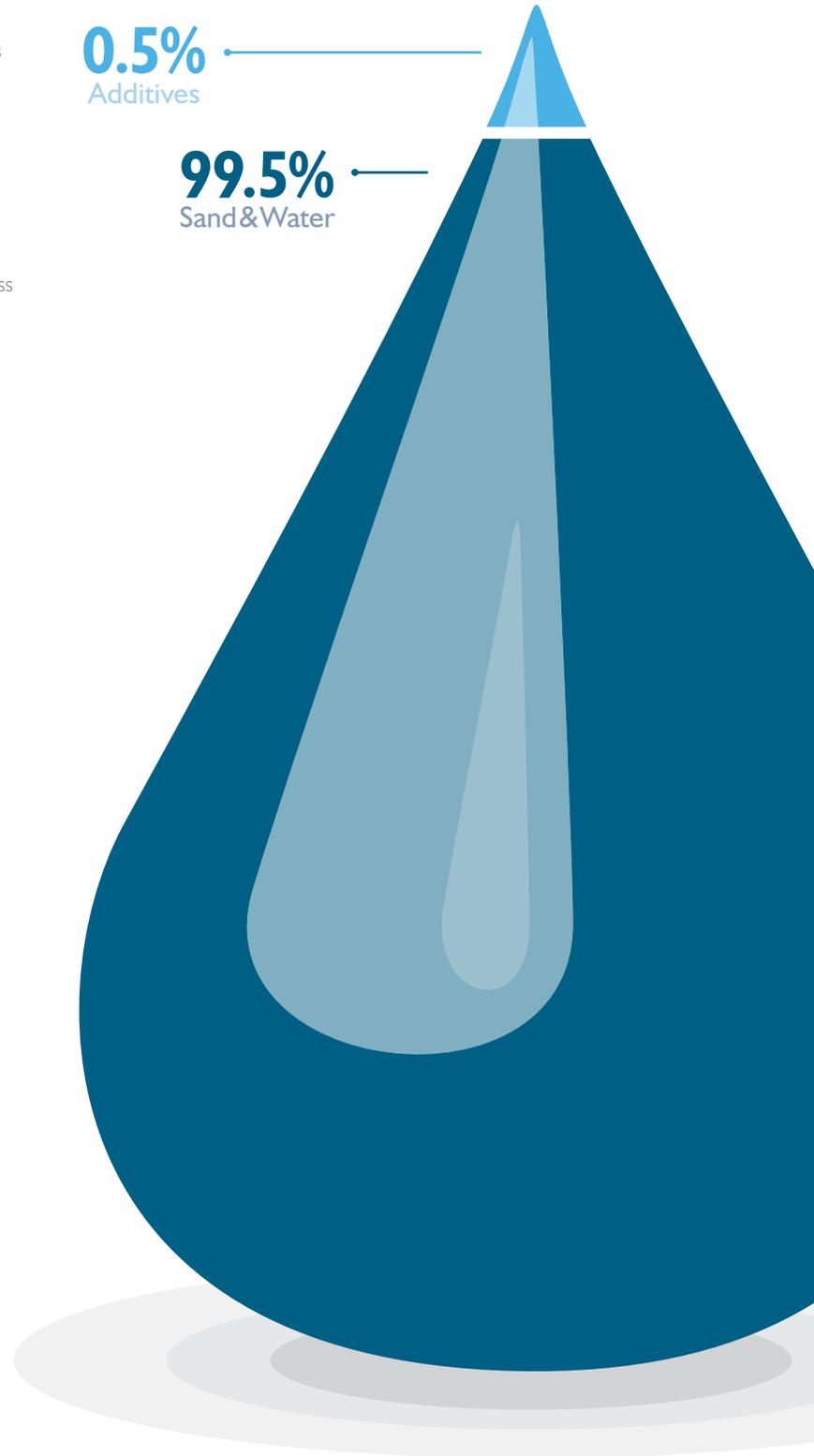


What's in Fracturing Fluid?

Typical Solution* Used In Hydraulic Fracturing



-  **Acid 0.123%**
is used to aid in dissolving minerals and initiating fissures in rock (pre-fracture). It is also found in **pool cleaner**.
-  **Petroleum Distillate 0.088%**
"slicks" the water to minimize friction. It is commonly found in make-up remover, laxatives, and **candy**.
-  **Isopropanol 0.085%**
increases the viscosity of fracturing fluid. It is used in glass cleaner, antiperspirant, hair color, and **rubbing alcohol**.
-  **Potassium Chloride 0.06%**
helps create a brine carrier fluid. It is also better known as low sodium **table salt**.
-  **Guar Gum 0.056%**
thickens water to suspend the sand. It is found in baked goods, **ice cream**, toothpaste, and salad dressings.
-  **Ethylene Glycol 0.043%**
prevents scale deposits within the pipe. It is found in automotive antifreeze, household cleaners, and **caulk**.
-  **Potassium Carbonate 0.011%**
maintains the effectiveness of other components, such as crosslinkers. It is used in **soap** and water softener.
-  **Sodium Chloride 0.01%**
allows a delayed breakdown of the gel polymer chains. It is better known as **salt**.
-  **Borate Salts 0.007%**
maintain the viscosity as the temperature increases. They are used in **laundry detergents** and hand soaps.
-  **Citric Acid 0.004%**
prevents precipitation of metal oxides. It is a food additive and better known as **lemon juice**.
-  **N, n-Dimethyl Formamide 0.002%**
prevents corrosion of the pipe. It is commonly used in pharmaceuticals, acrylic fibers, and **plastic**.
-  **Glutaraldehyde 0.001%**
eliminates bacteria in the water. It is found in disinfectants, and **sterilizers** for medical equipment.



*Source: DOE, GWPC: Modern Gas Shale Development in the United States: A Primer (2009)
The specific compounds used in a given fracturing operation will vary depending on source water quality and site, and specific characteristics of the target formation. The compounds listed above are representative of the major material compounds used in the hydraulic fracturing of natural gas shales. Compositions are approximate.