pHlocrite
SYNTHETIC SEMI- CALCINED DOLOMITIC LIMESTONE

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pHlocrite Usage Calculation

1 part of pHlocrite Grade' A' neutralises approximately 0.8 parts of free carbon dioxide.

1 part of pHlocrite Grade' B' neutralises approximately 1.2 parts of free carbon dioxide.

1 cubic metre of pHlocrite weighs approximately 1150 kilograms.

The pHlocrite will need topping up when a maximum of 75% of the bed has been consumed.

A water containing 10mg/l (10 grams per cubic metre) of carbon dioxide will consume 8 grams of pHlocrite Grade ' A' for every cubic metre of water passed through the pHlocrite bed and pro rata for any other level of carbon dioxide.
If the flow rate through the unit is reasonably constant then it is a simple arithmetic operation to determine how long 75% of the bed will last at that flow rate.

Example

A 450mm diameter filter containing 0.13 cubic metres of pHlocrite Grade' A' weighing around 150 kilograms will remove 90 kilograms (75% of 150 X 0.8) of CO_2 before topping up is required. If the water to be treated contains 25 grams of free CO_2 per cubic metre then around 3600 cubic metres of water will be neutralised before top up is required.
At a flow rate of 2 cubic metres per hour this will give a continuous filter run of 1800 hours or approximately 7 to 8 months assuming maximum flow rate for 8 hours per day.

The estimated run time for Grade' B' calculated for a similar system to that used above would be around 11 to 12 months

Obviously, these run time estimates are pro rata for any other flow rate and operating times.

The calculation for hydrochloric acid depends upon whether or not the reactions take place in a closed system where all of the generated carbon dioxide reacts with the dolomite, or in an open system where some of the generated carbon dioxide is lost to atmosphere.

For a closed system where the all of the carbon dioxide is reacted as in the following reactions

$$2CaCO_3 + 2HCl \text{ -------> } CaCl_2 + Ca(HCO_3)_2$$
$$MgO + 2HCl \text{ -------> } MgCl_2 + H_2O$$

each gram of pHlocrite 'A' will neutralise 0.7 grams of HCl and each gram of pHlocrite 'B' will neutralise 1 gram of HCl. Since the possible loss of carbon dioxide to atmosphere is very variable it is safer to use the above figures for assessing the amount of pHlocrite consumed by a given amount of acid as calculated from the acid strength and flow rate.