AIR-CLEAR, LLC
OPERATIONS AND MAINTENANCE (O&M) MANUAL
AC PROJECT NO. E6001J1

-FOR-

Blackledge

-SUPPLIED BY-

AIR-CLEAR, LLC
P.O. BOX 85
KIRKWOOD, DE 19708

SITE SPECIFIC REQUIREMENTS

Per specific requirements of the Operation Permit (570461-AO) assigned to Blacklidge Emulsions facility at 2701 E. Second Ave, the following operating checks and frequencies listed below will need to be adhered to while operating the AIR-CLEAR system.

Pressure Drop Operation Check

Two magnehelic brand gages located next to the inlet side of the system are to be **checked and recorded daily**. The gages record pre-filter and main filter pressure drop. It is important to note that the main filters require maintenance when the press. drop reaches approximately 12" WC. The main filter press. gage is the left gage. See attachment at end of O&M for gage specs. See pg.3.

Temperature Chart Recorder

The temperature chart recorder shall be **checked for operation daily**. The recorder charts are to be **changed weekly**. The recorder chart instrument is a Dickson brand KT8 series recorder. Supplies can be found at www.dicksonweb.com or www.dicksondata.com . Temperature charts are to be filed in the office and available for inspection at any time. The chart recorder is to be calibrated by the manufacturer **every six months**. A calibration services order sheet is included at the end of the O & M manual. see Attachment.

Spare Parts to be Kept On-site

The following shall be kept on site for maintenance:

Fiber bed diffusion filters -24 X 24 X 36 - 1 set - no part number

Dickson red ink pens -P222

Dickson 8" charts - 7 day C450

SYSTEM DESCRIPTION

The AIR-CLEAR Fiber-bed Coalescing System has been designed to control oil mist from asphalt Tanks. The exhaust contains oil mist and possible particle sizes ranging from submicron and larger. The Air-Clear Fiber-bed Coalescing System uses Fiber-bed diffusion filters to collect these particulate and liquid mists. The objective is to control the resulting emissions opacity.

Air-Clear systems use Fiber-bed diffusion filters to collect the submicron particulate that is the cause of opacity. Fiber-bed filters are designed specifically for liquid mists, and are designed to drain collected liquids continuously. They have been used successfully for many years to control submicron emissions effectively and economically.

The process gas flow will be drawn from the customer's process through the Air-Clear Fiber-bed Coalescing System process by an induced draft fan. Clean gases are discharged to atmosphere through the customer's stack.

THIS MANUAL

Read and thoroughly understand this O&M Manual before attempting to install or operate the AIR-CLEAR Fiber-bed Coalescing System.

This manual contains important information regarding the installation, set-up and operation of the system. Failure to read and thoroughly understand the information in this manual may result in improper and dangerous installation and operation of the equipment.

If there are any questions regarding this manual or the installation or operation of the system, please contact AIR-CLEAR for clarification before proceeding.

PROCESS DESIGN PARAMETERS

Max Design Inlet Flow:	2,500 ACFM @ 120°F
Air-Clear Filter Pressure Drop:	1-3"WC clean Change out filters ~ 12"WC
Guaranteed Stack Opacity:	≤ 5%
Automatic Fire Detection Switch:	225°F inlet

Utilities

Customer to provide 30A electrical service at 480V, 3Ph, 60 Hz.

Operational Modifications

If operating conditions differ from the design parameters specified, please consult AIR-CLEAR before operating the system.

SCHEDULED MAINTENANCE ACTIVITIES

Daily: Record all velocity pressure gage, and filter pressure drop values on Log Sheet Check temperature chart recorder, visual check of system, hand check of carbon canister temperature.

Weekly: Check water/mist buildup liquid in filter sump. Change and file chart recorder chart as needed. Note sump for petrol/water pickup service.

Monthly: Note schedule of petrol/water pickup, check temp recorder calibration date. Bi-monthly - collect air grab sample from carbon exhaust for Method 18.

Quarterly: Check pre-filters for replacement, change more often if needed. Check for Temperature Chart Recorder calibration due date. Check main filters for condition.

Annual: Semi-annual replacement of carbon polishing adsorber activated carbon. Semi annual replacement of main filters. Change temperature chart recorder every six months for current calibration.

PROCESS FLOW

The Air-Clear Fiber-bed Coalescing System is a superior method for removing liquid aerosol droplets from industrial exhaust gas. These emissions, which often appear as smoke or blue haze, are made up of liquid and solid particulate predominately in the submicron size range. Fiber-bed filters, unlike many other control technologies, are specifically designed for liquid mists, and reduce stack opacity to 5% or less, which is generally not visible to the naked eye.

1.) As the process inlet gas enters the coalescing filter section, it is forced through beds of densely packed Fiber-bed filters where coalescing of the submicron aerosol is achieved.

2.) The cleaned air exits through the clean air plenum on top of the unit.

3.) The induced draft exhaust fan is located at the end of the system. Having the ID fan located at the end of the filter system helps keep the fan clean, thus reducing its maintenance requirements .

4.) The clean filtered exhaust air exits the fan and into the carbon filter (provided by others) for removal of odor causing compounds stack to the atmosphere, reducing opacity levels to less than 5%.

5.) To compensate for the gradual increase in pressure drop across the system, a variable frequency drive (VFD) and fan outlet damper are provided and to be used to maintain a constant volumetric flow from the customer's process. These settings will need adjustment from time to time depending upon usage, filter fouling and other factors.

COMPONENT DESCRIPTION

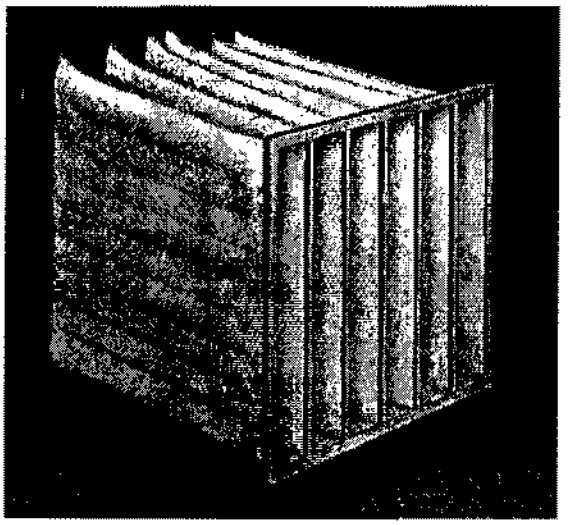
Filter Vessel

The vessel is constructed of 3/16" A-36 carbon steel, all seams continuously welded. Flanges and couplings as required for proper operation are included, as shown on the attached drawing. All access doors are hinged. Adequate space should be provided in front of the system to allow easy access to the filters for inspection or replacement.

A corrosion resistant coating is applied to all internal surfaces of this vessel. See MSDS sheet attached.

Pre-Filter

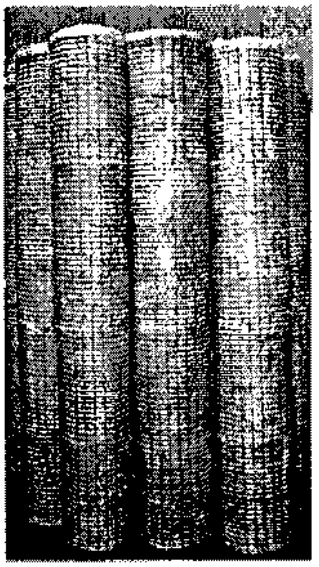
A fiber-bed (Figure 1) is provided to extend the life of the main filters. The fiber-bed will collect larger droplets and require more frequent replacement. It is accessed through the horizontal door on the vessel inlet. No overhead lifting equipment is required to service/replace the pre-filter.



Typical Fiber-bed Filters
Figure 1

Main Filters

The Fiber-bed diffusion filters are constructed of high efficiency fiberglass media, with the supporting assembly constructed of carbon steel (Figure 1). The filters attach to the tubesheet using studs and nuts. They are accessed through a side door on the vessel. No overhead lifting equipment is required to service the filters. The filter testing program ensures that Air-Clear systems perform as designed. Test conditions are much harsher than field conditions, making the test more discriminating.



Typical Fiber-bed Filters
Figure 1

Control/Instrumentation Package

The system is supplied with self-contained starter panel. Differential pressure guages are mounted on the unit to observe pre-filter, main filter pressure drop. A Velocity pressure gage is provided (to be mounted in the customer's stack) for visual indication of flow through the system. The fan outlet damper and/or the VFD can be adjusted manually to maintain a desired flow through the system. A normal range should fall between 1" and 4" WC.

Exhaust Fan

A 20.0 HP exhaust fan rated at 2600cfm with 3 phase 460V motor is provided with Variable Frequency Drive.

Fire Suppression

A fire suppression system is provided. A water sprinkler piping header is provided above the filter vessel tubesheet. Sprinkler heads and firewater supply are to be provided by the customer. The inlet fire detector is wired in a circuit to shut down the ID fan in the event of a fire. This relay should also be wired to the customer's fire control circuit, if available, to shut off the process flow in the event of a fire.

SEQUENCE OF OPERATION

This section will describe the general operation and setup of the Air-Clear system. Please refer to electrical and assembly drawings in Section 10 of this manual.

System Setup

Before Installation:

- Review all drawings and read the O&M Manual to familiarize your self with the system components. Verify all dimensions. Failure to do so or failure to report any discrepancies constitutes acceptance and concurrence with all site conditions.
- Off load unit and inspect all parts for shipping damage. Inventory all parts and compare them to the packing list. Report any losses immediately. The unit is provide with the pre-filter an main filters installed. Spare pre-filters are shipped loose.
- All standard safety practices for rigging and handling heavy equipment, as well as, adhering to all OSHA safety practices are required for safe and correct installation. Only qualified and certified heavy equipment operators are to operate machinery.

Installation Procedure:

1. Rig and set the main vessel of the unit in place. This is provided as one-piece section. Tie-down clips are provided for anchoring the unit to the pad.
2. Rig and set the fan skid per drawing.
3. Connect unit outlet spool with fan inlet spool using the clamped belt provided.
4. Fill the main dip tube (from above the tube sheet) and the two filter J tubes (from the main filter door) with oil prior to closing the vessel. Any motor oil will suffice.
5. Connect fire protection water supply to the coupling at the top of the unit. Install a sprinkler head (by customer).
6. Run and terminate 480V to the control panel disconnect.
7. Connect the 480 V power to the fan motor.
8. Wire the inlet fire detector to the control panel as shown on the electrical drawing attached.
9. Apply the supplied touch-up paint to all external areas as-necessary.
10. Mount pitot tube and velocity gauge in customer's stack. Install tubing from pitot to guage.

Pre-Start Inspection

Before starting the system, the operator must perform a pre-start inspection to ensure the following:

- Adequate electric is available.
- The drain valve is fully closed.
- Fire water is available.
- The access doors are closed, sealed and bolted.

Recommended Sequence for System Start-Up

The start-up sequence is as follows:

- Start Air-Clear system before any other upstream process.
- Turn Main Breaker ON.
- Turn VFD ON.(if VFD was provided)
- Check and record filter pressure.
- Adjust manual damper and/or VFD speed to maintain desired flow. Check the velocity gauge as a reference.

Shutdown

The start-up sequence is as follows:

- Shutdown Air-Clear System after any other upstream process.
- Turn VFD OFF
- Turn Main Breaker OFF.
- Drain system as needed.

SAFETY PROCEDURES

☠ DANGER ☠

HIGH VOLTAGE ELECTRICAL EQUIPMENT IS INCLUDED IN THIS SYSTEM. TURN OFF ALL POWER AND LOCK OUT THE DISCONNECT BEFORE ATTEMPTING ANY SERVICE OR TROUBLESHOOTING. SEVERE INJURY OR DEATH WILL OCCUR IF HAZARD IS IGNORED.

The control system for this unit must be designed to provide a safe operation. Any alteration or adjustment by anyone other than a qualified technician can damage the equipment and severely injure anyone in the area.

The equipment arrangement is shown on Drawing E attached. The electrical wiring diagram is shown on Drawing E, attached.

Do not attempt to operate under any other conditions then those specified in this document.

This system is designed for an unattended automatic operation after start up adjustments. Do not assume it is safe to perform maintenance or troubleshooting because the system is not operating. Lock, tag and try the disconnect before attempting maintenance on any part of the system.

Do not assume there is not electrical shock hazard when the disconnect is open. There will still be high voltage on the incoming side of the panel disconnect.

FIRE DETECTION AND SUPPRESSION

The system is equipped with a fire detection system for the inlet duct spool.

Please follow the manufacturers recommended testing procedures found in Section 9 of this manual.

The sprinkler system (sprinkler head and supply piping by customer) located in the main filter unit must be operational at all times. Please follow all NFPA and local codes when installing the fire water sprinkler nozzle.

It is the responsibility of the customer to maintain the fire suppression system.

MAINTENANCE

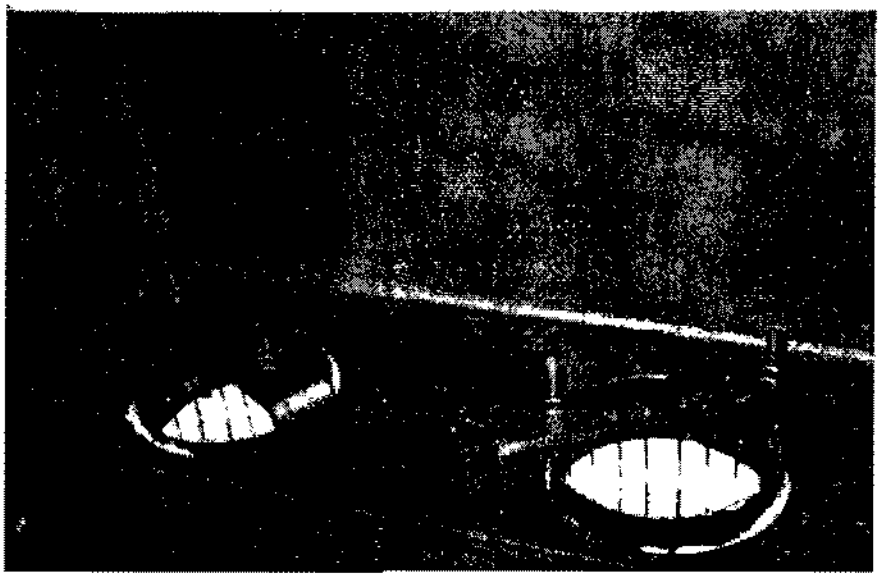
Fiber-bed Filter

The main filters must be replaced when their pressure drop approaches 12"WC. To change the main filters:

1.) Shut down the system fan and lock out the power.

2.) Open the main access door, unscrew the filter drains (J tubes) from the couplings in the bottom of the filters and remove them from the vessel.

3.) The Fiber-bed filters hang from the tubesheet. Each filter is fastened using two (2) studs attached to the end of the filter, which protrude through the tubesheet opening into the clean air plenum. A U-bracket straddles the tubesheet opening, with the studs going through the two holes in the u-bracket. Nuts fasten the filter studs to the bracket and retain them in the system.



Properly Installed Filter (View above tubesheet)
Figure 3

4.) Open the tubesheet access hatch and unbolt the filter studs protruding through the tubesheet. Position an employee outside the access door to guide the filter when it is unbolted. The filter will drop down to floor.

5.) Rotate the top of the filters out and remove them from the vessel.

6.) Pressure wash the inside of the unit. Blow out the tube sheet drains to ensure they are clear.

7.) Install the replacement filters. Insert the top of the filter through the tubesheet opening so that the studs and top of the filter collar protrude through the opening. While holding the filter from below, place the u-bracket over the two studs from above, so the legs of the bracket straddle the opening. Tighten the nuts securely to ensure a good seal between the top of the filter and the bottom of the tubesheet. Make sure that the filter collar extends above the tubesheet (see Figure 3). A credit card should be difficult to insert between the filter and tubesheet.

8.) Reattach the filter drains.

9.) Fill all filter and tubesheet drains with oil.

10.) Close and bolt the access door.

11.) Restart the system.

Fire Detection Circuit

The fire detection circuit must be checked monthly. The detection circuit is checked by opening the connection box at the fire detector and shorting the wires together. This must shutdown the fan. If not, the unit must be repaired to ensure safe operation of the fire suppression system.

It is the **customer's** responsibility to connect the fire sprinkler piping to the sprinkler water supply system in their plant. The customer must install sprinkler nozzles in accordance with the local code requirements and the requirements of their insurance carrier. Failure to connect the fire sprinkler water system to the Air-Clear system will negate all warranties.

TROUBLESHOOTING

Increased Pressure Drop

Pressure drop across the Fiber-bed filters can be a good indicator of filter condition. Increases in pressure drop are due to either an increase in the liquid loading, or collection of non-draining materials on the filter media. If an increased liquid loading is the cause, the pressure drop will (gradually) return to normal when the process exhaust returns to normal (lower liquid loading) conditions. If non-draining materials are the cause, filter replacement is usually required.

As solid materials build up on and in the filter, pressure drop increases. Filter replacement is required when the pressure drop exceeds acceptable levels. This is usually determined by the limitation of the fan moving the process air through the system. A log of system operating parameters, process conditions, etc. is invaluable in accurately planning maintenance requirements.

If a high-pressure drop is accompanied by an increase in opacity, check that the filter drain is clear. If it becomes plugged, liquid can build up in the filter assemblies, leading to high-pressure drop, re-entrainment and opacity.

Decreased Pressure Drop

Decreases in pressure drop are typically caused by a blown filter drain seal, physical damage to the filters, or corrosion of some part of the filter assembly by components of the process exhaust. This is generally accompanied by an increase in system emissions. If corrosion or physical damage is the problem, filter replacement is usually required.

Air-Clear System Log Sheet

Date	Time	Operator	Inlet Temperature	Filter Pressure Drop	Velocity Pressure (Stack)	filter Pressure Drop	Comments

GLOSSARY

The following terms are used in conjunction with the Air-Clear system. The customer should be familiar with the meanings and uses of these terms. Brief and simplified definitions are provided as a reference only. If there are any questions or need for clarification, please contact AIR-CLEAR.

ACFM: This is an abbreviation for "actual cubic feet per minute". It is the volumetric flow rate of a gas that has been changed by temperature and/or pressure. Thus, ACFM indicates the increase in volume of ambient air as it passes through the system. See SCFM.

Ambient Air: That portion of air outside buildings that is accessible to the general public.

Atomization: The conversion of a given liquid into a mist or spray.

Coalesce: To grow together, to unite.

Collection Efficiency: The ratio of the weight of pollutant collected to the total weight of pollutant entering the collector.

Condensation: The physical process of converting a substance from the gaseous phase to the liquid phase.

Counter-current Flow: Flow of two mediums in opposite directions.

Concurrent Flow: Flow of two mediums in the same direction.

Damper: A device located within a duct that controls the volumetric flow of the gas.

Density: The ratio of the weight of an object to its volume. For example, water weighs approximately 62 pounds per cubic foot.

Draft: The difference between the pressure (suction) within a vessel and atmospheric pressure.

Dry Air: Air which contains no water vapor.

Emissions: Discharge of a gases to atmosphere.

Emission Rate: The quantity of gases emitted per unit of time.

Fan Curve: A graph which shows the pressure versus the flow drawn by the fan.

Forced Draft: The positive pressure created by a fan.

Humidity, Absolute: The weight of water vapor carried by a unit weight of dry air or gas.

Humidity, Relative: The ratio of the absolute humidity in a gas to the absolute humidity of a saturated gas at the same temperature.

Induced Draft (ID) Fan: A fan is used to move a gas stream by creating a negative pressure (suction).

Inorganic Material: Chemical materials of mineral origin and not containing carbon.

Interlock: A mechanical or electrical safety which prevents the continuation of an unsafe condition.

Mist: Small, fine droplets of liquid.

Mist Eliminator: A device used to remove droplets of water (mist) from a gas stream.

Opacity: Degree of which light is obscured. One of the measurements of air quality. Measured in percent as compared to the Ringleman's scale or, most notably, by trained observer (EPA Reference Method (RM) 9.

Particulate: Fine liquid or solid particles such as dust, smoke, mist , fumes or smog found in the air or in stack emissions.

Particulate Matter: Any material, except water, that is airborne and exists as a liquid or solid at standard conditions.

Plume: Visible emission from a stack or vent.

Pressure Drop: The difference in static pressure between two points of a gas flow.

Process Gas: The exhaust gas delivered to the Air-Clear system from the customer.

SCFM: This represents "standard cubic feet per minute" It is the volumetric flow rate of a gas at a standard set of conditions.

Smoke: Particles suspended in air after incomplete combustion of materials containing carbon.

Stack: Any chimney, flue, vent, or duct arranged to discharge gases to the atmosphere.

Static Pressure: The pressure exerted in all directions by a fluid: measured in a direction normal (perpendicular) to the direction of the flow. See Pressure Drop.

Submicron: The size category for all particulate measuring less than one micron in diameter.

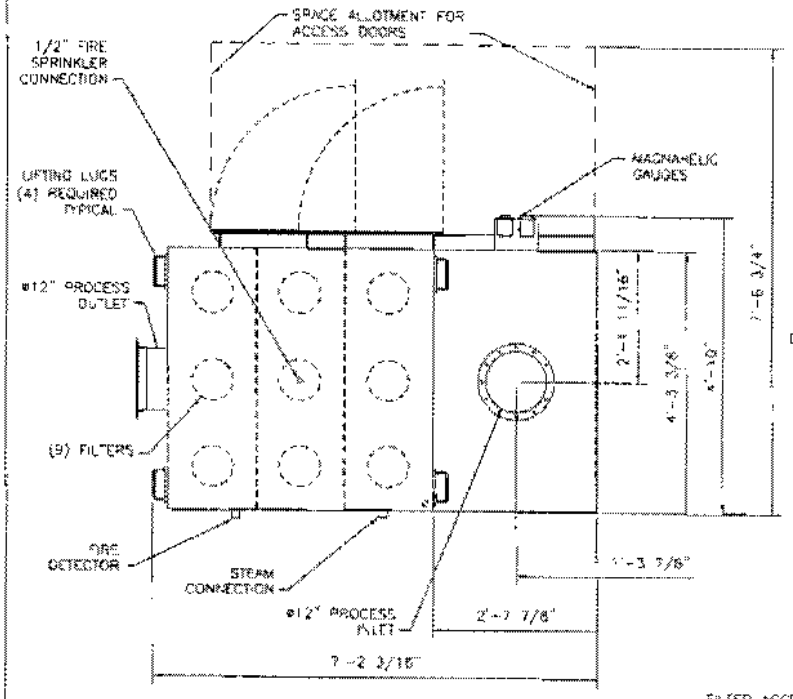
System Resistance: The system resistance is the total static pressure that a fan much develop in order to move the design flow of gases.

Thermocouple/Thermometer: A device used to measure temperature. Consists of two dissimilar metal wires which generate two different electrical signals when heated. The difference between the two signals is then converted to indicate the actual temperature.

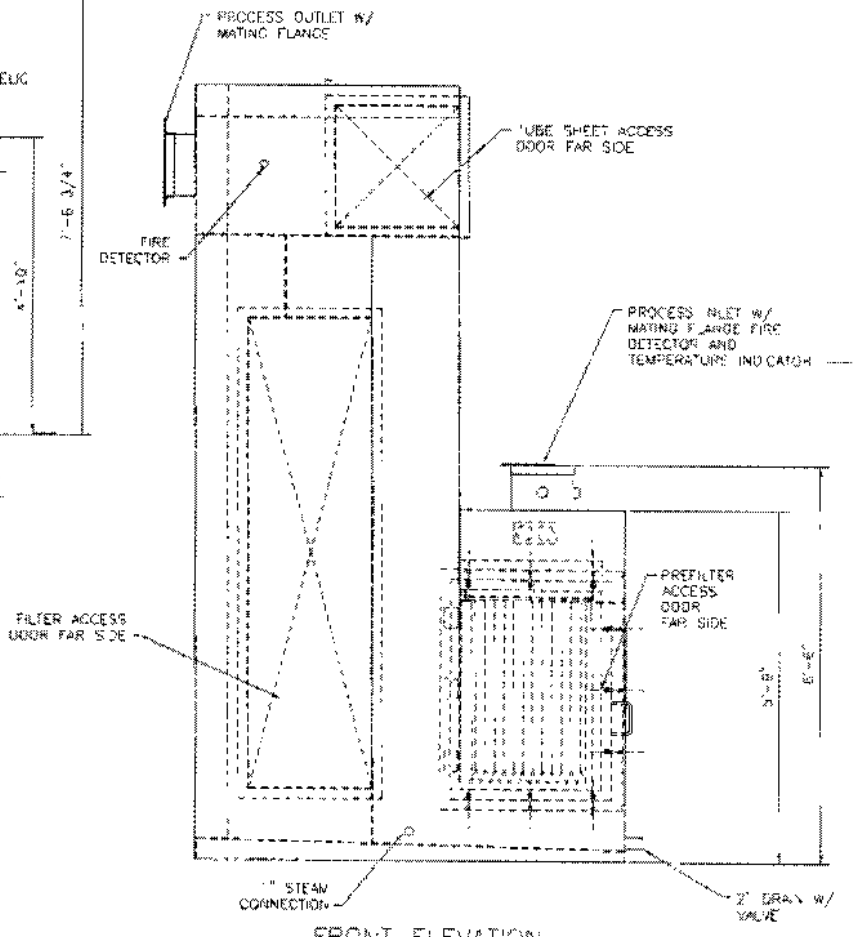
Tubesheet: The plate to which the filters are mounted.

Vapor: A gas which is generated from a solid or liquid that is placed under an increase in temperature and/or a decrease in pressure.

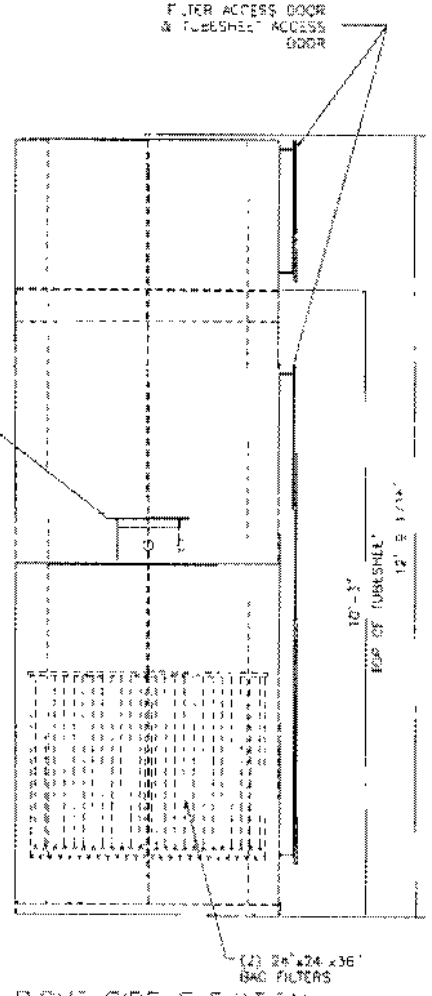
DRAWINGS



PLAN



FRONT ELEVATION



RIGHT SIDE ELEVATION

GENERAL NOTES

PROCESS VOLUME: 2,500 SCFM @ 120°F MAX INLET PARTICULATE LOADING 1500MG/M3
PROCESS AIR BLOWER: BY AES NEMA 12 COMBINATION STARTER 460/3PH
EXTERIOR PAINT: BY AES DEVRAN 224HS EPOXY COLOR (MEDIUM GRAY)
ELECTRICAL AND CONTROLS: BY AES
MATERIALS OF CONSTRUCTION: 3/16" A-36 UNLESS STATED OTHERWISE.
WELDS: CONTINUOUS SEAL WELD E70XX SERIES ELECTRODE
FAN: TO BE MOUNTED AND DUCTED BY CUSTOMER

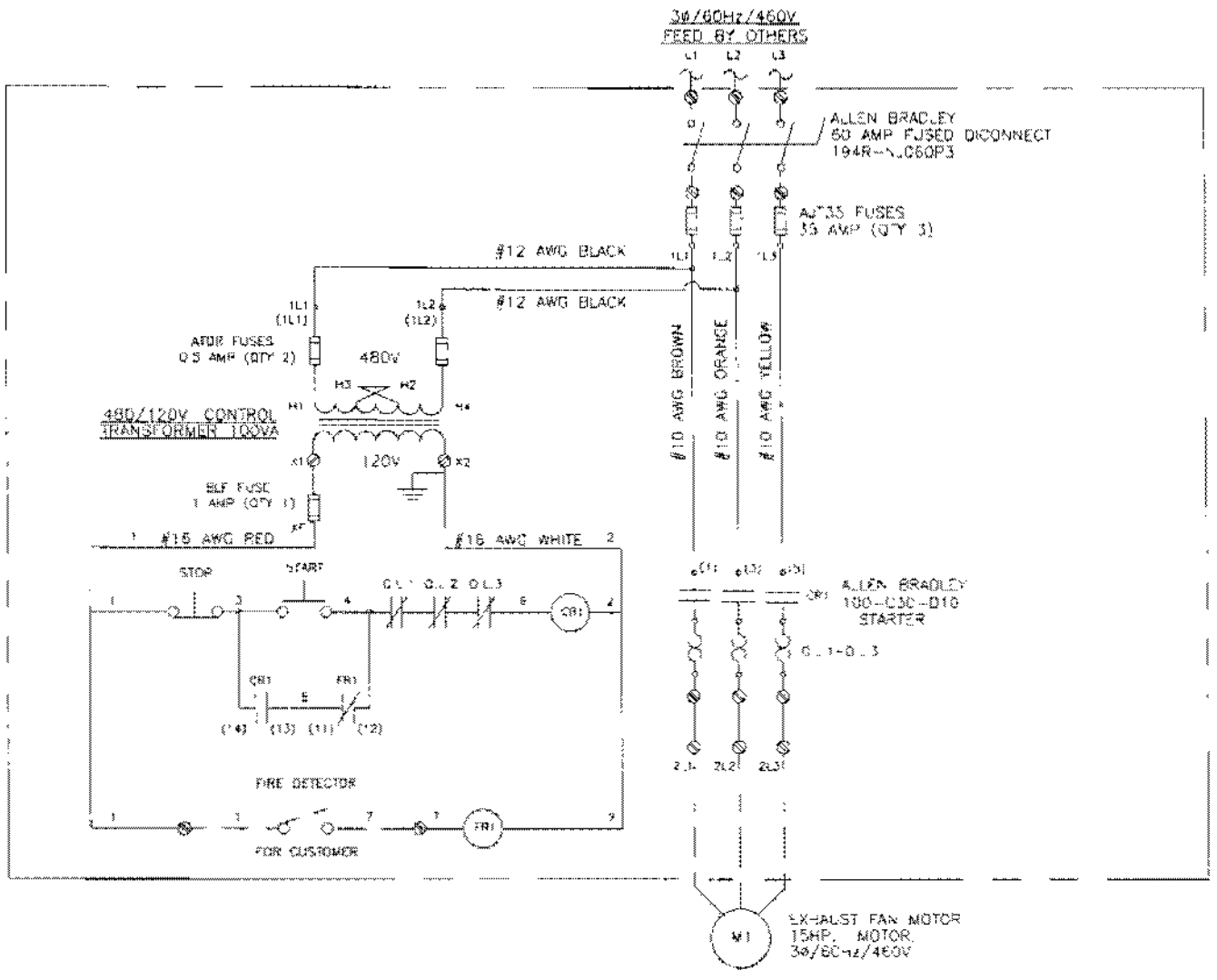
THIS SET OF DRAWINGS DOES NOT MEET OR SATISFY ISO 9001 REQUIREMENTS

REVISION	DESCRIPTION	DESIGN	SHOP	ENGINEER	DATE
DATE/ STAMP					

AC L.L.C

BLACKLEDGE EMULSIONS
AIR CLEAR MIST COLLECTION SYSTEM
AIR-CLEAR, LLC
Kenwood, DELAWARE

DRAWING TITLE: VERTICAL FILTER ASSEMBLY
TOLERANCES: +/-1/8"
DRAWING NUMBER: 5620JJ1-01-0"-000
SHEET: 1 OF 1
REV: C



NOTES:

1. ⊗ TERMINAL BLOCK MOUNTED IN CONTROL PANEL FOR REMOTE MOUNTED EQUIPMENT
2. ○ EQUIPMENT TERMINAL DESIGNATION
3. ALL FIELD WIRING MUST CONFORM TO ALL APPLICABLE CODES
4. DASHED LINES ON THE LADDER DIAGRAM INDICATE FIELD WIRING BY OTHERS
5. LAST WIRE NUMBER USED 8

1	ISSUED FOR FABRICATION	DEV 9/27/02	TJ 9/27/02	WPN 9/30/02	JW 9/30/02
REVISION	DESCRIPTION	DESIGN	SHOP	ENGINEER	SALES

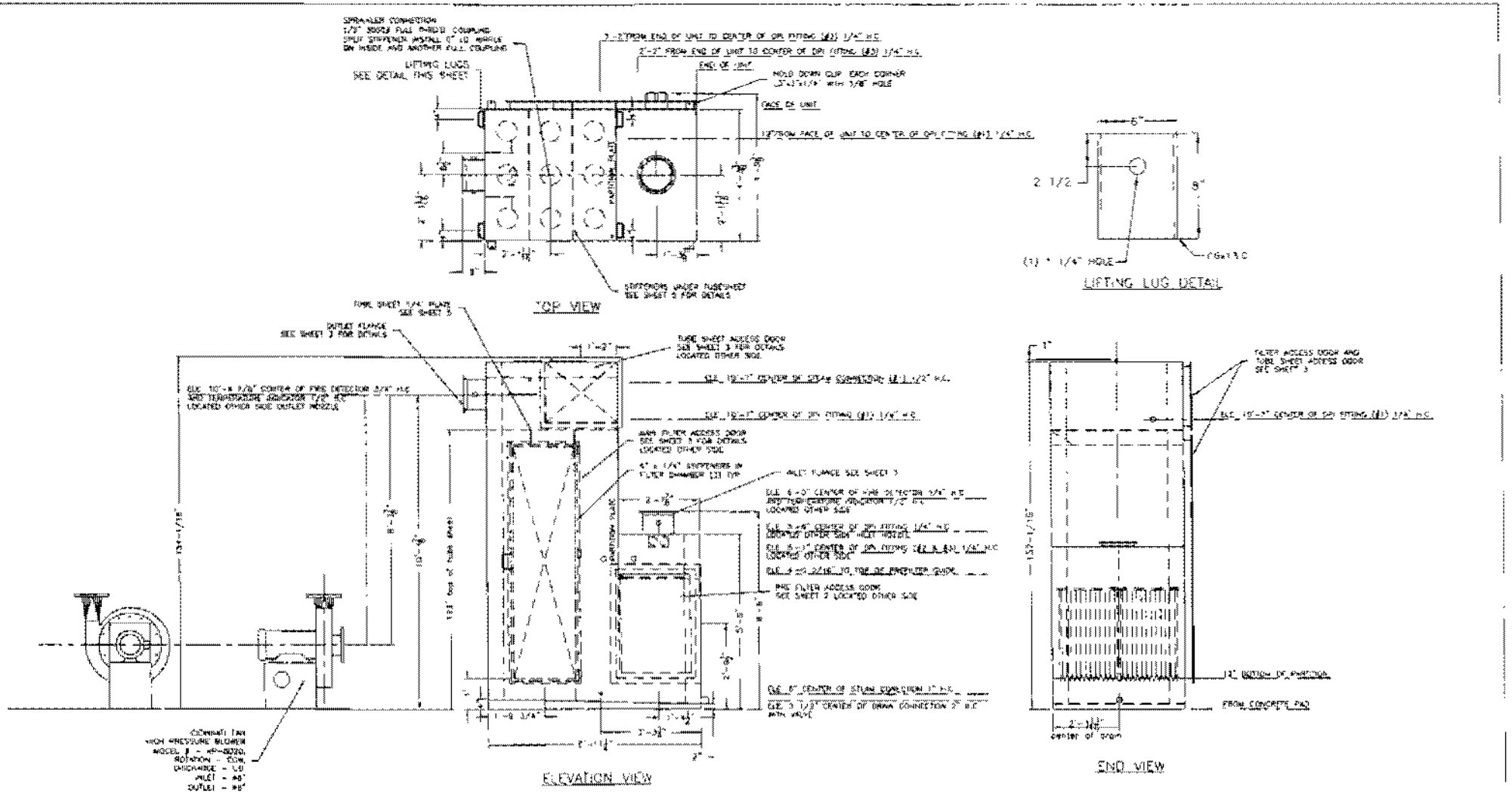
AC L.L.C.

BLACKLIDGE EMULSIONS
AIR CLEAR MIST COLLECTION SYSTEM
AIR-CLEAR, L.L.C.
KIRKWOOD, DELAWARE

DRAWING TITLE: ELECTRICAL ELEMENTARY WIRING

TOLERANCES: +/- 1/8" 7

DRAWING NUMBER: E8001J1-E3-00-000 SHEET 1



THIS SET OF DRAWINGS DOES NOT MEET OR SATISFY SO 9001 REQUIREMENTS

REVISION	DESCRIPTION	DATE / STAMP
1	ISSUED FOR FABRICATION	CEM 9/27/02 DESIGN; LT 9/27/02 SHOP; VRM 9/30/02 ENGINEER; JM 9/30/02 SALES

AC L.L.C.

BLACKBODICE ENULTIONS
AIR CLEAR MIST COLLECTION SYSTEM
AIR-CLEAR, LLC.
SEAFORD, DELAWARE

DRAWING BY: TRM

TO FRACTIONS +/- 1/16" 2 PLACE DECIMALS +/- .02

DRAWING NUMBER 3500-J1-08-31-000 SHEET 2 REV 0

cincinnati fan

REPRESENTED BY:

SYSTECH DESIGN
300 N. POTTSTOWN PIKE, STE 220
EXTON PA 19341
Phone: 610 524-9048
Fax: 610 524-7355

DRAWING SUBMITTAL

CUSTOMER: SYSTECH DESIGN
EXTON OFFICE CT.,BLDG. N
300 N. POTTSTOWN PIKE STE. 220
EXTON, PA 19341

DATE: 11/09/06

ATTENTION: Dan Walker

P.O. # W61828

CFV # 615882

REPRESENTATIVE ORDER # W61828

x REFERENCE _____ APPROVAL _____ CORRECTION

QTY.	DRAWING NO.	DESCRIPTION
	---------	SPECIFICATION SHEET
	HP4	MODEL HP-8D20
	27332	INLET & DISCHARGE FLANGE
	---------	PERFORMANCE CURVE

REMARKS: _____

Visit our web site at www.cincinnatifan.com

cincinnati fan and ventilator company, inc.

SPECIFICATION SHEET

CFV NO.	CUSTOMER ID NUMBER	PAGE
615882	4356800	1

SOLD TO
SYSTECH DESIGN
EXTON OFFICE CT.,BLDG. N
300 N. POTTSTOWN PIKE STE. 220
EXTON, PA 19341

SHIP TO
AIR-CLEAR, LLC
2440 OLDFIELD POINT RD.
ELKTON, MD 21921

CUSTOMER P.O. NUMBER	BUYER	REQUESTED SHIP DATE
W61828	DAN WALKER	11/17/06

MARKS
W61828

SHIP VIA	REPRESENTATIVE	REF. ORDER NO.	SHIPPING CHARGES
Pitt Ohio or Roadway	SYSTECH DESIGN	W61828	Bill 'Ship-To'

QTY.	DESCRIPTION	MODEL	ROT	DISCH	ARR	WHEEL/PROP	INLET
1	HIGH PRESSURE BLOWER	HP-8D20	CCW	UB	4	20	8

MOTOR DATA

HP	RPM	PH	CYCLE	VOLTAGE	FRAME	ENCLOSURE	SUPPLIED BY	INSTALLED BY
20	3550	3	60	230/460V	256T	TEFC	CFV	CFV

SPECIAL MOTOR FEATURES: 3790310R

GROOVES | FXD/ADJ | BELT

FAN DATA AT OPERATING CONDITIONS

DENSITY	TEMP	ALTITUDE	CFM	SP	RPM	BHP
.065	120°F.		2600	23.000	3550	16.252

MOTOR SHEAVE | BUSHING

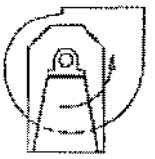
FAN SHEAVE | BUSHING

MOTOR VENDOR MODEL NUMBER: P25S3030

Record Print, Performance Curve

Complete Motor Description:
MTR,20 HP,3450 RPM,3PH,60Hz,230/460V,TEFC,EPAct Eff,FM,256T,1.15 SF,F Insul.,
40C Amb.,F1 Box,Steel frame,Reliance

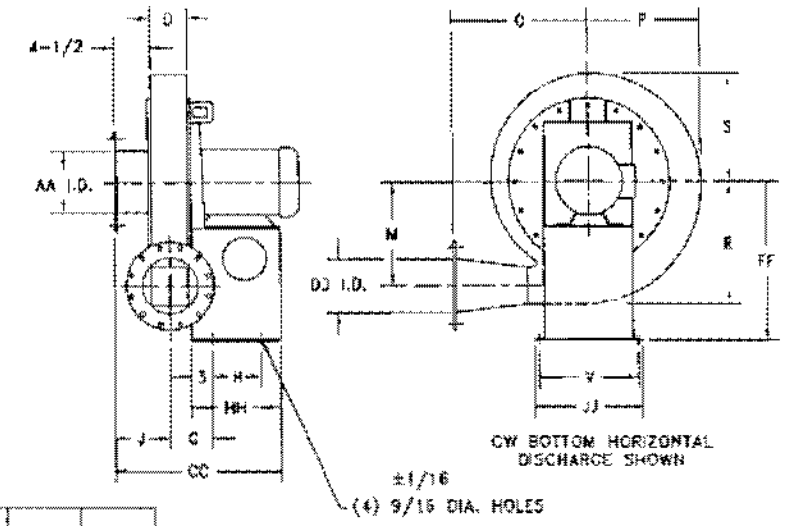
Maximum allowable wheel speed at 70°F is 4930 RPM
Motor operated with Variable Frequency Drive.
TEFLON SHAFT SEAL
DRILL INLET FLANGE STANDARD BOLT CIRCLE STRADDLING-CENTERS
DRAIN
DRILL DISCHARGE FLANGE STANDARD BOLT CIRCLE STRADDLING-CENTERS



CCW UB

DR. BY SUE DATE: 11/09/06 CERTIFIED

A HP4



	MODEL *	MOTOR FRAME	D	G	H	J	M	O	P	R	S	V	AA	④ CC	DD	FF	HH	JJ
	HP-4A	143T-184T	4	5	6 3/4	6 1/2	11 3/4	18	13 9/16	14 5/8	12 3/4	14 3/4	6	21 1/4	4	21	12 3/4	16 3/4
	HP-4C	143T-215T			9		14 13/16	17 15/16	16 7/16	17 7/16	15 7/16	17		23 1/2		25	15	19
		254T-286T			14									28 1/2			20	
	HP-6B	143T-184T	6 3/8	6 3/16	6 3/4	7 11/16	11 3/4	18	13 9/16	14 5/8	12 3/4	14 3/4	8	23 5/8	6	21	12 3/4	16 3/4
		213T-215T			12 1/2									29 3/8			15 1/2	
	HP-6C	143T-215T	4	5	9	6 1/2	14 13/16	17 15/16	16 7/16	17 7/16	15 7/16	17	6	23 1/2		25	15	19
		254T-256T			14									28 1/2			20	
	HP-6E	184T-256T	5 3/8	5 11/16	13	7 3/16	17 7/16	19 3/16	19 3/8	20 9/16	18 3/16	19	8	28 7/8		29	19	21
	HP-8B	143T-184T	6 3/8	6 3/16	6 3/4	7 11/16	11 3/4	19 15/16	13 9/16	14 5/8	12 3/4	14 3/4		23 5/8	8	21	12 3/4	16 3/4
		213T-254T			12 1/2									29 3/8			18 1/2	
	HP-8D	182T-215T			9		14 13/16	19 3/4	16 7/16	17 7/16	15 7/16	17		25 7/8		25	15	19
X		254T-286TS			14									30 7/8			20	
	HP-8E	184T-256T	5 3/8	5 11/16	13	7 3/16	17 7/16	21	19 3/8	20 9/16	18 3/16	19		28 7/8		29	19	21
		284TS-286TS			15 1/2									31 3/8			21 1/2	
	HP-10D	184T-215T	6 3/8	6 3/16	9	7 11/16	14 13/16	21 3/4	16 7/16	17 7/16	15 7/16	17		25 7/8		25	15	19
		254T-286TS			14									30 7/8	10		20	
	HP-10F	215T-256T	7 3/8	6 11/16	13	8 3/16	17 7/16	23	19 3/8	20 9/16	18 3/16	19	10	33 3/8		29	19	21
		284TS-326TS			15 1/2												21 1/2	
	HP-12F	184T-256T			13									30 7/8	12		19	
		284TS-364TS			15 1/2									33 3/8			21 1/2	

* COMPLETE MODEL NUMBER INCLUDES WHEEL DIA.

NOTES:
1. TEFLON SHAFT SEAL IS STANDARD.
2. MOTOR MAY EXTEND PAST END OF BASE.
3. FAN HOUSINGS ARE REVERSIBLE AND ROTATABLE IN 45° INCREMENTS.
4. IF AMCA "C" ADD 1/8 INCH TO DIMENSIONS "C" AND "CC".
5. SEE DRAWING A27338 FOR FLANGE DETAILS.
6. DISCHARGE FLANGE NOT AVAILABLE WITH DOWNBLAST DISCHARGE ON FOLLOWING MODELS: HP-8B, HP-10D, & HP-12F.

cincinnati fan
7697 SNIDER ROAD MASON, OHIO 45040

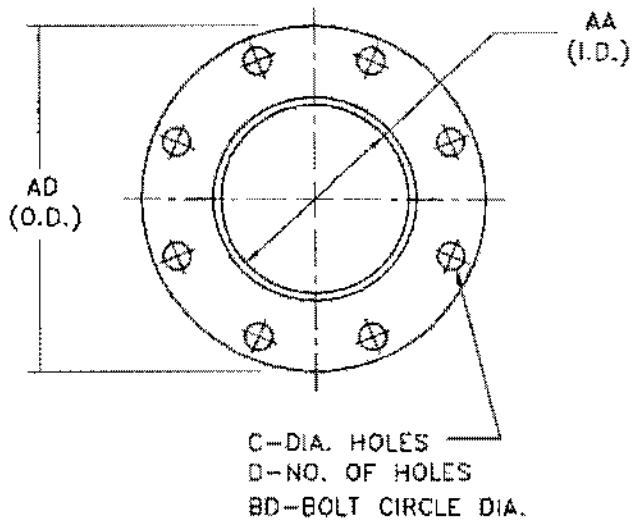
TOLERANCES: ANGLES: ± 1° FRACTIONS ±1/8 ALL DIMENSIONS IN INCHES UNLESS OTHERWISE SPECIFIED

SUPERSEDES:

CERTIFIED DRAWING

TITLE: HP BLOWERS, SERIES II, ARR. 4

A | DRAWING NO. HP4 | REV. 7

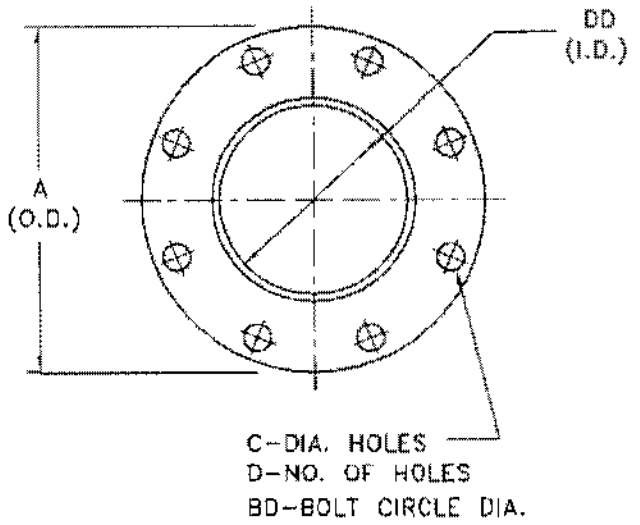


INLET FLANGE

☐ OPTIONAL HOLE PATTERN:
FLANGE HOLES ON
MAJOR CENTERLINES

NOTE

STANDARD HOLE PATTERN
IS FOR FLANGE HOLES TO
STRADDLE CENTERLINES



DISCHARGE FLANGE

☐ OPTIONAL HOLE PATTERN:
FLANGE HOLES ON
MAJOR CENTERLINES

	MODEL	INLET SIZE	DIMENSIONS AD O.D.	AA I.D.	BD B.C.	C DIA.	D
	HP-4A,4C,6C	6	11	6	9-1/2	7/8	8
X	HP-6B,6E,8B 8D,8E,10D	8	13-1/2	8	11-3/4	7/8	8
	HP-10F,12F	10	16	10	14-1/4	1	12
	HP-12G	14	21	14	18-3/4	1-1/8	12

	MODEL	DISCHARGE SIZE	DIMENSIONS A O.D.	DD I.D.	BD B.C.	C DIA.	D
	HP-4A,4C	4	9	4	7-1/2	3/4	8
	HP-6B,6C,6E	6	11	6	9-1/2	7/8	8
X	HP-8B,8D,8E	8	13-1/2	8	11-3/4	7/8	8
	HP-10D,10F	10	16	10	14-1/4	1	12
	HP-12F,12G	12	19	12	17	1	12

Dickson Certificate of Instrument Calibration and Testing

Dickson Remote Temperature Model Numbers: KT8 / KT6 Series / TC200

Calibration Procedure

The customer instrument was compared to the calibration standard. Drifts and faults were determined, and any necessary mechanical or electronic adjustments were taken. The Dickson calibration system conforms to the requirements of MIL-STD-45662A, ANSI/NCSL Z540, ISO/IEC guide 25, and ISO 17025 as appropriate. Recalibration of the customer instrument is recommended within 6 months after the unit is placed into service.
A2LA Certificate Number - 1621.01

Calibration Standards

Ectron Model # 1120
Serial #'s 26016, 25745, 25623
Accuracy: ± .4 °F

The calibration standards are traceable through the National Institute of Standards and Technology.

Dickson Brand Charts and Pens
Required to Achieve Stated Accuracy

We certify that your Dickson Thermocouple temperature instrument was calibrated using our standard measurement system to be accurate within the published specifications for the recorder

KT8 accuracy specifications: ± 0.3% of full range ±1 °C (1.8 °F) (Recorder Only)
KT6 accuracy specification: ± 0.5% of full range ±1 °C (1.8 °F) (Recorder Only)
TC200 accuracy specification: ±.2% of reading ±.5 °C (Unit Only)

FOR YOUR NEXT CALIBRATION NO PHONE CALLS REQUIRED

Fill out and send this form along with your instrument to Dickson. Label the outside of the box with "CCM" - that is your RA#.

That's all there is to it!

1. Purchase Order #: _____
   Name: _____
   Phone: _____
   Model #: _____
   Serial #: _____

A 3-pt Deluxe NIST will be performed unless otherwise requested

2. ☐ 1-Point Deluxe NIST Calibration $149.00
   ☐ 3-Point Deluxe NIST Calibration $199.00
   ☐ 3-Point Ultima Deluxe A2LA NIST $299.00 (with incoming reading)
   ☐ N995 - User selectable NIST Temperature points $50.00 each (to be selected in addition to one of the above calibration options)
   ☐ N997- Next Day Service $50.00 (Not available for ULTIMA service)

3. Please return via:
   ☐ Ground Freight*
   ☐ 2nd Day Air*
   ☐ Next Day Air*

***Charges added at factory**

Returned UPS 2nd Day unless otherwise requested

4. Ship To: _____

Bill To: _____

Charts/Pens
(Order now and receive them with your calibrated unit)

	Order No.	Qty	Price Ea.
☐ 6 Red Pens	P232	_____	$36 pk
☐ 3 Red/3 Blue Pens	P246	_____	$36 pk.
☐ Charts* (60 per box)	C_ _ _	_____	$24 box

*Please fill in the chart order number. For a listing of available charts go to www.dicksonweb.com, click on "product search" and select the product type, "Parts Accessories."

Prices are subject to change

Let Dickson remind you the next time your unit is due for calibration. Register for our FREE Calibration Club now at www.dicksonweb.com

Dickson Calibration Services
930 South Westwood Avenue Addison, Illinois 60101 630-543-3747 Fax 630-543-0498

Tubing Connections for Dry Filter Systems