

BUILDBLOCK® BUILDING SYSTEMS U.S. ENGINEERING TABLES

HIGH WIND LOAD REINFORCEMENT REQUIREMENTS FOR 4" ICF WALLS

Reinforcement in Above Grade 4" Walls FBC 2004/ACI 318-05

| Wall Height | Wind Speed | | | |
|------------------|------------|------------|----------|------------|
| | 120 mph | | 160 mph | |
| | Vertical | Horizontal | Vertical | Horizontal |
| 8' | #4 @ 24" | #4 @ 16" | #4 @ 18" | #4 @ 16" |
| 9' | #4 @ 24" | #4 @ 16" | #4 @ 12" | #4 @ 16" |
| 10' ¹ | #4 @ 24" | #4 @ 16" | #5 @ 12" | #4 @ 16" |
| 11' | #4 @ 24" | #4 @ 16" | N/A | N/A |
| 12' | #4 @ 18" | #4 @ 16" | N/A | N/A |

Assumptions:

120 mph at exposure category B

160 mph at exposure category C

Max clear span for floor trusses is 24'

Max clear span for roof trusses is 40'

Max mean roof height is 30'

Max 2 stories

$f_c' = 3,000$ psi Concrete

$f_y = 60,000$ psi Rebar

Dead load = 25 psf

Live floor load = 40 psf

Live roof load = 20 psf

No snow load

No seismic load

Wall openings 2 - #4 all around²

*Doesn't apply to bottom steel for lintels

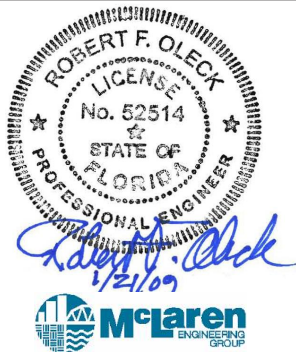
¹ At 160 mph must use:

Max clear span for floor trusses is 20'

Max clear span for roof trusses is 36'

Max mean roof height is 25'

² See typical opening detail and also Prescriptive Method



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High Wind Load
Reinforcement
Requirements
for 4" ICF Walls

TABLE NUMBER

1-A

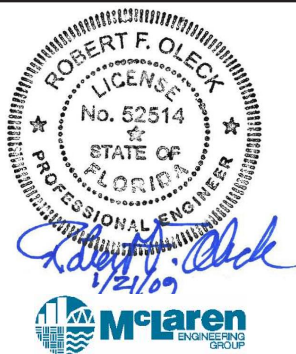
BUILDBLOCK® BUILDING SYSTEMS

U.S. ENGINEERING TABLES

HIGH WIND LOAD REINFORCEMENT REQUIREMENTS FOR 4" ICF LINTELS

Notes:

- 1.) When using more than 1 bar for the bottom reinforcement in a single lintel place them on top of each other, 1" clear spacing. (See 4" Lintel Detail)
- 2.) To calculate uniformly distributed load, UDL;
in a 1 story building, use: $UDL = S_r(DL+L_r)/2$
in a 2 story building, use: $UDL = S_r(DL+L_r)/2 + S_f(DL + LL)/2$
where Dead Load, DL = 25 psf
 Live Load, LL = 40 psf
 Live Roof Load, L_r = 20 psf
 Roof Truss Span, S_r = 40' MAX
 Floor Truss Span, S_f = 24' MAX
- 3.) If UDL falls between two table values, use the greater value.
- 4.) Stirrup end distance starts at the opening face and extends along the lintel into the opening on both sides.
- 5.) All horizontal steel around openings shall be within 12" of the bottom or top of the opening and must extend 24" beyond the side of the opening. Where 24" cannot be obtained beyond the limit of the opening, the bar shall be bent 90 degrees in order to obtain a minimum 12" embedment.
- 6.) All vertical steel around openings shall be within 12" of each side of the opening and shall run the full height of the wall.
- 7.) Only uniformly distributed gravity loads and lateral wind loads have been considered.
For lintels in walls that are 10' high located in 160 mph wind zones, and for point loads, consult a local design professional.
*For windows, distance from bottom of window to unfinished floor must be atleast 2'-8", except for windows in 12' high walls where this distance must be atleast 4'. If distances between bottom of window to unfinished floor are less than these values consult a local design professional.
- 8.) Lintels shall have atleast 6" bearing on the wall, on both sides. (See 4" Lintel Detail)



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High Wind Load
Reinforcement
Requirements
for 4" ICF Lintels
NOTES

TABLE NUMBER
1B-1F NOTES

BUILDBLOCK® BUILDING SYSTEMS U.S. ENGINEERING TABLES

HIGH WIND LOAD LINTEL TABLES FOR 4" ICF LINTELS

Reinforcement In 4" Thick, 8" High Concrete Lintel FBC 2004/ACI 318-05

| Opening Width [ft] | Uniformly Distributed Load [lb/ft] [‡] | | | | | | | | | |
|--------------------|---|------------------------|--------------|------------------------|--------------|------------------------|--------------|------------------------|--------------|------------------------|
| | 350 | | 850 | | 1350 | | 1850 | | 2350 | |
| | Bottom Steel | Stirrup End Dist. [in] | Bottom Steel | Stirrup End Dist. [in] | Bottom Steel | Stirrup End Dist. [in] | Bottom Steel | Stirrup End Dist. [in] | Bottom Steel | Stirrup End Dist. [in] |
| 3 | 1-#4 | 7 | 1-#4 | 14 | 1-#4 | 14 | 1-#5 | 18 | 1-#5 | 18 |
| 4 | 1-#4 | 11 | 1-#4 | 18 | 1-#5 | 21 | | | | |
| 6 | 1-#4 | 25 | | | | | | | | |
| 8 | 1-#5 | 35 | | | | | | | | |

Assumptions:

6" bearing on each side

#3 Stirrups @ 3.5 in. o.c. - As needed

Max 2 stories (1 structural floor and roof)

‡ These are service level or working loads

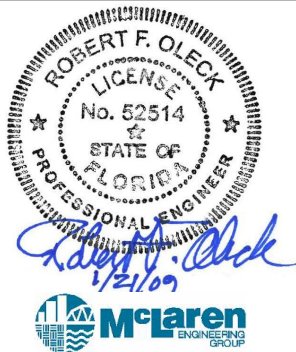
$f'_c =$ 3000 psi Concrete

$f_y =$ 60 ksi Rebar

$f_y =$ 40 ksi Stirrups

$h =$ 8 in

$b =$ 4 in



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Reinforcement In
4" Thick, 8" High
Concrete Lintel

TABLE NUMBER

1-B

BUILDBLOCK® BUILDING SYSTEMS U.S. ENGINEERING TABLES

HIGH WIND LOAD LINTEL TABLES FOR 4" ICF LINTELS

Reinforcement In 4" Thick, 16" High Concrete Lintel FBC 2004/ACI 318-05

| Opening Width [ft] | Uniformly Distributed Load [lb/ft] [‡] | | | | | | | | | |
|-----------------------|---|------------------------|-------------------|------------------------|--------------|------------------------|-------------------|------------------------|--------------|------------------------|
| | 350 | | 850 | | 1350 | | 1850 | | 2350 | |
| | Bottom Steel | Stirrup End Dist. [in] | Bottom Steel | Stirrup End Dist. [in] | Bottom Steel | Stirrup End Dist. [in] | Bottom Steel | Stirrup End Dist. [in] | Bottom Steel | Stirrup End Dist. [in] |
| 3 | 1-#4 | 0 | 1-#4 | 6 | 1-#4 | 12 | 1-#4 | 12 | 1-#4 | 12 |
| 4 | 1-#4 | 0 | 1-#4 | 12 | 1-#4 | 18 | 1-#4 | 18 | 1-#4 | 18 |
| 6 | 1-#4 | 6 | 1-#4 | 24 | 1-#5 | 30 | 1-#5 | 30 | 1-#6 | 30 |
| 8 | 1-#4 | 18 | 1-#5 | 36 | 1-#6 | 42 | 1-#7 [‡] | 42 | | |
| 10 | 1-#4 | 30 | 1-#6 | 48 | | | | | | |
| 12 | 1-#5 | 42 | 1-#7 [¥] | 60 | | | | | | |
| 14 | 1-#6 | 54 | | | | | | | | |

Assumptions:

6" bearing on each side

#3 Stirrups @ 6 in. o.c. - As needed

Max 2 stories (1 structural floor and roof)

¥ Can be substituted for 1-#5 + 1-#6

‡ Can be substituted for 2-#5

‡ These are service level or working loads

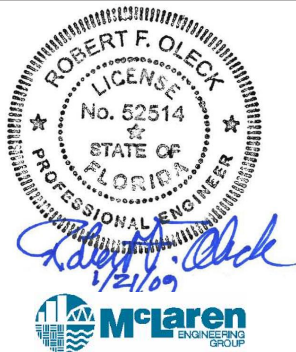
$f'_c =$ 3000 psi Concrete

$f_y =$ 60 ksi Rebar

$f_y =$ 40 ksi Stirrups

$h =$ 16 in

$b =$ 4 in



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Reinforcement In
4" Thick, 16" High
Concrete Lintel

TABLE NUMBER

1-C

BUILDBLOCK® BUILDING SYSTEMS U.S. ENGINEERING TABLES

HIGH WIND LOAD LINTEL TABLES FOR 4" ICF LINTELS

Reinforcement In 4" Thick, 24" High Concrete Lintel FBC 2004/ACI 318-05

| Opening Width [ft] | Uniformly Distributed Load [lb/ft] ‡ | | | | | | | | | |
|--------------------|--------------------------------------|------------------------|--------------|------------------------|--------------|------------------------|--------------|------------------------|--------------|------------------------|
| | 350 | | 850 | | 1350 | | 1850 | | 2350 | |
| | Bottom Steel | Stirrup End Dist. [in] | Bottom Steel | Stirrup End Dist. [in] | Bottom Steel | Stirrup End Dist. [in] | Bottom Steel | Stirrup End Dist. [in] | Bottom Steel | Stirrup End Dist. [in] |
| 3 | 1-#4 | 0 | 1-#4 | 0 | 1-#4 | 6 | 1-#4 | 6 | 1-#4 | 12 |
| 4 | 1-#4 | 0 | 1-#4 | 0 | 1-#4 | 12 | 1-#4 | 12 | 1-#4 | 18 |
| 6 | 1-#4 | 0 | 1-#4 | 12 | 1-#4 | 24 | 1-#5 | 24 | 1-#5 | 30 |
| 8 | 1-#4 | 0 | 1-#4 | 24 | 1-#5 | 36 | 1-#6 | 36 | 1-#6 | 42 |
| 10 | 1-#4 | 12 | 1-#5 | 36 | 1-#6 | 48 | 1-#7 | 48 | 1-#8 | 54 |
| 12 | 1-#5 | 24 | 1-#6 | 48 | 1-#7 | 60 | 1-#8 | 60 | | |
| 14 | 1-#5 | 36 | 1-#7 | 60 | 1-#8 | 72 | | | | |
| 16 | 1-#5 | 48 | 1-#8 | 72 | | | | | | |
| 18 | 1-#6 | 60 | 1-#8 | 84 | | | | | | |
| 20 | 1-#6 | 72 | | | | | | | | |

Assumptions:

6" bearing on each side

#3 Stirrups @ 6 in. o.c. - As needed

Max 2 stories (1 structural floor and roof)

1-#7 can be substituted for 2-#5

1-#8 can be substituted for 2-#6

‡ These are service level or working loads

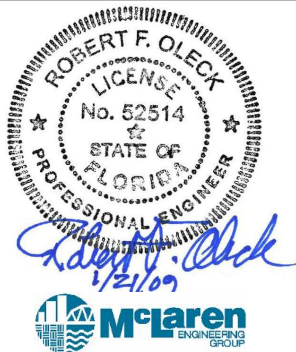
$f'_c =$ 3000 psi Concrete

$f_y =$ 60 ksi Rebar

$f_y =$ 40 ksi Stirrups

$h =$ 24 in

$b =$ 4 in



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Reinforcement In
4" Thick, 24" High
Concrete Lintel

TABLE NUMBER

1-D

BUILDBLOCK® BUILDING SYSTEMS U.S. ENGINEERING TABLES

HIGH WIND LOAD LINTEL TABLES FOR 4" ICF LINTELS

Reinforcement In 4" Thick, 32" High Concrete Lintel FBC 2004/ACI 318-05

| Opening Width [ft] | Uniformly Distributed Load [lb/ft] [‡] | | | | | | | | | |
|--------------------|---|------------------------|--------------|------------------------|---------------------------------|------------------------|--------------|------------------------|--------------|------------------------|
| | 350 | | 850 | | 1350 | | 1850 | | 2350 | |
| | Bottom Steel | Stirrup End Dist. [in] | Bottom Steel | Stirrup End Dist. [in] | Bottom Steel [in ²] | Stirrup End Dist. [in] | Bottom Steel | Stirrup End Dist. [in] | Bottom Steel | Stirrup End Dist. [in] |
| 3 | 1-#4 | 0 | 1-#4 | 0 | 1-#4 | 0 | 1-#4 | 0 | 1-#4 | 6 |
| 4 | 1-#4 | 0 | 1-#4 | 0 | 1-#4 | 0 | 1-#4 | 6 | 1-#4 | 12 |
| 6 | 1-#4 | 0 | 1-#4 | 0 | 1-#4 | 12 | 1-#4 | 18 | 1-#5 | 24 |
| 8 | 1-#4 | 0 | 1-#4 | 12 | 1-#5 | 24 | 1-#5 | 30 | 1-#6 | 36 |
| 10 | 1-#4 | 0 | 1-#5 | 24 | 1-#6 | 36 | 1-#6 | 42 | 1-#6 | 48 |
| 12 | 1-#4 | 0 | 1-#6 | 36 | 1-#6 | 48 | 1-#7 | 54 | 1-#8 | 60 |
| 14 | 1-#5 | 12 | 1-#6 | 48 | 1-#7 | 60 | 1-#8 | 66 | | |
| 16 | 1-#5 | 24 | 1-#6 | 60 | 1-#8 | 72 | | | | |
| 18 | 1-#6 | 36 | 1-#7 | 72 | | | | | | |
| 20 | 1-#6 | 48 | 1-#8 | 84 | | | | | | |

Assumptions:

6" bearing on each side

#3 Stirrups @ 6 in. o.c. - As needed

Max 2 stories (1 structural floor and roof)

1-#7 can be substituted for 2-#5

1-#8 can be substituted for 2-#6

‡ These are service level or working loads

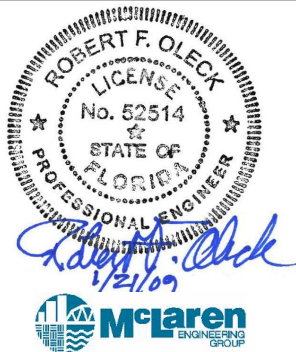
$f'_c =$ 3000 psi Concrete

$f_y =$ 60 ksi Rebar

$f_y =$ 40 ksi Stirrups

$h =$ 32 in

$b =$ 4 in



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Concrete Lintel

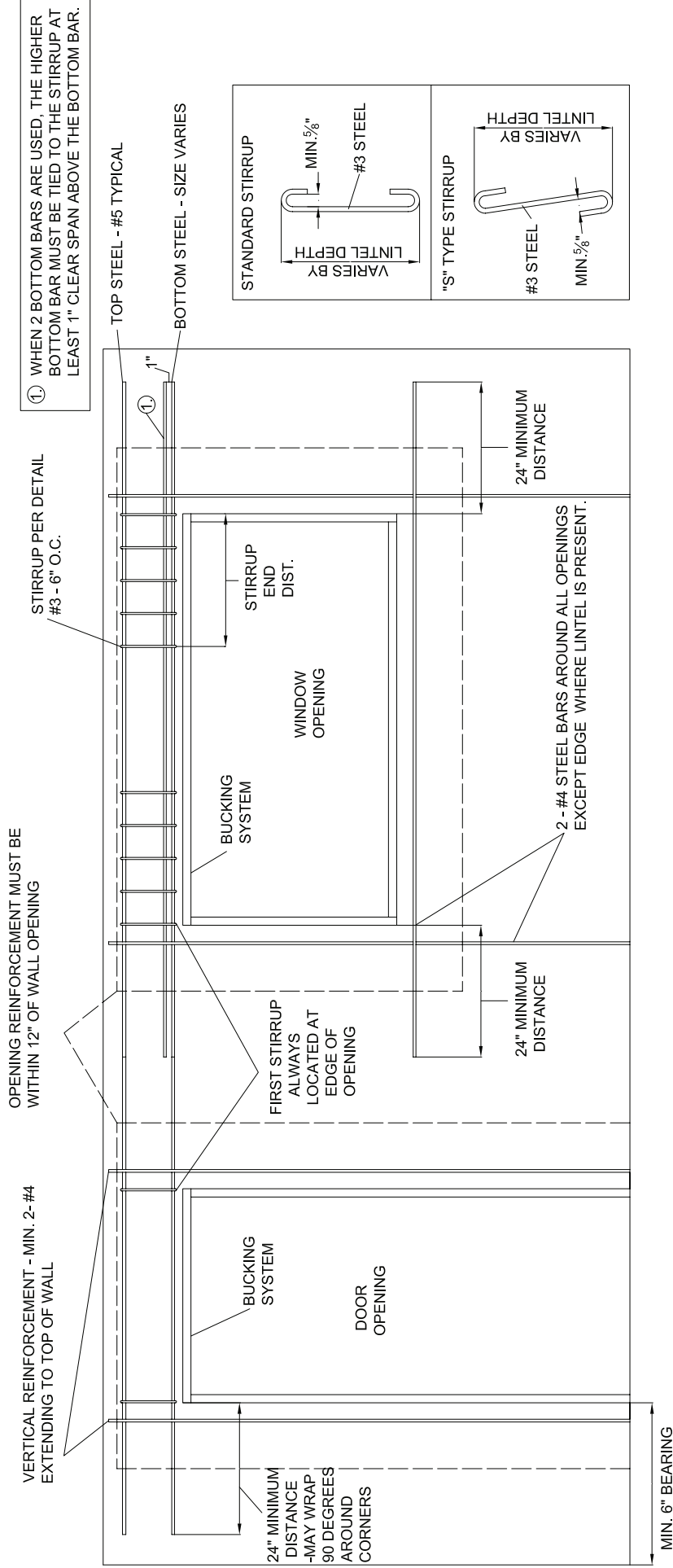
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1-E

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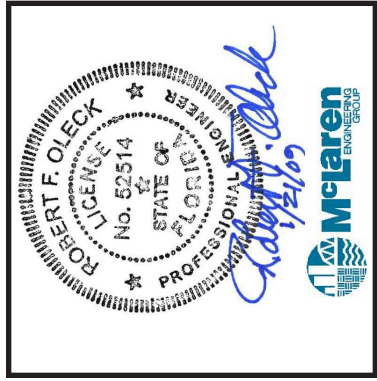
U.S. ENGINEERING TABLES

HIGH WIND LOAD LINTEL TABLES FOR 4" ICF LINTELS



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4" Lintel Detail

TABLE NUMBER
1-F