TEST REPORT

Applicant   : StaticTech

Address   : 6200 Bury Drive,Eden Prairie,MN 55346,USA

Report on the submitted sample said to be:

Sample Name	:	ESD Rubber Mat
Description	:	Normal
Model/type	:	SP2051, SP2052, SP2053, SP2054, SP2055 SP2056. SP2057, SP2058, SP2059
Manufacturer	:	Static Tech
Address	:	6200 Bury Drive, Eden Prairie, MN 55346, USA
Received Date	:	Jul.09, 2017
tested Date	:	Jul.09, 2017 - Jul.14, 2017

Test Requested	Test result
IEC 61340-4-1:2015	
Electrostatics – Part 4-1: Standard test methods for specific applications – Electrical resistance of floor coverings and installed floors	**Pass**

Prepared by: Examine By :   Approved(Manager):

Eva   *Calvin Chen*   *Machael Mo*

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Clause	Requirement - Test	Result - Remark	Verdict
5	Apparatus		P
5.1	Resistance measuring apparatus		P
	This apparatus consists of a self-contained resistance meter (ohmmeter) or power supply and current meter in the appropriate configuration for resistance measurement, with a ±10 % accuracy, and capable of the following requirements.		P
5.1.1	Laboratory evaluations		P
	The apparatus shall have a circuit voltage while under load of – 10 V ± 0,5 V for resistance below $1,0 \times 10^6$ Ω – 100 V ± 5 V for resistance between $1,0 \times 10^6$ Ω and $1,0 \times 10^{11}$ Ω – 500 V ± 25 V for resistance above $1,0 \times 10^{11}$ Ω		P
5.1.2	Acceptance testing		P
	A laboratory evaluation apparatus shall be used for acceptance testing or an apparatus with an open-circuit voltage of – 10 V ± 0,5 V for resistance below $1,0 \times 10^6$ Ω – 100 V ± 5 V for resistance between $1,0 \times 10^6$ Ω and $1,0 \times 10^{11}$ Ω – 500 V ± 25 V for resistance above $1,0 \times 10^{11}$ Ω.		P
5.2	Measuring electrodes		P
	a)2,5 kg ± 0,25 kg for measurements on hard, non-conformable surfaces; or		P
	b)5,0 kg ± 0,25 kg for measurements on all other surfaces.		P
5.3	Counter-electrode		P
	The counter-electrode consists of a flat stainless steel plate, 600 mm ± 10 mm square and of 1 mm (nominal) thickness, with a terminal for connection to the resistance measuring apparatus.		P
5.4	Support plates		P
	For point-to-point resistance measurements, where required (see Clause 6) and resistance to ground measurements: support plates shall be equal in area to the test specimens, of sufficient rigidity to hold specimens together for testing, and made from insulating material with a vertical resistance at least one order of magnitude greater than the expected		P

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	value or if the expected value is unknown, greater than 1014 Ω.		
5.5	Insulating plate		P
	For vertical resistance measurements: a flat plate 640 mm ± 10 mm square, 5 mm ± 1 mm thick, made from insulating material with a vertical resistance greater than 1014 Ω shall be used. For point-to-point and resistance to ground measurements: a flat plate 1 300 mm ± 10 mm by 600 mm ± 10 mm, 5 mm ± 1 mm thick, made from insulating material with a vertical resistance at least one order of magnitude greater than the expected value or if the expected value is unknown, greater than 1014 Ω shall be used.		P
6	Sampling for laboratory evaluations		P
	Selection and sampling of test materials shall be carried out according to ISO 1957. Although ISO 1957 is intended for textile floor coverings, its principles are relevant to other types of floor covering.		P
7	Preparation of test specimens		P
	If considered necessary, specimens shall be cleaned before conditioning and testing. Cleaning shall be carried out according to the manufacturer's instructions or as otherwise agreed.		P
8	Atmosphere for conditioning and testing		P
	Unless otherwise agreed or specified, the atmosphere for conditioning and testing shall be 23 °C ± 2 °C and 12 % ± 3 % relative humidity. The conditioning time prior to testing shall be at least 48 h. Textile floor coverings are preferably pre-conditioned for at least 24 h at 20 °C ± 2 °C and 65 % ± 3 % relative humidity prior to conditioning and testing.		P
9	Test procedures		P
9.1	Cleaning electrodes		P
	Prior to each test sequence, clean the contact area of the measuring and counter-electrodes using a low-linting cloth moistened with either ethanol or propan-2-ol (≥95 % concentration). Allow the surfaces to dry before making measurements		P
9.2	Point-to-point resistance		P
	a) the measured resistance at 10 V is greater than 1,0 × 106 Ω and the measured resistance at 100 V is less		P

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	than $1,0 \times 106\ \Omega$; or b) the measured resistance at 100 V is greater than $1,0 \times 1011\ \Omega$ and the measured resistance at 500 V is less than $1,0 \times 1011\ \Omega$.		
9.3	Vertical resistance (laboratory evaluations only)		P
	a) the measured resistance at 10 V is greater than $1,0 \times 106\ \Omega$ and the measured resistance at 100 V is less than $1,0 \times 106\ \Omega$; or b) the measured resistance at 100 V is greater than $1,0 \times 1011\ \Omega$ and the measured resistance at 500 V is less than $1,0 \times 1011\ \Omega$.		P
9.4	Resistance to ground		P
	a) the measured resistance at 10 V is greater than $1,0 \times 106\ \Omega$ and the measured resistance at 100 V is less than $1,0 \times 106\ \Omega$; or b) the measured resistance at 100 V is greater than $1,0 \times 1011\ \Omega$ and the measured resistance at 500 V is less than $1,0 \times 1011\ \Omega$.		P
10	Calculation and expression of results		P
	For each sample and each type of measurement, calculate the geometric mean of the individual readings. Express both the individual results and the geometric means to two significant figures.		P
11	Test report		P
	The test report shall include at least the following information:		P
	a) reference to this International Standard, i.e. IEC 61340-4-1;		P
	b) all the information necessary for complete identification of test samples;		P
	c) date of testing;	Jul.15, 2017-	P
	d) the atmosphere for pre-conditioning, conditioning and testing as follows: – for laboratory evaluations: temperature and relative humidity during pre-conditioning (if used), conditioning and testing, and the duration of any pre-conditioning and conditioning; – for tests on installed floors: temperature and relative humidity during testing;	25℃ 52% RH	P
	e) details of any cleaning or finishing procedures;		P
	f) details of any procedures used to combine small		P

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	specimens together;		
	g) details of any support plates used and procedures and materials used to fix samples to support plates;		P
	h) details of any procedures and materials used to fix groundable point(s) to samples;		P
	i) type of measurement: point-to-point resistance, vertical resistance, resistance to ground;		P
	j) the circuit voltage under load used when making measurements;		P
	k) all individual results for each type of measurement on each specimen;		P
	l) the geometric mean of all results for each type of measurement on each sample;		P
	m) any opera+tions not specified in this part of IEC 61340, or in any standard to which normative reference is made, or regarded as optional, which might have affected the results.		P

TEST RESULTS

Resistance meter set to apply 100V for 15 seconds; test atmosphere 23℃, 25% relative humidity

Test Area	Surface Resistance /	Surface Resistivity /
Surface Resistivity / top surface		
1	20.5×10^6	4.06×10^8
2	9.7×10^6	1.92×10^8
3	6.1×10^6	1.21×10^8
4	3.58×10^6	7.09×10^7
5	25.3×10^6	5.01×10^8
Outer surface mean	Mean = 1.30×10^7	Mean = 2.57×10^8
bottom surface		
1	1.92×10^4	3.80×10^5
2	2.53×10^4	5.01×10^5
3	2.71×10^4	5.37×10^5
4	2.02×10^4	4.00×10^5
5	2.23×10^4	4.42×10^5
Inner surface mean	Mean = 2.28×10^4	Mean = 4.52×10^5

1. Mean values are the geometrical mean, not the arithmetic mean

2. Surface resistivity is derived by multiplying the surface resistance by a form factor related to the dimensions of the electrodes. The form factor for the electrodes in use at SATRA is 19.8

PHOTOS

Photo 1 view ☒front ☐back ☐side ☐top ☐internal ☐bottom	
Photo 2 view ☐front ☒back ☐side ☐top ☐internal ☐bottom	

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