

L U B E

T E C H N I - G R A M



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The Basics of Compressor Air/Oil Separators

Air oil separators remove compressor lubricant from the compressed air stream. During normal operation, the compressor lubricant is returned to the oil sump and the compressed air continues to the air receiver.

A typical oil separator reduces the lubricant entrained in the compressed air to 2-3 ppm. Under normal operating conditions an oil separator's service life is 4,000 to 6,000 operating hours. Air/oil separators are also called oil separators and demisters.

Oil Separator Function

Most rotary screw compressors and rotary vane compressors inject compressor oil right into the compression chamber with the air being compressed. The oil serves as a coolant and a lubricant, which also absorbs the heat of compression. The main benefit of using compressor lubricant as a coolant is to create a steady air compressor operating temperature so that, no matter what duty cycle, you are creating a continuous duty air compressor.

Injecting the compressor oil into the compression chamber also creates a problem. The compressed air is full of oil when it leaves the compressor air end. The compressor lubricant needs to be removed to protect the air system and to return it to the oil sump so the compressor lubricant can be used over and over again.

The oil separator is the component that separates the compressor lubricant from the compressed air and returns it to the main oil sump.

Air/Oil Separator Features

- Deliver oil carryover 2-3 ppm
- At installation, typically pressure differential is around 24 psig
Change intervals should be considered at 12 to 16 psig drop normally
- Able to withstand pressure differentials during normal operation and routine surge demand
- Compatible with mineral and synthetic lubricants including diesters and PAOs. Always make sure your replacement oil separator is compatible with the compressor lubricant you are running.



... to keep it running

Oil separators stand up to the demanding environment of a continuous duty rotary compressor; but several things can shorten an air/oil separator's service life including:

- Contamination from broken down compressor oil
- Dirt bypassing the compressor intake filter
- Water from internal condensation caused by running too cool or from poor piping practice

Changing compressor oil on-schedule (or maintaining long-drain capable oil with used oil analysis), installing drain valves, and changing your compressor intake filter on-schedule all help the air/oil separator function effectively.

Troubleshooting Oil Separators

As previously mentioned, in general, oil separators are designed to provide 4,000 to 6,000 service life hours. Service life is dependent on many factors including:

- Compressor package design
- The amount of liquid oil removed before the air reaches the oil separator
- Amount of contamination getting past the compressor intake filter
- Type of oil separator (air-oil separator design)

Here are some tips to help you get the best life out of your oil separator.

- **Oil Separator Pressure Drop or Differential Builds up to Soon**

The most common cause of this is plugging of the element by dirt or water. If on physical inspection the oil separator appears to be plugged with dirt check your compressor inlet filter. Contaminant bypassing the inlet filter will stop in the air-oil separator.

If inspection of the oil separator reveals water, the problem is usually from running too cool or poor discharge prior to piping. A symptom of water contamination is the presence of rust on and in the oil separator.

- **Oil Carryover Downstream of the Air-Oil Separator**

The culprit of carryover oil can be one of several things. Here is a list to work your way through to find the culprit.

- A plugged scavenge line or scavenge line filter or orifice
- A scavenge line not properly installed (not reaching the bottom of the oil separator housing or not cut at a 45° angle)
- The oil sump has been overfilled
- An oil separator not compatible with the compressor lubricant is installed

- A crack in the oil separator's bonding or complete separator failure. Oil separator failure is usually caused by not properly grounding it or from a severe surge demand