SECTION 07450

MINERAL-FIBER-REINFORCED CEMENTITIOUS PANELS

Display hidden notes to specifier by using “Tools”/“Options”/“View”/“Hidden Text”.

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Fiber cement panels of the following types:
   1. Through color high density fiber cement panels. (Cembonit) (Zenit) (True)
   2. Surface colored high density fiber cement panels. (Metro)
   3. Natural color high density fiber cement panels. (grayboard). (Minerit HD) (Raw)
   4. Lightweight fiber cement panels. (grayboard). (Minerit LW)
   5. Cladding attachment system.

1.2 RELATED SECTIONS

A. Section 05400 – Cold Formed Metal Framing: Support framing.

B. Section 06110 – Wood Framing: Wood framing.

C. Section 07210 – Building Insulation: Exterior thermal insulation.

D. Section 07250 – Building Air/Moisture Barrier: Exterior wall air and moisture barrier (vapor permeable).

1.3 REFERENCES

A. ASTM International (ASTM):

B. Materials and Equipment Acceptance (MEA) - New York City Department of Buildings Division.

   1. EN 12467 Fiber Cement Flat Sheets-Product Specifications and Test Methods.
   2. EN 13501 Fire Test to Building Material.
   3. EN 20105 Test for Color Fastness.
      a. Part A02 Grey Scale.
1.4 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

C. Shop Drawings: Provide detailed drawings of non-standard applications of fiber cement materials which are outside the scope of the standard details and specifications provided by the manufacturer.

D. Attachment System Engineered Drawings:
   1. Provide engineered design for attachment and back-up framing to support exterior cladding.
   2. Provide static calculations verifying sizing of members, attachment devices and fasteners to support the exterior cladding with a safety factor required by Authority having jurisdiction (AHJ).
   3. Provide Installation drawings and details.

E. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

F. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Minimum of 2 years experience with installation of similar products.

B. Color Evaluation: Insignificant change after 3000 hours of QUV test (EN 20105).

C. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
   1. Finish areas designated by Architect.
   2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
   3. Remodel mock-up area as required to produce acceptable work.

1.6 FABRICATION, DELIVERY, STORAGE, AND HANDLING

A. All cladding materials to be finished and fabricated in the United States with backup inventory in residence in the United States to support job in-progress.

B. Store products in manufacturer's unopened packaging until ready for installation in accordance with manufacturer’s recommended guidelines.

C. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.7 PROJECT CONDITIONS
A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.8 WARRANTY

A. Warranty: Manufacturer warrants that its products are manufactured in accordance with its applicable material specifications and are free from defects in materials and workmanship.
   1. Only products that are installed and used in accordance with applicable manufacturer’s instructions and specifications are warranted.
   2. The warranty is applicable only to claims made in writing and received by the manufacturer within thirty days after the defect was discovered and within ten years after the date of the shipment of the product by the manufacturer.

PART 2 PRODUCTS

2.1 MANUFACTURER/SUPPLIER

A. Basis of Design: AFC Cladding Fiber Cement Panels by American Fiber Cement Corp.; 6901 S. Pierce St. Suite 260, Littleton, CO 80123. ASD. Toll Free Tel: (800) 688-8677 ext. 102. Tel: (303) 978-1199. Fax: (303) 978-0308. Email: danglada@afccladding.com. Web: http://www.americanfibercement.com. Panel type and color as referenced in Section 2.2.

B. Substitutions: Not permitted.

C. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.2 THROUGH COLOR HIGH DENSITY FIBER CEMENT PANELS

A. Through Color High Density Fiber Cement Panels:
   1. Product: Cembonit as manufactured/supplied by American Fiber Cement Corp.
      c. Thickness: 5/16 inch (8 mm).
      d. Finish: Through-colored, muted, matte finish with a unique weather-proof treatment which makes it resistant to staining and surface dirt.
      e. Color: Pearl.
      g. Color: Granite.
      h. Color: Amber.
      i. Color: Ruby.
      k. Color: Tufa.
      l. Color: Flint.
      m. Color: Graphite.
      n. Color: Magma.
      o. Color: Adobe.
         1) Density Dry: 1500 kg/m$^3$.
         2) Bending strength @ with grain: 32.0 MPa.
         3) Bending strength @ across grain: 22.0 MPa.
         4) Modulus of elasticity @ with grain: > 16 GPa.
         5) Modulus of elasticity @ across grain: > 14 GPa.
6) Hygric movement wet-dry-wet (max), mean: 2.60 mm/m.
7) Durability classification (EN 12467): Category A.
8) Strength classification (EN 12467): Class 4.
9) Fire reaction (EN 13501-1): A2-s1-d0.
10) Warm water test: Ok.
11) Soak dry test: Ok.
12) Freeze thaw test: >100 cycles.
13) Thermal conductivity $\lambda$: 0.4 W/mK.

2. Product: Zenit as manufactured/supplied by American Fiber Cement Corp.
   c. Thickness: 5/16 inch (8 mm).
   d. Finish: Through-colored, baseboard fully covered with matching acrylic coating.
   e. Color: Luna.
   g. Color: Saturn.
   h. Color: Mars.
   i. Color: Orcus.
   k. Color: Terra.
   l. Color: Jupiter.
   m. Color: Mercury.
   n. Color: Erebus.
   o. Color: Rhea.
   q. Color: Triton.
   r. Color: Mimas.
   s. Color: Calisto.
   t. Color: Neptune.
   u. Physical Characteristics: EN 12467 ‘Fiber-cement flat sheets’.
      1) Density Dry: 1700 kg/m$^3$.
      2) Bending strength @ with grain: 24.0 MPa.
      3) Bending strength @ across grain: 18.0 MPa.
      4) Modulus of elasticity @ with grain: > 8 GPa.
      5) Modulus of elasticity @ across grain: > 7 GPa.
      6) Hygric movement wet-dry-wet (max), mean: 3 mm/m.
      7) Durability classification (EN 12467): Category A.
      8) Strength classification (EN 12467): Class 4.
      9) Fire reaction (EN 13501-1): A2-s1-d0.
     10) Warm water test: Ok.
     11) Soak dry test: Ok.
     12) Freeze thaw test: >100 cycles.
     13) Thermal conductivity $\lambda$: 0.4 W/mK.

3. Product: True as manufactured/supplied by American Fiber Cement Corp.
   c. Thickness: 5/16 inch (8 mm).
   e. Color: Antarctic.
   g. Color: Olympus.
h. Color: Vesuv.
i. Color: Gobi.
k. Color: Kilimanjaro.
i. Physical Characteristics: EN 12467 ‘Fiber-cement flat sheets’.
1) Density Dry: 1550 kg/m$^3$.
2) Bending strength @ with grain: 30.0 MPa.
3) Bending strength @ across grain: 21.0 MPa.
4) Modulus of elasticity @ with grain: > 15 GPa.
5) Modulus of elasticity @ across grain: > 13 GPa.
6) Hygric movement wet-dry-wet (max), mean: 1.5 mm/m.
7) Durability classification (EN 12467): Category A.
8) Strength classification (EN 12467): Class 4.
9) Fire reaction (EN 13501-1): A2-s1-d0.
10) Warm water test: Ok.
11) Soak dry test: Ok.
12) Freeze thaw test: >100 cycles.
13) Thermal conductivity $\lambda$: 0.5 W/mK
14)

2.3 SURFACE COLORED AND TEXTURED HIGH DENSITY FIBER CEMENT PANELS

A. Surface Colored and Textured High Density Fiber Cement Panels:
1. Product: Metro as manufactured/supplied by American Fiber Cement Corp.
c. Thickness: 5/16 inch (8 mm).
d. Finish: Classic, natural grey baseboard fully covered with an opaque, water-based acrylic coating which is resistant to moss, algae, staining and surface dirt.
e. Color: Hamburg.
g. Color: Geneva.
h. Color: Barcelona.
i. Color: Athens.
j. Color: Lyon.
k. Color: Oslo.
m. Color: Nuuk.
o. Color: Dublin.
q. Color: Copenhagen.
r. Color: Istanbul.
s. Color: Riga.
t. Color: Naples.
w. Color: Prague.
x. Color: Bonn.
y. Color: Lisbon.
z. Color: Kiev.
1) Density Dry: 1700 kg/m³.
2) Bending strength @ with grain: 24.0 MPa.
3) Bending strength @ across grain: 18.0 MPa.
4) Modulus of elasticity: 8 GPa.
5) Maximum water absorption: 12 %.
6) Moisture movement (30-90%, mean): 3.0 mm/m.
7) Thermal expansion coefficient: 0.008 mm/m degree C.
8) Thermal conductivity coefficient: 0.4 W/mK.
9) Frost resistance: Frost resistant >100 cycles.
10) Reaction to fire according to EN13501-1: A2; ASTM E84-Zero Flame Spread, and smoke developed of < 5; ASTM E-136-passed.

2.4 NATURAL COLOR HIGH DENSITY FIBER CEMENT PANELS (GRAYBOARD)
A. Natural Color High Density Fiber Cement Panels:
1. Product: Raw (formerly Minerit HD) as manufactured/supplied by American Fiber Cement Corp.
2. Finish: Factory stained per exterior finish schedule.
3. Finish: Field painted per exterior finish schedule.
5. Thickness: 1/4 inch (6 mm).
6. Thickness: 5/16 inch (8 mm).
7. Thickness: 3/8 inch (9.5 mm).
8. Physical Characteristics: Properties based on 1/4 inch (6 mm) material. ASTM C1185, ASTM C1186, EN12467
   a. Density Dry: 961 kg/m³ (105 lbs/ft³)
   b. Normal Moisture Content: 5%.
   c. Modulus of Rupture, psi, MD: 3200 (22063 kPa).
   d. Modulus of Rupture, psi, CMD: 2500 (17237 kPa).
   e. Modulus of Elasticity, psi: 1.4 x 10⁶ (9.7 kPa x 10⁶).
   f. Tensile Strength, psi, MD: 2300 (15858 kPa).
   g. Tensile Strength, psi, (Parallel to surface) CMD: 1600 (11032 kPa).
   h. Compressive Strength, psi: 11,600 (79979 kPa).
   i. Impact Strength, lb-ft/sf: 230 (1156 kgf/sq. m).
   k. Thermal Conductivity, BTU-in/sf, hr, degree F: 2.1. (0.390 W/mK).
   l. Coefficient of Thermal Expansion, in/in, degree F, 5.0x10⁻⁶ (68 degree F to 212 degree F (20 degree C to 100 degree C)).
   m. Moisture Movement: 0.4% (3.3 mm/m) (Oven dry – saturation).
   n. Surface Burning Characteristics, Class I:
      Flame spread – 0.
      Smoke developed <5.
   o. Continuous Maximum Temperature: 250 degree F (121 degree C).

2.5 LIGHTWEIGHT FIBER CEMENT PANELS (GRAYBOARD)
A. Lightweight Fiber Cement Panels (Non-Asbestos):
1. Product: Minerit LW as manufactured/supplied by American Fiber Cement Corp.
2. Finish: Factory stained per exterior finish schedule.
3. Finish: Field painted per exterior finish schedule.
5. Thickness: 0.25 inch (6 mm).
6. Thickness: 0.35 inch (9 mm).
7. Thickness: 0.47 inch (12 mm).
8. Physical Characteristics: Properties based on 1/4 inch (6 mm) material.
   b. Moisture Content, normal, %: 12.
   c. Modulus of Rupture, psi, MD: 1880.
   d. Modulus of Rupture, psi, CMD: 1300.
   e. Modulus of Elasticity, psi x10 (6) 580.
   f. Tensile Strength, psi, MD: 580.
   g. Tensile Strength, psi, (Parallel to surface) CMD: 430.
   h. Impact Strength, lb-ft/sf: 137.
   j. Thermal Conductivity, BTU-in/sf, hr, degree F: 1.3.
   k. Coefficient of Thermal Expansion, in/in degree F, 5.0x10 (-6) (68 degree F to 212 degree F (20 degree C to 100 degree C): 3.9
   l. Moisture Movement, in/ft: .042 (Oven dry – saturation).
   m. Surface Burning Characteristics, Class I:
      Flame spread – 0.
      Smoke developed <5.
   n. Continuous Maximum Temperature: 250 degree F (121 degree C).

2.6 MISCELLANEOUS CLADDING MATERIALS

A. Building Wrap: AFCC Building Wrap complying with local codes for product and installation requirements.

B. Aluminum Joint Closures and Decorative Corner Profiles: Manufacturer’s standard products as detailed. Maximum thickness of finishing profile to be 0.8 mm or 21 gauge.

2.7 ATTACHMENT SYSTEMS AND FIXING

A. Attachment system for ventilated rain screen construction of exterior cladding panels.
   1. Product: R-TEC CI System as manufactured/supplied by American Fiber Cement Corp. for compliance with ASHRAE 90.1 continuous insulation definitions and requirements.
   2. Accessories:
      a. R-TEC CI Bracket
      b. Aluminum “L,” “T,” “Hat” or “Z” profiles as indicated on engineered design submittal.
      c. Screws and Rivets: As selected and engineered by attachment manufacturer to conform with the specified cladding and the exterior insulation in both thickness and type. ie. Foam (high or low density) or mineral wool.
   3. UV Protective membrane: As supplied by American Fiber Cement Corp.
      a. For open joint ventilated rain screen systems.
      b. For exterior insulation requiring UV protection.
   4. Attachment System - Engineering:
      a. Provide engineered design for attachment and back-up framing to support exterior cladding.
b. Provide static calculations verifying sizing of members, attachment devices and fasteners to support the exterior cladding with a safety factor required by Authority having jurisdiction (AHJ).

c. Provide Installation drawings and details.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install in accordance with manufacturer’s instructions and approved submittals.

B. For exterior applications, comply with local codes and structural engineer’s fastening calculations along with manufacturer’s recommendations for fastener spacing.

3.4 EXTERIOR CLADDING FOR RAINSCREEN APPLICATIONS

A. Detailing Requirements:
   1. Air space at top and bottom of building or wall termination shall be 3/4 inch (20 mm) to facilitate airflow from behind the panels. Do not block vertical airflow at windows, doors, eaves, or at the base of the building. Airflow shall be continuous from bottom to top so there is air movement behind each panel. For walls over 60 feet high (25mm), the ventilated cavity between rear of panels and exterior wall shall be increased to 1-1/4 inches (30 mm). Air flow behind the cement fiber panels is critical to the performance of the rain screen constructions.

   2. Fasteners in profile shall accommodate thermal expansion/contraction of metal and not interfere with panel application.

   3. Install panels from top of building to bottom.

   4. For straight walls, start panel installation in center and work outward.

   5. For walls with inside corners, start installation at corner and work across wall.


   7. Pattern: Straight pattern with horizontal panels. Panel size as indicated.


B. Rain Screen Installation: Comply with manufacturer’s installation requirements.

   1. Attachment System: Comply with manufacturer’s engineered design for cladding support framing.

3.5 PROTECTION
A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION