



Introduction:  
Hydraulic Fluid Management  
by  
**Kleentek: Electrostatic Oil Cleaner  
(TP Series)**

Focus Machinery Pte Ltd, Singapore

x

Kleentek Corporation, Japan

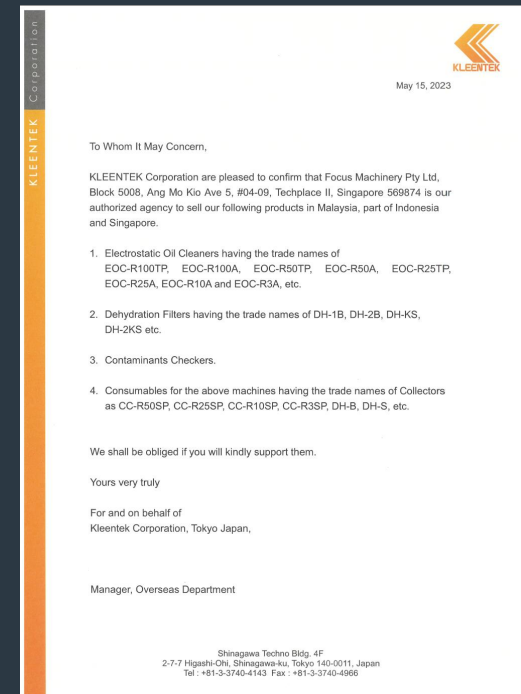
# 1. Focus Machinery Pte Ltd, Singapore – Our Story, History and Heritage

Focus Machinery Pte Ltd, Singapore has been working with Kleentek Corporation, Inc in Japan since 1999.

We started off supplying auxiliary equipment such as dehumidifier, hopper and dryers used for the plastic manufacturing industry found within the Asian market – Singapore, Malaysia and Part of Indonesia.

Subsequently we started supplying Kleentek: Electrostatic Oil Cleaner together with Dr. Akira Sasaki from Kleentek Corp, Japan for the Asia Pacific Region, such as Singapore, Malaysia and Parts of Indonesia.

Numerous units of Kleentek, Electrostatic Oil Cleaners (EOCs) previously also known as Electrostatic Liquid Cleaners (ELCs) has been delivered successfully to various industries such as plastic injection and molding industries, blow molding (for PET bottles production) and power generation plants in the region by Focus Machinery Pte Ltd, Singapore.



# 1. Letter of Appointment – Distribution Rights



May 15, 2023

To Whom It May Concern,

KLEENTEK Corporation are pleased to confirm that Focus Machinery Pty Ltd, Block 5008, Ang Mo Kio Ave 5, #04-09, Techplace II, Singapore 569874 is our authorized agency to sell our following products in Malaysia, part of Indonesia and Singapore.

1. Electrostatic Oil Cleaners having the trade names of EOC-R100TP, EOC-R100A, EOC-R50TP, EOC-R50A, EOC-R25TP, EOC-R25A, EOC-R10A and EOC-R3A, etc.
2. Dehydration Filters having the trade names of DH-1B, DH-2B, DH-KS, DH-2KS etc.
3. Contaminants Checkers.
4. Consumables for the above machines having the trade names of Collectors as CC-R50SP, CC-R25SP, CC-R10SP, CC-R3SP, DH-B, DH-S, etc.

We shall be obliged if you will kindly support them.

Yours very truly

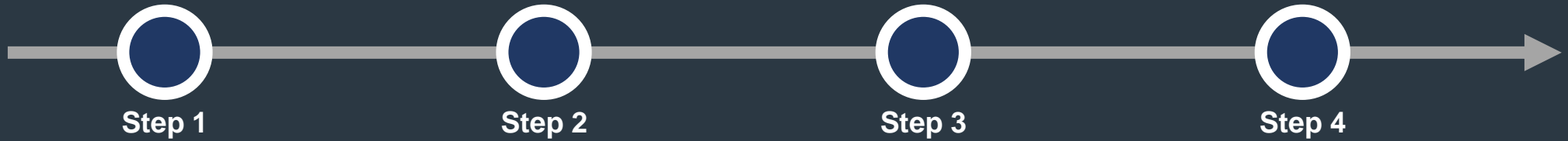
For and on behalf of  
Kleentek Corporation, Tokyo Japan,

Manager, Overseas Department

Shinagawa Techno Bldg. 4F  
2-7-7 Higashi-Ohi, Shinagawa-ku, Tokyo 140-0011, Japan  
Tel : +81-3-3740-4143 Fax : +81-3-3740-4966



# 1. Our Framework



Client,  
(You)

- initial contact
- expression of interest
- initial discussion

## Step 2

- benchmarking of oil performance (using Kleentek Oil Analysis report)
- benchmarking of oil performance using independent laboratory

## Step 3

- taking delivery of Kleentek's Oil Cleaner
- preparation of materials and resources
- ...

## Step 4

- taking delivery of oil cleaner
- implementation of oil management control
- perform oil top-up and replenishment based on Kleentek's recommendation

Focus Machinery  
Pte Ltd,  
Singapore

- understanding of technical background, application
- collection of oil samples, (used/new)
- membrane patch testing, internal

- negotiation of pricing and payment term
- drafting of technical solution based on client's environment
- placement of order with the maker

- commissioning, installation of system
- boardroom presentation, on-site training
- ...

- performance measurement
- regular interval oil performance measurement
- yearly onsite visit with customer,

Kleentek Corp  
Inc., Japan

- maker informed of the client, enquiry
- processing of oil samples
- oil analysis report

- maker produce the Kleentek machine with accordance to technical requirement
- tentative lead time: approx. 3 months

- oil samples are sent back to Kleentek Corp Inc., Japan for oil analysis
- provide recommendation based on the oil analysis
- ...

- feedback on the performance of client's environment
- provide recommendation and feedback on client's environment
- ...

For more information, please contact your regional/local sale agent and representative

## 2. Application of Kleentek: Electrostatic Oil Cleaner

### Type of Lubricant/Oil

### Specific Application

Hydraulic Oil  
VG22 ~ 68

Hydraulic Press; Casting Machine; Forging Machine; Injection Molding; Steel Mill/Paper Mill; Gauge Control System (Steel, Aluminums, Paper); Governor Control (Power Plant); Machining Centers; Test Stand Simulator



Lubricant  
VG68 ~ 200

Mechanical Press Machine; Gas & Steam Turbines (Power Plants); Paper Dryer Bearing; Vacuum Pumps;



Turbine Oil

Power Plants



### Summary:

Application Oil : Mineral based oil with the exception of engine oil  
Viscosity : below 200mm<sup>2</sup>/s  
Temperature : below 60°C

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### 3. Value Proposition of Kleentek: Electrostatic Oil Cleaner (“EOC”)

To promote sustainable practice through the reduced use of non-renewable natural resource by refocusing the use refined mineral oil while ensuring maximum uptime; reduce cost of maintenance and minimizing operational impact.

## 4. Kleentek: Electrostatic Oil Cleaner (EOC) TP Series – Features

### Designed for: (Industry)

- ✓ Plastic Manufacturing
- ✓ Power Generation – Utilities
- ✓ Automobile
- ✓ Aviation
- ✓ Paper Pulp/Mills and etc..

### Applicable for:

- ✓ Hydraulic Fluid
- ✓ Circulating/Lube Oil
- ✓ Gear Oil
- ✓ Thermal Oil
- ✓ Compressor Oil
- ✓ Mineral Oil Cutting Fluid
- ✓ Transformer Oils
- ✗ Water-based Fluids
- ✗ Engine oil, synthetics



Picture above is for illustration purposes. Difference models may or may not differ from the one above.

### TP Series: Product Features

- Improved Ergonomic Setup - Digital Display
- Improved Digital Control
- Remote Monitoring Enabled (PLC)
- 15kV Potential Cleaning Chamber for Faster Cleaning Performance
- Higher High-Voltage Transformer (“HVT”) Capacity
- Available in various models in different capacities
- Designed and Made in Japan, Tokyo – Certificate of Origin/Manufacture, available upon request

Please contact your local/regional agent more details.



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### Benefits of EOC:

- Eliminate Hydraulic Problems
- Eliminate Oil Leakages
- Eliminate Stuck Servo Valve
- Eliminate Oil Contamination
- Eliminate Varnish Formation
- Eliminate Oil Oxidation Product
- Improve Membrane Patch Colorimetry (“MPC”) Varnish Potential

Please contact your local/regional agent more details.

## 4. Kleentek: Electrostatic Oil Cleaner (EOC) TP Series – Features

### Technical Advantage:

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- ✓ Reduced Footprint
  - ✓ Compact Size
  - ✓ Improved Performance
  - ✓ Digitalize Display & Control
  - ✓ Remote Monitoring Enabled
- 

### Technology:

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- ✓ Remove Insoluble Solid Contaminant and Varnishes
  - ✓ Remove Oil Oxidation Products
  - ✓ Clean “internal surface” of the component of your system
  - ✓ Eliminate damages to your hydraulic lubricant due to “spark discharge”
- 



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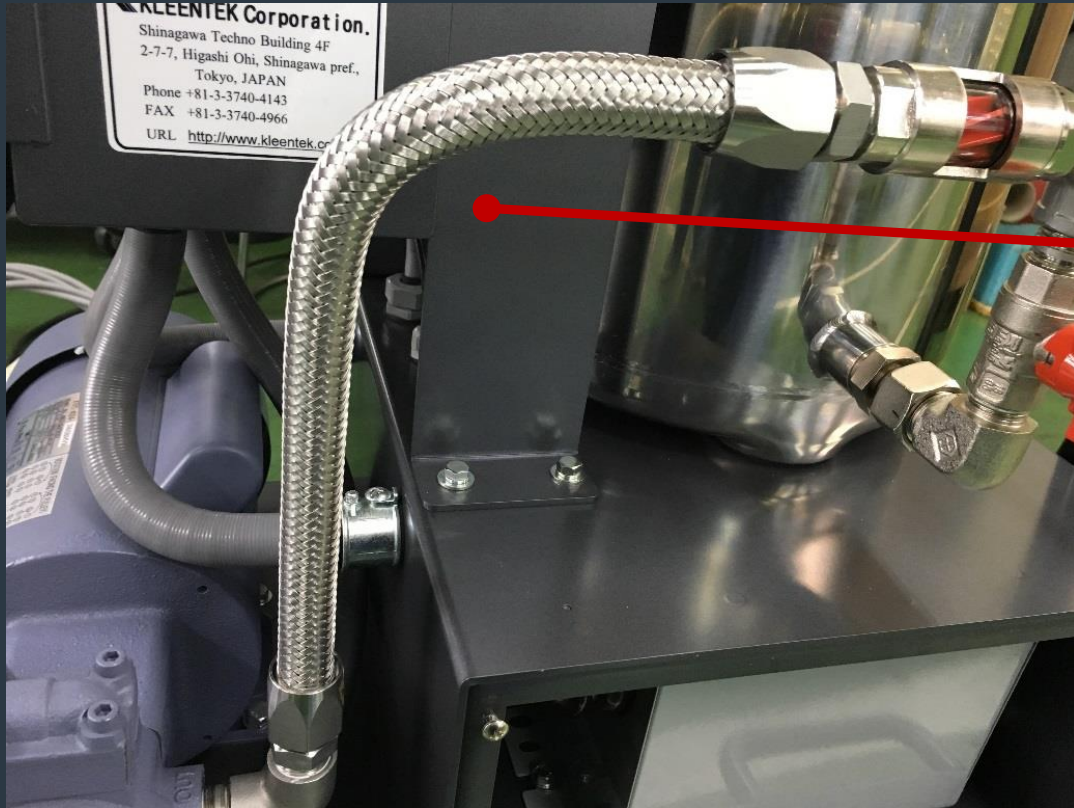
## 5. Additional New Feature on the TP Series



### Additional New Feature on KLEENTEK: TP Series

- ✓ **Sampling Valve:** improve and increase the ease of drawing fluid sample from the oil cleaner for sampling of fluid
- ✓ **Flexible Hose:** improve the easy of pump replacement and ease of servicing when the pump need to be replaced.
- ✓ **Touch Screen:** improve the ease of operating the equipment, allow the users to navigate through multiple-function and features and clearing of errors
- ✓ **Propeller Flow Indicator:** this new added feature enable the user/operator of the equipment to have a visual indication of the directional flow of the fluid
- ✓ **Collector Stopper:** newly added feature to ensure a constant fixture of the cartridge collector into the cleaning chamber

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Water contamination!  
Auto retry in progress.  
Please wait for automatic restart.

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Auxiliary Relay (MR2) detects overcurrent conditions for 3 seconds or more, the **AUTO RETRY** function activates. When **AUTO RETRY** activates, the pump operation is terminated/turned off, and then the screen is change to **AUTO RETRY** screen as indicated on the right side.

Refer display indicated on the left side

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When the pump operation is resumed, the high voltage transformer will be turned on and the **AUTO RETRY** screen is changed to **RUNNING STATUS** screen automatically.



## 5. Additional New Feature on the TP Series



Overcurrent!  
Possible water contamination.  
Please check oil condition.

Reset

Back

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### RETRY Function

The AUTO RETRY function works only when the excess current is detected less than 4 times within 24 hours. When excess current is detected more than 4 times within 24 hours, the status is change to overcurrent alarm. If subsequent overcurrent is not detected within 24 hours, the AUTO RETRY number is reset to zero. When OVERCURRENT alarm is sounded, the pump operation is

## 5. Additional New Feature on the TP Series



Overcurrent!  
Possible water contamination.  
Please check oil condition.

Reset      Back

### Additional New Feature on KLEENTEK: TP Series

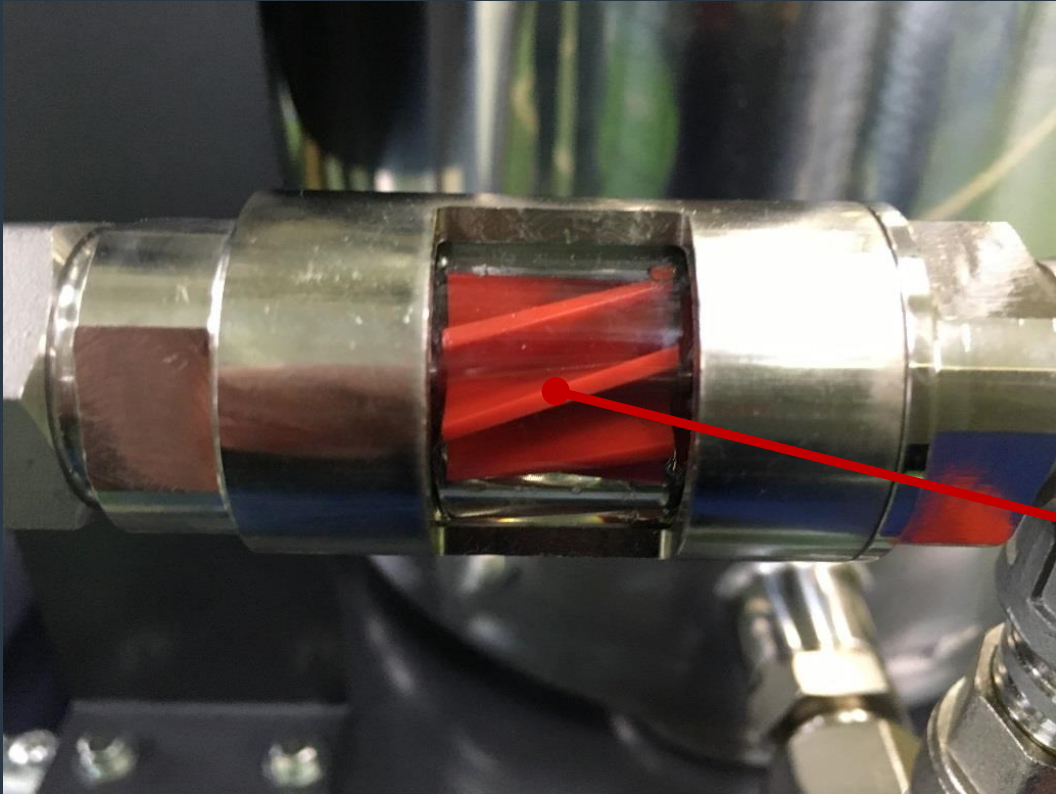
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#### RETRY Function

When OVERCURRENT alarm is sounded, the pump operation is terminated. The high voltage transformer will be cut-off, and the overcurrent alarm screen will re-appear automatically.

**[Action Required by User]:** Confirm the concentration of the water in the oil or check the condition of the Cartridge Collector. Press RESET icon to reset the alarm, and BACK icon to return back to the home menu.

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## 6. Kleentek: Electrostatic Oil Cleaner (EOC) TP Series – Optional Accessories

Models TP Series:	Ergonomic Trolley Handle	Screen Protector	Ergonomic Lifting Handle	Power Supply Option	Delivery Lead Time
<b>EOC-R25TP</b>	●	●	○	<ul style="list-style-type: none"> <li>• Single Phase, 120V, 50Hz,</li> <li>• Single Phase, 220V, 50Hz,</li> <li>• Three Phase, 318V, 50Hz,</li> <li>• Three Phase, 400V, 50Hz</li> </ul>	3.5 months/ 14 weeks
<b>EOC-R50TP</b>	●	●	○	<ul style="list-style-type: none"> <li>• Single Phase, 120V, 50Hz,</li> <li>• Single Phase, 220V, 50Hz,</li> <li>• Three Phase, 318V, 50Hz,</li> <li>• Three Phase, 400V, 50Hz</li> </ul>	3.5 months/ 14 weeks
<b>EOC-R100TP</b>	●	●	●	<ul style="list-style-type: none"> <li>• Single Phase, 120V, 50Hz,</li> <li>• Single Phase, 220V, 50Hz,</li> <li>• Three Phase, 318V, 50Hz,</li> <li>• Three Phase, 400V, 50Hz</li> </ul>	3.5 months/ 14 weeks

Remarks: ○ Not Available

● Available

## 7. Kleentek: Electrostatic Oil Cleaner (EOC) TP Series – Optional Accessories



### Option 1: Screen Protector

Screen protector add-on accessories that helps to protect the LCD screen against both physical and accidental impact protection, as well as harsh climate, environmental condition and exposure.

Protect the LCD screen from smudges, fingerprints and other oily residue from remaining on the LCD.

Material: Acrylic Plastic Cover



### Option 2: Ergonomic Trolley Handle

Improve the ergonomic working environment of your facility, by selecting this optional seam welded onto the chassis of your Kleentek: Electrostatic Oil Cleaner (EOC) for durability, functionality and practicality reason.

Ensuring that you will have a strong and practice handle for you or your staff to move the oil cleaner around your facility with ease.

## 7. Kleentek: Electrostatic Oil Cleaner (EOC) TP Series – Optional Accessories



### Option 3: Ergonomic Lift Handle

Optional ergonomic lifting handles provides ergonomic lifting point for operator of the machine to lift the oil cleaner in a safe, ergonomic manner.

\*Available only for R50TP and R100TP range.

## 8. Working Principle of Electrostatic Oil Cleaner (“EOC”)



### Operating Principle of EOC



Contaminants within the oil are charged using the electrode. The charged particles will move towards the electrode having opposite polarity.



EOC has the ability to eliminate any kinds and sizes of contaminants including sub-micron contaminants



Combined both the principle of electrophoresis & dielectrophoresis

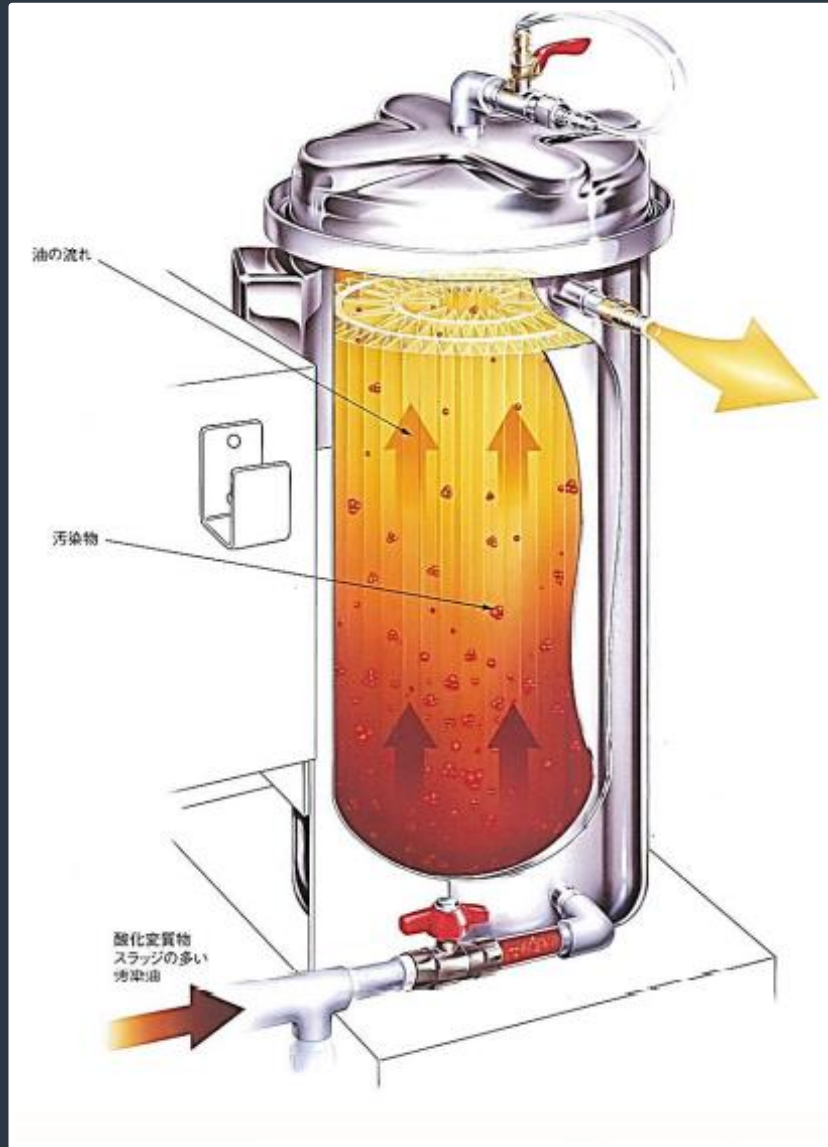


Patented designed collector materials that deform the electrical field and neutral contaminants are attracted to the strongest field region (Dielectrophoresis)



Free-flowing of the fluid within the cleaning chamber. No pressure differences between the bottom and the top of the cleaning chamber

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## 8. Advantages, Features and Performance



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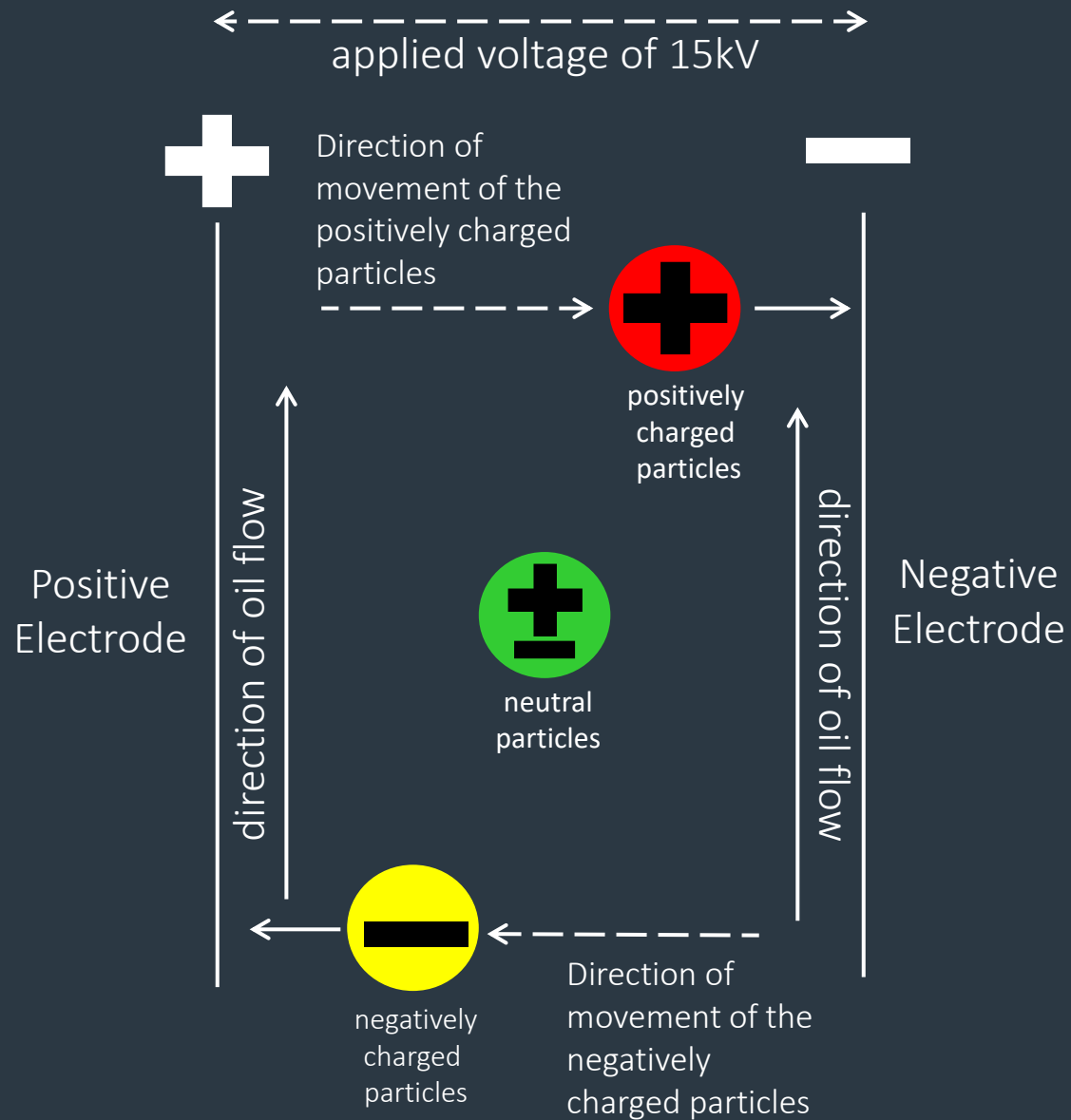


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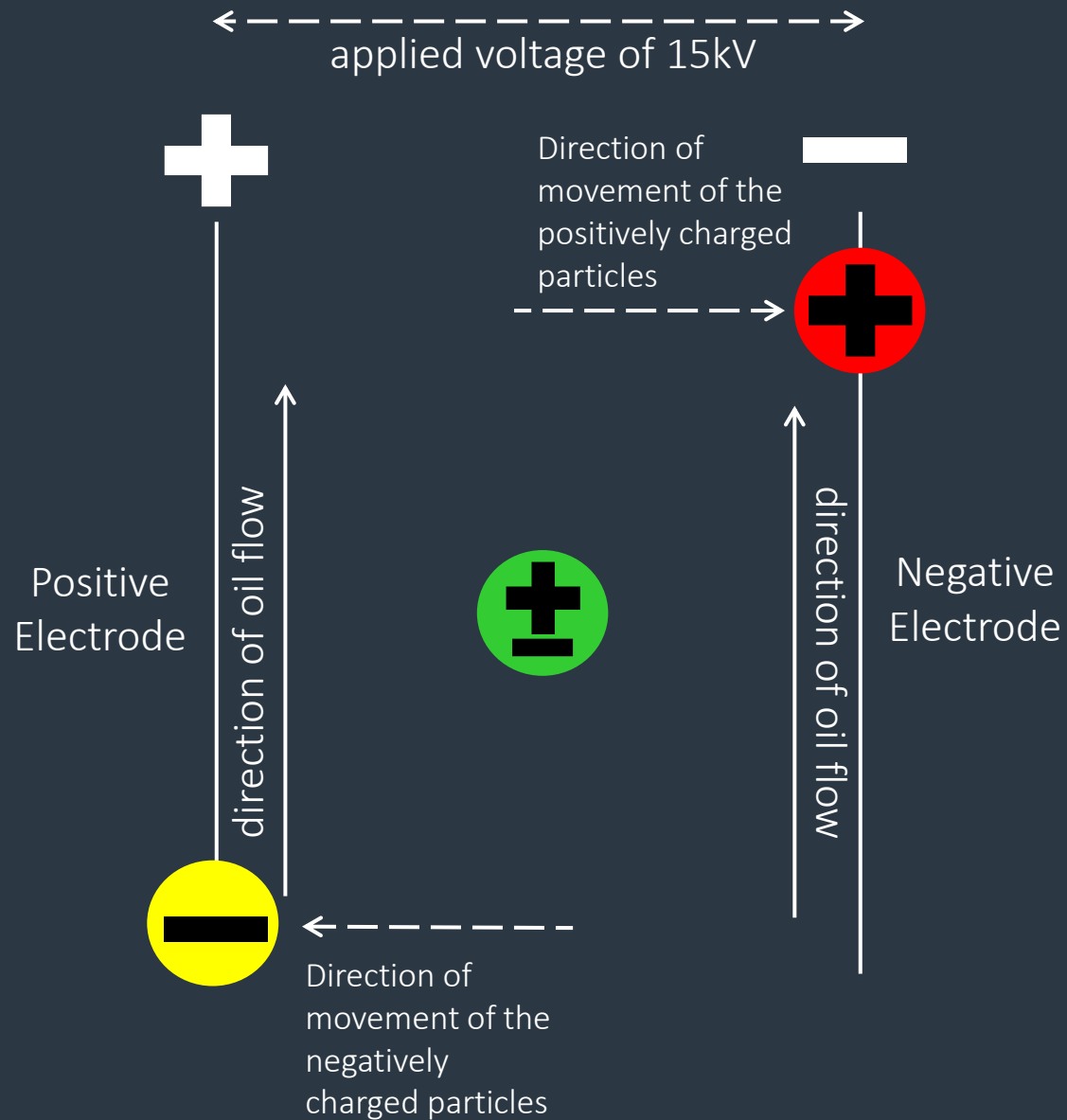


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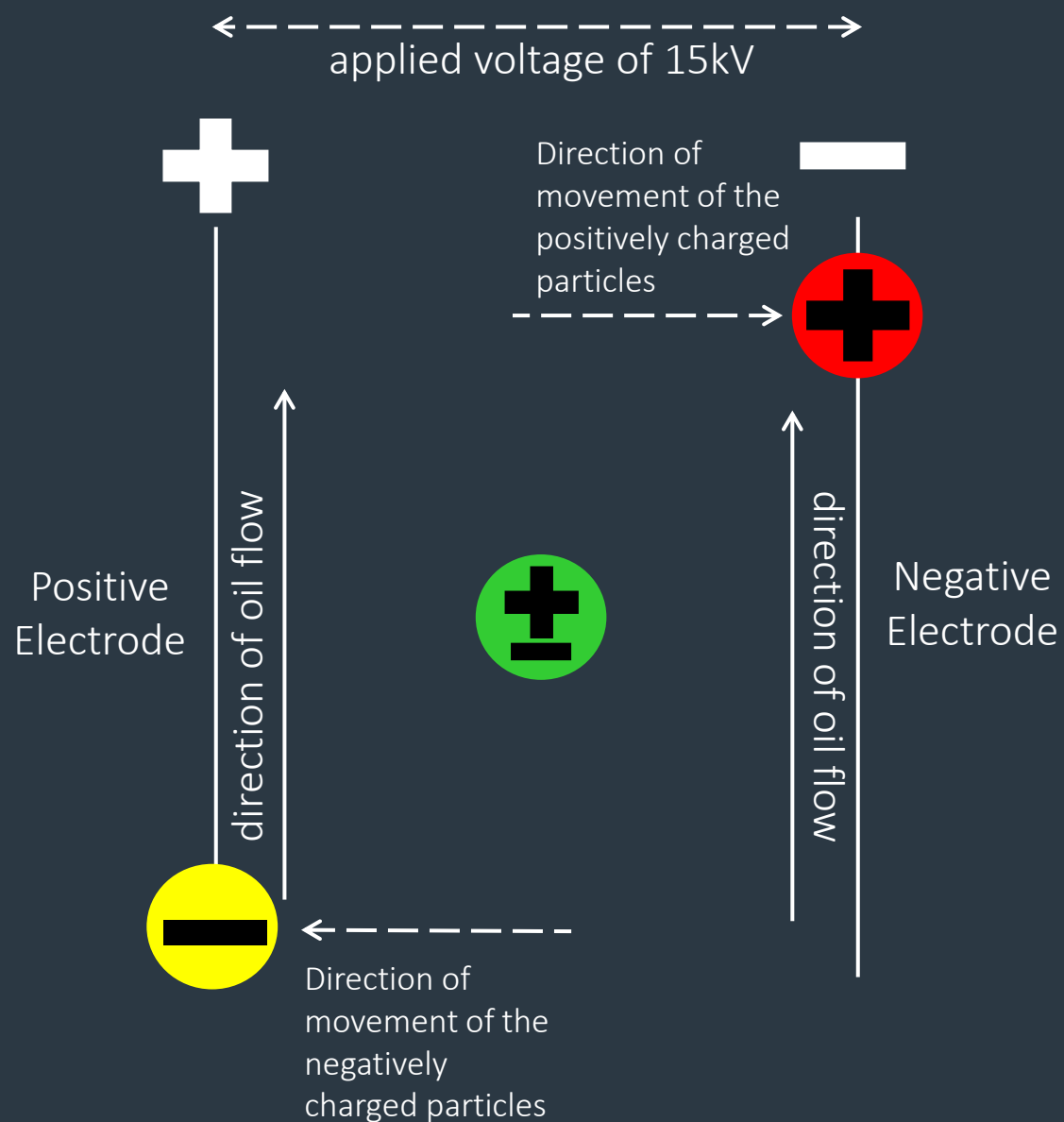
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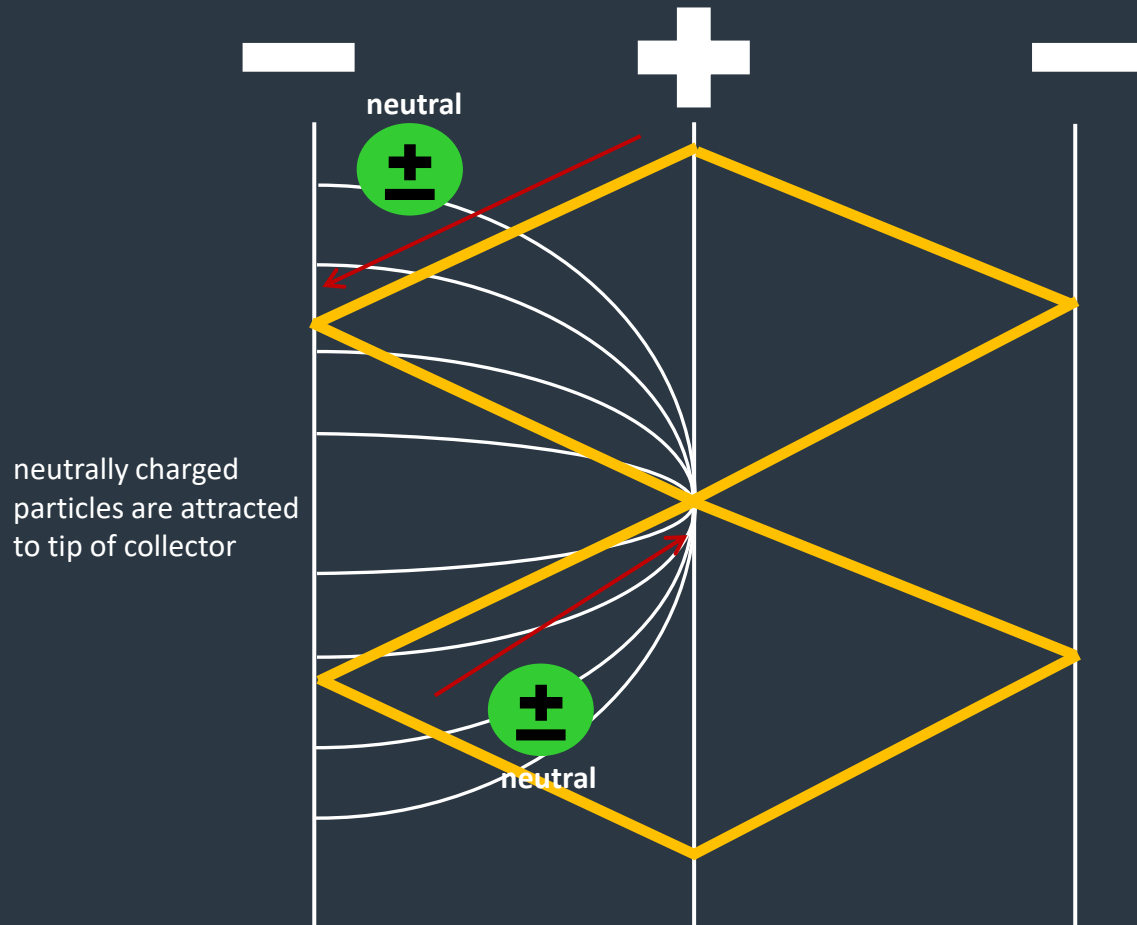
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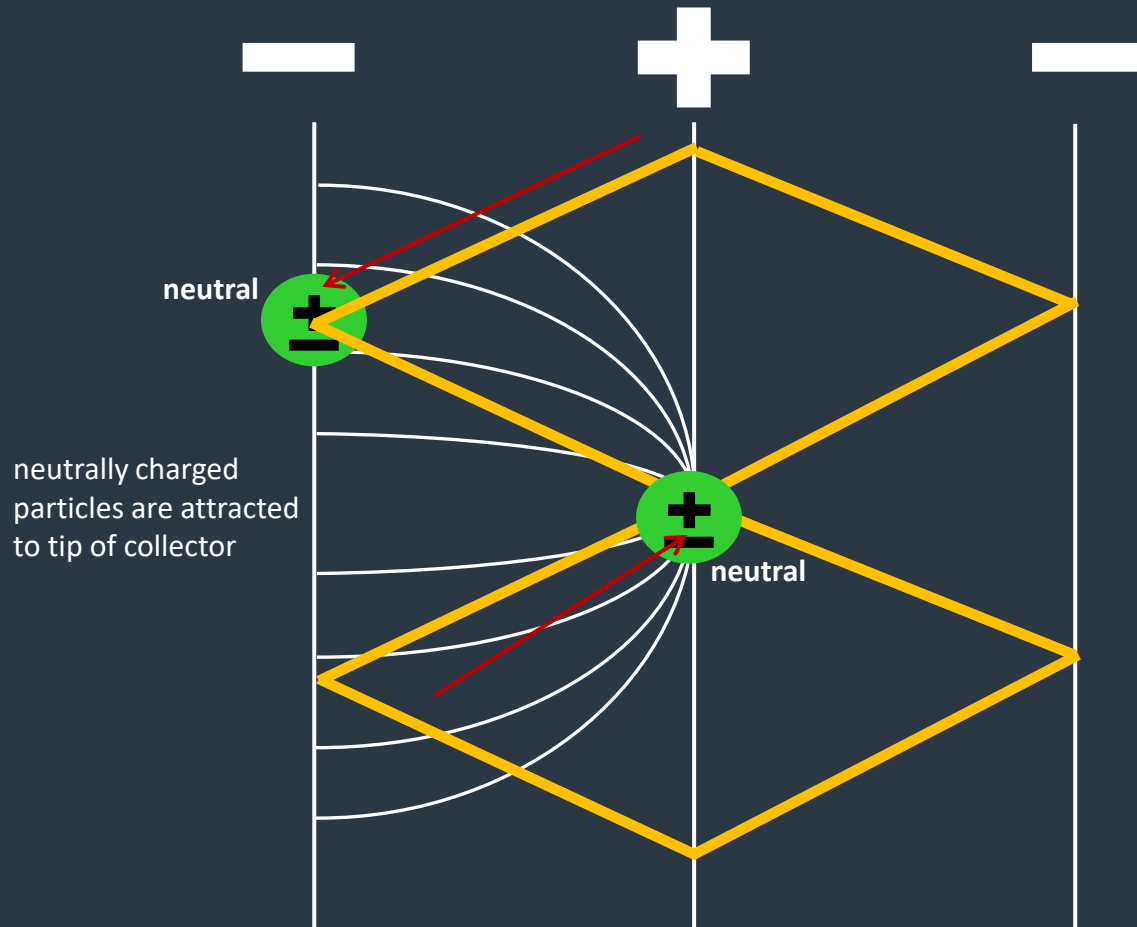
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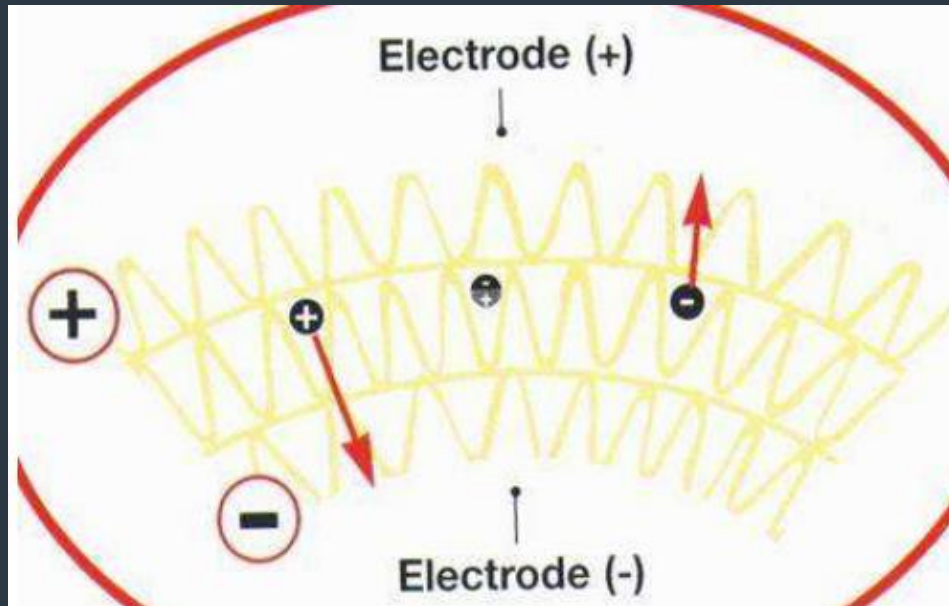
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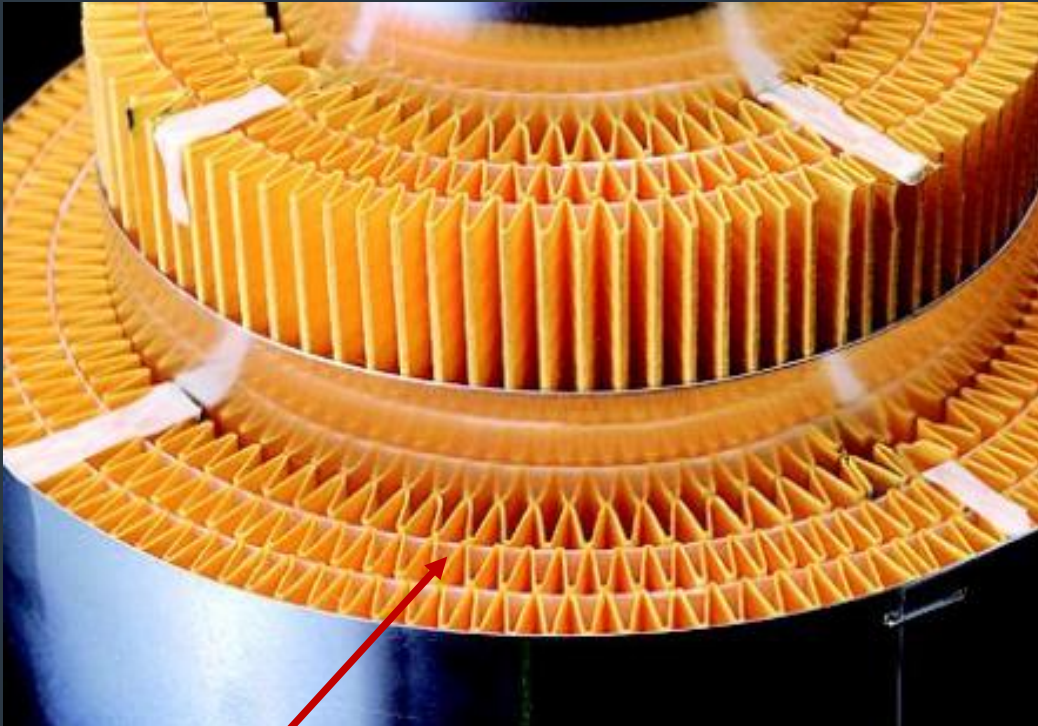
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## 8. Working Principle of Electrostatic Oil Cleaner (“EOC”)



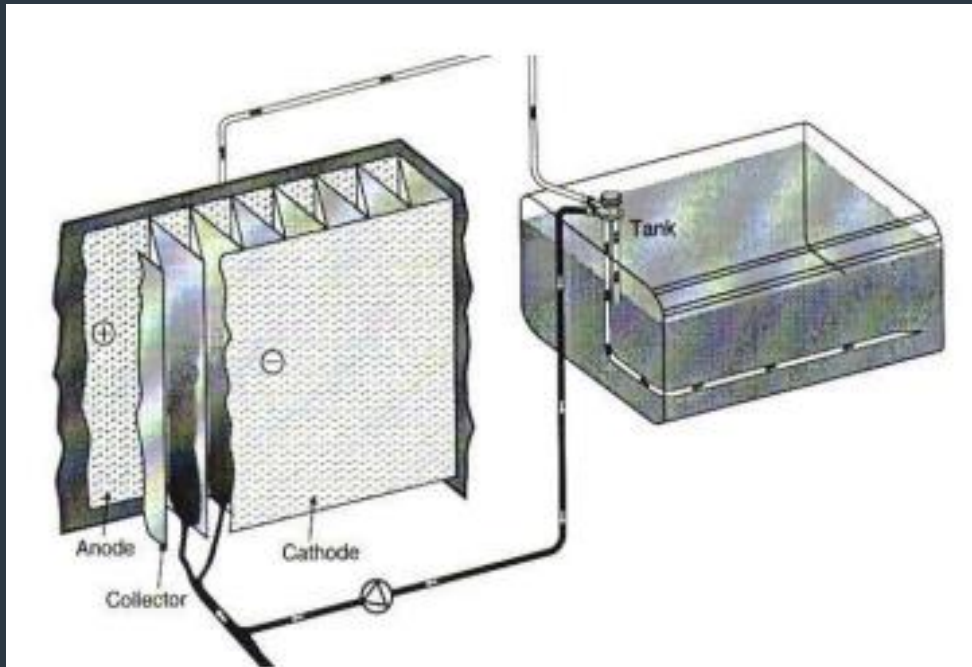
Honeycomb Structure

### Operating Principle of EOC

- ✓ Contaminants within the oil are charged using the electrode. The charged particles will move towards the electrode having opposite polarity.
- ✓ EOC has the ability to eliminate any kinds and sizes of contaminants including sub-micron contaminants
- ✓ Combined both the principle of electrophoresis & dielectrophoresis
- ✓ Patented designed collector materials that deform the electrical field and neutral contaminants are attracted to the strongest field region (Dielectrophoresis)
- ✓ Free-flowing of the fluid within the cleaning chamber. No pressure differences between the bottom and the top of the cleaning chamber



## 9. Implementing and Operating Electrostatic Oil Cleaner (“EOC”)



### Implementing, Operating and Running your EOC

- ✓ Simple, quick and straightforward Implementation and Installation
- ✓ No modification to your existing machine/system is required
- ✓ Promote Active-Active (“online”)/Active-Passive (“off-line”) setup, no downtime is required for mission-critical application
- ✓ Just connect the power supply, one inlet and return hose to and from your Kleentek, Electrostatic Oil Cleaner, and your system will be up and running in no time



## 9. Implementing and Operating EOC



### Change of Kleentek: Cartridge Collector(s)


- ✓ Cartridge Collector(s) are replaced every 2,000 hours
- ✓ Necessary to ensure maximum cleaning efficiency
- ✓ Procedure requires only 30 minutes
- ✓ Primary machine do not require to be shutdown


## 10. Comparison between using an EOC vs Conventional in-line Filter


### Using a Traditional and Conventional in-line Filter

 Replace line-filter when clogging occurs


 Change of oil when hydraulic failures occurs


 Change of oil when oil providers recommends a oil change  
(without system flushing)


 Oil change continue to be part of the requirement of the preventive maintenance schedule with accordance to majority of the manufacturer – environmentally not sustainable


 Remove up to micro-level particles (6 $\mu$ m) sized particles only. This is equivalent of particle sized up fine iron oxide


### Using a Kleentek: Electrostatic Oil Cleaner

 No clogging of the Kleentek Cartridge Collectors upon reaching it lifespan of approximately 2,000 hours  
Note: depending on the level of contamination

 Removal of sub-micron particles and oil oxidation products that accounts for 70% of the contaminations that take place in a hydraulic system

 Removal of oil oxidation product from the surface of the internal component without removal of complex components

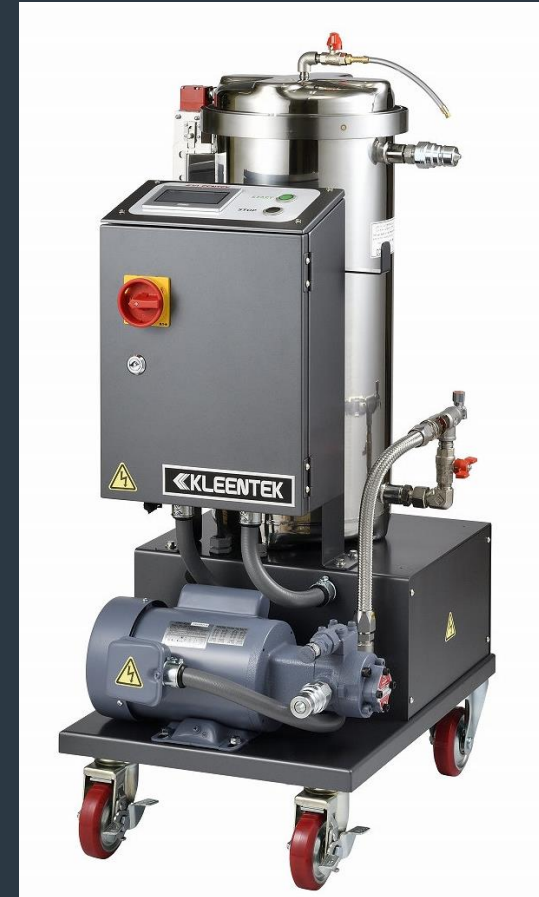
 No oil change is would be required  
Note: small quantity of oil (5% to 10%) top-up would be required in order to replenish the drop in level of oil additive and due to depletion of oil samples for testing

 Ability to remove up to sub-micro level particles (0.03 $\mu$ m) sized particles. This is equivalent of up to carbon sized particles at a microscopic level.

# 11. Comparison between using an EOC vs Conventional in-line Filter

Using a Traditional and Conventional in-line Filter

Using a Kleentek: Electrostatic Oil Cleaner



This slide has been left blank intentionally  
for presentation illustration purpose

## 12. Advantage of Using Electrostatic Oil Cleaner (“EOC”) – TP series

### Measures

#### Productivity

### Details

- reduce machine downtime
- reduce the no. of defective parts produce
- ensure consistent and high-quality of manufactured parts

#### Environment

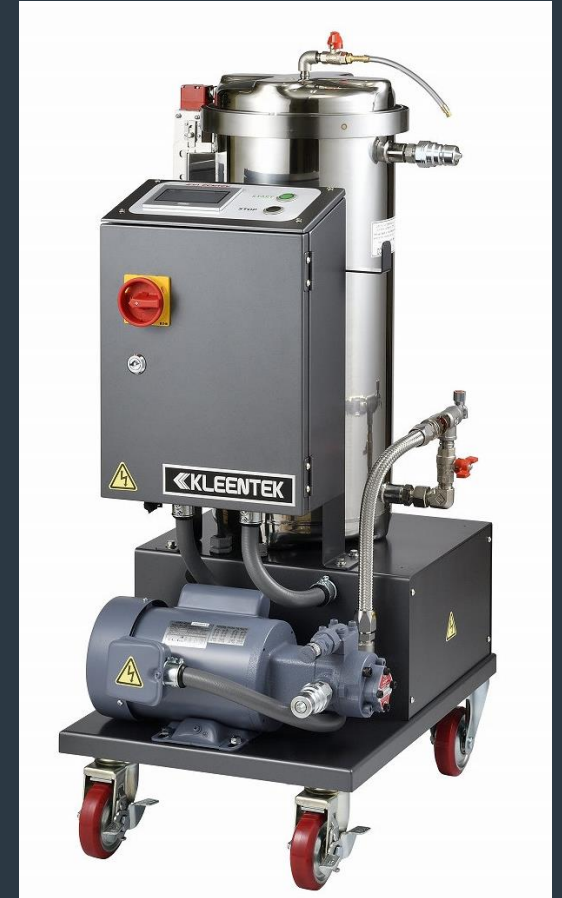
- extend life of lubricating fluid/oil used
- encourage energy saving
- reduce oil leakage – from components and oil seals

#### Cost Reduction

- reduce freq. and vol. of oil purchases, disposing of expenses
- reduce cost of maintenances of equipment
- reduce and eliminate the occurrence of servo value failure and pump failure

#### Sustainability

- reduce the use of non-renewable natural resources
- refocus of refined minerals oil/lubricant
- promote the use of sustainable practices



Picture above is for illustration purposes.  
Difference models may or may not differ from the one above.  
Please contact your local/regional agent for more details.  
Subjected to changes without notice.

### 13. Kleentek: Electrostatic Oil Cleaner – TP series Physical Dimension and Specification

Models TP Series:	Dimension (Length x Width x Height) (in mm):	Weight (in kg):	Pump Flow (lit/min):	Consumable Parts:
EOC-R25TP	701 (mm) x 366 (mm) x 959 (mm)	70 kg	3.7	<ul style="list-style-type: none"> <li>• CC-R25SP x 1 pcs</li> <li>• CC-R25V x 1 pcs</li> <li>• CC-R25PP x 1 pcs</li> </ul>
EOC-R50TP	738 (mm) x 453 (mm) x 1,104 (mm)	100 kg	9	<ul style="list-style-type: none"> <li>• CC-R50SP x 1 pcs</li> <li>• CC-R50V x 1 pcs</li> <li>• CC-R50PP x 1 pcs</li> </ul>
EOC-R100TP	1,084 (mm) x 468 (mm) x 1,087 (mm)	160 kg	12	<ul style="list-style-type: none"> <li>• CC-R50SP x 2 pcs</li> <li>• CC-R50V x 2 pcs</li> <li>• CC-R50PP x 2 pcs</li> </ul>
EOC-R200TP	1,110 (mm) x 867 (mm) x 1,164 (mm)	300 kg	24	<ul style="list-style-type: none"> <li>• CC-R50SP x 4 pcs</li> <li>• CC-R50V x 4 pcs</li> <li>• CC-R50PP x 4 pcs</li> </ul>



## 15. Case Study – Tokyo Motomotive Co., Ltd, Japan – Cost Benefits Analysis

Item	Description of Content	w/o Kleentek Implementation (USD)	with Kleentek Implementation (USD)	Cost Saving (dollars/year) (USD)
servo valve replacement	average 3 times a year (@USD 6,250/year)	18,750	0	18,750
cost of oil replacement	$\frac{7,000 \text{ litres}}{3 \text{ years}} = 2,333 \text{ litres/year}$ $2,333 \text{ litres} \times \text{USD } 4.00 = \text{USD } 9,333$	9,333	0	9,333
cost of collector per year	replacement of collector twice per year @ USD 820 per collector	0	1,640	-1,640
oil addition (recommended)	5% of tank capacity of 7,000 litres (7,000 litres x 5% = 350 litres) (350 litres x USD4.00 = USD1,400.00)	0	1,400	-1,400
energy saving	reduce 5% of power consumption of hydraulic pump motor 417kW (150kW x 2 machine x 95 x 22kW) (417kW X 46% X 18h X 22 days X 12 months X 5% X USD013USD/kWh)	118,500	112,580	5,920
<b>Total Saving</b>		<b>146,580</b>	<b>115,620</b>	<b>30,960</b>

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<b>Total Saving</b>		<b>146,580</b>	<b>115,620</b>	<b>30,960</b>

## 15. Case Study – Tokyo Motomotive Co., Ltd, Japan

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**Customer,  
Region** Tokyo Motormotives Co., Ltd  
Tokyo Shinangawa

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**Department** Engineering and Production Facilities  
Maintenance Department

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**Equipment** Hydraulic Press Machine  
Qty: 5 units  
Vol. of Oil Tank: 4,000 litres

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**Operating Parameters** Operating Temp: 45°C  
Lubri. Brand & Grade: Shell Tellus, VG46

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**Current Practice** Oil Change Cycle: once every 2 years  
Line Filter Replacement: once every year

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**Challenges** Hydraulic Failures  
Value Replacement: once every 3 years  
Pump Malfunction: once every 2 years

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# 15. Case Study – Tokyo Motomotive Co., Ltd, Japan (cont.)

## ANALYSIS REPORT

No. 20669-1 ( T-H ) 47307  
 DATE OF REPORT : 03MAY2021  
 SALES CONTACT : TSUBACO

Customer: AQUA ELECTRIC APPLIANCE VIETNAM

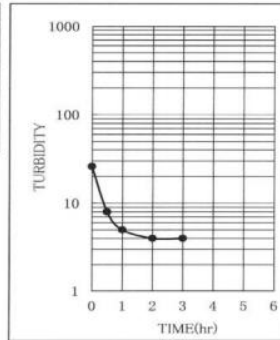
We're pleased to report the analysis results of your oil as follows :

### 1. TEST

SAMPLE DATA	
OIL NAME	Shell Tellus Oil S2 M46
EQUIPMENT	Injection machine
CLEANER	NONE
OPERATING HOURS	
OIL VOLUME	2,500L
FLUID TEMP	40-50
TESTING CONDITIONS	
CLEANER TYPE	EDC-03
TRIAL QUANTITY	1.0L
TEMPERATURE	18.6→27.0°C
VOLTAGE	14kV
CURRENT	0.7→1.5 μ A
FLOW RATE	0.34ℓ/min

### 2. SHIFT OF TURBIDITY

TIME(hr)	TURBIDITY
0	26
0.5	8
1	5
2	4
3	4



### 3. TEST RESULT

SAMPLE	USED OIL	EDC 3hrs	
GRAVIMETRIC LEVEL	7.1mg/100ml	0.4mg/100ml	
WATER CONTENT	60ppm	—	
Membrane Filter MILLIPORE CAT No.,AAWG04700  Size : 0.8 μ m Fluid Volume : 100ml			

### Kleentek Corporation

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 Shinagawa-ku, Tokyo, 140-0011 JAPAN  
 Tel : +81 3 3740 4141  
 Fax : +81 3 3740 4966



## Sample Oil





For more information, you may reach us at:



**WRITE TO US**

[sales@focusmachinery.com.sg](mailto:sales@focusmachinery.com.sg)  
[enquiry@focusmachinery.com.sg](mailto:enquiry@focusmachinery.com.sg)



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