

SECTION 04240

AUTOCLAVED AERATED CONCRETE UNITS

Date: 04-19-07

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.
- B. Related sections:
 - 1. Section 01630: Product Substitution Procedures.
 - 2. Section 03200: Concrete Reinforcement.
 - 3. Section 03300: Cast-in-Place Concrete.
 - 4. Section 04070: Masonry Grout.
 - 5. Section 04210: Brick.
 - 6. Section 07600: Flashing and Sheet Metal.
 - 7. Section 07650: Flexible Flashing.
 - 8. Section 07840: Firestopping.
 - 9. Section 07920: Joint Sealants.
 - 10. Section 08110: Steel Doors and Frames.
 - 11. Division 9: Finishes
 - 12. Division 15: Mechanical.
 - 13. Division 16: Electrical.

1.02 REFERENCES

- A. Standards of the following as referenced:
 - 1. American Concrete Institute (ACI).
 - 2. American Society for Testing and Materials (ASTM).
 - 3. The Masonry Society (TMS).
 - 4. Underwriters Laboratories, Inc. (UL)

1.03 DEFINITIONS

- A. Terms:
 - 1. AAC unit: Autoclaved Aerated Concrete Unit.
 - 2. Bed joint: Horizontal mortar joint between two AAC units.
 - 3. Head joint: Vertical joint between two AAC units.
 - 4. Jumbo block: Nominally square face size AAC unit, 24" (60.8cm) by 24" (60.8) cm.
 - 5. Standard block: Nominally rectangular face AAC unit 24" (60.8cm) by 8" (20cm).
 - 6. Strength Class: AAC2, AAC4, or AAC6.

1.04 SUBMITTALS

- A. Quality control submittals:

1. Certificate from the AAC manufacturer indicating AAC product is manufactured in accordance with ASTM C1386.

1.05 QUALITY ASSURANCE

- A. Furnish AAC units from single manufacturer.
- B. 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. Workmanship.
 - d. Reinforcement, if required.
 - e. Flexible flashing.
 - f. Exterior finishes.
 - g. 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.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Storage and protection:
 1. Offload AAC units with pallets resting on ground. Placing AAC units in direct contact with earth is prohibited.
 2. Protect AAC units from oil and chemical staining.

1.07 PROJECT CONDITIONS

- A. Cold and hot weather installation practices:
 1. Cold weather precautions for AAC masonry work:
 - a. When temperature of AAC units is below 20°F, do not install.
 - b. Remove visible ice on AAC units prior to installation.
 - c. Heat mortar sand or mixing water to produce mortar temperatures between 40°F. and 120°F. at time of mixing. Maintain mortar temperature above freezing until placed.
 - d. Ambient temperature requirements:
 - 1) Between 25°F. and 20°F.: Use heat sources on both sides of AAC walls under construction. Install wind breaks when wind velocity is in excess of 15 mph.
 - 2) Below 20°F.: Provide enclosure for AAC walls under construction. Use heat sources to maintain temperatures above 32°F. within enclosures.
 - e. Daily mean temperature requirements:
 - 1) Between 40°F. and 32°F.: Protect completed AAC walls from rain or snow by covering with weather resistive membrane for a minimum of 24 hours after construction.
 - 2) Between 32°F. and 25°F.: Completely cover completed AAC walls with weather resistive membrane for a minimum of 24 hours after construction.
 - 3) Between 25°F. and 20°F.: Completely cover completed AAC walls with insulating blankets or equal protection for a minimum of 24 hours after construction.
 - 4) Below 20°F.: Maintain AAC wall construction above 32°F. for 24 hours after completion by enclosure with supplementary heat, electric heating blankets, infrared heat lamps, or other acceptable methods outlined to Architect.
 2. Hot weather precautions for AAC masonry work:
 - a. When erected in ambient air temperature of 100°F. or ambient air temperature of 90°F.

with wind velocity in excess of 8 mph, implement the following:

- 1) Protect AAC wall construction from direct exposure to wind and sun.
- 2) Spreading mortar beds more than 4'-0" ahead of AAC units is prohibited.
- 3) Setting AAC unit more than one minute after spreading mortar is prohibited.

1.08 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. Filling in chases and routed areas specified in other Sections.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturers:
 1. Acceptable manufacturer: Xella Aircete North America Inc.; 2400 Hebel Boulevard, Adel, Georgia 31620; Telephone: 229.896.1593; Fax 229.896.1912

TYPICALLY, USE BELOW IF CLOSED SPEC

2. Substitutions for products listed are prohibited.

USE THIS SUBPARAGRAPH FOR ALLOWING SUBSTITUTIONS WITHOUT NAMING OTHER MFRS.

3. Products of other manufacturers similar in type, quality, and performance are acceptable, subject to compliance with specified ** requirements.
** requirements and submission of required data indicated in Product Substitution Procedures section.

2.02 MANUFACTURED UNITS

- A. AAC units:
 1. Composition: Autoclaved aerated concrete mixture consisting of quartz, sand, 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. Tongue and Groove Block: ** 4" (10cm) ** 6" (15cm) ** 8" (20cm) ** 10" (25cm) ** 12" (30cm) nominal widths by 8" (20cm) nominal height by 24" (60.8cm) nominal length; Strength class ** AAC2 ** AAC4 ** AAC6
 - b. Standard Block; square head joints: ** 3" (7.5cm) ** 4" (10cm) ** 6" (15cm) ** 8" (20cm) ** 10" (25cm) ** 12" (30cm) nominal widths by 8" (20cm) nominal height by

- 24" (60.8cm) nominal length; Strength class ** AAC2 ** AAC4 ** AAC6
- c. Jumbo Block: ** 6" (15cm) ** 8" (20cm) ** 10" (25cm) ** 12" (30cm) nominal widths by 24" (60.8cm) nominal height by ** 40" (101.6cm) ** 48" (121.9cm) nominal length; Strength class ** AAC4 ** AAC6
 - d. Shaft Block: ** 3" (7.5cm) ** 4" (10cm) nominal widths by 24" (60.8cm) nominal height by 24" (60.8cm) nominal length; Strength class ** AAC2 ** AAC4

SELECT APPROPRIATE LINTEL TYPE – SOLID REINFORCED TYPE OF “U” TYPE

- e. Solid lintel units; reinforced: Same width as walls by ** 8" (20cm) ** 12" (30cm) ** 16" (40.3cm) ** 24" (60.8) ** nominal height; Strength class AAC4.
- f. Lintel “U-Block” units: Same width as walls by 10" (25cm) nominal height by 24" (60.8cm) nominal length; Strength class AAC4.

B. Fire ratings: In accordance with Underwriters Laboratories listed assemblies.

2.03 ACCESSORIES

A. Mortar materials:

- 1. AAC unit head joint and bed joint mortar; acceptable product: Xella Aircrete North America Inc.; HEBEL Thin Bed Mortar and/or HEBEL Large Grain Mortar.
- 2. Leveling bed mortar: ASTM C270, Type “M”.
- 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.

- a. 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 alkalies, acids, and organic materials.
- B. Bond beam reinforcement: ASTM A615, Grade 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. Tension tie-downs; acceptable manufacturer: Go-Bolt, Inc.; DeLand, Florida or equivalent.
- G. Fasteners and Anchors: Compatible with AAC materials.

2.04 MIXES

A. Mortar proportions:

- 1. ACC 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.

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 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.
3. Cut AAC units with unit manufacturer recommended hand type saw or electric bandsaw specially designed for cutting AAC units. **Lay out units to minimize cutting.**

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 1/2".
 - b. Apply AAC unit head joint and bed joint mortar on full face of AAC unit already laid.
2. 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.
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 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. Grout Filled Cells
 - 1. Provide a clean-out opening at the base of the AAC wall at each vertical reinforcing bar locations.
 - 2. Remove debris through-out from core area prior to placement of concrete grout.
 - 3. Pre-wet the core cells with clean water prior to placement of concrete grout.
 - 4. Fill core cell with concrete grout using appropriate lift procedures to avoid wall blow-outs.
 - 5. Consolidate the grout filled core with a needle vibratory device.

- 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 24'-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, rub AAC unit to remove excess mortar

- B. Patch AAC units with excessive spalls or chips.

END OF SECTION 04240