WALL ENGINEERING

There are two main resources for the engineering of flat ICF walls in the United States:

1. PCA 100-2007, Prescriptive Design of Exterior Concrete Walls for One- and Two-Family Dwellings. This document is widely recognized across most of the United States.

The provisions of this Standard apply to the design and construction of concrete footings, foundation walls and above-grade walls, both load bearing and non-load bearing, for:
1. Detached one and two-family dwellings
2. Multiple dwellings
3. One-story buildings of other occupancy groups assigned to Seismic Design Category A.

(This is the first edition of the Portland Cement Association's (PCA) Prescriptive Design of Exterior Concrete Walls for One- and Two-Family Dwellings. This con - sensus standard was developed by the PCA's National Standards Development Committee (Committee) that operates under PCA's American National Standards Institute (ANSI) approved "Procedures for the Development and Maintenance of Portland Cement Association Standards." The consensus process of PCA for promulgating standards is accredited by ANSI. The Committee is balanced and was formed and operated in accordance with the PCA procedures).

2. ACI 318 "Building Code Requirements for Structural Concrete" is used for walls which are outside the scope and applicability limits of the Prescriptive Method. A local licensed/registered engineer is required to approve the design using this resource.

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Table 3.4. Minimum Vertical Reinforcement for Concrete Crawlspace Walls[1,2,3,4,5,6,7,10]

Shape of concrete walls	Nominal wall thickness[8] (in.)	Minimum vertical reinforcement – bar size No. and spacing (in.)		
		Maximum design lateral soil load		
		30 psf/ft	45 psf/ft	60 psf/ft
Flat	4[9]	4@48	4@38	4@34
	6	NR	NR	NR
	8	NR	NR	NR
	10	NR	NR	NR
Waffle-grid	6	4@48	4@48	4@48
	8	NR	NR	NR
Screen-grid	6	4@48	4@48	4@48

For SI: 1 inch = 25.4 mm; 1 foot = 0.3048 m; 1 psf/ft = 0.1571 kN/m^2/m

1 Table values are based on reinforcing bars with a minimum yield strength of 60,000 psi (420 MPa), concrete with a minimum specified compressive strength of 2,500 psi (17.2 MPa), and vertical reinforcement being located at the centerline of the wall. See Section 3.3.
2 Vertical reinforcement with a yield strength of less than 60,000 psi (420 MPa) and/or bars of a different size than specified in the table are permitted in accordance with Section 2.5.7 and Table 2.3.
3 In lieu of using No. 4 bars, No. 3 bars are permitted provided the spacing shown in the table or determined in accordance with Note 2 is reduced by 50%.
4 NR indicates no vertical wall reinforcement is required, except for 6-inch (152 mm) nominal flat walls formed with stay-in-place forming systems in which case vertical reinforcement shall be No. 3@24 (610 mm) or No. 4@48 inches (1219 mm) on center.
5 Applicable only to crawlspace walls 5 feet (1.5 m) or less in unsupported height with a maximum unbalanced backfill height of 4 feet (1.2 m).
6 Interpolation shall not be permitted.
7 Where walls will retain 4 feet (1.2 m) of unbalanced backfill, they shall be laterally supported at the top and bottom before backfilling.
8 Nominal thicknesses are shown for walls. See Table 2.1 for tolerance from nominal thickness permitted for flat walls and thicknesses and dimensions of waffle- and screen-grid walls.
9 Applicable only to one-story construction with floor bearing on top of crawlspace wall.
10 See Sections 3.2.2, 3.2.4 and 3.2.5 for minimum reinforcement required for crawlspace walls supporting above-grade concrete walls.

Table 3.5. Minimum Horizontal Reinforcement for Concrete Basement Walls[1,2]

Maximum unsupported height of basement wall-feet (meters)	Location of horizontal reinforcement
≤ 8 (2.4)	One No. 4 bar within 12 inches (305 mm) of the top of the wall story and one No. 4 bar near mid-height of the wall story
> 8 (2.4)	One No. 4 bar within 12 inches (305 mm) of the top of the wall story and one No. 4 bar near third points in the wall story

1 Horizontal reinforcement requirements are for reinforcing bars with a minimum yield strength of 40,000 psi (280 MPa) and concrete with a minimum concrete compressive strength 2,500 psi (17.2 MPa).
2 See Sections 3.2.3, 3.2.4 and 3.2.5 for minimum reinforcement required for basement walls supporting above-grade concrete walls.

Table 3.6. Minimum Vertical Reinforcement for 6-Inch (152 mm) Nominal Flat Concrete Basement Walls[1,2,3,4,5,7,8,9,10]

Maximum unsupported wall height (ft)	Maximum unbalanced backfill height[6] (ft)	Minimum vertical reinforcement – bar size No. and spacing (in.)		
		Maximum design lateral soil load		
		30 psf/ft	45 psf/ft	60 psf/ft
8	4	NR	NR	NR
	5	NR	5@39	6@48
	6	5@39	6@48	6@35
	7	6@48	6@34	6@25
	8	6@39	6@25	6@18
9	4	NR	NR	NR
	5	NR	5@37	6@48
	6	5@36	6@44	6@32
	7	6@47	6@30	6@22
	8	6@34	6@22	6@16
	9	6@27	6@17	DR
10	4	NR	NR	NR
	5	NR	5@35	6@48
	6	6@48	6@41	6@30
	7	6@43	6@28	6@20
	8	6@31	6@20	DR
	9	6@24	6@15	DR
	10	6@19	DR	DR

For SI: 1 inch = 25.4 mm; 1 foot = 0.3048 m; 1 psf/ft = 0.1571 kN/m^2/m

[1] Table values are based on reinforcing bars with a minimum yield strength of 60,000 psi (420 MPa), concrete with a minimum specified compressive strength of 2,500 psi (17.2 MPa), and vertical reinforcement being located at the centerline of the wall. See Section 3.3.

[2] Vertical reinforcement with a yield strength of less than 60,000 psi (420 MPa) and/or bars of a different size than specified in the table are permitted in accordance with Section 2.5.7 and Table 2.3.

[3] Deflection criterion is ***L***/240, where ***L*** is the height of the basement wall in inches.

[4] Interpolation shall not be permitted.

[5] Where walls will retain 4 feet (1.2 m) or greater of unbalanced backfill, they shall be laterally supported at the top and bottom before backfilling.

[6] Refer to Chapter 1 for the definition of unbalanced backfill height.

[7] NR indicates no vertical wall reinforcement is required, except for 6-inch (152 mm) nominal walls formed with stay-in-place forming systems in which case vertical reinforcement shall be No. 4@48 inches (1219 mm) on center.

[8] See Sections 3.2.3, 3.2.4 and 3.2.5 for minimum reinforcement required for basement walls supporting above-grade concrete walls.

[9] See Table 2.1 for tolerance from nominal thickness permitted for flat walls.

[10] DR means design is required in accordance with the applicable building code, or where there is no code in accordance with ACI 318.

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Table 3.7. Minimum Vertical Reinforcement for 8-Inch (203 mm) Nominal Flat Concrete Basement Walls[1,2,3,4,5,6,8,9]

Maximum unsupported wall height (ft)	Maximum unbalanced backfill height[7] (ft)	Minimum vertical reinforcement – bar size No. and spacing (in.)		
		Maximum design lateral soil load		
		30 psf/ft	45 psf/ft	60 psf/ft
8	4	NR	NR	NR
	5	NR	NR	NR
	6	NR	NR	6@37
	7	NR	6@36	6@35
	8	6@41	6@35	6@26
9	4	NR	NR	NR
	5	NR	NR	NR
	6	NR	NR	6@35
	7	NR	6@35	6@32
	8	6@36	6@32	6@23
	9	6@35	6@25	6@18
10	4	NR	NR	NR
	5	NR	NR	NR
	6	NR	NR	6@35
	7	NR	6@35	6@29
	8	6@35	6@29	6@21
	9	6@34	6@22	6@16
	10	6@27	6@17	6@13

For SI: 1 inch = 25.4 mm; 1 foot = 0.3048 m; 1 psf/ft = 0.1571 kN/m^2/m

1 Table values are based on reinforcing bars with a minimum yield strength of 60,000 psi (420 MPa), concrete with a minimum specified compressive strength of 2,500 psi (17.2 MPa), and vertical reinforcement being located at the centerline of the wall. See Section 3.3.

2 Vertical reinforcement with a yield strength of less than 60,000 psi (420 MPa) and/or bars of a different size than specified in the table are permitted in accordance with Section 2.5.7 and Table 2.3.

3 NR indicates no vertical reinforcement is required.

4 Deflection criterion is ***L***/240, where ***L*** is the height of the basement wall in inches.

5 Interpolation shall not be permitted.

6 Where walls will retain 4 feet (1.2 m) or greater of unbalanced backfill, they shall be laterally supported at the top and bottom before backfilling.

7 Refer to Chapter 1 for the definition of unbalanced backfill height.

8 See Sections 3.2.3, 3.2.4 and 3.2.5 for minimum reinforcement required for basement walls supporting above-grade concrete walls.

9 See Table 2.1 for tolerance from nominal thickness permitted for flat walls.

Table 3.8. Minimum Vertical Reinforcement for 10-Inch (252 mm) Nominal Flat Concrete Basement Walls[1,2,3,4,5,6,8,9]

Maximum unsupported wall height (ft)	Maximum unbalanced backfill height[7] (ft)	Minimum vertical reinforcement – bar size No. and spacing (in.)		
		Maximum design lateral soil load		
		30 psf/ft	45 psf/ft	60 psf/ft
8	4	NR	NR	NR
	5	NR	NR	NR
	6	NR	NR	NR
	7	NR	NR	NR
	8	6@48	6@35	6@28
9	4	NR	NR	NR
	5	NR	NR	NR
	6	NR	NR	NR
	7	NR	NR	6@31
	8	NR	6@31	6@28
	9	6@37	6@28	6@24
10	4	NR	NR	NR
	5	NR	NR	NR
	6	NR	NR	NR
	7	NR	NR	6@28
	8	NR	6@28	6@28
	9	6@33	6@28	6@21
	10	6@28	6@23	6@17

For SI: 1 inch = 25.4 mm; 1 foot = 0.3048 m; 1 psf/ft = 0.1571 kN/m^2/m

1 Table values are based on reinforcing bars with a minimum yield strength of 60,000 psi (420 MPa), concrete with a minimum specified compressive strength of 2,500 psi (17.2 MPa), and vertical reinforcement being located at the centerline of the wall. See Section 3.3.

2 Vertical reinforcement with a yield strength of less than 60,000 psi (420 MPa) and/or bars of a different size than specified in the table are permitted in accordance with Section 2.5.7 and Table 2.3.

3 NR indicates no vertical reinforcement is required.

4 Deflection criterion is ***L***/240, where ***L*** is the height of the basement wall in inches.

5 Interpolation shall not be permitted.

6 Where walls will retain 4 feet (1.2 m) or greater of unbalanced backfill, they shall be laterally supported at the top and bottom before backfilling.

7 Refer to Chapter 1 for the definition of unbalanced backfill height.

8 See Sections 3.2.3, 3.2.4 and 3.2.5 for minimum reinforcement required for basement walls supporting above-grade concrete walls.

9 See Table 2.1 for tolerance from nominal thickness permitted for flat walls.

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Table 4.1. Minimum Vertical Reinforcement for Flat Above-Grade Walls[1,2,3,4,5,11]

Basic wind speed (mph)			Maximum unsupported wall height per story (ft)	Minimum vertical reinforcement – bar size No. and spacing (in.)[6,7,8]							
Exposure category				Nominal[9] wall thickness (in.)							
				4		6		8		10	
B	C	D		Top[10]	Side[10]	Top[10]	Side[10]	Top[10]	Side[10]	Top[10]	Side[10]
85			8	4@48	4@48	4@48	4@48	4@48	4@48	4@48	4@48
			9	4@48	4@43	4@48	4@48	4@48	4@48	4@48	4@48
			10	4@47	4@36	4@48	4@48	4@48	4@48	4@48	4@48
90			8	4@48	4@47	4@48	4@48	4@48	4@48	4@48	4@48
			9	4@48	4@39	4@48	4@48	4@48	4@48	4@48	4@48
			10	4@42	4@34	4@48	4@48	4@48	4@48	4@48	4@48
100	85		8	4@48	4@40	4@48	4@48	4@48	4@48	4@48	4@48
			9	4@42	4@34	4@48	4@48	4@48	4@48	4@48	4@48
			10	4@34	4@34	4@48	4@48	4@48	4@48	4@48	4@48
110	90	85	8	4@44	4@34	4@48	4@48	4@48	4@48	4@48	4@48
			9	4@34	4@34	4@48	4@48	4@48	4@48	4@48	4@48
			10	4@34	4@31	4@48	4@37	4@48	4@48	4@48	4@48
120	100	90	8	4@36	4@34	4@48	4@48	4@48	4@48	4@48	4@48
			9	4@34	4@32	4@48	4@38	4@48	4@48	4@48	4@48
			10	4@30	4@27	4@48	5@48	4@48	4@48	4@48	4@48
130	110	100	8	4@34	4@34	4@48	4@48	4@48	4@48	4@48	4@48
			9	4@32	4@28	4@48	4@33	4@48	4@48	4@48	4@48
			10	4@26	4@23	4@48	5@43	4@48	4@48	4@48	4@48
140	120	110	8	4@34	4@30	4@48	4@35	4@48	4@48	4@48	4@48
			9	4@27	4@24	4@48	5@44	4@48	4@48	4@48	4@48
			10	4@21	4@19	5@41	5@37	4@48	4@48	4@48	4@48
150	130	120	8	4@29	4@26	4@48	5@47	4@48	4@48	4@48	4@48
			9	4@23	4@20	5@43	5@38	4@48	4@48	4@48	4@48
			10	4@18	4@16	5@35	5@34	4@48	4@48	4@48	4@48
166	140	130	8	4@25	4@22	5@47	5@41	4@48	4@48	4@48	4@48
			9	4@19	4@17	5@37	5@34	4@48	4@48	4@48	4@48
			10	4@15	4@14	5@34	5@34	4@48	5@37	4@48	4@48
179	150	140	8	4@21	4@19	5@40	5@36	4@48	4@48	4@48	4@48
			9	4@16	4@15	5@34	5@34	4@48	5@39	4@48	4@48
			10	DR	DR	5@34	5@31	5@35	6@46	4@48	4@48
192	163	150	8	4@18	4@16	5@35	5@34	4@48	5@43	4@48	4@48
			9	4@14	4@13	5@34	5@34	4@48	6@48	4@48	4@48
			10	DR	DR	5@29	5@27	6@43	6@40	4@48	4@48

For SI: 1 inch = 25.4 mm; 1 foot = 0.3048 m; 1 mph = 0.4470 m/s

Table 4.4. Minimum Vertical Reinforcement for Flat, Waffle- and Screen-Grid Stem Walls Designed Continuous With Above-Grade Walls[1,2,3,4,5,19,20]

Basic wind speed (mph)			Height of stem wall,[9,10] (ft)	Max. design lateral soil load (psf/ft)	Max. unsupported height of above-grade wall (ft)	Min. vertical reinforcement – bar size No. and spacing (in.)[6,7,8]						
Exposure category						Wall type and nominal thickness, (in.)[18]						
						Flat				Waffle		Screen
B	C	D				4	6	8	10	6	8	6
90			3	30	8	4@30	4@36	4@48	4@48	4@22	4@26	4@21
					10	4@24	5@44	4@38	4@48	4@17[15]	4@21	4@17[15]
				60	10	4@20	5@37	5@48	4@41	4@15[16]	4@18	4@14[16]
			6	30	10	DR	5@21[11]	6@35[12]	6@41	DR	4@10[17]	DR
				60	10	DR	DR	6@26[13]	6@28[14]	DR	DR	DR
110	90	85	3	30	8	4@22	5@42	4@37	4@46	4@16	4@20	4@16
					10	4@17	5@34	5@44	4@35	4@12[15]	4@17	4@12[15]
				60	10	4@15	5@34	5@39	5@48	4@11[16]	4@17	4@11[16]
			6	30	10	DR	5@18[11]	6@35[12]	6@35	DR	4@9[17]	DR
				60	10	DR	DR	6@23[13]	6@28[14]	DR	DR	DR
120	100	90	3	30	8	4@19	5@37	5@48	4@40	4@14	4@17	4@14
					10	4@14	5@34	5@38	5@48	4@11[15]	4@17	4@10[15]
				60	10	4@13	5@33	6@48	5@43	4@10[16]	4@16	4@9[16]
			6	30	10	DR	5@16[11]	6@33[12]	6@32	DR	4@8[17]	DR
				60	10	DR	DR	6@22[13]	6@28[14]	DR	DR	DR
140	120	110	3	30	8	4@14	5@34	5@38	5@48	4@11	4@17	4@10
					10	DR	5@28	6@41	5@36	DR	4@13	DR
				60	10	DR	5@29	6@43	5@38	DR	4@12	DR
			6	30	10	DR	5@13	6@27[12]	6@28	DR	DR	DR
				60	10	DR	DR	6@19[13]	6@25[14]	DR	DR	DR
166	140	130	3	30	8	DR	5@28	6@41	5@37	DR	4@13	DR
					10	DR	5@20	6@35	6@39	DR	4@10	DR
				60	10	DR	5@19	6@35	6@37	DR	4@9	DR
			6	30	10	DR	DR	6@21	6@28	DR	DR	DR
				60	10	DR	DR	6@16	6@21[14]	DR	DR	DR
179	150	140	3	30	8	DR	5@24	6@36	6@46	DR	4@12	DR
					10	DR	5@18	6@35	6@34	DR	4@8	DR
				60	10	DR	5@17	6@34	6@32	DR	4@8	DR
			6	30	10	DR	DR	6@19	6@25	DR	DR	DR
				60	10	DR	DR	6@15	6@20	DR	DR	DR
192	163	150	3	30	8	DR	5@21	6@35	6@41	DR	4@10	DR
					10	DR	5@15	6@31	6@30	DR	4@7	DR
				60	10	DR	5@15	6@30	6@29	DR	DR	DR
			6	30	10	DR	DR	6@17	6@22	DR	DR	DR
				60	10	DR	DR	6@14	6@18	DR	DR	DR

For SI: 1 inch = 25.4 mm; 1 foot = 0.3048 m; 1 mph = 0.4470 m/s; 1 psf/ft = 0.1571 kN/m^2/m

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Table 7.3. Maximum Allowable Clear Spans for 4-inch Nominal Thick Flat Lintels in Load-Bearing Walls[1,2,3,4,5,6,13]
Roof Clear Span 40 feet and Floor Clear Span 32 feet

Lintel Depth[7], ***D*** (in.)	Number of bars and bar size in top and bottom of lintel	Steel yield strength[8], f_y (psi)	Loading condition determined from Table 7.2							
			1	2		3		4		5	
				Maximum ground snow load (psf)							
				30	70	30	70	30	70	30	70
			Maximum clear span of lintel (ft-inches)								
8	Span without stirrups[9,10]		3-2	3-4	2-4	2-6	2-2	2-1	2-0	2-0	2-0
	1 – #4	40,000	5-2	5-5	4-1	4-3	3-10	3-7	3-4	2-9	2-9
		60,000	6-2	6-5	4-11	5-1	4-6	4-2	3-8	2-11	2-10
	1 – #5	40,000	6-3	6-7	5-0	5-2	4-6	4-2	3-8	2-11	2-10
		60,000	DR	DR	DR	DR	DR	DR	DR	DR	DR
	Center distance ***A***[11,12]		1-1	1-2	0-8	0-9	0-7	0-6	0-5	0-4	0-4
12	Span without stirrups[9,10]		3-4	3-7	2-9	2-11	2-8	2-6	2-5	2-2	2-2
	1 – #4	40,000	6-7	7-0	5-4	5-7	5-0	4-9	44	3-8	3-7
		60,000	7-11	8-6	6-6	6-9	6-0	5-9	5-3	4-5	4-4
	1 – #5	40,000	8-1	8-8	6-7	6-10	6-2	5-10	5-4	4-6	4-5
		60,000	9-8	10-4	7-11	8-2	7-4	6-11	6-2	4-10	4-8
	2 – #4 1 – #6	40,000	9-1	9-8	7-4	7-8	6-10	6-6	6-0	4-10	4-8
		60,000	DR	DR	DR	DR	DR	DR	DR	DR	DR
	Center distance ***A***[11,12]		1-8	1-11	1-1	1-3	1-0	0-11	0-9	0-6	0-6
16	Span without stirrups[9,10]		4-7	5-0	3-11	4-0	3-8	3-7	3-4	3-1	3-0
	1 – #4	40,000	6-8	7-3	5-6	5-9	5-2	4-11	4-6	3-10	3-8
		60,000	9-3	10-1	7-9	8-0	7-2	6-10	6-3	5-4	5-2
	1 – #5	40,000	9-6	10-4	7-10	8-2	7-4	6-11	6-5	5-5	5-3
		60,000	11-5	12-5	9-6	9-10	8-10	8-4	7-9	6-6	6-4
	2 – #4 1 – #6	40,000	10-7	11-7	8-10	9-2	8-3	7-9	7-2	6-1	5-11
		60,000	12-9	13-10	10-7	11-0	9-10	9-4	8-7	6-9	6-6
	2 – #5	40,000	13-0	14-1	10-9	11-2	9-11	9-2	8-2	6-6	6-3
		60,000	DR	DR	DR	DR	DR	0-6	DR	DR	DR
	Center distance ***A***[11,12]		2-3	2-8	1-7	1-8	1-4	1-3	1-0	0-9	0-8
20	Span without stirrups[9,10]		5-9	6-5	5-0	5-2	4-9	4-7	4-4	3-11	3-11
	1 – #4	40,000	7-5	8-2	6-3	6-6	5-10	5-7	5-1	4-4	4-2
		60,000	9-0	10-0	7-8	7-11	7-1	6-9	6-3	5-3	5-1
	1 – #5	40,000	9-2	10-2	7-9	8-1	7-3	6-11	6-4	5-4	5-2
		60,000	12-9	14-2	10-10	11-3	10-1	9-7	8-10	7-5	7-3
	2 – #4 1 – #6	40,000	11-10	13-2	10-1	10-5	9-4	8-11	8-2	6-11	6-9
		60,000	14-4	15-10	12-1	12-7	11-3	10-9	9-11	8-4	8-1
	2 – #5	40,000	14-7	16-2	12-4	12-9	11-4	10-6	9-5	7-7	7-3
		60,000	17-5	19-3	14-9	15-3	13-5	12-4	11-0	8-8	8-4
	2 – #6	40,000	16-4	18-11	12-7	13-3	11-4	10-6	9-5	7-7	7-3
		60,000	DR	DR	DR	DR	DR	DR	DR	DR	DR
	Center distance ***A***[11,12]		2-9	3-5	2-0	2-2	1-9	1-7	1-4	0-11	0-11
24	Span without stirrups[9,10]		6-11	7-9	6-1	6-3	5-9	5-7	5-3	4-9	4-8
	1 – #4	40,000	8-0	9-0	6-11	7-2	6-5	6-2	5-8	4-9	4-8
		60,000	9-9	11-0	8-5	8-9	7-10	7-6	6-11	5-10	5-8
	1 – #5	40,000	10-0	11-3	8-7	8-11	8-0	7-7	7-0	5-11	5-9
		60,000	13-11	15-8	12-0	12-5	11-2	10-7	9-10	8-3	8-0
	2 – #4 1 – #6	40,000	12-11	14-6	11-2	11-6	10-5	9-10	9-1	7-8	7-5
		60,000	15-7	17-7	13-6	13-11	12-7	11-11	11-0	9-3	9-0
	2 – #5	40,000	15-11	17-11	13-9	14-3	12-8	11-9	10-8	8-7	8-4
		60,000	19-1	21-6	16-5	17-1	15-1	14-0	12-6	9-11	9-7
	2 – #6	40,000	17-7	21-1	14-1	14-10	12-8	11-9	10-8	8-7	8-4
		60,000	DR	DR	DR	DR	DR	DR	DR	DR	DR
	Center distance ***A***[11,12]		3-3	4-1	2-5	2-7	2-1	1-11	1-7	1-2	1-1

For SI: 1 inch = 25.4 mm; 1 psf = 0.0479 kN/m^2; 1 ft = 0.3048 m; Grade 40 = 280 MPa; Grade 60 = 420 MPa

See page 7-7 for notes.

Table 7.4. Maximum Allowable Clear Spans for 4-inch Nominal Thick Flat Lintels in Load-Bearing Walls[1,2,3,4,5,6,13]
Roof Clear Span 32 feet and Floor Clear Span 24 feet

Lintel Depth[7], ***D*** (in.)	Number of bars and bar size in top and bottom of lintel	Steel yield strength[8], f_y (psi)	Loading condition determined from Table 7.2							
			1	2		3		4		5	
				Maximum ground snow load (psf)							
				30	70	30	70	30	70	30	70
			Maximum clear span of lintel (ft–inches)								
8	Span without stirrups[9,10]		3-9	3-11	2-8	2-10	2-6	2-3	2-1	2-0	2-0
	1 – #4	40,000	5-10	6-0	4-7	4-9	4-3	4-0	3-8	3-1	3-0
		60,000	7-0	7-2	5-5	5-8	5-1	4-9	4-3	3-4	3-2
	1 – #5	40,000	7-1	7-3	5-6	5-9	5-2	4-10	4-3	3-4	3-2
		60,000	DR	DR	DR	DR	DR	DR	DR	DR	DR
	Center distance ***A***[11,12]		1-5	1-6	0-10	0-11	0-9	0-8	0-6	0-5	0-4
12	Span without stirrups[9,10]		3-10	4-1	3-1	3-2	2-10	2-9	2-7	2-4	2-3
	1 – #4	40,000	7-5	7-10	6-0	6-3	5-6	5-2	4-9	4-0	3-11
		60,000	9-0	9-6	7-3	7-6	6-8	6-3	5-9	4-10	4-9
	1 – #5	40,000	9-2	9-8	7-4	7-8	6-10	6-5	5-10	4-11	4-10
		60,000	10-11	11-6	8-9	9-2	8-2	7-8	7-0	5-6	5-3
	2 – #4 1 – #6	40,000	10-2	10-9	8-2	8-6	7-7	7-2	6-7	5-6	5-3
		60,000	12-1	12-9	9-9	10-2	8-11	8-0	7-1	5-6	5-3
	Center distance ***A***[11,12]		2-2	2-5	1-5	1-6	1-2	1-1	0-11	0-8	0-7
16	Span without stirrups[9,10]		5-2	5-8	4-3	4-5	4-0	3-10	3-7	3-3	3-2
	1 – #4	40,000	7-6	8-1	6-2	6-5	5-9	5-4	4-11	4-2	4-1
		60,000	10-5	11-3	8-7	8-11	8-0	7-6	6-11	5-10	5-8
	1 – #5	40,000	10-7	11-5	8-9	9-1	8-2	7-7	7-0	5-11	5-9
		60,000	12-9	13-10	10-7	11-0	9-10	9-2	8-6	7-2	6-11
	2 – #4 1 – #6	40,000	11-11	12-10	9-10	10-3	9-1	8-6	7-10	6-8	6-5
		60,000	14-3	15-5	11-9	12-3	10-11	10-3	9-5	7-8	7-4
	2 – #5	40,000	14-6	15-8	12-0	12-6	11-2	10-5	9-4	7-4	7-0
		60,000	DR	DR	DR	DR	DR	DR	DR	DR	DR
	Center distance ***A***[11,12]		2-10	3-4	1-11	2-1	1-8	1-6	1-3	0-11	0-10
20	Span without stirrups[9,10]		6-5	7-2	5-6	5-8	5-2	4-10	4-7	4-2	4-1
	1 – #4	40,000	8-3	9-1	7-0	7-3	6-6	6-1	5-7	4-9	4-7
		60,000	10-1	11-1	8-6	8-10	7-11	7-5	6-10	5-9	5-7
	1 – #5	40,000	10-3	11-4	8-8	9-0	8-1	7-7	7-0	5-11	5-9
		60,000	14-3	15-8	12-0	12-6	11-2	10-6	9-8	8-2	7-11
	2 – #4 1 – #6	40,000	13-3	14-7	11-2	11-8	10-5	9-9	9-0	7-7	7-4
		60,000	15-11	17-7	13-6	14-0	12-6	11-9	10-10	9-2	8-11
	2 – #5	40,000	16-3	17-11	13-9	14-3	12-9	11-12	10-8	8-6	8-2
		60,000	19-4	21-4	16-5	17-1	15-3	14-3	12-7	9-10	9-5
	2 – #6	40,000	19-0	21-0	14-10	15-10	13-3	12-0	10-8	8-6	8-2
		60,000	DR	DR	DR	DR	DR	DR	DR	DR	DR
	Center distance ***A***[11,12]		3-5	4-2	2-6	2-8	2-2	1-10	1-7	1-2	1-1
24	Span without stirrups[9,10]		7-8	8-9	6-8	6-11	6-3	5-11	5-7	5-1	5-0
	1 – #4	40,000	8-11	10-0	7-8	8-0	7-2	6-9	6-2	5-3	5-1
		60,000	10-10	12-2	9-5	9-9	8-9	8-2	7-7	6-5	6-2
	1 – #5	40,000	11-1	12-5	9-7	10-0	8-11	8-4	7-8	6-6	6-4
		60,000	15-5	17-4	13-4	13-11	12-5	11-8	10-9	9-1	8-10
	2 – #4 1 – #6	40,000	14-3	16-1	12-5	12-11	11-6	10-9	9-11	8-5	8-2
		60,000	17-3	19-5	15-0	15-7	13-11	13-1	12-0	10-2	9-11
	2 – #5	40,000	17-7	19-10	15-3	15-10	14-2	13-4	12-0	9-7	9-3
		60,000	21-2	23-9	18-4	19-0	17-0	15-11	14-3	11-3	10-9
	2 – #6	40,000	20-9	23-4	16-6	17-7	14-9	13-5	12-0	9-7	9-3
		60,000	DR	DR	DR	DR	DR	DR	DR	DR	DR
	Center distance ***A***[11,12]		4-0	5-1	3-0	3-3	2-7	2-3	1-11	1-5	1-4

For SI: 1 inch = 25.4 mm; 1 psf = 0.0479 kN/m^2; 1 ft = 0.3048 m; Grade 40 = 280 MPa; Grade 60 = 420 MPa

See page 7-7 for notes.

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Table 7.5. Maximum Allowable Clear Spans for 6-inch Nominal Thick Flat Lintels in Load-Bearing Walls[1,2,3,4,5,6,13]
Roof Clear Span 40 feet and Floor Clear Span 32 feet

Lintel Depth[7], ***D*** (in.)	Number of bars and bar size in top and bottom of lintel	Steel yield strength[8], f_y (psi)	Loading condition determined from Table 7.2							
			1	2		3		4		5	
				Maximum ground snow load (psf)							
				30	70	30	70	30	70	30	70
			Maximum clear span of lintel (ft–inches)								
8	Span without stirrups[9,10]		4-2	4-8	3-1	3-3	2-10	2-6	2-3	2-0	2-0
	1 – #4	40,000	5-1	5-5	4-2	4-3	3-10	3-6	3-3	2-8	2-7
		60,000	6-2	6-7	5-0	5-2	4-8	4-2	3-11	3-3	3-2
	1 – #5	40,000	6-3	6-8	5-1	5-3	4-9	4-3	4-0	3-3	3-2
		60,000	7-6	8-0	6-1	6-4	5-8	5-1	4-9	3-8	3-6
	2 – #4 1 – #6	40,000	7-0	7-6	5-8	5-11	5-3	4-9	4-5	3-8	3-6
		60,000	DR	DR	DR	DR	DR	DR	DR	DR	DR
	Center distance ***A***[11,12]		1-7	1-10	1-1	1-2	0-11	0-9	0-8	0-5	0-5
12	Span without stirrups[9,10]		4-2	4-8	3-5	3-6	3-2	2-11	2-9	2-5	2-4
	1 – #4	40,000	5-7	6-1	4-8	4-10	4-4	3-11	3-8	3-0	2-11
		60,000	7-9	8-6	6-6	6-9	6-1	5-6	5-1	4-3	4-1
	1 – #5	40,000	7-11	8-8	6-8	6-11	6-2	5-7	5-2	4-4	4-2
		60,000	9-7	10-6	8-0	8-4	7-6	6-9	6-3	5-2	5-1
	2 – #4 1 – #6	40,000	8-11	9-9	7-6	7-9	6-11	6-3	5-10	4-10	4-8
		60,000	10-8	11-9	8-12	9-4	8-4	7-6	7-0	5-10	5-8
	2 – #5	40,000	10-11	12-0	9-2	9-6	8-6	7-8	7-2	5-6	5-3
		60,000	12-11	14-3	10-10	11-3	10-1	9-0	8-1	6-1	5-10
	2 – #6	40,000	12-9	14-0	10-8	11-1	9-7	8-1	7-3	5-6	5-3
		60,000	DR	DR	DR	DR	DR	DR	DR	DR	DR
	Center distance ***A***[11,12]		2-6	3-0	1-9	1-10	1-6	1-3	1-1	0-9	0-8
16	Span without stirrups[9,10]		5-7	6-5	4-9	4-11	4-5	4-0	3-10	3-4	3-4
	1 – #4	40,000	6-5	7-2	5-6	5-9	5-2	4-8	4-4	3-7	3-6
		60,000	7-10	8-9	6-9	7-0	6-3	5-8	5-3	4-4	4-3
	1 – #5	40,000	7-11	8-11	6-10	7-1	6-5	5-9	5-4	4-5	4-4
		60,000	11-1	12-6	9-7	9-11	8-11	8-0	7-6	6-2	6-0
	2 – #4 1 – #6	40,000	10-3	11-7	8-10	9-2	8-3	7-6	6-11	5-9	5-7
		60,000	12-5	14-0	10-9	11-1	10-0	9-0	8-5	7-0	6-9
	2 – #5	40,000	12-8	14-3	10-11	11-4	10-2	9-2	8-7	6-9	6-6
		60,000	15-2	17-1	13-1	13-7	12-3	11-0	10-3	7-11	7-7
	2 – #6	40,000	14-11	16-9	12-8	13-4	11-4	9-8	8-8	6-9	6-6
		60.000	DR	DR	DR	DR	DR	DR	DR	DR	DR
	Center distance ***A***[11,12]		3-3	4-1	2-5	2-7	2-1	1-9	1-6	1-0	1-0
20	Span without stirrups[9,10]		6-11	8-2	6-1	6-3	5-8	5-2	4-11	4-4	4-3
	1 – #5	40,000	8-9	10-1	7-9	8-0	7-3	6-6	6-1	5-1	4-11
		60,000	10-8	12-3	9-5	9-9	8-10	8-0	7-5	6-2	6-0
	2 – #4 1 – #6	40,000	9-11	11-4	8-9	9-1	8-2	7-4	6-10	5-8	5-7
		60,000	13-9	15-10	12-2	12-8	11-5	10-3	9-7	7-11	7-9
	2 – #5	40,000	14-0	16-2	12-5	12-11	11-7	10-6	9-9	7-11	7-8
		60,000	16-11	19-6	15-0	15-6	14-0	12-7	11-9	9-1	8-9
	2 – #6	40,000	16-7	19-1	14-7	15-3	13-1	11-3	10-2	7-11	7-8
		60,000	19-11	22-10	17-4	18-3	15-6	13-2	11-10	9-1	8-9
	Center distance ***A***[11,12]		3-11	5-2	3-1	3-3	2-8	2-2	1-11	1-4	1-3
24	Span without stirrups[9,10]		8-2	9-10	7-4	7-8	6-11	6-4	5-11	5-3	5-2
	1 – #5	40,000	9-5	11-1	8-7	8-10	8-0	7-3	6-9	5-7	5-5
		60,000	11-6	13-6	10-5	10-9	9-9	8-9	8-2	6-10	6-8
	2 – #4 1 – #6	40,000	10-8	12-6	9-8	10-0	9-0	8-2	7-7	6-4	6-2
		60,000	12-11	15-2	11-9	12-2	11-0	9-11	9-3	7-8	7-6
	2 – #5	40,000	15-2	17-9	13-9	14-3	12-10	11-7	10-10	9-0	8-9
		60,000	18-4	21-6	16-7	17-3	15-6	14-0	13-1	10-4	10-0
	2 – #6	40,000	18-0	21-1	16-4	16-11	14-10	12-9	11-8	9-2	8-11
		60,000	21-7	25-4	19-2	20-4	17-2	14-9	13-4	10-4	10-0
	Center distance ***A***[11,12]		4-6	6-2	3-8	4-0	3-3	2-8	2-3	1-7	1-6

Table 7.6. Maximum Allowable Clear Spans for 6-inch Nominal Thick Flat Lintels in Load-Bearing Walls[1,2,3,4,5,6,13]
Roof Clear Span 32 feet and Floor Clear Span 24 feet

Lintel Depth[7], ***D*** (in.)	Number of bars and bar size in top and bottom of lintel	Steel yield strength[8], f_y (psi)	Loading condition determined from Table 7.2							
			1	2		3		4		5	
				Maximum ground snow load (psf)							
				30	70	30	70	30	70	30	70
			Maximum clear span of lintel (ft–inches)								
8	Span without stirrups[9,10]		5-1	5-6	3-8	3-10	3-3	2-9	2-6	2-0	2-0
	1 – #4	40,000	5-9	6-1	4-7	4-10	4-3	3-9	3-6	2-11	2-10
		60,000	6-11	7-4	5-7	5-9	5-2	4-6	4-3	3-6	3-5
	1 – #5	40,000	7-0	7-5	5-8	5-11	5-3	4-8	4-4	3-7	3-6
		60,000	8-5	8-11	6-9	7-1	6-3	5-6	5-2	4-1	3-11
	2 – #4 1 – #6	40,000	7-10	8-4	6-4	6-7	5-10	5-2	4-10	4-0	3-10
		60,000	DR	DR	DR	DR	DR	DR	DR	DR	DR
	Center distance ***A***[11,12]		2-0	2-3	1-4	1-5	1-2	0-11	0-9	0-6	0-6
12	Span without stirrups[9,10]		4-9	5-4	3-10	4-0	3-6	3-1	2-11	2-6	2-6
	1 – #4	40,000	6-3	6-9	5-2	5-5	4-10	4-3	4-0	3-3	3-2
		60,000	8-8	9-6	7-3	7-7	6-9	5-11	5-6	4-7	4-6
	1 – #5	40,000	8-10	9-8	7-5	7-8	6-11	6-1	5-8	4-8	4-6
		60,000	10-8	11-8	8-11	9-4	8-4	7-4	6-10	5-8	5-6
	2 – #4 1 – #6	40,000	9-11	10-10	8-4	8-8	7-9	6-10	6-4	5-3	5-1
		60,000	11-11	13-0	10-0	10-5	9-3	8-2	7-7	6-3	6-2
	2 – #5	40,000	12-2	13-3	10-2	10-7	9-6	8-4	7-9	6-2	5-11
		60,000	14-5	15-9	12-1	12-7	11-3	9-11	9-2	6-10	6-7
	2 – #6	40,000	14-3	15-6	11-11	12-4	11-1	9-3	8-3	6-2	5-11
		60,000	DR	DR	DR	DR	DR	DR	DR	DR	DR
	Center distance ***A***[11,12]		3-1	3-8	2-2	2-4	1-10	1-5	1-3	0-10	0-10
16	Span without stirrups[9,10]		6-4	7-4	5-4	5-7	4-11	4-4	4-1	3-6	3-6
	1 – #4	40,000	7-1	8-0	6-2	6-5	5-9	5-0	4-8	3-11	3-9
		60,000	8-8	9-9	7-6	7-9	7-0	6-2	5-9	4-9	4-7
	1 – #5	40,000	8-10	9-11	7-8	7-11	7-1	6-3	5-10	4-10	4-8
		60,000	12-3	13-10	10-8	11-1	9-11	8-9	8-1	6-9	6-7
	2 – #4 1 – #6	40,000	11-5	12-10	9-10	10-3	9-2	8-1	7-6	6-3	6-1
		60,000	13-9	15-6	11-11	12-5	11-1	9-9	9-1	7-6	7-4
	2 – #5	40,000	14-0	15-9	12-2	12-8	11-4	10-0	9-3	7-6	7-3
		60,000	16-10	18-11	14-7	15-2	13-7	12-0	11-2	8-10	8-6
	2 – #6	40,000	16-6	18-7	14-4	14-11	13-4	11-0	9-10	7-6	7-3
		60.000	DR	DR	DR	DR	DR	DR	DR	DR	DR
	Center distance ***A***[11,12]		4-0	5-0	3-0	3-3	2-7	2-0	1-9	1-2	1-2
20	Span without stirrups[9,10]		7-9	9-4	6-9	7-1	6-3	5-7	5-3	4-6	4-5
	1 – #5	40,000	9-8	11-2	8-7	9-0	8-0	7-1	6-7	5-6	5-4
		60,000	11-9	13-7	10-6	10-11	9-9	8-8	8-0	6-8	6-6
	2 – #4 1 – #6	40,000	10-10	12-7	9-9	10-1	9-1	8-0	7-5	6-2	6-0
		60,000	15-2	17-6	13-6	14-1	12-7	11-2	10-4	8-7	8-5
	2 – #5	40,000	15-5	17-10	13-10	14-4	12-10	11-4	10-7	8-9	8-6
		60,000	18-7	21-6	16-8	17-4	15-6	13-8	12-9	10-2	9-10
	2 – #6	40,000	18-3	21-1	16-4	17-0	15-3	12-8	11-5	8-9	8-6
		60,000	21-10	24-10	19-6	20-4	18-2	15-0	13-5	10-2	9-10
	Center distance ***A***[11,12]		4-9	6-4	3-9	4-1	3-3	2-7	2-3	1-6	1-5
24	Span without stirrups[9,10]		9-0	11-2	8-3	8-7	7-7	6-9	6-4	5-6	5-5
	1 – #5	40,000	10-3	12-2	9-6	9-10	8-10	7-10	7-3	6-0	5-11
		60,000	12-7	14-10	11-7	12-0	10-9	9-6	8-10	7-4	7-2
	2 – #4 1 – #6	40,000	11-7	13-9	10-8	11-1	10-0	8-10	8-3	6-10	6-8
		60,000	14-2	16-9	13-0	13-6	12-2	10-9	10-0	8-4	8-1
	2 – #5	40,000	16-7	19-7	15-3	15-10	14-3	12-7	11-8	9-9	9-6
		60,000	20-0	23-8	18-5	19-2	17-2	15-2	14-2	11-6	11-1
	2 – #6	40,000	19-8	23-3	18-1	18-9	16-10	14-5	13-0	10-1	9-9
		60,000	23-7	22-10	21-9	22-7	20-3	16-8	15-0	11-6	11-1
	Center distance ***A***[11,12]		5-4	7-6	4-7	4-11	4-0	3-1	2-8	1-10	1-9

For SI: 1 inch = 25.4 mm; 1 psf = 0.0479 kN/m^2; 1 ft = 0.3048 m; Grade 40 = 280 MPa; Grade 60 = 420 MPa

See Page 7-7 for notes.

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Table 7.7. Maximum Allowable Clear Spans for 8-inch Nominal Thick Flat Lintels in Load-Bearing Walls[1,2,3,4,5,6,13]
Roof Clear Span 40 feet and Floor Clear Span 32 feet

Lintel Depth[7], ***D*** (in.)	Number of bars and bar size in top and bottom of lintel	Steel yield strength[8], f_y (psi)	Loading condition determined from Table 7.2							
			1	2		3		4		5	
				Maximum ground snow load (psf)							
				30	70	30	70	30	70	30	70
			Maximum clear span of lintel (ft–inches)								
8	Span without stirrups[9,10]		4-4	4-9	3-7	3-9	3-4	2-10	2-7	2-1	2-0
	1 – #4	40,000	4-4	4-9	3-7	3-9	3-4	2-11	2-9	2-3	2-2
		60,000	6-1	6-7	5-0	5-3	4-8	4-0	3-9	3-1	3-0
	1 – #5	40,000	6-2	6-9	5-2	5-4	4-9	4-1	3-10	3-2	3-1
		60,000	7-5	8-1	6-2	6-5	5-9	4-11	4-7	3-9	3-8
	2 – #4 1 – #6	40,000	6-11	7-6	5-9	6-0	5-4	4-7	4-4	3-6	3-5
		60,000	8-3	9-0	6-11	7-2	6-5	5-6	5-2	4-2	4-1
	2 – #5	40,000	8-5	9-2	7-0	7-3	6-6	5-7	5-3	4-2	4-0
		60,000	DR	DR	DR	DR	DR	DR	DR	DR	DR
	Center distance ***A***[11,12]		2-1	2-6	1-5	1-6	1-3	0-11	0-10	0-6	0-6
12	Span without stirrups[9,10]		4-10	5-8	4-0	4-2	3-9	3-2	3-0	2-7	2-6
	1 – #4	40,000	5-5	6-1	4-8	4-10	4-4	3-9	3-6	2-10	2-10
		60,000	6-7	7-5	5-8	5-11	5-4	4-7	4-3	3-6	3-5
	1 – #5	40,000	6-9	7-7	5-9	6-0	5-5	4-8	4-4	3-7	3-6
		60,000	9-4	10-6	8-1	8-4	7-6	6-6	6-1	5-0	4-10
	2 – #4 1 – #6	40,000	8-8	9-9	7-6	7-9	7-0	6-0	5-8	4-7	4-6
		60,000	10-6	11-9	9-1	9-5	8-5	7-3	6-10	5-7	5-5
	2 – #5	40,000	10-8	12-0	9-3	9-7	8-7	7-5	6-11	5-6	5-4
		60,000	12-10	14-5	11-1	11-6	10-4	8-11	8-4	6-7	6-4
	2 – #6	40,000	12-7	14-2	10-10	11-3	10-2	8-3	7-6	5-6	5-4
		60,000	DR	DR	DR	DR	DR	DR	DR	DR	DR
	Center distance ***A***[11,12]		3-2	4-0	2-4	2-6	2-0	1-6	1-4	0-11	0-10
16	Span without stirrups[9,10]		6-5	7-9	5-7	5-10	5-2	4-5	4-2	3-7	3-6
	1 – #4	40,000	6-2	7-1	5-6	5-8	5-1	4-5	4-2	3-5	3-4
		60,000	7-6	8-8	6-8	6-11	6-3	5-5	5-1	4-2	4-0
	1 – #5	40,000	7-8	8-10	6-10	7-1	6-4	5-6	5-2	4-3	4-1
		60,000	9-4	10-9	8-4	8-7	7-9	6-8	6-3	5-2	5-0
	2 – #4 1 – #6	40,000	8-8	10-0	7-8	8-0	7-2	6-2	5-10	4-9	4-8
		60,000	12-0	13-11	10-9	11-2	10-0	8-8	8-1	6-8	6-6
	2 – #5	40,000	12-3	14-2	11-0	11-4	10-3	8-10	8-3	6-9	6-7
		60,000	14-10	17-2	13-3	13-8	12-4	10-8	10-0	7-11	7-8
	2 – #6	40,000	14-6	16-10	13-0	13-5	12-1	10-1	9-2	6-11	6-8
		60.000	17-5	20-2	15-7	16-1	14-6	11-10	10-8	7-11	7-8
	Center distance ***A***[11,12]		4-1	5-5	3-3	3-6	2-10	2-1	1-10	1-3	1-2
20	Span without stirrups[9,10]		7-10	9-10	7-1	7-5	6-7	5-8	5-4	4-7	4-6
	1 – #5	40,000	8-4	9-11	7-8	8-0	7-2	6-3	5-10	4-9	4-8
		60,000	10-2	12-1	9-5	9-9	8-9	7-7	7-1	5-10	5-8
	2 – #4 1 – #6	40,000	9-5	11-3	8-8	9-0	8-1	7-0	6-7	5-5	5-3
		60,000	11-6	13-8	10-7	11-0	9-11	8-7	8-0	6-7	6-5
	2 – #5	40,000	11-9	13-11	10-10	11-2	10-1	8-9	8-2	6-8	6-7
		60,000	16-4	19-5	15-0	15-7	14-0	12-2	11-4	9-3	9-0
	2 – #6	40,000	16-0	19-0	14-9	15-3	13-9	11-10	10-10	8-3	8-0
		60,000	19-3	22-11	17-9	18-5	16-7	13-7	12-4	9-3	9-0
	Center distance ***A***[11,12]		4-10	6-10	4-1	4-5	3-7	2-8	2-4	1-7	1-6
24	Span without stirrups[9,10]		9-2	11-9	8-7	8-11	8-0	6-11	6-6	5-7	5-6
	1 – #5	40,000	8-11	10-10	8-6	8-9	7-11	6-10	6-5	5-3	5-2
		60,000	10-11	13-3	10-4	10-8	9-8	8-4	7-10	6-5	6-3
	2 – #4 1 – #6	40,000	10-1	12-3	9-7	9-11	8-11	7-9	7-3	6-0	5-10
		60,000	12-3	15-0	11-8	12-1	10-11	9-5	8-10	7-3	7-1
	2 – #5	40,000	12-6	15-3	11-11	12-4	11-1	9-7	9-0	7-5	7-3
		60,000	17-6	21-3	16-7	17-2	15-6	13-5	12-7	10-4	10-1
	2 – #6	40,000	17-2	20-11	16-3	16-10	15-3	13-2	12-4	9-7	9-4
		60,000	20-9	25-3	19-8	20-4	18-5	15-4	14-0	10-7	10-3
	Center distance ***A***[11,12]		5-6	8-1	4-11	5-3	4-4	3-3	2-10	1-11	1-10

For SI: 1 inch = 25.4 mm; 1 psf = 0.0479 kN/m^2; 1 ft = 0.3048 m; Grade 40 = 280 MPa; Grade 60 = 420 MPa

Top and bottom reinforcement for lintels without stirrups shown in shaded cells shall be equal to or greater than that required for a lintel of the same depth and loading condition that has an allowable clear span that is equal to or greater than that of the lintel without stirrups.

See Page 7-7 for additional notes.

Table 7.8. Maximum Allowable Clear Spans for 8-inch Nominal Thick Flat Lintels in Load-Bearing Walls[1,2,3,4,5,6,13]
Roof Clear Span 32 feet and Floor Clear Span 24 feet

Lintel Depth[7], ***D*** (in.)	Number of bars and bar size in top and bottom of lintel	Steel yield strength[8], f_y (psi)	Loading condition determined from Table 7.2							
			1	2		3		4		5	
				Maximum ground snow load (psf)							
				30	70	30	70	30	70	30	70
			Maximum clear span of lintel (ft–inches)								
8	Span without stirrups[9,10]		6-2	7-1	4-7	4-10	4-1	3-2	2-10	2-3	2-2
	1 – #4	40,000	4-10	5-3	4-0	4-2	3-9	3-1	2-11	2-4	2-4
		60,000	6-9	7-4	5-7	5-10	5-3	4-4	4-1	3-4	3-3
	1 – #5	40,000	6-11	7-6	5-9	5-11	5-4	4-5	4-2	3-4	3-3
		60,000	8-4	9-0	6-10	7-2	6-5	5-4	5-0	4-1	4-0
	2 – #4 1 – #6	40,000	7-9	8-4	6-5	6-8	5-11	4-11	4-8	3-9	3-8
		60,000	9-3	10-0	7-8	8-0	7-1	5-11	5-7	4-6	4-5
	2 – #5	40,000	9-5	10-2	7-9	8-1	7-3	6-0	5-8	4-7	4-6
		60,000	DR	DR	DR	DR	DR	DR	DR	DR	DR
	Center distance ***A***[11,12]		2-7	3-0	1-9	1-11	1-6	1-1	0-11	0-7	0-7
12	Span without stirrups[9,10]		5-6	6-7	4-7	4-10	4-2	3-5	3-3	2-8	2-8
	1 – #4	40,000	6-0	6-9	5-2	5-5	4-10	4-0	3-9	3-1	3-0
		60,000	7-3	8-2	6-4	6-7	5-10	4-11	4-7	3-9	3-8
	1 – #5	40,000	7-5	8-4	6-5	6-8	6-0	5-0	4-8	3-10	3-9
		60,000	10-4	11-8	9-0	9-4	8-4	7-0	6-6	5-4	5-3
	2 – #4 1 – #6	40,000	9-7	10-10	8-4	8-8	7-9	6-6	6-1	4-11	4-10
		60,000	11-7	13-1	10-1	10-6	9-4	7-10	7-4	6-0	5-10
	2 – #5	40,000	11-10	13-4	10-3	10-8	9-6	8-0	7-6	6-1	5-11
		60,000	14-2	15-11	12-3	12-9	11-5	9-7	8-11	7-3	7-1
	2 – #6	40,000	13-11	15-8	12-1	12-7	11-3	9-4	8-5	6-2	5-11
		60,000	DR	DR	DR	DR	DR	DR	DR	DR	DR
	Center distance ***A***[11,12]		3-10	4-11	2-11	3-2	2-6	1-9	1-6	1-0	1-0
16	Span without stirrups[9,10]		7-3	8-11	6-4	6-8	5-9	4-9	4-6	3-9	3-8
	1 – #4	40,000	6-9	7-10	6-1	6-4	5-8	4-9	4-5	3-8	3-7
		60,000	8-3	9-7	7-5	7-9	6-11	5-10	5-5	4-5	4-4
	1 – #5	40,000	8-5	9-9	7-7	7-11	7-1	5-11	5-7	4-6	4-5
		60,000	10-3	11-11	9-3	9-7	8-7	7-3	6-9	5-6	5-5
	2 – #4 1 – #6	40,000	9-6	11-0	8-7	8-11	8-0	6-8	6-3	5-1	5-0
		60,000	13-2	15-5	11-11	12-5	11-1	9-4	8-9	7-1	7-0
	2 – #5	40,000	13-6	15-8	12-2	12-8	11-4	9-6	8-11	7-3	7-1
		60,000	16-3	18-11	14-8	15-3	13-8	11-5	10-9	8-9	8-6
	2 – #6	40,000	15-11	18-7	14-5	15-0	13-5	11-3	10-3	7-7	7-4
		60.000	19-1	22-0	17-3	17-11	16-1	13-4	12-0	8-9	8-6
	Center distance ***A***[11,12]		4-11	6-7	4-0	4-4	3-6	2-5	2-2	1-5	1-4
20	Span without stirrups[9,10]		8-9	11-3	8-0	8-5	7-4	6-1	5-9	4-10	4-9
	1 – #5	40,000	9-1	10-11	8-6	8-10	8-0	6-8	6-3	5-1	5-0
		60,000	11-1	13-4	10-5	10-10	9-9	8-2	7-8	6-3	6-1
	2 – #4 1 – #6	40,000	10-3	12-4	9-8	10-0	9-0	7-6	7-1	5-9	5-8
		60,000	12-6	15-0	11-9	12-2	10-11	9-2	8-7	7-1	6-11
	2 – #5	40,000	12-9	15-4	12-0	12-5	11-2	9-4	8-10	7-2	7-0
		60,000	17-9	21-4	16-8	17-3	15-6	13-0	12-3	10-0	9-9
	2 – #6	40,000	17-5	20-11	16-4	17-0	15-3	12-9	12-0	9-0	8-9
		60,000	21-0	25-3	19-8	20-5	18-4	15-3	13-10	10-3	9-11
	Center distance ***A***[11,12]		5-9	8-3	5-0	5-5	4-4	3-1	2-9	1-10	1-9
24	Span without stirrups[9,10]		10-1	13-5	9-8	10-2	8-11	7-5	6-11	5-10	5-9
	1 – #5	40,000	9-8	11-11	9-4	9-9	8-9	7-4	6-11	5-8	5-6
		60,000	11-9	14-7	11-5	11-10	10-8	9-0	8-5	6-11	6-9
	2 – #4 1 – #6	40,000	10-11	13-6	10-7	11-0	9-10	8-4	7-10	6-5	6-3
		60,000	13-4	16-5	12-11	13-5	12-0	10-2	9-6	7-9	7-7
	2 – #5	40,000	13-7	16-9	13-2	13-8	12-3	10-4	9-8	7-11	7-9
		60,000	18-11	23-4	18-4	19-0	17-2	14-5	13-6	11-1	10-10
	2 – #6	40,000	18-7	22-11	18-0	18-8	16-10	14-2	13-3	10-6	10-2
		60,000	22-5	27-8	21-9	22-7	20-4	17-1	15-8	11-8	11-4
	Center distance ***A***[11,12]		6-5	9-9	6-0	6-6	5-3	3-9	3-3	2-2	2-1

For SI: 1 inch = 25.4 mm; 1 psf = 0.0479 kN/m^2; 1 ft = 0.3048 m; Grade 40 = 280 MPa; Grade 60 = 420 MPa

Top and bottom reinforcement for lintels without stirrups shown in shaded cells shall be equal to or greater than that required for a lintel of the same depth and loading condition that has an allowable clear span that is equal to or greater than that of the lintel without stirrups. See Page 7-7 for additional notes.

5.0 Wall Engineering

Table 7.9. Maximum Allowable Clear Spans for 10-inch Nominal Thick Flat Lintels in Load-Bearing Walls[1,2,3,4,5,6,13]
Roof Clear Span 40 feet and Floor Clear Span 32 feet

Lintel Depth[7], ***D*** (in.)	Number of bars and bar size in top and bottom of lintel	Steel yield strength[8], f_y (psi)	Loading condition determined from Table 7.2							
			1	2		3		4		5	
				Maximum ground snow load (psf)							
				30	70	30	70	30	70	30	70
			Maximum clear span of lintel (ft–inches)								
8	Span without stirrups[9,10]		6-0	7-2	4-7	4-10	4-1	3-1	2-11	2-3	2-2
	1 – #4	40,000	4-3	4-9	3-7	3-9	3-4	2-9	2-7	2-1	2-1
		60,000	5-11	6-7	5-0	5-3	4-8	3-10	3-8	2-11	2-11
	1 – #5	40,000	6-1	6-9	5-2	5-4	4-9	3-11	3-9	3-0	2-11
		60,000	7-4	8-1	6-3	6-5	5-9	4-9	4-6	3-7	3-7
	2 – #4 1 – #6	40,000	6-10	7-6	5-9	6-0	5-5	4-5	4-2	3-4	3-4
		60,000	8-2	9-1	6-11	7-2	6-6	5-4	5-0	4-1	4-0
	2 – #5	40,000	8-4	9-3	7-1	7-4	6-7	5-5	5-1	4-1	4-0
		60,000	9-11	11-0	8-5	8-9	7-10	6-6	6-1	4-8	4-6
	2 – #6	40,000	9-9	10-10	8-3	8-7	7-9	6-4	5-10	4-1	4-0
		60,000	DR	DR	DR	DR	DR	DR	DR	DR	DR
	Center distance ***A***[11,12]		2-6	3-1	1-10	1-11	1-7	1-1	0-11	0-7	0-7
12	Span without stirrups[9,10]		5-5	6-7	4-7	4-10	4-3	3-5	3-3	2-8	2-8
	1 – #4	40,000	5-3	6-0	4-8	4-10	4-4	3-7	3-4	2-9	2-8
		60,000	6-5	7-4	5-8	5-10	5-3	4-4	4-1	3-4	3-3
	1 – #5	40,000	6-6	7-6	5-9	6-0	5-5	4-5	4-2	3-5	3-4
		60,000	7-11	9-1	7-0	7-3	6-7	5-5	5-1	4-2	4-0
	2 – #4 1 – #6	40,000	7-4	8-5	6-6	6-9	6-1	5-0	4-9	3-10	3-9
		60,000	10-3	11-9	9-1	9-5	8-6	7-0	6-7	5-4	5-3
	2 – #5	40,000	10-5	12-0	9-3	9-7	8-8	7-2	6-9	5-5	5-4
		60,000	12-7	14-5	11-2	11-6	10-5	8-7	8-1	6-6	6-4
	2 – #6	40,000	12-4	14-2	10-11	11-4	10-2	8-5	7-8	5-7	5-5
		60,000	14-9	17-0	13-1	13-6	12-2	10-0	9-1	6-6	6-4
	Center distance ***A***[11,12]		3-9	4-11	2-11	3-2	2-7	1-9	1-7	1-0	1-0
16	Span without stirrups[9,10]		7-1	9-0	6-4	6-8	5-10	4-9	4-6	3-9	3-8
	1 – #4	40,000	5-11	7-0	5-5	5-8	5-1	4-3	4-0	3-3	3-2
		60,000	7-3	8-7	6-8	6-11	6-3	5-2	4-10	3-11	3-10
	1 – #5	40,000	7-4	8-9	6-9	7-0	6-4	5-3	4-11	4-0	3-11
		60,000	9-0	10-8	8-3	8-7	7-9	6-5	6-0	4-11	4-9
	2 – #4 1 – #6	40,000	8-4	9-11	7-8	7-11	7-2	5-11	5-7	4-6	4-5
		60,000	10-2	12-0	9-4	9-8	8-9	7-3	6-10	5-6	5-5
	2 – #5	40,000	10-4	12-3	9-6	9-10	8-11	7-4	6-11	5-8	5-6
		60,000	14-4	17-1	13-3	13-8	12-4	10-3	9-8	7-10	7-8
	2 – #6	40,000	14-1	16-9	13-0	13-5	12-2	10-1	9-6	7-0	6-10
		60.000	17-0	20-2	15-8	16-2	14-7	12-0	10-11	8-0	7-9
	Center distance ***A***[11,12]		4-9	6-8	4-0	4-4	3-6	2-5	2-2	1-5	1-4
20	Span without stirrups[9,10]		8-7	11-4	8-1	8-5	7-5	6-1	5-9	4-10	4-9
	1 – #4	40,000	6-5	7-10	6-2	6-4	5-9	4-9	4-6	3-8	3-7
		60,000	7-10	9-7	7-6	7-9	7-0	5-10	5-6	4-5	4-4
	1 – #5	40,000	8-0	9-9	7-8	7-11	7-2	5-11	5-7	4-6	4-5
		60,000	9-9	11-11	9-4	9-8	8-9	7-3	6-10	5-6	5-5
	2 – #4 1 – #6	40,000	9-0	11-1	8-8	8-11	8-1	6-9	6-4	5-2	5-0
		60,000	11-0	13-6	10-6	10-11	9-10	8-2	7-9	6-3	6-2
	2 – #5	40,000	11-3	13-9	10-9	11-1	10-0	8-4	7-10	6-5	6-3
		60,000	15-8	19-2	15-0	15-6	14-0	11-8	11-0	8-11	8-9
	2 – #6	40,000	15-5	18-10	14-8	15-2	13-9	11-5	10-9	8-6	8-3
		60,000	18-7	22-9	17-9	18-5	16-7	13-10	12-9	9-5	9-2
	Center distance ***A***[11,12]		5-7	8-4	5-1	5-5	4-5	3-1	2-9	1-10	1-9
24	Span without stirrups[9,10]		9-11	13-7	9-9	10-2	9-0	7-5	7-0	5-10	5-9
	1 – #5	40,000	8-6	10-8	8-5	8-8	7-10	6-6	6-2	5-0	4-11
		60,000	10-5	13-0	10-3	10-7	9-7	8-0	7-6	6-1	6-0
	2 – #4 1 – #6	40,000	9-7	12-1	9-6	9-9	8-10	7-5	7-0	5-8	5-6
		60,000	11-9	14-9	11-7	11-11	10-10	9-0	8-6	6-11	6-9
	2 – #5	40,000	12-0	15-0	11-9	12-2	11-0	9-2	8-8	7-1	6-11
		60,000	14-7	18-3	14-4	14-10	13-5	11-2	10-7	8-7	8-5
	2 – #6	40,000	14-3	17-11	14-1	14-7	13-2	11-0	10-4	8-5	8-3
		60,000	19-11	25-0	19-7	20-3	18-4	15-3	14-5	10-10	10-7
	Center distance ***A***[11,12]		6-3	9-11	6-1	6-6	5-4	3-9	3-4	2-2	2-1

For SI: 1 inch = 25.4 mm; 1 psf = 0.0479 kN/m^2; 1 ft = 0.3048 m; Grade 40 = 280 MPa; Grade 60 = 420 MPa

Top and bottom reinforcement for lintels without stirrups shown in shaded cells shall be equal to or greater than that required for a lintel of the same depth and loading condition that has an allowable clear span that is equal to or greater than that of the lintel without stirrups. See Page 7-7 for additional notes.

Table 7.10. Maximum Allowable Clear Spans for 10-inch Nominal Thick Flat Lintels in Load-Bearing Walls[1,2,3,4,5,6,13]
Roof Clear Span 32 feet and Floor Clear Span 24 feet

Lintel Depth[7], ***D*** (in.)	Number of bars and bar size in top and bottom of lintel	Steel yield strength[8], f_y (psi)	Loading condition determined from Table 7.2							
			1	2		3		4		5	
				Maximum ground snow load (psf)							
				30	70	30	70	30	70	30	70
			Maximum clear span of lintel (ft–inches)								
8	Span without stirrups[9,10]		7-2	8-6	5-5	5-10	4-10	3-5	3-2	2-5	2-4
	1 – #4	40,000	4-9	5-3	4-0	4-2	3-9	3-0	2-10	2-3	2-2
		60,000	6-7	7-4	5-7	5-10	5-3	4-2	3-11	3-2	3-1
	1 – #5	40,000	6-9	7-5	5-9	5-11	5-4	4-3	4-0	3-2	3-2
		60,000	8-2	9-0	6-11	7-2	6-5	5-1	4-10	3-10	3-9
	2 – #4 1 – #6	40,000	7-7	8-4	6-5	6-8	6-0	4-9	4-6	3-7	3-6
		60,000	9-2	10-1	7-9	8-0	7-2	5-9	5-5	4-4	4-3
	2 – #5	40,000	9-3	10-3	7-10	8-2	7-4	5-10	5-6	4-5	4-4
		60,000	11-1	12-2	9-4	9-9	8-9	6-11	6-6	5-2	5-0
	2 – #6	40,000	10-10	12-0	9-3	9-7	8-7	6-10	6-5	4-7	4-5
		60,000	DR	DR	DR	DR	DR	DR	DR	DR	DR
	Center distance ***A***[11,12]		3-1	3-9	2-3	2-5	1-11	1-3	1-1	0-8	0-8
12	Span without stirrups[9,10]		6-2	7-8	5-3	5-7	4-10	3-8	3-5	2-10	2-9
	1 – #4	40,000	5-9	6-8	5-2	5-4	4-10	3-10	3-7	2-11	2-10
		60,000	7-0	8-1	6-3	6-6	5-10	4-8	4-5	3-6	3-6
	1 – #5	40,000	7-2	8-3	6-5	6-8	6-0	4-9	4-6	3-7	3-6
		60,000	8-9	10-1	7-10	8-1	7-3	5-10	5-6	4-5	4-4
	2 – #4 1 – #6	40,000	8-1	9-4	7-3	7-6	6-9	5-4	5-1	4-1	4-0
		60,000	11-3	13-0	10-1	10-6	9-5	7-6	7-1	5-8	5-7
	2 – #5	40,000	11-6	13-3	10-3	10-8	9-7	7-7	7-2	5-9	5-8
		60,000	13-10	16-0	12-4	12-10	11-6	9-2	8-8	7-0	6-10
	2 – #6	40,000	13-7	15-8	12-2	12-7	11-4	9-0	8-6	6-1	5-11
		60,000	16-3	18-6	14-6	15-1	13-6	10-9	10-2	7-2	7-0
	Center distance ***A***[11,12]		4-6	6-0	3-7	3-11	3-2	2-0	1-9	1-2	1-1
16	Span without stirrups[9,10]		8-0	10-5	7-3	7-8	6-8	5-1	4-9	3-11	3-10
	1 – #4	40,000	6-5	7-9	6-0	6-3	5-8	4-6	4-3	3-5	3-4
		60,000	7-10	9-5	7-4	7-8	6-11	5-6	5-2	4-2	4-1
	1 – #5	40,000	8-0	9-8	7-6	7-10	7-0	5-7	5-4	4-3	4-2
		60,000	9-9	11-9	9-2	9-6	8-7	6-10	6-6	5-3	5-1
	2 – #4 1 – #6	40,000	9-1	10-10	8-6	8-10	7-11	6-4	6-0	4-10	4-9
		60,000	11-0	13-3	10-4	10-9	9-8	7-9	7-3	5-10	5-9
	2 – #5	40,000	11-3	13-6	10-7	10-11	9-10	7-11	7-5	6-0	5-11
		60,000	15-8	18-9	14-8	15-3	13-8	10-11	10-4	8-4	8-2
	2 – #6	40,000	15-4	18-5	14-5	14-11	13-5	10-9	10-2	7-8	7-6
		60.000	18-6	22-2	17-4	18-0	16-2	12-11	12-2	8-9	8-6
	Center distance ***A***[11,12]		5-7	8-1	4-11	5-4	4-4	2-9	2-5	1-7	1-6
20	Span without stirrups[9,10]		9-6	13-0	9-3	9-8	8-5	6-6	6-1	5-0	5-0
	1 – #4	40,000	6-11	8-7	6-9	7-0	6-4	5-1	4-10	3-11	3-10
		60,000	8-6	10-3	8-3	8-7	7-9	6-3	5-10	4-9	4-8
	1 – #5	40,000	8-8	10-9	8-5	8-9	7-11	6-4	6-0	4-10	4-9
		60,000	10-7	13-1	10-4	10-8	9-8	7-9	7-4	5-11	5-9
	2 – #4 1 – #6	40,000	9-9	12-2	9-6	9-11	8-11	7-2	6-9	5-6	5-4
		60,000	11-11	14-9	11-8	12-1	10-10	8-9	8-3	6-8	6-6
	2 – #5	40,000	12-2	15-1	11-10	12-4	11-1	8-11	8-5	6-9	6-8
		60,000	16-11	21-1	16-7	17-2	15-6	12-5	11-9	9-6	9-4
	2 – #6	40,000	16-7	20-8	16-3	16-10	15-2	12-2	11-6	9-3	9-0
		60,000	20-1	25-0	19-8	20-4	18-4	14-9	13-11	10-3	10-0
	Center distance ***A***[11,12]		6-6	10-0	6-3	6-8	5-5	3-6	3-1	2-0	2-0
24	Span without stirrups[9,10]		10-11	15-6	11-1	11-8	10-2	7-11	7-5	6-2	6-0
	1 – #5	40,000	9-1	11-8	9-3	9-7	8-8	7-0	6-7	5-4	5-3
		60,000	11-2	14-3	11-3	11-8	10-7	8-6	8-0	6-6	6-5
	2 – #4 1 – #6	40,000	10-4	13-2	10-5	10-10	9-9	7-10	7-5	6-0	5-11
		60,000	12-7	16-1	12-9	13-3	11-11	9-7	9-1	7-4	7-3
	2 – #5	40,000	12-10	16-5	13-0	13-6	12-2	9-10	9-3	7-6	7-4
		60,000	15-8	20-0	15-10	16-5	14-10	11-11	11-3	9-2	9-0
	2 – #6	40,000	15-4	19-7	15-6	16-1	14-6	11-9	11-1	9-0	8-9
		60,000	21-4	27-4	21-7	22-5	20-3	16-4	15-5	11-10	11-6
	Center distance ***A***[11,12]		7-3	11-10	7-5	8-0	6-6	4-3	3-9	2-6	2-5

For SI: 1 inch = 25.4 mm; 1 psf = 0.0479 kN/m^2; 1 ft = 0.3048 m; Grade 40 = 280 MPa; Grade 60 = 420 MPa

Top and bottom reinforcement for lintels without stirrups shown in shaded cells shall be equal to or greater than that required for a lintel of the same depth and loading condition that has an allowable clear span that is equal to or greater than that of the lintel without stirrups. See Page 7-7 for additional notes.

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Table 7.17. Maximum Allowable Clear Spans for Flat Lintels Without Stirrups in Non-Load-Bearing Walls [1,2,3,4,5,7,8]

Lintel Depth[6], ***D*** (in.)	Number of bars and bar size	Steel yield strength, f_y (psi)	Nominal Wall Thickness (inches)							
			4		6		8		10	
			Construction of wall above lintel							
			Concrete wall	Light framed gable	Concrete wall	Light framed gable	Concrete wall	Light framed gable	Concrete wall	Light framed gable
			Maximum clear span of lintel (ft-inches)							
8	1 – #4	40,000	10-11	11-5	9-7	11-2	7-10	9-5	7-3	9-2
		60,000	12-5	11-7	10-11	13-5	9-11	13-2	9-3	12-10
	1 – #5	40,000	12-7	11-7	11-1	13-8	10-1	13-5	9-4	13-1
		60,000	DR	DR	12-7	16-4	11-6	14-7	10-9	14-6
	2 – #4 1 – #6	40,000	DR	DR	12-0	15-3	10-11	15-0	10-2	14-8
		60,000	DR	DR	DR	DR	12-2	15-3	11-7	15-3
	2 – #5	40,000	DR	DR	DR	DR	12-7	16-7	11-9	16-7
		60,000	DR	DR	DR	DR	DR	DR	13-3	16-7
	2 – #6	40,000	DR	DR	DR	DR	DR	DR	13-2	17-8
		60,000	DR	DR	DR	DR	DR	DR	DR	DR
12	1 – #4	40,000	11-5	9-10	10-6	12-0	9-6	11-6	8-9	11-1
		60,000	11-5	9-10	11-8	13-3	10-11	14-0	10-1	13-6
	1 – #5	40,000	11-5	9-10	11-8	13-3	11-1	14-4	10-3	13-9
		60,000	11-5	9-10	11-8	13-3	11-10	16-0	11-9	16-9
	2 – #4 1 – #6	40,000	DR	DR	11-8	13-3	11-10	16-0	11-2	15-6
		60,000	DR	DR	11-8	13-3	11-10	16-0	11-11	18-4
	2 – #5	40,000	DR	DR	11-8	13-3	11-10	16-0	11-11	18-4
		60,000	DR	DR	11-8	13-3	11-10	16-0	11-11	18-4
16	1 – #4	40,000	13-6	13-0	11-10	13-8	10-7	12-11	9-11	12-4
		60,000	13-6	13-0	13-8	16-7	12-4	15-9	11-5	15-0
	1 – #5	40,000	13-6	13-0	13-10	17-0	12-6	16-1	11-7	15-4
		60,000	13-6	13-0	13-10	17-1	14-0	19-7	13-4	18-8
	2 – #4 1 – #6	40,000	13-6	13-0	13-10	17-1	13-8	18-2	12-8	17-4
		60,000	13-6	13-0	13-10	17-1	14-0	20-3	14-1	
	2 – #5	40,000	13-6	13-0	13-10	17-1	14-0	20-3	14-1	
		60,000	DR	DR	13-10	17-1	14-0	20-3	14-1	
20	1 – #4	40,000	14-11	15-10	13-0	14-10	11-9	13-11	10-10	13-2
		60,000	15-3	15-10	14-11	18-1	13-6	17-0	12-6	16-2
	1 – #5	40,000	15-3	15-10	15-2	18-6	13-9	17-5	12-8	16-6
		60,000	15-3	15-10	15-8	20-5	15-9		14-7	20-1
	2 – #4 1 – #6	40,000	15-3	15-10	15-8	20-5	14-11		13-10	
		60,000	15-3	15-10	15-8	20-5	15-10		15-11	
	2 – #5	40,000	15-3	15-10	15-8	20-5	15-10		15-11	
		60,000	15-3	15-10	15-8	20-5	15-10		15-11	
24	1 – #4	40,000	16-1	17-1	13-11	15-10	12-7	14-9	11-8	13-10
		60,000	16-11	18-5	16-1	19-3	14-6	18-0	13-5	17-0
	1 – #5	40,000	16-11	18-5	16-3	19-8	14-9	18-5	13-8	17-4
		60,000	16-11	18-5	17-4		17-0		15-8	
	2 – #4 1 – #6	40,000	16-11	18-5	17-4		16-1		14-10	
		60,000	16-11	18-5	17-4		17-6		17-1	
	2 – #5	40,000	16-11	18-5	17-4		17-6		17-4	
		60,000	16-11	18-5	17-4		17-6		17-8	

For SI: 1 inch = 25.4 mm; 1 psf = 0.0479 kN/m^2; 1 ft = 0.3048 m; Grade 40 = 280 MPa; Grade 60 = 420 MPa

1 See Table 2.1 for tolerances permitted from nominal thickness.
2 Table values are based on concrete with a minimum specified compressive strength of 2,500 psi (17.2 MPa). See note 5.
3 Deflection criterion is ***L****/240*, where ***L*** is the clear span of the lintel in inches, or ½-inch (13 mm), whichever is less.
4 Linear interpolation between lintels depths, ***D***, is permitted provided the two cells being used to interpolate are shaded.
5 Where concrete with a minimum specified compressive strength of 3,000 psi (20.7 MPa) is used, spans in cells that are shaded shall be permitted to be multiplied by 1.05.
6 Lintel depth, ***D***, is permitted to include the available height of wall located directly above the lintel, provided that the increased lintel depth spans the entire length of the lintel.
7 DR indicates design required
8 The maximum clear opening width between two solid wall segments shall be 18 feet (5.5 m). See Section 5.2.1. Lintel spans in table greater than 18 feet are shown for interpolation and information purposes only.

Table 7.19. Maximum Allowable Clear Spans for 4-inch Nominal Thick Flat Lintels in Top Story Walls Subject to Roof Uplift Forces[1,2,3,4,5,6,13]

Lintel Depth[7], ***D*** (in.)	Number of bars and bar size in top and bottom of lintel	Steel yield strength[8], f_y (psi)	Factored roof uplift force from Table 7.1A (plf)								
			600	800	1000	1200	1400	1600	1800	2000	2200
			Maximum clear span of lintel for uplift forces (ft-inches)								
8	Span without stirrups[9,10]		5-6	4-1	3-3	2-8	2-3	2-0	2-0	2-0	2-0
	1 – #4	40,000	8-3	7-1	6-4	5-9	5-4	5-0	4-8	4-5	4-3
		60,000	9-10	8-5	7-6	6-10	6-4	5-11	5-4	4-9	4-4
	1 – #5	40,000	10-0	8-7	7-8	7-0	6-5	6-0	5-4	4-9	4-4
	Center distance ***A***[11,12]		5-6	4-1	3-3	2-8	2-3	2-0	2-0	2-0	2-0
12	Span without stirrups[9,10]		4-8	3-5	2-9	2-3	2-0	2-0	2-0	2-0	2-0
	1 – #4	40,000	10-11	9-5	8-4	7-7	7-0	6-7	6-2	5-10	5-7
		60,000	13-2	11-4	10-1	9-2	8-6	7-11	7-5	7-1	6-9
	1 – #5	40,000	13-5	11-6	10-3	9-4	8-8	8-1	7-7	7-2	6-10
		60,000	16-1	13-10	12-3	11-2	10-4	9-8	8-11	8-0	7-3
	2 – #4 1 – #6	40,000	15-0	12-11	11-6	10-5	9-8	9-0	8-6	8-0	7-3
		60,000	17-10	15-4	13-8	12-5	11-5	10-1	8-11	8-0	7-3
	Center distance ***A***[11,12]		4-8	3-5	2-9	2-3	2-0	2-0	2-0	2-0	2-0
16	Span without stirrups[9,10]		6-9	4-11	3-11	3-2	2-9	2-4	2-1	2-0	2-0
	1 – #4	40,000	13-2	11-3	10-0	9-1	8-5	7-10	7-5	7-0	6-8
		60,000	16-0	13-8	12-2	11-1	10-2	9-6	8-11	8-6	8-1
	1 – #5	40,000	16-4	13-11	12-5	11-3	10-5	9-8	9-2	8-8	8-3
		60,000		16-10	14-11	13-7	12-6	11-8	11-0	10-5	9-11
	2 – #4 1 – #6	40,000	18-3	15-8	13-44	12-8	11-8	10-10	10-3	9-8	9-3
		60,000			16-8	15-2	14-0	13-0	12-3	11-4	10-3
	2 – #5	40,000			17-0	15-5	14-3	13-3	11-9	10-7	9-7
	Center distance ***A***[11,12]		6-9	4-11	3-11	3-2	2-9	2-4	2-1	2-0	2-0
20	Span without stirrups[9,10]		8-10	6-5	5-1	4-2	3-6	3-1	2-9	2-5	2-3
	1 – #4	40,000	15-2	13-0	11-6	10-5	9-7	9-0	8-5	8-0	7-7
		60,000	18-6	15-9	14-0	12-8-	11-8	10-11	10-3	9-9	9-3
	1 – #5	40,000	18-10	16-1	14-3	12-11	11-11	11-1	10-6	9-11	9-5
		60,000		19-5	17-3	15-8	14-5	13-5	12-8	12-0	11-5
	2 – #4 1 – #6	40,000		18-1	16-0	14-6	13-5	12-6	11-9	11-2	10-7
		60,000			19-4	17-6	16-2	15-1	14-2	13-5	12-9
	2 – #5	40,000			19-8	17-10	16-5	14-10	13-1	11-9	10-8
		60,000						18-4	16-4	14-8	13-3
	2 – #6	40,000				20-0	17-0	14-10	13-1	11-9	10-8
	Center distance ***A***[11,12]		8-10	6-5	5-1	4-2	3-6	3-1	2-9	2-5	2-3
24	Span without stirrups[9,10]		11-1	8-0	6-3	5-2	4-4	3-10	3-4	3-0	2-9
	1 – #4	40,000	17-1	14-6	12-10	11-8	10-9	10-0	9-5	8-11	8-6
		60,000	20-9	17-8	15-7	14-2	13-1	12-2	11-5	10-10	10-4
	1 – #5	40,000		18-0	15-11	14-5	13-4	12-5	11-8	11-0	10-6
		60,000			19-4	17-6	16-2	15-0	14-2	13-5	12-9
	2 – #4 1 – #6	40,000		20-3	17-11	16-3	15-0	13-11	13-1	12-5	11-8
		60,000					18-1	16-10	15-10	15-0	14-3
	2 – #5	40,000					18-5	16-4	14-5	12-11	11-8
		60,000							18-3	16-4	14-10
	2 – #6	40,000					18-9	16-4	14-5	12-11	11-8
	Center distance ***A***[11,12]		11-1	8-0	6-3	5-2	4-4	3-10	3-4	3-0	2-9

For SI: 1 inch = 25.4 mm; 1 plf = 0.0146 kN/m; 1 ft = 0.3048 m; Grade 40 = 280 MPa; Grade 60 = 420 MPa