

# Blue INNOship

## **Project name:**

Controlling PM emissions

## **Project participants:**

Alfa Laval, MAN, (Force Technology).



# Key features or key findings

*What key features or findings would you like to highlight from your project work until now?*

1. Valuable knowlegde about particle measurements and characterisation gained.
2. Relevant laboratories and instituts has been found and used for chemical and physical characterisation of the PM in the exhaust gas.
3. Matlab model for calculating PM emissions and for making sensitivity analysis up runnning (1st version)

# Project challenges and solutions

*What challenges have the project team experienced and how has the team solved them?*

1. Only legislation and enforcement can secure that ship owners will buy a “low PM or BC” solution.
2. Effective enforcement is very important to secure equal competition and hence that the costs are passed to the society.
3. First step is to investigate different measurement methods and standards, as it is not possible to setup any fair limits if the measurement methods are unclear or gives unreliable results. It is not possible to find an “optimal” solution if no adequate measurement method exist.
4. Pros and cons for the different methods have to be evaluated. Results so far show that it is difficult just to make one single spot measurement so continuous monitoring onboard the entire world fleet seems far away. Implementation of “Best Available Techniques” based on unit approvals (spot measurements) seems more realistic.

On a more detailed level, the challenges are:

- A. Planning and co-ordination of extensive PM measurement campaigns at the test engine at MAN Diesel & Turbo in Copenhagen and at the test engine at Alfa Laval Aalborg
- B. Selecting all the measurement equipment, positions and chemical analysis that have to be made.
- C. Subsequent data analysis and drawing conclusions due to measurement uncertainties and because the different measurement techniques give different results!

# Why should you buy our solution?

*What makes your solution the preferable one compared to other available solutions?*

1. Because it is compliant with current legislation (TR1)
2. Because we do our best to ensure that it is also compliant with future legislation (TR9)\*

\*)

MAN and Alfa Laval have for many years contributed to the discussions about the technical possibilities for reducing emissions from engines and by aid of e.g. exhaust gas scrubbers within IMO, CIMAC, DK EPA, GSF and presentations at international conferences. Mostly through fully published papers and reports as this helps to ensure that the legislation and technology goes “hand in hand”, whereby we can focus our R&D effort on solutions that are actually requested. In turn, this help to ensure that our solutions are also compliant with future legislation.