



AISCT® SAL™ SALINITY SYSTEM • SPECIFICATION SHEET SS-SAL-001

Ion-Specific Salinity Screening

AI-integrated, ion-specific screening for chloride — and sodium — in soil and water, using a precision Ion Selective Electrode array in place of bulk electrical conductivity.

THE SYSTEM — HARDWARE, APPLICATION AND AI ENGINE OPERATE AS ONE

The Kit

Potentiometric ISE array tuned to the chloride ion, a standardized dry-bath soil extraction station, TRIUM-supplied ionic strength adjustment for matrix independence, and a laptop-based AI interface with integrated calibration and QA/QC logging.

The Application

Central data hub for field and laboratory information. Sample log, automated QA/QC report, and field metadata capture — soil type, depth interval, temperature, moisture — recorded per sample under an enforced standard procedure.

The AI Engine

Percentile population analysis, threshold selection, spatial and depth profiling, probability-of-exceedance output, automatic laboratory correlation for Cl^- and Na^+ , and AI-generated screening summary reports.

TECHNICAL SPECIFICATIONS

Primary analyte	Chloride (Cl^-)
Expanding parameters	Sodium (Na^+) module being introduced
Measurement principle	Potentiometric Ion Selective Electrode (ISE) array — ion-specific, not bulk EC
Sample extraction	Standardized dry-bath extraction, temperature enforced at 25 °C for every sample
Matrix control	Proprietary AISCT® I.S.E. Solution (TRIUM-supplied ionic strength adjuster)
Decision accuracy	>90% correct classification — impacted vs. non-impacted — against laboratory data
Throughput	Up to 40 samples per hour
Data output	Concentration vs. criterion, with probability of exceedance per sample
Sample matrix and units	Soil and water — reports both mg/kg and mg/L
QA/QC outputs	Calibration records, probe conditioning logs, standard checks, step-downs, blanks, duplicates, triplicates
Reporting parameters	User-defined: date range, location, sample subset, regulatory criteria
Operating temperature	Above 0 °C — units must not be exposed to freezing conditions
Probe maintenance	Weekly and daily usage-determined probe maintenance and preparation cycles
Regulatory alignment	Alberta Tier 1 salinity parameters; CCME CSQG; AER Directive 058; CCME Vol. 1 Section 3
Required protocol	AISCT® Sal Standard Operating Procedure (SAL-SOP-001) — mandatory for every sample
Data ownership	All system logs, diagnostics and firmware data owned by TRIUM

PERFORMANCE BENCHMARK

Sal consistently achieves decision accuracy exceeding 90% — correctly classifying samples as impacted or non-impacted relative to laboratory-confirmed chloride. The advantage comes from ion-specific ISE measurement and the standardized extraction protocol enforced by the kit and the application, which removes the primary sources of error in bulk conductivity screening.

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false negatives across 31 laboratory-confirmed samples on a recent coarse-sand programme

~10%

false positive rate on that programme — inside the USEPA Triad range of <20%

>90%

decision accuracy against laboratory classification

ANALYTICS AND DATA OUTPUTS

Spatial summary	Real-time breakdown of chloride screening results by depth interval and sample location, enabling rapid identification of spatial trends and anomalies.
Population analysis	Automatic breakdown of the data population into percentile groups, providing statistical context for threshold setting.
Threshold selection	User-selectable screening threshold — percentile-based or manually defined — classifying samples before laboratory data is available.
Probability of exceedance	Field duplicate readings capture the natural heterogeneity of the soil and are expressed as a probability that the sample sits above criteria — turning scatter into usable triage information.
Depth profiling	Vertical chloride profiles by location, supporting conceptual site model development and delineation decisions.
Laboratory correlation	Automatic correlation of field ion response against laboratory chloride and sodium. A strong relationship enables laboratory-grounded threshold selection, reclassification of all screened samples, and predictive concentration estimation for samples never submitted to the laboratory.

DEPLOYMENT ACROSS THE INVESTIGATION LIFECYCLE

Initial response — spill characterization	Deploy immediately on discovery of a produced water, brine or road salt release. Establish baseline chloride data, identify the extent of impact, and generate QA/QC-compliant records. Submit targeted samples to initiate correlation.
Phase II ESA — systematic investigation	Screen all soil and water samples collected. Use population analysis and spatial summaries to identify areas of elevated concern and direct targeted delineation sampling.
Phase III ESA — delineation	Apply laboratory-correlated thresholds to classify all screened samples and leverage predictive estimation for non-submitted samples to reduce laboratory cost while maintaining confidence.
Remediation monitoring and closure	Track remediation performance in real time against site criteria, and carry a complete QA/QC-documented screening record into final regulatory submissions.



KEY APPLICATIONS

- Produced water and brine release investigations — Phase II and delineation
- Upstream oil and gas salt spill response under AER Directive 058
- Road salt impact assessment
- Remediation progress monitoring on salt-impacted sites
- High-density chloride mapping for delineation and volume estimation
- Water sample screening with the appropriate tube configuration

REQUIREMENTS AND LIMITATIONS

PROTOCOL COMPLIANCE

SAL-SOP-001 must be followed exactly for every sample. Any deviation — non-approved consumables, non-standard extraction volumes, alternative ISE conditioning — invalidates the comparability of results and the reliability of analytics outputs.

ISE PROBE CARE

ISE probes are sensitive instruments requiring proper conditioning. Maintenance and preparation cycles are determined by weekly and daily usage and are prompted by the application. Failure to maintain conditioning may cause drift, degraded performance or probe damage. All consumables and calibration solutions must be sourced through TRIUM.

EXCLUSIVITY OF THE KIT

The analytics platform, population analysis, threshold calibration and laboratory correlation functions are calibrated to the measurement characteristics of the Sal hardware and the proprietary ionic strength adjuster. The reported decision accuracy is achievable only with the Sal kit under the Sal SOP with TRIUM-supplied consumables.

PROFESSIONAL RESPONSIBILITY

Sal is a decision-support tool. All professional judgments regarding site characterization, risk assessment, remediation design and regulatory submissions remain the responsibility of the qualified environmental professional.

IMPORTANT NOTICE

AISCT® Sal™ provides field screening information only. Results are not accredited laboratory data and must not be used as a substitute for accredited laboratory analysis for regulatory compliance purposes. Results should be interpreted by qualified environmental professionals. TRIUM is not responsible for any decisions, interpretations, actions or project outcomes arising from the use of AISCT® data.

Get Started

Request a demonstration

All AISCT® equipment, consumables and supplies must be ordered through TRIUM. Procurement from unauthorized sources constitutes non-compliance with the AISCT® operating agreement.

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