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Sample ID : İZOTILE PVC- ASA ROOF TILES

	TEST	METHOD	VALUE	RESULT
*	Standard for Tests for Flammability of Plastic Materials for Parts in Devices and Appliances	UL 94	5VA	PASS
*	THERMAL INSULATION	INHOUSE	0.030927 W/mK	
*	UV AGING	INHOUSE	See Table	



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Environment

The requirements and standards apply to equipment intended for use in

X	Residential (domestic) environment
X	Commercial and light-industrial environment
X	Industrial environment
X	Medical environment

UL 94: Standard for Tests for Flammability of Plastic Materials for Parts in Devices and Appliances

Scope

These requirements cover tests for flammability of polymeric materials used for parts in devices and appliances. They are intended to serve as a preliminary indication of their acceptability with respect to flammability for a particular application.

The methods described in this Standard involve standard size specimens and are intended to be used solely to measure and describe the flammability properties of materials, used in devices and appliances, in response to a small open flame or radiant heat source under controlled laboratory conditions.

Procedure - Plate specimens test procedure

Test to classify the specimens as 5VA or 5VB

Support the plate specimen by a clamp on the ring stand in the horizontal plane. Adjust and calibrate the burner. The flame is then to be applied to the center of the bottom surface of the plate at an angle of $20 \pm 5^\circ$ from the vertical, so that the tip of the blue cone is within 0 to 3 mm of the plate surface - without impinging into the specimen.

Apply the flame for 5 ± 0.5 seconds and then remove for 5 ± 0.5 seconds. Repeat the operation until the plate specimen has been subjected to five applications of the test flame. When necessary, to complete the test, hand hold the burner and fixture so that the tip of the inner blue cone maintains the required distance. After the fifth application of the test flame, and after all flaming or glowing combustion has ceased, it is to be observed and recorded whether or not the flame penetrated (burned through) the plate material. Flame penetration shall be defined as any visible flame observed during the test on the surface of the plate opposite to the surface to the test flame applied. In addition, no opening greater than 3 mm shall appear after the test and the sample has cooled for 30 seconds.

Test criteria

Material shall be classified 5VA or 5VB on the basis of test results obtained on small bar and plate test specimens when tested as described in the Test Procedure above.

Materials classified 5VA or 5VB shall also comply with the requirements for materials classified V-0 or V-1 at the thickness under consideration.

Table 1 specifies the 5V classifications.

Table 1
5V Burning Classifications

Criteria	5VA	5VB
Afterflame time plus afterglow time after the fifth flame application ($t_1 + t_2$) for each individual bar specimen	$\leq 60s$	$\leq 60s$
The cotton pad indicator ignited by flaming particles or drops from any bar test specimen	No	No
Classified as V-0 or V-1	Yes	Yes
Either <ul style="list-style-type: none">• burn-through occurs with any of the individual plate test specimens• no plate test specimens have been tested	No	No

Test to classify the specimens as V-0, V-1 or V-2

The following are to be observed and recorded for each specimen:

- Afterflame time after first flame application, t_1 .
- Afterflame time after second flame application, t_2 .
- Afterflame time plus afterglow time after second flame application, $t_2 + t_3$.
- Whether or not specimens burn up to the holding clamp.

Note: Burned to the clamp – After allowing the sample to cool, use a soft, dry cloth to wipe away soot and effluent residue and examine the sample 2 mm below the clamp line for signs of combustion or pyrolysis. Any thermal damage, such as melting or distortion, on the sample below the clamp, shall be neglected.

- Whether or not specimens drip flaming particles and whether the particles ignited the cotton indicator.

The flame was applied for 10 seconds and then removed. When combustion stopped, the burner was placed again under the sample at a distance of 10 mm for another 10 seconds.

Table 2 specifies the V classifications.

Table 2
Materials Specification

Criteria conditions	V-0	V-1	V-2
Afterflame time for each individual specimen t_1 or t_2	$\leq 10s$	$\leq 30s$	$\leq 30s$
Total afterflame time for any condition set (t_1 plus t_2)	$\leq 50s$	$\leq 250s$	$\leq 250s$
Afterflame plus afterglow time for each individual specimen after the second flame application (t_2+t_3)	$\leq 30s$	$\leq 60s$	$\leq 60s$
Afterflame or afterglow of any specimen up to the holding clamp	No	No	No
Cotton indicator ignited by flaming particles or drops	No	No	Yes

Test Results

Results of the test specimen İZOTILE PVC- ASA ROOF TILES to determine the classification V of the material

NUMUNE-1 / SPECIMEN-1	Time	Result
Afterflame time after first flame application, t_1 .	0.0 s	V-0
Afterflame time after second flame application, t_2 .	0.03 s	
Afterflame time plus afterglow time after second flame application, $t_2 + t_3$.	$t_3=0.05$ s $t_2+t_3=0.08$ s	
Whether or not specimens burn up to the holding clamp	No	
Whether or not specimens drip flaming particles and whether the particles ignited the cotton indicator	No	

Results of the test specimen İZOTILE PVC- ASA ROOF TILES to classify as 5VA or 5VB

NUMUNE-1 / SPECIMEN-1	Time	RESULT
Afterflame time plus afterglow time after the fifth flame application ($t_1 + t_2$) for each individual bar specimen	$t_1+t_2=0.03$ s	5VA
The cotton pad indicator ignited by flaming particles or drops from any bar test specimen	No	
Classified as V-0 or V-1	Yes (V-0)	
Either <ul style="list-style-type: none"> • burn-through occurs with any of the individual plate test specimens • no plate test specimens have been tested 	No	
Time results of the test to decide the 5V classification: $t_1=0.0$ s, $t_2=0.03$ s, $t_3=0.05$ s, $t_4=0.0$ s, $t_5=0.014$ s		
<p>Comment: After the fifth application of the test flame, and after all flaming or glowing combustion has ceased, the flame was not penetrated the plate material. Any visible flame was not observed during the test on the surface of the plate opposite to the surface to the test flame applied, so flame penetration did not occur. No opening greater than 3 mm didn't appear, after the test and the sample has cooled for 30 seconds.</p>		

THERMAL INSULATION

Calculation

The thermal conductivity values obtained from one set of observations should not differ from each other by more than 10 %. The average of the thermal conductivity values is taken to be the thermal conductivity of the material.

$$X = \frac{\Delta\theta_2}{\Delta\theta_1}$$

$\Delta\theta_1$ = the temperature difference (°C) at time t

$\Delta\theta_2$ = the temperature difference (°C) at time $2t$

Determine the Y value corresponding to each value of X calculated with the values given in the standard; The k-value corresponding to each value of t can then be found from:

$$k = \frac{qLY}{2A\Delta\theta_1}$$

k = the thermal conductivity [W/(m K)]

q = the electrical power input to the heater (W)

L = the average thickness of the specimens (m)

A = the area of one face of the specimen (m²)

TEST RESULTS

Specimen	X value	Y value	Thermal Insulation (W/mK)
İZOTİLE PVC- ASA ROOF TILES	1.02	0.999	0.030927

UV AGING

İZOTILE PVC- ASA ROOF TILES			
Test		Color Values Before Test	Post-Test Color Values
UV	L:	41.56	41.88
	a:	33.93	34.18
	b:	18.50	18.02
	Brightness	0009.6 gu	0010.5 gu

Test Item: Rapid Aging Test-Xenon-arc

Exposure Example Description: İZOTILE PVC- ASA ROOF TILES

Test Method: ISO 4892-2: 2013 Loop 1 and ISO 105-A02: 1993 / Cor.2: 2005

Exposure cycle

ISO 4892-2: 2013 cycle 1

Irradiation: (0,50 ± 0,2) W / (m²-nm) at 340nm 110 hour, -40°C to +85°C, (50 ± 10)% RH

Filter: Daylight - UV-B / UV-A / UV-C – KSENON ARK

Exposure time : 400 Hour

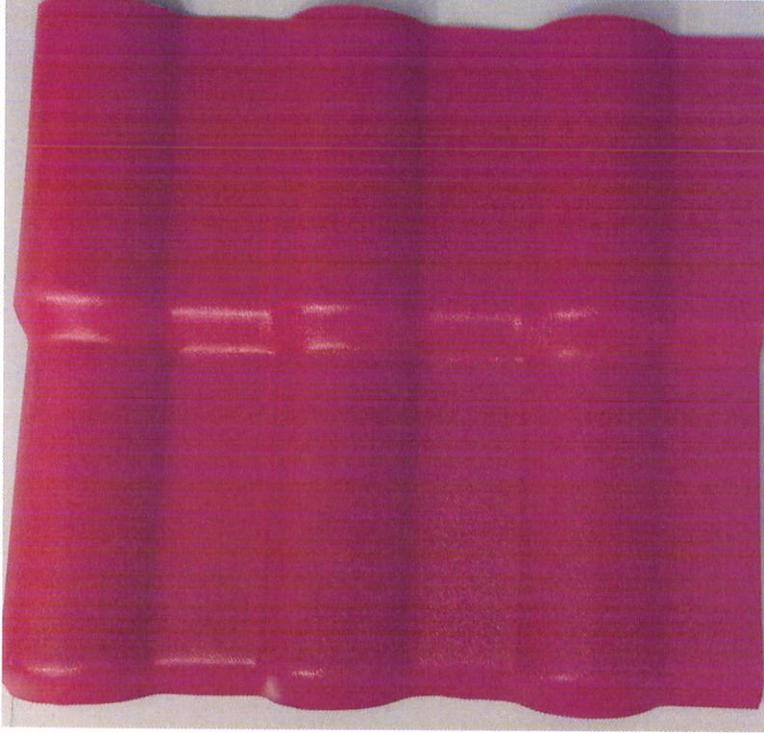
Test Result;

TEST SAMPLE	UV EXPOSURE TIME	GRAY SCALE	RESULT
İZOTILE PVC- ASA ROOF TILES	1440 Hour	5-5	Pass

Note:

1. According to ISO 105-A02: 1993 / Cor.2: 2005, under the gray scale D65 standard light, the best scale was determined as 5 and the worst scale as 1.
2. The results were performed within 1 hour after the specified times at the end of the exposure, as well as the interim examination.

SAMPLE IMAGE



*****End Of Report*****