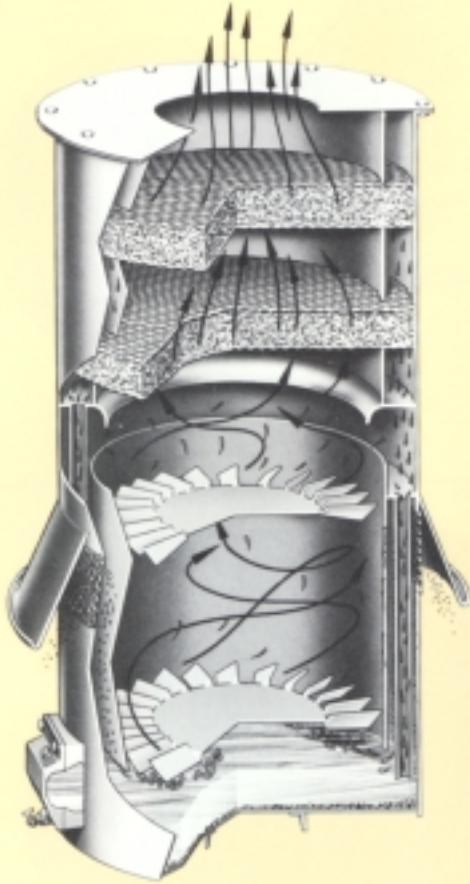


CyCoil®

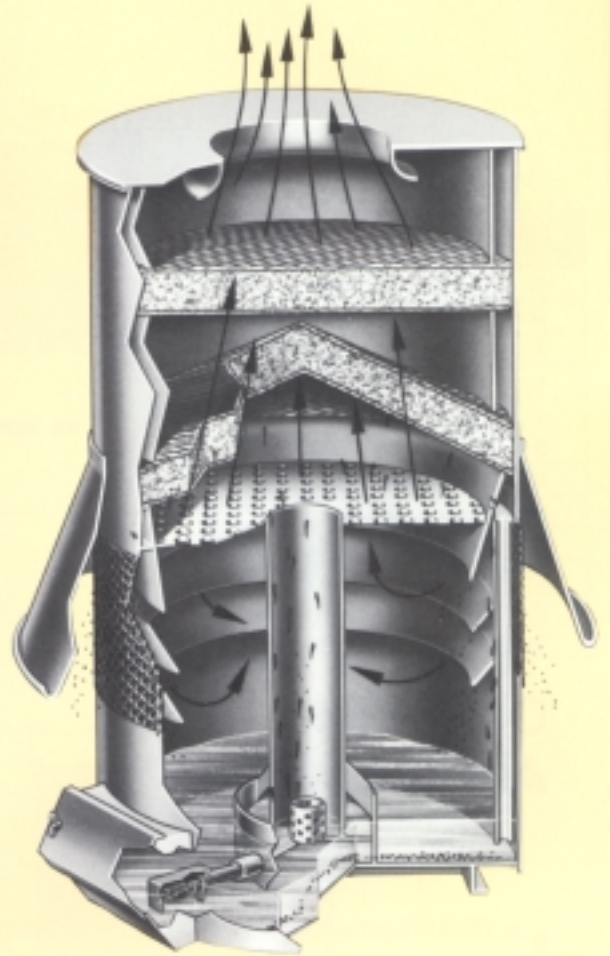
TYPE "W" AND "P"
OIL BATH
AIR CLEANER



CYCOIL SERIES OIL BATH AIR CLEANERS



TYPE W CYCOIL



TYPE P CYCOIL

CYCOIL OIL BATH AIR CLEANER

The oil bath Cycoil air cleaner has been the leader for cleaning engine and compressor intake air for fifty years. It has proven itself under virtually all operating conditions throughout the world, from the sands of the Sahara to wet, rainy and snow-laden environments—all over the world.

The Cycoil is available in 15 sizes to handle from 115 cfm to 50,000 cfm, with models available for both smooth and pulsating air flow.

The Cycoil offers many advantages over other filters for cleaning of intake air.

- **High Efficiency**—Maintained cleaning efficiency with variations in air flow.
- **Self-Cleaning**—Continuous oil-washing action cleans the unit while it is operating.
- **Economical Operation**—No external power source required for its operation.
- **Ease of Maintenance**—No moving parts are required for continuous, self-washing operation. (Valve discs on Type POI-V and Type PO3-V Cycoils do open and close.) Periodic oil change is only maintenance required.
- **No Special Oil Required**—Any straight-run paraffin base mineral oil (without additives) of a mean viscosity of 1500SSU is satisfactory.
- **Unattended Operation**—Handles a wide range of dust concentrations without operator attention.
- **All-Weather Protection**—A peripheral intake combined with the upward flow of intake air provides excellent snow and rain protection.
- **Minimum Space Requirements**—Occupies a minimum amount of space and requires a relatively small foundation.

CLEANING EFFICIENCY

The cleaning efficiency of the Cycoil has been determined by tests conducted in accordance with AFI test procedures using Arizona Road Dust Fine. The average of the tests run indicates a cleaning efficiency for the Cycoil of more than 92%. Due to the self-cleaning feature, high efficiency is maintained over the operating range of the cleaner. Even at partial loads, the engine is provided with clean air.

POSITIVE OIL CIRCULATING SYSTEM

The positive oil circulating system is one of the features which makes the Cycoil different from other oil bath cleaners and accounts for its excellent reputation of satisfactory performance even under the most severe operating conditions. The design of the pads, the use of drain tubes, and the quantity of oil in circulation are the things that make this oil circulating system so effective. The Cycoil is unique in the large quantity of oil circulated and in its two steps of oil elimination. This continuous operation of supplying the cleanest oil to the pads to replenish this dust collecting adhesive and the collected oil droplets draining to the perimeter of the filter pads provides a self-washing action which makes it unnecessary to dismantle the cleaner when servicing. The migrating oil collects in the annular chamber at the outer periphery of the pads (this area being out of the air stream) and flows to the reservoir through the drain tubes where the dirt and grit settles as sludge. A secondary filter pad removes any oil mist that may have escaped entrapment in the primary filter.

DUST HOLDING CAPACITY

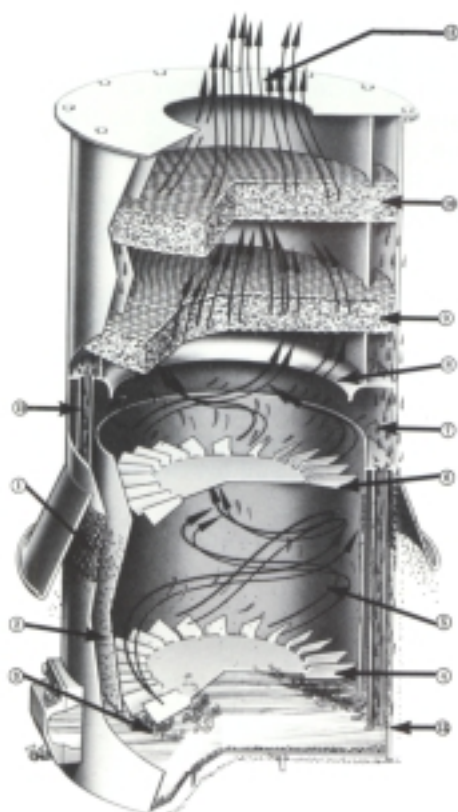
One important feature of Cycoil cleaners is the fact that there is no danger of oil pull-over even though the oil level is raised somewhat by the dust load accumulated. Most dust will settle to the bottom of the cleaner in the form of sludge, and it is safe to permit this to reach a depth of 2". This will raise the oil level approximately $\frac{1}{2}$ ", the difference being absorbed by the dust. The weight of this sludge, exclusive of oil, will vary, depending upon the specific gravity of the dust collected. In the case of dust such as is encountered in dust storms, the maximum dust load will be approximately 3½ lbs. for each gallon of oil. Some types of dust will not settle out, but have a tendency to thicken the oil. The intervals between oil changes under these conditions will have to be sufficiently short to keep the oil fluid.

TYPE W CYCOIL— DESCRIPTION OF OPERATION

Dirty air enters under the rain shield and passes through removable bug screen (1) then passes downward through the space (2) between the inner and outer cylinders. At (3) it impinges against oil, depositing the heavier dust particles immediately, picks up oil and then passes upward through vanes (4) which impart a whirling motion to the air and oil mixture. In chamber (5) the whirling air and oil are thoroughly mixed and the centrifugal action developed throws a large portion of the dust against the oil-coated walls of the inner cylinder. The air-oil mixture then passes through vanes (6) which impart a still faster whirl, throwing the oil with the dust it

has collected outward by centrifugal action. At the top of the cylinder (7) is an enlarged chamber into which most of the oil and dirt are thrown from the air stream. The pre-cleaned air then passes upward through orifice (8) and through the double filter cells (9) and (10) leaving the cleaner at (11) to pass into the engine or compressor. The air which reaches the filter cells contains a mist of oil which is collected by the cells and drains out around the outer edges. This continuous flow of oil keeps the filter cells thoroughly washed so that any dust collected on them is immediately carried away.

The oil which is thrown out at (7) and the oil which drains from the filter pads passes downward to the oil reservoir through pipes (12) and (13). There the dirt settles out and the oil recirculates.



**CUTAWAY TYPE W
CYCOIL**

TYPE W CYCOIL SIZING DATA

I. CFM Displacement Formula:
$$\frac{B^2 \times S \times \text{RPM} \times N}{K_1 \times K_2}$$

Where

B = Bore in inches

S = Stroke in inches

RPM = Revolutions per minute

N = (A) Number of cylinders—Engine.

(B) Number of low pressure
cylinders—Compressor.

K₁ = 2200 for (A) Two cycle engines with
scavenging blower.

(B) Four cycle engines
naturally aspirated of 4 or
more cylinders

1760 for (A) Pump scavenged engines.

(B) Air compressors—single
cylinder—single acting.

(C) Air compressors—single
cylinder—double acting.

(D) Air compressors—Two or
more low pressure
cylinders—double acting.

(E) Four cycle engines—one,
two or three cylinders.

K₂ = 1 for two cycle engines

2 for four cycle engines

1 for single acting compressor

½ for double acting compressor

II. Enter capacity chart at required air volume and allowable resistance and read air cleaner size and oil level. If required air volume is in excess of that shown for the 24 W Cycoil, then select a Type 'P' Cycoil from curves on page 8.

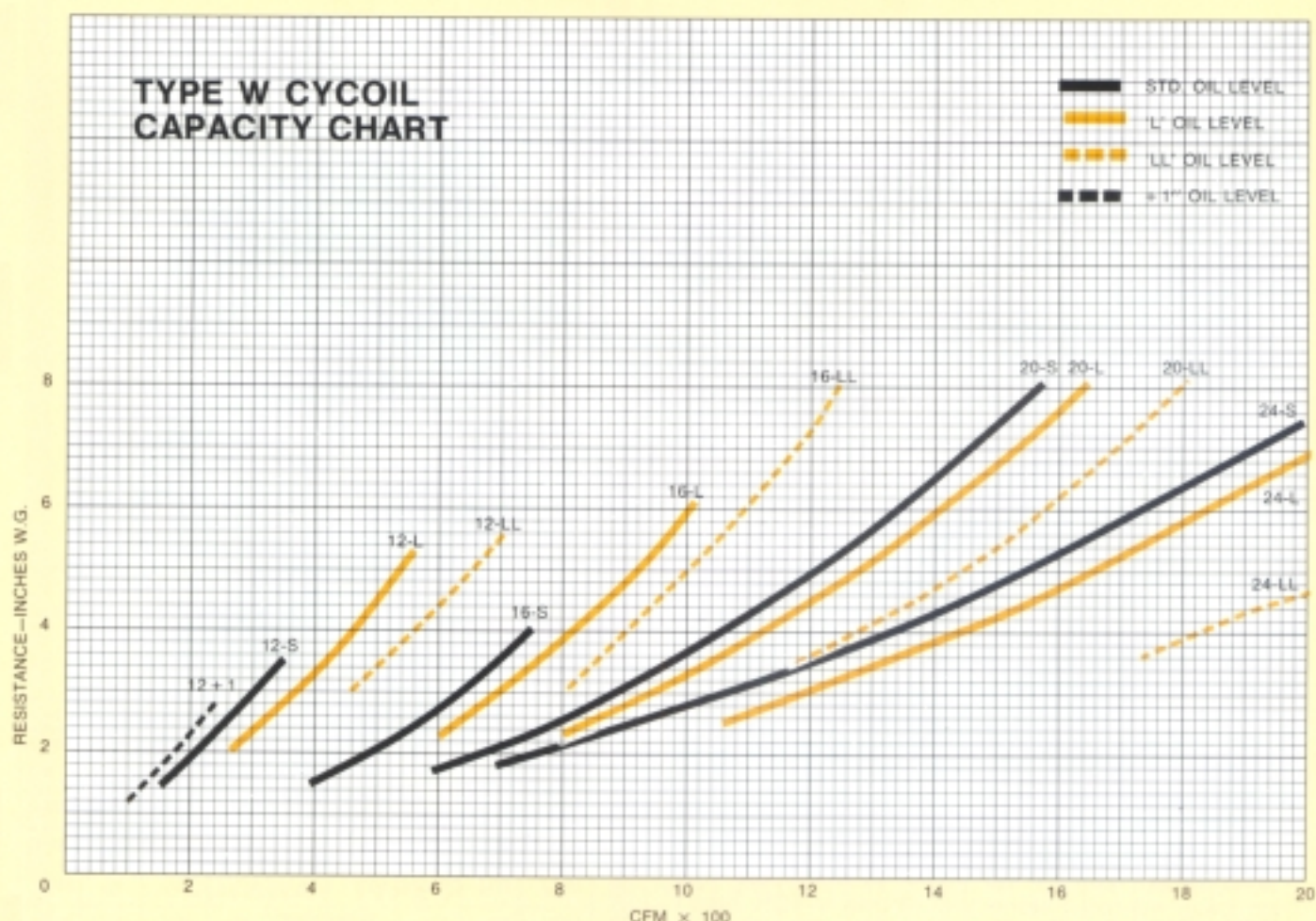
Maintenance consists of periodically draining the dirty oil, removing the inspection plate to scrape out accumulated sludge, and refilling with clean oil. If properly maintained, it should never be necessary to remove the filter cells for cleaning, but the top is made removable and the filter cells may be lifted out, inspected, or cleaned in case unusual conditions make this necessary.

CYCOIL OIL LEVELS

Different oil levels are used in the W Cycoil to meter the amount of oil circulated within the cleaner. The air flow through the Cycoil will entrain sufficient oil to maintain a fixed operating level regardless of the standing level in the reservoir. The more oil in circulation the higher the resistance to air flow and inversely the less oil, within practical limits, the lower

the resistance. Excess oil may flood the filter pads and be carried over in the intake air. Too little oil will affect efficiency and impair the washing action in the pads. Thus, the oil level in the W Cycoil becomes an important factor in its performance.

Three oil levels—"Standard," "L" and "LL"—are used in the W Cycoil. Normal capacity ratings are based on the "Standard" oil level. Use of the "L" level permits a cleaner to operate at lower resistance or at an increased capacity at rated resistance. With the "LL" level the amount of oil in circulation and the sludge holding capacity are greatly reduced which limits its use in extreme operating conditions. Oil levels in the Type W Cycoil are established by the locations of the filler opening in the clean-out door. Unless otherwise specified or recommended, the Cycoil will be furnished with "Standard" oil level.



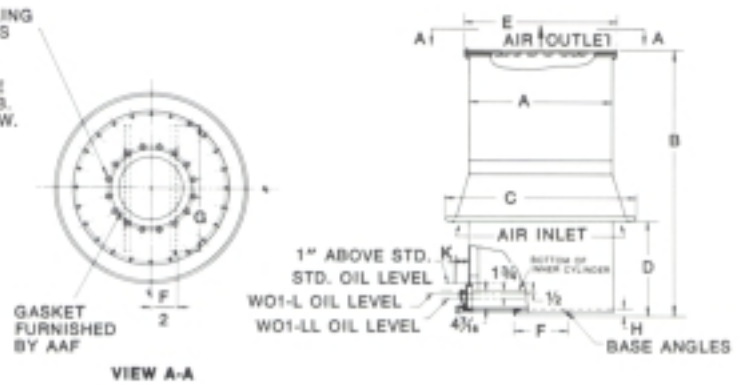
TYPE WO1 CYCOIL DIMENSIONS

150 LB. A.S.A. FLANGE DRILLING STRADDLING CENTER LINE. HALF THE NUMBER OF NUTS ARE USED EXCEPT ON SIZE 8 WHERE ALL ARE USED.

NUTS WELD TO UNDERSIDE OF TOP PLATE AND FIT STANDARD BOLT SIZE FOR 150 LB. A.S.A. FLANGE DRILLING SPECIFIED BELOW.

SEE J DIMENSION FOR TOP PLATE THICKNESS.

Top outlet Cycoil cleaners are furnished with top plate drilled to match SPECIFIED FLANGE SIZE and with nuts welded to underside of top plate. A gasket to insure positive air seal is included also. Standard flange sizes match 125 lb. or 150 lb. ASA drilling.



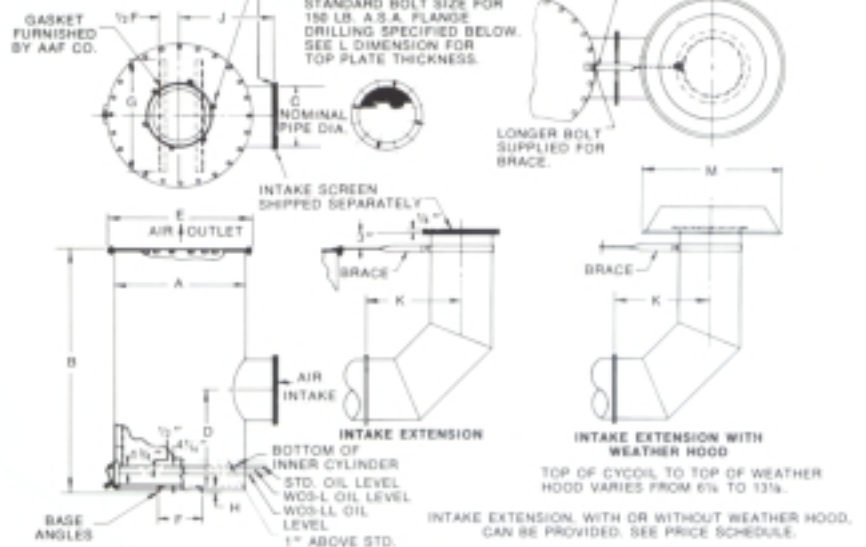
DIMENSION TABLE (WO1)

Model	Approx. Net Weight Dry	Outlet Flange		Gallons Oil				A	B	C	D	E	F	G	H	J	K
		Std.	Max.	Std. Level	WO1-L Level	WO1-LL Level	1" Above Std.										
12-WO1	90 Lbs.	4	6	2.2	1.9	1.3	2.8	12 ⁵ / ₁₆	32 ¹ / ₄	20 ¹ / ₄	11 ¹ / ₁₆	14 ³ / ₁₆	4 ³ / ₈	9	1	10 Ga.	2 ³ / ₈
16-WO1	140 Lbs.	6	10	3.8	3.4	2.3	4.6	16 ³ / ₁₆	37 ¹ / ₄	24 ¹ / ₈	13 ¹ / ₁₆	18 ¹ / ₄	5 ¹ / ₁₆	13	1	10 Ga.	3 ¹ / ₄
20-WO1	235 Lbs.	8	10	6.0	5.3	3.7	7.4	20 ³ / ₁₆	43 ¹ / ₁₆	29 ¹ / ₈	15 ¹ / ₁₆	22 ¹ / ₄	7	17	1	3 ¹ / ₁₆	3 ¹ / ₂
24-WO1	330 Lbs.	8	14	8.7	7.7	5.3	10.7	24 ³ / ₁₆	48 ³ / ₁₆	34	18 ¹ / ₁₆	26 ¹ / ₄	8 ¹ / ₄	21	1 ¹ / ₂	3 ¹ / ₁₆	3 ⁵ / ₈

All dimensions are in inches.

TYPE WO3 CYCOIL DIMENSIONS

125.7 A.S.A. FLANGE DRILLING STRADDLING CENTER LINE. HALF THE NO. OF NUTS OR HOLES ARE USED EXCEPT FOR SIZE 8 WHERE ALL ARE USED. NUTS WELD TO UNDERSIDE OF TOP PLATE AND FIT STANDARD BOLT SIZE FOR 150 LB. A.S.A. FLANGE DRILLING SPECIFIED BELOW. SEE L DIMENSION FOR TOP PLATE THICKNESS.



DIMENSION TABLE (WO3)

Model	Approx. Net Wt.	Outlet Flange		Gallons Oil				Casing Dia.	Height of Cycoil	Inlet Dia.	Bottom To Inlet	Top Plate Dia.	Base Angle Spacing	Base Angle Length	Base Angle Size	Cycoil To Inlet Flange	Inlet Flange To Extension	Top Plate Thick.	Dia. Weather Hood
		Std.	Max.	Std. Level	L Level	LL Level	1" Above Std.												
12-WO3	90 Lbs.	4	6	2.2	1.9	1.3	2.8	12 ⁵ / ₁₆	32 ¹ / ₄	6	12 ⁵ / ₁₆	14 ³ / ₁₆	4 ³ / ₈	9	1	12 ³ / ₁₆	9 ¹ / ₂	10 Ga.	15 ¹ / ₂
16-WO3	140 Lbs.	6	10	3.8	3.4	2.3	4.6	16 ³ / ₁₆	37 ¹ / ₄	8	13 ¹ / ₁₆	18 ¹ / ₄	5 ¹ / ₁₆	13	1	14 ³ / ₁₆	12 ³ / ₂	10 Ga.	19 ³ / ₁₆
20-WO3	235 Lbs.	8	10	6.0	5.3	3.7	7.4	20 ³ / ₁₆	43 ¹ / ₁₆	10	15 ¹ / ₁₆	22 ¹ / ₄	7	17	1	16 ³ / ₁₆	15 ¹ / ₂	3 ¹ / ₁₆	24 ¹ / ₈
24-WO3	330 Lbs.	8	14	8.7	7.7	5.3	10.7	24 ³ / ₁₆	48 ³ / ₁₆	12	17 ¹ / ₁₆	26 ¹ / ₄	8 ¹ / ₄	21	1 ¹ / ₂	18 ³ / ₁₆	18 ¹ / ₂	3 ¹ / ₁₆	28 ¹ / ₁₆

All dimensions are in inches.

TYPE P CYCOIL— DESCRIPTION OF OPERATION

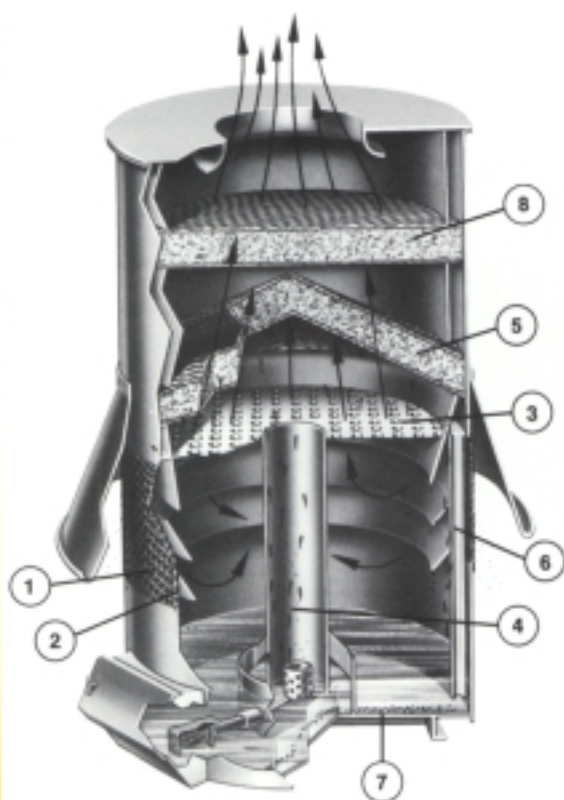
Air enters the P Cycoil through a bug screen⁽¹⁾ and is coursed slightly downward⁽²⁾ by a series of cones on the inside of the shell. These cones also prevent high velocity crosswinds from affecting the normal operation of the cleaner.

This dust-laden air is mixed with the oil by means of a perforated plate⁽³⁾ continually flooded with oil from the reservoir. The openings in the plate are calibrated to increase the velocity of air through these openings just the proper amount to pick up the oil as it tends to spill over the edges of the holes. At the same time, the perforated plate

serves to distribute air flow uniformly over the filter pad area.

A constant flow of oil to the perforated plate is supplied from the reservoir by the unique pneumatic oil lift⁽⁴⁾ operated on the pressure drop across this perforated plate.

The mixture of dust-laden air and oil are carried upward from the perforated plate into a conical shaped filter pad.⁽⁵⁾ Dirt collected by the pad is washed out by the oil as it drains to the perimeter of the filter and back to the reservoir.⁽⁶⁾ Dust and grit settle out as sludge in the reservoir.⁽⁷⁾ A secondary pad removes any oil mist that may have escaped entrapment in the first pad.⁽⁸⁾



**CUTAWAY TYPE P
CYCOIL**

TYPE P CYCOIL SIZING DATA

(1) Type PO1, PO1-V, PO3 and PO3-V Cycoils may be selected from the capacity charts on page 8 for the following smooth flow machines:

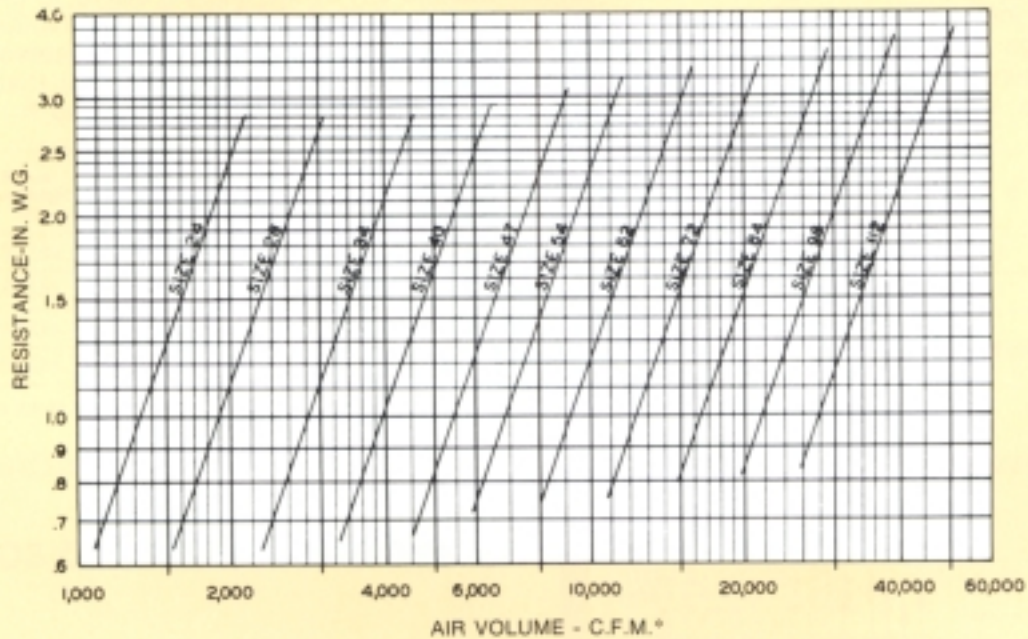
- (A) Turbocharged Engines — Select air cleaner on actual turbocharger flow in CFM.
- (B) Supercharged Engines — Select air cleaner on actual supercharger flow in CFM.

(2) Types PO1 and PO3 Cycoils may be selected from the capacity charts on page 8 for pulsating flow machines by using the formula on page 4. Types PO1-V and PO3-V should not be used on pulsating air flow.

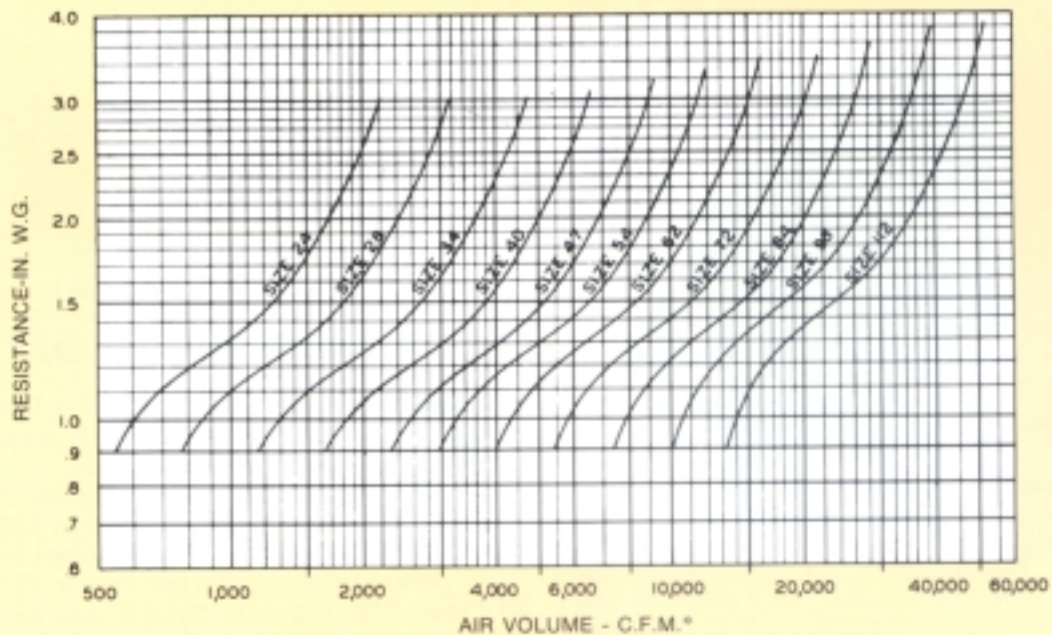
SELECTING THE PROPER SIZE

To select the proper size Cycoil, determine CFM and allowable resistance. Refer to capacity-resistance curves to select proper Cycoil. In specifying, size number should precede type of Cycoil, i.e. No. 47-PO1 indicates a size 47, Type P Cycoil. Size numbers designate nominal diameter of Cycoil in inches. Where the Vari-Flow valve is desired, -V is added, i.e. No. 47-PO1-V.

CYCOIL TYPE PO1 CAPACITY AND RESISTANCE

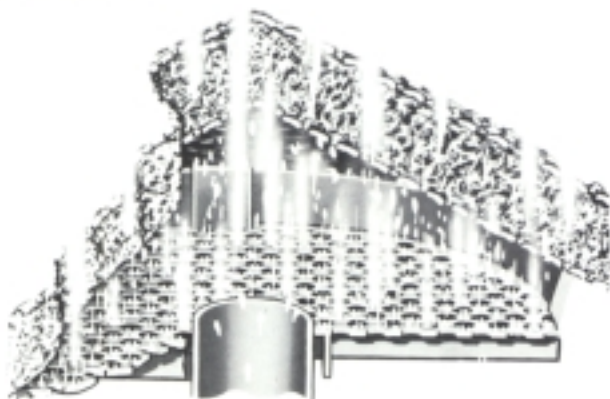


CYCOIL TYPE PO1-V CAPACITY AND RESISTANCE



*MAXIMUM AIR VOLUME IS BASED ON MAXIMUM AIR OUTLET PIPE VELOCITY OF 4,000 F.P.M. FOR HIGHER OUTLET PIPE VELOCITIES SEE DRAWING NO. 63P-773135.

OPERATION OF THE PNEUMATIC OIL LIFT



PERFORATED PLATE

Perforated distribution plate assures oil feed to all parts of filter pad and provides maximum effective use of pad area, preventing velocity stratification.

With air flowing through the P Cycoil, the static pressure inside the lift tube is approximately that of the space just above the oil distribution plate. The discharge end of the aspirator tube is placed in the vena contracta at the entrance to the lift tube, amplifying the negative static pressure in the aspirator tube over that which exists in the lift tube, which likewise is lower than the static pressure exerting force on the surface of the oil in the reservoir.

Oil therefore starts to rise in the aspirator tube to a height equal to the difference of these static pressures. This differential pressure also causes air to enter the aspirator holes in the aspirator tube, some of it below the level of the oil standing in this tube. These jets of air entering below the oil level have sufficient velocity to break the oil surface tension, creating oil droplets.

Part of the air entering the P Cycoil will enter the bottom of the air lift tube and flow upward through it the same as it does through the individual orifices of the perforated plate. This air entrains the liquid droplets fed to it by the aspirator tube and imparts the necessary energy to forcefully carry them to the top of the lift tube and disperse them over the entire surface of the perforated plate. There the air-oil droplet mixture mixes with the main airstream flowing through the perforated plate and carries the small aspirated oil droplets on to the pad. The larger droplets fall to the perforated plate to be reaspirated and carried to the pad.

CONTROL OF OIL FEED

In the P Cycoil the rate of oil feed is controlled so that it is nearly the same over the complete range of operation.

The oil feed control is built into the pneumatic oil lift. The bottom end of the aspirator tube extends to the bottom of a cup. The cup is deep enough so that its top lip rises well above the oil in the reservoir. The inside of the cup is connected to the oil reservoir only through the metering pipe. Several

metering pipes are used on the larger size Cycoils.

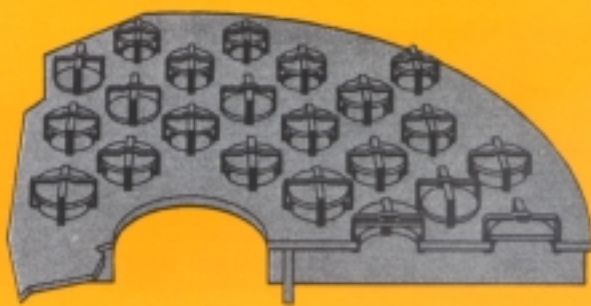
When air starts flowing through the cleaner the aspirator immediately starts removing oil from the cup and supplying it to the pads so that the washing and cleaning action starts as soon as air starts flowing.

As air flow initially increases, the liquid level in the cup decreases, permitting an increased flow through the metering pipes and up the lift. The maximum liquid circulation is obtained when the liquid level in the cup is zero. At this point, the metering pipe has a maximum head, forcing liquid into the cup. Oil feed starts at approximately $\frac{1}{2}$ " W.G. pressure drop across the cleaner and reaches a maximum amount at approximately 1" W.G. pressure drop. At any P Cycoil resistance above 1" the oil feed rate is the same, thereby assuring maintained cleaning efficiency and uniform circulation of the oil at the lower cleaner rating.

The metering pipe for the smallest P Cycoil is $\frac{1}{8}$ " pipe approximately 2" long, thereby having a large open area to reduce any possibility of plugging. To prevent large objects such as leaves, bugs, etc., from blanking off the end of the metering pipe, a large area screen protects it.

TYPE P-V CYCOIL

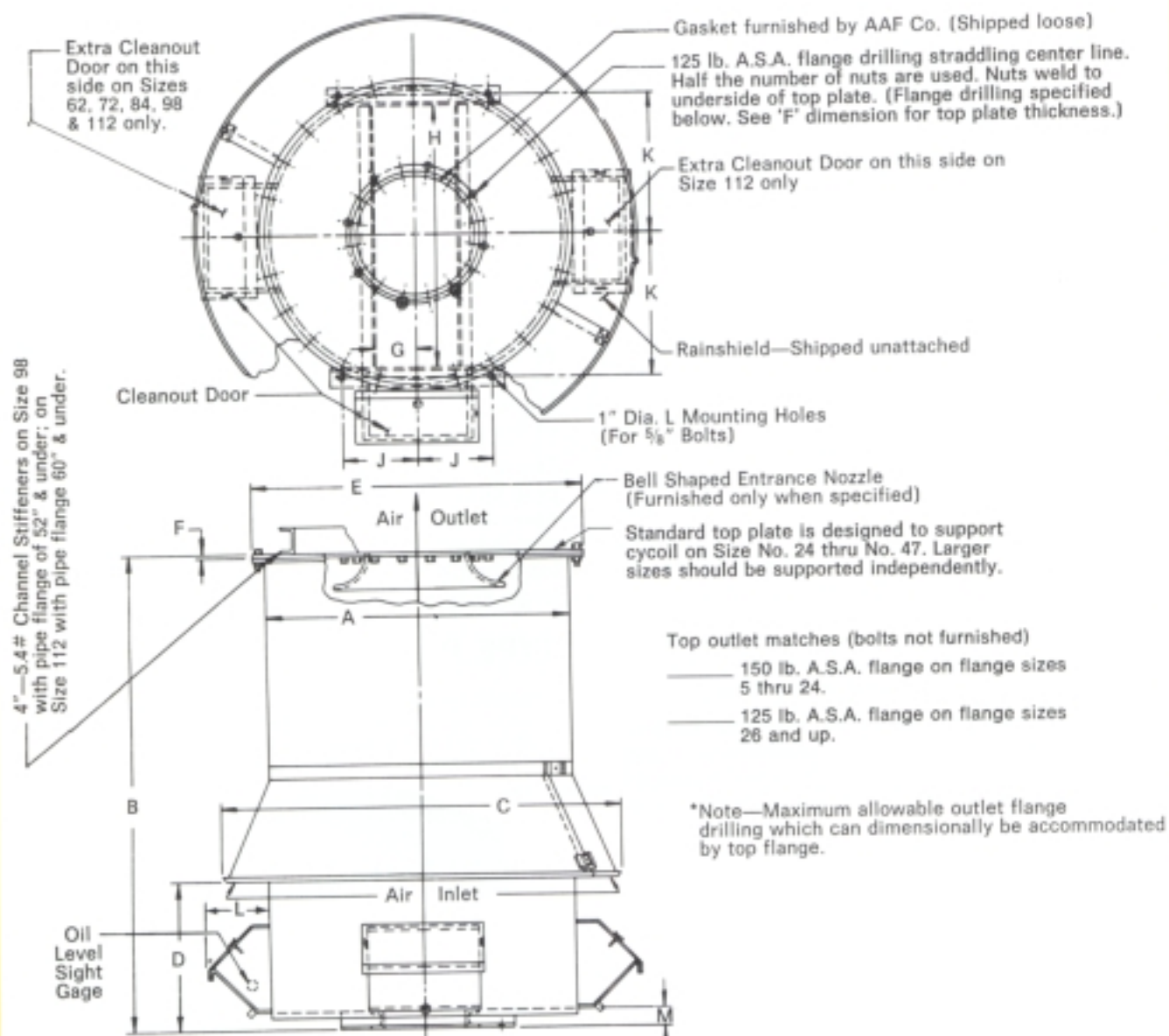
Close-up of distribution plate with vari-flow valves attached. The valves are supported in individual cages made of two pieces of flat spring steel. Valves are opened and held suspended by velocity pressure of air passing through perforated plate.



The Type P-V Cycoil is identical to the Type P except that vari-flow valves have been added on the entrainment plate to insure top efficiency and thorough cleaning action regardless of percentage of rated capacity at which the cleaner is operating.

These independently-actuated valves cover the openings in the perforated plate and are individually opened or closed depending on the air volume. This action of the valves controls the percentage of opening in the perforated plate, so that the velocity through the openings is always sufficient to pick up oil and carry it to the conical pad. This assures thorough washing of the filter pad regardless of air volume, and provides the maximum removal of dust from as low as 20% of rating to full capacity. This is the only oil bath air cleaner with this unusual characteristic of uniformly efficient performance over such a wide operating range.

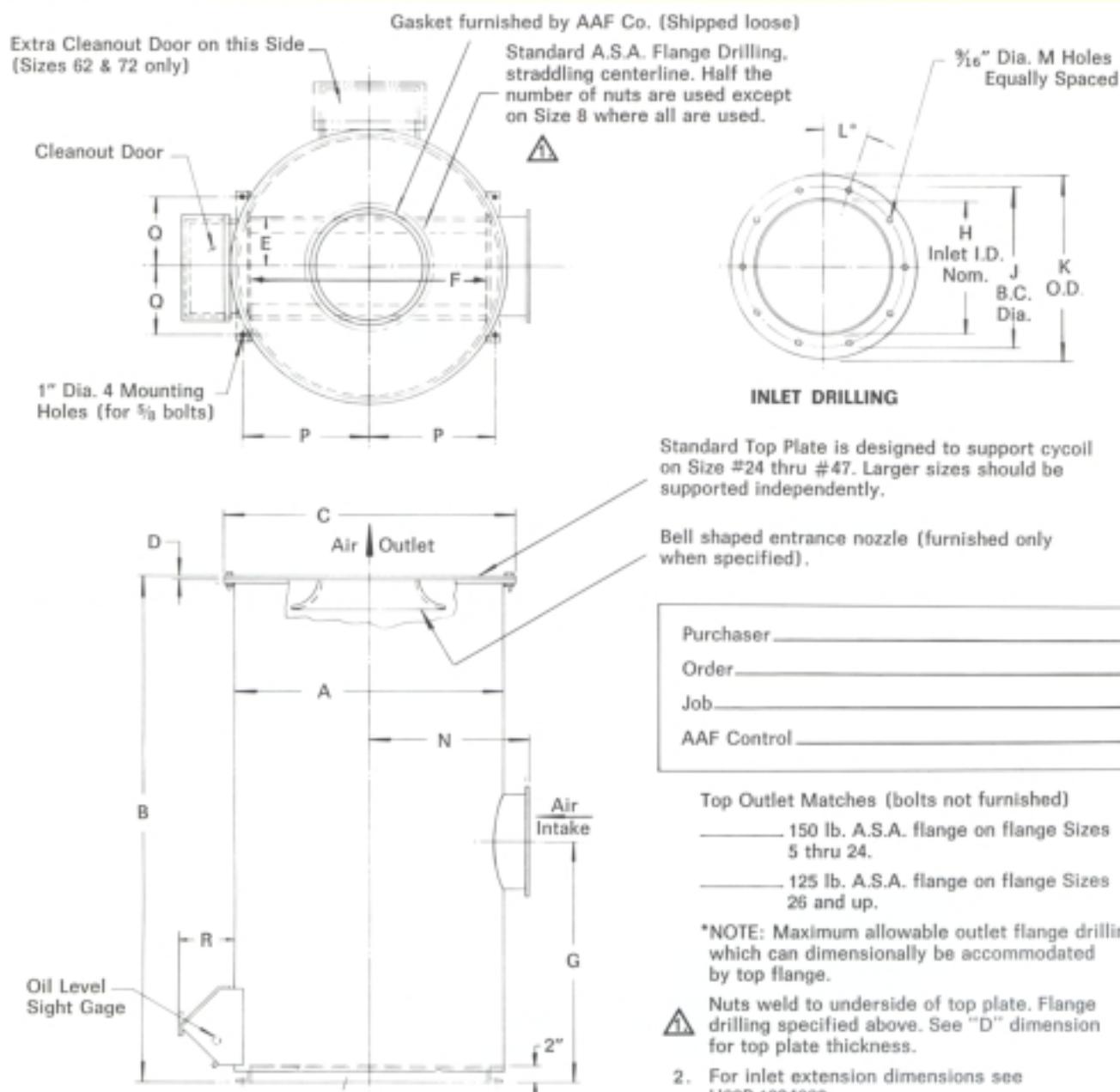
TYPE PO1 AND PO1-V MODEL "D" CYCOIL DIMENSIONS



Size	Type	Outlet Flange * Max.	Gals. Oil	Approx. Net Wt. Dry	A	B	C	D	E	F	G	H	J	K	L	M
24		14	9	350#	24 1/4	48 1/4	36 3/16	14 3/4	26 1/4	3/16	4	21 3/4	6 3/8	12	7 3/8	2
28		18	12	560#	28 1/4	54 3/8	42 11/16	18 1/8	31 1/4	1/4	4 3/4	25 1/2	6 7/8	13 3/8	7 3/4	2
34		24	18	750#	34 1/4	63 3/8	50 1/2	19 1/8	37 1/4	1/4	5 3/4	31	8 3/8	16 3/8	8 1/8	2
40		30	24	1050#	40 1/4	73	59 13/16	24 1/8	43 1/4	3/8	6 1/2	37	8 3/4	19 3/8	8 3/8	2
47		36	34	1400#	47 1/4	83 3/4	69 9/16	27 9/16	50 3/4	3/8	7 3/4	43 1/2	10	27 3/8	8 3/8	2
54		38	45	1900#	54 1/4	90 3/8	79 13/16	29 1/16	58 1/4	3/8	9	50	11 1/4	26 1/8	8 3/4	2
62		46	59	2560#	62 1/4	108	91 1/16	33 5/16	66 1/4	3/8	10 1/2	57 1/2	12 1/2	29 3/8	8 3/8	2
72		54	80	3750#	72 1/4	118 1/4	106 1/16	38 1/16	76 1/4	3/8	12	67	14 1/2	34 3/8	9	2
84		60	109	5440#	84 1/4	135 1/2	122 1/2	43	88 1/4	3/8	20	71 1/2	23	37 1/2	9 1/8	3
98		72	148	8500#	98 1/4	155 1/4	142 1/2	46 1/4	102 1/4	3/8	23 1/2	83 1/2	26 1/2	43 1/2	9 1/4	3
112		72	194	12500#	112 1/4	173 3/4	162	51 1/2	116 1/4	3/8	27	95 1/2	30	49 1/2	9 3/8	3

All dimensions are in inches.

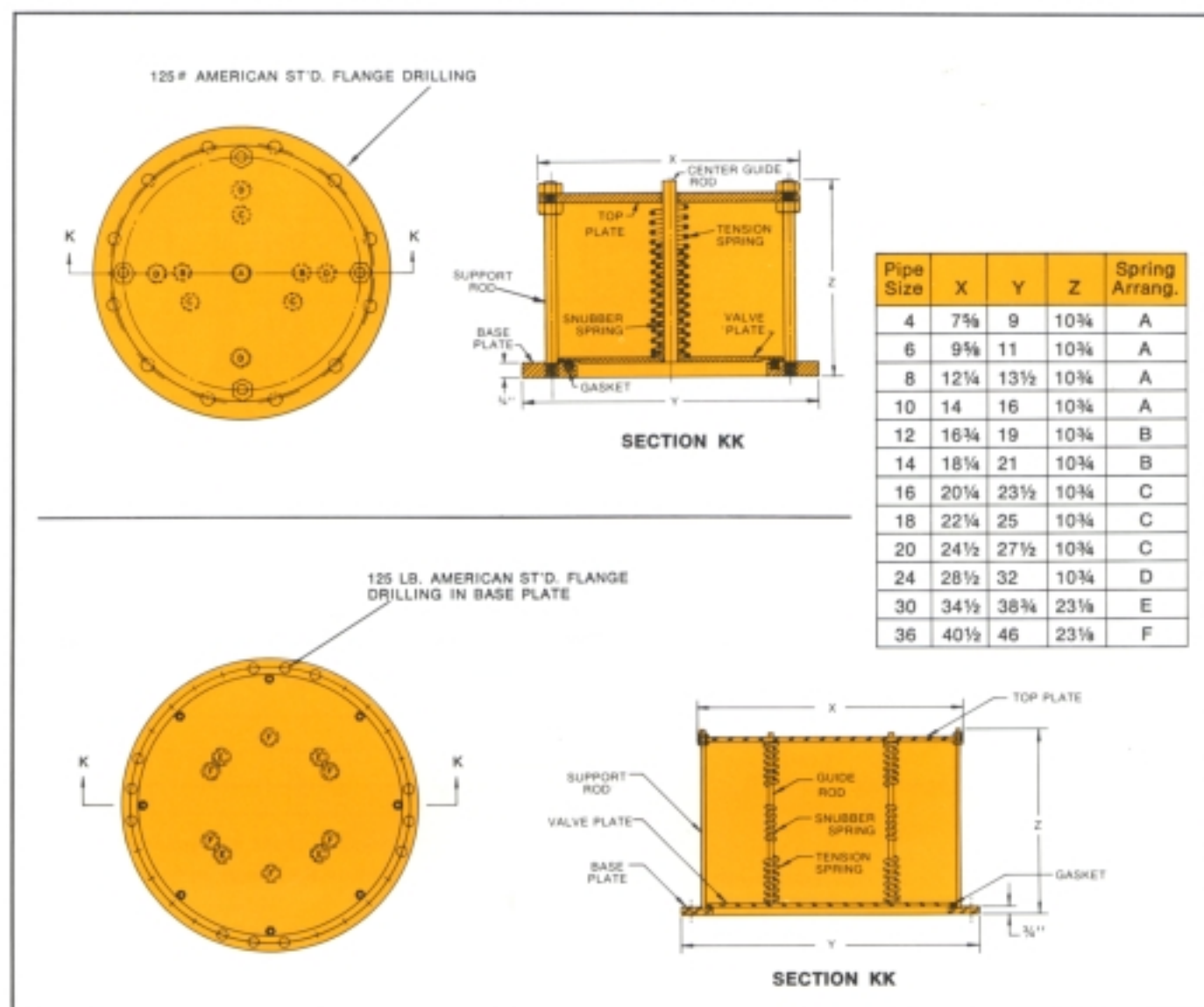
TYPE PO3 AND PO3-V MODEL "E" CYCOIL DIMENSIONS



Size	Type	Outlet Flange*		Gals. Oil	Approx. Net Wt.	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R
		Std.	Max.																		
24		10	16	9	350	24 1/4	48 1/4	26 1/4	3 1/16	4	21 3/4	20 3/4	11 7/8	15	18	30	6	18 1/8	12	6 1/8	7 3/8
28		12	20	12	560	28 1/4	54 1/8	31 1/16	1/4	4 3/4	25 1/2	23 1/8	13 3/8	17	20	30	6	20 1/8	13 3/8	6 3/8	7 3/4
34		14	24	18	750	34 1/4	63 3/8	37 1/16	1/4	5 3/4	31	26 3/8	17 3/8	20 1/2	23 1/2	22 1/2	8	23 1/8	16 3/8	8 3/8	8 3/8
40		16	30	24	1050	40 1/4	73	43 1/16	3/8	6 1/2	37	29 3/8	20 3/8	23 1/2	26 1/2	18	10	26 1/8	19 3/8	8 3/4	8 3/8
47		18	36	34	1380	47 1/4	83 3/4	50 1/16	3/8	7 3/4	43 1/2	35 1/16	23 3/8	27	30	18	10	29 3/8	22 3/8	10	8 3/8
54		20	42	44	1880	54 1/4	90 3/8	58 1/16	3/8	9	50	35 1/16	27 3/4	31	34	15	12	33 3/8	26 3/8	11 1/4	8 3/4
62		24	50	59	2540	62 1/4	108	66 1/16	3/8	10 1/2	57 1/2	45 1/16	31 3/4	35	38	15	12	37 3/8	29 3/8	12 1/2	8 3/8
72		26	54	80	3730	72 1/4	118 1/4	76 1/16	3/8	12	67	47 1/16	36 3/4	40	43	11 1/4	16	42 3/8	34 3/8	14 1/2	9

All dimensions are in inches.

BACKFIRE RELIEF VALVE



When Cycloil cleaners are installed on engines which have a tendency to backfire, a backfire relief valve should always be provided to protect the cleaner. These valves should be placed in direct line with the engine intake pipe. The AAF backfire relief valve is of simple, sturdy design and bolts directly to standard pipe fittings. It consists primarily of a plate

seated on a suitable gasket, and held in place by a spring which exerts a light pressure. A second spring of heavier construction serves to cushion the plate when it is forced open by backfire, and returns it to closed position. AAF backfire relief valves are available for application on pipes ranging in diameter from 4" to 36". Ask for drawing 63P-332 for sizes and dimensions.



P. O. BOX 35690 • LOUISVILLE, KENTUCKY 40232-5690