

Direct / Alternating Current Voltage Gradient Survey

Reliable Detection and Assessment of Coating Defects



Accurate detection and localization of coating defects and foreign contacts



Quantification of defect severity for better maintenance planning



Minimized excavation costs with precise defect targeting



Integration with other survey methods for a complete integrity assessment

A Direct Current Voltage Gradient (DCVG) or Alternating Current Voltage Gradient (ACVG) survey is a proven method for detecting and assessing coating defects on buried pipelines or finding other foreign connections. Applying a current signal to the pipeline or analyzing the natural voltage gradients in the soil, these surveys help to identify coating defects and areas of potential corrosion risk, allowing targeted repairs and optimized cathodic protection performance.

A reference electrode placed on the ground detects variations in potential, which indicate various defects such as coating anomalies, connections, offtakes, or stray current defects. By measuring signal strength and direction, operators can precisely locate and assess the severity of each defect. The survey classifies defects based on their impact on pipeline integrity, enabling effective maintenance planning and regulatory compliance. The use of ACVG or DCVG depends upon the environmental factors or the pipeline and the cathodic protection system. ACVG can be used in areas where no CP system is in place or environmental factors are insufficient for DCVG, e.g., high-resistance ground. DCVG is, however, a rapid inspection and can be conducted at approximately 2x the rate of ACVG. Each solution is selected based on the inspection requirements.



Benefits

- **Precise defect identification:** Locates coating defects with high accuracy, reducing unnecessary excavation.
- **Severity assessment:** Helps prioritize repairs by classifying defect impact.
- **Optimized maintenance planning:** Supports cost-effective integrity management by addressing critical issues first.
- **Cost-effective maintenance:** Supports proactive decision-making for long-term asset protection
- **Regulatory compliance:** Meets industry standards for corrosion protection assessments such as NACE SP0502, DOT 49 CFR Part 192 & 195, NACE SP0169, and ISO15589.
- **Integration with other methods:** Complements CIPS for a comprehensive pipeline protection strategy or as part of NIPA

Technical Specifications

	DCVG	ACVG
Range	DCVG +/- 500 mV DC, (Combined CIPS: +/- 5 V DC	100mA to 3A - 4Hz
Accuracy	0.1 mV DC for all readings	100mA min. – Signal strength dependent
Impedance	25MΩ or 200MΩ (Combined CIPS: 15MΩ)	NA
IP Rating	IP67	IP67
Battery	Li-Ion	Li-Ion
GPS	Integrated WAAS GPS, RTK Compatible	Integrated WAAS GPS, RTK Compatible
Distance / Day	~10km (terrain dependent)	~5km (terrain dependent)

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