



TECHNICAL BULLETIN: HDK-HOLD DOWN KITS

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Striem large horizontal tanks are engineered to be installed below grade. When installing below grade, a concrete pad is required at finished grade. This acts to protect the covers as well as an anti-flotation "anchor".

NOTE:

Hold down kits are only needed for installations with a high water table, not on all installations.

Striem Hold Down Kits are available for all large horizontal tanks. A Hold Down Kit consists of pre-fabricated straps with D-rings, drop forged hot dipped galvanized turnbuckles, and two concrete deadmen with anchors (by others).

How they work: Striem Hold Down Kits leverage the weight of the backfill directly over the tank and deadmen. The calculations below show that the weight of the backfill and concrete are more than sufficient to offset the buoyant force of an empty unit installed completely beneath a high water table. Additional calculations below show that the straps are sufficient to resist the net buoyant force.

HDK-3-8 BUOYANCY AND BACKFILL CALCULATIONS

HDK Model	HDK-3	HDK-4	HDK-5	HDK-6	HDK7	HDK-8
Number of straps	2	2	4	4	6	2
Buoyant Volume (m ³)	2.64	3.42	4.45	6.62	10.00	2.37
Buoyancy Force of Empty Tank (lbs)	5803.12	7517.67	9781.77	14551.75	21981.5	5209.62
Concrete Volume Above Tank and Deadmen (ft ³)	28.67	32.03	36.79	49.15	67.50	21.54
Backfill Volume Above Tank and Deadmen (ft ³)	90.54	105.90	125.55	168.98	274.33	68.83
Volume of (2) 12x12 Deadmen (ft ³)	17.17	17.50	18.33	22.00	38.11	10.00
Concrete Weight Above Tank and Deadmen (lbs)	4071.00	4548.26	5223.47	6979.30	9585.00	3058.68
Backfill Weight Above Tank and Deadmen (lbs)	9053.80	10589.90	12554.80	16898.00	27433.00	6883.00
Weight of (2) 12x12 Deadmen (lbs)	2437.67	2485.00	2603.33	3124.00	5411.78	1420.00
Weight of Tank (lbs)	1200.00	1300.00	1450.00	1600.00	2000.00	800.00
Total Weight (lbs)	16762.46	18923.16	21831.60	28601.30	44429.78	12161.68
Strap Minimum Factor of Safety	2.90	2.14	3.20	2.06	2.00	3.02
Deadmen Minimum Factor of Safety	2.89	2.52	2.23	1.97	2.02	2.33

