

Client Support Laboratory

Specialized Support in Europe and Africa



OUR MISSION

To provide support for a wide range of environmentally sound well construction and production fluid technology by

- improving service delivery for our customers
- optimizing fluid designs to meet customer objectives
- facilitating the rapid deployment of new technology
- disseminating new ideas and best practices to the field
- ensuring that all products and lab equipment comply with customer requirements and meet internal and regulatory standards
- performing lab testing beyond the capabilities of GeoMarket* regions
- training field personnel on fluid design and safer, more effective lab testing.

WORLD-CLASS LABORATORIES

Schlumberger continuously invests in local resources and infrastructure to further enhance service capabilities and address technical challenges. Our Client Support Laboratories (CSLs) are equipped with specialized, state-of-the-art equipment to support local operations and meet stringent regulatory requirements.

EXTENSIVE EXPERIENCE AND TRAINING

The scientists, engineers, fluid specialists, and supporting laboratory technicians at our CSLs are some of the most highly trained specialists in the industry. Laboratory staff must complete years of rigorous training to acquire the technical skills and extensive knowledge necessary to meet customer needs. Training focuses on bringing the highest quality, efficiency, and safety standards from the lab to the field.

INTEGRATED NETWORK

Each CSL operates as a central hub for an integrated network of district and area laboratories, product centers, and regional technology centers.



RIGOROUS QA/QC STANDARDS

Schlumberger CSLs are designed with a fit-for-purpose workspace. API- and ISO-approved equipment enables performance-based lab testing and ensures the highest QA/QC standards.



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SUSTAINABLE SOLUTIONS

The Europe and Africa CSL, located in Aberdeen, develops high-performance, low-environmental-impact cementing and stimulation formulations for some of the most stringent regulatory authorities in the world, including OSPAR[†] and the European Union.

We continually work to develop chemical products that

- are biodegradable, nonbioaccumulative, and nontoxic
- phase out hazardous components
- meet or exceed local environmental legislation
- are environmentally safer than the products being replaced
- maintain or improve chemical product technical performance
- optimize product loading and cost.

WELL INTEGRITY

Our lab technicians use leading-edge equipment and simulators to test the performance of cement blend, cement slurry, slurry designs, and spacer fluids under many downhole conditions. This helps ensure lasting well integrity through optimized thickening times, compressive strength development, gel strength, and cement placement.

Tests include

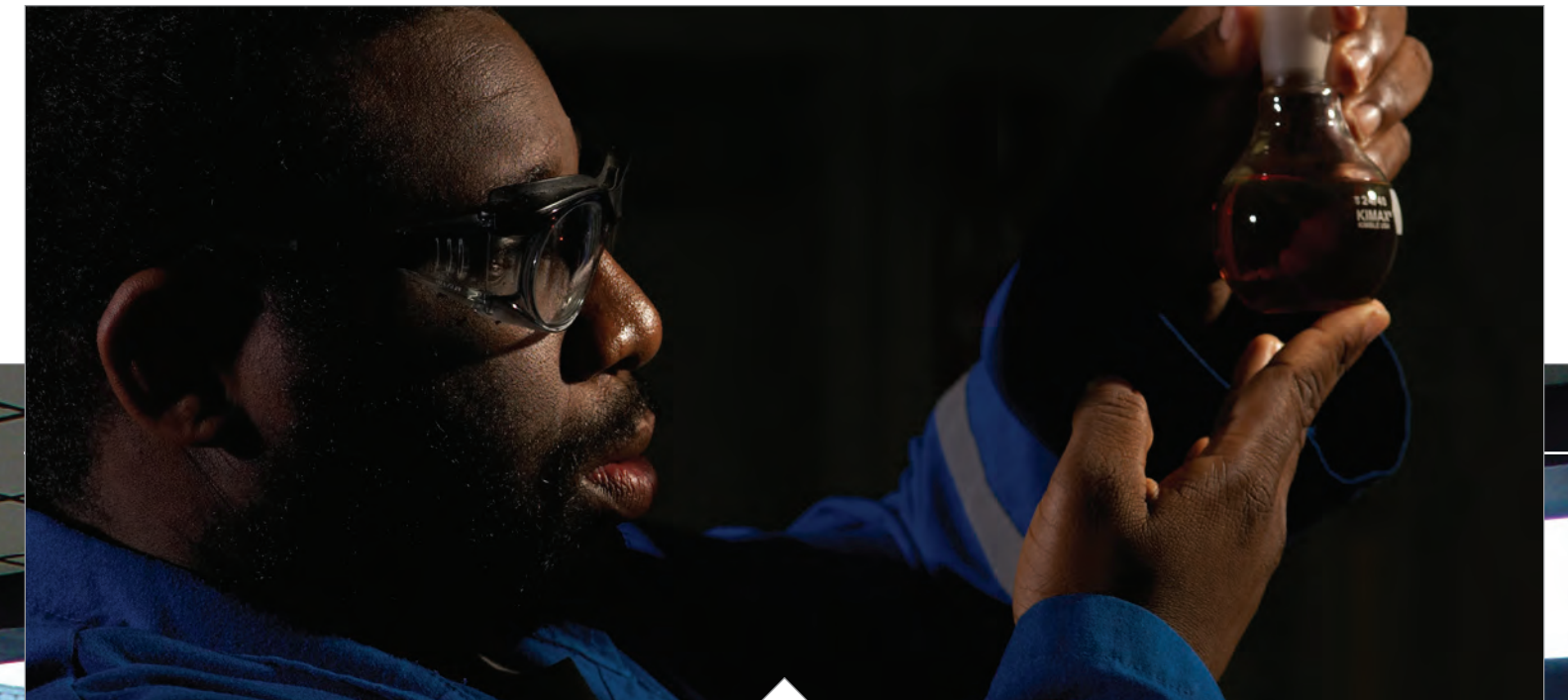
- infrared spectroscopy
- X-ray diffractometry
- gel strength measurements
- gas migration evaluation
- set-cement properties evaluation
- fluid compatibility assessments
- plug placement and lost circulation simulations.

INNOVATIVE WELL STIMULATION

In most wells, it is essential to perform some type of production enhancement treatment. The Europe and Africa CSL performs thorough evaluations and optimizations for acidizing treatments, hydraulic fracturing, and water, sand, and scale control.

Tests include

- acid response testing
- pre-flood and post-flood test analysis of core samples
- formation damage evaluation
- fluid and crude oil compatibility testing
- formation sand size analysis
- gravel-pack carrier fluid testing
- resin consolidation testing
- fracturing fluid evaluation and optimization
- proppant analysis
- static and dynamic fluid-loss measurements
- gel extrusion resistance
- scale identification and removal



The Europe and Africa CSL improves performance and service quality through technology transfer and technical cooperation with customers. For example, fluid designs are tested at reservoir conditions to ensure compliance with local regulations, API and ISO requirements, and Schlumberger operating procedures before they are pumped.



[†] Convention for the Protection of the Marine Environment of the North-East Atlantic

EAF Client Support Laboratory Capabilities

Equipment	Function	Application
Atmospheric consistometer	Measurement of thickening times at atmospheric pressures	Cement slurry conditioning
Brookfield viscometer	Rheology measurements of viscous fluids from 15–2,000,000 cP [mPa.S]	Fracturing, sand control, and matrix fluid design
Capillary suction timer	Measurement of the potential of a clay to swell once it is introduced to a fluid	Fracturing, sand control, and matrix fluid design
Carver press	API fracturing proppant/sand crush resistance test up to 15,000 psi [1,034 bar]	Fracturing and sand control proppant/sand API test
Cement hydration analyzer	Evaluation of cement slurry gas tightness properties	Well cementing gas migration analysis
Chemical diverter apparatus	Core flood testing of chemical diverter at constant flow rate or pressure at temperatures to 232 degC [450 degF]	Matrix acid treatment diversion
Chillers	Determining properties of fluids at low temperatures	Deepwater cementing testing
Core flood apparatus	Core flood testing at reservoir conditions with pressures to 68.9 MPa [10,000 psi] and temperatures to 177 degC [350 degF]	Formation damage studies and matrix acidizing optimization
Curing chamber	Curing cement slurries at pressures to 21 MPa [25,000 psi] and temperatures to 371 degC [700 degF]	Cement slurry and set cement curing
Dynamic fluid-loss apparatus—Fracturing	Evaluation of fracturing fluid loss at pressures to 31 MPa [4,500 psi] and temperatures to 232 degC [450 degF]	Fracturing fluids leakoff analysis
Dynamic fluid-loss apparatus—Reservoir drilling fluids	Evaluation of mud cleanup fluid formations	Matrix and sand control treatment design
Energy dispersive analysis by X-rays (EDAX)	Scanning electron microscope attachment for elemental analysis of compounds	Formation and scale mineralogy analysis
Fourier transform infrared spectrometer	Analysis of liquids and powders at the molecular level	Cement, additive, and material QA/QC analysis
Helium porosimeter	Measurement of porosity of core samples	Stimulation treatments design
Helium pycnometer	Measurement of powder densities	Dry cement blend density measurements
High-pressure and high-temperature rheometer	HPHT rheological measurement at pressures to 207 MPa [30,000 psi] and temperatures to 315 degC [600 degF]	Fluids rheology measurements at bottomhole conditions
High-temperature rheometer	Rheological measurements of viscous gels to 204 degC [400 degF]	Fracturing, water control, and sand control treatments design
Load cell	Testing mechanical strength of materials	Cement compressive strength and resin consolidation strengths measurements
Loss circulation screens	Evaluation of effectiveness of loss circulation materials	Curing loss circulation during drilling and cementing
Modified fluid-loss cells	Evaluation of fluid-loss control (against core samples and inside gravel-pack screens), working time of water-control fluids, and mud-cleanup fluids	Sand control, fracturing, and water control treatments design
Mud removal kit	Evaluation of effectiveness of spacers for mud removal	Spacers design
Nitrogen permeameter	Measurement of nitrogen permeability of core samples	Formation rock properties measurements
Particle-size analyzer	Evaluation of particle-size distributions of solids in liquid media	Cement characterization, product QA/QC
Pressurized consistometer	Determination of cement slurry thickening times under bottomhole conditions at pressures to 276 MPa [40,000 psi] and temperatures to 315 degC [600 degF]	Cement slurry properties evaluation
Reciprocating capillary viscometer	Rheology measurements of viscous fluids at temperatures to 204 degC [400 degF]	Fracturing and sand control fluids selection
Scanning electron microscope	Examination and identification of porosity and minerals on a microscopic scale with image analysis capability	Formation rocks and shale analysis
Shear history simulator	Shear rate (100–800 1/S), temperatures (40–200 degF), pressure to 3,000 psi	Fracturing and StimPAC* fluid design
Static gel strength analyzer	Evaluation of cement slurry gel strength development using ultrasonic waves at pressures to 138 MPa [20,000 psi] and temperatures to 204 degC [400 degF]	Cement slurry design
Static HPHT fluid-loss cells	Evaluation of cement slurry fluid loss at temperatures to 204 degC [400 degF]	Cement slurry properties design
Transmitted light microscope	Examination of thin sections of core samples	Stimulation treatments design and formation damage analysis
Ultrasonic cement analyzer	Estimation of cement slurry compressive strength using ultrasonic waves at pressures to 138 MPa [20,000 psi] and temperatures to 315 degC [600 degF]	Set cement analysis
UV-visible spectrophotometer	Ion analysis of solutes and filtrates	Water, scale and flowback fluids analysis
Static gel strength measurement	Evaluation of cement slurry gel measurement using vane geometry at pressures to 35 MPa [5,000 psi] and temperatures to 204 degC [400 degF]	Cement slurry rheology measurements
X-ray diffractometer	Detection of crystalline compounds	Formation, scale, and cement analyses

Client Support Laboratory

The Europe and Africa CSL supports field operations by testing and developing a wide range of stimulation formulations for higher performance with less environmental impact.



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