ESD Facility Certification Newsletter

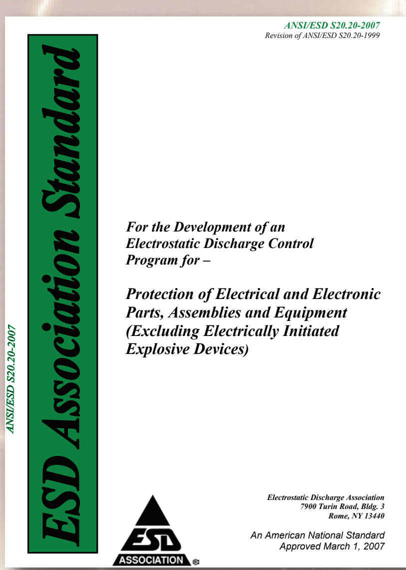
sponsored by the ESD Association

June 2012

The ESD Association Facility Certification Program evaluates a facility's ESD program based on industry standard ANSI/ESD S20.20-2007 or IEC 61340-5-1.

ANSI/ESD S20.20-2007 Document Status

ANSI/ESD S20.20-2007 is currently being revised during the five-year review. The revised document is in the work-in-progress (WIP) stage and will be reviewed by the Technical and Advisory Support (TAS) Committee during the June 2012 meeting series.



ANSI/ESD S20.20-2007
Revision of ANSI/ESD S20.20-1999

ESD Association Standard

ANSI/ESD S20.20-2007

For the Development of an Electrostatic Discharge Control Program for –

Protection of Electrical and Electronic Parts, Assemblies and Equipment (Excluding Electrically Initiated Explosive Devices)

Electrostatic Discharge Association
7900 Turin Road, Bldg. 3
Rome, NY 13440

An American National Standard
Approved March 1, 2007

Facility Certification Program Checklist

We have received many questions regarding question #8 on the checklist. **Have all ESD control items been qualified for use per the ESD Association Standards listed in ANSI/ESD S20.20-2007 (tables 2 and 3)?** Several comments have been made during witness audits (or when a knowledgeable person is involved in an S20.20 assessment) regarding how this question is being handled – or in most cases – not handled.

The intent of this question is to ensure that the materials selected for ESD Control meet the requirements of the standards in all environments. The compliance verification plan ensures that the control items meet the requirements at the time of the measurement and are properly connected. What you as an assessor should look for is objective evidence (documents) that shows the user company has the required data to ensure the qualification requirements for the ESD Control items listed in "The Plan" (e.g. wrist straps, flooring, footwear, tables, table mats, etc.) have been met.

The objective evidence can be in the form of supplier data sheets, or test reports from an internal laboratory or from a third party laboratory. The documentation should contain language that the material was tested to ESD Association test methods (see Table 1 below for which test methods apply to which materials), and that they meet the requirements of either ANSI/ESD S20.20 or in the case of packaging materials ANSI/ESD S541. If the materials were tested to another specification, the organization would have to determine if the standards were equivalent (such as the IEC 61340-4 series of test methods) or have a tailoring statement on the use of different test methods.

TABLE 1

ESD Control Item	Relevant Specification
Wrist Straps	ANSI/ESD S1.1
Garments	ANSI/ESD STM2.1
Ionizing systems	ANSI/ESD STM3.1
Worksurfaces (tables/table mats)	ANSI/ESD S4.1 and/or STM4.2
Flooring (resilient flooring or mats)	ANSI/ESD S7.1
Footwear (shoes)	ANSI/ESD STM9.1
Footwear (heel straps)	ANSI/ESD SP9.2
Flooring/Footwear System test	ANSI/ESD STM97.1, STM97.2
Packaging Materials	ANSI/ESD S541, STM11.11, STM11.12, STM11.13, STM11.31
Seating/Chairs	ANSI/ESD STM12.1

Continued...

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Figure 1 is a representative supplier data sheet that would meet the requirements noted above. Figure 2 is a representative third party test report that would meet the requirements. An internal laboratory test report should be similar to the third party example given in Figure 2.

If a company has no objective evidence present, and no plans to obtain it, a major non-conformance would be appropriate. If they have data sheets for some of their products, and plan to either obtain others or investigate writing a tailoring statement for items that data sheets or test reports may not be available, then either no finding, or an observation would be appropriate.

A note about tailoring statements – we would expect to see more tailoring on this area as people understand this requirement. A facility that, for instance, has been using an ESD floor and a certain brand of shoes, would probably find writing a tailoring statement useful rather than trying to obtain qualification test data for the particular floor/footwear system they are using. An appropriate data package for this situation would include compliance verification data and some body voltage measurements during different seasons of use to capture the various environmental conditions that the facility would see. This data package would need to be generated for each facility seeking certification, as flooring, footwear, and environmental conditions could easily be different at different facilities.

If you have any questions regarding this, or any other topic, do not hesitate to contact the ESD Association.

3M™ 8400 Series ESD Floor Tile

Mechanical Properties (typical)

Static-Dissipative Floor Tile (Model numbers 8411-8427)
Conductive Floor Tile (Model numbers 8431-8447)

Flammability Flame Spread Index (ASTM E162/ASTM E84) Smoke Development (ASTM E84)	 Meets Class 1 requirements Meets Class 1 requirements
Critical Radiant Flux (ASTM E648/NFPA 253)	> 1.1w/cm²
Physical Specifications	Meets ASTM F1066-99 Meets US Federal Specification SS-T-312B
Hardness (ASTM D 2240)	55+/- Shore D
Flexibility (CSA 126.2) 100 mm mandrel @ 25°C	Does not break
Abrasion Resistance (ASTM D 3389) Taber H22 wheel, 70 rpm	0.445 grams (weight of tile removed per 1000 cycles)
Static Load (ASTM F970) 125 lbs., 0.25 in. diameter indentor foot, 24 hours	2500 PSI point load

Electrical Properties (typical)

	Static-Dissipative	Conductive
Electrical Resistance (Surface-to-ground, ESD S7.1)	1×10^6 to 1×10^9 ohms	2.5×10^4 to 1×10^6 ohms
Static Generation (With conductive footwear at 20% RH)	< 50 volts	< 25 volts
Static Decay (Federal TM 101B, Method 4046 @ 15% RH [5000 volts to 0 volts])	<0.10 sec.	<0.03 sec.

Sizes

Static-Dissipative and Conductive

0.125 x 12 x 12 in. (3.2 x 305 x 305 mm)
0.125 x 24.25 x 24.25 in. (3.2 x 615 x 615 mm)
– for raised access floor panels
0.125 x 24 x 24 in. (3.2 x 610 x 610 mm)
0.125 x 36 x 36 in. (3.2 x 915 x 915 mm)
– for seamwelded installations

Figure 1 – An Acceptable Supplier Data Sheet – applicable language is highlighted

Specialists in Materials Testing and Technical Services

TEST REPORT

Transforming Technologies
Workstation Mat

TESTED FOR

Point-to-Point Resistance
Point-to-Groundable-Point Resistance
Per ANSI/ESD S4.1-2006

Report #: 2008-083
October 17, 2008

3612 3rd Pl. NW, Rochester, MN 55901 • Phone: 507-292-0230 • Fax: 507-292-0698 • www.microstatlabs.com

SUMMARY

Six samples of worksurface mat material were received for testing. The samples were supplied in 24" x 12" panels and had two groundable points fixed 2 inches from the edges in the bottom two corners of the mat samples. Testing per paragraph 6.2 "*Material Evaluation*" of ANSI/ESD S4.1-2006 was requested. All worksurface samples were in the high 10^6 to low 10^7 ohms range for point-to-groundable-point resistance measurements, and in the low 10^7 ohms range for point-to-point resistance measurements.

EXPERIMENTAL AND DISCUSSION

All testing was carried out per the methods defined in paragraph 6.2 of ANSI/ESD S4.1-2006. Samples 1 – 3 were conditioned at 12% R.H. and 72°F for 52 hours prior to testing them in the controlled environment. Samples 4 – 6 were conditioned at 50% R.H. and 72°F for 51.5 hours prior to testing them in the controlled environment. All data is included below in Tables 1 and 2.

Table 1
Point-to-Groundable-Point Resistance Measurement Data

Test Location	12 % R.H. Samples			50 % R.H. Samples		
	1	2	3	4	5	6
A to 1	$1.05 \times 10^7 \Omega$	$9.43 \times 10^6 \Omega$	$9.56 \times 10^6 \Omega$	$6.42 \times 10^6 \Omega$	$6.81 \times 10^6 \Omega$	$7.22 \times 10^6 \Omega$
A to 2	$1.01 \times 10^7 \Omega$	$1.07 \times 10^7 \Omega$	$9.25 \times 10^6 \Omega$	$6.33 \times 10^6 \Omega$	$8.06 \times 10^6 \Omega$	$6.67 \times 10^6 \Omega$
A to 3	$1.01 \times 10^7 \Omega$	$9.40 \times 10^6 \Omega$	$1.03 \times 10^7 \Omega$	$5.52 \times 10^6 \Omega$	$7.07 \times 10^6 \Omega$	$8.07 \times 10^6 \Omega$
B to 1	$1.04 \times 10^7 \Omega$	$9.94 \times 10^6 \Omega$	$9.26 \times 10^6 \Omega$	$5.94 \times 10^6 \Omega$	$7.48 \times 10^6 \Omega$	$7.00 \times 10^6 \Omega$
B to 2	$1.00 \times 10^7 \Omega$	$1.03 \times 10^7 \Omega$	$9.45 \times 10^6 \Omega$	$6.36 \times 10^6 \Omega$	$7.45 \times 10^6 \Omega$	$7.14 \times 10^6 \Omega$
B to 3	$9.84 \times 10^6 \Omega$	$9.46 \times 10^6 \Omega$	$1.15 \times 10^7 \Omega$	$5.88 \times 10^6 \Omega$	$6.65 \times 10^6 \Omega$	$7.80 \times 10^6 \Omega$
Minimum	$9.25 \times 10^6 \Omega$			$5.52 \times 10^6 \Omega$		
Median	$9.99 \times 10^6 \Omega$			$6.91 \times 10^6 \Omega$		
Maximum	$1.15 \times 10^7 \Omega$			$8.07 \times 10^6 \Omega$		

Table 2
Point-to-Point Resistance Measurement Data

Test Location	12 % R.H. Samples			50 % R.H. Samples		
	1	2	3	4	5	6
A	$2.72 \times 10^7 \Omega$	$2.44 \times 10^7 \Omega$	$2.18 \times 10^7 \Omega$	$1.51 \times 10^7 \Omega$	$1.85 \times 10^7 \Omega$	$1.65 \times 10^7 \Omega$
B	$2.25 \times 10^7 \Omega$	$2.26 \times 10^7 \Omega$	$2.32 \times 10^7 \Omega$	$1.48 \times 10^7 \Omega$	$1.88 \times 10^7 \Omega$	$1.51 \times 10^7 \Omega$
Minimum	$2.18 \times 10^7 \Omega$			$1.48 \times 10^7 \Omega$		
Median	$2.29 \times 10^7 \Omega$			$1.58 \times 10^7 \Omega$		
Maximum	$2.72 \times 10^7 \Omega$			$1.88 \times 10^7 \Omega$		

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Figure 2 – Example Third Party Test Report – applicable language is highlighted

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John Kinnear is an IBM Senior Engineer specializing in process & system technology, and facility certification in accordance with ANSI/ESD S20.20. He has a BS degree from University of Buffalo and a MS degree from Syracuse University. John has coordinated the testing of large mainframes for compliance to EMC, Safety, Environmental, Shipping and Volatile Organic Emission standards. He has also been the lead engineer on testing large mainframe systems to EMC emissions and immunity standards for FCC, CE Mark, VCCI and other national requirements. As a member of the ESD Association since 1990, John has served in several Standards Development Committees as well as association management positions. John currently serves as a member of the ESD Association Board of Directors and as committee chair of the Facility Certification Program. John is the appointed Technical Adviser to the United States National Committee/IEC Technical Committee 101, where he represents the United States to the International Electrotechnical Commission (IEC). John was a developer of the ESD Association's Facility Certification (ANSI/ESD S20.20) development program including the Lead Assessor training, ISO Registrar Certification, and witness audits. John has served in every ESD Association officer's position, including Vice President, Senior Vice President and President. He is the past Chairman of the EOS/ESD Symposium Technical Program Committee and past General Chairman of the 2004 EOS/ESD Symposium. For his contributions to the ESD Association, John was presented with the Outstanding Contribution Award in September, 2006, from the ESD Association.

Carl Newberg is the president of MicroStat Laboratories and is a director of S20.20 Manufacturing Programs for Dangelmayer Associates, L.L.C. He has a BS degree and a professional engineer's license in metallurgical engineering, and a MS degree in materials science. He is an iNARTE Certified ESD Engineer, and is one of the first to test and receive certification from the ESDA as a Certified ESD Program Manager. He has held positions as the ESD Program Manager for Western Digital Corporation, and has been actively involved in the corporate ESD programs within Seagate Technology and IBM Corporation. Currently he works for Magnecomp Precision Technology as a Senior Scientist – Contamination Control. Carl has been a member of the ESD Association since 1995 and was a member of the ESDA Board of directors from 2005 to 2011. Carl was the Technical Program Committee Chairman for the 2004 EOS/ESD Symposium, Vice Chairman for the 2005 Symposium, and General Chairman for the 2006 Symposium. Since 2005, Carl has been actively involved in standards development for the ESD Association, and he served as the Standards Business Unit Manager from 2009 to 2011, overseeing standards development for the ESD Association. Carl was the 2009 recipient of the David F. Barber Sr. Memorial award from the ESD Association.

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