



# CONCRETE LINTEL DESIGN & INSTALLATION GUIDE



# SIZING OVERVIEW

## SOLID LINTEL

### 4" x 8" SOLID LINTELS



Lintel Length  
**30" to 68"**



Lintel Length  
**72" to 88"**



Lintel Length  
**90" to 96"**



Lintel Length  
**102" to 144"**

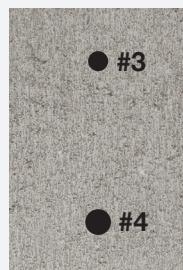
### 6" x 8" SOLID LINTELS



Lintel Length  
**30" to 64"**



Lintel Length  
**72" to 88"**

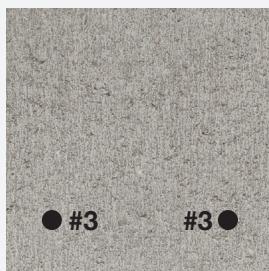


Lintel Length  
**90" to 96"**

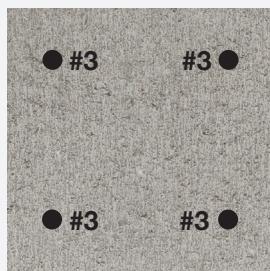


Lintel Length  
**104" to 144"**

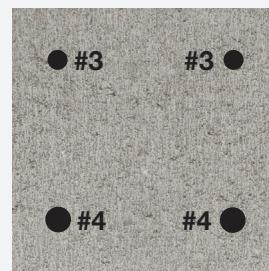
### 8" x 8" SOLID LINTELS



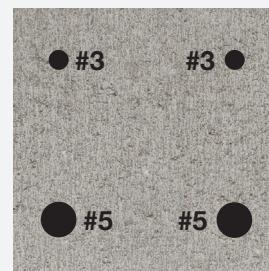
Lintel Length  
**40" to 64"**



Lintel Length  
**72" to 88"**



Lintel Length  
**96"**



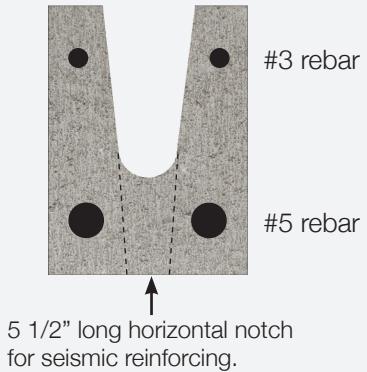
Lintel Length  
**108" to 144"**

Special rebar schedules available upon request.

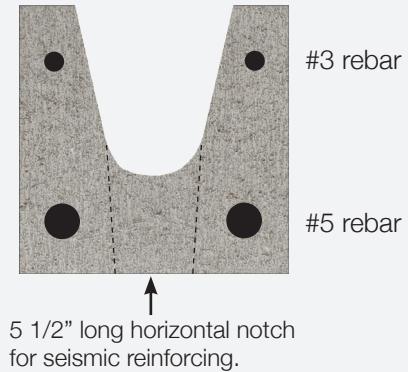
# SIZING OVERVIEW

## U-LINTELS

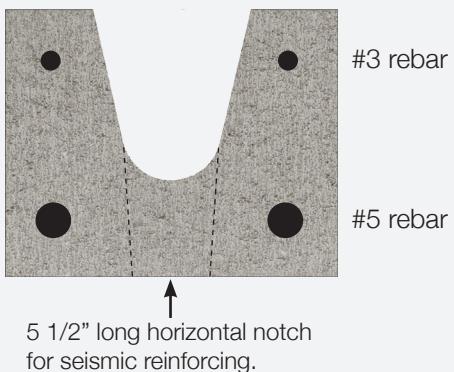
### 6" x 8" U-LINTELS



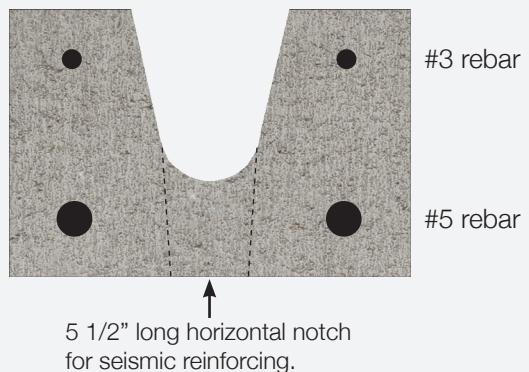
### 8" x 8" U-LINTELS



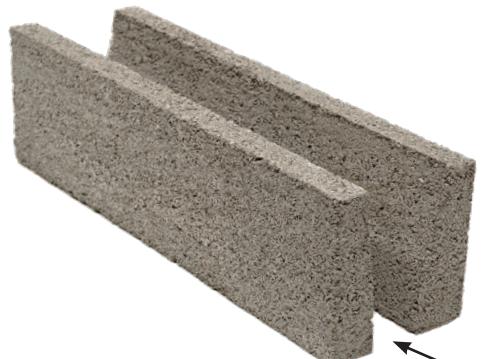
### 10" x 8" U-LINTELS



### 12" x 8" U-LINTELS



- U-lintels are available in lengths from 36" to 144".
- All four widths are stocked in various lengths. Please contact us for more information.
- #3 and #5 rebar placed as shown.

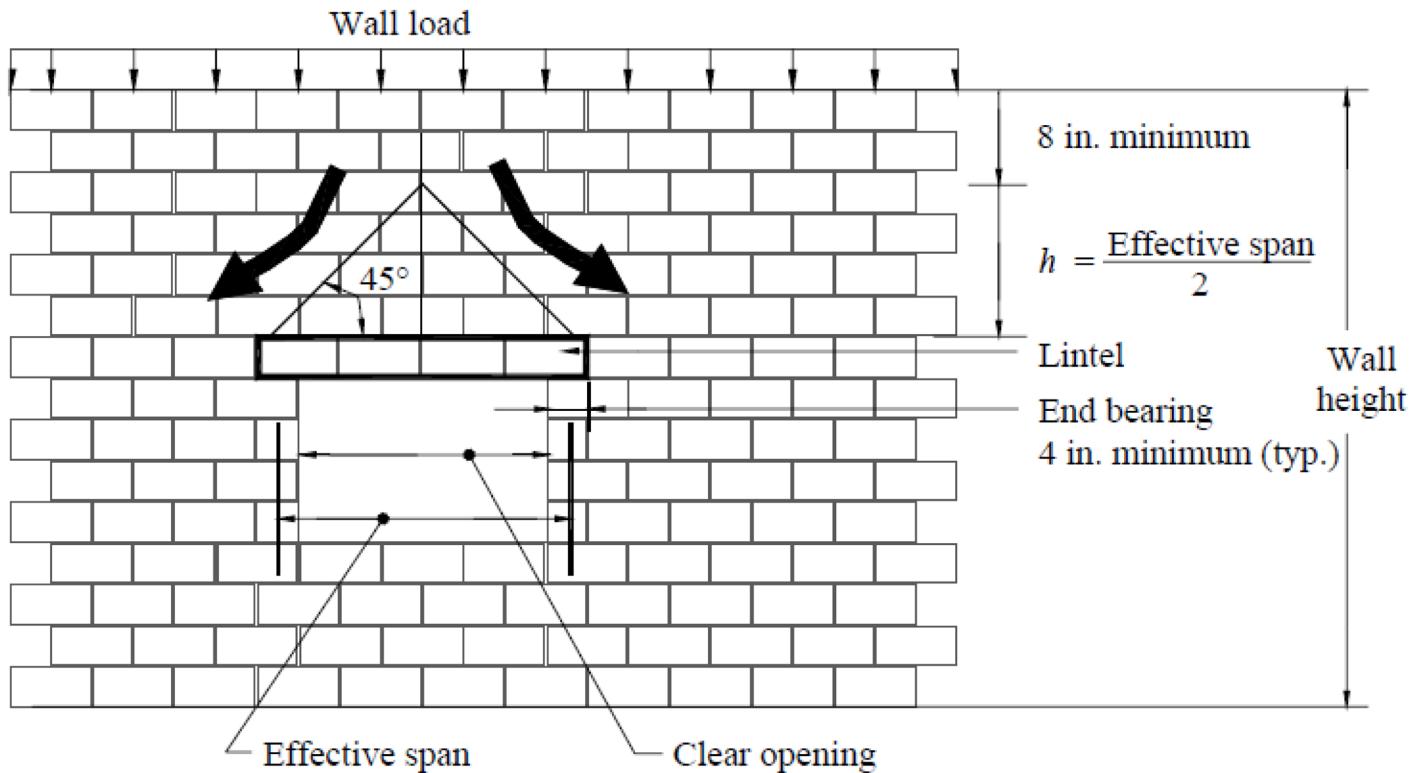


Notch to allow for seismic reinforcing.

Rebar is grade 60 steel ASTM 615  
5,000 PSI concrete mix design

Rebar placement:  
Clearance from bottom: 1 1/2"  
Clearance from top: 1 1/2"

# MASONRY WALL ARCHING ACTION



The typical door and window openings in masonry walls are bridged over by horizontal members spanning from opening jamb to jamb by lintels which are essentially beams. In many cases the loads to be applied to the York Building Products precast lintels may be calculated with consideration of masonry walls load “arching” behavior. Through the “arching” behavior some loads may be considered to distribute to either side of the opening and not need to be resisted by the precast lintel.

The wall surrounding the opening must meet several criterion in order to consider arching action to be occurring. These criterions are:

1. The masonry wall is laid in a running bond pattern.
2. At the time that all of loads that are to be supported by the lintel are applied, the masonry wall must be in a completed condition and cured to full wall material strength.
3. Minimum end bearing of at least 4 inches.
4. There is sufficient masonry wall on either side of the wall opening to resist the horizontal thrust induced by the arching action.
5. Control joints, expansion joints or other discontinuities are not located at or adjacent to the opening.
6. There is sufficient wall height above the top of the lintel to include a 45 degree triangular “arching” zone.
7. The wall height above the apex of the triangular zone is at least 8 inches.

If these criterions are met, arching action may be considered in lintel sizing and selection.

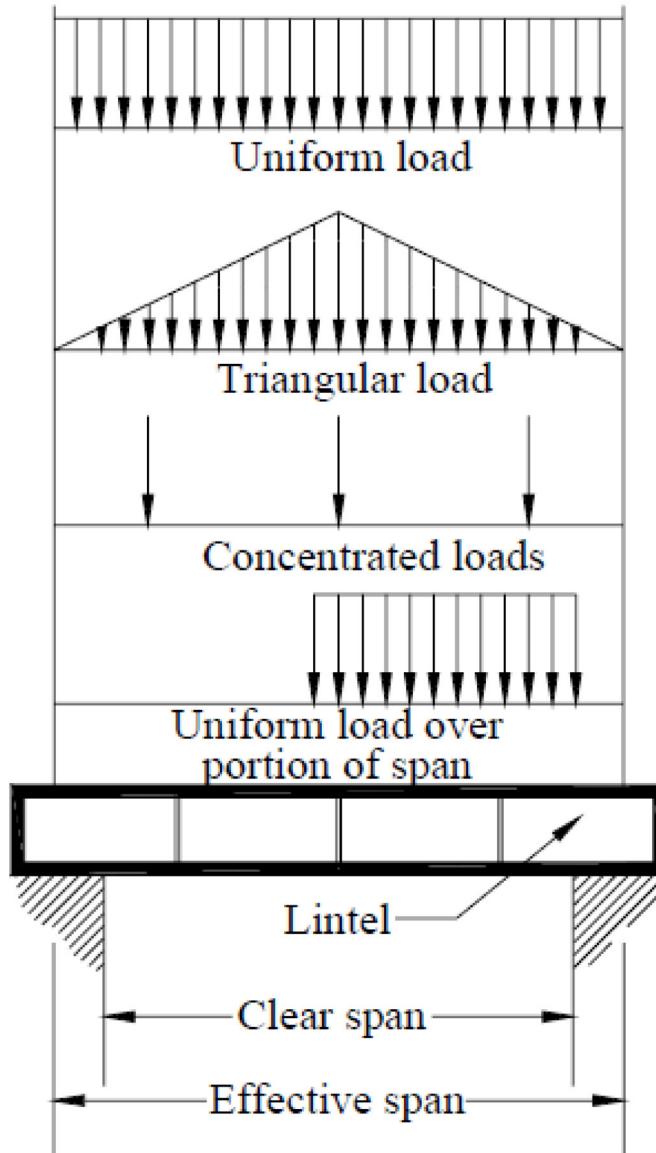
# MASONRY WALL ARCHING ACTION

The types of load patterns that are typically supported by lintels are, uniform, concentrated , partial uniform and triangular as indicated in the below diagram.

If arching action is in effect the final loads to be supported by the lintel include:

- The self weight of the lintel,
- The weight of the masonry wall within the triangular zone.
- Concentrated load within the triangular zone.

Other load types either dead or live load floor and roof loads above the triangular arching zone may be considered to "arch" and distribute the load to each side over the wall opening.



## LOAD TABLES

### SOLID LINTELS

4" x 8"

6" x 8"

8" x 8"

### U-LINTELS

6" x 8"

8" x 8"

10" x 8"

12" x 8"

# LOAD TABLES

Lintel Fire Ratings:

4" Solid – 1 hour

6" Solid & U-lintel – 1 hour

8" Solid & U-lintel – 2 hour

10" & 12" U-lintel – 3 hour

Compiled from ACI216.1-14/TMS 216-  
14, Table 5.1c.

**Table 5.1c—Reinforced masonry lintels**

Nominal lintel width, in.	Minimum longitudinal reinforcement cover for fire-resistance rating, in.			
	1 hour	2 hours	3 hours	4 hours
6	1-1/2	2	NP	NP
8	1-1/2	1-1/2	1-3/4	3
10 or more	1-1/2	1-1/2	1-1/2	1-3/4

Note: NP = Not permitted without a more detailed analysis.

The following load calculation tables were independently developed by a third party engineering firm to ensure accuracy.

Should you need additional assistance, or more detailed data, please contact an Oberfields representative.

# SOLID LINTELS - 4" X 8"

**DESIGN CAPACITY TABLE**

Reinforcement		Top		Bottom		None												(1) - #3		(1) - #4		(1) - #5 "																							
Nominal Lintel Length (inch)	[LA+fl]	24	30	32	36	40	42	44	48	54	56	60	64	66	72	78	80	84	88	90	96	102	104	108	112	114	120	128	132	136	144														
Masonry Opening <b>M.O.</b> (inch)		8	14	16	20	24	26	28	32	38	40	44	48	50	56	62	64	68	72	74	80	86	88	92	96	98	104	112	116	120	128														
Effective Span ( <b>LE</b> = M.O.+h/2) (inch)		16	22	24	28	32	34	36	40	46	48	52	56	58	64	70	72	76	80	82	88	94	96	100	104	106	112	120	124	128	136														
Maximum Shear Strength ( <b>FVn</b> ) lbs.		1221	1221	1221	1221	1221	1221	1221	1221	1221	1221	1221	1221	1221	1221	1221	1221	1221	1221	1221	1479	1479	1699	1699	1699	1699	1699	1699	1699	1699	1699														
Maximum Moment Strength (+FMn) lb-ft.		2762	2762	2762	2762	2762	2762	2762	2762	2762	2762	2762	2762	2762	2762	2762	2762	2762	2762	2762	4703	4703	6276	6276	6276	6276	6276	6276	6276	6276	6276														
Maximum Uniform Factored Load (Nvn) lbs/ft.	<b>3662</b>	<b>6575</b>	<b>5525</b>	<b>3605</b>	<b>2416</b>	<b>2074</b>	<b>1817</b>	<b>1456</b>	<b>1121</b>	<b>1042</b>	<b>912</b>	<b>811</b>	<b>788</b>	<b>664</b>	<b>584</b>	<b>562</b>	<b>522</b>	<b>487</b>	<b>570</b>	<b>520</b>	<b>548</b>	<b>534</b>	<b>507</b>	<b>483</b>	<b>472</b>	<b>441</b>	<b>406</b>	<b>391</b>	<b>376</b>	<b>350</b>															
Maximum Uniform Service Load (ws) lbs/ft. @																																													
(3)(4)	LE / 240	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	1520	1138	875	805	688	592	830	674	734	690	544	514	436	355	323	294	245								
Di =	LE / 360	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	2052	1812	1435	1045	787	609	561	481	416	566	461	497	467	414	369	349	297	243	220	201	168				
	LE / 600	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	1306	1157	924	751	682	520	408	378	327	285	297	312	293	261	233	221	189	155	142	130	109				
(3)(4)	LE / 240	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	3998	3397	2524	1710	1520	1221	999	909	743	584	542	469	410	514	423	440	414	369	330	313	268	221	201	184	156
Di + D s =	LE / 360	9999+	9807	9807	7655	4959	3423	2889	2479	1867	1290	1154	938	776	710	576	459	428	374	329	384	319	319	301	269	242	230	198	165	151	139	119	116	102	87										
	LE / 600	9999+	6567	5191	3448	2444	2091	1810	1391	987	890	734	616	567	457	363	337	292	255	289	243	230	218	196	178	169	148	122	112	102	87														

**Table Use:**

Enter Table with Required Strength = Factored Uniform Load  $w_u$

Select Lintel Size Where  $w_u < N_{Wn}$

DL: Dead Load LL: Live Load

Factored Load Effect  $w_u$  ; Greater of

1.4 DL CR 1.2DL + 1.6LL

Notes:

(1) See "arching" data sheet for applied load calculation where arching action determined by Architect/Engineer is applicable.

(2) See calculation example for explanation of table of calculation methods and Code references.

(3) Mid-Span deflection  $D_s$  at service load is calculated as  $W_{\text{SERVICE}} = 0.67 \times F_{W_n}$  lbs/ft for the section in question.

For long term deflection  $D_s$  , sustained loads are assumed to be at maximum section capacity for time greater than 60 months

(4) Immediate elastic deflections values are for maximum uniform service load values noted. Long term deflections consider that 50 percent of maximum service is sustained load. Load values noted indicate limiting load for deflection limits of LE/240, LE/360, LE/600, considering long term creep and shrinkage effect. Deflections values do not consider shear deformations and are for pin ended supports.

Di Immediate elastic deflection

Di + D s Immediate elastic deflection + Long Term Creep Deflection

(5) Load capacity of installed lintel assumed to have lateral bracing at distances not greater than: [9.2-3.1]  $50b_w$  , < 5.2-1.2 >  $32b_w$  OR  $120(b_w)^2/d_{eff}$  =

(6) Minimum end bearing distance shall be 8 inches by width of the lintel.

(7) Moment capacity noted limited by maximum allowable reinforcement area for tension controlled section [9.3-3 & 21.2.2]. Excess steel area ignored in moment capacity value indicated.

(8) Shear span considered as M.O. for LA24.

(9) 24" lintels contain NO rebar.

**Controlling Section Capacity  $F_{W_n}$**

**Shear**  
**Moment**

**(Red)**  
**(Blue)**

Code References:

ACI 318 - 19	[ ]
TMS402-16	< >
ASCE 7-16	{ }

116 in. =  
9.67 ft.

# SOLID LINTELS - 4" X 8"

**Materials:**  
 Concrete Compressive Strength ( $f_c$ ) 3,000 psi (min)  
 Reinforcing Fy = 60,000 psi  
 Lintel Weight: 28 lbs/ft.

**Unit Dimensions:**  
 Width:bw = 3.625 inch  
 Height h = 7.625 inch

## INSTALLATION GUIDE TABLE

Code Reference: [ACI 318-19]

Reinforcement	Top		Bottom		None		(1) - #3		(1) - #4		(1) - #5	
	None	(1) - #3	None	(1) - #3	None	(1) - #3	None	(1) - #3	None	(1) - #3	None	(1) - #3
Nominal Lintel Length (inch) [LA#]	24	30	32	36	40	42	44	48	54	56	60	64
Masonry Opening M.O. (inch) (4)	8	14	16	20	24	26	28	32	38	40	44	48
Effective Span (LE = M.O. + h/2) (inch)	16	22	24	28	32	34	36	40	46	52	56	64
<b>Case 0</b>												
Maximum Factored $w_{cmu}$ Load (lbs/ft)	3622	6536	5485	3566	2377	2035	1777	1416	1082	1002	873	772
<b>Case 1 - 1 Strut</b>												
Maximum Factored $w_{cmu}$ Load (lbs/ft)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Strut Load $P_u$ (lbs)												
<b>Case 2 - 2 Struts</b>												
Maximum Factored $w_{cmu}$ Load (lbs/ft)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Strut Load $P_u$ (lbs)												

## Table Use:

Check Lintel Size & Support Requirements During Construction

- Select weight of wall being supported by lintel from appropriate reference.  
(Ref. NCMA TEK 14-1SB),  $s_{WALL}$  (lbs/ft)
- Determine factored installed wall load as follows:  
 $W_u = 1.4 \times s_{WALL} \times H$  or  $H_{max} = W_{cmu} / (1.4 \times s_{WALL})$   
"H" is maximum height of masonry wall to be installed above top of lintel before wall is cured. (ft.)
- Enter table for appropriate support condition, lintel size, masonry opening.
- Confirm calculated  $W_u$  is less than or equal to  $w_{cmu}$  noted in table.
- Confirm loads do not exceed immediate deflection value limits desired as noted in Design Capacity Tables.
- For Case 1 and Case 2 support conditions deflection span is  $(L_E/2)$  and  $(L_E/3)$ , respectively.
- NR - Not Recommended, no negative flexural reinforcement. Use continuous temporary support if required.
- Load capacity of installed lintel assumed to have lateral bracing at distances not greater than:  
 $[9.2.3.1] 5b_{lw} < 5.2.1.2-32 bw$  OR  $120b_{lw}/d_{eff}^2 = 9.67$  ft.
- 24" lintels contain NO rebar.

## Support Conditions

Case 0:	None - Clear Span Between Jamps
Case 1:	One Temporary Strut at MidSpan
Case 2:	Two Temporary Struts, Each at Third Points

## Example:

- Lintel : 4" solid with M.O. = 144 inches  
 4" Normal Weight Solid CMU = 41 lbs/sf.  
 Support Condition Case 2  
 H Installed = 8 feet  
 $W_u = 1.4 \times 41 \times 8 = 459$  lbs/ft.  
 Enter table and confirm  $W_u < w_{cmu} = 459$  lbs/ft. < 712 lbs/ft. OK
- Strut Loads:**  
 At  $W_u$ :  $P_u = [459 / (1.4 \times 28 \text{ Lintel weight}) + 712] \times 3121 = 1907$  lbs  
 $P_{service} = P_u / 1.4 = 1907 / 1.4 = 1362$  lbs.  
 At  $W_{cmu}$ :  $P_{service} = P_u / 1.4 = 3121 / 1.4 = 2229$  lbs.
- Ref. 6"x8" For Case 0 Example  
 Ref. 8"x8" For Case 1 Example

# SOLID LINTELS - 6" X 8"

## DESIGN CAPACITY TABLE

**Materials:**  
 Concrete Compressive Strength (f'c) 3,000 psi (min)  
 Reinforcing Fy = 60,000 psi  
 Lintel Weight: 42 lbs/ft.

**Unit Dimensions:**  
 Width: bw = 5.625 inch  
 Height: h = 7.625 inch

Reinforcement	Top		None						(1) - #3		(1) - #5	
		Bottom	(1) - #3						(1)-#4			
Nominal Lintel Length (inch)	[LB#]		30	32	40	48	56	64	72	80	88	96
Masonry Opening M.O. (inch)			14	16	24	32	40	48	56	64	72	80
Effective Span (LE = M.O.+ h/2) (inch)			22	24	32	40	48	56	64	72	80	88
Maximum Shear Strength ( $F_V_n$ ) lbs.			1636	1636	1636	1636	1636	1636	1636	1636	1983	2278
Maximum Moment Strength ( $+FM_n$ ) lb-ft.			2825	2825	2825	2825	2825	2825	2825	2825	4911	7204
Maximum Uniform Factored Load ( $FW_n$ ) lbs/ft.			6724	5650	3178	1951	1396	1038	795	628	509	697
Maximum Uniform Service Load (w <sub>s</sub> ) lbs/ft. @												
(3)(4) Di =	LE / 240		9999+	9999+	9689	5011	2934	1873	1278	912	676	764
	LE / 360		9999+	9999+	6600	3451	2044	1321	913	660	496	536
	LE / 600		9999+	9609	4209	2261	1373	910	644	475	364	366
(3)(4) Di + Ds =	LE / 240		9999+	9999+	5530	3016	1863	1251	919	684	527	517
	LE / 360		9999+	9016	4190	2364	1502	1033	762	576	450	417
	LE / 600		8185	6565	3226	1897	1241	826	593	439	337	320

### Table Use:

Enter Table with Required Strength = Factored Uniform Load  $w_u$

Select Lintel Size Where  $w_u < FW_n$

DL: Dead Load LL: Live Load

Factored Load Effect  $w_u$ ; Greater of

1.4 DL OR 1.2DL + 1.6LL

Notes:

- See "arching" information sheet for applied load calculation where arching action determined by Architect/Engineer is applicable.
- See calculation example for explanation of table calculation methods and Code references.

- Mid-Span deflection Di at service load is calculated as  $W_{SERVICE} = 0.67 \times FW_n$  lbs/ft for the section in question.
- For long term deflection Ds , sustained loads are assumed to be at maximum section capacity for time greater than 60 months

- Immediate elastic deflections values are for maximum uniform service load values noted. Long term deflections consider that 50 percent of maximum service is sustained load. Load values noted indicate limiting load for deflection limits of LE/240,LE/360, LE/600, considering long term creep and shrinkage effect. Deflections values do not consider shear deformations and are for pinned end supports.
- Immediate elastic deflection Di + Ds Immediate elastic deflection + Long Term Creep Deflection
- Load capacity of installed lintel assumed to have lateral bracing at distances not greater than: [9.2.3.1] 50bw , <5.2.1.2> 32bw OR  $120(bw)^2/d_{eff}$  = 180 in. = 15.00 ft.
- Minimum end bearing distance shall be 8 inches by width of the lintel.

### Deflections

Controlling Section Capacity $FW_n$	Shear (Red)	Moment (Blue)
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Code References:  
 ACI 318 - 19 [ ]  
 TMS402-16 < { }  
 ASCE 7-16 }

# SOLID LINTELS - 6" X 8"

## INSTALLATION GUIDE TABLE

**Materials:**

Concrete Compressive Strength (f'c)	3,000 psi (min)
Reinforcing Fy =	60,000 psi
Lintel Weight:	42 lbs/ft.

Code Reference: [ACI 318-19]  
 bw = 5.625 inch  
 h = 7.625 inch

Reinforcement	Top		None							
	Bottom		(1) - #3			(1) - #4			(1) - #3	
Nominal Lintel Length (inch) <b>[LB-#]</b>	30	32	40	48	56	64	72	80	88	96
Masonry Opening <b>M.O.</b> (inch) <sup>(4)</sup>	14	16	24	32	40	48	56	64	72	80
Effective Span ( <b>L<sub>E</sub></b> = M.O. + h/2) (inch)	22	24	32	40	48	56	64	72	80	88
<b>Case 0</b>										
Maximum Factored w <sub>cmu</sub> Load (lbs/ft)	6666	5592	3120	1892	1337	979	736	569	450	638
<b>Case 1 - 1 Strut</b>										
Maximum Factored w <sub>cmu</sub> Load (lbs/ft)	NR	NR	NR	NR	NR	NR	923	814	727	806
Strut Load P <sub>u</sub> (lbs)							3272	3272	3272	3965
<b>Case 2 - 2 Struts</b>										
Maximum Factored w <sub>cmu</sub> Load (lbs/ft)	NR	NR	NR	NR	NR	NR	1478	1307	1171	1296
Strut Load P <sub>u</sub> (lbs)							3006	3006	3006	3642

### Table Use:

Check Lintel Size & Support Requirements During Construction

- Select weight of wall being supported by lintel from appropriate reference.  
(Ref. NCMA TEK 14-13B), s<sub>wall</sub> (lbs/sf)
- Determine factored installed wall load as follows:  
$$W_u = 1.4 \times s_{WALL} \times H$$
 or determine  $H_{max} = W_{cmu} / (1.4 \times s_{WALL})$   
"H" (ft.) is the height of masonry wall to be installed above top of lintel before wall is cured.
- Enter table for appropriate support condition, lintel size, masonry opening.  
Confirm calculated  $W_u$  is less than or equal to  $w_{cmu}$  noted in table.
- Confirm loads do not exceed immediate deflection value limits desired as noted in Design Capacity Tables.  
For Case 1 and Case 2 support conditions deflection span is  $(L_E / 2)$  and  $(L_E / 3)$ , respectively.
- NR - Not Recommended, no negative flexural reinforcement. Continuous temporary support if required.
- Load capacity of installed lintel assumed to have lateral bracing at distances not greater than:  
[9.2.3.1]  $50b_w < 5.2.1.2 > 32 b_w$  OR  $120(b_w)^2/d_{eff} = 180$  in. = 15.00 ft.

### Support Conditions

- |   |   |
|---|---|
| Case 0 - None - Clear Span Between Jambs            | Case 0 : 6" solid with M.O. = 72 inches                               |
| Case 1 - One Temporary Strut at MidSpan             | 6" Normal Weight CMU wall grouted at 48" o.c. = 36 lbs/sf.            |
| Case 2 - Two Temporary Struts, Each at Third Points | Support Condition Case 0  |
|   | H Installed = 8 feet  |
|   | Wu = 1.4 x 36 x 8 = 403 lbs/ft.                                       |
|   | Enter table and confirm $W_u < W_{cmu}$ = 403 lbs/ft. < 600 lbs/ft OK |

Ref. 8"x8" For Case 1 Example  
Ref. 4"x8" For Case 2 Example

### Example:

Lintel : 6" solid with M.O. = 72 inches  
6" Normal Weight CMU wall grouted at 48" o.c. = 36 lbs/sf.  
Support Condition Case 0  
H Installed = 8 feet  
Wu = 1.4 x 36 x 8 = 403 lbs/ft.

# SOLID LINTELS - 8" X 8"

## DESIGN CAPACITY TABLE

**Materials:**

Concrete Compressive Strength ( $f'c$ ) 3,000 psi (min)  
 Reinforcing  $F_y$  = 60,000 psi  
 Lintel Weight: 56 lbs/ft.

**Unit Dimensions:**  
 Width:  $b_w$  = 7.625 inch  
 Height:  $h$  = 7.625 inch

Reinforcement	Top		Bottom		None		(2) - #3		(2) - #4		(2) - #5		(2) - #6		(2) - #7		
	(2) - #3	(2) - #4	(2) - #3	(2) - #4	(2) - #3	(2) - #4	(2) - #3	(2) - #4	(2) - #3	(2) - #4	(2) - #3	(2) - #4	(2) - #3	(2) - #4	(2) - #3	(2) - #4	
Nominal Lintel Length (inch) <b>[LC-#]</b>	40	48	56	64	72	80	88	96	104	108	112	120	128	136	144	168	
Masonry Opening <b>M.O.</b> (inch)	24	32	40	48	56	64	72	80	88	92	96	104	112	120	128	152	
Effective Span ( <b>LE</b> = M.O. + $h/2$ ) (inch)	32	40	48	56	64	72	80	88	96	100	104	112	120	128	136	160	
Maximum Shear Strength ( <b>fv</b> ) lbs.	2525	2525	2525	2525	2525	2525	2525	2525	2525	3033	3496	3496	3496	3496	3496	3496	3921
Maximum Moment Strength ( <b>+FM<sub>n</sub></b> ) lb-ft.	5542	5542	5542	5542	5542	5542	5542	5542	5542	9255	13201	13201	13201	13201	13201	13201	12919
Maximum Uniform <b>Factored Load</b> ( <b>FW<sub>n</sub></b> ) lbs/ft.	<b>4997</b>	<b>3011</b>	<b>2154</b>	<b>1677</b>	<b>1373</b>	<b>1162</b>	<b>998</b>	<b>1067</b>	<b>1098</b>	<b>1044</b>	<b>994</b>	<b>908</b>	<b>836</b>	<b>774</b>	<b>721</b>	<b>581</b>	
Maximum Unif. <b>Service Load</b> ( <b>w<sub>s</sub></b> ) lbs/ft. @																	
<b>D<sub>i</sub> =</b>	LE / 240	9999+	9225	5381	3411	2305	1633	1202	1343	1387	1228	1093	878	715	591	494	382
	LE / 360	9999+	6262	3675	2347	1599	1143	849	922	941	835	744	599	490	406	341	261
	LE / 600	7510	3951	2356	1534	1064	774	585	600	594	529	473	384	316	264	223	168
<b>D<sub>i</sub> + D<sub>s</sub> =</b>	LE / 240	9860	5142	3106	2045	1518	1108	842	853	837	746	668	543	448	375	318	272
	LE / 360	6990	3830	2374	1600	1187	883	681	649	613	549	494	406	338	286	244	197
	LE / 600	5030	2876	1847	1281	949	693	525	503	449	409	368	305	252	211	179	139

**Table Use:**

Enter Table with Required Strength = Factored Uniform Load  $w_u$

Select Lintel Size Where  $w_u < FW_n$

D<sub>L</sub>: Dead Load

Factored Load Effect  $w_u$  ; Greater of

1.4 D<sub>L</sub> OR

Notes:

- (1) See "arching" information sheet for applied load calculation where arching action determined by Architect/Engineer is applicable.
- (2) See calculation example for explanation of table calculation methods and Code references.
- (3) Mid-Span deflection D<sub>i</sub> at service load is calculated as  $W_{SERVICE} = 0.67 \times FW_n$  lbs/ft for the section in question.

For long term deflection D<sub>s</sub> , sustained loads are assumed to be at maximum section capacity for time greater than 60 months

- (4) Immediate elastic deflections values are for maximum uniform service load values noted. Long term deflections consider that 50 percent of maximum service is sustained load. Load values noted indicate limiting load for deflection limits of LE/240, LE/360, LE/600, considering long term creep and shrinkage effect.
- (5) Deflections values do not consider shear deformations and are for pin ended supports.

D<sub>i</sub> Immediate elastic deflection

D<sub>i</sub> + D<sub>s</sub> Immediate elastic deflection + Long Term Creep Deflection

(6) Minimum end bearing distance shall be 8 inches by width of the lintel.

- (7) Moment capacity noted limited by maximum allowable reinforcement area for tension controlled section [9.3.3 & 21.2.2]. Excess steel area ignored in moment capacity value indicated.

**Deflections**

Controlling Section Capacity  $FW_n$

**Shear** (Red)

**Moment** (Blue)

Code References:  
 ACI 318 - 19 [ ]  
 TMS402-16 < >  
 ASCE 7-16 { }

# SOLID LINTELS - 8" X 8"

## INSTALLATION GUIDE TABLE

**Materials:**  
 Concrete Compressive Strength (f<sub>c</sub>) : 3,000 psi (min)  
 Reinforcing F<sub>y</sub> : 60,000 psi  
 Lintel Weight: 56 lbs/ft.

Code Reference: [ ACI 318-19 ]

Reinforcement	Top	None			(2) - #3			(2) - #4			(2) - #5			(2) - #6		
Nominal Lintel Length (inch) [L-C#]	Bottom	(2) - #3			(2) - #3			(2) - #4			(2) - #5			(2) - #6		
Masonry Opening M.O. (inch) <sup>(4)</sup>	40	48	56	64	72	80	88	96	104	108	112	120	128	136	144	168
Effective Span (L.E. = M.O.+ h/2) (inch)	24	32	40	48	56	64	72	80	88	92	96	104	112	120	128	152
<b>Case 0</b>	32	40	48	56	64	72	80	88	96	100	104	112	120	128	136	160
Maximum Factored w <sub>cmu</sub> Load ( lbs/ft)	4919	2932	2076	1599	1295	1084	919	988	1020	965	916	830	757	696	642	503
<b>Case 1 - 1 Strut</b>																
Maximum Factored w <sub>cmu</sub> Load ( lbs/ft)	NIR	NR	NR	NR	1436	1268	1133	1245	1320	1264	1212	1120	1040	970	909	863
Strut Load P <sub>U</sub> (lbs)					5049	5049	5049	6067	6991	6991	6991	6991	6991	6991	6991	7842
<b>Case 2 - 2 Struts</b>																
Maximum Factored w <sub>cmu</sub> Load ( lbs/ft)	NR	NR	NR	NR	2293	2030	1819	1994	2111	2023	1942	1798	1673	1563	1467	1395
Strut Load P <sub>U</sub> (lbs)					4638	4638	4638	5572	6421	6421	6421	6421	6421	6421	6421	7203

### Table Use:

Check Lintel Size & Support Requirements During Construction  
 (1) Select weight of wall being supported by lintel from appropriate reference.

(Ref. NCMA TEK 14-13B ), s<sub>WALL</sub> (lbs/sf)  
 (2) Determine factored installed wall load as follows:

$$W_u = 1.4 \times s_{WALL} \times H \quad \text{or} \quad H_{max} = W_{cmu} / (1.4 \times s_{WALL})$$

"H" is maximum height of masonry wall to be installed above top of lintel before wall is cured. (ft.)  
 (3) Enter table for appropriate support condition, lintel size, masonry opening.  
 Confirm calculated W<sub>u</sub> is less than or equal to W<sub>cmu</sub> noted in table.

(4) Confirm loads do not exceed immediate deflection value limits desired as noted in Design Capacity Tables.  
 For Case 1 and Case 2 support conditions deflection span is (L.E / 2) and (L.E./3), respectively.

(5) NR - Not Recommended, no negative flexural reinforcement. Continuous temporary support if required.  
 (6) Load capacity of installed lintel assumed to have lateral bracing at distances not greater than:

$$[9.2.3.1] 50b_w , <5.2.1.2> 32 b_w \text{ OR } 120(b_w)^2/d_{eff} = 244 \text{ in.} = \boxed{20.33 \text{ ft.}}$$

### Support Conditions

Case 0 - None - Clear Span Between Jambs  
 Case 1 - One Temporary Strut at MidSpan  
 Case 2 - Two Temporary Struts, Each at Third Points

### Example:

Lintel : 8" solid with M.O. = 120 inches  
 8" Normal Weight CMU wall grouted at 24" o.c. = 55 lbs/sf.  
 H Installed = 10.67 feet  
 Wu = 1.4 x 55 x 10.67 = 822 lbs/ft.

Enter capacity table and confirm Wu < W<sub>cmu</sub> = 822 lbs/ft. < 970 lbs/ft OK

### Strut Loads:

At W<sub>U</sub>: P<sub>U</sub> = [822 / ((1.4 x 56 Lintel weight) + 970)] x 6991 = 5481 lbs  
 P<sub>SERVICE</sub> = P<sub>U</sub> / 1.4 = 5481 / 1.4 = 3915 lbs.  
 At W<sub>cmu</sub>: P<sub>SERVICE</sub> = P<sub>U</sub> / 1.4 = 6991 / 1.4 = 4993 lbs.

Ref. 6"x8" For Case 0 Example  
 Ref. 4"x8" For Case 2 Example

# U-LINTELS - 6" X 8"

## U-LINTEL SIZE:

## DESIGN CAPACITY TABLE

Reinforcement	Top		(2) - #3		(2) - #5 (8)		(2) - #3		(2) - #5 (8)	
	Bottom									
Nominal Lintel Length (inch) [LUB#]	24	30	32	36	40	48	54	60	64	66
Concrete Compressive Strength ( $f'c$ )	5,000	60,000	(min)							
Reinforcing Fy =										
Lintel Weight:	34 lbs/ft, ungrouted									
Masonry Comp. Strength $f'm$ :										
Grout Comp. Strength $f'g$ :	3,000 psi									
Height: h =	7.625 inch									
Width: bw =	5.625 inch									
Nominal 6 inch										
8 inch										

**Table Use:**  
Enter Table with Required Strength = Factored Uniform Load  $W_u$   
Select Lintel Size Where  $W_u < F W_n$

D<sub>i</sub> = Mid-span immediate deflection at service load noted is calculated for the section in question.

LL: Live Load  
Factored Load Effect  $W_u$  : Greater of  
1.4 DL OR  
1.2DL + 1.6LL

### Notes:

(1) See "arching" information sheet for applied load calculation where arching action determined by Architect/Engineer is applicable.

(2) See calculation example for explanation of table calculation methods and Code references.

(3) Mid-span immediate deflection D<sub>i</sub> at service load noted is calculated for the section in question.  
For long term deflection D<sub>s</sub>, sustained loads are assumed to be applied for a time greater than 60 months.

(4) Immediate elastic deflections values are for maximum uniform service load values noted. Long term deflections consider that 50 percent of maximum service is sustained load. Load values noted indicate limiting load for deflection limits or M.O./240, M.O./360, M.O./600, considering long term creep and shrinkage effect. Deflections values do not consider shear deformations and are for pinned supports.

D<sub>i</sub> = Immediate elastic deflection

D<sub>i</sub> + D<sub>s</sub> = Immediate elastic deflection + Long Term Creep Deflection

(5) Load capacity of installed lintel assumed to have lateral bracing at distances not greater than: <5.2.1.2> 32 bw =

(6) Minimum end bearing distance shall be 8 inches by width of the lintel.

**Controlling Section Capacity  $F_{W,u}$**

Code References:  
Masonry Mortar ASTM C270 PCL or Masonry Cement Type M or S

Shear (Red)  
Moment (Blue)

TMS402-16

ASCE 7-16

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(7) Masonry Span considered as M.O., at face of support for shear controlled capacity values.  
(8) Moment capacity noted limited by maximum allowable reinforcement area for tension controlled section  
<9.3.3.2.1 (a). Excess steel area provided ignored in moment capacity value indicated in table.

# U-LINTELS - 8" X 8"

## U-LINTEL SIZE:

8"x8"

## DESIGN CAPACITY TABLE

Materials:		Unit Dimensions:											
		Actual						Nominal					
		Width: bw = 7.625 inch			Height: h = 7.625 inch			Width: bw = 8 inch			Height: h = 8 inch		
Reinforcement	Top	(2) - #3	(2) - #5	(2) - #3	(2) - #5	(2) - #3	(2) - #5	(2) - #3	(2) - #5	(2) - #3	(2) - #5	(2) - #3	(2) - #5
Nominal Lintel Length (inch) [LU#]	24	30	32	36	40	42	44	48	54	56	60	64	66
Masonry Opening M.O. (inch)	8	14	16	20	24	26	28	32	38	40	44	48	50
Effective Span (LE = M.O. + h <sub>rem</sub> ) (inch)	16	22	24	28	32	34	36	40	46	48	52	56	58
Maximum Shear Strength (FV <sub>max</sub> ) lbs.	4651	4651	4651	4651	4651	4651	4651	4651	4651	4651	4651	4651	4651
Maximum Moment Strength (+FM <sub>max</sub> ) lb-ft.	14427	14427	14427	14427	14427	14427	14427	14427	14427	14427	14427	14427	14427
Maximum Uniform Factored Load (FW <sub>w</sub> ) lbs/ft.	13953	7973	6877	5587	4651	4293	3987	3489	2938	2537	2326	2233	1993
Maximum Uni. Service Load (W <sub>s</sub> ) lbs/ft. @	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+
D i =	M.O./240	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+
D i + D s =	M.O./600	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+

**Table Use:**  
Enter Table with Required Strength = Factored Uniform Load W<sub>u</sub>  
Select Lintel Size Where W<sub>u</sub> < FW<sub>w</sub>

D<sub>i</sub>: Dead Load  
L<sub>l</sub>: Live Load  
Factored Load Effect W<sub>u</sub>; Greater of  
1.4 D<sub>i</sub> OR 1.2D<sub>i</sub> + 1.6L<sub>l</sub>

**Notes:**

- See "anchoring" information sheet for applied load calculation where anchorage action is determined by Architect/Engineer if applicable.
- See calculation example for explanation of table calculation methods and Code references.
- Mid-span immediate deflection D<sub>i</sub> at service load noted is calculated for the section in question.
- For long term deflection D<sub>s</sub>, sustained loads are assumed to be applied for a time greater than 60 months.
- Immediate elastic deflections values are for maximum uniform service load values noted. Long term deflections consider that 50 percent of maximum service is sustained load. Load values noted indicate limiting load for deflection limits of M.O./240, M.O./360, M.O./600, considering long term creep and shrinkage effect. Deflections values do not consider shear deformations and are for pin ended supports.
- Deflection capacity of installed lintel assumed to have lateral breaching at distances not greater than: <math><math> -5.2.1.2 > 32 \text{ bw} = </math>
- Load capacity of installed lintel shall be 8 inches by width of the lintel.
- Minimum end bearing distance shall be 8 inches by width of the lintel.
- Masonry Mortar ASTM C270 PCL or Masonry Cement Type M or S
- Shear span considered as M.O., at face of support for shear controlled capacity values.

Controlling Section Capacity FW<sub>w</sub>  
Shear (Red)  
Moment (Blue)

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Di =	Immediate elastic deflection	Long Term Creep Deflection	Code References:
M.O./240	1.4 D <sub>i</sub>	1.2D <sub>i</sub> + 1.6L <sub>l</sub>	TMS402-16 < >
M.O./360	1.4 D <sub>i</sub>	1.2D <sub>i</sub> + 1.6L <sub>l</sub>	ASCE 7-16 { }
M.O./600	1.4 D <sub>i</sub>	1.2D <sub>i</sub> + 1.6L <sub>l</sub>	

# U-LINTELS - 10" X 8"

## U-LINTEL SIZE: 10"x8"

### DESIGN CAPACITY TABLE

Reinforcement	Top		(2) - #3		(2) - #5		Unit Dimensions:		Nominal Actual 9.625 inch 9.625 inch 7.625 inch 8 inch
	Bottom						Width: bw = h =	Height: h =	
Nominal Linel Length (inch) [LUD#]	24	30	32	36	40	48	54	60	64
Masonry Comp. Strength f'm :	3,000 psi						84	88	90
Grout Comp. Strength f'g :	3,000 psi						96	102	104
Concrete Compressive Strength (f'c) =		5,000 (min)					108	112	114
Reinforcing Fy =		55 ksi/ft. ungrouted					120	128	132
Linel Weight:							136	144	
Maximum Shear Strength ( $FV_{im}$ ) lbs.	5672	5872	5872	5872	5872	5872	5872	5872	5872
Maximum Moment Strength ( $M_{im}$ ) lb-ft.	15017	15017	15017	15017	15017	15017	15017	15017	15017
Maximum Uniform Factored Load ( $FW_n$ ) lbs/ft.	17616	8808	7046	5872	4404	3708	2936	2818	2273
Maximum Unif. Service Load ( $W_s$ ) lbs/ft. @							2937	2722	2072
D i =	M.O / 240	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+
D i + D s =	M.O / 600	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+
D i + D s =	M.O / 240	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+
D i + D s =	M.O / 360	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+
D i + D s =	M.O / 600	9999+	9999+	9999+	9999+	9999+	9999+	9999+	9999+

### Table Use:

Enter Table with Required Strength = Factored Uniform Load  $W_u$

Select Linel Size Where  $W_u < F \cdot W_n$

D L: Dead Load LL: Live Load

Factored Load Effect  $W_u$  Greater of

1.4 D L OR 1.2 D L + 1.6 L

### Notes:

- (1) See "arching" data sheet for applied load calculation where arching action determined by Architect/Engineer is applicable.
- (2) See calculation example for explanation of table of calculation methods and Code references.
- (3) Mid-span immediate deflection D is calculated for the section in question.
- (4) Immediate elastic deflections values are for maximum uniform service load values noted. Long term deflections consider that 50 percent of maximum service is sustained load. Load values noted indicate limiting load for deflection limits of M.O./240, M.O./360, M.O./600, considering long term creep and shrinkage effect. Deflections values do not consider shear deformations and are for pin ended supports.

D i = Immediate elastic deflection

D i + D s = Immediate elastic deflection + Long Term Creep Deflection

(5) Load capacity of installed linel assumed to have lateral bracing at distant cas not greater than:  $< 5.2.1.2> 32 bw =$

(6) Minimum end bearing distance shall be 6 inches by width of the linel.

(7) Masonry Mortar ASTM C270 PCL or Masonry Cement Type M or S

(8) Shear span considered as M.O., at face of support for shear controlled capacity values.

Controlling Section Capacity  $FW_a$

Shear	(Red)
Moment	(Blue)

Code References:

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# U-LINTELS - 12" X 8"

## U-LINTEL SIZE: 12"x8"

### DESIGN CAPACITY TABLE

Reinforcement	Top		(2) - #3		(2) - #5	
	Bottom					
Nominal Lintel Length (inch) [LUE#]	24	30	32	36	40	48
Concrete Compressive Strength ( $f_c$ )	5,000 (min)					
Reinforcing Fy = Lintel Weight:	60,000 70 lbs/ft, ungrouted	psi				
Masonry Comp. Strength f'm :	3,000 psi					
Grout Comp. Strength f'g:	3,000 psi					
Unit Dimensions:						
Width: bw =	11.63 inch					
Height: h =	7.625 inch					
Nominal 8 inch						

**Table Use:**

Enter Table with Required Strength = Factored Uniform Load  $W_u$   
Select Lintel Size Where  $W_u < F_w$

D : Dead Load  
LL: Live Load  
Factored Load Effect Wu : Greater of  
1.4 Dl OR  
1.2Dl + 1.6L

**Notes:**

- (1) See "arching" data sheet for applied load calculation where arching action determined by Architect/Engineer is applicable.
- (2) See calculation example for explanation of table of calculation methods and Code references.
- (3) Mid-span immediate deflection  $D_i$  at service load noted is calculated for the section in question.
- (4) Immediate elastic deflections values are for maximum uniform service load values noted. Long term deflections consider that 50 percent of maximum service is sustained load. Load values noted indicate limiting load for deflection limits of M.O./240, M.O./360, M.O./600, considering long term creep and shrinkage effect. Deflections values do not consider shear deformations and are for pin ended supports.
- (5) Load capacity of installed lintel assumed to have lateral bracing at distances not greater than:  $<5.2.1.2> 32 b_w =$
- (6) Minimum end bearing distance shall be 8 inches by width of the lintel.
- (7) Masonry Mortar ASTM C270 PCL or Masonry Cement Type M or S
- (8) Shear span considered as M.O. , at face of support for shear controlled capacity values.

Controlling Section Capacity  $F_w$   
Shear (Red)  
Moment (Blue)

Code References:  
TMS402-16 < >  
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# LINTELS



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