SECTION 09650

RESILIENT FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

1.2 SUMMARY

A. Section Includes:
1. Electrostatic Dissipative (ESD), heat welded seams, vinyl flooring and accessories as shown on the drawings and schedules, as indicated by the requirements of this section.
2. Self Leveling Underlayment flooring and accessories where needed in accordance with ACI 302.1 R-89, Flatness Tolerance.

B. Related Sections:
1. Section 01110 – Cleanroom Construction Protocol
2. Section 01111 – Cleanroom Construction and Cleaning Procedures
3. Section 01112 – Cleanroom Certification and Acceptance
4. Section 03300 – Cast-in-Place Concrete: not the work of this section.
5. Section 09653 – Resilient Wall Base and Accessories

1.3 REFERENCES/PROJECT REQUIREMENTS

A. Additional project requirements:
1. ASTM E 84 - Standard Method of Test for Surface Burning Characteristics of Building Materials.
2. ASTM E 595 – Standard Test Method for Total Mass Loss and Collected Volatile Condensable Materials from Outgassing in a Vacuum Environment.
3. ASTM E 648 - Standard Method of Test for Critical Radiant Flux of Floor-Covering System Using a Radiant Heat Energy Source.
4. ASTM E 662 - Standard Research Test Method for Determining Smoke Generation of Solid
5. ASTM F 150 - Standard Test Method For Electrical Resistance Of Conductive And Static Dissipative Resilient Flooring Materials.
6. ASTM F 970 – Standard Test Method For Static Load Limit
7. ASTM F 1066 – Standard Specification for Vinyl Composition Floor Tile.
8. EOS/ESD S7.1 - Standard For Protection Of Electrostatic Discharge Susceptible Items - Resistive Characterization Of Materials Floor Materials
9. NFPA 101 Life Safety Code – Class 1 Interior Floor Finishes.
10. FTMS 4046 – Static decay.
11. Fed. Spec. SS-T-312B, Type IV, Composition 1 (asbestos-free).
12. ACI 302.1 R-89 Flatness Tolerance

1.4 SUBMITTALS

A. Submit the following in accordance with Conditions of Contract and Division 1:
1. Product Data:
a. Submit manufacturer's specifications to provide evidence of compliance with these specifications.

b. Submit manufacturer's installation and maintenance instructions.

2. Manufacturer's Product Data shall be clearly and specifically marked to indicate the specific models or types intended for submittals and desired approval.
3. Samples: Submit the manufacturer's standard samples showing the required colors for flooring and applicable accessories.
4. Shop Drawings: Submit shop drawings showing seaming plan.
5. Certification: Submit laboratory certification that resilient floor meets Surface Burning Characteristics requirements specified per ASTM E 84/NFPA 255/UL723, ASTM E 648/NFPA 253 and ASTM E 662/NFPA 258.
6. Maintenance Data: Furnish to the Owner two copies of printed maintenance instructions of the manufacturer for replacement, cleaning and buffing for each type of flooring installed.

1.5 QUALITY ASSURANCE

A. Selected subcontractor shall submit proof of skill of not less than five (5) years experience laying ESD resilient flooring.

B. Special Requirements of Regulatory Agencies: Submit certification that system complies with all VOC (Volatile Organic Compounds) requirements and regulations of the Environmental Protection Agency (EPA), Occupational Safety Health Administration (OSHA), State, County, City and Local Air Control District.

C. Each tile to be individually tested for electrical resistance before packaging.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver, materials in good condition to the jobsite in the manufacturer's original unopened containers that bear the name and brand of the manufacturer, project identification, shipping and handling instructions.

B. Store materials (and adhesives) in original containers, in a clean, dry, enclosed space off the ground, protected from the weather and from extremes of heat and cold. Store flooring, adhesives and accessories in the spaces where they will be installed for at least 48 hours prior to installation.

1.7 PROJECT/SITE CONDITIONS OR SPECIAL CONDITION

A. Maintain temperatures in the spaces to receive the flooring and accessories as recommended by manufacturer or as stated below, which ever is more stringent: Minimum 65º Fahrenheit (18º Celsius) and a maximum temperature of 100º Fahrenheit (38º Celsius) for at least 48 hours before, during and for not less than 48 hours after installation. Thereafter, maintain a minimum temperature of 55º Fahrenheit (13º Celsius) in areas where work in completed. Protect all materials from the direct flow of heat from hot-air registers, radiators or other heating fixtures and appliances.

B. Install flooring and accessories after the other finishing operations, including painting, have been completed. Close spaces to traffic during the installation of the flooring.

C. Do not install flooring over concrete slabs until they are sufficiently dry to achieve a bond with the adhesive, in accordance with the manufacturer's recommended bond and moisture test.

1.8 WARRANTY

A. Provide manufacturer's warranty for a period of five years that products maintain electrical resistance performance requirements and are free from defects in materials and workmanship.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. A specific product or material manufactured by any of the following listed manufacturers is "acceptable" (not "approved") only if the specific product or material can evidence exact compliance with the Contract Documents.
   1. Armstrong World Industries, Inc.
   2. Azrock Floor Products Div., Azrock Industries, Inc.
   3. Kentile Floors
   4. Tarkett, Inc.
   5. VPI LLC. Floor Products
   6. FORBO Floor Products
   7. Ardex
   8. Mapei

2.2 MATERIALS

A. Vinyl Floor Tile: 24" X 24" X 1/8" thick vinyl floor tile, pre-grooved for heat weld seams:
   1. Homogeneous solid vinyl tile with encapsulated conductive elements of the carbon family distributed throughout the tile. Low emissivity, DOP-free tile (per ASTM E-595)
   2. Critical Radiant Flux (per ASTM E 648/NFPA 253): Class I (minimum 0.45 watts per square centimeter).
   3. Flame Spread (per ASTM E 84/NFPA 255/UL723): 75 or less.
   4. Smoke Developed (per ASTM E 662/NFPA 258): 450 or less.
   5. Electrical Resistance (per ASTM F 150): $1X10^{6}$-10^{8}
   6. Static Decay (Per FTMS 4046 – 101C): 5,000 to 50 volts <0.01 seconds
   7. Heat welded seams with complementary color welding rod.

B. Chemical Resistance: Resilient Flooring shall have the following ratings when tested with indicated reagents:

Reagent	Rating	Rating
	1 minute	24 hours
Acetic Acid Concentrated	0	5
Acetone	4	6
Ammonium Hydroxide 28%	0	0
Amyl Acetate	0	6
Benzene	0	5
Butyl Alcohol	0	5
Carbon Tetrachloride	0	4

Reagent	Rating	Rating
	1 minute	24 hours
Chloroform	0	5
Cresol	0	6
Dimethyl Sulfoxide	2,6	2,6
Ethyl Acetate	0	6
Ethyl Alcohol	0	0
Ethyl Ether	0	4
Hydrochloric Acid 5%	0	5
Hydrochloric Acid Concentrated	0	0
Iodine	0	8
Isopropyl Alcohol	0	3
Methyl Alcohol	0	0
Methyl Ethyl Ketone	4	6
Methylene Chloride	6	6
Mineral Oil	0	0
Nitric Acid 5%	0	5
Nitric Acid Concentrated	0	3
Perchloroethylene	3	6
Phenol	0	5
Silver Nitrate 5%	0	8
Sodium Hydroxide 50%	0	0
Sodium Metasilicate	0	0
Slufuric Acid 5%	0	0
Sulfuric Acid 77%	0	3,8
Sulfuric Acid Concentrated	0	3,8
Thimerosal	0	8
Toluene	3	6
Tribasic Sodium Phosphate	0	0
Trichloroethane	6	6
Trichloroethylene	4	5
Xylene	0	5

1. Rating scale: 0= No Effect; 1=Very slight surface dulling; 2=slight surface dulling; 3=surface dulling; 4=very slight surface attack; 5=slight surface attack; 6=surface attack (flooring suffered surface damage); 7=bleaching, loss of color; 8=staining, discoloration; 9=soffened

C. Adhesives: Use waterproof adhesives, recommended by the manufacturer for the type of installation. Conductive epoxy adhesive to link elements and to provide tile to tile conductivity.

D. Underlayment for Self-Leveling Subfloor: Is to be composed of a hydraulic cement/latex reinforced type having a minimum compressive strength of 3,500 psi or greater and approved for compatibility with the floor tiles by the floor tile manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine and verify that receiving substrate surfaces of the structure have no defects or errors which would result in poor or potentially defective application or cause latent defects in workmanship.
   1. Conditions of Surfaces
      a. Flat, plumb, level
      b. Clean, free of oil, water, moisture, laitance, or any other deleterious substances.

B. Report any unsatisfactory conditions to the Architect.

3.2 PREPARATION

A. Fill cracks and irregularities in concrete subfloor with underlayment. Apply 1/8" (3.2 mm) thick maximum per coat in accordance with manufacturer's written directions. Allow 24 hours between coats, use as many coats as needed to build up required thickness.

B. Grind down high points in concrete subfloor with disk sander with a No. 1 Grit Emery Paper. Clean after grinding with an industrial vacuum cleaner. Maintain tolerance of ± 1/8" (3.2 mm) in any ten foot (3 m) dimension and no area shall vary at a rate greater than 1/16" (0.16 mm) per running foot (305 mm).

C. Subfloor shall be dry, broom clean, and free of grease, curing compounds, mortar or any matter that will impair adhesion.

3.3 INSTALLATION

A. Install in exact accordance with manufacturer's latest published requirements, instructions, specifications, details and shop drawings.

B. Follow adhesive manufacturer's directions for mixing and applying the adhesive. Cover surface evenly with adhesive. Apply adhesive at a rate to permit installation of flooring within working time of adhesive. Remove adhesive that films over or dries and recoat area.

C. Use safety sparkproof fans where solvent-based adhesives are used, and natural ventilation is inadequate; smoking shall be prohibited. Protect adjoining surfaces from soiling of adhesives.

D. Layout work square with room size with seams aligned with modular cleanroom partition and cleanroom ceiling grid. Fit seams neatly into breaks and recesses, against bases and around pipes.

E. Lay resilient flooring true, level and even; with tight, aligned joints.

F. Clean off surplus adhesive in accordance with manufacturer's recommendations using an approved cleaner as the work progresses.

G. Grounding:
   1. Connect grounding strip to column in accordance with manufacturer's instructions. In rooms without steel columns, such as the SEM rooms, connect to grounding strip mounted on wall.
   2. Lay balance of grounding strip flat in conductive adhesive on floor and cover with additional adhesive. Install flooring over grounding strip.

3.4 TESTING

A. Test completed installation by factory representative in presence of Architect and Owner's representative in accordance with the test procedures of ASTM F 150.

3.5 PROTECTION

A. Protect all resilient flooring which will be subjected to traffic, or which may be damaged due to subsequent construction operations, with heavy, nonstaining plastic or other approved means.

B. After all construction operations are completed, machine buff resilient flooring for final acceptance.

END OF SECTION 09650