

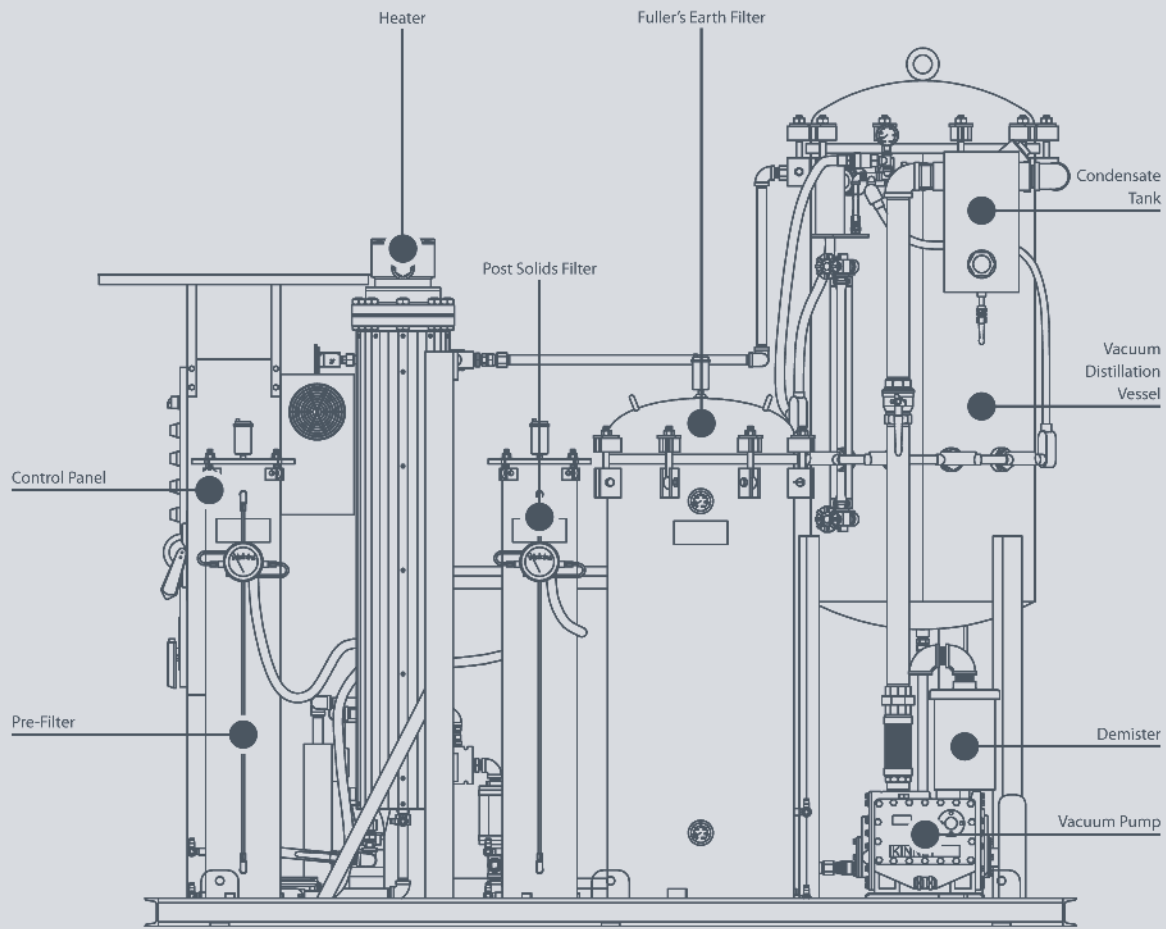


Allen Filters™



AOC Series

Oil Conditioner



Lubrication and seal oil deteriorates over time due to absorption of moisture from the atmosphere, contamination of hydrocarbon gases, and acid generation as a result of hydrolysis. The Allen Oil Conditioner™ is designed to purify the compressor oil and prolong its useful life almost indefinitely.

Allen Oil Conditioners are designed in three standard models:

- Full-size stationary (with optional small wheels)
- Trailer-mounted
- Compact

All Allen Oil Conditioner systems can be supplied as custom-made to accommodate any capacity.

## Full-Size Stationary



A typical full-size stationary Allen Oil Conditioner system consists of a 5-micron solids pre-filter followed by a stainless steel immersion heater that heats the oil to approximately 170 °F. Oil is then dispersed over a bed of packing rings, which provide an extremely large surface area for the oil to flow over in a thin layer while it is under high vacuum. The temperature and vacuum serve to facilitate the mass transfer of the contaminants such as water and gases, which distill off to a condensate tank. The condensate tank prevents the corrosive vapors from damaging the vacuum pump.

Purified, dry oil is pumped back to the compressor oil tank through an optional activated fuller's earth adsorbent filter system—which adsorbs acidity and restores color—followed by a 0.5-micron final solids filter.

Full-size systems come in two varieties:

### SINGLE-PASS

The single-pass purification system uses a two-stage vacuum process that consists of a first-stage rotary blower and a second-stage, high-speed piston-type vacuum pump to exert a deep vacuum on the heated oil. This high vacuum serves to instantly flash-distill off the contaminants so that purification is accomplished during a single pass through the Allen Oil Conditioner, providing faster purification for large volumes of insulating oil.

### MULTI-PASS

Multi-pass purification systems use a single piston-type vacuum pump that ultimately achieves the same level of purification, but in several passes through the Allen Oil Conditioner. Multi-pass systems are typically less costly and suitable for most small- to medium-sized transformer applications.

## Trailer-Mounted



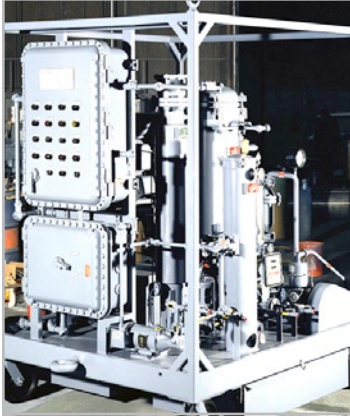
Allen Oil Conditioners can be mounted on a specially designed, road-portable trailer which include the following features:

- Allen-designed Bearclaw™ system
- Heavy-duty off-road suspension and tires
- Steel I-beam frame
- Dual axle support
- Electric or pneumatic brakes
- Road lights
- Heavy-duty ball and tongue with safety chains

Trailers can be open or covered in sturdy sheet metal enclosures.

All Allen-manufactured trailers are designed in accordance with the U.S. Department of Transportation and the U.S. Army Military Specifications for battle-ready vehicles .

## Compact



Compact systems are designed with a small footprint and are specifically constructed to be placed in confined spaces such as off-shore production platforms and aircraft carriers. Typically made for hazardous environments, Allen Oil Conditioner compact systems are manufactured with electrical components encased in explosion-proof boxes. Positioning of the system is effortless with the supplied wheels and an optional on-board programmable logic controller (PLC) provides remote sensing and control capabilities.

In off-shore production platform applications, the compact system can be designed to purify transformer insulating oil from the on-board medium-sized transformers. With an optional refrigerated condensing system the Allen Oil Conditioner can also purify gas compressor, gas turbine lubrication, and thermal synthetic oils.

## Optional Accessories

Each standard Allen Oil Conditioner system can be supplied with the following optional accessories:

### PRE-FILTERS

Pre-filters remove solids larger than 5-micron before they can enter the purifier. This lessens the solids load on the purifier and reduces the need for cleaning out the downstream immersion heater.

### FULLER'S EARTH FILTER CARTRIDGES

Filled with fuller's earth material, these filters adsorb acidity from the oil and restore color.

### POST-FILTERS

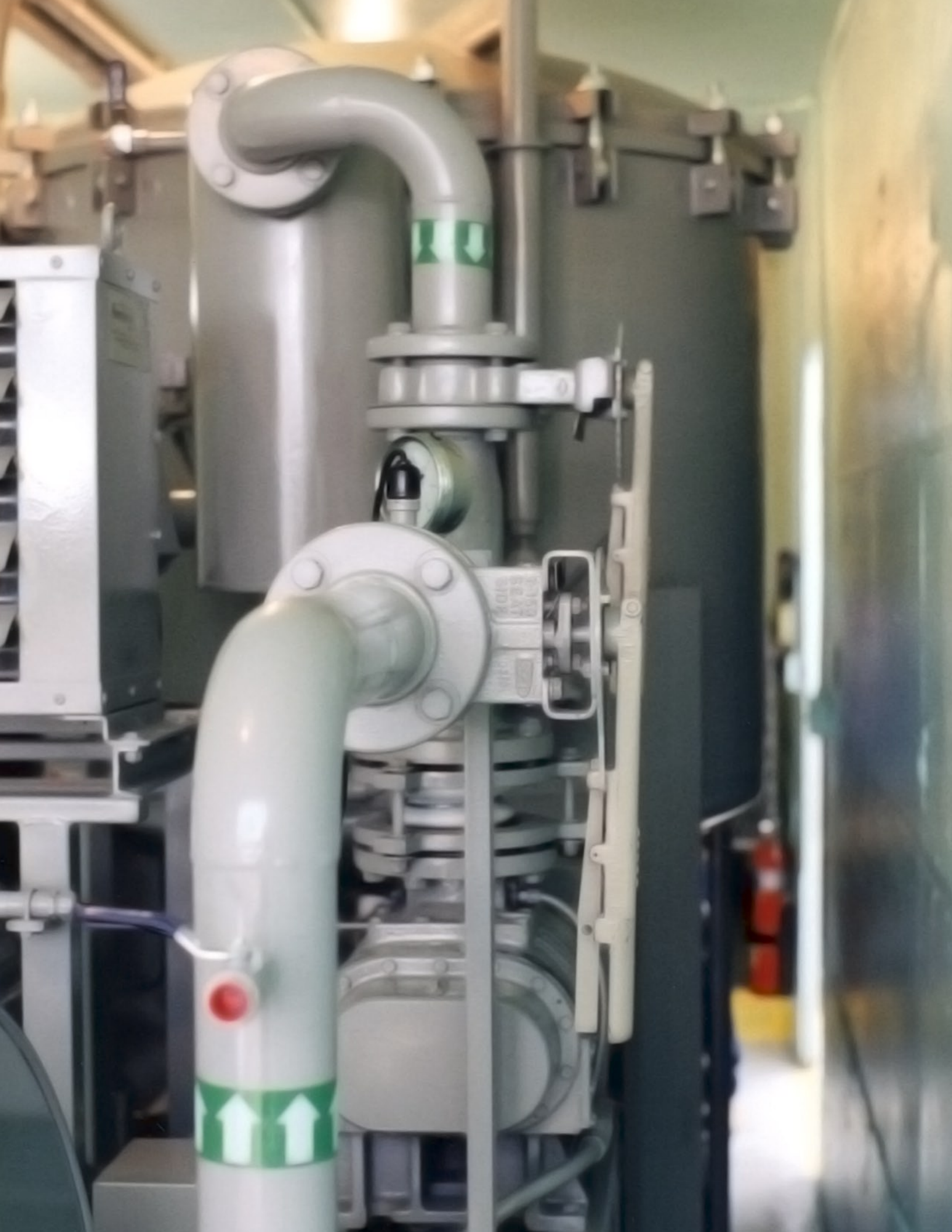
Post-filters are necessary if a fuller's earth option is used. They are designed to trap any fine solids that may pass through the fuller's earth filter cartridges.

### MOISTURE ANALYZER

The moisture analyzer is installed on the discharge of the Allen Oil Conditioner to indicate in real-time the moisture content of the oil coming out of the purifier.

### IN-LINE PARTICLE COUNTER

The particle counter uses a laser to continuously monitor oil cleanliness on a real-time basis.



## RELATIVE HUMIDITY ANALYZER

A relative humidity analyzer continuously measures the humidity of the vapor stream being evacuated from the empty transformer by the purifier's vacuum system. The analyzer signals when no more moisture is being extracted from the paper insulation and purified oil can be re-introduced into the transformer.

## VARIABLE FREQUENCY DRIVES

These drives are used to vary the rotational speed of the electric motors and pumps in response to varying oil viscosity.

## ETHERNET OR SCADA CONNECTIVITY

Connectivity can be provided as part of the control system for remote monitoring and process control .

## GPS MONITORING

GPS can be utilized for remote locations such as off-shore production platforms.

## LABORATORY EQUIPMENT

Any equipment required for routine monitoring of oil quality can be provided, such as dielectric testers and test kits for monitoring acidity and moisture.

## ANCILLARY EQUIPMENT

Equipment such as fault gas detectors and transformer oil level sensors can be provided.

## AUXILIARY POWER

Auxiliary emergency power can be provided by a diesel generator or by solar panels, which charge a battery system for backup power in remote locations.



## Technical Specifications

<b>Size</b>	Between 36" L x 30" W x 48" H (914 mm x 762 mm x 1219 mm) and 50" L x 96" W x 72" H (1270 mm x 2438 mm x 1829 mm)
<b>Weight</b>	1000-6000 lbs (454-2722 kg)
<b>Flow Rate</b>	200-2000 gph
<b>Inlet/Outlet Connections</b>	NPT or RF flanged, Schedule 40
<b>Inlet Strainer</b>	200 mesh, 80 microns, check valve, inlet ball valve
<b>Vacuum Pump</b>	5–15 cubic feet per minute, rotary piston pump
<b>Heater</b>	15–100 kW low watt-density circulation heater with 316 stainless steel elements
<b>Pre-Filter</b>	Two (2) 5-micron elements with beta ratio of 1,000
<b>Vacuum Vessel</b>	ASME design with Raschig Ring packing for large surface area
<b>Inlet/Outlet Pumps</b>	Heavy-duty, positive displacement internal gear types
<b>Materials of Construction</b>	Carbon steel and cast steel (stainless steel optional)
<b>Base</b>	Reinforced carbon steel with drip lip and lifting lugs, protective structural steel frame
<b>Maximum Working Pressure</b>	250 psig (18 bar)
<b>Maximum Process Temperature</b>	180°F (82°C)
<b>Controls</b>	Digital controls with a programmable logic controller and free software (touch screen and ARMS optional)
<b>Safety Alarms</b>	Low flow, high temperature, high level (high filter differential pressure optional)
<b>Shutdown Functions</b>	<ul style="list-style-type: none"> <li>• No flow</li> <li>• High oil temperature</li> </ul>
<b>Power Supply</b>	<ul style="list-style-type: none"> <li>• 480 V, 60 Hz, 3-phase</li> <li>• 380 V, 50 Hz, 3-phase</li> <li>• 220 V, 60 Hz, 1-phase</li> <li>• 220 V, 50 Hz, 1-phase</li> </ul>
<b>Gauges</b>	Pressure, temperature, flow, vacuum
<b>Performance</b>	<ul style="list-style-type: none"> <li>• Water removal down to 5 parts per million (ppm) total water</li> <li>• Particulates down to .5 microns (with optional filter)</li> <li>• Dissolved and entrained gases down to 0 ppm</li> <li>• Viscosity and flash point to as-new or better</li> <li>• Acidity down to 0.01 mg KOH/gram oil</li> </ul>



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