SECTION 068315 – ACRYLOYL ENGINEERED POLYMER WALL AND CEILING PANELS

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. Acryloyl engineered polymer panels and accessories for interior walls and ceilings.

    a. Spline, joint covers, mastic, finishing compound, sealants, fasteners, and other components required for a complete, hermetically sealed, wall and ceiling assembly.
    b. Flush glazed window units.
    c. Finishing accessories.

B. Related Sections:

1. Section 054000 - Cold-Formed Metal Framing
2. Section 068320 - GFRP Composite Molded Architectural Shapes
3. Section 082200 - Fiberglass Reinforced Polymer (FRP) Doors.
4. Section 083110 - Acrylic Access Doors and Panels
5. Section 092216 - Non-Structural Metal Framing
6. Section 095820 – Fiberglass Suspended Ceiling Inverted Tee Rail System.

1.3 REFERENCES

A. American Society of Mechanical Engineering (ASME).

1. ASME N510 document, Testing of Nuclear Air Treatment Systems (1989).

B. ASTM International (ASTM)

1. ASTM D523-14: Standard Test Method for Specular Gloss.
2. ASTM D570-98: Standard Test Method for Water Absorption of Plastics.
3. ASTM D638-14: Standard Test Method for Tensile Properties of Plastics.
4. ASTM D695-15: Standard Test Method for Compressive Properties of Rigid Plastics.
5. ASTM D696-16: Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics Between -30°C and 30°C with a Vitreous Silica Dilatometer
6. ASTM D790-17: Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
7. ASTM D1308-02 (2013): Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes
8. ASTM D1621-16: Standard Test Method for Compressive Properties of Rigid Cellular Plastics.

9. ASTM D1929-20: Standard Test Method for Determining Ignition Temperature of Plastics.
10. ASTM D2583-13: Standard Test Method for Indentation Hardness of Rigid Plastics by Means of a Barco! Lmpressor
11. ASTM D2843-19: Standard Test Method for Density for Smoke from the Burning or Decomposition of Plastics.
12. ASTM D3273-16: Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
13. 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.
14. ASTM E84-19b: Surface Burning Characteristics of Building Materials.
15. ASTM E96-16: Standard Test Methods for Water Vapor Transmission of Materials.
16. ASTM E831-19: Standard Test Method for Linear Thermal Expansion of Solid Materials by Thermo-Mechanical Analysis.

C. European Committee for Standardization (CEN)

1. Classification of Reaction to Fire Performance in accordance with EN 13501-1: 2007 + A1: 2009.

D. International Organization for Standardization (ISO)

1. ISO 846: 2019: Plastics - Evaluation of the action of microorganisms.
2. ISO 2812-4:2017: Paints and varnishes - Determination of resistance to liquids - Part 4: Spotting Methods.
3. ISO 9705-1:2016, Annex B: Full-scale Room Test for Surface Products.

E. United States Department of Health and Human Services,

1. Centers for Disease Control (CDC): Biosafety in Microbiological and Biomedical Laboratories (BMBL); Sixth Edition, 2021.
2. National Institutes of Health: Design Policy and Guidelines, 2016.

F. The Public Health Agency of Canada

1. The Laboratory Biosafety Guidelines: 3rd Edition 2004.

G. Australia / New Zealand

1. PC4 Biosafety Guidelines.

H. UK Public Health

1. ACDP4 Biosafety Guidelines.

I. Compliance

1. New York City MEA Approval 414-04-M - University of Pittsburgh Test Protocol for Measurement of Acute Lethality of Thermal Decomposition Products from Specimen.
2. Seismic Testing – Seismic requirements of NAS 4219 and ICC-ES AC156 (US) for Arcoplast wall and ceiling system
3. Determination of Extractives Residue according to US FDA 21 CFR 177.2600 Arcoplast finishing compound/sealant
4. Living Building Challenge 3.1 Red List (Declare Label).
5. (EPD) Environmental Product Declaration.

6. (HPDC) Health Product Declaration Collaborative.

J. Electromagnetic Compatibility Teste Report #G105789756GRR-001 Rev.

1. Non-Standard Differential Radio Frequency Attenuation:

a. 0.9 GHz
b. 2.437 GHz
c. 5 GHz
d. 6.515 GHz

1.4 SUBMITTALS

A. Comply with Section 013300 - Submittal Procedures.

B. Product Data: Submit manufacturer's product data including installation instructions.

C. Sustainable Design Submittals:

1. Credit MRc4: Building product disclosure and optimization - material ingredients. Option 1. Material ingredients reporting.

a. Manufacturer to provide Declare Product Label indicating all ingredients have been evaluated down to 1,000 ppm.

2. Credit EQc2: Low-emitting materials.

a. Manufacturer to provide product data for installation adhesives, including printed statement of VOC content and material safety data sheets

D. Shop Drawings: Submit manufacturer's shop drawings, including plans, elevations, sections, and details, indicating composite ceiling panels, wall panels, wall base, joints, radius joints, finish junctions at wall-to-wall, wall-to-ceiling, wall-to-floor, wall-to-window/door frames, mastic or tape adhesive, and attachment screws.

1. Indicate size and location of wall openings and penetrations.
2. Indicate items to be supported by walls. Include loads.
3. Indicate method of sealing joints, openings, and penetrations.
4. Suspension system spacing and details.
5. Splicing, joint treatment, and fastening details of ceiling panels.
6. Changes in ceiling planes, openings, and intersections with vertical element.
7. Ceiling access door dimensions and location.

E. Samples: Submit manufacturer's samples.

1. Composite ceiling panels.
2. Composite wall panels.
3. Wall base.
4. Attachment joints.
5. Bio-Seal Finishing compound detailing.

F. Manufacturer's Certification: Submit manufacturer's certification that materials comply with specified requirements and are suitable for intended application.

G. Warranty: Submit manufacturer's standard warranty. The manufacturer guarantees the product supplied shall be free of defects in material or workmanship under normal use and service.

1. Warranty Period: Five years from date of delivery.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain engineered polymer panels and accessories from a single manufacturer.

B. Manufacturer's Qualifications: Minimum five-year's experience constructing BSL3E and/or BSL4 spaces with polymer paneling systems and accessories. Manufacturer shall have completed at least one project containing partitions within BSL4 or equivalent (Australia/New Zealand PC4, Public Health Agency of Canada CL4, UK ACDP4) containment.

C. Installer/Applicator Qualifications: Manufacturer-trained and certified specialty installer/applicators with minimum 2-years' experience constructing BSL3E and/or BSL4 spaces with polymer paneling systems and accessories. Manufacturer shall have completed at least one project containing partitions within BSL4 U.S. (NIH) National Institute of Health, or equivalent (Australia/New Zealand PC4, Public Health Agency of Canada CL4, UK ACDP4) containment.

D. Mockups: in addition to the High Containment Technical Mockup specified in Section 01 4339.13 "High Containment Mockups."

1. Before installing entire installation, build Wall Mockup to demonstrate polymer paneling systems aesthetic effects and set quality standards for materials and execution.

a. Notify Architect/Engineer two weeks prior to date when approval is requested. Construct mock-up with the following finishes, penetrations, and fittings:

1) Typical transition from flooring to wall, with wall base.
2) Typical electrical duplex outlet.
3) Typical wall corner.
4) Typical wall attachment.

2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

E. Preinstallation Conference: Conduct conference at Project site as specified in Section 013100 "Project Management and Coordination."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Storage:

1. Store materials in clean, dry area indoors in accordance with manufacturer's instructions.
2. Composite Panels: Store flat.
3. Finishing Compound: Store for a maximum of 6 months from date of shipment at temperature of 50 degrees F to 80 degrees F (10 degrees C to 27 degrees C).
4. Adhesive: Store for a maximum of 6 months from date of shipment at temperatures below 80 degrees F (27 degrees C).

C. Handling: Protect materials and finish from damage during handling and installation in accordance with manufacturer's instructions.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Do not install materials until building is enclosed and areas to receive materials are protected from dirt and dust.

B. Maintain the following conditions during and after installation in areas to receive materials.

1. Minimum Temperature: 60 degrees F (15 degrees C).
2. Relative Humidity: 20 to 60 percent.

PART 2 - PRODUCTS

2.1 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. Acryloyl for BSL-3 Environment
2. Acryloyl for BSL-3 Ag Environment
3. Acryloyl for BSL-4 Environment

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

2.2 ACRYLOYL ENGINEERED POLYMER WALL AND CEILING PANELS

A. Wall and Ceiling Panels: Acryloyl engineered polymer panels impregnated with fire-rated resin and fire-rated fillers.

1. Panel Thickness:

a. Applied Over Substrate: 1/4 inch (6mm), or 3/8 inch (9mm)
b. Applied to Metal Stud: 1/2 inch (12.5mm), 3/8 inch (9.5mm), or 3/4 inch (19mm).
c. Free Standing Partition Panel System: 3/4 inch (19mm).

2. Size:

    a. Modular, 4’ (1.2m) wide (up to 16’ (4.87m) long.

        1) Side Edge Profile: Eased Side Edge Grooved.
        2) End Cut Profile: Grooved.
        3) Joint System: Mechanical Spline.

    b. Custom, maximum 5’ (1.524m) wide (up to 16’ (4.87m) long.

        1) Side Edge Profile: Square Cut.

3. Color: To be selected from manufacturers full line of available colors.

B. Physical Properties of Acryloyl Engineered Polymer Panels: 1/2-inch thickness (12mm).

1. Tensile Strength, ASTM D 638-03: 3740 psi.
2. Flexural Strength, ASTM D 790-03: 8070 psi.
3. Compressive Strength 12502 psi.
4. Barcol Hardness, ASTM D 2583: 58.
5. Water Absorption of Plastic, ASTM D 570: 0.04%
6. Surface Burning Characteristics, ASTM E 84 and CAN/ULC-S102-10, Whole Panel, Class A:

    a. Flame Spread Index: 25.
    b. Smoke Development: 450.

7. Gloss Property, ASTM D 523: 97.8 reflectance at 85-degree light source.
8. Toxicity Test - UPITT Protocol: MEA 64-96-M, Solid Colors.
9. ASTM E831-06 – Standard Test Method for Linear Thermal Expansion of Solid Thermal Analysis: 2.96×10^{-5}.
10. Coefficient of Linear Thermal Expansion, ASTM D 696-03: 2.3 in/in °F.

C. Wall and Ceiling System Mock-Up Testing for Acryloyl Engineered Polymer Panels:

1. Vacuum Decay Testing on Arcoplast Wall and Ceiling System Mock-up for High Containment Levels BSL-3, BSL-3 Ag, BSL-4:

    a. Reference – The Public Health Agency of Canada document - Laboratory Biosafety Guidelines: 3rd Edition 2004.
    b. ASME N 510 – Testing of Nuclear Air Treatment Systems.

2. Supplemental Helium Leak Test.
3. Pressure Leak Testing with various MEP interface system for a High Containment Levels BSL-3, BSL-3 Ag, BSL-4:

    a. The Public Health Agency of Canada – Laboratory Biosafety Guidelines: 3rd Edition (2004).

        1) Sealed Metal Duct interface with Arcoplast composite panel
        2) Electrical Box face plate interface with Arcoplast composite panel
        3) Expansion / Contraction joint system interface with Arcoplast composite panel
        4) Panel penetration by mechanical fastener
        5) ASME N 510 – Testing of Nuclear Air Treatment Systems.
        6) Arcoplast Flush Glazed Window Test Report NC-ARC 14810 A-01

7) ISO 9705-Annex B: 1993 (E) Full-scale room test.

4. Engineered polymer panels under guidelines NIH/CDC biological decontamination procedures using:

a. Chlorine Dioxide
b. Formaldehyde Gas
c. Hydrogen Peroxide Vapor

5. Pull-Out Strengths of mechanical fasteners test for fixing and mounting of fitments.

2.3 ACCESSORIES

A. Trim Accessories: Manufacturer's standard acrylic finishing accessories designed to provide airtight, leak proof and gas tight seal available in thickness from .060” to 1.250 in various sizes and may be installed in wall or ceiling panels.

1. Acrylic Finishing Accessories include the following:

a. Grommets
b. Face Plates
c. Device Trim Plates
d. Fire Outlet Boxes
e. Slip Connections
f. Access Doors
g. Escutcheons
h. Cabinets

2. Acrylic finishing accessories are labeled as combustible and classified by UL as slow burning plastic. Protect material from flames and high heat sources.

a. Flame Spread: 140 per 3mm thickness – ASTM E 84
b. Smoke Density: 10.3% - ASTM D 2843
c. Self-Ignition temperature: 910F (1.5mm) thickness – ASTM D 1929

3. Flush Glazed Window Unit

a. Flush glazed extruded aluminum interior window assembly; fully integrated and sealed into wall construction with manufacturers high strength finishing compound.

1) Limited to installation with 3/8” (9.5mm) and 1/2” (12.7mm) wall panels.
2) Provides air, moisture, and gas leak tight unit.
3) Resistant to Fungi & Bacteria and does not support microbial growth.
4) Resistant to high pressure wash, sanitation, and decontamination regimen.
5) Meets regulatory requirements including FDA 21 CFR 177.2600.

b. Finish: Clear anodized, corrosion resistant.
c. Size: Custom.
d. Glazing: 5/16 inch (8mm) tempered glass.

1) Single glazed.
2) Double glazed.

B. Wall and Ceiling Panel Accessories:

1. Splines: Aluminum spline for panel joints or seams.
2. Battens: Solid engineered polymer resin and filler matrix, same color as composite panels.
3. Wall Base:

    a. Solid engineered polymer resin and filler matrix, same color as composite panels.
    b. Surface mounted galvanized termination strip.
    c. Surface mounted stainless steel termination strip.

4. Attachment Screws: Coated steel or stainless steel screws of length and type as determined by manufacturer to support composite panels.
5. Adhesive: Structural Adhesive, acrylic base A-2020 – white.
6. Tape Adhesive: 3M – VHB #4959 - thickness 120 mils x 1/2” (12.5mm) width.
7. Bio-Seal Finishing Compound Edge Tape – 3M - #2460 – Acrylic Adhesive Back, 3.3 mils x 1” (25mm) width.
8. Sealant and Finishing Compound A-1010 Bio-Seal:

    a. Pick proof two-component, 1:1 mix, non-sag, non-porous, non-yellowing, high-gloss, odor-free, solvent-free sealant and finishing compound A-1010 Bio-Seal.

        1) Solids: 100 percent.
        2) Color: Match panel color.
        3) FDA Approved: Determination of Extractives Residue according to US FDA 21 CFR 177.2600 Arcoplast finishing compound/sealant.
        4) NSF Approved: Registration #148103.

PART 3 - EXECUTION

3.1 TRAINING AND CERTIFICATION

A. Only manufacturer trained and certified specialty applicators shall be considered for the construction of High Containment Environments as well as BSL-3, BSL-3Ag, and BSL-4 facilities.

1. Minimum Applicator requirements:

    a. Minimum 2 years’ experience in construction of High Containment facilities.
    b. Familiar with construction guidelines pertaining to Bio-Safety in Microbiological and Biomedical Laboratories established by NIH (National Institute of Health), CDC (Center of Disease Control, NAID (National Institute of Allergy and Infectious Disease).
    c. Accredited by manufacturer on application of Acryloyl engineered polymer panels for high containment establishments.
    d. US Department of Labor Occupational Safety and Administration (OSHA).

        1) OSHA Standard 29CFR1926 - Safety and Health Regulation for Construction.

3.2 EXAMINATION

A. Examine areas to receive composite wall and ceiling panels. Notify Architect of conditions that would adversely affect installation or subsequent use.

B. Ensure other work to be performed behind composite panels is complete before starting installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 INSTALLATION

A. Substrate compatibility and surface adhesion for acryloyl engineered polymer panel materials is critical for performance capable of meeting BSL-3, BSL-3 Ag, and BSL-4 compliance.

1. Install composite wall and ceiling panels, accessories, and finish accessories in accordance with manufacturer's written instructions.
2. When substrate compatibility and surface adhesion is doubtful, conduct physical bond test to determine best surface preparation, adhesive primer, and adhesive product to use and submit recommendations to owner/contractor for approval.

B. Gauge and thicknesses of all steel studs used in framing support for partition walls must be sized to meet the required use and purpose.

1. Wall deflections:

a. Zero deformation under room pressure.
b. 1:360 deflection under design pressure.

2. Ceiling deflection:

a. Zero deformation under room pressure.
b. 1:300 maximum allowable deflection of the ceiling panels under total dead and live loads.

C. All partition and system walls shall be able to support the load of wall mounted fire extinguishers and all wall mounted fitments that have been specified.

D. The construction of all wall types must allow for mounting of hose reels, fire extinguishers, manual call points, alarm bells, eye wash and any other wall-mounted equipment & fitment.

E. Fixing and mounting of fitments, fixtures, and fittings, shall not compromise the airtightness and structural integrity of the system wall panels.

F. Window Installation: Install per manufacturers written instructions. Windows are fully integrated into wall panel system, bonded together, and sealed with two-component mix of high-strength finishing compound A-1010 Bio-Seal.

G. Lay out panels to minimize joints and to provide balanced borders at room perimeter. Use full and uncut panels where possible.

H. Field cut panels as necessary in accordance with manufacturer's instructions.

I. Apply mastic or tape adhesive to furring, steel studs, or existing substrate in accordance with manufacturer’s instructions.

J. Screw panels into galvanized steel studs with attachment screws below floor base line and above ceiling line to hide exposed fasteners.

K. Install panels plumb, level, square, and in proper alignment.

L. Finishing Compound: Clean floor, walls, and ceiling areas thoroughly, seal and quarantine area prior to application. Prepare surfaces and apply finishing compound in accordance with manufacturer's instructions.

M. Finish wall-to-wall and wall-to-ceiling junctions with 1/2-inch radius joints using finishing compound.

N. Wall Base: Finish wall-to-floor junctions with 1/2-inch radius joints using finishing compound prior to installing wall base before application of floor finish. Set in mastic in accordance with mastic manufacturer's instructions.

O. Seamless Floor Application: Sand panels lightly to remove gloss from surface finish ensuring proper bond. If termination bars/strips are to be used for wall-to-floor base termination, install the bars/strips with VHB tape and avoid mechanical fasteners.

P. Sealants: Apply Bio-Seal sealant in accordance with sealant manufacturer's instructions and shop drawings.

1. Seal joints, openings, and penetrations in accordance with manufacturer's instructions and shop drawings.

Q. Apply Arcoplast finishing compound over countersunk fasteners and penetrations in accordance with manufacturer's instructions.

R. Repair minor damages to composite panel finish in accordance with manufacturer's instructions and as approved by Architect.

S. Remove and replace damaged components that cannot be successfully repaired as determined by Architect.

T. Primary wall and ceiling panel system shall be installed and sealed per manufacturers written instructions to comply with project requirements and testing; including but not limited to the following:

1. Rooms tested for positive/negative pressure.
2. Room sterilized for micro-bacterial decontamination without risk of transfer of fumes to adjoining spaces.
3. Rooms sealed to prevent cross-contamination between rooms and service corridors.

3.4 CLEANING

A. Remove temporary protective film at doorways, windows, equipment, and accessories.

B. Clean composite panels promptly after installation in accordance with manufacturer's instructions.

C. Do not use harsh cleaning materials or methods that would damage finish.

3.5 PROTECTION

A. Protect installed composite wall and ceiling panels from damage.

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

3.6 COMMISSIONING

A. Room commissioning shall be performed by third party Commissioning Agency.

1. When lead or copper shielding is specified room commissioning must be performed by qualified radiation Physicist.

B. Manufacturer shall have representative present at time of Commissioning Testing.

1. Provide manufacturer 10 day notice prior to the scheduled testing.

END OF SECTION 068315