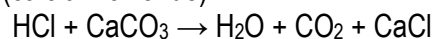


Matrix Acidizing FAQs

What is matrix acidizing? Matrix acidizing is technique to improve well productivity by injecting an acid into a formation below the formation-fracturing pressure. The acid dissolves material that is restricting flow and enhances or creates new flow paths to the wellbore.

What acids are used to treat oil wells? Hydrochloric acid (HCl), commonly called muriatic acid, and sometimes acetic acid are used for matrix acidizing carbonate (limestone) formations, such as those that form the hydrocarbon reservoirs in Florida.

What happens to the injected acid? The acid is naturally neutralized by dissolving carbonate minerals within the formation, as intended, according to the following reaction. The end products are water, carbon dioxide gas, and a salt (calcium chloride).



The spent acidizing solution is recovered, tested for its pH (and further neutralized if necessary), and then properly disposed of, typically by deep well injection.

Is matrix acidizing new to Florida? No. Matrix acidizing has long been practiced in the oil industry. It is also a standard technique used to develop and rehabilitate potable water supply wells.

Is matrix acidizing new to Collier County and southwest Florida? No. Many potable water utilities in southwest Florida routinely has matrix acidification performed on its potable water production wells, including Bonita Springs Utilities, Island Water Association, Collier County Utilities, Lee County Utilities, Cape Coral Utilities, City of Fort Myers, Gasparilla Island Water Association, and City of Naples.

Is the matrix acidification an accepted technique for potable water supplies wells? Yes. It is a widely used technique and discussed in textbooks on well construction and testing.

How is matrix acidification of oil wells different from that performed on water wells? The oil reservoir rock has a much lower permeability than aquifer strata, which requires that the acid solution be injected at a higher pressure (but below the fracturing pressure) in order to push the solution into the formation. The chemical process is the same. Oil well casings are composed of steel which requires the use of anticorrosion additives, which are not needed for water supply wells constructed with PVC or fiberglass casings. However, some public water supplies that do have steel components use anticorrosion additives.

Are other chemicals used in matrix acidizing? Sometimes. Corrosion inhibitors may be added to minimize potential corrosion of steel casing. These include surfactants (soap/detergent-like substances) that adsorb onto the pipe surface or otherwise reduce the rate of corrosion and iron control substances.

Is matrix acidification safe? Any handling of acids involves some health and safety concerns. Workers should be properly trained in handling acids and provided with personal protection equipment.

Does matrix acidizing present a threat to the environmental and groundwater supplies. The environmental risk is negligible as any spilt acid will be neutralized by calcium carbonate in the soil

and shallow aquifer. The organic compounds used for corrosion control are biodegradable. The technique has long been safely used on oil and potable water supply wells and would clearly not pose a threat when applied over two miles below land surface.

Table 1. List of chemical from Dan A Hughes Acidizing Plans			
Chemical (Main ingredients)	Trade or common name	Use	Other uses
Hydrochloric acid (HCl)	Muriatic acid	Acid	Stomach acid, calcium scale remover, pool chemical
Hydrochloric acid and organic acids	Supersol EQH- 105	Acid	
Acetic acid (CH ₃ COOH)		Acid	Vinegar
Isopropyl alcohol	LT-32	Surfactant	Disinfectant
Acrylamide modified polymer Petroleum distillates Ammonium chloride Oxyalkylated alcohol	Agicel 11	Gelling agent	
Citric acid	Ferrotrol 111	Iron control	Food and soft drink additive
Trisodium nitrilotriacetate monohydrate	Ferrotrol 80L	Iron control	Chelating agent
Aromatic aldehyde Isopropanol Oxyalkylated fatty acids Quaternary ammonium compound Formic acid	C-31	Corrosion inhibitor	
Oxylated alcohol	NE-945	Non- emulsifier	Household detergents
Benzoic acid	Benzoic acid	Divertor	Food preservative
Claycare – Clay Treat 2C, 260	Choline chloride	Clay stabilization	Ingredient in pet foods – a vitamin
2-Butoxyethanol	US 40	Solvent	Solvent for paints and surface coatings, cleaning products, and inks
Guar gum	GW-38LF	Gelling agent	Food ingredient
Citrus terpenes hydrocarbon	Paravan 28	“Green” solvent	Natural citrus cleaner