



TECHNICAL NOTES on Brick Construction

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Technical Notes 11B - Guide Specifications for Brick Masonry, Part 3 Rev [Feb. 1972] (Reissued Sept. 1988)

INTRODUCTION

This *Technical Notes* contains the guide specifications in CSI format for Part III - Execution. Part I - General, and Part II - Products are in *Technical Notes* 11A Revised.

Guide Specification and Notes

PART III - EXECUTION

3.01 PREPARATION:

A. Wetting Brick:

1. Wet brick with absorption rates in excess of 30 g./30 sq. in./min. (30 g./194 cm²/min.) determined by ASTM C 67- _____, so that rate of absorption when laid does not exceed this amount.

2. Recommended procedure to insure that brick are nearly saturated, surface dry when laid is to place a hose on the pile of brick until the water runs from the pile. This should be done one day before brick are to be used. In extremely warm weather, place hose on pile several hours before brick are to be used.

B. Cleaning Reinforcement: Before being placed, remove loose rust, ice and other coatings from reinforcement.

NOTE:

3.01.A.1 Note requirements for cold weather, section 1.05.C.2.a, and section 1.03.B.3 for testing requirements.

3.02 GENERAL ERECTION REQUIREMENTS:

A. Pattern Bond:

1. Lay exposed masonry in running bond.

2. Bond unexposed masonry units in a wythe by lapping at least 2 in. (51 mm).

NOTE:

3.02.A.1 Alter if other than running bond required.

B. Joining of Work:

1. Where fresh masonry joins partially set masonry:

a. Remove loose brick and mortar.

b. Clean and lightly wet exposed surface of set masonry.

2. Stop off horizontal run of masonry by racking back 1/2 length of unit in each course.

3. Tothing is not permitted except upon written acceptance of the Architect/Engineer.

C. Tooling and Tuck Pointing:

1. Tooling:

- a. Tool exposed joints when "thumb-print" hard with a round jointer, slightly larger than width of joint.
- b. Trowel-point or concave-tool exterior joints below grade.
- c. Flush cut all joints not tooled.

2. Tuck pointing:

- a. Rake mortar joints to a depth of not less than 1/2 in. (12.7 mm) nor more than 3/4 in. (19 mm).
- b. Saturate joints with clean water.
- c. Fill solidly with _____ pointing mortar.
- d. Tool joints.

NOTE:

3.02.C Alter to allow other joints to meet architectural requirements.

3.02.C.2 Delete if not required.

3.02.C.2.c Specify proportions. Pointing mortar should be of same proportions as mortar in main part of wall, if known; if not, type N.

D. Flashing:

1. Clean surface of masonry smooth and free from projections which might puncture flashing material.
 - a. Place through-wall flashing on bed of mortar.
 - b. Cover flashing with mortar.

E. Weep Holes:

1. Provide weep holes in head joints in first course immediately above all flashing by: (a) Leaving head joint free and clean of mortar

****OR****

- (a) Placing and leaving sash cord in joint.

2. Maximum spacing: 24 in. (610 mm) o.c.

3. Keep weep holes and area above flashing free of mortar droppings.

F. Sealant Recesses:

1. Leave joints around outside perimeters of exterior doors, window frames and other wall openings:

- a. Depth: uniform 3/4 in. (19 mm).

- b. Width: 1/4 in. (6.4 mm) to 3/8 in. (9.5 mm).

G. Movement Joints:

1. Keep clean from all mortar and debris.

2. Locate as shown on drawings.

H. Cutting Brick:

1. Cut exposed brick with motor-driven saw.

****OR****

1. By other methods which provide cuts that are straight and true.

I. Mortar Joint Thickness:

1. Lay all brick with _____ in. joint.

NOTE:

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

3.03 NON-REINFORCED BRICK MASONRY

A. Brick Installation:

1. Lay brick plumb and true to lines.
2. Lay with completely filled mortar joints.
3. Do not furrow bed joints.
4. Butter ends of brick with sufficient mortar to fill head joints.
5. Rock closures into place with head joints thrown against two adjacent brick in place.
6. Fill vertical, longitudinal joints, except in cavity walls:
 - a. By parging either face of backing or back of facing.
- **OR****
 - a. By pouring the vertical joint full of grout.
- **OR****
 - a. Shoving alone.
7. Do not pound corners and jambs to fit stretcher units after they are set in position. Where an adjustment must be made after mortar has started to harden, remove mortar and replace with fresh mortar.

NOTE:

3.03.A If hollow units are specified, alter to conform to requirements of the units.

B. Cavity Walls:

1. Keep cavity in cavity walls clean by:
 - a. Slightly beveling mortar bed to incline toward cavity.
- **OR****
 - a. Placing wood strips with attached wire pulls on metal ties.
 - b. Before placing next row of metal ties, remove and clean wood strips.

2. As work progresses, trowel protruding mortar fins in cavity flat on to inner face of wythe.

C. Non-Bearing Partitions:

1. Extend from top of structural floor to bottom surface of floor construction above.
2. Wedge with small pieces of tile, slate or metal.
3. Fill topmost joint with mortar.

NOTE:

3.03.C Alter to local code requirements if suspended ceilings are used.

D. Structural Bonding:

1. Bond or anchor corners and intersections of loadbearing brick walls.
2. Structural bond multi-wythe non-reinforced brick walls with_____.
 - a. Extend headers not less than 3 in. (76 mm) into backing.
 - b. Maximum distance between adjacent headers: 24 in. (610 mm) either vertically or horizontally.
 - c. When a single header does not extend through wall, overlap headers from opposite sides of wall at least 3 in. (76 mm).
 - d. Minimum headers: 4%.

OR

- a. Provide minimum of one cavity wall tie for each 4 1/2 sq. ft. (0.42 m²) of wall surface.
- b. Stagger ties in alternate courses.
- c. Maximum distance between adjacent ties:
 - (1) Vertically: 24 in. (610 mm).
 - (2) Horizontally: 36 in. (920 mm).
- d. Embed ties in horizontal joints of facing and backing.
- e. Provide additional ties at openings:
 - (1) Maximum spacing around perimeter: 36 in. (920 mm).
 - (2) Install within 12 in. (305 mm) of opening.

OR

- a. Use continuous prefabricated joint reinforcement to bond multi-wythe walls; spaced not more than 16 in. (406 mm) vertically.

3. Stack bond:
 - a. Embed continuous No. 2 steel reinforcement or No. 9 gage wire in horizontal joints at vertical intervals not to exceed 16 in. (406 mm).
 - b. Provide not less than one longitudinal bar or wire for each 6 in. (152 mm) of wall thickness or fraction thereof.

NOTE:

3.03.D Note special bonding requirements for high-lift grout, section 3.05.B.

3.03.D.2 Masonry headers, metal ties or continuous joint reinforcement.

E. Anchoring:

1. Anchor exterior brick walls facing or abutting concrete members with dovetail, flat-bar or wire anchors inserted in slots built into concrete.
 - a. Maximum anchor spacing:
 - (1) Vertically: 24 in. (610 mm).

(2) Horizontally: 36 in. (920 mm).

b. Maintain a space not less than 1/2 in. (12.7 mm) wide between masonry wall and concrete members.

c. Keep space free of mortar or other rigid material to permit differential movement between concrete and masonry .

2. For intersecting bearing or shear walls carried up separately:

a. Regularly block vertical joint with 8-in. (203 mm) maximum offsets.

b. Provide joints with rigid steel anchors.

c. Space anchors not more than 4 ft. (1.2 m) apart vertically.

****OR****

a. When acceptable to the Architect/Engineer, eliminate blocking and provide rigid steel anchors spaced not more than 24 in. (610 mm) apart vertically.

3. Anchor non-bearing partitions abutting or intersecting other walls or partitions with:

a. Cavity wall ties at vertical intervals of not more than 24 in. (610 mm).

****OR****

a. Masonry bonders in alternate courses

4. Attach brick veneer to backing with metal veneer ties:

a. Use one tie for each 4 sq. ft. (0.37 m²) of wall area.

b. Maximum space between adjacent ties:

(1) Vertically and horizontally: 24 in. (610 mm).

c. Embed ties at least 2 in. (51 mm) in horizontal joint of facing.

d. Provide additional ties at openings:

(1) Maximum spacing around perimeter: 36 in. (914 mm).

(2) Install within 12 in. (305 mm) of opening.

NOTE:

3.03.E 4 Tie spacing is based on a design wind pressure of 20 psf (958 N/m²). Maximum spacing should be decreased for higher wind pressures. Recommended spacing for:

30 psf (1436 N/m²):

Vertically: 24 in. (610 mm)

Horizontally: 16 in. (406 mm)

40 psf (1913 N/m²):

Vertically: 18 in. (457 mm)

Horizontally: 16 in. (406 mm)

3.04 REINFORCED BRICK MASONRY:

A. Brick Installation:

1. Lay brick plumb and true to lines.

2. Lay with completely filled mortar joints.

3. Do not furrow bed joints.

4. Butter ends of brick with sufficient mortar to fill head joints.
5. Slightly bevel mortar bed to incline towards cavity.
6. Rock closures into place with head joints thrown against two adjacent brick in place.
7. Do not pound corners and jambs to fit stretcher units after they are set in position. Where an adjustment must be made after mortar has started to harden, remove mortar and replace with fresh mortar.

NOTE:

3.04.A If hollow units are specified, alter to conform to requirements of the units.

B. Forms and Shores:

1. Provide substantial and tight forms.
2. Leakage of mortar or grout is not permitted.
3. Brace or tie forms to maintain position and shape.
4. Do not remove forms and shores until masonry has hardened sufficiently to carry its own weight and other temporary loads that may be placed on it during construction:
 - a. For girders and beams: Minimum 10 days.
 - b. Under brick slabs: Minimum 7 days.

C. Placing Reinforcement:

1. Position metal reinforcement accurately.
2. Secure against displacement:
 - a. Hold vertical reinforcement firmly in place by means of frames or other suitable devices.
 - b. Horizontal reinforcement may be placed as brickwork progresses.
3. Spacing:
 - a. Minimum clear distance between longitudinal bars, except in columns: Nominal diameter of bar or 1 in. (25 mm).
 - b. Minimum clear distance between bars in columns: Not less than 1/2 times bar diameter or 1/2 in. (38 mm). 4
4. Minimum thickness of mortar or grout between brick and reinforcement: 1/4 in. (6.4 mm), except:
 - a. 1/4 - in. (6.4 mm) bars may be laid in 1/2-in.(12.7 mm) horizontal mortar joints.
 - b. No. 6 gage or smaller wires may be laid in 3/8-in. (9.5 mm) mortar joints.
5. Minimum width of collar Joints containing both horizontal and vertical reinforcement: 1/2 in. (12.7 mm) larger than sum of diameters of horizontal and vertical reinforcement.
6. Splice reinforcement or attach reinforcement to dowels by placing in contact and wiring.

7. Do not splice reinforcement at points other than shown on drawings, unless approved by the structural engineer.

8. Shape and dimension reinforcement as shown on drawings:

- a. Cold bend all bars.
- b. Do not straighten or repair in a manner that will injure material.
- c. Do not use bars with kinks or bends not shown on drawings.
- d. Reinforcement can be heated when entire operation is approved by structural engineer.

3.05 GROUTING:

A. Low-Lift Grouting:

1. Keep grout core clean from mortar and drippings.
2. Grout spaces less than 2 in. (51 mm) in width at intervals of not more than 24 in. (610 mm) in lifts of 6 to 8 in. (152 to 203 mm) as the wall is built.
3. In grout spaces more than 2 brick in thickness:
 - a. Place or float brick in grout.
 - b. Minimum grout between brick: 3/8 in. (9.5 mm).
4. Agitate or puddle grout during and after placement to insure complete filling.
5. Stop grout 1/2 in. (38 mm) below top of masonry:
 - a. If grouting is stopped for 1 hr. or more.
 - b. Except when completing grouting of finished wall.
6. If brick headers are used for ties in low-lift grouting space:
 - a. Maximum: 8% of wall area.

NOTE:

3.05.A.6 Using headers for tying wythes is not recommended; however, if selected, construction should conform to the requirements of this section.

B. High-Lift Grouting:

1. For running bond, provide one metal tie for each 3 sq. ft. (0.28 ma) of wall with maximum spacing:
 - a. Vertically: 16 in. (406 mm).
 - b. Horizontally: 24 in. (610 mm).
2. For stack bond, provide one metal tie for each 2 sq. ft. (0.19 m²) of wall with maximum spacing:
 - a. Vertically: 12 in. (305 mm).
 - b. Horizontally: 24 in. (610 mm).
3. Keep grout core clean from mortar and droppings.

4. Provide cleanout holes by omitting every other brick in bottom course on one side of wall.
5. Prior to closing cleanout holes and pouring grout, use high-pressure jet stream of water or high-pressure air to remove excess mortar from grout space and to clean reinforcement.
6. Do not plug cleanout holes until condition of area to be grouted has been approved.
7. Before pouring grout, plug cleanout holes with masonry units and brace against grout pressure.
8. Grout spaces 2 in. (51 mm) or more in width in lifts not exceeding 4 ft. (1.2 m) at intervals:
 - a. Coarse grout: Not more than 48 times the least clear dimension of grout space.

OR

 - a. Fine grout: Not more than 64 times the least clear dimension of grout space.

 - b. Not to exceed height of 12 ft. (3.7 m).
9. Do not place grout until the entire wall has been in place 3 days.
10. Vibrate or agitate grout during, and after placement to insure complete filling of grout space.
11. Stop grout 1 1/2 in. (38 mm) below top of masonry:
 - a. If grouting is stopped for 1 hr. or more.
 - b. Except when completing grouting of finished wall.
12. Provide grout blocks at convenient intervals to meet project requirements.

3.06 CLEANING:

- A. Cut out any defective joints and holes in exposed masonry and repoint with mortar.
- B. Clean all exposed unglazed masonry:
 1. Apply cleaning agent to sample wall area of 20 sq. ft. (2 m²) in location acceptable to the Architect/Engineer.
 2. Do not proceed with cleaning until sample area is approved by Architect/Engineer.
 3. Clean initially with stiff brushes and water.
 4. When cleaning agent is required:
 - a. Follow brick manufacturer's recommendations.
 - b. Thoroughly wet surface of masonry on which no green efflorescence appears.
 - c. Scrub with acceptable cleaning agent.
 - d. Immediately rinse with clear water.
 - e. Do small sections at a time.
 - f. Work from top to bottom.

g. Protect all sash, metal lintels and other corrodible parts when masonry is cleaned with acid solution.

h. Remove green efflorescence in accordance with brick manufacturer's recommendations.

NOTE:

3.06 If care is taken during laying and the wall is acceptable, the requirements of this section can be deleted.