

SERVICE DESCRIPTION:

Flushing of Lube Oil Systems with Unique Pulsation Technology

How does flushing with pulsation technology work in a typical lube oil system? In the following we will shortly describe and illustrate how Ocean Team uses this technology to reduce flush time and increase the level of cleanliness in a typical system.

The end results for our customers are higher system reliability, extended system and component lifetime and considerable cost savings with both less production losses and reduced costs for maintenance and repair.

In general, lube oil flushing is a cleaning method applied to compressor- and gas turbine lube oil systems. The purpose of flushing lube oil/hydraulic oil is to remove foreign objects such as scale, corrosion, metal shavings, sands etc.



▲ *Steam turbine*

The Essentials of Flushing

- The lube oil is circulated from the console, through the associated pipe systems and coolers to the lube oil system of the compressors and gas turbines and back to the tank again. The process is performed in accordance with the prescribed terms of pressure and flow rate.
- The temperature of the oil ought to be at 50°C during flushing and may never exceed 71°C.
- Flushing elements are to be installed in all system filters and an offline decontamination unit are to be connected to the gas turbine/compressor in order to pick up the loosened foreign objects from the system.

- Compressor bearings are to be bypassed during the lube oil flushing by installing a temporary hose at the return line of the lube oil to the tank.
- The cleanliness level of the oil is analysed by using a comparison contamination kit as well as an electric particle counter measuring instrument. The oil is to meet the specified criteria for optimal system cleanliness.

Flushing with Pulsations

One method is to expose the flushing oil to pulses, caused by sudden but controlled compression, in order to create sound waves (induced waves). This will result in an even higher Reynolds number in the pipe system.

The result is creation of a powerful turbulent flow, which together with the sound waves, will dislodge the impurities from the inside of the pipe system or cooler and flush them with the oil to the filters.

Another advantage of this method is that the induced waves create vibrations inside the pipe system, which results in an even more efficient dislodgement of contamination from the piping walls. This is a quality, which significantly enhances the cleaning process – especially when talking about oil coolers.



▲ *Turbines in gas compression systems*

The Essentials of the Method

Dry air (IA) is injected into the oil flow system through filter and air regulator to valve. Slowly, step by step, the pressure level is raised by adjusting the air pressure regulator and injection of air is started.

NOTE! Check the maximum working pressure of the lube oil system and install a temporary PSV or PRV at this value.

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The pressure is gently raised and lowered, which is controlled by a manually operated hand valve (by-pass). Together with the injection of air a compression/decompression situation is created, which generates a pulsed flow.

NOTE! Observe through pressure gauge that no overpressure rises in system and reservoir during pulsation. Operate frequently by close/open all temporary valves on each loop hoses to secure controlled turbulent flow through each system.

▼ Scales are one of the reasons for pulsated flushing

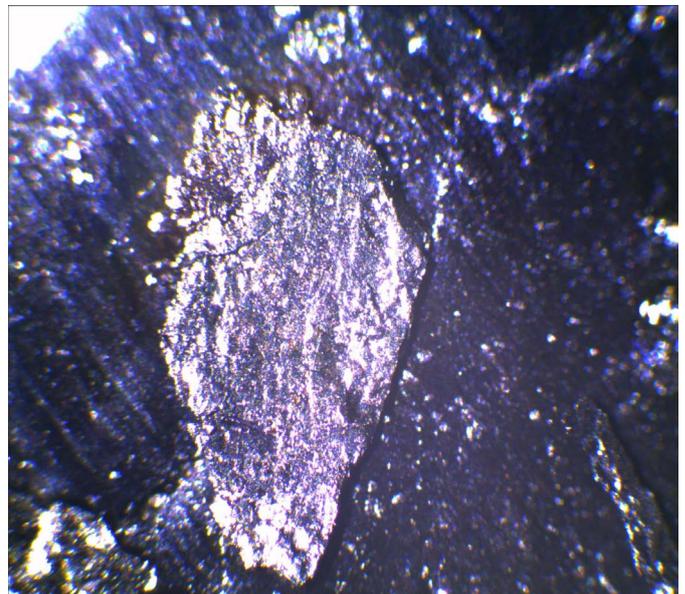


Benefits of Pulsed Flushing of Lube Oil Systems

Using pulsation flushing technology to clean lube oil systems benefits Ocean Team customers by:

- A flushing time reduced by 40-50%, saving cost and time.
- Providing a considerable cleaner system, enhancing operational reliability and promotes lifetime extension for the system.
- Only one type of oil is required (conditional)
- Turnkey projects on flushing and filtration are performed with the pulsation technology.

▼ Particle from gear



Not cleaned, particles from bearings

...and gears will reduce the lube oil layer, damaging bearings and gears by creating metal to metal contact.