Calcium Carbonate (CaCO₃)

CALCIUM CARBONATE is used as a bridging agent and/or weighting material in oil base and water base drilling fluids, drill-in fluids, work over fluids, and completion fluids. CALCIUM CARBONATE comes in a wide variety of particle sizes ranging from 325 mesh (35 µ) to 30 mesh (550 µ). Custom sizing for particular applications is also available.

CALCIUM CARBONATE is used to prevent fluid invasion of permeable zones, and to prevent loss of circulation during drilling, workover, and completion activities. CALCIUM CARBONATE is applicable in all drilling fluids, aqueous and non-aqueous. It can be used to prepare a pill for spotting purposes.

CALCIUM CARBONATE is also used as an acid soluble weighting material for drill-in or workover fluids with a density of 14.0 ppg or less.

CALCIUM CARBONATE is 98 to 99.5% soluble in 7.5-15% hydrochloric acid solution, thus minimizing permanent plugging of the producing formation. It is available in grades ranging from 325 mesh up 30 mesh to provide the particle sizes needed for effective bridging of the producing interval.

#### Particle Size Analysis

<table>
<thead>
<tr>
<th>Mesh</th>
<th>Micron</th>
</tr>
</thead>
<tbody>
<tr>
<td>400</td>
<td>35.56</td>
</tr>
<tr>
<td>75</td>
<td>190.80</td>
</tr>
<tr>
<td>60</td>
<td>250.00</td>
</tr>
<tr>
<td>50</td>
<td>300.00</td>
</tr>
<tr>
<td>40</td>
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<td>30</td>
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<td>850.00</td>
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<tr>
<td>14</td>
<td>1400.00</td>
</tr>
<tr>
<td>10</td>
<td>1700.00</td>
</tr>
</tbody>
</table>
**Lost Circulation Material**

**Treatment**

CALCIUM CARBONATE concentrations of 5 to 10 ppb are usually sufficient as a bridging agent to prevent fluid loss in work over systems. Concentrations of 20 to 40 ppb are used in the preparation of LCM pills.

As a weighting agent, CALCIUM CARBONATE can be added to increase fluid densities up to 14.0 ppg. The weight up formula for CALCIUM CARBONATE is:

\[
\text{Required lb/bbl of CALCIUM CARBONATE} = \frac{945 \left( W_2 - W_1 \right)}{22.5 - W_2}
\]

Where:
- \( W_1 \) = initial mud weight in ppg
- \( W_2 \) = desired mud weight in ppg

**Function**

CALCIUM CARBONATE acts as a bridging agent like most solids but is used because of its acid soluble nature. As a weight material it is somewhat limited because of the low density, but this may be compensated for by the use of salt to increase the water phase density. In a water based system the \( \text{pH} \) of the drilling fluid needs to be above 7.0 since the CALCIUM CARBONATE is acid soluble. At a lower \( \text{pH} \), it will begin to dissolve and contaminate the drilling fluid with calcium and will no longer be effective as a lost circulation material.

**Typical Physical Properties**

- **Appearance**: ................. white powder
- **Specific Gravity**: .......... 2.7
- **Hygroscopic**: ............... no
- **\( \text{pH} \) in water**: ............ neutral
- **Bulk density**: ............... 63 pcf

**Safe Handling Recommendations**

Utilize normal precautions for employee protection when handling chemical products. Use of appropriate respirator, gloves, goggles, and apron is recommended for employee comfort and protection. See Material Safety Data Sheet (MSDS) for this product prior to use.

**Packaging**

CALCIUM CARBONATE is packaged in 50 pound multiwall bags.