

SECTION 03425

REINFORCED AUTOCLAVED AERATED CONCRETE PANELS

SECTION REQUIRES EDITOR TO MAKE SELECTIONS - GENERALLY SELECTIONS ARE PRECEDED BY **. SPEC EDITOR TO DELETE INAPPROPRIATE INFORMATION.

PART 1 – GENERAL

SELECT APPROPRIATE SECTIONS FOR BELOW; DELETE OTHERS

1.01 SUMMARY

- A. Section includes, but is not limited to: Design, Fabrication, transportation, and erection of reinforced Autoclaved Aerated Concrete (AAC) structural **floor, **wall, **and roof **panels.
- B. Related sections:
 - 1. Section 01630: Product Substitution Procedures.
 - 2. Section 03200: Concrete Reinforcement.
 - 3. Section 03300: Cast-in-Place Concrete.
 - 4. Section 03541: Gypsum Underlayment.
 - 5. Section 04070: Masonry Grout.
 - 6. Section 04210: Brick.
 - 7. Section 04225: Autoclave Aerated Concrete Units.
 - 8. Section 07600: Flashing and Sheet Metal.
 - 9. Section 07650: Flexible Flashing.
 - 10. Section 07840: Firestopping.
 - 11. Section 07920: Joint Sealants.
 - 12. Section 08110: Steel Doors and Frames.
 - 13. Division 9: Finishes

1.02 REFERENCES

- A. Standards of the following as referenced:
 - 1. American Concrete Institute (ACI).
 - 2. ASTM.
 - a. ASTM C 1452: Standard Specification for Precast Reinforced Autoclaved Aerated Concrete Elements.
 - 3. Underwriters Laboratories, Inc. (UL).
 - a. UL 263 (ASTM E 119): Fire Tests of Building Construction Materials.

1.03 DEFINITIONS

- A. Terms:
 - 1. AAC panels: Reinforced Autoclaved Aerated Concrete panels.
 - 2. Strength Class: Classification that defines the physical properties of the AAC, designated as AAC-3, AAC-4, or AAC-6.

1.04 PERFORMANCE REQUIREMENTS

- A. Conform to Autoclaved Aerated Concrete Products Association's (AACPA) and manufacturer's standards and recommendations.
- B. AAC manufacturer shall be a current member of the Autoclaved Aerated Concrete Products

Association (AACPA).

C. Design Requirements:

1. Basic reinforcement requirements: Reinforce for handling/ transportation loads and design loads indicated in Contract Documents.
2. Maximum deflection:
 - a. Floor panels:
 - 1) Live load: L/360
 - 2) Dead plus live load: L/240
 - b. Roof panels:
 - 1) Live load: L/240
 - 2) Dead plus live load: L/180
 - c. Wall panels; wind loads: L/240
3. Design for structures supporting AAC roof, floor, and wall panels: L/360 maximum total deflection.

1.05 SUBMITTALS

A. Product Data:

1. Manufacturer's product data for the AAC Construction System, including AAC panels and thin-bed mortar. Provide actual AAC panel dimensions.
2. Material Safety Data Sheets (MSDS) for AAC, thin-bed mortar and finish materials.
3. Finishes: Submit manufacturer's full range of colors, textures and finish patterns for selection by Architect.

B. Shop drawings:

1. Indicate loads used for the design of AAC panels.
2. Indicate dimensions of panels, arrangement of joints, and erection details. Include location of openings fabricated in panels.
3. Identify AAC panels with mark on shop drawings. Identifying marks shall be located on surfaces not visible in installed configuration.
4. Indicate Strength Class.

C. Quality control submittals:

1. Certificate from the AAC manufacturer indicating AAC product is manufactured in accordance with ASTM C 1452.
2. Current Legacy Report number or Evaluation Report number for the AAC manufacturer.

1.06 QUALITY ASSURANCE

A. Furnish reinforced AAC panels from single manufacturer.

B. Mock-ups:

1. Build a mock-up as directed by Architect.
2. The following items are to be approved:
 - a. Mortar joints.
 - b. Control joint complete with joint sealant.
 - c. Patching of chips and corners.
 - d. Workmanship.
 - e. Reinforcement, if required.
 - f. Flashing.
 - g. Exterior finishes.
 - h. Interior finishes.
3. Prepare sample wall at least 14 days prior to beginning AAC unit work. Should mock-up be disapproved, prepare additional mock-up until approved by Architect.

4. Maintain mock-up throughout work as standard of AAC unit work. Do not destroy wall until directed by Architect.
- C. Pre-installations conferences:
1. Prior to installation of AAC panels, schedule and hold a pre-installation conference to review scope of work.
 2. Attendees shall include a representative from each subcontractor involved with AAC panels and adjacent construction material installation.
- 1.07 DELIVERY, STORAGE, AND HANDLING
- A. Delivery and handling:
1. Deliver AAC products and accessory items to the designated storage area.
 2. Designated storage area shall be located at or near the staging areas, minimizing excessive handling of AAC material.
 3. Transport and handle reinforced AAC panels with equipment designed to protect panels from strain, warping, cracking, chipping, or staining.
 4. Placing AAC panels in direct contact with earth is prohibited
- B. Storage and protection:
1. Offload AAC panels with appropriate equipment and store pallets of AAC material on dry, level ground or surface. Placing AAC panels in direct contact with earth is prohibited.
 2. AAC panels shall be stored in an area and manner to prevent breakage, cracking, chipping, spilling or other damage.
 3. Protect AAC panels from oil and chemical staining.
 4. Protect AAC material from the weather and keep covered until ready for installation.
 5. Packaged materials shall be delivered in the original, unopened containers of the manufacturers and stored in water protected areas.
 6. Store and protect reinforcement and anchors so that when placed, they will be free of soil, dirt, ice, loose rust scale, grease or other coatings which would destroy or reduce bond with mortar.
 7. Place so identifications marks are easily discernible.
- 1.08 PROJECT CONDITIONS
- A. Cold weather construction – When the use of Thin Bed Mortar is specified and ambient air temperature is below 40°F, implement cold weather procedures and comply with the following:
1. Preparation – Comply with the following requirements prior to conducting AAC panel work:
 - a. Do not install AAC panels having either a temperature below 20°F or containing frozen moisture, visible ice, or snow on their surface.
 - b. Remove visible ice on AAC panels prior to installation.
 - c. Remove visible ice and snow from the top surface of existing foundations to receive new construction and AAC units. Heat these surfaces above freezing, using methods that do not result in damage.
 2. Construction – These requirements apply to work in progress and are based on ambient air temperature. Do not heat water or aggregates used in mortar or grout above 140°F. Comply with the following requirements during construction during the following ambient air conditions:
 - a. 40°F to 32°F: Heat sand or mixing water to produce mortar temperature between 40°F and 120°F at the time of mixing. Grout does not require heated materials, unless the temperature of the materials is below 32°F.:
 - b. 32°F to 25°F: Heat sand and mixing water to produce mortar temperature between 40°F and 120°F at the time of mixing. Maintain mortar temperature above freezing until used in AAC masonry. Heat grout aggregates and mixing water to produce grout temperature between 70°F and 120°F at the time of mixing. Maintain grout temperature above 70°F at the time of grout placement. Heat AAC panels to a minimum temperature of 40°F before installing thin-bed mortar.

- c. 25°F to 20°F: Comply with Section 1.08.A.2.b and the following: Heat AAC panels' surfaces under construction to 40°F and use wind breaks or enclosures when the wind velocity exceeds 15 mph. Heat AAC masonry to a minimum of 40°F prior to grouting.
 - d. 20°F and below: Comply with Section 1.08.A.2.c and the following: Provide an enclosure and auxiliary heat to maintain air temperature above 32°F within the enclosure.
 - e. Apply finish base coating or textured coating when temperatures are above 45°F. Do not apply to frozen surfaces.
3. Protection – These requirements apply after AAC panels is placed and are based on anticipated minimum daily temperature for grouted AAC masonry and anticipated mean daily temperature for ungrouted AAC panels. Maintain the temperature of AAC panels above 32°F for the first 4 hours after thin-bed mortar application. Protect completed AAC panels in the following manner during the following ambient air conditions:
- a. 40°F to 25°F: Protect newly completed AAC panels by covering with a weather-resistive membrane for a minimum of 24 hours after completion of work.
 - b. 25°F to 20°F: Cover newly constructed AAC panels completely with weather-resistive insulating blankets, or equal protection, for 24 hours after completion of work. Extend time period to 48 hours for grouted AAC panels, unless the only cement in the grout is Type III Portland cement.
 - c. 20°F and below: Maintain newly constructed AAC panels temperature above 32°F for at least 24 hours after being completed by using heated enclosures, electric heating blankets, infrared lamps, or other acceptable methods. Extend time period to 48 hours for grouted AAC panels, unless the only cement in the grout is Type III Portland cement.
- B. Hot weather construction – When the use of Thin Bed Mortar is specified implement approved hot weather procedures and comply with the following provisions:
1. Preparation – Prior to conducting AAC panel work:
 - a. When the ambient air temperature exceeds 100°F or exceeds 90°F. with wind velocity in excess of 8 mph:
 - 1) Spread mortar beds no more than 4'-0" ahead of AAC panels.
 - 2) Set AAC panels within one minute after spreading mortar.
 - b. When the ambient air temperature exceeds 115°F, or exceeds 105°F with a wind velocity greater than 8 mph, implement the requirements of Section 1.08.B.1.a and shade materials and mixing equipment from direct sunlight.
 2. Construction – While AAC panels work is in progress:
 - a. When the ambient air temperature exceeds 100°F or exceeds 90°F with a wind velocity greater than 8 mph:
 - 1) Maintain temperature of mortar and grout below 120°F.
 - 2) Flush mixer and mortar transport container with cool water before they come into contact with mortar ingredients or mortar.
 - b. When the ambient temperature exceeds 115°F, or exceeds 105°F with a wind velocity greater than 8 mph, implement the requirements of Section 1.08.B.2.a and use cool mixing water for mortar and grout. Ice is permitted in the mixing water prior to use. Do not permit ice in the mixing water when added to the other mortar to grout materials.
 - c. Do not apply base coating or textured coating when ambient temperatures are over 90°F. Protect base coating from excessive evaporation during hot, windy, or dry conditions by pre-wetting substrate. Protect from rain.
 - d. Do not apply joint sealant when ambient temperatures are over 100°F.
 3. Protection – When the mean daily temperature exceeds 100°F, or exceeds 90°F with a wind velocity greater than 8 mph, fog spray newly constructed panels until damp, at least three times a day until the AAC masonry is three days old.

1.09 SEQUENCING AND SCHEDULING

- A. Loading AAC panels walls is prohibited prior to the following:
1. Uniform floor or roof loads: 12 hours, minimum.
 2. Concentrated loads: Three days, minimum.

- B. Construction activities coordination specified in other Sections for work built into walls:
1. Work required under this Section includes chase and routing coordination with construction activities specified in other Sections.
 2. As panel installation is completed, coordinate with work required in other Sections for chases or routing areas required in AAC walls for electrical, plumbing, and other items.
 3. Request relevant construction activities to mark actual routing or chase locations; include required depth.
 4. Fill in chases and routed areas as specified in other Sections.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Acceptable AAC Manufacturers:

1. Xella Mexicana, S.A. de C.V.; Rio Amacuzac 1201 Ote., Col. Valle Oriente, Monterrey, MX 66269; Telephone: (+52-81) 8399-2424, Fax (+52-81) 8399-2460

TYPICALLY, USED BELOW IF CLOSED SPEC

2. Substitutions: No substitutions permitted.

CONTACT LOCAL AAC MANUFACTURER FOR ADDITIONAL FINISH AND SEALANT MANUFACTURERS

B. Acceptable Finish and Sealant Manufacturers:

1. Elite Cement Products, Inc.; P.O. Box 48823, Atlanta, GA 30362; Telephone: (770) 448-0856.
2. Sider-Oxydro, Inc.; 10110 Regur Road, Hawkinsville, GA 31036; Telephone: (478) 892-9800.
3. Sto Corp.; 3800 Camp Creek Parkway, Building 1400, Suite 120, Atlanta, GA 30331; Telephone (404) 346-3666, 1-800-221-2397

2.02 MANUFACTURED PANELS

A. Reinforced AAC panels:

1. Composition: Autoclaved aerated concrete mixture consisting of quartz / sand / silica source, lime, cement, proprietary additives, water and reinforcement.

SELECT APPROPRIATE THICKNESS (ES) AND USE; DELETE OTHERS; SEVERAL DIFFERENT WALL THICKNESSES REQUIRE MULTIPLE SELECTION. SELECT STRENGTH CLASS (ES) REQUIRED.

2. Nominal dimensions: **
 - a. Non-load bearing wall panels, reinforced: ** 6" (15cm) ** 7" (17.5cm) ** 8" (20cm) ** 10" (25cm) ** 12" (30cm) thickness by ** 24" (61cm) nominal width and up to 20' (610cm) long. See Plans for required thicknesses; Strength class ** AAC-3. ** AAC-4. ** AAC-6. **
 - b. Load bearing wall panels, reinforced: ** 6" (15cm) ** 7" (17.5cm) ** 8" (20cm) ** 10" (25cm) ** 12" (30cm) thickness by ** 24" (61cm) nominal width and up to 20' (610cm) long. See Plans for required thicknesses; Strength class ** AAC-3. ** AAC-4. ** AAC-6. **
 - c. Floor panels, reinforced: ** 4" (10cm) ** 5" (12.5cm) ** 6" (15cm) ** 7" (17.5cm) ** 8" (20cm) ** 10" (25cm) ** 12" (30cm) thickness by ** 24" (61cm) nominal width and up to 20' (610cm) long. See Plans for required thicknesses; Strength class ** AAC-3. ** AAC-4. ** AAC-6. **
 - d. Roof panels, reinforced: ** 4" (10cm) ** 5" (12.5cm) ** 6" (15cm) ** 7" (17.5cm) ** 8" (20cm) ** 10" (25cm) ** 12" (30cm) thickness by ** 24" (61cm) nominal width and up

to 20' (610cm) long. See Plans for required thicknesses; Strength class ** AAC-3. ** AAC-4. ** AAC-6. **

- B. Compression Strength and Density: In accordance with ASTM C 1452 and ASTM C 1386.
- C. Fire ratings: In accordance with UL 263 or ASTM E 119.
- D. Acoustical ratings: In accordance with ASTM E 90.

2.03 ACCESSORIES

- A. Key joints and bond beams reinforcement: ASTM A 615, Grade 60; deformed type for #3 and larger bars, actual sizes indicated on Contract Drawings.
- B. Fasteners and Anchors: Compatible with AAC materials. Allowable loading determined by independent laboratory or manufacturer's testing. The use of powder-actuated fasteners in AAC is strictly prohibited.
- C. Joint sealant:

DELETE SUBPARAGRAPH BELOW IF NO THIN BED MORTAR IS SPECIFIED.

- 1. AAC Panels head joint and bed joint mortar; acceptable products: Xella Mexicana, S.A. de C.V., Thin Bed Mortar; Elite Cement Products, Inc., Thin Bed Mortar; Sider-Oxydro, Inc., Thin Bed Mortar.
- 2. Leveling bed mortar: ASTM C270, Type "M" or Type "S".
- 3. Aggregate:
 - a. Leveling bed mortar: Clean, hard, natural, washed sand in accordance with ASTM C144.

DELETE SUBPARAGRAPH BELOW IF NO CEMENT GROUT IS REQUIRED.

- b. AAC panels grout:
 - Fine aggregate: ASTM C404, Size No. 1
 - Coarse aggregate: ASTM C404, Size No. 89.
- 4. Water: Clean, potable, free from deleterious amounts of alkalis, acids, and organic materials.
- D. Backer rods and sealants: Specified in Joint Sealants Section.
- E. Flexible flashing: Specified in Flexible Flashing Section.
- F. Fire-rated insulation for penetrations of rates walls: Specified in Firestopping Section.
- G. Headers and Frames:
 - 1. Headers at penetrations in floor and roof system: Designed and detailed by AAC Panel Manufacturer.
 - 2. Supplemental steel framing at openings in wall systems: Designed and detailed by Project Engineer of Record.
- H. Gage Metal Anchors: Galvanized steel, bent per drawings with factory drilled holes to accept screws and anchor.

2.04 MIXES

DELETE SUBPARAGRAPH BELOW IF NO CEMENT GROUT IS REQUIRED.

- A. Mortar proportions:

1. AAC unit head joint and bed joint mortar: Mix in accordance with manufacturer's mixing instructions.
2. Proportion materials by volume in accordance with ASTM C270 for leveling course only. Use AAC thin-bed mortar for head and bed joints and other joints in AAC work.

DELETE GROUT PROPORTIONS PARAGRAPH IF DELETED ABOVE.

- B. Grout proportions:
1. Fine and Coarse Grout: Proportion materials by volume in accordance with ASTM C476.
 2. Slump: 8" to 11" measured in accordance with ASTM C143.

2.05 FABRICATION

- A. Shop assembly:
1. Fabricate reinforced AAC panels in accordance with approved shop drawings.

2.06 FINISHES

- A. All paints, stuccos, coatings, etc. shall be specifically formulated for use with AAC. Vapor permeability (PERM rating of the coating) as determined in accordance with ASTM E 96 shall not be less than 5.
- B. All colors and aggregate for finish coat shall be factory mixed from the same production run to assure consistent installed color and texture.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Protection:
1. Protect finished exposed work from stains.
 2. Take particular care to keep AAC units clean.

3.02 ERECTION

- A. Reinforced AAC panel work:
1. Follow approved shop drawings for installations of work.
 2. Set reinforced AAC panels plumb, level, and true to line within specified erection tolerances. Dimensions tolerances shall be non-cumulative.
 3. Secure reinforced AAC panels in place as indicated on approved shop drawings.
 4. Provide temporary bracing as required to resist construction loads, including wind.
- B. Building in other work:
1. Install work of other sections required to be incorporated with AAC panels as work progresses; include anchors, and accessories. Space and align built-in parts; exercise care not to disturb other materials from position.
 2. Coordinate with SEQUENCING AND SCHEDULING Section for required routing and chases.
 3. Fill in interior spaces around built-in items with fine grout or interior plaster.
 4. Fill in exterior spaces around built-in items with fine grout or stucco.
 5. Fill hollow metal frames in AAC unit walls with fine grout as wall is laid. Rake back 1/2" joint between hollow metal frame and adjacent AAC unit to receive sealant at butt type frames.
- C. Floor and roof panels: Fill joints between reinforced AAC panels using reinforcing bars and grout, as specified. Mix and place grout in accordance with manufacturer's recommendations. Feather-out grout at joint irregularities.

- D. Cleaning and patching: Patch spalls and chips in reinforced AAC panels in accordance with AAC panel manufacturer's recommendations.

3.03 APLICATIONS

A. Tolerances:

1. Maximum variation from plumb: $\frac{1}{4}$ " in 10'-0"; not exceeding $\frac{3}{8}$ " in 20'-0".
2. Maximum variation from level: $\frac{1}{4}$ " in 20'-0", not exceeding $\frac{1}{2}$ " in 49'-0" or more.
3. Maximum variation in linear building line from location indicated: $\frac{1}{4}$ " in 20'-0".

END OF SECTION 03425