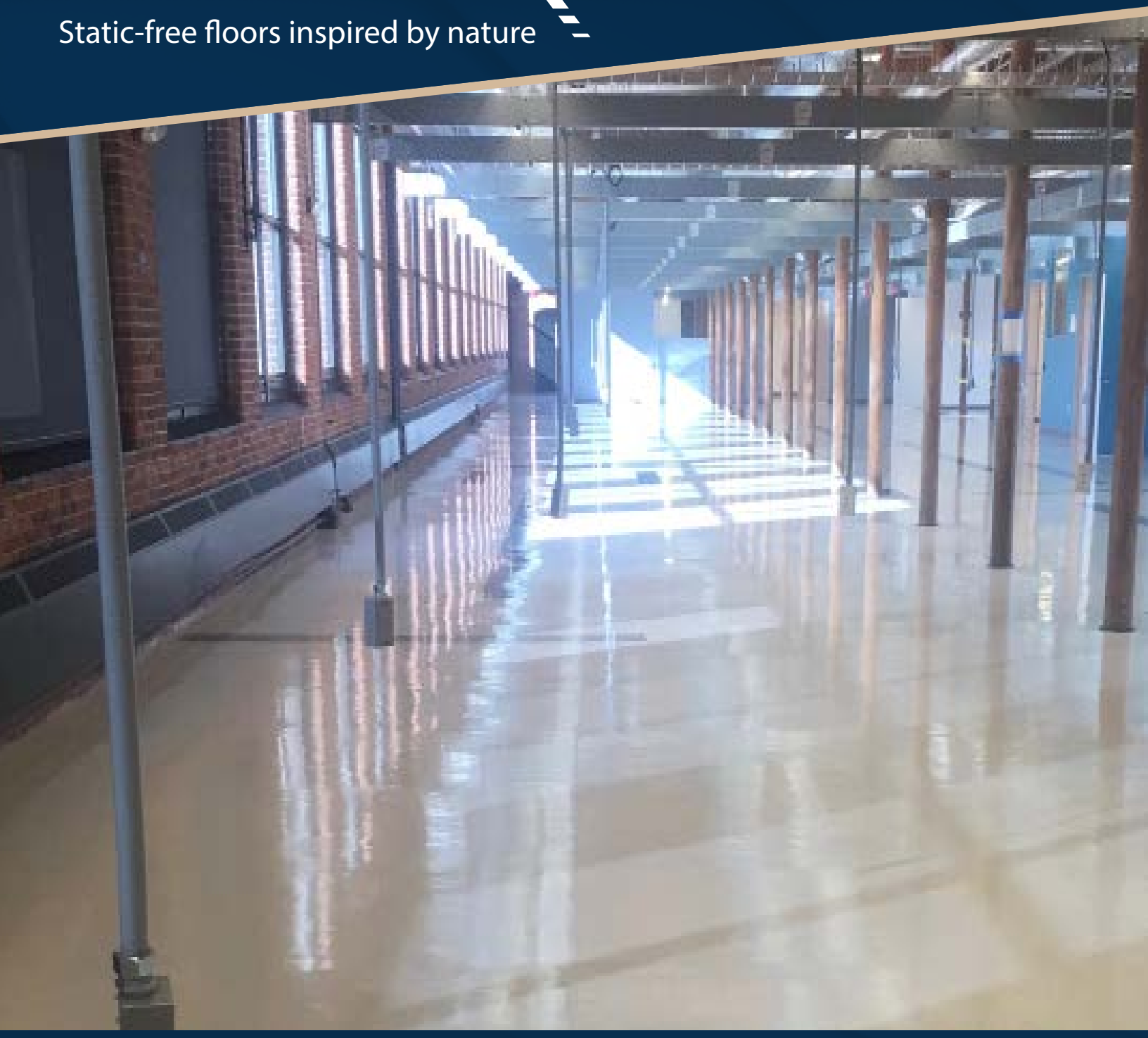
staticworx

Static-free floors inspired by nature



Test Reports with AmeriWorx® Conductive Vinyl Tile

ANSI S20.20 2007 | ANSI S20.20 2014 | ESD S7.1 | ESD STM97.1 | ESD STM 7.2

ANSI S20.20-2007 Approved February 11, 2007 ESD Association*

What was expected in 2007: Personnel Grounding Requirement

PERSONNEL GROUNDING TECHNICAL REQUIREMENT	PRODUCT QUALIFICATION[1]		COMPLIANCE VERIFCATION	
	TEST METHOD	REQUIRED LIMIT(S)	TEST METHOD	REQUIRED LIMIT(S)
Wrist Strap System[2]	ANSI/ESD S1.1 (Section 5.11)	< 3.5×10^7 ohms	ESD TR53 Wrist Strap Section	< 3.5×10^7 ohms
Flooring/Footwear System - Method 1	ANSI/ESD STM97.1	< 3.5×10^7 ohms	ESD TR53 Flooring Section	< 3.5×10^7 ohms
			ESD TR53 Footwear Section	< 3.5×10^7 ohms
Flooring/Footwear System – Method 2 (both required)	ANSI/ESD STM97.1	< 10^9 ohms	ESD TR53 Flooring Section	< 1.0×10^9 ohms
	ANSI/ESD STM97.2	< 100 volts	ESD TR53 Footwear Section	< 1.0×10^9 ohms

1. Product qualification is normally conducted during the initial selection of ESD control products and materials. Any of the following methods can be used: product specification review, independent laboratory evaluation or internal laboratory evaluation.

2. For situations where an ESD garment is used as part of the wrist strap grounding path, the total system resistance including the person, garment and grounding cord shall be less than 3.5×10^7 ohms.

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What was expected in 2007: EPA ESD Control Items

TECHNICAL REQUIREMENT	ESD CONTROL ITEM	PRODUCT QUALIFICATION[1]		COMPLIANCE VERIFICATION	
		TEST METHOD	REQUIRED LIMIT(S)[2]	TEST METHOD	REQUIRED LIMIT(S)
EPA	**Worksurface**	ANSI/ESD S 4.1 and/or ANSI/ESD STM 4.2	< 1 x 10^9 ohms and/ or < 200 volts	ESD TR53 Worksurface Section	< 1 x 10^9 ohms resistance to ground
	Wrist Strap Cord	ANSI/ESD S1.1	0.8 x 10^6 to 1.2 x 10^6 ohms	For compliance verification of a wrist strap system, see Personnel Grounding Requirement Table.	
	Wrist Strap Cuff	ANSI/ESD S1.1	Interior > 1 x 10^5 ohms		
			Exterior > 1 x 10^7 ohms		
	Wrist Strap Cord Bending Life	ANSI/ESD S1.1	> 16,000 cycles		
	Footwear	ANSI/ESD STM9.1	< 1 x 10^9 ohms	See Personnel Grounding Requirement Table	
	Foot Grounders	ESD SP9.2	< 1 x 10^9 ohms		
	Flooring	ANSI/ESD S7.1	< 1 x 10^9 ohms		
	Seating	ANSI/ESD STM 12.1	< 1 x 10^9 ohms	ESD TR53 Seating Section	< 1 x 10^9 ohms resistance to ground
	Ionization other than Room Systems	ANSI/ESD STM 3.1 • Discharge time • Offset voltage	User defined < ± 50 volts	ESD TR53[3] • Discharge time • Offset voltage	User defined < ± 50 volts
	Ionization (Room Systems)	ANSI/ESD STM 3.1 • Discharge time • Offset voltage	User defined < ± 150 volts	ESD TR53[3] • Discharge time • Offset voltage	User defined < ± 150 volts
	Shelving	ANSI/ESD S4.1	< 1 x 10^9 ohms	ESD TR53 Worksurface Section	< 1 x 10^9 ohms resistance to ground
	Mobile Equipment (Working Surfaces)	ANSI/ESD S4.1	< 1 x 10^9 ohms	ESD TR53 Mobile Equipment Section	< 1 x 10^9 ohms resistance to ground
	Continuous Monitors	User defined	User defined	ESD TR53 Continuous Monitors Section	Manufacturer defined
	Garments	Static Control Garment (ANSI/ESD STM2.1)	< 1 x 10^{11} ohms	ESD TR53 Garments Section	< 1 x 10^{11} ohms
		Groundable Static Control Garment (ANSI/ESD STM2.1)	< 1 x 10^9 ohms	ESD TR53 Garments Section	< 1 x 10^9 ohms
		Groundable Static Control Garment System (ANSI/ESD STM2.1)	< 3.5 x 10^7 ohms	ESD TR53 Garments Section	< 3.5 x 10^7 ohms

1. Product qualification is normally conducted during the initial selection of ESD control products and materials. Any of the following methods can be used: product specification review, independent laboratory evaluation or internal laboratory evaluation.

2. For standards that have multiple resistance test methods, these limits apply to all methods.

3. For additional information on periodic testing of Ionizers, see ANSI/ESD SP3.3.

ANSI S20.20-2014 Approved July 31, 2014 ESD Association*

What was expected in 2014: Personnel Grounding Requirement

PERSONNEL GROUNDING TECHNICAL REQUIREMENT	PRODUCT QUALIFICATION[4]		COMPLIANCE VERIFCATION	
	TEST METHOD	REQUIRED LIMIT(S)	TEST METHOD	REQUIRED LIMIT(S)
Wrist Strap System	ANSI/ESD S1.1 (Section 6.11)	< 3.5×10^7 ohms	ESD TR53 Wrist Strap Section	< 3.5×10^7 ohms
Flooring / Footwear System[5] – (Both limits must be met)	ANSI/ESD STM97.1	< 1.0×10^9 ohms	ESD TR53 Flooring Section	< 1.0×10^9 ohms[(6)]
	ANSI/ESD STM97.2	< 100 volts Peak	ESD TR53 Footwear Section	< 1.0×10^9 ohms[(6)]

4. Product qualification is normally conducted during the initial selection of ESD control products and materials. Any of the following methods can be used: product specification review, independent laboratory evaluation or internal laboratory evaluation.

5. For ESD control footwear/flooring systems that were installed before the adoption of this standard, on-going compliance verification records can be used as evidence of product qualification.

6. The required limit of < 1.0×10^9 ohm is the "maximum" allowed value. The user should document the resistance values that were measured for product qualification for the footwear and the floor to comply with the < 100 volts body voltage generation and use these resistances for compliance verification.

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ANSI S20.20-2014 Approved July 31, 2014 ESD Association*

What was expected in 2014: EPA ESD Control Items

TECHNICAL REQUIREMENT	ESD CONTROL ITEM	PRODUCT QUALIFICATION[1]		COMPLIANCE VERIFICATION	
		TEST METHOD	REQUIRED LIMIT(S)[2]	TEST METHOD	REQUIRED LIMIT(S)
EPA	**Worksurface[9,10] (Qualification can be done by either Test Method)**	ANSI/ESD S 4.1 and/or ANSI/ESD STM 4.2	Point to Point $< 1 \times 10^9$ ohms	ESD TR53 Worksurface Section	Point to Ground $< 1 \times 10^9$ ohms
			Point to Groundable Point $< 1 \times 10^9$ ohms		
			< 200 volts		
	Wrist Strap	ANSI/ESD S1.1	0.8×10^6 to 1.2×10^6 ohms		
	Wristband	ANSI/ESD S1.1	Interior $> 1 \times 10^5$ ohms	For compliance verification of a wrist strap system, see Personnel Grounding Requirement Table	
			Exterior $> 1 \times 10^7$ ohms		
	Personnel Ground wrist strap connection (non-monitored	ANSI/ESD S6.1	Point to Ground < 2 ohms	ESD TR53 Grounding Bonding Systems	Point to Ground < 2 ohms
	Footwear	ANSI/ESD STM9.1	Point to Groundable Point $< 1 \times 10^9$ ohms	For compliance verification of Footwear/ Flooring System, see Personnel Grounding	
	Foot Grounders	ESD SP9.2	Point to Groundable Point $< 1 \times 10^9$ ohms		
	Flooring	ANSI/ESD STM7.1	Point to Groundable Point $< 1 \times 10^9$ ohms		
			Point to Groundable Point $< 1 \times 10^9$ ohms		
	Seating	ANSI/ESD STM 12.1	Point to Groundable Point $< 1 \times 10^9$ ohms	ESD TR53 Seating Section	Point to Ground $< 1 \times 10^9$ ohms
	Ionization	ANSI/ESD STM3.1	Discharge Time User defined	ESD TR53[11] Ionization Section	Discharge Time User defined Offset Voltage -35 < V offset < 35
			Offset Voltage -35 < V offset < 35		
	Shelving (When used to store unprotected ESDS)	ANSI/ESD S4.1	Point to Groundable Point $< 1 \times 10^9$ ohms	ESD TR53 Worksurface Section	Point to Ground $< 1 \times 10^9$ ohms
	Mobile Equipment (Working Surfaces)	ANSI/ESD S4.1	Point to Point $< 1 \times 10^9$ ohms	ESD TR53 Worksurface Section	Point to Ground $< 1 \times 10^9$ ohms
			Point to Groundable Point $< 1 \times 10^9$ ohms		

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ANSI S20.20-2014 Approved July 31, 2014 ESD Association*

What was expected in 2014: EPA ESD Control Items (Continued)

TECHNICAL REQUIREMENT	ESD CONTROL ITEM	PRODUCT QUALIFICATION[1]		COMPLIANCE VERIFICATION	
		TEST METHOD	REQUIRED LIMIT(S)[2]	TEST METHOD	REQUIRED LIMIT(S)
EPA	**Electrical Soldering/ Desoldering Hand Tools**	ANSI/ESD S13.1	Tip to Ground < 2.0 ohms Tip < 20 millivolts Tip Leakage < 10 milliamps	ESD TR53 Soldering Iron Section Or ANSI/ESD S13.1 Section 6.1	Tip to Ground < 10 ohms
	Continuous Monitors	User defined	User defined	ESD TR53 Continuous Monitors Section	Manufacturer defined
	Static Control Garment	ANSI/ESD STM2.1	Point to Point < 1×10^{11} ohms	ESD TR53 Garments Section	Resistance Point to Point <1×10^{11} ohms
	Groundable Static Control Garment	ANSI/ESD STM2.1	Point to Groundable Point < 1×10^{9} ohms	ESD TR53 Garments Section	Resistance to Groundable Point < 1×10^{9} ohms
	Groundable Static Control Garment System	ANSI/ESD STM2.1	< 3.5×10^{7} ohms	ESD TR53 Personal Grounding with Garments Section	< 3.5 x 107 ohms

7.Product qualification is normally conducted during the initial selection of ESD control products and materials. Any of the following methods can be used: product specification review, independent laboratory evaluation or internal laboratory evaluation.

8. For standards that have multiple resistance test methods, these limits apply to all methods.

9. Worksurfaces are defined as any surface on which an unprotected ESDS item is placed.

10. Due to a wide variety of applications for worksurfaces, specific requirements that could be broadly applied are difficult to determine. If there is a concern for CDM failures, then a lower limit of 1×10^{6} ohms for point to point and point to groundable point should be considered.

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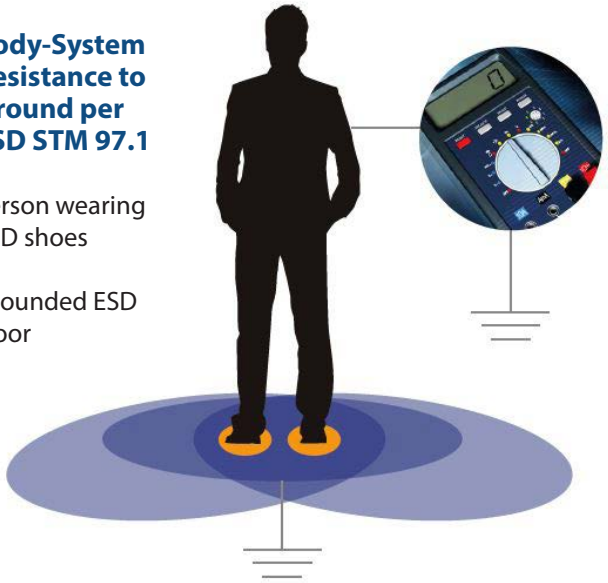
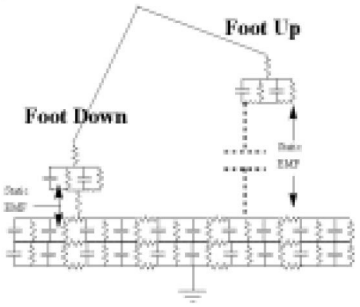
The following test reports show that AmeriWorx Tile meets all aspects of ESDA 20.20 as shown in the tables below:

Body-System Resistance to Ground per ESD STM 97.1

Person wearing ESD shoes

Grounded ESD Floor





EPA = ESD protected area. A defined location with the necessary materials, tools and equipment capable of controlling static electricity to a level that minimizes damage to ESD susceptible items.

Examples: 100 = 102, 1000 = 103, 10000 = 104, 100000 = 105, 3.49 x104 = 34900

ESD S7.1 TESTS "Flooring Resistance" – Ohms | 12% RH 720F

RESISTANCE	TO GROUNDABLE POINT (10 VOLTS)	
	POINT A	POINT B
1	3.49×10^4	4.90×10^4
2	3.59×10^4	3.04×10^4
3	3.78×10^4	4.58×10^4
4	4.91×10^4	2.46×10^4
5	2.73×10^4	2.96×10^4
6	3.21×10^4	3.72×10^4
Average	**3.62×10^4**	**3.61×10^4**
Maximum	**4.91×10^4**	**4.90×10^4**
Minimum	**2.73×10^4**	**2.46×10^4**
Std. Dev.	**7.30×10^3**	**9.68×10^3**

POINT TO POINT (10 VOLTS)	
1	4.69×10^4
2	7.36×10^4
3	1.22×10^5
4	1.12×10^5
5	2.96×10^4
Average	**8.96×10^4**
Maximum	**1.22×10^5**
Minimum	**4.69×10^4**
Std. Dev.	**3.02×10^4**

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ESD STM97.1 TESTS

"Resistance – with Person/Shoe" – Ohms Using Desco 17200 Foot Ground, Heel with 1 MEG Resistor

FEET ON FLOOR RESISTANCE	GROUNDED	12% RH 72 °F	100 VOLTS
	BOTH FEET	LEFT ONLY	RIGHT ONLY
1	7.06×10^5	1.31×10^6	1.34×10^6
2	7.04×10^5	1.32×10^6	1.33×10^6
3	6.69×10^5	1.27×10^6	1.29×10^6
4	6.72×10^5	1.29×10^6	1.30×10^6
5	6.77×10^5	1.33×10^6	1.30×10^6
Average	**6.86×10^5**	**1.30×10^6**	**1.31×10^6**
Maximum	**7.06×10^5**	**1.33×10^6**	**1.34×10^6**
Minimum	**6.69×10^5**	**1.27×10^6**	**1.29×10^6**
Std. Dev.	**1.80×10^4**	**2.41×10^4**	**2.17×10^4**

ESD STM97.2 TESTS

"Voltage with Person" 12% RH Grounded Charge Generation Voltage (Peak Voltage) Using Estatec Shoes ESH-N128

FLOOR	WALK
1	11
2	12
3	11
4	12
5	10
6	10
7	10
8	13
9	12
Average	**11**
Maximum	**13**
Minimum	**10**
Std. Dev.	**1**

ESD STM97.2 TESTS

"Voltage with Person" 12% RH 720F Grounded Charge Generation Voltage (Peak Voltage) Using Desco 17200 Foot Ground, Heel with 1 MEG Resistor

FLOOR	WALK	SCUFF
1	-4	-15
2	-5	-17
3	-6	22
4	4	20
5	5	-8
6	5	-13
7	-10	11
8	-6	-19
9	7	12
Average	**-1**	**-1**
Maximum	**7**	**22**
Minimum	**-10**	**-19**
Std. Dev.	**6**	**17**

ESD STM97.2 TESTS

"Voltage with Person" 12% RH 720F Grounded Charge Generation Voltage (Peak Voltage) Using Desco 17292 Foot Ground Full Coverage, 2 MEG

FLOOR	WALK	SCUFF
1	2	8
2	4	15
3	3	14
4	4	18
5	-4	20
6	3	17
7	5	18
8	6	19
9	4	13
Average	**3**	**16**
Maximum	**6**	**20**
Minimum	**-4**	**8**
Std. Dev.	**3**	**4**

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Benefits of AmeriWorx

- Gap-Free Installation: Precision milled edges eliminate gaps in installation. High density resin eliminates tile shrinkage.
- Color runs through entire thickness of the tile so that deep scratches do not reveal a different color — helps hide scratches.
- Never requires wax: High density resin reduces maintenance, resists scuff marks and staining, and overall is easier to keep clean.
- Ideal for extreme duty manufacturing applications.
- Meets requirements for Buy Federal American as well as RoHS directive

CATEGORY	TEST METHOD	RESULT
Critical Radiant Flux CRF (W/cm^2)	ASTM E-648	1.0 W/cm^2
Chemical Resistance	ASTM F-925	Excellent (Acids, Alkalis, Household Chemicals)
Electrical Resistance	ASTM F-150	Point to Point & Point to Ground: 50,000 – 1,000,000 Ohms
Electrostatic Propensity	AATCC-134	<12 volts
Fire Resistance (Steiner Tunnel)	ASTM E-84	< 75 (Class 1)
Electrically Conductive Floor Coverings	ANSI/UL 779	Meets UL Standard
Floor Materials – Resistive Characterization of Materials	ANSI/ESD.S7.1-2013 Conductive<1.0×10^6 1.0×10^6 Dissipative ≥ 1.0×10^6 and < 1.0×10^9	Surpasses recommended standards of ANSI/ESD S20.20
Floor Materials and Footwear-Resistance Measurement in Combination with a Person	ANSI/ESD STM97.1 < 3.5×10^7	Surpasses recommended standards of ANSI/ESD S20.20
Floor Materials and Footwear-Voltage Measurement in Combination with a Person	ANSI/ESD STM97.2 <25 volts with conductive footwear	Surpasses recommended standards of ANSI/ESD S20.20
Life Safety Code	NFPA 101	Passes
Smoke Density	ASTM E-662	≤ 450
Solid Vinyl Floor Covering Materials Standard for Health Care Facilities	ASTM F-1700	Conforms
Standard for Health Care Facilities	NFPA 99	Passes
Static Decay, Method 4046 at 15% RH	ASTM F-101C	000 – 0 Volts in <0.01 sec
Static Load	ASTM F-970	<0.001" RI @ 250 psi (1.125" diameter foot) 0.005" RI @ 2,500 psi (0.5" diameter foot)

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