



TECHNICAL NOTES on Brick Construction

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Technical Notes 11C - Guide Specifications for Brick Masonry, Part 4 Rev. [July 1972] (Reissued May 1998)

INTRODUCTION

This issue of *Technical Notes* and the following issue, *Technical Notes* 11D, contain the required additional sections and statements to be incorporated into the "Guide Specifications for Brick Masonry", *Technical Notes* 11A Revised and 11B Revised. This will make the guide specifications in those *Technical Notes* suitable for Engineered Brick Masonry.

The sections contained in these *Technical Notes* deal primarily with the quality assurance, selection of units, strength and construction tolerances to provide masonry that meets the minimum design requirements for Engineered Brick Masonry.

In the construction of Engineered Brick Masonry, quality control may be maintained in either of two ways: (1) by testing the brick and controlling the mortar which can be done by laboratory tests or by mixing proportions, or (2) by periodic testing of masonry prisms. This *Technical Notes* covers quality control by method (1), testing brick and control of mortar. *Technical Notes* 11D covers quality control by method (2), testing masonry prisms.

When quality control by materials testing (brick and mortar) is to be used, the design compressive strength (f'_m) can be assumed, using Table 2 of the BIA Standard, "Building Code Requirements for Engineered Brick Masonry", and the quality control requirements of this *Technical Notes* should be incorporated into the guide specifications in *Technical Notes* 11A Revised and 11B Revised.

All other sections of the Guide Specifications for Brick Masonry (*Technical Notes* 11A Revised and 11B Revised) are appropriate for Engineered Brick Masonry.

QUALITY ASSURANCE BASED ON BRICK AND MORTAR TESTS

Guide Specifications and Notes

PART I - GENERAL

1.02 QUALITY ASSURANCE

Delete section and notes for 1.02.A in Technical Notes 11A Revised, and substitute the following quality control requirements based on brick tests.

A. Brick Tests:

1. Preconstruction Tests:

- a. Test five brick for compressive strength to determine acceptability of units for compliance with specifications.
- b. Use brick similar to those selected for use, matching color, texture, raw material, moisture content and coring.
- c. Cost of tests shall be borne by the General Contractor.

2. Site Control Tests:

- a. Test units selected at random from units delivered to the project.
- b. Cost of tests of units after delivery shall be borne by the General Contractor, unless tests indicate that units do not conform to the requirements of the specifications, in which case cost shall be borne by the seller.

3. 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
 $1 + 1.5 (v - 0.12)$

100

where v is the coefficient of variation of sample tested.

Add the following to Section 1.02 in Technical Notes 11A Revised.

C. Preconstruction Requirements:

1. Prebid conference:

- a. A prebid conference, directed by the Architect/Engineer, will be held one week prior to the bid opening to discuss:

- (1) Structural concept.
- (2) Method and sequence of masonry construction.
- (3) Special masonry details.
- (4) Quality control requirements.
- (5) Material requirements.
- (6) Job organization.
- (7) Workmanship.

- b. Attendance is mandatory for all prospective:

- (1) General contractors.
- (2) Masonry subcontractors.
- (3) Brick suppliers.

NOTE:

1.02.C This requirement may be deleted if not necessary for the project due to bidders being knowledgeable with engineered brick masonry.

1.02.C.1.b Invitation to attend should be extended to others, such as the inspectors (local building department and other government agencies) and Owner.

2. Preconstruction Testing and Certification:

a. After award of the contract, the General Contractor shall:

(1) Within 14 days, submit to the Architect/Engineer for approval the name of the independent laboratory which will perform the site control tests and provide the certificates and test reports required in Section 1.03.

(2) Upon approval of the laboratory, certificates and test reports, and prior to any masonry construction, make arrangements for the following tests:

(a) Brick tests in accordance with preconstruction requirements, Section 1.02.A

(b) Mortar tests in accordance with mortar section.

b. Masonry work can begin only after approval of testing.

c. Testing is acceptable if test results indicate that materials meet the minimum requirements of Part II - Products.

d. Cost of preconstruction testing shall be borne by the General Contractor, 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.C.2 Inspection, laboratory and testing for quality control can be a responsibility of the Structural Engineer. If so, revise section.

3. Preconstruction Conference:

a. A preconstruction conference, directed by the Architect/Engineer, will be held after the award of the General Contract, but prior to beginning of masonry work to discuss:

(1) Structural concept.

(2) Method and sequence of masonry construction.

(3) Special masonry details.

(4) Standard of workmanship.

(5) Quality control requirements.

(6) Job organization.

b. Attendance is mandatory for:

(1) General contractor job superintendent.

(2) Masonry subcontractor job superintendent.

(3) Masonry subcontractor foreman.

(4) At least two masons.

(5) Authorized representative of the brick supplier.

(6) Mortar material suppliers.

NOTE:

1.02.C.3.b Invitations to attend should be extended to others, such as inspectors (local building department and other government agencies) and Owner.

D. Job Site Quality Control:

1. Site control brick and mortar tests:

- a. Use compressive strength of brick units and compressive strength of mortar cubes to control quality.
- b. Test brick in accordance with site control requirements, Section 1.02.A.
- c. Test mortar cubes in accordance with mortar section.
- d. Test five brick and three mortar cubes for each 100,000 brick or fraction thereof.
- e. Brick and mortar to be selected at random by the Architect/ Engineer.
- f. Site control data shall be acceptable if material exceeds specified strength.
- g. Cost of tests shall be borne by the General Contractor.

NOTE:

1.02.D.1.c Type M, S or N as specified in the mortar section. More than one mortar type may be specified. If so, provide sections to cover all requirements. Mortar design compressive strengths should be based on laboratory tests of mortar made from materials mixed to the proportion specification as required by the mortar section.

1.02.D.1.e As calculated by the Structural Engineer. May vary for different parts of the building. If so, provide sections to cover all design strengths.

****OR****

1. Site control brick and mortar batching:

- a. Use compressive strength of brick units and control on material proportions used in batching mortar to control quality.
- b. Test brick in accordance with site control requirements, Section 1.02.A.
- c. Control mortar batches to conform to proportion specification specified in mortar section.
- d. Test five brick for each 100,000 brick or fraction thereof.
- e. Site control data shall be acceptable if brick compressive strengths meet the requirements of Part II and mortar is batched to proportion specification.
- f. Cost of tests shall be borne by the General Contractor.

PART II - PRODUCTS

2.01 BRICK

A. Facing Brick:

1. *Delete Note and replace with:*

NOTE:

2.01.A.1 Grades and Types. Brick subject to the action of weather or soil, but not subject to frost action when permeated with water, shall be of grade MW or grade SW, and where subject to temperature below freezing while in contact with soil shall be grade SW. Brick used in loadbearing or shear wall construction shall comply with the dimensional and distortion tolerances specified for type FBS of ASTM C 216-_____. Where such brick do not comply with these tolerance requirements, the compressive strength of brick masonry shall be determined by prism tests.

PART III - EXECUTION

3.02 GENERAL ERECTION REQUIREMENTS

Delete Section 3.02.I in Technical Notes 11B Revised, and replace with the following Section 3.02.I and add Section 3.02.J.

I. Mortar Joint Thickness

1. Lay brick with _____-in. mortar joints, not to exceed 1/2 in. (12.7 mm).

NOTE:

3.02.I Coordinate joint thickness with brick specified in 2.01.A.2.

J. Construction Tolerances:

1. Maximum variation from plumb in vertical lines and surfaces of columns, walls and arrises:

- a. 1/4 in. (6.4 mm) in 10 ft. (3 m).
- b. 3/8 in. (9.6 mm) in a story height not to exceed 20 ft. (6 m).
- c. 1/2 in. (12.7 mm) in 40 ft. (12 m) or more.

2. Maximum variation from plumb for external corners, expansion joints and other conspicuous lines:

- a. 1/4 in. (6.4 mm) in any story or 20 ft. (6 m) maximum.
- b. 1/2 in. (12.7 mm) in 40 ft. (12 m) or more.

3. Maximum variation from level of grades for exposed lintels, sills, parapets, horizontal grooves and other conspicuous lines:

- a. 1/4 in. (6.4 mm) in any bay or 20 ft. (6 m).
- b. 1/2 in. (12.7 mm) in 40 ft. (12 m) or more.

4. Maximum variation from plan location of related portions of columns, walls and partitions:

a. 1/2 in. (12.7 mm) in any bay or 20 ft. (6 m).

b. 3/4 in. (19 mm) in 40 ft. (12 m) or more.

5. Maximum variation in cross-sectional dimensions of columns and thicknesses of walls from dimensions shown on drawings:

a. Minus 1/4 in. (6.4 mm).

b. Plus 1/2 in. (12.7 mm).

NOTE:

3.02.J These construction tolerances are for engineered brick masonry only, and are based on actual dimensions. They are intended for the sole purpose of protecting the structural integrity of engineered brick masonry elements and may not be adequate for establishing construction tolerances associated with esthetics or visual requirements.