



PRODUCTION
TECHNOLOGIES.
FULL SERVICE.

ConcentraFlo

Pipeline chemistry solutions and services

PREVENT — PERFORM — CURE

Schlumberger

CHEMICALLY DRIVEN, COMPREHENSIVE SOLUTIONS FOR MAXIMUM THROUGHPUT

Schlumberger specialists deliver integrated chemical, equipment, and analytical packages customized to meet all your pipeline needs—from new builds to in-service maintenance and decommissioning.

Chemistries used in the Schlumberger portfolio deliver a high level of environmental performance, with many approved for offshore discharge in select locations.





PREVENT

PERFORM

CURE

Schlumberger integrates its industry-leading chemical portfolio with leading-edge equipment, software, and expertise to provide a single-source solution to help ensure optimal performance throughout the life of your midstream asset.

For new builds, we provide precommissioning services, including cleaning, filling, hydrostatic testing, drying, and nitrogen inerting. During operation, we sustain optimal flow through continuous injections or batch treatments to control corrosion and microbial activity. Our custom-designed programs also remediate a wide range of contaminants, such as black powder, wax buildup, spent glycol, biological films, salt, water, and corrosives—any of which over time can decrease flow, increase pipeline pressures, contribute to corrosion, or increase the likelihood of stuck pigs.

Schlumberger selects products from the PREVENT suite of preventive chemical technologies, PERFORM suite of flow performance chemical technologies, and CURE chemical removal portfolio to customize chemical-based solutions that optimize production and mitigate risks in pipelines. These include specialty cleaners for debris suspension and removal, hydrostatic test fluid corrosion inhibitors that can also be used for mothballing pipelines, gel pigs and leak detection dyes, corrosion inhibitors, and biocides.

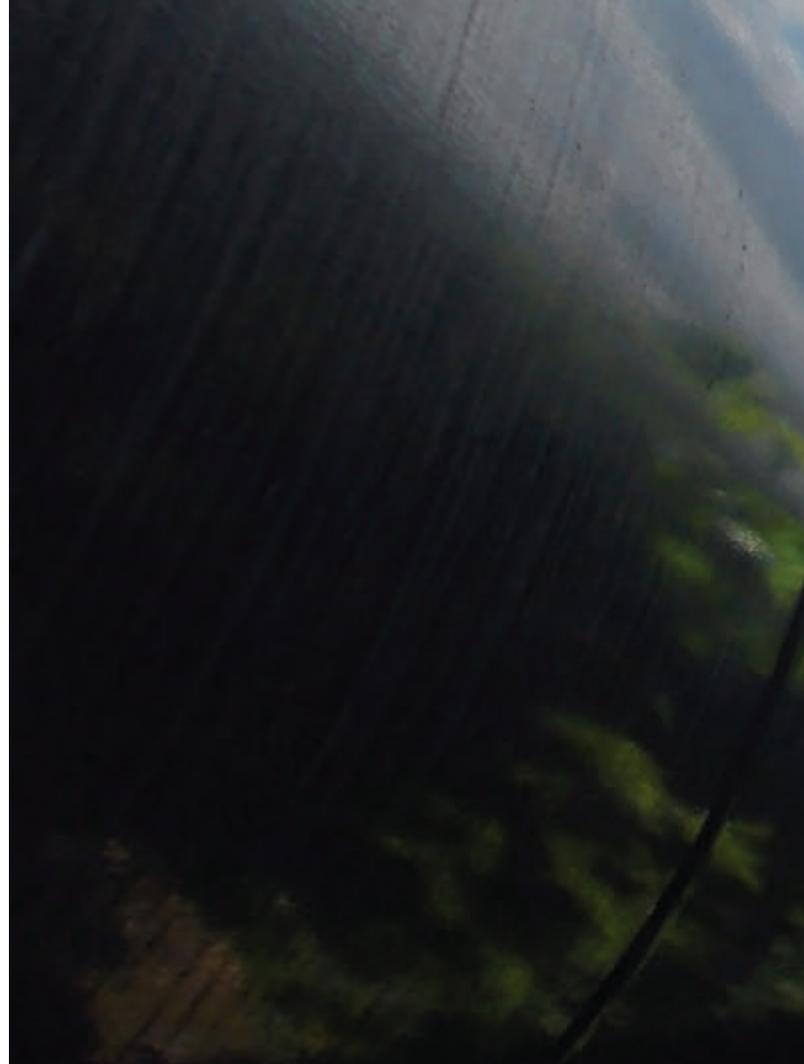
Using these proven chemistries and engineering experience, Schlumberger can more safely and effectively address the full scope of midstream-related issues, including innovative flow assurance pipeline chemistry, pipeline separation services, chemical cleaning, gas flaring, nitrogen services, line precommissioning, and decommissioning.

FULL INTEGRATION

Schlumberger has the resources to engineer a pipeline maintenance strategy that incorporates a broad suite of chemicals, equipment, and services that are tailored specifically to your requirements and objectives.

We offer

- extensive production chemistry expertise
- highly sophisticated pipeline cleaning technologies
- PIPESIM* steady-state multiphase flow simulator and OLGA* dynamic multiphase flow simulator for pipeline and flow modeling
- DeScal* descaling, decontamination, and decommissioning service
- nitrogen services
- integration with Schlumberger separation, testing, process, and flow assurance services
- experience in new equipment development and services
- specialty applications using Schlumberger coiled tubing and wireline technologies.



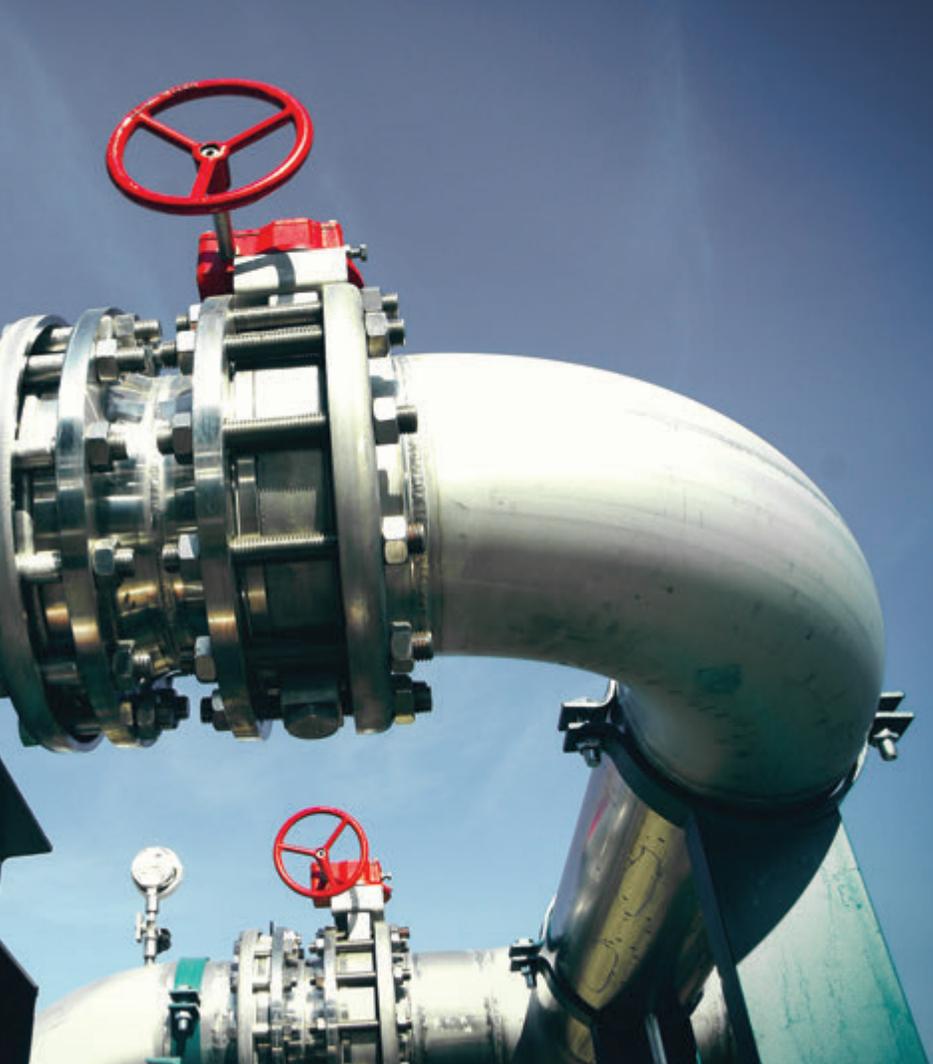


CUSTOM-ENGINEERED CLEANING SOLUTIONS

In developing a customized program to maintain and maximize productivity, Schlumberger specialists first analyze each pipeline's individual characteristics and challenges. Product quality, pipeline design, geography, flow regimes, corrosion history, operations, and maintenance history are among the principal factors we consider in evaluating the condition of your flowline.

This detailed project data is then integrated with our technological expertise to deliver advanced cleaning workflows. After identifying and analyzing the problem and determining contributing factors, we continue with the development and deployment of an application-specific solution. Using advanced analytics, we manage the treatment effectiveness; during posttreatment, we measure performance to quantify production improvement.





The proliferation of and advances in smart pigging have further reinforced the need for the advanced chemical cleaning technologies provided by Schlumberger.

CONCENTRAFLO SERVICE TACKLES THE MOST TROUBLESOME DEPOSITS

On newer pipelines especially, a simple cleaning program using mechanical pigging alone may suffice. However, for older and seldom-pigged pipelines with a greater degree of deposit buildup, we developed ConcentraFlo* pipeline chemistry solutions and service.

This service primarily encompasses our gel pigging and chemical cleaning technologies and has emerged as the solution of choice for the most demanding pipeline cleaning applications. Our ConcentraClean* pipeline cleaning technology represents the latest generation of cleaning technologies, having evolved from simple and time-tested degreasers to advanced residue-free cleaners used in the aerospace industry. ConcentraClean technology is proved as an effective microemulsion, comprising advanced blends of wetting agents, dispersing surfactants, and solvents and cosolvents, which consistently exhibit outstanding performance in cleaning the most contaminated oil and gas pipelines.



Schlumberger

CONCENTRAGEL TECHNOLOGY AS AN UNPIGGABLE PIPELINE SOLUTION

For high-risk, unconventional, or otherwise unpiggable pipelines, Schlumberger offers the alternative ConcentraGel* gel pig technology. The ConcentraGel technology is used for line sweeping and displacement, pipeline isolation, temporary plugging, cleaning, and chemical batching for pipelines that prohibit the use of mechanical pigs or pipelines lacking traditional pig launchers and receivers. ConcentraGel technology can be pushed with either conventional pigs, gas, or liquids and has a proven track record of cleaning pipelines where bends, variable dimensions, or other irregularities make standard pigging difficult.

ConcentraGel technology can be pumped directly into the pipeline through any valve and then deployed to clean, collect, and remove solids, debris, and retained fluids—much like a traditional pig. ConcentraGel technology also contains a fluorescing dye for leak detection.

If left in the pipeline, the gels typically biodegrade within 7 days, as indigenous bacteria accelerate degradation. However, because ConcentraGel technology is customized to meet specific project and customer objectives, degradation can be engineered to occur faster or slower, depending on your requirements. Winterized chemical formulations are also available.





ConcentraGel technology is used for line sweeping and displacement, pipeline isolation, temporary plugging, cleaning, and chemical batching for pipelines with configurations that prohibit the use of mechanical pigs.

Case Study

ENGINEERED BIODEGRADABLE GEL PIG BOOSTS GAS PRODUCTION 58%, TEXAS

CHALLENGE

Production from a gas well in Texas, USA, was stagnating liquids in low-lying segments of the operator's small, variable-ID pipeline, creating backpressure and restricting flow. The pipeline dimensions, low working-pressure rating, and tie-ins and bends posed challenges in accommodating conventional mechanical pigs.

SOLUTION

To restore production and improve the economics of line maintenance, Schlumberger customized a biodegradable chemical cleaning solution that incorporated ConcentraGel technology.

RESULTS

Following the injection of ConcentraGel technology, daily production increased from 190 to 300 Mcf/d—a 58% increase.





Case Study

OPERATOR RECOVERS 12,500 BBL OF SELLABLE CONDENSATE IN GOM PIPELINE BEFORE DECOMMISSIONING

CHALLENGE

An operator in the Gulf of Mexico needed to remove produced fluid from an offshore pipeline with three different ODs before hydrotesting and abandonment.

SOLUTION

Schlumberger engineered a solution combining ConcentraGel technology and HydroHib-P* corrosion inhibitor to push condensate out of the offshore pipeline and into temporary storage containers onshore.

RESULTS

A cumulative 12,500 bbl of sellable condensate was recovered from the decommissioned offshore pipeline network.

MITIGATE CORROSION, MINIMIZE RISK, AND MAXIMIZE PRODUCTION

Acidic gases such as carbon dioxide and hydrogen sulfide, as well as organic acids dissolved in produced water, will corrode pipelines if left untreated. Failure to control corrosion rates can yield potentially catastrophic consequences, resulting in environmentally damaging leaks and compromised personnel safety.

As part of the PREVENT suite of preventative chemical technologies, Schlumberger delivers a comprehensive portfolio of chemical treatments to preserve asset integrity. Ideally suited for all production conditions worldwide, these treatments tackle all types of corrosion—regardless of environmental, production, or geographical challenges.

Along with PREVENT technologies, Schlumberger also offers the HydroHib-P inhibitor, a combination surfactant, cationic, filming amine corrosion inhibitor, and oxygen scavenger for application in freshwater and brines. HydroHib-P inhibitors control saltwater corrosion through CO_2 , inorganic salts, and dissolved oxygen as well as H_2S contamination from sour fluids or bacterial action. Recommended for use as a hydrostatic corrosion inhibitor, HydroHib-P inhibitors have been used for more than 30 years in hundreds of pipeline hydrostatic test projects around the world. These inhibitors can also be used for long-term mothballing of pipelines to protect these valuable assets while not in use so that they can be reemployed at a later date without corrosion-related integrity issues.





Schlumberger offers the industry's most extensive suite of corrosion control chemistries, including

- CO₂ and H₂S corrosion inhibitors
- hydrotesting inhibitors
- cooling water corrosion inhibitors
- environmentally acceptable corrosion inhibitors
- batch corrosion inhibitors
- high-temperature corrosion inhibitors
- gas corrosion inhibitors
- multifunctional products (combined scale and corrosion inhibitors)
- oxygen and H₂S scavengers
- oil and gas pipeline inhibitors
- subsea and deepwater corrosion inhibitors
- encapsulated corrosion inhibitors.





HYDROTAG PIPELINE TRACER DYES

Liquid dyes have been used for years to detect leaks in hydrocarbon pipelines, tanks, vessels, and cooling systems. Schlumberger developed HydroTag* pipeline tracer dyes to provide a simple application of these presolubilized dyes, with black light detection at 485 nm.

These dyes come in a variety of colors. Environmentally sensitive areas, however, often require colored dyes to be treated prior to discharge. For these environments, we developed a clear liquid dye product, which eliminates visible coloring but clearly exposes any leaks with black light detection at 349 nm.

UNLOCK POTENTIAL OPTIMIZE PRODUCTION

A full service offering to maintain and restore full production.

Schlumberger production technology specialists deliver targeted, integrated strategies that help to decisively remediate production issues such as deposit formation and naturally occurring gases, enabling customers to restore and improve flow performance and revenue while avoiding costly repairs and shutdowns.

Firmly established at the forefront of technology, Schlumberger has a full service offering that integrates pioneering chemical and process solutions, equipment, and software with unrivaled technical expertise.

Working with the world's largest oilfield services provider, customers benefit from a unique combination of outstanding technological capabilities and improve their understanding of how to successfully address production challenges in an increasingly competitive marketplace.

The team's global footprint and extensive suite of technologies helps customers to reliably and efficiently maximize production—regardless of system complexities or geography.

**MAXIMIZE PRODUCTION
FROM RESERVOIR TO REFINERY**



UNLOCK POTENTIAL

OPTIMIZE PRODUCTION



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