PRODUCT CATALOGUE

OIL MIST SEPARATOR

ENGINEERING, EQUIPMENT AND CONSULTING

Contents

ENEQ Overview

With nine years of solid performance and a project portfolio exceeding €20 million, ENEQ Consult Ltd. is a trusted partner in the power industry. We deliver cost-effective, high-quality mechanical equipment for the nuclear, conventional power, oil & gas, and petrochemical sectors, with a specialized focus on solutions for nuclear power plants with PWR reactor technology.

Our expertise spans the entire project lifecycle, from **equipment supply** and turn-key delivery to critical **engineering analyses** (including FEA & CFD) and comprehensive **service** from production to commissioning and after-sales support. Through exclusive partnerships with 15 global manufacturers, we provide a wide range of equipment compliant with international standards such as ASME, EN, N Stamp, DIN, and ISO.

This catalogue provides detailed technical information on the high-efficiency oil mist separators supplied by ENEQ Consult Ltd. It is intended for technical designers, engineers, and prospective clients seeking a comprehensive understanding of the product portfolio and its application.

APPLICATION AREAS FOR OIL MIST SEPARATORS

Installation on lubricating oil tanks from
- Gas and steam turbines
- Hydro turbines
- Compressors
- Gas and diesel engines
- Vacuum pumps

for applications in
- Upstream (Onshore, Offshore)
- Midstream (compressor stations, LNG)
- Downstream (refineries)
- Power plants

1. The Challenge: Oil Mist in Industrial Operations

Oil mist is a common byproduct in all types of rotating machinery where bearings are lubricated. The heat generated by friction creates fine oil particles that, if not properly managed, can lead to significant problems[2]:

- **Safety Hazards:** Contaminated work halls and equipment create an increased safety risk.
- **Fire Risk:** A lack of negative pressure in the lube oil system can cause leaks in the bearings, increasing the risk of fire[4].
- **Environmental Damage:** Unfiltered oil mist released into the atmosphere causes long-term pollution.
- **Economic Loss:** The loss of expensive lubricating oil and potential damage to machinery increases operational costs.

Our oil mist separators are the ecological and efficient solution to these challenges, ensuring clean air, protecting employees, and helping companies comply with environmental regulations.

ENEQ Oil Mist Separator Portfolio Overview

Type	Key Feature	Application	Volume Flow (m^3/h)	Power & Materials
HG Series (HG10 - HG20)	Compact design for low-volume applications.	Small generators, vacuum pumps, and auxiliary industrial machinery.	10 - 20	• **Power:** Scaled to flow (overall range 0.2-15 kW) • **Materials:** Carbon Steel / Stainless Steel
FF2 Series (Low-Mid Capacity: FF2-011 - FF2-166)	Designed for small to medium turbines, often featuring internal admixed air and integrated oil return lines.	Small to medium gas and steam turbines, turbo compressors, and generators.	23 - 280	• **Power:** Scaled to flow (overall range 0.2-15 kW) • **Materials:** Carbon Steel / Stainless Steel
FF2 Series (High Capacity: FF2-266 - FF2-777)	High-capacity design, often with redundant stand-by vacuum pumps (double	Heavy-duty gas and steam turbines in conventional and nuclear power plants, and large-	320 - 900	• **Power:** Scaled to flow (overall range 0.2-15 kW)

	compressor) for critical operations.	scale industrial compressors.		• **Materials:** Carbon Steel / Stainless Steel
FF2 Series (Very High Capacity: FF2-888 - FF2-999)	Maximum volume flow for the largest industrial applications.	The largest heavy-duty turbines and centralized lube oil systems in major power generation facilities.	1,000 - 2,500	• **Power:** Scaled to flow (overall range 0.2-15 kW) • **Materials:** Carbon Steel / Stainless Steel
Special Solution for Hydro Turbines	A single separator extracts oil mist from up to four separate bearings, with individual vacuum regulation for each line.	Hydroelectric and pump-storage power stations.	Varies; sized per application.	• **Power:** Sized per application requirements. • **Materials:** Carbon Steel / Stainless Steel
Special Solution for Gas/Diesel Engines	Equipped with a frequency converter to automatically regulate pump speed and adapt to changing crankcase pressure.	Peak-load electricity generation plants and other applications using large gas and diesel engines with variable loads.	Varies; sized per engine requirement.	• **Power:** Sized per application requirements. • **Materials:** Carbon Steel / Stainless Steel • **Compliance:** Can be supplied with ATEX, NEMA, and other certifications.

2. Principle of Operation: The Coalescence Effect

Our systems operate on the mechanical filtration principle of **coalescence**. This process is highly efficient and preserves the chemical constitution of the lubricating oil.

1. **Vacuum Creation:** An integrated **side channel vacuum pump**, fan, or blower creates a constant negative pressure in the lubricating oil system, drawing the oil-laden air into the filter housing. The required vacuum can be precisely adjusted millibar-wise.

2. **Filtration:** The air is passed through specially developed, highly efficient **microfiber filter cartridges**. Inside the cartridges, the tiniest oil particles (down to 0.1 µm) collide and merge—or coalesce—into larger droplets.

3. **Oil Return:** Pulled by gravity, the larger oil droplets flow to the bottom of the filter housing and are continuously returned to the lubricating oil tank via an integrated return line. This process recovers valuable oil and extends its longevity.

4. **Clean Air Exhaust:** The purified air is so clean that it can be released directly into the surrounding environment, such as the turbine hall, eliminating the need for complex and expensive external pipework.

3. Performance Specifications & Key Benefits

Our systems are designed for reliable, efficient, and low-maintenance operation.

Performance Metric	Specification
Filtration Efficiency	**99.99%** at a particle size of 0.1 µm
Residual Oil Content	As low as **1-5 mg/m^3** in exhaust air
Maintenance Interval	Up to **30,000 hours** or more of continuous, maintenance-free operation
Lube Oil Quality	Maintained or even improved; viscosity and TAN levels remain constant
Operation	Fully automatic function without the need for on-site intervention

4. Product Series & Technical Data Sheet

4.1 Product Series & Primary Applications

The selection of the correct separator size generally depends on the lube oil tank size of the machine[22]. The portfolio is designed to cover all applications, from small machines to heavy-duty turbines.

Product Series	Volume Flow (m^3/h)	Typical Applications	Image

HG10 - HG20	10 - 20	Smaller machines and auxiliary equipment.	
FF2-011 - FF2-166	23 - 280	Small to medium gas and steam turbines, compressors, and generators.	
FF2-266 - FF2-777	320 - 900	Medium to heavy-duty gas and steam turbines, large diesel engines.	
FF2-888 - FF2-999	1,000 - 2,500	Very large heavy-duty turbines and centralized extraction systems.	

4.2 Detailed Technical Data Sheet

Parameter	Specification & Options
Volume Flow Range	10 - 2,500 m^3/h
Materials of Construction	Carbon Steel or Stainless Steel
Inlet/Outlet Flanges	Standard: EN 1092-1 / ASME ANSI, according to customer requirements
Vacuum Generation	Side Channel Vacuum Pump, Fan, or Blower
Power	0.2 - 15 kW
Power Supply	230/400 V, 50 Hz, or according to customer specifications (e.g., 60 Hz, other voltages)
Certifications	ISO 9001, ISO 14001, EAC, ASME, CE, WPAR
Designs for Hazardous Areas	ATEX-compliant designs for Zone 1 and Zone 2

5. Industries & Application-Specific Solutions

We provide tailor-made solutions for a wide range of industries[35].

5.1 Target Industries

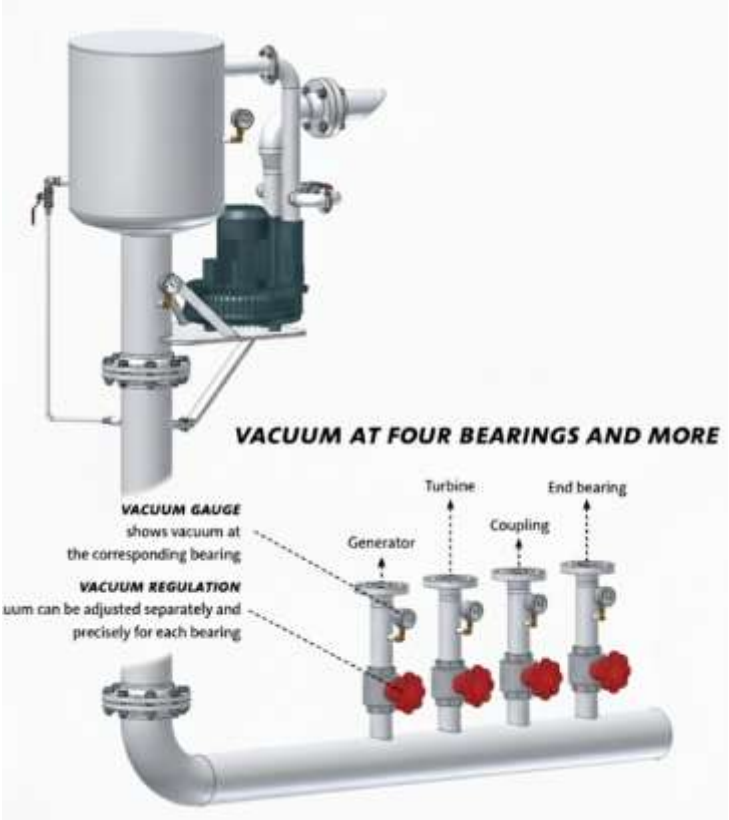
- **Upstream Oil & Gas** (Onshore, Offshore)
- **Midstream** (Compressor Stations, LNG)
- **Downstream** (Refineries)
- **Power Generation** (Conventional, Nuclear, Hydroelectric)

5.2 Gas, Steam & Nuclear Turbines

For these critical applications, reliability is paramount. Heavy-duty models like the **FF2-366** and **FF2-777** are often equipped with a **double compressor (stand-by pump)** to ensure continuous operation and failure safety. In nuclear facilities, our systems have been selected to meet the highest safety regulations.

5.3 Hydro Turbines

Hydroelectric power plants have unique layouts. Our Partner has developed a specialized solution where a **single oil mist separator can extract from up to four bearings** via a manifold distributor. Each line has its own vacuum gauge and regulator for precise, independent adjustment. This design saves significant cost and space.



5.4 Gas & Diesel Engines

These engines often operate with varying loads, causing constant changes in crankcase pressure. To manage this, separators are fitted with **frequency converters**. A differential pressure transmitter sends a signal to the converter, which automatically regulates the pump's speed to maintain a stable vacuum.

6. Technical Design, Customization & Instrumentation

6.1 Installation & Piping

- **Mounting:** The most economical installation is directly on the oil tank.
- **Geodetic Height:** A minimum height must be maintained between the filter outlet and the oil level to ensure gravity-fed oil return[48]. This is achieved with a length-adjusted **standpipe** for direct mounting or **siphon solutions** when the unit is installed at a distance.
- **Pipe Couplings:** To reduce on-site welding and compensate for pipe length tolerances, optional tube couplings provide a fast and secure axial connection.

6.2 Customization & Optional Modules

- **Stand-by Vacuum Pump:** A second, redundant pump ensures failure safety. Installed shut-off valves allow for seamless switchover without further adjustments.

- **Bypass Line:** Protects the system from overpressure and allows for filter cartridge replacement during continuous turbine operation.
- **Internal Admixed Air:** For harsh environments (offshore, deserts), this design draws air from a clean point after the filters to regulate vacuum. It prevents contaminants from being sucked in and eliminates the need for an external air filter and its maintenance.

6.3 Instrumentation & Monitoring

- **Vacuum Gauges:** Systems are equipped with two primary gauges for monitoring:
    - **U1:** Displays the overall vacuum in the lubricating oil system.
    - **U2:** Shows the current differential pressure across the filter cartridges, indicating their level of saturation.
- **Pressure Switches:** An optional pressure switch can be installed to report the system's condition to a central control room, enabling remote monitoring.

7. Maintenance & Service

Our systems are designed for long periods of unattended operation.

- **Filter Change Indicator:** The filter cartridges must be replaced when the differential pressure, as shown on gauge **U2**, reaches a value of approximately **100 mbar**.
- **Simple Replacement:** The replacement process is straightforward and requires no special tools. The fixing Phillips screws are designed to be tightened by hand.
- **Global Service:** We offer on-site assembly, commissioning, and maintenance services performed by experienced technicians and a growing global network of service partners.