



List of References:

Handbook of Construction Tolerances 2 ed
by David Kent Ballast, AIA, CSI

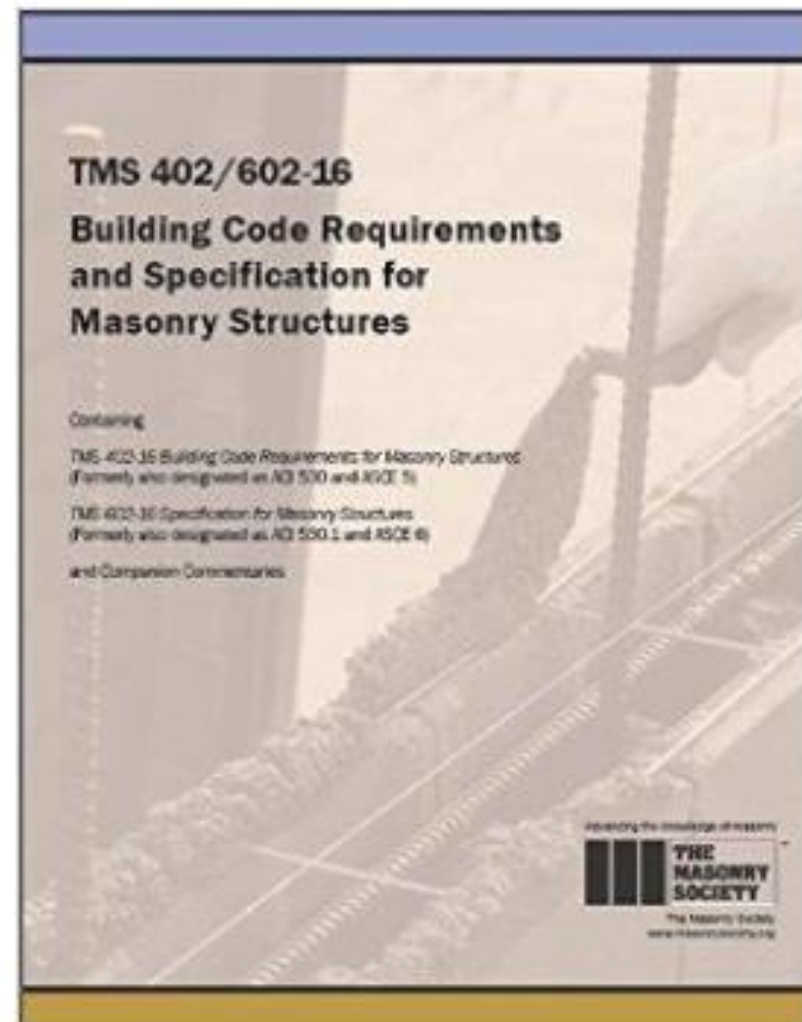
CMU: ASTM C55, ASTM C90, ASTM C129, ASTM 744

Masonry: ASTM C62, ASTM C216, ASTM 652, ASTM C1088

**ACI 530.1/ASCE 6/TMS 602 – Specifications for
Masonry Structures Dimension Stone**

Design Manual VI

Indiana Limestone Institute 21st ed.





MASONRY TOLERANCE

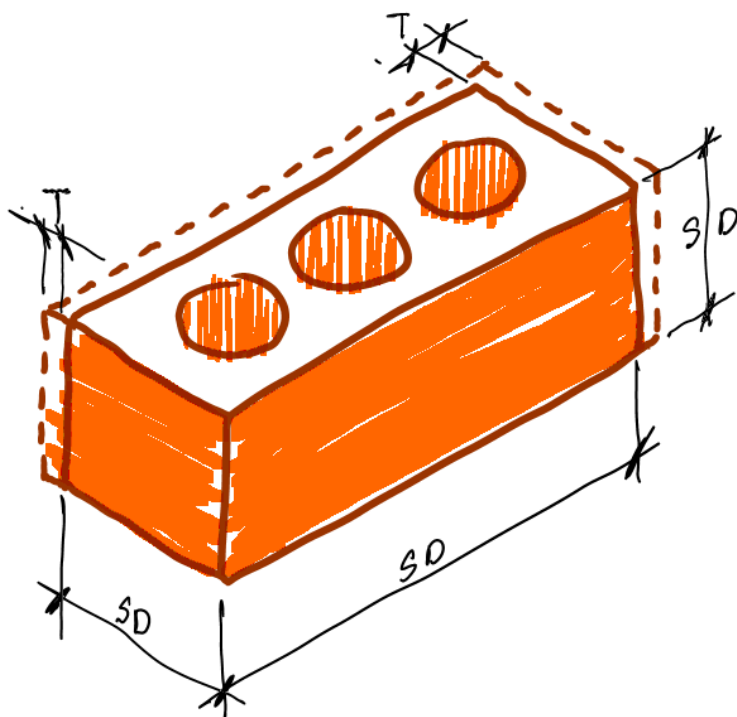
ASTM C216 – FBX & FBS

SD = Specified Dimension

T = Tolerance

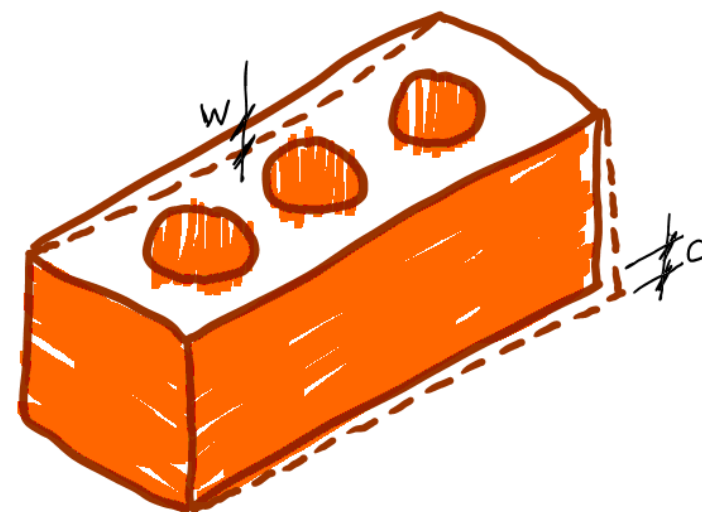
d = Distortion

w = Warpage



FBS $T = \pm 1/8''$

FBX $T = \pm 3/32''$



FBS $w = \pm 3/32''$

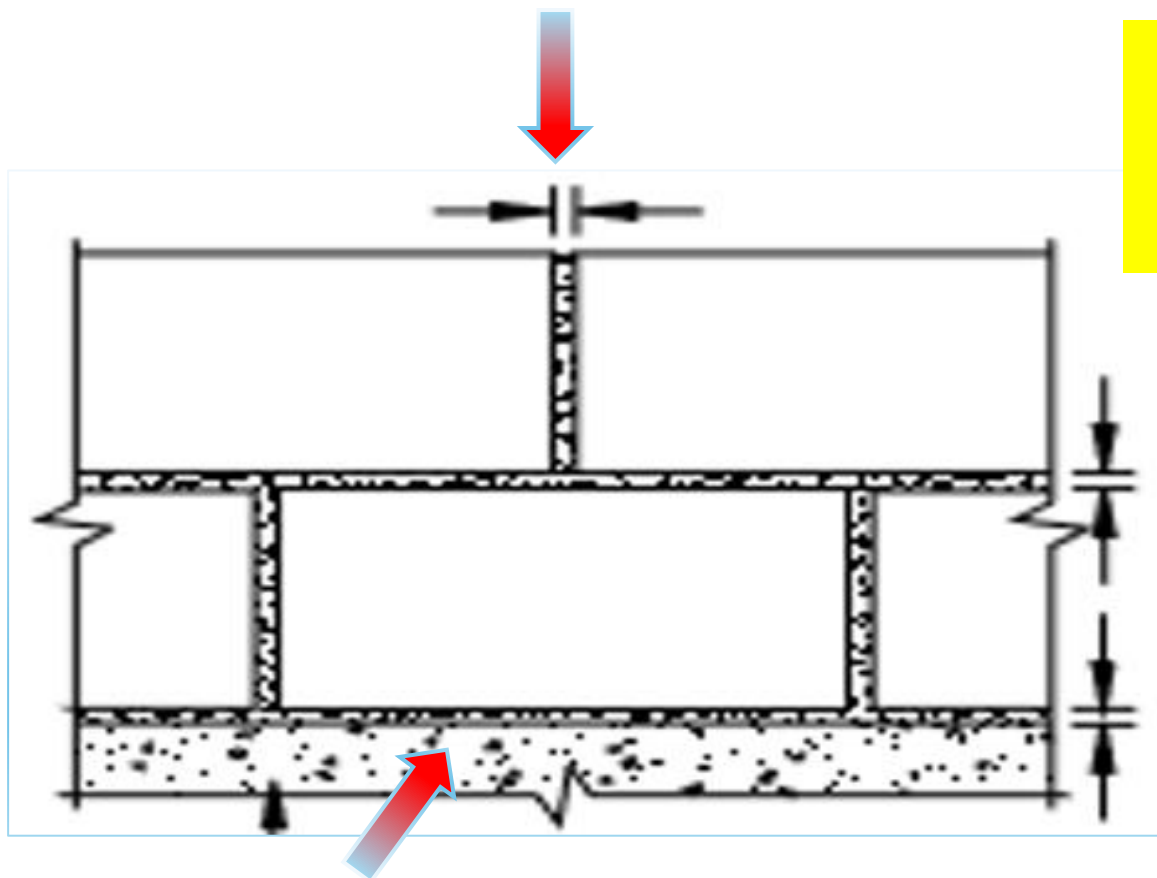
FBX $w = \pm 1/16''$

FBS $d = \pm 3/32''$

FBX $d = \pm 1/16''$



HEAD JOINT THICKNESS = $(3/8'')$ - $1/4''$ to $+3/8''$



So...we need to take the masonry unit tolerance into account

BED JOINT THICKNESS = $(3/8'')$ $\pm 1/8''$

INITIAL BED THICKNESS = $1/4''$ min to $1\frac{1}{4}''$ max

Footing Allowable Tolerance $\pm 1/2''$ (ACI 117)

Note: TMS 402-6.1.2.3...Max wire size = $1/2$ joint thickness



MASONRY WALL TOLERANCE

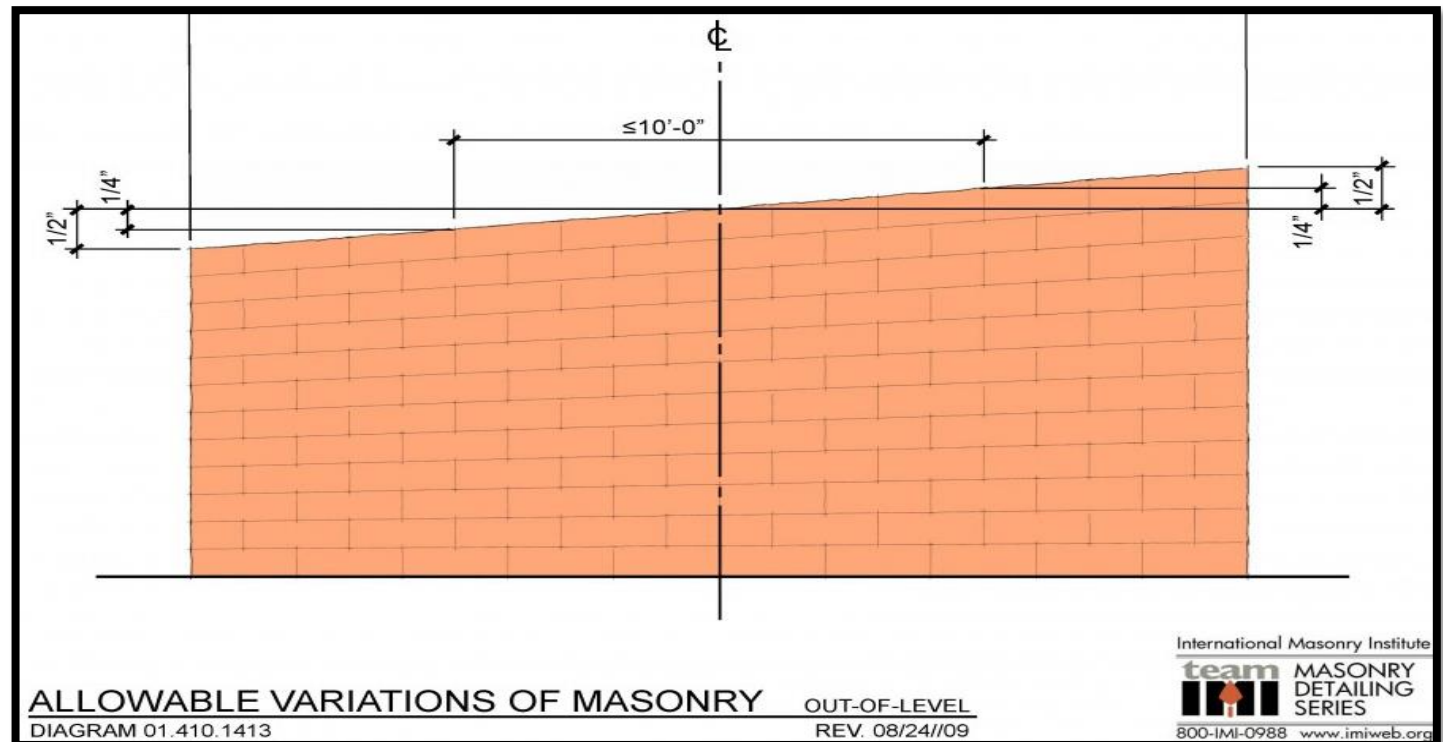
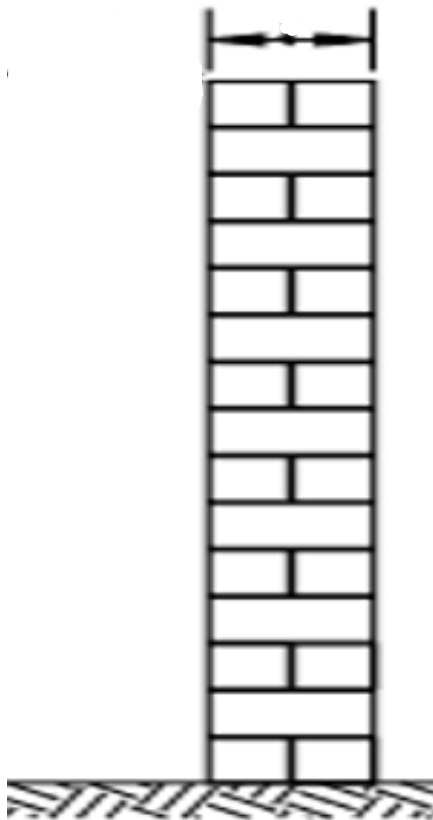
CROSS SECTIONAL

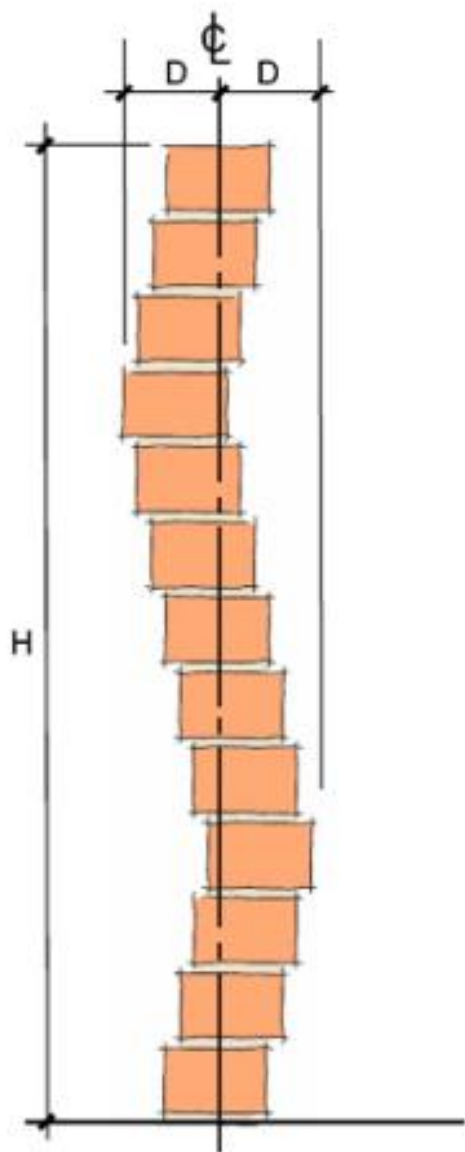
- 1/4" to + 1/2"

ELEVATION

Load Bearing : $\pm 1/4"$ in 10' (Max 1/2")

Non-Load Bearing : $\pm 1/4"$ per story (Max $\pm 3/4"$)





VARIATION IN PLUMB

H = Wall Height

D = Allowable Variation

When $H < 10'-0''$

$D < \frac{1}{4}''$

When $H < 20'-0''$

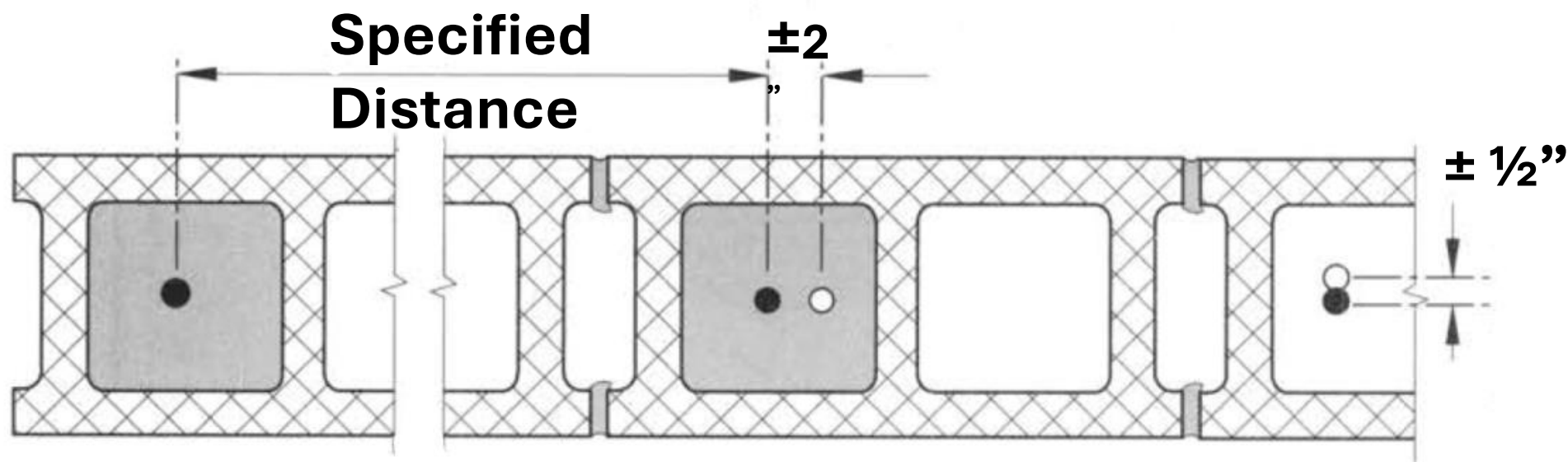
$D < \frac{3}{8}''$

When $H > 20'-0''$

$D < \frac{1}{2}''$



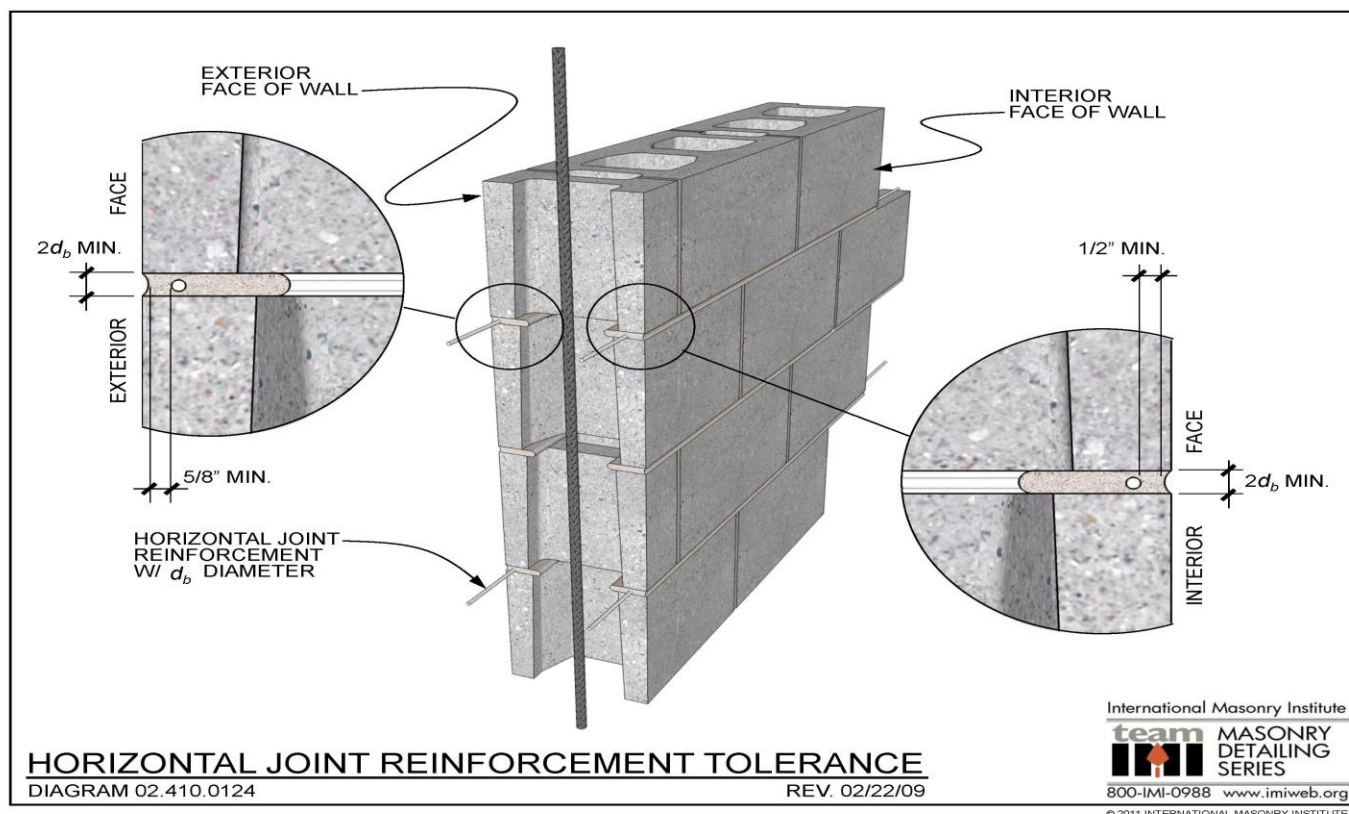
MASONRY REBAR TOLERANCE – ACI 530





HORIZONTAL JOINT REINFORCEMENT

Note: TMS 402-6.1.2.3...Max wire size = $\frac{1}{2}$ joint thickness



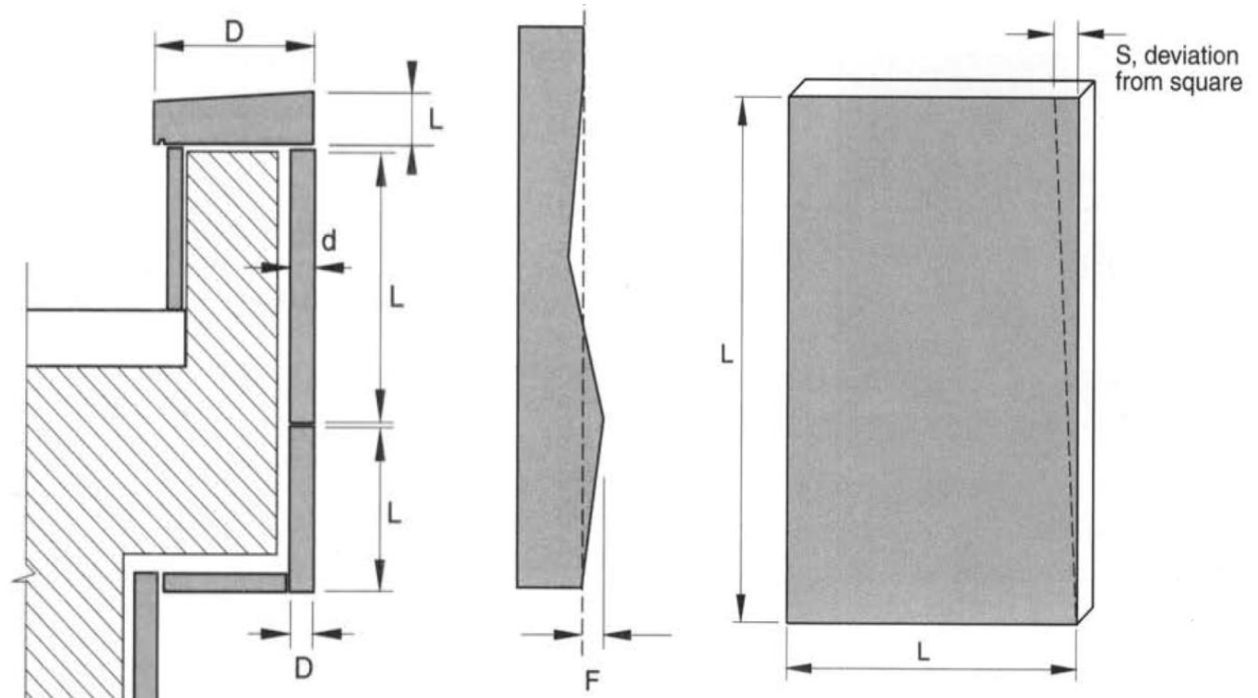
So, based on the Code and allowable tolerances...

Does a 3/16" wire size truly work?



LIMESTONE FABRICATION TOLERANCES

Specifying how the limestone is cut is important for tolerances.

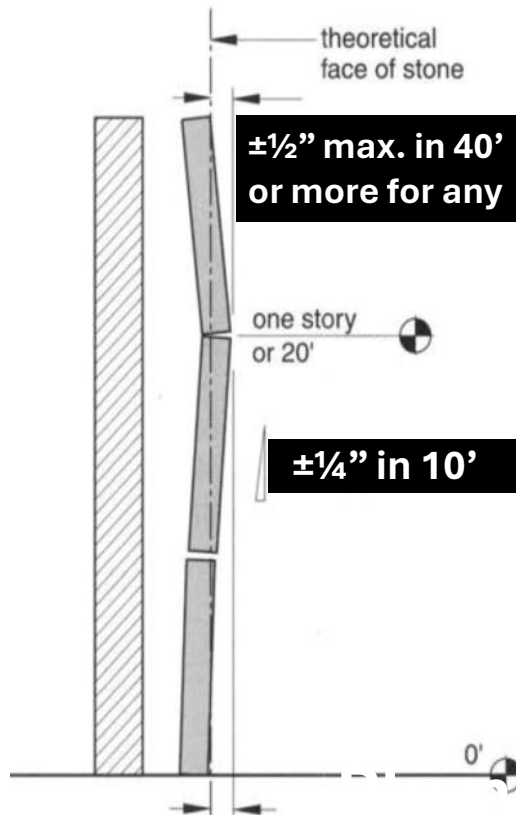


Finish type	Length, L, in (mm)	Deviation from flat surface, F, in (mm)	Critical depth, D, in (mm)	Non-critical depth, d, in (mm)	Deviation from square, S, in (mm)
Smooth machine finish	$\pm 1/16$ (2)	$\pm 1/16$ (2)	$\pm 1/16$ (2)	$\pm 1/2$ (13)	$\pm 1/16$ (2)
Diamond gang finish	$\pm 1/16$ (2)	$\pm 1/4$ (6)	$\pm 1/8$ (3)	$\pm 1/2$ (13)	$\pm 1/16$ (2)
Chat sawed finish	$\pm 1/16$ (2)	$\pm 1/4$ (6)	$\pm 1/8$ (3)	$\pm 1/2$ (13)	$\pm 1/16$ (2)
Shot sawed finish	$\pm 1/16$ (2)	$\pm 1/2$ (13)	$\pm 1/4$ (6)	$\pm 1/2$ (13)	$\pm 1/16$ (2)

Source: Indiana Limestone Handbook, 21st ed. Indiana Limestone Institute of America, Inc.



LIMESTONE INSTALLATION



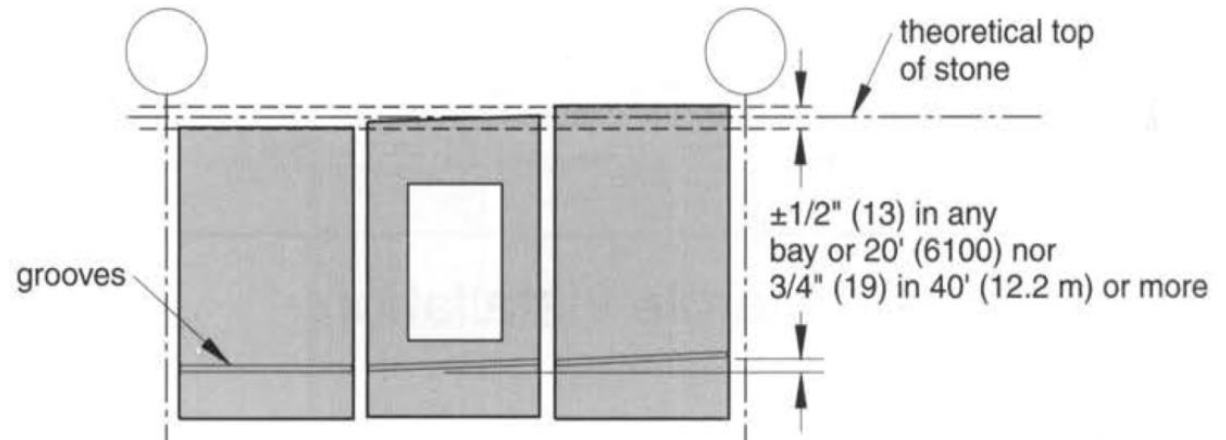
**±1/2" max. in 40'
or more for any**

one story
or 20'

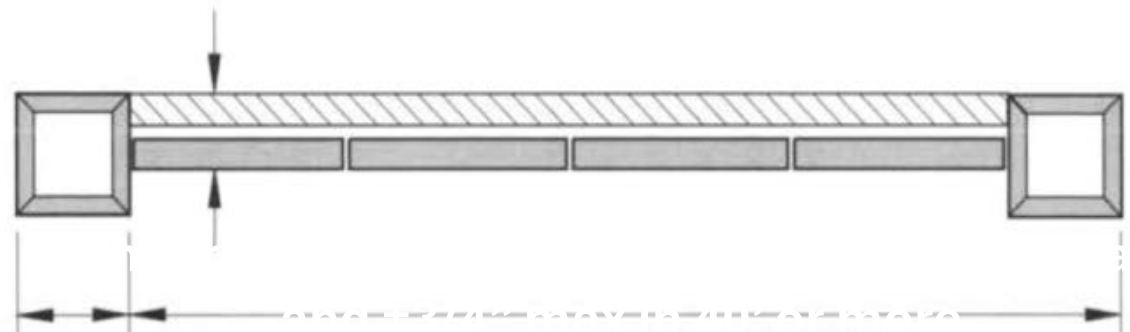
±1/4" in 10'

**±3/8" for one story or 20' max for
lines & surfaces of col & walls**

**±1/4" for one story or 20' max for
external corners, expansion joints,
and other conspicuous lines**



Tolerance for Level



Tolerances for Plan & Cross-Section

Source: Indiana Limestone Handbook, 21st ed. Indiana Limestone Institute of America, Inc.