering, classification according to climate zone S (severe climate) is fulfilled.

