# 7 WAYS staticWorx® ShadowFX™ ESD

## Carpet Tile Differs from Standard Commercial Carpet

### 1 The nylon tufts in ShadowFX™ are wrapped with conductive fibers.

Fibers in standard carpet are not conductive.

### 2 In ShadowFX™ carpet, a conductive precoat binds the tufts to the primary backing and creates electrical continuity across all tufts.

The precoat on standard carpet is insulative, and acts more like a dam than a bridge—stopping charges from moving to ground.

### 3 A special carbon-loaded fiberglass layer in ShadowFX™ carpet tile provides another conduit for transporting static charges.

The fiberglass layer in standard commercial carpet tile is electrically insulative.

### 4 Carbon in the PVC backing renders ShadowFX™ carpet tile static dissipative.

Standard carpet tile is made with insulative materials like PVC and polyolefin.

ShadowFX™ backing is carbon loaded. By adding a precise amount of carbon we control the static dissipation levels, which eliminates the threat of ESD, and also protects people working near electrified equipment.

The resistance of our carpet tile meets industry standards such as Motorola R56, ATIS 0600321.2015 and FAA 019f—which require the use of static-dissipative flooring.

### 5 A special conductive adhesive or underlayment acts as a conductive ground plane, connecting all ShadowFX™ ESD tiles in a contiguous installation to ground.

Standard commercial carpet tile has no measurable conductivity. Used with standard carpet tiles (e.g., regular Shaw, Mohawk or Interface tiles) conductive adhesive would act like any off-the-shelf adhesive, providing zero static protection.

### 6 The conductive adhesive is grounded using copper strips supplied by Staticworx®.

Copper strips are the final link in the carpet-to-ground connection. One end of the copper strips is attached at the perimeter of the room to the adhesive or underlayment; the other end of the copper strips is connected to an earth ground or A/C ground connection.

### 7 Staticworx® ShadowFX™ carpet tile can be tested with an Ohm meter.

With no measurable conductivity, regular commercial carpet will fail this test.

## Questions?

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# How Is Commercial Carpet Tile Different From Staticworx® Static-Control (ESD) Carpet Tile?

Humans cannot perceive a static discharge under 3000 volts. A static discharge of only 20 volts can damage or destroy the micro-circuits inside high-speed electronics. Protecting electronics from these minute static charges requires far more ESD protection than the anti-static treatments on commercial-grade carpet can provide.

In Staticworx® ShadowFX™ carpet tiles, electrically conductive carbon elements are introduced during multiple stages in the manufacturing process. This inherent conductivity prevents static electricity from accumulating on people by drawing charges from the surface of the carpet and dissipating or transporting these charges to ground.

**Root Cause of Static Build-up on a Person**

Friction that occurs when the sole of shoes contacts and separates from the floor creates static, called walking body voltage.

## Technically, Staticworx® static-control carpet differs from standard commercial carpet in several key ways:

## 1 The nylon tufts in ShadowFX™ are wrapped with conductive fibers.

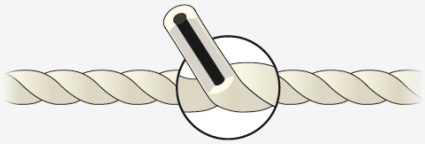
Commercial carpet is treated with an anti-static, allowing the yarn fibers to retain a small amount of moisture. This helps prevent static from building on the carpet, so we don't feel a shock when we walk on the floor. There is no measurable conductivity and the carpet cannot be grounded.

The nylon fiber tufts in Staticworx® ShadowFX™ ESD carpet are wrapped with electrically conductive fibers. When people walk on our ESD carpet, the conductive fibers wrapped around the yarn tufts make contact with the soles of their shoes. Like brushes inside a copier, the conductive helix fibers woven into the carpet brush static from the soles of shoes and discharge it through the conductive layers in the carpet tile, across the adhesive or conductive underlayment, to ground.

The conductive fibers in Staticworx® ESD carpet also provide excellent electrical contact with conductive castors and drag chains on carts and chairs.

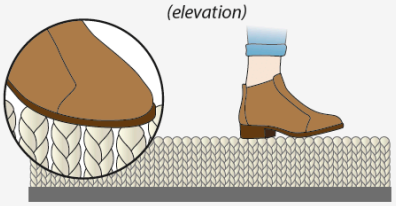
**Standard Low-kV Carpet**

*(thread cross section)*



*Conductive fiber is buried inside each thread.*

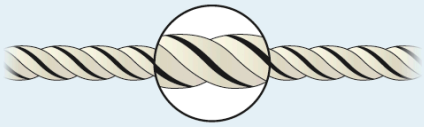
*(elevation)*



*Buried in the carpet thread, conductive fiber cannot make contact with the shoe, so there is no conductivity. Standard carpet tile cannot be grounded.*

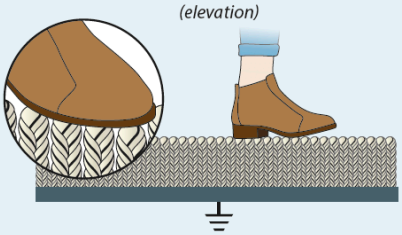
**Staticworx® ShadowFX™ Carpet Tile**

*(thread cross section)*



*Conductive fiber is integrated into the carpet weave.*

*(elevation)*

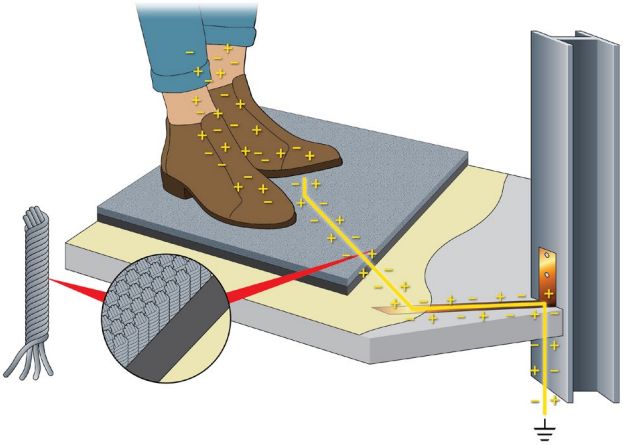


*ANSI/ESD-compliant carpet tile provides four layers of conductivity. Under the conductive fiber is a conductive primary backing, a conductive pre-coat, and conductive fiberglass, with a static-dissipative PVC backing at the bottom.*

## 2 Our conductive precoat binds the yarn tufts to the primary backing and creates electrical continuity across all tufts.

The underside of the ShadowFX™ backing is pre-coated with a conductive, carbon-impregnated material. This conductive coating draws static electricity from the walking surface through the thickness of the tile. From there, static charges move across the underlying conductive ground plane for transport to ground.

The backing on standard carpet is insulative; it acts more like a dam than a bridge—stopping charges from moving to ground.



## 3 We use a special carbon-loaded fiberglass layer in place of standard fiberglass.

This carbon-loaded fiberglass layer provides another conduit for transporting static charges through the thickness of the tile. From the conductive fibers at the surface, static charges flow downward, through the carbon-loaded fiber-glass, then into the backing toward ground.

## 4 Carbon in the PVC backing renders ShadowFX™ carpet tile static dissipative.

Standard carpet tile is backed with insulative materials like PVC and polyolefin.

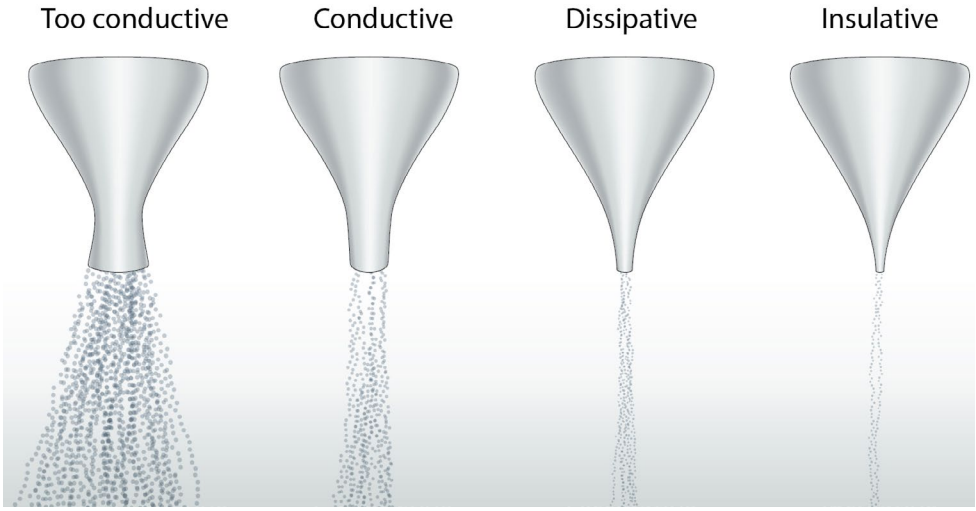
By adding a precise amount of carbon to our backing, we control the static dissipation levels so that charges move neither too slowly nor too quickly.

Most *ESD carpet tile* with a carbon (vs PVC) backing is electrically conductive.

In end-user spaces such as telecom, 9-1-1 dispatch, critical call centers, flight towers, etc., where people do not wear static-protective footwear with a built-in electrical resistor, conductive floors are prohibited. To protect personnel working with or near electrified equipment, standards such as Motorola R56, ATIS 0600321.2015 and FAA 019f require the use of static-dissipative carpet.

**Conductive floors versus static dissipative floors**

**Does it matter?**

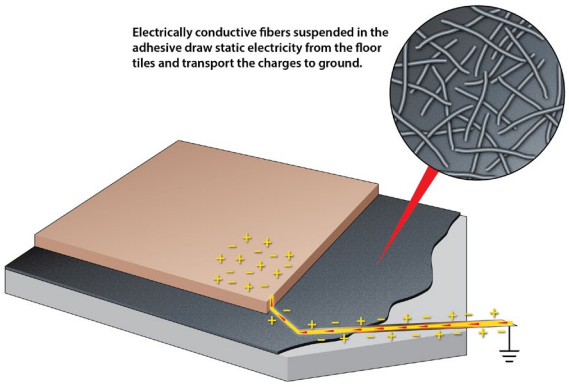


## 5 ShadowFX™ tiles are secured using a special conductive adhesive or can be free-floating with a conductive underlayment.

The conductive adhesive or underlayment below Staticworx® ShadowFX™ carpet tile acts as a conductive ground plane, connecting all ESD tiles in a contiguous installation to ground.

To transport static through the carpet tile to the adhesive or underlayment the tile must have inherent conductivity. Standard commercial carpet tile has no measurable conductivity. With no conductivity, standard carpet tile cannot transport static charges to the adhesive.

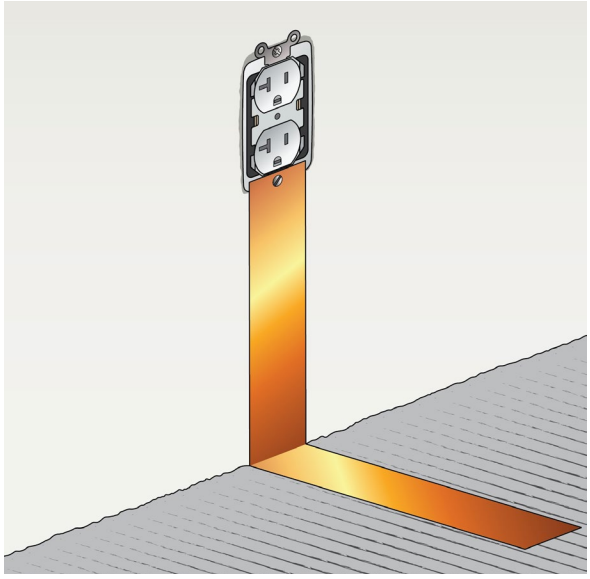
If you were to use conductive adhesive with standard carpet tiles (e.g., regular Shaw, Mohawk or Interface tiles) it would act like any off-the-shelf adhesive, providing zero static protection. The same principle would apply to a conductive underlayment like Staticworx® Groundbridge.




## 6 The conductive adhesive or underlayment is grounded using copper strips supplied by Staticworx®.

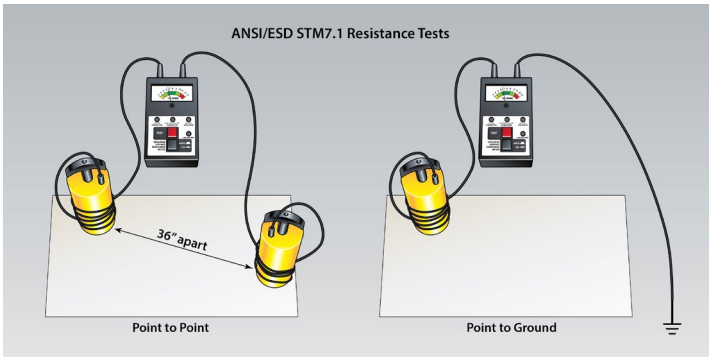
Copper strips are the final link in the carpet-to-ground connection.

From the underlying conductive ground plane (conductive adhesive or underlayment) static is transported to copper strips placed around the perimeter of the room. These copper strips are attached to an earth ground or A/C ground connection.



## 7 Staticworx® ShadowFX™ carpet tile can be tested with an Ohm meter.

With no measurable conductivity, regular commercial carpet will fail this test.

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