TEMS

Tailings Environmental & Management Systems

Tailings Environmental & Management Systems (TEMS) are used by mining operators, engineering teams and geoenvironment teams to follow the state of tailings over long periods of times. Parameters such as soil temperature, water content, pH, conductivity, oxygen dissolved and capillary sensor for instance can be monitored by this system. Each datalogger is customized and tailored to be fully adapted to the specific requirements of each site. They are designed to withstand the harshest conditions to provide long term coverage and data.

Why use TEMS?

TEMS are specialized systems designed to acquire and store data from geoenvironmental instruments, removing the need for regular site visits and optimizing staff resources.

They provide localized data at locations across tailings network automatically. They can integrate a variety of instruments such as pH probes or O_2 content sensors to provide engineers and mine owners the data required for environment-related decisions. The system can include telecommunications options such as cellular or satellite modems to extract data in real-time from the instruments.

How do they work?

TEMS is an all-in-one package of specialized dedicated geoenvironmental instruments and GKM Consultants' line of data loggers model DL-series. Each instrument is polled at a specified interval and data is stored in the on-board memory. Each TEMS has a built-in battery that ensures continuous operation in the event of a blackout and during long dark winters. A combination of specialized sensors provides all the relevant data for short and long-term tailings monitoring.

Example applications

Arctic mines tailings

Tailings dams in arctic mines require a combination of geotechnical instruments disseminated over a large area and environmental instruments in key locations. Supplementing the commonly-used piezometers and thermistor strings, TEMS can provide global information on the status of the acidifying tailings and wastewater retaining dams.

Aluminum refinery tailings

Aluminum refineries hold caustic waste in tailings ponds that are designed for long term storage. In addition to geotechnical instrumentation and piezometers, proactive measurements with environmental instruments can detect contamination and leaks early, helping site owners take corrective measures. As an option, dust levels and air quality can be measured locally to protect the health of workers and local residents.

Site reclamation

Rehabilitation of industrial sites or mines require close monitoring of water quality. TEMS can be installed in the preliminary phases to establish a baseline of the site's state. They can also be deployed during and after the site reclamation operations to measure positive effects and long term benefits of the procedure.

Technical features

TEMS

Many instruments types

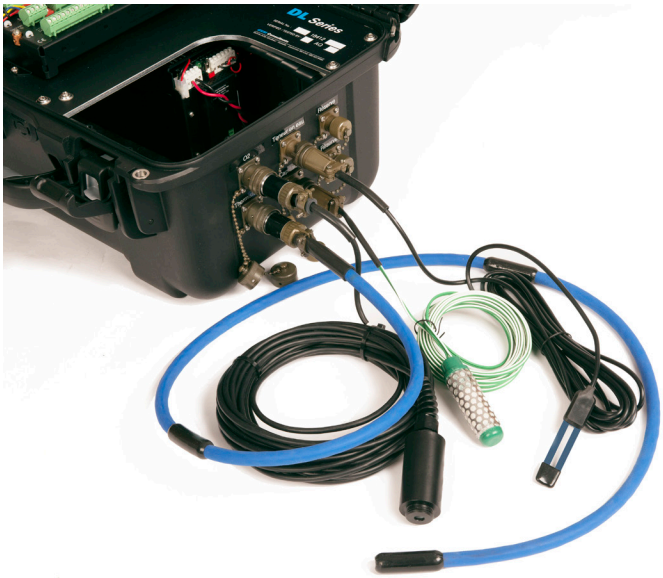
TEMS automates many types of environmental instruments such as water content sensors, O_2 content sensors, pH probes and water potential probes.

Standalone operation

TEMS are designed to be powered by a regular power line or be completely stand alone and powered by a solar panel. With this option, they can be deployed in remote areas with the assurance that the system will remain fully functional for the duration of the project.

Online data visualization

TEMS is fully integrated into GKM Consultants' online data visualization platform for easy analysis of the acquired data.



Environmental Instruments

Integration of geotechnical instruments

The TEMS is entirely compatible with the DL Series instruments. Piezometers, thermistor strings, multi-point extensometers, in-place inclinometers and much more. They are fully compatible with all of GKM Consultant's systems.

Options

Extended temperature range

The DL Series withstand the most difficult conditions, down to -55 °C.

Radio communications

All TEMS can be customized for radio communications, facilitating data collection over large areas. It helps operators save money and increase safety by collecting all data in a central location in all weather.

Weather stations

Local weather patterns directly affect measured parameters of environmental instruments.

Technical Information

Dissolved O_2 probe

- Measurement Range: 0 to 100 %
- Response Time: 1 minute

Water content probe

- Accuracy Mineral soil: ±3% VWC, most mineral soils
- Resolution: 0.1% VWC (mineral soil)
- Range: Calibration dependent; up to 0-100% VWC with polynomial equation

Soil Water potential

- Accuracy: Soil water potential: ±(10% + 2 kPa) from -9 to -100 kPa;
- Resolution: Soil water potential: 0.1 kPa

Soil Water potential

- Range: 0 to -200 kPa

pH Probe

- pH range: 2 to 12
- Accuracy: ±0.2 pH (over 10° to 40°C)

The exact technical specifications will be set by the requirements of your project.

GKM Consultants will help you select the right instruments to tailor your system to your needs.

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