



Fast, Accurate Testing of Alkanolamines & Sulfolane in Water by LC-MS/MS

LC-MS/MS Test Now Available in Calgary

Alkanolamines and Sulfolane are widely used in the Sulfinol process for the sweetening of natural gas to remove acid gases including CO₂, H₂S, and other sulfur gases.

ALS has offered industry-leading LC-MS/MS testing of Alkanolamines & Sulfolane in Canada since 2018, and this top quality, fast turnaround service is now offered locally for our oil and gas sector clients in the Canadian Prairies.

LC-MS/MS (Liquid Chromatography with tandem Mass Spectrometric detection) provides optimal specificity and accuracy for definitive measurements and confidence that interferences will not cause false positives or bias, which can occur with non-selective tests such as GC-FID (Gas Chromatography with Flame Ionization Detection). GC-FID is a universal, non-specific measurement technique, widely used for aggregate hydrocarbons (e.g. CCME F1-F4), but often subject to interferences (e.g. from hydrocarbons) when used for measurement of discrete compounds.

In addition to higher data quality, LC-MS/MS also provides faster analysis and turnaround time compared to other methods, due to a reduced need for sample manipulation and extraction prior to analysis.

Quality Advantages of LC-MS/MS Method

The ALS LC-MS/MS method for Alkanolamines and Sulfolane provides numerous data quality advantages over more traditional methods.

Multiple Reaction Monitoring (MRM) is used, with two independent mass transitions monitored for each analyte. Each MRM transition represents the isolation of an ion of specific atomic mass, which must then be fragmented to a second specific mass before detection. Monitoring two MRM transitions per analyte virtually eliminates any chance of false positive detection by this technique.



The method uses quantitation by isotope dilution or internal standards. Five different deuterium-labelled analogs of Alkanolamines and Sulfolane are added to each sample prior to analysis, and are used to adjust instrumental response for the specific matrix of each sample, ensuring high accuracy and precision.

Analysis is by direct aqueous injection, which eliminates any potential for cross-contamination or carryover issues due to labware or from complex sample extraction or derivatization processes.

Fast Turnaround Combined Analysis Options

Next-day and priority turnaround time analysis options are available, which can be critical to support spill response incidents in the Prairie region.

Another advantage of LC-MS/MS is that both Sulfolane and Alkanolamines are analyzed together in a single test, reducing overall cost and simplifying sample collection tasks when testing for both analyte categories is required.

Sampling and Test Selection Details

Sampling and test selection details are highlighted in Table 1. Test methods with routine and low-level Limits of Reporting (LORs) are available, as shown in Table 2.

A single 100 mL amber glass unpreserved sample container is required per sample, which supports low-flow sampling techniques, simplifies field sampling tasks, and reduces sampling time and cooler weight.

ALS maintains ISO 17025 accreditation for testing of Alkanolamines and Sulfolane in waters at our Calgary laboratory. Please refer to our [CALA scope of accreditation](#) for current status.

Table 1. Test and Sampling Details

Test Method	Alkanolamines & Sulfolane in water
Instrumentation	LC-MS/MS with MRM
ALS Test Code (routine LORs)	E705
ALS Test Code (low-level LORs)	E705-L
Sample Container	1 x 100 mL amber glass
Preservation	none
Storage Temperature	≤6°C, ≤10°C during transit
Hold time	7 days

Summary of Canadian Guidelines

Please refer to Table 2 for a summary of current Canadian guidelines and standards for Alkanolamines and Sulfolane, cross-referenced with our routine and low-level test method LORs. Compliance with most Canadian regulatory criteria can be assessed with our routine method.

Table 2. Test Code Limits of Reporting & Canadian Guideline Summary

Parameter	Routine LOR E705 µg/L	Low-Level LOR E705-L µg/L	ABT1 (lowest) µg/L	AB SWQG (lowest) µg/L	BC CSR (lowest) µg/L	BC AWWQG (lowest) µg/L	SEQG (lowest) µg/L	ON PWQO (lowest) µg/L	CCME CEQG (lowest) µg/L	Canada Interim GWQG (lowest) µg/L
Diethanolamine (DEA)	40	5	60	450	8	-	60	-	-	-
Diisopropanolamine (DIPA)	50	5	1600	1600	3500	1600	1600	-	1600	1600
Methyldiethanolamine (MDEA)	50	5	-	-	-	-	-	-	-	-
Monoethanolamine (MEA)	50	5	600	-	-	-	75	200	-	-
Monoisopropanolamine (MIPA)	50	5	-	-	-	-	-	-	-	-
Triethanolamine (TEA)	50	5	-	-	-	-	-	-	-	-
Sulfolane	50	5	90	800	90	90	90	-	500	500

ABT1 = Alberta Tier 1 Guidelines

AB SWQG = Alberta Surface Water Quality Guidelines

BC CSR = British Columbia Contaminated Sites Regulation

BC AWWQG = BC Approved & Working Water Quality Guidelines

SEQG = Saskatchewan Environmental Quality Guidelines

ON PWQO = Ontario Provincial Water Quality Objectives

CCME CEQG = Canadian Council of Ministers of the Environment Canadian Environmental Quality Guidelines

Canada Interim GWQG = Canada Interim Groundwater Quality Guidelines

Please contact your ALS Canada Project Manager for more information or to request sampling supplies.