Over 50 years of chemical cleaning experience enables Halliburton to offer best-in-class technology for preoperational, operational, and decommissioning operations in the petrochemical, gas-to-liquids, refining, utility, and process industries.

**Single-Fill Methods Minimize Cleaning Time and Waste Disposal Costs**

Minimizing both downtime and environmental impact are critical to achieving cost-effective cleaning operations. Halliburton’s single-fill methods dramatically reduce waste volume and cleaning time when compared to traditional multifill cleaning methods. Single fill methods are available for cleaning a broad range of equipment including boilers, process tanks, transfer piping, pipelines, gas-to-liquids process equipment, refinery process equipment, heat transfer systems, utility systems, and pulp and paper process equipment.

**Specialized Decontamination Solvents and Surfactants Help Reduce Waste Disposal Costs**

Where applicable, Halliburton’s operational cleaning processes are designed to reclaim valuable hydrocarbons for reprocessing. Specialized decontamination solvents and surfactants help reduce waste disposal costs by providing effective system decontamination and recovery of valuable process fluids.

**Tailored Processes for Cleaning and Passivation**

The Halliburton chemical cleaning processes normally incorporate passivation of freshly cleaned system alloys. Protection of freshly cleaned and passivated surfaces can be further extended by wet lay-up, or by drying and filling with inert nitrogen gas supplied by Halliburton. Regardless of required lay-up method, Halliburton can provide effective cleaning, passivation, and preservation procedures that meet specific project needs.

**Comprehensive Laboratory Capabilities**

Halliburton’s dedication to developing faster more effective, and more economical cleaning methods results in continual advancement of chemical cleaning technology and equipment. With technical support centers in Houston, Carrollton, Duncan, and Pune, and field laboratories in most operational locations, Halliburton has the capability to design the most cost-effective approach to almost any process system-cleaning problem.

**Proven Dependable Cleaning Processes**

**The CitrosolvSM Process**

Halliburton was among the first to introduce low-chloride, citric acid-based cleaning processes that provide scale removal, neutralization, and passivation with only one solvent fill.
The unique properties of the Citrosolv™ process make it an excellent choice for removing deposits consisting primarily of iron oxides or mixtures of iron oxides and copper. The Citrosolv process should be considered when cleaning carbon steels, low alloy steels, or stainless steel.

The MagSolv™ Process
The MagSolv™ process is also a low-chloride, citric acid-based process that can be custom designed to meet specific requirements. The unique properties of the MagSolv process make it an excellent choice for preoperational cleaning. Proper application provides degreasing, scale removal, neutralization, and passivation with only one solvent fill. This process offers considerable savings in time, water, and waste disposal costs. The many variations of the MagSolv process make it applicable to virtually any operational or preoperational cleaning where the primary contaminants are oils/greases and iron oxides or mill scale.

Hydrochloric Acid
Hydrochloric acid (HCl) has been the “work horse” of the chemical cleaning industry for many reasons. HCl is very aggressive toward most metal oxides, metal sulfides, and water-formed deposits. The addition of certain materials to HCl-based solvents widens the scope of application to allow removal of deposits containing silicon and copper. Since HCl is such an aggressive solvent, it is ideal for situations where heating of the cleaning solvent is impractical. It is often used for removing scale from pipelines or when performing cleaning operations in remote locations where power and/or heat are not readily available. A wide variety of effective corrosion inhibitors are available for HCl.

D-Crude 1™ Decontamination Process
Decontamination with D-Crude 1™ specialty surfactant readily removes potentially flammable or hazardous components from hydrocarbon process systems. The unique properties of D-Crude 1 provide efficient system decontamination, allow for recovery of valuable process fluids, and minimize offsite waste disposal. Decontamination with D-Crude 1 can result in time savings of up to 60 percent when compared to conventional steam decontamination methods.

Other Proven Halliburton Chemical Services and Products
- Alkaline degreasers
- D-Crude™ PL surfactant
- Paragon™ EA solvent
- Paragon Plus solvent
- Parasperse® LR™ cleaner
- Musol™ solvent
- BaSO4ivent™ barium sulfate solvent
- LSD™ calcium sulfate disintegrator
- Hyfor™ acid

Examples of Recently Completed Projects
- **S America** – Preoperational cleaning of amine, glycol, and hot oil systems at offshore gas processing platform
- **Middle East** – Chemical cleaning of 3-in. oxygen service pipelines at steel plant
- **Middle East** – Chemical cleaning (using MagSolv process) and high-volume flushing of boiler and thermal cycle at steam power plant
- **S America** – Preoperational chemical cleaning (degreasing and MagSolv process) of piping and vessels at a major gas processing plant
- **Europe** – Preoperational chemical cleaning (degreasing and MagSolv process) of piping and vessels at a major industrial plant

For more information about Halliburton’s Chemical Cleaning Services, contact your local Halliburton representative or email pps@halliburton.com

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