

Advanced Drilling Fluids Engineering Training Course

2 – 6 May 2027
Chicago

AGILE LEADERS
Training Center

Advanced Drilling Fluids Engineering Training Course

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Overview

Advanced Drilling Fluids Engineering Training Course is a one-week advanced course for drilling-fluid, mud, and drilling engineers, wellsite supervisors, laboratory personnel, technical-service teams, and assurance reviewers who leave with a Drilling Fluid Design and Troubleshooting File. Participants apply advanced drilling fluids engineering to water-based drilling fluid testing, non-aqueous drilling fluid testing, drilling fluid rheology control, and drilling mud troubleshooting. The course turns field and laboratory evidence into auditable treatment decisions. Agile Leaders Training Center presents drilling-fluid engineering practice.

Who Should Attend

- Functions responsible for drilling-fluid system design and treatment
- Well teams responsible for hydraulics, pressure margins, and hole cleaning
- Rig-site functions responsible for sampling, testing, and maintenance decisions
- Laboratory functions responsible for fluid characterization and treatment trials
- Technical-assurance functions responsible for mud-program review and traceability

The course assumes participants interpret mud reports, well data, and fluid calculations at work, and it leaves out introductory drilling, drilling safety, cementing, acidizing, and fracturing fluids.

Departments and Industries

The course supports departments and industries that design, operate, test, or assure circulating-fluid systems.

- Oil and gas drilling, well engineering, and operations
- Geothermal well construction and subsurface projects
- Drilling-fluid laboratories and technical services
- Rig contractors and solids-control service teams
- Environmental, waste-interface, and operational-assurance functions

Learning Objectives

By the end of this course, participants will be able to:

- Compare water-based and non-aqueous fluid-system options
- Analyze rheology, hydraulics, density, and pressure-control data
- Evaluate filtration, inhibition, and contamination treatments
- Diagnose HPHT, lost-circulation, sag, and stuck-pipe risks
- Prioritize solids-control, dilution, maintenance, and displacement actions
- Build an auditable mud-program decision file

Course Agenda

Day 1: Establish the Fluid Design Basis

- Well Section and Drilling-Fluid Design-Basis Register
- Water-Based and Non-Aqueous System Selection Matrix
- Density, Pore-Pressure, and Fracture-Margin Plot
- Fluid Functions, Constraints, and Performance-Criteria Map
- Mud Program Assumptions and Decision-Traceability Log

Day 2: Control Rheology, Hydraulics, and Filtration

- Flow-Curve, Plastic-Viscosity, and Yield-Point Calculation Sheet
- Gel-Strength, Surge, Swab, and Equivalent-Circulating-Density Model
- Hole-Cleaning and Annular-Velocity Performance Map
- API RP 13B-1 and RP 13B-2 Field-Test Workflow
- Filtration, Filter-Cake, and Permeability-Plugging Evaluation Method

Day 3: Manage Chemistry and Contamination

- Clay Hydration and Shale-Inhibition Selection Matrix
- Salinity, Alkalinity, Hardness, and Chemical-Conditioning Test Sheet
- Solids, Oil-Water Ratio, and Electrical-Stability Interpretation Method
- Cement, Salt, Calcium, Carbonate, and Drill-Solids Contamination Diagnostic Tree
- Treatment Pilot-Test and Product-Concentration Decision Record

Day 4: Assure Field Performance

- HPHT Rheology, Filtration, and Sag Risk Review
- Lost-Circulation Severity and Material-Selection Matrix
- Differential-Sticking and Wellbore-Stability Prevention Checklist
- API RP 13C Solids-Control Equipment Performance Review
- Dilution, Maintenance, Displacement, and Waste-Interface Plan

Day 5: Practice Fluid Design and Troubleshooting

- Suggested Exercise: Interpret a Field Mud-Test Report
- Suggested Exercise: Diagnose Rheology and Contamination Trends
- Suggested Exercise: Select Lost-Circulation and Stuck-Pipe Controls
- Suggested Exercise: Optimize Solids-Control and Maintenance Actions
- Capstone Exercise: Complete the Drilling Fluid Design and Troubleshooting File

Practical Exercises

The course uses suggested activities to convert measurements and well constraints into traceable fluid decisions.

- Suggested activity: compare fluid systems against formation, temperature, pressure, environmental, and operational constraints.
- Suggested activity: calculate rheology indicators and diagnose hydraulics, filtration, and hole-cleaning performance.
- Suggested activity: identify contamination signatures and document treatment trials, dilution, and solids-control actions.
- Suggested activity: assemble a mud-program decision file with monitoring limits, response actions, and assurance evidence.

FAQs

Who suits advanced drilling fluids engineering training, and what does it assume?

Advanced drilling fluids engineering training suits fluid, mud, drilling, laboratory, wellsite, technical-service, and assurance personnel. It assumes participants interpret mud reports, well data, and engineering calculations.

How does advanced drilling fluids engineering differ from general drilling training?

Advanced drilling fluids engineering focuses on fluid selection, measurement, treatment, hydraulics, solids control, and troubleshooting. General drilling training covers the wider well-construction sequence, equipment, practices, and operational coordination.

How is drilling fluid rheology control evaluated?

Drilling fluid rheology control uses viscometer readings, flow-model parameters, plastic viscosity, yield point, gel strength, temperature behavior, hydraulic calculations, and trend evidence to balance suspension, transport, pressure loss, and restart behavior.

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What drives drilling mud troubleshooting decisions?

Drilling mud troubleshooting combines verified sampling, field and laboratory tests, trend comparison, well events, material balances, treatment trials, and system constraints before selecting chemical, dilution, mechanical-separation, or operational responses.

How are HPHT drilling-fluid risks managed?

HPHT drilling-fluid risks are managed by testing temperature and pressure effects on rheology, filtration, sag, stability, fluid loss, and material compatibility, then documenting operating limits, monitoring frequency, contingencies, and treatment criteria.

Conclusion

Participants take back a Drilling Fluid Design and Troubleshooting File linking system selection, test evidence, hydraulics, chemistry, solids control, treatment, and contingencies. It changes separate mud reports and well observations into a traceable decision path. The file supports field monitoring, technical review, treatment approval, displacement planning, and performance improvement.