

Electrostatic oil cleaners



KLEENTEK

Righini Industrial Division S.r.l.

KLEENTEK TECHNOLOGY

A **contaminant particle**, regardless of its nature (be it dust, metal, rust, sludge etc.) and size (from molecular scales to several tens of microns), **can only be:**



positive

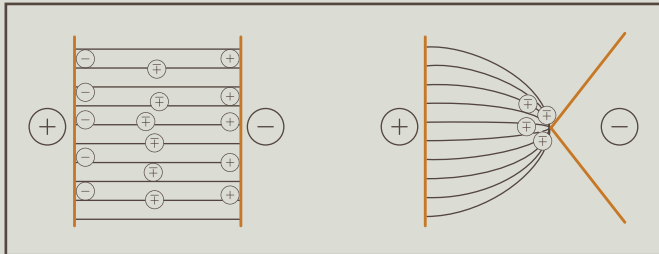


negative

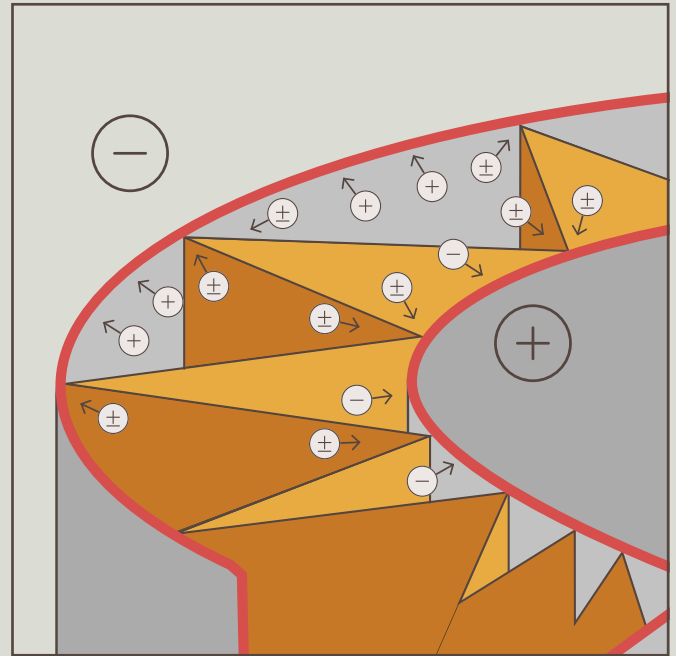


neutral

In a uniform high potential electrostatic field produced by parallel electrodes, positive particles are attracted by the negative electrode and vice versa (electrophoresis). In this situation, the neutral particles are not influenced. On the other side, if one electrode has a pointed shape, the concentration of forces is so strong that it can polarize even originally neutral particles which can thus be attracted (dielectrophoresis).



KLEENTEK oil cleaner combines these two effects in a single cylindrical cartridge (the collector) that **can remove any kind of contaminant from the oil, regardless of its size or nature.**



THE COLLECTOR

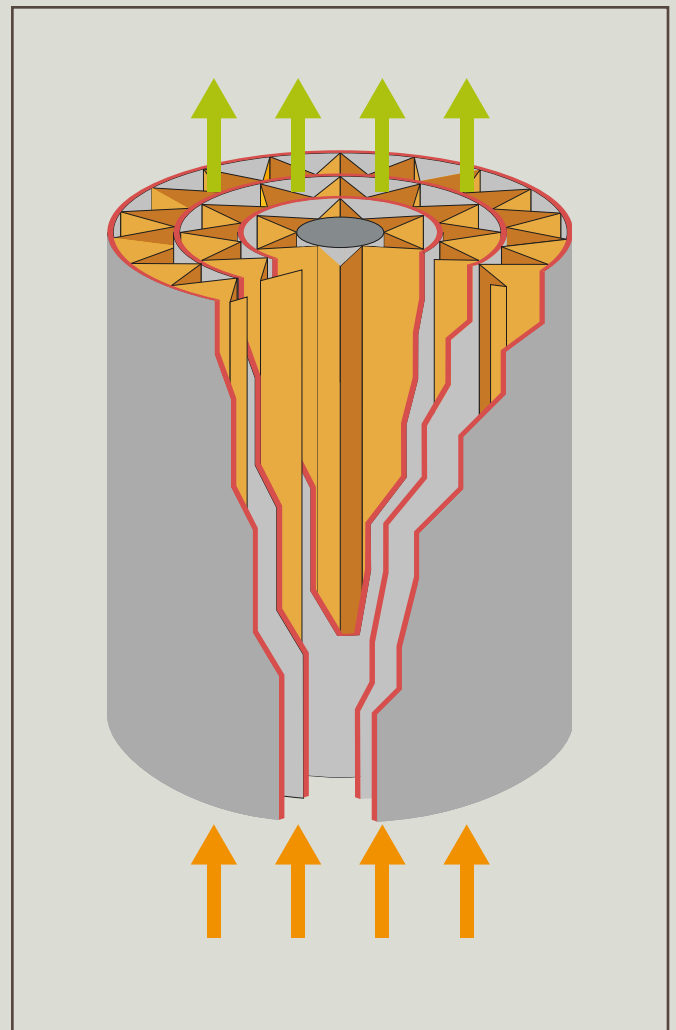
KLEENTEK collector is not a filter: it is a cartridge through which the oil flows from bottom to top without encountering obstacles and therefore without building up pressure.

Quick and easy to replace, it consists of a cylindrical unit enclosing other coaxial aluminum cylinders, interspersed with accordion-folded dielectric material. Regardless of their size, the contaminants in the oil are electrostatically attracted and retained by the collector's cylindrical walls.

KLEENTEK collectors never clog, even in the presence of particularly contaminated oil.

Thanks to a **very extensive collection surface**, they can retain a huge amount of contaminants, much higher than that retained by traditional filters. This characteristic ensures an **extraordinarily long useful life of the collectors and, consequently, reduced operating costs.** KLEENTEK collector is easy to dismantle (just open a few clips).

Furthermore, by separating the paper elements from the metallic ones, its volume is reduced, facilitating disposal.

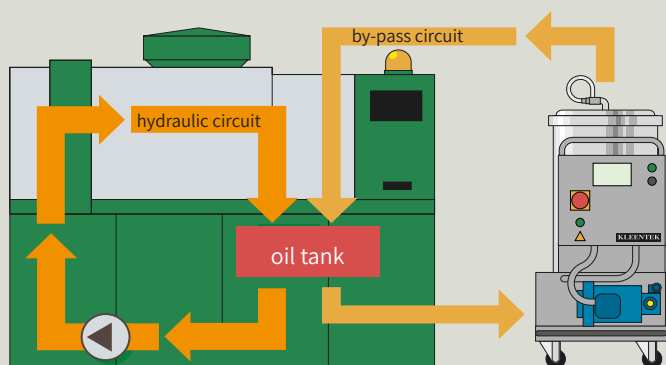


INSTALLATION AND USE SCHEME

KLEENTEK electrostatic oil cleaner works as a by-pass unit and can therefore be installed and removed without the need to stop the machine it is connected to or to interrupt the production cycle.

It can work whether the machine is running or not. The **cleaner's pump creates a continuous external oil flow**, which remains independent from the machine's circuit: in short, the oil is drawn from the tank, passes through the cleaner and returns to the tank.

KLEENTEK electrostatic oil cleaner can be used for the **continuous flushing of oil from a single tank** (fixed unit) **or for the rotational cleaning of oils from multiple installations** (mobile unit).



KLEENTEK electrostatic oil cleaner can be used in the following **applications**:

hydraulic systems

- hydraulic presses
- injection moulding
- blow moulding machines
- forging presses
- extrusion presses
- rubber presses
- ceramic/ tile presses
- hydraulic controls
- machine tools
- paper machines
- hydraulic test stands

lubrication systems

- turbines
- compressors
- vacuum pumps
- bearings
- rolling mills

test stands

- test oil

H.V. transformers

- insulating oil

GUIDE TO CORRECT SIZING

To choose the most suitable cleaner for a specific application, one must consider the operating conditions as well as the type, total quantity, and viscosity of the oil to be treated. The following table shows the maximum amount of oil that each model can manage, depending on the viscosity. These maximum values are an indication and may be reduced depending

on the type of application and operating conditions. KLEENTEK technical staff is able to identify the best application solutions based on each specific requirement (customized service).

Unit	Max. oil quantity (litres)		
	Oil viscosity ISO VG		
	32	46	68
ELC-R100TP	48.000	33.000	22.000
ELC-R50TP	24.000	16.000	11.000
ELC-R25TP	12.000	8.000	5.500
ELC-R10SP	5.000	3.400	2.200
ELC-R3SP	800	550	380

Specifications				
Power (W)	Size (mm)	Weight (kg)	Flow rate (l/min)	Collector n/type
1.200	468x1084x1087(h)	161	12,0	2/CC-R50SP
900	453x738x1087(h)	108	9,0	1/CC-R50SP
540	366x701x959(h)	72	3,7	1/CC-R25SP
320	363x680x915(h)	70	2,2	1/CC-R10SP
200	311x359x536(h)	20	1,2	1/CC-R3SP

Types of oil can be cleaned:

- Mineral oils (except engine oils and HLP-D oils according to DIN 51524/2)
- Synthetic oils (PAO, ester, vegetable oils with a standard unit)
- Phosphate ester (except Skydrol) and PGA (with a special unit)

- Max oil temperature (constant): 60 °C – 80° with “H” models
- Max viscosity: 600 cst
- Max removable water content: 500 ppm
- Standard power sources: 230 V 1P - 380 V 3P

FUNCTIONAL CHARACTERISTICS

KLEENTEK electrostatic oil cleaner offers many unique advantages:

- it works as a by-pass unit to the oil tank 24/7;
- there is no pressure and it doesn't clog, even with particularly dirty oils. As a result, there are no safety issues (vibrations, pipe failures, leaks etc.) and it does not require any particular maintenance or supervision;
- thanks to its limited overall power needs (from 200 to 1.200 W), the power consumption is negligible;
- it has a low flow rate, allowing it to work as a by-pass without causing problems for the system it is connected to;
- it can remove up to 500 ppm of water;
- it is an excellent and reliable monitoring system for humidity and water, one of the most dangerous contaminants for oil and circuits;
- it does not remove oil additives;
- it does not affect oil's chemical characteristics;
- it is compact, making it very practical and simple to use in all circumstances;
- it does not require any specific maintenance, meaning no unexpected costs;
- it is easy to use and very hard-wearing: it boasts a very long service life without problems.

KLEENTEK: UNIQUE TECHNOLOGY

KLEENTEK electrostatic oil cleaner is the only technology that:

- removes any kind of contaminant from the oil, regardless of its size and nature and therefore it is the only technology able to totally remove even insoluble oil oxidation products, the precursors of the so-called "varnish";
- ensures that cleaned oil removes the deposits accumulated in the circuits, ensuring the perfect cleaning of all components (valves, pumps, filters, etc.);
- ensures that, while passing through the collector, the oil does not charge electrostatically, as it happens when using standard filtration systems. This protects the oil and the circuits involved;
- ensures a significant increase in the oil's service life;
- encourages us to no longer consider oil as a consumable, but as a precious technological fluid and a long-term asset to be maintained in good conditions over time.

A highly innovative tool, essential for the efficiency of any industrial process, KLEENTEK electrostatic oil cleaner guarantees a tangible return on investment easily assessable at the planning stage, helping to enhance the Company's overall competitiveness.

RESULTS

KLEENTEK electrostatic oil cleaner guarantees that all circuit components are kept clean (especially the most fragile components such as valves, filters, pumps, etc.) and the **achievement of results that can't be reached with traditional filtering:**

- reduction of maintenance costs (manpower and spare parts);
- reduction of machine failures and breakdowns;
- improvement of equipment reliability and efficiency;
- faster machine start-up times;
- less friction and subsequent less wear and energy consumption;
- increase in process repeatability;
- increase in product quality;
- reduction in number of rejects;
- reduction of spare parts stock.

Along with the undeniable **economic advantages**, KLEENTEK electrostatic oil cleaner also allows remarkable **benefits in terms of environmental protection**, such as the reduction in energy consumption, the increase of oil service life and cleaner and safer equipment.

MODELS

Thanks to the **control PLC**, new cleaners allow the **remote control of the main operating parameters**.

Different models are available to satisfy any type of need.

Oil cleaners are modular, ELC-R200TP and ELC-R300TP models are also available for even larger quantities of oil.



ELC-R100 TP



ELC-R50 TP



ELC-R25 TP



ELC-R10SP



ELC-R3PSP

ANALYSIS KIT: KLEENTEK CONTAMINANT CHECKER

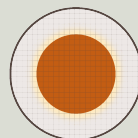
In order to monitor the electrostatic oil cleaner's work, as well as to quickly evaluate the level of contaminants presence in the oil at any time, KLEENTEK Contaminant Checker kit is the appropriate tool.

This kit allows to easily perform the gravimetric patch test: an analysis that is both precise and quick to perform.

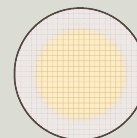
An oil sample of defined volume is diluted and passed, with the aid of a vacuum pump, through a filter/membrane with a porosity of 0.45-0.8 μm . All contaminant particles larger in size are retained on the surface of the membrane. This very fine porosity is aimed at detecting all contaminants, especially the smaller ones, and particularly those generated by the oil oxidation process.

These latter, indeed, being very small in size, are not detected by the normal tests based on particle counting (ISO 4406/NAS scales).

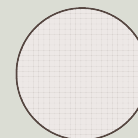
The examples provided here highlight the difference between the results of analysis conducted on an oil 'filtered' with traditional systems and an oil 'purified'



dirty oil



oil filtered by
traditional filter



purified oil
by Kleentek

with KLEENTEK: **the brown halo still present in the first sample completely disappears in the second, demonstrating the exceptional effectiveness of the electrostatic cleaner.**



Easy to use, the patch test can be performed by the machine operators themselves and represents the most immediate and reliable system to check the oil contamination level and therefore assess the safety and reliability level of the plant.

With the use of a quantity of oil proportional to the diameter of the membrane, the test performed with the KLEENTEK Contaminant Checker can be assimilated to the Membrane Patch Colorimetry, according to **ASTM 7843**.



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