

# Base Oil Polishing & Finishing Plant



# POLISHLUBE™



Treatment & Polishing of  
Base Oil as per API Group II

The **POLISHLUBE** plants are advanced systems developed by **Enviroflex** for the treatment, upgrading, and polishing of a wide range of oils. They are designed to process distilled lube oil through our proprietary activated adsorbent **TURBOSORB**, available in capacities from **0.2 to 100 tons per day**. Beyond conventional distilled black base oil polishing, **POLISHLUBE** plants are also applied for:

- \* **Upgrading of base oil** to API Group II or Group I+ quality
- \* **Polishing of diesel and distilled fuels** to improve clarity and stability
- \* **Treatment and decolorization of dark paraffinic oils**
- \* **Regeneration of hydraulic oils** and other industrial lubricants

All plants are engineered and manufactured in Germany to meet stringent performance standards. They deliver the following key results:

- \* **Significant reduction of sulfur content**
- \* **Improvement of color**, from dark to light yellow
- \* **Reduction of aromatic compounds** and complete removal of unpleasant odors
- \* **Effective neutralization of acidity**
- \* **Removal of esters**
- \* **Improvement of Cold Cranking Simulator (CCS)** values at  $-25\text{ }^{\circ}\text{C}$ , important factor for production of **0W** and **5W** engine lubricants
- \* **Elimination of particulate matter and dirt**

What sets Enviroflex **POLISHLUBE** plants apart from conventional polishing systems is **their continuous cyclic operation**. Using an automated program, the adsorbent inside the reactors is regenerated automatically after each polishing cycle. This enables the same adsorbent to be reused many times – typically **150 to 500 cycles before replacement**. The process consists of three main stages:

1. Oil Polishing
2. Adsorbent Reactivation

This innovative design enables:

- \* **Stable operation** with minimized operating cost
- \* **High reusability** of adsorbent, reducing consumable requirements
- \* **Consistent product quality** without interruptions

A typical **POLISHLUBE** system is composed of several integrated modules:

- \* **Oil Polishing Modules (Banks)**
- \* **Feed & Discharge Module**
- \* **Adsorbent Reactivation Module**
- \* **Control Module**

Additionally, **POLISHLUBE** plants can be configured with **jacketed reactors** (boiler-grade steel) or **simple columns**, depending on the application and the quality of feedstock. Where required, pretreatment steps can be added downstream of the polishing unit to adapt the process to different types of used oils or feedstocks.



Before Polishing

Polished Oil after Treatment and Polishing of Black Distilled Lube Oil

After Polishing



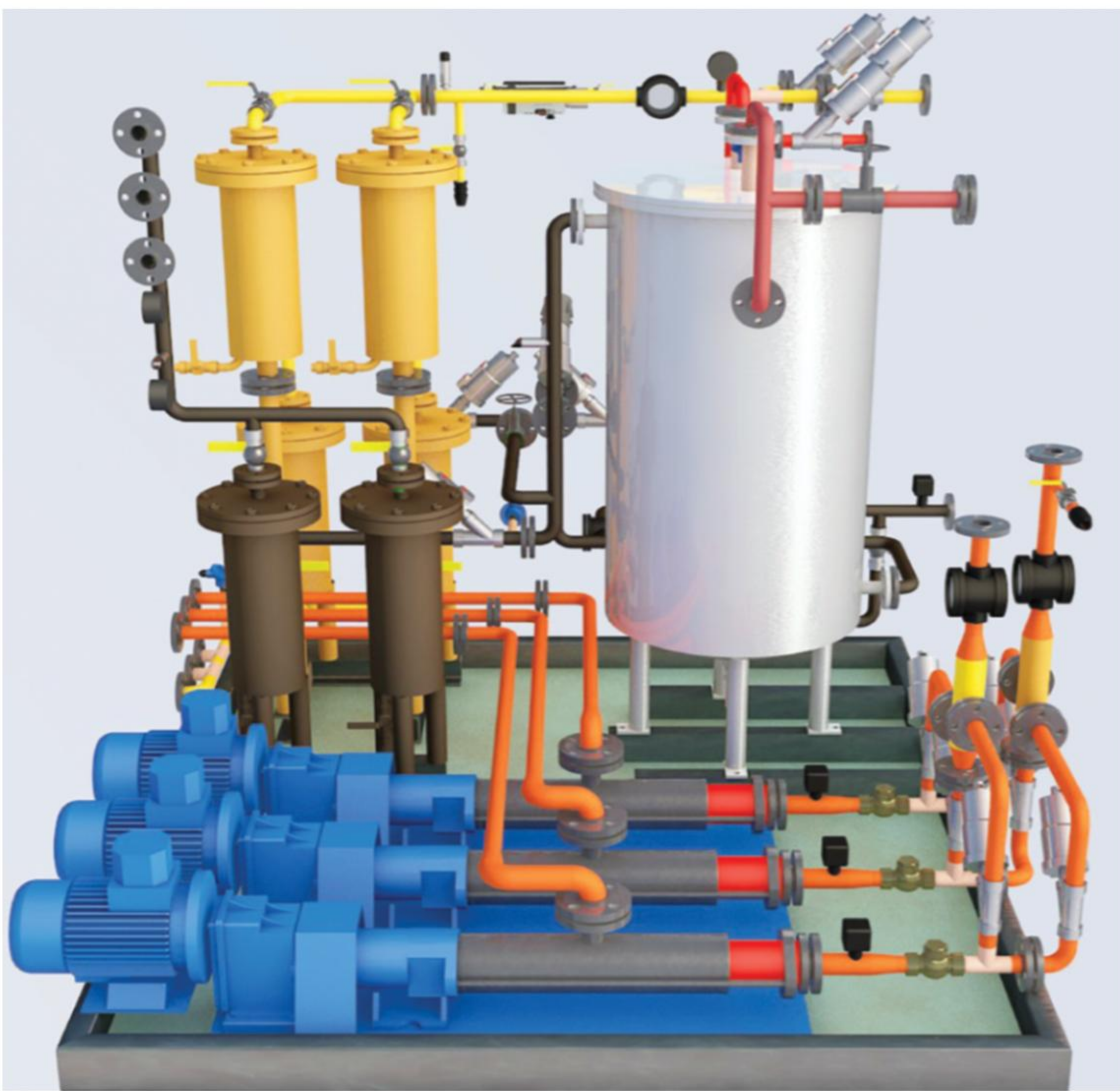
POLISHLUBE PLANT, 3 Bank, 36 Jacketed Reactors, Contains 6500 kg TURBOSORB Adsorbent, 15 ton/day

## Typical Quality Achieved After Polishing\*

(\*depending on feedstock quality and number of passes)

- ✓ **Sulfur content:** < 300 ppm (ASTM D2622)
- ✓ **Color:** < 1.0 (water-white to light yellow) (ASTM D1500)
- ✓ **Acidity (TAN):** < 0.05 mg KOH/g (ASTM D974)
- ✓ **Aromatic content:** reduced to 2–5% (ASTM D2007)
- ✓ **Ester content:** reduced to near zero
- ✓ **Odor:** neutral, no unpleasant smell
- ✓ **Cold Cranking Simulator (CCS at  $-25\text{ }^{\circ}\text{C}$ ):** < 3500 mPa·s (ASTM D5293)
- ✓ **Particulate matter & dirt:** fully removed

As per API Group II or Group I+



**Feed & Discharge Module**



**Polishing Module, 30 Columns  
5400 kg TURBOSORB**

The **operational cost** of our **POLISHLUBE** plants is exceptionally low. For example, a plant in Europe with a feed capacity of **20 tons/day** ( $\approx 6,000$  tons per year) has the following typical cost structure:

- \* Approx. **8 EUR/ton** for adsorbent and other consumable materials & spare parts
- \* Approx. **15 EUR/ton** for energy consumption
- \* Approx. **15 EUR/ton** for operational staff
- \* Total cost: **about 38 EUR/ton**, equal to a maximum of **42 US\$/ton** ( $\approx 228,000$  EUR per year)

During the final stage of adsorbent reactivation, a small fraction of high-sulfur oil (referred to as **Scrap-Oil**) is separated. The amount of Scrap-Oil is typically **no more than 2% of the feed oil** to the polishing plant.

Importantly, this Scrap-Oil is **not considered waste** – it can be:

- \* **Reprocessed** in the distillation unit of the re-refinery, or
  - \* **Blended** with black fuel or with the heavy residue fraction from the distillation process.
- This ensures zero waste generation while maximizing product recovery and sustainability.



Polishing by Activated Adsorbent "TURBOSORB"

Up to **500 times** Reactivations before Adsorbent Replacement

Delivered Plant to a Re-refinery in Germany

Design with Jacketed Reactors or simple Columns

With Adsorbent Reactivation Unit

**0.2 to 100 Ton per day,** Feed of distilled Oil



**Cartridge Filter, 0.5 to 5.0  $\mu$ m**



**Roots Blower for Adsorbent Reactivation**



**POLISHLUBE Plant Layout (15 tons/day)**

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