

SECTION 04225

AUTOCLAVED AERATED CONCRETE UNITS

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: Fabrication, transportation, and erection of Autoclaved Aerated Concrete (AAC) units and associated components.
- B. Related sections:
 - 1. Section 01630: Product Substitution Procedures.
 - 2. Section 03200: Concrete Reinforcement.
 - 3. Section 03300: Cast-in-Place Concrete.
 - 4. Section 03425: Reinforced Autoclaved Aerated Concrete Panels.
 - 5. Section 04070: Masonry Grout.
 - 6. Section 04210: Brick.
 - 7. Section 05500: Steel and Miscellaneous Metal Work.
 - 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
 - 14. Division 15: Mechanical.
 - 15. Division 16: Electrical.

1.02 REFERENCES

- A. Standards of the following as referenced:
 - 1. American Concrete Institute (ACI).
 - a. ACI 318: Building Code Requirements for Structural Concrete.
 - b. ACI 530: Building Code Requirements for Masonry Structures.
 - c. ACI 530.1: Specifications for Masonry Structures.
 - 2. ASTM.
 - a. ASTM C 1386: Standard Specification for Precast Autoclaved Aerated Concrete (PAAC) Wall Construction Units.
 - b. ASTM C 1555: Standard Practice for Autoclaved Aerated Concrete Masonry.
 - 3. Underwriters Laboratories, Inc. (UL).
 - a. UL 263 (ASTM E 119): Fire Tests of Building Construction Materials.

1.03 DEFINITIONS

- A. Terms:
 - 1. AAC unit: Autoclaved Aerated Concrete Unit or Autoclaved Aerated Concrete Block.
 - 2. Bed joint: Horizontal mortar joint between two AAC units.
 - 3. Head joint: Vertical joint between two AAC units.
 - 4. AAC Masonry Block System: Combination of AAC units and thin-bed mortar bonded

together vertically and horizontally to form complete assembly; for load-bearing and non-load-bearing applications.

5. Strength Class: AAC-2, 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).

1.05 SUBMITTALS

- A. Product Data:
 1. Manufacturer's product data for the AAC Integrated Construction System, including AAC units and thin-bed mortar. Provide actual AAC unit 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. Quality control submittals:
 1. Certificate from the AAC manufacturer indicating AAC product is manufactured in accordance with ASTM C 1386.
 2. Current Legacy Report number or Evaluation Report number for the AAC manufacturer.
 3. Mix designs for grout.

1.06 QUALITY ASSURANCE

- A. Furnish AAC units from single manufacturer.
- B. Installer Qualifications: Engage and AAC trained installer who has the necessary equipment and experience in AAC system handling, placement and installation.
- C. Mock-ups:
 1. Lay 6'-0" long by 4'-0" high sample wall with AAC units. Orient wall 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. Flexible flashing.
 - g. Exterior finishes.
 - h. Interior finishes.
 3. Prepare sample wall at least 14 days prior to beginning AAC unit work. Should wall be disapproved, prepare additional walls until approved by Architect.
 4. Maintain wall throughout work as standard of AAC unit work. Do not destroy wall until directed by Architect.

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.

B. Storage and protection:

1. Offload AAC units with appropriate equipment and store pallets of AAC material on dry, level ground or surface. Placing AAC units in direct contact with earth is prohibited.
2. AAC units shall be stored in an area and manner to prevent breakage, cracking, chipping, spalling or other damage.
3. Protect AAC units 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.

1.08 PROJECT CONDITIONS

A. Cold weather construction – When 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 masonry work:
 - a. Do not lay AAC units having either a temperature below 20°F or containing frozen moisture, visible ice, or snow on their surface.
 - b. 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 units 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 masonry 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 masonry is placed and are based on anticipated minimum daily temperature for grouted AAC masonry and anticipated mean daily temperature for ungrouted AAC masonry. Maintain the temperature of AAC masonry above 32°F for the first 4 hours after thin-bed mortar application. Protect completed AAC masonry in the following manner during the following ambient air conditions:
 - a. 40°F to 25°F: Protect newly completed AAC masonry 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 masonry 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 masonry, unless the only cement in the grout is Type III Portland cement.

- c. 20°F and below: Maintain newly constructed AAC masonry 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 masonry, unless the only cement in the grout is Type III Portland cement.
- B. Hot weather construction – Implement approved hot weather procedures and comply with the following provisions:
1. Preparation – Prior to conducting AAC masonry 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 units.
 - 2) Set AAC unit 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 masonry 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 masonry until damp, at least three times a day until the AAC masonry is three days old.

1.09 SEQUENCING AND SCHEDULING

- A. Loading AAC unit walls or columns 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 walls are 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 UNITS

A. AAC units:

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

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

2. Nominal dimensions: **
 - a. Standard Block; square head joints: **4" (10cm) **5" (12.5cm) **6" (15 cm) ** 8" (20cm) **10" (25cm) ** 12" (30cm) nominal thickness by 8" (20cm) nominal height by 24" (61cm) nominal length. See Plans for required thicknesses; Strength class ** AAC-2 ** AAC-3 ** AAC-4 ** AAC-6 **
 - b. Cored "O-Block" units: Same width as walls by ** 8" (20cm) nominal height by 24" (61cm) nominal length; Strength class **AAC-2 **AAC-4 **AAC-6.
 - c. Semi-Jumbo Block: **6" (15cm) ** 8" (20cm) **10" (25cm) ** 12" (30cm) nominal thickness by 16" (40cm) nominal height by ** 24" (61cm) nominal length. See Plans for required thicknesses; Strength class ** AAC-2. ** AAC-3. **AAC-4. ** AAC-6. **
 - d. Jumbo Block: **6" (15 cm) ** 8" (20cm) **10" (25cm) ** 12" (30cm) nominal thickness by 24" (61cm) nominal height by **40" (100cm) **48" (120cm) nominal length. See Plans for required thicknesses; Strength class ** AAC-2. ** AAC-3. **AAC-4. ** AAC-6. **

SELECT APPROPRIATE LINTEL TYPE – SOLID REINFORCED TYPE OF "U" TYPE

- e. Solid lintel units; reinforced: Same width as walls by ** 8" (20cm) ** 10" (25cm) ** 12" (30cm) nominal height; Strength class AAC-4.
- f. Lintel "U-Block" units: Same width as walls by ** 8" (20cm) nominal height by 24" (61cm) nominal length; Strength class **AAC-2 **AAC-4.

- B. Compression Strength and Density: In accordance with 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. Mortar materials:

1. AAC unit 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. Masonry 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.
- B. Bond beam and grouted cell reinforcement: ASTM A615, Grade 40 or 60 deformed type for #3 and larger bars; actual sizes indicated on Contract Drawings.
- C. Backer rods and sealants: Specified in Joint Sealants Section.
- D. Flexible flashing: Specified in Flexible Flashing Section.
- E. Fire-rated insulation for penetrations of rates walls: Specified in Firestopping Section.
- F. 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.
- G. Gage Metal Anchors: Galvanized steel, bent per drawings with factory drilled holes to accept screws and anchor.

2.04 MIXES

- 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 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. Keep walls dry during erection by covering at end of each work period with non-staining waterproof membrane covering.
2. Protect partially completed walls not being worked on with non-staining waterproof membrane until construction activities specified in other sections completes protection of walls.
3. Covering: Overhang at least 2'-0" on each side of wall; anchor on each side of wall.
4. Protect finished exposed work from stains.
5. Take particular care to keep AAC units clean.
6. Brace walls during construction to protect from wind or seismic damage.

3.02 INSTALLATION

A. Workmanship:

1. Lay AAC units plumb, level, and true to line for range.
2. Lay units in running bond with 4" minimum head joints lap in alternate courses. Align units to allow cores and openings to be filled with grout, when required.
3. Cut AAC units with unit manufacturer recommended hand type saw or electric bandsaw specially designed for cutting AAC units. Layout units to minimize cutting.
4. Prepare AAC bearing surfaces required to receive other structural work at the specified elevation. Adjust height of bearing course and / or starter course by cutting, sanding, rasping AAC units as necessary to achieve proper elevations. Bearing surfaces shall be level and smooth.

B. Building in other work:

1. Install work of other sections required to be incorporated with AAC units 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 Article 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. Mortar joints:

1. Head and bed joints:
 - a. Lay first course in full bed of leveling bed mortar in thickness necessary to level AAC unit top; not less than 1/4".
 - b. Clean head joint and bed joint of dust and loose particles and apply AAC unit head joint, if specified, and bed joint mortar on full face of AAC unit already laid.
2. Place each block as close to head joint as possible before lowering the block onto the bed joint. Avoid excessive movement along bed joint. Make adjustment while mortar is still soft and plastic by tapping to plumb and bringing to alignment.
3. Check each AAC unit as laid with mason's level for level and plumb with wall below. Rasp top of block course, if necessary, to ensure a level bed joint for the next course.
4. Remove and replace mortar with fresh mortar, where adjustment must be made after mortar has started to set.
5. Keep bed and head joints uniform in width.
6. Standard thickness for both horizontal and vertical mortar joints:
 - a. Base leveling course bed joint: 1/2", nominal, +/- 1/4".
 - b. Other vertical coursing and head joints: 1/16", nominal.

7. Take particular care to avoid spreading mortar on exposed face of AAC unit. Only normal mortar droppings will be accepted on face of AAC unit; remove only after mortar has dried enough not to smear.
- D. Prior to grouting operations, thoroughly wet all cells and grout contact surfaces.
- E. Flexible flashing:
1. Clean AAC unit surfaces smooth; maintain free from projections capable of puncturing flashing material.
 2. Follow requirements indicated in Flexible Flashing Section.
- F. Joint treatment: Remove excess extruded mortar immediately after laying AAC unit; tooling joints is not required.
- G. Control joints:
1. Make joint $\frac{1}{2}$ " wide, unless indicated otherwise, rake out control joints to depth of $\frac{3}{4}$ " while mortar is still plastic.
 2. Provide joints at 16'-0" O.C. unless otherwise indicated.
 3. Leave joint open and clean for caulking in accord with Joint Sealants Section.
- H. 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".
- 3.03 CLEANING AND PATCHING
- A. Keep AAC unit work free of mortar droppings as work progresses and, at completion of work, rasp AAC unit to remove excess mortar
- B. Patch AAC units with excessive chips.

END OF SECTION 04225