HiTech Fluid Systems
THE BALANCE IS ALWAYS IN THE SERVICE

Storage Tank Volumes

Tank Volume, m3/metre (Rectangular Tanks Only)

	Length (m)															
Width (m)	3.05	3.66	4.27	4.88	5.49	6.10	7.62	9.15	10.67	12.19	13.72	15.24	16.76	18.29	19.81	21.23
1.83	5.58	6.70	7.81	8.93	10.05	11.16	13.94	16.73	19.53	22.31	25.11	27.89	30.67	33.47	36.25	38.85
2.13	6.50	7.80	9.10	10.39	11.69	12.99	16.23	19.47	22.73	25.96	29.22	32.46	35.70	38.96	42.20	45.22
2.44	7.44	8.93	10.42	11.91	13.40	14.88	18.59	22.30	26.03	29.74	33.48	37.19	40.89	44.63	48.34	51.80
2.74	8.36	10.03	11.70	13.37	15.04	16.71	20.88	25.04	29.24	33.40	37.59	41.76	45.92	50.11	54.28	58.17
3.05	9.30	11.16	13.05	14.88	17.74	18.61	23.24	27.88	32.54	37.18	41.85	46.48	51.12	55.78	60.42	64.75

Tank Volume Formulas:

Capacity, volume and displacement calculations use simple volumetric relationships for rectangles, cylinders, concentric cylinders and other shapes with the appropriate unit conversion factors.

Tanks on rigs can be a variety of shapes, but most are either rectangular or cylindrical. Three shapes of tanks are covered here:

1. Rectangular
2. Cylindrical, vertical
3. Cylindrical, horizontal

Rectangular Tank:

Mud tanks are usually rectangular with parallel sides and ends that are perpendicular to the bottom.

For a typical rectangular tank, the capacity can be calculated from the height, width and length.

Where:

Tank Capacity = V_{tank}
Tank Length = L
Tank Width = W
Tank Height = H

The general equation to calculate the capacity of a rectangular vessel is:

Volume = Length x Width x Height

This formula is valid for both English and Metric units.

Therefore, the capacity of a rectangular pit, using metres, is calculated by:

V_{tank} (m^3) = L (m) X W (m) X H (m)

1800, 505 – 3rd Street SW Calgary, Alberta, Canada T2P 3E6 Telephone: 403.547.2906 Fax: 403.547.3129

Email: info@hitechfluid.com Web: www.hitechfluid.com

Vertical Cylindrical Tank:

Cylindrical tanks mounted in a vertical position are normally used for liquid mud and/or dry bulk Barite storage.

Where:

V_{Cyl} = Capacity of the Cylindrical Tank
D = Diameter of Cylinder
H = Height of Cylinder
M = Material Level Height
π = 3.1416

If the diameter is not known, measure the circumference and divide by 3.1416

$$D = \frac{Tank\ Circumference}{\pi} = \frac{Tank\ Circumference}{3.1416}$$

The general formula to calculate the capacity for a vertical cylinder tank is:

$$V_{Cyl}\ (m^3) = \frac{\pi \times D^2(m) \times H\ (m)}{4} = \frac{3.1416 \times D^2(m) \times H\ (m)}{4} = \frac{D^2(m) \times H\ (m)}{1.273}$$

The actual mud volume (V_{mud}) of a vertical cylinder tank is calculated using the mud/material level height (M) by:

$$V_{mud}\ (m^3) = \frac{\pi \times D^2 \times M}{4} = \frac{D^2 \times M}{1.273}$$

Horizontal Cylindrical Tank:

Cylindrical tanks mounted in a horizontal position are normally used primarily for storage of diesel fuel, other liquids and/or Barite. The vertical capacity and volume of a horizontal cylindrical tank varies with the horizontal cross-section area, and is not a linear function of height. Charts and tabular methods are available to calculate the capacity and volume of horizontal cylindrical tanks.

Where:

V_{Cyl}	=	Capacity of the Cylindrical Tank
D	=	Diameter of Cylinder
L	=	Length of Cylinder
M	=	Mud or Material Height
π	=	3.1416

$$V_{cyl} = \frac{L}{2}\left[(2M - D)\sqrt{MD - M^2} + \frac{D^2}{2}\,\boldsymbol{sin^{-1}}\,\frac{(2M-1)}{D} + \frac{\pi D^2}{4}\right]$$

The result from $\sin^{-1}$ must be in radians before being added to the other parts of the equation (2π radians = 360°). To convert from degrees, divide by 57.3 (degree/radian) to obtain radians.