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Oil Flushing Strategies for Compressors

"How would you perform an oil flush for a rotary-screw air compressor?"

The purpose of oil flushing is to clean the system in contact with the lubricant. Whether it involves a machine, storage container, lubricant line, hose or lubricant conditioning system, flushing is designed to eliminate or control contamination that can negatively affect the performance of the lubricant or machine.

The flushing strategy you choose should be based on the specific contaminant to be removed. Flushing must also be performed in conjunction with other maintenance activities, such as a machine repair or an oil change, in order to restore the machine and lubricant condition to a reliable state.

The first step should be to define the root cause, type, concentration and location of the contaminant to be removed.

Root Cause and Contaminant Type

Several questions must be asked to determine the root cause of the contamination. Has there been a catastrophic machine failure? If so, it may be necessary to disassemble the system and remove chunks of metal that may be trapped in the lubrication system. Have sediment and moisture settled in the machine due to a long standby period? If this is the case, an oil drain and turbulent oil flow with fresh oil should be enough to remove the contaminants.

Is varnish deposited in the compressor's synchronizing gears or screws? Check with the equipment manufacturer as well as the oil manufacturer about using a detergent. When the varnish is soft or sticky, a detergent additive can be a good option. Several lubricant manufacturers offer these types of additives. However, if the varnish has been deposited for a long period of time and has become an enamel-like compound, no chemical or solvent likely will be able to remove it.

If the situation allows, consider switching to a diester or polyglycol to remove existing varnish or to prevent its generation in the future. Of course, always follow the compatibility precautions.

Although the use of solvents in oil is no longer common, an emerging technology involves adding 10 percent of an oil-miscible polyglycol that has high solvency. This strategy has been used in turbines, but be sure to check its suitability for your compressors.

Contaminant Concentration and Location

If the contaminant concentration is high or risky for the application, first open the machine and clean it manually. After the machine has been reassembled, perform an oil flush. If you choose a high turbulent flush, isolate any sensitive components and ensure the affected area will have the necessary flow to remove the contaminants.

The following chart provides effective strategies based on the issue detected.

Flush Zone(s)/Condition(s)	A. Drawdown filtration/separation	B. High turbulence, high fluid velocity, low oil viscosity	C. High flush oil temperature	D. Cycling flush oil temperature	E. Pulsating flush oil flow	F. Reverse flush oil flow	G. Wand flush tool	H. Charged particle technology	I. Solvent/detergent flush fluid	J. Chemical cleaning	K. Mechanical cleaning
Suspended Contaminants or degradation products	U	U	S	N	S	U	S	U	R	N	N
Bottom sediment and water (BS&W)	S	U	S	N	S	U	U	N	R	R	N
Soft and loose surface deposits	R	U	U	N	U	U	U	S	U	U	N
Sticky, adherent surface deposits	R	S	S	N	S	S	S	S	U	U	U
Hard, crusty surface deposits	N	N	R	S	S	S	S	N	R	U	U
Hard, enamel-like surface deposits	N	N	N	N	N	N	N	R	R	U	U

U = Usually effective S = Sometimes effective R = Rarely effective N = Not effective or practical