SECTION 095820 – FIBERGLASS SUSPENDED CEILING INVERTED TEE RAIL SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Suspended pultruded fiberglass inverted tee rail system for extreme environments.

B. Related Sections

1. Section 095800 – Closed Edge GFRP Insulated Lay-In Ceiling Panels.
2. Section 095810 - Acryloyl Engineered Polymer Ceiling Panels.

C. Products furnished, but not installed under this Section, include anchors, clips, and other ceiling attachment devices to be cast in concrete.

1.3 REFERENCES

A. ASTM E 84 - Surface Burning Characteristics of Building Materials.

1. Flame spread and smoke development ratings are based on the ASTM E-84 tunnel test as performed by an independent testing laboratory. These are comparison numbers for design, code and insurance considerations. The test are small-scale tests and, in some cases, do not represent the hazards under actual fire conditions. Fiberglass reinforced plastic will burn, as will other organic based components, and will produce smoke.

B. ISO 846 - Plastics - Evaluation of the action of microorganisms- Resistance to Fungi & Bacteria Test method.

C. ASTM D3273-00 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.

D. ASTM D3274-09 - Standard Test Method for Evaluating Degree of Surface Disfigurement of Paint Films by Fungal or Algal Growth, or Soil and Dirt Accumulation.

E. ISO 2812-4:2007 and ASTM D1308-02 (2013) - Chemical Resistance Testing of engineered polymer panels.

F. Determination of Extractives Residue according to US FDA 21 CFR 177.2600 Arcoplast finishing compound/sealant.

G. ICC approved for Seismic Installation (Evaluation Report ESR-1722 for full details).

H. USDA and Local Government (Building Code) regulations compliant.

1.4 ACTION SUBMITTAL

A. Product Data: Submit manufacturer's data for the fiberglass inverted tee rail ceiling system and accessory items.

B. Samples: Submit sample kit of fiberglass ceiling components and 6 inch square sample of lay-in panels.

C. Delegated-Design Submittal: For seismic restraints for fiberglass ceiling systems.

1. Include design calculations for seismic restraints including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFOMATIONAL SUBMITTALS

A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other:

1. Suspended railing components.
2. Bulkhead, ceiling drop and ceiling well elevations.
3. Structural members to which suspension systems will be attached.
4. Size and location of initial access modules for ceiling panels.
5. Items penetrating finished ceiling including the following:

a. Lighting fixtures.
b. Air outlets and inlets.
c. Speakers.
d. Sprinklers.
e. Access panels.
f. Monitoring systems.
g. Servicing conduits (new and existing protrusions).

6. Perimeter moldings.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance and Repair Data: For finishes to include in maintenance manuals.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Suspension-System Components: Quantity of each exposed component equal to 2 percent of quantity installed.
2. Hold-Down Panel Clips, Clamps, and Fasteners: Equal to 2 percent of quantity installed.
3. Wall, main, cross rails, sealant, and gaskets equal to 2 percent of the quantity installed.

1.8 QUALITY ASSURANCE

A. Ceiling work to be performed by an experience installer with a minimum 2 years of experience with suspended ceiling type of construction.

B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

1. Build mockup of typical fiberglass inverted tee rail and lay-in ceiling area as shown on Drawings.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in Manufacturer’s original unopened packages with contents fully identified. Handle and store in accordance with Manufacturer’s instructions and recommendations.

B. Deliver suspension-system components, and accessories to project site in original, well identified unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from direct sunlight, surface contamination, and other causes.

1.10 FIELD CONDITIONS

A. Do not install materials until the following conditions are met; interior spaces have been enclosed and are weather-tight; work above ceilings has been completed.

B. Environmental Limitations: Do not install inverted tee rail ceiling components until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above lay-in ceiling system is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for project when occupied for its intended use.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design seismic restraints for ceiling systems.

B. Seismic Performance: Suspended ceilings shall withstand the effects of earthquake motions determined according to [**ASCE/SEI 7**] <**Insert requirement**>.

C. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: Class A (Flame spread of 5 according to UL 723).
2. Smoke-Developed Index: 65 according to E84.

D. Suspension System Structural Considerations:

1. Pultruded fiberglass inverted tee rail deflection shall not exceed .133” when subjected to a 7 pound per linear foot loading over a 4’-0” unsupported span.
2. Inverted tee rail system design shall accept dead load of 2.25 pounds per square foot with hanger wire at 4’-0” on center or 3 lbs. per square foot with hanger wire at 3’-6” foot on center.
3. Inverted tee rail members will have a 50% of the yield strength value as determined by a point load applied at the midpoint of a 4’-0” simply supported span. This 50% value shall exceed 40 pounds.

2.2 MANUFACTURER

A. Basis of Design: Subject to compliance with requirements, provide the following **by ARCOPLAST, 106 Crafton Drive, O’Fallon, Missouri 63366**. Toll Free (888) 736-2726. Phone (636) 978-7781. Fax (636) 978-7782. Web Site www.arcoplast.com.

1. The following components meet critical environment and high containment facility requirements. SUBSTITUTION ARE NOT ALLOWED.

2.3 TR35 FIBERGLASS SUSPENDED CEILING INVERTED TEE RAIL SYSTEM

A. Suspended Ceiling Rail System:

1. Exposed pultruded fiberglass ceiling inverted tee rail system components.

a. 12’-0” (nominal) main rail, 4’-0”, 3’-0”, 2’-0”, (nominal), and 1-0”’ (nominal) cross rails manufactured from pultruded fiberglass. 1-3/8” wide face minimum.
b. 12’-0” pultruded fiberglass wall rails, 1-1/2” by 1-1/2”, and 1/8” thick.
c. PVC assembly clamps and lock down clips manufactured from virgin PVC.

2.4 ACCESSORIES

A. Hanging Wire:

1. Option 1: Hanging wire to be 12 ga soft annealed wire strand.
2. Option 2: Hanging wire to be 12 ga stainless steel.
3. Option 3: Hanging wire to be 12 ga Monel.

B. Wall angle fasteners.

1. Option 1: Fasteners to be stainless steel, aluminum, or plastic.
2. Option 2: Continuous bead of sealant applied to the back of the wall angle to prevent air and water leakage, airborne contaminants seeping from interstitial to process area and vice versa.
3. Option 3: Rivet Cross tee, lock and splice clips with one 1/8” inch diameter lockrivets (Stainless steel or aluminum) on each side of the clip. The lockrivet is to be between the first and second rib on the tee or 9/16” or more below the top of the inverted tee. Backup washers are to be used with the lockrivets.

C. Fiberglass Acrylic Rail Sealer: All cut ends of main tees, cross tees, and wall angle require a clear acrylic spray to seal raw end cuts and prevent moisture, oils, and air born contaminants from glass wicking.

PART 3 - EXECUTION

3.1 INSPECTION

A. Ceiling system installer shall examine the job site and conditions under which the suspended ceiling work is to be performed and notify the Architect in a timely manner of any unsatisfactory conditions.

3.2 PREPARATION

A. Ceiling system installer shall meet at the project site with Architect and contractors from related trades working in the areas containing the suspended ceiling system prior to commencement of installation.

1. Refer to the approved reflected ceiling plan for ceiling layout.
2. Measure each ceiling area and establish layout of the inverted tee rail system to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders and comply with layout shown on reflected ceiling plans.
3. Review areas of potential interference and resolve conflicts before proceeding with the project.
4. Coordinate the work with the layout of other work that penetrates the ceiling.

3.3 INSTALLATION

A. General: Install lay-in ceiling panels to comply with ASTM C 636/C 636M and seismic design requirements indicated, according to manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."

B. Suspend ceiling hangers from building's structural members and as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
4. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of four tight turns. Connect hangers directly to structure or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both the structure to which hangers are attached and the type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.

6. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
7. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
8. Do not attach hangers to steel deck tabs.
9. Do not attach hangers to steel roof deck. Attach hangers to structural members.
10. Space hangers not more than 48 inches o.c. (light duty) along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
11. Size supplemental suspension members and hangers to support intermediate duty and heavy duty ceiling loads within performance limits established by manufacturers standards.

    a. Refer to manufacturer’s literature for ceiling panel weights.

C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or post-installed anchors.

D. Install wall rails at perimeter of ceiling area and where necessary to conceal edges of lay-in ceiling panels.

1. Apply sealants in a continuous ribbon concealed on back of vertical leg of wall rail before installation to ensure a gas, moisture, and air-tight installation.
2. Screw attach wall rail to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet. Miter corners accurately and connect securely.
3. Do not use exposed fasteners, including lockrivets, on wall rail.

E. Install suspension-system main and cross rails so they are level, square, flush, and securely interlocked with one another. Remove and replace damaged, splintered pultruded end cuts.

F. All light fixture frames, equipment, air duct diffusers, filters, or ceiling penetrations must be independently hung/supported.

1. Net Opening: Flange to flange in Arcoplast Pultruded Inverted Tee Rail is 22-3/4” x 46-7/8” for a 2x4 system; verify any access door, light fixture lens frames, or penetration will function with this opening.

G. Refer to manufacturers Installation Manual for fiberglass suspended ceiling system installation requirements.

3.4 FIELD QUALITY CONTROL

A. Special Inspections: [**Owner will engage**] [**Engage**] a qualified special inspector to perform the following special inspections:

1. Periodic inspection during the installation of suspended ceiling grids according to ASCE/SEI 7.

B. Testing Agency: [**Owner will engage**] [**Engage**] a qualified testing agency to perform tests and inspections.

C. Perform the following tests and inspections of completed installations of ceiling hangers and anchors and fasteners in successive stages and when installation of ceiling suspension systems on each floor has reached 20 percent completion, but no panels have been installed. Do not proceed with installations of ceiling hangers for the next area until test results for previously completed installations of ceiling hangers show compliance with requirements.

1. Within each test area, testing agency will select one of every 10 power-actuated fasteners and postinstalled anchors used to attach hangers to concrete and will test them for 200 lbf of tension; it will also select one of every two postinstalled anchors used to attach bracing wires to concrete and will test them for 440 lbf of tension.
2. When testing discovers fasteners and anchors that do not comply with requirements, testing agency will test those anchors not previously tested until 20 pass consecutively and then will resume initial testing frequency.

D. Hangers, anchors, and fasteners will be considered defective if they do not pass tests and inspections.

E. Prepare test and inspection reports.

3.5 CLEANING

A. Clean exposed surfaces including trim, edge moldings, and suspension-system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.

B. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

3.6 PROTECTION

A. Protect installed fiberglass suspended ceiling rail system from damage.

B. Allow 24 hours curing time before performing pressure wash down sanitation procedures.

END OF SECTION 095820