

SECTION 095XX

TRANSPARENT MICRO SLOTTED SOUND ABSORBING PANEL (DEAMP®)

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Transparent micro slotted sound absorbing panel: DeAmp®
- B. Standard hardware / suspension system.
- C. Coordination with all trades having elements that attach to, penetrate through or are concealed behind/above the transparent panels of this section.

1.2 PRODUCTS INSTALLED BUT NOT SUPPLIED UNDER THIS SECTION

- A. Any custom mounting hardware or ceiling suspension system.

1.3 RELATED SECTIONS

- A. Section 08400 – Entrances and storefronts
- B. Section 08500 - Windows
- C. Section 08600 - Skylights
- D. Section 08700 - Hardware
- E. Section 08800 – Glazing
- F. Section 08900 – Glazed curtain wall

1.4 ALTERNATES

- A. No substitutions permitted.

1.5 REFERENCES

- A. Local Building Code – Current Edition
- B. International Organization for Standardization
 - a. ISO 354 - Measurement of Sound Absorption in a Reverberation Room
 - b. ISO 10534 - Determination of sound absorption coefficient and impedance in impedance tubes - Part 1: Method using standing wave ratio.
 - c. DIN EN ISO 13 468-1: Light Transmission
- C. American Society for Testing & Materials (ASTM)
 - a. ASTM E 1050-98 - Standard Test Method for Impedance and Absorption of Acoustical Materials Using a Tube, Two Microphones, and a Digital Frequency Analysis System
 - b. ASTM C 423 - Sound Absorption & Sound Absorption Coefficients by the Reverberation Room Method
 - c. ASTM E 84: Standard Test Method for Surface Burning Characteristics of Building Materials.
 - d. ASTM D 2843-99 Smoke Density Rating
 - e. ASTM D 635-98 Combustion Rating
 - f. ASTM D 1929-96 Self Ignition Temperature
 - g. ASTM E 795 - Standard Practice for Mounting Test Specimens during Sound Absorption Tests
 - h. ASTM E 1264 - Classification for Acoustical Ceiling Products

1.6 SYSTEM DESCRIPTION

- A. Design Requirements: Sound absorption shall be provided by viscous losses in the micro-slots, whose sub-millimeter diameter is comparable to the thickness of a boundary layer of air. As sound passes through these micro-slots, sound absorption shall occur due to viscous boundary layer losses in the slots, as long as an air cavity is provided between the sound absorbing panel and the vision

glass boundary or other hard surface. It is therefore possible to achieve sound absorption without the need for additional porous material in the cavity behind the micro-slotted sheet, thus allowing the panel to be transparent, translucent or tinted. In addition to a single panel layer, multiple, separated panel layers may be used to broaden the range of frequencies over which efficient absorption occurs.

B. Performance Requirements

1. Random Incidence, 1/3 rd Octave Band, Sound Absorption Coefficients (a): Tested by independent, accredited, facility according to ISO 354. (Comparable Tests: ASTM 423).

| f (Hz) | Absorption Coefficients | | | |
|------------|-------------------------|-------------|-------------|---------------------------------|
| | 8" Cavity | 4" Cavity | 2" Cavity | Double Layer 4", 1" Cavities |
| 100 | 1.09 | 0.44 | 0.11 | 0.72 |
| 125 | 1.24 | 0.44 | 0.19 | 0.9 |
| 160 | 1.23 | 0.64 | 0.22 | 0.88 |
| 200 | 1.11 | 1.03 | 0.37 | 1.02 |
| 250 | 0.87 | 1.03 | 0.52 | 0.71 |
| 315 | 0.72 | 0.84 | 0.67 | 0.69 |
| 400 | 0.75 | 0.98 | 0.81 | 0.7 |
| 500 | 0.46 | 0.7 | 0.94 | 0.54 |
| 630 | 0.39 | 0.57 | 0.67 | 0.54 |
| 800 | 0.26 | 0.4 | 0.54 | 0.63 |
| 1000 | 0.29 | 0.32 | 0.43 | 0.52 |
| 1250 | 0.28 | 0.23 | 0.3 | 0.41 |
| 1600 | 0.18 | 0.17 | 0.22 | 0.28 |
| 2000 | 0.16 | 0.16 | 0.17 | 0.22 |
| 2500 | 0.14 | 0.15 | 0.14 | 0.18 |
| 3500 | 0.12 | 0.13 | 0.12 | 0.16 |
| 4000 | 0.13 | 0.13 | 0.13 | 0.14 |
| NRC | 0.45 | 0.60 | 0.55 | 0.50 |

1.7 SUBMITTALS

- A. Product Data: Submit standard cut panel including basic system description, options and component sizes. Identify all applicable features and options. Cross out any inapplicable features or options.
- B. Shop Drawings: The contractor shall produce and submit shop drawings of products and suspension or mounting systems overlaid on base drawings (interior elevations or reflected ceiling plans) supplied electronically by the architect. Show overall layout with dimensions and references to details as necessary for penetrations, joints, ends and intersections with other materials or building components. Submit schedule of all quantities, sizes, hole patterns, borders and transparency. Field-verify site conditions with dimensions shown on shop drawings.
- C. Samples: Submit an 8-1/2" x 11" sample
- D. Design Data / Test Reports: Submit third-octave band sound absorption coefficient data according to ISO DIN EN 20 354, submit light transmission at 400-800 nm according to DIN EN ISO 13468-1 and fire rating according to DIN 4102.

1.8 QUALITY ASSURANCE

- A. Qualifications: Manufacturer and installation contractor shall have a minimum of three years experience with similar systems.
- B. Single Source: All products under this section shall be supplied by a single manufacturer to ensure consistency in product size and finish.
- C. Flammability and Smoke Developed: Tested by independent, accredited facility.
 - 1. PETG B1 Test: DIN 4102
 - 2. Acrylic B2 Test: DIN 4102
 - 2. Not Completed Tests: ASTM E84, ASTM D 2843-99 Smoke Density Rating, ASTM D 635-98 Combustion Rating, and ASTM D 1929-96 Self Ignition Temperature

Light Transmitting Plastics:

NFPA 101 (section 6-5.3) refers use of light-transmitting plastics for interior applications to authorities and organizations having local jurisdiction. Such authorities and organizations typically adopt the US Model Building Codes, which are supported by the organization listed below:

- Building Officials and Code Administrators International (BOCA)
- International Conference of Building Officials (ICBO)
- Southern Building Code Congress International (SBCCI)

ASTM E84/UL723 tests do not accurately characterize the flame and smoke performance of light-transmitting plastics. These tests, virtually identical in methodology and criteria, measure the Flame Spread Index and the Smoke Density of a material relative to red oak in ceiling position. Both standards recognize the problem with thermoplastic materials that soften and melt before burning, unlike wood. Materials that fall to the floor of the 12" high tunnel may contribute to ceiling burning which is unrealistic in actual installations. Because of this, the smoke generation may become artificially high in these test conditions.

Light transmitting plastics usually melt, burn and smoke more readily than glass, metals or wood. As a result, for such materials, there are three specific ASTM tests, evaluation of which forms the basis for a plastic material to become recognized by BOCA, ICBO and SBCCI. These three ASTM tests are required in the 2000 International Building Codes (IBC), upon which the three organizations rely for material compliance.

- ASTM D 2843-99 Smoke Density Rating
- ASTM D 635-98 Combustion Rating
- ASTM D 1929-96 Self Ignition Temperature

ASTM D635 and ASTM D2843 also measure Flame Spread and Smoke Density, as does ASTM E84, but these tests are for light transmitting plastics.

Polycarbonate and PETG have been tested according to DIN 4102 and achieve a B1 rating. Polycarbonate materials typically are approved as an accepted light transmitting plastic, however, NFPA 101 (section 6-5.3) refers use of light-transmitting plastics for interior applications to authorities and organizations having local jurisdiction. Therefore, final approval is under their jurisdiction.

- E. Light Transmission: The light transmission is 83% for the transparent panel, measured according to DIN EN ISO 13 468-1
- F. UV Stabilized: The panel is UV stabilized
- G. Material: The material shall be standard 5 mm thick Acrylic or PETG unless otherwise requested at a thickness of ____ mm (2mm-15mm possible, thickness does affect acoustical performance).
- H. Pre-Installation Meeting: Installing contractor shall organize and conduct pre-installation meetings with all other trades to coordinate substrate conditions, conditioning of the space (temperature &

humidity), and elements attaching to, penetrating through or concealed above/behind work in this section

1.9 DELIVERY STORAGE AND HANDLING

- A. Shipping, Handling and Unloading: Deliver plastic panels to the project site in the manufacturer's original, unopened packaging. Do not unpack or handle finished products until the project environmental requirements have been met and the products are ready to be installed.
- B. Storage and Protection: Store all plastic panels and associated pieces in a clean, dry, fully-enclosed storage facility. Protect products from damage that may be caused by exposure to dust, chemicals, or impact damage.
- C. Acceptance at Site: Ensure that all project environmental requirements have been met prior to unpacking or installing plastic panels or associated products. Full or partial installation constitutes complete product acceptance.
- D. Waste Management and Disposal: Dispose of all packaging materials and debris in a safe and environmentally responsible manner according to the instructions set forth by the General Contractor, local ordinances or codes and the Environmental Protection Agency.

1.10 PROJECT CONDITIONS

- A. Project Environmental Requirements: Prior to unpacking or installing plastic products, ensure that the installation area is fully enclosed and environmentally controlled. Ensure that the building's mechanical systems are fully operational and will not be turned off again even for testing and balancing of the mechanical systems. Coordinate with other trades to ensure that all work above or behind plastic surfaces is complete and that all wet and dusty trades have completed work.
- B. Product Acclimation: For a minimum period of seventy-two (72) hours and prior to unpacking or installing any plastic products, allow both the installation area and the plastic products to stabilize in temperature and humidity levels that are representative of the final temperature and humidity levels expected after building completion and occupation.
- C. Product Handling: Handle panel carefully so as to avoid cracking, scuffing or chipping.

1.11 WARRANTY

- A. Submit to Owner or Owner's Representative a written and dated warranty issued by the panel manufacturer warranting the panel against defects in materials or manufacturing for a period of one (1) year from the date of delivery.
- B. Components used in the system but not provided by the manufacturer are excluded from the manufacturer's warranty. Damage caused by exposure to moisture or rapid or extreme changes to temperature or humidity are excluded from the manufacturer's warranty. Damage caused by improper storage, handling, acclimatization, or installation is excluded from the warranty.

1.12 OWNER'S INSTRUCTIONS

- A. Installing contractor shall provide to the building owner or to the owner's representative a copy of the manufacturer's maintenance manual supplied with the panel.

1.13 MAINTENANCE

- A. Extra Materials: If provided per the project requirements, extra materials shall remain in the manufacturer's original, unopened packaging and shall be given to the building owner or owner's representative upon substantial completion of work.

PART 2 PRODUCTS

2.1 MANUFACTURER

- A. RPG Diffusor Systems, Inc., 651-C Commerce Drive, Upper Marlboro, MD 20774 301-249-0044 (telephone), 301-249-3912 (facsimile), <http://www.rpginc.com>.

2.2 MATERIALS

- A. Panel: Micro-slotted Acrylic or PETG panels with a thickness of 5mm or ___mm (2mm-15mm possible)
- B. Protection: The panel shall be protected on both sides with a thin plastic removable layer.

2.3 MANUFACTURED UNITS

- B. Panels: (consult manufacturer for larger/custom sizes)
 - 1. Width: Maximum width dependent on material thickness, 2438 mm for 5mm thickness
 - 2. Height: Maximum height dependent on material thickness, 1219 mm for 5mm thickness
 - 3. Material:
 - PETG 5 mm, 6.35 kg/m² (1.30 lbs/sf)
 - Acrylic 5 mm, 5.95 kg/m² (1.21 lbs/sf)
 - 4. Slot diameter: 0.22 mm
 - 5. Slot length: 100mm
 - 6. Space between slots: 10mm
 - 7. Edge condition: Natural edge or non-perforated border (specify size)
 - 8. Shape: Flat

2.4 ACCESSORIES

- A. Aluminum mounting hardware and fasteners.

2.5 FABRICATION

- A. Shop Assembly: Standard panels have a natural edge, where holes may come close to edge of panel. Custom panels may be fabricated with a non-perforated border, which must be specified.

2.6 FINISHES

- A. Shop Finishing: No finish shall be applied to the panel. The panel shall be transparent and shall be protected with a thin plastic layer on both sides.

2.7 SOURCE QUALITY CONTROL

- A. Manufacturing facility for panels shall be ISO 9001 certified and provide certification documentation upon request by Architect.

PART 3 EXECUTION

3.1 INSTALLERS

- A. Installing contractor shall have a minimum of five (5) years successful experience installing plastic ceiling and wall systems in similar applications using similar mounting techniques or suspension systems.

3.2 EXAMINATION

- A. Site Verification of Conditions: Examine installation area for compliance with all manufacturers' project environmental requirements and ensure uninstalled products have been stored, handled and acclimatized properly prior to commencing installation. Inspect all substrates for completion and quality of work to ensure that surfaces are level, plumb, clean, dry and completely cured from water or solvent evaporation. Do not commence installation if the structural capacity of the substrate is questionable or inadequate.
- B. Coordination with Other Trades: Coordinate with all other trades to ensure that wet work including concrete, terrazzo, plastering, painting, etc. in the installation area is complete, cured and dry prior to installation. Coordinate with all other trades to verify that components associated with mechanical, electrical, lighting, data, telecommunication, audio, video, fire suppression and other building systems are installed behind or above designated installation areas prior to commencing installation. Coordinate the exact size, location and sequencing of building system components that penetrate the plastic ceiling/wall panels.

3.3 PREPARATION

- A. Protection: Protect all floor, wall and ceiling finishes against possible damage prior to commencing installation and during installation.
- B. Surface Preparation: When necessary, field measure substrates to acquire accurate dimensions of plastic panels and submit final dimensions to manufacturer.

3.4 INSTALLATION

- A. Install panel panels as shown and detailed in the architectural drawings and according to manufacture's guidelines and industry standards.

3.5 CONSTRUCTION

- A. Interface with Other Work: Coordinate panel installation with other trades including glazing, skylights, windows, curtain walls, etc.

3.6 ADJUSTING

- A. Following initial installation, adjust mounting hardware or suspension system so that removable panels can be removed easily, yet stay safely secured upon replacement. Adjust panels so that surfaces are aligned, flush and level or plumb and gaps in between units are of a consistent width and straight.
- B. Check that manufacturer's expansion/contraction requirements were maintained during installation. As required, adjust the mounting hardware or suspension system to allow for the appropriate amount of product expansion/contraction.
- C. Remove and replace at no extra charge any damaged panels that cannot be repaired to the Owner's and Architect's satisfaction.

3.7 CLEANING

- A. Remove dust from surfaces, grooves and penetrations by vacuuming using only a soft brush. Do not scratch panel surfaces with sharp metal or plastic vacuum cleaner extensions. Remove general surface dirt with a clean, soft cloth dampened with a diluted, mild, cleaning agent and warm water. Wipe again with clean, soft cloth dampened only with warm water. Finally, dry surface completely with clean, dry cloth. Do not use abrasive cleaners with grit or cloths that could scratch the plastic finish.
- B. Remove and replace at no additional charge any materials that cannot be cleaned to the Owner's satisfaction.

3.8 DEMONSTRATION

- A. Demonstrate to the building owner or to the owner's representative the safe and proper method for removing and replacing all types of accessible panels.
- B. Supply the building owner or the owner's representative with any special tools provided by the manufacturer required to unlatch safety hardware on accessible panels.

3.9 PROTECTION

- A. Upon completion of work, protect installed plastic surfaces from damage or soiling until project substantial completion and owner occupancy.

END OF SECTION