



Installation Instructions

KEY #467 ESD URETHANE SEALER

I. GENERAL INFORMATION

KEY #467 ESD URETHANE SEALER is a clear, low odor aliphatic urethane sealer with an orange peel finish and a slight dark appearance due to the conductive filler. Key #467-ESD will test in the “ESD” range, between 1,000,000 and 1,000,000,000 ohms electrical resistance, when applied in a single coat at 4 mils thickness over a properly prepared non-conductive polymer resin basecoat, epoxy terrazzo, or polymer resin floor topping. Key #467-ESD has excellent chemical and abrasion resistance. Key #467-ESD is available in clear only.

II. SURFACE PREPARATION

Surface Preparation is the most critical portion of any successful resinous flooring system application. All concrete substrates must be properly prepared to a minimum surface profile of CSP-2 as outlined in **KEY RESIN COMPANY'S TECHNICAL BULLETIN #1**. Epoxy resin basecoats should be thoroughly sanded (complete removal of gloss) using 80-100 mesh sandpaper, abrasive screen, diamond-impregnated buffer pad, or black buffer pad. Epoxy terrazzo should be polished to a maximum 120 grit or 220 grit finish. Application over textured resin floors may not require additional preparation, consult with Key Resin Technical Service for recommendations.

Specific attention should be paid to the following:

- A. Concrete Placement--An efficient vapor barrier should be under slabs on or below grade to prevent moisture migration.
- B. Curing and Finishing Techniques of the Concrete Substrate
- C. Age of Concrete
- D. Previous Contamination of the Substrate
- E. Present Condition of the Substrate

Also, the temperature and humidity conditions of the area to receive the flooring system should be checked. Key #467-ESD is a moisture-cured urethane, relative humidity should be a minimum of 30% and maximum of 90%. Relative humidity level will affect speed of cure (lower humidity causes slower cure time). An optimum room temperature of 75°F with a minimum slab temperature of 60°F is required for proper cure of the resin flooring system.

III. MATERIAL QUANTITIES

A. Guideline Requirements for 1000 ft²

4 Mils

Key #467 ESD Sealer System

Qty./1000 ft²

1. *Key #467-ESD Urethane*

3 gallons

Note: Key #47-ESD must be applied over a properly prepared polymer resin basecoat, epoxy terrazzo, or polymer resin floor topping.

IV. INSTALLATION

Key #467-ESD Urethane Sealer

Note: This system must be applied in a **single coat ONLY** with a smooth finish texture or very minimal texture to ensure proper contact of the test apparatus with the surface of the coating. **IMPORTANT: Do not apply Key #467-ESD thicker than 4 mils dry-film thickness (350 ft²/gallon) or conductivity will decrease, possibly resulting in a zero conductivity finish. This would then require complete removal and reapplication of Key #467-ESD, or application of a non-conductive epoxy basecoat to bury the existing Key #467-ESD, followed by reapplication of Key #467-ESD at the proper coverage rate.**

1. Mixing
 - i. Thoroughly mix each component prior to combining.
 - ii. Mix four (4) parts by volume of Part A with one (1) part by volume of Part B for three minutes with a low speed electric drill and mixing paddle (Jiffy mixer). Do not thin material. After mixing Part A and Part B as outlined above, continue mixing while adding ESD Additive and continue mixing for 1-2 minutes.
 - iii. **Do not mix more material than can be used in 2 (two) hours.**
2. Application
 - i. To ensure proper application thickness and consistency, it is best to use a “dip and roll” procedure and apply at 350-400 ft²/gallon. This will yield 3.5-4 mils dry film thickness. Apply in a “V” shape procedure, using aggressive pressure on the roller handle. DO NOT apply thicker than 4 mils DFT (350 ft²/gallon) or puddle resin, particularly when applied over broadcasted or troweled mortar systems with low spots, as this may cause microbubbles and a resulting white haze, or cause a decrease/loss of conductivity.
 - ii. Immediately and slowly cross roll with a lint-free short nap 3/8” mohair roller to even the surface texture of the coating, again using aggressive pressure on the roller handle. All cross rolling steps must be done immediately in sequence after initial application of resin. DO NOT re-roll isolated areas more than 10-15 minutes after completing final cross roll procedure, as roller marks may occur! Material must be **very thoroughly** rolled, or tiny “fish eyes” (i.e., material separation) may occur. Also, “aggressive” pressure does not mean rapid rolling, but rather to bear down on the roller handle with enough force that the handle bends slightly, to insure enough pressure is used, to help reduce material separation. Crossrolling is always recommended, do this immediately. If resin begins to “fish eye” or pull apart, immediately re-roll. Be sure to check areas already finished to confirm that fish eyes did not form. DO NOT rapidly roll the Key #467-ESD Urethane or microbubbles may form from air entrainment. **Important:** Change roller cover every 45-60 minutes if a residue begins to build up on the ends of the roller or roller frame, as accumulated older resin may cause reaction with fresh material, resulting in shortened working time and/or microbubbles.
 - iii. DO NOT apply a second coat of Key #467-ESD unless approved by Key Resin Technical Service. **Important:** Key #467-ESD is a moisture cure urethane, relative humidity will significantly affect cure speed. Relative humidity range must be 30%-90% RH, **low RH will slow the cure rate.** Note that very high humidity (90%+) may result in moisture condensation on the substrate, which can cause numerous small bubbles to form in the urethane.
 - iv. Do not open to light foot traffic for 24 hours at 75°F, 50% RH (additional time will be necessary for lower RH). Do not open to heavy traffic for 72+ hours at 75°F, 50% RH. Full chemical cure and maximum resistance are achieved in five to seven (5-7) days at 75°F, 50% RH.

- v. Key #467-ESD conductivity testing: Allow to cure minimum 24-48 hours at 75°F, 50% RH before testing with floor surface ohm meter.

V. Testing

1. Testing should be performed after 72 hours to confirm proper conductivity range. Testing performed prior to 72 hours cure time will initially yield higher test results (higher ohms), which will decrease as cure time progresses to 72 hours.
2. Flooring contractor or owner's agent is responsible for testing floor.
3. Test multiple random areas to confirm a conductivity range of 1,000,000 to 1,000,000,000 ohms. Consult with Key Resin Technical Service if any areas do not test properly.

VI. Installation of Copper Grounding Tape, Grounding Plates, and Connection to the Building's Earth Ground Points

Note: *May be optional depending on project and/or building owner's requirements*

A high degree of ESD control can be achieved without direct connection to an earth grounding point or AC equipment grounding point, particularly for floor installations bonded directly to a concrete substrate. However, building owners, project specifications or critical applications may dictate that the ESD floor finish be applied in direct uninterrupted contact with properly prepared grounding points. Key Resin defers to the building owner to confirm their own unique requirements and make the final decision on whether or not connecting the ESD floor finish to specific earth ground points, AC equipment ground points, or auxiliary ground points are required. Be aware that additional ESD control measures may be required such as ESD footwear, personnel grounding straps, electrically grounded work stations, etc. Refer to the appropriate ANSI/ESD standards, available for purchase from the Electrostatic Discharge Association at www.esda.org.

Metal floor joints, metal equipment bases and steel columns/posts may be used for earth grounding points if they have been electrically tested to confirm permanent continuity with an earth ground. This should be confirmed by the building owner's electrician. Unless otherwise specified, a general rule of thumb is one grounding point for every 1000 square feet of flooring in rooms larger than 1000 square feet, or two grounding points in rooms smaller than 1000 square feet. Metal structures used as grounding points must be cleaned, sanded or lightly abraded with a grinder to remove all insulative coatings, rust and dirt. Approximately 1/4" height by 3" width of surface preparation will be necessary to create a grounding point.

Copper tape with conductive adhesive can be used to connect the flooring system to grounding points, bridging over exposed joints around columns or connecting different concrete slabs separated by exposed joints. Copper tape may not maintain long-term integrity over expansion joints that experience significant movement. Suppliers of copper tape and/or grounding plates: McMaster-Carr (www.mcmaster.com, part #76555A642 for 1/2" width tape, or available from Key Resin as special order), Ground Zero Electrostatics (www.gndzero.com) for various sizes of tape, grounding plates and lead wires.

1. A minimum 4" length of copper tape is adhered between between the polymer resin basecoat and the Key #467-ESD Urethane Sealer, with the remainder length allowed to run up the wall to an electrical outlet where it can be attached by an electrician. The connection is made to the green wire or grounding portion of the electrical outlet. For metal structures such as columns, attach tape to prepared surface by drilling hole into steel and securing tape with machine screw and washer.
2. Alternate method using copper or other conductive metal plate: In addition to installing copper tape as outlined above, adhere plate to surface of cured Key #467-ESD Urethane

Sealer. Use plate with conductive adhesive backing. Attach copper wire (#10 or #12 gauge) to plate and electrical outlet ground or secure to hole in steel structure with machine screw and washer. Plates purchased from Ground Zero have lead wires attached to plate.

3. Alternate method for attaching to ground point inside drywall: Connect #10 or #12 wire from any convenient ground point and drop down to floor/wall junction, with wire brought underneath wall via a small hole cut into drywall or chip out hole in concrete floor. The copper wire is intertwined or soldered to the copper tape or plate. If using tape, it can be pushed into the wall.