HTDM82 Indirect-Fired Units

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Moffitt
NATURAL VENTILATION SOLUTIONS

HTDM82 Indirect-Fired Heater Product Details

PRODUCT DESCRIPTION

The HTDM82 (High Turndown Indirect-Fired Units) utilizes destratification to eliminate stagnant air in heated buildings with open spaces. It relocates the hot air that is trapped at the ceiling by rotating it down to the floor. This removes the colder layers on the floor which in turn allows the building to warm up.

STANDARD FEATURES

- Cabinet: Welded structural or formed channel base frame primed with rust inhibitor
- Louvered Inlet: Sized for a maximum velocity of 500 FPM to prevent moisture.
- Casing: Heavy gauge colorbond steel casing with rust-resistant gray enamel paint finish
- Insulation: One inch thick 1.5# density neoprene coated fiberglass. The insulation is glued and pinned, solid liner in the burner section lifting lugs.
- Venting: Type 3/4 venting, condensate neutralizer tank (shipped loose)
- Blower/Motor: AMCA rated forward curve DWDI centrifugal blower, polished steel shaft with rust inhibitor. Maximum operating speed less than 75% of first critical speed
- Bearings:
  - Blowers ≥ 20”x20”: Standard heavy-duty industrial bearings.
  - Blowers ≤ 18” x 18”: Sealed cartridge bearings
- Motor: TEFC motor, 1800 RPM, T-frame, 1.15 service factor mounted on adjustable base. Motor starter with overloads.
- Drives: Adjustable V-belt drives used up to and including 5 HP; fixed drives on 7.5 HP and larger. Drives are designed for 150% motor brake horsepower.
- Efficiency: 82% efficiency
- Heat Exchanger: Stainless steel heat exchanger and cast-iron gas manifold. Intermittent pilot assembly with spark igniter and ignition transformer solid state flame monitoring system with burner observation port
- Controls: Multiple system options
- Controls Enclosure: Electronic flame safeguard relay manual reset, high and low airflow pressure switches. Manual reset high limit. Control circuit transformer, 120-volt control panel service switch and circuit breaker. Terminal connections for exhaust interlock.
- Manifold: pilot regulator, gas valve and shutoff valve, safety shutoff valve, pressure regulator or combination modulating and pressure regulating valve, modulating gas valve, main test fire valve, manifold pressure taps are included
- Manifold Pressure:
  - Natural gas 7-14" W C. or 1-5 psig
  - Propane 11"W.C.

OPTIONAL FEATURES

- Special Coatings: Corrosion resistant two-step acrylic finish
- Special Construction: aluminum, stainless steel, heavier gauge
- 80/20 Mix Box: Recirculates air to provide cost effective space heating. Includes V-bank filter rack.
- Housing: Control and manifold enclosure
- Filter Section: V-bank filter section with side access suitable for 2" filters
- Winter Filter Section: Located on the discharge side of burner.
- Filters: 2" thick permanent, pleated, and throwaway filters; high efficiency filters, various efficiency bag filters and HEPA filters complete with filter gauge and/or indicating light
- Motorized Damper: Parallel blade damper with a two-position spring return actuator and end switch.
- Roof Curb: Prefabricated galvanized roof curb 16" or 24" high; full perimeter available on most units
- Blowers: Backward inclination, air foil, and plug fans.

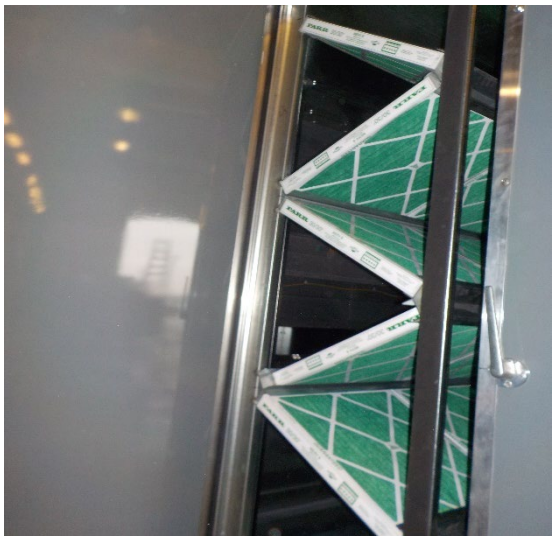
- Heat Recovery: Heat wheels or cutting-edge fixed media options
- DX Plenum: Coil located in vertical or horizontal airflow complete with drain pan when applicable.
- Coil Plenums: Heating coils- steam, hot water, and glycol
- Cooling Coils: chilled water, DX coil
- Evaporative Coolers: Industrial and commercial models available.
- Hinged Access Doors: Optional on filter section, motor section and weather housing. Comes with #140 vent lock handles, #310 vent lock handles upgrade available.
- Mushroom Hood: Complete with internal screen for debris
- Discharge Heads
  - 4-Way Adjustable
  - 180° Vertical and horizontal adjustment with 360° of free rotation
- Internal Vibration Isolation: Blower and motor isolated on separate frame with R.I.S. or spring c/w canvas connector.
- External Vibration Isolation: Floor mounted or suspended isolation.
- Service Platform: Provides access to controls and gas train.
- Motors: TEFC and high-efficiency, meeting EEE and CSA standards and 2-speed
- Disconnect Switch: Weatherproof enclosure; non-fused or fused.
- FM Gas Train: Meets Factory Mutual (FM) requirements.
- IRI Gas Train: Meets Industrial Risk Insurers requirements.
- High Gas Pressure Regulator: Required on natural gas with pressure more than 14" W.C and LP applications more than 11" W.C.
- High / Low Gas Pressure Switches: Manual reset. Gas pressure safety switches lock out the burner in the event of gas pressure malfunction.
- Controls: NEMA 4 or 12 custom, unit mounted, or remote enclosures.
- Freeze Protection: Auto low-limit freeze protection with bypass timer. 10-point electronic circuit analyzer with signal lights.
- Exhaust Interlock Relay
- Proof of Closure Valve
- Inlet Air Controller (burner economizer)
- Ultraviolet flame supervision
- Audible alarm
- Null pressure switch
- Firestat
- Purge timer
- Delay exhaust start
- 115-volt GFI service receptacle
- Marine service light with 100-watt bulb, guard, and lighted switch
- High density insulation
  - 2" thick insulation
  - 4" thick insulation
- Motor and bearings out of airstream
- Internal liners
  - 22 gauge solid
  - Perforated
- JIC wiring
- Extended grease lines
- Belt guards
- Checker plate floor

PRODUCT BENEFITS

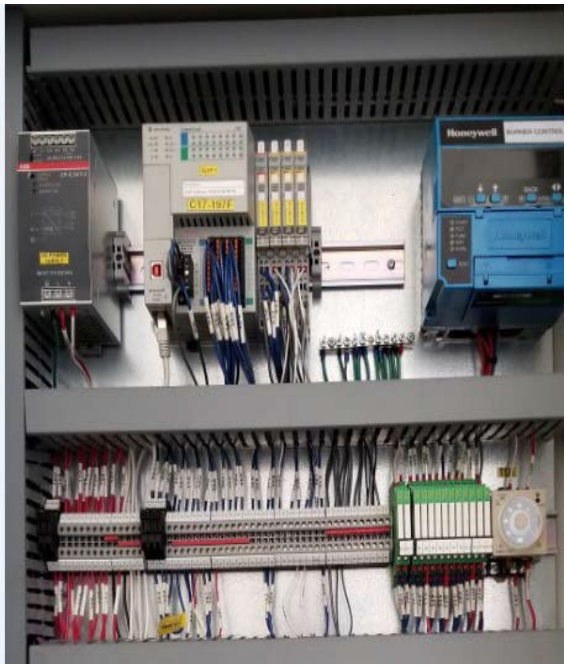
- Works with a Natural Ventilation or Pressure Gravity System®
- Units are ETL & C-ETL listed.
- Factory wired, piped, and test fired. Includes factory numbered terminal strip.
- Best turndown ratio for power burners in the industry (up to 60:1)
- Our lead times for industrial cooling & heat recovery are from 20 weeks to 12-14 weeks.

HTDM82 Heater Product Details

Tube Heat Exchanger



Side Out Filter with Metal Frame



Allen Bradley Compact Logix PLC

Power Flex VFD

FEATURES

- Electronic flame safeguard relay, manual reset high and low airflow pressure switches.
- Factory wired control panel with numbered terminal strip motor starter with overloads.
- Control circuit transformer, 120-volt Control panel service switch
- Terminal connections for exhaust interlock
- Nationally recognized components, service parts.
- Circuit breaker

HTDM82 Heater Custom Wiring Options

SEIMENS PLC WITH HMI

ALLEN BRADLEY PLC

B.A.C. NET CONTROLS

LONWORKS CONTROLS

CONTROLS

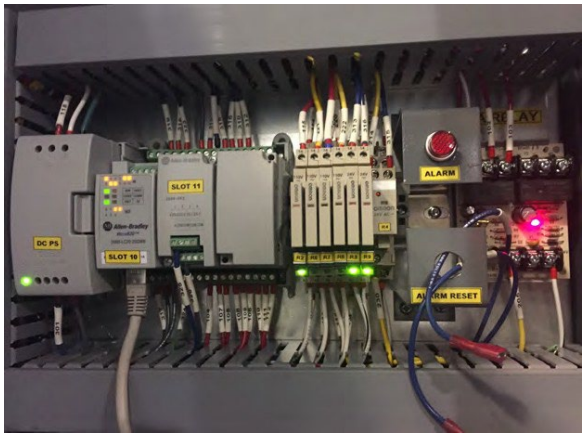
- Controls selected to meet end-user protocol.
- Factory installed.
- Factory programmed.
- Factory tested.
- Field commissioning services available

HTDM82 Controller System

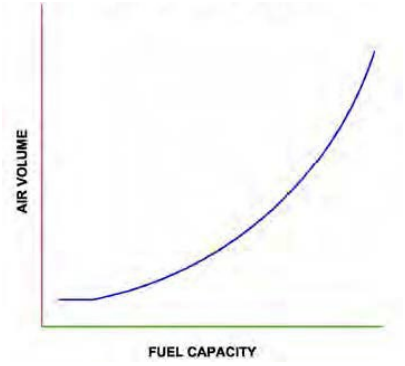
Moffitt heat exchangers have been developed to create near perfect combustion throughout the operating range. The controller comes with 6 factory presets within the combustion curve. From these 6 presets a microprocessor produces an infinite number of points to precisely control the combustion curve. The system can be precisely programmed for different elevations to ensure the highest quality rate of combustion.

To acquire this near perfect combustion, the controller sends signals to a solid-state relay. This relay in turn controls the rpm of the combustion motor and optimizes the gas ball valve position. This allows the user to set the combustion at any set point desired. The combustion fan information and gas valve position feedback are sent back via a tac sensor for constant interlock of both variables. This technology produces quiet combustion and smooth modulation changes between low fire and high fire to ensure greater efficiency, greater control and impressive turndown ratios that cannot be matched by competitors.

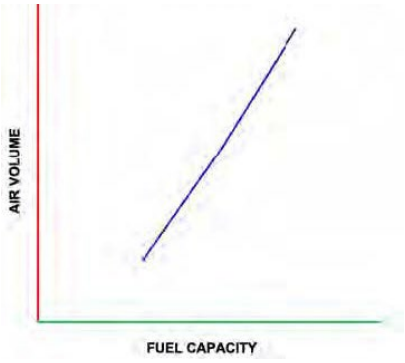
- Heat Modes: Factory set discharge temperature.
- Remote Temperature Selector (RTS)
- External modulation control
- Signal: 4-10mA, 0-10 VDC, compatible with Building Management Systems (BMS)
- Error signal indication:
  - High limit
  - Low limit
  - Air Proving
  - Flame Failure
  - Gas Valve
- Options:
  - Space Over-ride
  - Low Limit
  - System Pre-heat
  - Standby
  - Fan Standby



MOFFIT COMBUSTION CURVE



COMPETITOR COMBUSTION CURVE



HTDM82 Heater Controls

STANDARD OPTION: BACNET MS/TP

The BACNet MS/TP enabled DDC controller provides communication with the Building Management System to remotely control and override setpoints, unit start/stop and monitor process variables such as temperature, humidity, alarms and more.

Terminals are provided in each unit for easy and smooth termination of twisted pair wires into the DDC controller network ports.

DISTECHALLURE EC SMART SENSOR

The Allure smart sensor provides remote control of the unit. It is compact and can be configured to suit end user's needs which simplifies equipment operation. A single CAT5e Ethernet cable is used to connect the smart space sensor to the DDC controller. No additional wiring required.

The Allure EC smart sensor senses temperature, humidity, CO_2 and motion. The built in LCD is configured to display unit alarms, space/ outside air temperatures, required set points, fan status, current mode of operation and more. Setpoints can be easily adjusted via the keypad to satisfy occupants of the space.

OPTIONAL UPGRADE: DISTECH ECLYPSE CONTROLLER (ECY-303)

The ECLYPSE Connected Equipment Controller is designed to satisfy the needs of a wide range of HVAC applications such as small and medium terminal applications. It integrates a control, automation and connectivity server, power supply, and I/O in one convenient package.

- Distech Eclypse controller supports BACNet IP communications and supports Modbus to connect meters, variable frequency drives etc.
- Fewer wire runs to a centralized switch are required, thereby achieving installation and cost reduction.
- A laptop can be connected to the second Ethernet port for direct programming, configuration and commissioning using ECgfxProgram or ENVYSION.
- Both wired and wireless connection. Wi-Fi connection to the building's existing Wi-Fi network or to Hotspot.

Horyzon Touch screen Display: The Horyzon display features a high resolution, color LCD touch screen designed for wall or panel mounting. They provide easy and intuitive access to the internal data of ECLYPSE series controllers. With Touch screen display system integrators can quickly access, view, and configure operating parameters for troubleshooting.

HTDM82 Performance

MODEL	INPUT/ OUTPUT MBH	AIR CAPACITY CFM	TEMPERATURE RISE (Deg-F)
		1,431	110
		1,574	100
HTDM		1,749	90
200	200/170	1,968	80
85% EFF		2,249	70
		2,623	60
		3,148	50

MODEL1	INPUT/ OUTPUT MBH	AIR CAPACITY CFM	TEMPERATURE RISE (Deg-F)
		10,354	110
		11,389	100
HTDM		12,654	90
1500	1500/1230	14,236	80
82% EFF		16,270	70
		18,981	60
		22,778	50

MODEL	INPUT/ OUTPUT MBH	AIR CAPACITY CFM	TEMPERATURE RISE (Deg-F)
		2,761	110
		3,037	100
HTDM		3,374	90
400	400/328	3,796	80
82% EFF		4,339	70
		5,062	60
		6,074	50

MODEL	INPUT/ OUTPUT MBH	AIR CAPACITY CFM	TEMPERATURE RISE (Deg-F)
		13,805	110
		15,185	100
HTDM		16,872	90
2000	2000/1640	18,981	80
82% EFF		21,693	70
		25,309	60
		30,370	50

MODEL	INPUT/ OUTPUT MBH	AIR CAPACITY CFM	TEMPERATURE RISE (Deg-F)
		4,141	110
		4,556	100
HTDM		5,062	90
600	600/492	5,694	80
82% EFF		6,508	70
		7,593	60
		9,111	50

MODEL	INPUT/ OUTPUT MBH	AIR CAPACITY CFM	TEMPERATURE RISE (Deg-F)
		17,256	110
		18,981	100
HTDM		21,091	90
2500	2500/2050	23,727	80
82% EFF		27,116	70
		31,636	60
		37,963	50

MODEL	INPUT/ OUTPUT MBH	AIR CAPACITY CFM	TEMPERATURE RISE (Deg-F)
		6,902	110
		7,593	100
HTDM		8,436	90
1000	1000/820	9,491	80
82% EFF		10,847	70
		12,654	60
		15,185	50

MODEL	INPUT/ OUTPUT MBH	AIR CAPACITY CFM	TEMPERATURE RISE (Deg-F)
		20,707	110
		22,778	100
HTDM		25,309	90
3000	3000/2460	28,472	80
82% EFF		32,540	70
		37,963	60
		45,556	50

HTDM82 System Weights

HORIZONTAL UNITS

	HTDM 85 200	HTDM 82+ 400	HTDM 82 600	HTDM 82 1000	HTDM 82 1500	HTDM 82 2000	HTDM 82 2500	HTDM 82 3000
Basic Unit: c/w Blower, Filter & Heat Exchanger	2,747	3,240	4,053	5,733	6,508	7,917	10,725	11,176
c/w Return Air and Mixbox	2,834	3,387	4,168	5,977	6,773	8,109	11,042	11,623
c/w Mixbox & Coil Section	3,454	3,798	4,594	6,583	7,455	8,758	11,841	12,814
c/w Mixbox & High Eff. Filter Plenum	3,173	3,609	4,464	6,360	7,190	8,411	11,526	12,140
c/w Mixbox with Relief	3,342	3,620	4,603	6,220	7,038	8,301	11,350	11,834
c/w Mixbox with Relief & Return Air Blower	3,699	4,120	4,952	7,221	8,116	9,222	12,654	13,195
c/w Coil Plenum	3,062	3,779	4,669	6,463	7,445	8,751	11,196	12,361
c/w Packaged DX Cooling & Mixbox	3,732	4,361	5,206	7,491	8,447	10,155	13,403	14,329

COMPONENTS

	HTDM 82 200	HTDM 82 400	HTDM 82 600	HTDM 82 1000	HTDM 82 1500	HTDM 82 2000	HTDM 82 2500	HTDM 82 3000
Coil Plenum; Horizontal Discharge	547	695	788	1,172	1,319	1,587	1,826	1,918
Coil Plenum; Down Discharge	622	789	935	1,338	1,718	1,962	2,232	2,362
High Eff. Filter Section; Horizontal Discharge	407	550	628	888	1,005	1,180	1,319	1,334
High Eff. Filter Section Down Discharge	507	636	851	1,114	1,289	1,486	1,781	1,856
Inlet Hood	46	60	114	151	192	293	316	320
Relief Fresh Air Section	647	811	902	1231	1,408	1,607	1,771	1,800
Relief Fresh Air Blower Section	1,472	1,578	1,727	2,650	2,900	3,215	3,452	3,596

STATIC PRESSURE DROP(S) DUE TO ACCESSORIES	
ACCESSORIES	**STATIC PRESSURE DROP (IN INCHES WATER)**
Flat and v-Bank Filter Section	0.4
Louvered Inlet Hood	0.1
Evaporative Cooler (Commercial)	0.3
Evaporative Cooler (Industrial)	0.4
Inlet Damper	0.1
DX Plenum & Coil	0.6
80/20 Mixbox w/ Filters	0.7
Horizontal Discharge Head	0.5
High Eff. Filter Section	1.0
Heat Coil	0.2
Fixed Media Heat Recovery	1.0

1. For additional components, add the component weight to the basic unit weight. Includes 10% safety factor.
2. All weights in lbs. For reference only, subject to change without notice.
3. Accessory static pressure drops are calculated at maximum CFM loads.

HTDM82 Heater & Filter Performance Table

		HEATER SECTION					FILTER SECTION		
SCFM	MODEL	EFFICIENCY	INPUT / OUTPUT (MBH)	TURNDOWN	CONNECTION FO GAS (IN.)	TEMPERATURE RISE	FILTER QTY & SIZE (IN.)	TOTAL FILTER FREE AREA (FT^2)	MAXIMUM CFM ALLOWED
1,434						110			
1,574						100			
1,749						90			
1,968	**HTDM 200**	85%	200/170	23:1	1 1/4	80	(2) 16x25x2	5.26	2,780
2,249						70			
2,623						60			
3,148						50			
2,761						110			
3,037						100			
3,374						90			
3,796	**HTDM 400**	82%	400/328	35:1	1	80	(4) 16x25x2	11.1	5,550
4,339						70			
5,062						60			
6,074						50			
4,141						110			
4,556						100			
5,062						90	(3) 16x20x2		
5,694	**HTDM 600**	82%	600/492	35:1	1	80	(3) 20x20x2	15	7,550
6,508						70			
7,593						60			
9,111						50			
6,902						110			
7,593						100			
8,436						90	(4) 20x25x2		
9,491	**HTDM 1000**	82%	1000/820	50:1	1 1/4	80	(4) 20x20x2	25	12,500
10,847						70			
12,654						60			
15,185						50			
10,354						110			
11,389						100			
12,654						90	(12)		
14,236	**HTDM 1500**	82%	1500/1230	60:1	1 1/4	80	16x25x2	33.3	16,500
16,270						70			
18,981						60			
22,778						50			
13,805						110			
15,185						100			
16,872						90	(12)		
18,981	**HTDM 2000**	82%	2000/1640	60:1	2	80	24x24x2	48.8	24,000
21,693						70			
25,309						60			
30,370						50			
17,256						110			
18,981						100			
21,091						90	(16)		
23,727	**HTDM 2500**	82%	2500/2050	60:1	2	80	25x20x2	55.6	27,500
27,116						70			
31,636						60			
37,963						50			
20,707						110			
22,778						100			
25,309						90	(12)		
28,472	**HTDM 3000**	82%	3000/2460	60:1	2 1/2	80	25x20x2	63.9	32,000
32,540						70	(8) 25x16x2		
37,963						60			
45,556						50			

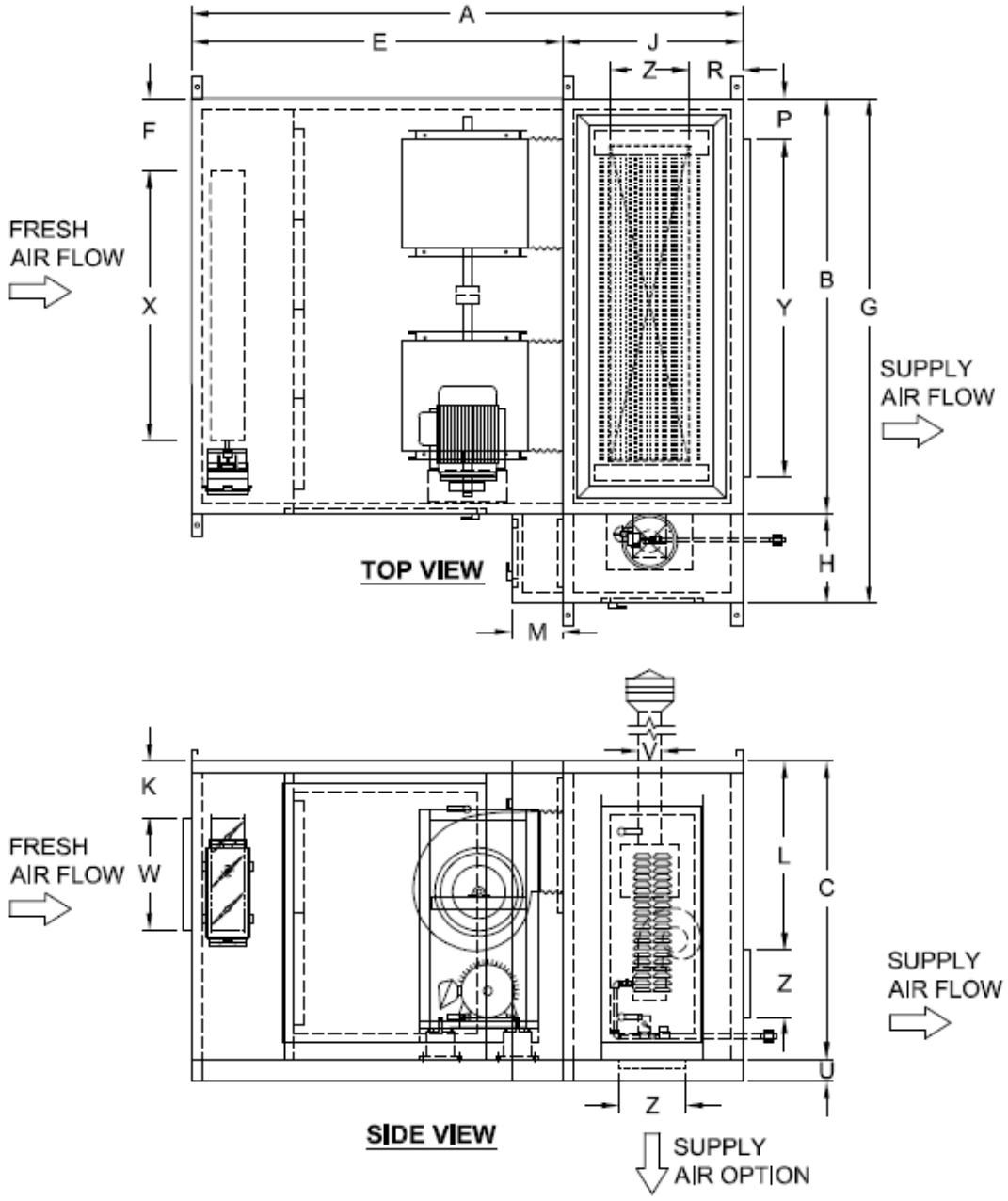
NOTES

- All static values include the blower, burner, and casing.
- Accessory static values must be added to obtain the total static.
- Brake horsepower does NOT include drive losses.
- The static pressure drop through the filters is approximately 0.4" W.C. (clean) and approximately 0.8" W.C. (dirty).
- The maximum airflow is calculated so that the velocity across the filters never exceeds 500 fpm.
- A V-bank filter section is required on the HTDM82 1000, 1500, 2000 and 3000 when the temperature rise is less than 70°F.
- The standard filter section may contain one of the following:
  1. Replaceable: 2" fiberglass media with an average efficiency of 20% at 500 fpm.
  2. Throwaway: 2" pleated media with an average efficiency of 30% at 500 fpm.
  3. Permanent: 2" media with layers of silt and expanded aluminum. media efficiency averages 20% at 500 fpm. The media can be cleaned using a stream of water.

HTDM82 Fan Performance Table

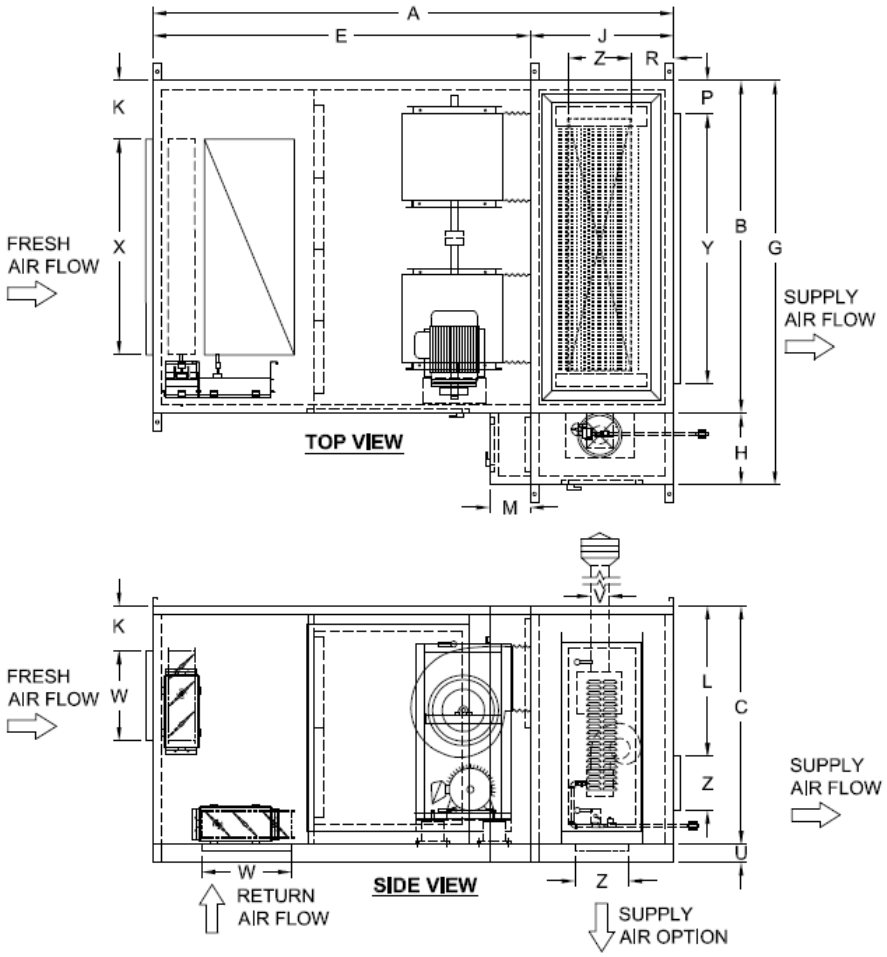
		0.25" W.C. ESP		0.5" W.C. ESP		0.75" W.C. ESP		1.0" W.C. ESP		1.5" W.C. ESP		2.0" W.C. ESP	
MODEL	SCFM	BLOWER	BHP	BLOWER	BHP	BLOWER	BHP	BLOWER	BHP	BLOWER	BHP	BLOWER	BHP
HTDM 200	1,434	9x9	0.36	9x9	0.44	9x9	0.55	9x9	0.61	9x9	0.81	9x9	1.05
	1,574	9x9	0.42	9x9	0.51	9x9	0.60	9x9	0.69	9x9	0.89	9x9	1.12
	1,749	10x10	0.52	9x9	0.61	9x9	0.71	9x9	0.81	9x9	1.01	10x10	1.24
	1,968	10x10	0.70	9x9	0.80	9x9	0.90	9x9	1.02	9x9	1.24	10x8	1.46
	2,249	10x10	0.79	9x9	1.09	9x9	1.20	9x9	1.32	9x9	1.63	10x9	1.89
	2,623	10x10	1.17	10x10	1.31	10x10	1.45	10x10	1.60	10x10	1.91	10x10	2.21
	3,148	12x12	1.29	12x12	1.47	12x9	1.71	12x9	1.86	12x12	2.33	12x12	2.84
HTDM 400	2,761	10x10	1.11	10x10	1.23	10x10	1.37	10x10	1.51	10x10	1.82	10x10	2.13
	3,037	12x12	0.88	10x10	1.57	10x10	1.71	10x10	1.86	10x10	2.18	10x10	2.52
	3,374	12x12	1.06	12x12	1.24	12x12	1.43	12x12	1.63	12x12	2.03	12x12	2.48
	3,796	12x12	1.31	12x12	1.50	12x12	1.71	12x12	1.92	12x12	2.36	12x12	2.81
	4,339	12z12	1.86	15z15	1.51	15z11	1.75	15z11	2.02	15z15	2.66	15x15	3.29
	5,062	15z15	1.83	15x15	2.06	15x15	2.30	15x15	2.61	15x15	3.28	18x18	3.88
	6,074	15x15	2.98	15x15	3.26	15x15	3.53	15x15	3.81	15x15	4.52	18x18	5.05
HTDM 600	4,141	12x12	1.61	12x12	1.80	12x12	2.02	12x12	2.24	12x12	2.71	12x12	3.19
	4,556	15x15	1.34	15x15	1.54	15x15	1.78	15x11	2.03	15x15	2.68	15x15	3.30
	5,062	15x15	1.68	15x15	1.92	15x15	2.15	15x15	2.42	18x18	2.92	15x15	3.75
	5,694	15x15	2.18	15x15	2.47	15x15	2.74	15x15	2.98	15x15	3.59	15x15	4.36
	6,508	18x18	2.25	18x18	2.56	18x18	2.86	18x18	3.20	18x18	4.01	18x18	4.87
	7,593	18x18	3.14	18x18	3.53	18x18	3.89	18x18	4.24	18x18	5.01	20x20	6.28
	9,111	20x20	3.97	20x20	4.54	20x20	5.09	20x20	5.61	20x20	6.49	20x20	7.76
HTDM 1000	6,902	2-12x12	2.15	2-12x12	2.53	2-12x12	2.93	2-12x12	3.36	2-12x12	4.68	2-12x12	5.65
	7,593	2-12x12	3.10	2-12x12	3.54	2-12x12	4.00	2-12x12	4.47	2-12x12	5.40	2-12x12	6.41
	8,436	2-15x15	2.82	2-15x15	3.36	2-15x15	3.98	2-15x15	4.57	2-12x12	6.42	2-12x12	7.47
	9,491	2-15x15	3.57	2-15x15	4.06	2-15x15	4.67	2-15x15	5.06	2-18x18	6.54	2-12x18	8.08
	10,847	2-15x15	4.84	2-15x15	5.36	2-15x15	5.89	2-15x15	6.55	2-18x18	7.67	2-12x18	9.34
	12,654	2-18x18	5.35	2-18x18	6.03	2-18x18	6.81	2-18x18	7.67	2-18x18	9.45	2-12x18	9.50
	15,185	2-18x18	8.20	2-18x18	8.97	2-18x18	9.74	2-18x18	10.08	2-18x18	11.59	2-12x20	11.92
HTDM 1500	10,354	2-15x15	3.89	2-15x15	4.33	2-15x15	4.91	2-15x15	5.49	2-15x15	6.93	2-18x18	8.16
	11,389	2-15x15	4.69	2-15x15	5.30	2-15x15	5.88	2-15x15	6.43	2-18x18	7.20	2-18x18	8.87
	12,654	2-18x18	4.59	2-15x15	5.21	2-18x18	5.89	2-18x18	6.98	2-18x18	8.74	2-18x18	9.45
	14,236	2-18x18	5.88	2-18x18	6.26	2-18x18	6.94	2-18x18	7.63	2-18x18	9.22	2-20x20	11.62
	16,270	2-18x18	7.52	2-18x18	8.34	2-18x18	9.12	2-18x18	9.8	2-18x18	11.43	2-20x20	13.76
	18,981	2-20x20	8.88	2-20x20	10.09	2-20x20	11.25	2-20x20	12.38	2-20x20	14.16	2-20x20	16.58
	22,778	2-20x20	13.76	2-20x20	14.91	2-20x20	16.26	2-20x20	17.72	2-20x20	20.50	2-20x20	22.93
HTDM 2000	13,805	2-18x18	4.45	2-18x18	5.14	2-18x18	5.80	2-18x18	6.45	2-18x18	7.89	2-18x18	9.63
	15,185	2-20x20	4.30	2-20x20	5.19	2-18x18	6.80	2-18x18	7.65	2-18x18	9.05	2-18x18	10.72
	16,872	2-20x20	5.57	2-20x20	6.44	2-20x20	7.53	2-20x20	8.53	2-18x18	11.18	2-18x18	12.78
	18,981	2-22x22	5.81	2-20x20	8.30	2-20x20	9.31	2-20x20	10.54	2-20x20	12.77	2-18x18	15.96
	21,693	2-22x22	7.77	2-22x22	8.78	2-22x22	9.84	2-20x20	13.30	2-20x20	16.04	2-20x20	18.60
	25,309	2-22x22	11.30	2-22x22	12.48	2-22x22	13.64	2-22x22	14.88	2-20x20	21.21	2-20x20	24.38
	30,370	2-25x25	14.55	2-25x25	16.11	2-22x22	20.68	2-22x22	22.08	2-22x22	25.03	2-20x20	28.03
HTDM 2500	17,256	2-22x22	4.29	2-20x20	6.32	2-20x20	7.32	2-20x20	8.41	2-20x20	10.22	2-20x15	13.92
	18,981	2-22x22	5.07	2-22x22	5.98	2-20x20	8.50	2-20x20	9.57	2-20x20	11.95	2-20x20	13.74
	21,091	2-22x22	6.58	2-22x22	7.55	2-22x22	8.60	2-20x20	11.78	2-20x20	14.37	2-20x20	16.88
	23,727	2-22x22	8.67	2-22x22	9.79	2-22x22	10.92	2-22x22	12.52	2-20x20	18.08	2-20x20	21.14
	27,116	2-25x25	9.54	2-25x25	10.85	2-22x22	14.43	2-22x22	15.68	2-22x22	18.26	2-22x22	25.60
	31,636	2-25x25	13.77	2-25x25	15.32	2-25x25	16.88	2-22x22	22.04	2-22x22	24.92	2-22x22	28.01
	37,963	2-28x28	17.42	2-25x25	22.73	2-25x25	24.62	2-25x25	26.48	2-25x25	30.10	2-25x25	33.92
HTDM 3000	20,707	2-25x25	4.98	2-22x22	6.95	2-22x22	7.95	2-20x20	10.98	2-20x20	13.48	2-20x20	
	22,778	2-25x25	5.82	2-22x22	8.28	2-22x22	9.34	2-22x22	10.38	2-20x20	15.42	2-22x22	
	25,309	2-25x25	7.45	2-25x25	8.73	2-22x22	11.75	2-22x22	12.96	2-22x22	15.41	2-20x20	
	28,472	2-25x25	9.77	2-25x25	11.16	2-22x22	15.23	2-22x22	16.57	2-22x22	19.25	2-22x22	
	32,540	2-28x28	11.08	2-25x25	14.81	2-25x25	16.36	2-25x25	17.93	2-25x25	21.19	2-28x28	
	37,963	2-28x28	15.24	2-28x28	17.05	2-25x25	22.39	2-25x25	24.22	2-25x25	27.90	2-25x25	
	45,556	2-30x30	19.58	2-30x30	21.46	2-28x28	27.73	2-28x28	29.85	2-28x28	34.40	2-28x28	

Horizontal Gravity Vented c/w Flat Filter



1. Dimensions are generalized for illustrative purposes. Contact us for a no-obligation design customized to meet your specific needs.
2. Service access panels must not be obstructed. Recommended clearances are a minimum of 24".
3. 1-1/2" discharge & inlet flanges at openings.
4. Right hand unit shown, left hand opposite shown.
5. Lifting lug 2"x4" (typical)
6. Dimensions are displayed in inches. Dimensions are subject to change without notice and to manufacturing tolerances.

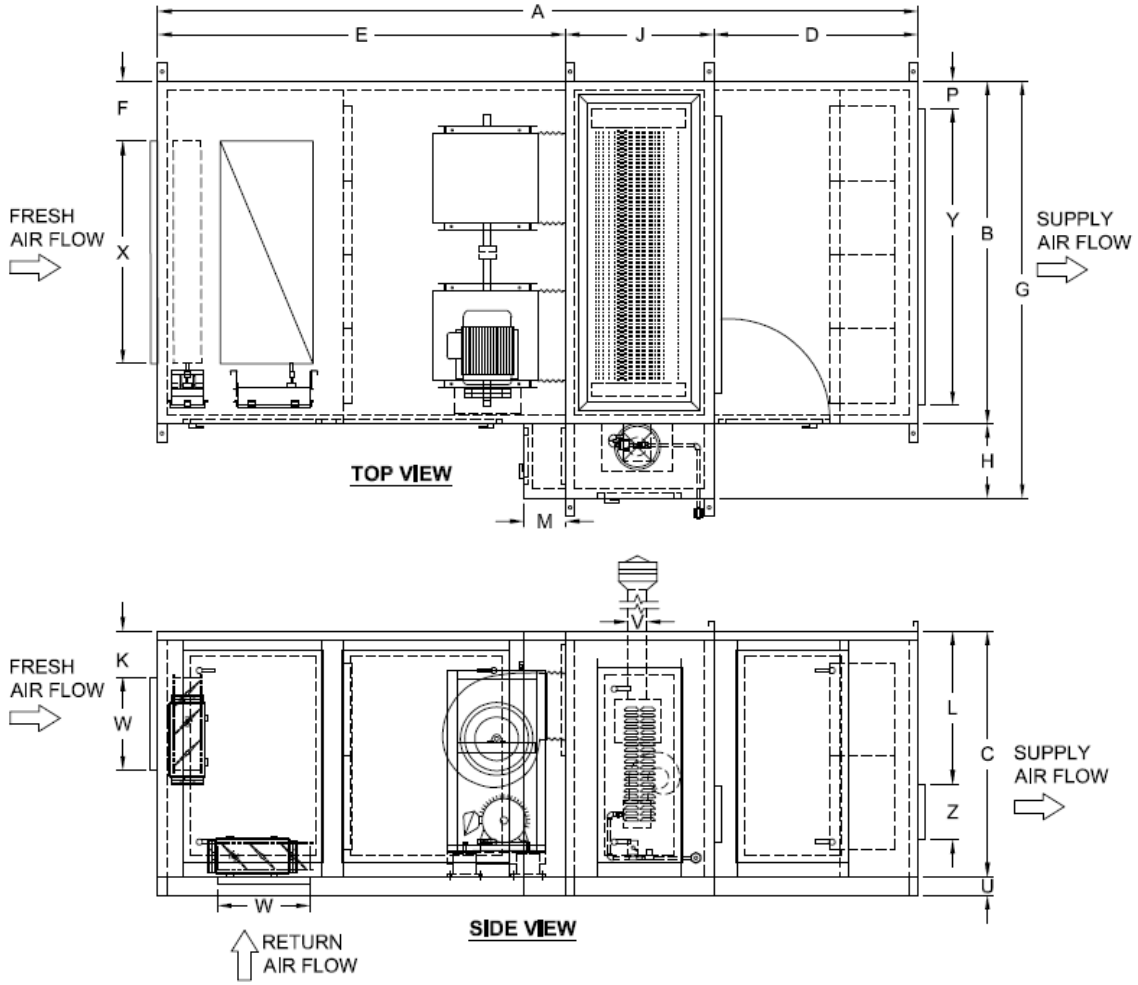
HTDM 82 Indirect-Fired Units, Horizontal, Gravity Vented c/w Flat Filter & Mix Box



MODEL	A	B	C	E	F	G	H	J	K	L	M	P	R	U	V	W	X	Y	Z
200	104	36	45	72	6	52	16	32	12	33½	9	7	10½	4	6	18	18	20	12
400	111	60	45	79	6	76	16	32	15	33½	9	12	10 ½	4	8	14	42	36	12
600	116	74	45	84	13	90	16	32	10	33½	9	8	10½	4	8	20	48	58	12
1000	144	84	55	94	6	102	18	50	14	42¾	9	5	9¼	4	10	26	66	74	20
1500	149	89	78	98	6	107	18	51	12	44 ½	9	5	12½	4	12	30	70	78	24
2000	152	106	78	98	6	126	20	54	16	43 ½	9	6	17	6	14	30	92	100	20
2500	158	115	88	98	7	139	22	60	12	48 ½	9	5	18	6	16	36	96	104	24
3000	174	118	88	108	7	142	24	66	18	44 ½	9	6	20½	6	18	40	102	106	26

1. Dimensions are generalized for illustrative purposes. Contact us for a no-obligation design customized to meet your specific needs.
2. Service access panels must not be obstructed. Recommended clearances are a minimum of 24".
3. 1-1/2" discharge & inlet flanges at openings.
4. Right hand unit shown, left hand opposite shown.
5. Lifting lug 2"x4" (typical)
6. See page 30 for intake and exhaust hood dimensions.
7. Dimensions are displayed in inches. Dimensions are subject to change without notice and to manufacturing tolerances.

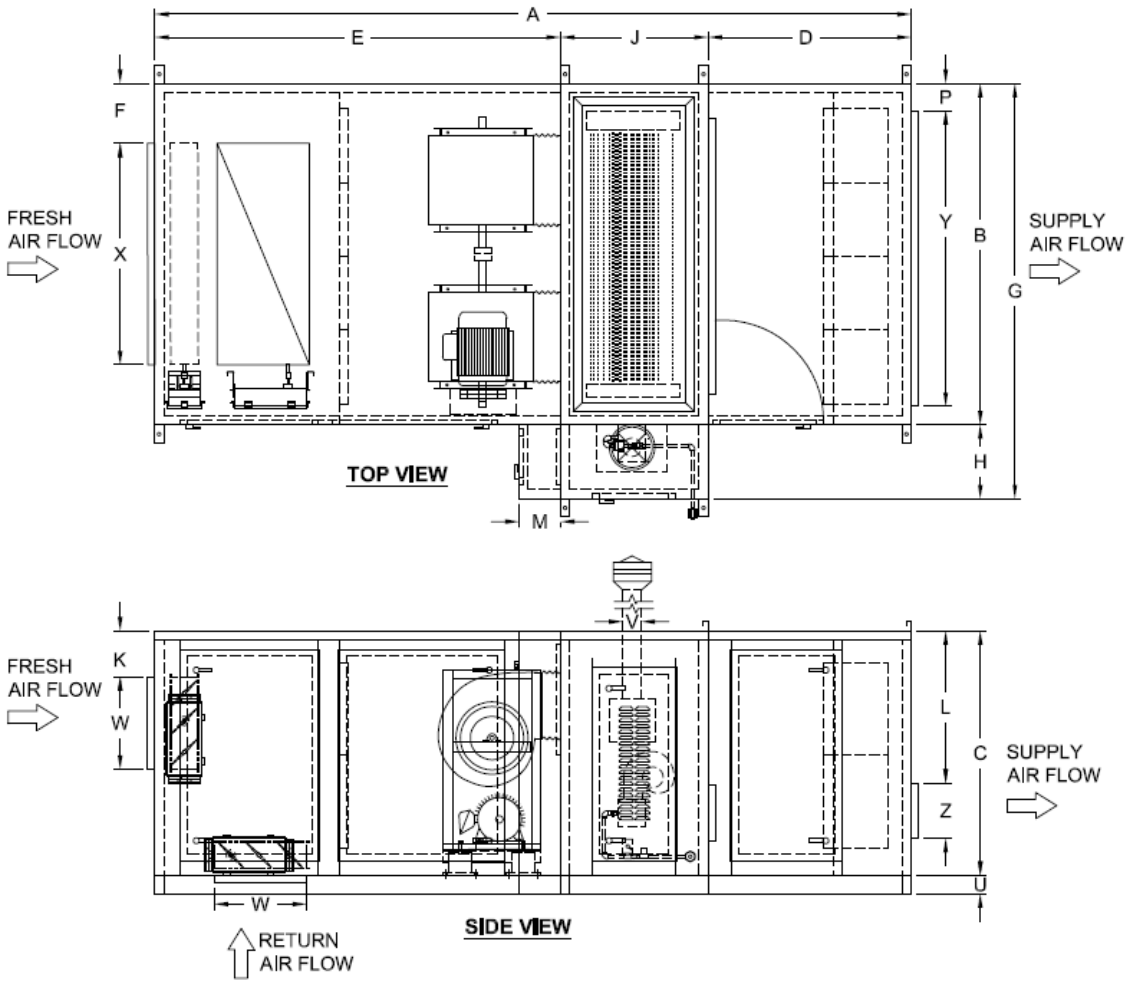
HTDM 82 Indirect-Fired Units, Horizontal, Gravity Vented c/w Flat Filter, Mix Box, High E. Filter Plenum & Horizontal Discharge



MODEL	A	B	C	E	F	G	H	J	K	L	M	P	R	U	V	W	X	Y	Z
200	148	36	45	44	72	6	52	16	32	12	33½	9	7	4	6	18	18	20	12
400	155	60	45	44	79	6	76	16	32	15	33½	9	12	4	8	14	42	36	12
600	160	74	45	44	84	13	90	16	32	10	33½	9	8	4	8	20	48	58	12
1000	188	84	55	44	94	6	102	18	50	14	42¾	9	5	4	10	26	66	74	20
1500	193	89	78	44	98	6	107	18	51	12	44½	9	5	4	12	30	70	78	24
2000	196	106	78	44	98	6	126	20	54	16	43½	9	6	6	14	30	92	100	20
2500	202	115	88	44	98	7	139	22	60	12	48½	9	5	6	16	36	96	104	24
3000	218	118	88	44	98	7	142	24	66	18	44½	9	6	6	18	40	102	106	26

1. Dimensions are generalized for illustrative purposes. Contact us for a no-obligation design customized to meet your specific needs.
2. Service access panels must not be obstructed. Recommended clearances are a minimum of 24".
3. 1-1/2" discharge & inlet flanges at openings.
4. Right hand unit shown, left hand opposite shown.
5. Lifting lug 2"x4" (typical)
6. Dimensions are displayed in inches. Dimensions are subject to change without notice and to manufacturing tolerances.

HTDM 82 Indirect-Fired, Horizontal, Gravity Vented c/w Flat Filter, Mix Box, High E. Filter Plenum & Bottom Discharge

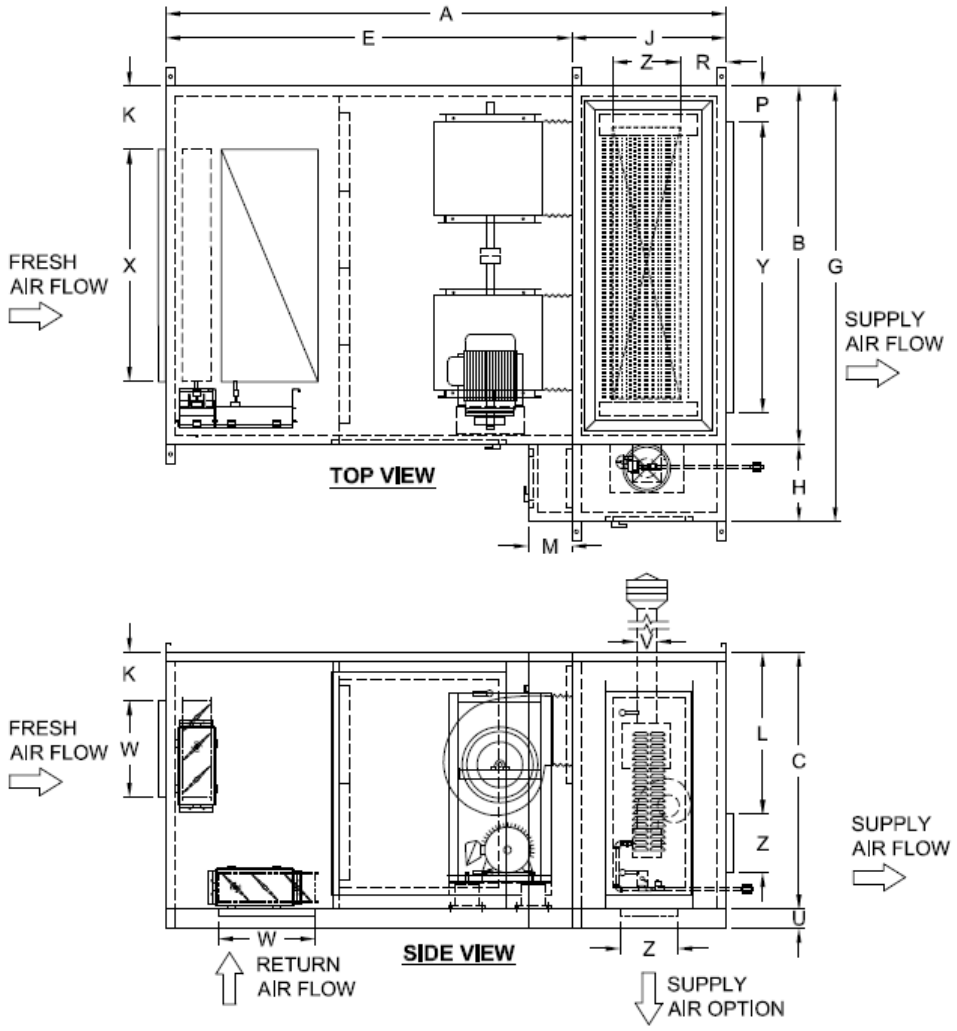


1. Dimensions are generalized for illustrative purposes. Contact us for a no-obligation design customized to meet your specific needs.

MODEL	A	B	C	E	F	G	H	J	K	L	M	P	R	U	V	W	X	Y	Z
200	119	36	45	87	6	52	16	32	12	33½	9	7	10½	4	6	18	18	20	12
400	126	60	45	94	6	76	16	32	15	33½	9	12	10½	4	8	14	42	36	12
600	131	74	45	99	13	90	16	32	10	33½	9	8	10½	4	8	20	48	58	12
1000	159	84	55	109	6	102	18	50	14	42¾	9	5	9¼	4	10	26	66	74	20
1500	164	89	78	113	6	107	18	51	12	44½	9	5	12½	4	12	30	70	78	24
2000	167	106	78	113	6	126	20	54	16	43½	9	6	17	6	14	30	92	100	20
2500	173	115	88	113	7	139	22	60	12	48½	9	5	18	6	16	36	96	104	24
3000	189	118	88	123	7	142	24	66	18	44½	9	6	20½	6	18	40	102	106	26

2. Service access panels must not be obstructed. Recommended clearances are a minimum of 24".
3. 1-1/2" discharge & inlet flanges at openings.
4. Right hand unit shown, left hand opposite shown.
5. Lifting lug 2"x4" (typical)
6. Dimensions are displayed in inches. Dimensions are subject to change without notice and to manufacturing tolerances.

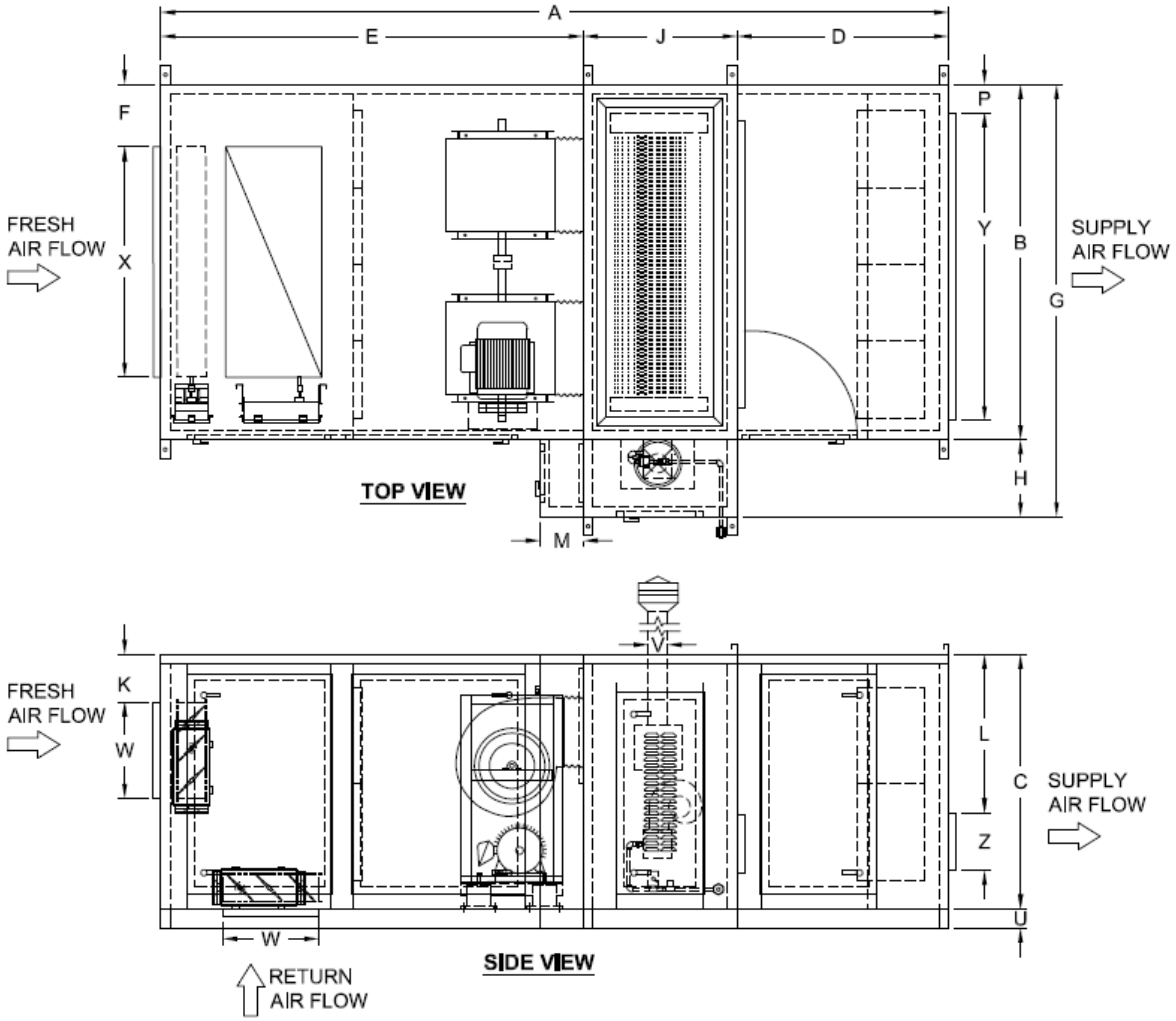
HTDM 82 Indirect-Fired, Horizontal, Gravity Vented c/w Flat Filter, Coil & Mix Box



MODEL	A	B	C	E	F	G	H	J	K	L	M	P	R	U	V	W	X	Y	Z
200	130	36	45	42	56	6	52	16	32	12	33 ½	9	7	4	6	18	18	20	12
400	140	60	45	42	67	6	76	16	32	15	33 ½	9	12	4	8	14	42	36	12
600	140	74	45	42	66	13	90	16	32	10	33 ½	9	8	4	8	20	48	58	12
1000	158	84	55	42	66	6	102	18	50	14	42 ¾	9	5	4	10	26	66	74	20
1500	163	89	78	42	70	6	107	18	51	12	44 ½	9	5	4	12	30	70	78	24
2000	166	106	78	42	70	6	126	20	54	16	43 ½	9	6	6	14	30	92	100	20
2500	172	115	88	42	70	7	139	22	60	12	48½	9	5	6	16	36	96	104	24
3000	178	118	88	42	70	7	142	24	66	18	44 ½	9	6	6	18	40	102	106	26

1. Dimensions are generalized for illustrative purposes. Contact us for a no-obligation design customized to meet your specific needs.
2. Service access panels must not be obstructed. Recommended clearances are minimum 24".
3. 1-1/2" discharge & inlet flanges at openings.
4. Right hand unit shown, left hand opposite shown.
5. Lifting lug 2"x4" (typical)
6. Dimensions are displayed in inches. Dimensions are subject to change without notice and to manufacturing tolerances.

HTDM 82 Indirect-Fired, Horizontal, Gravity Vented C/W Flat Filter, Coil Plenum and Horizontal Discharge

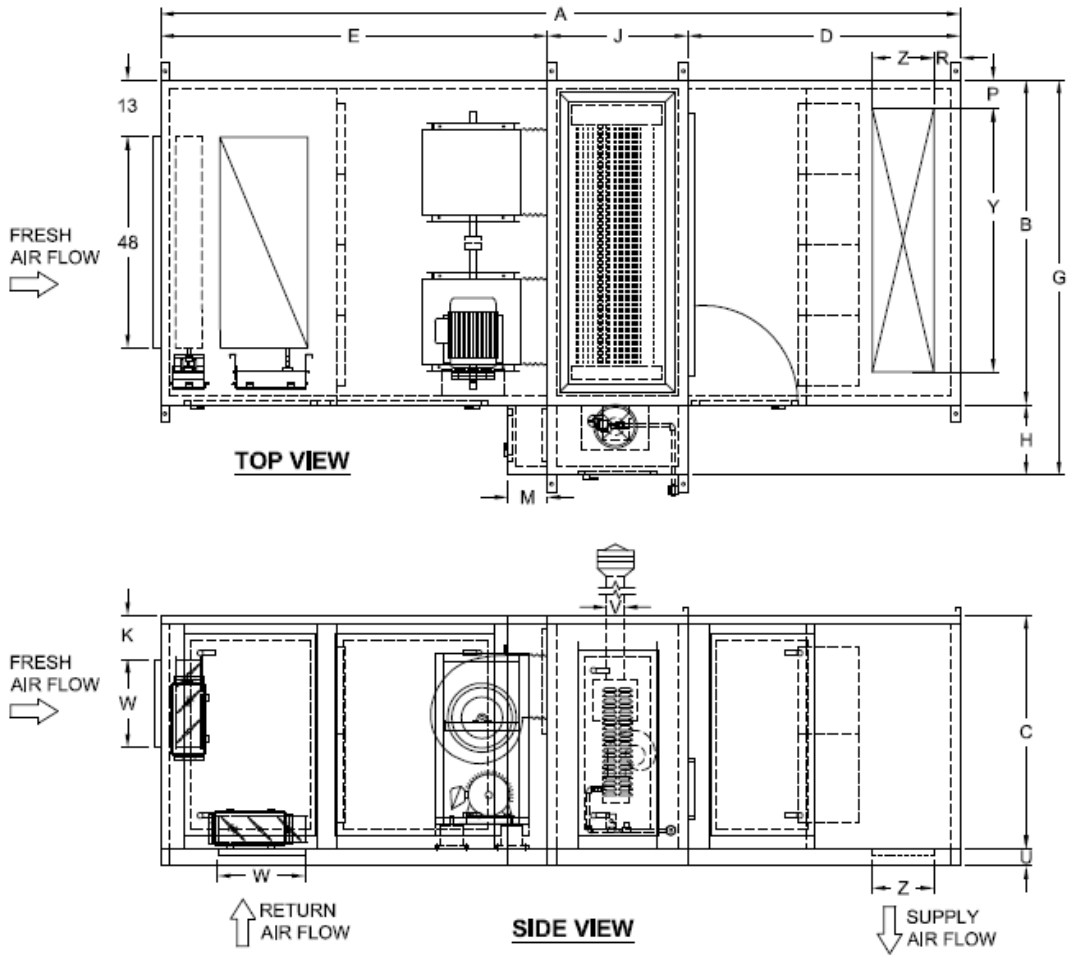


1. Dimensions are generalized for illustrative purposes. Contact us for a no-obligation design customized to meet your specific needs.

MODEL	A	B	C	E	F	G	H	J	K	L	M	P	R	U	V	W	X	Y	Z
200	130	36	45	42	56	6	52	16	32	12	33½	9	7	4	6	18	18	20	12
400	140	60	45	42	67	6	76	16	32	15	33½	9	12	4	8	14	42	36	12
600	140	74	45	42	66	13	90	16	32	10	33½	9	8	4	8	20	48	58	12
1000	158	84	55	42	66	6	102	18	50	14	42 ¾	9	5	4	10	26	66	74	20
1500	163	89	78	42	70	6	107	18	51	12	44½	9	5	4	12	30	70	78	24
2000	166	106	78	42	70	6	126	20	54	16	43½	9	6	6	14	30	92	100	20
2500	172	115	88	42	70	7	139	22	60	12	48½	9	5	6	16	36	96	104	24
3000	178	118	88	42	70	7	142	24	66	18	44½	9	6	6	18	40	102	106	26

2. Service access panels must not be obstructed. Recommended clearances are minimum 24".
3. 1-1/2" discharge & inlet flanges at openings.
4. Right hand unit shown, left hand opposite shown.
5. Lifting lug 2"x4" (typical)
6. Dimensions are displayed in inches. Dimensions are subject to change without notice and to manufacturing tolerances.

HTDM 82 Indirect-Fired, Horizontal, Gravity Vented c/w Flat Filter, Coil Plenum & Bottom Discharge

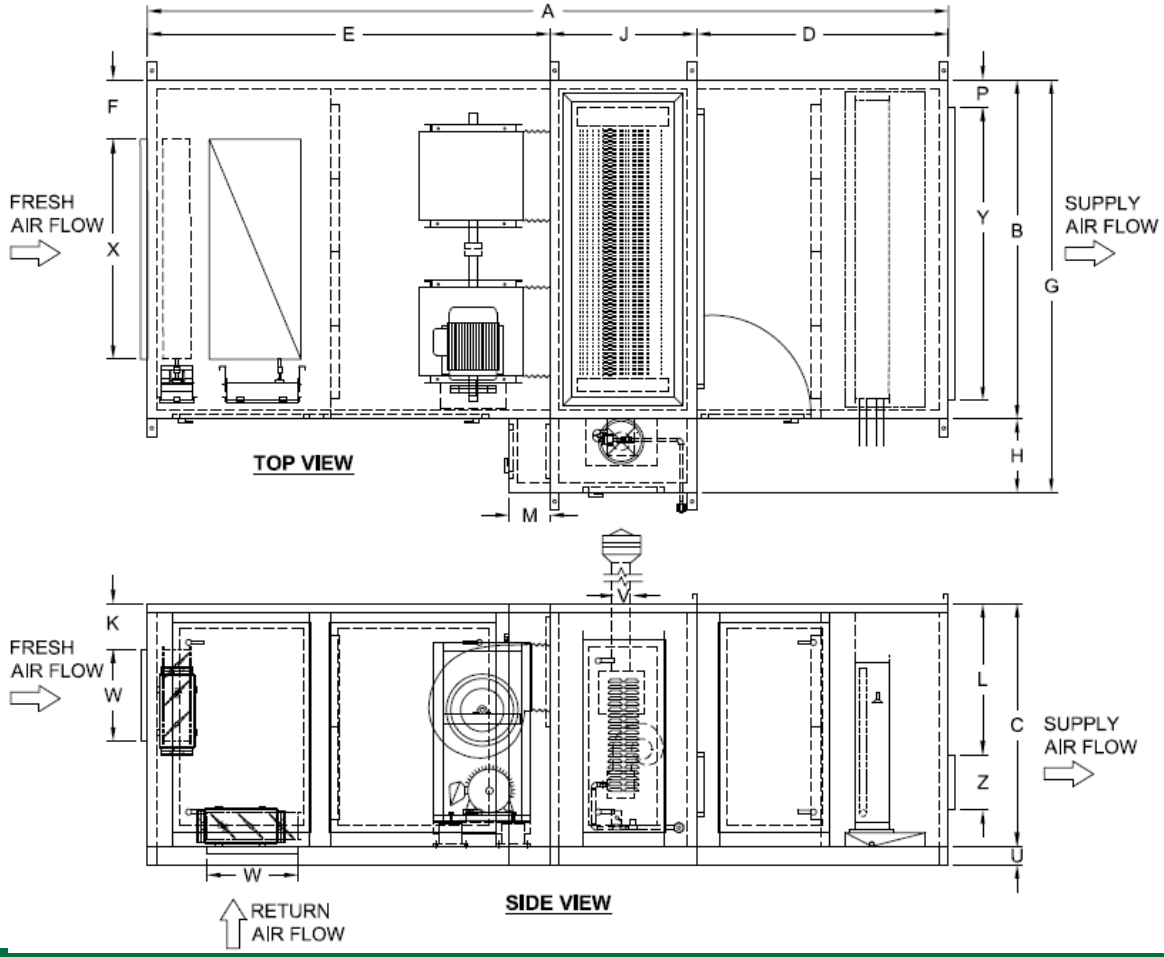


1. Dimensions are generalized for illustrative purposes. Contact us for a no-obligation design customized to meet your specific needs.

MODEL	A	B	C	E	F	G	H	J	K	L	M	P	R	U	V	W	X	Y	Z
200	164	36	45	76	56	6	52	16	32	12	9	7	6	4	6	18	18	20	12
400	180	60	45	82	67	6	76	16	32	15	9	12	6	4	8	14	42	36	12
600	174	74	45	76	66	13	90	16	32	10	9	8	6	4	8	20	48	58	12
1000	198	84	55	82	66	6	102	18	50	14	9	5	6	4	10	26	66	74	20
1500	207	89	78	86	70	6	107	18	51	12	9	5	6	4	12	30	70	78	24
2000	206	106	78	82	70	6	126	20	54	16	9	6	6	6	14	30	92	100	20
2500	216	115	88	86	70	7	139	22	60	12	9	5	6	6	16	36	96	104	24
3000	224	118	88	88	70	7	142	24	66	18	9	6	6	6	18	40	102	106	26

2. Service access panels must not be obstructed. Recommended clearances are a minimum of 24".
3. 1-1/2" discharge & inlet flanges at openings.
4. Right hand unit shown, left hand opposite shown.
5. Lifting lug 2"x4" (typical)
6. Dimensions are displayed in inches. Dimensions are subject to change without notice and to manufacturing tolerances.

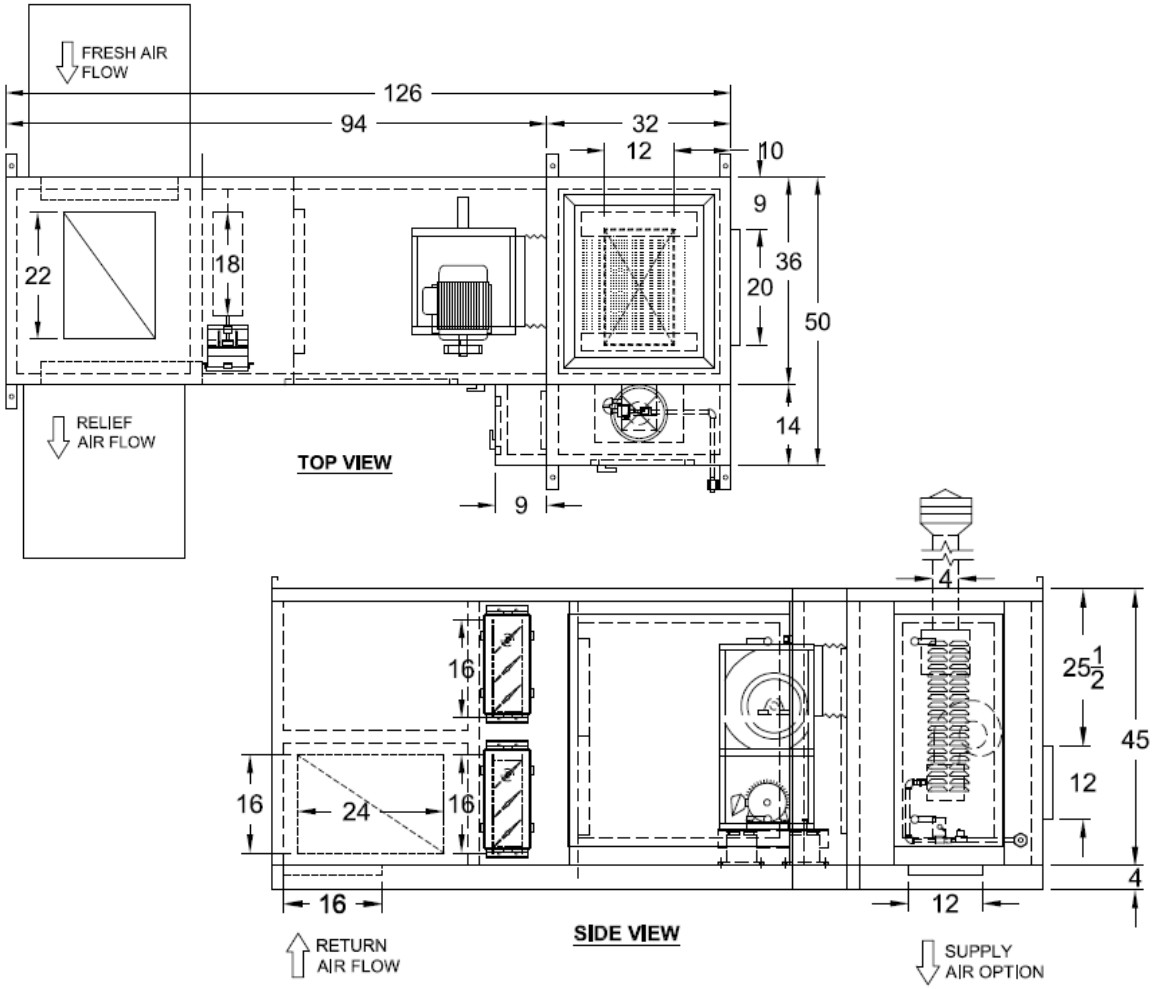
HTDM 82 Indirect-Fired, Horizontal, Gravity Vented c/w Flat Filter, Mix Box, Coil Plenum & Horizontal Discharge



MODEL	A	B	C	E	F	G	H	J	K	L	M	P	R	U	V	W	X	Y	Z
200	146	36	45	42	72	6	52	16	32	12	33½	9	7	4	6	18	18	20	12
400	153	60	45	42	79	6	76	16	32	15	33½	9	12	4	8	14	42	36	12
600	158	74	45	42	84	13	90	16	32	10	33½	9	8	4	8	20	48	58	12
1000	186	84	55	42	94	6	102	18	50	14	42¾	9	5	4	10	26	66	74	20
1500	191	89	78	42	98	6	107	18	51	12	44½	9	5	4	12	30	70	78	24
2000	194	106	78	42	98	6	126	20	54	16	43½	9	6	6	14	30	92	100	20
2500	200	115	88	42	98	7	139	22	60	12	48½	9	5	6	16	36	96	104	24
3000	206	118	88	42	108	7	142	24	66	18	44½	9	6	6	18	40	102	106	26

1. Dimensions are generalized for illustrative purposes. Contact us for a no-obligation design customized to meet your specific needs.
2. Service access panels must not be obstructed. Recommended clearances are minimum 24".
3. 1-1/2" discharge & inlet flanges at openings.
4. Right hand unit shown, left hand opposite shown.
5. Lifting lug 2"x4" (typical)
6. See page 30 for intake and exhaust hood dimensions.
7. Dimensions are displayed in inches. Dimensions are subject to change without notice and to manufacturing tolerances.

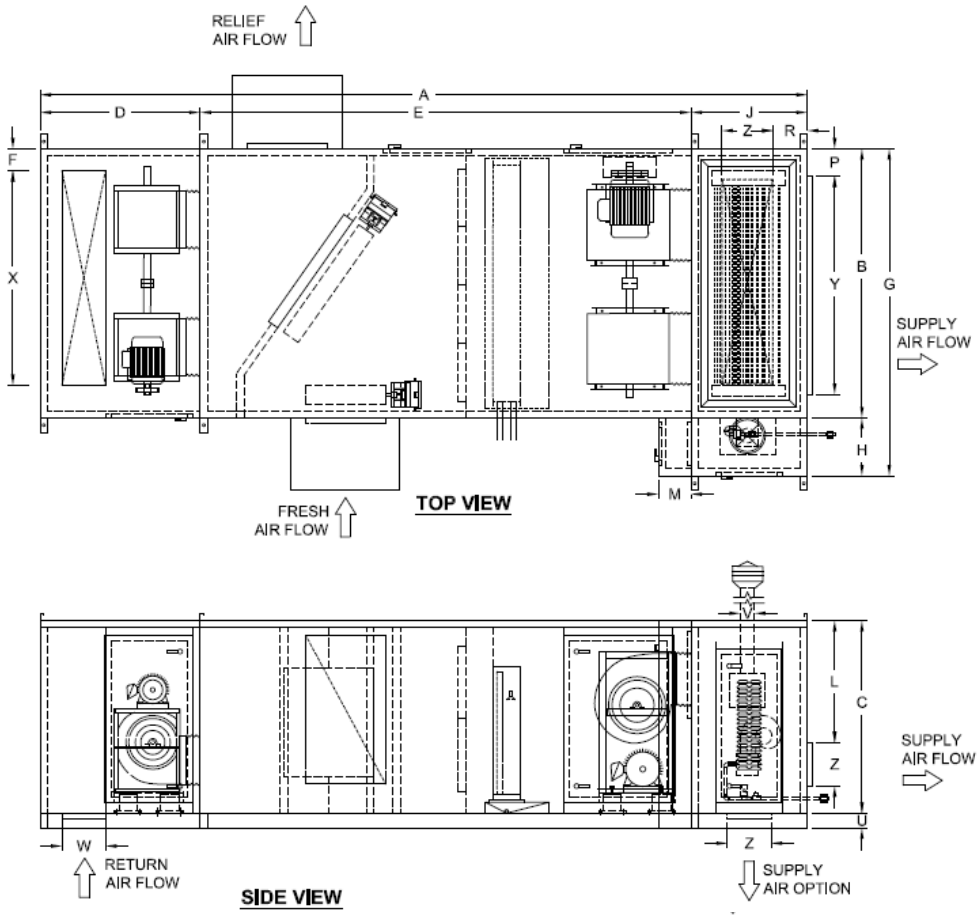
HTDM 82 Indirect-Fired, Horizontal, Gravity Vented c/w Flat Filter & Mix Box w/ Relief Fan



MODEL	A	B	C	E	F	G	H	J	K	L	M	N	P	R	U	V	W	X	Y	Z
400	180	60	45	122	6	76	16	32	15	33 ½	9	26x26	12	10½	4	8	14	42	36	12
600	180	74	45	122	13	90	16	32	10	33 ½	9	30x30	8	10½	4	8	20	48	58	12
1000	202	84	55	122	6	102	18	50	14	42 ¾	N/A	32x32	5	9¼	4	10	26	66	74	20
1500	211	89	78	126	6	107	18	51	12	44 ½	N/A	36x36	5	12½	4	12	30	70	78	24
2000	236	106	78	126	6	126	20	54	16	43½	N/A	36x36	6	17	6	14	30	92	100	20
2500	242	115	88	126	7	139	22	60	12	48½	N/A	42x42	5	18	6	16	36	96	104	24
3000	252	118	88	126	7	142	24	66	18	44½	N/A	46x46	6	20½	6	18	40	102	106	26

1. Dimensions are generalized for illustrative purposes. Contact us for a no-obligation design customized to meet your specific needs.
2. Service access panels must not be obstructed. Recommended clearances are a minimum of 24".
3. 1-1/2" discharge & inlet flanges at openings.
4. Right hand unit shown, left hand opposite shown.
5. Lifting lug 2"x4" (typical)
6. Dimensions are displayed in inches. Dimensions are subject to change without notice and to manufacturing tolerances.

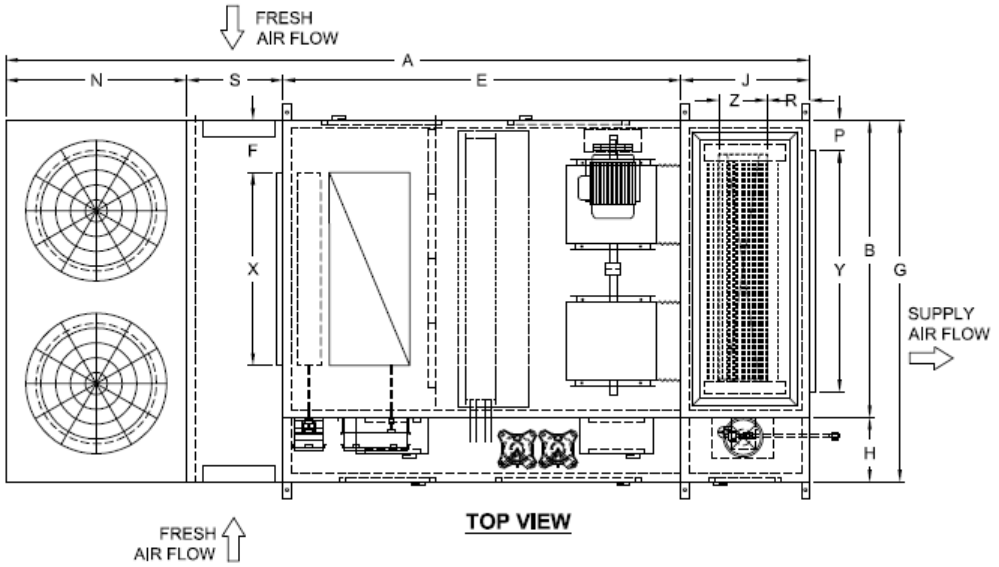
HTDM 82 Indirect-Fired, Horizontal, Gravity Vented c/w Flat Filter, Return Blower Section, Coil & Mix Box w/ Relief Fan

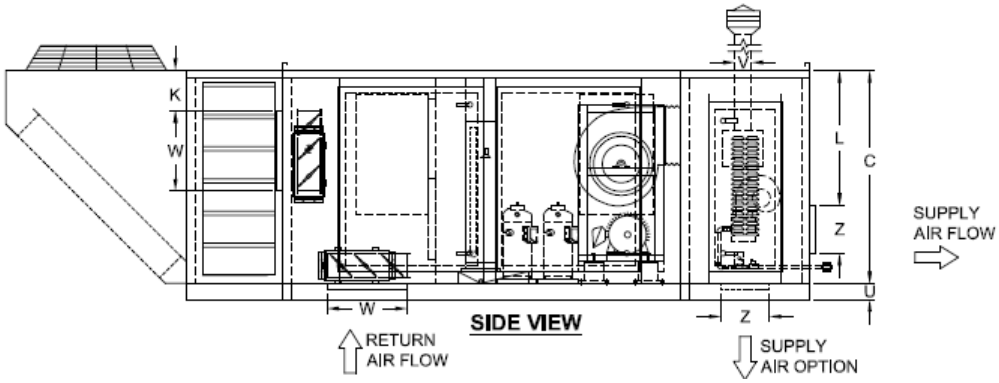


MODEL	A	B	C	E	F	G	H	J	K	L	M	N	P	R	U	V	W	X	Y	Z
200	233	36	45	32	149	52	16	32	12	33½	9	24x24	7	10½	4	6	18	18	20	12
400	222	60	45	34	138	76	16	32	15	33½	9	26x26	12	10½	4	8	14	42	36	12
600	222	74	45	37	138	90	16	32	10	33½	9	30x30	8	10½	4	8	20	48	58	12
1000	245	84	55	42	143	102	18	50	14	42¾	N/A	32x32	5	9¼	4	10	26	66	74	20
1500	250	89	78	45	147	107	18	51	12	44½	N/A	36x36	5	12½	4	12	30	70	78	24
2000	253	106	78	48	147	126	20	54	16	43½	N/A	36x36	6	17	6	14	30	92	100	20
2500	259	115	88	52	147	139	22	60	12	48½	N/A	42x42	5	18	6	16	36	96	104	24
3000	265	118	88	57	147	142	24	66	18	44½	N/A	46x46	6	20½	6	18	40	102	106	26

1. Dimensions are generalized for illustrative purposes. Contact us for a no-obligation design customized to meet your specific needs.
2. Service access panels must not be obstructed. Recommended clearances are a minimum of 24".
3. 1-1/2" discharge & inlet flanges at openings.
4. Right hand unit shown, left hand opposite shown.
5. Lifting lug 2"x4" (typical)
6. Dimensions are displayed in inches. Dimensions are subject to change without notice and to manufacturing tolerances.

HTDM 82 Indirect-Fired, Horizontal, Gravity Vented c/w Flat Filter, DX Coil, Mix Box, Horizontal Discharge and Condenser

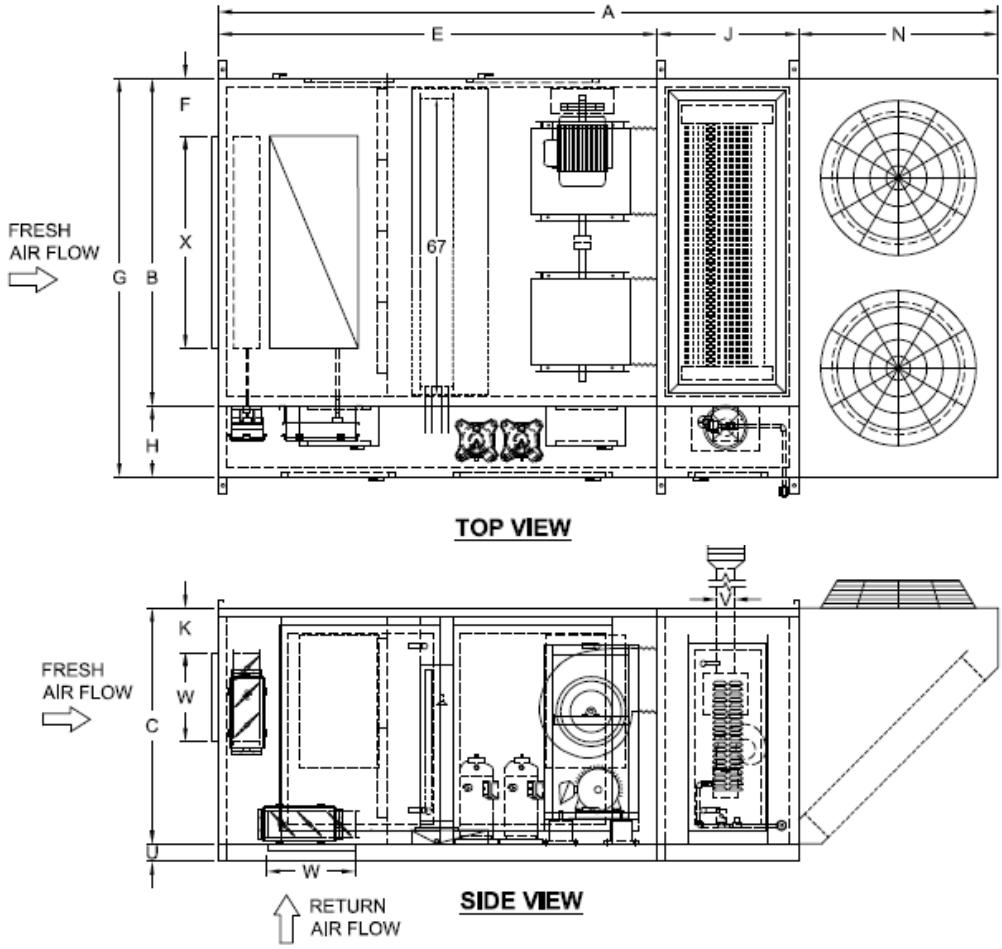




MODEL	A1	A2	A3	B	C	E	F	G	H	J	K	L	N1	N2	N3	P	S	U	V	W	X	Y	Z
200	171	205	-	36	45	83	6	52	16	32	12	33½	42	76	-	7	14	4	6	18	18	20	12
400	183	219	-	60	45	95	6	76	16	32	15	33½	42	78	-	12	14	4	8	14	42	36	12
600	200	235	268	74	45	99	13	90	16	32	10	42¾	45	80	113	8	24	4	8	20	48	58	12
1000	230	267	300	84	55	109	6	102	18	50	14	44½	45	82	115	5	26	4	10	26	66	74	20
1500	237	276	312	89	78	113	6	107	18	51	12	44½	45	84	120	5	28	4	12	30	70	78	24
2000	243	281	319	106	78	113	6	126	20	54	16	43½	48	86	124	6	28	6	14	30	92	100	20
2500	251	291	331	115	88	113	7	139	22	60	12	48½	48	88	130	5	30	6	16	36	96	104	24
3000	267	309	359	118	88	123	7	142	24	66	18	44½	48	90	140	6	30	6	18	40	102	106	26

1. Dimensions are generalized for illustrative purposes. Contact us for a no-obligation design customized to meet your specific needs.
2. Service access panels must not be obstructed. Recommended clearances are a minimum of 24".
3. 1-1/2" discharge & inlet flanges at openings.
4. Right hand unit shown, left hand opposite shown.
5. Lifting lug 2"x4" (typical)
6. Dimensions are displayed in inches. Dimensions are subject to change without notice and to manufacturing tolerances.

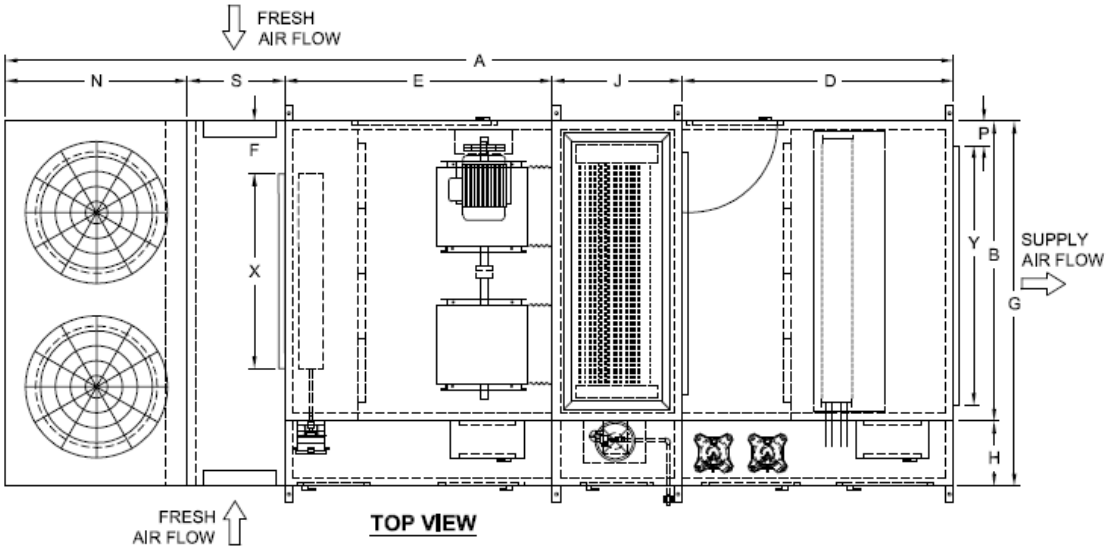
HTDM 82 Indirect-Fired, Horizontal, Gravity Vented c/w Flat Filter, DX Coil, Mix Box, Bottom Discharge & Condenser

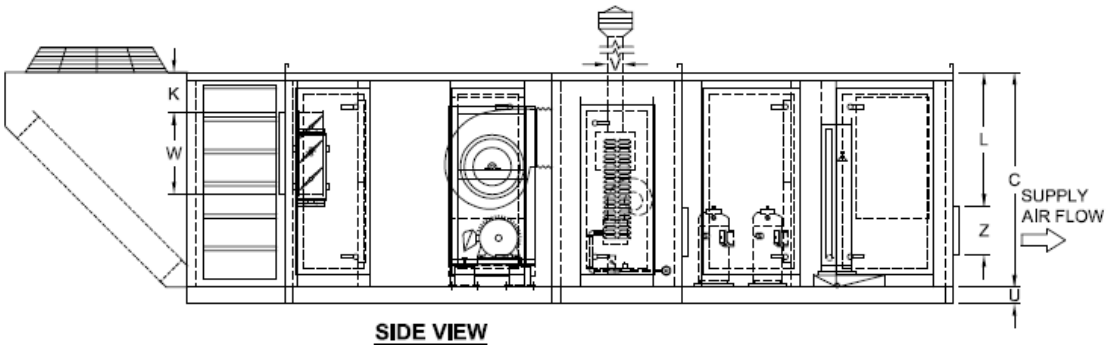


MODEL	A1	A2	A3	B	C	E	F	G	H	J	K	L	N1	N2	N3	P	S	U	V	W	X	Y	Z
200	157	191	-	36	45	83	6	52	16	32	12	42	76	-	7	4	6	14	22	20	12	157	191
400	169	205	-	60	45	95	6	76	16	32	15	42	78	-	12	4	8	14	42	36	12	169	205
600	176	211	244	74	45	99	13	90	16	32	10	45	80	113	8	4	8	20	48	58	12	176	211
1000	204	241	274	84	55	109	6	102	18	50	14	45	82	115	5	4	10	26	66	74	20	204	241
1500	209	248	284	89	78	113	6	107	18	51	12	45	84	120	5	4	12	30	70	78	24	209	248
2000	215	253	291	106	78	113	6	126	20	54	16	48	86	124	6	6	14	30	92	100	20	215	253
2500	221	261	303	115	88	113	7	139	22	60	12	48	88	130	5	6	16	36	96	104	24	221	261
3000	237	279	329	118	88	123	7	142	24	66	18	48	90	140	6	6	18	40	102	106	26	237	279

1. Dimensions are generalized for illustrative purposes. Contact us for a no-obligation design customized to meet your specific needs.
2. Service access panels must not be obstructed. Recommended clearances are minimum 24".
3. 1-1/2" discharge & inlet flanges at openings.
4. Right hand unit shown, left hand opposite shown.
5. Lifting lug 2"x4" (typical)
6. Dimensions are displayed in inches. Dimensions are subject to change without notice and to manufacturing tolerances.

HTDM 82 Indirect-Fired, Horizontal, Gravity Vented c/w Flat Filter, DX Coil Plenum, Horizontal Discharge & Condenser

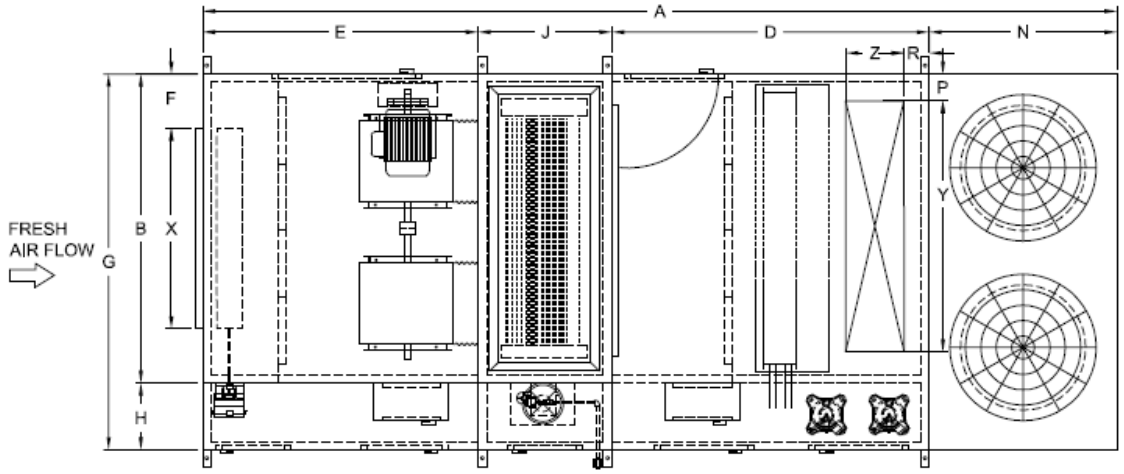




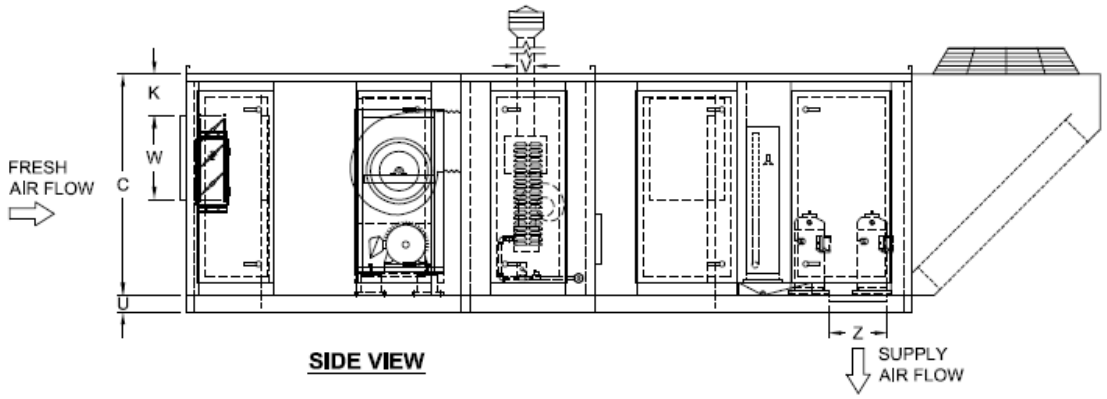
MODEL	A1	A2	A3	B	C	E	F	G	H	J	K	L	N1	N2	N3	P	S	U	V	W	X	Y	Z
200	198	232	-	36	45	54	56	6	52	16	32	12	33½	42	76	-	7	14	4	6	14	22	20
400	208	244	-	60	45	54	66	6	76	16	32	15	33½	42	78	-	12	14	4	8	14	42	36
600	211	246	279	74	45	54	66	13	90	16	32	10	33½	45	80	113	8	24	4	8	20	48	58
1000	241	278	311	84	55	54	66	6	102	18	50	14	42 ¾	45	82	115	5	26	4	10	26	66	74
1500	248	287	323	89	78	54	70	6	107	18	51	12	44 ½	45	84	120	5	28	4	12	30	70	78
2000	254	292	330	106	78	54	70	6	126	20	54	16	43½	48	86	124	6	28	6	14	30	92	100
2500	262	302	344	115	88	54	70	7	139	22	60	12	48½	48	88	130	5	30	6	16	36	96	104
3000	268	310	360	118	88	54	70	7	142	24	66	18	44 ½	48	90	140	6	30	6	18	40	102	106

1. Dimensions are generalized for illustrative purposes. Contact us for a no-obligation design customized to meet your specific needs.
2. Service access panels must not be obstructed. Recommended clearances are a minimum of 24".
3. 1-1/2" discharge & inlet flanges at openings.
4. Right hand unit shown, left hand opposite shown.
5. Lifting lug 2"x4" (typical)
6. Dimensions are displayed in inches. Dimensions are subject to change without notice and to manufacturing tolerances.

HTDM 82 Indirect-Fired, Horizontal, Gravity Vented c/w Flat Filter, DX Coil Plenum, Bottom Discharge & Condenser



TOP VIEW

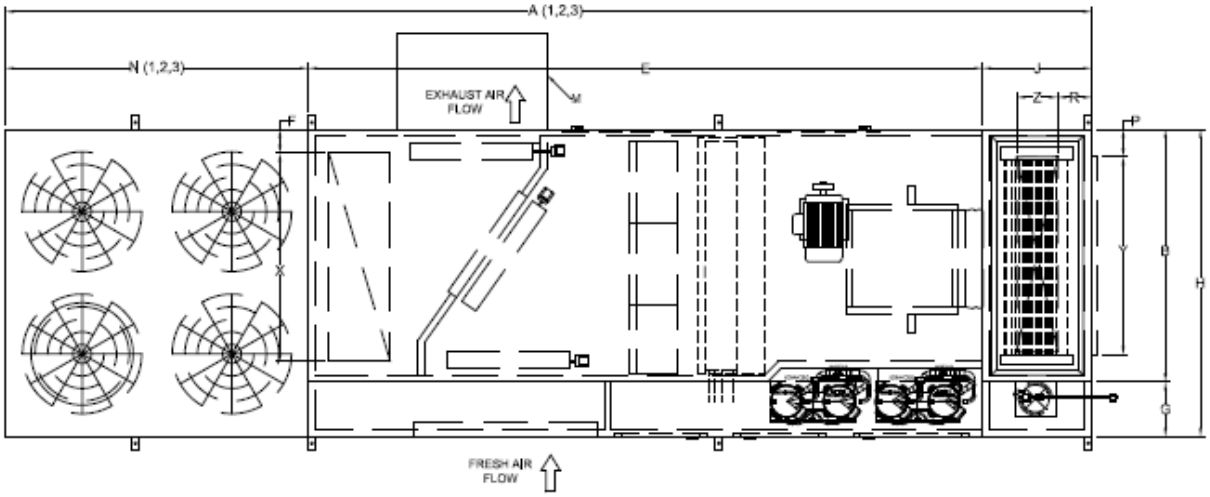


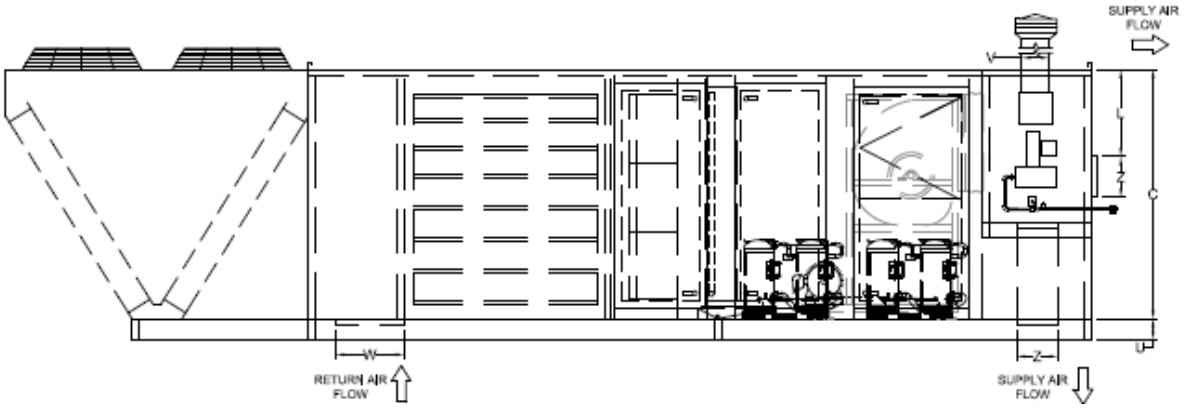
SIDE VIEW

MODEL	A1	A2	A3	B	C	E	F	G	H	J	K	L	N1	N2	N3	P	S	U	V	W	X	Y	Z
200	206	240	-	36	45	76	56	6	52	16	32	12	42	76	-	7	6	4	6	14	22	20	12
400	222	258	-	60	45	82	66	6	76	16	32	15	42	78	-	12	6	4	8	14	42	36	12
600	219	254	287	74	45	76	66	13	90	16	32	10	45	80	113	8	6	4	8	20	48	58	12
1000	243	280	313	84	55	82	66	6	102	18	50	14	45	82	115	5	6	4	10	26	66	74	20
1500	252	291	327	89	78	86	70	6	107	18	51	12	45	84	120	5	6	4	12	30	70	78	24
2000	254	292	330	106	78	82	70	6	126	20	54	16	48	86	124	6	6	6	14	30	92	100	20
2500	264	304	346	115	88	86	70	7	139	22	60	12	48	88	130	5	6	6	16	36	96	104	24
3000	272	314	364	118	88	88	70	7	142	24	66	18	48	90	140	6	6	6	18	40	102	106	26

1. Dimensions are generalized for illustrative purposes. Contact us for a no-obligation design customized to meet your specific needs.
2. Service access panels must not be obstructed. Recommended clearances are a minimum of 24".
3. 1-1/2" discharge & inlet flanges at openings.
4. Right hand unit shown, left hand opposite shown.
5. Lifting lug 2"x4" (typical)
6. Dimensions are displayed in inches. Dimensions are subject to change without notice and to manufacturing tolerances.

HTDM 82 Indirect-Fired, Horizontal, Gravity Vented c/w Flat Filter, DX Coil & Mix Box with Relief Fa & Condenser

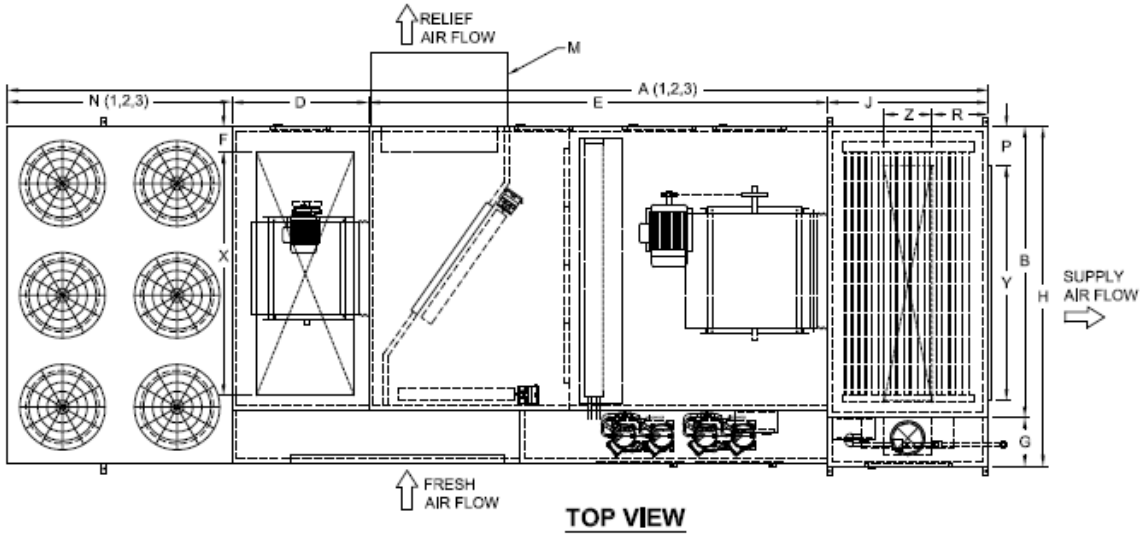


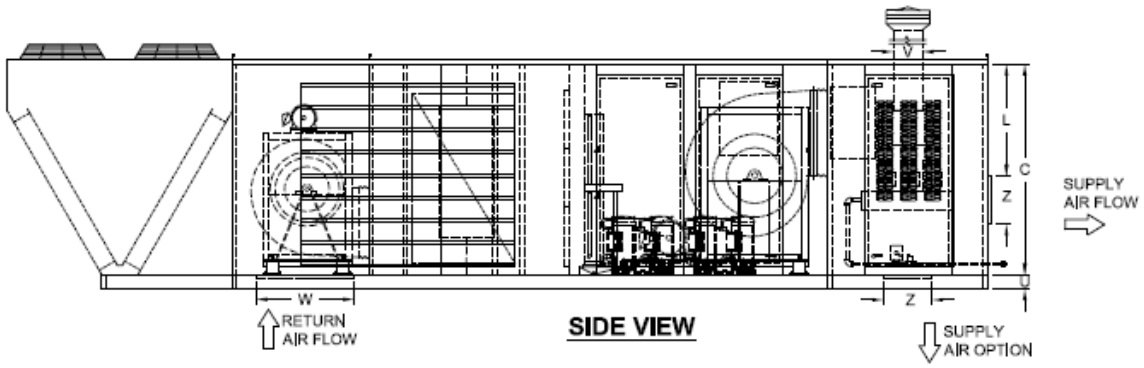


MODEL	A1	A2	A3	B	C	E	F	G	H	J	K	L	N1	N2	N3	P	S	U	V	W	X	Y	Z
200	223	257	-	36	45	149	6	52	16	32	12	33½	24x24	42	76		7	10½	4	6	18	18	20
400	212	248	-	60	45	138	6	76	16	32	15	33½	26x26	42	78		12	10½	4	8	14	42	36
600	215	250	283	74	45	138	13	90	16	32	10	33½	30x30	45	80	113	8	10½	4	8	20	48	58
1000	238	275	308	84	55	143	6	102	18	50	14	42 ¾	32x32	45	82	115	5	9¼	4	10	26	66	74
1500	243	282	318	89	78	147	6	107	18	51	12	44½	36x36	45	84	120	5	12½	4	12	30	70	78
2000	249	287	325	106	78	147	6	126	20	54	16	43 ½	36x36	48	86	124	6	17	6	14	30	92	100
2500	255	295	337	115	88	147	7	139	22	60	12	48 ½	42x42	48	88	130	5	18	6	16	36	96	104
3000	261	303	353	118	88	147	7	142	24	66	18	44 ½	46x46	48	90	140	6	*20½*	6	18	40	102	106

1. Dimensions are generalized for illustrative purposes. Contact us for a no-obligation design customized to meet your specific needs.
2. Service access panels must not be obstructed. Recommended clearances are a minimum of 24".
3. 1-1/2" discharge & inlet flanges at openings.
4. Right hand unit shown, left hand opposite shown.
5. Lifting lug 2"x4" (typical)
6. Dimensions are displayed in inches. Dimensions are subject to change without notice and to manufacturing tolerances.

HTDM 82 Indirect-Fired, Horizontal, Gravity Vented c/w Flat Filter, Return Blower Section, DX Coil & Mix Box with Relief Fa & Condenser

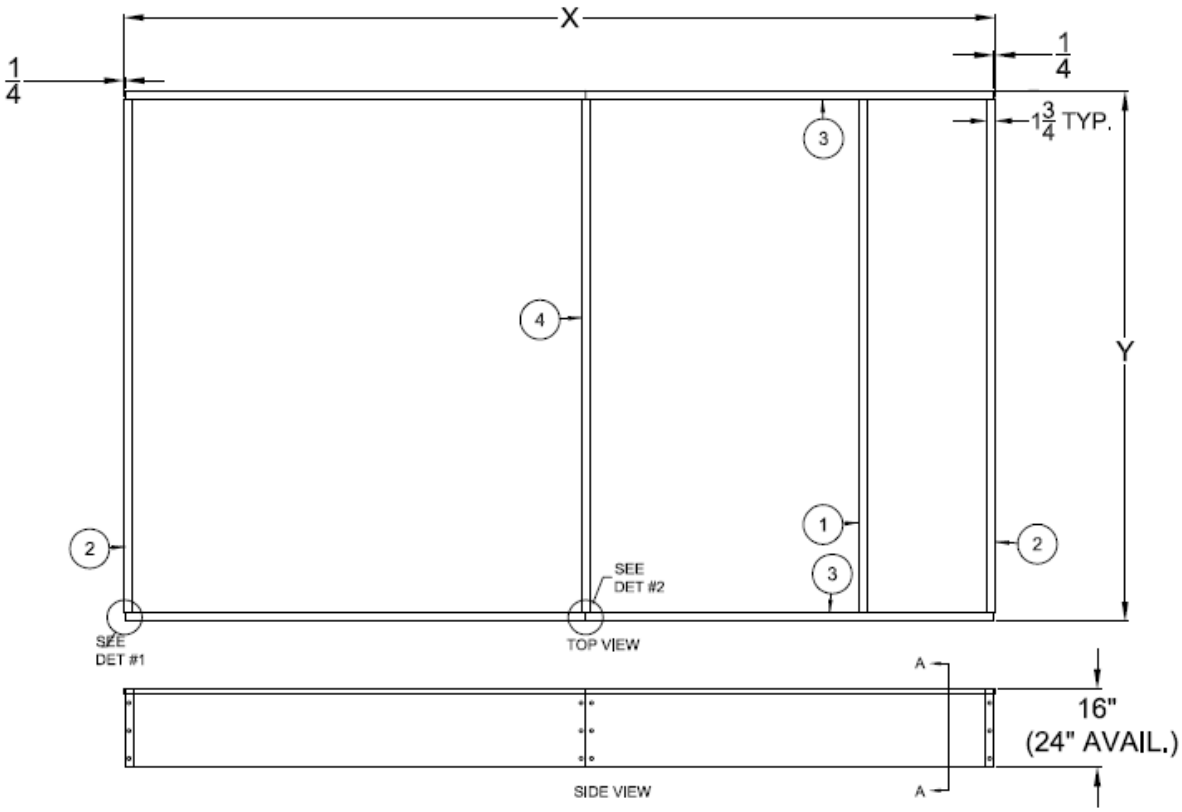




MODEL	A1	A2	A3	B	C	E	F	G	H	J	K	L	N1	N2	N3	P	S	U	V	W	X	Y	Z
200	255	289	-	36	45	32	149	6	52	16	32	12	33½	24x24	42	76	-	7	10½	4	6	18	18
400	246	282	-	60	45	34	138	6	76	16	32	15	33½	26x26	42	78	-	12	10½	4	8	14	42
600	252	287	320	74	45	37	138	13	90	16	32	10	33½	30x30	45	80	113	8	10½	4	8	20	48
1000	280	317	350	84	55	42	143	6	102	18	50	14	42¾	32x32	45	82	115	5	9¼	4	10	26	66
1500	288	327	363	89	78	45	147	6	107	18	51	12	44½	36x36	45	84	120	5	12½	4	12	30	70
2000	297	335	373	106	78	48	147	6	126	20	54	16	43½	36x36	48	86	124	6	17	6	14	30	92
2500	307	347	389	115	88	52	147	7	139	22	60	12	48½	42x42	48	88	130	5	18	6	16	36	96
3000	318	360	410	118	88	57	147	7	142	24	66	18	44½	46x46	48	90	140	6	20½	6	18	40	102

1. Dimensions are generalized for illustrative purposes. Contact us for a no-obligation design customized to meet your specific needs.
2. Service access panels must not be obstructed. Recommended clearances are a minimum of 24".
3. 1-1/2" discharge & inlet flanges at openings.
4. Right hand unit shown, left hand opposite shown.
5. Lifting lug 2"x4" (typical)
6. Dimensions are displayed in inches. Dimensions are subject to change without notice and to manufacturing tolerances.

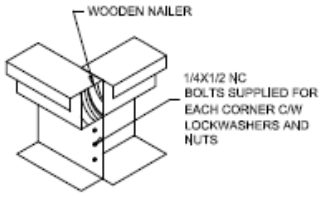
HTDM 82 Indirect-Fired, Horizontal, Gravity Vented c/w Flat Filter, Return Blower Section, DX Coil, Mix Box with Relief Fa & Condenser



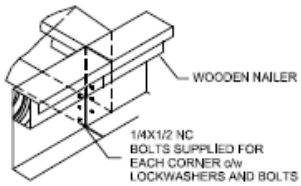
1. DUCT SUPPORT ANGLE (BTM. DISCH. ONLY)
2. CURB ENDS
3. CURB SIDES
4. CENTER CURB BRACING

UNITS WITH 4" BASE FRAME
X; SUBTRACT 4⅝" FROM THE CHOSEN UNIT'S "A" DIMENSION
Y; SUBTRACT 4⅝" FROM THE CHOSEN UNIT'S "B" DIMENSION

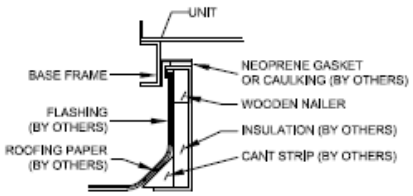
UNITS WITH 6" BASE FRAME
X; SUBTRACT 5¾" FROM THE CHOSEN UNIT'S "A" DIMENSION
Y; SUBTRACT 5¾" FROM THE CHOSEN UNIT'S "B" DIMENSION



CORNER BOLTING ASSEMBLY DETAIL #1



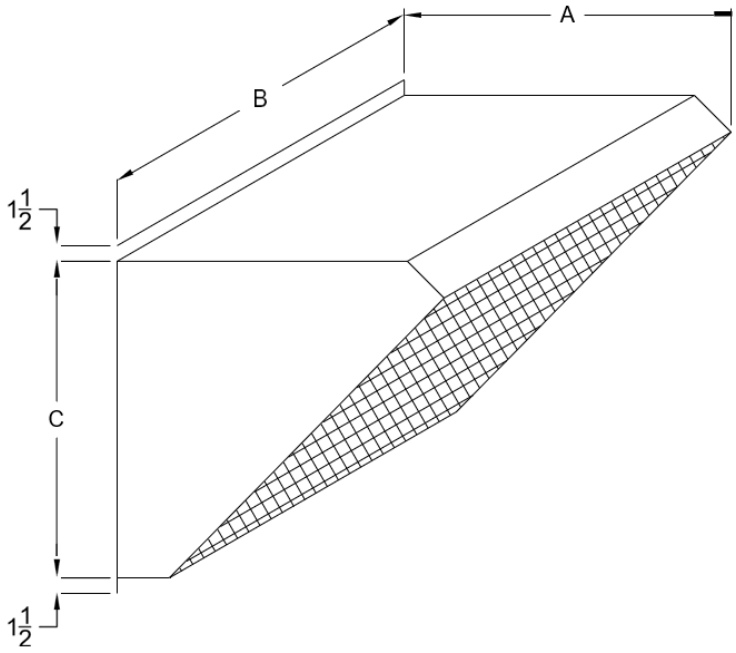
CENTER BRACING
BOLTING ASSEMBLY DETAIL #2



ROOF CURB CROSS SECTION DETAIL AA

1. Dimensions are generalized for illustrative purposes. Customized to meet your specific needs, service access panels must not be obstructed. Recommended clearances are a minimum of 24".
2. 1-1/2" discharge & inlet flanges at openings.
3. Lifting lug 2"x4" (typical)
4. Dimensions are displayed in inches. Dimensions are subject to change without notice and to manufacturing tolerances.

Indirect-Fired Heater Inlet Hood Dimensions



	HTDM 91 PLUS SERIES		
MODEL	A	B	C
200	19.75	36	51.5
400	19.75	60	51.5
600	39	74	51.5
1000	43.5	84	67.5
1500	52.75	89	76.5
2000	79	111	76.5
2500	79	115	86.5
3000	79	118	86.5

Indirect-Fired Specifications

CASING

The unit exterior casing shall be heavy gauge G90 rated bonderized steel. The unit roof shall feature standing seam construction. The entire unit casing shall be insulated with 1-in. thick, 1.5-lb. (2-in. thick 1.5-lb.) fiberglass insulation with hard neoprene backing in a sandwich wall fashion (22-gauge solid liner). The unit exterior shall be finished with industrial enamel (catalyzed epoxy) paint. An integral welded iron channel frame shall support the unit casing. The structural iron frame shall be sandblasted, primed, and finished with industrial enamel (catalyzed epoxy) paint.

BLOWER/MOTOR SECTION

The fan section and motor assembly shall be constructed in accordance with the requirements of the Air Moving and Conditioning Association (AMCA). The assembly shall be designed to house the fan(s), bearings, motor, and v-belts, which shall be selected for at least 50% above the rated motor capacity. The fan(s) and motor shall be mounted on a welded unitary base made of angle iron frame. The frame shall be sandblasted, primed, & finished with industrial enamel (catalyzed epoxy) paint. The unitary base shall be provided with seismic spring vibration isolation. The blower section shall have a hinged access door with Ventlock handles to allow easy maintenance of filters and belts. The NEMA T-Frame motor shall be mounted on an adjustable base located within the fan section. The blower wheel shall be statically and dynamically balanced, and mounted on a turned, ground and polished shaft with rigid bearing supports. The shaft shall be designed with a maximum operating speed not exceeding 75% of the first critical speed. The bearings shall be split taper lock ball bearing type L20 minimum life of 100,000 hours (L10 200 kHr).

Fan performance shall be based on tests conducted in accordance with AMCA Standard Test Code for Air moving Devices. (All fans shall have sharply rising pressure characteristic extending throughout the operating range and continuing to rise well beyond the efficiency peak to assure quiet and stable operation under all conditions. Horsepower characteristics shall be truly non-overloading and shall reach a peak in the normal selection area.) Fan manufacturer shall provide sound power ratings in the eight octave bands, which shall be based on AMCA Standard 300-67, test, setup number one. Sound power ratings shall be referenced 10-12 watts. A factory dynamic balance shall be made on all fans after their assembly. An IRD or PMC analyzer shall be used to measure velocity, and the final reading shall not exceed 0.1 inches per second. The exact level of vibration shall be recorded on the fan as proof of the final dynamic balance at the factory.

HTDM TYPE HEAT EXCHANGER

The heat exchanger shall be of a two-pass design, made up of at least 16-gauge stainless steel drum and tubes. The primary and secondary heat transfer surfaces shall be constructed of Type 409 series stainless steel, with internal stainless steel high efficiency enhancing baffles. The stainless-steel tubes shall be continuously welded into the secondary front and rear header tube sheets to ensure an airtight seal. Units shall be provided with multiple condensate drains. The heat exchanger section shall have an internal radiation shield to maintain a jacket loss of less than 2% of rated output. All heat transfer surfaces, including headers and the front collector box, shall be inside the casing and in the airstream.

The construction of the heat exchanger shall permit free, unrestricted lateral, vertical, and peripheral expansion during the heating and cooling cycle without damage or strain to any part. The burner shall be constructed with at least 14-gauge stainless steel and with the air baffles being made up of 430 stainless steel to ensure high durability and life of the burner. The burner assembly shall be a blow through positive pressure type with an intermittent pilot ignition system. Flame supervision shall be with a solid state programmed flame relay complete with flame rod. The unit's burner motor and modulating gas valve must be electronically controlled to always guarantee the customer a highly efficient unit and applications. The unit efficiency shall be a minimum of 80% through the entire operation.

range and shall be independently tested and verified by ETL. The main and pilot manifolds shall be completely factory pre-piped to the burner. This assembly shall be wired and include the following minimum components; main and pilot manual shut-off valves, main and pilot regulators, main and pilot automatic shut off valves and adequate unions and test ports for unconstrained service. There must also be a means of collecting and disposal of condensate formed in the flue gas by means of a 409 stainless steel flue box with drain and heat exchanger drains. Drains shall be made of copper (stainless steel) tubing.

DAMPERS & FILTER SECTION

The dampers are galvanized steel (aluminum airfoil low leak) type (with seals). The dampers shall be equipped with 2-position (modulating) actuators. The filters shall be 2" pleated throwaway type with minimum of 85% arrestance and 30% efficiency. Filter access shall be through a latched and gasketed access door located on both sides of the unit. (Final filters shall be 4- or 12-inch-high efficiency cartridge filters.)

EVAPORATOR COILS

Evaporator coils are intended for use with a wide range of applications and refrigerant types. Coils are to be designed to maximize performance under specified conditions with minimal air-side pressure drop. Coils shall be UL recognized as Refrigerant Containing Component. Coils to be used with refrigerant R-410A shall have undergone cycle testing and shall be safety listed with 750 psig rating. Tubes and return bends shall be constructed from seamless UNS C12200 copper conforming to ASTM B224 and ASTM E527. Properties shall be O50 light annealed with a maximum grain size of 0.040 mm. Tubes are mechanically expanded into fins (secondary surface) for maximum heat transfer. Materials are to be 3/8" diameter x (0.014, 0.022) wall thickness, 1/2" diameter x (0.016, 0.025) wall thickness, or 5/8" diameter x (0.020, 0.025, 0.035, 0.049) wall thickness. Secondary surface (fins) shall be of the plate-fin design using aluminum or copper, with die-formed collars. Fan is designed to be flat, waffle, or sinewave in a staggered tube pattern to meet performance requirements.

Collars will hold fin spacing at specified density and cover the entire tube surface. Aluminum properties are to be Alloy 1100 per ASTM B209, with O (soft) temper; copper is to be Alloy 11000 per ASTM B152-06 with soft (anneal) temper. Fins are to be free of oils and oxidation. Headers are to be constructed of seamless UNS C12200, Type L (drawn) copper material sized to match specified connection size. Type K (drawn) copper headers shall be offered as optional material.

Die-formed copper end caps are brazed on the inside of the headers, unless spun-closed (for sized up to 1-3/8"). Evaporator coils shall be designed with brass liquid distributors (as required), and copper sweat suction connections. Distributors shall be capped using soft solder for ease of cap removal; suction connections shall be capped. Coil casing material shall be of G90 galvanized steel, 16 gauge minimum. Heavier material, stainless steel, copper, or aluminum casing are to be provided as required.

Intermediate tube supports are to be provided on all coils 48" and longer fin length. Coil casing on top and bottom of coils are to have double-flange construction, allowing for vertical stacking of coils. All coils are to be brazed with a minimum of 5% silver content (BCup-3) filler material to ensure joint integrity. Coils shall be tested at 550 psig using dry nitrogen, submerged under water. Dual- operator verification shall determine that all coils are leak-free. Coils shall be shipped with nitrogen charge to verify leak-free integrity, and to prevent moisture migration into coil. Coils shall be certified to withstand 750 psig working pressure.

CONDENSER COILS

Condenser coils are intended for use with a wide range of applications and refrigerant types. Coils are to be designed to maximize performance under specified conditions with minimal air-side pressure drop. Coils shall be UL recognized as Refrigerant Containing Component. Coils to be used with refrigerant R-410A shall have undergone cycle testing and shall be safety listed with 750 psig rating. Tubes and return bends shall be constructed from seamless UNS C12200 copper conforming to ASTM B224 and ASTM E527. Properties shall be O50 light annealed with a maximum grain size of 0.040 mm. Tubes are mechanically expanded into fins (secondary surface) for maximum heat transfer. Materials are to be 3/8" diameter x (0.014, 0.022) wall thickness, 1/2" diameter x (0.016, 0.025) wall thickness, or 5/8" diameter x (0.020, 0.025, 0.035, 0.049) wall thickness. Internally enhanced rifled or cross-hatched tubes can be offered as an option. Secondary surface (fins) shall be of the plate-fin design using aluminum or copper, with die-formed collars. Fin design to be flat, waffle, or sinewave in a staggered tube pattern to meet performance requirements.

Collars will hold fin spacing at specified density and cover the entire tube surface. Aluminum properties are to be Alloy 1100 per ASTM B209, with O (soft) temper; copper is to be Alloy 11000 per ASTM B152-06 with soft (anneal) temper. Fins are to be free of oils and oxidation. Headers are to be constructed of seamless UNS C12200, Type L (drawn) copper material sized to match specified connection size. Type K (drawn) copper headers shall be offered as optional material. Die-formed copper end caps are brazed on the inside of the headers, unless spun-closed (for sized up to 1-3/8"). Condenser coils shall be designed with copper sweat connections and shall be shipped with caps on connections. Coil casing material shall be of G90 galvanized steel, 16 gauge minimum. Heavier material, stainless steel, copper, or aluminum casing are to be provided as required. Coils designed for hot-gas applications shall have oversized tube sheet holes for hot gas feeds to allow for free expansion and contraction of tubes during operation.

Intermediate tube supports are to be provided on all coils 48" and longer fin length. Coil casing on top and bottom of coils are to have double-flange construction, allowing for vertical stacking of coils. All coils are to be brazed with a minimum of 5% silver content (BCup-3) filler material to ensure joint integrity. Coils shall be tested at 550 psig using dry nitrogen, submerged under water. Dual- operator verification shall determine that all coils are leak-free. Coils shall be shipped with nitrogen charge to verify leak-free integrity, and to prevent moisture migration into coil. Coils shall be certified to withstand 750 psig working pressure.

REFRIGERATION COMPRESSORS

Hermetic compressors- Compressors shall be set on resilient neoprene mounts and complete with line voltage break internal overload protection, internal pressure relief valve and crankcase heater. Each unit shall have a minimum of two compressors or a single digital scroll compressor. Whereby a unit utilizing two compressors in tandem, the first stage compressor must be a digital scroll operating with an Emerson EC3/EC2 series stand-alone superheat controller with a built-in synchronization control for the digital scroll. Unit will provide modulation on cooling. Multiple refrigeration circuits shall be separate from each other. Refrigeration circuits shall be complete with liquid line filter-driers. Service ports fitted with Schraeder fittings and combination sight glass moisture indicators. Units shall incorporate electronic expansion valves and VFD controlled condenser fans operating on a floating head design. Thermostatic expansion valves and hot gas bypass valves will not be accepted. Each system shall be factory run and adjusted prior to shipment. Controls shall include:

- Compressor motor contactors
- Overload protection control
- Cooling relays
- Ambient compressor lockout
- Dual pressure controls
- Anti-cycle timers

Packaged units shall operate down to 50 degrees Fahrenheit as standard. Minus 40 refrigeration systems are available as an option. Compressors shall be located on the side of the unit in a service enclosure complete with hinged access doors.