

SECTION 07416
MULTI-USE COMPOSITE ALUMINUM PANELS
PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Laminated core aluminum panels ¼” thick.
2. Laminated core aluminum panels ½” thick.
3. Laminated core aluminum panels 1” thick.

B. Related Sections:

1. Section 06160 SHEATHING for roof, wall and floor materials for use as substrates for shielding.
2. Section 07210 BUILDING INSULATION for metal skin panel insulation.
3. Section 07413 INSULATED-CORE METAL WALL PANELS for use in metal siding and finish surfaces.
4. Section 07415 COMPOSITE WALL PANELS for exterior finish panels with thermoplastic cores.
5. Division 8 DOORS AND WINDOWS Sections for shielding for doors, frames, hardware and glazing products.
6. Division 9 FINISHES Sections for related panel products for substrates for shielding panels and finishes applied to shielding panels.

7. Section 09511 ACOUSTICAL PANEL CEILINGS for ceiling suspension systems used in conjunction with shielding panels.
8. Division 15 MECHANICAL Sections for shielding for products penetrating shielding panels.
9. Division 16 Electrical Sections for shielding for products penetrating shielding panels and grounding procedures for shielding panel system.

1.3 DEFINITIONS

- A. Attenuation Coefficient: The degree to which magnetic, or radio frequency power is absorbed, or blocked by a given material.
1. The higher the Attenuation Coefficient the more efficient the blockage of the radio waves.
 2. Measurement is in decibels (dB) where an Attenuation Coefficient of 100dB is a complete blockage.

1.4 REFERENCES: (Testing performed under the standards listed.)

- A. MIL-STD-285 Shielding Effectiveness
- B. UL 2218 Impact Resistance of Roof Coverings
- C. ASTM C 1363-97 Thermal Performance Test
- D. ASTM E903 Hemispherical Spectral Reflectance
- E. ASTM E408-71 Total Emitance Test
- F. ASTM E84-04 Surface Burning Characteristics
- G. ASTM E90 Sound Transmission Loss Test
- H. ASTM D3273-94 Resistance to Growth of Mold

1.5 PERFORMANCE REQUIREMENTS

- A. Multi-use Panels: Panels designed for multi-use to include the following:
 - 1. Electromagnetic and Radio Frequency Shielding.
 - 2. Insulating Radiant Barrier.
 - 3. Acoustic Attenuation.
 - 4. Fire Retardant Barrier.
 - 5. Impact Resistant Underlayment for Roofing.

- B. Delegated Design: Design panel assemblies for use intended, including engineering analysis of system/s by a qualified engineer for the system, or systems, using performance requirements and design criteria indicated and as follows.

- C. RF Shielding: (MIL-STD-285)
 - 1. 200 KHz Magnetic Field
 - a. ¼” Thick Panel - 25 dB Attenuation
 - b. ½” Thick Panel – 25 dB Attenuation
 - c. 1” Thick Panel – 25 dB Attenuation
 - 2. 200 KHz Electric Field
 - a. ¼” Thick Panel - 80 dB Attenuation
 - b. ½” Thick Panel – 80 dB Attenuation
 - c. 1” Thick Panel – 100 dB Attenuation
 - 3. 1 MHz Electric Field
 - a. ¼” Thick Panel - 80 dB Attenuation
 - b. ½” Thick Panel – 80 dB Attenuation
 - c. 1” Thick Panel – 100 dB Attenuation
 - 4. 10 MHz Electric Field
 - a. ¼” Thick Panel - 80 dB Attenuation
 - b. ½” Thick Panel – 80 dB Attenuation
 - c. 1” Thick Panel – 100 dB Attenuation
 - 5. 80 MHz Electric Field
 - a. ¼” Thick Panel - 80 dB Attenuation
 - b. ½” Thick Panel – 100 dB Attenuation
 - c. 1” Thick Panel – 100 dB Attenuation
 - 6. 400 MHz Plane Wave

- a. 1/4" Thick Panel - 60 dB Attenuation
 - b. 1/2" Thick Panel – >90 dB Attenuation
 - c. 1" Thick Panel – 100 dB Attenuation
7. 700 MHz Plane Wave
- a. 1/4" Thick Panel - 60 dB Attenuation
 - b. 1/2" Thick Panel – 100 dB Attenuation
 - c. 1" Thick Panel – 100 dB Attenuation
8. 1 GHz Plane Wave
- a. 1/4" Thick Panel - 60 dB Attenuation
 - b. 1/2" Thick Panel – 100 dB Attenuation
 - c. 1" Thick Panel – 100 dB Attenuation
9. 10 GHz Plane Wave
- a. 1/4" Thick Panel - 60 dB Attenuation
 - b. 1/2" Thick Panel – 100 dB Attenuation
 - c. 1" Thick Panel – 100 dB Attenuation

D. Hail Damage Protection

- 1. Testing per UL 2218 Class 4 Hail Test.
- 2. Summary of testing results with 1/2" thick panels underlayment:
 - a. 50% less surface damage to roof material.
 - b. 100% less damage to structure.

E. Fire Resistance

- 1. Testing per ASTM E84-04: Surface Burning Characteristics
- 2. Summary of testing results with 1/2" thick panels:
 - a. Class A Fire Rating: Flame Spread Index = 25
 - b. Class A Smoke Rating: Smoke Developed = 20

F. Insulating Performance

- 1. Testing per ASTM C 1363-97 Thermal Performance Test
 - a. 1" Thick Panel – R value = 2.89
 - b. 1/2" Thick Panel – R value = 1.61
 - c. 1/4" Thick Panel – R value = 1
- 2. Testing per ASTM E903 Hemispherical Spectral Reflectance

- a. ½” Thick Panel – 81.5% Solar Reflectance
- b. ¼” Thick Panel – 80.4% Solar Reflectance
- 3. Testing per ASTM E408-71 Total Emittance Test
 - a. ½” Thick Panel - .02 Emittance - .98 Reflectance
 - b. ¼” Thick Panel - .03 Emittance - .97 Reflectance

G. Acoustic Performance

- 1. Testing per ASTM E90 Sound Transmission Loss Test
- 2. Summary of testing results with ½” thick panels:
 - a. STC (Sound Transmission Class) of 19
 - b. OITC (Outdoor Indoor Transmission Class) of 15
 - c. NRC (Noise Reduction Coefficient) of 0.6
 - d. CAC (Ceiling Attenuation Class) of 38
- 3. Summary of testing results with ¼” thick panels:
 - a. STC (Sound Transmission Class) of 9
 - b. OITC (Outdoor Indoor Transmission Class) of 7
- 4. Summary of testing results with 1” thick panels:
 - a. STC (Sound Transmission Class) of 25
 - b. NCR (Noise Reduction Coefficient) of 0.6
 - c. CAC (Ceiling Attenuation Class) of 43

H. Mold, Fungus and Mildew Treatment Performance

- 1. Testing per ASTM D3273-94 Resistance to Growth of Mold
- 2. Zero growth indicated.

I. Insect Treatment Performance (Option)

- 1. Testing with an industry recognized product.
- 2. Water based repulpable coating.
 - a. Minimal insect damage to panels.
 - b. Insect repellent.
 - c. Insect mortality rate of 93-100% in 24 hours.
 - d. EPA approved for use in food containers.

1.6 ACTION SUBMITTALS

- A. Refer to Division 1 Sections for general provisions for submittals.
- B. Product Data: For each type of product indicated.
- C. Shop Drawings: Show fabrication and installation layouts of metal panels, details of edge conditions, joints, corners, anchorages, attachment methods, closures, and special details. Distinguish between assemblies at factory, shop, or in field.

1.7 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Scaled elevations, and details of penetrations and wall mounted items.
- B. Product test reports.
- C. Warranties: Sample of special warranties.

1.8 CLOSEOUT SUBMITTALS

- A. Test reports of assemblies in place.
- B. Grounding test reports for assemblies requiring grounding.

1.9 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and approved by manufacturer.
- B. Fire-Test-Response Characteristics: Provide panels and systems that meet the fire test responses as listed under Performance Requirements.

- C. United States Green Building Council (USGBC):
Provide products that meet USGBC requirements to aid in gaining points toward L.E.E.D certification.
- D. Energy Star: Provide products that meet the requirements of and hold an Energy Star label of approval.
- E. Pre-Installation Conference: Conduct a pre-installation conference at the project site with the installing contractor. Keep minutes of meeting and provide copies of minutes to all parties. Coordinate with manufacturer's recommendations for installation.

1.10 DELIVERY, STORAGE AND HANDLING

- A. Refer to Division 1 sections for additional information.
- B. Store products in manufacturer's unopened packaging until ready for installation.
- C. Deliver, store, and handle products so they will not be damaged or deformed.
- D. Storage and protection: Stack panels flat on platforms or pallets and protect from elements and damage from other trades and materials.

1.11 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair, or replace components of metal wall panel assemblies that fail in materials, or workmanship within specified warranty period.

B. Warranty Period: Five years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers: TruProtect, 7012 Cedar Avenue, Lubbock, Texas, 79404; Phones: [877-219-5616](tel:877-219-5616), [806-281-9698](tel:806-281-9698), [806-781-2554](tel:806-781-2554); Website – www.truprotect.com; Email Contact – m.mcdonald@truprotect.com

B. Substitutions: As permitted by Division 1 Sections.

C. Acceptable alternative products will be considered when meeting the following qualifications.

1. Panel composition and assembly match that of the indicated product materials.
2. Panel under consideration must meet the testing requirements specified under Part 1 of this section.
3. Panel under consideration must meet the minimum warranty requirements stated under Part 1 of this section.
4. Requests for substitution must be in writing to the Architect and approved by the Architect within ten day prior to the date of receipt for bids.

2.2 PANEL PRODUCTS AND SYSTEMS

A. Panel Sizes: In addition to the products listed below custom thicknesses, lengths, and widths are available from the manufacturer where indicated.

1. Contact manufacturer for specific limitations.
2. Aluminum plies vary in number with panel thickness.

3. Contact manufacturer for factory attachment to wood panel OSB.
4. Contact manufacturer for factory attachment to gypsum board products.

B. Panel Finishes: In addition to the natural finish of the aluminum colored and textured coatings can be shop (manufacturer) applied, or field applied by the Owner, or contractor.

1. Contact manufacturer for specific limitations.
2. Anodized coatings are not available.

C. 1/4" thick composite aluminum panel – 4' wide x 8' long.

1. Panel composition:
 - a. Face Skin: 2 mil (0.002") thick aluminum foil
 - b. Core: 1/4" thick corrugated fiberboard
 - c. Back Skin: 5 mil (0.005") thick aluminum foil
 - d. Edges: Open (no aluminum) unless otherwise required by design
2. Panel weight: 8 lbs (pounds)

D. 1/2" thick regular composite aluminum panel – 4' wide x 8' long.

1. Panel composition:
 - a. Back Skin: 2 mil (0.002") thick aluminum foil
 - b. First Core: 1/4" thick corrugated fiberboard
 - c. Inner Layer Skin: 2 mil (0.002") thick aluminum foil
 - d. Second Core: 1/4" thick corrugated fiberboard
 - e. Face Skin: 5 mil (0.005") thick aluminum foil
 - f. Edges: mil (0.005") thick aluminum foil tape
2. Panel weight: 17 lbs (pounds)

E. 1/2" thick HD (High Density) composite aluminum panel – 4' wide x 8' long.

1. Panel composition:
 - a. Back Skin: 5 mil (0.005") thick aluminum foil
 - b. First Core: 1/4" thick corrugated fiberboard

- c. Inner Layer Skin: 5 mil (0.005") thick aluminum foil
 - d. Second Core: 1/4" thick corrugated fiberboard
 - e. Face Skin: 5 mil (0.005") thick aluminum foil
 - f. Edges: mil (0.005") thick aluminum foil tape
2. Panel weight: 18 lbs (pounds)

F. 1" thick composite aluminum panel – 4' wide x 8' long.

1. Panel composition:
- a. Back Skin: 5 mil (0.005") thick aluminum foil
 - b. First Core: 1/4" thick corrugated fiberboard
 - c. First Inner Layer Skin: 2 mil (0.002") thick aluminum foil
 - d. Second Core: 1/4" thick corrugated fiberboard
 - e. Second Inner Layer Skin: 2 mil (0.002") thick aluminum foil
 - f. Third Core: 1/4" thick corrugated fiberboard
 - g. Third Inner Layer Skin: 2 mil (0.002") thick aluminum foil
 - h. Fourth Core: 1/4" thick corrugated fiberboard
 - i. Face Skin: 5 mil (0.005") thick aluminum foil
 - j. Edges: mil (0.005") thick aluminum foil tape
2. Panel weight: 34 lbs (pounds)

G. 1/2" thick composite aluminum ceiling panel – 2' wide x 4' long.

1. Panel composition:
- a. Back Skin: 2 mil (0.002") thick aluminum foil
 - b. First Core: 1/4" thick corrugated fiberboard
 - c. Inner Layer Skin: 2 mil (0.002") thick aluminum foil
 - d. Second Core: 1/4" thick corrugated fiberboard
 - e. Face Skin: 5 mil (0.005") thick aluminum foil
 - f. Edges: mil (0.005") thick aluminum foil tape
2. Panel weight: 4.5 lbs (pounds) approximate based on HD 4'x8' panel

H. 1/2" thick composite aluminum ceiling panel – 2' x

2' square.

1. Panel composition:

- a. Back Skin: 2 mil (0.002") thick aluminum foil
 - b. First Core: 1/4" thick corrugated fiberboard
 - c. Inner Layer Skin: 2 mil (0.002") thick aluminum foil
 - d. Second Core: 1/4" thick corrugated fiberboard
 - e. Face Skin: 5 mil (0.005") thick aluminum foil
 - f. Edges: 5 mil (0.005") thick aluminum foil tape
2. Panel weight: 2.25 lbs (pounds) approximate based on HD 4'x8' panel

I. 1/2" thick wire shielding tubes.

1. Individual Tube Length (maximum): 8'-0"
2. Standard Widths:
 - a. 4 inches x 4 inches inside dimension
 - b. 6 inches x 6 inches inside dimension
 - c. Custom dimensions as required (Contact manufacturer.)
3. Shop fabricated from panels.
 - a. Mitered and taped corners

2.3 JOINT & EDGE TREATMENT PRODUCTS

A. Panel Edge Tape:

1. 5 mil (0.005") thick aluminum foil
2. Width as recommended by manufacturer for application, or
 - a. 2" where indicated for field exposed panel edges
 - b. 3" where indicated for field exposed panel edges
3. Adhesive backing
 - a. 2 mil (0.002") thickness
 - b. Water based

B. Panel Joint Seam Sealing Tape:

1. 5 mil (0.005") thick aluminum foil
2. Width as recommended by manufacturer for

- application, or
- a. 2" where indicated for exposed panel joints
- b. 3" where indicated for exposed panel joints
- 3. Adhesive backing
 - a. 2 mil (0.002") thickness
 - b. Water based

C. Panel Joint Conductive Tape: (RF Uses)

- 1. 5 mil (0.005") thick aluminum foil
- 2. Width as recommended by manufacturer for application, or
 - a. 3" where indicated for exposed panel joints
 - b. 4" where indicated for exposed panel joints
 - c. 6" where indicated for exposed panel joints
- 3. Adhesive backing
 - a. 2 mil (0.002") thickness
 - b. Water based
 - c. Electrically Conductive

D. Tube Joint Coupling Sleeves

- 1. Sheet metal:
 - a. 28 gage galvanized steel sheet
 - b. Manufacturer formed
- 2. Dimension to match tube inner dimensions
- 3. Fabricated with minimum 6 inch extension into each tube section.
- 4. Refer to Panel Joint Seam Sealing, or Conductive Tape for joint sealing between tubes.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates for compliance with requirements and conditions which may affect performance of panels.
- B. Examine panels prior to installation and reject panels that may be damaged.

- C. Prepare, or insure the preparation of substrates is in compliance with manufacturer's instructions for panel installation.
- D. Proceed with installation only after correction of unsatisfactory conditions has been performed.

3.2 APPLYING PANELS

- A. Install panels with the face skin facing outward toward the installer regardless of relative location.
- B. Attach panels to varying substrates in accordance with panel manufacturer's instructions and recommendations.
- C. Close edges of panels, which have been field cut to fit, using aluminum tape in accordance with panel manufacturer's instructions and recommendations for the specific application intended.
- D. Use aluminum tape products provided by panel manufacturer for joint treatment after panel installation. Where electrically grounded systems are being installed provide only tape with conductive adhesive installed to provide proper ground for designed system as instructed and recommended by panel manufacturer.
- E. Install panels for systems designed to be grounded in accordance with panel manufacturer's instructions and recommendations.

3.3 APPLYING FINISHES DIRECTLY TO PANELS

- A. Clean and prepare aluminum panel surfaces as directed by panel manufacturer for finish to be applied.

B. Aluminum panel surfaces are manufactured ready to receive finishes. Minimal cleaning should be required to remove construction dust from surfaces. If oils, or other deleterious materials are on the panels no attempt to clean them should be made. The soiled panels must then be removed and replaced.

3.4 PROTECTION

- A. Protect adjacent surfaces from damage due to the installation of the panels. Repair and/or clean any damaged, or soiled adjacent surfaces as required.
- B. Protect installed panels from being soiled, or damaged during the remainder of the construction process.
- C. Remove and replace any panels that may become damaged prior to substantial completion of the project.

END OF SECTION