

How many pounds of barite should be added to one sack of cement to obtain a slurry density of 140 lb/cu ft. Water requirement for barite is 0.0264 gal per pound of barite. Specific gravities of barite and cement are 4.23 and 3.14 respectively. Water requirement for cement is 5 gal per sack.

Additive	Weight (lb)	Density (lb/ft ³)	Volume (ft ³)
Cement	94	195.9	0.48
Barite	χ	264	$\frac{\chi}{264}$
Water for cement	41.7	62.4	0.668
Water for barite	$\frac{62.4(\chi \cdot 0.0264)}{7.48}$	62.4	$\frac{\chi \cdot 0.0264}{7.48}$

$$\text{Density} = \frac{\text{total wt}}{\text{total Vol}}$$

$$\begin{aligned} \text{Density} = 140 &= \frac{\frac{62.4(\chi \cdot 0.0264)}{7.48} + 41.7 + \chi + 94}{0.48 + \frac{\chi}{264} + 0.668 + \frac{\chi \cdot 0.0264}{7.48}} \\ &= \frac{67.2 + 0.53 \chi + 93.52 + 0.494 \chi}{0.22 \chi + 41.7 + \chi + 94} \end{aligned}$$

$$\chi (1 + .22 - .53 - .494) = -94 - 41.7 + 67.2 + 93.52$$

$$0.196 \chi = 25.02$$

$$\chi = 127 \text{ lb per one sack}$$