Supporting Information related to manuscript:

Particulate mass and non-volatile particle number emissions from marine engines using low-sulfur fuels, natural gas or scrubbers

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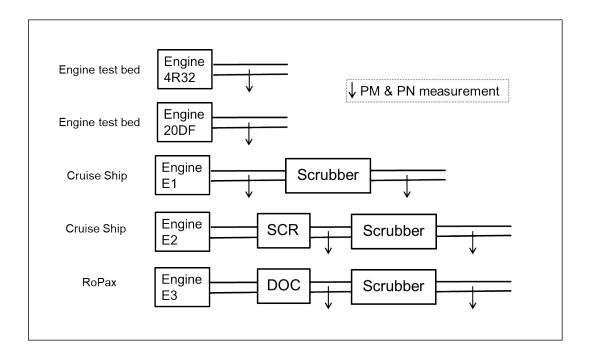
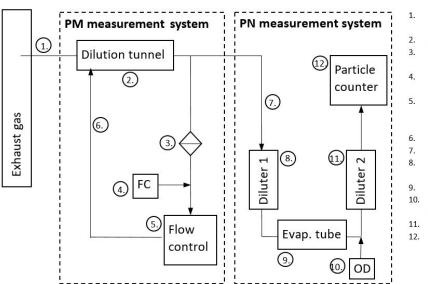


Figure S1 A schematic of the layout of all engines tested on the engine test bed and on board.



- Heated transfer line (wall temp 250 °C), length 2-6 meters depending on measured application
- Dilution tunnel (DR 10)
- PM filter holder inside heated cabinet (42 52 °C), 47 mm filter
- Flow compensation for compensating the flow taken by PN measurement
- Flow control unit including pump and mass flow meters and controllers for dilution air and sample flow
- Dilution air (heated to max. 52 °C)
- PN-sampling line (non-heated, length ca. 1 meter) Primary diluter (dilution air temp. 250 °C, PCRF* ca. 10)
- Evaporation tube (temp 300 400 °C)
- . Additional T-branch dilution for high particle
- concentrations (non-heated, PCRF ca. 9)
- Secondary diluter (non-heated, PCFR ca. 10)
 Particle counter (cut point 23 nm)

*PCFR particle concentration reduction factor as defined in PMP method.

Figure S2 PM measurement system according to ISO8178:2006 and the "PMP" PN (non-volatiles

>23) measurement system.