

# SPECIFICATIONS FOR STRAPS AND CONCRETE PADS

CAPACITY GALLONS	TANK DIAMETER	TANK LENGTH	TANK BUOYANT FORCE (POUNDS)	TANK THICK-NESS	TANK WEIGHT (POUNDS)	BALLAST PAD WEIGHT REQ'D (POUNDS)	PAD WIDTH	PAD LENGTH	PAD DEPTH WITHOUT COVER	PAD DEPTH WITH 3' SOIL COVER	HOLD DOWN STRAP SIZE	* THREADED ADJUSTMENT RODS (" -Ø)	TUMBUCKLE SIZE (" -Ø)	NUMBER OF STRAPS REQ'D	ANCHOR BOLT SIZE (" -Ø)	NUMBER OF BOLTS REQ'D
500	4' 0"	5' 5"	4,584.8	7 Ga.	754.3	3,830.5	6' 0"	8' 0"	1' 0"	0' 6"	2"X1/4"	3/4	3/4	2	3/4	4
1,000	4' 0"	10' 9"	8,336	7 Ga.	1,200.5	7,135.5	6' 0"	12' 9"	1' 2"	0' 6"	2"X1/4"	3/4	3/4	2	3/4	4
1,500	5' 4"	9' 0"	12,504	7 Ga.	1,461.1	11,042.9	7' 4"	11' 0"	1' 9"	0' 8"	3"X1/4"	3/4	3/4	2	3/4	4
2,000	5' 4"	12' 0"	16,672	7 Ga.	1,836.5	14,835.5	7' 4"	14' 0"	1'10"	0' 9"	3"X1/4"	3/4	3/4	2	3/4	4
2,500	5' 4"	15' 0"	20,840	7 Ga.	2,211.8	18,628.2	7' 4"	17' 0"	1'10"	1' 0"	3"X1/4"	3/4	3/4	2	3/4	4
3,000	5' 4"	18' 0"	25,008	7 Ga.	2,587.1	22,420.9	7' 4"	20' 0"	1'11"	1' 0"	3"X1/4"	3/4	3/4	2	3/4	4
4,000	5' 4"	24' 0"	33,344	7 Ga.	3,337.8	30,006.2	7' 4"	26' 0"	1'11"	1' 0"	3"X1/4"	3/4	3/4	2	3/4	4
4,000	8' 0"	10' 6"	33,344	1/4"	3,812.9	29,531.6	10' 0"	12' 6"	2'11"	2' 0"	3"X3/8"	7/8	1	2	7/8	4
5,000	6' 0"	23'10"	41,680	1/4"	5,305.4	36,374.6	8' 0"	25'10"	2' 3"	1' 3"	3"X3/8"	7/8	1	2	7/8	4
5,000	7' 0"	17' 6"	41,680	1/4"	4,756.7	36,923.3	9' 0"	19' 6"	2' 8"	1' 8"	3"X3/8"	7/8	1	2	7/8	4
5,000	8' 0"	13' 4"	41,680	1/4"	4,509.1	37,170.9	10' 0"	15' 4"	3' 0"	2' 0"	3"X3/8"	7/8	1	2	7/8	4
6,000	6' 0"	28' 8"	50,016	1/4"	6,356.2	43,659.8	8' 0"	30' 8"	2' 3"	1' 3"	3"X3/8"	1	1-1/8	2	1	4
6,000	7' 0"	21' 0"	50,016	1/4"	5,664.5	44,351.5	9' 0"	23' 0"	2' 8"	1' 8"	3"X3/8"	1	1-1/8	2	1	4
6,000	8' 0"	16' 0"	50,016	1/4"	5,205.8	44,810.2	10' 0"	18' 0"	3' 1"	2' 1"	3"X3/8"	1	1-1/8	2	1	4
7,000	8' 0"	18' 8"	58,352	1/4"	5,902.6	52,449.4	10' 0"	20' 8"	3' 2"	2' 2"	3"X3/8"	7/8	1	3	7/8	6
7,500	8' 0"	20' 0"	62,520	1/4"	6,250.9	56,269.1	10' 0"	22' 0"	3' 2"	2' 2"	3"X3/8"	1	1-1/8	3	1	6
8,000	7' 0"	28' 0"	66,688	1/4"	7,189.3	59,498.7	9' 0"	30' 0"	2' 9"	1' 8"	3"X3/8"	1	1-1/8	3	1	6
8,000	8' 0"	21' 4"	66,688	1/4"	6,599.3	60,088.7	10' 0"	23' 4"	3' 3"	2' 2"	3"X3/8"	1	1-1/8	3	1	6
8,000	10' 0"	14' 0"	66,688	1/4"	6,116.1	60,571.9	12' 0"	16' 0"	3'11"	2'11"	4"X1/2"	1	1-1/2	2	1	4
8,000	8' 0"	21' 4"	66,688	5/16"	8,006.1	58,681.9	10' 0"	23' 4"	3' 2"	2' 1"	3"X3/8"	1	1-1/8	3	1	6
8,000	10' 0"	14' 0"	66,688	5/16"	7,588.0	59,100.0	12' 0"	16' 0"	3'10"	2' 9"	4"X1/2"	1	1-1/2	2	1	4
10,000	8' 0"	26' 8"	83,360	1/4"	7,992.8	75,367.2	10' 0"	28' 8"	3' 3"	2' 3"	3"X3/8"	1	1-1/8	4	1	8
10,000	10' 0"	17' 0"	83,360	1/4"	7,331.4	76,028.6	12' 0"	19' 0"	4' 2"	3' 1"	4"X1/2"	1	1-1/2	2	1	4
10,000	8' 0"	26' 8"	83,360	5/16"	10,247.5	73,112.5	10' 0"	28' 8"	3' 2"	2' 1"	3"X3/8"	1-1/8	1-1/8	3	1-1/8	6
10,000	10' 0"	17' 0"	83,360	5/16"	8,984.3	74,375.7	12' 0"	19' 0"	4' 1"	3' 0"	4"X1/2"	1	1-1/2	2	1	4
12,000	8' 0"	32' 0"	100,032	1/4"	9,386.2	90,645.8	10' 0"	34' 0"	3' 4"	2' 3"	3"X3/8"	1	1-1/8	4	1	8
12,000	10' 0"	20' 6"	100,032	1/4"	8,546.7	91,485.3	12' 0"	22' 6"	4' 3"	3' 2"	4"X1/2"	1	1-1/2	3	1	6
12,000	8' 0"	32' 0"	100,032	5/16"	11,592.3	88,439.7	10' 0"	34' 0"	3' 3"	2' 2"	3"X3/8"	1	1-1/8	4	1	8
12,000	10' 0"	20' 6"	100,032	5/16"	10,380.6	89,651.4	12' 0"	22' 6"	4' 2"	3' 1"	4"X1/2"	1	1-1/2	3	1	6
15,000	8' 0"	40' 0"	125,040	5/16"	14,282.1	110,757.9	10' 0"	42' 0"	3' 3"	2' 2"	3"X3/8"	1	1-1/8	5	1	10
15,000	10' 0"	25' 6"	125,040	5/16"	12,335.4	112,704.6	12' 0"	27' 6"	4' 3"	3' 2"	4"X1/2"	1	1-1/2	3	1	6
20,000	10' 0"	34' 0"	166,720	5/16"	15,965.8	150,754.2	12' 0"	36' 0"	4' 4"	3' 3"	4"X1/2"	1	1-1/2	4	1	8
20,000	10' 6"	31' 0"	166,720	5/16"	15,686.4	151,033.6	12' 6"	33' 0"	4' 7"	3' 5"	4"X1/2"	1	1-1/2	4	1	8
25,000	10' 6"	38' 9"	208,400	3/8"	22,837.2	185,562.8	12' 6"	40' 9"	4' 7"	3' 5"	4"X1/2"	1-1/4	1-1/2	5	1-1/4	10
30,000	10' 6"	46' 6"	250,080	3/8"	26,874.7	223,205.3	12' 6"	48' 6"	4' 7"	3' 5"	4"X1/2"	1-1/4	1-1/2	6	1-1/4	12

In calculating this information, the following assumptions were made:

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| (1) The groundwater table is at the surface.                                 | (7) All straps are vertical at the point of anchorage.              |
| (2) The tank excavation has not been backfilled.                             | (8) A factor of safety of 2 is used for the anchorage strap design. |
| (3) The tank is empty.   | (9) Weight of water 8.33 pounds per gallon.                         |
| (4) The yield stress of all steel is $F_y = 36$ ksi.                         | (10) Weight of submerged concrete is 80 pounds per cubic foot.      |
| (5) The allowable stress on steel in tension is $f_t = .6 X F_y = 21.6$ ksi. |   |
| (6) All straps are tightened to produce uniform loading upon each strap.     |   |

\*Use with "Safety" hold down strap.

Note: Underground tank tie down systems should be designed by a licensed structural engineer, due to the complexity of soil conditions. Material listed above is only intended as a guide.



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