

# PETROSTEP® OILFIELD FOAMERS

PRODUCT	APPLICATIONS	CHEMICAL THERMAL STABILITY	BRINE TOLERANCE (% WEIGHT)	CONDENSATE TOLERANCE (% VOLUME)	% SOLIDS	POUR POINT	FLASH POINT
AMPHOTERICS							
PETROSTEP C-3	BETAINE DERIVED FROM CAPRYLATE/ CAPRATE METHYL ESTERS, USED IN A WIDE RANGE OF FOAMING APPLICATIONS. FOAMS EXCEPTIONALLY WELL IN HIGH BRINE SYSTEMS.	GOOD	EXCELLENT	EXCELLENT	44	-10°C	>94°C
PETROSTEP CG-50	BETAINE COMPATIBLE WITH MOST OTHER SURFACTANTS. EXHIBITS GOOD FOAMING IN A VARIETY OF CONDITIONS.	GOOD	EXCELLENT	GOOD	44	-8°C	>94°C
PETROSTEP LME-50	BETAINE WITH HIGH BRINE TOLERANCE, COMPATIBLE WITH MOST OTHER SURFACTANTS. CAN POTENTIALLY BE USED IN GAS WELL DELIQUIFICATION, DRILLING AND COMPLETION FLUIDS. ALSO EXHIBITS A LOW POUR POINT.	GOOD	EXCELLENT	EXCELLENT	43	-36°C	>94°C
PETROSTEP MME-50	BETAINE THAT EXCEPTIONALLY WELL IN A BROAD RANGE OF CONDENSATE AND BRINE SYSTEMS.	GOOD	EXCELLENT	EXCELLENT	41	-9°C	>94°C
PETROSTEP B-1235	BETAINE WITH HIGH THERMAL STABILITY.	EXCELLENT	EXCELLENT	GOOD	38	-10°C	>94°C
PETROSTEP SB	HYDROXYSULTAINE COMPATIBLE WITH MOST OTHER SURFACTANTS AND EXHIBITS GOOD FOAMING IN A VARIETY OF CONDITIONS.	GOOD	EXCELLENT	GOOD	50	-12°C	>94°C
ALPHA OLEFIN SULFONATES							
PETROSTEP C-1	CAN BE USED AS A DRILLING FOAMER WITH EXTENDED STABILITY IN FRESH- WATER APPLICATIONS.	GOOD	FAIR	GOOD	40	-4°C	>94°C
PETROSTEP C-5	CAN BE USED IN GAS WELLS AS A FOAMER OR DRILLING FOAMER BASE. EXCELLENT FOAMER IN FRESHWATER, LOW BRINE SYSTEMS, AND HARD AND SOFT WATER.	GOOD	GOOD	GOOD	46	-8°C	>94°C
ALKYL ETHER SULFATES							
PETROSTEP C-4	CAN BE USED FOR A VARIETY OF APPLICATIONS INCLUDING FOAM DRILLING, FOAM FRACTURING AND UNLOADING GAS WELLS.	GOOD	GOOD	GOOD	50	-25°C	28°C
PETROSTEP ES-65A	COMPATIBLE WITH MOST OTHER SURFACTANTS. PERFORMS WELL OVER A BROAD RANGE OF HYDROCARBON AND BRINE LEVELS. THERMAL STABILITY IS LIMITED TO LESS THAN 93°C AND IS ADVERSELY AFFECTED BY LOWER pH.	GOOD	EXCELLENT	GOOD	65	<-21°C	28°C

**Solids:** Percent of non-volatiles in the surfactant.

**Ranking:** Excellent>Good>Fair. Ranking is based on comparative performance results of Stepan's Foam Column tests.

**Brine Tolerance:** Relative ability of the surfactant treated at 2,000 ppm to foam in a brine solution.

**Pour Point:** Lowest possible temperature at which a surfactant can still be pourable.

**Flash Point:** Temperature at which a surfactant's vapor will cause combustion (PMCC Method).

**Condensate tolerance:** Relative ability of the surfactant treated at 2,000 ppm to foam in fresh water and condensate mixed solution.

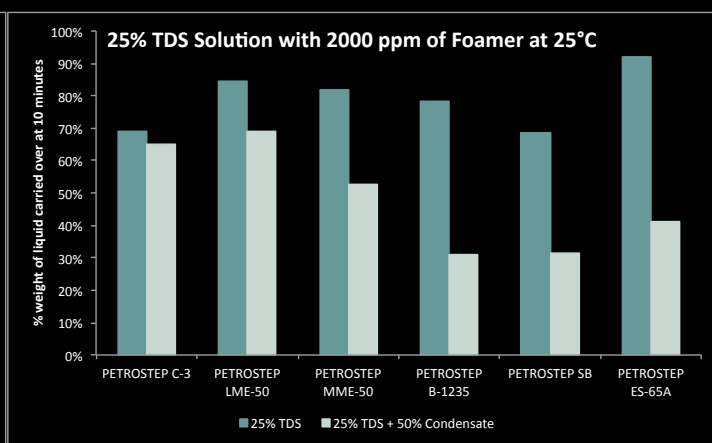
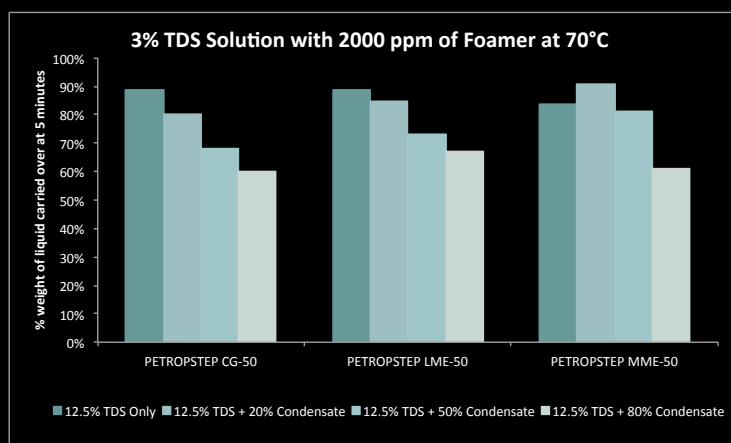
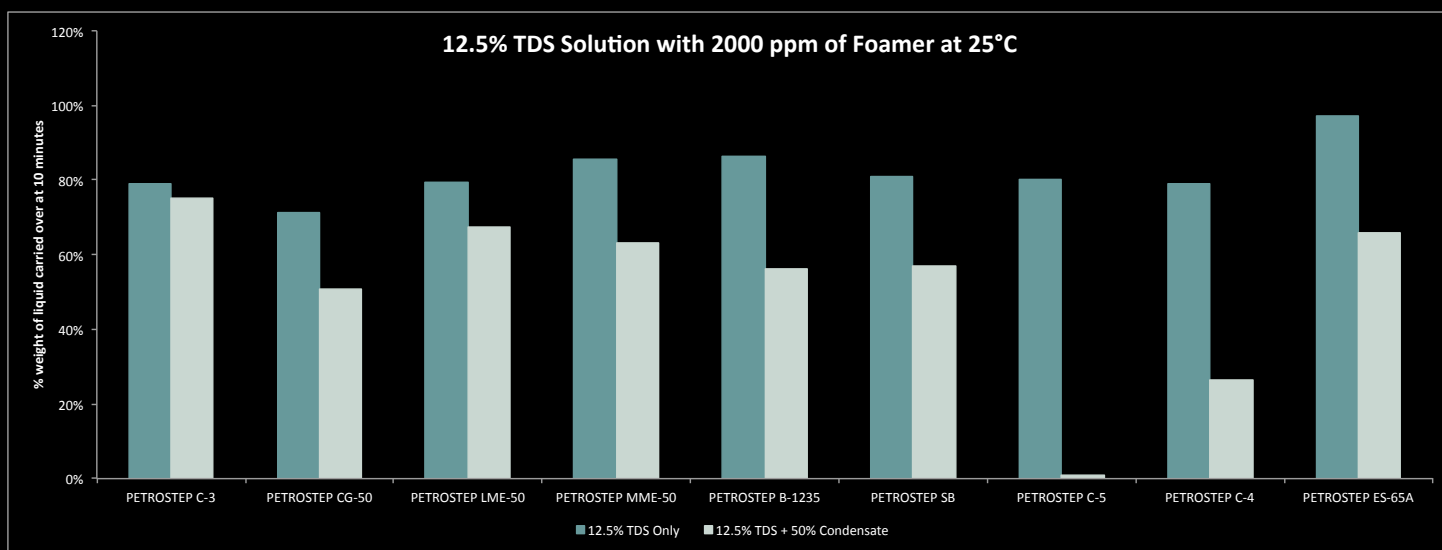
**Condensate used for tests:** Dearomatized distillates with a density of 0.77 g/mL.

**Condensate Tolerance:** Ability of the surfactant to foam in the presence of condensate (low aromatic mineral spirits).

**Temperature Stability:** Relative ability of the surfactant to be stable in a high-temperature environment. It is based on the temperature at which the surfactant decomposes and the chemical breaks down.

## Foam Column Test

The Foam Column test is designed to simulate downhole foam performance utilizing a specialized 3-inch reflux column. A nitrogen gas line is connected at the bottom of the column through an adaptor containing a glass frit to generate foam with the surfactant/brine/condensate solution. The test is run at 25°C for 10 minutes or 70°C for 5 minutes (with 2,000 ppm active surfactant in 3%, 12.5% and 25% total dissolved solids (TDS) brine solution). Low aromatic mineral spirits are used to mimic the effect of the condensate. The percent carry-over (brine plus condensate) is then calculated to replicate how well the PETROSTEP oilfield foamers remove accumulated fluids. The higher the percent carry-over, the better the performance of the foamer. Stepan's method is used as a screening tool and recommendations are based on specific applications.



For more information about the PETROSTEP oilfield foamers and other products, email [oilfield@stepan.com](mailto:oilfield@stepan.com) or contact your Stepan Oilfield Solutions sales representative.



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