

# Diesel particle filter systems for ships

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### EXHAUST AFTERTREATMENT - FOR HIGH HORSEPOWER ENGINES



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Agricultural & forest machines



## CHALLENGE: MIDSPEED ENGINES



Mid speed engines have high oil consumption and emit large amounts of black carbon New filter material FA2 with focus on BC from mid speed engines Certification/measuremenat standards needed BC, SOF already in discussion at IMO



#### Comparison of medium speed and high speed emissions



\* G. Hellen, J. Ristimäki, Wärtsilä, CIMAC 2007 paper #56

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#### CIMAC<sup>\*</sup> methods for PM measurement recommended

#### 4.3.1.2 Direct Measurement Method - All Fuel Qualities

Measurement after engine and before heat recovery boiler, before flue gas cleaning system, etc -Recommended methods:

- ISO 9096: 2003: Stationary source emissions Manual determination of mass concentration of particulate matter. In-stack filtration
- EN 13284-1: Stationary source emissions Determination of low range mass concentration of dust – Part 1: Manual Gravimetric method. In-stack filtration.
- VDI 2066 Blatt 1 (Germany): Particulate matter measurement. Measuring of particulate matter in flowing gases. Gravimetric determination of dust load.
- EPA Method 17 (USA): Determination of particulate emissions from stationary sources
- JIS Z8808 (Japan): Methods of measuring dust concentration in flue gases

Measurement of Black Carbon

 $\rightarrow$  dry dust measurement protocols for medium speed DPF assessment

\* CIMAC Internat. Council on Combustion Engines WG5 guide to diesel exhaust emission control 28/2008



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