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	TEST	DIRECTIVE	METHOD	RESULT
*	Surface preparation	The General Product Safety Directive (GPSD) (2001/95/EC)	EN 14901-2	PASS
*	Appearance			PASS
*	Adhesion			PASS
*	Coating thickness			PASS
*	Non porosity			PASS
*	Indentation resistance			PASS
*	Impact resistance			PASS
*	Heat ageing in water			PASS

NOTE: This test result replaces the conformity assessment, can be presented to official institutions, and used in products and brochures.



Seal

Customer Representative
Merve Nur KIRVELİLaboratory Manager
Merve ÖZLÜ

Test/inspection results, methods and other information about the sample shown in the relevant pages of this Report are based on the information specified in accordance with "Test/inspection Request Form (PR03-F01) conveyed to us from the Applicant. Test/inspection results are valid for the sample as identified above. Sample may not represent the lot which it belongs. This Report does not replace a Product Certificate. Full report or any part of it may not be reproduced or used for any other purpose without the written permission of EUROLAB Laboratory. Sampling has not been done by us. Unsigned and unsealed Reports are invalid. Analysis as indicated with "*" are in the Scope of our Accreditation Certificate issued from UAF according to TS EN ISO/IEC 17020, 17025, Analysis as indicated with "**" are performed at the external laboratories using accredited test/inspection methods according to EN ISO/IEC 17020, 17025 from UAF. Possible extra notes may add with starting "N" to related pages. Tested and remaining samples will be kept in specified terms & conditions at test/inspection request and/or proposal form. Physically, chemically and microbiologically decomposed samples are discarded regardless of the storage period. Applicant can not claim any right in this regard. Results are shown in this Report do not include Measurement Uncertainty values. Measurement Uncertainty values are not taken in consideration during Pass/Fail assessment the of test/inspection results shown in this Report. Evaluation of the test/inspection results using Measurement Uncertainty values is the responsibility of the Applicant. An inspection body shall issue an inspection certificate that does not include the inspection results only when the inspection body can also produce an inspection report containing the inspection results, and when both the inspection certificate and inspection report are traceable to each other.

PR33-F01/08.10.2015/Rev:17.01.2017-R01

5	Technical Requirements	Result
5.2	Surface preparation	PASS
	Surface preparation shall be designed in order to reach the required performances specified in this European standard. It is the responsibility of the manufacturer to demonstrate the fitness for purpose of surface preparation technology and to put in place a quality control procedure to ensure the stability of those performances (see 7.1.1).	
5.3	Appearance and continuity	PASS
	The TMPO coating of the final product shall be of: — uniform colour, except for permitted marking; — uniform appearance and smoothness, except for admissible repairs; — free of visible defects (pinholes, bubbles, blisters, wrinkles, cracks or voids). Slight superficial colour variations due to repairs or prolonged exposure to sunlight are permissible (See 7.1.2). Repairs are permitted (see 5.6).	
5.4	Adhesion	PASS
	Adhesion shall be tested in accordance with the test method described in 7.1.3 on production samples (fittings and accessories). The TMPO coating adhesion shall achieve an average value of at least 8 MPa and a minimum single value of 6 MPa. In case of multilayer systems no adhesive failure between the layers is permitted.	
5.5	Coating thickness	PASS
	When measured in accordance with the method defined in 7.1.4, except on designated zones, the localized minimum thickness shall be greater than 300 µm and the minimum average thickness shall be equal to or greater than 350 µm. For designated zones, localized minimum thickness of 200 µm is permissible.	
5.6	Non porosity	PASS
	When tested in accordance with the test method described in 7.2.4 with a tension of 1500 V, the coated body of the component shall be free from porosity i.e. no electrical puncture shall occur. In designated zones, electrical punctures are permitted.	
6	Performance Requirements	Result
6.2	Impact Resistance	PASS
	When tested in accordance with the test method described in 7.2.2, for coated fittings and accessories no electrical puncture is permitted.	
6.3	Indentation resistance	PASS
	The indentation resistance shall be assessed by testing in accordance with the test method defined in 7.2.3. The indentation depth of the TMPO coating shall not exceed 0,3 mm or 30 % of the initial coating thickness measured.	
6.4	Durability	PASS
6.4.1	Heat ageing resistance in water After undergoing the test procedure of 7.2.5.1, the coating shall have an average adhesion of at least 6 MPa on each sample.	

Test Methods

7.1.1 Surface preparation

The blasted surface of the component should be checked visually for compliance according to EN ISO 8501-1.

Test Results

Sample No.	Cleaning Level	Result
1	Sa 2½	Pass
2	Sa 2½	Pass
3	Sa 2½	Pass
4	Sa 2½	Pass
5	Sa 2½	Pass

7.1.2 Appearance

The appearance of the finished coating shall be checked visually.

Test Results

Sample No.	Uniform Color	Smooth Surface	Defects Observed	Result
1	Yes	Yes	None	Pass
2	Yes	Yes	None	Pass
3	Yes	Yes	None	Pass
4	Yes	Yes	None	Pass
5	Yes	Yes	None	Pass

7.1.3 Adhesion

Adhesion shall be determined using the pull off test according to EN ISO 4624.

Adhesion shall be determined on flat surfaces of a coated component or coated test plates (if more convenient). Test plates shall be manufactured of identical material and be coated by the identical procedure. The coating thickness at the test area shall be between 350 µm and 700 µm.

EN ISO 4624: Paints and Varnishes — Pull-Off Test For Adhesion

Scope

This International Standard specifies three methods for determining the adhesion by carrying out a pull-off test on a single coating or a multi-coat system of paint, varnish or related product.

Procedure

Number of determinations

Carry out at least six determinations, i.e. using at least six test assemblies.

Ambient conditions

Carry out the test at 23 ± 2 °C and a relative humidity of 50 ± 5 %.

Adhesive

Prepare and apply the adhesive in accordance with the manufacturer's instructions. Use the minimum quantity of adhesive required to produce a firm, continuous and even bond between the components of the test assembly. Remove any excess adhesive immediately if possible.

Preparing and applying adhesive procedure

- The dolly surface and coating surface are grit-sanded and cleaned with alcohol and air.
- Adhesive components are mixed for 1 minute.

- The mixed adhesive is applied to the dolly and attached to the test surface.
- The samples are heated at 70°C for 1 hour in the oven, and then left to cool for 24 hours after being taken out of the oven.
- The dollies are pulled and the force is measured via a Pull-off test device.

Test Results

Sample Number	Breaking Strength (MPa)
1	10.192
2	10.974
3	10.291
4	9.829
5	8.716
6	9.797
7	10.382
8	10.522
9	11.009
10	10.483
Average	10.2195
Standart Deviation	0,6307

Sample Images

During Test**Post-Test****7.1.4 Coating thickness**

The thickness of the coating shall be measured with non-destructive instruments with a measuring accuracy of $\pm 1\%$.

A minimum of 10 measurements evenly distributed over the component shall be carried out. The average and minimum localized thickness shall then be determined.

Test Results

Sample No.	Average Thickness (μm)	Localized Minimum Thickness (μm)	Result
1	350	310	Pass
2	352	312	Pass
3	348	305	Pass
4	351	307	Pass
5	349	310	Pass

7.2.2 Impact resistance

The impact resistance shall be tested by dropping a weight on the coating with a given energy and checking the absence of damage. The specimen shall be supported by a rigid construction such that the impact energy caused by the impact of the falling weight is absorbed by the specimen. The front surface of the falling weight shall be a section of a sphere of hardened steel with a diameter of 25 mm. Ten impacts separated by at least 30 mm shall be carried out.

The test shall be carried out at an ambient temperature of $(23 \pm 2) ^\circ\text{C}$. The impact energy (E) shall be $(5 \text{ Nm/mm coating thickness}) \pm 5 \%$. The height of fall of the weight (500 g) shall be 1 m. Care shall be taken to ensure that little friction occurs when the falling weight is dropped and that the impact energy is maintained at a constant level.

The absence of impact damage shall be tested after each impact using the non-porosity test according to 7.2.4.

Test Results

Sample No.	Impact Energy (Nm)	Porosity Test Result	Visual Inspection
1	1.75	Pass	No visible damage
2	1.75	Pass	No visible damage
3	1.75	Pass	No visible damage
4	1.75	Pass	No visible damage
5	1.75	Pass	No visible damage

7.2.3 Indentation resistance

The test is to be carried out on five specimens.

The test apparatus consists of a 250 g metal bar which can receive an additional weight. A metal pin with a smooth end face measuring 1,8 mm in diameter ($2,5 \text{ mm}^2$ of punch area) shall be attached centrically to the bottom end of the bar. The total weight shall be 2,5 kg which equates to a pressure of 10 N/mm^2 .

A penetrometer comprising a dial gauge with an accuracy of 0,05 mm is required.

The test shall be carried out at a temperature of $(23 \pm 2) ^\circ\text{C}$. After a temperature stabilization period of one hour, the punch without additional weight shall be slowly and carefully placed on the specimen and the zero value determined within 5 s. The additional weight shall subsequently be applied slowly and carefully. The depth of penetration (indentation depth) shall be measured on the penetrometer scale to within 0,05 mm after a loading period of 24 h and 48 h.

Test Results

Sample No.	Initial Thickness (μm)	Indentation Depth (24h, mm)	Indentation Depth (48h, mm)	Result
1	355	0.10	0.15	Pass
2	345	0.12	0.16	Pass
3	350	0.11	0.15	Pass
4	348	0.12	0.17	Pass
5	352	0.10	0.15	Pass

7.2.4 Non porosity

AC or DC or impact current devices with a tension of 1500 V and conductive rubber test electrodes are required as test instruments. With impact, current capacitive earthing is possible which allows earthing without damaging the coating.

During the measurement the test electrode shall be in contact with the surface of the coating, since any significant air gap would falsify the result.

Test Result

Sample No.	Test Voltage (V)	Electrical Puncture Detected	Result
1	1500	None	Pass
2	1500	None	Pass
3	1500	None	Pass
4	1500	None	Pass
5	1500	None	Pass

7.2.5 Durability

7.2.5.1 Heat ageing resistance in water

These test samples shall be immersed for 7 days in deionized water at $(50 \pm 2) ^\circ\text{C}$.

After this test period the samples shall be taken from the water bath, cooled and dried. After the coating has equilibrated to $(23 \pm 2) ^\circ\text{C}$, the adhesion test shall be determined according to EN ISO 4624 on three test positions per test sample.

EN ISO 4624: Paints and Varnishes — Pull-Off Test For Adhesion

Scope

This International Standard specifies three methods for determining the adhesion by carrying out a pull-off test on a single coating or a multi-coat system of paint, varnish or related product.

Procedure

Number of determinations

Carry out at least six determinations, i.e. using at least six test assemblies.

Ambient conditions

Carry out the test at $23 \pm 2 ^\circ\text{C}$ and a relative humidity of $50 \pm 5 \%$.

Adhesive

Prepare and apply the adhesive in accordance with the manufacturer's instructions. Use the minimum quantity of adhesive required to produce a firm, continuous and even bond between the components of the test assembly. Remove any excess adhesive immediately if possible.

Preparing and applying adhesive procedure

- The dolly surface and coating surface are grit-sanded and cleaned with alcohol and air.
- Adhesive components are mixed for 1 minute.
- The mixed adhesive is applied to the dolly and attached to the test surface.
- The samples are heated at 70°C for 1 hour in the oven, and then left to cool for 24 hours after being taken out of the oven.
- The dollies are pulled and the force is measured via a Pull-off test device.

Test Results

Sample Number	Breaking Strength (MPa)
1	7.056
2	7.805
3	7.616
4	6.841
5	8.716
6	5.493
7	7.035
8	7.632
9	8.690
10	7.646
Average	7,453
Standart Devision	0,9365

Post-Test Sample Image*****End Of Report*****