



TECHNICAL NOTES on Brick Construction

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Technical Notes 11A - Guide Specifications for Brick Masonry, Part 2 Rev [June 1978] (Reissued Sept. 1988)

INTRODUCTION

This *Technical Notes* contains the guide specifications in CSI format for Division 4, Section 04210, Part I - General, and Part II - Products. Part III - Execution is in *Technical Notes* 11B Revised.

The specifications are applicable to ANSI A41.1 - 1953 (R1970), "Building Code Requirements for Masonry," ANSI A41.2 - 1960 (R 1970), "Building Code Requirements for Reinforced Masonry," or equivalent sections in the Model Building Codes.

The guide specifications in *Technical Notes* 11A Revised and 11B Revised can be used for engineered brick masonry designed to comply with *Building Code Requirements for Engineered Brick Masonry*, BIA, August 1969, or equivalent sections in the Model Building Codes, when additional quality assurance requirements are incorporated into the specifications. See *Technical Notes* 11C Revised.

Guide Specification & Notes

PART I - GENERAL

1.01 DESCRIPTION:

A. Related Work Specified Elsewhere:

1. Concrete work: Section 03_____.
2. Rough carpentry: Section 06_____.
3. Structural steel and metals: Section 05_____.
4. Waterproofing: Section 07_____.

B. Material Installed but Furnished by Others:

1. Bolts.
2. Anchors.
3. Nailing blocks.
4. Inserts.
5. Flashing.
6. Lintels.
7. Doors.

8. Window frames.
9. Vents.
10. Conduits.
11. Expansion joints.

1.02 QUALITY ASSURANCE:

A. Brick Tests:

1. Test in accordance with ASTM C 67-_____ with the following additional requirements:

a. If the coefficient of variation of the compression samples tested exceeds 12%, obtain compressive strength by multiplying average compressive strength of specimens by

where v is the coefficient of variation of sample tested.

b. Cost of tests of units after delivery shall be borne by the purchaser, unless tests indicate that units do not conform to the requirements of the specifications, in which case cost shall be borne by the seller.

NOTE:

1.02.A This section can be deleted if Architect/Engineer has sufficient experience and confidence in the brick manufacturer to accept compliance with project specifications based on certification section 1.03.C.

1.02.A. 1.a. To be applied only for engineered brick masonry.

1.02.A. 1.b. To be used only in a case of dispute.

B. Furnish Sample Panel:

1. Approximately 4 ft. (1.2 m) long by 3 ft. (1 m) high, showing the proposed color range, texture, bond, mortar and workmanship. All brick shipped for the sample shall be included in the panel.

2. Erect panel in the presence of the Architect/Engineer before installation of materials.

3. When required, provide a separate panel for each type of brick or mortar.

4. Do not start work until Architect/Engineer has accepted sample panel.

5. Use panel as standard of comparison for all masonry work built of same material.

6. Do not destroy or move panel until work is completed and accepted by Owner.

NOTE:

1.02. B. 1. The sample panel, when accepted, shall become the project standard for: bond, mortar, workmanship and appearance.

1.02.B.3. Brick for sample panels are usually furnished at no cost. If additional panels are needed, care must be exercised not to burden the supplier with excessive costs.

1.03 SUBMITTALS:

A. Samples: Furnish not less than five individual brick as samples, showing extreme variations in color and texture.

B. Test Reports:

1. Test reports for each type of building and facing brick are to be submitted to the Architect Engineer for approval.
2. Testing and reports are to be completed by an independent laboratory.
3. Test reports shall show:
 - a. Compressive strength.
 - b. 24 - hr. cold water absorption.
 - c. 5 - hr. boil absorption.
 - d. Saturation coefficient.
 - e. Initial rate of absorption (suction).

C. Certificates: Prior to delivery, submit to Architect/Engineer certificates attesting compliance with the applicable specifications for grades, types or classes included in these specifications.

NOTE:

1.03.A and B Sections can be deleted if Architect/Engineer has sufficient experience and confidence in the brick manufacturer to accept compliance with project specifications based on certification section 1.03.C.

1.03.B.3. This section should be altered to meet the requirements of the project. Brick are not required to meet the 5-hr boil absorption and/or saturation coefficient requirements of ASTM C 216, ASTM C 62 and ASTM C 652 if they meet the physical property requirements of Sections 5.1 and 5.2 of ASTM C 216, Sections 3A, 3.5 and 3.6 of ASTM C 62 and Sections 5.1 and 5.2 of ASTM C 652.

No limit is placed on initial rate of absorption (suction). Units having initial rates of absorption exceeding 30 g./min./30 sq. in. (194 cm²) should be wetted prior to laying. For cold weather masonry construction, higher suctions may be tolerated (up to 30-40 g.) than for normal construction. Note Sections 1.05.C.2.a and 3.01.A. 1.

1.03.C. List materials for which certificates of compliance are required.

1.04 PRODUCT DELIVERY, STORAGE AND HANDLING:

- A. Store brick off ground to prevent contamination by mud, dust or materials likely to cause staining or other defects.
- B. Cover materials when necessary to protect from elements.
- C. Protect reinforcement from elements

1.05 JOB CONDITIONS:

A. Protection of Work:

1. Wall covering:

- a. During erection, cover top of wall with strong waterproof membrane at end of each day or shutdown.
- b. Cover partially completed walls when work is not in progress.

c. Extend cover minimum of 24 in. (610 mm) down both sides.

d. Hold cover securely in place.

2. Load application:

a. Do not apply uniform floor or roof loading for at least 12 hr. after building masonry columns or walls.

b. Do not apply concentrated loads for at least 3 days after building masonry columns or walls.

B. Staining:

1. Prevent grout or mortar from staining the face of masonry to be left exposed or painted:

a. Remove immediately grout or mortar in contact with face of such masonry.

b. Protect all sills, ledges and projections from droppings of mortar, protect door jambs and corners from damage during construction.

Protection:

1. Preparation:

a. If ice or snow has formed on masonry bed, remove by carefully applying heat until top surface is dry to the touch.

b. Remove all masonry deemed frozen or damaged.

2. Products:

a. When brick suction exceeds recommendations of Section 1.03.B.3, sprinkle with heated water:

(1) When units are above 32° F. (0° C.), heat water above 70°F. (21° C.).

(2) When units are below 32° F. (0° C.), heat water above 130° F. (54° C.).

b. Use dry masonry units.

c. Do not use wet or frozen units.

3. Construction requirements while work is progressing:

a. Air temperature 40° F. (4° C.) to 32° F. (0° C.):

(1) Heat sand or mixing water to produce mortar temperatures between 40° F. (4° C.) and 120° F. (49° C.).

b. Air temperature 32° F. (0° C.) to 25° F. (-4° C.):

(1) Heat sand and mixing water to produce mortar temperatures between 40° F. (4° C.) and 120° F. (49° C.).

(2) Maintain temperatures of mortar on boards above freezing.

c. Air temperatures 25° F. (-4° C.) to 20° F. (-7° C.):

(1) Heat sand and mixing water to produce mortar temperatures between 40° F. (4° C.) and 120° F. (49° C.).

(2) Maintain mortar temperatures on boards above freezing.

(3) Use salamanders or other heat sources on both sides of walls under construction.

(4) Use windbreaks when wind is in excess of 15 mph.

d. Air temperature 20° F. (-7° C.) and below:

(1) Heat sand and mixing water to produce mortar temperatures between 40° F. (4° C.) and 120° F. (49° C.).

(2) Provide enclosures and auxiliary heat to maintain air temperature above 32° F. (0° C.).

(3) Minimum temperature of units when laid: 20° F. (-7° C.).

4. Protection requirements for completed masonry and masonry not being worked on:

a. Mean daily air temperature 40° F. (4° C.) to 32° F. (0° C.):

(1) Protect masonry from rain or snow for 24 hr. by covering with weather-resistive membrane.

b. Mean daily air temperature 32° F. (0° C.) to 25° F. (-4° C.):

(1) Completely cover masonry with weather-resistive membrane for 24 hr.

c. Mean daily air temperature 25° F. (-4° C.) to 20° F. (-7° C.):

(1) Completely cover masonry with insulating blankets or equal protection for 24 hr.

d. Mean daily air temperature 20° F. (-7° C.) and below:

(1) Maintain masonry temperature above 32° F. (0° C.) for 24 hr. by:

(a) Enclosure and supplementary heat.

****OR****

(a) Electric heating blankets.

****OR****

(a) Infrared lamps.

****OR****

(a) Other approved methods.

NOTE:

1.05.C.3 Ideal mortar temperature is 70° F. ± 10° F. (21° C. ± 6° C.). The mixing temperature should be maintained within 10° F. (6° C.).

1.05.C.4 The following options may be used in cold weather construction:

1. Change to a higher type of mortar required in ASTM C 270. (Example: If ASTM type N mortar is specified for normal temperature, change to type S or type M.)

2. Increase the protection time where required in Section 1.05.C.4 to 48 hr. with no change being made in the type of mortar.

3. Without changing the mortar type and maintaining 24-hr. protection in Section 1.05.C.4, replace type I Portland cement in the mortar with type III, ASTM C 150.

1.05.C.4.d This section may be written to allow the contractor to select means of protection.

PART II-PRODUCTS

2.01 BRICK:

A. Facing Brick:

1. ASTM C 216-_____, Grade_____, Type_____.

2. Dimensions:_____ x _____ x _____.

(t) (h) (l)

3. Minimum compressive strength: _____.

4. Provide brick similar in texture and physical properties to those available for inspection at the Architect/Engineer's office.

5. Do not exceed variations in color and texture of samples accepted by the Architect/Engineer.

NOTE:

2.01.A.1 Grade: SW for brick in contact with earth or where weathering index is greater than 50, MW elsewhere. Type: FBS, FBX, FBA.

2.01.A.2 Determine availability. Typical actual sizes for use with 3/8 - in. mortar joints: 3 5/8 x 2 5/16 x 7 5/8 or 11 5/8 in. (92 x 59 x 194 or 295 mm); 3 5/8 x 2 13/16 x 7 5/8 or 11 5/8 in. (92 x 74 x 194 or 295 mm); 3 5/8 x 3 5/8 x 7 5/8 or 11 5/8 in. (92 x 92 x 194 or 295 mm); 3 5/8 x 5 x 7 5/8 or 11 5/8 - in (92x 127x 194 or 295 mm); 3 5/8 x 1 5/8 x 11 5/8 in. (92 x 41 x 295 mm); 5 5/8 x 2 5/16 x 11 5/8 in. (143 x 59 x 295 mm); 5 5/8 x 2 13/16 x 11 5/8 in. (143 x 74 x 295 mm); 5 5/8 x 3 5/8 x 11 5/8 in. (143 x 92 x 295 mm).

2.01.A.3 Required only for structural masonry. Range: 2000 psi to 14,000 psi (13.8 MPa to 96.5 MPa).

****OR****

A. Facing Brick: Provide a cash allowance of_____per thousand.

B. Glazed Brick:

1. ASTM C 126-_____, Grade_____, Type_____.

2. Dimensions:_____ x _____ x _____.

(t) (h) (l)

3. Minimum compressive strength:_____.

NOTE:

2.01.B.1 Grade: S for narrow mortar joints; SS where face dimension variation must be very small. Type: I, II.

2.01.B.2 See 2.01.A.2.

2.01. B.3 See 2.01.A.3.

C. Building Brick:

1. ASTM C 62-_____, Grade_____.

2. Dimensions:_____ x _____ x _____.

(t) (h) (l)

3. Minimum compressive strength:_____.

NOTE:

2.01.C.1 Grade: SW for brick in contact with earth or where weathering index is greater than 50, MW elsewhere, NW in interior and backup areas.

2.01.C.2 See 2.01.A.2.

2.01.C.3 See 2.01.A.3.

D. Hollow Brick:

1. ASTM C 652-_____, Grade_____, Type_____.

2. Dimensions:_____ x _____ x _____.

(t) (h) (l)

3. Minimum compressive strength:_____.

4. Provide brick similar in texture and physical properties to those available for inspection at the Architect/Engineer's office.

5. Do not exceed variation in color and texture of samples accepted by the Architect/Engineer.

NOTE:

2.01.D.1 Grade: SW for brick in contact with earth or where weathering index is greater than 50, MW elsewhere. Type: HBS, HBX, HBA, HBB.

2.01.D.2 See 2.01.A.2.

2.01.D.3 See 2.01.A.3.

2.02 REINFORCEMENT:

A. Cold-drawn steel wire: ASTM A 82-_____.

B. Welded steel wire fabric: ASTM A 185-_____.

C. Billet steel deformed bars: ASTM A 615-_____, Grade_____.

D. Rail steel deformed bars: ASTM A 616-_____, Grade_____.

E. Axle steel deformed bars: ASTM A 617-_____, Grade_____.

NOTE:

2.02.C Grade 40, 50, 60.

2.02.D Grade 50, 60.

2.02.E Grade 40, 60.

2.03 ANCHORS AND TIES:

A. Coated or corrosion-resistant metal meeting or exceeding applicable standard:

1. Zinc-coating flat metal: ASTM A 153-_____, Class_____.

2. Zinc-coating of wire, ASTM A 116-_____, Class 3.

3. Copper-coated wire: ASTM B 227-_____, Grade 30HS.

4. Stainless steel: ASTM A 167-_____, Type 304.

NOTE:

2.03.A.1 Class B-1, B-2, B-3.

B. Types:

1. Wire mesh:

a. Minimum gage: 20.

b. Mesh: 1/2 in. (12.7 mm).

c. Galvanized wire.

d. Width: 1 in. (25 mm) less than width of masonry.

2. Corrugated veneer ties:

a. Minimum gage: 22.

b. Minimum width: 7/8 in. (22 mm).

c. Length: 6 in. (152 mm)

****OR****

2. Wire ties: Use two 10-gage.

3. Cavity wall ties:

a. Wire diameter: 3/16 in. (4.7 mm).

b. Shape: Rectangular, at least 2 in. (51 mm) wide with ends overlapped or "Z" with 2 - in. (51 mm) legs.

c. Length: Select length to allow 1 - in. (25 mm) minimum mortar cover of ends or legs.

4. Multi-wythe wall ties:

a. Prefabricated welded joint reinforcement.

b. Longitudinal cross tie wire:

(1) 9 gage.

(2) Spaced 16 in. (406 mm) o.c.

NOTE:

2.03.B.4 Cavity wall ties may be used.

5. Dovetail flat bar or wire anchors:

a. Flat bar:

(1) Minimum gage: 16.

(2) Minimum width: 7/8 in. (22 mm).

(3) Fabrication: Corrugated, turned up 1/4 in. (6.4 mm) at end or with 1/2-in. (12.7 mm) hole within 1/2 in. (12.7 mm) of end of bar.

b. Wire:

(1) Wire gage: 6.

(2) Minimum width: 7/8 in. (22 mm).

(3) Fabrication: Wire looped and closed.

6. Rigid anchors for intersecting bearing walls:

a. Dimensions: 1 1/2 in. (38 mm) wide by 1/4 in. (6.4 mm) thick by minimum 24 in. (610 mm) long.

b. Fabrication: Turn up ends minimum 2 in. (51 mm) or provide cross pins.

7. Wire ties for high-lift grout reinforced brick masonry:

a. Minimum gage: 9.

b. Fabrication:

(1) Bend into stirrups 4 in. (102 mm) wide and 2 in. (51 mm) shorter than overall wall thickness.

(2) Form so that tie ends meet in center of one embedded end of stirrup.

2.04 CLEANING AGENTS:

A. Do not use cleaning agent other than water on brick, except with concurrence of Architect/Engineer.

B. Acceptable cleaner for dark brick: _____.

C. Acceptable cleaner for light colored brick: _____.

NOTE:

2.04.B Specify cleaner recommended by brick manufacturer.

2.04.C Proper cleaning agent is more critical for light colored brick.