TPM® #115 Sparkproof / Conductive Mortar System

**General Polymers TPM #115 SPARKPROOF / CONDUCTIVE SYSTEM** is a high build protective surfacing utilizing a conductive epoxy based mortar, comprised of a selected gradation of non-sparking aggregates, a high build grout and selected topcoats to provide sparkproof, static dissipating floors within the required ohms resistance range.

### Advantages
- 25,000 - 1,000,000 ohms floor resistance range protects sensitive equipment
- Durable wear resistant
- Seamless - no joints to harbor contaminants
- Chemical Resistant

### Uses
- Solvent storage areas
- Fireworks plants
- Explosive gasses or powder areas

### Typical Physical Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conductivity</td>
<td>Resistance range of 25,000 - 1,000,000 ohms</td>
<td>0.1 grams lost</td>
</tr>
<tr>
<td>Abrasion Resistance</td>
<td>NFPA#99</td>
<td>10,000 psi</td>
</tr>
<tr>
<td>Compressive Strength</td>
<td>ASTM D 4060</td>
<td>2,500 psi</td>
</tr>
<tr>
<td>Tensile Strength</td>
<td>ASTM C 579</td>
<td>2,500 psi</td>
</tr>
<tr>
<td>Resistance to Elevated Temperatures</td>
<td>ASTM C 307</td>
<td>No slip or flow at required temperature of 158°F</td>
</tr>
<tr>
<td>Flexural Strength</td>
<td>MIL-D-3134J</td>
<td>4,500 psi</td>
</tr>
<tr>
<td>Thermal Coefficient of Expansion</td>
<td>ASTM C 580</td>
<td>2 x 10^6</td>
</tr>
<tr>
<td>Water Absorption</td>
<td>ASTM C 531</td>
<td>0.10 %</td>
</tr>
<tr>
<td>Chemical Resistance</td>
<td>ASTM C 413</td>
<td>No Effect</td>
</tr>
<tr>
<td>Hardness, Shore D</td>
<td>ASTM D 1308</td>
<td>80/75</td>
</tr>
<tr>
<td>Adhesion</td>
<td>ASTM D 2240</td>
<td>300 psi</td>
</tr>
<tr>
<td>Fick's Law</td>
<td>ACI 503R</td>
<td>concrete failure</td>
</tr>
<tr>
<td>Fire resistance</td>
<td>MIL-D-3134J</td>
<td>Self-extinguishing over concrete</td>
</tr>
<tr>
<td>Impact Resistance</td>
<td>Withstands 16 ft/lbs</td>
<td></td>
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</tbody>
</table>

ASTM C = Mortar System
ASTM D = Resin only
Installation
General Polymers materials shall only be installed by approved contractors. The following information is to be used as a guideline for the installation of the **TPM #115 SPARKPROOF / CONDUCTIVE MORTAR System**. Contact the Technical Service Department for assistance prior to application.

Surface Preparation — General
General Polymers systems can be applied to a variety of substrates, if the substrate is properly prepared. Preparation of surfaces other than concrete will depend on the type of substrate, such as wood, concrete block, quarry tile, etc. Should there be any questions regarding a specific substrate or condition, please contact the Technical Service Department prior to starting the project. Refer to Surface Preparation (Form G-1).

Surface Preparation — Concrete
Concrete surfaces shall be abrasive blasted to remove all surface contaminants and laitance. The prepared concrete shall have a surface profile equal to CSP 4-6. Refer to Form G-1.

After initial preparation has occurred, inspect the concrete for bug holes, voids, fins and other imperfections. Protrusions shall be ground smooth while voids shall be filled with a General Polymers system filler. For recommendations, consult the Technical Service Department.

Temperature
Throughout the application process, substrate temperature should be 50ºF - 90ºF. Substrate temperature must be at least 5ºF above the dew point. Applications on concrete substrates should occur while temperature is falling to lessen offgassing. The material should not be applied in direct sunlight, if possible.

### Application Information  CSP 4-6

<table>
<thead>
<tr>
<th>VOC MIXED</th>
<th>MATERIAL</th>
<th>MIX RATIO</th>
<th>THEORETICAL COVERAGE PER COAT CONCRETE</th>
<th>PACKAGING</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;50 g/L</td>
<td>Primer</td>
<td>3424</td>
<td>4:1</td>
<td>250 sq. ft. / gal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1-1.5 pints water per 1.25 gallon kit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;50 g/L</td>
<td>Mortar</td>
<td>3561C</td>
<td>4:1</td>
<td>18 sq. ft. / 1¼ gal @ 1/4&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5115C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;50 g/L</td>
<td>Grout coat</td>
<td>3424</td>
<td>4:1</td>
<td>100 sq. ft. / gal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1-1.5 pints water per 1.25 gallon kit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;100 g/L</td>
<td>Seal Coat</td>
<td>3525</td>
<td>2:1</td>
<td>275-400 sq. ft. / gal</td>
</tr>
</tbody>
</table>
Static Control Floors

Static control flooring can be defined as a flooring system that can drain and/or dissipate static charges by grounding personnel, equipment or other objects contacting the floor surface or that controls the generation and accumulation of static charges. The resistance to the movement of electrons across the material's surfaces defines static control floors into the following two categories:

i) Conductive Floor has a resistance of \(2.5 \times 10^4\) - \(10^6\) ohms per 3 ft. It can drain static charge dissipating a 5,000 - volt charge to zero in 0.05 seconds.

ii) Static Dissipative Floor has a resistance of \(10^5\) - \(10^6\) ohms per 3 ft. It adds no static electricity to the environment and drains off a 5,000 - volt charge to zero in less than 0.2 seconds.

A conductive floor has a much lower electrical resistance than a dissipative floor. It will carry the static charges to a ground quickly and efficiently as to prevent accidental discharge and ignition. If the floor is too conductive, an operator on the floor can become too effectively grounded and will suffer electrical shock. For this reason the NFPA requires all flooring surfaces to have a minimum resistance of 25,000 ohms. Frequent contact between tools and equipment, or dropping the tools on the floor, will cause spark and ignition. For those circumstances, a sparkproof conductive flooring system is highly recommended. The rapid rate of charge dissipation of conductive flooring can create a magnetic field which can present a problem for manufacturers of electronic components.

Dissipative flooring systems have greater resistance to electric current flow than conductive floorings. At a working environment dealing with high test voltages, such as facilities where electronic components are manufactured or assembled, a dissipative floor should be installed so that the static charges can be gradually transferred to ground, protecting personnel from electrical shock while at the same time protecting sensitive electronic equipment.

Conductive Flooring Measurement Guide

There are three test standards available for the evaluation of static dissipative or conductive floors and they are ANSI/ESD-S7.1, ASTM F 150 and NFPA 99 (56A). These test methods describe three types of measurements to be taken, which are summarized below:

1. **Surface-to-surface resistance** — Two 2.5 inch diameter electrodes, each weighing 5 lbs, are placed 3 ft apart on the floor. Apply the prescribed voltage (either 500VDC for conductive flooring or 100VDC for static dissipative flooring) and take the readings 5 seconds after the application of voltage or once the reading has reached equilibrium. The resistance in ohms is read on a properly calibrated Megohmmeter ("megger").

2. **Point-to-groundable point resistance** — An electrode with a 2.5 inch diameter and a weighing 5 lbs is connected to a Megohmmeter and placed on the surface being tested. The other megger lead is connected directly to a groundable point on the surface being tested.

3. **Surface resistance** — Two parallel metal electrodes of equal length and cross section are placed on the surface being tested. The distance between the electrodes should be the same as the length of the electrodes. Resistance is read on a Megohmmeter connected to the two electrodes and is expressed in ohms/square.

For quality control and lab procedures, the surface-to-surface test is most convenient. The measurements of point-to-groundable point test on smaller lab samples usually vary considerably from readings on a practical large floor. Based on these test results a facility manager can check if the flooring conforms to the specification when initially installed and track continual performance of the floor periodically.

NFPA 99 requires 5 measurements in each room and the average of the five readings is used as to determine the resistance level. ANSI/ESD standards also require 5 measurements per room and a minimum of 5 tests per 5,000 square feet for larger areas. At least 3 of the 5 readings must be conducted in areas of wear due to traffic, chemical or water exposure. The ANSI/ESD and NFPA standards require testing records to include date, temperature, humidity, testing voltage, duration of the test and the equipment used.

Maintenance of Resinous Static Control Floors

Providing floors with good maintenance is always the best solution to lasting service life for any type of floor. The standard of NFPA 99 describes appropriate maintenance for a conductive floor to maintaining conductive property through its service life. There are four maintenance guidelines for static dissipative floors:

i) The surface of conductive or dissipative floors shall not be insulated by a film of oil or wax. Any waxes, polishes, or dressings used for maintenance of conductive floors shall not adversely affect the conductivity of the floor.

ii) Cleaning instructions for conductive and dissipative floors shall be established, such as a daily basic cleaning, non-abrasive brush or pads being used and requirements for cleaners, then carefully followed to assure that conductivity characteristics of the floor are not adversely affected by such treatment.

iii) The floor's resistance shall be periodically tested to ensure it still falls the range as initially specified.

Grounding Static Control Flooring

All static control flooring systems must be connected through an equipotential couple to a permanent earth ground. It is absolutely critical that a true earth ground be established and that a reference ground not be used. The ground couple is established over the primer layer with a conductive strip, mesh, wire or tape in accordance with EOS/ESD S6. "Standard for Protection of Electrostatic Discharge susceptible Items—Grounding—Recommended Practice”. Contact the Technical Service Department for additional information.

**Primer**

**Mixing and Application**

1. Premix 3424A (hardener) and 3424B (resin) separately, using a low speed drill and Jiffy blade. Mix for one minute and until uniform, exercising caution not to whip air into the material.

2. Add 4 parts 3424A (hardener) to 1 part 3424B (resin) by volume. Mix with low speed drill and Jiffy blade for three minutes and until uniform. 3424 must be reduced with potable water up to 10-15% minimum. DO NOT reduce product until after both components have been mixed together for 90 seconds. Mix side A and side B minimum of 90 seconds, then MUST ADD1-1.5 pints water per 1.25 gallon kit. Reduction water must be added after A side and B side is mixed first.

3. Apply using a short nap roller at a rate of 250 - 320 square feet per gallon (5-6 WFT mils). Allow to cure at least 4 hours prior to topcoating but no more than 24 hours. A light sanding may be required prior to applying topcoat.

4. Inspect primer coat prior to application of system. Test surface resistance in accordance with NFPA 99. Resistance range should be less than 150,000 ohms. If deviation from this range occurs, consult the Technical Service Department immediately.

**Mortar**

**Mixing and Application**

1. Premix 3561C A and B components separately using a low speed drill and Jiffy mixer. Mix for one minute and until uniform, exercising caution not to whip air into the materials.

2. Add 4 parts 3561CA (4 quarts resin) to 1 part 3561CB (1 quart hardener) by volume. Mix with a low speed drill and Jiffy mixer for three minutes and until uniform. Slowly add 25 lbs of 5115C (Selected gradation aggregate) mix an additional one minute or until material is wet out. Apply using a flat steel trowel. Allow to cure overnight.
Grout Coat
Mixing and Application

1. Inspect primer coat prior to application of system. Test surface resistance in accordance with NFPA 99. Resistance range should be less than 150,000 ohms. If deviation from this range occurs, consult the Technical Service Department immediately.

2. Premix 3424A (hardener) and 3424B (resin) separately, using a low speed drill and Jiffy blade. Mix for one minute and until uniform, exercising caution not to whip air into the material.

3. Add 4 parts 3424A (hardener) to 1 part 3424B (resin) by volume. Mix with low speed drill and Jiffy blade for three minutes and until uniform. 3424 must be reduced with potable water up to 10-15% minimum. DO NOT reduce product until after both components have been mixed together for 90 seconds. Mix side A and side B minimum of 90 seconds, then MUST ADD1-1.5 pints water per 1.25 gallon kit”. Reduction water must be added after A side and B side is mixed first.

4. Apply using a short nap roller at a rate of 250 - 320 square feet per gallon (5-6 WFT mils). Allow to cure at least 4 hours prior to seal coating but no more than 24 hours. A light sanding may be required prior to applying seal coat.

Seal Coat
Mixing and Application

1. Inspect base coat prior to application of seal coat. Test surface resistance in accordance with NFPA 99. Average resistance range should be 25,000 - 1,000,000 ohms. If deviation from this range occurs, consult the Technical Service Department immediately.

2. Both A & B components of 3525 must be premixed to disperse conductive elements evenly throughout the resin. It is normal to have color variations in the components even after premixing.

3. Premix 3525A (resin) and 3525B (hardener) separately, using a low speed drill and Jiffy mixer. Mix for one minute and until uniform, exercising caution not to whip air into the material.

4. Add 2 parts 3525A (resin) to 1 part 3525B (hardener) by volume. Mix with low speed drill and Jiffy mixer for three minutes and until uniform. Apply using a squeegee or short nap roller at a spread rate of 275-400 sq. ft. per gallon to yield 4-6 mils WFT. Strictly adhere to published coverage rates.

5. Allow to cure at least 24 hours before opening to light foot traffic.

Application Equipment
Brush / Roller

Use 1/2” phenolic core rollers and professional quality, medium stiff natural bristle brushes.

To learn more, visit us at
www.sherwin-williams.com/protective
or call 1-800-524-5979
to have a representative contact you.