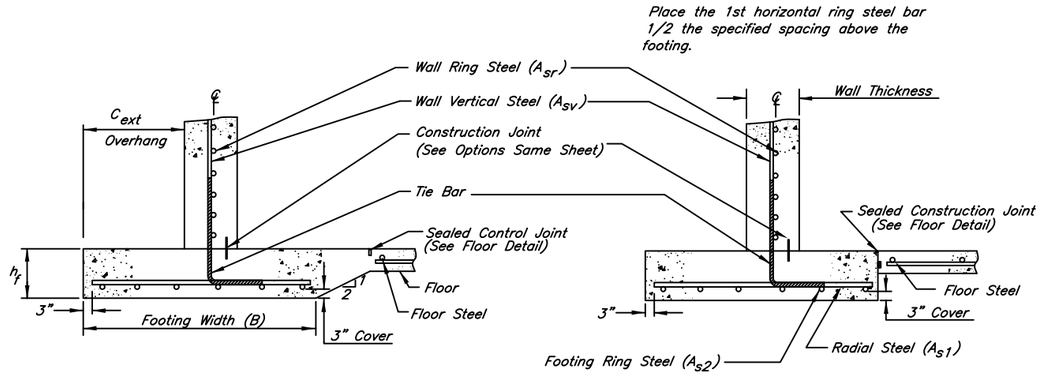
RING FOUNDATION

Footing Dimensions and Steel						
Wall Height H	Tank Diameter D	Footing Width B	Footing Depth h_f	Overhang C_{ext}	Radial Steel A_{s1}	Ring Steel A_{s2}
8 ft.	all	30 in.	10 in.	12 in.	Place A_{s1} at vertical wall steel (A_{sv}) spacing. For spacing greater than 9 inches use #5 bars, otherwise use #4 bars (#5 bars could be replaced with #4 bars at 1/2 A_{sv} spacing).	#4 @ 8 in.
10 ft.	all	36 in.	12 in.	14 in.		#4 @ 6 in.
12 ft.	all	48 in.	12 in.	14 in.		#4 @ 6 in.
14 ft.	all	60 in.	12 in.	15 in.		#4 @ 6 in.

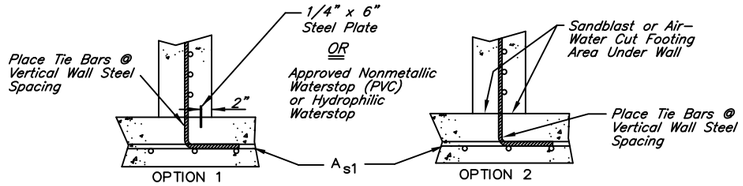
1. *For tanks 10 feet and deeper, required soil bearing pressure shall be at least 2,000 psf; tanks less than 10 feet require 1,500 psf.*
2. *Place ring steel 3 inches above the footing bottom.*
3. *Place radial steel on top of ring steel.*



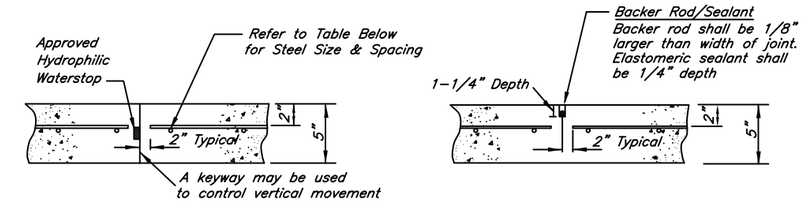
MONOLITHIC FOOTING/FLOOR PLACEMENT

SEPARATE FOOTING/FLOOR PLACEMENT

WALL TO RING FOUNDATION DETAILS



WALL TO FOOTING CONSTRUCTION JOINT OPTIONS



SEALED CONSTRUCTION JOINT

SEALED CONTROL JOINT

TYPICAL FLOOR DETAILS

VERTICAL MOVEMENT STRAIGHT CONSTRUCTION JOINT OPTION

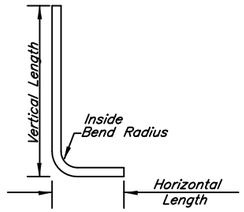
1. *5/8 inch diameter by 12 inches long smooth dowel bar coated to prevent bond at 12 inches C–C.*
2. *Dowels shall be parallel to concrete slab and each other.*
3. *Dowels shall be perpendicular to joint.*
4. *Dowels must not be in contact with floor steel (slab thickness may be increased at joint to accommodate dowel bars).*

Control joints shall be sawed to a depth of 1/4 of the floor thickness. All control joints shall be sealed. Control joint spacing in the floor shall be based on the steel used in the floor. All joints shall be sawed to create a rectangular grid in the floor slab (the longer side of each section, excluding the slab/footing joint, shall not be more than 1.5 times the length of the shorter side).

FLOOR STEEL

Steel Used	Grade 40 Control Joint Spacing	Grade 60 Control Joint Spacing	Conversion Factor Lin.ft./ft² floor
#3 @ 18" C–C	40 ft.	60 ft.	1.404
#3 @ 15" C–C	50 ft.	75 ft.	1.684
#3 @ 12" C–C	60 ft.	90 ft.	2.105
#4 @ 18" C–C	75 ft.	110 ft.	1.422
#4 @ 12" C–C	110 ft.	120 ft.	2.133

1. *Check the availability of floor steel bar size and grade.*
2. *Allowable steel tensile stress = 2/3 of f_y.*
3. *Coefficient of subgrade drag = 1.5.*
4. *5 inch concrete slab, unit weight = 150 pcf.*



BAR DIMENSIONS

Bar Size	#4	#5
Vertical Length	26 in.	29 in.
Horizontal Length	8 in.	11 in.
Inside Bend Radius	1–1/2 in.	1–7/8 in.
Total Length	34 in.	40 in.

1. *Use the same bar size as A_{sv}*

TIE BAR CONFIGURATION

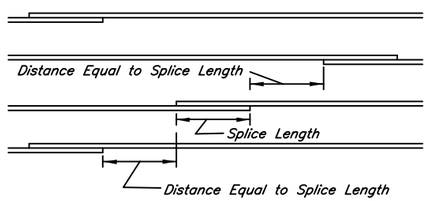
WALL STEEL REINFORCEMENT

Wall Height	8 ft. (8" thickness)				10 ft. (8" thickness)				12 ft. (10" thickness)				14 ft. (10" thickness)			
	Ring Steel A_{sr}		Vertical Steel A_{sv}		Ring Steel A_{sr}		Vertical Steel A_{sv}		Ring Steel A_{sr}		Vertical Steel A_{sv}		Ring Steel A_{sr}		Vertical Steel A_{sv}	
Tank Diam.	Bar Size	Spacing	Bar Size	Spacing	Bar Size	Spacing	Bar Size	Spacing	Bar Size	Spacing	Bar Size	Spacing	Bar Size	Spacing	Bar Size	Spacing
30 ft.	#4	@ 12"	#4	@ 12"	#4	@ 12"	#4	@ 12"	#4	@ 9"	#4	@ 11"	#4	@ 8"	#4	@ 11"
45 ft.	#4	@ 12"	#4	@ 12"	#4	@ 10"	#4	@ 12"	#4	@ 9"	#4	@ 11"	#4	@ 7"	#4	@ 11"
60 ft.	#4	@ 12"	#4	@ 12"	#4	@ 8"	#4	@ 11"	#4	@ 6"	#4	@ 10"	#5	@ 8"	#5	@ 12"
75 ft.	#4	@ 12"	#4	@ 12"	#4	@ 8"	#4	@ 10"	#4	@ 6"	#4	@ 8"	#5	@ 7"	#5	@ 10"
90 ft.	#4	@ 8"	#4	@ 12"	#4	@ 7"	#4	@ 9"	#4	@ 6"	#4	@ 8"	#5	@ 7"	#5	@ 9"
105 ft.	#4	@ 8"	#4	@ 12"	#4	@ 7"	#4	@ 8"	#5	@ 8"	#5	@ 9"	#5	@ 6"	#5	@ 8"
120 ft.	#4	@ 6"	#4	@ 12"	#4	@ 6"	#4	@ 8"	#5	@ 8"	#5	@ 9"	#5	@ 6"	#5	@ 7"

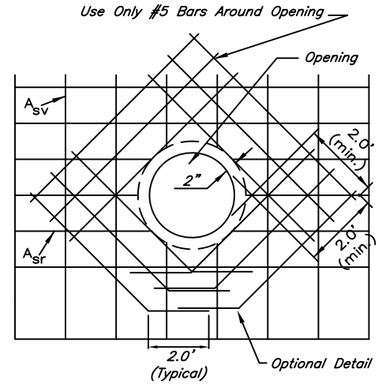
1. *For tank sizes not listed use the steel spacing & wall thickness from the next larger tank size (Maximum height is 14 feet, maximum diameter 120 feet).*
2. *Ring steel shall be located along the wall centerline.*
3. *Place vertical steel on the outside of the ring steel.*
4. *See MidWest Plan Service, Publication TR–9, Circular Concrete Manure Tanks (March 1998) for alternative ring steel placement (Tables 4, 5, 6, and 7).*

SPLICE LENGTHS FOR ALL BARS

Bar Size	Min. Splice Lengths
#3	16 inches
#4	20 inches
#5	24 inches



SPLICING DETAIL FOR WALL AND FOOTING RING STEEL



1. *Cut all vertical and ring steel 2 inches from opening.*
2. *For each ring steel bar interrupted by the opening, install one #5 bar around each side of the opening. A minimum 2 – #5 bars are to be used along each side.*
3. *Bars spacing shall not be closer than 3 inches C – C and not farther apart than A_{sr} spacing.*

DETAIL OF PIPE PROTRUDING THROUGH A WALL

Date / Approved / Title / Title

Date / Designed / Drawn / Traced / Checked

U.S. DEPARTMENT OF AGRICULTURE – NATURAL RESOURCES CONSERVATION SERVICE

CIRCULAR CONCRETE MANURE TANK DETAILS

CAD FILE NAME
Tr9sht2.dwg

DRAWING NO.
IA 1630
(Rev. 5/99)

SHEET NO. 2 OF 2