



LiORA Hydrocarbon Sensor

Continuous In-Well PHC Monitoring | SoilSense / WaterSense

Technical Specification

Continuous, autonomous in-well sensor for petroleum hydrocarbons (PHC) and soil gas conditions. Available in two installation modes: SoilSense (soil dry-wells) and WaterSense (submerged in groundwater). Delivers real-time data on plume stability, remediation performance, and natural source zone depletion (NSZD) without repeated field visits.



1. SENSOR SPECIFICATIONS

Measured	PHC (EC2–EC12 including BTEX), CO ₂ , O ₂ , CH ₄ , temperature, pressure, relative humidity
Method	Non-dispersive infrared (NDIR), multi-channel
F1 PHC Range	Soil: 0.0004–960 mg/kg · Water: 0.00002–140 mg/L · Vapour: 1–76,000 ppmv
Sampling	1 sample every 30 minutes
Communication	LoRaWAN (LiORA-provisioned gateway required on site)
Deployment	≥2" monitoring well or dry well; up to 3 sensors per well at customisable depths
Operating Range	-20 °C to +40 °C
Depth	≤30 m below ground surface; ≤10 m below water table
Power	Internal battery, >12 months service life

2. DETECTION PERFORMANCE

Per-compound detection limits and saturation maxima, derived from multi-channel NDIR response and phase-partitioning model. LoD values represent the 1 σ noise floor of each analyte, measured on N₂ blanks. Real-world detection limits depend on temperature, soil/water matrix, and spectral overlap from mixtures of gases.

Compound	Vapour LoD (ppmv)	Vapour Max (ppmv)	Water LoD (mg/L)	Water Max (mg/L)	Soil LoD (mg/kg)	Soil Max (mg/kg)
CO ₂	15	900,000	—	—	—	—
CH ₄	5	900,000	—	—	—	—
F1 ¹	0.23	76,000	0.00002	140	0.0004	960
Benzene	0.09	130,000	0.001	3,500	0.001	4,300
Toluene	0.03	38,000	0.0004	1,100	0.0007	2,100
Ethylbenzene	0.27	13,000	0.003	340	0.008	1,000
Xylenes	0.21	11,000	0.003	390	0.01	1,200
MTBE	1	330,000	0.2	80,000	0.1	40,000

¹ F1 considered as PHC fraction with EC ≥6, EC <10, excluding BTEX. Max represents sensor saturation as equivalent matrix concentration. For some compounds (notably F1 in water) the effective upper range is solubility-limited below the value shown.



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3. OPERATING CONDITIONS & SITE REQUIREMENTS

Ambient Temperature	-20 °C to +40 °C
Deployment Depth	≤30 m below ground surface; ≤10 m below water table
Well Diameter	≥2" (50 mm) ID, existing monitoring well or dry well
Multi-depth	Up to 3 sensors per well at customer-specified depths
Battery Life	>12 months at default sampling cadence
On-site Infrastructure	LiORA-provisioned LoRaWAN gateway within radio range of all sensors. Coverage and placement per site survey.