



Effective Cleaning Technology for Large Reciprocating Engines



# Effective Cleaning Technology

## R-MC- improving output, fuel consumption, reliability and longevity

### The R-MC Cleaning Concept

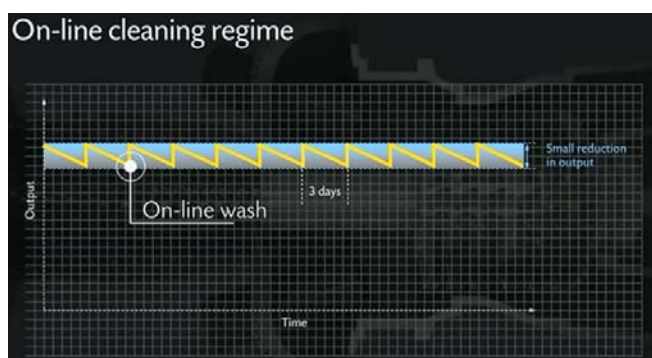
Despite improvements in air filtration, fouling of turbocharger compressors, charge air coolers, valves and other induction system components remains a serious problem in large reciprocating engine operation; microscopic particulates (which would otherwise be harmless) pass through filters and are 'glued' together by hydrocarbons present as oil vapour, and become sticky deposits on the surfaces of compressor blades, air cooler tubes, etc.



This fouling reduces the aerodynamic efficiency of the compressor and restricts the passage of air through the induction system, resulting in reduced specific output, increased fuel consumption, increased operating temperatures and increased engine load and wear.

There are two traditional approaches used in an attempt to combat the problem. The first is to stop the engine, disassemble and manually clean the components using solvent-based cleaning fluids. This is time-consuming and can only be carried out infrequently due to operational constraints. Solvent-based fluids are also volatile, hazardous to use and are certainly not environmentally friendly.

The alternative traditional approach is to introduce abrasive cleaners into the induction airflow. Although this can be carried out whilst the engine is running, it is not effective downstream of the turbocharger and frequent use can result in erosion of compressor blades and coatings, and can contribute to blocked coolers.



### Different wash regimes & performance losses





## R-MC T70 The complete engine cleaning solution

R-MC T70 fluid provides a complete cleaning solution, overcoming all the problems associated with traditional methods. With a pedigree of more than 50 years, R-MC are the global pioneers of engine cleaning technologies. R-MC T70's patented formulation provides the following benefits;

- Highly effective cleaning of entire induction system including turbocharger compressor, air cooler and valves.
- Used 'on-line' - no need to stop the engine or reduce load
- Water-based
- Non-toxic
- Non-flammable
- Non-corrosive
- No harmful effect on engine components or cylinder lubrication
- Readily biodegradable
- Supplied ready to use
- Effective on a variety of engines and fuel types:
  - 2 and 4-stroke
  - heavy fuel oil, distillates and gaseous fuels

The unique performance of R-MC T70 is attributed to three main constituents;

### Surfactant

T70 contains a patented blend of non-ionic surfactants, the main action of which is to break down the hydrocarbon bonds between the particulates.

The surfactant also:

- Wets surfaces by reducing surface tension and breaks down the soil layer.
- Emulsifies and disperses organic and inorganic soils
- Prevents soil re-depositing by forming a 'coating' around the soil particle

### Inhibitor

The inhibitor contained within T70 forms a sacrificial, fluid layer of molecular thickness on the compressor blades, cooler tubes, etc.

This reduces corrosion and creates a protective layer in the air path to inhibit further soiling for up to 72 hours.

### De-carboniser

Breaks down carbon fouling, enabling the surfactants to penetrate and work effectively on the more tenacious carbon deposits.

### The Complete Engine Cleaning System

A highly effective cleaning fluid is only part of the story – the fluid must also be delivered into the engine's induction system in an effective manner. It is vital that the design of injection nozzles produces the correct degree of atomisation to give the required cleaning performance, and also that the nozzles are positioned correctly within the induction system.

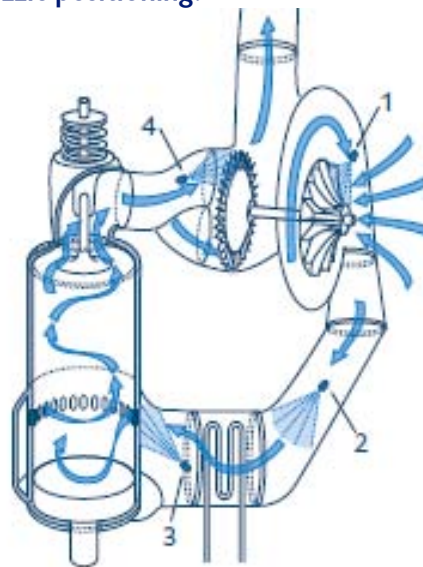
R-MC can design and supply injection nozzles to suite any engine application. These can be installed to replace the standard fit nozzles if fitted, or can be retrofitted to engines where there is no OEM facility.

R-MC can also supply a fluid delivery facility where there is no OEM arrangement. This can be a simple, portable pressure vessel type system, or a state-of-the-art, semi-automatic system, permanently connected to a number of nozzles on the engine. Both systems are air-driven for maximum safety and reliability.

Proven Technology from the World Leaders, R-MC products for large reciprocating engines have been proved in the field, and have been adopted by many leading engine manufacturers, ship owners and power station operators.

You can expect nothing less than unparalleled performance from R-MC

### Effective cleaning performance through correct nozzle positioning:



Nozzle Positions:

1. Injection nozzles for fouled compressors
2. Injection nozzles for fouled charge air coolers
3. Injection nozzles for fouled scavenge channel
4. Injection nozzle for fouled turbine (gas side)

**RMC**<sup>TM</sup>

Enhancing Engine Performance