
NAVFAC

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Preparing Activity: LANTNAVFACENGCOM

Based On UFGS-04200N

ITALIAN GUIDE SPECIFICATIONS

Use for ITALIAN projects only

SECTION 04200

UNIT MASONRY

04/03

NOTE: This guide specification is issued by the Atlantic Division, Naval Facilities Engineering Command for regional use in Italy.

NOTE: This specification covers three types of unit masonry; brick, clay block and concrete block. These are future subdivided as follows:

- Brick: Finished face brick and common building brick.
- Clay Block: Finished face clay block, unfinished hollow clay block.
- Concrete Block: Finished face concrete block and unfinished hollow concrete block.

Of these, the most widely used in Italy is the unfinished hollow clay block. It is used throughout Italy (and most of Europe) for bearing and non-bearing walls and as permanent centering in slabs. It can be plain or reinforced. It is one of the most common building materials in Italy. It has several advantages over concrete block. It is: readily available, more familiar to the masons, made to a higher compressive strength, made to more precise dimensions, less prone to shrinkage and made with many more cells, thus improving its insulating value.

Hollow concrete block is available but not widely used. No common standards similar to ASTM C90 or NCMA have been found, therefore, manufacturers' product literature must be consulted for technical characteristics. Also available in Italy, but not mentioned in this specification, is a low-density concrete block of unknown compressive strength and inconsistent appearance. It is not recommended for use on government projects. Concrete block meeting

certain minimum requirements may be used, however, the availability in the project area should be investigated prior to specifying their use.

Brick has been used in Italy since the Roman times. It has been used both as a back-up material and as a face brick. No common references such as those published by the Brick Institute of America have been found, therefore, more details and technical information is required to be included in the documents. The availability and quality of brick products varies across Italy and the project location should be considered in the materials selection.

Much of Italy (including Sigonella, Naples and Aviano) is included in seismic zones. Masonry walls can be integral part of the seismic design. Close and early coordination between the architect and the structural engineer and careful masonry product selection and detailing is required to successfully plan a masonry building in these zones.

NOTE: The following information shall be shown on the project drawings:

1. Locations and dimensions of each type of masonry work.
2. Color, texture, and size of brick and color of mortar if other than natural gray.
3. Bond pattern if other than running bond.
4. Through-wall flashing details.
5. Control joint and expansion joint locations and details.
6. Special brick shapes if required.
7. Compressive strength of units, mortar, grout, or entire assembly.
8. Reinforcing, ties, splices, and bond beam details.
9. Size and location of any pipes, ducts, or other embedded items.

Comments and suggestion on this specification are welcome and should be directed to the technical proponent of the specification. A listing of the

technical proponents, including their organization designation and telephone number, is on the Internet.

Use of electronic communication is encouraged.

Brackets are used in the text to indicate designer choices or locations where text must be supplied by the designer.

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

EUROPEAN COMMITTEE FOR STANDARDIZATION (EN)

EN 196-1	(1995) Methods of Testing Cement - Part 1: Determination of Strength
EN 196-2	(1995) Methods of Testing Cement - Part 2: Chemical Analysis of Cement
EN 196-3	(1995) Methods of Testing Cement - Part 3: Determination of Setting Time and Soundness
EN 196-4	(1995) Methods of Testing Cement - Part 4: Quantitative Determination of Constituents
EN 206	(2000) Concrete - Specification, Performance, Production and Conformity
EN 413-1	(1995) Masonry Cement - Part 1: Specification
EN 459-1	(2001) Building Lime - Part 1: Definitions, Specifications and Conformity Criteria
EN 459-2	(2001) Building Lime - Part 2: Test Methods
EN 932-1	(1997) Tests for General Properties of Aggregates - Part 1: Methods for Sampling
EN 932-3	(1997) Tests for General Properties of Aggregates - Part 3: Procedure and Terminology for Simplified Petrographic Description
ENV 1996-1-1	(1995) Eurocode 6: Design of Masonry Structures - Part 1-1: General Rules for

Buildings - Rules for Reinforced and
Un-Reinforced Masonry

ENV 10080	(1996) Steel for the Reinforcement of Concrete, Weldable, Ribbed Reinforcing Steel B 500 - Technical Delivery Conditions for Bars, Coils and Welded Fabric
EN 10218-1	(1994) Steel Wire and Wire Products - General Part 1: Tests Methods
EN 10218-2	(1997) Steel Wire and Wire Products - General Part 1: Wire and Dimensions and Tolerances
EN 10142	(2000) Continuously Hot-Dip Zinc Coated Low Carbon Steel Sheet and Strip for Cold Forming - Technical Delivery Conditions
EN 10143	(1993) Continuously Hot-Dip Zinc Coated Low Carbon Steel Sheet and Strip for Cold Forming - Tolerances on Dimensions and Shape

INTERNATIONAL STANDARDS ORGANIZATION (ISO)

ISO 9447	(1990) Cold Rolled Stainless Steel Narrow Strip - Tolerances on Dimensions and Form
ISO 1190-1	(1982) Copper and Copper Alloys - Code of Designation - Part 1: Designation of Materials

ENTE NAZIONALE ITALIANO DI UNIFICAZIONE (UNI)

UNI 8942/1	(1986) Products of Brick for Walls - Terminology and System of Classification
UNI 8942/2	(1986) Products of Brick for Walls - Limits of Acceptance
UNI 8942/3	(1986) Products of Brick for Walls - Test Methods
UNI 9418	(1998) Fresh Concrete - Determination of Consistency - Slump Test
UNI 9858	(1991) Concrete, Presentation, Production Placement in Work and Criteria of Conformity

MINISTERIAL DECREE (DM)

DM 20/11/87

(1987) Decree of the Minister of the Interior (Types of Mortar for Use on Buildings)

MINISTERIAL CIRCULAR (CM)

CM 91

(1961) Circular 91 of the Minister of Public Works (Fire Resistance of Building Materials)

1.2 SUBMITTALS

NOTE: Submittals must be limited to those necessary for adequate quality control. The importance of an item in the project should be one of the primary factors in determining if a submittal for the item is required.

A "G" following a submittal item indicates that the submittal requires Government approval. Some submittals are already marked with a "G". Only delete an existing "G" if the submittal item is not complex and can be reviewed through the Contractor's Quality Control system. Only add a "G" if the submittal is sufficiently important or complex in context of the project.

Submit the following in accordance with section entitled "Submittal Procedures."

SD-02 Shop Drawings

Reinforcing Steel

Movement joints

Fabricated steel plate

Indicate splicing, laps, shapes, dimensions, and details of movement joints, reinforcing steel, and accessories. Include details of anchors, adjustable wall ties, positioning devices, bond beams, and lintels. Do not scale drawings to determine lengths of bars.

SD-03 Product Data

Masonry units

Masonry accessories

Reinforcement

Flashing

Pre-mixed mortar

Control joints

Expansion joints

Submit for each type.

SD-04 Samples

Masonry units

Mortar color

Submit two sets of each type masonry units, showing full range of color, texture, finish, and dimensions and two samples of each color of mortar.

Masonry panel

**NOTE: Require sample panels on projects with
exposed exterior masonry veneer.**

Anchors

Wall Ties

Submit two of each type of anchor and wall tie used.

SD-05 Design Data

Pre-mixed mortar

SD-06 Test Reports

Unit strength method

Mortar properties

Grout

Efflorescence test

Submit efflorescence test reports on masonry units that are to be exposed to weathering.

Grout strength

Mortar strength and properties

SD-07 Certificates

Building brick

Facing brick

Concrete masonry units

SD-08 Manufacturer's Instructions

Masonry cement

When masonry cement is used, submit the manufacturer's printed instructions on proportions of water and aggregates and on mixing to obtain the type of mortar required.

1.3 MASONRY PANEL REQUIREMENTS

NOTE: Use the first bracketed option for construction projects consisting of concrete masonry unit and brick veneer exterior walls. Use the second bracketed option for cold-formed steel framing and brick veneer construction. Coordinate whether rubber washers or sealant is used at sheathing and anchor penetrations.

[At the job site submit for approval by the Contracting Officer, a sample masonry panel approximately 1200 mm long by 1200 mm high 4 feet long by 4 feet high showing the workmanship, coursing, bond, weep holes, flashing, thickness, anchors, joint reinforcing, wall ties, rigid-board insulation, intersection of walls, bond beams, expansion and control joints, and tooling of joints, range of color, texture of masonry, and mortar color. The sample panel shall be protected from damage and shall remain at the site until masonry work is complete and approved, at which time the panel shall be removed from the site. Masonry work shall match the approved sample.]

[At the job site submit for approval by the Contracting Officer, a sample masonry panel approximately 1200 mm long by 1200 mm high 4 feet long by 4 feet high showing the workmanship, coursing, bond, weep holes, flashing, cold-formed steel framing, insulation, fiberglass-faced gypsum sheathing, [rubber washers,] [sealant,] masonry ties and anchors, and tooling of joints, the range of color and texture of brick veneer, and the color of mortar. The sample panel shall be protected from damage and shall remain at the site until masonry work is complete and approved, at which time the panel shall be removed from the site. Masonry work shall match the approved sample.]

1.4 QUALITY ASSURANCE

1.4.1 Appearance

Do not change source or supply of materials after work has started if the appearance of the finished work would be affected.

1.4.2 Testing

Masonry strength shall be determined in accordance with EN 196-1 and the cost of testing shall be paid by the Contractor.

1.5 DELIVERY, STORAGE, AND HANDLING

Deliver cementitious materials to the site in unbroken containers, plainly marked and labeled with manufacturers' names and brands. Store cementitious materials in dry, weathertight sheds or enclosures and handle so as to prevent entry of foreign materials and damage by water or dampness. Store masonry units off the ground and handle with care to avoid chipping and breakage. Protect materials from damage and, except for sand, keep dry until used. Cover sand to prevent intrusion of water and foreign materials and to prevent drying. Do not use materials containing frost or ice. Store concrete masonry units at the site for a minimum of 28 days for air cured units, 10 days for atmospheric steam or water cured units, and 3 days for units cured with steam at a pressure of 800 to 1000 kPa 120 to 150 psi and at a temperature of 180 to 185 degrees C 350 to 365 degrees F for at least 5 hours. Protect moisture controlled units from rain and ground water.

[1.6 ENVIROMENTAL CONDITIONS

NOTE: Most Mediterranean areas are temperate and are not likely to require extraordinary cold weather precautions. Northern Italy and other European areas, however, may require special procedures. No European standard similar to ACI 530.1 was available as of this writing. If necessary include the following:

1.6.1 Cold Weather Construction

Do not lay masonry when the air temperature is below 4 degrees Centigrade and falling, or when it appears that the air temperature will drop to 4 degrees Centigrade or below within 24 hours, unless the work is protected from freezing as specified below. Work will not be permitted with or on frozen materials. Comply with the requirements specified below for the respective air temperature.

1.6.1.1 Air Temperature 4 Degrees to 0 Degrees Centigrade

Heat sand or mixing water to produce mortar temperature between 4 and 50 degrees Centigrade.

1.6.1.2 Air Temperature 0 Degrees to -4 Degrees Centigrade

Heat sand and mixing water to produce mortar temperature between 4 and 50 degrees Centigrade.

1.6.1.3 Air Temperature -4 Degrees to -7 Degrees Centigrade

Heat sand and mixing water to produce mortar temperature between 4 and 50 degrees Centigrade. Provide auxiliary heat sources on both sides of walls under construction. Use windbreaks when wind is in excess of 25 kilometers per hour.

1.6.1.4 Air Temperature -7 Degrees Centigrade and Below

Heat sand and mixing water to produce mortar temperature between 4 and 50 degrees Centigrade. Provide enclosures and auxiliary heat to maintain air temperature above 0 degrees Centigrade on both sides of walls under construction. Ascertain that temperatures of masonry units are not less than -7 degrees Centigrade when units are laid.

1.6.2 Cold Weather Protection

Protect newly laid masonry as specified below for the respective Mean Daily Air Temperature (MAT).

1.6.2.1 MAT 4 to 0 Degrees Centigrade

Protect masonry from rain and snow by covering top 1.20 meters with weather-resistant membrane for 24 hours after laying.

1.6.2.2 MAT 0 to -4 Degrees Centigrade

Completely cover newly-laid masonry with insulating blankets and weather-resistive membrane for 24 hours.

1.6.2.3 MAT -7 Degrees Centigrade and Below

Maintain temperature of masonry above 0 degrees Centigrade for 24 hours by providing enclosures and supplementary heat or other approved means.

1.7 SCHEDULING

Coordinate masonry work with the work of other trades to accommodate built-in items and to avoid cutting and patching.

1.8 SPARE VIBRATOR

NOTE: On small projects, requirement for spare vibrator may be deleted.

Maintain at least one spare vibrator on site at all times.

1.9 BRACING

Provide bracing and scaffolding necessary for masonry work. Design bracing to resist wind pressure as required by local code.

1.10 SEISMIC REQUIREMENT

NOTE: Use the following paragraph for projects being constructed in seismic zones. Refer to minimum seismic reinforcing required in T1-809-04.

In addition to design requirements of Eurocode, the Contractor shall provide additional seismic reinforcement[as detailed on the drawings][as indicated][]. The total minimum reinforcing percentage for structural walls shall be 0.20 percent and non-structural walls shall be 0.15 percent. Not less than 1/3 of the total minimum reinforcing percentage shall be used in either direction horizontal and vertical. The maximum spacing of reinforcing bars shall be as follows:

<u>Wall Type</u>	<u>Vertical</u>	<u>Horizontal</u>
Structural	600 mm	1200 mm
Non-structural	1200 mm	2000 mm
<u>Wall Type</u>	<u>Vertical</u>	<u>Horizontal</u>
Structural	24 inches	48 inches
Non-structural	48 inches	80 inches

Bond beams are required at the top of footings, at the bottom and top of openings at roof and floor levels above and below wall openings, and at the top of parapet walls.

PART 2 PRODUCTS

2.1 MASONRY UNITS

2.1.1 Building Brick

NOTE: Brick sizes vary from one manufacturer to the next. Consult manufacturers' product literature prior to developing masonry details including building brick. Building brick is recommended only for above grade, non-structural, concealed work. The typical range of semi-full (=/< 15% void) bricks is:

Height: 5, 5.5 and 6 cm
Width: 11.5, 12, 13, and 14 cm
Length: 23 through 26 cm

Not all sizes are available in all locations.
Consult manufacturers product literature.

NOTE: If larger units, such as utility brick are required, change the specified dimensions. If nominal dimensions are used, they should be so noted.

Building brick shall be [_____]. [Color, texture, and range of building brick provided in the exterior face of walls shall match the brick [on display at [_____]] [indicated].]

2.1.2 Facing Brick

NOTE: Choose one of the following options.

NOTE: Facing brick sizes vary widely from one manufacturer to the next. Consult manufacturers' product literature prior to developing masonry details including facing brick. Brick is not categorized by strength, size or absorption rate. Facing brick is recommended only for above grade, non-structural exposed work.

2.1.2.1 Full Brick

Natural clay units less than or equal to 15% void meeting the requirements of UNI 8942/1, UNI 8942/2 and UNI 8942/3.

2.1.3 Hollow Clay Block (Vertical) (Blocchi)

NOTE: Hollow clay block is available in "load bearing" categories. However, seismic design criteria in most of Italy and Spain require significant horizontal reinforcing in bearing walls that may be difficult to achieve in hollow clay block. Consultations with a structural engineer and review of product literature is advised prior to using hollow clay block for bearing walls.

NOTE: Hollow clay block with vertical cavities is used for walls requiring a thickness greater than 200 mm. Thinner partitions (from 80 mm to 250 mm) are often made of hollow clay units with horizontal cavities. These units are not reinforced.

Extruded natural hollow clay units of modular dimensions and kiln cured meeting the requirements of UNI 8942/1, UNI 8942/2, and UNI 8942/3, with vertical cavities. Height: 18.50 mm, length: 500 mm, thickness: [20] [25] [30] mm [as indicated].

- a. Hollow, non-load bearing (greater than 55% void) BF.
- b. Semi-full Type A, (15% to 45% void) BS (A), load bearing.
- c. Semi-full Type B, (45% to 55% void) BS (B), load bearing.

2.1.4 Hollow Clay Block (Horizontal) (Tavelloni)

Extruded natural hollow clay units of modular dimensions and kiln cured meeting the requirements of UNI 8942/1, UNI 8942/2, UNI 8942/3 with horizontal cavities. Non-load bearings. Height: 25 cm, length: 25 cm, thickness: [8] [10] [12] [15] [20] [25] cm [as indicated].

2.1.5 Concrete Masonry Units

NOTE: No European technical norms for concrete block have been found. Instead, specify the technical characteristics of the block available in the area of the project. Not all block types and strengths are available in all markets. Consult manufacturers' product literature. Some manufacturers produce concrete masonry units for use as reinforced masonry in seismic zones. The following is an example of one manufacturer with facilities in northern Italy and Sicily, but not the Naples area.

**Paaver Construzioni, S.p.A. (Product types listed above)
via Nociaccio, 10
51019 Ponte Buggianese (Pistoia)
Tel: 0572/63 5555
Fax: 0572/63 5554**

NOTE: Hollow CMUs are available in a variety of densities. The higher densities are more resistant to moisture transmission. Density will vary among manufacturers. Consult product literature for product availability.

Units of modular dimensions and air, water, or steam cured. [Surfaces of units which are to be plastered or stuccoed shall be sufficiently rough to provide bond]; [elsewhere,] [exposed surfaces of units shall be smooth and of uniform texture].

- a. Hollow Non-Load Bearing Units: Size: w = 120 [200] [250] [300] mm [as indicated], h = 200 mm, l = 500 mm. Fire resistance: REI 120. Weight: 11 Kg. Density: 900 [1400] [1600] Kg/M3. Type: B12-3P.
- b. Hollow Load-Bearing Units (for reinforcing): Size: w = 120 [200] [250] [300]mm [as indicated], h = 200 mm, l = 500 mm. Fire resistance: REI 180. Weight: 18 Kg. Density: 900 [1400] [1600] Kg/M3. Type: B20-2 FORI.
- c. Hollow Load Bearing Units (for reinforcing and use in seismic zones): Size: w = 250 mm [as indicated], h = 200 mm, l = 500 mm. Fire resistance: REI 180. Weight: 20 Kg. Density: 900 [1400] [1600] Kg/M3. Type: B25-4P.
- d. Special Shapes: Provide special shapes such as closures, header units, and jamb units as necessary to complete the work. Special shapes shall conform to the requirements for the units with which they are used.

Products made by the following manufacturer meet the requirements of these specifications:

Paaver Construzioni, S.p.A. (Product types listed above)
 via Nociaccio, 10
 51019 Ponte Buggianese (Pistoia)
 Tel: 0572/63 5555
 Fax: 0572/63 5554

Not every product of this manufacturer is implied to meet the requirements of this specification.

NOTE: Typically, exterior concrete masonry walls in Europe are finished with stucco. This greatly enhances resistance to moisture transmission. This approach or the use of outer wythe of brick is recommended rather than relying on water repellent admixtures or spayed-on finishes. Product literature does not refer to polymeric additives used in concrete masonry blocks. This approach should not be relied upon for moisture protection.

2.1.6 Precast Concrete Lintels

UNI 9858 for flexural and shear strength. Same materials and surface texture as adjacent masonry units, with a 28 day compressive strength of not less than 20 MPa 3000 psi. Provide reinforcing as indicated. Provide lintels of sizes indicated, with at least 200 mm 8 inches of bearing at each end.

2.1.7 Flue Linings and Thimbles

Linings and thimbles to be free from fractures. Sizes and shapes shall be as indicated.

2.2 MORTAR

2.2.1 Mortar Properties

NOTE: As of this writing, the Eurocode 6 is voluntary and not yet adopted by Italy. Ministerial Decree 20 November 1987 of the Minister of the Interior, Republic of Italy, describes four classes of mortar:

Type	Class			
	M1 Cement	M2 Cement	M3 Composite	M4 Hydraulic
Compressive Strength (N/mm ²)	12	8	Good	Best
Workability	Poor	Low	Good	Poor
Modulus of elasticity	High	Good	Low	Poor
Resistance to Efflorescence	Poor	Low	Good	Best
Durability	High	Good	Low	Poor
Permeability	Low	Medium	Higher	Highest
Sand/cement	3/1	4/1	5/1	9/1

Use type M1 for reinforced masonry and where a high compressive strength or high degree of lateral load resistance is required. For other uses M2 is recommended. Consider the use of poured-in-place concrete for walls in contact with the ground. For masonry walls in contact with the ground, consult manufacturer of masonry units and mortar for the availability of moisture resisting additives.

DM 20/11/87, Type M1 for reinforced masonry, load-bearing walls, shear walls; Type M2 for non-load bearing partitions; Type [____] with [_____] moisture resisting additive for foundation walls [and piers] [basement walls]. [Provide air content of not less than 11 percent]. [Provide colored mortar as indicated, add metal oxide pigment (< 10% of the

weight of the cement) to obtain the mortar color indicated. Carbon black <2% by weight.]. Compressive strength =/> [____] N/mm².

2.2.1.1 Portland Cement

EN 196-1, EN 196-2, EN 196-3, EN 196-4.

2.2.1.2 Hydrated Lime

EN 459-1, EN 459-2. [Hydrated lime in mortar for exterior brickwork shall be white.]

2.2.1.3 Masonry Cement

EN 196-2. Containers shall bear complete instructions for proportioning and mixing to obtain the required types of mortar.

2.2.1.4 Sand

EN 932-1, EN 932-3. [Sand in combination with cementitious materials shall produce a mortar of the specified color.]

2.2.1.5 Water

Clean, potable, and free from substances which could adversely affect the mortar.

2.2.2 Pre-Mixed Mortar

- a. "Incoplast IMC" cement masonry mortar; portland cement, lime, ground pozzolan (0-3 mm) and organic additives. Resistance to compression =/> 10 N/mm²; by:

Sakrete Incoplast, S.r.l.
via di Salone, 323
00010 Roma
Tel: 06/41 90 267
Fax: 06/41 30 246

- b. "FerriMix Muratura F-V" cement masonry mortar; resistance to compression =/> 90 Kg/cm², resistance to bending 30 Kg/cm², granule size 0-2 mm; by:

Ferri, S.r.l.
via Emilia Ovest, 58/B
43036 Fidenza (PR)
Tel: 0524/520 312
Fax: 0524/520 314

- c. "CIMAX MAL 300" cement masonry mortar; hydrated lime, portland cement, chemical additives to improve workability. Granule size 0-3 mm, resistance to compression 92 Kg/cm², by:

Calci Idrate Marcellina, S.p.a.

Locale Cesalunga
00010 Marcellina (RM)
Tel: 0774/42 4487
Fax: 0774/42 5166

2.3 GROUT

UNI 9858, fine and coarse. Slump between 200 and 280 mm 8 and 11 inches. Provide minimum grout strength of 13,800 kPa 2000 psi in 28 days, as tested by UNI 9418.

2.3.1 Admixtures

NOTE: A grouting admixture may be desirable when concrete masonry and clay brick units are highly absorbent to reduce early water loss, promote bonding, and produce slight expansion to help ensure complete filling of cavities.

Do not use air-entrainment, anti-freeze, or chloride admixtures.

2.4 MASONRY ACCESSORIES

2.4.1 Horizontal Joint Reinforcement

NOTE: Various combinations of wire sizes are available and are usually designated as follows:

	Long. wires	Cross wires
Standard	3.8 mm	3.8 mm
Heavy Duty	4.8 mm	3.8 mm
Extra Heavy Duty	4.8 mm	4.8 mm

Reinforcement made with 4.2 mm 8 gage wire is considered special and is not available from all manufacturers.

Fabricate from cold drawn steel wire, EN 10218-1, EN 10218-2 Wire shall be hot-dipped galvanized after fabrication in accordance with EN 10142 and EN 10143. Reinforcement shall be truss type with two or more longitudinal wires welded to a continuous diagonal cross wire, or ladder type with perpendicular cross wires not more than 400 mm 16 inches o.c. Provide flat sections 3 m 10 feet long, and preformed corners and tees approximately 800 mm 30 inches long. Overall width shall be approximately 50 mm 2 inches less than nominal thickness of wall.

2.4.1.1 Single-Wythe

For single-wythe walls and partitions, provide two 3.8 mm 0.1483 inch longitudinal wires and 3.8 mm cross wires.

2.4.1.2 Brick-Faced or Composition Walls

For brick-faced or composition walls, provide three [(3.8 mm) (0.1483 inch)] [4.8 mm 3/16 inch] longitudinal wires, one for each face shell of concrete masonry units and one for the brick wythe, and [[3.8 mm] [4.8 mm] 3/16 inch] cross wires.

2.4.1.3 Cavity Walls

NOTE: Choose one of the following options and Add:
"Cavity wall reinforcing shall have integral drip
located in the cavity."

NOTE: Use vertically adjustable ladder type
reinforcing at cavity walls in lieu of three
longitudinal wires.

[For cavity walls, provide truss type reinforcing utilizing three [3.8 mm 0.1483 inch] [4.8 mm 3/16 inch] longitudinal wires, one for each face shell of concrete masonry units and one for the brick wythe, and [[3.8 mm] [4.8 mm] 3/16 inch] cross wires.]

[For cavity walls, provide vertically adjustable ladder type consisting of two [3.8 mm 0.1483 inch)] [4.8 mm 3/16 inch] longitudinal wires for the inner wythe, [4.8 mm 3/16 inch] cross wires either winged loop or eye-section receivers, and 4.8 mm 3/16 inch wire hook type box ties or rectangular pintle ties at not more than 400 mm 16 inches o.c. Pintles shall have two vertical legs. Maximum play between pintles and eyes shall be 2 mm 1/16 inch. Maximum vertical misalignment between bed joints of brick and the joint reinforcement shall be 32 mm 1.25 inches. Provide one tie for every 0.16 square meters 1.78 square feet of wall area, 400 mm 16 inches o.c. both ways.]

2.4.2 Anchors and Wall Ties

NOTE: Industry standard rigid steel anchor 6 mm
thick by 25 mm wide by 600 mm long with 75 mm 1/4
inch thick by one inch wide by 24 inches long with 3
inch bends.

Provide approved designs of stainless steel, ISO 9447, Type 304, zinc-coated steel, or noncorrosive metal having the equivalent total strength of steel types. Zinc coat steel by the hot-dip process after fabrication to a minimum of 35 grams 1.25 ounces of zinc per square foot of surface in accordance with EN 10142 and EN 10143.

- [a. Rigid steel anchors: Not less than [25 mm] [35 mm] wide, [5 mm] [6 mm] thick, and [450 mm] [600 mm] long [one inch] [1 1/2 inches] wide, [3/16] [1/4] inch thick, and [18] [24] inches long with each end bent not less than 50 mm 2 inches.
- b. Steel eyelet anchors with wire ties: Steel eyelet anchor shall be self-drilling fastener with [15.6] [25] [50] mm [5/8] [one] [2] inch barrel for [15.6 gypsum board] [25] [50] mm [5/8 inch gypsum board] [one] [2] inch insulation] anchored directly to steel stud. Wire tie shall be not lighter than 6 gage and provide vertical adjustment.
- c. Dovetail, flat bar or wire anchors: flat bar: sheet steel, not lighter than 16 gage, and 22 mm 7/8 inch wide, with end turned up 6 mm 1/4 inch. Wire: not lighter than 6 gage, 22 mm 7/8 inch wide with wire looped and closed. Dovetail slots and inserts are specified in Section 03300, "Cast-In-Place Concrete."
- [d. Fabricated steel plate anchors: Stainless steel plate shall be 3 mm thick, 75 mm wide, [_____] mm long with a 9 by 38 mm 1/8 inch thick, 3 inches wide, [_____] inches long with a 3/8 by 1 1/2 inch vertical slot provided for attachment of triangular wire ties.]

NOTE: Regarding the text below, do not use corrugated metal ties in cavity walls. These ties are very thin and prone to corrosion. These ties are generally used in residential construction.

- [e. Corrugated metal ties: Not less than 22 mm wide by approximately 175 mm long and not lighter than 22 gage.]

2.4.3 Fastenings

Build in bolts, metal wall plugs, and other metal fastenings furnished under other sections for securing furring and other items.

2.4.4 Reinforcing Bars

ENV 10080.

2.4.4.2 Bar Positioners

Provide positioners that prevent displacement of reinforcing during construction.

2.4.5 Through-Wall Flashing

NOTE: Require flashing in exterior masonry walls, including single-wythe construction, at all obstructions such as bond beams, sills, lintels, and

concrete tie beams. The wall design and detailing must conform to National Concrete Masonry Association (NCMA) publications: TEK 13A, "Details for Building Dry Concrete Masonry Walls"; TEK 53, "Design of Concrete Masonry for Crack Control"; TEK 126, "Flashing Concrete Masonry"; BIA Technical Notes 7 for water penetration, resistance; and BIA Technical Notes 18A for crack control. Show locations and details on project drawings.

Provide one of the following types [except that flashing indicated to terminate in reglets shall be metal or coated-metal flashing] [and] [except that the material shall be one which is not adversely affected by dampproofing material.]

- a. Coated-Copper Flashing: 0.2 kg 7 ounce, electrolytic copper sheet, uniformly coated on both sides with acid proof, alkali proof, elastic bituminous compound. Factory apply coating to a weight of not less than 1.8 kg per square meter 6 ounces per square foot (approximately 0.9 kg per square meter 3 ounces per square foot on each side).
- b. Copper or Stainless Steel Flashing: Copper, ISO 1190-1, minimum 450 g 16 ounce weight; stainless steel, ISO 9447, .4 mm 0.015 inch thick. Provide with factory-fabricated deformations that mechanically bond flashing against horizontal movement in all directions. Deformations shall consist of dimples, diagonal corrugations, or a combination of dimples and transverse corrugations.

NOTE: Regarding the text below, reinforced membrane flashing should only be an option for residential construction. Do not use polyester film flashing on any other type construction projects.

- c. Reinforced Membrane Flashing: Polyester film core with a reinforcing fiberglass scrim bonded to one side. The membrane shall be impervious to moisture, flexible, and not affected by caustic alkalis. The material, after being exposed for not less than 1/2 hour to a temperature of 0 degrees C 32 degrees F, shall show no cracking when, at that temperature, it is bent 180 degrees over a 2 mm 1/16 inch diameter mandrel and then bent at the same point over the same size mandrel in the opposite direction 360 degrees.

2.4.6 Weep Holes

NOTE: Include weep holes and dampproofing requirements in geographic areas where these are acceptable practices. Specify dampproofing in

Division 7 of the project specification for projects utilizing concrete masonry unit interior wythe cavity walls. Now that masonry wall cavities are usually at least half full of rigid board insulation, and the backup wythe is usually complete before the brickwork is started, the wood strip method of keeping the cavities clean is neither practicable nor effective. The specified method for concrete masonry unit and brick cavity wall is effective, but may be deleted if the specifier is reluctant to require it. Care must be taken (1) to prevent damage to mortar joints, especially adjacent to the washout holes, and (2) to prevent accumulation of water at the bottom of the wall. The cavities must be inspected to verify that they are clean and functional.

Where ever through-wall flashing occurs, provide weep holes to drain flashing to exterior. Weep holes shall be clear round holes not less than 6 mm in diameter and 600 mm o.c.

2.4.7 Synthetic Rubber Washers

Rubber washers shall be provided between veneer anchors and the [fiberglass-faced gypsum sheathing] [moisture barrier] on the outside face.

2.4.8 Sealant

Sealant as specified in Section 07920, "Joint Sealants."

2.4.9 Fiberglass-Faced Gypsum Sheathing

Fiberglass-faced gypsum sheathing shall be as specified in Section 09250, "Gypsum Board."

2.5 SOURCE QUALITY CONTROL

2.5.1 Efflorescence Test

Conduct efflorescence tests on masonry units that are to be exposed to weathering. Schedule tests far enough in advance of starting masonry work to permit retesting if necessary. Test five pairs of specimens of each type of masonry unit for efflorescence in accordance with UNI 8942/3. If any pair is rated "effloresced," reject the units represented by the samples.

2.5.2 Unit Strength Method

Compute compressive strength of masonry system "Unit Strength Method," EN 196-1. Submit calculations and certifications of unit and mortar strength.

2.5.3 Prism Test

Submit test reports on three prisms in accordance with EN 196-1.

PART 3 EXECUTION

3.1 PREPARATION

Prior to start of work, masonry inspector shall verify the applicable conditions. The Officer in Charge of Construction will serve as inspector or will select a masonry inspector.

3.1.1 Protection

- a. Stains: Protect exposed surfaces from mortar and other stains. When mortar joints are tooled, remove mortar from exposed surfaces with fiber brushes and wooden paddles. Protect base of walls from splash stains by covering adjacent ground with sand, sawdust, or polyethylene.
- b. Loads: Do not apply uniform loads for at least 12 hours or concentrated loads for at least 72 hours after masonry is constructed.
- c. Provide temporary bracing as required.

3.1.2 Surface Preparation

Surfaces on which masonry is to be placed shall be smooth, clean, and free of foreign substances when mortar is applied.

3.2 FIELD QUALITY CONTROL

3.2.1 Mortar Strength and Properties

EN 196-1, for the first 3 consecutive days, and each third day thereafter.

3.2.2 Grout Strength

EN 206, for the first 3 consecutive days, and each third day thereafter, or each batch of ready-mixed grout.

3.2.3 Prism Test

Make at least one prism test sample for each 465 square meters but not less than three such samples for any building.

3.3 WORKMANSHIP

Comply with ENV 1996-1-1. Carry masonry up level and plumb. Furnish and use story poles or gage rods throughout the work. Changes in coursing or bonding after the work is started will not be permitted. Do not carry one section of the walls up in advance of the others. Step back unfinished work for joining with new work. Tothing will not be permitted. Check heights of masonry at each floor and at sills and heads of openings to maintain the level of the walls. Build in door and window frames, louvered

openings, anchors, pipes, ducts, and conduits as the masonry work progresses. Fill spaces around metal door frames solidly with mortar. Handle masonry units with care to avoid chipping, cracking, and spalling of faces and edges. Drilling, cutting, fitting, and patching to accommodate the work of others shall be performed by masonry mechanics. Cut masonry with masonry saws for exposed work. Structural steelwork, bolts, anchors, inserts, plugs, ties, lintels, and miscellaneous metalwork specified elsewhere shall be placed in position as the work progresses. Provide chases of approved dimensions for pipes and other purposes where indicated and where necessary. Cover tops of exposed walls and partitions not being worked on with a waterproof membrane secured in place and extended down at least 600 mm 2 feet on both sides. Inspect scaffolding regularly to ensure that it is amply strong, well braced, and securely tied in position. Do not overload scaffolding.

3.4 MORTAR MIXING

Measure mortar materials in .0283 cu. m 1 cu. ft. containers to maintain control and accuracy of proportions. Do not measure materials with shovels. Mix mortar in a mechanical batch mixer for not less than 3 nor more than 5 minutes after all ingredients are in so as to produce a uniform mixture. Add water gradually as required to produce a workable consistency.

Do not load mixer beyond its rated capacity. Keep mortar boxes, pans, and mixer drums clean and free of debris and dried mortar. Retemper mortar which has stiffened because of evaporation by adding water and mixing to obtain a workable consistency. Do not use or retemper mortar which has not been placed in final position within 2 1/2 hours after the initial mixing. Do not use antifreeze compounds, salts, or other substances to lower the freezing point of mortar.

NOTE: For single-wythe, concrete masonry unit exterior walls, specify water-repellant admixture for both the masonry units and the mortar.

- a. Mortar: Mix mortar in accordance with EN 413-1 to obtain type mortar required. [Where colored mortars are required, pigments may be added at the site or provided as part of prepackaged mortar mix.] When masonry cement is provided, conform to masonry cement manufacturer's printed mixing instructions.
- b. Grout: EN 206. Provide fine grout in grout spaces less than 50 mm 2 inches in any horizontal dimension or in which clearance between reinforcing and masonry is less than 20 mm 3/4 inch. Provide coarse grout in grout spaces 50 mm 2 inches or greater in all horizontal dimensions provided the clearance between reinforcing and masonry is not less than 20 mm 3/4 inch.

3.5 MORTAR JOINTS

Uniform thickness of 10 mm 3/8 inch unless otherwise indicated. Tool exposed joints and the exterior joints of the interior wythe of cavity walls slightly concave with a round or other suitable jointer when the

mortar is thumbprint hard. For horizontal joints, jointers shall be at least 300 mm 12 inches long for brickwork and 600 mm 16 inches long for concrete masonry. Jointers shall be slightly larger than the width of the joint so that complete contact is made along the edges of the units, compressing and sealing the surface of the joint. Except for the exterior joints of the interior wythe of cavity walls, strike flush joints that will not be exposed. Tool vertical joints first. Brush joints to remove all loose and excess mortar. Horizontal joints shall be level; vertical joints shall be plumb and in alignment from top to bottom of wall within a tolerance of plus or minus 10 mm in 10 m 1/2 inch in 40 feet.

3.6 TOLERANCES

Masonry work shall be within the following limits:

- a. [Pilasters] [and] [Columns]: 6 mm 1/4 inch from true line.
- b. Face of Brick: 1 mm 1/32 inch from face of adjacent brick.
- c. Face of Concrete Masonry Unit: 2 mm 1/16 inch from face of adjacent unit.
- d. Variation From True Plane: 6 mm in 3 m 1/4 inch in 10 feet and 20 mm in 10 m 1/2 inch maximum in 20 feet or more.
- e. Variation From Plumb: 6 mm 1/4 inch in each story, noncumulative and 13 mm 1/2 inch maximum in two stories or more.
- f. Variation From Level: 3 mm in 1 m 1/8 inch in 3 feet, 6 mm in 3 m 1/4 inch in 10 feet, and 13 mm 1/2 inch maximum.
- g. Variation in Wall Thickness: Plus or minus 6 mm 1/4 inch.

3.7 BRICKWORK

Provide brickwork that conforms to requirements of paragraph entitled "Tolerances" of this section. Select and place brick so that better face of stretchers and headers is exposed.

3.7.1 Testing

Except during cold weather, as defined under paragraph entitled "Environmental Conditions," test clay or shale brick daily on the job, prior to laying, as follows: Using a wax pencil, draw a circle the size of a quarter on five randomly selected bricks. Apply 20 drops of water with a medicine dropper to the surface within the circle on each brick. If the average time that the water is completely absorbed in the five bricks is less than 1-1/2 minutes, wet bricks represented by the five bricks tested. Ensure that each brick is nearly saturated, but surface dry when laid. During cold weather, keep masonry units dry until laid.

NOTE: Regarding the text below:

If other than running bond is desired, delete the first sentence and specify and/or indicate type of bond required.

3.7.2 Application

Unless indicated or specified otherwise, lay brick in running bond. Completely fill joints between bricks with mortar. Form bed joints of a thick layer of mortar slightly furrowed or battered; bevel or pyramid the bed mortar. Form head joints by applying a full coat of mortar on the brick to be laid. Slushing of head joints will not be permitted. Lay closure bricks with mortar on each bedding surface of unit to be laid and units in place. Place brick carefully without disturbing brick previously laid. Dry or butt joints will not be permitted. [Provide grouting as specified.] [Lay fire brick by dipping each brick in a soft mixture of fire clay and water and then rubbing the brick into place with joints as thin as practicable or provide refractory mortar with joints not more than 10 mm 3/8 inch thick.]

3.7.3 Brick-Faced Walls

NOTE: Use the first bracketed option for masonry cavity wall construction. Use the second bracketed option for cold-formed steel framing and brick veneer.

Brick-Faced Walls: [Bond the two wythes in every sixth brick course with continuous horizontal joint reinforcement.] [Bond brick in the pattern as indicated on the drawings.] Provide additional bonding ties spaced not more than 1 meter 3 feet apart around the perimeter of and within 300 mm 12 inches of all openings.

- a. Collar Joints: Fill collar joints solid with mortar as each course of brick is laid. Do not disturb units in place.
- b. Brick Sills: Lay brick on edge, slope, and project not less than 10 mm 1/2 inch beyond the face of the wall to form a wash and drip. Fill all joints solidly with mortar and tool.

NOTE: Regarding the text below:

Include weep holes and dampproofing requirements in geographic areas where these are acceptable practices. Specify dampproofing in Division 7 of the project specification for projects utilizing concrete masonry unit interior wythe cavity walls. Now that masonry wall cavities are usually at least half full of rigid board insulation, and the backup wythe is usually complete before the brickwork is

started, the wood strip method of keeping the cavities clean is neither practicable nor effective.

The specified method for concrete masonry unit and brick cavity wall is effective, but may be deleted if the specifier is reluctant to require it. Care must be taken (1) to prevent damage to mortar joints, especially adjacent to the washout holes, and (2) to prevent accumulation of water at the bottom of the wall. The cavities must be inspected to verify that they are clean and functional. ("Provide weep holes 6 mm in diameter spaced 600 mm 24 inches o.c. at base of wall and vertical obstructions (e.g. lintels).")

3.7.4 Cavity Walls

Provide a continuous cavity as indicated. Securely tie the two wythes together with horizontal joint reinforcement. Bevel mortar beds away from cavity to prevent projection into cavity when bricks are shoved in place. Keep cavities clear and clean of mortar droppings. [At the bottom of cavity walls, in the course immediately above the through-wall flashing, temporarily omit one brick every 1200 mm 4 feet. With a hose and clean water, wash all mortar droppings and debris out of the cavity through the temporary openings at least twice each day masonry is laid, and more often when required to keep the cavities clean. Fill in the openings with bricks and mortar after the wall is complete and the cavity has been inspected and found clean.] Provide weep holes 6 mm in diameter spaced 600 mm 24 inches o.c. wherever the cavity is interrupted. [Cavity face of interior wythe shall be dampproofed in accordance with Section 07112, "Bituminous Dampproofing."]

3.7.5 Reinforced Brick Walls

Provide two wythes of brick separated by a [_____] mm[_____] inch wide continuous space filled with [grout] [bricks "floated" in grout] and reinforced as indicated. Bevel mortar beds away from grout space to prevent projection into grout space when bricks are shoved in place. Deeply furrowed bed joints will not be permitted. Lay exterior wythe of brick to the height of each grout pour in advance of interior wythe. Clean grout space and set reinforcing before laying interior wythe. Provide metal ties to prevent spreading of the wythes and to maintain vertical alignment of walls. Position reinforcing as indicated. Wire vertical reinforcing securely in position as the brickwork progresses. Use puddling rod or vibrator to consolidate the grout. The minimum clear distance between parallel bars shall be the nominal diameter of the bars; the minimum clear distance between masonry and reinforcing shall be 6 mm 1/4 inch. Unless indicated or specified otherwise, form splices by lapping bars not less than 40 bar diameters and wire tying them together. Stagger splices in adjacent horizontal bars.

NOTE: At the text below, if a chimney wall is 200 mm 8 inches or less in thickness, the space between the flue liner and brickwork should be kept clean

and clear to avoid cracking the brickwork.

3.7.6 Chimneys

Construct chimneys of brick with flue linings of the sizes indicated. Extend flue linings from 300 mm 12 inches below the smoke inlet to 100 mm 4 inches above the chimney cap. Place thimbles as indicated, flush with inside of or up to 25 mm one inch into the flue lining. Set linings in fire clay mortar or refractory mortar and fill and smooth the joints on the inside. Set each section of flue lining before surrounding brickwork reaches top of flue lining section below. Build brickwork around lining, and [fill the space] [leave a 25 mm one inch airspace] between lining and brickwork [with grout]. [Seal top of airspace before installing chimney cap.] Do not cut linings after they are installed in chimney. Unless indicated otherwise, provide a chimney cap of air-entrained concrete. Slope cap to a minimum edge thickness of 50 mm 2 inches and reinforce with two rings of No. 3 gage galvanized steel wire.

NOTE: Use the paragraph below when cold-formed steel framing and brick veneer construction is required.

3.7.7 [Brick Veneer], [Hollow Clay Units]

Provide a continuous cavity as indicated. Install brick veneer after sheathing, masonry anchors, and flashing have been installed to the cold-formed steel framing system. Care shall be provided to avoid damaging the moisture barrier. Damaged moisture barrier and flashing shall be repaired or replaced before brick veneer is installed. Means shall be provided to keep cavities clean and clear of mortar droppings.

3.8 CONCRETE MASONRY UNIT WORK

Lay the first course in a full bed of mortar for the full width of the unit. Lay succeeding courses in running bond unless otherwise indicated. Form bed-joints by applying mortar to entire top surfaces of inner and outer face shells. Form head joints by applying mortar for a width of about 25 mm one inch to ends of adjoining units. Mortar shall be of such thickness that it will be forced out of the joints as the units are placed in position. Where anchors, bolts, and ties occur within the cells of the units, place metal lath in the joint at the bottom of such cells and fill cells with mortar or grout as work progresses. Provide concrete brick for bonding walls, working out the coursing, topping out walls under sloping slabs, distributing concentrated loads, backing brick headers, and elsewhere as required. Do not dampen concrete masonry units before or during laying. Do not place damp concrete masonry units (i.e. units with a moisture content in excess of 40% of total absorption)."

3.8.1 Special Concrete Masonry Unit Work

Where exposed concrete masonry unit walls and partitions are indicated in

[____], provide special concrete masonry unit work. Select units for uniformity of size, texture, true plane, and undamaged edges and ends of exposed surfaces. Place units plumb, parallel, and with properly tooled joints of maximum 10 mm 3/8 inch thickness. Keep exposed surfaces clean and free from blemishes or defects. [Lay units in the bond pattern indicated.]

3.8.2 Reinforced Concrete Masonry Unit Walls

Where vertical reinforcement occurs, fill cores solid with grout. Lay units in such a manner as to preserve the unobstructed vertical continuity of cores to be filled. Embed the adjacent webs in mortar to prevent leakage of grout. Remove mortar fins protruding from joints before placing grout. Minimum clear dimensions of vertical cores shall be 50 by 75 mm 2 by 3 inches. Position reinforcing accurately as indicated before placing grout. As masonry work progresses, secure vertical reinforcing in place at vertical intervals not to exceed 160 bar diameters. Use puddling rod or vibrator to consolidate the grout. Minimum clear distance between masonry and vertical reinforcement shall be not less than 12 mm 1/2 inch. Unless indicated or specified otherwise, form splices by lapping bars not less than 40 bar diameters and wire tying them together.

3.8.3 Fire Rated Concrete Masonry Unit Walls

Comply with the requirements of CM 91.

3.9 BONDING AND ANCHORING

Unless indicated otherwise, extend partitions from the floor to the bottom of the construction above. Structurally bond or anchor walls and partitions to each other [and to concrete walls, beams, and columns]. Securely anchor non-load-bearing partitions and interior walls to the construction above [as indicated] [in a manner that provides lateral stability while permitting unrestricted deflection of construction above]. Completely embed anchors in mortar joints.

- a. Corners of Load-Bearing Walls: Provide a true masonry bond in each course, except where indicated or specified otherwise.
- b. Intersections of Load-Bearing Walls: Provide a true masonry bond in each course, or anchor with rigid steel anchors not more than 600 mm apart vertically, unless otherwise indicated.
- c. Intersections of Non-Load-Bearing Partitions With Other Walls or Partitions: Tie with wire mesh ties at vertical intervals of not more than 600 mm or with masonry bonding in alternate courses.
- d. Masonry Walls Facing or Abutting Concrete Members: Anchor masonry to concrete with dovetail or wire-type anchors inserted in slots or inserts built into concrete. Locate anchors not more than 300 mm 18 inches o.c. vertically and not more than 600 mm 24 inches o.c. horizontally.
- [e. Brick Veneer on Wood Frame: Provide corrugated metal ties nailed

to wood studs at 400 mm 16 inches o.c. both ways.]

3.10 THROUGH-WALL FLASHING

[Provide [_____] [as indicated]. Unless indicated otherwise, provide flashing to form a drip from a point 6 mm 1/4 inch outside of exterior face of walls, extend across exterior wythe and upward [in collar joint] [across wall cavity] [not less than 150 mm 6 inches and into] [reglets] [mortar of bed joint for backing wythe]. Bend down exterior edge to form a drip. Flashing shall be extended 50 mm past the cavity wall face of the backing wythe and be turned back on itself not less than 12 mm 1/2 inch [extended beyond interior face of wall and turned up not less than 50 mm 2 inches]. Secure flashing [in reglets to ensure a permanent watertight joint] [as indicated]. Provide flashing in lengths as long as practicable. Lap ends not less than 35 mm 1 1/2 inches for interlocking type and 100 mm 4 inches for other types. Seal laps as necessary to ensure watertight construction. Provide dams at ends of flashing where masonry abuts concrete and where flashing ends within the masonry.]

[Provide [_____] [as indicated]. Unless indicated otherwise, provide flashing to form a drip from a points 6 mm outside of exterior face of walls, extend across exterior wythe upward [in collar joint] [across wall cavity] [not less than 150 mm and into] [reglets] [mortar of bed joint for backing wythe]. Bend down exterior edge to from a drip. Flashing shall be terminated 20 mm back from interior face of walls and turned back on itself not less than 12 mm.]

3.11 WEEP HOLES

Wherever through-wall flashing occurs, provide weep holes to drain flashing to exterior. Weep holes shall be clear round holes not less than 6 mm in diameter and 600 mm o.c.

3.12 HORIZONTAL JOINT REINFORCEMENT

Provide reinforcement [where indicated] [[in every course] [in every other course and in the first two courses above and below openings] in walls [and partitions] of concrete masonry units]. [Provide in every course of concrete masonry unit walls of elevator shafts.] Reinforcement shall be continuous except at control joints and expansion joints. Reinforcement above and below openings shall extend not less than 600 mm 24 inches beyond each side of openings. Provide reinforcement in the longest available lengths, utilizing the minimum number of splices. Overlap ends not less than 150 mm 6 inches. Provide welded L-shaped assemblies and welded T-shaped assemblies to match the straight reinforcement, at corners and intersections of walls and partitions. Provide mortar cover for the wire of at least 16 mm 5/8 inch for exterior face of wall and 12 mm 1/2 inch for interior face of wall.

3.13 CONCRETE MASONRY UNIT LINTELS AND BOND BEAMS

Provide special units, fill cells solidly with grout or concrete, and provide not less than two 14 mm diameter reinforcing bars, unless indicated otherwise. Reinforcing shall overlap a minimum of 40 bar diameters at

splices. Terminate bond beams and reinforcing on each side of expansion joints [and control joints]. Concrete masonry units provided for lintels and bond beams shall have exposed surfaces of the same material and texture as the adjoining masonry units. Lintels shall be straight and true and shall have at least 200 mm 8 inches of bearing at each end. Allow lintels to set at least 6 days before shoring is removed.

3.14 CONTROL JOINTS

Steel should be interrupted at joints for intermediate bond beams. Steel should continue through joint for all structural bond beams. Provide where indicated in concrete masonry-unit walls. Provide sawed type or built-in type as required. Joints shall occur directly opposite each other on both faces of the wall and shall be filled with sealant as specified in Section 07920, "Joint Sealants," [or] [a properly formed synthetic rubber or vinyl plastic sealing strip] [as indicated].

3.15 EXPANSION JOINTS

Provide where indicated in brick walls. Fill joints with a permanently flexible preformed filler material and a sealant as specified in Section 07920, "Joint Sealants."

3.16 GROUT PLACEMENT

NOTE: For brickwork, when least clear horizontal dimension of grout space is less than 50 mm 2 inches, limit height of pour to 300 mm one foot. When such dimension is 50 mm 2 inches or more, limit height to 48 times such dimension for coarse grout or 64 times for fine grout. For concrete masonry, limit height of pour to 1200 mm 4 feet, except for 200 mm 8 inch CMU, limit height of pour to 600 mm 2 feet.

Place grout from the interior side of walls, unless approved otherwise. Protect sills, ledges, offsets, and other surfaces from grout droppings. Remove grout from such surfaces immediately. Grout shall be well mixed to prevent segregation and shall be sufficiently fluid to flow into joints and around reinforcing without leaving voids. Place grout by pumping or pouring from buckets equipped with spouts in lifts not exceeding [_____] meter [_____] feet. Keep pours at 40 mm 1 1/2 inches below top of masonry units in top course, except at finish course. [Float bricks into grout to a position not less than 12 mm 1/2 inch nor more than 50 mm 2 inches from surrounding bricks.] Puddle or agitate grout thoroughly to eliminate voids. Remove masonry displaced by grouting operation and re-lay in alignment with fresh mortar.

3.17 FORMS AND SHORING

Construct to the shape, lines, and dimensions of members indicated. Prevent deflections which may result in cracking or other damage to supported masonry. Do not remove until members have cured.

3.18 PARGING

Parge outside of masonry basement walls in contact with earth with two coats of Type M1 mortar, each 10 mm 3/8 inch thick. Cross-scratch first coat and allow to cure at least 24 hours. Trowel smooth second coat, bevel at top, and cove out to edge of footing. Extend parging not more than 100 mm 4 inches above grade, unless indicated otherwise, and keep damp for at least 3 days.

3.19 CLEANING

3.19.1 Protection

During cleaning operations, protect work which may be damaged, stained, or discolored.

3.19.2 Pointing

Upon completion of masonry work and before cleaning, cut out defective mortar joints and tuck point joints and all holes solidly with prehydrated mortar.

3.19.3 Cleaning

Clean exposed masonry surfaces with clear water and stiff fiber brushes and rinse with clear water. Where stains, mortar, or other soil remain, continue scrubbing with warm water and detergent. [Where soil still remains on brickwork, continue cleaning as follows: [Thoroughly wet exposed surfaces of dark-colored brickwork with clear water and scrub with stiff fiber brushes and a solution of not more than 1 part of muriatic acid to 9 parts of water applied to an area of 1 to 2 square meter 15 to 20 square feet at a time.] [Clean light-colored brickwork surfaces with non-acid or buffered-acid cleaners as recommended by the brick manufacturer. Use cleaners in accordance with the instructions and recommendations of the brick and cleaner manufacturers.]] Immediately after cleaning each area, rinse thoroughly with clear water. Do not use caustic solutions or sandblasting to clean surfaces. Masonry shall be free of stains, efflorescence, mortar or grout droppings, and debris. Restore damaged, stained, and discolored work to original condition or provide new work.

-- End of Section --