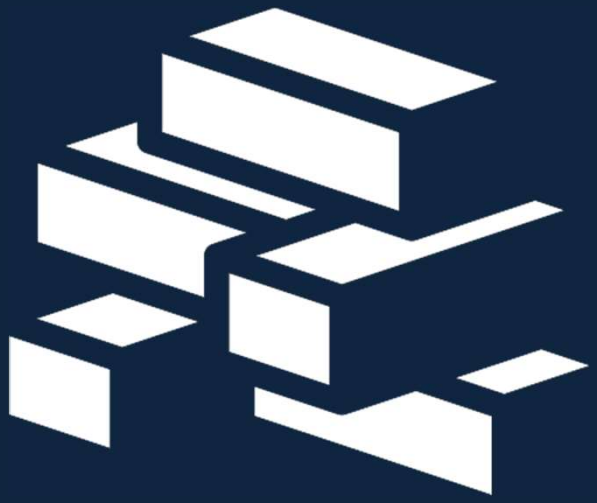


MASONRY Association of Florida

KEY INSPECTION POINTS

COMPONENT 4

Don Beers, PE , GC

Don Beers, PE, GC is currently the staff engineer for the Masonry Association of Florida (since 2009) and President of Adrian Engineering, Inc. Previous to 2009 Don acted as Engineering Services Manager with Rinker Materials for 29 years. He is a graduate of the University of South Florida in Civil and Structural Engineering and is a licensed engineer and general contractor in Florida. Has served as Chairman of the National Concrete Masonry Association's Codes Committee, the Florida Concrete & Products Association's Block Committee and a board member for The Masonry Society (TMS).

561-310-9902
don@floridamasonry.com

Jerry Painter, FASTM

Jerry Painter, is the principle of Jerry Painter Masonry Consulting, LLC. He serves on the Board of the Masonry Association of Florida and is a Past Chairman of MAF. Mr. Painter is a member of ASTM committees C12, C15, C27, E06 and E54. He is the past chair of committee C12 (Mortars and Grouts) and subcommittee C15.05 (Masonry Assemblies) as well as a Board member of C15 (Masonry Units). Mr. Painter is the Past President of The Masonry Society and is on the TMS 402/602 committee (previously known as MSJC). He is a member of Mason Contractors of America Association and is chair of the Technical Committee. Mr. Painter is a nationally recognized masonry industry speaker, seminar instructor and columnist.

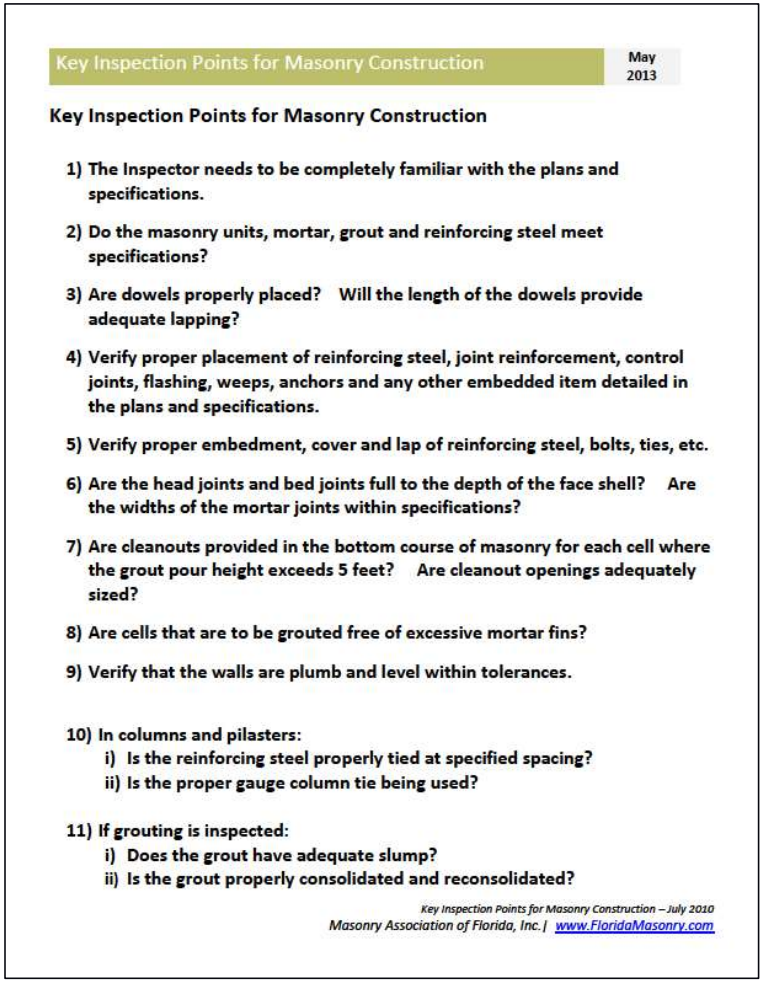
KEY INSPECTION POINTS

IN MASONRY CONSTRUCTION

Key Inspection Points for Masonry Construction

1

The Inspector needs to be completely familiar with the plans and specifications.



Key Inspection Points for Masonry Construction — May 2013

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   ii) Is the proper gauge column tie being used?

11) If grouting is inspected:
   i) Does the grout have adequate slump?
   ii) Is the grout properly consolidated and reconsolidated?

WHERE IS THE INFO?

ON THE APPROVED PLANS

CIDCO OF MAHARASHTRA LIMITED
C.A. NO. 02/CIDCO/EE(B&U-I)/2010-11

SL. PG. NO.

PARTICULAR SPECIFICATIONS

MASONRY WORK – STONE MASONRY

1.0 **INDIAN STANDARDS**:

Work shall be carried out to Indian Standards and Code of practices. In absence International Standards shall be followed. These shall be latest issue. List given hereunder is not to be considered as conclusive and is for reference and guidance only. Any discrepancies / conflict noticed shall be directed to the EIC for his direction / approval. However as a general rule more stringent specification shall take precedence.

IS: 1121	Methods of test for determination of strength properties of natural building stones Part 1 Compressive strength Part 2 Transverse strength Part 3 Tensile strength Part 4 Shear strength
IS: 1124	Methods of test for determination of water absorption apparent specific gravity and porosity of natural building stone.
IS 1127	Recommendations for dimensions and workmanship of natural building stones for masonry work.
IS 1489	Specification for Portland Pozzolana cement
IS 1597	Code of Practice for Part 1 construction of stone masonry: Rubble stone masonry
SP 27	Handbook of method of measurement of building works.

WHERE IS THE INFO?

IN THE JOB SPECS

Structural Specification Notes

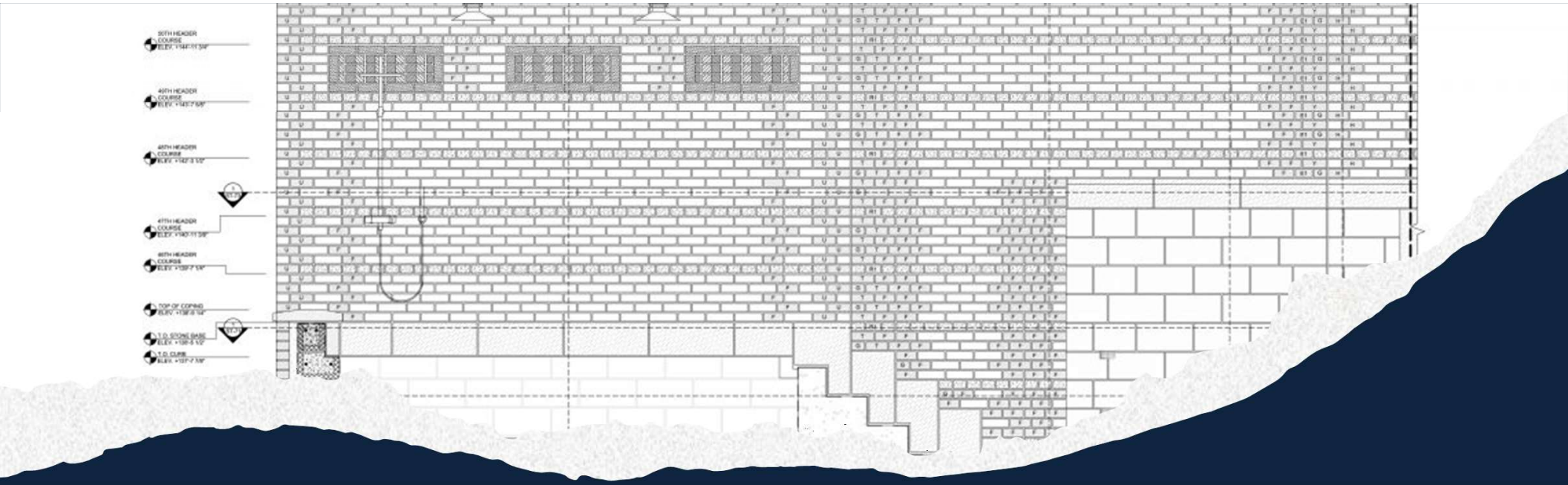
WHERE ARE THESE?

Usually on the Plans – But-
May be on a spec doc or on details.

Structural notes and Architectural notes

Danger – these don't always match!!
-Be sure and check for revisions-

Always must be aware of penetrations and shared space with utilities



WHERE IS THE INFO?

SHOP DRAWINGS

WHERE IS THE INFO?

MOCK-UP PANEL

IMPORTANCE OF THE MASONRY MOCK-UP

REPLICATION OF WALL CONDITIONS

- May require more than one mock up
- Sizes of units
- Flashing
- Color
- Texture
- Cleaning and Sealing
- Etc.

CARE OF INSTALLATION

- Same as the wall

FOR EVERYONE'S PROTECTION

IMPORTANT NOT TO REMOVE FROM JOB

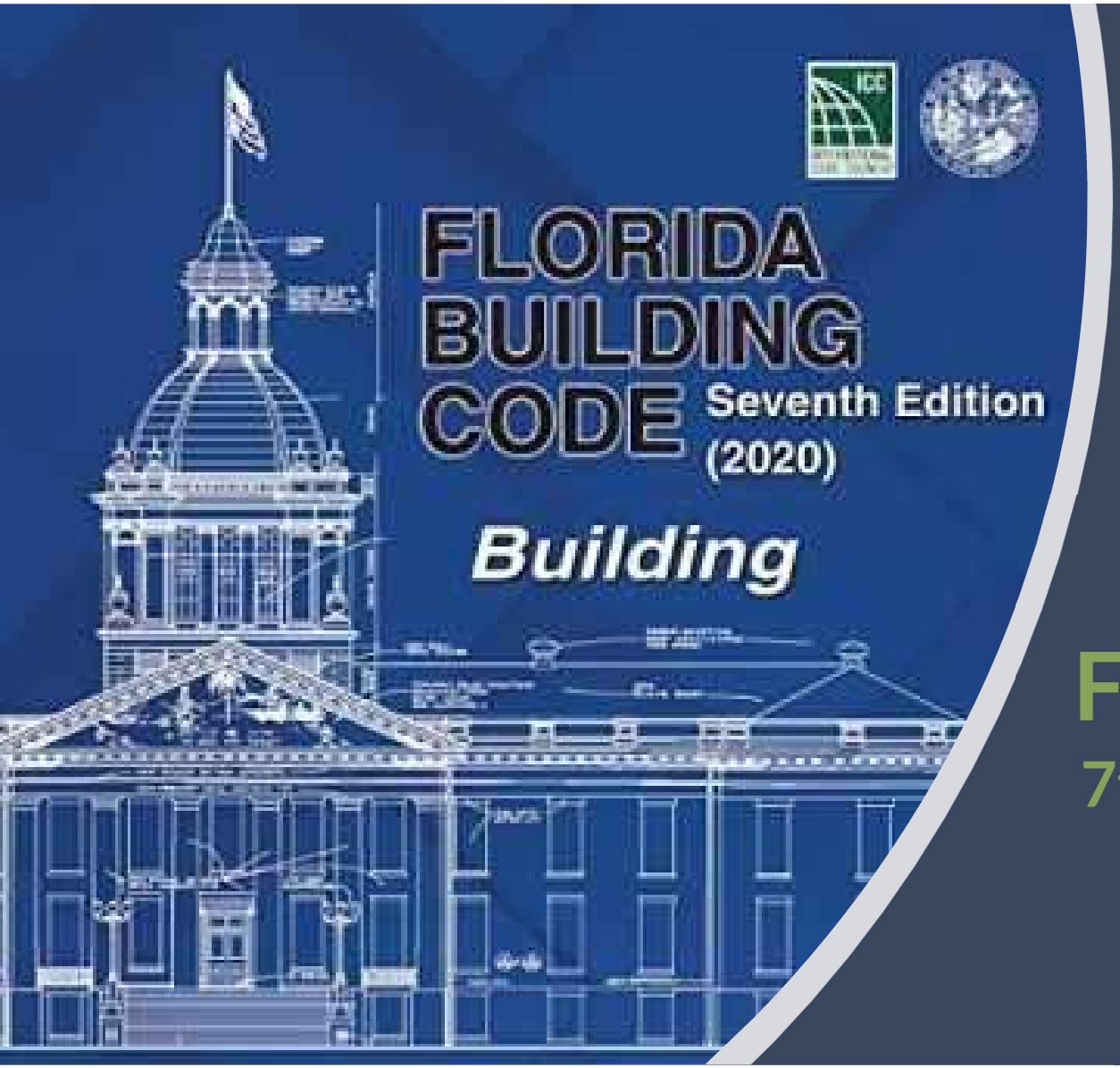
IMPORTANCE OF THE MASONRY MOCK-UP

JOB SITE ORDER OF IMPORTANCE

- Plans – on the job
- Specs – in the truck
- Mock up Panel – hauled off site

COURT OF LAW ORDER OF IMPORTANCE

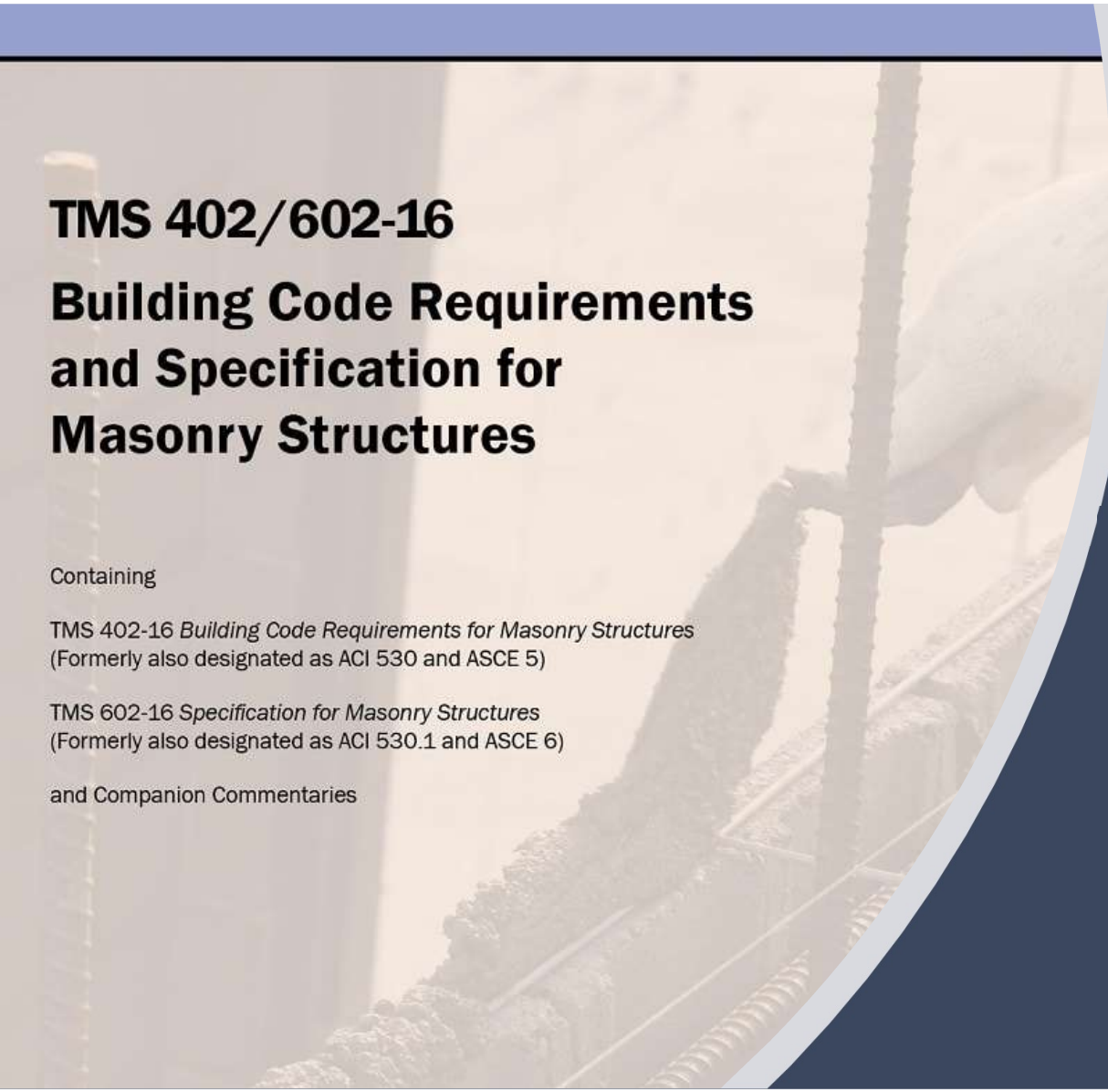
- Mock up Panel – viewed under a microscope by forensic engineers
- Specs – Studied by attorneys word for word
- Plans – Available if needed



WHERE IS THE INFO?

GOVERNING FLORIDA CODE

7th Ed. FBC, Chapter 21



WHERE IS THE INFO?

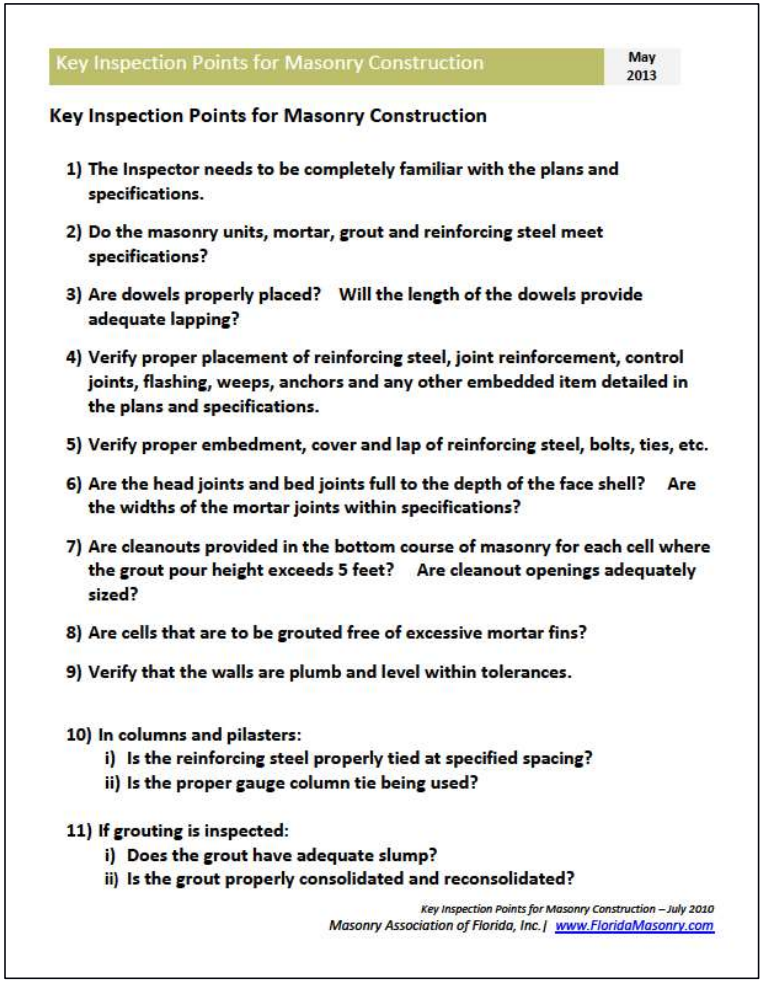
GOVERNING NATIONAL CODE

TMS 402/602 (2016)

Key Inspection Points for Masonry Construction

2

Do the masonry units, mortar, grout and reinforcing steel meet specifications?



Key Inspection Points for Masonry Construction — May 2013

Key Inspection Points for Masonry Construction

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RELATIONSHIP TABLE

	CONCRETE	BLOCK	GROUT	MORTAR	BRICK
PRODUCT SPEC	ACI 301 C-94	C-90	C-476	C-270	C-216 C-652
SAMPLING & TESTING	C-31 C-39	C-140 C-1314	C-1019	C-780	C-67
DESIGN & INSTALLATION	ACI 318	TMS 402/602	TMS 402/602	TMS 402/602	TMS 402/602

COMPRESSIVE STRENGTH

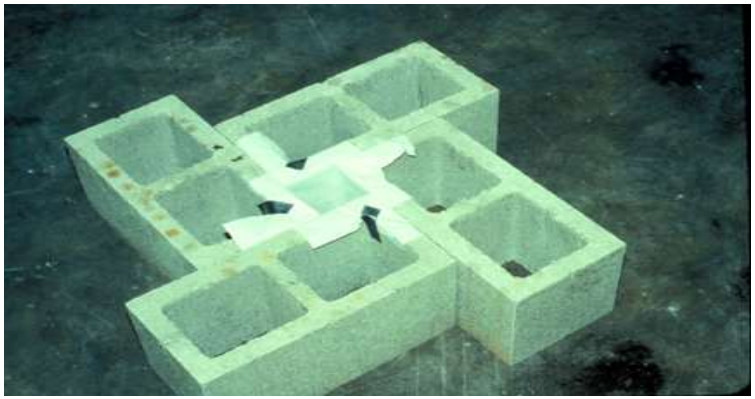
PG. S-18 TABLE 2

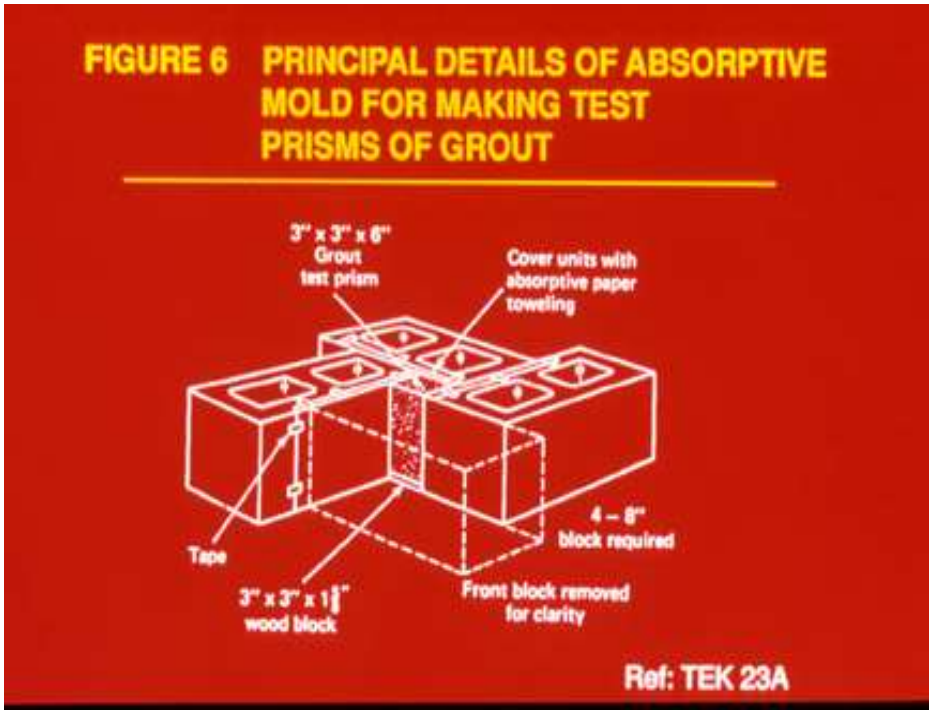
Table 2 — Compressive strength of masonry based on the compressive strength of concrete masonry units and type of mortar used in construction

Net area compressive strength of concrete masonry, psi (MPa)	Net area compressive strength of concrete masonry units, psi (MPa)	
	Type M or S mortar	Type N mortar
1,700 (11.72)	---	1,900 (13.10)
1,900 (13.10)	1,900 (13.10)	2,350 (14.82)
2,000 (13.79)	2,000 (13.79)	2,650 (18.27)
2,250 (15.51)	2,600 (17.93)	3,400 (23.44)
2,500 (17.24)	3,250 (22.41)	4,350 (28.96)
2,750 (18.96)	3,900 (26.89)	-----
3,000 (20.69)	4,500 (31.03)	-----

[1]For units of less than 4 in. (102 mm) nominal height, use 85 percent of the values listed.

ASTM C-1019





Not tested by C1019??

THEN IT'S NOT GROUT

GROUT

C-476
TMS 602

C-1019

TMS 602

HOW DO WE CLASSIFY MORTARS?

M - 2500 psi
A
S - 1800 psi
O
N - 750 psi

W
O - 350 psi
R
K - 75 psi

6.3 *Water Retention*



Start with the <u>flow</u> test . . . . .

vacuum/suction . . .

flow test again.

IN THE LAB

ASTM C 270

C780 – SAMPLING AND TESTING OF MORTAR IN THE FIELD

MORTAR
C-270
C-780
TMS 602

IN THE FIELD

KEYS TO GOOD MORTAR

- Dry Storage of Cement Products
- Proper Measurement of Materials
- Damp Loose Sand
- Cool Potable Water
- 3-5 Minutes Mixing Time

REINFORCING BAR MARKINGS

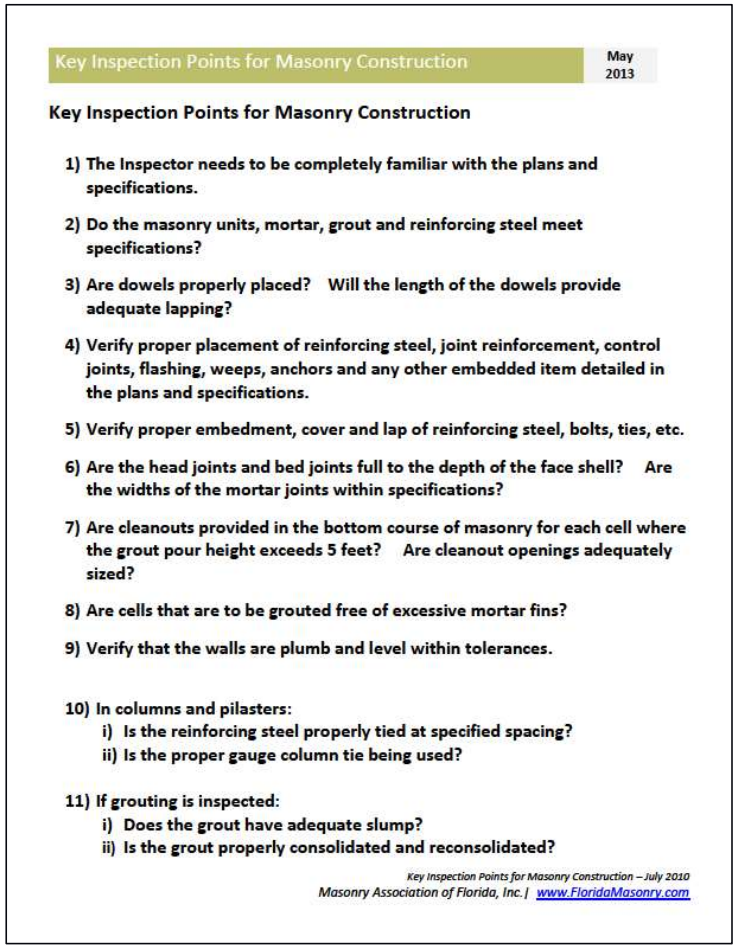
REINFORCING BAR MARKINGS

Sizes and Dimensions			
Bar designation number	Nominal diameter in inches (not including the deformations)	Metric designation number	Weight in pounds per foot
3	0.375	10	0.376
4	0.500	13	0.668
5	0.625	16	1.043
6	0.750	19	1.502
7	0.875	22	2.044
8	1.000	25	2.670
9	1.128	29	3.400
10	1.270	32	4.303

KEY INSPECTION POINTS

3

Are dowels properly placed? Will the length of the dowels provide adequate lapping?



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Key Inspection Points for Masonry Construction – July 2010
Masonry Association of Florida, Inc. | www.FloridaMasonry.com

PLACEMENT TOLERANCES

PG. S-69
SECT 3.4 B. 11. A.

3.4 B. *Reinforcement* (Continued)

11. *Placement tolerances*

a. Place reinforcing bars in walls and flexural elements within a tolerance of ± 1/2 in. (12.7 mm) when the distance from the centerline of reinforcing bars to the opposite face of masonry, *d*, is equal to 8 in. (203 mm) or less, ± 1 in. (25.4 mm) for *d* equal to 24 in. (610 mm) or less but greater than 8 in. (203 mm), and ± 1 1/4 in. (31.8 mm) for *d* greater than 24 in. (610 mm).

PLACEMENT TOLERANCES

PG. S-69
SECT 3.4 B. 11. B.

b. Place vertical bars within:

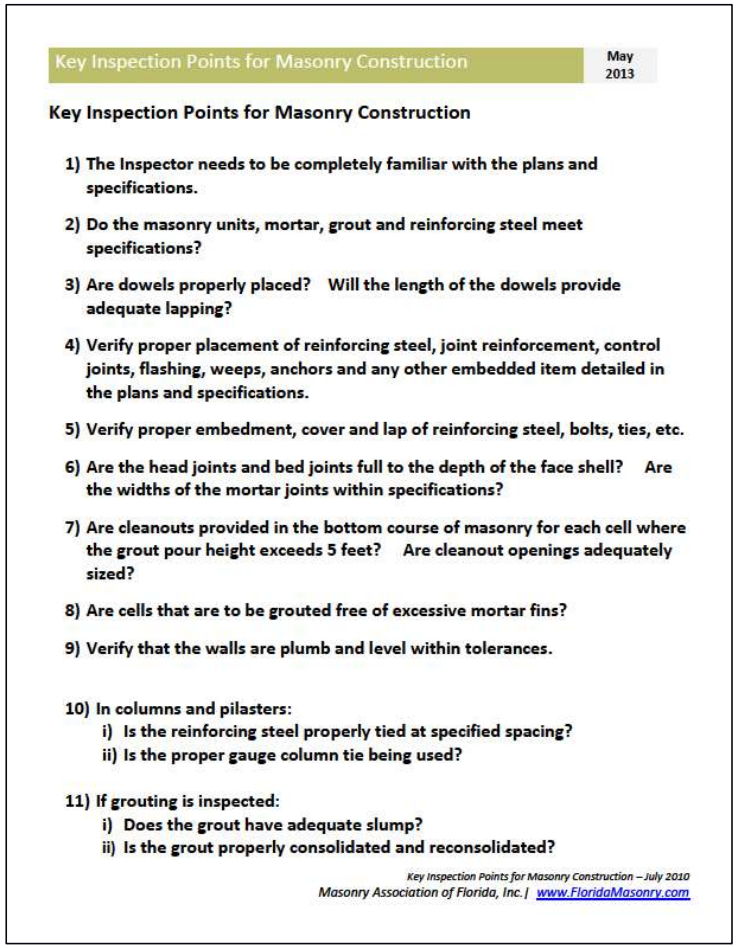
1) 2 in. (50.8 mm) of the required location along the length of the wall when the wall segment length exceeds 24 in. (610 mm).

2) 1 in. (25.4 mm) of the required location along the length of the wall when the wall segment length does not exceed 24 in. (610 mm)

KEY INSPECTION POINTS

4

Verify proper placement of reinforcing steel, joint reinforcement, control joints, flashing, weeps, anchors and any other embedded item detailed in the plans and specifications.



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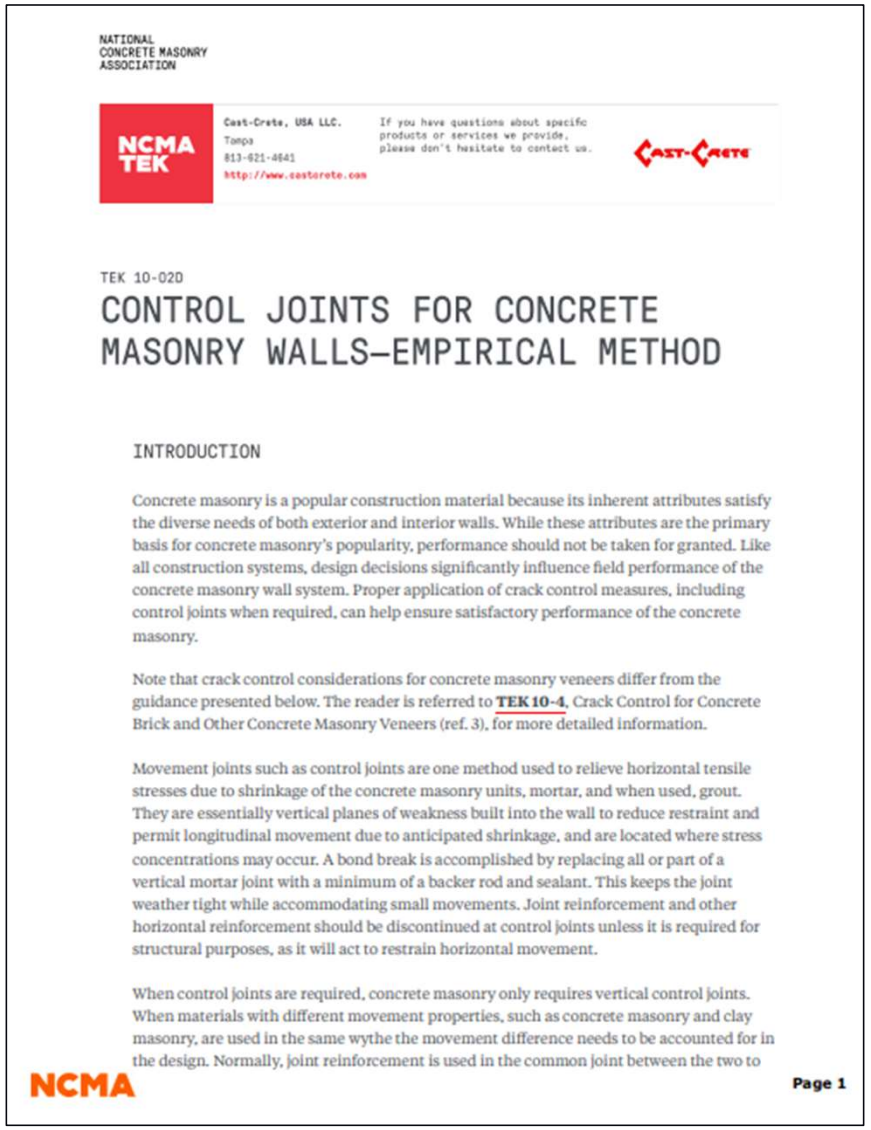
CONTROL JOINT EMPIRICAL METHOD NCMA TEK 10-2D



NATIONAL
CONCRETE MASONRY
ASSOCIATION

NCMA TEK

Cast-Crete, USA LLC.
Tampa
813-621-4641
http://www.castcrete.com

If you have questions about specific products or services we provide, please don't hesitate to contact us.

CAST-CRETE

TEK 10-02D

CONTROL JOINTS FOR CONCRETE MASONRY WALLS—EMPIRICAL METHOD

INTRODUCTION

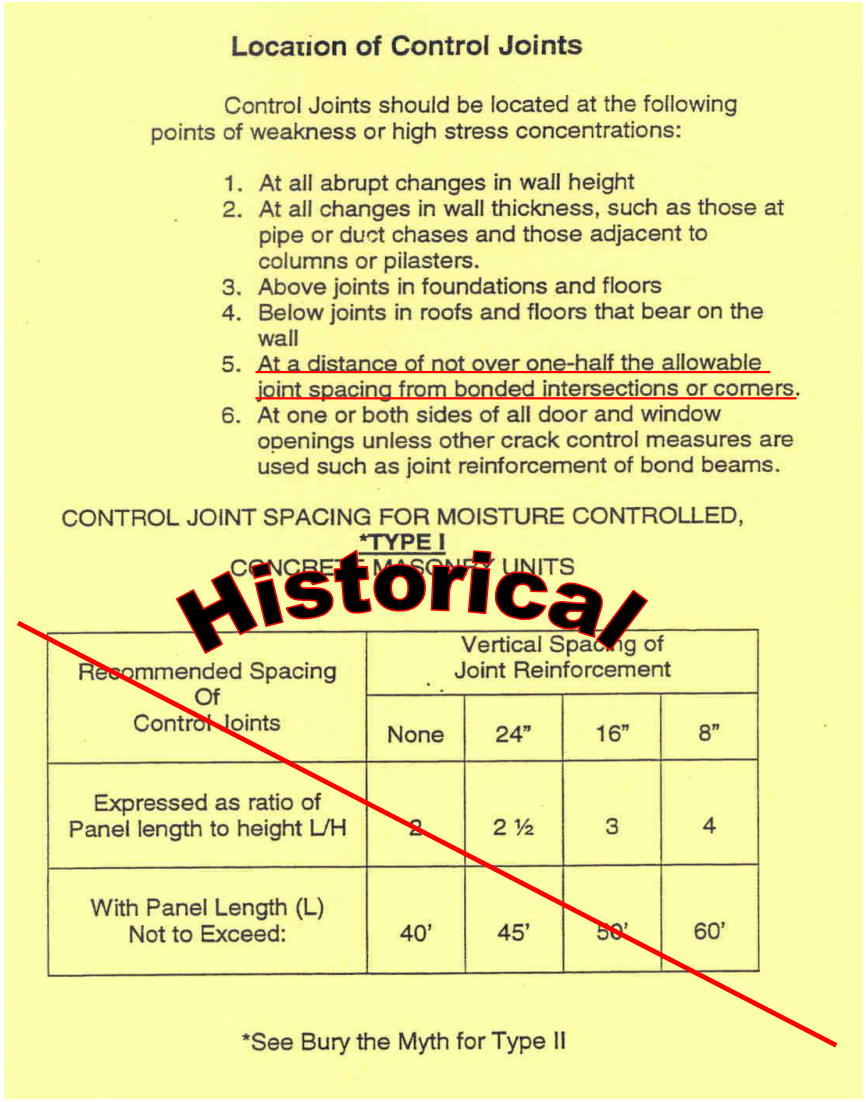
Concrete masonry is a popular construction material because its inherent attributes satisfy the diverse needs of both exterior and interior walls. While these attributes are the primary basis for concrete masonry's popularity, performance should not be taken for granted. Like all construction systems, design decisions significantly influence field performance of the concrete masonry wall system. Proper application of crack control measures, including control joints when required, can help ensure satisfactory performance of the concrete masonry.

Note that crack control considerations for concrete masonry veneers differ from the guidance presented below. The reader is referred to **TEK 10-4**, Crack Control for Concrete Brick and Other Concrete Masonry Veneers (ref. 3), for more detailed information.

Movement joints such as control joints are one method used to relieve horizontal tensile stresses due to shrinkage of the concrete masonry units, mortar, and when used, grout. They are essentially vertical planes of weakness built into the wall to reduce restraint and permit longitudinal movement due to anticipated shrinkage, and are located where stress concentrations may occur. A bond break is accomplished by replacing all or part of a vertical mortar joint with a minimum of a backer rod and sealant. This keeps the joint weather tight while accommodating small movements. Joint reinforcement and other horizontal reinforcement should be discontinued at control joints unless it is required for structural purposes, as it will act to restrain horizontal movement.

When control joints are required, concrete masonry only requires vertical control joints. When materials with different movement properties, such as concrete masonry and clay masonry, are used in the same wythe the movement difference needs to be accounted for in the design. Normally, joint reinforcement is used in the common joint between the two to

NCMA



Location of Control Joints

Control Joints should be located at the following points of weakness or high stress concentrations:

1. At all abrupt changes in wall height
2. At all changes in wall thickness, such as those at pipe or duct chases and those adjacent to columns or pilasters.
3. Above joints in foundations and floors
4. Below joints in roofs and floors that bear on the wall
5. At a distance of not over one-half the allowable joint spacing from bonded intersections or corners.
6. At one or both sides of all door and window openings unless other crack control measures are used such as joint reinforcement of bond beams.

CONTROL JOINT SPACING FOR MOISTURE CONTROLLED,
*TYPE I
CONCRETE MASONRY UNITS

Historical

Recommended Spacing Of Control Joints	Vertical Spacing of Joint Reinforcement			
	None	24"	16"	8"
Expressed as ratio of Panel length to height L/H	2	2 ½	3	4
With Panel Length (L) Not to Exceed:	40'	45'	50'	60'

*See Bury the Myth for Type II

LOCATION OF CONTROL JOINTS

1) Abrupt changes in wall height
2) Changes in wall thickness
3) Above joints in foundations and floors
4) Below joints in roofs and floors
5) **<u>½ the allowable joint spacing from wall corners</u>**
6) One or both sides of doors and windows.

CONTROL JOINT EMPIRICAL METHOD NCMA TEK 10-2C TABLE 1

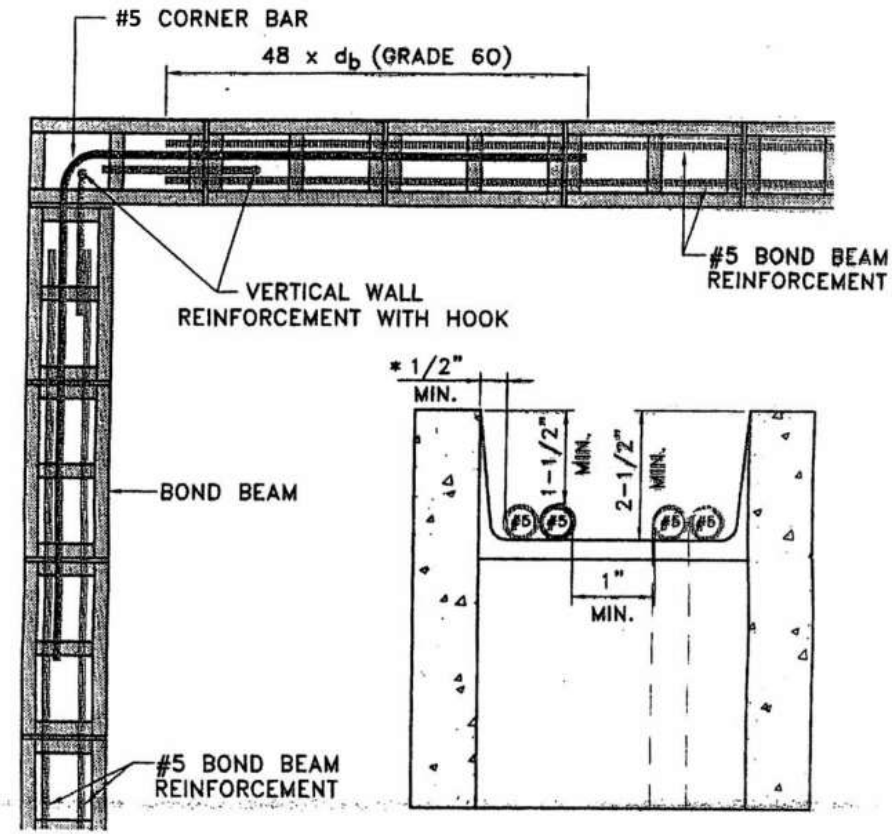
Table 1—Recommended Control Joint Spacing for Above Grade Exposed Concrete Masonry Walls[A]

Distance between joints not to exceed the lesser of: Length to height ratio	or ft (m)
1½ : 1	25 (7.62)

[A] Notes:

1. Table values are based on the use of horizontal reinforcement having an equivalent area of not less than 0.025 in.²/ft (52.9 mm²/m) of height to keep unplanned cracks closed (see Table 2).

CONGESTION

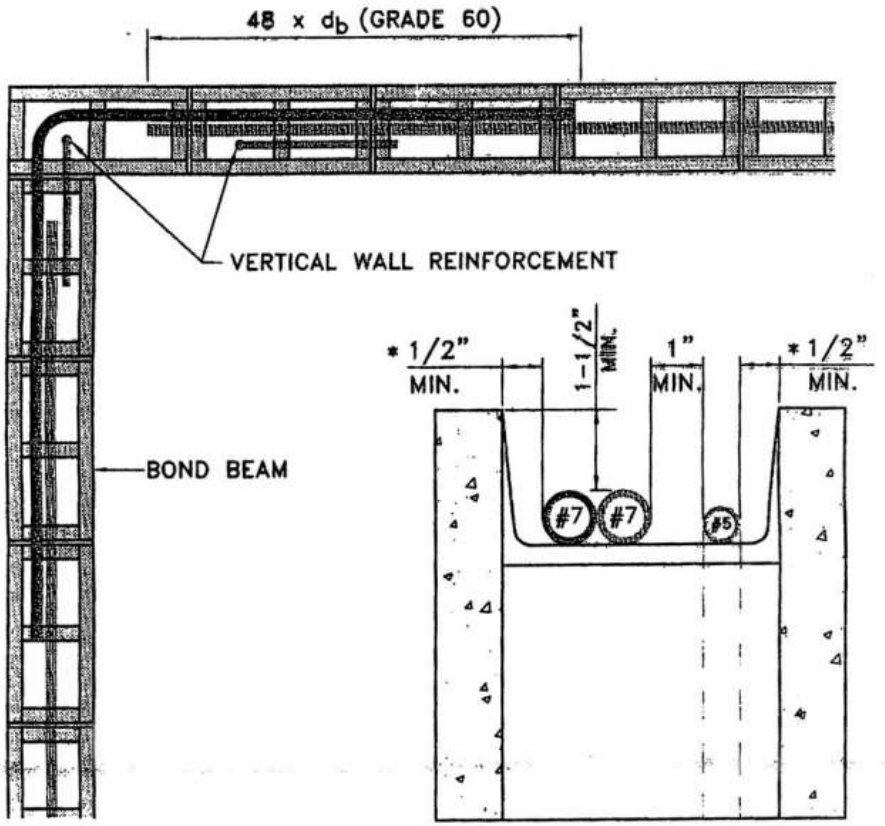


NOTE: REINFORCING BARS SHALL HAVE A MINIMUM OF 1-1/2" CONCRETE COVER.

* 1/2" CLEARANCE ALLOWS USE OF COURSE AGG. GROUT PER **TMS 602**

PLAN

TYPICAL BOND BEAM CORNER DETAIL
(TWO #5 REINFORCING BARS IN BOND BEAM)

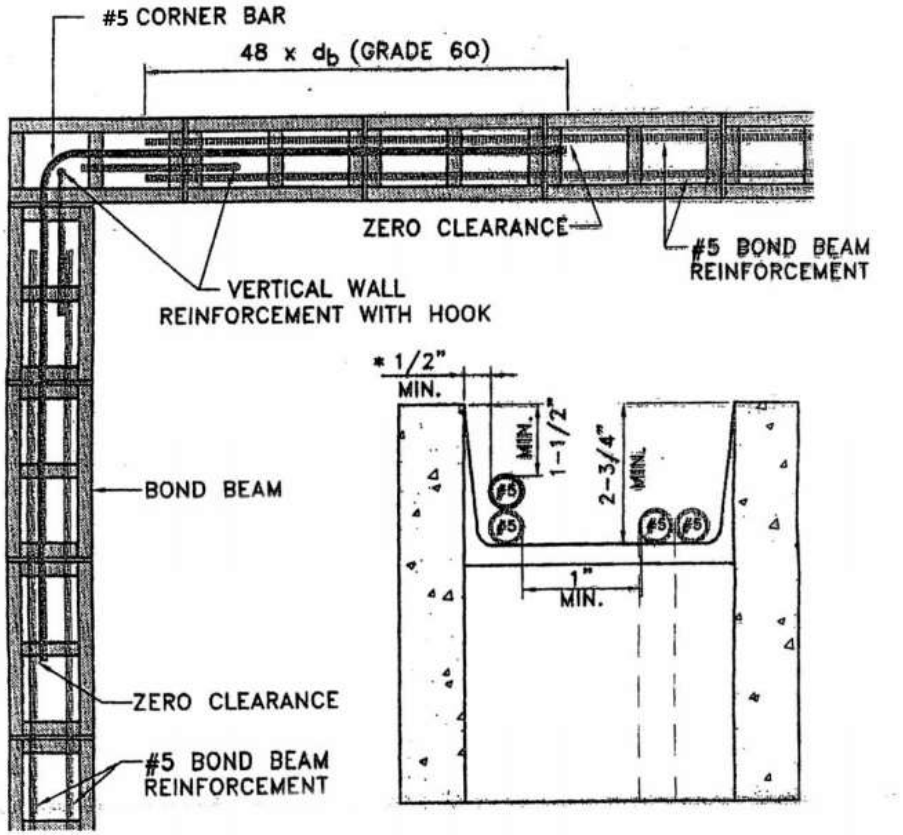


NOTE: REINFORCING BARS SHALL HAVE A MINIMUM OF 1-1/2" CONCRETE COVER.

* 1/2 CLEARANCE ALLOWS USE OF COURSE AGG. GROUT PER **TMS 602**

PLAN

TYPICAL BOND BEAM CORNER DETAIL
(ONE #7 REINFORCING BAR IN BOND BEAM)



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* 1/2" CLEARANCE ALLOWS USE OF COURSE AGG. GROUT PER **TMS 602**

PLAN (Proposed Unit)

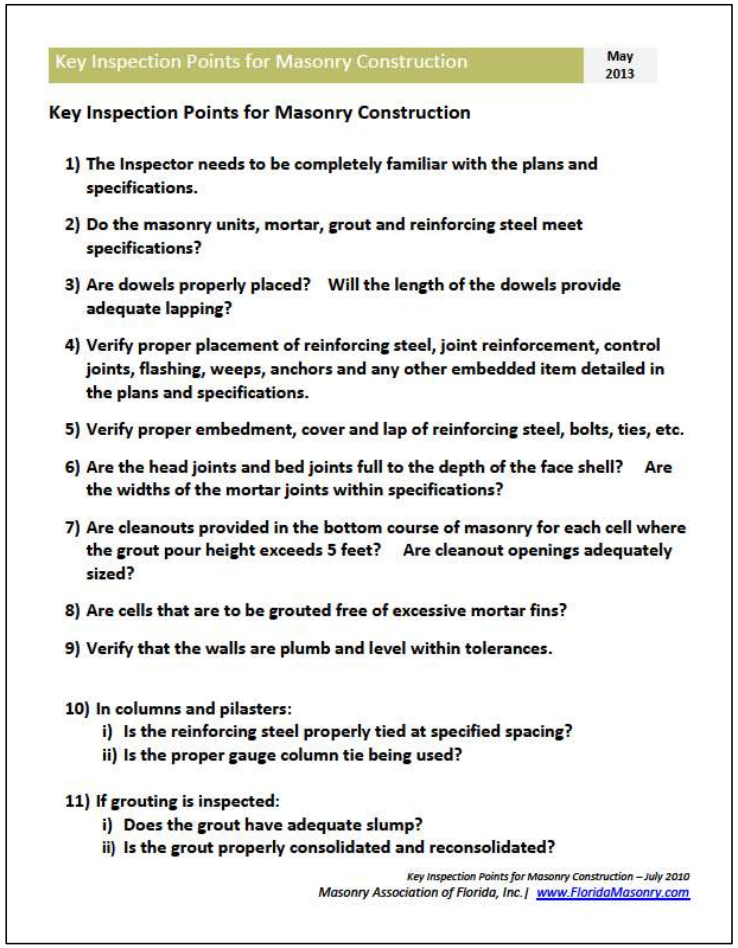
TYPICAL BOND BEAM CORNER DETAIL

(TWO #5 REINFORCING BARS IN BOND BEAM)

KEY INSPECTION POINTS

5

Verify proper embedment, cover and lap of reinforcing steel, bolts, ties, etc.



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TMS 402 LAP METHOD

$$l_d = \frac{0.13 d_b^2 f_y \gamma}{K\sqrt{f'_m}}$$

Eq 6-1
TMS 402-16
pp C-65

γ
=1.0 for #3 through #5 bar
=1.04 for #6 and #7 bars
=1.2 for #8 and #9 bars

Modified factors for Y (gamma) approved in the 7th Ed FBC

EMBEDMENTS & LAPS

Development Lengths (l_d)

Assumptions
-f_y=60,000 psi
-f'm=2,000 psi
-Bar spacing > $9d_b$
-Bars centered in cell

	Min/Max Laps		8" Masonry		12" Masonry	
Bar Size	40db (Min per FBC)	72db (Max Req per FBC)	Lap Per TMS 402-16	Lap Per TMS 402-16 w/FBC Y Factors	Lap Per TMS 402-16	Lap Per TMS 402-16 w/FBC Y Factors
3	15.0	27.0	12.0	12.0	12.0	12.0
4	20.0	36.0	12.2	12.2	12.0	12.0
5	25.0	45.0	19.5	19.5	12.4	12.4
6	30.0	54.0	37.1	29.7	23.4	18.8
7	35.0	63.0	51.4	41.1	32.3	25.8
8	40.0	72.0	79.0	63.2	49.3	39.4
9	45.0	81.0	101.9	81.5	63.1	50.5

K Chart					
Bar Size	9 x db	Cover for 8" Masonry	K for 8" Masonry	Cover for 12" Masonry	K for 12" Masonry
3	3.38	3.63	3.38	5.63	3.38
4	4.50	3.56	3.56	5.56	4.50
5	5.63	3.50	3.50	5.50	5.50
6	6.75	3.44	3.44	5.44	5.44
7	7.88	3.38	3.38	5.38	5.38
8	9.00	3.31	3.31	5.31	5.31
9	10.13	3.25	3.25	5.25	5.25

$$l_d = \frac{0.13 d_b^2 f_y \gamma}{K\sqrt{f'_m}}$$

Eq 6-1
TMS 402-16
pp C-65

γ

=1.0 for #3 through #5 bar
=1.04 for #6 and #7 bars
=1.2 for #8 and #9 bars

COVER REQUIREMENTS (AGAIN!)

PG. S-66
SECT 3.4 B. 4.

4. Place reinforcing bars maintaining the following minimum cover:

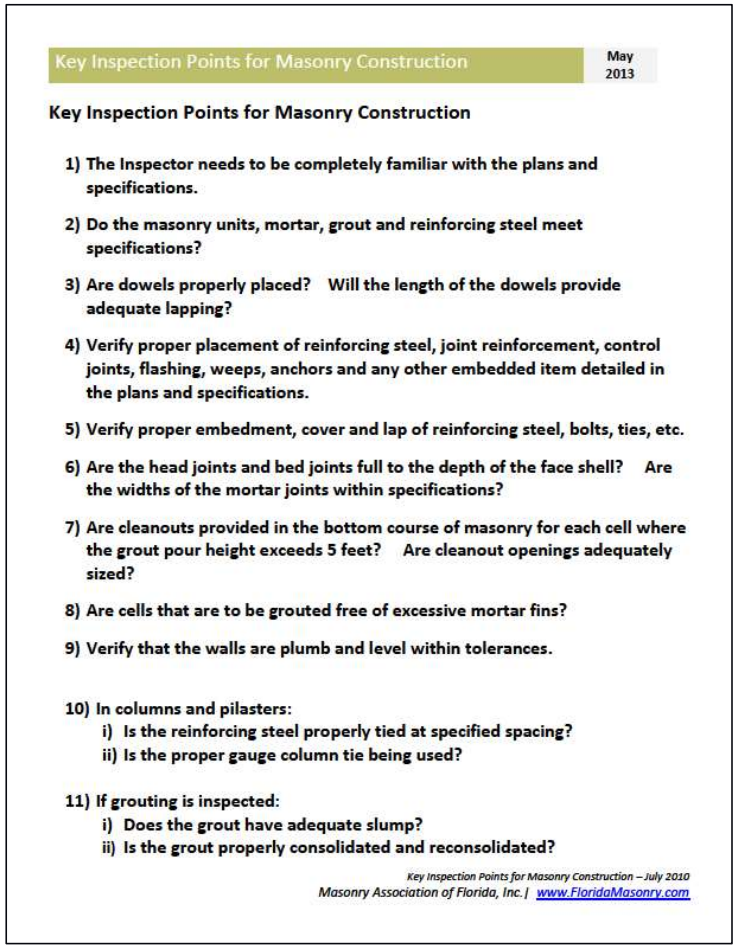
   a. Masonry face exposed to earth or weather: 2 in. (50.8 mm) for bars larger than No. 5 (M #16); 1½ in. (38.1 mm) for No. 5 (M #16) bars or smaller.

   b. Masonry not exposed to earth or weather: 1½ in. (38.1 mm).

KEY INSPECTION POINTS

6

Are the head joints and bed joints full to the depth of the face shell? Are the widths of the mortar joints within specifications?



Key Inspection Points for Masonry Construction — May 2013

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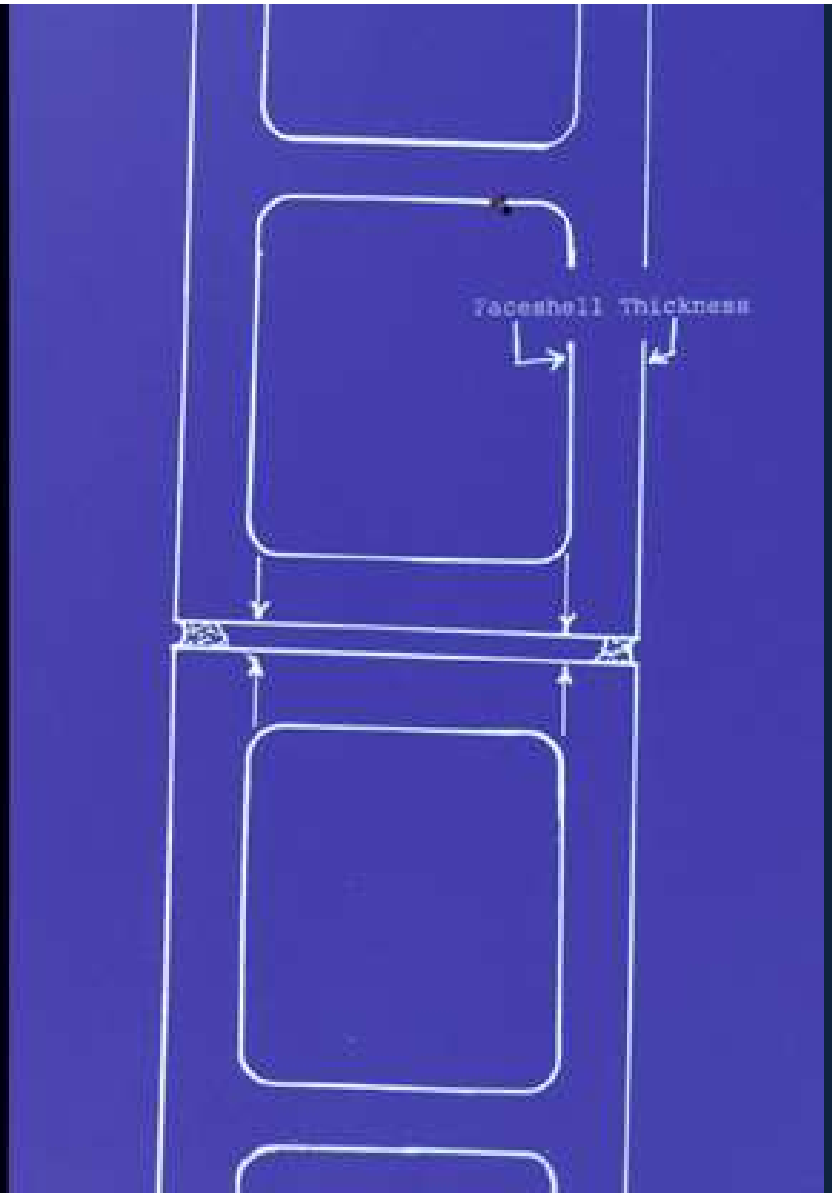


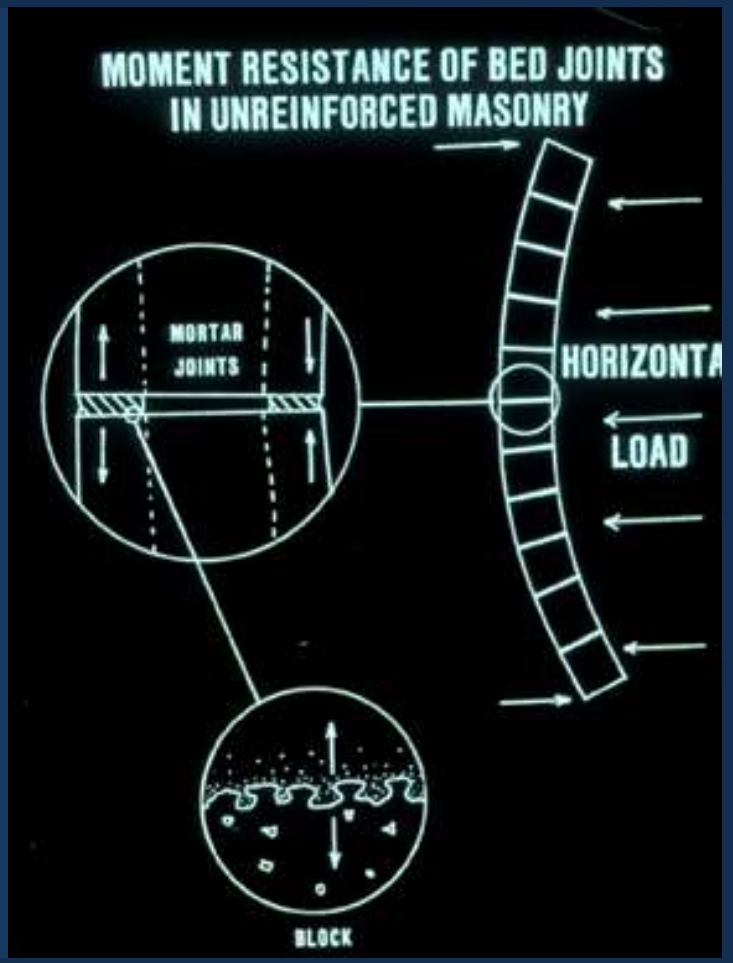
KEY INSPECTION POINTS

Full head joint - Equivalent to the thickness of the face shell

KEY INSPECTION POINTS

Reasons for Full Head and Bed Joints

1- Load Transfer
2- Water Intrusion



KEY INSPECTION POINTS

PG. S-64 SECT 3.3 F.

Head Joints 1/8" to ¾"

3.3 F. *Site tolerances* — Erect masonry within the following tolerances from the specified dimensions.

1. Dimension tolerances

   a. In cross section or elevation
   .....-1/4 in. (6.4 mm), +1/2 in. (12.7 mm)

   b. Mortar joint thickness

   bed joints between masonry courses
   .....±1/8 in. (3.2 mm)

   bed joint between flashing and masonry
   ..... - ½ in. (12.7 mm), +1/8 in. (3.2 mm)

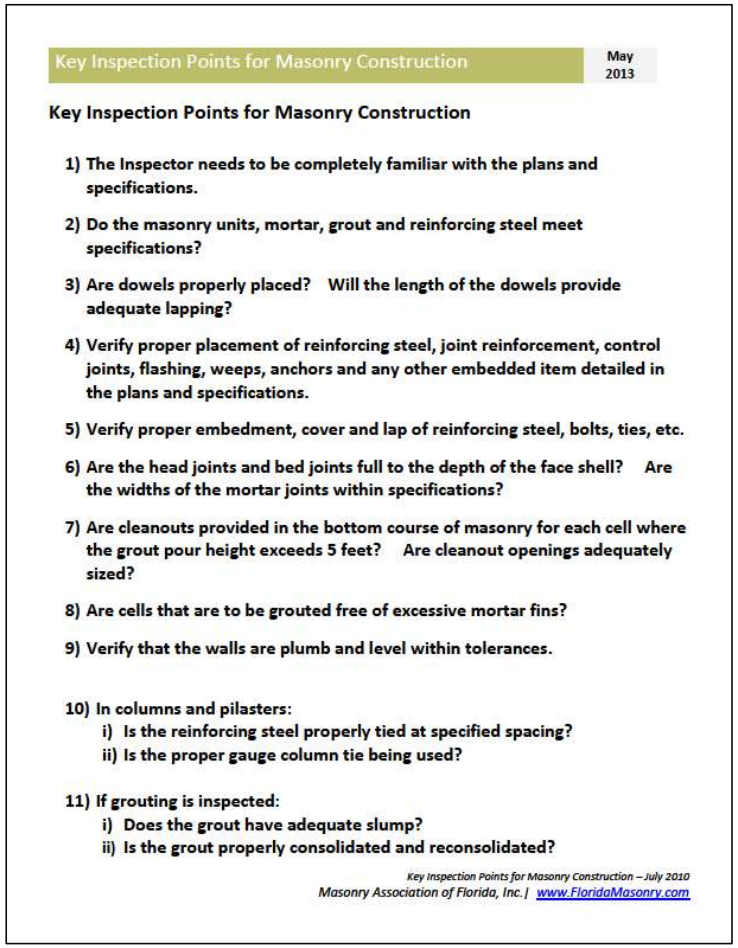
   head .....- 1/4 in. (6.4 mm), + 3/8 in. (9.5 mm)

   collar.....-1/4 in. (6.4 mm), + 3/8 in. (9.5 mm)

KEY INSPECTION POINTS

7

Are cleanouts provided in the bottom course of masonry for each cell where the grout pour height exceeds 5’-4”? Are cleanout openings adequately sized?



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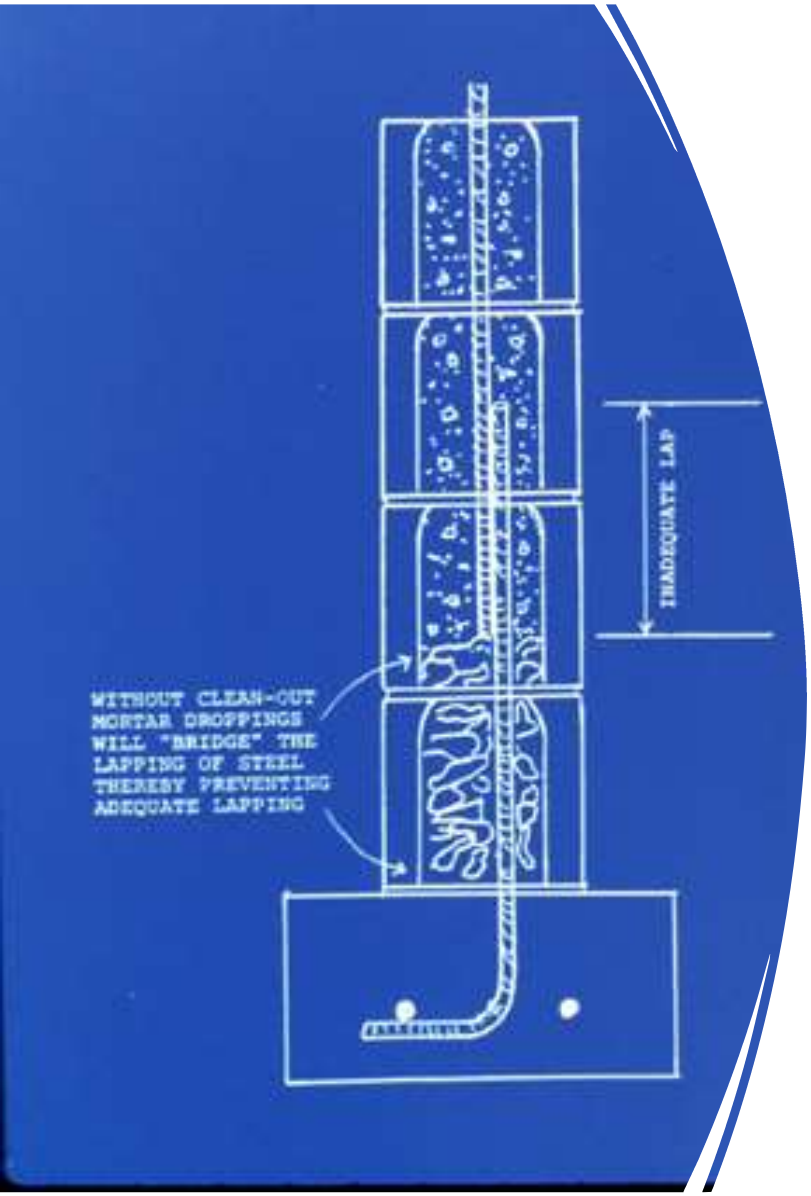


KEY INSPECTION POINTS

Cleanout also is for cleaning out

Key Inspection Points

Size of cleanout = 3 inch minimum

CLEANOUTS

PG. S-58 SECT 3.2 F.

3.2 F. *Cleanouts* — Provide cleanouts in the bottom course of masonry for each grout pour when the grout pour height exceeds 5 ft 4 in. (1.63 m).

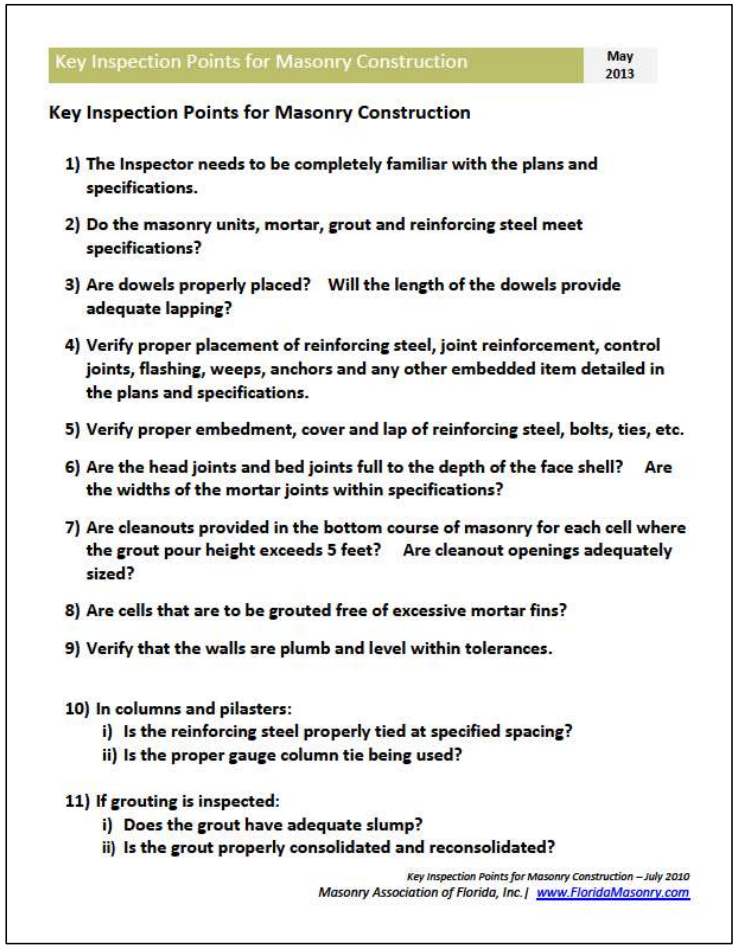
1. Construct cleanouts so that the space to be grouted can be cleaned and inspected. In solid grouted masonry, space cleanouts horizontally a maximum of 32 in. (813 mm) on center.

2. Construct cleanouts with an opening of sufficient size to permit removal of debris. The minimum opening dimension shall be 3 in. (76.2 mm).

KEY INSPECTION POINTS

8

Are cells receiving grout sufficient in size and free of obstructions?



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GROUT SPACE REQUIREMENTS

PG. S-77 SECT 3.5 C.
TABLE 6

Table 6 – Grout space requirements

Collar Joint

Grout type[1]	Maximum grout pour height, ft (m)	of grout space,[2,3] in. (mm)	Minimum clear grout space dimensions for grouting cells of hollow units,[3,4,5] in. x in. (mm x mm)
Fine	1 (0.30)	3/4 (19.1)	1 1/2 x 2 (38.1 x 50.8)
Fine	5.33 (1.63)	2 (50.8)	2 x 3 (50.8 x 76.2)
Fine	12.67 (3.86)	2 1/2 (63.5)	2 1/2 x 3 (63.5 x 76.2)
Fine	24 (7.32)	3 (76.2)	3 x 3 (76.2 x 76.2)
Coarse	1 (0.30)	1 1/2 (38.1)	1 1/2 x 3 (38.1 x 76.2)
Coarse	5.33 (1.63)	2 (50.8)	2 1/2 x 3 (63.5 x 76.2)
Coarse	12.67 (3.86)	2 1/2 (63.5)	3 x 3 (76.2 x 76.2)
Coarse	24 (7.32)	3 (76.2)	3 x 4 (76.2 x 102)

[1] Fine and coarse grouts are defined in ASTM C476.

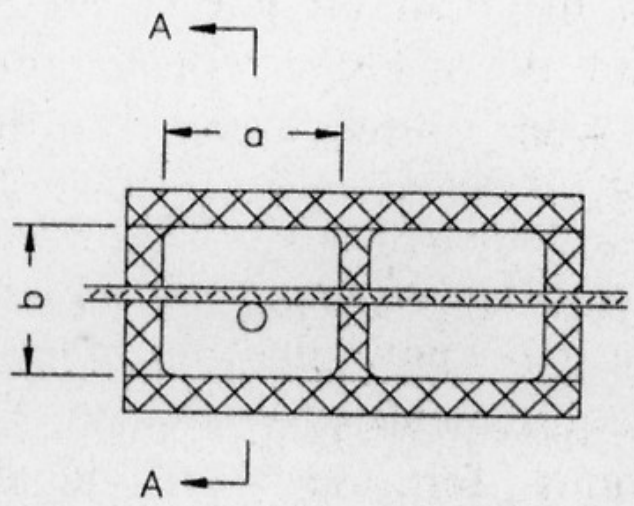
[2] For grouting between masonry wythes.

[3] Minimum clear width of grout space and minimum clear grout space dimension are the net dimension of the space determined by subtracting masonry protrusions and the diameters of horizontal bars from the as-built cross-section of the grout space. Select the grout type and maximum grout pour height based on the minimum clear space.

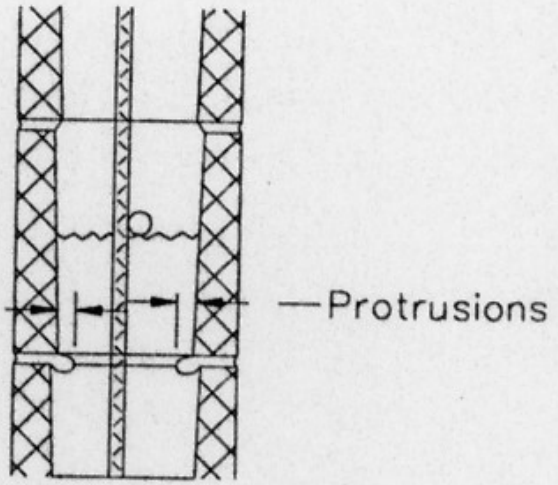
[4] Area of vertical reinforcement shall not exceed 6 percent of the area of the grout space.

[5] Minimum grout space dimension for AAC masonry units shall be 3 in. (76.2 mm) x 3 in. (76.2 mm) or a 3 in. (76.2 mm) diameter cell.

3.5 C. ***Grout pour height*** **— Do not exceed the maximum grout pour height given in Table 6**



a > Minimum Grout Space Dimension
b > Minimum Grout Space Dimension
Plus Horizontal Bar Diameter
Plus Horizontal Protrusions

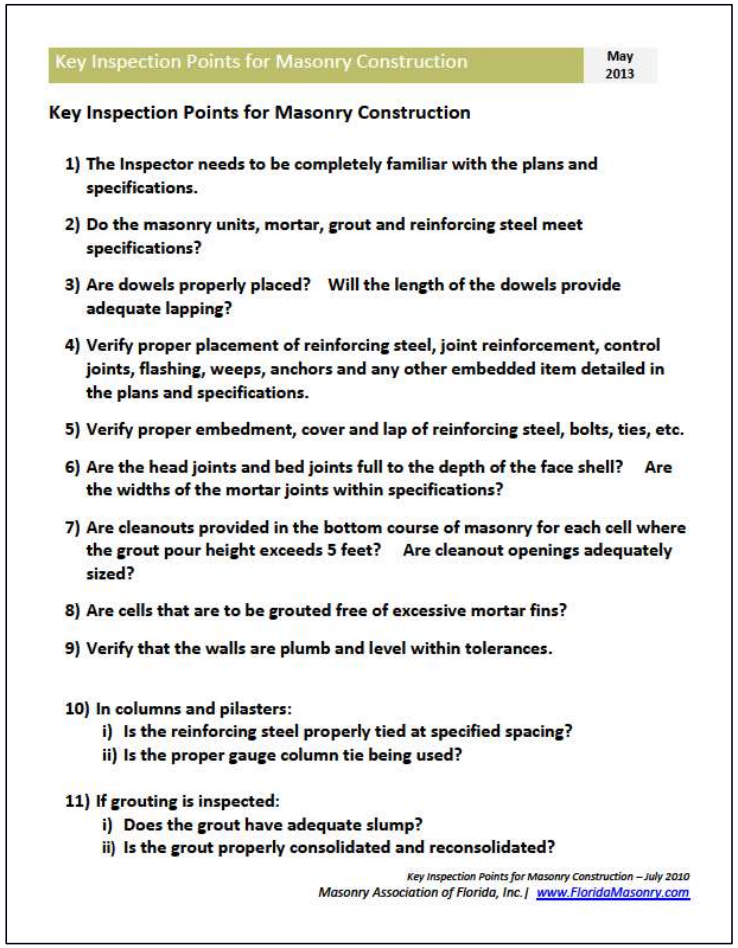


Section A–A

KEY INSPECTION POINTS

9

Verify that the walls are plumb and level within tolerances.



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TOLERANCE TABLE

PG. S-65 SECT 3.3 F.

¼" in 10' – ½" Max

3.3 F. *Site tolerances* (Continued)

2. Members

a. Variation from level:

bed joints
.....±1/4 in. (6.4 mm) in 10 ft (3.05 m)
.....±1/2 in. (12.7 mm) maximum

top surface of load-bearing walls
.....±1/4 in. (6.4 mm) in 10 ft (3.05 m)
.....±1/2 in. (12.7 mm) maximum

b. Variation from plumb
.....±1/4 in. (6.4 mm) in 10 ft (3.05 m)
.....±3/8 in. (9.5 mm) in 20 ft (6.10 m)
.....±1/2 in. (12.7 mm) maximum

c. True to a line
.....±1/4 in. (6.4 mm) in 10 ft (3.05 m)
.....±3/8 in. (9.5 mm) in 20 ft (6.10 m)
.....±1/2 in. (12.7 mm) maximum

d. Alignment of columns and walls (bottom versus top)
..... ±1/2 in. (12.7 mm) for load-bearing walls and columns
.±3/4 in. (19.1 mm) for non-load-bearing walls

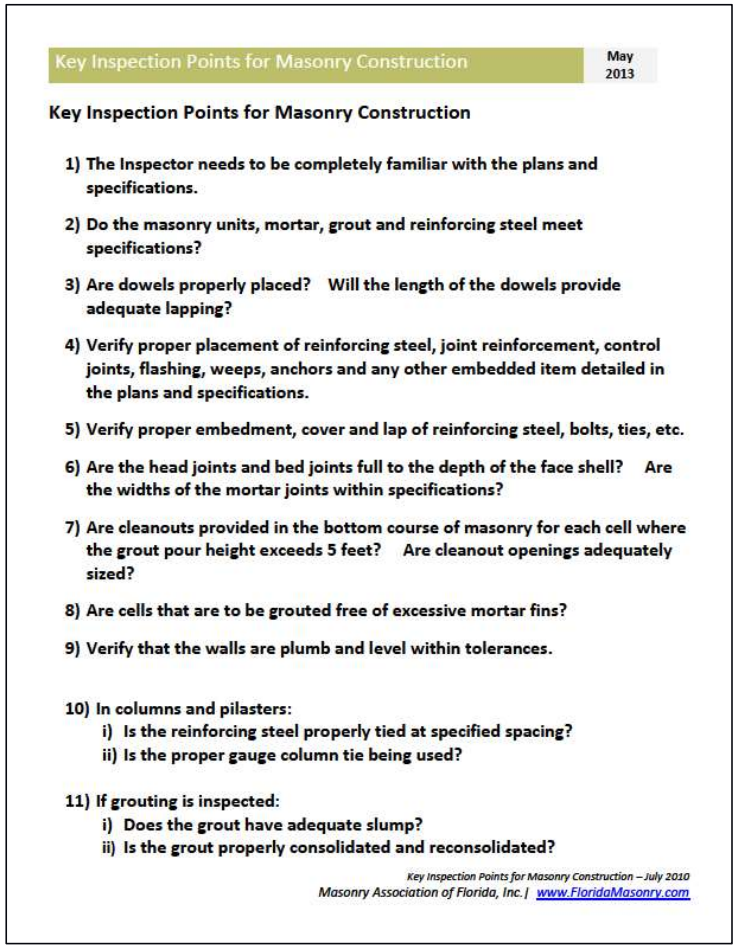
KEY INSPECTION POINTS

10

In columns and pilasters:

- Is the reinforcing steel properly tied at specified spacing?

- Is the proper gauge column tie being used?



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DEFINITION OF A COLUMN

pg. C-15 Sect 2.2

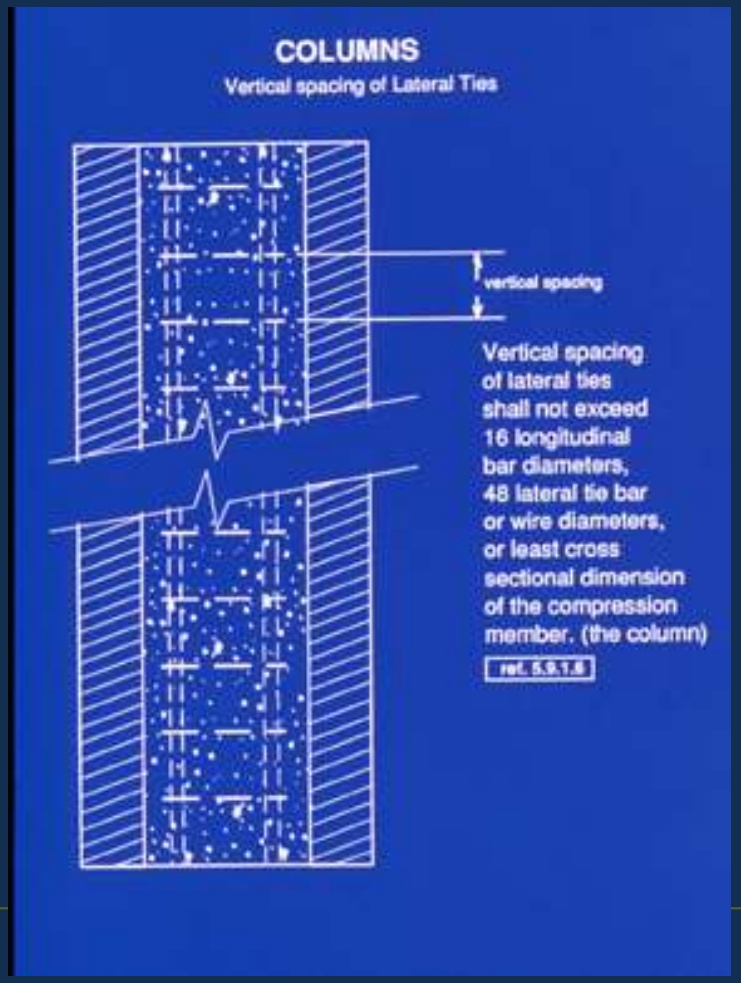
Column — A structural member, not built integrally into a wall, designed primarily to resist compressive loads parallel to its longitudinal axis and subject to dimensional limitations.

pg. C-56 Sect CC 5.3

5.3 — Columns

Columns are defined in Section 2.2. They are isolated members usually under axial compressive loads and flexure. If damaged, columns may cause the collapse of other members; sometimes of an entire structure. These critical structural elements warrant the special requirements of this section.

Special Column Requirements



Are ties needed on columns?

CODE DEFINITION OF A PILASTER

PG. C-18 SECT 2.2

Pilaster - A vertical member, built integrally with a wall, with a portion of its cross section typically projecting from one or both faces of the wall.

CODE COMMENTARY ON A PILASTER

PG. C-18 COMMENTARY

Pilaster – A pilaster may support axial loads parallel to its longitudinal axis, as well as …….

Longitudinal reinforcement in a pilaster only needs to be laterally tied if the design relies upon that reinforcement to resist axial and/or flexural compression, although lateral ties (stirrups) may also be required if shear stresses are high.

PILASTERS

From The 7th Edition Florida Building Code Chapter 21

2107.5 TMS 402/ACI 530/ASCE 5, Section 5.4 Pilasters.
Modify Section 5.4 as follows:

5.4 — Pilasters

5.4.3 Where vertical pilaster reinforcement is not provided to resist axial compressive stress, lateral ties are not required.

A Pilaster Built Integrally with no Specific Vertical Load is not a Column

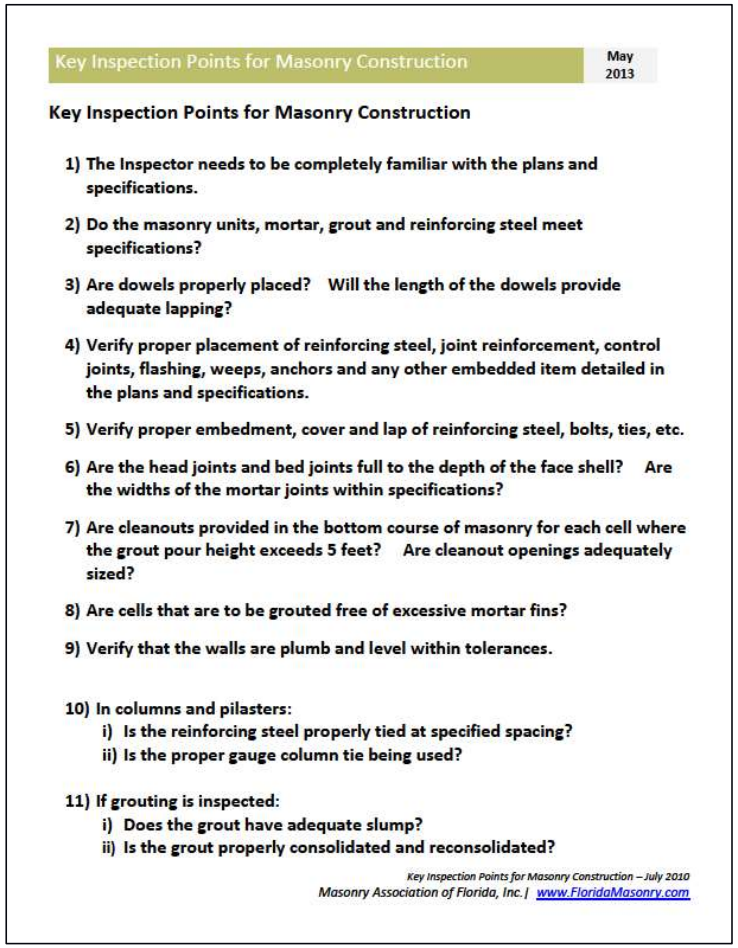
KEY INSPECTION POINTS

11

If grouting is inspected:

- Does the grout have adequate slump?

- Is the grout properly consolidated and reconsolidated?



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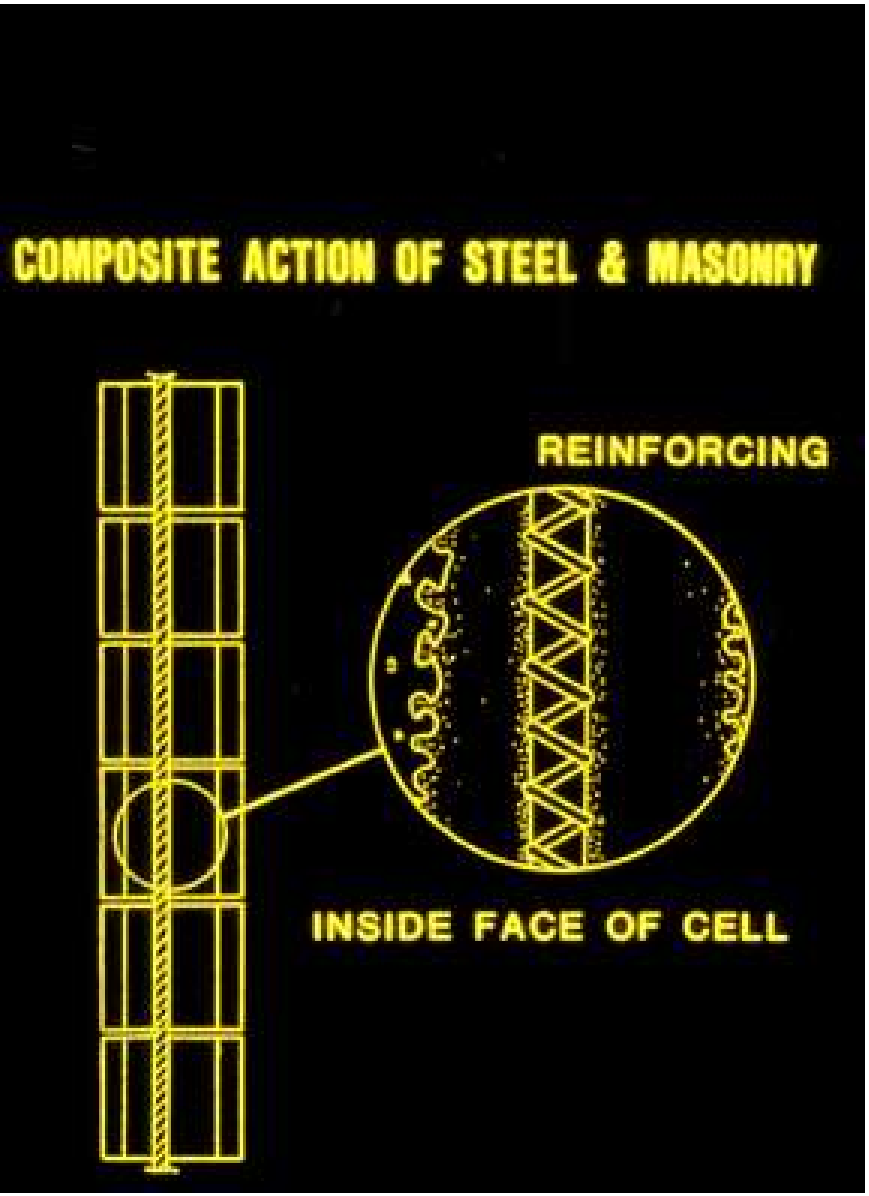

BAR MUST BE EMBEDDED IN GROUT

GROUTING

PG. S-76 SECT 3.5 A.

3.5 A. *Placing time* — Place grout within $1\frac{1}{2}$ hr from introducing water in the mixture and prior to initial set.

1. Discard site-mixed grout that does not meet the specified slump without adding water after initial mixing.

2. For ready-mixed grout:

   a. Addition of water is permitted at the time of discharge to adjust slump.

   b. Discard ready-mixed grout that does not meet the specified slump without adding water, other than the water that was added at the time of discharge.

   The time limitation is waived as long as the ready-mixed grout meets the specified slump.

GROUTING

Conflict between TMS 602-16 and FBC 7th Ed.

7TH ED. FBC SECT 2122.8.7

2122.8.7 Grout shall be placed before any initial set has occurred, but in no case more than $1^1/_2$ hours after the mix-designed water has been added.

Suggest working this out before the job starts if it is perceived as a potential problem. Temperature may be a better guage.

GROUTING

PG. S-76 SECT 3.5 B.

3.5 B. *Confinement* — Confine grout to the areas indicated on the Project Drawings. Use material to confine grout that permits bond between masonry units and mortar.

USE GROUT STOP --- SCREEN – *NO FELT* PAPER

GROUT POUR & GROUT LIFT

PG. S-6 SECT 1.2

1.2 — Definitions (Continued)

V. *Grout lift* — An increment of grout height within a total grout pour. A grout pour consists of one or more grout lifts.

W. *Grout pour* — The total height of masonry to be grouted prior to erection of additional masonry. A grout pour consists of one or more grout lifts.

GROUT POUR & GROUT LIFT

PG. S-78 SECT 3.5 D.

3.5 D. *Grout lift height*

1. For grout conforming to Article 2.2 A: (C-476)
   a. Where the following conditions are met, place grout in lifts not exceeding 12 ft 8 in. (3.86 m).
      i. The masonry has cured for at least 4 hours.
      ii. The grout slump is maintained between 10 and 11 in. (254 and 279 mm).
      iii. No intermediate reinforced bond beams are placed between the top and the bottom of the pour height.

CONSOLIDATION & RECONSOLIDATION

PG. S-78 SECT 3.5 E.

3.5 E. *Consolidation*

1. Consolidate grout at the time of placement.
   a. Consolidate grout pours 12 in. (305 mm) or less in height by mechanical vibration or by puddling.
   b. Consolidate pours exceeding 12 in. (305 mm) in height by mechanical vibration, and reconsolidate by mechanical vibration after initial water loss and settlement has occurred.
2. Consolidation or reconsolidation is not required for self-consolidating grout.

FLORIDA HVHZ CODE ALLOWS PUDDLING

Thank You!