

TABLE 1 - ALTERNATE A - STRUCTURES

TYPE	STRUCTURE/RISER DIAMETER (ft)	CAST-IN-PLACE ITEMS CLASS II CONCRETE			PRECAST ITEMS				
		CLASS II CONCRETE		A _S (in ² /ft.)	CLASS II CONCRETE		ASTM C478		A ₂ *** (in ² /ft.)
		t ₁ RISER (in.)	t ₂ BOTTOM (in.)		t ₁ RISER (in.)	t ₂ BOTTOM (in.)	t ₁ or t ₂ (in.)	A ₂ *** (in ² /ft.)	
P	3'-6"	6	8	0.20	6	8	0.20	4**	0.105
P	4'-0"	6	8	0.20	6	8	0.20	5**	0.120
J	5'-0"	-	8	0.20	-	8	0.20	6**	0.150
J	6'-0"	-	8	0.20	-	8	0.20	6	0.180
J	7'-0"	-	8	0.20	-	8	0.20	7	0.210
J	8'-0"	-	8	0.20	-	8	0.20	8	0.240
J	10'-0"	-	10	0.40##	-	10	0.40##	10	0.300
J	12'-0"	-	10	0.40##	-	12	0.40##	12	0.360

t₁ and t₂ - Wall Thickness.

A_S - Vertical and horizontal areas of reinforcement.

Provide 0.20 eq. in.²/ft. at each face, 12" max. bar spacing.

** Modified minimum wall thickness.

*** Min. total circumferential reinforcement for continuous steel hoops:

A₂ = 0.40 sq. in. for riser section height equal or less than 2'-0" (2 hoop min.)

A₂ = 0.60 sq. in. for riser section height more than 2'-0" up to 4'-0" (3 hoop min.)

Areas of reinforcing for precast items are based on Grade 60 reinforcing.

No reduction in the area of reinforcement is allowed for welded wire fabric in Table 1.

Area of vertical reinforcing may be reduced in accordance with ASTM C478.

TABLE 2 - ALTERNATE B SQUARE AND RECTANGULAR STRUCTURES

TYPE	WALL LENGTH (FT)	MAX. DEPTH (FT)	WALL THICKNESS (t ₃)	
			C-I-P (in.)	PRECAST (in.)
P	≤ 3'-6"	40	6 Riser 8 Bottom	6
J	4'-0"	40	8	6
J	5'-0"	22	-	6
J	6'-0"	15	-	6
J	5'-0" to 9'-0"	40	8	8
J	10'-0"	26	8	8
J	10'-0" to 12'-0"	40	10	9
J	16'-0"	35	-	9
J	16'-0"	40	10	10
J	20'-0"	25	-	9
J	20'-0"	30	10	10

See Table 4 for Reinforcing Schedule.

TABLE 4 - WALL DESIGNS - RECTANGULAR STRUCTURES

VERTICAL REINFORCING		HORIZONTAL REINFORCING		WALL THICKNESS	
WALL DEPTH	SCHEDULE	WALL DEPTH	SCHEDULE		
SIZE: 3'-6" & RISER					
≥ 1.17' - 40'	A12	≥ 1.17' < 10'	B10	6"/8"	
		10' < 18'	B5.5	6"/8"	
		18' < 29'	C6.5	6"/8"	
		29' - 40'	C3.5	6"/8"	
SIZE: 4'-0"					
≥ 1.17' - 40'	A12	≥ 1.17' < 6'	B10	6"/8"	
		6' < 10'	B5.5	6"/8"	
		10' < 20'	C6.5	6"/8"	
		20' < 28'	C3.5	6"/8"	
		28' - 40'	D4.5	6"/8"	
SIZE: 5'-0"					
≥ 1.17' - 40'	A12	≥ 1.17' < 5'	B5.5	6"/8"	
		5' < 9'	C6.5	6"/8"	
		9' < 15'	C3.5	6"/8"	
		15' < 22'	D4.5	6"/8"	
		22' - 40'	E3	8"	
SIZE: 6'-0"					
≥ 1.17' < 26'	A12	≥ 1.17' < 9'	C3.5	6"/8"	
		9' < 15'	D4.5	6"/8"	
		15' < 26'	E3	8"	
	Inside/Outside		Inside/Outside		
26' - 40'	A12	26' - 40'	D7	D7	8"
SIZE: 7'-0"					
	Inside/Outside		Inside/Outside		
≥ 1.17' < 25'	A12	≥ 1.17' < 7'	B10	B10	8"
26' - 40'	B10	7' < 10'	B5.5	B5.5	8"
		10' < 20'	C6.5	C6.5	8"
		20' < 30'	D7	D7	8"
		30' - 40'	E5	E5	8"
SIZE: 8'-0"					
	Inside/Outside		Inside/Outside		
≥ 1.17' < 20'	A12	≥ 1.17' < 6'	B5.5	B5.5	8"
20' - 40'	C6.5	6' < 13'	C6.5	C6.5	8"
		13' < 22'	D7	D7	8"
		22' < 31'	E5	E5	8"
		31' - 40'	F5	F5	8"
SIZE: 9'-0"					
	Inside/Outside		Inside/Outside		
≥ 1.17' < 12'	A12	≥ 1.17' < 8'	C6.5	C6.5	8"
12' < 28'	C6.5	8' < 15'	D7	D7	8"
28' - 40'	D7	15' < 23'	F5	F5	8"
		23' - 40'	F5	F5	8"
SIZE: 9'-0"					
	Inside/Outside		Inside/Outside		
≥ 1.17' < 10'	B10	≥ 1.17' < 10'	D7	D7	8"
10' < 21'	C6.5	10' < 17'	E5	E5	8"
21' < 26'	D7	17' < 26'	F5	F5	8"
26' - 40'	C6.5	26' - 40'	F5	F5	10"

TABLE 4 NOTES:

1. Wall depth is measured to the top of the bottom slab for boxes and to the top of the intermediate slab for risers.
2. Wall height is the distance between top of lower slab to bottom of upper slab. Maximum wall height is 12' for wall lengths exceeding 5', or 10' for wall lengths exceeding 12'.
3. Wall lengths exceeding 6'-0" require two layers of reinforcing (See Table 4) with 2" of cover from the horizontal bars to the inside and outside faces for each layer.
4. Wall lengths exceeding the dimensions or depths shown in Table 4, or 12'-0" diameter require a special design.
5. Wall thickness and reinforcing for rectangular structures is based on the longer wall length.

TABLE 3 - REINFORCING SCHEDULE

SCHEDULE	GRADE 60 BARS OR 65 KSI & 70 KSI WELDED WIRE REINFORCING			
	GRADE 60 AREA (in ² /ft)	MAXIMUM SPACING		
		GR 60 BARS (in.)	65 KSI (in.)	70 KSI (in.)
A12	0.20	12	8	8
A6	0.20	6	5	4 1/2
B10	0.24	10	8	7 1/2
B5.5	0.24	5 1/2	5	4
C6.5	0.37	6 1/2	6	5
C3.5	0.37	3 1/2	3	2 1/2
D7	0.53	7	6	5
D4.5	0.53	4 1/2	4	3 1/2
E5	0.73	5	4	4
E3	0.73	3	3	3
F5	1.06	5	4	4
F3.5	1.06	3 1/2	3	3
G5	1.45	5	4	4
G.3.5	1.45	3 1/2	3	3
H4	1.75	4	3	3

Corrected Typo

TABLES 1, 2, 3, AND 4

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