

WasteWizard® Application Review: Compressor Condensate

Customers Benefiting from This Waste Reduction Technology

Virtually every large industrial plant uses compressed air. Large users are companies which use pneumatic tooling for assembly and other operations and where spray painting is done. Users range from machine shops to furniture plants. In addition, utility companies use large compressors to pump natural gas.

Waste Water Source

In the process of compressing air, the air's humidity is compressed to form a condensate. This condensate mixes with the compressor lubricant and creates an oily waste problem. (Some of the newer compressors do not generate oily waste, but the majority of installed systems do generate large volumes.) The amount of condensate formed will depend upon the type of equipment, the age of the equipment, and the relative humidity in the area where the compressor is operating. As a general rule of thumb, about ¼ gallon (1liter) of condensate is formed for every 1 HP of compressor motor at 76% relative humidity.

Waste Water Description

There are two distinct types of lubricant which create two distinct types of effluent problems.

Mineral Oils: Motor oil (usually 30 weight) and automatic transmission fluid (ATF) are commonly used lubricants in the mineral oil category. Typically, the condensate from these applications contains very little emulsified oil and therefore, inexpensive coalescers are difficult to compete with. However, in some cases, the effluent quality from the coalescers is not acceptable for local discharge and therefore these customers are good prospects for Ransohoff WasteWizard.

Synthetic Oils: The term synthetic oils is used to refer to polyglycols, diesters, PAO's and silicone oils. These lubricants are used to obtain longer run time on the compressor but they create a more difficult waste stream to treat. The waste stream will be emulsified and cannot be treated with a coalescer. Many UF units will also have a compatibility problem with the aggressive synthetic lubricants, especially the polyglycols and silicone oils. Ransohoff WasteWizard can handle both emulsified oils as well as aggressive lubricants.

Objective of Treatment System

Treatment for Discharge: In virtually all cases, the permeate from this application will be put to the sewer. There is no logical place to use this water and therefore the permeate must meet local discharge limits.

Features and Benefits

Ransohoff Features	Ransohoff WasteWizard Benefits
Hydrophilic Membrane	Will handle free oils for standard lubrication oil applications
Membrane Resists Oil Fouling	High /stable output during the run for reliable operation
Solvent Resistant Membrane	Resists aggressive synthetic lubricants, including polyglycols
Automated Cleaning	No labor required which can offset savings
Portable System	Can operate off 55-gallon drums in multiple plant locations
Limited Hauling	Control of your own destiny
	Lower cost of processing: ~\$0.01 - \$0.10/gallon (\$0.0024 to \$0.024/liter) vs. \$0.30-\$3.00/gallon (\$0.08-\$0.0/liter) to haul, plus the additional cost of new coolant
Will Run Any Lubricant	Customer can change lubricant or have more than one coolant in the plant and still comply
Barrier Separation	Reliable effluent quality

Overall System Design

<i>UF Process Parameters</i>	
Temperature of Operation	Ambient (70-80°F) (23 -27°C)
Expected Flux Rate	30 gsf (very conservative, will likely be higher)
Volume of Permeate	90-99%
Volume of Concentrate	<1-5%
Membrane of Choice	UltraChem M-500 (500,000mwco)

Recommended Process Flow Schematic: Ransohoff has developed an overall flow schematic that is the recommended way to set the systems up in the customer's plant. We offer accessory packages that can be purchased to assemble the system as recommended or the customer can choose to assemble these accessories themselves.

Pre-Treatment

Holding Tank: Not required for this application.

Working Tank: The working tank for this application can be on the small side. However, Ransohoff recommends that the membrane be cleaned between concentrations. As a result, a larger working tank (100 gallon (380 l) vs. 55 gallon (208 l) drum can be used if the customer does not want to clean the system as often. In such a setup, a working tank can be used to accumulate the waste and the WasteWizard System should be operated in batch mode. This will prevent the system from sitting in oil after the concentration is completed

Pre-Filtration

Generally, pre-filtration is not required for this application. Occasionally, you may run into an application where the customer has had the condensate sitting in a drum for some time, in which case pre-filtration is required. A rusting drum also may contribute solids and should be avoided. Try to convince the customer to use a polypropylene tank or equivalent.

Free Oil Removal

Generally not required.

Post-Treatment

Carbon is required to meet effluent requirements when permit requirements are 10 mg/l and the lubricant is synthetic. For synthetic lubricants, the lowest Ransohoff can accomplish is about 50 to 100mg/l without carbon.

Special Process Considerations

For synthetic lubricants, Ransohoff has developed a novel processing technique to get the permeate quality to the 30 mg/l level. We have discovered that the polyglycols have a reverse solubility in water. Therefore if we raise the processing temperature, we will decrease the solubility of the polyglycols and improve the quality of the permeate. Consult with the Technical Support Department for more details.

Economic Considerations

Like Machining, the major consideration is hauling. Competitively, the coalescers are very low in cost and will also have economic impact if they can accomplish the separation.

NOTE: No other manufacturer can presently handle polyglycols.