



YILDIZ TECHNICAL UNIVERSITY
Faculty of Arts & Sciences, Department of Chemistry
Davutpaşa Campus Esenler 34210 İstanbul/TÜRKİYE
Tel: +90 212 383 42 23 Fax: +90 212 383 41 34

CUSTOMER INFORMATION

Akkim Yapı Kimyasalları San.ve Tic. A.Ş.	Date of Sample Arrival : 01/10/2015
Tel: +90 212 771 13 71, Fax: +90 212 771 38 88	e-mail: info@akkim.net

REPORT OF CHEMICAL TESTING AND ANALYSIS

Analysis Reference	Name and identity of test item	Date of Report
BS 6920-1:2000	Spray Polyurea Waterproofing Material (Polyurea FA 1044)	02/12/2015

SUBJECT

This report was prepared by the request of AKKİM YAPI KİMYASALLARI SAN. ve TİC. A.Ş. in accordance with BS 6920-1:2000, for the product Spray Polyurea Waterproofing Material (Polyurea FA 1044) for use in contact with potable water with regard to its effect on the quality of water in terms of metallic impurities.

MEASUREMENT and EVALUATION

In order to determine maximum metal amount that can migrate into water, received sample was immersed in potable water and analyzed according to BS 6920-1: 2000 standard. The material was contacted with water and allowed possible metals to migrate throughout from the sample into the water. Based on the analysis result of the contact water, the product sample is found suitable for use in drinking water systems in terms of element impurities according to BS 6920 standard.

Metal Analysis	Limit	Result
Aluminum (Al) amount , µg/L	≤200	30
Antimony (Sb) amount , µg/L	≤5	No
Arsenic (As) amount , µg/L	≤10	No
Barium (Ba) amount , µg/L	≤1000	No
Cadmium (Cd) amount , µg/L	≤5	No
Chromium (Cr) amount, µg/L	≤50	No
Iron (Fe) amount, µg/L	≤200	No
Lead (Pb) amount µg/L	≤25	No
Manganese (Mn) amount, µg/L	≤50	No
Mercury (Hg) amount, µg/L	≤1	No
Nickel (Ni) amount , µg/L	≤20	<5
Selenium (Se) amount , µg/L	≤10	<1

Supervisor of Physical and Chemical Analysis Section act.



Prof. Dr. Metin TULÜ



Head of Dept: Prof. Dr. Yücel ŞAHİN



Analyst: Mustafa U. GÜRBÜZ



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REPORT OF CHEMICAL TESTING AND ANALYSIS

Analysis Reference	Name and identity of test item	Date of Report
ASTM D 6108-13	Spray Polyurea Waterproofing Material (Polyurea 1044)	02/12/2015

SUBJECT

This report was prepared by the request of AKKİM YAPI KİMYASALLARI SAN. ve TİC. A.Ş. for the determination of **compression strength** of Spray Polyurea Waterproofing Product (Polyurea 1044) in accordance with ASTM D 6108-13 standard.

RESULTS

Five sample of Spray Polyurea Coating Material (Polyurea 1044) having size of 200 mm x 100 mm x 20 mm which were received from Akkim Yapı Kimyasalları Company. Each samples were tested via Tensile Force Instrument with compression platens. Material compression strength and elasticity modulus values were recorded and listed in Table below.

Applied Test	Results
Compression strength	20,95 MPa
Elasticity modulus	91,8 MPa

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REPORT OF CHEMICAL TESTING AND ANALYSIS

Analysis Reference	Name and identity of test item	Date of Report
ASTM D 2794	Spray Polyurea Waterproofing Material (Polyurea 1044)	02/12/2015

SUBJECT

This report was prepared by the request of AKKİM YAPI KİMYASALLARI SAN. ve TİC. A.Ş. for the determination of **impact resistance property** of Spray Polyurea Waterproofing Product in accordance with ASTM D 2794 standard.

RESULT

The concrete slabs were coated with 2 mm thickness of spray polyurea and dried at $23\text{ }^{\circ}\text{C} \pm 2^{\circ}\text{C}$ for 14 days. When drying was completed, 1 kg weight was reduced over the surface of polyurea sample by the impact resistance device. After test completion, coating surface was analyzed according to whether deformation and cracking. The test results are presented in the table below.

Height (mm)	Weight	Result
500	1 kg	No deformation or cracking : $\geq 20\text{ N.m}$ direct impact
750	1 kg	No deformation or cracking : $\geq 20\text{ N.m}$ direct impact

EVALUATION

Based on the analysis results, it is determined that **impact strength** of Spray Polyurea Coating Material (Polyurea 1044) is suitable in accordance with ASTM D 2794 standard.

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REPORT OF CHEMICAL TESTING AND ANALYSIS

Analysis Reference	Name and identity of test item	Date of Report
ASTM D 570-98	Spray Polyurea Waterproofing Material (Polyurea 1044)	02/12/2015

SUBJECT

This report was prepared by the request of AKKİM YAPI KİMYASALLARI SAN. ve TİC. A.Ş. for the determination of **water absorption property** of Spray Polyurea Waterproofing Product in accordance with ASTM D 570-98 standard.

RESULT

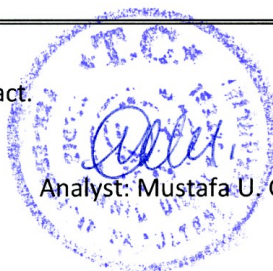
Three Polyurea Coating Material samples size of 76.5 mmx25.4mmx2mm were dried in an oven for 24 hours at 50±3° C. Then quickly cooled in a desiccator, dry weight of the samples was measured to 0,001 g precision. Dried samples were immersed completely into the distilled water at 23±2 ° C for 24 hours. After a standard waiting time, wet weight of the samples was measured to 0,001 g precision. Based on the samples weight measurement values, the change in mass and the mass increase percentage was determined. Test results are shown as;

Wet weight of the sample (Avg.) = 0,1239 g
Dry weight of the sample (Avg.) = 0,1226 g
Mass increase percentage = 0,13 %

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REPORT OF CHEMICAL TESTING AND ANALYSIS

Analysis Reference	Name and identity of test item	Date of Report
ASTM D543 & ASTM D1308	Spray Polyurea Waterproofing Material (Polyurea 1044)	02/12/2015

SUBJECT

Spray Polyurea Waterproofing Material (Polyurea 1044) was immersed in different concentrations of acid, base, solvents and alcohols for 7 days. **Chemical resistance** of Products was determined at the end of seventh day. Based on test results, samples were classified in accordance with ASTM D543 and ASTM D1308 according to damage, swelling and discoloration

Chemical Resistance ASTM D 543 (7 days)		Chemical Resistance ASTM D 543 (7 days)	
Chemical Type	Resistance	Chemical Type	Resistance
sulfuric acid 5 %	A	potassium hydroxide 20 %	A
sulfuric acid 10%	A	acetic acid 3%	A
sulfuric acid 50%	NR	ethyl alcohol 10 %	A
hydrochloric acid 10%	A	ethyl alcohol 50%	A
hydrochloric acid 20%	C	diesel	A
acetic acid 25%	C	hydraulic oil	A
nitric acid 10 %	NR	acetone	C
hydrofluoric acid 10 %	A	hexane	A
sodium hydroxide 5%	A	methanol	A
sodium hydroxide 10 %	A	diethyl ether	A
sodium hydroxide 20 %	A	hydrogen peroxide	A
sodium hydroxide 50%	A	MEK	D
ammonium hydroxide 10 %	A	Xylene	D
ammonium hydroxide 20 %	A	Bleacher	C
potassium hydroxide 10%	A		

Evaluation Criteria

A	B	C	D	E	NR
No Damage	Little Damage	Swelling - discoloration	Swelling < 48 hours	Swelling < 24 hours	Not Recommended

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REPORT OF CHEMICAL TESTING AND ANALYSIS

Analysis Reference	Name and identity of test item	Date of Report
ASTM D 714-02	Spray Polyurea Waterproofing Material (Polyurea 1044)	02/12/2015

SUBJECT

This report was prepared by the request of AKKİM YAPI KİMYASALLARI SAN. ve TİC. A.Ş. in accordance with ASTM D 714-02 standard, for examining **size and density of blisters** of Spray Polyurea Waterproofing Product (Polyurea 1044) on different substrates.

RESULT

Three Polyurea samples were applied on substrates (obtained concrete, metal and wood substrates according to mentioned standards). Swelling Size categories were defined as 2, 4, 6, 8 and 10 depending on the size of the blisters formed on the coating surface. Swelling size 10 represents that there is no swelling on the coating surface. In the standard, categories were defined with regard to the density of blisters as low-medium – medium heavy- very heavy. Polyurea samples were visually examined in order to determine blister size and density on the coating surfaces. Samples photos and their test results were shown below.

Substrate Type	Blister number	Blister density
Concrete substrate	10	No blister
Metal substrate	10	No blister
Wood substrate	10	No blister

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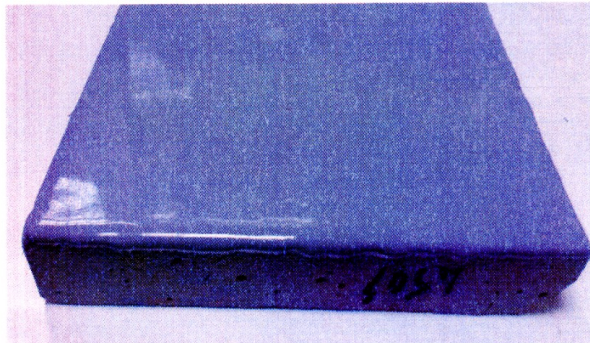


Figure 1. Polyurea coating applied to concrete substrate

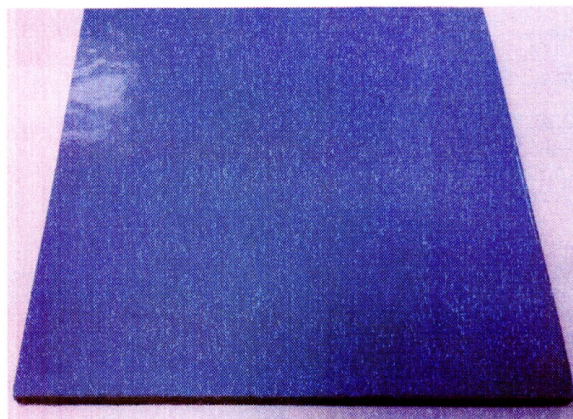



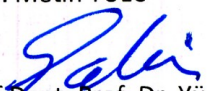
Figure 2. Polyurea coating applied to wood substrate



Figure 3. Polyurea coating applied to metal substrate

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