SAFE-CARB

Ground marble bridging agent

APPLICATIONS
- Controlling fluid loss, density, and bridging in a range of fluids
- Sealing of sand-control completion assemblies

ADVANTAGES
- Minimized formation damage through high-quality, acid-soluble material design
- Effective bridging, especially when using OPTIBRIDGE* bridging agent selection software to design an optimized, application-specific blend
- Simplified method of identifying the approximate d_{50} of agent
- High-hardness ground marble makeup that resists particle-size degradation
- Essentially inert for minimized effect on fluid properties

SAFE-CARB* ground marble bridging agent is a high-purity, acid-soluble calcium carbonate used as a bridging and weighting agent in drilling, drill-in, workover, and completion fluids. Compared with limestone, the agent features higher hardness and purity, providing better acid solubility.

This calcium carbonate bridging and weighting agent can be used in fluids ranging from conventional drilling fluids to advanced drill-in fluid systems, including FLOPRO NT* water-based reservoir drill-in fluid, FAZPRO* reversible invert-emulsion reservoir drill-in fluid system, VERSAPRO* invert-emulsion reservoir drill-in fluid system, and DIPRO* high-density divalent reservoir drill-in fluid.

It can also be used with SEAL-N-PEEL* fluid loss control pill to seal the inside of sand-control completion assemblies as a bridging agent and fluid-loss additive. Use OPTIBRIDGE software to select the optimal blend of SAFE-CARB agent to reduce fluid loss and minimize fluid and solids invasion.

The agent can also be added on a periodic basis for seepage control to limit losses to lost circulation and leak-off to high-permeability formations. It is particularly effective when drilling with high differential pressures caused by an overbalanced condition or when drilling depleted zones. Treatments range from 2 to 10 sacks per hour when used as a preventative measure. For depleted-zone drilling or induced-fracture applications, SAFE-CARB agent is most effective when used with G-SEAL* sized graphite bridging agent, G-SEAL PLUS* wellbore stabilizing agent, or G-SEAL PLUS COARSE* carbon-based bridging agent.

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Median Particle Size (d_{50}), um</th>
<th>Recommended Test Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAFE-CARB 2</td>
<td>1–4</td>
<td>Laser light scattering</td>
</tr>
<tr>
<td>SAFE-CARB 10</td>
<td>6–15</td>
<td>Laser light scattering</td>
</tr>
<tr>
<td>SAFE-CARB 20</td>
<td>16–29</td>
<td>Laser light scattering</td>
</tr>
<tr>
<td>SAFE-CARB 40</td>
<td>31–48</td>
<td>Laser light scattering</td>
</tr>
<tr>
<td>SAFE-CARB 140</td>
<td>120–180</td>
<td>Dry-sieve analysis</td>
</tr>
<tr>
<td>SAFE-CARB 250</td>
<td>225–300</td>
<td>Dry-sieve analysis</td>
</tr>
<tr>
<td>SAFE-CARB 500</td>
<td>430–520</td>
<td>Dry-sieve analysis</td>
</tr>
<tr>
<td>SAFE-CARB 600</td>
<td>550–650</td>
<td>Dry-sieve analysis</td>
</tr>
<tr>
<td>SAFE-CARB 750</td>
<td>655–800</td>
<td>Dry-sieve analysis</td>
</tr>
<tr>
<td>SAFE-CARB 1400</td>
<td>1,200–1,550</td>
<td>Dry-sieve analysis</td>
</tr>
<tr>
<td>SAFE-CARB 2500</td>
<td>2,100–2,700</td>
<td>Dry-sieve analysis</td>
</tr>
</tbody>
</table>

Median particle size (d_{50}) is reported as a size range due to variations in the manufacturing and grinding process. If a precise size distribution of a product is critical to a drilling operation, it should be measured with the appropriate recommended test procedure using samples that are representative of those expected to be used in that operation. Nominal d_{10} and d_{90} values are available upon request.

Imperial measurements
Volume of SAFE-CARB agent in lbm/bbl = \((980 \left( w_2 - w_1 \right))/\left(23.3 - w_2\right)\)

where
w_1 = initial mud weight in lbm/galUS
w_2 = desired mud weight in lbm/galUS.

Metric measurements
Volume of SAFE-CARB agent in kg/m\(^3\) = \((2,800 \left( w_2 - w_1 \right))/\left(2.8 - w_2\right)\)

where
w_1 = initial mud weight in relative density
w_2 = desired mud weight in relative density.
**Typical Physical Properties**

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical appearance</td>
<td>White powder</td>
</tr>
<tr>
<td>Relative density</td>
<td>2.7–2.8</td>
</tr>
<tr>
<td>Solubility in water at 212 degF [100 degC]</td>
<td>0.0035 g/100 mL</td>
</tr>
<tr>
<td>Solubility in 15% HCl at 76 degF [24.4 degC]</td>
<td>≥97%</td>
</tr>
</tbody>
</table>

**Toxicity and handling**

Bioassay information is available upon request. No claim of personal safety is intended nor implied by the use of the name “SAFE” in this product. Handle as an industrial chemical, wear protective equipment, and observe the precautions as described in the material safety datasheet (MSDS).

**Packaging and storage**

SAFE-CARB agent is packaged in 50-lbm [22.7-kg], 55-lbm [25-kg], and 110-lbm [50-kg] multiwall paper sacks. Store in a dry, well-ventilated area. Keep container closed when not in use. Store away from incompatibles. Follow safe warehousing practices regarding palletizing, banding, shrink-wrapping, and stacking.