

## Slow speed running and Exhaust Gas Boilers

*Monitoring and keeping your exhaust gas boiler/economizer clean is especially important when running your main engine at slow speed because fouling of the boiler decreases efficiency.*

Again in 2008, the issue of running the Main Engines at **slow speed** has come up due to the rise in the oil prices, and to some extent also the concern of emissions (NO<sub>x</sub> and S).

In terms of the exhaust gas boiler (EGB) installation, this is of course possible and does not cause any major concerns, but the issue of **fouling** should be addressed in due course. Depending on the engine type, it might be accomplishing a less complete combustion than at the normal higher load and there-

fore cause a higher/faster fouling of the heating surface of the EGB.

This fouling will obviously cause a lower than normal steam production (normal being when the heating surface is clean) but also increase the risks of a **soot fire** in water tube exhaust gas fired boilers with extended heating surfaces. Consequently, a higher attention to the fouling issue is required in order to prevent soot fires.

Depending on boiler type, a soot fire is more serious in some boilers than in others. The forced circulation boilers, particularly EGBs with extended heating surface, are more sensitive to soot fires than others, and require a constant water flow through the boiler in order to prevent damage caused by a soot fire. In general, forced circulation boilers should have water flow through the boiler at all times except when taken out of operation for maintenance and inspections.



*Speed up the steam production by keeping your EGB clean – even during slow speed running of your main engine. The cruise ship "NORWEGIAN GEM" is equipped with 2 MISSION™ OM oil-fired boilers and 5 MISSION™ XW exhaust gas economizers.*

The following general guidelines are recommended (not just in connection with slow speed running conditions, but also as a normal procedure) in order to monitor the condition of the EGB and determine when **cleaning** is required.

- Make a differential pressure and temperature <sup>\*)</sup> curve for every 10% ME load increase up to full load. The boiler must be clean during the procedure.
- Constantly / daily compare the actual condition with the curves.
- Perform soot blowing 2-3 times a day as a minimum, at at least 75% engine load (high gas velocity will help carry out the soot), if a soot blower is installed.
- Perform a visual inspection of the heating surface (minimum scope) every 3 months.
- Adjust soot blowing frequency in order to obtain a reasonable cleaning condition of the boiler, and / or
- Perform water washing as necessary.

\*) Differential pressure and temperature curve refers to the drop over the EGB,  $DP = P_{inlet} - P_{outlet}$ ,  $DT = T_{inlet} - T_{outlet}$

*Note 1: When performing water washing, it should be ensured that the water washing is complete and that the soot does not just flood from the upper part down to a lower part of the boiler.*

*Note 2: As at each water washing a slight corrosion occurs in the boiler, it should never be performed unless deemed necessary.*



*The gilled tube design is used in our large capacity MISSION™ XW-TG exhaust gas boilers/economizers as well as in the standard MISSION™ XW design of boilers after diesel engines. The spacing of the gilled tubes is calculated to minimize soot build-up. Cleaning with water washing or soot blowing keeps the EGB efficient.*

