

AWS

“LOV” OIL MIST ELIMINATOR

INSTALLATION OPERATION AND MAINTENANCE MANUAL

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1. FOREWORD



The present manual contains safety indications regarding installation operation and maintenance.

- All specific company regulations and national safety regulations are valid and must be respected.
- Good practice safety rules shall be followed while equipment is installed, operated or in maintenance.

Present manual shall be integrated with Installation Operation and maintenance manuals of specific sub-components (e.g. blower, instruments) part of the supply.

All installation and maintenance activities must be performed with incoming power supply switched off and locked out, and by trained personnel.

2. DESCRIPTION

AWS Corp. FIBERWIND™ L.O.V. Mist Eliminators separate oil particles entrained in form of aerosols coming from reservoirs of equipment such mechanical vacuum pumps, compressors or turbines. The oil mist is filtered through a coalescing media. The separated oil drains back into the equipment reservoir through a drain that collect all filtered oil. Oil mist eliminators eliminate 100% of oil droplets > 2 µm, and more than 99% of oil droplets with dimension < 2 µm, from equipment discharge. LOVs are recommended for use with all oil-sealed mechanical equipments. The AWS Corp. FIBERWIND™ L.O.V. Mist Eliminators consist of the following (see Figure 1):

- A coalescing filter mounted inside a vessel;
- A centrifugal Blower;
- An ambient air intake filter with a manual flow control valve⁽¹⁾;
- A Manual butterfly valve⁽¹⁾;
- A Differential Pressure Gauge⁽¹⁾;
- Vacuum breaker valve⁽¹⁾;
- A Support frame⁽¹⁾.

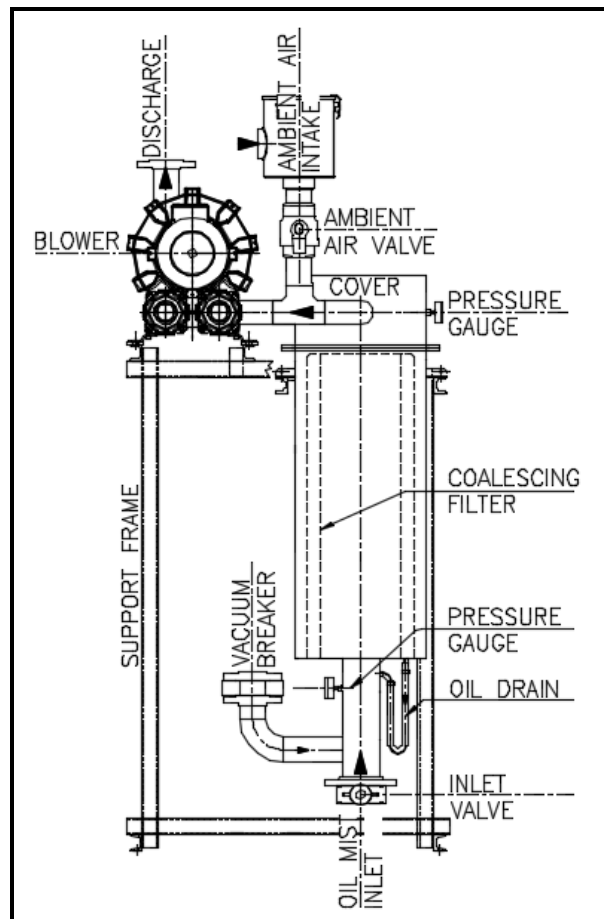


Figure 1 - LOV mounted on support frame

⁽¹⁾ This component may not be present.

3. PRINCIPLE OF OPERATION

The oil mist eliminator works on the principle of the Brownian filtration. Oil mist particles are intercepted by the filtering media and agglomerated into larger droplets. These larger droplets are drained through the filtering media by gravity, allowing them to drain from the bottom of the vessel. Standard LOVs contain filtering elements composed of layers of glass fibers.

The filtering element's glass fiber is tightly packed, thus building up oil mist droplets into larger droplets, until gravity forces them to filter down through the fibers, saturating the element's lower portion. This process may take several hours. As the height of the saturated zone grows, pressure drop across filtering element rises, causing the oil to flow through the outer shell, where it builds up at the bottom of the LOV housing. An oil drain allows the oil to drain back into the equipment via the hose tubing.

Gas leaving the oil mist eliminator through the LOV discharge connection contains invisible oil, which can only be removed by condensation or sorption traps; in most cases, this invisible oil can be piped outside. When operating correctly, no smoke should be visible in the LOV discharge connection. Visible smoke from a correctly sized LOV indicates that the element may be damaged, clogged or improperly seated.

The exhauster included in the LOV scope of supply is a "side channel" blower. Side channel blowers are suitable for all those applications requiring a stable flow rate not significantly affected by change in pressure drop as standard centrifugal fans are on the opposite. Side channel exhausters are also suitable for all those applications requiring a considerably high vacuum.

Usually the oil tank (by customer) is protected against pressure conditions below its design vacuum pressure, by means of a breather valve. Nevertheless, to protect the oil reservoir, AWS LOVs are provided (1) with a vacuum breaker valve, in order to prevent, at the inlet nozzle, a vacuum exceeding -50 mbar.

In applications (small filter) the design flow rate of the filter is lower than the flow rate of the smallest blower available on the market. In such cases the suction pipe of the blower is connected to an ambient air intake filter, with a hand control valve, which aims to control the flow rate of oil mist filtering through the coalescing filter. When the control valve is fully open, the flow rate filtering through the coalescing filter is negligible, once the control valve is throttled the filtered flow rate starts increasing up to the design value.

4. STORAGE AND HANDLING

Wooden cage, crate or loose devices have to be stored in a proper storage area.

If stored outside, it is required to cover wooden cage or crate with a waterproof covering.

Lift the equipment only by means of synthetic slings choked around the support frame, in order to avoid any possible damages to the paint or to equipment.

LIFTING LUGS OF THE BLOWER, VESSEL, OR MOTORS SHALL NOT BE USED FOR LIFTING THE WHOLE EQUIPMENT.

If an element has been damaged during transportation or during handling or installation, please notify immediately to Technical Service Dept.

5. INSTALLATION

INTRODUCTION:

A careful and proper installation is the prerequisite to a subsequent trouble-free operation. Installation errors may cause personal injuries and property damages as well as premature wear of components. In case of work not done by the manufacturer, any liability for improper installation and for consequences of non-compliance with safety and technical hints is excluded.

Erection of skid mounted units :

Before delivery , the equipment is aligned with its support structure.

When installing , the structure must be aligned so that :

- 1) The level of the discharge nozzle is horizontal in every direction. This can be checked with a spirit level.
- 2) Suction and discharge pipelines must be connected in such a way that no significant loads are transmitted to Nozzles of equipment.

Skid structure is fixed to customer equipment by means of stud bolts anchored or welded beforehand according to the holes pattern of the skid structure.

The support structure must be aligned using spacers made with thin metal plates, or using nuts underneath the supporting structure.

Erection of standalone units :

When the LOV doesn't include a support structure (optional) , the equipment is defined as "standalone"

When installing it, the equipment must be aligned so that :

- 1) The level of the discharge nozzle is horizontal in every direction. This can be checked with a spirit level.
- 2) Suction and discharge pipelines must be connected in such a way that no significant loads are transmitted to the equipment.

The equipment shall be fixed by means of lugs, provided on the housing of the vessel .

Electrical installation :

For wiring of blower motor refer to the relevant IOM manual.

6. OPERATION

PRECOMMISSIONING:

- Check equipment and duct work for any dirt and debris. Remove in case.
- Check all bolted and screwed connections.
- Check all hand valves operate properly.
- Check manually vacuum breaker valve operate properly.
- Check electrical connections and verify proper sense of rotation of blower.
- Check pressure instruments are calibrated.
- Check the coalescing filter is clean, tightened and properly seated.
- Fill the U-shaped drain with oil, and verify hose is firmly connected .

START-UP PROCEDURE :

- Fully open inlet and outlet valves.
- Fully open the ambient air control valve (if present).
- Start the blower.
- Close gradually the air control valve checking the differential pressure across FIBERWIND™ element as per following prescriptions:
- At the first start-up , when the internal filter is not yet saturated by oil particles, close the air control valve until the measured pressure drop across the coalescing filter reaches minimum 50 mmwc +- 5%. It is possible to increase the pressure drop up to max.150 mmwc in case the filtered flow is not sufficient to exhaust all vapours.
- In case of start-up after maintenance activity , when filter is already saturated by oil droplets, close the air control valve until the measured pressure drop reaches 80(min.) 200(max) mmwc +- 5%.

SHUT DOWN-UP PROCEDURE :

- Stop the blower.

OPERATION :

- At the first startup the pressure drop will gradually increase, for several days, until the filtering elements become saturated. Once steady condition are reached, the pressure drop will be approx. 200 mmwc. During operation pressure drop shall be recorded on a weekly basis.



7. MAINTENANCE

The table located below indicate items which must be performed to maintain systems and equipment at a minimum level of operational readiness. The listed action items should be supplemented by manufacturer-recommended maintenance activities and procedures for specific of equipment.

STANDARD MAINTENANCE ACTIVITIES	
Action	Frequency
WARNING! BEFORE BEGINNING ANY MAINTENANCE. DISCONNECT ELECTRICAL POWER. LOCK OUT AND TAG SWITCH AT MCC.	
Filters	
Check filters. Replace as required.	Mo
Drain hose	
Check for proper oil drainage.	Mo
Fans or Blowers	
Check for hot bearings	Mo
Check tightness of fasteners (nuts, machine screws, set screws, shaft collars, etc.) and tighten as required.	Mo
Check for unusual noise or vibration	Week
Visually inspect drive alignment	Mo
Lubricate bearings:	
Sleeve bearings	Mo
Ball bearings	3 mo
Roller bearings	Mo
For units with belt drives inspect belts and pulleys.	Mo
Measure belt tension and alignment; adjust where required.	Mo
Inspect fan blades for buildup of dirt or scale, use soft brush or clean rags to loosen or remove dirt, and flush surfaces with clean water.	Mo
All Valves	
Exercise all valves and perform routine maintenance, and report all discrepancies to supervisor.	Mo
Grease stems on valves.	Mo
Inspect packing gland and tighten as necessary.	Mo
Verify correct position and operation.	Mo
Check for leaking seals.	Mo
Pressure Gauges	
Isolate pressure gauge by closing the proper valves. Remove and check in a fixture against a calibrated gauge. Adjust as required following equipment manufacturer's instructions.	6 mos
Motors	
Check and clean cooling airflow passages on electric motors as necessary so that nothing obstructs airflow.	6 mos
All Electrical Devices	
Check, clean, and tighten terminals at motors, starters, disconnect switches, etc.	6 mos
Wiring	
Check insulation on conductors in starters, switches, and junction boxes at motors for cracks, cuts, or abrasions. Replace wiring as required and correct cause of damage.	6 mos

The following procedures describe the main maintenance activities:

1) **FIBERWIND™ ELEMENT REMOVAL AND INSTALLATION**

- Loose the top cover flange and remove it.
- Loose the FIBERWIND™ fixing nut and unscrew it completely (7.1).
- Remove the FIBERWIND™ filter elements from the vessel (7.2).
- Install the new element inside the vessel and tighten the fixing the nut (7.1).
- Replace the gasket on the top cover flange and close the cover.



Figure 7.1 - Release the fixing nut



Figure 7.2 – Remove the element

2) **FIBERWIND™ ELEMENT CLEANING**

- Remove the filter from the housing.
- Flood the element with a suitable solvent and provide flow or agitation to dissolve oil particles in the washing solution. Standard safety precautions shall be used according to Material Safety Data Sheet of the chemical solvent used in the washing solution.
- DO NOT USE :
 - High pressure fluids .
 - Strong alkaline solutions .
 - Extended steam exposure.

3) **FILTERING MEDIA REMOVAL**

- Release the outer cage from filtering media , removing the cage clips .
- Slightly expand the cage and remove it .
- Make a longitudinal cut, with knife, from end to end into the fiber packing material and remove the filtering media. (Extreme care must be used to avoid damage to the element cage if the cage material of construction is FRP or Polypropylene or any other non metallic material).



8. RETURN POLICY

Health and Safety regulations prohibit AWS Corp. from receiving equipment with any hazardous contaminants. Any equipment not in compliance with this regulation is subject to rejection.

Cages must be received at our facility free of the filtering media fiber and any contamination. If hazardous substances have been used in the cleaning/decontamination process, the equipment must be free of any of these agents (either liquid or solid) and customers are requested to provide a material safety data sheets of used cleaning agents.

9. TROUBLESHOOTING

FAULTY CONDITION	POSSIBLE CAUSE	REMEDIAL ACTION
Oil smoke is present in the exhaust	Filtering element is not seated properly	Reseat the filtering element if possible, or replace element
	Filtering element dirty or damaged	Change filtering element
	Drain clogged	Check the drain pipe / clean the drain pipe
Oil from nuts/bolts/gaskets	Gasket damaged	Change the gasket
	Bolts not tight	Tighten the bolts
High Pressure drop > 250 mmwc	Filtering media dirty or clogged	Replace filtering media.
	Air flow control valve fully closed.	Open the air control valve and check pressure drop and flow rate are according to design data.
Vacuum breaker open continuously	High Vacuum pressure at the inlet. Inlet valve partially closed. Oil Tank intake filter clogged.	Clean intake filter of oil tank. Open inlet valve.



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Dichiarazione di Conformità CE
(conforme al punto A allegato II direttiva 2006/42/CE)
EC Declaration of Conformity
(conform to point A annex II of 2006/42/CE Directive)

AWS Corporation dichiara in qualità di fabbricante che le macchine :
AWS Corporation declares that the complete Machinery :

Nome generic / generic Name: Lube oil coalescer
Funzione / Function: Filtrazione sfiati / Vent Filtration
Modelli / Models: 307F
L50
L100
L200
L300

N. Serie / Serial N. :

Sono fabbricati in accordo alle seguenti direttive :
Are fabricated according to the following directives :

1) 2006/42 CE

Si dichiara inoltre che per la progettazione sono stati seguiti i seguenti standard armonizzati:

Manufacturer declares that following harmonized standard have been applied:

ISO 12100 : 2010
ISO 14121-2 : 2013

Cologno al Serio – Italy
21/04/2017

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