

Equipment by measurement

The method and equipment we use for each measurement

MEASUREMENT	METHOD	OUR EQUIPMENT	REFERENCE
NOx	Chemiluminescence (CLD)	Horiba PG-350 and PG-250, ECO Physics HCLD	NTC 2008, Appendix 3, 3.4
NO2 converter	NO2/NO converter, efficiency tested with an ozonator	M&C NO2 converter, Signal NOxgen III for the efficiency test	NTC 2008, Appendix 4, section 7
CO and CO2	Non-dispersive infrared (NDIR)	Horiba PG-350 and PG-250, Thermo Scientific, Siemens Ultramat 23	NTC 2008, Appendix 3, 3.1 and 3.2
O2	Paramagnetic analyzer or electrochemical sensor	M&C paramagnetic oxygen analyzer, Horiba PG-350 and PG-250	NTC 2008, Appendix 3, 3.5
SO2	Portable gas analyzer	Horiba PG-350 and PG-250	-
THC	Heated FID, 190 ± 10 °C	Horiba MEXA 1170 HFID	NTC 2008, Appendix 3, 3.3
Methane	Heated FID with non-methane cutter	THC analyzer with non-methane cutter	MEPC.414(84)
N2O and other compounds	FTIR	FTIR, up to 50 compounds	MEPC.414(84)
Particulate matter	Gravimetric	PM system developed by ME-Tech	ISO 8178, 40 CFR Part 1065
Smoke	Filter smoke number (FSN)	AVL 415S smoke meter	ISO 10054, ISO 8178-3
Engine performance	Thermocouples and pressure sensors	Calibrated and documented sensors	NTC 2008, Appendix 4, 1.3 and table 4

Analyzers are calibrated and documented before use. NTC 2008 is the NOx Technical Code 2008, adopted as resolution MEPC.177(58) and amended since.

Our equipment

The full list. All of it can be used onboard, and is packed for transport

Gas analyzers

- + Horiba PG-350 and PG-250
- + Horiba MEXA 1170 HFID
- + ECO Physics CLD 82 Mh
- + Thermo Scientific Model 60i
- + Siemens Ultramat 23
- + M&C paramagnetic oxygen analyzer

Smoke, particulates and FTIR

- + AVL 415S smoke meter
- + PM system developed by ME-Tech
- + FTIR, up to 50 compounds

Sampling and conditioning

- + M&C gas cooler
- + M&C NO2 converter
- + Winkler heated lines up to 190 °C
- + Heated sampling pump up to 190 °C
- + Temperature controllers (Winkler, Eltherm and CKE K1A)

Calibration equipment

- + Signal NOxgen III, for converter efficiency
- + Horiba SGD-710C gas divider
- + Pressure calibrator
- + Dry-block calibrators for temperature
- + Sealed humidity chamber with salt ampoules (HygroPalm)
- + Certified calibration gases to your specification

Handheld measuring instruments

- + Testo 511, for ambient pressure
- + Testo 440 and Testo dp440
- + Vaisala ambient analyzer, for pressure, temperature and humidity
- + HygroPalm
- + ELMA 712 differential thermometer
- + Digitron 2023P handheld pressure meter

Engine performance sensors

- + Thermocouples
- + Pressure sensors
- + Calibrated and documented together with the emission measurements