

OIL MIST ELIMINATOR



REGISTERED ISO 9001 ASSURED QUALITY AND SERVICE

OME

DOLLINGER HISTORY

Since 1921, Dollinger Corporation has been an industry leader in the research, development, engineering, and manufacturing of filtration equipment. Over the past 70 years Dollinger has developed a broad line of air intake, compressed air and gas, coalescing and liquid filters.

Over the past seven decades, industries such as electric power utilities, chemical processing, nitric acid, air separation, natural gas transmission, and compressor OEM's have relied on Dollinger filtration technology and experience.

Our leadership continues through advanced R&D, application of the latest technologies, and our proven capability to design, build and support innovative, high quality filtration systems. The Dollinger Oil Mist Eliminator product is yet another result of Dollinger's commitment to continue to bring innovative products to the marketplace.



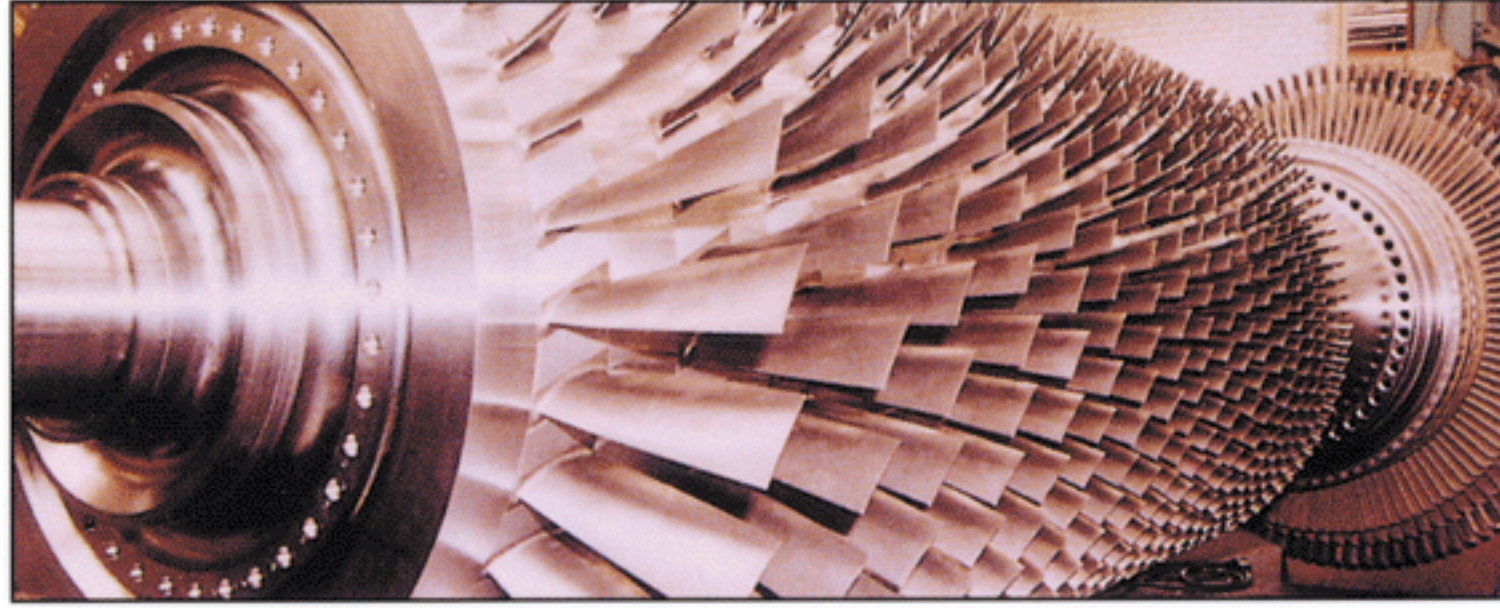
QUALITY

Dollinger is fully committed to meeting or exceeding the most rigorous international quality assurance standards. We view our ISO 9001 Certification as a baseline for our quality program – a minimum for any manufacturer engineering and building products for use in high speed, high performance rotating equipment.



OIL MIST ELIMINATORS

Large high speed rotation equipment such as gas turbines, steam turbines, axial and centrifugal compressors, requires a large volume of oil for lubrication, cooling, and sealing of the bearings. The lubricating oil can be either mineral based or synthetic.



Turbines are widely found throughout the world used in a variety of mechanical drive applications, including compressors, electric generators, marine propulsion, pumps and other loads. These applications are typically found in air separation, power generating, gas transmission and petrochemical facilities.



1. Turbine - pipeline compressor module

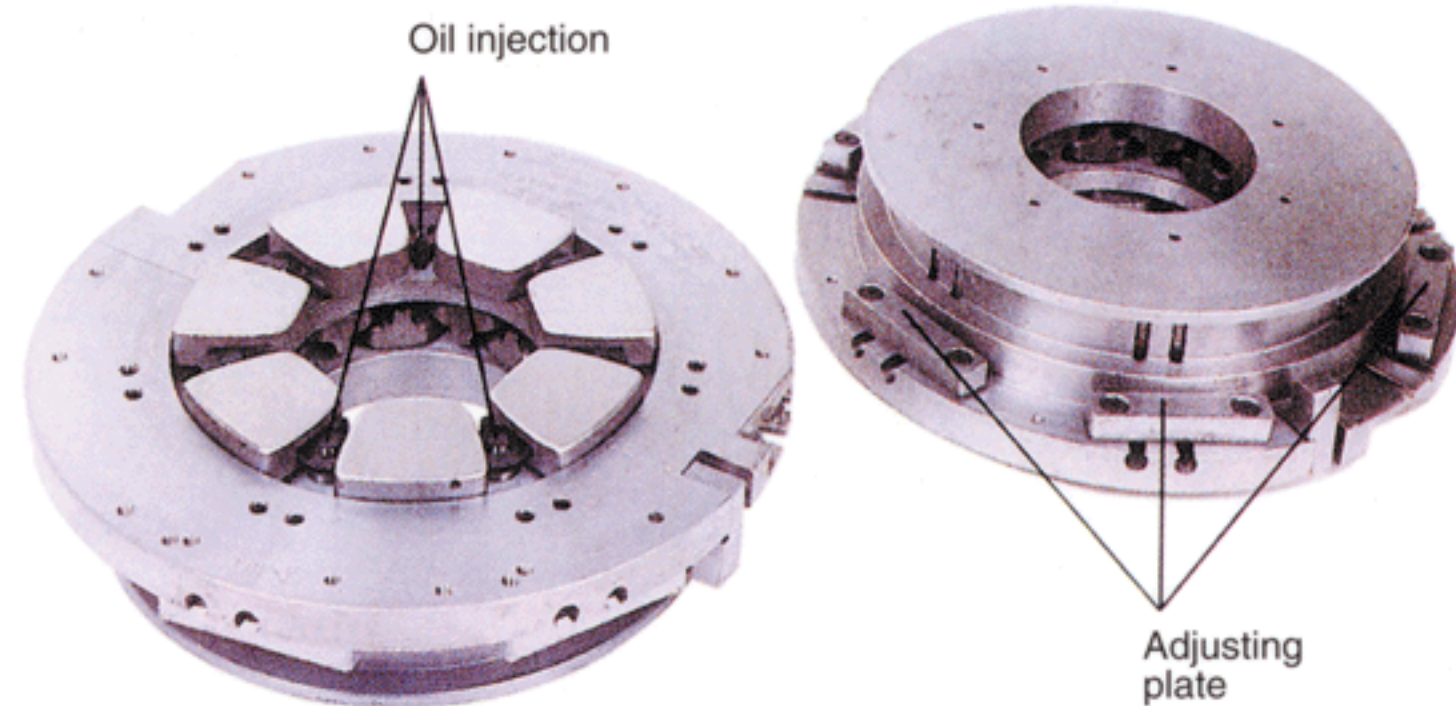


2. Turbine - reinjection compressor module



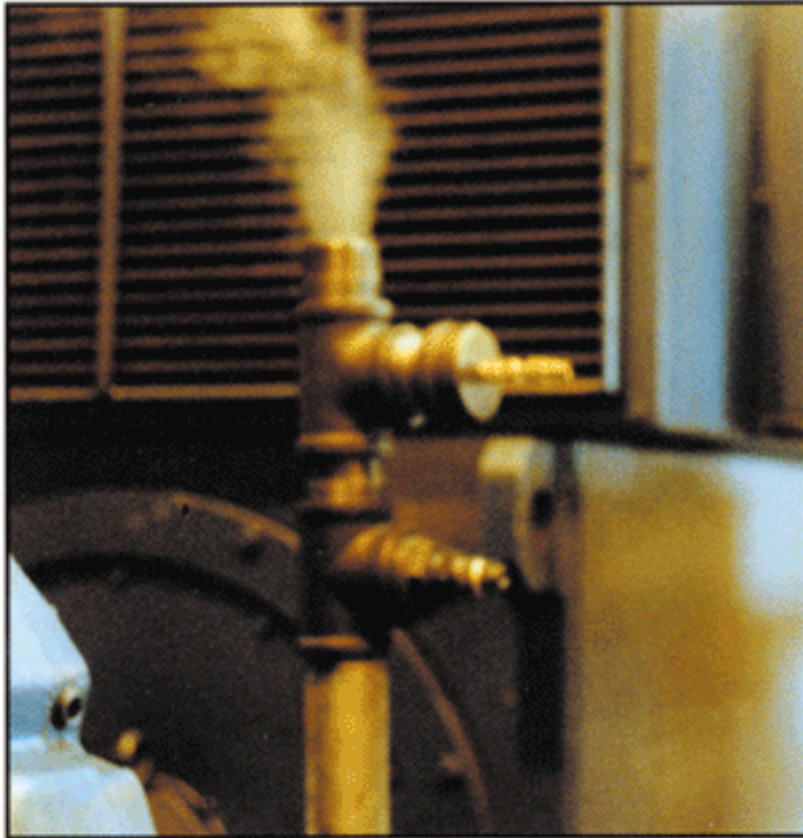
3. Turbine - generator module

The bearing surfaces that the oil comes in contact with are very hot (350°-700°F), and are rotating at high speeds. The high temperature and shearing action generates a large volume of very fine oil mist (droplets) plus a considerable amount of vapor (gas). When this oil mist and oil vapor is vented from the lube oil tank, it causes a visible plume. This oil plume is subject to increasingly stringent environmental laws and regulations at all government levels throughout the United States and the world.



WHY CONTROL YOUR OIL MIST EMISSIONS?

In addition to the obvious aesthetic problems, owners and specifiers of high speed rotating equipment are recognizing the need to control oil mist emission for four primary reasons:



Environmental

Concern for the environment has led to worldwide emissions legislation. There is a growing awareness in industry that everyone must take responsibility for keeping our environment clean. As The Clean Air Act of 1990 becomes more clearly defined each year, through subsequent amendments, environmental regulations for oil mist emissions will become more restrictive.

Economics

Any oil mist vented to the atmosphere is lost forever. A reservoir venting 200 cfm with a 100 ppm oil mist concentration would lose almost 100 gallons of oil in a year. Oil mist can cause premature equipment failure, resulting directly in lost production.

Maintenance

It is much easier to operate and maintain a clean machine than a dirty one. Employee morale and efficiency are also increased when the working environment is clean and safe.

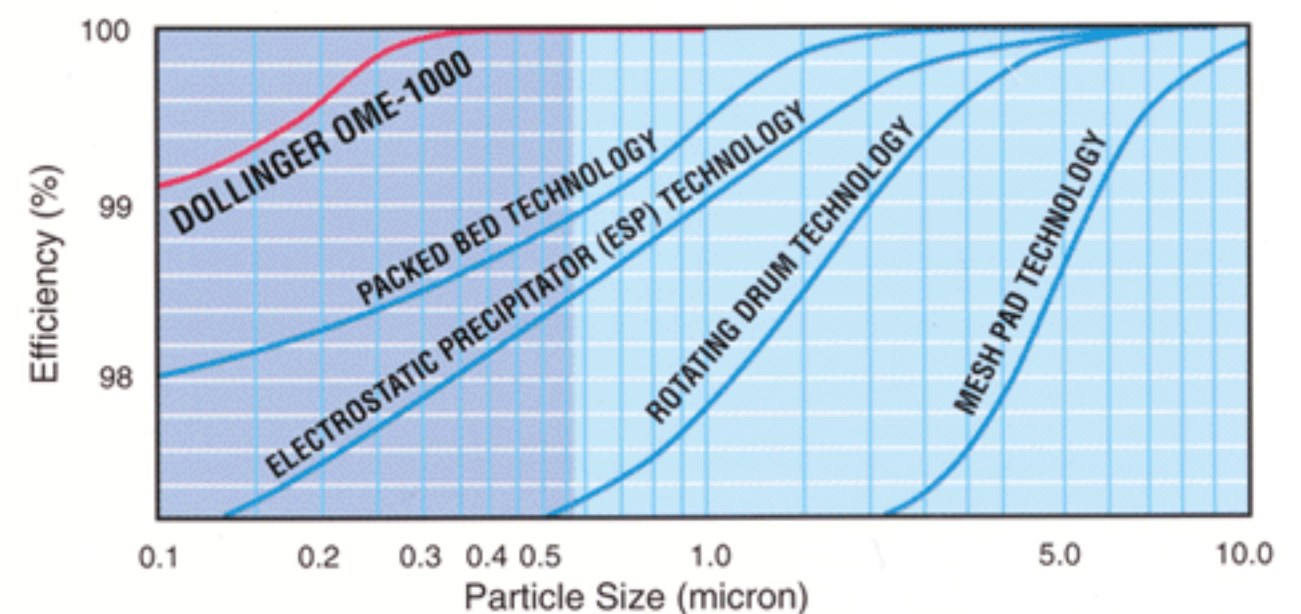
Safety

Oil mist and condensing vapor will settle on adjacent areas such as ladders, walk ways and ceilings, creating slippery, dangerous conditions and fire hazards.

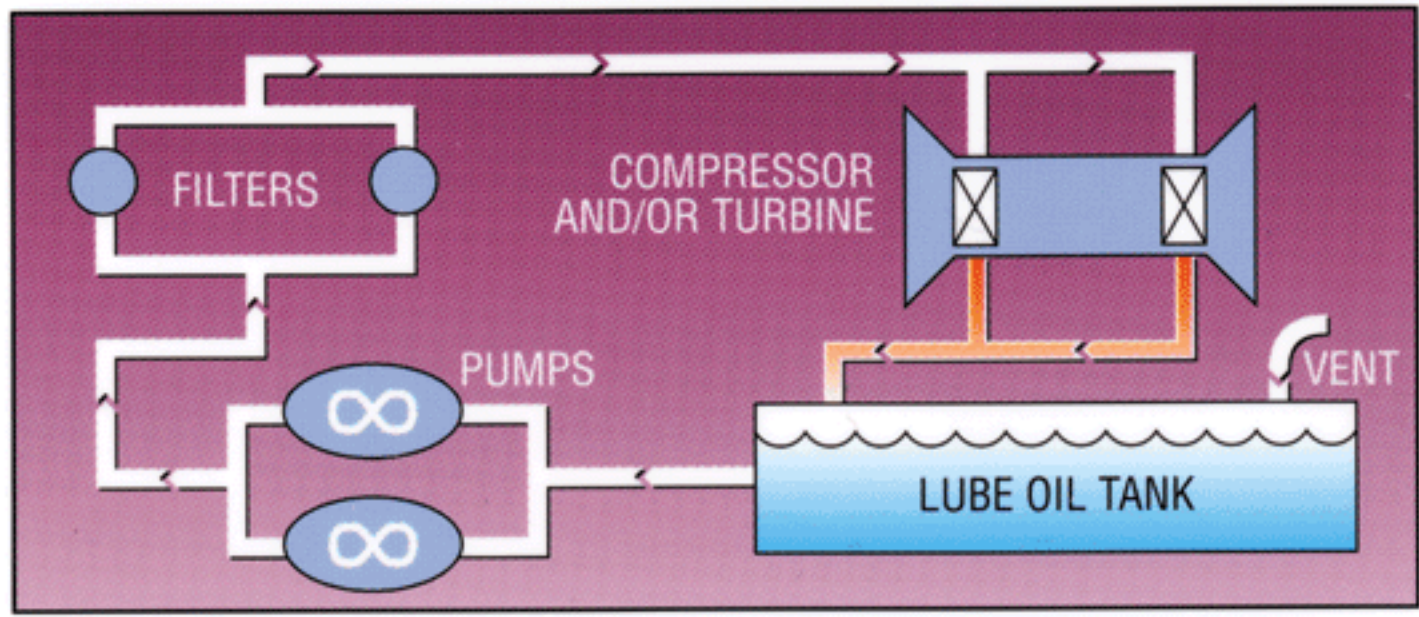
LUBE OIL SYSTEMS

The emissions from the vent of a lube oil tank are difficult to eliminate because the majority of the oil mist droplets fall in the range of less than 1 micron in diameter. Oil mist control technologies that have been used in the past include electrostatic precipitators (ESPs), rotating drums, packed fiber beds and mesh pads. The manufacturers of these technologies all claim at least 95% efficiency, some even go as high as 99% efficiency. While all of these types of technologies are satisfactory for removing large droplets of oil, they are not adequate enough for removing sub-micron particles 0.5 microns and smaller.

COLLECTION EFFICIENCY vs. PARTICLE SIZE



Oil that is vaporized at the bearing recondenses into droplets at 0.5 μ & smaller!



Typical Lube Oil System - The primary parts of a lube oil system are as follows:

- Lube Oil Reservoir
- Lube Oil Filters
- Lube Oil Pumps
- Lines from the Reservoir to the Bearings
- Lines returning from the Bearing to the Reservoir

The basic operation of a lube oil system is similar for all designs. Lubricating oil (mineral or synthetic) is pumped to the bearings to lubricate and cool the metal to metal surface contacts. The high speed shearing and heat that occurs at the metal to metal contact causes droplet formation and vaporization of some of the oil.

Therefore the return lines to the lube oil reservoir contain not only hot oil but also mist-laden air and vapor. On the return trip to the reservoir, most of the vapor cools and condenses back into oil droplets. Our detailed field and laboratory research have shown that these droplets are extremely small – between 0.05 and 0.5 microns. (See table below of particle size and distribution).

Particle Size and Distribution for Typical Turbo Machinery Lube Oil Vents

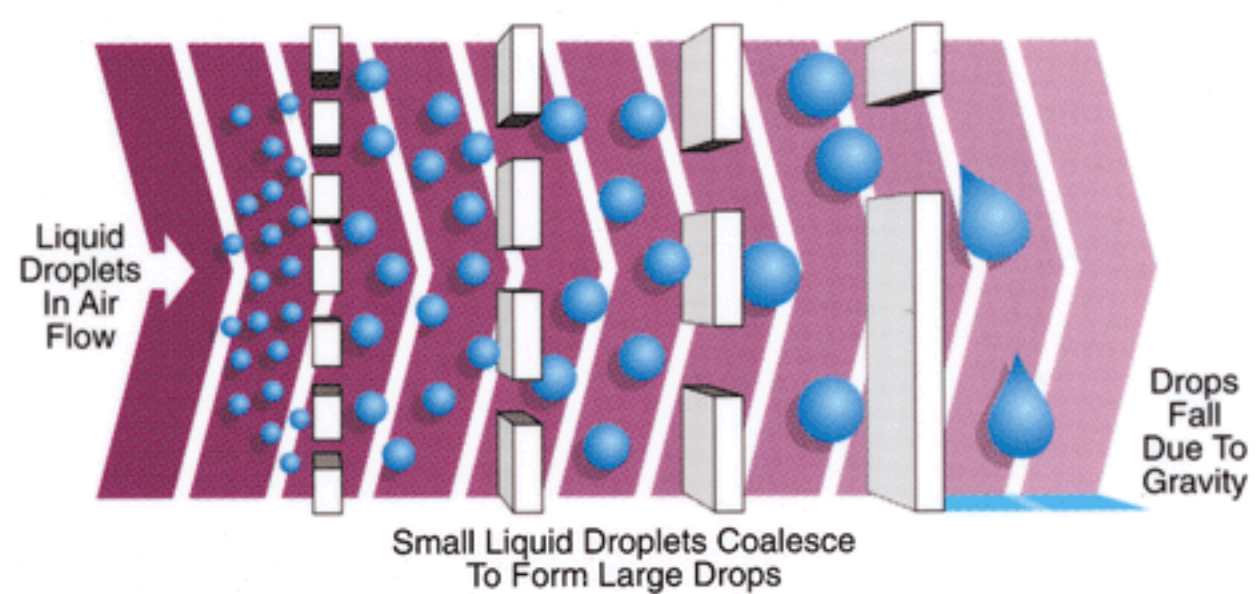
10-20%	.56 micron
10-15%	.28 micron
25-30%	.14 micron
40-50%	≤.07 micron

The large droplets (>1 micron) drop out on the return to the reservoir. Vapor created by the high temperature at the bearing recondenses into submicronic droplets.

Once back in the reservoir, most of the larger droplets fall out; however the reservoir must be vented or open to atmosphere. This is accomplished by two means:

1. By injecting pressurized air at the bearings, thus keeping a slightly positive pressure in the lube oil reservoir as compared to atmosphere.
2. By connecting the suction side of a blower to the top of the reservoir, thus creating a slight vacuum in the reservoir, as compared to atmosphere.

COALESCING PROCESS



How Coalescers Work - At the heart of the Dollinger Oil Mist Eliminator is a high efficiency coalescing element.

Coalescers combine small aerosols through the filter media to form large droplets. The droplets recombine until their mass is significant enough to gravity-drain away from the element to a sump area.



SOLUTIONS



The Dollinger Oil Mist Eliminator is a highly efficient engineered filtration system for controlling oil mist created by high speed rotation equipment. The product range includes non-blower, blower and eductor assisted models for positive and negative pressure lube oil systems.

PRINCIPLES OF OPERATION

Air laden with oil mist enters the filter and is directed into the interior of the high efficiency coalescing element. The oil droplets are collected on the propriety microfine fibers used in the construction of the element and drain to the bottom. The cleaned air exits the filter housing. Extensive field and laboratory tests verify that the removal efficiency is 99.97% of particles 0.3 microns and larger. The collected oil then drains back into the reservoir through a trap or into a receptacle for collection.

On the blower assisted units, the gas is pulled through the element by a high efficiency blower. The blower assisted units have a butterfly damper between the filter and the blower to control the negative pressure in the reservoir.

WHAT SETS DOLLINGER APART FROM THE MARKET?

In order to insure the highest removal performance rating at the lowest saturated pressure drop, Dollinger uses a proprietary enhanced media that insures the maximum performance with a low pressure drop and the longest possible life.

The fiber and media pore size selected for use in this application are some of the smallest available on the market. This is key in removing the oil mist particle, critical in order for Dollinger to make its unmatched guarantee of...

“NO VISIBLE SMOKE PLUME, AND CONCENTRATIONS OF LESS THAN 5 PPM BY WEIGHT CLEAN SIDE OF OUR FILTER.”

LIQUID DRAINAGE FROM THE ELEMENT...

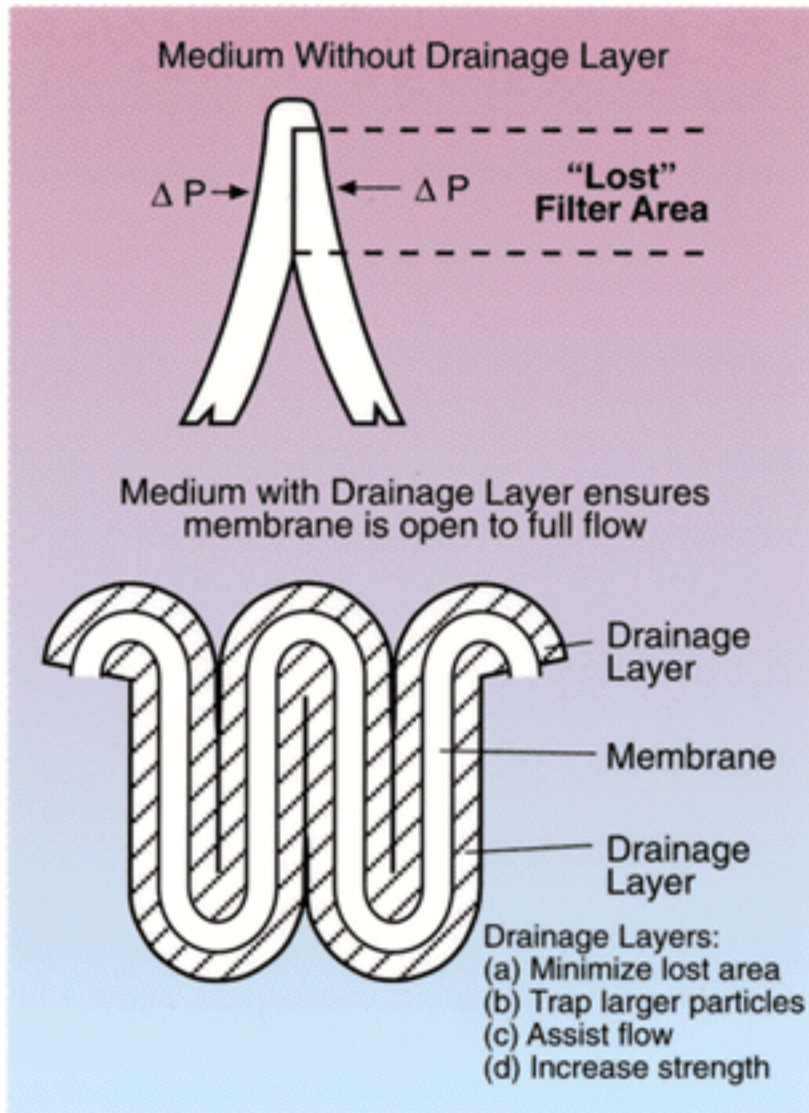
an important consideration in order to minimize pressure drop across the element, and to prevent or minimize the effects of re-entrained contaminants. To accomplish this, the Dollinger oil mist coalescing elements are designed with the following key advantages:

1. The direction of flow is from inside to out – This insures lower annular velocities on the outside of the element.
2. Filter media is designed to minimize pore size and void volume to ensure drainage on the lower end of the element. This is key to minimize the effect on re-entrainment.
3. A classifying layer (outer wrap) of polyester which is compatible with all compressor oil types, and provides additional assurance of re-entrainment protection.

PLEATED MEDIA

Dollinger invented the idea of pleating media in the early 1920s. In fact, the first air intake filter that was used in automobiles and trucks was of the Dollinger pleated design.

Cartridge Construction - Function of Pleats



When used in a coalescing application, pleating offers many advantages over other forms of media configuration.

- By pleating, you increase the surface area of the media which allows for higher dirt holding capabilities. Dollinger elements are designed with 6 to 9 times the surface area of other commercially available oil mist eliminator elements.
- By pleating, you increase the surface area of the media. The greater the available surface area in an element, the lower the velocity of the air/oil mixture, and the greater the chance of capture of the particle on a fiber.
- Proper pleating design is also critical to ensure that the pleats are not pinched, but opened to full flow. More media is not better, if all of the media is not exposed to the air flow. The Dollinger design maximizes surface area to enhance performance and life with a lower saturated pressure drop.

- The media Dollinger uses is sandwiched between 2 drainage layers. Other manufacturers may use a particulate filter upstream of their coalescer to provide longer life to the coalescer. This increases "first cost" of the system, and maintenance is increased two-fold.

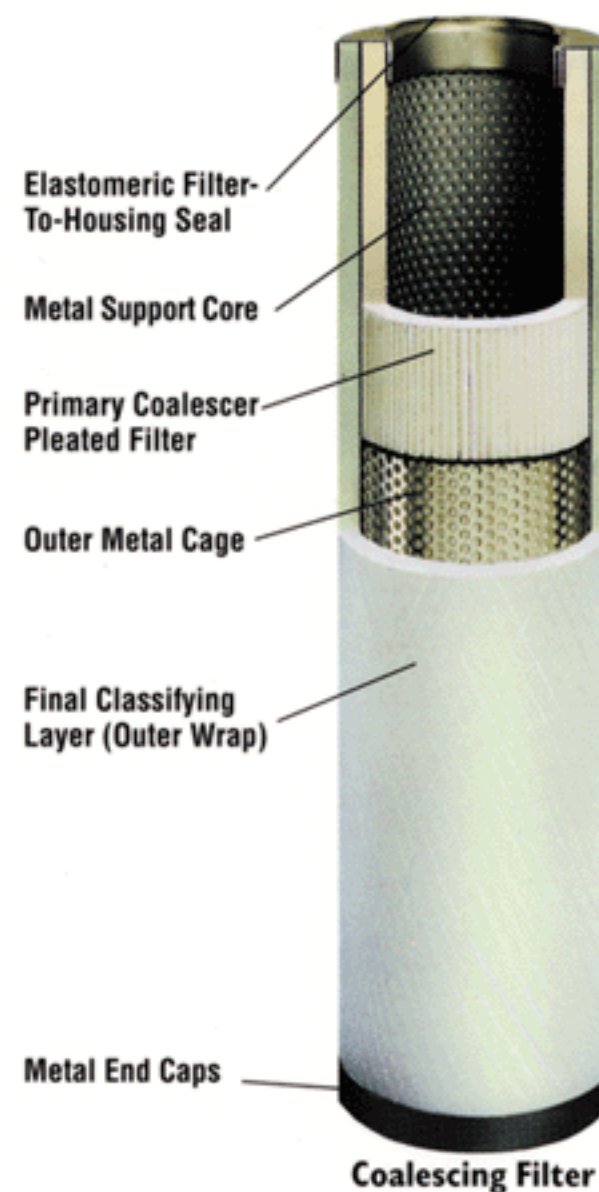
ELEMENT DESIGN

Steel construction is used to strengthen the filter media, thus preventing fluctuating flows and pressures from damaging filter media.

- Outer support core provides media support during normal operation.
- Increased support provides additional protection against reverse direction flows.
- Steel end-caps and cores contribute to the overall construction strength. Prevents damage during installations, which could result in contaminant by-pass.

Dollinger's most current design utilizes D-ring seals compatible with synthetic and petroleum-based compressor and turbine oils. The D-rings seal the element in the housing to prevent contaminant by-pass.

In the educator models, a screwed-in element design is used. This design insures no by-pass.



OIL MIST & VAPOR EMISSION PROBLEMS SOLVED. GUARANTEED.

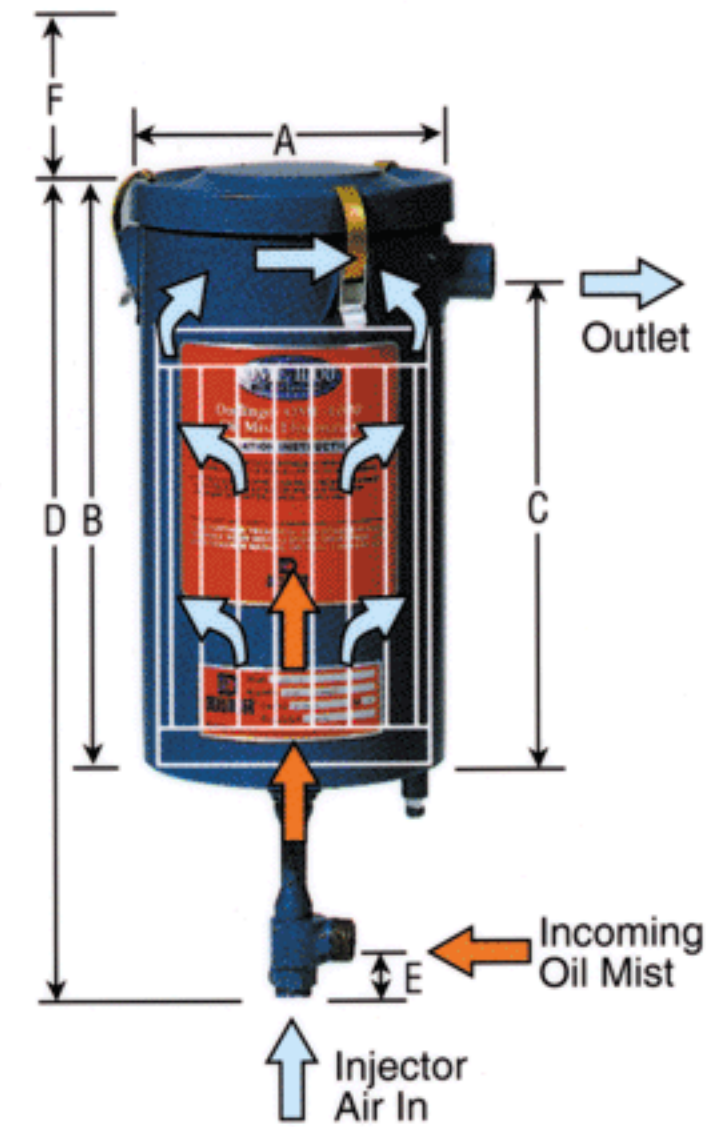
ADVANTAGES

- **Eliminates All Visible Oil Plume** - Complies with all environmental regulations.
- **Unmatched Efficiency** - 99.97% collection efficiency of all droplets and particles 0.3 micron and larger; guaranteed less than 5 ppm by weight oil mist carryover.
- **Simple, Efficient, Energy-Saving Operation** - Once installed, provides years of trouble-free operation: prevents undue power loss and maintenance by stopping mist from entering the air intake system.
- **Maintenance Free** - Depending on the dirt loading, has a filter element (cartridge) life of 1-2 years.
- **Rugged Enameled Carbon Steel Construction** - Assures long life protection in virtually any environment.
- **Compact** - Space saving physical envelope and lightweight structure make it ideal in a crowded environment.
- **Proven Performance** - Years of demonstrated performance on Aeroderivative Gas Turbine Packages for power generation and oil reservoir vents on large compressors.
- **Accountability** - Will provide on-site testing to measure influent and effluent gas streams.
- **World-Class Quality** - Backed with over 70 years of on-line experience.

No Visible Smoke Plume, and Concentrations of Less Than 5 PPM by Weight Clean Side of Our Filter

**OE-158E
EDUCTOR
MODELS**

OIL MIST ELIMINATORS FOR LUBRICATING OIL SYSTEMS ON CENTRIFUGAL AND RECIPROCATING COMPRESSORS, VENTED BEARINGS AND OTHER LOW FLOW APPLICATIONS



OE-158E



SPECIFICATIONS														
Dollinger Model Number	Drawing Number	CAPACITY Flow CFM (NM ³ /H)	INLET Size (Inches)	ELEMENT		Max. Comp. Air Req'd. SCFM (Nm ³ /H)	Max. Comp. Air Pressure Req'd. PSIG (Kg/Cm ²)	APPROX. DIM. INCHES (mm)						WT. LBS. (Kg)
				Model Number	No. Req'd.			A	B	C	D	E	F	
OE-158E-5T	37594	5 (8.5)	½ MPT	95-187	1	5 (8.5)	40 (2.8)	7¼ (185)	12½ (320)	10½ (255)	21⅞ (540)	6 (150)	8 (205)	12 (5)
OE-158E-15T	37595	15 (25)	1 MPT	95-188	1	12 (20)	40 (2.8)	9½ (230)	16⅞ (430)	14⅞ (360)	28⅞ (720)	6½ (165)	12 (305)	25 (10)
OE-158E-30T	37596	30 (50)	1¼ MPT	95-189	1	20 (45)	40 (2.8)	12½ (320)	18 (460)	14¾ (375)	31¾ (805)	6½ (165)	12 (305)	35 (15)
OE-158E-60T	37597	60 (100)	1½ MPT	95-190	1	50 (85)	40 (2.8)	12½ (320)	28 (710)	24¾ (630)	43⅞ (1100)	7 (180)	22 (560)	50 (20)

Options: Other connections available; Stainless steel and aluminum construction.

Oil Types: Mineral or Synthetic

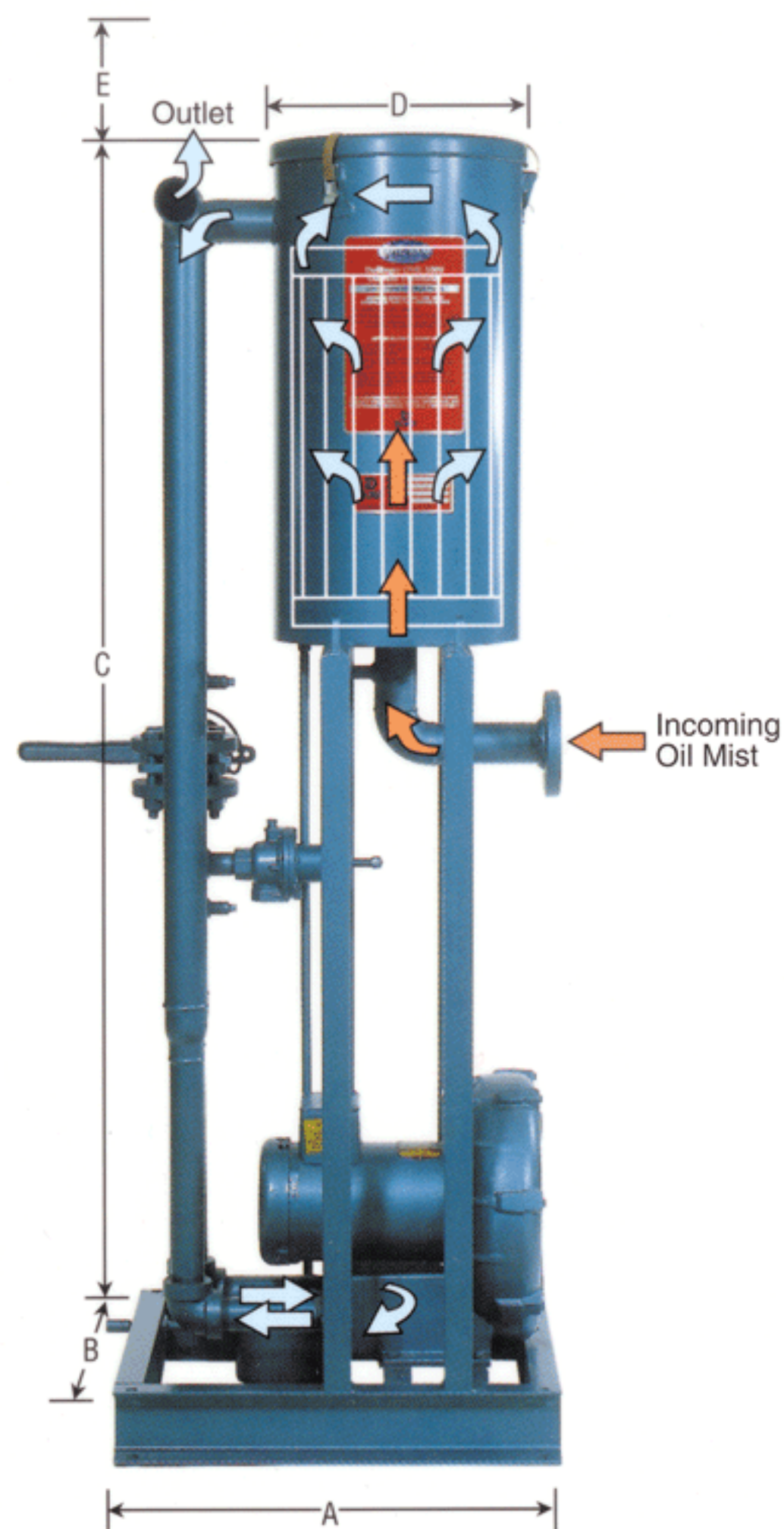
TECHNICAL DATA	
Minimum Operating Temp.:	5°F/-15°C
Recommended Differential Pressure for Element Change:	30" W.C. (760 mm W.C.)
Pressure Differential: Dry	6" W.C. (150 mm W.C.)
Fully Saturated	18" W.C. (460 mm W.C.)

In order to guarantee no visible oil plume, the temperature of the air/oil mixture entering the OME must be below 120°F when using mineral oils and below 170°F when using synthetic oils.

**OE-158B
BLOWER ASSIST
MODELS**

**OIL MIST ELIMINATORS FOR
NEGATIVE PRESSURE
LUBRICATING OIL SYSTEMS**

Many gas turbines and turbo compressors are designed to operate with the lube oil reservoir maintained at a negative pressure (-1 to -4" W.C.). When installing an oil mist eliminator on such systems, a blower assist model is used to overcome the differential pressure of the filter and, at the same time, keep the negative pressure in the reservoir under control.



OE-158B



SPECIFICATIONS												
Dollinger Model Number	Drawing Number	CAPACITY Flow CFM (Nm ³ /H)	INLET Size (Inches)	ELEMENT		APPROX. DIM. INCHES (mm)					H.P. Hp (Kw)	WT. LBS. (Kg)
				Dollinger Part Number	Qty. Req'd.	A	B	C	D	E		
OE-158B-60	37021	60 (100)	1½ FLG	95-155	1	24 (610)	18½ (475)	62 (1575)	14½ (360)	13 (330)	1.5 (1.1)	200 (90)
OE-158B-125	36700	125 (210)	2 FLG	95-154	1	24 (610)	21½ (535)	71 (1800)	14½ (360)	22 (560)	4 (3.0)	250 (110)
OE-158B-200	36571	200 (340)	3 FLG	95-121	1	24 (610)	21½ (535)	79½ (2020)	14½ (360)	28 (710)	5 (3.7)	350 (160)
OE-158B-300	36710	300 (510)	4 FLG	95-151	1	30 (760)	30½ (765)	78 (1980)	28½ (715)	24 (610)	7½ (5.6)	500 (225)
OE-158B-500	38219	500 (850)	6 FLG	95-137	1	36 (915)	36 (915)	96 (2440)	28½ (725)	37 (940)	5 (3.7)	800 (360)
OE-158B-1000	36712	1000 (1700)	8 FLG	95-121	5	43 (1090)	50 (1270)	92 (2335)	42½ (1080)	28 (710)	10 (7.5)	1100 (500)
OE-158B-1500	36927	1500 (2500)	10 FLG	95-121	8	54 (1370)	70 (1780)	102 (2590)	52 (1320)	28 (710)	15 (11.3)	1400 (635)

Options: Other connections available; Stainless steel and aluminum construction; Differential pressure gauges.

Motor Characteristics: 200-230/460 VAC 3 phase 60 Hz; 220-240/380-415 VAC 3 phase 50 Hz.
Oil Types: Mineral or Synthetic, from Automatic Transmission (ATF) to MIL 1-23699.

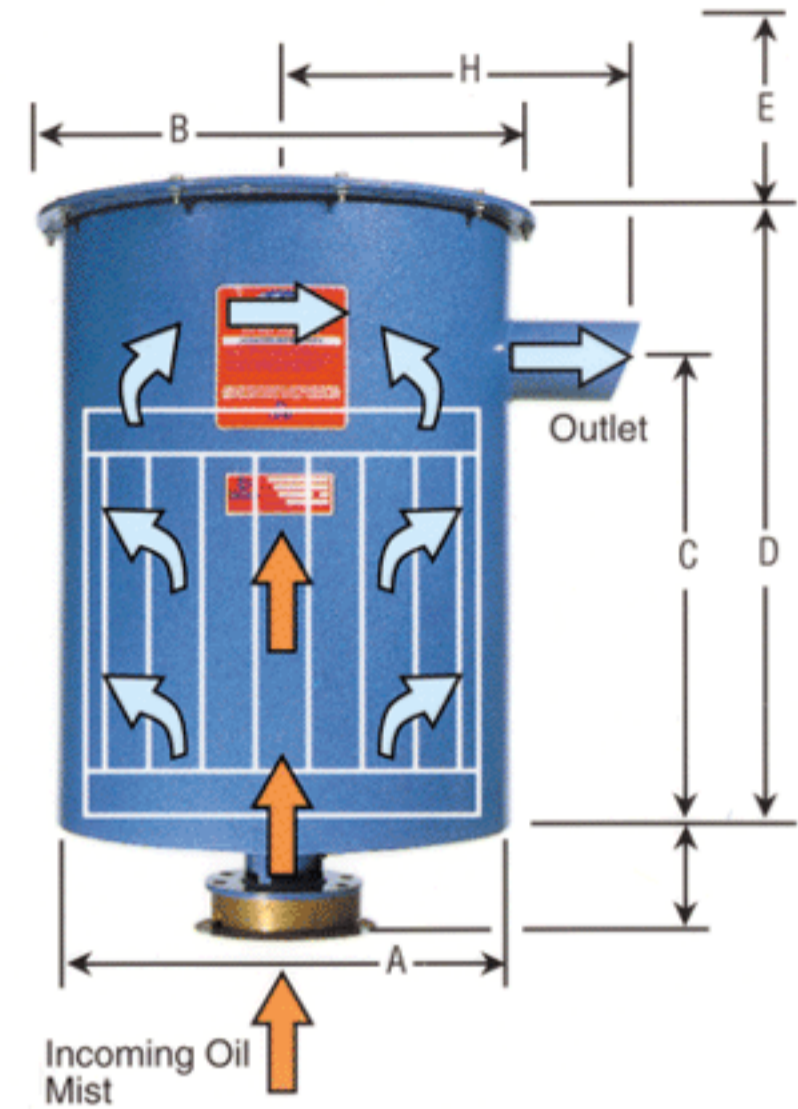
TECHNICAL DATA	
Minimum Operating Temp.:	5°F/-15°C
Sound Pressure Level:	<85dba
Recommended Differential Pressure for	
Element Change:	30" W.C. (760 mm W.C.)
Pressure Differential: Dry	6" W.C. (150 mm W.C.)
Fully Saturated	18" W.C. (460 mm W.C.)

In order to guarantee no visible oil plume, the temperature of the air/oil mixture entering the OME must be below 120°F when using mineral oils and below 170°F when using synthetic oils.

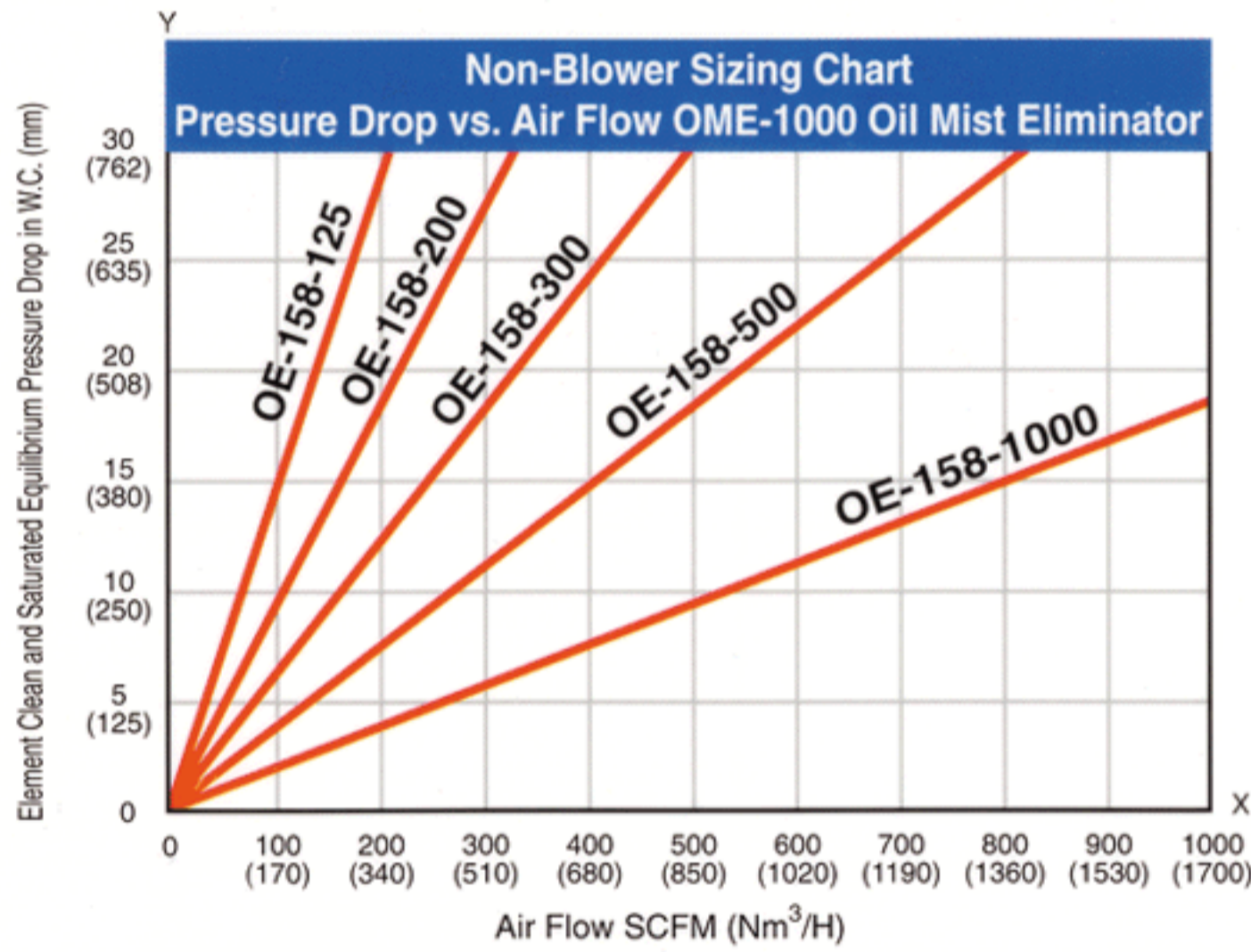
**OE-158
NON-BLOWER
MODELS**

**OIL MIST ELIMINATORS FOR
LUBRICATING OIL SYSTEMS
ON AERODERIVATIVE GAS
TURBINE PACKAGES AND
OTHER POSITIVE PRESSURE
SYSTEMS**

With positive pressure systems there is usually sufficient pressure in the reservoir to overcome the differential pressure (approx. 18" W.C.) of our oil mist eliminator.



OE-158



SPECIFICATIONS																
Dollinger Model Number	Drawing Number	CAPACITY Flow CFM (Nm ³ /H)	INLET Size (Inches)	OUTLET Size (Inches)	ELEMENT		APPROX. DIM. INCHES (mm)								WT. LBS. (Kg)	
					Model Number	No. Req'd.	A	B	C	D	E	F	G	H		
OE-158-125	36683	125 (210)	2 MPT	2	95-154	1	13 3/4 (350)	14 1/4 (360)	23 (580)	27 1/2 (700)	31 1/4 (795)	3 3/4 (95)	22 (560)	11 (280)	50 (20)	
OE-158-200	36404	200 (340)	3 MPT	3	95-121	1	13 3/4 (350)	14 1/4 (360)	30 (760)	35 1/2 (890)	39 1/2 (990)	4 (100)	28 (710)	11 (280)	100 (45)	
OE-158-300	36706	300 (510)	4 FLG	4	95-151	1	25 1/2 (650)	28 1/2 (715)	26 (660)	34 (865)	38 (965)	4 (100)	24 (610)	20 (510)	200 (90)	
OE-158-500	36405	500 (850)	6 FLG	6	95-137	1	25 1/2 (650)	28 1/2 (715)	40 (1015)	48 (1220)	52 (1320)	4 (100)	37 (940)	20 (510)	250 (110)	
OE-158-1000	36711	1000 (1700)	8 FLG	8	95-121	5	40 (1015)	42 1/2 (1080)	41 (1040)	48 (1220)	52 (1320)	4 (100)	28 (710)	28 1/2 (725)	500 (220)	

Options: Other connections available; Stainless steel and aluminum construction; Differential pressure gauges.

Oil Types: Mineral or Synthetic, from Automatic Transmission (ATF) to MIL 1-23699.

TECHNICAL DATA	
Minimum Operating Temp.:	5°F/-15°C
Recommended Differential Pressure for Element Change:	30" W.C. (760 mm W.C.)
Pressure Differential: Dry	6" W.C. (150 mm W.C.)
Pressure Differential: Fully Saturated	18" W.C. (460 mm W.C.)

In order to guarantee no visible oil plume, the temperature of the air/oil mixture entering the OME must be below 120°F when using mineral oils and below 170°F when using synthetic oils.

FLEXIBILITY

● MANUFACTURING FACILITIES ■ DISTRIBUTORS



SPECIAL ENGINEERED OPTIONS

Automated Control Package
Special Silencing
Special Motors
Coolers
Special Paints
Stainless Steel Construction

Dollinger oil mist eliminators are successfully used on machines in hundreds of locations.

Listed below are just a few:

MACHINE TYPES

ALLISON 501
DEMAG
ELLIOTT COMPRESSOR
GENERAL ELECTRIC FRAME 3, 5, 6, 6B, 6FA,
MS-6001-FA, 7, 8, 9, 9E, 9F, LM-6000,
LM-5000, LM-2500, LM-1600
GENERAL ELECTRIC STEAM TURBINE
IR CENTAC
JOY TA CENTRIFUGAL
PRATT & WHITNEY FT-4
ROLLS ROYCE RB-211, TRENT
SIEMENS V64, V64.3, V84, V84.2, V84.3
SOLAR CENTAUR
SOLAR SATURN
SOLAR MARS 100
SULZER STEAM TURBINE
WESTINGHOUSE 501D GAS TURBINE





DOLLINGER

A United Dominion Company

Flair Filtration



Flair Filtration Plant at Stanley, North Carolina

CAPABILITIES

ADVANCED RESEARCH AND DEVELOPMENT

For almost a century, Dollinger Corporation has been an industry leader in solving filtration problems through extensive research and development. Our superior-quality products are the results of this experience and innovation.

Dollinger maintains a technologically advanced, fully staffed R&D Laboratory. Here we test for pressure drop, chemical compatibility, temperature and abrasion resistance, degree of filtration, ASHRAE standards, contaminant level and other properties.

Our R&D enables us to analyze the performance of our filter system components under every conceivable condition — both in the lab and in the field. We invite you to submit samples for such testing and welcome you to witness the tests.

ENGINEERING EXPERTISE

In addition to the standard Dollinger product lines, our engineers can design custom filtration systems for virtually any air intake and compressed air and gas application. This engineering “know how” is supported by up-to-date computerized information access and an independent CAD system.

QUALITY MANUFACTURING

Modern manufacturing facilities and methods, specially designed fabrication equipment, and skilled employees together sustain the Dollinger reputation for unequalled product quality.

EXTENSIVE CUSTOMER SERVICE

Our extensive domestic and international sales representative organization assures you of prompt customer service worldwide. This organization is backed up by Dollinger Engineering Specialists who are trained, experienced and prepared to discuss and satisfy all your filtration needs.

DOLLINGER MANUFACTURES A WIDE RANGE OF EXCELLENT FILTRATION SYSTEMS AND EQUIPMENT

- Single- and Multi-Stage Air Intake Filters
- Compressed Air and Gas Pipeline Filters
- Coalescing Filters
- Vacuum/Exhaust Filters
- StayNew® Spin Filters
- Liquid Filters
- Special-Application & Custom Designed.

Dollinger Corporation has representatives in major cities in the United States and Canada, as well as many countries around the world.

For more information, contact your local Dollinger sales representative or Dollinger's Technical Sales Office. Toll free: **1-800-344-2611**.

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Manufacturing Facilities

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Killarney, Ireland □