



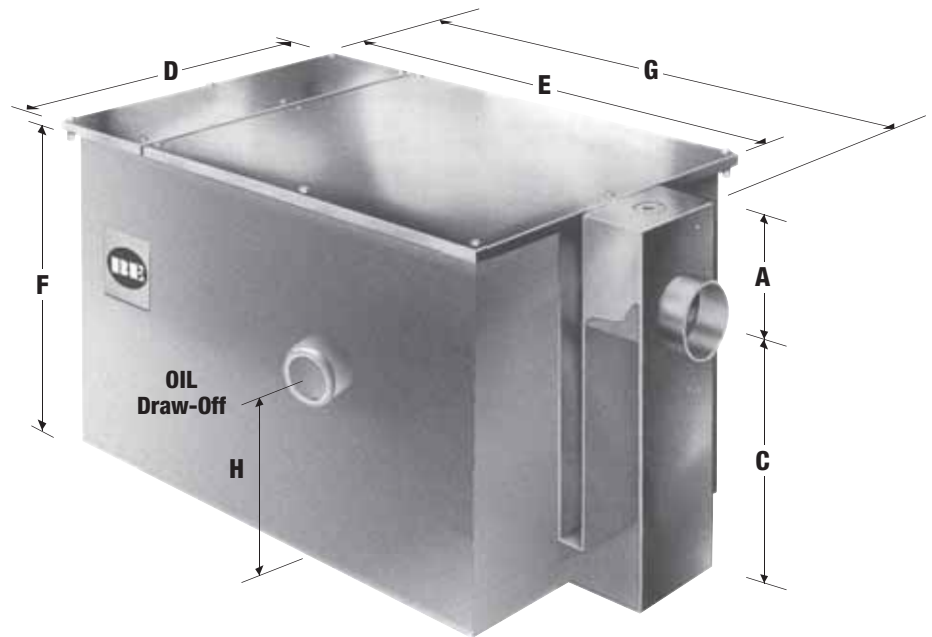
IBESTEC
ENGINEERING

Oil Interceptors

The Most Effective Way to Remove Oil and Grease From Water

BESTEC INTERCEPTORS OI SERIES OIL INTERCEPTOR SPECIFICATIONS

For use in dry cleaning plants, garages, gasoline stations, industrial plants, machine shops, maintenance depots, refineries, repair shops, and similar projects requiring the retention and safe disposal of oil and other volatile liquids.



Job Specification: Oil Interceptors shall be Bestec Interceptors as manufactured by Bestec Engineering.

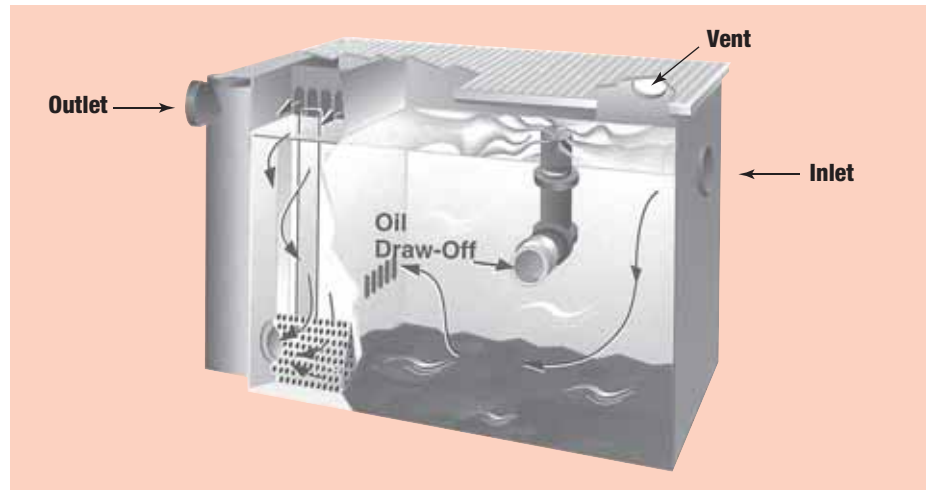
Interceptor Specifications: Furnish and install by _____ Bestec Model OI _____ all welded Epoxy coating steel interceptor _____ g.p.m. intermittent flow, _____" tapped inlet and outlet connection, with tapped outlet vent connection, _____" tapped oil draw off, connection for adjustable oil draw-off, visible double-wall outside trap seal, removable filter screen, non removable filter screen 3mm nonskid Aluminium cover (for flush-with-floor installation) for pedestrian traffic, or reinforced for _____ (light) (heavy) traffic, cover secured with stainless steel bolts, extra heavy leakproof gasket.

Model	Intermittent Flow GPM	Tapped Inlet and Outlet	Static Holding Gallons	Capacity Cubic Feet	Top to Center of Outlet A	Bottom to Center of Inlet B	Bottom to Center of Outlet C	Width D	Length E	Height F	Overall Length G	Bottom to Oil Draw-off H	Tapped Oil Draw-off	Bottom to Internal Vent	Tapped Internal Vent	Weight	Covers
OI.6025	25	2"	45 gal.	6cu.ft.	4.5"	25.5"	25.5"	18"	24"	30"	29"	19"	1.5"	26"	3"	306lb.	1
OI.6035	35	3"	64gal.	8.5cu.ft.	5"	26"	26"	20"	30"	31"	37"	19"	1.5"	27"	3"	399lb.	1
OI.6050	50	3"	75gal.	10cu.ft.	6"	26"	26"	25"	36"	32"	43"	19"	1.5"	28"	3"	571lb.	1
OI.6065	65	4"	100gal.	14cu.ft.	9.5"	26.5"	26.5"	30"	40"	36"	49"	18.5"	2"	30"	4"	742lb.	1
OI.6075	75	4"	150gal.	20.cu.ft.	10.5"	27.5"	27.5"	36"	45"	36"	49"	16.75"	2"	30"	4"	850lb.	2
OI.6100	100	4"	172gal.	23.cu.ft.	9.5"	26.5"	26.5"	36"	49.5"	36"	58"	17.75"	2"	30"	4"	944lb.	2
OI.6150	150	4"	210gal.	28.cu.ft.	14"	30"	30"	36"	57"	44"	66"	22"	2"	35"	4"	1,235lb.	2
OI.6200	200	4"	285gal.	38.cu.ft.	17.5"	30.5"	30.5"	40"	64.25"	48"	73.25"	22.25"	2"	38"	4"	1,524lb.	3
OI.6250	250	4"	397gal.	53.cu.ft.	15.5"	35.5"	35.5"	45"	64.25"	51"	73.25"	24"	3"	42"	4"	1,654lb.	3
OI.6300	300	• 6"	487gal.	65.cu.ft.	15.5"	36.5"	36.5"	45"	70.25"	52"	94.88"	24"	3"	43"	4"	1,887lb.	3
OI.6350	350	• 6"	525gal.	70.cu.ft.	16.5"	43.5"	43.5"	45"	76.25"	60"	100.88"	31"	3"	48"	4"	1,913lb.	3
OI.6400	400	• 6"	598gal.	78.5.cu.ft.	17"	43"	43"	45"	83"	60"	107.88"	31"	3"	49"	4"	2,261lb.	3
OI.6450	450	• 6"	630gal.	84.cu.ft.	17"	43"	43"	45"	94.25"	60"	118.88"	31"	3"	49"	4"	2,350lb.	3
OI.6500	500	• 6"	735gal.	98.cu.ft.	20"	46"	46"	45"	94.25"	66"	118.88"	34"	3"	52"	4"	2,500lb.	3

LARGER UNITS AVAILABLE

Call for information when larger units are required.

BESTEC INTERCEPTORS OI SERIES OIL INTERCEPTORS



Note the course of water travel in cut-open view. The arrows designate the course from the inlet through the first separating screen, upward and through the second separating screen, downward through the filter and flow regulator screen to the outlet, and upward to the drainage line. There is no straight in-and-out travel from the inlet to the outlet of the interceptor.

Our simple design is a perfect application of the principle of nature's own law of gravity in separating lighter-than-water wastes from heavier-than-water matter. These light-density substances, as well as oily, greasy sludge or solids, are retained in the Bestec Interceptor.

APPLICATION

Bestec Oil Interceptor are designed to receive, directly from plant equipment or floor drains, various kinds of oils, gasoline, kerosene, naphtha, benzene, other volatile liquid waste, and sludge. They retain this harmful waste matter and prevent its entry into the drainage system, providing triple advantages.

ADVANTAGES

The safe retention of this flammable material reduces (1) the hazards of fire and explosions inside the building, (2) the pollution of our soil and waterways caused by the indiscriminate disposal of waste material, and (3) the loss of a salable or reusable by-product.

OPERATION

These oil Interceptors are for **intermittent** operation. For continuous or severe operation, consult our Engineering Department.

CONSTRUCTION

The interceptor is built of all-welded heavy-duty steel plate for maximum strength and durability. Both the interior and exterior are coated to resist acid corrosion. These units have removable covers for on-the-floor, partially recessed or flush-with-floor installation, suitable for pedestrian traffic or reinforced for heavy traffic. The cover is secured to the body with recessed stainless steel bolts and includes an extra heavy leakproof gasket.

Separating screens and a flow-regulator filter screen regulate flow and filter waste water, making outside flow control or retarder unnecessary. An extra large inlet compartment has adjustable oil draw-off. The outlet is separated from the main body of the unit, meeting all plumbing code requirements of an outside visible trap seal.

Independent internal vent connection on the inlet compartment dissipates excessive fumes and vapors from evaporating gases and volatile liquids. The outlet of the Interceptor is vented to prevent siphoning of its contents into the drainage system.

METHOD OF OPERATION

The basic requirement for efficient retention of non-soluble oil or other volatile liquid wastes is the absence of turbulence in the waste water movement. This is accomplished in the Bestec Interceptors by its design for maximum water travel without agitation and by the filtering action of its screens. The combination of two separating screens and a flow-regulator filter screen reduces the turbulence to allow proper separation, and prevents the evacuation of solids into the drainage system. The absence of a solids-evacuating channel is additional proof of the non-turbulent flow through the Interceptor.

SAFETY FEATURES

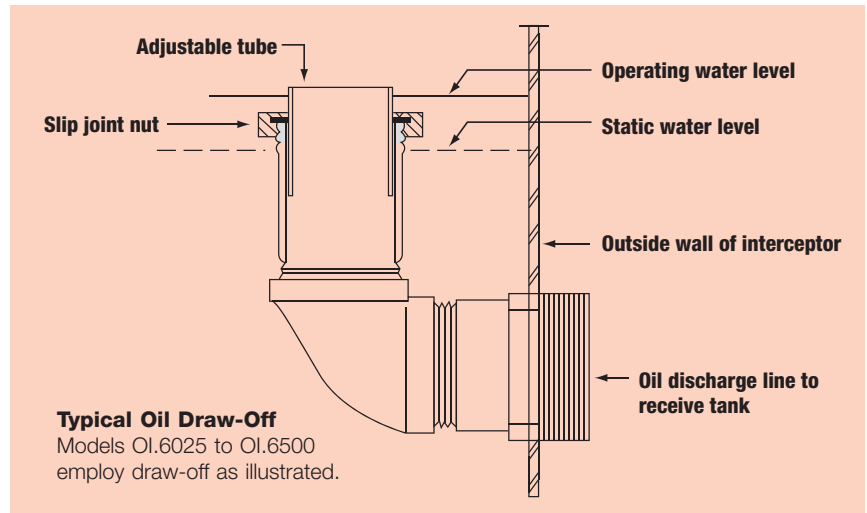
Visible double-wall outside trap seal with vent connection prevents siphoning. Separate internal vent connection keeps pressure from building up inside the unit and from forcing the contents into the drainage system. This independent vent also releases any fumes which may build up inside the unit. The wet inlet design prevents the entry of sewer air into the premises.

ENGINEERING SERVICE

Where individual problems or large projects require special applications, the assistance of our Engineering Department is recommended.

BESTEC INTERCEPTORS OI SERIES OIL INTERCEPTORS

For vehicle servicing and storage, mechanical and manual car washing.



OIL DRAW-OFF

The oil draw-off funnel is adjustable to the gravity height of oil and gallon-per-minute flow. It leads into the oil discharge pipe, from which a suitable disposal of oil can be made in the most economical way.

After the interceptor is installed, establish the operating water level by running water through the interceptor at the maximum flow rate expected. Adjust the vertical draw-off pipe 1/8" to 1/4" above the water line. Periodic checking of this level after the interceptor is in operation will ensure the proper functioning of the oil draw-off. If drawn-off oil contains any water, raise the vertical draw-off pipe until only oil flows from the interceptor.

INTERMITTENT FLOW OIL INTERCEPTORS

The maximum amount of waste water containing non-soluble oil that can be discharged through any listed interceptor is two (2) times the stated flow rate in g.p.m. For example, a interceptor rated at 50 g.p.m. may only have 100 gallons discharged through it in a one-hour time period. This is usually accomplished by a batch dumping process. However, 100 gallons may be discharged continuously if the flow rate is monitored at the rate of 1.66 g.p.m.

FILTER MEDIUM

Some oil-laden wastes carry with them small particles of suspended matter. For such installations, we recommend the OI interceptor be ordered with a filter medium. This will keep the tiny particles of suspended matter with attached oil globules from passing into the drainage line.

TYPICAL CODE REGULATIONS

VEHICLE SERVICING

When an oil interceptor is installed in an automobile, truck, bus, or tractor garage, in a service station or in a repair shop with facilities for motor or transmission overhauling, it must have a minimum static water depth of 24 inches below the invert of the interceptor outlet and a minimum static water capacity of 6 cubic feet.

This regulation applies to facilities where not more than three vehicles are serviced. For each additional vehicle up to and including ten, 1 cubic foot of static capacity shall be added. For each vehicle over ten, an additional 0.25 cubic foot shall be added.

VEHICLE STORAGE

In motor vehicle storage facilities, a combination interceptor-drain shall be installed with a static water level of 1 gallon for every 100 square feet of area to be drained.

VEHICLE STORAGE AND SERVICING

Where motor vehicles are serviced and stored, an oil interceptor shall be installed with a static water capacity of 1 cubic foot for every 100 square feet of area to be drained. The oil interceptor shall have a minimum static water level of 6 cubic feet.

MECHANICAL CAR WASHING

In facilities designed especially for mechanical washing of motor vehicles, a sand and gravel interceptor shall be installed to receive the waste water from all washing facilities. A minimum static water level of 2.5 feet and a minimum static water capacity of 50 cubic feet shall be maintained.

Where motor cleaning services are rendered a mechanical car washing facilities, an oil interceptor shall be installed in that section of the drainage system which receives waste water from this operation.

No outlet from a sand and gravel interceptor shall be discharged to an oil interceptor.

MANUAL CAR WASHING

In a one-car washing facility, a combination interceptor-drain shall be installed with a minimum static water capacity of 30 gallons.

BESTEC INTERCEPTORS OI SERIES CONTINUOUS FLOW OIL INTERCEPTORS

DESIGN CRITERIA

ACTUAL JOB INSPECTION AND RECOMMENDATION

Upon inspection of your plant and testing of the waste oil sample received, we submit a report similar to the following for your consideration.

The following information was given to us:

- **Water Consumption** : **3,000,000 gallons per month**
- **Work Day** : **24 hours**
- **Work Week** : **6-day week**
- **Oil Consumed** : **600 gallons per month**

From the above information we obtained these figures as averages:

- **Average Work Month** : **25.5 days**
- **Flow Rate Per 24 Hour Period** : **117,645 gallons**
- **Flow Rate Per Hour** : **4,901 gallons**
- **Flow Rate Per Minuted** : **81.6 gallons, or 10.88cfm**

Based upon the information received from the local sanitary district office, **200 ppm** of oil is being discharged into the sewer. This totals out of **589 gallons** per month. This concurs with the figure of **600 gallons** per month that is purchased and consumed in your operations (**589 gallons** vs. **600 gallons**).

DESIGN CRITERIA

Research and experimental work have led to the adoption of fundamental principles which provide mathematical bases for the determination of Interceptor. size and shape. These principles have been applied, and the results are Interceptors demonstrating highly effective performance.

It must be noted that the design and shape of the Interceptor depend upon the character and quantity of the oily water to be separated. Even a properly sized Interceptor is limited to the separation of oils and solids which are susceptible to gravity separation. It must also be noted that modifications, and possible refinements to this design can result in Interceptors with improvements and merits.

The following design criteria is based upon a mathematical formula resulting from research done, and upon which Bestec Interceptors base their design.

The design of a rectangular oil Interceptor is based on three relationships:

- 1. A minimum horizontal area**
- 2. A minimum vertical cross-sectional area**
- 3. A minimum ratio of depth to width of 0.3 (0.5 maximum).**

The design of this Interceptor was calculated using varying temperatures of waste water from 70°F to 100°F. We are presenting design information based upon a temperature of 100°F, which in our estimation, is more likely to be the average temperature.

BESTEC INTERCEPTORS OI SERIES CONTINUOUS FLOW OIL INTERCEPTORS

DESIGN CRITERIA FORMULAE

1. A minimum horizontal area – expressed as A_h

$$A_h = F \frac{Q_m}{V_t} = 1.64 \frac{10.88}{.145} = 123$$

Q_m = flow rate in **cfm** of waste water
 F = a factor to allow for the effects of turbulence and short-circuiting, the

value of $\frac{V_h}{V_t}$ applied to a corresponding

chart of known values.

$$F = \frac{V_h}{V_t} = \frac{2.175}{.145} = 15$$

15 applied to chart equals
1.37 (turbulence factor)

$$F = (F_t) (F_1) = (1.37) (1.2) = 1.64$$

$$F = 1.64$$

$$V_t = .0241 \frac{S_w - S_o}{M} = .0241 \frac{(.933 - .9520)}{.0068} = .145$$

$$V_t = .145$$

.0241 = known value

S_w = specific gravity of waste water at design temperature

S_o = specific gravity of waste oil at design temperature

M = absolute viscosity of waste water at design temperature

The product of the short-circuiting factor and the turbulence factor, yield the design factor F by which the surface area of the ideal interceptor is multiplied to obtain the surface area required of an actual Interceptor.

It is to be noted, in the recommended design method which follows, that the value of the horizontal area, A_h , is not determined directly, but that acceptable values of depth and width are established first in accordance

with the relationship of A_e and $\frac{d}{B}$

The length is then computed with the formula:

$$L = F \frac{(V_h)}{V_t} d = 1.64 \frac{(2.175)}{.145} 3 = 73.8 \text{ feet}$$

$$L = 73.8 \text{ feet}$$

2. A minimum cross-sectional vertical area – expressed as A_e

$$A_e = \frac{Q_m}{V_h}$$

V_h = a horizontal velocity of flow no greater than **15x** the rising velocity, and not to exceed **3 fpm**.

$$V_h = 15 (V_t)$$

$$15 (.145) = 2.175 \text{ fpm}$$

$$2.175 \text{ is less than } 3$$

$$A_e = \frac{10.88}{2.175} = 5$$

Note: There are established values that must be employed. They have not been determined directly, but are established by various relationships.

Example: The rising velocity of oil globules in water is based on an oil globule of **.015 cm** in size.

3. A minimum ratio of depth to width of 0.3 (max 0.5)

$$\frac{d}{B} = 0.3 \text{ to } 0.5$$

d = depth in feet of waste water in Interceptor

B = width in feet of Interceptor chamber

Tests conducted indicate that the depth-to-width ratio is not subject to theoretical analysis. Tests conducted prove that oil retention is not influenced until the depth-to-width ratio becomes **0.2**. There is no objection, if economics dictate, to the use of depth-to-width ratios of approximately **0.5**. The depth, however, must be limited to a minimum of **3 feet** and a maximum of **8 feet**; the width from a minimum of **6 feet** to **20 feet** maximum. Experimental studies have shown that hydraulic characteristics are improved by increasing the length and decreasing the width. A longer channel has the effect of minimizing the disturbing influence of the inlet and outlet zones.

We have a Interceptor, using minimum ratios, with dimensions as follows:

3 feet deep (static depth) x **6 feet** wide x **73.8 feet** long. Static liquid holding capacity of **1,328 cubic feet**, or **9,960 gallons**.

This Interceptor will give a **two hour** retention period for the separation of oil, water and solids.

However, this length is not feasible at your building site. Also, more than likely, construction of a Interceptor this size would be too costly.

Bearing in mind the importance of the depth-to-width ratio maximum of **0.5**, we have altered the dimensions as follows: **30 feet** long, **9 feet** wide, with a water level of **4 1/2 feet**. This represents the maximum allowable ratio of **0.5**; also a static capacity of **9,112 gallons**, which is a **1 hour, 51 minute** period.

This oil-water Interceptor has been designed according to the **3,000,000 gallon** figure presented to us. If there is the possibility of a change in this figure, either up or down, it would have a bearing on the overall design of this Interceptor.

INFORMATION BASED ON A.P.I. DESIGN CRITERIA