

Counterflo INDIRECT-FIRED INDUSTRIAL HEATERS



- Space Heating
- Make-Up Air
 - Heating and Ventilating
 - Air Conditioning Can Be Added

**Self-contained,
Automatic,
Indirect-fired,
Warm-air
Heater**

**C.S.A.
APPROVED
UNITS
AVAILABLE**

**Natural Gas or Propane Firing
Air Deliveries From
4,500 to 70,000 SCFM.
Heating Outputs From
400,000 to 4,500,000 Btuh**

**CF
BASIC COUNTERFLO
HEATER**

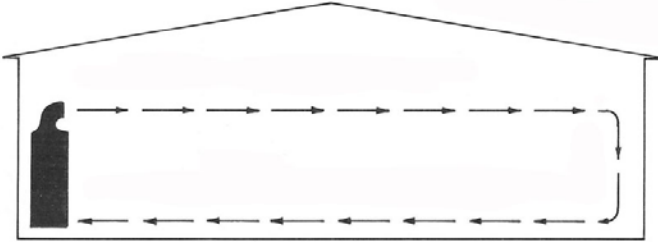
**RCF
CURB MOUNTED
ROOFTOP HEATER**

**CFDF
COUNTERFLO
DUCT FURNACE**

The Counterflo System of Heating

The Counterflo system, by generating heat in a self-contained floor mounted unit within the conditioned space, minimizes the problem of air stratification. The coolest room air from the floor level is drawn into the base of the heater. The heated air is discharged horizontally through optional high velocity nozzles at a point just above the working level. The removal of colder floor air allows the stratified warmer ceiling air to drop back into the working area, where it is further dissipated by the action of the high velocity discharge air stream.

The recirculation of heated air within the working area, and the virtual elimination of stratification combine to reduce the cost of heating while providing more uniform room temperature.



The Counterflo Space Heating System

Among additional advantages of the Counterflo system are lower installation cost, with savings in duct work and a reduction of the number of units required, and lower maintenance cost due to increased equipment accessibility.

Complete Design Flexibility

Application

Counterflo indirect-fired heaters are well suited for a variety of uses. The standard unit includes those components and controls needed for SPACE HEATING and is shipped with an unmounted room or space thermostat. For HEATING AND VENTILATING applications, small modifications are required along with the substitution of a full modulation burner. For MAKE-UP AIR applications, stainless steel tubes and headers are strongly recommended, in addition to full modulation burner. Special high temperature units are offered for PROCESS applications. In some cases, these units can be designed to handle inlet air temperatures as high as 400 degrees F.

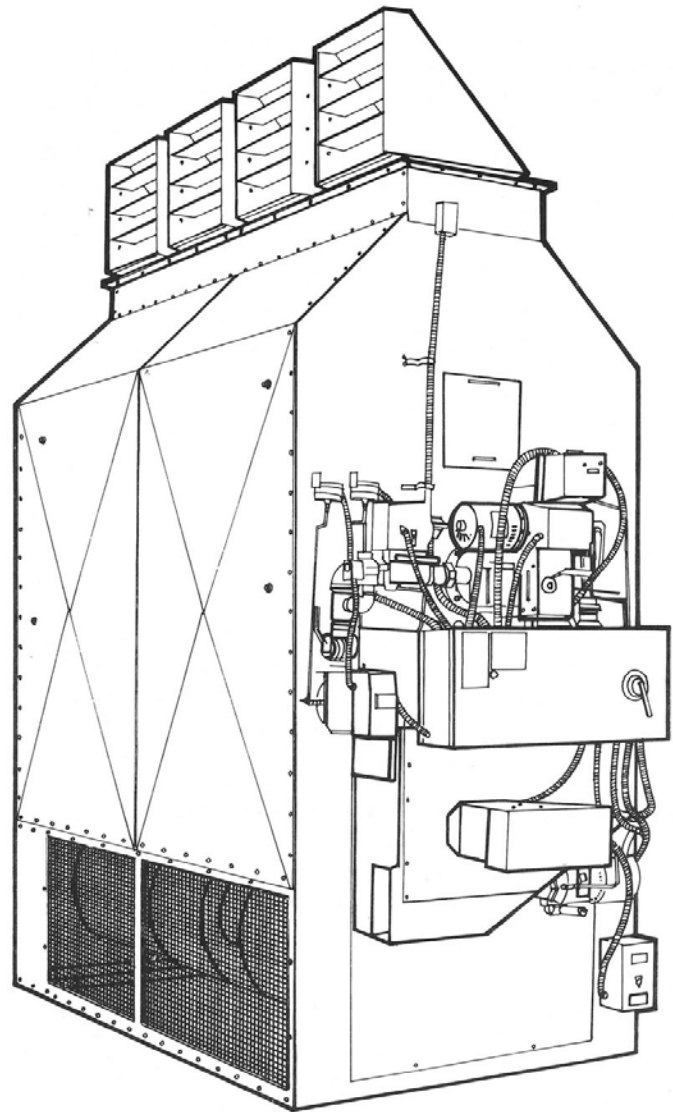
Choice of Burner

Natural or propane gas burners are offered in On-Off, Hi-Lo-Off and Full Modulation service. Full modulation, depending on model size and fuel used, is available with turndown ratios as high as 8:1

Burner control sequences:

On-Off – provides full rate firing as controlled by an on-off space thermostat.

Hi-Lo-Off – provides low fire (50% of input) or high fire (full input) as controlled by two stage space thermostat.



Floor Mounted Upright CF-250 Counterflo Heater

Full modulation – 2:1 turndown ratio provides a minimum fire rate 50% of input, and 8:1 a 12-1/2% minimum fire rate with infinite firing rate between low fire and full input. The firing rate is controlled by a modulating space thermostat while the burner circuit is controlled by an on-off thermostat.

Equipment Location

The many building types, configurations and different heating applications present an endless variety of problems for the heating engineer. An acceptable equipment location is normally a major consideration.

The Counterflo indirect-fired heater is available in a wide range of sizes and models. If recommend floor mounted upright system is not practical, the equipment may be suspended horizontally from above, or even wall mounted in an inverted position. Weatherproof outdoor Counterflo models can be selected in those applications where indoor space is not available.

counterflo INDIRECT-FIRED INDUSTRIAL HEATERS

Counterflo FEATURES

LONG LIFE COMBUSTION CHAMBER

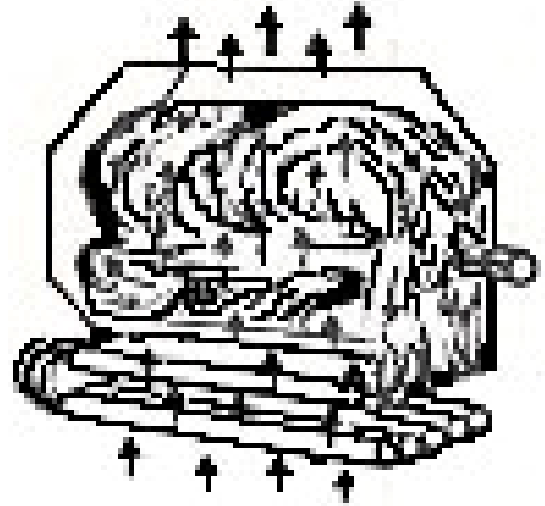
The floating, heavy gauge, stainless steel combustion chamber is designed to withstand contraction and expansion cycles to ensure long, trouble-free operation. The original Counterflo combustion chamber was introduced over forty years ago. This time-tested reliability and proven performance assures the extended life of the Counterflo chamber.

AIR COOLED RADIATION SHIELD

An internal, air cooled radiation shield is provided to ensure minimum radiation, to limit transmission losses to less than 2% and to cool cabinet surfaces.

FLUE GAS EXHAUSTER

The combustion gas exhaust system includes a heavy-duty exhaust fan, three phase motor, adjustable V-belt drive and heat slinger to yield low ambient temperature motor operating conditions.

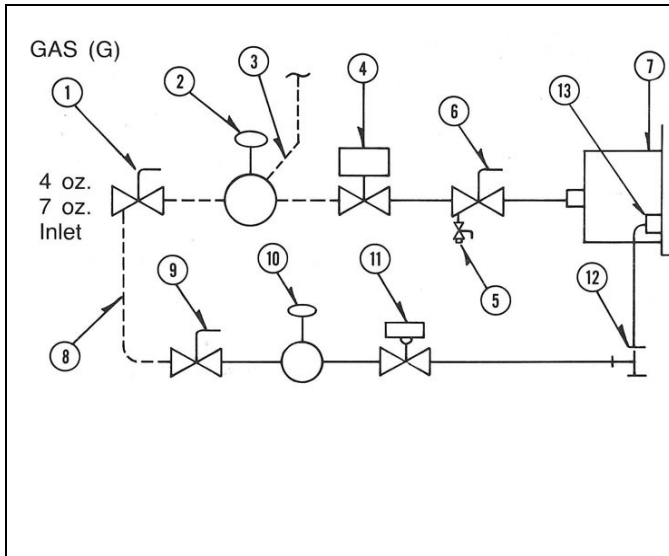


Four-Pass Design

FOUR-PASS HEAT EXCHANGER

In the Counterflo heater design, the combustion products flow internally four times across the path of the air to be heated. The first two passes are within the primary heat exchanger, a stainless steel combustion chamber where the flame and hot gases release 75% of their total heat through contact with the entire chamber surface. The third and fourth passes are made in the secondary heat exchanger through two staggered economizer tube sections. The net result is a compact and highly efficient heat exchange unit.

Typical Schematic Piping Diagram (No Optional Features Shown)



Furnished and installed by Others			
Furnished by Factory, installed by Others			
Factory Mounted			
Key	Description		
1	Main Gas Hand Shutoff Valve		•
2	Main Gas Pressure Regulator		•
3	Vent Line		•
4	Main Gas Valve	•	
5	Leak Test Petcock w/Plugged Test Connection	•	
6	Manual Leak Test Hand Valve	•	
7	Main Burner	•	
8	Pilot Gas Supply Line		•
9	Pilot Gas Hand Valve	•	
10	Pilot Gas Pressure Regulator	•	
11	Pilot Gas Solenoid Valve	•	
12	Pilot Needle Valve	•	
13	Pilot Burner	•	

counterflo INDIRECT-FIRED INDUSTRIAL HEATERS

Standard Equipment

CABINET

Base heater is indoor upright model, fabricated of 16 gauge, Aluminized and/or CRS, heavily reinforced to assure rigidity, and backed by an internal radiation shield. Cooling air, traveling up both sides of the radiation shield, keeps the cabinet surface cool. Air inlets are screened. A pressure relief door and an observation port are provided on the end of the casing where the burner is mounted. The casing is primed and finished with a coat of enamel.

FAN ASSEMBLY

Fans – Forward curved, DWDI centrifugal fans tested in accordance with AMCA standards.

Shaft – Cold rolled steel machined journals with first critical speed limited to at least 25% above maximum operating speed.

Bearings – 200,000 Hour Self-aligning, pillow block, ball/needle bearings.

ENERGY EFFICIENT MOTORS

Three phase, open drip proof type on adjustable mount.

DRIVES

Fixed sheaves with V-belts safely enclosed within the air intake section.

COMBUSTION CHAMBER

Primary exchanger, all welded 14 gauge 400 series stainless steel, designed for two passes and transfer of 75% of total heat release. Two staggered sections of stainless steel secondary tubes insure maximum combustion efficiency.

FLUE GAS EXHAUSTER

Combustion gas exhaust system includes a heavy-duty exhaust fan, motor, adjustable V-belt drive and heat slinger.

ELECTRICAL

230/60/3 line current; 115/60/1 control current with transformer furnished for all voltages.

CONTROLS

Safety Control – Electronic sequencing burner safety relay with main and pilot flame sensing. Flame rod on gas; ultra-violet sensor on oil.

MAIN BLOWER

Air flow Switch – Prevents burner operation in the absence of air flow.

Pre-purge Timer – Provides four full internal air changes prior to ignition.

Fan/Limit Switch – Provides for continuous fan operation and for burner shutdown.

Draft Switch – Insures operation of exhauster prior to ignition and burner shutdown on loss of draft.

Combustion Air Switch – Prevents burner operation in the absence of proper combustion air flow.

Burner Switch – Manually de-energizes burner circuit.

Blower Starter – Magnetic, three phase, across the line.

NEMA 1 Master Control Panel.

Thermostat – Maintains desired space temperature utilizing On-Off space thermostat (for field mounting and wiring).

BURNER

Standard burner is On-Off.

Gas (G) – Power type, with pilot spark ignition and main burner pilot ignition for use with natural, manufactured, mixed, liquefied petroleum gas or liquefied gas/air mixture. Included in the manifold are main gas electric shut off valve with linkage to combustion air damper, main and pilot gas pressure regulators for maximum inlet pressure of 1 PSI, pilot gas-air mixer and pilot solenoid valve. Minimum standard entering pressure is 4 ozs.

FACTORY TESTED

Factory piped, wired and flame tested.

Options and Accessories

GENERAL

In addition to upright units, Counterflo heaters are available in horizontal or inverted arrangements.

COMPONENTS

Duct Inlet – Side or rear enclosure plates replace screened panels when intake air is ducted to the heater.

Flatbank Filters – On upright or inverted indoor heaters, model CF-40 through CF-325, throwaway or cleanable filters are mounted on both sides and rear of unit.

V-Bank Filters – Throwaway or cleanable filters in V-bank section for 100% air through one side or base of heater.

Inlet Air Dampers – Manual or automatic intake dampers for mounting on sides of unit.

Discharge Air Damper – Complete with two position damper motor for horizontal unit only.

V-Bank Mixing Box – With throwaway or cleanable filters and manual or automatic dampers for mounting on one side or base of heater.

Service Platform – With guard rail per OSHA standard. Available with horizontal and inverted units. Shipped unmounted with horizontal heaters and mounted on inverted units as an integral part of channel frame.

Weatherproofing – Provides complete enclosure for burner, exhauster, control box, fan-limit switch and complete caulking of all joints and seams. A stub exhaust stack and cap is furnished with horizontal unit.

Stormproof Weatherhood – Complete with louvers and birdscreen.

Discharge Nozzles - 45° or 90°.

Nozzle Extension – Can be furnished in any desired length from 2" to 46" in 2" increments.

Grease Lines for Main Bearings – Permits bearing lubrication from one location. Furnished as standard with horizontal or inverted heaters

counterflo INDIRECT-FIRED INDUSTRIAL HEATERS

Options and Accessories

ELECTRICAL

Line current other than standard 230/60/3.

MOTORS

TEFC Motors – Fan, exhauster and burner motors.

Motor Capacitor – Reduces current draw for energy conservation.

Premium Energy Efficient Motors – Three phase T frame motors reduce power demand with subsequent reduced electric rates.

ELECTRIC CONTROLS

NEMA 12 Control Box.

Summer-Winter Switch.

Remote Station with Summer-Winter switch and indicating lights.

Day-Night Operation

Alarm Light or Audible Alarm.

Fused Disconnect Switch – dead front fused disconnect switch or circuit breaker mounted in cover of main control box.

Service Receptacle – 120/60/1 (rated 3.5 amps maximum).

GAS CONTROLS

FM or IRI Controls – Adds controls for these approvals.

C.S.A. Approval(s) – Available on outdoor and indoor models with most burners. Contact your Hastings HVAC, Inc. representative.

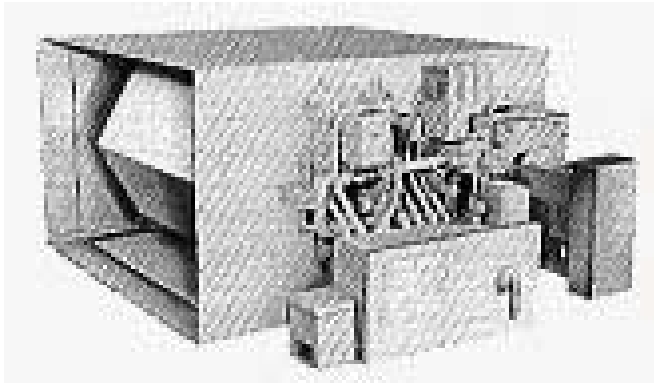
High Gas Pressure Regulator – For inlet pressures of over 1 to 75 PSIG.

Low Gas Pressure Controls – For inlet pressures of 4" to 7" with On-Off operation or pressures of 7" to 10" with gas modulation burners.

Modulating Burner – Hi-Lo-Off and 2:1, 8:1 full modulation are also available.

Propane Firing – For gas burners 8:1 modulation is not available on CF40 thru 85.

CFDF – COUNTERFLO DUCT FURNACE



NOTE: Air delivery fan performance based on standard CF Fan assembly. Remote blowers with CFDF may not provide the same results.

The CFDF heater consists of the basic Counterflo burner section without a blower section. The burner section is applied as a duct furnace in field fabricated heating systems with the fans located remote from the heater.

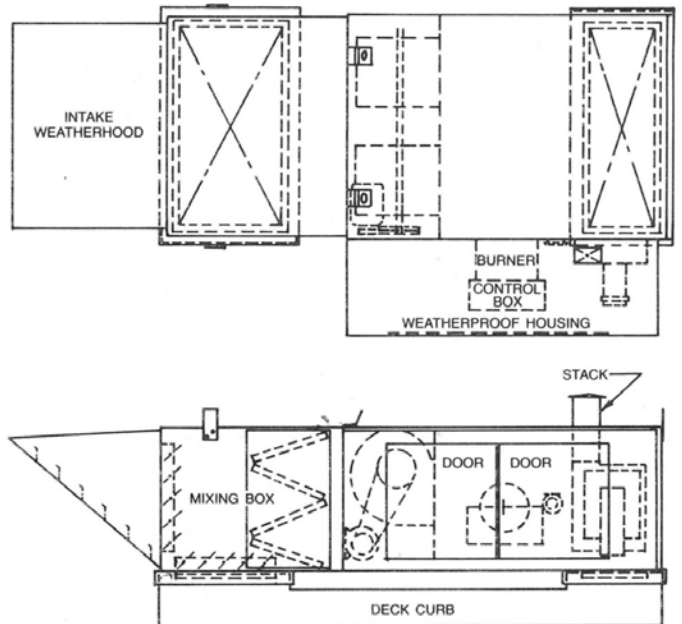
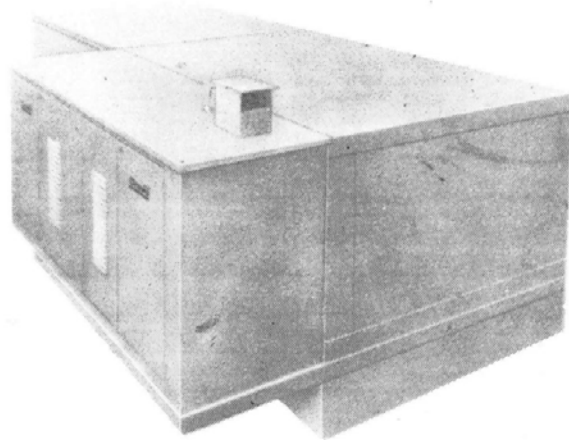
The CFDF duct furnace includes terminal box and control circuit disconnect in addition to all burner controls.

Consult your local Hastings sales representative for selection and dimensional information.

RCF – CURB MOUNTED ROOFTOP MODEL

(Models RCF-40 Thru RCF-450)

Roof curbs available for Heating (100% return air). Make-up Air (100% fresh air) and Heating & Ventilating (mixed fresh and return air) applications. Consult your local Hastings sales representative for selection and dimensional information.



counterflo Models 40 thru 125

Specification Data

	ITEM*		MODEL						
			40	55	60	85	100	125	
HEAT	OUTPUT - MBH		400	550	600	850	1,000	1,250	
	FUEL CONSUMPTION	GAS (1,000 BTU/CU. FT.) - CFH	500	688	750	1,062	1,250	1,562	
	COMBUSTION CHAMBER (400 SERIES S.S.)	GAUGE		16	16	16	14	14	14
		SURFACE AREA - SQ. FT.		35	35	60	60	78	78
		VOLUME - CU. FT.		17	17	35	35	50	50
	SECONDARY HEAT EXCH.	COLLECTION BOX GAUGE		10	10	10	10	10	10
		NO. OF TUBES (4" DIA.)		7	7	9	9	11	11
SURFACE AREA - SQ. Ft.			33	33	40	40	50	50	
AIR	CAPACITY - CFM **		4,500	6,250	6,500	9,500	12,000	15,000	
	TEMPERATURE RISE - °F		82	82	85	82	78	78	
	NO. AND DIA. (IN) OF FANS (FC, DIDW)		2-15	2-15	2-15	2-15	2-18	2-18	
	MAIN FAN MOTOR (STD.) - HP		1	2	2	5	5	10	
	DUCT FURNACE PRESSURE DROP (IN.W.C.) ◇		.60	1.20	.375	.50	.75	1.05	
MISC	EXHAUSTER MOTOR HP (230/60/3 GAS)		½	½	½	½	¾	¾	
	RECOMMENDED STACK DIA. - IN		8	8	10	10	10	12	
	CASING GAUGE		16	16	16	16	16	16	
	SHIPPING WEIGHT - UPRIGHT MODEL - LBS ◇◇		1400	1450	1800	1900	2300	2400	

• Data is based on standard units and normal conditions 100° TR Maximum. For non-standard units and/or application consult with local representative or the factory.

** Based on standard air (70°F and 14.7 psi) with discharge nozzles or equivalent ¼" W.C. TESP. Use Total External Static Pressure column that will overcome total system resistance. Approximate pressure drop for component and accessory items; filter (dirty) ¼", intake hood 1/8", birdscreen 1/8", discharge louver ¼". Damper resistance may be ignored.

◇ Based on standard air capacity. Check factory for optimum application.

◇◇ Approximate weight of basic unit with standard motor.

Fan Performance

MODEL ***	SCFM	TOTAL EXTERNAL STATIC PRESSURE (DUCT OUTLET) - IN. W.C.											
		1/4		1/2		3/4		1		1-1/4		1-1/2	
		BHP	MHP	BHP	MHP	BHP	MHP	BHP	MHP	BHP	MHP	BHP	MHP
CF-40 CF-55	4,500	0.8	1	1.1	1-1/2	1.4	1-1/2	1.7	2	2.0	2	2.3	3
	5,000	1.1	1-1/2	1.3	1-1/2	1.7	2	2.0	2	2.3	3	2.7	3
	5,500	1.3	1-1/2	1.7	2	2.0	2	2.3	3	2.7	3	3.2	5
	6,000	1.7	2	2.0	2	2.4	3	2.8	3	3.1	5	3.6	5
	6,500	2.4	3	2.5	3	2.8	3	3.2	5	3.7	5	4.0	5
	7,000	2.6	3	2.9	3	3.4	5	3.8	5	4.2	5	4.6	5
	7,500	3.0	3	3.5	5	3.9	5	4.4	5	4.8	5	-	-
	8,000	3.7	5	4.2	5	4.6	5	4.9	5	-	-	-	-
CF-60	8,500	4.3	5	4.8	5	-	-	-	-	-	-	-	-
	6,500	1.7	2	2.2	3	2.7	3	3.2	5	3.7	5	4.3	5
	7,000	2.2	3	2.6	3	3.1	5	3.6	5	4.2	5	4.8	5
	7,500	2.5	3	3.0	3	3.6	5	4.1	5	4.6	5	5.2	7-1/2
	8,000	3.0	3	3.5	5	4.0	5	4.6	5	5.2	7-1/2	5.8	7-1/2
	8,500	3.5	5	4.2	5	4.7	5	5.2	7-1/2	5.8	7-1/2	6.4	7-1/2
CF-85	9,000	4.2	5	4.7	5	5.3	7-1/2	5.8	7-1/2	6.4	7-1/2	7.0	7-1/2
	9,500	4.7	5	5.3	7-1/2	5.8	7-1/2	6.6	7-1/2	7.3	7-1/2	7.8	10
	10,000	5.3	7-1/2	6.0	7-1/2	6.7	7-1/2	7.5	7-1/2	8.3	10	8.9	10
	10,500	6.1	7-1/2	6.8	7-1/2	7.5	7-1/2	8.4	10	9.3	10	-	-
	11,000	6.9	7-1/2	7.7	10	8.5	10	9.3	10	-	-	-	-
	11,500	8.0	10	8.7	10	-	-	-	-	-	-	-	-
	12,000	9.0	10	9.8	10	-	-	-	-	-	-	-	-
CF-100	12,500	9.5	10	-	-	-	-	-	-	-	-	-	-
	10,000	2.8	3	3.4	5	3.8	5	4.4	5	5.3	7-1/2	5.9	7-1/2
	11,000	3.4	5	4.2	5	4.2	5	5.5	7-1/2	6.1	7-1/2	6.5	7-1/2
	12,000	4.2	5	4.6	5	5.7	7-1/2	6.3	7-1/2	6.9	7-1/2	8.4	10
CF-125	13,000	5.1	7-1/2	5.9	7-1/2	6.7	7-1/2	7.4	7-1/2	8.6	10	9.5	10
	14,000	6.6	7-1/2	7.5	7-1/2	8.2	10	9.3	10	10.0	10	11.0	15
	15,000	8.0	10	8.8	10	9.8	10	10.7	15	11.8	15	12.6	15
	16,000	9.8	10	10.7	15	11.6	15	12.7	15	13.6	15	14.5	15
	17,000	11.7	15	12.6	15	13.6	15	14.5	15	-	-	-	-
	18,000	13.4	15	14.7	15	-	-	--	-	-	-	-	-

*** Maximum allowable temperature rise - 100° F.

counterflo Models 150 thru 250

Specification Data

	ITEM*	MODEL					
		150	175	200	225	250	
HEAT	OUTPUT – MBH	1,500	1,750	2,000	2,250	2,500	
	FUEL CONSUMPTION	GAS (1000 BTU/CU. FT.) - CFH					
	COMBUSTION CHAMBER (400 SERIES S.S.)	GAUGE	14	14	14	14	14
		SURFACE AREA – SQ. FT.	121	121	139	139	139
		VOLUME – CU FT.	95	95	127	127	127
	SECONDARY HEAT EXCH.	COLLECTION BOX GAUGE	10	10	10	10	10
		NO. OF TUBES (4" DIA.)	13	13	15	15	15
SURFACE AREA – SQ. FT.		108	108	131	131	131	
AIR	CAPACITY – CFM **	17,000	22,000	21,000	25,000	30,000	
	TEMPERATURE RISE - °F	82	74	88	83	77	
	NO. AND DIA.(IN.) OF FANS (FC. DIDW)	3-18"	3-18"	3-18"	3-18"	3-18"	
	MAIN FAN MOTOR (STD.) – HP	7-1/2	15	10	15	25	
	DUCT FURNACE PRESSURE DROP (IN. W.C.) ◇	.50	.70	.46	.65	.94	
MISC.	EXHAUSTER MOTOR HP (230/60/3 GAS)	¾	¾	¾	1	1	
	RECOMMENDED STACK DIA. – IN.	12	12	12	12	12	
	CASING GAUGE	16	16	16	16	16	
	SHIPPING WEIGHT – UPRIGHT MODEL – LBS. ◇◇	3,600	3,600	4,800	4,800	4,800	

• Data is based on standard units and normal conditions 100° TR Maximum. For non-standard units and/or application consult with local representative or the factory.

** Based on standard air (70°F and 14.7 psi) with discharge nozzles or equivalent ¼ W.C. TESP. Use Total External Static Pressure column that will overcome total system resistance. Approximate pressure drop for component and accessory items; filter (dirty) ¼", intake hood 1/8", birdscreen 1/8", discharge louver ¼", Damper resistance may be ignored.

◇ Based on standard air capacity. Check factory for optimum application.

◇◇ Approximate weight of basic unit with standard motor.

Fan Performance

MODEL***	SCFM	TOTAL EXTERNAL STATIC PRESSURE (DUCT OUTLET) – IN. W.C.											
		1/4		1/2		3/4		1		1-1/4		1-1/2	
		BHP	MHP	BHP	MHP	BHP	MHP	BHP	MHP	BHP	MHP	BHP	MHP
CF-150	14,000	3.8	5	4.7	5	5.7	7-1/2	6.0	7-1/2	6.8	7-1/2	7.9	10
	15,000	5.0	5	5.5	7-1/2	6.0	7-1/2	6.6	7-1/2	7.9	10	8.7	10
	16,000	5.7	7-1/2	6.3	7-1/2	7.6	10	8.2	10	9.2	10	9.5	15
	17,000	6.3	7-1/2	7.3	7-1/2	8.2	10	9.3	10	9.8	10	10.4	15
CF-175	18,000	7.4	7-1/2	8.3	10	9.2	10	10.2	15	11.3	15	12.4	15
	19,000	8.5	10	9.5	10	10.5	15	11.6	15	12.7	15	13.8	15
	20,000	9.9	10	11.0	15	12.0	15	13.1	15	14.2	15	15.4	20
	21,000	11.1	15	12.3	15	13.6	15	14.7	15	15.9	20	16.9	20
	22,000	12.6	15	14.1	15	15.2	20	16.4	20	17.7	20	18.9	20
	23,000	14.8	15	15.8	20	17.1	20	18.6	20	20.0	20	-	-
	24,000	16.6	20	17.9	20	19.5	20	-	-	-	-	-	-
	25,000	19.2	20	-	-	-	-	-	-	-	-	-	-
CF-200	19,000	6.3	7-1/2	7.3	7-1/2	8.8	10	9.5	10	11.0	15	12.6	15
	20,000	7.2	7-1/2	8.2	10	9.5	10	11.0	15	12.6	15	14.2	15
	21,000	8.2	10	9.5	10	10.7	15	12.6	15	13.3	15	15.6	20
	22,000	9.5	15	11.0	15	12.0	15	13.3	15	15.1	20	15.8	20
	23,000	10.1	15	12.3	15	13.3	15	15.3	20	15.8	20	17.3	20
	24,000	12.3	15	13.2	15	15.4	20	16.1	20	17.3	20	18.9	20
CF-225 CF-250	25,000	13.5	15	15.1	20	16.1	20	17.3+	20+	18.9+	20+	21.1+	25+
	26,000	15.4	20	16.4	20	18.3+	20+	18.9+	20+	19.9+	20+	22.1+	25+
	27,000	16.4	20	18.3	20	19.5+	20+	21.7+	25+	23.3+	25+	23.9+	25+
	28,000	18.1	20	19.5+	20+	22.1+	25+	23.6+	25+	24.9+	25+	25.8+	30+
	29,000	21.7+	25+	22.1+	25+	23.6+	25+	25.2+	30+	26.8+	30+	-	-
	30,000	22.1+	25+	23.9+	25+	24.9+	25+	26.8+	30+	-	-	-	-
	31,000	23.9+	25+	25.2+	30+	26.8+	30+	29.1+	30+	-	-	-	-
	32,000	25.8+	30+	26.8+	30+	29.9+	30+	-	-	-	-	-	-
	33,000	28.4+	30+	-	-	-	-	-	-	-	-	-	-

+ Requires heavy duty shaft and wheels. – Check Home Office for Price Add.

*** Maximum allowable temperature rise – 100° F.

counterflo Models 275 thru 450

Specification Data

	ITEM *		MODEL					
			275	300	325	350	400	450
HEAT	OUTPUT – MBH		2,750	3,000	3,250	3,500	4,000	4,500
	FUEL CONSUMPTION	GAS (1000 BTU/CU. FT.) – CFH	3,438	3,750	4,062	4,375	5,000	5,625
	COMBUSTION CHAMBER (400 SERIES S.S.)	GAUGE	14	14	14	14	14	14
		SURFACE AREA – SQ.Ft.	195	195	195	240	240	240
		VOLUME – CU. FT.	181	181	181	245	245	245
	SECONDARY HEAT EXCH.	COLLECTION BOX GAUGE	10	10	10	10	10	10
		NO. OF TUBES (4" DIA.)	22	22	22	22	22	22
SURFACE AREA – SQ. FT.		252	252	252	310	310	310	
AIR	CAPACITY – CFM **		31,000	37,000	40,000	42,000	48,000	54,000
	TEMPERATURE RISE - °F		82	74	75	77	77	77
	NO. AND DIA. (IN.) OF FANS (FC. DIDW)		3-22	3-22	3-22	3-25	3-25	3-25
	MAIN FAN MOTOR (STD.) - HP		10	15	20	15	20	25
	DUCT FURNACE PRESSURE DROP (IN. W.C.) ◇		.38	.55	.65	.75	1.00	1.20
MISC.	EXHAUSTER MOTOR HP (230/60/3 GAS)		1	1	1	2	2	2
	RECOMMENDED STACK DIA. – IN.		16	16	16	18	18	18
	CASING GAUGE		16	16	16	16	16	16
	SHIPPING WEIGHT – UPRIGHT MODEL – LBS. ◇◇		6,500	6,625	6,750	7,025	7,055	7,205

• Data is based on standard units and normal conditions 100° TR Maximum. For non-standard units and/or application consult with local representative or the factory.

** Based on standard air (70°F and 14.7 psi) with discharge nozzles or equivalent 1/4" W.C. TESP. Use Total External Static Pressure column that will overcome total system resistance. Approximate pressure drop for component and accessory items; filter dirty) ¼", intake hood 1/8", birdscreen 1/8", discharge louver 1/4", Damper resistance may be ignored.

◇ Based on standard air capacity. Check factory for optimum application.

◇◇ Approximate weight of basic unit with standard motor.

Fan Performance

MODEL ***	SCFM*	TOTAL EXTERNAL STATIC PRESSURE (DUCT OUTLET) – In. W.C											
		1/4		1/2		3/4		1		1-1/4		1-1/2	
		BHP	MHP	BHP	MHP	BHP	MHP	BHP	MHP	BHP	MHP	BHP	MHP
CF-275 CF-300 CF-325	30,000	9.5	10	10.0	10	11.4	15	12.3	15	13.2+	15+	14.1+	15+
	31,000	10.0	10	11.2	15	12.2	15	13.0	15	14.0+	15+	14.8+	15+
	32,000	11.0	15	12.0	15	12.8	15	13.7+	15+	14.6+	15+	16.5+	20+
	33,000	11.8	15	12.8	15	13.6	15	14.3+	15+	16.0+	20+	18.5+	20+
	34,000	12.5	15	13.4	15	14.3	15	15.0+	15+	18.0+	20+	20.0+	20+
	35,000	13.2	15	14.0	15	15.0+	15+	17.4+	20+	20.0+	20+	22.5+	25+
	36,000	14.0	15	14.8	15	17.0+	20+	19.5+	20+	22.0+	25+	24.5+	25+
	37,000	14.7	15	16.5	20	19.0+	20+	21.5+	25+	24.0+	25+	26.5+	30+
	38,000	16.0	20	18.5+	20+	21.0+	25+	23.5+	25+	26.0+	30+	28.5+	30+
	39,000	18.0	20	20.5+	25+	23.0+	25+	25.0+	25+	28.0+	30+	-	-
	40,000	20.0	20	22.5+	25+	25.0+	25+	27.5+	30+	30.0+	30+	-	-
	41,000	22.0+	25+	24.5+	25+	27.0+	30+	29.5+	30+	-	-	-	-
	42,000	24.0+	25+	26.5+	30+	29.0+	30+	-	-	-	-	-	-
	43,000	27.0+	30+	28.5+	30+	-	-	-	-	-	-	-	-
44,000	29.0+	30+	30.0+	30+	-	-	-	-	-	-	-	-	
CF-350 CF-400 CF-450	42,000	13.0	15	15.0	15	17.0	20	20.0	20	23.0	25	26.0	30
	44,000	15.0	15	17.0	20	19.0	20	22.0	25	25.0	25	28.0	30
	45,000**	16.0	20	18.0	20	20.0	20	23.0	25	26.0	30	29.0	30
	46,000	17.0	20	19.0	20	21.0	25	24.0	25	27.0	30	30.0	30
	48,000	19.0	20	21.0	25	23.0	25	27.0	30	29.0	30	32.0	40
	50,000	21.0	25	23.0	25	25.0	25	29.0	30	32.0	40	35.0	40
	52,000	23.0	25	25.0	25	27.0	30	31.0	40	34.0	40	37.0	40
	54,000	25.0	25	27.0	30	30.0	30	34.0	40	37.0	40	-	-
	56,000	28.0	30	31.0	40	34.0	40	37.0	40	40.0	40	-	-
	58,000	30.0	30	33.0	40	37.0	40	39.0	40	-	-	-	-
	60,000	33.0	40	37.0	40	41.0	50	43.0	50	-	-	-	-
	62,000	36.0	40	40.0	40	44.0	50	47.0	50	-	-	-	-
	64,000	40.0	40	44.0	50	47.0	50	-	-	-	-	-	-
	66,000	44.0	50	47.0	50	-	-	-	-	-	-	-	-
	68,000	47.0	50	51.0	60	-	-	-	-	-	-	-	-
	70,000	50.0	50	-	-	-	-	-	-	-	-	-	-

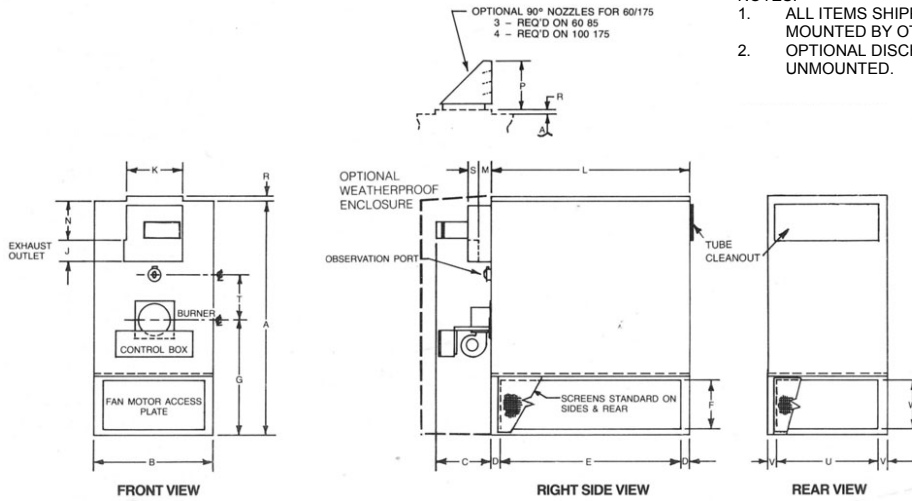
** Minimum CFM for Model 450

*** Maximum allowable temperature rise – 100° F.

+ Requires heavy duty shaft and wheels. – Check Home Office for Price Add.

Base Unit Dimensions – Upright Models

CF-40 thru CF-175



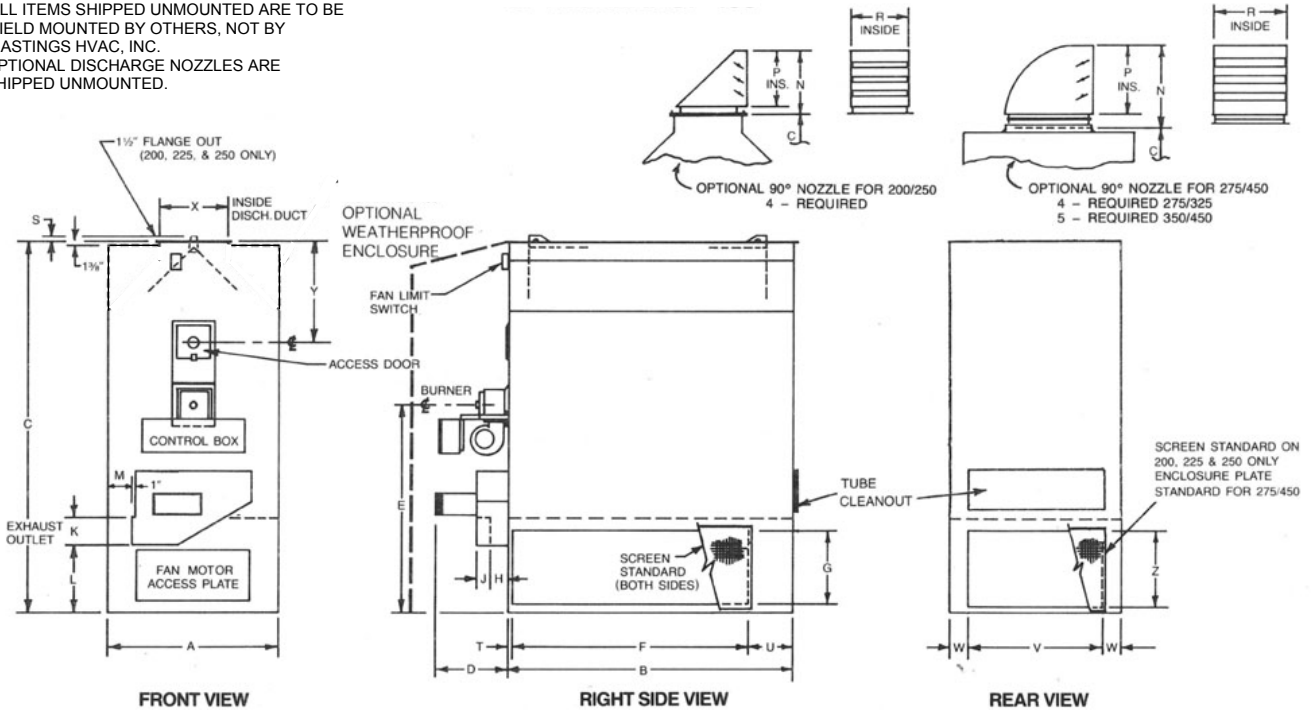
- NOTES:
1. ALL ITEMS SHIPPED UNMOUNTED ARE TO BE FIELD MOUNTED BY OTHERS, NOT BY HASTINGS HVAC, INC. OPTIONAL DISCHARGE NOZZLES ARE SHIPPED UNMOUNTED.
 - 2.

MODEL	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	U	V	W	Control Box Size
40/55	88	33	22	3-1/2	45	27-1/8	50-3/4	16 1/2	6-5/8	15	52	2-7/8	12-1/8	16-3/4	2	3-3/4	14	23	5	25-7/8	21 x 21 x 7
60/85	94-5/8	39-1/8	22-3/4	3-1/8	54-7/8	24	49-5/8	-	7-5/8	17	61-1/8	3	14-3/4	18	1-1/2	4-3/8	16-1/4	32-7/8	3-1/8	24	30 x 12 x 7
100/125	98-1/8	44-5/8	21-5/8	3-1/8	64-3/8	24	51-7/8	-	9-1/4	24	70-5/8	2	15-3/4	18	2	5-1/4	16	34-7/8	4-7/8	24	30 x 12 x 7
150/175	108	55-1/8	25-3/8	4-1/8	82-7/8	22-3/8	53	-	9-3/4	26	91-1/8	6	18-1/8	22-1/2	2	5	21-1/8	46-7/8	4-1/8	22-3/8	36 x 12 x 7

All dimensions in inches.

CF-200 thru CF-450

- NOTES:
1. ALL ITEMS SHIPPED UNMOUNTED ARE TO BE FIELD MOUNTED BY OTHERS, NOT BY HASTINGS HVAC, INC.
 2. OPTIONAL DISCHARGE NOZZLES ARE SHIPPED UNMOUNTED.



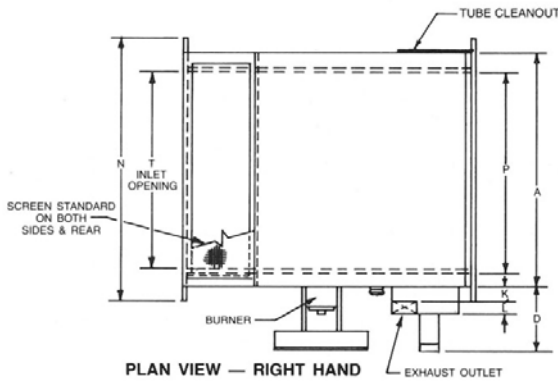
MODEL	A	B	C	D	E	F	G	H	J	K	L	M
200/225/250	60 1/8	100	130 3/4	25 1/2	72 1/2	83	25 1/2	6 1/8	5	9 3/4	23 1/8	8 5/8
275/300/325	67 5/8	142 1/2	135 3/8	29 1/8	88	131	33	7 1/8	5 5/8	11 3/8	33	6 3/8
350/400/450	80	164	135 3/8	29 1/8	88	150	33	7 1/8	5 5/8	11 3/8	33	9-1/4

MODEL	N	P	R	S	T	U	V	W	X	Y	Z	Control Box Size
200/225/250	22 1/2	20 1/2	20	1 3/4	1 1/4	15 3/4	46 7/8	6 5/8	24	36 1/8	26 1/2	36 X 12 X 7
275/300/325	29 3/8	24	29 1/2	2 1/2	5 3/4	5 3/4	58 7/8	4 3/8	24	24 5/8	33	35 X 15 X 7
350/400/450	29 3/8	24	29 1/2	2 1/2	7	7	65	7 1/2	36	24 5/8	33	36 X 15 X 7

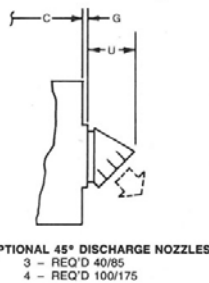
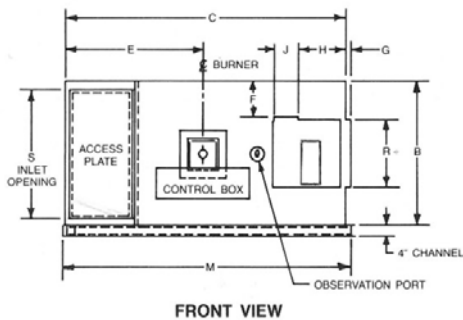
All Dimensions in Inches. Note: Inverted models also available.

Base Unit Dimensions – Horizontal Models

CF-40 thru CF-175



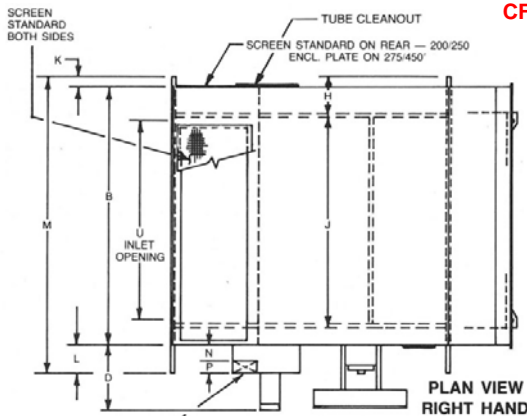
- NOTES:**
1. ALL ITEMS SHIPPED UNMOUNTED ARE TO BE FIELD MOUNTED BY OTHERS, NOT BY HASTINGS HVAC, INC.
 2. OPTIONAL DISCHARGE NOZZLES ARE SHIPPED SEPARATELY.



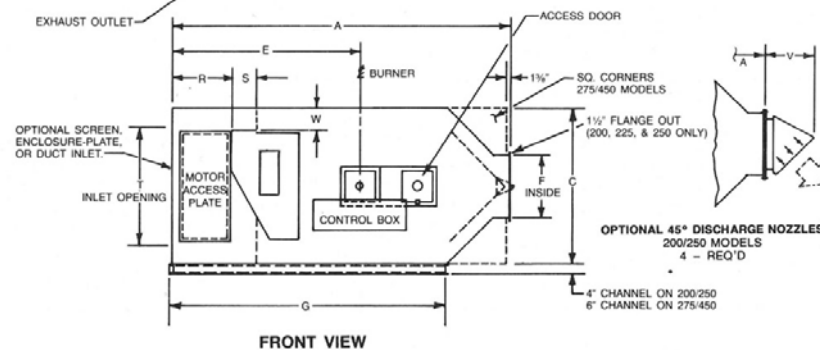
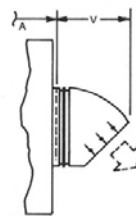
Model	40/55	60/85	100/125	150/175
A	52	61 1/8	70 5/8	91 1/8
B	33	39 1/8	44 5/8	55 1/8
C	88	94 5/8	98 1/8	108
D	22	22 3/4	21 5/8	25 3/8
E	50 3/4	49 5/8	51 7/8	53
F	7 3/8	8 3/8	9 1/2	13 5/8
G	2	1 1/2	2	2
H	12 1/8	14 3/4	15 3/4	18 1/8
J	6 5/8	7 5/8	9 1/4	9 3/4
K	2 7/8	3	2 1/8	6
L	3 3/4	4 3/8	5 1/4	5
M	90	97 1/4	99 3/4	110 3/4
N	64	73 1/8	82 5/8	103
P	41 5/8	49 1/2	58	78 1/2
R	15	17	24	26
S	24 7/8	33	38 1/2	49
T	43 7/8	55	64 1/2	75 3/4
U	13 5/8	14 1/2	14 1/2	18

All dimensions in inches

CF-200 thru CF-450



- NOTES: SAME AS ABOVE**



Model	200/225/250	275/300/325	350/400/450
A	130 3/4	135 3/8	135 3/8
B	100	142 1/2	164
C	60 1/8	67 5/8	80
D	25 1/2	29 1/8	29 1/8
E	72 1/2	88	88
F	24	24	36
G	106 3/8	133 7/8	133 7/8
H	15 7/8	17 3/8	18 5/8
J	81 5/8	123 3/8	142 3/8
K	4	6 3/4	6 3/4
L	11 1/4	6 3/4	6 3/4
M	115 1/4	156	177 1/2
N	6 1/8	7 1/8	7 1/8
P	5	5 5/8	5 5/8
R	23 1/8	33	33
S	9 3/4	11 3/8	11 3/8
T	45 1/2	61 1/2	73 7/8
U	77 3/8	119 1/8	138 1/8
V	18	28 5/8	28 5/8
W	8 5/8	6 3/8	9 1/4

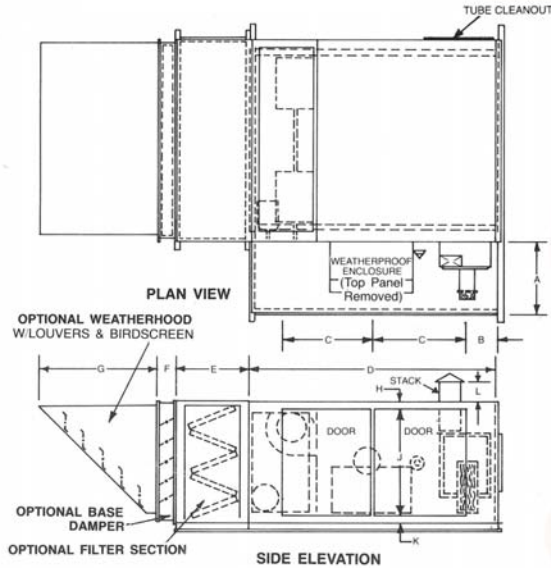
All dimensions in inches

Base Unit Dimensions – Weatherproof Models

WEATHERPROOF HORIZONTAL MODELS

(See page 10 For Complete Basic Dimensions)

CF-40 thru CF-175



CF-200 thru CF-450

(Same as Shown Except for Location of flue Gas Exhauster and Stack)

Model	40 55	60 85	100 125	150 175	200 225 250	275 300 325	350 400 450
A	30	30	30	33	39	48	48
B	7-3/8	10-1/2	12-1/4	14-1/4	32-1/4	9-1/4	9-1/4
C	37	37	37	40	40	57-3/4	57-3/4
D	88	94-5/8	98	108	130-3/4	135-3/8	135-3/8
E	25-1/2	31-5/8	34-1/2	32-1/4	30-3/4	31-5/8	29-1/2
F	8-5/8	8-5/8	8-5/8	8-5/8	8-5/8	8-5/8	8-5/8
G	26-1/2	36-3/4	47-5/8	52-1/2	56	48	72-3/8
H	5-1/4	3-1/2	3-1/4	3-1/4	5-3/4	3-1/2	3-1/2
J	31-1/2	33-7/8	39-5/8	48-1/8	48-1/8	60-1/8	72-1/2
K	1-1/4	1-1/4	1-1/4	3-1/4	5-3/4	3-1/2	3-1/2
L	12	12	12	12	12	12	12

All dimensions in inches

Note: Weatherproof upright and inverted model also available

Accessory Dimensions

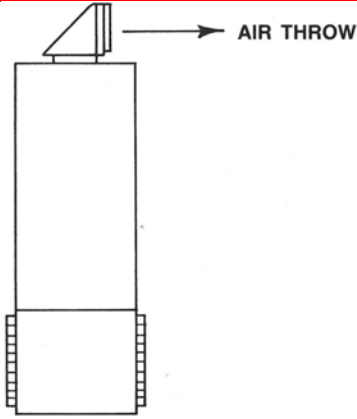
FILTERS-SIDE MOUNTING		
Model	Size	Qty.
40/55	20 X 25 X 2	6
60/85	20 x 25 x 2	12
100/125	20 x 25 x 2	12
150/175	20 x 25 x 2	8
	16 x 25 x 2	12
200/225/250	20 x 25 x 2	20
275/300/325	20 x 25 x 2	28
350/400/450	20 x 20 x 2	10
	20 x 25 x 2	25

Model	Side Mounting														
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R
40/55	26-1/2	28-1/2	47-1/8	25-1/2	32-7/8	49-1/8	40-3/4	21-1/4	42-1/2	3-1/4	32-7/8	49-1/8	8-5/8	26-1/2	47
60/85	36-3/4	36-1/8	56-3/8	32-1/4	27-3/4	61	52	17-1/4	53-7/8	5-1/4	27-3/4	61	8-5/8	24-1/2	55
100/125	47-5/8	41	66-5/8	32-1/4	27-3/4	70-1/2	52	20-1/4	55-3/8	4	27-3/4	70-1/2	8-5/8	25-1/4	66-1/2
150/175	44-5/8	35-1/8	87-1/8	32-1/4	28	91	52	20-1/4	76	4	28	91	8-5/8	22-1/2	83
200/225/250	45-3/4	40-5/8	97-3/8	32-1/8	42-5/8	97-7/8	55-5/8	33-1/2	85-1/2	4-3/4	42-5/8	97-7/8	8-5/8	27	83
275/300/325	-	-	-	33-1/2	50-5/8	139	53-1/4	37	121	2-3/4	50-5/8	139	8-5/8	33	131
350/400/450	-	-	-	28-1/2	52-1/8	162-3/8	61-1/4	40	132	2-3/4	52-1/8	162-3/8	8-5/8	33	150

All dimensions in inches.

Model	Base Mounting														
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R
40/55	26-1/2	28-1/2	47-1/8	25-1/2	32-7/8	49-1/8	40-3/4	21-1/4	42-1/2	3-1/4	32-7/8	49-1/8	8-5/8	26-1/2	47
60/85	36-3/4	36-1/8	56-3/8	31-5/8	39-1/8	58-3/4	52	29	52-1/8	5-1/4	39-1/8	58-3/4	8-5/8	36	56-1/4
100/125	47-5/8	41	66-5/8	34-1/2	44-1/2	68-5/8	57-1/2	34	62	4	44-1/2	68-5/8	8-5/8	42	66-1/2
150/175	52-1/2	51-1/8	87-1/8	32-1/4	55-1/8	91-1/8	52	30	77	3	55-1/8	91-1/8	8-5/8	51	87
200/225/250	56	53-5/8	91-1/8	30-3/4	60-1/8	97-7/8	55-5/8	35-1/2	85-1/2	2-3/4	60-1/8	97-7/8	8-5/8	51-1/2	91
275/300/325	48	61-5/8	136-7/8	31-5/8	67-5/8	139	53-1/4	37	121	2-3/4	67-5/8	139	8-5/8	61-1/2	119-1/2
350/400/450	72-3/8	60-1/8	135-1/2	29-1/2	62-1/8	162-3/8	61-1/4	40	132	2-3/4	62-1/8	162-3/8	8-5/8	74	138-1/2

Air Throw From Nozzles



The air throws listed below are based on air volumes shown in this bulletin for standard floor mounted heaters with standard discharge and inlets. They are also based on all discharge outlets being in the same direction, no obstruction between the heater and the area of throw, no interference from the building ceiling or roof, and standard ambient conditions. As the throw from a heater is subject to many variables, the figures listed below should be used only as a guide. Nozzles are optional items.

<u>COUNTERFLO</u>		<u>Average Air Throw (feet)</u>		<u>COUNTERFLO</u>		<u>Average Air Throw (feet)</u>	
Model No		Floor Mounted Units		Model No.		Floor Mounted Units	
40		80		225		225	
55		100		250		250	
60		120		275		200	
85		150		300		225	
100		160		325		250	
125		200		350		275	
150		200		400		300	
175		225		450		325	
200		200					

Engineers Specifications

Furnish and install the following Hastings Counterflo indirect-fired industrial heater:

Model No.	MBH Output	SCFM	Total ESP	Blower Motor HP	Voltage Phase	Gas-Fired	
						Type Gas	Gas Pressure

GENERAL

Each unit shall be factory assembled and wired, flame tested at the factory and shipped as a packaged assembly. Stack, external wiring and piping shall be furnished and installed by the contractor.

CASING

The cabinet shall be fabricated of 16 gauge Aluz./CRS, heavily reinforced to assure rigidity, and backed by an internal radiation shield. The casing shall be primed and finished with a coat of enamel. The heater shall have air inlet screens and are furnished with (duct discharge collar) or optional (air discharge nozzles).

FANS AND DRIVES

Each heater shall be equipped with centrifugal fans, statically and dynamically balanced, and mounted on a heavy-duty, cold-rolled steel shaft of a size limiting first critical speed to at least 25% above maximum operating speed. The fans shall be driven by a fixed sheave V-belt arrangement sized 35% greater than the required brake horsepower. The three phase, open dripproof motor shall have an adjustable mount. Fan bearing shall be 200,000 hour self-aligning, pillow block, ball/needle bearing with lubrication fittings.

COMBUSTION SECTION

The primary combustion chamber shall be of all welded, 400 series stainless steel construction, with a minimum of 16 gauge material. The chamber shall be designed for a minimum of two-pass flame travel within the chamber and the amount of heat transfer shall be approximately 75% of the total heat output. A port for observing the main flame shall be provided on the same end of the combustion chamber as the burner.

The third and fourth combustion product flow passes shall be made in the secondary heat exchanger through two staggered, stainless steel, tube sections.

FLUE GAS EXHAUSTER

The combustion exhaust gas system shall include a heavy-duty exhaust fan, three phase motor, adjustable V-belt drive and heat slinger. Remote grease lines for lubrication of bearings.

BURNER

The burners shall be (On-Off) (Hi-Lo-Off) (Modulating) type for burning (natural gas) (propane) (Insert burner description shown on page 4 of this bulletin.)

CONTROLS

Controls shall be factory mounted and include a control transformer, pre-purge timer, fan/limit switch, draft switch, air flow switch, combustion air switch, burner switch, blower starter, pilot flame safeguard and all necessary relays and switches.

Space thermostat shall be furnished for field mounting and wiring.

Control current shall be 115 volt.

TESTING and SERVICE

Heater(s) shall be piped, wired and flame tested before leaving factory. Start-up service and instructions to owner's personnel shall be furnished by unit manufacturer's field service engineer (optional).

OPTIONS and ACCESSORIES

The following options and accessories shall be provided: **(select from pages 4 and 5 of this bulletin).**

In order to maintain our policy of continuous product improvement, we reserve the right to change prices, specifications, ratings or dimensions without notice or obligation.

REPRESENTED BY:

HASTINGS

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