



Technical
Specifications

MICROPIMS

Intrinsically Safe. Wireless. Non-Intrusive.

microPIMS® Intrinsically Safe is a fully wireless, non-intrusive, ultrasonic corrosion/erosion monitoring system. Powered by long-life batteries, it operates using long range sub Gigahertz LoRaWan® wireless connectivity.

A WHOLE NEW APPROACH TO CORROSION/EROSION MONITORING

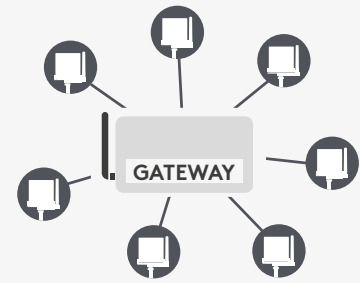
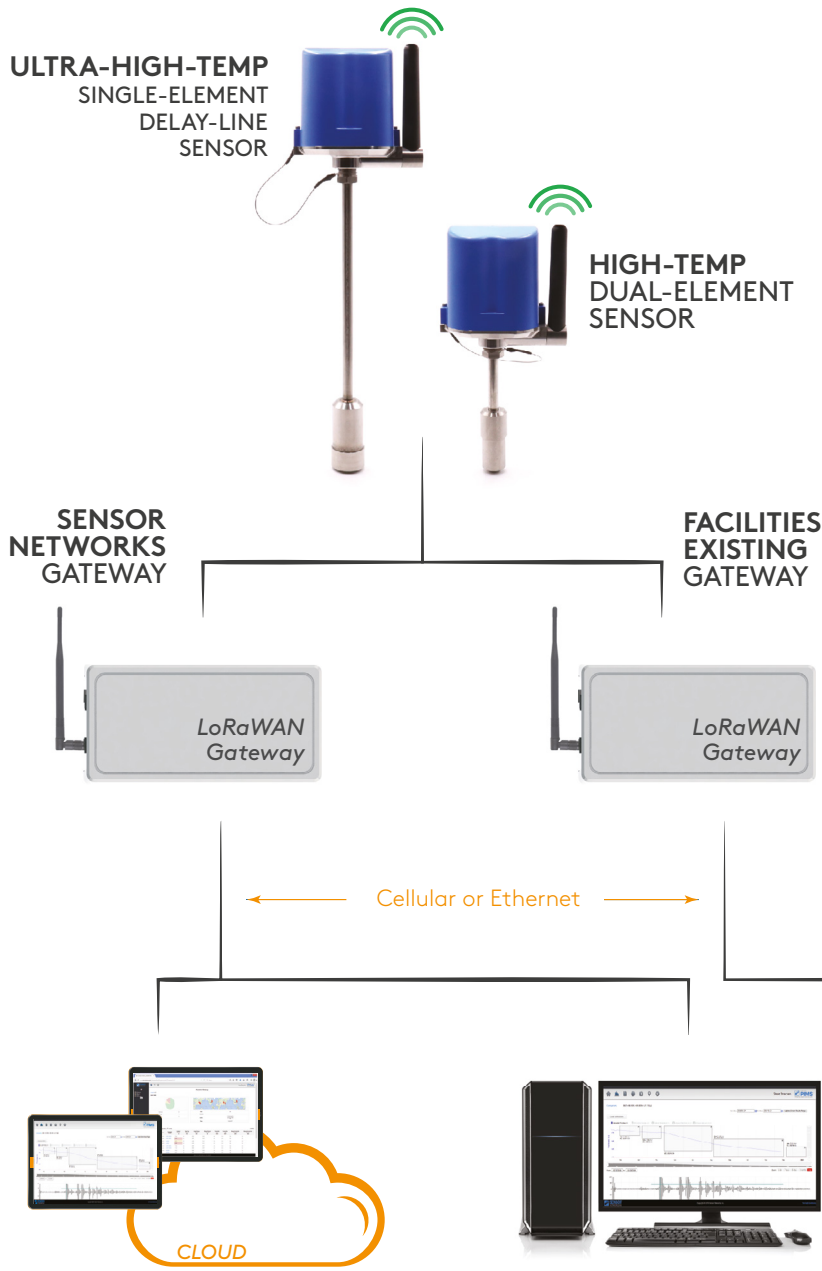
Each microPIMS sensor can be programmed to take thickness readings at any user-defined time interval. Data is automatically sent to private webPIMS™, cloud-based or on-premise LoRaWAN system + software back-end for analysis, trending and more.

- 15-years at 1 reading/day (2x D-Size Batteries - 3.6VDC).
- Two models: dual element (up to 135°C/275°F) and ultra-high-temp (up to 500°C/32°F).
- Built-in thermocouple provides surface temperature readings for temperature-compensated thickness data.
- Installed temporarily or permanently in under 15 minutes per sensor.
- Wireless gateway supports up to 1,000+ microPIMS nodes and offers up to ~1.6 km (1 mile) range in industrial settings.
- Cellular or ethernet data back-haul through gateway.
- ULCSA C1D1, ATEX/IECEX Zone 0 Hazardous-area certified.

microPIMS I.S. is a 3rd-generation, star-network topology system that builds upon successful experience in non-invasive corrosion/erosion monitoring.



DATA CONNECTION SYSTEM OPTIONS



STAR NETWORK TOPOLOGY

- 10x range over mesh networks
- More consistent and dependable battery life
- Allows for significantly more end points
- No repeaters needed
- Does not require line of site

LoRaWAN TO CLOUD

microPIMS thickness data from the sensors is transmitted wirelessly from the LoRaWAN gateway to the webPIMS software and stored via the cloud where thickness, temperature, A-Scans, and other data can be analyzed or exported instantly, on demand.

ON-PREMISES

If utilizing cloud data storage is not an option, the On-Prem webPIMS data management system provides users with a local self-contained (in-the-fence) system.

microPIMS thickness data from the sensor is transmitted through LoRaWAN gateways directly into the On-Prem system.

PRIVATE NETWORK INTEGRATION

For facilities with a current LoRaWAN private network, microPIMS can be installed and connected directly to an existing network.

FEATURES AND BENEFITS

- **Fast and consistent data readings:** For applications where frequent data is required to monitor corrosion/erosion rate issues.
- **Corrosion monitoring:** microPIMS gives short or long-term corrosion rate data needed to monitor crude-slate changes or to correlate operational system updates. Accurate to 0.025 mm (0.001 in) historically problematic locations.
- **Automatic and hands-free monitoring:** Once installed, microPIMS can take thickness readings at user-defined intervals, allowing for more frequent data without the cost of manual inspections.
- **Easy installation:** With magnetic and clamp-style attachment options available, microPIMS are easy to install - without sacrificing performance and accuracy.
- **Reduced cost:** Minimize scaffolding and insulation removal/refitting costs for internal corrosion monitoring.
- **Monitor "low spots":** Post-NDE screening of pits to evaluate remaining thickness. Measures down to 1 mm (0.040 in).



Figure 1: Ultra-High-Temp attached with a band clamp.

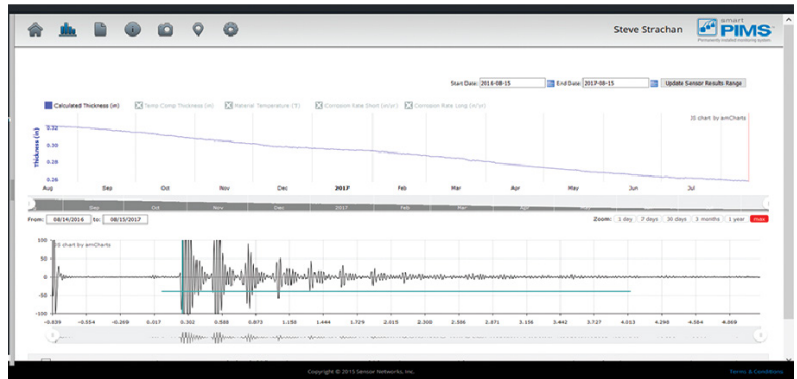


Figure 2: Trending screen graphically shows metal loss versus time, temperature, thickness, and digitized RF signals (A-Scans) for each measurement.

TECHNOLOGY EXPOSED

microPIMS employs advanced technology for automated corrosion control, eliminating the need for manual inspections

1. LoRaWAN High-Gain Antenna
2. Two D-Cell batteries
15 years of wireless operation. Commercially available (non-proprietary).
3. LoRa Radio
4. Ultrasonic Testing PCB
5. Stainless Steel Heat Stand-Off
6. Temperature Sensor
7. Single-Element Ultra-High-Temp Transducer capable of being installed on pipes up to 500°C (932°F).
8. Spring-Loaded, Dual-Element Ultrasonic Transducer enhances accuracy and can measure pits down to 1 mm (0.040 in) remaining wall thickness on pipes / tubes as small as 24.5 mm Ø (1 in).

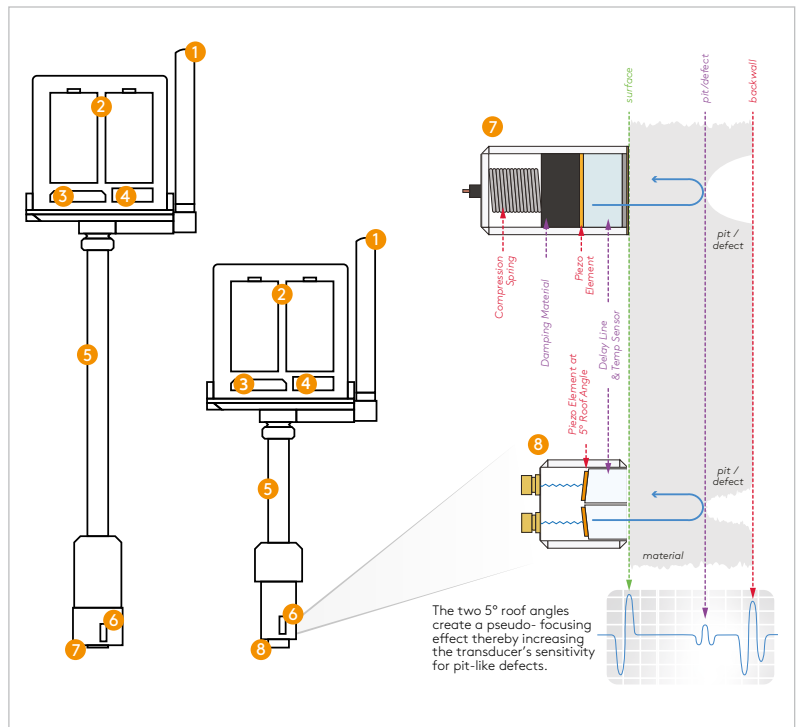


Figure 3: A closer look at the technology powering microPIMS.

SPECIFICATIONS

SENSORS	DUAL ELEMENT	ULTRA-HIGH-TEMP
Elements	Dual	Single (delay-line)
Frequency	5 MHz	7 MHz
Element diameter	10 mm (0.375 in)	10 mm (0.375 in)
Measurement range	1-100 mm (0.040-4 in)	3-25 mm (0.125-1 in)
Sensor surface temperature	-40°C (-40°F) up to 135°C (275°F)	-40°C (-40°F) up to 500°C (932°F)
Weight	580 g (20.5 oz)	880 g (31.0 oz)
Size (height x housing diameter)	241x70 mm (9½x2.8 in)	394x70mm (15½x2.8 in)

MICROPIMS

Hazardous location rating	See chart on the right
Intrinsic safety	
Ingress protection rating	IP-67
Resolution	0.025 mm (0.001 in)
Battery life (typical)†	15 yr. @ 1 reading/day 20°C (68°F)
Construction	303 stainless steel
Mounting	Magnetic base; band clamp
Data	Digital thickness, RF waveform, temperature, time/date stamp
Data access	Cloud-based via webPIMS™ portal or on-premise
Local network	LoRaWAN (node to gateway)
Connectivity	Gateway to cloud (cellular or ethernet) OR on-premise
Sensor count	1,000+ microPIMS units per gateway
Gateway*	Outdoor; cast alum.; Approx. 305x152x102 mm (12x6x4 in); 2.7 kg (6.0 lb)

UK CR 2503 CE 2776 Ex II 1 G Ex ia IIC T4 Ga, Ta = -40°C to +70°C
CML 21ATEX2356X | CML 21UKE2357X | IECEx CML 21.0044X

Ex ia IIC T4 Ga | Class I, Div 1, Gp A-D T4 Ex ia
Class I Zone 0, AEx ia IIC T4 Ga | Class I, Div 1 Gp A-D T4
Ta = -40°C to +70°C
E114158 - Hazardous Location

WARNING: USE ONLY TADIRAN TL-5930, SL-2780 OR XENO XL-205F BATTERIES
WARNING: SPECIAL CONDITIONS FOR SAFE USE, SEE INSTRUCTIONS

IP 67
BATTERY POWERED: 2 Cells, 7.2V, 0.94W
PROGRAMMING PORT: Um = 5V

Contains:
IC: 23069-CW24012
FCC: 2ANDP-CW24-012
Made in the USA

†Typical Values. Results may vary site to site.

*Without antennas.

ON-PREMISES	RACK MOUNT CONFIGURATION	DESKTOP CONFIGURATION
Configuration	Single-socket 1U rack size/482.6 mm (19 in)	Desktop
Weight	12.2 kg (36.9 lbs)	11.70 kg (25.70 lbs)
Dimensions	434 mm (17.1 in), 596 mm (23.5 in)	175 mm (6.88 in), 360 mm (14.17 in) 454 mm (17.87 in)
Main power	110-230VAC/50-60Hz	110-230VAC/50-60Hz
Haz area cert	None	None
Operating system	Linux	Linux
LoRaWan configuration	ResloT - perpetual license	ResloT - perpetual license
Analysis application	webPIMS - perpetual license	webPIMS - perpetual license

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