

SECTION 09 67 33

ELECTROSTATIC DISSIPATIVE (ESD) FLOORING

DTI StatGuard System

PART 1 - GENERAL

1.1 SUMMARY

A. This Section covers resinous electrostatic dissipative and conductive flooring using the DTI StatGuard ESD Flooring System, installed over prepared concrete and connected to a verified building ground.

B. The system build-up is:

1. Primer: DTI PrimeBond.
2. Conductive body coat: DTI StatGuard Conductive Coat, a resinous coat loaded with conductive elements that collect static charge across the floor surface.
3. Topcoat: DTI StatGuard Topcoat, the wear surface, formulated to maintain the specified resistance range under traffic.
4. Grounding: copper grounding strips and tape tying the conductive coat to a verified building ground point.

C. The work includes surface preparation, moisture testing, installation of the grounding network, application of the full system build-up, cure, electrical resistance testing after cure, and a written test report.

D. The class of floor, conductive or static dissipative, shall be as specified in 1.3 and scheduled for each area. One class shall not be substituted for the other without written approval.

1.2 REFERENCES

A. ANSI/ESD STM7.1 - Standard Test Method for the Characterization of Materials, Floor Materials, Resistive Characterization of Materials.

B. ASTM F150 - Standard Test Method for Electrical Resistance of Conductive and Static Dissipative Resilient Flooring.

C. ANSI/ESD S20.20 - Standard for the Development of an Electrostatic Discharge Control Program.

D. ANSI/ESD STM97.1 - Standard Test Method for the Measurement of Floor Materials and Footwear, Resistance Measurement in Combination with a Person.

E. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.

F. ASTM D4258 - Standard Practice for Surface Cleaning Concrete for Coating.

G. ASTM D4259 - Standard Practice for Abrading Concrete.

1.3 DEFINITIONS

A. Conductive Flooring: flooring with a measured resistance below 1.0×10^6 ohms, point-to-point and point-to-ground, tested per ANSI/ESD STM7.1 or ASTM F150. Conductive floors drain charge fastest.

B. Static Dissipative Flooring: flooring with a measured resistance from 1.0×10^6 ohms to 1.0×10^9 ohms, point-to-point and point-to-ground, tested per the same methods. Static dissipative floors drain charge more slowly and in a more controlled manner, and suit most electronics, laboratory, and clean manufacturing spaces.

C. Point-to-Point Resistance: resistance measured between two electrodes placed on the floor surface at a

specified spacing.

D. Point-to-Ground Resistance (Resistance to Ground, RTG): resistance measured between one electrode on the floor surface and the verified ground point.

E. Groundable Point: the location where the floor grounding network connects to the building ground, verified before installation under 1.5.

F. Flooring System Resistance: the combined resistance of the floor, footwear, and a person, measured per ANSI/ESD STM97.1. It is a property of the combination and is not established by floor-only readings.

1.4 SUBMITTALS

A. Product data for DTI PrimeBond, DTI StatGuard Conductive Coat, and DTI StatGuard Topcoat.

B. Installer qualifications: experience installing static-control resinous flooring, including completed projects verified by post-installation resistance testing.

C. Grounding layout drawing showing copper strip and tape locations, ground connection points, and the verified building ground each connection ties to.

D. Written test report after cure (see 3.5), recording every test location, point-to-point and point-to-ground readings, test instrument and electrode type, ambient temperature, and relative humidity at the time of testing. The test report is a required submittal; the work is not complete without it.

E. Maintenance instructions, including the restrictions in 3.6.

1.5 QUALITY ASSURANCE

A. Pre-installation conference with the Owner, General Contractor, and flooring contractor to confirm the specified class for each area, the grounding layout, the location and verification of building ground points, test point density, acceptance criteria, schedule, and environmental conditions.

B. Ground verification: before installation, verify with the Owner's electrical representative that each designated ground point is a true building ground. Resistance values in this Section are only meaningful against a verified ground; do not connect the grounding network to unverified points, conduit, or piping assumed to be grounded.

C. Environmental conditions: maintain substrate and ambient conditions within the system manufacturer's limits during application and cure. Record ambient temperature and relative humidity during testing. Low humidity is the worst case for static control because most surfaces become more resistive as air dries; readings taken in humid conditions may flatter the floor, and where the facility will operate at low humidity, testing at or corrected to the low humidity condition governs acceptance.

D. Moisture: test concrete moisture per ASTM F2170 before application and do not exceed the system manufacturer's limits.

1.6 MOCK-UP

A. Before production work, complete a mock-up of not less than 100 square feet in an area designated by the Owner, carried through the full sequence including preparation, grounding strip installation and connection, primer, conductive body coat, and topcoat.

B. Test the cured mock-up per 3.5. The approved mock-up, including its test readings, establishes the standard for appearance, grounding workmanship, and electrical performance for the project. Production work shall match the approved mock-up.

C. The mock-up may remain as part of the finished floor if its grounding connection is permanent and its readings are recorded in the project test report.

1.7 DESIGN LIMITATIONS AND EXCLUSIONS

A. The floor is one element of an ESD control program, not the program itself. Compliance of the floor material with the resistance ranges in this Section does not constitute certification of the facility, the room, or the operation under ANSI/ESD S20.20, which covers the complete program including personnel grounding, footwear, garments, work surfaces, ionization where used, training, and auditing. No representation of S20.20 program certification is made by this Section.

B. Resistance of the flooring and footwear in combination with a person is a combined system property. Floor-only readings do not guarantee the combined system value; where a combined system limit applies, it shall be verified separately per ANSI/ESD STM97.1 with the footwear actually in use.

C. ESD performance depends on the floor staying intact and correctly maintained. Insulative waxes, standard floor finishes, and cleaners that leave an insulating residue will defeat the dissipative surface and are prohibited; see 3.6.

D. Traffic wears the conductive path in lanes, at workstations, and at turning points first. Resistance in those areas drifts upward over time; periodic retesting under 3.6 is required to catch that drift, and retesting is by the Owner unless otherwise specified.

E. Grounding connections can be painted over, cut, or disconnected by later work of other trades. Protection and re-verification of grounding connections after other work in the area is by the Owner and the trades performing that work.

F. This Section does not include structural slab repair, moisture mitigation beyond the limits in 1.5, or correction of slab conditions that prevent the specified surface preparation.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Primer: DTI PrimeBond, a penetrating resinous primer formulated to bond the system to prepared concrete and to provide a uniform base for the conductive coat. Where slab moisture approaches the system limit, use the moisture-tolerant primer configuration recommended by the manufacturer for the measured condition.

B. Conductive body coat: DTI StatGuard Conductive Coat, a resinous body coat loaded with conductive elements distributed through the coat, applied at the manufacturer's specified thickness so the conductive network is continuous across the floor and in contact with the grounding strips.

C. Topcoat: DTI StatGuard Topcoat, a resinous wear coat formulated with conductive or dissipative elements so the finished surface holds the specified resistance range of 1.3 after cure, under traffic. Texture, sheen, and color as selected by the Owner from the manufacturer's standard range.

D. Performance requirement: the cured, installed system, primer, conductive coat, and topcoat together, shall test within the class specified for each area:

1. Conductive: below 1.0×10^6 ohms, point-to-point and point-to-ground.

2. Static dissipative: 1.0×10^6 ohms to 1.0×10^9 ohms, point-to-point and point-to-ground.

E. Grounding materials: copper grounding strips and copper tape, of a width and thickness suitable for a permanent concealed connection under the system, with connectors and attachment hardware compatible with copper and with the building ground point. Grounding materials are generic copper; no proprietary grounding component is required.

F. Crack and joint repair materials: resinous repair materials compatible with the system and capable of being coated over without creating an insulating break in the conductive network; where a repair crosses

the conductive path, restore continuity with copper tape bridged over the repair and tied into the adjacent conductive coat.

G. Sealers and finishes: none. Do not apply waxes, polishes, or topical finishes over the topcoat except products the manufacturer certifies in writing as compatible with the specified resistance range.

2.2 EQUIPMENT

A. Surface preparation equipment capable of achieving the specified concrete surface profile uniformly, with vacuum dust collection.

B. Application equipment per the manufacturer's instructions for each coat, including thickness verification tools such as wet film gauges.

C. Test equipment: a megohmmeter (resistance meter) with a range covering at least 1.0×10^4 ohms to 1.0×10^{11} ohms, used with cylindrical electrodes of 5 pounds (2.27 kg) weight and conductive rubber contact pads, per ANSI/ESD STM7.1 and ASTM F150. Test equipment shall be within its calibration interval, and the calibration date shall be recorded in the test report.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify the slab is cured, sound, and free of curing compounds, sealers, coatings, adhesives, oils, and other bond breakers, or identify areas requiring removal under 3.2.

B. Test slab moisture per ASTM F2170 and compare against 1.5 before any material is applied. Do not proceed where readings exceed the manufacturer's limits; notify the Owner in writing.

C. Verify the designated ground points with the Owner's electrical representative and mark their locations on the grounding layout drawing.

D. Document existing cracks, joints, and slab defects photographically before starting.

3.2 PREPARATION

A. Mechanically prepare the concrete to the surface profile specified by the manufacturer, typically CSP 2 to CSP 3, by grinding or shot blasting. Clean per ASTM D4258 and abrade per ASTM D4259 as applicable. Chemical stripping alone is not acceptable.

B. Fill dormant cracks and treat joints with the repair materials of 2.1 so the finished system is continuous. Moving or structural joints shall be reported to the Owner and shall not be bridged with the rigid system without a detail approved in writing.

C. Vacuum and tack the surface so it is dust-free immediately before priming. Protect adjacent surfaces and equipment.

3.3 GROUNDING INSTALLATION

A. Install copper grounding strips and tape in the locations shown on the approved grounding layout, over the prepared slab and before or within the primer and conductive coat sequence exactly as the manufacturer directs, so each strip is in permanent electrical contact with the conductive coat.

B. Provide ground connections at a minimum of one per room and one per 1,000 square feet of floor area, whichever results in more connections, and additional connections where the layout shows long runs, so no area of floor is remote from a ground path.

C. Run copper tape tails from the strip network to each verified ground point and make the connection

mechanically sound and accessible for inspection until the connection is covered. Label or record each connection location on the as-built grounding layout.

D. Test continuity of the grounding network before it is covered by the topcoat. A break found after the system is complete requires opening the floor; verify continuity while correction is still simple.

3.4 SYSTEM APPLICATION

A. Apply DTI PrimeBond uniformly at the manufacturer's specified rate and allow it to cure per instructions before the next coat.

B. Apply DTI StatGuard Conductive Coat at the specified thickness, working the coat into full contact with the grounding strips. Verify wet film thickness during application. Respect recoat windows; where a window has passed, abrade and tack the surface per the manufacturer's instructions before continuing. Skipping intercoat preparation causes delamination and breaks in the conductive path.

C. Apply DTI StatGuard Topcoat at the specified thickness and finish to the selected texture and sheen. Keep traffic, dust, and other trades off the floor for the full cure period.

D. Allow the complete system to cure for the manufacturer's specified period before testing or use. Testing an uncured floor produces readings that do not represent the finished floor.

3.5 FIELD QUALITY CONTROL AND TESTING

A. After full cure, test the finished floor with the megohmmeter and electrodes specified in 2.2, following ANSI/ESD STM7.1 or ASTM F150 methods.

B. Test point density: a minimum of one point-to-point measurement and one point-to-ground measurement per 500 square feet of floor, with a minimum of five of each per room, plus additional readings at the mock-up area, at grounding connections, in traffic lanes, and at any repaired areas.

C. Testing procedure: place electrodes on the clean, dry floor at the spacing the test method specifies for point-to-point readings, apply the test voltage the method specifies for the expected range, and allow the reading to stabilize before recording. For point-to-ground, connect one lead to the verified ground point used by that area of floor.

D. Acceptance: every recorded reading shall fall within the class specified for the area under 1.3. Areas reading above the specified maximum shall be investigated for grounding breaks, contamination, or coat defects, corrected, and retested. Isolated high readings are not averaged away.

E. Environmental record: record ambient temperature and relative humidity during testing in the test report. Where testing occurs in humid conditions and the facility will operate drier, note in the report that low humidity is the worst case and readings may rise in service; recommend a confirmatory retest at the operating humidity.

F. Submit the written test report under 1.4, including a plan or sketch keying every test location to its readings.

3.6 PROTECTION, MAINTENANCE, AND TURNOVER

A. Protect the finished floor from construction traffic, dragged equipment, and contamination until turnover. Do not permit other trades to paint, cut, or fasten through the floor in a way that severs grounding connections without re-verification of the affected area.

B. Turnover cleaning: clean with a cleaner the manufacturer certifies as non-insulating and residue-free. Do not apply wax, polish, or standard floor finish at turnover or at any time in service; these products insulate the surface and void the electrical performance.

C. Deliver maintenance instructions that state plainly: no waxes, no insulating cleaners or finishes, use only

certified compatible cleaning products, protect grounding connections during later work, and retest the floor on a schedule, at least annually and after any resurfacing, repair, or change of cleaning product or cleaning contractor.

D. Turnover package: product data, maintenance instructions, the as-built grounding layout, and the signed written test report.

END OF SECTION 09 67 33