KLEENTEK®

# Electrostatic Oil Cleaners

CLARCOR Industrial Air | UAS®

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# A Varnish Removal Solution For Your Entire System Ensuring Optimal Machine Performance


Oxidation in oil reservoir – curable with Kleentek

## Varnish Deteriorates Machine Performance

As machinery runs, a chemical process called oxidation occurs — forming tar, varnish and sludge. Varnish acts as a catalyst to shorten the life of lubricants. In addition, the tacky nature of varnish attracts other contaminants, converting smooth metal surfaces to sandpaper.

Products of oil oxidation coat the hydraulic servo, proportional and cartridge valves which forces the friction in these valves to increase. Unfortunately, the change in friction in these highly sensitive, close tolerance components can cause unwanted effects, including:

- Loss of control stability
- Constant valve adjustment
- Reduced machine performance
- Erratic cycle times
- Increased downtime
- Slow start-ups

## Solving Varnish Problems

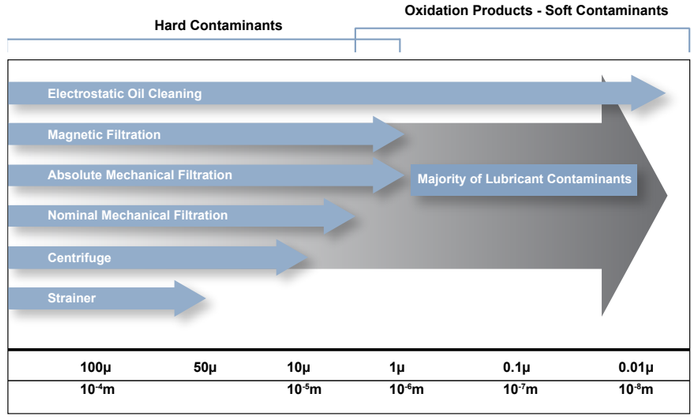
Unlike traditional oil filtration, the Kleentek patented electrostatic technology removes all insoluble contaminants, including degradation by-products that are responsible for varnish. Kleentek electrostatic oil cleaners actually clean the system. The technology allows the lubricants to act as a system cleaner, stripping varnish away one molecular layer at a time.



## The End Of Contaminants And System Downtime

Kleentek systems have the unique ability to draw contaminants of all sizes out of the oil, trapping them on the surface of a collector. This removal of all insoluble contaminants, including tars and varnishes, allows you to achieve ultimate machine performance.

Traditional mechanical filters remove only large particles, while Kleentek electrostatic systems are particle size independent, allowing submicronic particles as well as large contaminants to be removed from any nonconductive liquid. This means that only insoluble oil contaminants are extracted. Soluble additives present in the oil are not affected. In addition, because the Kleentek system is so effective at maintaining oil cleanliness, it significantly reduces the need for repeated oil changes.




## The Benefits Of Kleentek

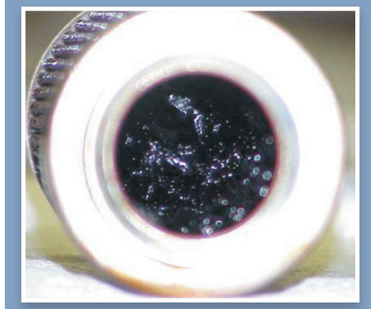
Kleentek electrostatic oil cleaners provide significant benefits and return on investment.

Some of the benefits include:

- Varnish-free lube and hydraulic oil circuits
- Extended oil life
- Avoidance of unplanned outages
- Improved heat exchanger performance
- Energy savings by lowering the coefficient of friction in mechanical equipment
- Extended seal and o-ring life
- Elimination of costly system flushes



## Typical Varnish-Related Problems



Plugged filter from static discharge

Varnished valve

Varnished bearing surface

Kleentek solutions become a key element of your reliability program and an essential partner in profitable operations and maintenance. Kleentek systems often pay for themselves many times over in the first year of operation.

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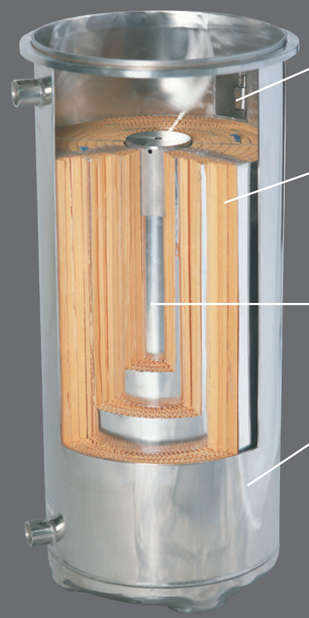
## Treatable Fluids

- **Compressor Oil**
- **Hydraulic Oil**
- **Lubricating Oil**
- **Gear Oil**
- **Phosphate Esters**
- **Transformer Oil**
- **Turbine Oil**
- **Many Other Non-Conductive Fluids**



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# The Kleentek System


### Alarm Light
Indicates when system requires attention.

### On/Off
Power switch.

### Outlet
Clean oil discharged from system and returned to system reservoir.

### Motor
Fully-enclosed, fan-cooled 1/4 hp motor.

### Pump
Positive displacement gear pump regulates flow of oil.


### Control Panel
Digital module monitors system performance.

### Powder Coated Finish
Helps prevent fading and chalking in outdoor applications.

### Fluid Switch
Effectively monitors oil level to activate controls.

### Collector
High capacity collector utilizes multiple cleaning fields for optimal varnish removal.

### High Voltage Electrode
Provides high voltage charge.

### Stainless Steel Tank
Stainless steel oil reservoir provides superior corrosion resistance.

### Inlet
Easily attaches to oil reservoir utilizing NPT fittings.

### Options
- 60Hz supply voltage
- Hazardous location electrical upgrade
- Hose kit
- Phosphate ester configuration
- Casters
- Water absorptive pre-filter
- Water coalescer pre-filter





## A Multitude of Industries Served

**Power Generation**
Eliminates servo valve failures on turbines.

**Pulp and Paper**
Eliminates servo valves sticking on calendering stacks and hydraulic press sections.

**Refining/Chemicals**
Eliminates varnish problems on turbo compressors.

**Injection Molding**
Improves accuracy and reduces friction on highly sensitive, close tolerance components.

**Automotive / Assembly**
Eliminates transfer line hydraulic system failures.

**Steel Processing**
Eliminates servo valve failures on temper mill hydraulic systems.

**Marine**
Eliminates servo valve failures on controlled pitch propeller systems.

Virtually any other hydraulic and petroleum fluid application.

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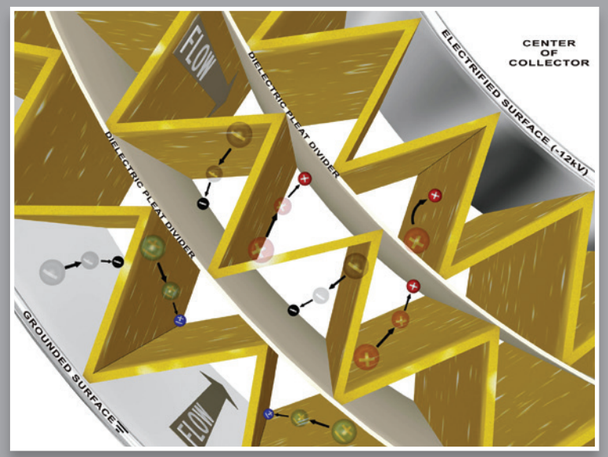
# Advanced Technology Unparalled Performance

Kleentek utilizes a kidney-loop process that draws oil from a main reservoir and circulates it at very low velocity. The result: continual removal of contaminants from hydraulic fluids and lubricating oils.

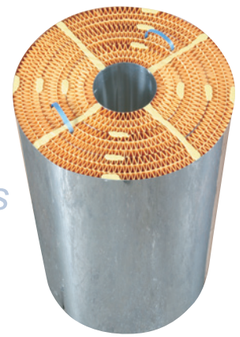
Using the principles of electrostatics to collect fluid contaminants, Kleentek's patented design utilizes gradient force, allowing it to take advantage of the natural charge that each contaminant contains. Contaminants with a positive charge are drawn toward a negative electrode within the system, while those with an inherent negative charge are drawn toward a grounded surface.

As the fluid flows freely through the system, Kleentek removes contaminants, submicronic particles, dust, dirt and products of oil oxidation, including tars and varnishes. These contaminants are trapped in the collector for easy disposal.




## High-Capacity Contaminant Collection

Kleentek's pleated collection element is housed within a stainless steel chamber. Depending on the application, these high-capacity collection elements provide continual operation from 2,000 to 8,000 hours.



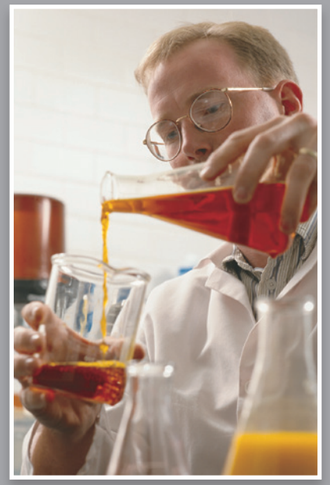
*Kleentek eliminates the need for costly system flushes.*

## Designed For Industrial Applications

Kleentek offers five models to meet the needs of virtually any hydraulic or oil lubricating application and performance requirement.

Kleentek units are specifically designed to accommodate individual hydraulic and hydrostatic systems. These units are designed to be installed as dedicated systems.



## Kleentest

Kleentest goes beyond traditional testing because we check products of oil oxidation at the molecular level, as well as checking for particulate.

By performing a Colormetric test — the analysis of insoluble oil contamination of hydraulic and lubricating oils — Kleentek can effectively identify varnish potential. This procedure involves drawing oil and soluble additives through a 0.45 micron filter patch, leaving only the insoluble portion (real contaminants) behind. The insoluble portion is identified by the color and shade of stain.

A Spectrophotometer analyzes the light reflectance of this color and shade of stain, then compares it to a clean, unused patch giving a total color difference. This total color difference is charted by Colormetric value and cleanliness level to give a definitive answer to the question, "How's your oil?"

## Specifications

| UNIT SPECIFICATIONS | Model | Cleaning Chamer Capacity | | Flow Rate | | Width | | Length | | Height | | Weight | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Gal | Liters | GPM | LPM | Inches | cm | Inches | cm | Inches | cm | lb | kg |
| | DOC-R3 | 0.79 | 3 | 0.25 | 0.94 | 11.1 | 28.2 | 14 | 35.6 | 26.15 | 66.4 | 42 | 19.1 |
| | DOC-N10<br>DOC-S10 | 3.17 | 12 | 0.5 | 1.9 | 12.75 | 32.4 | 17.75 | 45.1 | 21.5 | 54.6 | 37 | 16.8 |
| | DOC-N25<br>DOC-S25 | 5.01 | 19 | 1.5 | 5.7 | 12.75 | 32.4 | 17.75 | 45.1 | 29.5 | 75 | 122 | 55.5 |
| | DOC-N50 | 9.24 | 35 | 2.8 | 11.4 | 15.75 | 40 | 27.91 | 70.9 | 33.75 | 85.73 | 150 | 68 |
| | DOC-N100 | 18.48 | 70 | 5.5 | 20.8 | 20.75 | 52.7 | 43.25 | 109.8 | 33.25 | 104.8 | 270 | 122.5 |

System voltage 115/1/60.

| OIL REQUIREMENTS | Oil Viscosity | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Method | cSt | SUS | cSt | SUS | cSt | SUS | cSt | SUS |
| | Temperature | 40 C | 110 F | 40 C | 110 F | 40 C | 110 F | 40 C | 110 F |
| | Grade | 32 | 150 | 46 | 210 | 68 | 300 | 100 | 460 |
| | Model | Gallons of Oil | | | | | | | |
| | DOC-R3 | 105 | | 74 | | 50 | | 32 | |
| | DOC-N10<br>DOC-S10 | 660 | | 449 | | 291 | | 211 | |
| | DOC-N25<br>DOC-S25 | 1,638 | | 1,136 | | 766 | | 502 | |
| | DOC-N50 | 3,170 | | 2,193 | | 1,479 | | 1,004 | |
| | DOC-N100 | 6,340 | | 4,385 | | 2,959 | | 2,008 | |

NOTES:
1. Unit capacity may vary depending upon application.
2. Performance specification based upon units with pump options and oil at 140° F (60° C) or less.
3. Oil viscosity guidelines: contact an authorized dealer for specific application requirements.


N100
Hazardous Location
Electric Option

# KLEENTEK®

## Why Choose Kleentek?

**A world-renowned reputation**.
For more than 30 years, we've been the industry leader in electrostatic oil cleaning systems — a proven track record that speaks for itself.

**Commitment to quality products.**
Measuring our quality against documented expectations, we practice continuous improvement methods to anticipate challenges and implement successful solutions.

**Unparalleled customer support.**
As a customer-driven solutions provider, we earn credibility and establish successful relationships by exceeding expectations for professional service and attitude.

**Innovative technical leadership.**
Always, we keep technology at the forefront — ensuring continuous product advancements through ongoing investments in design and manufacturing.

**CLARCOR Industrial Air**

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