



SO_x / NO_x / Particulates / Hydrocarbons

Opacity / CO₂

all are being challenged

Global and/or local Rules?

We all must be prepared

INTERTANKO proposal to IMO

**Max. 1% sulphur globally from 2010 and only
destillate fuels**

**Can engines run such fuels?
Will such fuels be available?
Intended to waive SECA's?**

Low-Sulphur Fuel Operation



- **Two-stroke engines can operate on HFO, GO, DO (and all kinds of more exotic fuels, if necessary)**
- **Large two-stroke engines are largely non sensitive to fuel quality, however;**
- **Cylinder lube-oil base numbers are to be considered**
- **Viscosity is to be considered**
- **When fuel is mixed to control Sulphur content in fuel oils, compatibility becomes important**
- **More fuel and cylinder lube-oil storage tanks to be implemented on new buildings**
- **Fuel Change over process important**



- **Too little corrosion may result in too little wear and in damaging polishing of the liner surface**
- **A BN 70 can therefore be a less optimal solution than a BN 50 cylinder lube oil**

Cylinder Liner Surface



'Open' graphite structure with good tribological abilities



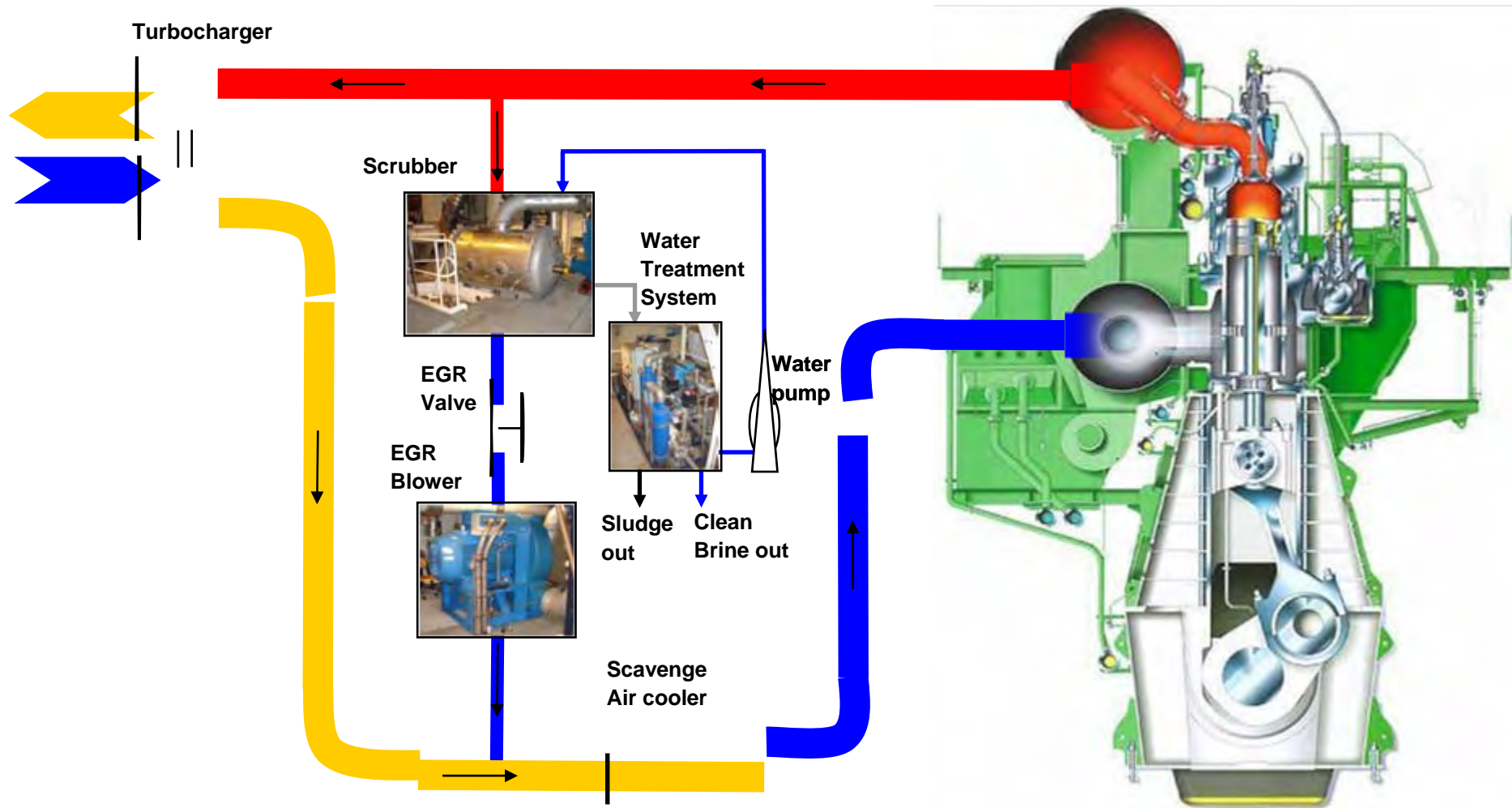
1.6 mm

'Closed' graphite structure with reduced tribological abilities



1.6 mm

EGR- Exhaust Gas Recirculation Application on 4T50ME-X Test Engine



Total Emission Control System 40 MW Power Plant, Buk Cheju, Korea



Emission limits:

$\text{SO}_x < 50 \text{ ppm at } 4\% \text{ O}_2, \text{ dry gas}$

$\text{NO}_x < 250 \text{ ppm at } 13\% \text{ O}_2, \text{ dry gas}$

$\text{PM} < 30 \text{ mg/Sm}^3 \text{ at } 4\% \text{ O}_2, \text{ dry gas}$

MAN B&W two-stroke diesel engine 12K80MC-S

