

Operation and Maintenance Plan

**708 East 26th Avenue
Vancouver, BC**



Prepared for:
Fraser Street Residence GP Inc.
668 – 1199 West Pender Street
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V6E 2R1

Prepared by:
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Operation and Maintenance Plan

Site ID: 14672

Site Location: 708 E 26th Avenue, Vancouver, BC

This document satisfies part of the reporting requirements for Type 2 risk controls outlined in Contaminated Sites Regulation *Administrative Guidance 14*. Specifically, it outlines the Operation and Maintenance Plan for the mechanically activated vapour management system (VMS) installed below 708 East 26th Avenue, Vancouver, BC. Operation of the VMS is the principal risk control outlined in PGL's March 2015 Performance Verification Plan for the Site. Operation of the VMS is required to maintain the Site's Risk-based Certificate of Compliance.

1.0 VAPOUR MANEGMENT SYSTEM OBJECTIVES

The objective of the VMS is to manage risk from soil-vapour contaminants that can potentially accumulate to concentrations exceeding the Contaminated Sites Regulation Schedule 11 Standards. Specific vapour contaminants of concern to be managed are trichloroethene and vinyl chloride. These parameters exceed Contaminated Sites Regulation Schedule 11 Standards beneath the concrete slab at the southeast corner of the building, before operation of the VMS.

2.0 VMS OPERATION

The VMS achieves its objective by providing fresh air exchange (air intake and exhaust) below the concrete slab. The concrete slab prevents vapour migration into the breathing zone. The system exhausts the sub-slab area by pulling air from perforated pipes (sub-slab exhaust [SSE]). Fresh air is supplied from the sub-slab drainage piping (sub-slab supply). Outdoor air is drawn from grade through the plumbing stack and transferred from the sub-slab supply to the pore space within the ¾" clean rock sub-slab backfill via perforations in the piping. The exhaust air is drawn from the pore space through the SSE piping and discharged to the surface. Both sub-slab supply and SSE piping are composed of 4" diameter perforated polyvinyl chloride laid out as per the attached drawing. The piping lines are fitted with clean-outs for maintenance work. A pressure blower is installed in line with the SSE piping before the discharge point. The blower specifications are attached.

Key to the system's effective operation are the following:

- The pressure blower must run continually at a minimum exhaust rate of 34CFM.
- A sensor that monitors air flow or differential pressure across the fan must be installed with the pressure blower. This sensor must be wired to the building's annunciator panel to sound an alarm if the exhaust rate falls below 34CFM.
- The exhaust air is designed to discharge to the atmosphere at a location at least 3m away from other building intakes or openings.

3.0 VMS MAINTENANCE

A comprehensive maintenance program must be in place for all aspects of the vapour management system (piping, communication, electrical, and mechanical equipment). As a minimum, inspection should include the following tasks:

- Service the blower fan and motor as per the manufacturer's recommendation;
- Ensure debris has not accumulated within the vicinity of the intake and exhaust air grills. Clean and remove small debris/lint/dust to ensure proper air flow and check that the blower is operating on a monthly basis;
- Verify the blower is operating with a constant air flow greater than a minimum flow of 34CFM on an annual basis; and
- Verify the annunciator panel alarm is functional and is properly reset following maintenance on an annual basis.

Records of VMS operation and maintenance must be maintained by the responsible persons (the building owner) or their agent. The records must be available for inspection by the Ministry of Environment if requested. The Ministry of Environment must be notified promptly by the persons responsible for the site if the VMS does not operate as described. In this event, the following information must be submitted to the Director with the notification, or as soon as practicable thereafter:

- The time period over which the VMS did not operate as described;
- The nature of the excursions;
- The temporary or permanent corrective measures implemented or to be implemented;
- An implementation schedule; and
- Supporting documentation.

4.0 STANDARD LIMITATIONS

PGL prepared this report for Fraser Street Residences GP Inc. and its agents exclusively. It may be relied upon by these parties, the BC Ministry of Environment and the Contaminated Sites Approved Professionals Society exclusively. PGL accepts no responsibility for any damages that may be suffered by third parties as a result of decisions or actions based on this report.

The purpose of the Operation and Maintenance Plan is to provide the client and the Ministry of Environment with the steps necessary to operate and maintain the recommended risk management measures at the Site. These recommendations are based on information collected during PGL's environmental investigations. These investigations consisted of a screening for potential contamination and, as is true for all environmental investigations, potential remains for the presence of unknown, unidentified, or unforeseen surface or subsurface contamination. More or different investigation may be required, and additional risk management measures may be required if other risks are identified. The data used to develop these risk management measures is valid for the date of sampling, but Site conditions may change with time.

The findings and conclusions are Site-specific and were developed in a manner consistent with that level of care and skill normally exercised by environmental professionals currently practicing under similar conditions in the area. Changing assessment techniques, regulations, and site conditions means that environmental investigations and their conclusions can quickly become dated, so this report is for use now.

The project has been conducted according to our instructions and work program. Additional conditions and limitations on our liability are set forth in our work program/contract. This report is neither an endorsement nor a condemnation of the subject property. No warranty, expressed or implied, is made.

Respectfully submitted,

POTTINGER GAHERTY ENVIRONMENTAL CONSULTANTS LTD.

Per:


2748
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Mar 20 2015
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CDC/KHG/mlo
X:\2500-2599\2554 - Vancouver Pacific Development Corporation\05-02\Client Docs\Roster Docs\O&M Plan\2554-05-02-O&M-Mar15.docx

Attachments: Vapour Management System Drawing
Pressure Blower Specifications

Vapour Management System Drawing



NO.	DATE	BY	REVISION	DESCRIPTION
1	SEP 12/13	HH	ISSUED FOR PRICING PREVIEW	
2	AUG 15/13	ZE	ISSUED FOR STAGE 1 PERMIT	

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PROJECT NO. 2521
MECHANICAL

CLIENT:

PROJECT:
Fraser & 26th

ADDRESS:
708 East 26th Av.
(Formerly 4226 Fraser St.)

DATE: AUG 2013
SCALE: 1/4"=1'
DRAWN: ZE
CHECKED: ZE

DRAWING TITLE:
FOUNDATION PLAN

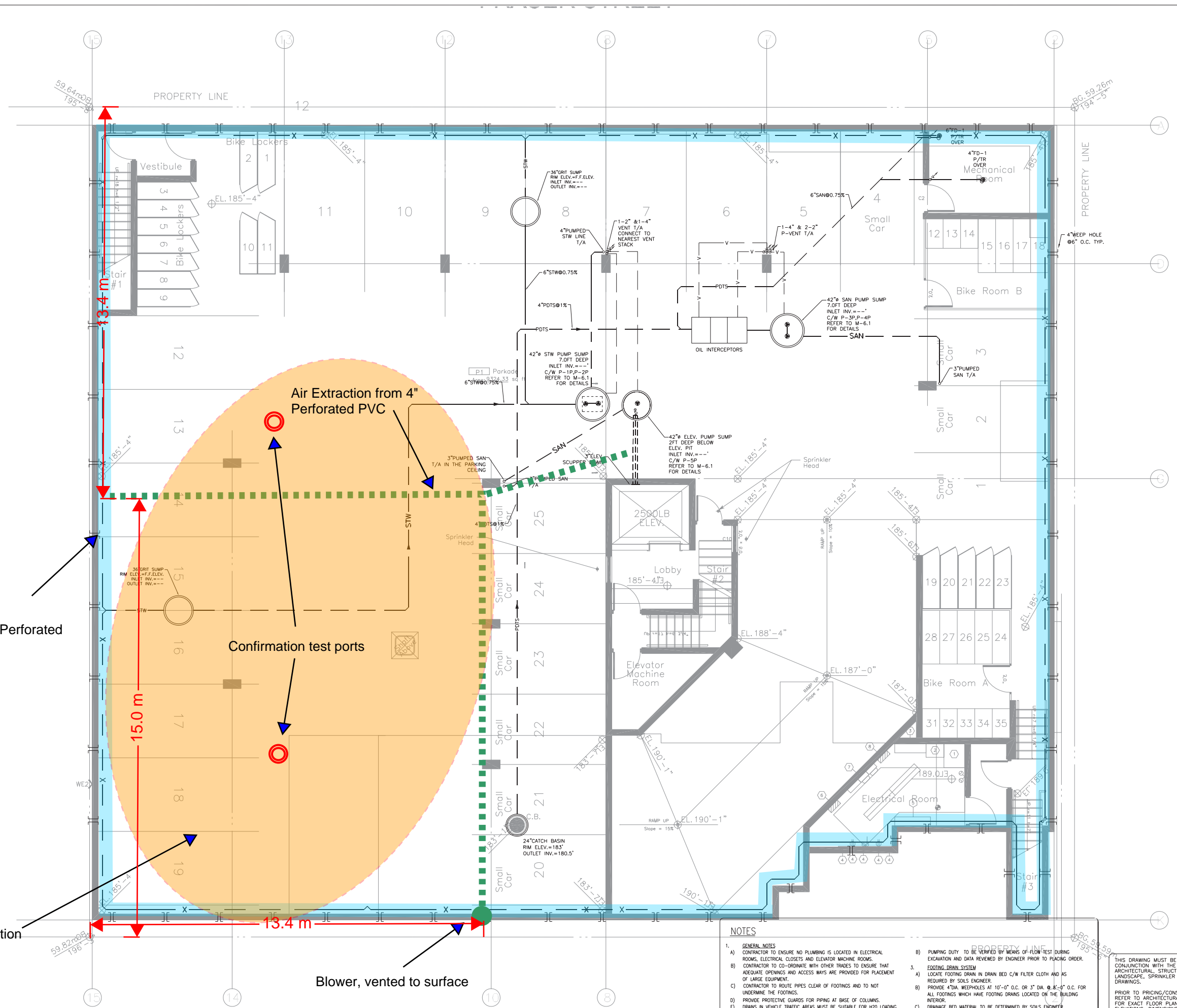
SCALE:

DATE:

PROJECT:

CLIENT:

PROJECT NO. 2521



Air Supply from 4" Perforated PVC Drain Tile

Air Extraction from 4" Perforated PVC

Confirmation test ports

Area of Vapour Contamination

Blower, vented to surface

NOTES

- GENERAL NOTES
 - CONTRACTOR TO ENSURE NO PLUMBING IS LOCATED IN ELECTRICAL ROOMS, ELECTRICAL CLOSETS AND ELEVATOR MACHINE ROOMS.
 - CONTRACTOR TO CO-ORDINATE WITH OTHER TRADES TO ENSURE THAT ADEQUATE OPENINGS AND ACCESS WAYS ARE PROVIDED FOR PLACEMENT OF LARGE EQUIPMENT.
 - CONTRACTOR TO ROUTE PIPES CLEAR OF FOOTINGS AND TO NOT UNDERMINE THE FOOTINGS.
 - PROVIDE PROTECTIVE GUARDS FOR PIPING AT BASE OF COLUMNS.
 - DRAINS IN VEHICLE TRAFFIC AREAS MUST BE SUITABLE FOR H2O LOADING AND CONFORM TO CAN/CSA - S413-87 PARKADE DESIGN REQUIREMENTS.
- STORM DRAINAGE SYSTEM
 - ALL SUMPS ARE MINIMUM 30" DIA. U.N.O.
- PUMPING DUTY TO BE DETERMINED BY MEANS OF FLOW TEST DURING EXCAVATION AND DATA REVIEWED BY ENGINEER PRIOR TO PUMPING ORDER.
 - FOOTING DRAIN SYSTEM
 - LOCATE FOOTING DRAIN IN DRAIN BED C/W FILTER CLOTH AND AS REQUIRED BY SOILS ENGINEER.
 - PROVIDE 4" DIA. WEEPHOLES AT 10'-0" O.C. OR 3" DIA. @ 8'-0" O.C. FOR ALL FOOTINGS WHICH HAVE FOOTING DRAINS LOCATED ON THE BUILDING INTERIOR.
 - SANITARY SYSTEM
 - INSULATE ALL EXPOSED SANITARY P-TRAPS IN PARKING.

THIS DRAWING MUST BE READ IN CONJUNCTION WITH THE LATEST ARCHITECTURAL, STRUCTURAL, CIVIL, LANDSCAPE, SPRINKLER & ELECTRICAL DRAWINGS.
PRIOR TO PRICING/CONSTRUCTION REFER TO ARCHITECTURAL DRAWINGS FOR EXACT FLOOR PLAN, FLOOR ELEVATIONS, DIMENSIONS AND FIXTURE LOCATIONS.
DO NOT SCALE OFF THIS DRAWING

Pressure Blower Specifications

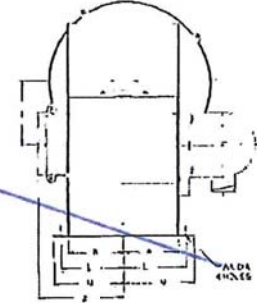
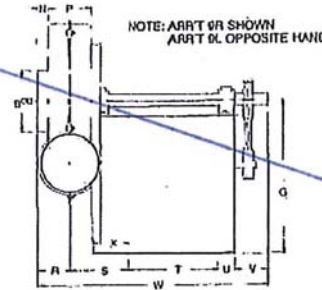
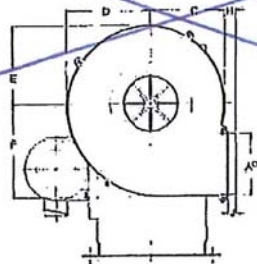
CAST ALUMINUM PRESSURE BLOWERS

Belt Driven

AF SIZE	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S*	T	U	V	W*	X	Y	Z	AA	SHAFT DIA.	KEYWAY	MAXIMUM MOTOR FRAME SIZE
8	4	4	4 ¹ / ₁₆	5 ¹ / ₁₆	5 ¹ / ₃₂	6 ¹ / ₁₆	15	1 ³ / ₈	1	5	6	7	1 ¹ / ₈	3 ¹ / ₂	2 ¹ / ₈	3	12	1	3	21 ¹ / ₈	1	4 ¹ / ₁₆	6 ¹ / ₁₆	7 ¹ / ₁₆	3/4	3/16 X 7/32	184-T	
9	4	5	6	7 ¹ / ₄	6 ¹ / ₃₂	7 ³ / ₄	15	1 ¹ / ₁₆	1	5	6	7	1 ¹ / ₈	3 ³ / ₄	3 ¹ / ₈	3 ³ / ₈	12	1	3	22 ¹ / ₁₆	1	5 ¹ / ₁₆	7 ¹ / ₁₆	7 ¹ / ₁₆	3/4	3/16 X 7/32	184-T	
10	5	6	6 ¹ / ₁₆	8 ¹ / ₁₆	7 ¹ / ₃₂	9	15	1 ¹ / ₈	1	5	6	7	1 ¹ / ₂	3 ³ / ₄	3 ³ / ₈	3 ³ / ₈	12	1	3	22 ¹ / ₂	1	6 ¹ / ₁₆	7 ¹ / ₁₆	7 ¹ / ₁₆	1	1/4 X 1/8	184-T	
12	6	7	7 ³ / ₄	9 ¹ / ₄	8 ¹ / ₂	10 ¹ / ₁₆	15	1 ¹ / ₈	1	5	6	7	1 ¹ / ₂	4 ¹ / ₄	3 ³ / ₈	3 ³ / ₈	12	1	3	23	1	7 ¹ / ₁₆	8 ¹ / ₁₆	7 ¹ / ₁₆	1	1/4 X 1/8	184-T	
15	8	*	9 ³ / ₈	11	10	12	19 ¹ / ₁₆	1 ¹ / ₁₆	1	7	8	9	1 ¹ / ₂	5 ¹ / ₈	4 ¹ / ₁₆	7 ¹ / ₈	12	2 ¹ / ₁₆	4 ³ / ₄	31	4 ¹ / ₁₆	7 ¹ / ₈	10 ¹ / ₁₆	7 ¹ / ₁₆	1 ¹ / ₁₆	3/8 X 7/16	256-T	

* "B" Dimension on AF-15 = 7, 8, or 10
 *AF-15 CW or CCW-DB
 add one inch to dimension shown

ARRANGEMENT 9 (ARRANGEMENT 1 SAME AS SHOWN, LESS MOTOR AND DRIVES)

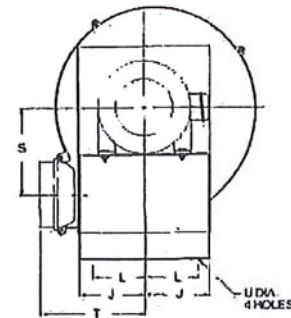
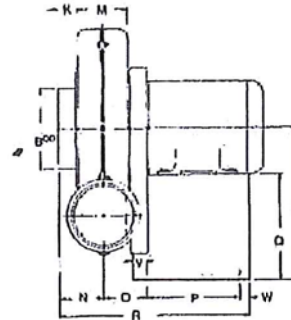
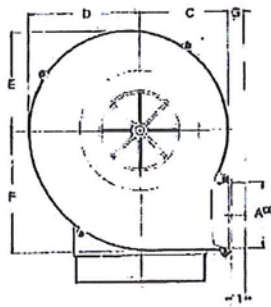


Direct Driven

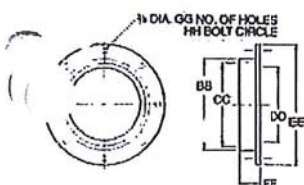
AF SIZE	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	T	U	V
8	4	4	4 ¹ / ₁₆	5 ¹ / ₁₆	5 ¹ / ₃₂	6 ¹ / ₁₆	1 ³ / ₈	8 ¹ / ₂	3 ³ / ₄	1 ¹ / ₈	2 ¹ / ₄	3 ¹ / ₂	2 ¹ / ₈	2 ¹ / ₈	5	5	11 ³ / ₄	4 ¹ / ₁₆	6 ¹ / ₁₆	1 ¹ / ₈	1
9	4	5	6	7 ¹ / ₄	6 ¹ / ₃₂	7 ³ / ₄	1 ¹ / ₁₆	10 ¹ / ₂	3 ³ / ₄	1 ¹ / ₁₆	2 ¹ / ₄	3 ³ / ₄	3 ¹ / ₈	3 ¹ / ₈	6	7	13 ¹ / ₈	5 ¹ / ₁₆	7 ¹ / ₁₆	7 ¹ / ₁₆	1

AF SIZE	A	U	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	FRAME SIZE
10	5	6	6 ¹ / ₁₆	8 ¹ / ₁₆	7 ¹ / ₃₂	9	1 ¹ / ₈	11 ¹ / ₂	5	1 ¹ / ₂	4	3 ³ / ₄	3 ³ / ₈	3 ¹ / ₄	7	8	14 ¹ / ₁₆	6 ¹ / ₁₆	7 ¹ / ₁₆	7 ¹ / ₁₆	1 ¹ / ₈	1 ¹ / ₈	11 ¹ / ₂
12	6	7	7 ³ / ₄	9 ¹ / ₄	8 ¹ / ₂	10 ¹ / ₁₆	1 ¹ / ₈	11 ¹ / ₂	5	1 ¹ / ₂	4	4 ¹ / ₄	3 ³ / ₈	3 ¹ / ₈	7	8	15	7 ¹ / ₁₆	8 ¹ / ₁₆	7 ¹ / ₁₆	1 ¹ / ₈	1 ¹ / ₈	12 ¹ / ₂
12	6	7	7 ³ / ₄	9 ¹ / ₄	8 ¹ / ₂	10 ¹ / ₁₆	1 ¹ / ₈	11 ¹ / ₂	5	1 ¹ / ₂	4	4 ¹ / ₄	3 ³ / ₈	3 ¹ / ₈	8	7	16 ¹ / ₁₆	7 ¹ / ₁₆	8 ¹ / ₁₆	7 ¹ / ₁₆	1 ¹ / ₈	1 ¹ / ₈	12 ¹ / ₂
15	8	*	9 ³ / ₈	11	10	12	1 ¹ / ₁₆	15	6 ¹ / ₁₆	1 ¹ / ₂	4 ¹ / ₈	5 ¹ / ₈	4 ¹ / ₁₆	5 ¹ / ₈	8 ³ / ₄	11 ¹ / ₂	20 ¹ / ₂	7 ¹ / ₈	10 ¹ / ₁₆	7 ¹ / ₁₆	1 ¹ / ₈	2 ¹ / ₁₆	11 ¹ / ₂
15	8	*	9 ³ / ₈	11	10	12	1 ¹ / ₁₆	15	6 ¹ / ₁₆	1 ¹ / ₂	4 ¹ / ₈	5 ¹ / ₈	4 ¹ / ₁₆	5 ¹ / ₈	8 ³ / ₄	10 ¹ / ₂	20 ¹ / ₂	7 ¹ / ₈	10 ¹ / ₁₆	7 ¹ / ₁₆	1 ¹ / ₈	2 ¹ / ₁₆	11 ¹ / ₂
15	8	*	9 ³ / ₈	11	10	12	1 ¹ / ₁₆	15	6 ¹ / ₁₆	1 ¹ / ₂	4 ¹ / ₈	5 ¹ / ₈	4 ¹ / ₁₆	5 ¹ / ₈	8 ³ / ₄	9 ³ / ₄	20 ¹ / ₂	7 ¹ / ₈	10 ¹ / ₁₆	7 ¹ / ₁₆	1 ¹ / ₈	2 ¹ / ₁₆	11 ¹ / ₂

ARRANGEMENT 4 STEEL BASE



FLANGES



COLLAR O.D.	PART NO.	BB	CC	DD	EE	FF	GG	HH
4	414	4 ¹ / ₁₆	4 ¹ / ₃₂	3 ¹ / ₈	7 ¹ / ₈	1 ¹ / ₄	4	6 ¹ / ₈
5	415	5 ¹ / ₈	5 ¹ / ₃₂	4 ¹ / ₈	7 ¹ / ₈	1 ¹ / ₄	4	6 ³ / ₄
6	416	6 ¹ / ₁₆	6 ¹ / ₃₂	5 ¹ / ₂	9	1 ¹ / ₁₆	4	8
7	417	7 ¹ / ₂	7 ¹ / ₃₂	6 ¹ / ₄	9 ¹ / ₈	1 ¹ / ₁₆	8	8 ⁷ / ₈
8	418	9	8 ¹ / ₃₂	7 ¹ / ₂	13 ¹ / ₂	1 ¹ / ₂	8	11 ³ / ₄
10	419	10 ¹ / ₁₆	10 ¹ / ₃₂	-	16	1 ¹ / ₈	8	14 ¹ / ₄

DISCHARGE POSITIONS

