HELIX

PRODUCT DATA SHEET

HLX-PDS-2026-006 · Rev C

Model HELIX PEC-Rev1

August 2026

NON-INTRUSIVE NDT SCREENING

HELIX PEC

Pulsed eddy current screening scanner

SHOWN: HELIX PEC DEPLOYED ON AN IN-SERVICE LINE

The HELIX system

HELIX PEC is one capture channel in a screening system, not a standalone gauge. A HELIX survey moves data through three stages — capture in the field, registration to the asset's real geometry, and analysis in HELIX Horizon — so a reading taken this campaign can be found, compared, and re-measured at the same physical location in the next.

STEP 1
Capture
One-point calibration on a known nominal thickness auto-configures pulser and receiver. Readings are taken as discrete grid points (<1 s each) or as an encoded sweep producing a continuous wall-thickness map.

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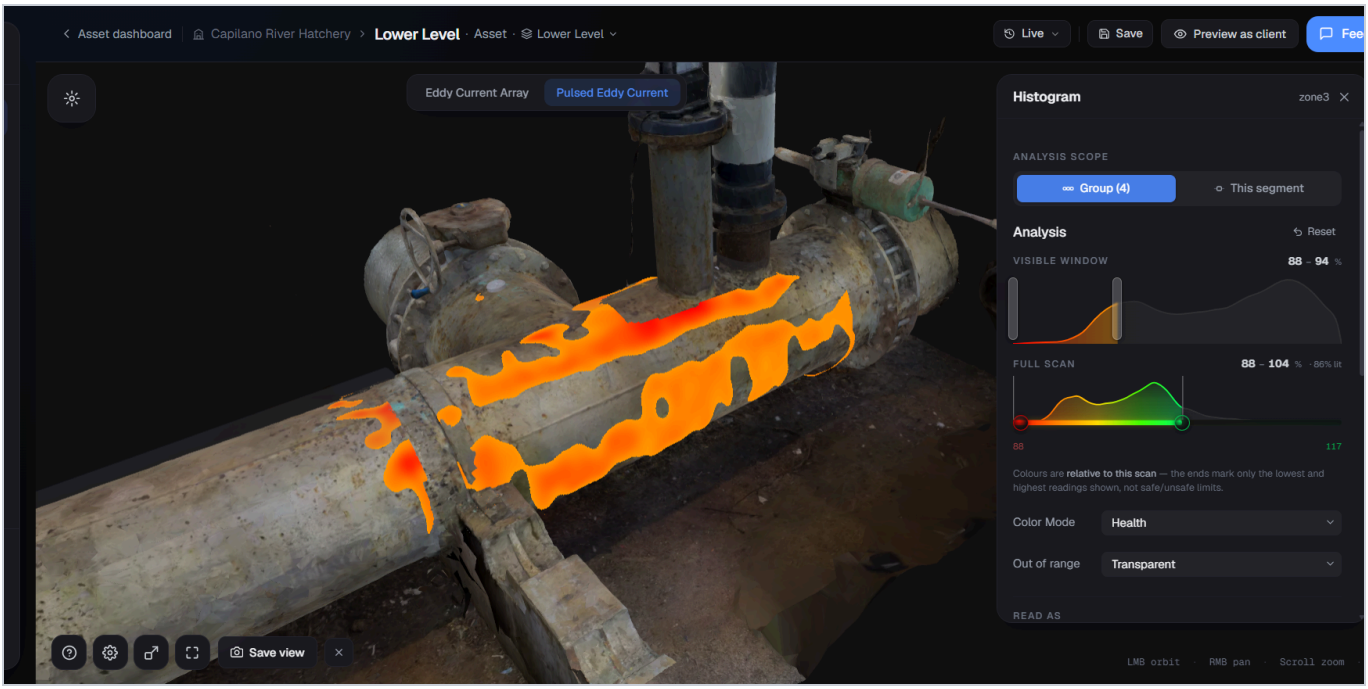
STEP 2
Register
On the same visit, the asset's outside geometry is captured with LiDAR and photogrammetry. Every PEC reading — with ECA and other survey data — is registered to its position on the resulting 3D model of the real asset.

→

STEP 3
Analyze in Horizon
Horizon renders results as heatmaps on the model, with per-zone histograms, point-of-interest cards, scan replay, and a scan-history slider. Repeat surveys and installed sensors feed rate-of-change trending and forecasts.



HELIX Horizon: PEC heatmap on the 3D model of an in-service line, histogram panel open (Capilano River Hatchery survey, HLX-2026-001). Colours are relative to this scan — they mark the lowest and highest readings shown, not safe/unsafe limits.

Four methods on one visit

A HELIX screening engagement combines PEC wall-response screening, eddy current array (ECA) surface-discontinuity screening, LiDAR + photogrammetry 3D capture, and registration of all results in Horizon. The methods are complementary: PEC finds and bounds regions of wall loss quickly over large areas; point techniques such as ultrasonic testing then size specific locations within them. Where an operator's own process data is available, Horizon can hold it alongside the measured record.

Product overview

HELIX PEC is a handheld, battery-powered pulsed eddy current instrument for in-service screening of average remaining wall thickness on ferromagnetic components. It induces a broad-spectrum magnetic pulse and measures the decay constant τ (ms) of the transient eddy-current response; referenced to a one-point calibration on a known nominal thickness, τ gives the average remaining wall over the 90 mm sensor footprint. The concentric-coil probe (90 mm excitation, 40 mm read) is placed against the outer surface as found — coated, painted, rough, blistered, or externally corroded — with no cutting, stripping, grinding, or couplant, while the component stays in service.

At a glance

- Screens in service through coatings, insulation, fireproofing, and weather jackets across a specified **0–125 mm liftoff range**, on nominal walls up to **127 mm** — no insulation removal
- Detects wall loss from **≤1.5% of footprint volume** at direct contact to low liftoff, with one-point calibration repeatable between operators
- Covers ground fast: **4 scans/s** over a 90 mm footprint and encoded sweeps at **90 mm/s** producing a wall-thickness map
- Every reading registers to its physical location on a LiDAR + photogrammetry 3D model in **HELIX Horizon**

The reported value is an average over the footprint, not a point thickness. That makes PEC a screening and area-coverage technique: it finds and bounds affected regions far faster than point measurement, including where UT coupling is impractical, and hands precise sizing of specific points to complementary techniques.

Instrument at a glance

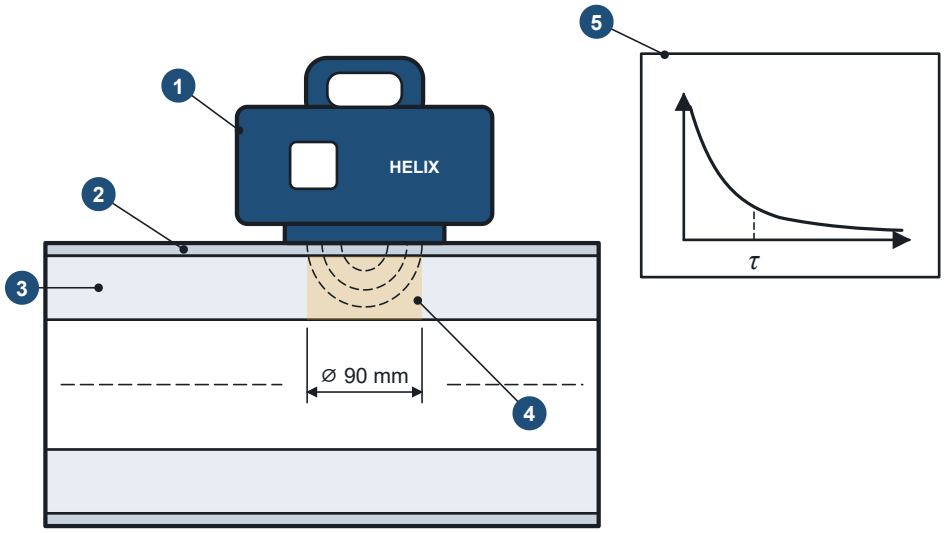
1	Sealed, fanless enclosure, designed to IP65; 1.3 in wide-angle IPS display
2	Full-length carry handle for one-handed placement against the surface
3	Probe face: concentric coils, 90 mm excitation / 40 mm read; interchangeable shoes for scab, splash-zone, tank-floor, and ship-deck work
—	18 V hot-swappable Li-ion power, 4 h typical per charge
—	Rotary or optical quadrature encoder input for mapped sweeps
—	Wi-Fi, Bluetooth (BLE), and 2×USB 2.0 for data offload

Applications

- Corrosion under insulation (CUI) and corrosion under fireproofing (CUF)
- Insulated pipework, pressure vessels, and process lines in service
- Components under aluminum, stainless, or galvanized steel cladding
- Coated, painted, and externally corroded surfaces where UT coupling is unreliable
- Corrosion scab and blister assessment without surface preparation
- Storage tank annular plates and ship decks without removing floor coverings
- Broad screening campaigns where area coverage rate governs inspection cost

How pulsed eddy current works

The section drawing shows the measurement principle: the probe sits on the outer surface as found, the excitation pulse induces a field through the intact coating into the steel wall beneath, and the instrument records the decay of the transient eddy-current response. The decay constant τ, referenced to a one-point calibration, gives the average wall response over the ~90 mm footprint.



1. PEC probe — handheld instrument
2. Coating — left intact, no surface prep
3. Steel wall — measured from outside
4. Averaged footprint — area per reading
5. Decay measurement — τ in milliseconds

How pulsed eddy current reads wall response through intact coatings — keyed callouts (1)–(5) are explained in the drawing legend.

Field deployment on a remote outdoor line — measured from the outer surface as found, no surface preparation.

Specifications — functional and performance

FUNCTIONAL	
Measurement principle	Pulsed eddy current: decay constant τ (ms) of the transient eddy-current response to a broad-spectrum magnetic pulse
Measurand	Average remaining wall thickness over the sensor footprint, referenced to a calibrated nominal
Probe geometry	Concentric coils: 90 mm excitation, 40 mm read; each reading averaged over the ~90 mm footprint
Calibration	One-point, on a known nominal thickness, averaged over 100 measurements; pulser and receiver parameters auto-configured
Surface contact	Through coatings, insulation, fireproofing, and weather jackets; no surface preparation, no couplant
Output	Point thickness readings; encoded wall-thickness map; registration to 3D model in HELIX Horizon

SENSITIVITY — MIN. DETECTABLE DEFECT VOLUME	
Direct contact to low liftoff	≤ 1.5% of footprint volume [1]
Across specified liftoff range	< 10% of footprint volume [3]
At 152 mm (6 in) liftoff	≈ 10% of footprint volume [2]

MEASUREMENT PERFORMANCE	
Nominal wall thickness	Up to 127 mm (5 in)
Liftoff range, specified	0–125 mm (0–4.92 in)
Liftoff, validated beyond spec	152 mm (6 in) [2]
Component geometry	76.2 mm (3 in) OD and above, up to flat surfaces
Sensor footprint	90 mm nominal

ACQUISITION	
Dynamic acquisition rate	4 scans/s over a 90 mm footprint
Dynamic scan speed	90 mm/s (3.54 in/s) typical
Grid point acquisition	< 1 s per point typical
Encoder input	Rotary or optical (quadrature)

Read the results as screening results. PEC reports a footprint-averaged, relative wall response — not an absolute point thickness. Deposits, scale, and ferromagnetic corrosion product respond as if they were wall, so a reading over heavy product can overstate remaining metal. Isolated pitting and defects small relative to the 90 mm footprint are not resolved. Comparisons are valid only within consistent material and geometry, and absolute values require a known nominal reference; without one, results are relative differences. Sensitivity degrades as liftoff increases — read the sensitivity figures against the survey's actual liftoff.

[1] Specified limit. Best value observed in testing was 0.75% of footprint volume; 1.5% is published as the conservative bound.

[2] 152 mm (6 in) is a validated test point outside the specified 0–125 mm liftoff range. It is not a specified operating condition.

[3] Bounded by the measured value at 152 mm; sensitivity within the specified range is better than this figure. Intermediate liftoff points are not yet individually characterized.

Specifications — physical and environmental

INSTRUMENT	
Dimensions (W × H × D)	200.7 × 177.8 × 81.3 mm (7.9 × 7.0 × 3.2 in); 2.9 L
Weight (with battery)	4.5 kg (10 lb)
Power	18 V hot-swappable Li-ion, onboard, or external PSU + battery
Operating time	4 h per charge (typical)
Display	1.3 in TFT LCD, 240 × 240 px, wide-angle IPS
Cooling	Sealed, fanless
Connectivity	Wi-Fi; Bluetooth 2.1 / 3.0 / 4.0 (BLE); 2 × USB 2.0

ENVIRONMENT	
IP rating	Designed to IP65
Operating temperature	0 to 40 °C (32 to 104 °F)
Operating humidity	≤ 95% RH, non-condensing
Compliance	TBD — confirm with HELIX

TEST TEMPERATURES	
Carbon steel component	−20 to 150 °C (−4 to 302 °F)
Weather jacket, direct contact	−20 to 80 °C (−4 to 176 °F)
Weather jacket, probe shoe	0 to 50 °C (32 to 122 °F) [4]

SURFACE AND CLADDING COMPATIBILITY	
Substrate, optimized	Carbon steel and other ferromagnetic materials
Substrate, supported	Stainless steel, aluminum — performance differs from carbon steel; contact HELIX for configuration-specific guidance
Outer surface condition	Coated, painted, rough, blistered, or externally corroded
Insulation / fireproofing	No removal required within specified liftoff range
Stainless steel cladding	≤ 1.5 mm
Aluminum cladding	≤ 1.0 mm
Galvanized steel cladding	≤ 1.0 mm; thicker or ferromagnetic cladding is outside the specified range

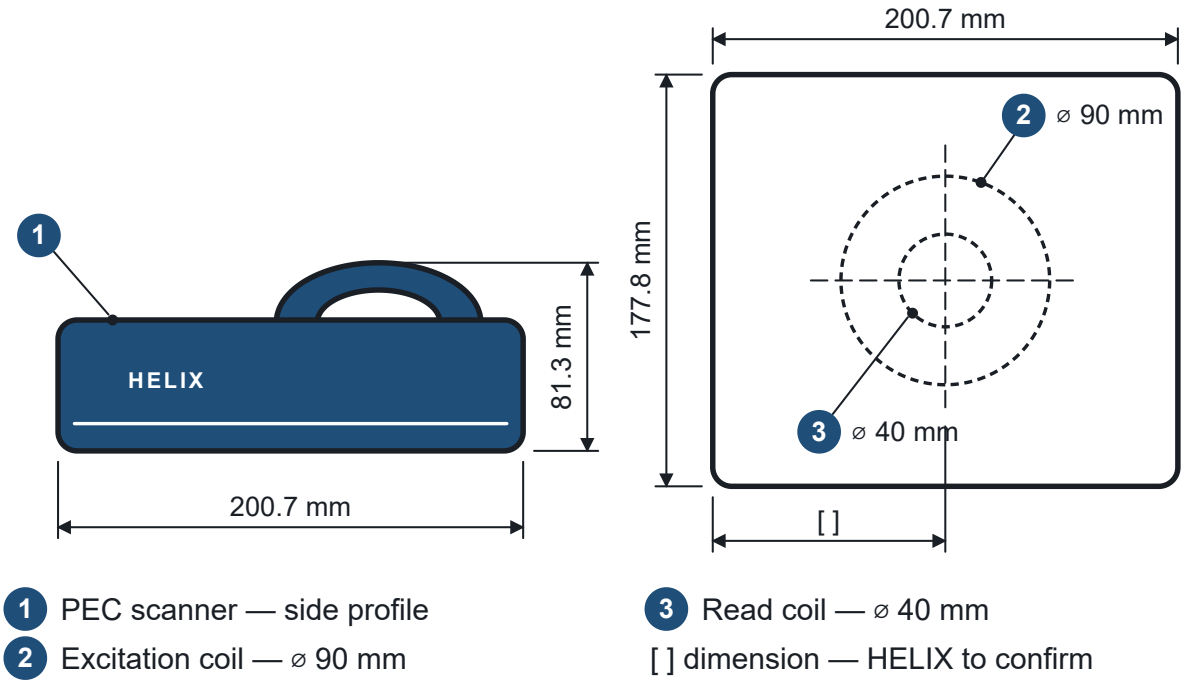
PROBE CONFIGURATIONS	
Standard probe	90 mm footprint — general CUI screening and wall-thickness mapping
Application-specific	Corrosion scab and blister; splash zone; CUI under galvanized steel cladding; tank floor and annular plate; ship deck
Custom	Footprint and shoe geometry on request

Geometry and temperature boundaries. Small-bore, high-curvature, and geometrically complex components fall outside the calibrated footprint model. Probe shoe temperature is limited by the heat deflection temperature of the printed resin, not by the electronics.

[4] Limited by the heat deflection temperature of the probe shoe.

Dimensional drawing

All dimensions in millimetres. Where this drawing and the HELIX PEC technical specification (HLX-SPC-2026-001) differ, the specification governs.



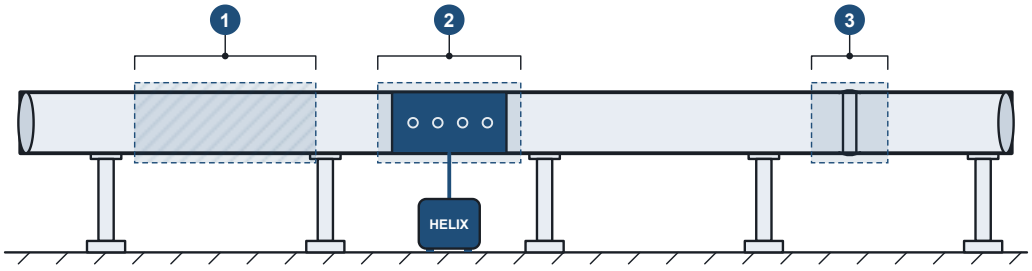
1 PEC scanner — side profile
2 Excitation coil — ⌀ 90 mm
3 Read coil — ⌀ 40 mm
[ ] dimension — HELIX to confirm

HELIX PEC enclosure — side profile and probe-face plan view with hidden-line coil positions. The coil-centre offset from the enclosure edge is shown as "[ ]" pending confirmation by HELIX.

PRINCIPAL DIMENSIONS	
Enclosure envelope (W × H × D)	200.7 × 177.8 × 81.3 mm (7.9 × 7.0 × 3.2 in)
Excitation coil	⌀ 90 mm
Read coil	⌀ 40 mm
Coil-centre offset from enclosure edge	[TBD — confirm with HELIX]
Weight (with battery)	4.5 kg (10 lb)

Engagement information

HELIX PEC is deployed by HELIX field crews as part of a screening engagement — no instrument purchase, model code, or operator training burden on the client side. Choose the scope; HELIX brings the equipment, runs the survey, and delivers the data.



1. PEC screening zone — periodic wall-response survey through coating
2. HELIX Sensor Wrap — continuous monitoring, cabled to logger
3. ECA weld band — surface-discontinuity screening at the weld

Representative monitoring positions on a single line: (1) PEC screening zone, (2) permanently installed HELIX Sensor Wrap section with logger, (3) ECA weld band. Screening bounds regions of interest; wrap monitoring watches a section continuously.

Engagement	Scope	Deliverables
PEC screening survey	PEC wall-response screening of the agreed line sections or components, in service, with one-point calibration per configuration	Inspection report (PDF); processed PEC dataset; point-of-interest register
Screening survey + 3D capture	As above, plus ECA surface-discontinuity screening and LiDAR + photogrammetry capture of the asset's outside geometry on the same visit	As above, plus processed ECA dataset, registered 3D model, and exported model views
Screening survey + Horizon subscription	As above, plus ongoing HELIX Horizon access for the surveyed assets: heatmaps on the model, per-zone histograms, scan history, and rate-of-change trending across repeat campaigns	As above, plus Horizon client portal access with per-asset dashboards and KPI tiles

Pricing: from C$50,000 per 50 m screening engagement — in line with the market, where incumbent engagements typically run C$60,000–C$80,000. Scope beyond 50 m, repeat-campaign schedules, and permanently installed HELIX Sensor Wrap monitoring are quoted per engagement. Contact HELIX for a scoped proposal.

Field record

In July 2026, HELIX screened approximately 100 m of 1970s-era piping (a 24 in wastewater line and a 4 in chlorinated water line) for Fisheries and Oceans Canada at the Capilano River Hatchery, North Vancouver, BC — in place, without cutting, draining, or dismantling (reference HLX-2026-001).

4	~100 m	68,679	34	46
DAYS ON SITE	PIPING SCREENED IN PLACE	PEC READINGS	INSPECTION ZONES	POINTS OF INTEREST

Reference frameworks

Framework	Relevance to HELIX PEC
ISO 20669:2017	Pulsed eddy current testing of ferromagnetic metallic components — the method framework HELIX PEC procedures are structured around
ISO 9712 / CAN/CGSB-48.9712	Qualification and certification of NDT personnel — listed for context; HELIX does not hold personnel certification under these schemes

Standards are cited as reference frameworks, not compliance claims. HELIX screening does not certify the asset to any code scheme, and fitness-for-service determination is a regulated engineering assessment that remains with the client's engineers. Hazardous-area certifications: contact HELIX.

Related documents

Document	Content
HLX-SPC-2026-000	Technologies overview — what each HELIX technology does and where it applies
HLX-SPC-2026-001	HELIX PEC technical specification (governs where it and this data sheet differ)
HLX-2026-001	Case study: NDT screening and 3D condition mapping, Capilano River Hatchery (DFO)

About HELIX Sensors

HELIX Sensors Inc. is a British Columbia company building non-intrusive screening instruments, patent-pending permanently installed sensor wraps, and the HELIX Horizon registration and visualization software. Periodic inspection gives a snapshot; HELIX's aim is continuous visibility of asset condition — screening surveys as the entry point, permanent monitoring as the product. Field record to date: 3,200+ ft² scanned and 360M+ data points collected.

Contact

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To scope a screening engagement or see HELIX Horizon on live data, book a meeting at helixsensors.com.