

# CHEMICALS & COMPOUNDS USED IN CSG FRACING

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Fraccing chemicals fall into the following categories.

- Proppants (such as sand or quartz) are used to hold the fracture open so that gas can be released.
- Microbial Controls inhibit the growth of organisms which could contaminate the coal seam and the frac fluid.
- Buffers, stabilisers and solvents maintain the stability of the frac fluid, immobilise clays and enhance pre-fracture.
- Clay management is used to minimise clay swelling in the vicinity of the well and in the formation.
- Gelling agents and binders are used to increase the viscosity of the frac fluid and allow more sand to be carried into the fractures.
- Breakers are used break down the frac gel and enable the release of the proppant into fractures. They also enhance the recovery of the frac fluid.
- Surfactants reduce the surface tension thereby aiding fluid recovery.

CAS n o.	Chemical type / name	Common function	Common use	%*	Volume ^
7732-18-5	Water	Fraccing / proppant suspension	Drinking, bathing, cooking	75-99	Proppants & proppant suspension make up 98.5-99.6% of frac fluid
7727-37-9	Nitrogen	Fluid weight reducer / proppant suspension	Used in cryogenic, food processing, medical	0-70	
14808-60-7	Crystalline silica (quartz)	Proppant	Cat litter, tile mortar, arts & crafts, glass, ceramic glaze, glaze, concrete, paint	0-25	
14464-46-1	Crystalline silica (cristobalite)	Proppant	Sand, gravel	0-25	
56-81-5	Glycerine	Additive	Food and pharmaceutical industry, hair products	0-1	
26172-55-4	5-chloro-2-methyl-2h-isothiazolol-3-one	Microbial control	Used in toiletries, cosmetics, dishwashing liquids	0-1	
2682-20-4	2-methyl-2h-isothiazol-3-one	Microbial control	Used in toiletries, cosmetics, dishwashing liquids	0-1	
7681-52-9	Sodium hypochlorite	Microbial control	Disinfectant, bleach, milk production, water treatment, dental/medical, wood/deck cleaner, mildew remover	0-1	
55566-30-8	Phosphonium sulfate	Microbial control	Cooling systems, paper-making industry	0-1	
6410-41-9	C.I. pigment red 5	Microbial control	Food colouring, paints, agriculture	0-1	
584-08-7	Potassium carbonate	Buffer, stabiliser, solvent	Soap, glass, and china production	0-1	
127-09-3	Sodium acetate	Buffer, stabiliser, solvent	Flavouring additive in food industry	0-1	
1310-73-2	Sodium hydroxide (caustic soda)	Buffer, stabiliser, solvent	Food preparation, household drain cleaner, paper, soaps, detergents	0-1	
144-55-8	Sodium bicarbonate	Buffer, stabiliser, solvent	Used as baking soda, cleaning, anti-pollutant	0-1	
497-19-8	Sodium carbonate (soda ash)	Buffer, stabiliser, solvent	Water softener, swimming pools food additive (E500), glass	0-1	
7647-01-0	Hydrochloric acid (muriatic acid)	Buffer, stabiliser, solvent	Household cleaning, food additive, swimming pools, drinking water	0-1	
463-79-6	Carbonic acid	Buffer, stabiliser, solvent	Soda drinks	0-1	
77-92-9	Citric acid	Buffer, stabiliser, solvent	Flavor additive, biological, cleaning, pharmaceutical	0-1	
64-19-7	Acetic acid	Buffer, stabiliser, solvent	Vinegar, found in citrus fruits, descaling agent	0-1	
533-96-0	Carbonic acid, sodium salt	Buffer, stabiliser, solvent	Food additive	0-1	
64-02-8	Tetrasodium ethylenediaminetetraacetate	Chelating agent	Cosmetic industry	0-1	
67-48-1	Choline chloride	Clay management	Poultry feed additive	0-1	
7447-40-7	Potassium chloride	Clay management	Table salt substitute, medical treatments, garden products, pet supplements, hair products	0-1.5	
26062-79-3	Polydimethylallylammonium chloride	Clay management	Water treatment (drinking, waste-water), textiles, cosmetics, paper-making, soil treatment, drinking, bathing, cooking	0-1	
75-57-0	Tetramethyl ammonium chloride	Clay management	Type of salt	0-1	
593-81-7	Trimethylammonium chloride	Clay management	Dyeing	0-1	
9000-70-8	Gelatine	Corrosion inhibitor	Capsules for medicines, desserts, jellies, ice cream	0-1	
100-43-52-4	Calcium chloride	Filler, stabiliser	Detergents, cosmetics, deodorant, pet products, desiccant (moisture absorber), food additive, sports drinks, pickles	0-1	Not all of these chemicals are used at any one time, generally 3-10 of these may be used in a frac & compose approximately 0.4-1.5% of the frac fluid
107-21-1	Ethylene glycol	Filler, stabiliser	Anti-freeze agent, de-icing, printer inks	0-1	
91053-39-3	Diatomaceous earth, calcined	Filler, stabiliser	Toothpaste, hydroponics, agriculture (grain storage), filter media (drinking water)	0-1	
14807-96-6	Magnesium silicate hydrate (talc)	Filler, stabiliser	Talcum powder, cosmetics, food additive, soaps, paper, paints, rubber, pottery	0-1	
7631-86-9	Non-crystalline silica	Filler, stabiliser	Glass, paints, coatings, fillers, plastics	0-1	
10043-35-3	Boric acid	Gel management	Cosmetics, skin care products	0-1	
102-71-6	Triethanolamine	Gel management	Cosmetics, skin care products	0-1	
1303-96-4	Sodium tetraborate	Gel management	Component of many detergents, cosmetics, texturing agent in cooking	0-1	
25038-72-6	Vinylidene chloride/methylacrylate	Gel management	Plastic wrap for foods	0-1	
26038-87-9	MEA borate	Crosslinker	Cosmetics, hair texturiser, hairspray, antiseptic, laundry detergent	0-1	
7647-14-5	Sodium chloride	Gel management	Food production, food additive, detergents, hair products, water softener	0-1	
7722-84-1	Hydrogen peroxide	Gel management	Hair bleach, food processing	0-1	
7727-54-0	Diammonium peroxodisulphate	Gel management	Hair bleach	0-1	
7772-98-7	Sodium thiosulfate	Gel management	Personal care, pet care, food production, aquarium/commercial aquaculture (food)	0-1	
7775-27-1	Sodium persulfate	Breaker	Hair bleach	0-1	
9000-30-0	Guar gum	Gel	Thickener in cosmetics, baked goods, ice cream, toothpaste, sauces & salad dressing	0-1	
9025-56-3	Hemicellulase enzyme	Breaker	Food industry, washing powder	0-1	
9012-54-8	Hemicellulase enzyme carbohydrates	Breaker	Common food additive	0-1	
7757-82-6	Sodium sulfate	Gel management	Textiles	0-1	
7757-83-7	Sodium sulfite	Gel management	Paper industry	0-1	
10377-60-3	Magnesium nitrate	Clay management	Facial care, home garden uses, ceramics	0-1	
7786-30-3	Magnesium chloride	Clay management	Food industry (tofu from soy milk), magnesium health supplements	0-1	
112926-00-8	Silica gel	Clay management	Cat litter	0-1	
111-76-2	2-Butoxyethanol	Surfactant	Home surface cleaners, jewellery cleaner	0-1	
64-17-5	Ethanol	Surfactant	Beer, wine, spirits	0-1	
67-63-0	Propan-2-ol	Surfactant	Solvent in cleaning fluid	0-1	
68187-17-7	C6-C10 Alcohol ethoxysulfate	Surfactant	Laundry detergent	0-1	
68439-45-2	Alcohols C6-C10 ethoxylated (surrogate C6-C12)	Surfactant	Household cleaners	0-1	

\* percentage volume of chemical in the frac fluid

^ percentage of frac fluid

