



FOR STORAGE STABILITY

PRI-RS FOR LONG-TERM HEAVY FUEL OIL STORAGE

PRI-RS is the ideal chemistry for protection against heavy fuel oil deterioration in long-term storage.

With **PRI-RS**, heavy fuel remains as fresh as the day it was bunkered. No stored fuel should be without the protection of **PRI-RS**.

PRI-RS should be applied to all the fuel onboard ships headed for layup to avoid the serious fuel degradation problems that do occur over time.

Harmful changes occur when fuel is stored – sometimes within weeks. The quality deteriorates. This deterioration is caused by:

- **Oxidation** – A chemical process that slowly breaks down molecular integrity, degrading ignition quality.
- **Separation** – Occurs when heavier components gradually separate from lighter hydrocarbons, resulting in fuel stratification.
- **Progressive Incompatibility** - A process that is the result of a chemical reaction between two dissimilar fuels, such as distillate cutter stock and residuum. While the incompatibility process is typically very slow to start, it becomes more aggressive in time, creating excessive fuel sludge.

PRI-RS is formulated with a series of very powerful anti-oxidant chemistries that arrest the oxidation process. The dispersant package of **PRI-RS** also migrates throughout the fuel blend to prevent separation. Additional **PRI-RS** components stop the chemical reactions that lead to incompatibility.

PRI-RS dose rate is an economical 1:4000.



*Fuel deterioration from long-term storage leads to sludge-laden purifiers like that shown here. **PRI-RS** application to the fuel prevents fuel degradation. With treatment, the fuel will remain fresh for months, even years at a time.*

The Risks of Not Treating Stored Fuels With PRI-RS

Can You Afford Them?

THE PROBLEMS:

Excessive Fuel Sludge: In storage, asphaltenic components constitute the heaviest portion of fuel oil. In time, asphaltenes precipitate from the blend, agglomerating in storage tank bottoms. Chemical incompatibility between certain cutter stocks and heavier fuels can also quickly result in excessive sludge production, overburdening purification systems, and in some cases, disabling them.



Sludge removed from purification system cleaning.

Degraded Ignition Quality: Several chemical processes serve to slowly oxidize certain fuel components in long-term storage, most typically the lighter hydrocarbons. Since the lighter hydrocarbons are responsible for early ignition response, ignition quality suffers when they are degraded.

At the very least, ignition quality degradation results in ignition delay, increased exhaust gas temperatures, and severe thermal stress on engine components. The result can be damaged piston crowns, exhaust valves and liners. At worst, a fuel with severely degraded ignition characteristics will simply fail to combust.



Man B&W 2-stroke cylinder liner damage from poor ignition quality.

Fuel Stratification: As the various weight molecular structures separate during fuel storage, layers of fuel with a given density form. Typically the lighter hydrocarbons will form in upper layers (although they can get trapped between denser layers) and the heavier hydrocarbon structures will layer toward tank bottoms.

When this occurs, it is virtually impossible for a chief engineer to maintain proper injection viscosity. Exhaust gas temperatures can soar. Severe damages can result.



Fuel stratification.

THE PRI-RS SOLUTION:

PRI-RS is a blend of powerful anti-oxidant and dispersant chemistries. **PRI-RS** preserves fuel operational integrity by preventing fuel oxidation and sludge precipitation in storage.

Supported by independent, third-party testing, **PRI-RS** offers vessel owners fuel insurance – a small investment which protects against massive potential losses.

Example: A tanker operator suffered plugged purifiers and degraded ignition from a 250 mt supply of RMG 380 fuel on board. The vessel faced a three-day delay for de-bunkering and replacement of the fuel. The total potential loss would have been \$195,000.

Instead, the chief engineer treated the fuel with **PRI-RS**, re-circulated the tank, and restored the fuel to an acceptable condition. Within hours, the vessel was on its way. A simple \$700 investment – the cost to treat the fuel with **PRI-RS** – saved this vessel operator \$194,300.