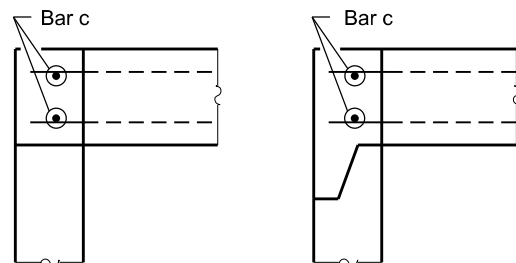
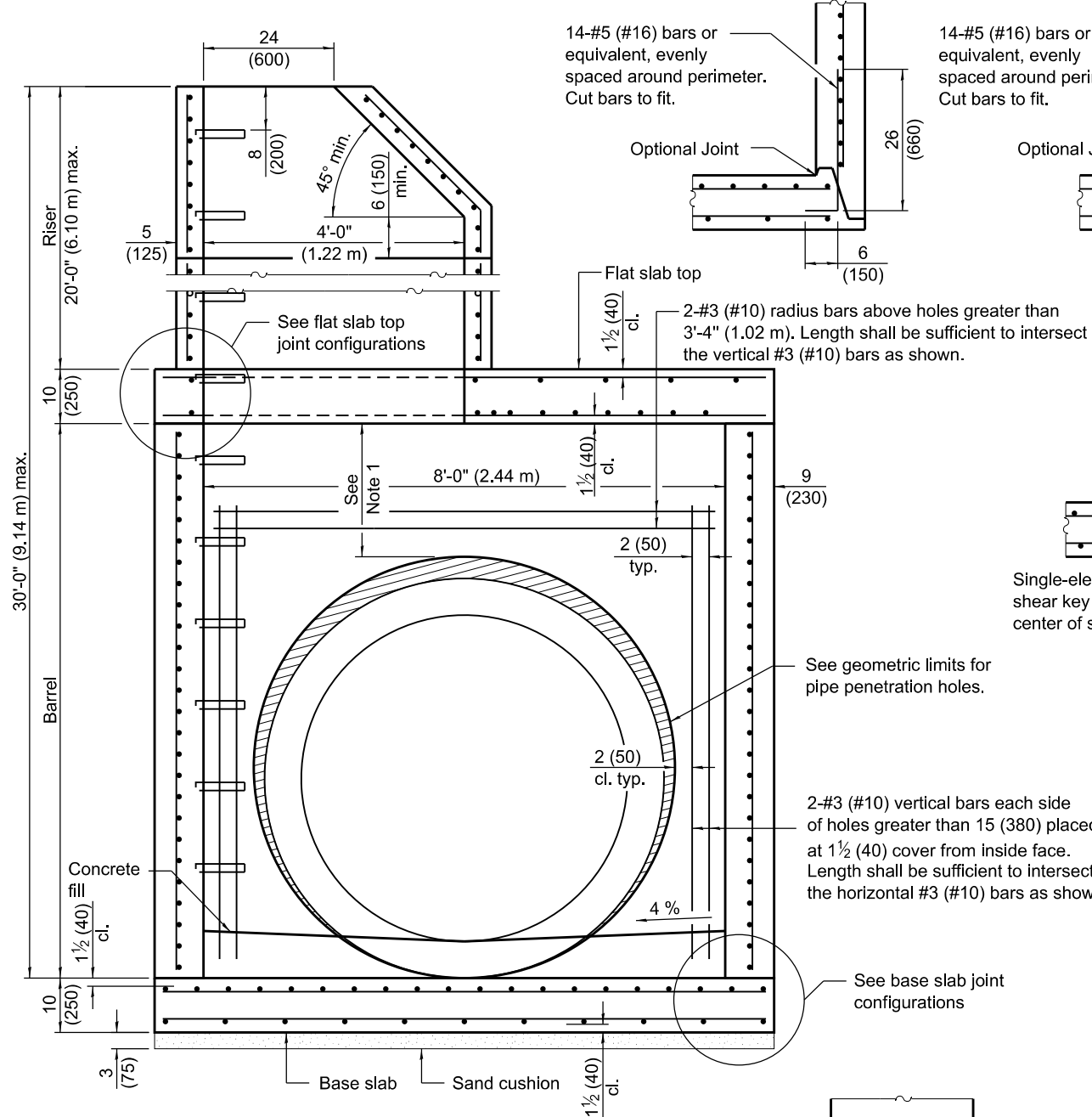


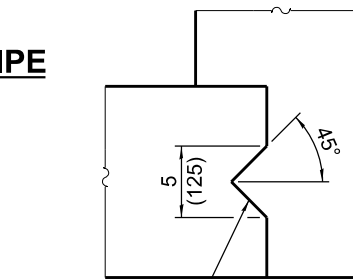
**SECTION PARALLEL TO PIPE**  
(Without conical top riser)



**FLAT SLAB TOP JOINT CONFIGURATIONS**  
(Shown at access hole)

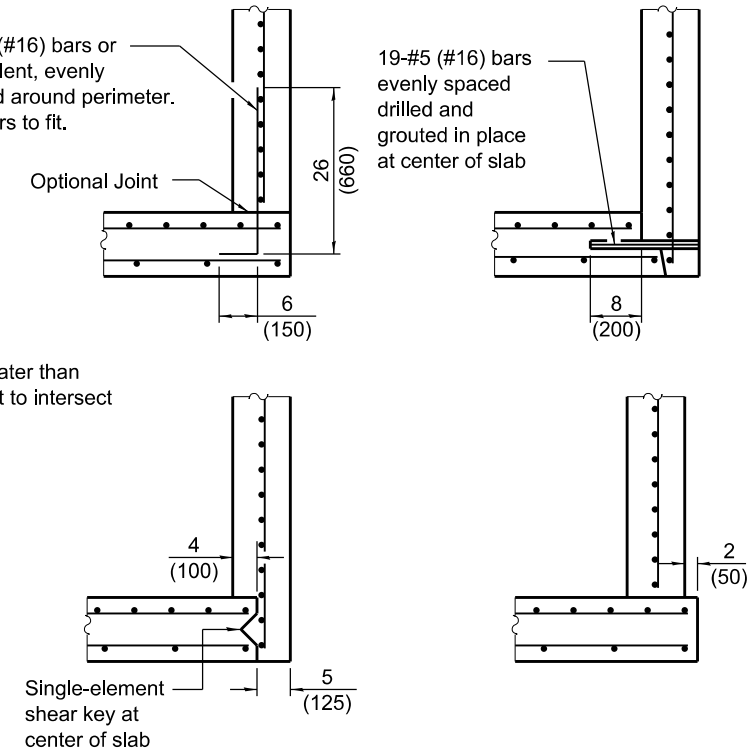


**SECTION PERPENDICULAR TO PIPE**  
(With conical top riser)



**SHEAR KEY GEOMETRY**  
(Reinforcement not shown for clarity)

**BASE SLAB JOINT CONFIGURATIONS**



**GENERAL NOTES**

Pipe holes shall be formed to facilitate proper placement of hole reinforcement.

The manufacturer shall ensure that all precast manhole sections are additionally reinforced where required to resist damage from handling, shipping and installation stresses.

Lifting holes shall be located in the sections as per the manufacturer's recommendations.

See Standard 602701 for details of manhole steps.

All dimensions are in inches (millimeters) unless otherwise noted.

**GEOMETRIC LIMITS FOR PIPE PENETRATION HOLES**

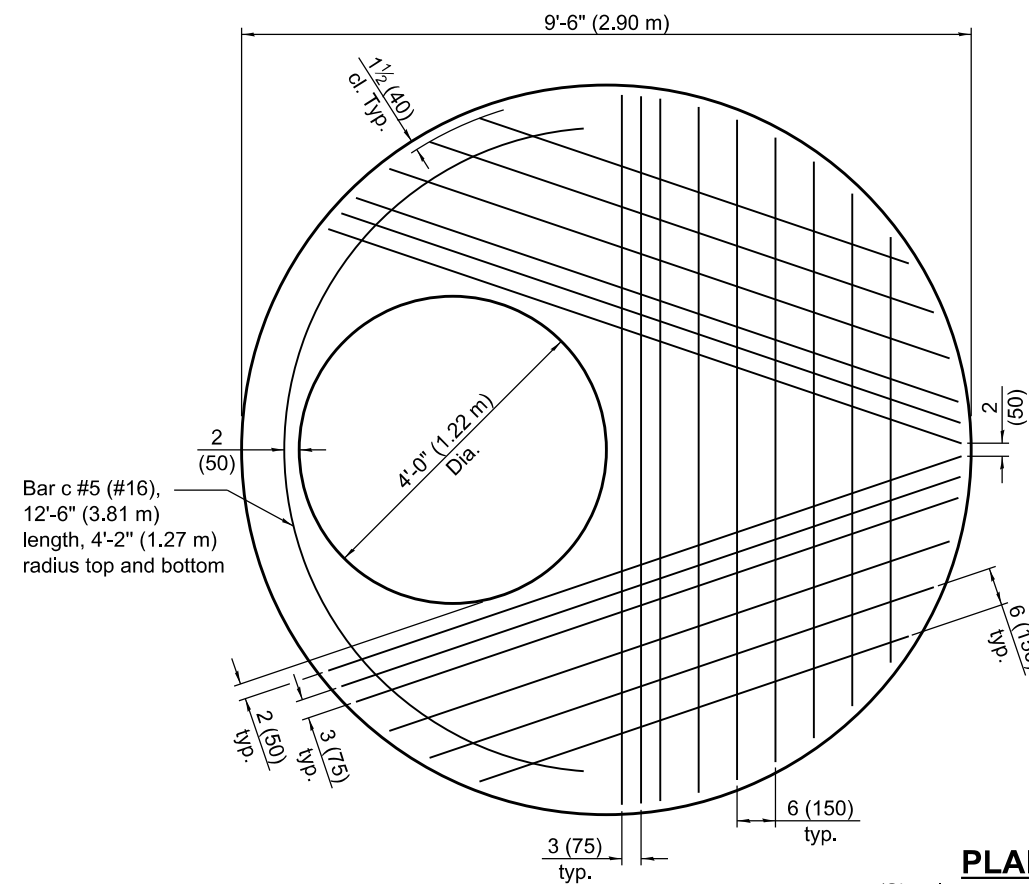
- Note 1: A minimum of 12 (300) of monolithic reinforced concrete shall be maintained above pipe penetration holes > 3'-4" (1.02 m).
- Note 2: A minimum 12 (300) inside arc length of reinforced concrete shall be maintained between pipe penetration holes > 15 (380).
- Note 3: A maximum of 60 percent of the inside perimeter of the reinforced concrete manhole walls may be removed.
- Note 4: Horizontal joints that intersect pipe penetration holes > 15 (380) shall have one joint splice for every location around the perimeter of the joint where the inside arc length between pipe penetration holes is < 24 (600). See joint splice detail.
- Note 5: The recommended pipe penetration hole is equal to the O.D. of the pipe plus 4 (100).
- Note 6: Only pipe penetration holes ≤ 15 (380) are allowed in riser sections.

DATE	REVISIONS
1-1-21	Revised Note 1 and lifting hole general note.
3-1-19	Moved wall reinforcement from inside face to middle.

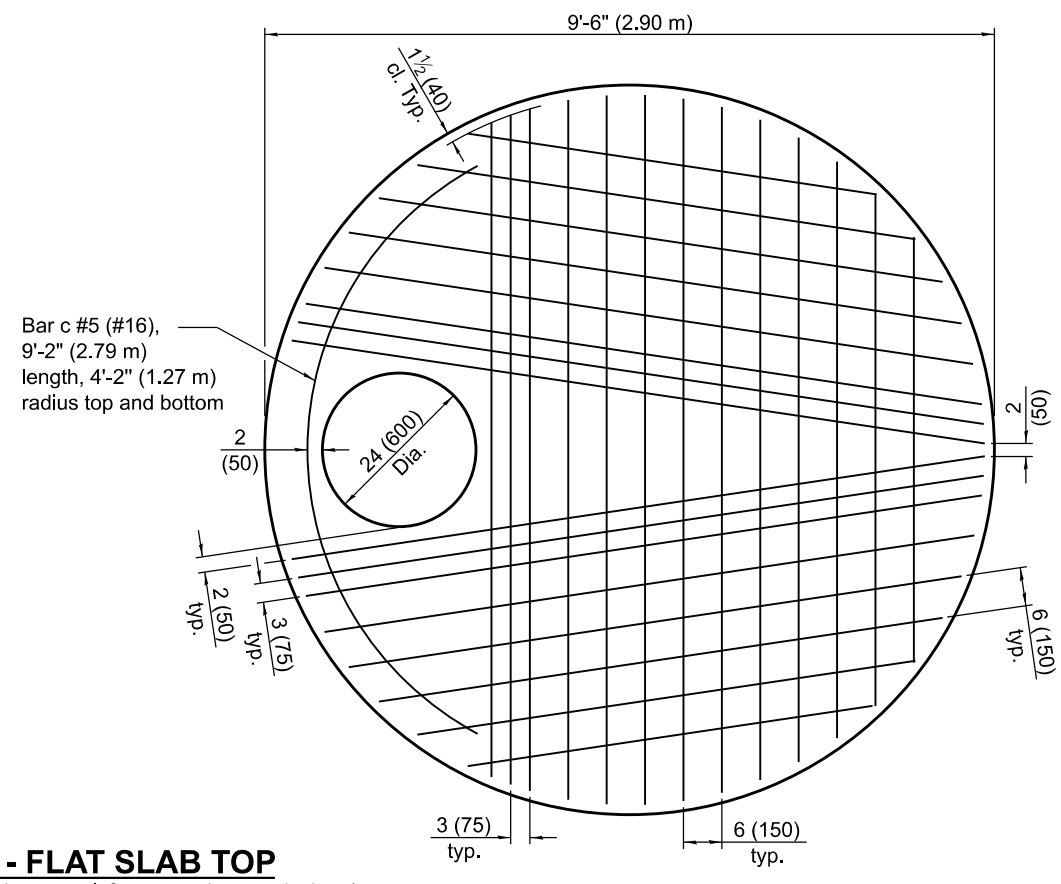
**PRECAST MANHOLE TYPE A**  
**8' (2.44 m) DIAMETER**

(Sheet 1 of 3)

**STANDARD 602416-09**

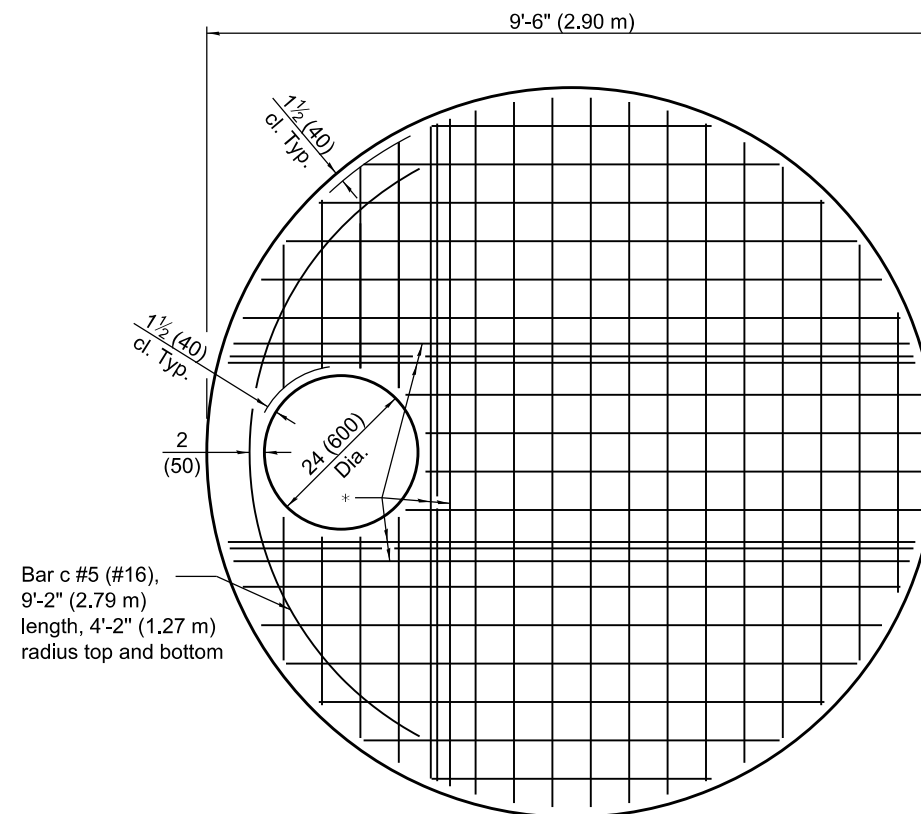
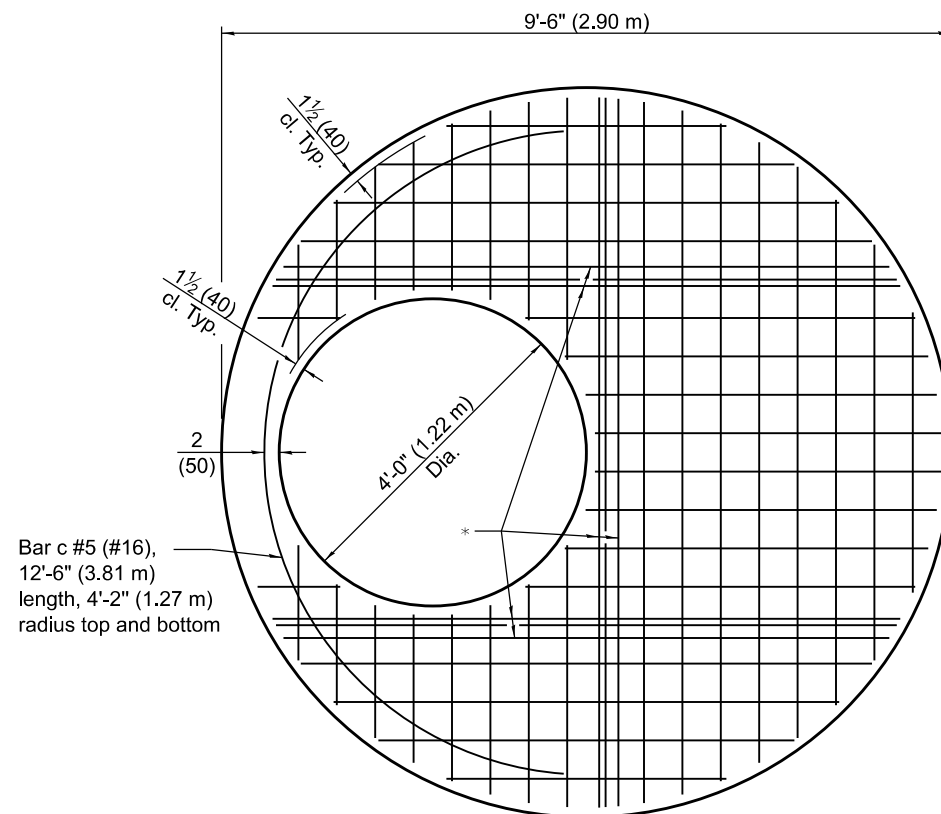


**PLAN - FLAT SLAB TOP**  
(Showing layout of bottom reinforcement bars and c bars)



**PLAN - FLAT SLAB TOP**

(Showing layout of Welded Wire Reinforcement and c bars)  
WWR not permitted for riser heights > 10' (3.05 m).



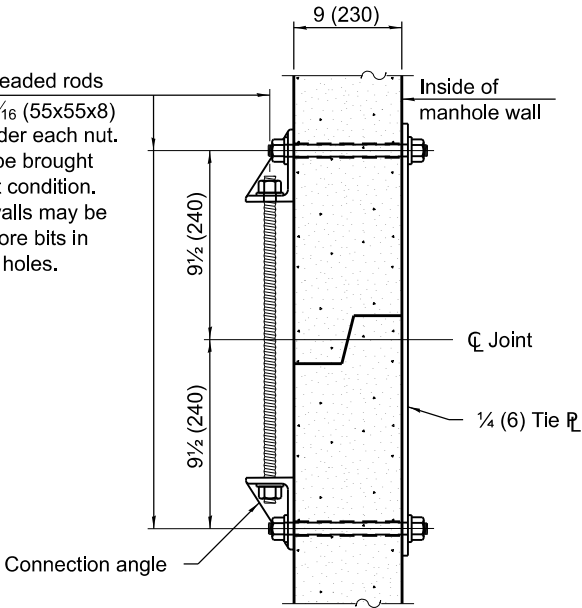
\* #6 (#19) bars bottom. Bundle first bar with closest WWR bar to the opening and place second bar ±3 (75) away.

**PRECAST MANHOLE TYPE A**  
**8' (2.44 m) DIAMETER**

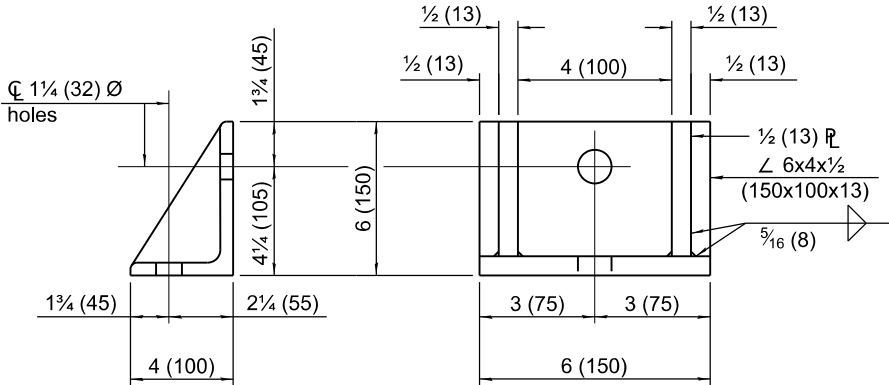
(Sheet 2 of 3)

**STANDARD 602416-09**

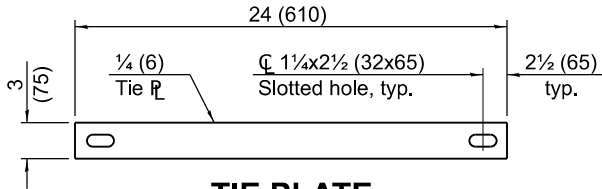
1(25) Ø Threaded rods  
 with 2½x2½x⅝ (55x55x8)  
 washers under each nut.  
 All nuts shall be brought  
 to a snug tight condition.  
 Holes in the walls may be  
 drilled using core bits in  
 lieu of formed holes.



JOINT SPLICE



CONNECTION ANGLE



TIE PLATE

FLAT SLAB TOP REINFORCEMENT

Location	Riser Height (RH)	WWR (each direction)		Rebar (each direction except as noted)		
		A <sub>s</sub> (min.)	Spacing (max.)	A <sub>s</sub> (min.)	Spacing (max.)	Bar Size
Top Mat	All	0.11 sq. in./ft. (233 sq. mm/m)	18 (450)	0.11 sq. in./ft. (233 sq. mm/m)	18 (450)	#3 or #4 (#10) (#13)
Bottom Mat	RH ≤ 10 ft. (3.05 m)	** 0.88 sq. in./ft. (1863 sq. mm/m)	6 (150)	See plan view for rebar orientation and spacing and this table for bar size		#6 (#19)
	RH > 10 ft. (3.05 m)	WWR not permitted				#7 (#22)

\*\* Only one layer of WWR permitted to avoid congestion.

WALL REINFORCEMENT

Location	Orientation	WWR or Rebar	
		A <sub>s</sub> (min.)	Spacing (max.)
4 ft. (1.22 m) Ø Riser	Circumferential	0.12 sq. in./ft. (254 sq. mm/m)	6 (150)
	Vertical	0.045 sq. in./ft. (95 sq. mm/m)	8 (200)
8 ft. (2.44 m) Ø Barrel	Circumferential	0.24 sq. in./ft. (508 sq. mm/m)	6 (150)
	Vertical	0.045 sq. in./ft. (95 sq. mm/m)	8 (200)

BASE SLAB REINFORCEMENT

Location	Riser Height (RH)/ Total Height (TH)	WWR or Rebar (each direction)	
		A <sub>s</sub> (min.)	Spacing (max.)
Top Mat	RH ≤ 10 ft. (3.05 m) & TH ≤ 20 ft. (6.10 m)	0.36 sq. in./ft. (762 sq. mm/m)	6 (150)
	RH > 10 ft. (3.05 m) or TH > 20 ft. (6.10 m)	0.60 sq. in./ft. (1270 sq. mm/m)	6 (150)
Bottom Mat	All	0.11 sq. in./ft. (233 sq. mm/m)	18 (450)