

BUOYANCY CALCULATIONS



MATERIAL	#/CF	#/GAL
SOIL (dry)	100	
SOIL (saturated)	117	
SOIL (net)	83	
WATER	62.4	8.34
CONCRETE	150	
DEADMEN		

VESSEL	WEIGHT (POUNDS) W	VOLUME (GAL) V	AREA (SF) A	COVER (#/INCH) CW	WEIGHT DISPLACED WD=V*8.34	BUOYANT FORCE (POUNDS) BF=WD-W	COVER REQUIRED (INCHES) BF/CW
RMT-500	225	537	21.8	150.8	4478.58	4253.58	28.2
RMT-750	360	1007	36.8	254.5	8398.38	8038.38	31.6
RMT-900	450	1147	43.3	299.5	9565.98	9115.98	30.4
RMT-1060	520	1337	50	345.8	11150.58	10630.58	30.7
RMT-1250	560	1464	56.3	389.4	12209.76	11649.76	29.9
RMT-1500	640	1771	68.9	476.6	14770.14	14130.14	29.7

NOTES

1. AREA OF TANKS IS CALCULATED WITHOUT MANHOLES
2. BUOYANCY FORCE IS ASSUMING SATURATED SOIL (WORST CASE SCENARIO)
3. THE NUMBERS CAN BE CHANGED BY CHANGING THE DRY SOIL WEIGHT FOR SITE CONDITIONS
4. WET SOIL WEIGHT IS INDEXED TO DRY SOIL
5. TANK IS ASSUMED TO BE FULLY SUBMERGED, IF ONLY 50% SUBMERGED, FORCES ARE HALVED
6. ALL CALCULATIONS ARE BASED ON AN EMPTY TANK
7. PLEASE SEE THE ROTH RESTRAINING COLLAR DRAWING FOR HIGH GROUNDWATER. THE SAFETY FACTOR NOTED ON THE DRAWING DOES NOT CONSIDER THE LOADING OF THE EARTH ON TOP OF THE TANK

ROTH RMT BUOYANCY RESTRAINING COLLAR-HIGH GROUNDWATER CONDITIONS

GENERAL NOTE:

1) THE BUOYANCY RESTRAINING COLLAR DESIGN IS BASED ON BUOYANCY FORCE CALCULATIONS AVAILABLE ON REQUEST FROM ROTH GLOBAL PLASTICS, INC. ALL FINAL DESIGN PARAMETERS ARE THE RESPONSIBILITY OF THE SYSTEM DESIGNER/INSTALLER.

CONCRETE NOTES:

- 1) PROVIDE CONCRETE TO OBTAIN THE MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI AT 28 DAYS
- 2) CONCRETE MATERIALS AND WORKMANSHIP SHALL BE IN ACORDANCE WITH ACI-318-99 (BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE) AND ACI-301-LATEST EDITION (SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS)

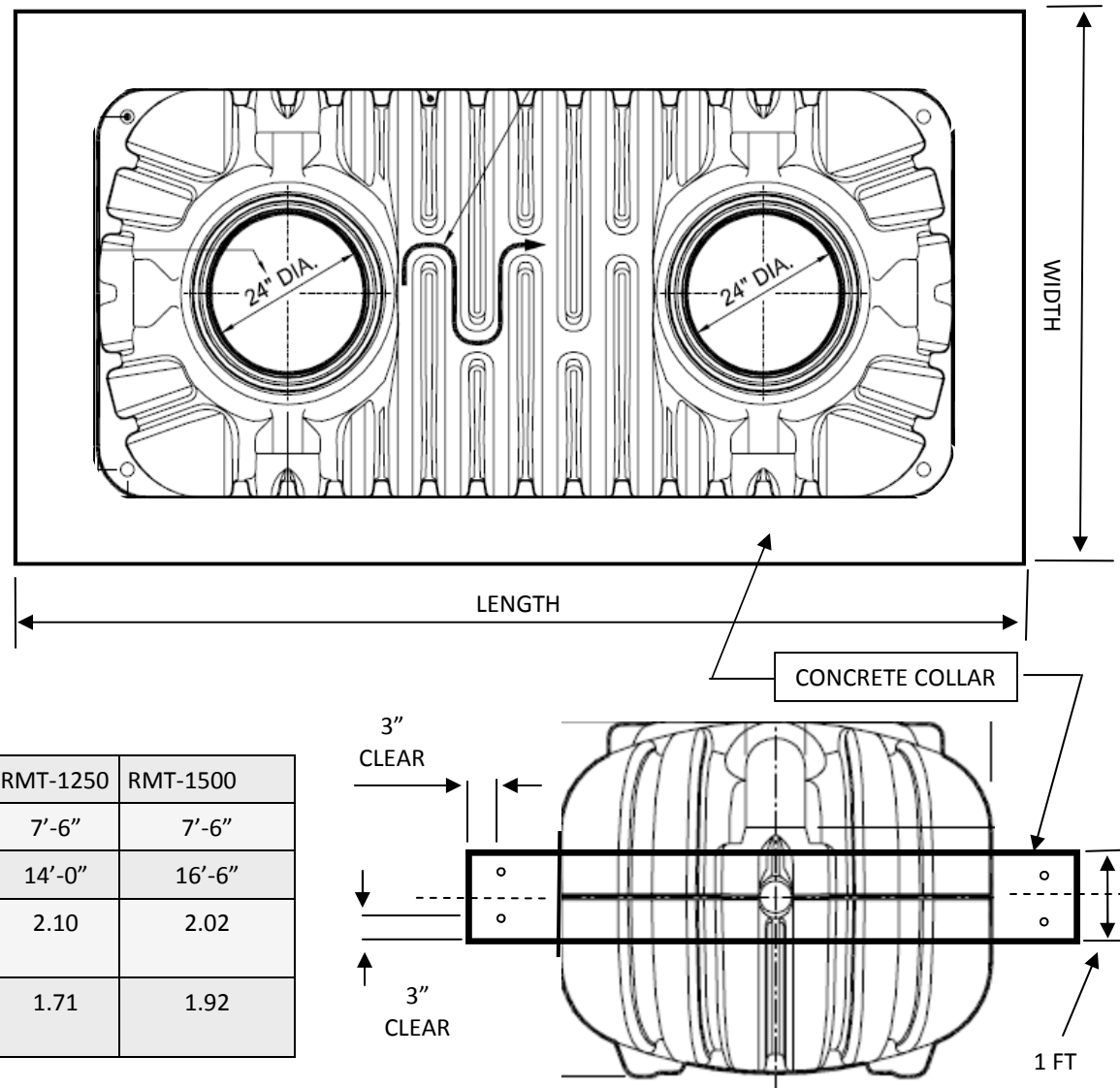
REINFORCING STEEL:

- 1) ALL STEEL SHALL BE BILLET STEEL CONFORMING TO STANDARDS OF ASTM A615, GRADE 60

CONCRETE COLLAR SPECIFICATIONS

TANK MODEL	RMT-500	RMT-750	RMT-1000E	RMT-1060	RMT-1250	RMT-1500
WIDTH (FT)	7'-0"	7'-0"	7'-6"	7'-6"	7'-6"	7'-6"
LENGTH (FT)	7'-0"	10'-6"	11'-6"	12'-0"	14'-0"	16'-6"
*NOMINAL SAFETY FACTOR	2.90	2.10	2.04	2.09	2.10	2.02
EST CONCRETE VOLUME	0.90	1.17	1.26	1.61	1.71	1.92

*based on installation with one foot of cover fill, density 115#/Ft³



DWG SCALE: 1:1

PLOT SCALE: 1:2

SHEET NO. 1 OF 1

ROTH RMT
TANK BUOYANCY RESTRAINING SYSTEM



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Product: Roth RMT Tanks

Subject: Buoyancy Restraining Collar- Construction materials required

Roth recommends the installation of a buoyancy restraining collar for installation conditions where counter buoyancy measures are indicated. The following guidelines are to provide estimates of materials required for construction of the buoyancy collar for Roth RMT tank sizes RMT-500 thru RMT-1500. Our safety factors are calculated on the basis of a 12 in x 12 in collar surrounding the tank. In practical use, the slab width may vary based on the distance between the tank wall and the excavation limit. The following table provides estimated concrete volume required in cubic yards for three slab widths:

Tank Size	Slab W 12 in	Slab W 14 in	Slab W 16 in
RMT-500	0.90	1.08	1.27
RMT-750	1.17	1.39	1.62
RMT-1000E	1.26	1.50	1.74
RMT-1060	1.35	1.61	1.87
RMT-1250	1.44	1.71	1.99
RMT-1500	1.62	1.92	2.23

Reinforcing steel requirements are based on (2) perimeters of #4 rebar set 3 in clear of the tank wall and collar top/bottom on vertical posts constructed from rebar to support the perimeters, 18 inches in length installed at 2-3 ft intervals. The following table provides estimates for total required rebar length in feet.

Tank Size	Rebar Length ft
RMT-500	56.7
RMT-750	77.0
RMT-1000E	85.0
RMT-1060	90.0
RMT-1250	98.0
RMT-1500	110.7

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