

Monitoring Methane Slip



2020 has seen a massive increase in LNG bunkering infrastructure to cope with the rapid expansion of LNG as a marine fuel. However, there is growing concern regarding its environmental benefits given methane's properties as an aggressive greenhouse gas.

LNG fuel is being promoted as an environmentally friendly 'green' option, but the methane lost during supply, production, and inefficient combustion is a pollution problem that could cancel out the fuel's initial environmental 'friendliness'. A significant number of oil majors and charterers are demanding monthly emissions inventories, including totalised methane, to include with their CSR data. Measuring methane slip has never been more important.

It is therefore critical that shipowners using LNG as their primary fuel have the tools they need to measure Methane Slip. Although currently unregulated by the IMO, methane slip is certain to become in the spotlight given the widespread uptake of LNG fuelled vessels.

Why Emsys?

- Methane is measured instantaneously in ppm (parts per million), readings can be referenced against the engines performance data and alarms sounded when thresholds are exceeded
- Emsys utilises a highly accurate laser sensor which reacts far quicker than traditional CEMs type instruments, this rapid speed allows multiple engines to be monitored from a single Emsys system
- Emsys records the mass of methane (kg/tons) produced on an hourly, weekly, monthly, and yearly basis, and generates PDF reports
- In some rare occasions, methane slip can be so bad that a build up of unburned methane can be in the exhaust uptakes, Emsys can provide alarms which alert operators to the potential safety / fire hazard
- The Emsys-iS is extremely compact and can be retrofitted easily to any vessel and any engine type (2-stroke or 4-stroke)
- Measuring the unburned hydrocarbons in an engine exhaust may alert operators to resolve any technical issues when engine performance limits are exceeded. Rapid resolutions of faults help prevent significant increased costs in fuel consumption

Technical Specification



Model Number	Emsys-iS
Ambient Temperature	0-+55 °C
Measurement Method	Extractive using Heated Filter Probes and Heated Sampling Lines, Hot-Wet sampling on a 'round-robin' basis. Sample returned to process
Measurement Technique	Multi-Channel QCL laser, IR Absorption Spectroscopy
Laser Classification	CLASS 1 BS EN 60825-1:2007 Safety of laser products Equipment classification and requirements (identical to IEC 60825-1 2007)
Repeatability	+/- 2%
Accuracy	+/- 2%
Linearity	R2 for a linear fit is ≥ 0.9990 . Error < 2% of full scale when analyzed to MCERTS standard
Measurement Rate	Up to 10 Hz
T90 Time	>10s for all gases except NH3
Zero Noise (2 sigma)	< detection limit for each component
Span Noise (2 sigma)	< 2% of full range for each component
24 hour zero drift	< detection limit for each component
24 hour span drift	< 2% of full range for each component
Pathlength (Cell internal)	2m
Cell temperature	180 °C
Cell pressure	300 Torr \pm 50 Torr
NO	0-2000 ppm (LOD 5ppm)
NO2	0-500ppm (LOD 1ppm)
CO	0-3000 ppm (LOD 5ppm)
CO2	0-15 % (LOD 0.1%)
SO2	0-200 / 0-500 / 0-1000 ppm (LOD 3ppm / 1ppm)
H2O	0-20 % (LOD 0.1%)
CH4	0-3000 ppm (LOD 5ppm)
Environmental Specification	Tested to IACS-E10
Analyzer Equivalence	ISO 8178/1 Part 7
Type Approvals	ABS, DNV-GL, Korean Register
# of Measurement Points	Single Enclosure – Up to 4, Multiple Enclosures (Up to 3) 12 points
Power Supply	230 VAC – Power requirement (kW) subject to # of points & length of Heated Sample Line
Air Supply	NOT REQUIRED
Enclosure Air Conditioning	NOT REQUIRED
Enclosure Rating	IP55 standard / IP56 Optional (weather deck mounting)
Enclosure dimensions	800mm (H) x 600mm (W) x 300mm (D)
Exhaust duct sizes	300mm – 5metres
	IACS E10
Communications Protocol	MODBUS RTU
Typical Applications	MARPOL Annex VI (NOx), engine testing, EGCS compliance monitoring, methane slip measurement, mass emissions totalizing, funnel smoke monitoring, charterer's CSR reporting, Class Notation compliance
US Patent	8,184,296,B2
EU Patent	EP 2 394 153 B1
Heated Filter Probe / PAB Enclosure / PM Enclosure Rating	IP65