



**IRON HORSE
CHEMICALS**



ACIDIZING CATALOG

www.ironhorsechemicals.com



COMPLETE ACIDIZING SOLUTIONS

IRON HORSE CHEMICALS ADVANTAGES

- ✓ LOGISTICS MANAGEMENT
- ✓ PRODUCT PERFORMANCE TESTING SUPPORT
- ✓ COMPETITIVE ECONOMICS
- ✓ ON-SITE MANAGEMENT



ACIDIZING PRODUCT LINE

Acidizing involves pumping acid into a wellbore or geologic formation that is capable of producing oil and gas. The purpose of any acidizing is to improve a well's productivity or injectivity.

There are three general categories of acid treatments: acid washing; matrix acidizing; fracture acidizing.

Iron Horse Chemicals has the expertise to handle all three.

RESEARCH AND DEVELOPMENT

Decades of experience are behind all our unique blends of chemistry. IHC is always enhancing our product line and can help our clients design formation specific treatments

- Corrosion protection
- Anti-sludging agents
- Non-emulsifiers
- Iron Control
- Surfactant packages
- Diverters

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ACIDS

DESCRIPTION

Understanding the type of formation being acidized and details of its composition (mineralogy) is critical to achieving positive results. Downhole temperature, pressure, production type and the acquisition of field samples will enhance the success of a program.

Hydrochloric Acid (HCl): This is a highly corrosive and strong acid used in well stimulation and various acidizing processes. It is commonly used to dissolve mineral deposits and stimulate reservoirs by creating or enlarging fractures, thereby improving hydrocarbon flow. Available in any blend up to 36% concentrate.

Hydrofluoric Acid (HF): An aqueous solution of hydrogen fluoride

Organic Acids: Formic, acetic, and citric acid are other acids commonly employed in acidizing treatments. They are less corrosive than HCl but still effective in dissolving carbonate formations and enhancing production rates.

SYN / Green Acid: A safer alternative to HCL and organic acids.

- pH zero
- Non-corrosive
- Non-skin, non-eye irritant, non-fuming
- Not D.O.T. regulated
- No special requirements for disposal

Acetic Acid	Acetic acid solutions
Citric Acid	Citric acid (solid and solutions) Formic acid solutions Hydrochloric acid solutions
Formic Acid	Safer acid alternative to traditional strong acids, various options are available depending on the acid to be
Hydrochloric Acid	replaced and the strength of the acid
SYN ACID	Acetic acid solutions



ACID CORROSION INHIBITORS

DESCRIPTION

Uninhibited hydrochloric acid of various strengths will react to corrode steel. The amount of damage to assets encountering the acid is a function of contact time, acid strength, and temperature.

As the temperature goes up, the effectiveness of many acid inhibitors drops below desirable protection levels. The proper operating temperatures are key to utilizing the best corrosion inhibitor.

FEATURES

These inhibitors are organic compounds that form a protective layer on the metal surface, preventing the reaction between the metal and the treating fluids

AI-LT3	High temperature corrosion inhibitor blend for well acidizing, acid fracturing, and industrial cleaning operations (< 350°F / 176°C)
AI-LT5	Cationic acid corrosion inhibitor for well acidizing, acid fracturing, and industrial cleaning operations (< 200°F / 93°C), Non-DOT regulated
AI-HT6	Cationic acid corrosion inhibitor for well acidizing, acid fracturing, and industrial cleaning operations (< 200°F / 93°C)
ACI-3	All in one Inhibitor, NE, Iron Sequestrant - 120°F
ACI-3C	All in one Inhibitor, NE, Iron Sequestrant - 200°F



ACID GELLANTS

DESCRIPTION

Gelled or viscous acid penetrates deeper into the formation before spending. The reaction rate of the acid is retarded to allow for this increased penetration.

The gelled system also reduces fluid loss and leak off the acid. As pH rises, the viscosity decreases; however, there is enough residual viscosity to flow back acid-insoluble fines.

Acid gelling agents can be added continuously while pumping or it can be premixed before pumping. If premixed, the fluids need to be agitated thoroughly to insure thorough mixing.

Acid gelling agents increase viscosity in HCl acid (up to 20% in concentration). When used in higher concentration acid the gel does not form until the acid spends below 20%.

They are compatible with both cationic and nonionic surfactants. Do not use with anionic surfactants, such as anionic anti-sludge agents.

FEATURES

- Gelled Acid penetrates deeper before spending
- Gel viscosity decreases as acid spends
- Residual viscosity helps remove insoluble fines
- Easily mixed liquid
- Compatible with cationic and nonionic surfactants

AGA-S50	Blend of cationic surfactants that viscosify hydrochloric (HCl) acid by forming a macromolecular structure of oriented micelles. Viscosity of 50-60 cps is typical for acid used up to 66 °C (150 °F)
AGA-D20	Acid gelling agent for diversion



ACID ANTI-SLUDGE AGENTS

DESCRIPTION

Formation permeability can be compromised by sludge deposits created by acidizing. Anti-sludge agents, properly tested pre-job with fluid from the target formation will inhibit the formation of these sludges and emulsions.

When some acids interact with incompatible crude oils, dense, asphaltene sludge deposits can form. Iron Horse Chemicals' anti-sludge agents work to prevent sludge formation, maintain formation permeability, and promotes rapid return of the treating fluid to the wellbore.

FEATURES

- Defends against acid sludge formation
- Demonstrates compatibility with cationic non-emulsifiers and corrosion inhibitors
- Proves to be soluble and stable in hydrochloric acid and other strong mineral acids
- Promotes the use of higher acid concentrations (15–28%) for more effective treatments
- Also performs as a non-emulsifier

ASA-3	Blend of cationic and non-ionic surfactants. Highly soluble and works with a range of crude oils, performing with long-term stability in HCl and other strong mineral acids.
ASA-6	Blend of cationic and non-ionic surfactants. Highly soluble and works with a range of crude oils, performing with long-term stability in HCl and other strong mineral acids.



ACID INTENSIFIER

DESCRIPTION

Selection of the proper corrosion inhibitor(s) is one of the most important criteria for high-temperature acidizing. The additional use of an intensifier with the inhibitor enhances the corrosion inhibition significantly.

This makes it possible to use a higher concentration of HCl acid at temperatures as high as 350°F, thus enhancing the fluid efficiency.

FEATURES

- High temperature application
- Increases corrosion inhibition

AI-500

Corrosion inhibitor intensifier for use in hydrochloric acid based acidizing systems



ACID DIVERTER

DESCRIPTION

Iron Horse Chemicals has a complete line of patent pending diverters that have been in development and in use for the past 5 years with proven field success. Our complete line of diverters included acid diverter.

Our acid diverter agent significantly improves matrix acidizing efficiency in production well acid operations. This is achieved with near wellbore diversion drops to increase overall acid placement throughout the wellbore. These are economical jobs to restore production in existing producing wells.

The diverter is biodegradable and hydrolyzes based upon reservoir temperature, pressure, and water to a clear, no-hazardous liquid.

FEATURES

- Wide temperature range - 120-to-330°F bottom hole temperature
- Fully Degradable
- Environmentally friendly - Green process
- Permeability studies showing no formation damage
- Applicable for all formations
- More effective and lower cost than Pods

ACID DIVERTER	Biodegradable and hydrolyzes based upon reservoir temperature, pressure, and water to a clear, no-hazardous liquid.
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ACID CLAY CONTROL

DESCRIPTION

Acid clay control is a temporary clay control agent used to suppress clay swelling during acidizing treatments.

ACC-10 utilizes magnesium ions to suppress clay swelling while the stimulation fluid is in contact with the reservoir.

ACC-10 is used at a treatment rate of 0.25 to 2.0 gallons per thousand gallons (GPT) of stimulation fluid. Pilot testing is highly recommended.

ACC-10 is compatible with all cationic and non-ionic additives typically found in industrial use. Anionic additives should be screened for compatibility.

ACC-10

Environmentally friendly, economic temporary clay control



ACID DEMULSIFIER

DESCRIPTION

Demulsifiers ensure that the fluids added during the acid stimulation are separated properly for the reservoir fluids. Demulsifiers break the bond between the oil and water and destabilize the emulsion.

AD-15 was designed to work under the harshest conditions including high temperature and high pressure. It is compatible with numerous fluids and is tested prior to every application to ensure efficiency.

AD-15

Acid Demulsifier – designed for numerous types of acids and applications



ACID NON-EMULSIFIER

DESCRIPTION

Non-emulsification affects well cleanup after fracturing and acidizing treatments. **NES-151** rapidly separates mixed oil and water by lowering interfacial surface tensions. **NES-151** also reduced surface tension to very low levels as an additional benefit.

NES-151 is a nonyl phenol resin with additional surfactants that function as non-emulsifiers addressing surface and interfacial surface tension for water based fracturing fluids.

NES-151 is non-ionic and does not leave an oil layer behind which improves the flow of hydrocarbons compared to cationic non-emulsifiers which can reduce permeability and flow through capacity due to oil layers.

NES-151

Nonyl phenol resin with additional surfactants that function as non-emulsifiers



IRON CONTROL

DESCRIPTION

IRA-S is an organic acid sodium salt that functions as an iron reducing agent and oxygen scavenger for fracturing and acidizing fluids. IRA-S also functions as an anti-oxidant and weak chelating agent

IRA-L is a polydentate amino acid sodium salt that sequesters iron, preventing gelatinous ferric hydroxide precipitation during hydrochloric acid (HCl) treatments.

Ferric hydroxide damages formation permeability and is a potential problem during any acidizing treatment. **IRA-L** sequesters both ferric (Fe+3) and ferrous (Fe+2) iron and has a temperature limit more than 177C (350F).

IC-301 chelates and maintains reduced iron in contaminated reservoir formation waters. **IC-301** reacts with dissolved ferrous iron in formation, flow back and produced waters to prevent ferric iron phases from precipitating in the wellbore.

IC-301 also keeps the iron in the solution at the molecular level allowing the iron to be flushed from the reservoir without damaging reservoir permeability. The product is a neat iron-control additive compatible over a broad range of pH and compatible with the full range of Iron Horse Chemicals completion fluid additives.

IRA-S	Iron reducing agent, solid
IRA - L	Iron reducing agent, liquid
IC-301	Iron chelating agent, liquid



SOLVENTS & BLENDS

DESCRIPTION

Chemical dissolution treatment necessitates application of solvents that will effectively and efficiently remove paraffin wax deposits, dissolving the paraffin regardless of structure, size, or melting point. This process requires much less energy compared with melting the wax crystals. Solvent effectiveness improves with increased temperature and agitation.

Our formulated solvent product line is a synergistic blend of aliphatic, aromatic, and cyclic structure streams. This broad product offering carries solvents for production, solvents/ mutual solvents and surfactants for reservoir and remediation applications.

HCl & Solvent Blends: IHC can provide numerous blends of HCl and acetic acids with solvent packages.

Our **ACIDSOLV** blends HCL and xylene in various ratios.

ACIDSOLV-XS is a blend of signature solvents designs to work on their own and in a blend with numerous acids. They are used in the place of straight Xylene.

Mutual Solvent	Chemical additive for stimulation treatments that is soluble in oil, water and acid-based treatment fluids
pSOLV	Solvent line designed to disrupt paraffin and asphaltene prior to acid treatment
Toluene	Hydrocarbon solvent
Xylene	Hydrocarbon solvent



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