



Air Handling Unit Fan Selection Guide

This document applies to models:

DFG – Direct Fired Gas Heater

IFG – Indirect Fired Gas Heater

MUA – Tempered Air

NTS – Non-Tempered Supply

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Fan Selection Procedure

KEES, Incorporated offers a wide range of air handlers capable of producing from 600 to 30,000 CFM. These units may include tempering sections. The following procedure explains how to choose an air handler that will meet the air flow, static pressure and heating and cooling requirements of a project.

Step #1 Determine the model of the air handler based on the tempering requirements.

Model	Heating Section	Cooling Section	Comments
DFG	Direct Fired Gas Heater	Any of the following cooling options can be included: · Dx Cooling Coil · Chilled Water Coil · Evaporative Cooler	
IFG	Indirect Fired Gas Heater		
MUA	Electric Heater Hot Water Coil Steam Coil None		Cooling only
NTS	None	None	Ventilation only

Step #2 Determine the air flow requirements (CFM) for the fan.

Codes, industry standard practices and heating and cooling loads may all be considered in establishing the requirements.

Step #3 Determine the housing size of the air handler.

The table shown on the next page includes the five standard housing sizes, the models that are available with each of them and the CFM ranges. In general, where possible, select the housing size with the air flow in the normal range. It will have the best balance between initial cost, operating costs, stable performance range, and noise generation.

- ➔ **Indirect Fired Heater** - Units with indirect fired heaters require special consideration since the dimensions of these heaters need to match up with the dimensions of the housing sizes. Therefore, it is necessary to look at the column titled "IFG Heater" in the following table to verify that the correct sized heater is available with a particular housing size. In instances where one heater size matches up with two housing sizes then choose between the two housing sizes based on the air flow.

If the size of the heater is not given then it can be determined using the following equations:

$$\Delta T = LAT - EAT \quad (\text{Temperature rise} = \text{Leaving air temp.} - \text{Winter design temp.})$$
$$\text{Required BTU} = \text{CFM} * \Delta T * 1.08 \div 0.80$$
$$\text{Heater size (MBH)} = \text{Required BTU} \div 1,000 \quad (\text{Round up to the nearest size heater})$$

- ➔ **Cooling coils, heating coils and evaporative coolers** - It may be necessary to select a larger housing size to accommodate a chilled water, Dx cooling coil, hot water or steam coil or an evaporative cooler to prevent excessive face velocities. The three right hand columns show the maximum recommended CFM for units with these options.

Housing Sizes

Housing Sizes	Available Models	CFM Ranges			IFG Heater (MBH Input)	Maximum CFM		
		Low	Normal	High		Dx or Chilled Water Coil	Evaporative Cooler	Steam or Hot Water Coil
#1	DFG, IFG, MUA, NTS	600 to 1,000	1,000 to 2,800	2,800 to 3,600	100, 150 200, 250	2,200	2,700	3,300
#2	DFG, IFG, MUA, NTS	1,200 to 2,800	2,800 to 5,400	5,400 to 7,000	200, 250, 300 500, 600	3,700	4,300	5,500
#2W	IFG	1,200 to 3,600	3,600 to 5,600	5,600 to 7,000	300, 350, 400 600, 700, 800	4,800	5,600	NA
#3	DFG, IFG, MUA, NTS	3,400 to 5,200	5,200 to 11,000	11,000 to 15,000	300, 350, 400 600, 700, 800 900, 1050, 1200	7,200	8,200	11,000
#4	DFG, MUA, NTS	6,000 to 10,600	10,600 to 22,000	22,000 to 30,000		13,000	16,500	20,000

Step #4 Calculate the resistance to air flow.

This resistance, also known as total static pressure loss, has two components; external and internal loss. The first component is the external loss (ESP) produced by ductwork and air devices such as air diffusers and kitchen hoods. Many times the external static pressure will be given in a specification. Manufacturer's data sheets and the ASHRAE handbooks are sources of information if these losses need to be calculated.

The second component is the loss produced internal to the air handling unit. Internal losses associated with the housing size, the open fan inlet and the ducted fan outlet are already included in our fan performance tables and do not need further consideration. However, other internal losses must be added on to the external losses in order to find the total static pressure loss. The data for these accessory pressure losses is summarized in the tables on pages 5-9. Intermediate points may be interpolated arithmetically.

➔ For air at non-standard conditions the total static pressure and brake horsepower (BHP) must be corrected. At sea level and 70°F no adjustments are necessary. However, if an adjustment is required then jump to Step #6 to adjust the total static pressure. Afterwards, return and move on to Step #5 using the new total static pressure value.

Step #5 Select the blower size and determine the BHP and RPM.

The performance tables on pages 10-15 summarize operating points at certain air flows and static pressures. All of the values shown represent stable points on the fan curves. The tables are arranged according to housing size and then further sub-divided according to the blower sizes that fit within them. Find the group of tables for the housing size selected in Step #3. Determine how many blowers in that grouping can meet the air flow and static pressure requirements. In cases where more than one blower will meet the requirements, it is good practice to eliminate any choices that are at the edges of the performance tables. This will ensure the selection is flexible enough to allow for adjustments if actual conditions in the field turn out to be different from the design conditions.

Another factor to consider when more than one blower choice is available is the size of the blower. Smaller blowers have a lower initial cost while larger ones have lower operating costs. If sound needs to be considered then use the rule of thumb that the outlet velocity should be kept below 2,800 FPM. Specific sound data is available from the factory if this will help in the decision making process.

After selecting the blower size, the brake horsepower (BHP) and RPM can be determined. This is done by finding the row in the performance table corresponding to the air flow from Step #2 and the column with the static pressure calculated in step #4. Interpolation can be used to find any intermediate values. Drive losses are included in the BHP.

Step #6 Adjust for non-standard air conditions.

Elevations and/or discharge temperatures that are not at standard conditions will affect air density and must be taken into account. These air correction factors are summarized in the table below. To apply this information first adjust the total static pressure:

$$\text{TSP}_{\text{corrected}} = \text{TSP} \times \text{Air Correction Factor.}$$

Then go back to Step #5 to select the fan at the design CFM and the corrected TSP. Finally, come back to Step #6 and correct the BHP value found in Step #5.

$$\text{BHP}_{\text{corrected}} = \text{BHP} \div \text{Air Correction Factor.}$$

The RPM does not change.

Air Correction Factor

Air Temp.	Altitude in Feet Above Sea Level						
	0	1,000	2,000	3,000	4,000	5,000	6,000
0°F	0.87	0.91	0.94	0.98	1.01	1.05	1.09
40°F	0.94	0.98	1.02	1.06	1.10	1.14	1.19
70°F	1.00	1.04	1.08	1.12	1.16	1.20	1.25
100°F	1.06	1.10	1.14	1.19	1.23	1.28	1.33

Step #7 Determine the correct motor size.

Drive losses are included in the fan performance tables. Therefore, simply use the brake horsepower value found in Step #5 (or the corrected one from Step #6) and choose the next largest standard motor size.

➔ **Refer to page 16 for examples that illustrate these principles.**

Worksheet

Step #1	Determine the model of the air handler	DFG	IFG	MUA	NTS	circle one
Step #2	Determine the air flow requirements	_____	CFM			
Step #3	Determine the housing size	#1	#2	#2W	#3	#4 circle one
Step #4	Determine the resistance to air flow	_____	T.S.P.			
Step #5	Select the blower size and determine the BHP and RPM	_____	blower			
		_____	BHP			
		_____	RPM			
Step #6	Adjust for non-standard conditions	_____	Air Correction Factor			
Step #7	Determine the motor size	_____	HP			

Accessory Pressure Loss Data (inches of water)

Housing #1

CFM	V-bank Filters						Filters in Intake Hood	
	Aluminum Mesh		Fiberglass Throwaway		Pleated		Aluminum Mesh	
	1"	2"	1"	2"	1"	2"	1"	2"
600	.02	.04	.03	.04	.03	.04	.01	.02
800	.03	.04	.04	.04	.04	.04	.02	.03
1,000	.03	.05	.04	.05	.04	.05	.03	.05
1,200	.04	.06	.05	.06	.05	.06	.04	.06
1,400	.05	.06	.06	.07	.06	.07	.05	.07
1,600	.05	.07	.06	.08	.06	.08	.06	.08
1,800	.06	.08	.07	.09	.07	.09	.07	.09
2,000	.06	.09	.07	.10	.07	.10	.08	.11
2,200	.07	.09	.08	.11	.08	.11	.09	.12
2,400	.07	.10	.09	.12	.09	.12	.11	.13
2,600	.08	.11	.09	.13	.09	.13	.12	.14
2,800	.08	.11	.10	.14	.10	.14	.13	.16
3,000	.09	.12	.10	.15	.10	.15	.14	.17
3,200	.09	.13	.11	.16	.11	.16	.15	.18
3,400	.10	.13	.12	.16	.12	.16	.16	.19
3,600	.10	.14	.12	.17	.12	.17	.17	.21

CFM	Heating or Cooling Coils*								
	Intake Hood	OA or RA Damper	DFG Heater	Electric Heater	Evap Cooler	1 Row 8 FPI	2 Rows 8 FPI	4 Rows 8 FPI	6 Rows 8 FPI
600	.01	.01	.50	.01	.01	.03	.06	.12	.17
800	.01	.02	.50	.01	.01	.04	.08	.15	.23
1,000	.01	.02	.50	.01	.01	.05	.10	.19	.29
1,200	.02	.02	.50	.01	.01	.06	.12	.23	.35
1,400	.02	.03	.50	.02	.01	.07	.13	.27	.40
1,600	.03	.03	.50	.02	.03	.08	.15	.31	.46
1,800	.04	.03	.50	.02	.05	.09	.17	.35	.52
2,000	.05	.04	.50	.03	.08	.10	.19	.38	.58
2,200	.05	.04	.50	.03	.10	.11	.21	.42	.63
2,400	.06	.05	.50	.04	.12	.12	.23	.46	.69
2,600	.07	.05	.50	.04	.14	.13	.25	.50	.75
2,800	.08	.05	.50	.04	.16	.13	.27	.54	.81
3,000	.09	.06	.50	.05	.18	.14	.29	.58	.87
3,200	.09	.06	.50	.05	.20	.15	.31	.62	.92
3,400	.10	.07	.50	.06	.22	.16	.33	.65	.98
3,600	.11	.07	.50	.06	.24	.17	.35	.69	1.04

* Add 30% for 10 FPI and 60% for 12 FPI

CFM	Indirect Fired Heater (IFG)				
	Downturn Plenum**	100 MBH	150 MBH	200 MBH	250 MBH
600	.01	NA	NA	NA	NA
800	.01	.10	NA	NA	NA
1,000	.01	.12	NA	NA	NA
1,200	.01	.14	.11	NA	NA
1,400	.03	.16	.12	NA	NA
1,600	.04	.21	.13	.10	NA
1,800	.06	.26	.14	.10	NA
2,000	.07	.32	.15	.10	.10
2,200	.09	.39	.16	.11	.11
2,400	.10	.46	.18	.12	.11
2,600	.12	.55	.22	.13	.12
2,800	.14	.64	.25	.14	.13
3,000	.15	.74	.29	.17	.14
3,200	.17	.84	.33	.19	.14
3,400	.18	.95	.37	.22	.15
3,600	.20	1.06	.41	.25	.16

** Only on IFG units with downturn plenum - do not include on end discharge units

Accessory Pressure Loss Data (inches of water)

Housing #2

CFM	V-bank Filters						Filters in Intake Hood	
	Aluminum Mesh		Fiberglass Throwaway		Pleated		Aluminum Mesh	
	1"	2"	1"	2"	1"	2"	1"	2"
1,800	.04	.06	.05	.06	.05	.06	.04	.05
2,200	.05	.06	.05	.07	.05	.07	.05	.07
2,600	.05	.07	.06	.08	.06	.08	.06	.09
3,000	.06	.08	.07	.10	.07	.10	.08	.10
3,400	.07	.09	.08	.11	.08	.11	.09	.12
3,800	.07	.10	.09	.12	.09	.12	.11	.13
4,200	.08	.11	.09	.13	.09	.13	.12	.15
4,600	.09	.12	.10	.14	.10	.14	.13	.16
5,000	.09	.13	.11	.15	.11	.15	.15	.18
5,400	.10	.13	.12	.17	.12	.17	.16	.19
5,800	.11	.14	.13	.18	.13	.18	.17	.21
6,200	.11	.15	.13	.19	.13	.19	.19	.23
6,600	.12	.16	.14	.20	.14	.20	.20	.24
7,000	.13	.17	.15	.21	.15	.21	.22	.26

CFM	Heating or Cooling Coils*								
	Intake Hood	OA or RA Damper	DFG Heater	Electric Heater	Evap Cooler	1 Row 8 FPI	2 Rows 8 FPI	4 Rows 8 FPI	6 Rows 8 FPI
1,800	.01	.02	.50	.01	.01	.05	.11	.22	.33
2,200	.02	.03	.50	.02	.01	.07	.13	.27	.40
2,600	.03	.03	.50	.02	.04	.08	.16	.32	.48
3,000	.04	.04	.50	.03	.07	.09	.18	.37	.55
3,400	.05	.04	.50	.03	.09	.10	.21	.41	.62
3,800	.06	.05	.50	.04	.12	.12	.23	.46	.70
4,200	.07	.05	.50	.04	.14	.13	.26	.51	.77
4,600	.08	.06	.50	.05	.17	.14	.28	.56	.84
5,000	.09	.06	.50	.05	.20	.15	.30	.61	.91
5,400	.10	.07	.50	.06	.22	.16	.33	.66	.99
5,800	.11	.07	.50	.06	.25	.18	.35	.71	1.06
6,200	.12	.08	.50	.07	.28	.19	.38	.76	1.13
6,600	.13	.08	.50	.07	.30	.20	.40	.80	1.21
7,000	.14	.09	.50	.08	.33	.21	.43	.85	1.28

* Add 30% for 10 FPI and 60% for 12 FPI

CFM	Indirect Fired Heater (IFG)					
	Downturn Plenum**	200 MBH	250 MBH	300 MBH	500 MBH	600 MBH
1,800	.01	.10	NA	NA	NA	NA
2,200	.03	.11	.11	NA	NA	NA
2,600	.05	.12	.12	.11	NA	NA
3,000	.07	.17	.14	.13	.28	NA
3,400	.09	.22	.15	.14	.30	NA
3,800	.11	.28	.18	.15	.36	.30
4,200	.12	.34	.22	.16	.44	.32
4,600	.14	.40	.26	.19	.52	.38
5,000	.16	.47	.31	.22	.62	.44
5,400	.18	.55	.36	.26	.72	.52
5,800	.20	.64	.42	.30	.84	.60
6,200	.22	.74	.48	.34	.96	.68
6,600	.24	.84	.54	.38	1.08	.76
7,000	.26	.94	.62	.43	1.24	.86

** Only on IFG units with downturn plenum - do not include on end discharge units

Accessory Pressure Loss Data (inches of water)

Housing #2W

CFM	V-bank Filters						Filters in Intake Hood	
	Aluminum Mesh		Fiberglass Throwaway		Pleated		Aluminum Mesh	
	1"	2"	1"	2"	1"	2"	1"	2"
3,000	.05	.07	.06	.08	.06	.08	.06	.08
3,400	.05	.07	.06	.09	.06	.09	.07	.09
3,800	.06	.08	.07	.09	.07	.09	.08	.10
4,200	.06	.09	.08	.10	.08	.10	.09	.11
4,600	.07	.09	.08	.11	.08	.11	.10	.12
5,000	.07	.10	.09	.12	.09	.12	.11	.14
5,400	.08	.11	.09	.13	.09	.13	.12	.15
5,800	.09	.12	.10	.14	.10	.14	.13	.16
6,200	.09	.12	.11	.15	.11	.15	.14	.17
6,600	.10	.13	.11	.16	.11	.16	.15	.19
7,000	.10	.14	.12	.17	.12	.17	.16	.20

CFM	Intake Hood	OA or RA Damper	DFG Heater	Electric Heater	Evap Cooler	Heating or Cooling Coils*			
						1 Row 8 FPI	2 Rows 8 FPI	4 Rows 8 FPI	6 Rows 8 FPI
3,000	.03	.03	.50	.02	.02	.07	.14	.29	.43
3,400	.03	.03	.50	.02	.04	.08	.16	.32	.49
3,800	.04	.04	.50	.03	.06	.09	.18	.36	.54
4,200	.05	.04	.50	.03	.08	.10	.20	.40	.60
4,600	.06	.04	.50	.03	.10	.11	.22	.44	.66
5,000	.07	.05	.50	.04	.13	.12	.24	.48	.71
5,400	.07	.05	.50	.04	.15	.13	.26	.51	.77
5,800	.08	.06	.50	.05	.17	.14	.28	.55	.83
6,200	.09	.06	.50	.05	.19	.15	.30	.59	.89
6,600	.10	.06	.50	.05	.21	.16	.31	.63	.94
7,000	.10	.07	.50	.06	.23	.17	.33	.67	1.00

* Add 30% for 10 FPI and 60% for 12 FPI

CFM	Downturn Plenum**	Indirect Fired Heater (IFG)					
		300 MBH	350 MBH	400 MBH	600 MBH	700 MBH	800 MBH
3,000	.03	.13	.11	NA	NA	NA	NA
3,400	.05	.14	.12	.10	NA	NA	NA
3,800	.06	.15	.13	.11	.30	NA	NA
4,200	.08	.16	.14	.12	.32	NA	NA
4,600	.10	.19	.15	.13	.38	.30	NA
5,000	.11	.22	.16	.14	.44	.32	.28
5,400	.13	.26	.19	.15	.52	.38	.30
5,800	.14	.30	.22	.17	.60	.44	.34
6,200	.16	.34	.25	.19	.68	.50	.38
6,600	.17	.38	.28	.22	.76	.56	.44
7,000	.19	.43	.32	.25	.86	.64	.50

** Only on IFG units with downturn plenum - do not include on end discharge units

Accessory Pressure Loss Data (inches of water)

Housing #3

CFM	<u>V-bank Filters</u>						<u>Filters in Intake Hood</u>	
	<u>Aluminum Mesh</u>		<u>Fiberglass Throwaway</u>		<u>Pleated</u>		<u>Aluminum Mesh</u>	
	1"	2"	1"	2"	1"	2"	1"	2"
4,000	.04	.06	.05	.07	.05	.07	.05	.07
5,000	.05	.07	.06	.09	.06	.09	.07	.09
6,000	.06	.09	.07	.10	.07	.10	.09	.11
7,000	.07	.10	.08	.12	.08	.12	.10	.13
8,000	.08	.11	.10	.13	.10	.13	.12	.15
9,000	.09	.12	.11	.15	.11	.15	.14	.17
10,000	.10	.13	.12	.16	.12	.16	.16	.19
11,000	.11	.14	.13	.18	.13	.18	.18	.21
12,000	.12	.16	.14	.20	.14	.20	.19	.23
13,000	.13	.17	.15	.21	.15	.21	.21	.25
14,000	.14	.18	.16	.23	.16	.23	.23	.27
15,000	.14	.19	.17	.24	.17	.24	.25	.30

CFM	<u>Heating or Cooling Coils*</u>								
	Intake Hood	OA or RA Damper	DFG Heater	Electric Heater	Evap Cooler	1 Row 8 FPI	2 Rows 8 FPI	4 Rows 8 FPI	6 Rows 8 FPI
4,000	.02	.03	.50	.02	.01	.06	.13	.26	.39
5,000	.03	.03	.50	.02	.04	.08	.16	.32	.49
6,000	.05	.04	.50	.03	.08	.10	.19	.39	.58
7,000	.06	.05	.50	.04	.11	.11	.23	.45	.68
8,000	.07	.05	.50	.04	.15	.13	.26	.52	.78
9,000	.09	.06	.50	.05	.18	.15	.29	.58	.88
10,000	.10	.06	.50	.05	.22	.16	.32	.65	.97
11,000	.11	.07	.50	.06	.25	.18	.36	.71	1.07
12,000	.13	.08	.50	.07	.29	.19	.39	.78	1.17
13,000	.14	.08	.50	.07	.32	.21	.42	.84	1.27
14,000	.15	.09	.50	.08	.36	.23	.45	.91	1.36
15,000	.16	.10	.50	.09	.39	.24	.49	.97	1.46

* Add 30% for 10 FPI and 60% for 12 FPI

CFM	<u>Indirect Fired Heater (IFG)</u>									
	Downturn Plenum**	300 MBH	350 MBH	400 MBH	600 MBH	700 MBH	800 MBH	900 MBH	1050 MBH	1200 MBH
4,000	.02	.14	.11	.10	.28	NA	NA	.42	NA	NA
5,000	.05	.22	.17	.13	.44	.34	.26	.66	.51	.39
6,000	.08	.32	.24	.18	.64	.48	.36	.96	.72	.54
7,000	.10	.43	.32	.25	.86	.64	.50	1.29	.96	.75
8,000	.13	.57	.42	.33	1.14	.84	.66	1.71	1.26	.99
9,000	.15	.73	.54	.41	1.46	1.08	.82	2.19	1.62	1.23
10,000	.18	.90	.67	.51	1.80	1.34	1.02	2.70	2.01	1.53
11,000	.21	1.08	.82	.62	2.16	1.64	1.24	3.24	2.46	1.86
12,000	.23	NA	.97	.75	NA	1.94	1.50	NA	2.91	2.25
13,000	.26	NA	1.12	.88	NA	2.24	1.76	NA	3.36	2.64
14,000	.28	NA	NA	1.01	NA	NA	2.02	NA	NA	3.03
15,000	.31	NA	NA	NA	NA	NA	NA	NA	NA	NA

** Only on IFG units with downturn plenum - do not include on end discharge units

Accessory Pressure Loss Data (inches of water)

Housing #4

CFM	<u>V-bank Filters</u>						<u>Filters in Intake Hood</u>	
	<u>Aluminum Mesh</u>		<u>Fiberglass Throwaway</u>		<u>Pleated</u>		<u>Aluminum Mesh</u>	
	1"	2"	1"	2"	1"	2"	1"	2"
8,000	.04	.06	.05	.07	.05	.07	.05	.07
10,000	.05	.08	.06	.09	.06	.09	.07	.09
12,000	.06	.09	.08	.10	.08	.10	.09	.11
14,000	.07	.10	.09	.12	.09	.12	.11	.13
16,000	.08	.11	.10	.13	.10	.13	.12	.15
18,000	.09	.12	.11	.15	.11	.15	.14	.17
20,000	.10	.13	.12	.17	.12	.17	.16	.20
22,000	.11	.15	.13	.18	.13	.18	.18	.22
24,000	.12	.16	.14	.20	.14	.20	.20	.24
26,000	.13	.17	.15	.21	.15	.21	.22	.26
28,000	.14	.18	.16	.23	.16	.23	.23	.28
30,000	.15	.19	.17	.25	.17	.25	.25	.30

CFM	Intake Hood	OA or RA Damper	DFG Heater	Electric Heater	Evap Cooler	<u>Heating or Cooling Coils*</u>			
						1 Row 8 FPI	2 Rows 8 FPI	4 Rows 8 FPI	6 Rows 8 FPI
8,000	.02	.03	.50	.02	.01	.07	.13	.26	.40
10,000	.04	.03	.50	.02	.05	.08	.17	.33	.50
12,000	.05	.04	.50	.03	.08	.10	.20	.40	.59
14,000	.06	.05	.50	.04	.12	.12	.23	.46	.69
16,000	.08	.05	.50	.04	.15	.13	.26	.53	.79
18,000	.09	.06	.50	.05	.19	.15	.30	.59	.89
20,000	.10	.07	.50	.06	.22	.17	.33	.66	.99
22,000	.12	.07	.50	.06	.26	.18	.36	.73	1.09
24,000	.13	.08	.50	.07	.30	.20	.40	.79	1.19
26,000	.14	.09	.50	.08	.33	.21	.43	.86	1.29
28,000	.15	.09	.50	.08	.37	.23	.46	.92	1.39
30,000	.17	.10	.50	.09	.40	.25	.50	.99	1.49

* Add 30% for 10 FPI and 60% for 12 FPI

Performance Tables - Housing Size #1

9" Light Duty Blower			Total Static Pressure (in. w.g.)															
Available Models	CFM	O.V.	0.25		0.50		0.75		1.00		1.25		1.50		1.75		2.00	
			RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
DFG-109-SM	600	1,180	773	0.13	906	0.16	1003	0.21	1094	0.24	1188	0.27	1280	0.32	1399	0.44	1479	0.48
MUA-109-SM	700	1,370	844	0.18	986	0.23	1083	0.27	1163	0.31	1241	0.35	1320	0.39	1399	0.44	1479	0.48
NTS-109-SM	800	1,570	913	0.24	1060	0.31	1162	0.35	1243	0.39	1314	0.44	1383	0.48	1453	0.53	1522	0.58
IFG-109-SM	900	1,760	983	0.32	1130	0.39	1239	0.45	1323	0.50	1394	0.55	1457	0.59	1519	0.64	1580	0.70
♦100 MBH	1,000	1,960	1054	0.40	1198	0.50	1311	0.56	1401	0.62	1475	0.67	1538	0.73	1595	0.78	1651	0.84
♦150 MBH	1,100	2,160	1127	0.51	1268	0.61	1382	0.69	1475	0.76	1553	0.82	1619	0.88	1677	0.94	1730	1.00
	1,200	2,350	1201	0.62	1338	0.74	1451	0.84	1546	0.92	1627	1.00	1697	1.06	1759	1.13	1813	1.19
	1,300	2,550	1279	0.76	1409	0.89	1520	1.01	1616	1.10	1699	1.19	1773	1.26	1838	1.33	1895	1.40
	1,400	2,750	1358	0.92	1481	1.06	1590	1.19	1686	1.30	1770	1.40	1844	1.49	1912	1.57	1972	1.64
	1,500	2,940	1438	1.10	1553	1.25	1661	1.39	1756	1.52	1840	1.63	1914	1.74	1983	1.83	2046	1.92
	1,600	3,140	1517	1.30	1627	1.46	1730	1.62	1824	1.76	1909	1.89	1985	2.01	2054	2.12	2118	2.21

9" Blower			Total Static Pressure (in. w.g.)															
Available Models	CFM	O.V.	0.25		0.50		0.75		1.00		1.25		1.50		1.75		2.00	
			RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
DFG-109	1,000	1,140	565	0.14	769	0.21												
MUA-109	1,100	1,250	578	0.16	772	0.23												
NTS-109	1,200	1,360	595	0.18	778	0.26	943	0.36										
IFG-109	1,300	1,480	615	0.22	786	0.30	943	0.40										
♦100 MBH	1,400	1,590	638	0.25	796	0.34	947	0.44	1089	0.55								
♦150 MBH	1,500	1,700	663	0.29	808	0.38	953	0.48	1087	0.59	1214	0.76						
♦200 MBH	1,600	1,820	690	0.34	823	0.43	962	0.54	1090	0.64	1216	0.76						
♦250 MBH	1,700	1,930	719	0.39	840	0.49	972	0.59	1097	0.71	1213	0.82	1330	0.95				
	1,800	2,050	748	0.45	860	0.55	985	0.66	1106	0.77	1219	0.89	1331	1.03				
	1,900	2,160	779	0.52	881	0.61	998	0.73	1116	0.85	1228	0.97	1333	1.10	1440	1.25		
	2,000	2,270	811	0.59	905	0.68	1014	0.80	1128	0.93	1237	1.06	1340	1.19	1442	1.34		
	2,100	2,390	843	0.67	930	0.76	1032	0.88	1140	1.02	1247	1.15	1346	1.28	1443	1.43	1537	1.57
	2,200	2,500	875	0.75	957	0.85	1052	0.97	1154	1.11	1256	1.25	1354	1.38	1447	1.52	1540	1.67
	2,300	2,610	908	0.84	985	0.94	1074	1.06	1169	1.20	1267	1.35	1363	1.49	1454	1.63	1545	1.79
	2,400	2,730	941	0.94	1015	1.05	1096	1.16	1187	1.31	1282	1.46	1375	1.61	1464	1.76	1551	1.92
	2,500	2,840	975	1.05	1046	1.16	1121	1.28	1206	1.42	1298	1.58	1390	1.74	1475	1.89	1558	2.05
	2,600	2,950	1009	1.18	1075	1.28	1148	1.41	1227	1.55	1312	1.70	1400	1.86	1486	2.03	1569	2.19

10" Blower			Total Static Pressure (in. w.g.)															
Available Models	CFM	O.V.	0.25		0.50		0.75		1.00		1.25		1.50		1.75		2.00	
			RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
DFG-110	1,200	1,130	504	0.15	676	0.24												
MUA-110	1,300	1,230	515	0.17	681	0.27												
NTS-110	1,400	1,320	527	0.20	688	0.29	827	0.41										
IFG-110	1,500	1,420	540	0.23	696	0.33	831	0.44										
♦100 MBH	1,600	1,510	554	0.26	706	0.36	836	0.48	955	0.61								
♦150 MBH	1,700	1,600	570	0.29	716	0.40	843	0.52	959	0.65								
♦200 MBH	1,800	1,700	586	0.33	727	0.44	851	0.57	964	0.70	1068	0.84						
♦250 MBH	1,900	1,790	602	0.37	739	0.49	860	0.62	970	0.75	1074	0.90	1068	0.84				
	2,000	1,890	619	0.42	752	0.54	870	0.67	978	0.81	1079	0.96	1174	1.11				
	2,100	1,980	637	0.46	765	0.60	880	0.73	986	0.87	1086	1.03	1177	1.18	1266	1.35		
	2,200	2,080	655	0.52	779	0.66	891	0.79	995	0.94	1092	1.09	1182	1.25	1268	1.42		
	2,300	2,170	674	0.57	793	0.72	902	0.86	1004	1.01	1099	1.16	1188	1.33	1274	1.50	1354	1.67
	2,400	2,260	693	0.63	807	0.78	915	0.93	1014	1.08	1107	1.24	1195	1.41	1279	1.59	1358	1.77
	2,500	2,360	712	0.70	822	0.86	927	1.01	1024	1.16	1115	1.32	1202	1.50	1284	1.68	1361	1.86
	2,600	2,450	732	0.76	838	0.93	940	1.09	1035	1.25	1125	1.41	1210	1.59	1290	1.77	1367	1.96
	2,700	2,550	752	0.84	854	1.01	953	1.18	1047	1.34	1135	1.51	1218	1.69	1297	1.87	1374	2.07
	2,800	2,640	772	0.92	871	1.10	967	1.27	1059	1.44	1145	1.61	1227	1.79	1305	1.98	1381	2.18
	2,900	2,740	793	1.00	888	1.19	982	1.37	1071	1.55	1156	1.72	1237	1.90	1314	2.09	1389	2.30
	3,000	2,830	814	1.09	906	1.28	997	1.47	1084	1.66	1168	1.84	1247	2.02	1323	2.21	1397	2.42
	3,100	2,920	834	1.19	924	1.38	1013	1.58	1098	1.77	1180	1.96	1258	2.14	1333	2.34	1405	2.55
	3,200	3,020	856	1.29	942	1.49	1029	1.69	1112	1.89	1193	2.08	1269	2.28	1343	2.48	1414	2.69
	3,300	3,110	877	1.40	961	1.60	1045	1.81	1127	2.02	1206	2.22	1281	2.41	1353	2.62	1423	2.83
	3,400	3,210	898	1.52	980	1.72	1062	1.94	1142	2.15	1219	2.36	1293	2.56	1364	2.77	1433	2.98
	3,500	3,300	920	1.63	999	1.85	1079	2.07	1157	2.29	1233	2.50	1305	2.71	1375	2.92	1443	3.14
	3,600	3,400	942	1.76	1018	1.98	1095	2.20	1172	2.43	1246	2.66	1317	2.87	1387	3.08	1454	3.30

Note: See page 15 for General Notes regarding these Performance Tables.

Performance Tables - Housing Size #2

Note: This is a non-standard combination of blower and housing size. Use it only if a 10" blower is required but the standard Housing Size #1 is too small. This may occur when a cooling coil is required.

10" Blower			Total Static Pressure (in. w.g.)															
Available Models	CFM	O.V.	0.25		0.50		0.75		1.00		1.25		1.50		1.75		2.00	
			RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
DFG-110	1,200	1,130	495	0.15	669	0.24												
MUA-110	1,400	1,320	520	0.20	681	0.29	821	0.41										
IFG-110♦	1,600	1,510	544	0.25	695	0.36	827	0.48	945	0.59								
♦200 MBH	1,800	1,700	570	0.32	713	0.44	838	0.56	953	0.68	1059	0.83						
♦250 MBH	2,000	1,890	600	0.40	734	0.53	854	0.65	964	0.79	1064	0.93	1159	1.09				
♦300 MBH	2,200	2,080	634	0.49	758	0.63	873	0.77	978	0.91	1075	1.06	1167	1.23	1254	1.39		
	2,400	2,260	670	0.60	786	0.76	894	0.90	995	1.05	1089	1.21	1178	1.38	1262	1.56	1343	1.74
	2,600	2,450	709	0.73	816	0.90	918	1.06	1014	1.21	1105	1.37	1191	1.55	1273	1.74	1352	1.92
	2,800	2,640	749	0.88	848	1.06	944	1.23	1036	1.40	1123	1.57	1207	1.75	1287	1.94	1363	2.13
	3,000	2,830	789	1.05	881	1.23	972	1.42	1060	1.60	1144	1.78	1225	1.97	1303	2.16	1376	2.36
	3,200	3,020	829	1.23	915	1.43	1002	1.63	1086	1.83	1167	2.02	1245	2.22	1320	2.41	1392	2.61
	3,400	3,210	869	1.44	950	1.64	1032	1.86	1113	2.08	1192	2.28	1267	2.49	1339	2.69	1409	2.90
	3,600	3,400	912	1.67	987	1.89	1064	2.11	1141	2.34	1216	2.56	1289	2.78	1359	3.00	1427	3.21

12" Blower			Total Static Pressure (in. w.g.)															
Available Models	CFM	O.V.	0.25		0.50		0.75		1.00		1.25		1.50		1.75		2.00	
			RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
DFG-112	1,800	1,220	444	0.22	593	0.33	719	0.44										
MUA-112	2,000	1,350	461	0.27	603	0.39	724	0.51										
NTS-112	2,200	1,490	478	0.33	613	0.45	730	0.58	836	0.72								
IFG-112♦	2,400	1,620	497	0.40	624	0.52	737	0.66	837	0.80	931	0.95						
♦200 MBH	2,600	1,760	518	0.48	636	0.60	746	0.75	843	0.90	935	1.06						
♦250 MBH	2,800	1,890	541	0.57	650	0.70	755	0.85	851	1.01	941	1.17	1024	1.35				
♦300 MBH	3,000	2,030	566	0.67	666	0.81	767	0.97	861	1.13	948	1.31	1029	1.48	1106	1.66	1179	1.84
♦500 MBH	3,200	2,160	593	0.79	683	0.93	780	1.09	871	1.27	956	1.45	1034	1.64	1110	1.83	1183	2.02
♦600 MBH	3,400	2,300	621	0.92	703	1.07	794	1.23	883	1.41	965	1.61	1042	1.80	1116	2.00	1187	2.20
	3,600	2,430	649	1.07	724	1.22	809	1.38	894	1.57	975	1.77	1051	1.98	1123	2.18	1192	2.39
	3,800	2,570	679	1.23	747	1.39	826	1.56	907	1.75	985	1.95	1060	2.17	1130	2.38	1198	2.60
	4,000	2,700	708	1.40	771	1.58	844	1.75	921	1.94	997	2.15	1069	2.37	1138	2.59	1205	2.82
	4,200	2,840	738	1.60	796	1.78	864	1.96	937	2.15	1010	2.36	1080	2.59	1148	2.82	1214	3.06
	4,400	2,970	768	1.81	822	2.00	885	2.19	954	2.38	1024	2.59	1093	2.82	1159	3.07	1224	3.32
	4,600	3,110	798	2.04	848	2.24	907	2.44	973	2.64	1041	2.85	1107	3.08	1172	3.34	1235	3.60
	4,800	3,240	829	2.29	876	2.50	931	2.71	993	2.92	1058	3.14	1123	3.37	1186	3.62	1247	3.89
	5,000	3,380	861	2.57	905	2.78	956	3.00	1014	3.22	1075	3.44	1137	3.67	1199	3.92	1258	4.20

15" Blower			Total Static Pressure (in. w.g.)															
Available Models	CFM	O.V.	0.25		0.50		0.75		1.00		1.25		1.50		1.75		2.00	
			RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
DFG-115	3,000	1,440	439	0.41	550	0.56	646	0.72	730	0.90								
MUA-115	3,200	1,540	453	0.47	559	0.63	654	0.79	737	0.98								
NTS-115	3,400	1,630	468	0.53	569	0.71	662	0.88	744	1.06								
IFG-115♦	3,600	1,730	483	0.61	581	0.79	671	0.97	751	1.16	824	1.37						
♦200 MBH	3,800	1,830	498	0.69	593	0.88	680	1.06	759	1.26	832	1.48						
♦250 MBH	4,000	1,920	514	0.77	605	0.97	689	1.17	767	1.38	839	1.59	904	1.81	967	2.05		
♦300 MBH	4,200	2,020	529	0.86	618	1.07	699	1.28	776	1.49	847	1.71	912	1.94	972	2.19		
♦500 MBH	4,400	2,120	545	0.96	631	1.18	710	1.40	785	1.62	855	1.85	919	2.07	978	2.33		
♦600 MBH	4,600	2,210	561	1.07	645	1.30	721	1.53	794	1.76	863	1.99	927	2.23	986	2.48	1041	2.73
	4,800	2,310	577	1.19	659	1.42	733	1.67	804	1.91	871	2.14	934	2.39	993	2.64	1048	2.90
	5,000	2,400	594	1.32	673	1.56	745	1.81	814	2.06	880	2.31	942	2.56	1001	2.81	1056	3.08
	5,200	2,500	611	1.46	688	1.71	758	1.97	825	2.23	889	2.49	951	2.74	1009	3.00	1064	3.28
	5,400	2,600	628	1.61	703	1.86	772	2.13	837	2.41	899	2.68	960	2.94	1018	3.20	1073	3.49
	5,600	2,690	646	1.77	718	2.03	786	2.31	849	2.59	910	2.87	969	3.15	1026	3.42	1081	3.71
	5,800	2,790	665	1.94	735	2.21	801	2.50	863	2.79	922	3.08	979	3.37	1036	3.65	1089	3.94
	6,000	2,880	683	2.13	751	2.40	816	2.70	877	3.00	934	3.30	990	3.60	1045	3.89	1098	4.18
	6,500	3,130	731	2.64	794	2.93	855	3.25	913	3.58	968	3.90	1020	4.23	1072	4.55	1122	4.88
	7,000	3,370	777	3.23	834	3.54	892	3.88	947	4.22	1000	4.57	1050	4.92	1099	5.27	1147	5.62

Note: See page 15 for General Notes regarding these Performance Tables.

Performance Tables - Housing Size #2W

Twin 9" Lt. Blowers			Total Static Pressure (in. w.g.)															
Available Models	CFM	O.V.	0.25		0.50		0.75		1.00		1.25		1.50		1.75		2.00	
			RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
IFG-209-SM	1,200	1,180	773	0.25	907	0.32	1002	0.38	1095	0.45	1187	0.53	1280	0.61				
300 MBH	1,400	1,370	844	0.35	986	0.44	1083	0.52	1163	0.59	1241	0.67	1320	0.75	1399	0.84	1479	0.93
350 MBH	1,600	1,570	913	0.47	1060	0.59	1162	0.67	1243	0.76	1314	0.85	1383	0.93	1453	1.02	1522	1.12
400 MBH	1,800	1,760	983	0.61	1130	0.76	1239	0.87	1323	0.96	1394	1.06	1457	1.15	1519	1.25	1580	1.36
	2,000	1,960	1054	0.78	1198	0.96	1311	1.09	1401	1.20	1475	1.31	1538	1.42	1595	1.52	1651	1.63
	2,200	2,160	1127	0.98	1268	1.18	1382	1.35	1475	1.49	1553	1.61	1619	1.73	1677	1.84	1730	1.95
	2,400	2,350	1201	1.21	1338	1.44	1451	1.64	1546	1.81	1627	1.95	1697	2.08	1759	2.21	1813	2.32
	2,600	2,550	1279	1.48	1409	1.74	1520	1.97	1616	2.16	1699	2.33	1773	2.47	1838	2.62	1895	2.75
	2,800	2,750	1358	1.80	1481	2.07	1590	2.33	1686	2.55	1770	2.75	1844	2.92	1912	3.08	1972	3.23
	3,000	2,940	1438	2.16	1553	2.45	1661	2.73	1756	2.98	1840	3.21	1914	3.42	1983	3.59	2046	3.77
	3,200	3,140	1517	2.56	1627	2.88	1730	3.18	1824	3.47	1909	3.73	1985	3.97	2054	4.17	2118	4.36

Twin 9" Blowers			Total Static Pressure (in. w.g.)															
Available Models	CFM	O.V.	0.25		0.50		0.75		1.00		1.25		1.50		1.75		2.00	
			RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
IFG-209	2,000	1,140	574	0.25	777	0.41												
300 MBH	2,200	1,250	590	0.30	783	0.46												
350 MBH	2,400	1,360	609	0.36	790	0.52												
400 MBH	2,600	1,480	629	0.42	800	0.59	954	0.77										
600 MBH	2,800	1,590	652	0.50	811	0.67	959	0.86										
700 MBH	3,000	1,700	677	0.58	824	0.76	968	0.96	1102	1.16								
800 MBH	3,200	1,820	704	0.67	840	0.86	979	1.07	1107	1.27	1231	1.52						
	3,400	1,930	733	0.78	858	0.97	991	1.18	1113	1.40	1233	1.64						
	3,600	2,050	763	0.90	878	1.09	1004	1.31	1123	1.55	1238	1.78	1349	2.05				
	3,800	2,160	794	1.03	900	1.22	1018	1.45	1135	1.70	1245	1.94	1351	2.20				
	4,000	2,270	826	1.18	923	1.36	1034	1.60	1146	1.86	1254	2.11	1356	2.37	1458	2.66		
	4,200	2,390	859	1.34	949	1.53	1052	1.77	1159	2.03	1264	2.30	1363	2.56	1460	2.85		
	4,400	2,500	891	1.51	976	1.70	1071	1.95	1173	2.22	1275	2.50	1372	2.77	1465	3.05	1559	3.37
	4,600	2,610	924	1.69	1004	1.90	1093	2.14	1190	2.42	1289	2.71	1384	3.00	1474	3.28	1565	3.59
	4,800	2,730	957	1.90	1033	2.12	1117	2.36	1209	2.64	1305	2.94	1397	3.25	1485	3.53	1572	3.84
	5,000	2,840	991	2.12	1064	2.35	1143	2.59	1230	2.87	1322	3.18	1412	3.50	1498	3.81	1580	4.11
	5,200	2,950	1027	2.36	1096	2.59	1169	2.84	1251	3.12	1337	3.43	1425	3.77	1510	4.10	1592	4.41

Twin 10" Blowers			Total Static Pressure (in. w.g.)															
Available Models	CFM	O.V.	0.25		0.50		0.75		1.00		1.25		1.50		1.75		2.00	
			RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
IFG-210	3,000	1,420	551	0.45	705	0.65	839	0.87										
300 MBH	3,200	1,510	562	0.51	712	0.71	843	0.94										
350 MBH	3,400	1,600	576	0.58	722	0.78	849	1.02										
400 MBH	3,600	1,700	592	0.65	733	0.87	857	1.11	969	1.37								
600 MBH	3,800	1,790	609	0.73	745	0.96	866	1.21	976	1.48								
700 MBH	4,000	1,890	628	0.82	759	1.07	876	1.32	984	1.59	1083	1.89						
800 MBH	4,200	1,980	647	0.92	773	1.18	888	1.43	993	1.72	1092	2.03						
	4,400	2,080	666	1.02	788	1.30	900	1.56	1002	1.85	1100	2.17						
	4,600	2,170	685	1.14	803	1.43	912	1.70	1013	1.99	1108	2.32	1196	2.64				
	4,800	2,260	705	1.26	819	1.56	925	1.85	1024	2.15	1115	2.47	1202	2.80				
	5,000	2,360	725	1.39	835	1.71	939	2.01	1035	2.31	1124	2.64	1210	2.98	1292	3.34		
	5,200	2,450	744	1.53	851	1.86	953	2.17	1046	2.49	1134	2.82	1219	3.17	1299	3.53		
	5,400	2,550	765	1.68	868	2.02	967	2.35	1059	2.68	1145	3.01	1229	3.37	1307	3.74		
	5,600	2,640	785	1.84	885	2.19	981	2.54	1071	2.88	1157	3.22	1239	3.58	1317	3.96	1393	4.36
	5,800	2,740	806	2.01	903	2.38	996	2.74	1085	3.09	1169	3.44	1249	3.80	1327	4.19	1402	4.60
	6,000	2,830	827	2.20	920	2.57	1011	2.95	1098	3.31	1181	3.67	1260	4.04	1336	4.43	1408	4.84
	6,500	3,070	882	2.71	968	3.11	1052	3.52	1134	3.92	1213	4.31	1289	4.70	1361	5.10		
	7,000	3,300	939	3.31	1018	3.74	1097	4.18	1175	4.61	1249	5.04						

Note: See page 15 for General Notes regarding these Performance Tables.

Performance Tables - Housing Size #3

Note: This is a non-standard combination of blower and housing size. Use it only if a 15" blower is required but the standard Housing Size #2 is too small. This may occur when a cooling coil is required.

15" Blower			Total Static Pressure (in. w.g.)															
Available Models	CFM	O.V.	0.25		0.50		0.75		1.00		1.25		1.50		1.75		2.00	
			RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
DFG-115	3,400	1,630	456	0.52	560	0.69	653	0.86	736	1.04								
MUA-115	3,800	1,830	483	0.66	580	0.85	668	1.04	748	1.23	822	1.44						
IFG-115♦	4,200	2,020	512	0.83	603	1.04	685	1.25	762	1.45	834	1.67	902	1.90	962	2.14		
♦300 MBH	4,600	2,210	543	1.03	628	1.26	705	1.48	778	1.71	848	1.94	914	2.17	974	2.42	1030	2.69
♦350 MBH	5,000	2,400	575	1.27	655	1.51	729	1.75	798	2.00	864	2.25	927	2.50	988	2.75	1043	3.02
♦400 MBH	5,400	2,600	609	1.54	684	1.80	754	2.06	820	2.34	883	2.61	944	2.87	1002	3.13	1058	3.41
♦600 MBH	5,800	2,790	644	1.86	714	2.13	781	2.41	844	2.70	904	3.00	962	3.28	1018	3.57	1073	3.85
♦700 MBH	6,200	2,980	680	2.23	744	2.50	808	2.80	869	3.11	927	3.42	982	3.73	1035	4.04	1088	4.34
♦800 MBH	6,600	3,170	716	2.64	775	2.92	836	3.23	894	3.56	950	3.89	1003	4.22	1054	4.54	1104	4.86
	7,000	3,370	752	3.10	806	3.39	865	3.71	921	4.06	975	4.40	1026	4.75	1076	5.10	1124	5.45

18" Blower			Total Static Pressure (in. w.g.)															
Available Models	CFM	O.V.	0.25		0.50		0.75		1.00		1.25		1.50		1.75		2.00	
			RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
DFG-118	4,000	1,380	318	0.49	409	0.69												
MUA-118	4,400	1,520	331	0.61	416	0.81	496	1.04										
NTS-118	4,800	1,660	343	0.73	425	0.96	499	1.19										
IFG-118♦	5,200	1,790	356	0.86	435	1.12	505	1.36	572	1.63								
♦300 MBH	5,600	1,930	370	1.02	446	1.30	513	1.56	576	1.84	638	2.12						
♦350 MBH	6,000	2,070	385	1.19	458	1.50	522	1.78	583	2.07	641	2.36	697	2.69				
♦400 MBH	6,400	2,210	401	1.39	471	1.73	533	2.03	591	2.33	647	2.64	701	2.97				
♦600 MBH	6,800	2,340	417	1.61	484	1.97	545	2.31	600	2.62	653	2.94	705	3.27	757	3.63		
♦700 MBH	7,200	2,480	434	1.85	498	2.25	557	2.61	611	2.94	661	3.27	711	3.61	760	3.97	808	4.34
♦800 MBH	7,600	2,620	451	2.13	512	2.54	570	2.93	622	3.29	671	3.64	718	3.99	766	4.36	811	4.74
♦900 MBH	8,000	2,760	469	2.43	527	2.86	583	3.28	634	3.67	681	4.04	727	4.40	772	4.78	817	5.17
♦1050 MBH	8,400	2,900	487	2.76	542	3.21	597	3.66	647	4.08	693	4.47	737	4.85	781	5.24	823	5.63
♦1200 MBH	8,800	3,030	504	3.12	558	3.59	610	4.06	659	4.51	705	4.94	748	5.34	790	5.73	831	6.14
	9,200	3,170	522	3.50	574	3.99	624	4.49	672	4.97	717	5.43	759	5.85	799	6.26	839	6.69
	9,600	3,310	540	3.93	590	4.44	638	4.95	685	5.46	730	5.95	771	6.40	809	6.83	848	7.27
	10,000	3,450	558	4.38	606	4.92	653	5.45	698	5.98	742	6.49	782	6.98	821	7.44	858	7.89

20" Blower			Total Static Pressure (in. w.g.)															
Available Models	CFM	O.V.	0.25		0.50		0.75		1.00		1.25		1.50		1.75		2.00	
			RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
DFG-120	5,000	1,280	308	0.67	386	0.92	455	1.22	517	1.54								
MUA-120	5,500	1,410	326	0.83	398	1.10	464	1.41	523	1.74								
NTS-120	6,000	1,530	344	1.02	410	1.31	473	1.62	531	1.97	583	2.34						
IFG-120♦	6,500	1,660	362	1.23	423	1.54	483	1.87	539	2.23	590	2.61	638	3.01				
♦300 MBH	7,000	1,790	380	1.48	437	1.80	494	2.14	548	2.51	598	2.91	645	3.33	690	3.78	733	4.23
♦350 MBH	7,500	1,920	399	1.75	453	2.10	506	2.45	558	2.84	607	3.25	653	3.68	696	4.14	737	4.60
♦400 MBH	8,000	2,050	417	2.06	469	2.43	519	2.80	568	3.20	616	3.62	661	4.07	703	4.53	743	5.01
♦600 MBH	8,500	2,170	436	2.40	486	2.80	533	3.20	580	3.60	626	4.04	669	4.50	711	4.97	750	5.46
♦700 MBH	9,000	2,300	455	2.78	503	3.22	548	3.63	593	4.05	637	4.50	679	4.97	719	5.45	758	5.96
♦800 MBH	9,500	2,430	474	3.20	522	3.68	564	4.11	606	4.54	648	5.01	689	5.49	729	5.98	767	6.50
♦900 MBH	10,000	2,560	494	3.67	540	4.18	581	4.63	621	5.09	661	5.56	701	6.06	739	6.57	776	7.10
♦1050 MBH	10,500	2,690	513	4.18	559	4.72	598	5.20	636	5.68	674	6.17	713	6.68	750	7.20	786	7.75
♦1200 MBH	11,000	2,810	533	4.73	578	5.32	616	5.82	652	6.32	689	6.83	725	7.36	762	7.90	797	8.45
	11,500	2,940	553	5.33	597	5.96	634	6.50	669	7.02	704	7.54	739	8.09	774	8.64	808	9.21
	12,000	3,070	573	5.99	616	6.65	653	7.23	687	7.77	720	8.32	753	8.87	787	9.45	820	10.03
	12,500	3,200	593	6.70	635	7.39	672	8.01	704	8.58	736	9.14	768	9.72	800	10.31	832	10.91
	13,000	3,320	613	7.47	654	8.19	690	8.85	723	9.45	753	10.03	783	10.62	815	11.23	846	11.85
	13,500	3,450	634	8.30	673	9.04	709	9.74	741	10.38	770	10.99	799	11.59	829	12.22	859	12.85
	14,000	3,580	655	9.19	692	9.95	728	10.70	760	11.38	788	12.00	816	12.62	845	13.27	874	13.92
	14,500	3,710	675	10.14	712	10.93	747	11.72	778	12.43	806	13.09	833	13.73	861	14.39	889	15.06
	15,000	3,840	696	11.16	732	11.98	766	12.79	797	13.55	825	14.25	851	14.92	878	15.58	904	16.27

Note: See page 15 for General Notes regarding these Performance Tables.

Performance Tables - Housing Size #3 (Con't.)

20" Heavy Duty Blower			Total Static Pressure (in. w.g.)															
Available Models	CFM	O.V.	0.25		0.50		0.75		1.00		1.25		1.50		1.75		2.00	
			RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
DFG-120-HD	5,000	1,180	293	0.57	373	0.84	450	1.17										
MUA-120-HD	5,500	1,290	307	0.70	382	0.98	453	1.31	520	1.69								
NTS-120-HD	6,000	1,410	321	0.85	392	1.14	458	1.48	522	1.86	582	2.29						
IFG-120-HD ♦	6,500	1,530	336	1.02	403	1.32	465	1.67	525	2.06	583	2.50	637	2.96				
♦300 MBH	7,000	1,650	351	1.21	415	1.53	474	1.89	530	2.29	586	2.73	639	3.21	689	3.69		
♦350 MBH	7,500	1,760	367	1.43	427	1.77	483	2.13	537	2.54	589	2.99	641	3.48	690	3.98		
♦400 MBH	8,000	1,880	383	1.67	441	2.03	494	2.41	545	2.82	595	3.28	644	3.77	692	4.29	737	4.83
♦600 MBH	8,500	2,000	399	1.95	455	2.33	505	2.72	554	3.14	602	3.60	648	4.09	694	4.62	739	5.19
♦700 MBH	9,000	2,120	416	2.25	469	2.65	518	3.06	564	3.49	610	3.96	654	4.46	698	4.99	741	5.57
♦800 MBH	9,500	2,240	433	2.59	484	3.01	531	3.44	576	3.88	619	4.36	661	4.86	703	5.40	745	5.98
♦900 MBH	10,000	2,350	450	2.96	499	3.41	545	3.85	588	4.31	630	4.79	670	5.31	710	5.85	750	6.43
♦1050 MBH	10,500	2,470	468	3.37	515	3.85	559	4.30	601	4.78	641	5.27	680	5.80	718	6.35	757	6.93
♦1200 MBH	11,000	2,590	486	3.81	531	4.32	574	4.80	614	5.29	653	5.80	691	6.33	728	6.89	765	7.48
	11,500	2,710	504	4.30	548	4.83	589	5.33	628	5.84	666	6.36	702	6.91	738	7.48	773	8.08
	12,000	2,820	522	4.82	564	5.39	604	5.91	642	6.43	679	6.97	715	7.54	749	8.12	783	8.72
	12,500	2,940	540	5.39	581	5.98	620	6.53	657	7.07	693	7.63	727	8.21	761	8.80	793	9.42
	13,000	3,060	558	6.00	598	6.62	635	7.20	671	7.76	706	8.33	740	8.92	773	9.53	804	10.16
	13,500	3,180	577	6.65	615	7.31	651	7.91	686	8.49	720	9.08	753	9.68	785	10.31	816	10.95
	14,000	3,290	595	7.36	632	8.04	667	8.67	701	9.28	734	9.88	767	10.50	798	11.14	828	11.80
	14,500	3,410	614	8.11	650	8.83	684	9.48	717	10.11	749	10.74	780	11.37	811	12.02	841	12.69
	15,000	3,530	633	8.92	668	9.66	701	10.35	733	11.01	764	11.66	795	12.31	825	12.97	854	13.65

Performance Tables - Housing Size #4

Note: This is a non-standard blower. Use it only if Housing Size #3 is too small and the standard twin 18" blowers that are in Housing Size #4 can not meet the fan performance requirements. This may occur when a cooling coil is required.

Twin 15" Blowers			Total Static Pressure (in. w.g.)															
Available Models	CFM	O.V.	0.25		0.50		0.75		1.00		1.25		1.50		1.75		2.00	
			RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
DFG-215	6,000	1,440	430	0.76	540	1.06	638	1.38	722	1.74								
MUA-215	6,400	1,540	441	0.87	548	1.19	644	1.52	728	1.88	805	2.26						
	6,800	1,630	454	0.99	558	1.33	651	1.67	734	2.03	809	2.44						
	7,200	1,730	467	1.12	568	1.48	658	1.84	740	2.21	814	2.62	883	3.05				
	7,600	1,830	482	1.27	579	1.65	667	2.03	747	2.41	820	2.82	888	3.27	953	3.72		
	8,000	1,920	496	1.43	591	1.84	675	2.22	754	2.62	826	3.04	894	3.49	957	3.97	1020	4.47
	8,400	2,020	512	1.61	603	2.03	685	2.44	762	2.85	833	3.28	900	3.73	962	4.22	1022	4.73
	8,800	2,120	527	1.80	615	2.24	695	2.67	770	3.10	841	3.54	907	4.00	968	4.49	1026	5.01
	9,200	2,210	543	2.01	628	2.46	706	2.92	779	3.36	849	3.82	914	4.28	974	4.78	1031	5.31
	9,600	2,310	559	2.24	642	2.70	717	3.18	789	3.65	857	4.12	921	4.59	981	5.09	1036	5.63
	10,000	2,400	575	2.49	655	2.96	729	3.46	799	3.95	865	4.44	928	4.93	988	5.43	1043	5.97
	10,400	2,500	592	2.75	669	3.24	741	3.75	809	4.27	874	4.78	936	5.29	995	5.80	1050	6.35
	10,800	2,600	609	3.04	684	3.53	754	4.07	820	4.61	883	5.14	944	5.67	1003	6.20	1058	6.75
	11,200	2,690	626	3.34	698	3.85	767	4.40	832	4.96	893	5.53	952	6.08	1010	6.62	1066	7.17
	11,600	2,790	644	3.67	713	4.19	780	4.76	844	5.34	904	5.92	961	6.50	1018	7.06	1074	7.63
	12,000	2,880	662	4.02	728	4.55	794	5.13	856	5.73	915	6.34	971	6.94	1027	7.52	1081	8.10
	13,000	3,130	707	5.00	767	5.55	829	6.17	888	6.81	945	7.46	998	8.11	1049	8.75	1100	9.37
	14,000	3,370	752	6.14	806	6.70	864	7.36	921	8.04	975	8.72	1026	9.43				

Note: See page 15 for General Notes regarding these Performance Tables.

Performance Tables - Housing Size #4 (Con't.)

Twin 18" Blowers			Total Static Pressure (in. w.g.)															
Available Models	CFM	O.V.	0.25		0.50		0.75		1.00		1.25		1.50		1.75		2.00	
			RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
DFG-218	8,000	1,380	310	0.93	402	1.30												
MUA-218	8,500	1,460	318	1.05	406	1.45												
NTS-218	9,000	1,550	326	1.19	412	1.61	490	2.06										
	9,500	1,640	334	1.33	418	1.79	493	2.24										
	10,000	1,720	342	1.50	424	1.99	496	2.45	565	2.97								
	10,500	1,810	351	1.67	431	2.20	500	2.68	567	3.20								
	11,000	1,890	360	1.86	438	2.42	506	2.92	570	3.45	632	4.03						
	11,500	1,980	369	2.06	445	2.66	511	3.19	573	3.72	633	4.30						
	12,000	2,070	378	2.28	453	2.91	517	3.47	577	4.02	636	4.61	693	5.24				
	12,500	2,150	388	2.51	460	3.17	523	3.77	582	4.34	639	4.94	694	5.57				
	13,000	2,240	397	2.76	468	3.45	530	4.08	587	4.67	642	5.29	696	5.93				
	13,500	2,320	407	3.03	475	3.75	537	4.41	592	5.03	646	5.66	698	6.31				
	14,000	2,410	417	3.31	483	4.06	543	4.76	598	5.41	650	6.05	701	6.72	751	7.42		
	14,500	2,500	427	3.61	491	4.38	550	5.13	604	5.81	655	6.47	705	7.15	753	7.85		
	15,000	2,580	437	3.93	499	4.73	557	5.51	611	6.23	661	6.91	709	7.60	756	8.32	803	9.06
	15,500	2,670	447	4.27	507	5.09	565	5.91	617	6.66	666	7.37	713	8.08	760	8.81	805	9.55
	16,000	2,750	457	4.63	516	5.48	572	6.33	624	7.12	672	7.85	718	8.58	764	9.33	808	10.09
	16,500	2,840	467	5.01	524	5.88	580	6.77	631	7.60	678	8.36	724	9.11	768	9.87	811	10.65
	17,000	2,930	478	5.41	533	6.31	588	7.23	638	8.09	685	8.90	729	9.67	773	10.44	815	11.24
	17,500	3,010	488	5.84	542	6.77	596	7.71	646	8.61	692	9.46	735	10.25	777	11.04	819	11.85
	18,000	3,100	499	6.29	552	7.25	604	8.21	653	9.15	699	10.04	742	10.87	783	11.67	824	12.50
	18,500	3,180	509	6.77	562	7.75	612	8.74	661	9.72	707	10.65	749	11.51	789	12.33	829	13.18
	19,000	3,270	520	7.27	572	8.28	621	9.29	668	10.30	714	11.27	756	12.18	796	13.03	835	13.91
	19,500	3,360	532	7.79	581	8.83	629	9.86	676	10.90	721	11.92	763	12.87	802	13.75	841	14.65
	20,000	3,440	543	8.35	591	9.41	638	10.46	684	11.53	728	12.58	770	13.57	808	14.49	846	15.39

Twin 20" Blowers			Total Static Pressure (in. w.g.)															
Available Models	CFM	O.V.	0.25		0.50		0.75		1.00		1.25		1.50		1.75		2.00	
			RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
DFG-220	10,000	1,180	293	1.11	371	1.64	451	2.30										
MUA-220	11,000	1,290	305	1.35	382	1.91	452	2.57	520	3.33								
NTS-220	12,000	1,410	319	1.63	392	2.22	456	2.88	521	3.65	579	4.48						
	13,000	1,530	333	1.97	401	2.58	463	3.26	523	4.03	581	4.89	635	5.80				
	14,000	1,650	348	2.35	412	2.99	471	3.69	528	4.48	584	5.36	637	6.30	687	7.28		
	15,000	1,760	364	2.79	423	3.45	481	4.18	535	4.98	588	5.87	639	6.84	688	7.86		
	16,000	1,880	380	3.27	436	3.97	491	4.73	543	5.55	593	6.45	642	7.43	690	8.47	735	9.54
	17,000	2,000	397	3.81	450	4.55	503	5.34	553	6.18	600	7.09	646	8.07	693	9.13	737	10.25
	18,000	2,120	413	4.41	465	5.20	515	6.01	563	6.87	608	7.80	652	8.79	696	9.86	740	10.99
	19,000	2,230	430	5.07	482	5.91	529	6.75	573	7.64	617	8.58	659	9.59	701	10.66	743	11.80
	20,000	2,350	447	5.79	498	6.69	542	7.57	585	8.48	627	9.44	668	10.46	707	11.54	747	12.69
	21,000	2,470	464	6.58	516	7.54	557	8.45	597	9.39	638	10.38	677	11.42	715	12.52	753	13.67
	22,000	2,590	482	7.45	533	8.47	571	9.42	609	10.39	649	11.41	688	12.47	724	13.58	761	14.75
	23,000	2,700	499	8.39	550	9.48	586	10.47	622	11.47	662	12.52	699	13.61	734	14.74	770	15.92
	24,000	2,820	517	9.42	566	10.57	601	11.61	636	12.64	674	13.72	711	14.84	744	16.00	779	17.20
	25,000	2,940	535	10.53	582	11.74	616	12.83	651	13.91	688	15.01	724	16.16	756	17.34	790	18.58
	26,000	3,060	553	11.73	597	13.00	631	14.15	666	15.27	701	16.40	736	17.58	768	18.79	801	20.05
	27,000	3,170	571	13.03	612	14.35	647	15.56	681	16.73	716	17.89	749	19.09	780	20.33	812	21.62
	28,000	3,290	590	14.42	628	15.79	663	17.07	697	18.29	730	19.49	762	20.71	793	21.98	824	23.29
	29,000	3,410	608	15.91	644	17.33	679	18.67	712	19.95	744	21.19	776	22.44	806	23.74	836	25.07
	30,000	3,530	627	17.51	661	18.97	696	20.37	728	21.71	759	23.00	790	24.29				

General Notes:

1. Performances shown are for units with an outlet duct and include drive losses.
2. At higher elevations use the appropriate air density correction factor or contact the factory for assistance.
3. The internal static pressure losses for the blower section are included in the tables.
4. Any additional losses from external sources or from optional accessories must be added in.
5. Units with total static pressure greater than 2.0" are available. Contact the factory for fan performance information.
6. Fan curves and sound and efficiency information are available from the factory upon request.

Examples

Direct Fired Gas Heater

10,000 CFM at 0.75" ESP
Design Temperature Rise = 70°F
V-bank filters (1" aluminum mesh)
Intake damper
Intake hood

- Step #1 - Model DFG is required.
Step #2 - 10,000 CFM is given.
Step #3 - Housing Size #3 is chosen.
Step #4 - Use chart on page 8.
0.10" filters
0.06" damper
0.10" intake
0.50" direct fired heater
0.76" internal losses

$$\text{Total static pressure} = 0.75" + 0.76" = 1.51"$$

Step #5 - From the performance tables on pp. 13-14 it can be seen that three blowers in housing size #3 can operate at 10,000 CFM and 1.51" TSP. The 18" blower selection is at its limit, however. It may be chosen to save some initial cost but only if noise is not a concern. Both 20" blowers work well. The standard one is less expensive than the heavy duty so it will be selected.

The 20" blower performance table shows the fan will operate at approximately 701 RPM and 6.06 BHP.

Step #7 - 7-½ HP motor is required.

Indirect Fired Gas Heater

2,700 CFM at 0.63" ESP
Design Temperature Rise = 40°F
Intake hood with flat filters (2" mesh)
Downturn plenum

- Step #1 - Model IFG is required.
Step #2 - 2,700 CFM is given.
Step #3 - Required BTU = $2,700 \times 40 \times 1.08 \div 741 = 145,800$
Heater size is $145,800 \div 1,000 = 150$ MBH
Housing Size #1 is chosen.
Step #4 - Use chart on page 5.
0.15" filters
0.07" intake
0.13" downturn
0.24" IFG Heater
0.59" internal losses

$$\text{Total static pressure} = 0.63" + 0.59" = 1.22"$$

Step #5 - From the performance table on page 10 it can be seen that only the 10" blower is recommended at 2,700 CFM and 1.22" TSP.

The 10" blower performance table shows the fan will operate at slightly less than 1135 RPM and 1.51 BHP.

Step #7 - 1-½ HP motor is required.

Cooling Coil Only

4,500 CFM at 0.50" ESP
4 Row, 8 FPI Dx Cooling Coil
V-bank filters (1" fiberglass throw-away)
Intake damper
Intake hood

- Step #1 - Model MUA is required.
Step #2 - 4,500 CFM is given.
Step #3 - Housing Size #3 is chosen based on the coil.
Step #4 - Use chart on page 8.
0.06" filters
0.03" damper
0.03" intake
0.29" Dx cooling coil
0.41" internal losses

$$\text{Total static pressure} = 0.50" + 0.41" = 0.91"$$

Step #5 - From the performance tables on pp. 13-14 it can be seen that none of the standard blowers in housing size #3 meet the requirements. The non-standard 15" blower meets the requirements, however.

The 15" blower performance table shows the fan will operate at approximately 744 RPM and 1.56 BHP. These values were interpolated since 4,500 CFM and 0.91" are in the middle of two rows and columns in the table.

Step #7 - 2 HP motor is required.

Ventilation Only

1,200 CFM at 1.0" ESP
Intake hood with flat filters (2" mesh)
4,000 feet elevation

- Step #1 - Model NTS is required.
Step #2 - 1,200 CFM is given.
Step #3 - Housing Size #1 is chosen.
Step #4 - Use chart on page 5.
0.06" filters
0.02" intake
0.08" internal losses

$$\text{Total static pressure} = 1.0" + 0.08" = 1.08"$$

Step #6 - Corrected TSP = $1.08" \times 1.16 = 1.25"$

Step #5 - From the performance table on page 10 it can be seen that only the 9" light duty blower is recommended at 1,200 CFM and 1.25" TSP. The 9" and 10" blowers are both at unstable points.

The 9" light duty blower performance table shows the fan will operate at approximately 1627 RPM and 1.00 BHP.

Step #6 - Corrected BHP = $1.00 \text{ BHP} \div 1.16 = 0.86 \text{ BHP}$.

Step #7 - 1 HP motor is required.