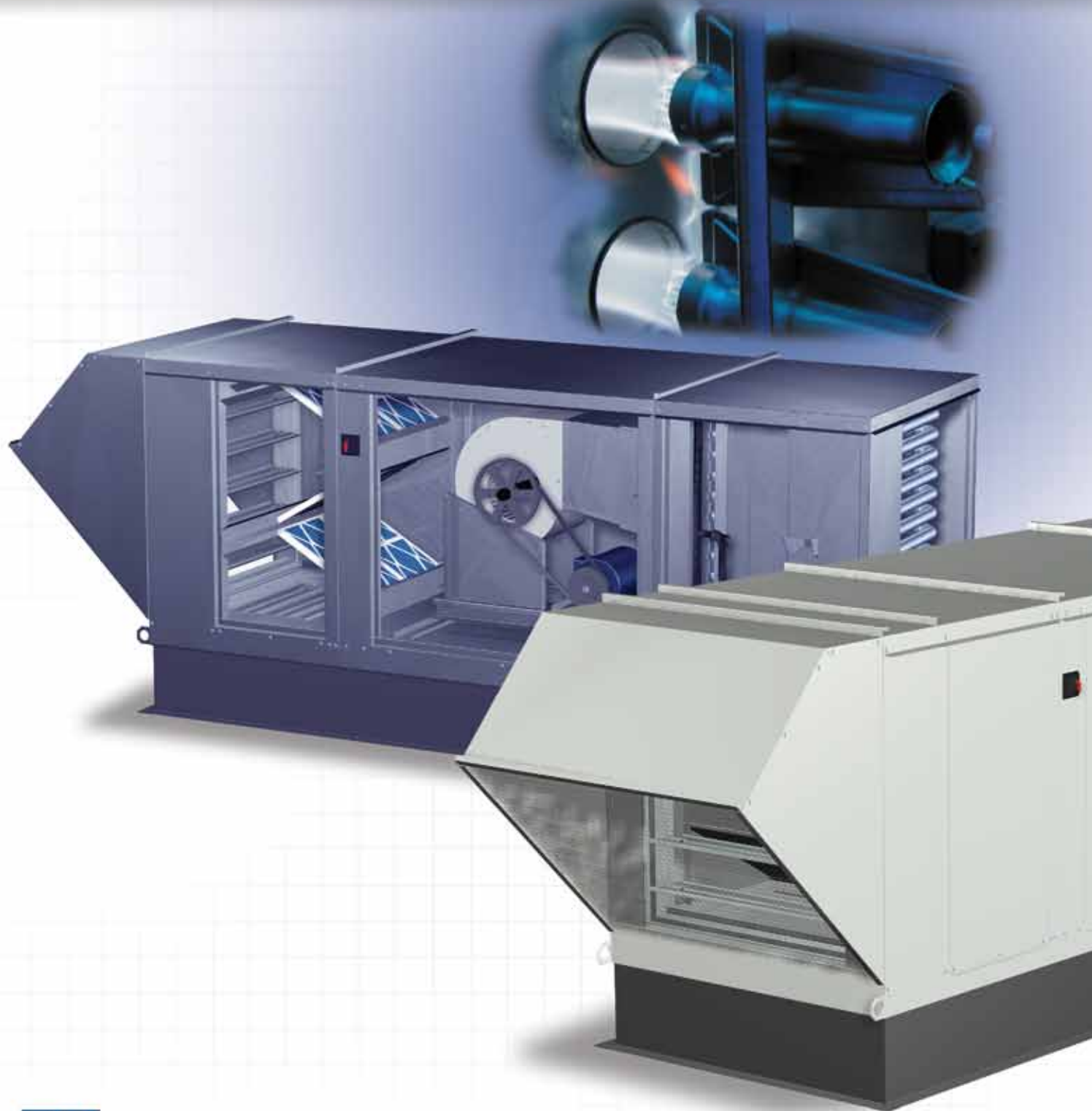


Modular Heating & Ventilating Unit

Model IGX-HV

- Indirect Gas-Fired Heating
- Evaporative • Chilled Water • DX Cooling



Model IGX-HV Indirect Gas-Fired Heating and Ventilating Unit Indoor/Outdoor Installations

All Greenheck model IGX-HV units feature 80% efficient indirect gas-fired furnace(s), filtered mixing box section, fan section, and are ETL Listed to the UL-1995 test standard. Heating capacities range from 100,000 to 1,200,000 Btu/hr and airflow volumes are available up to 15,000 cfm.

A modular design concept enables the flexibility to customize each product for its application. Modules are then factory assembled and wired to minimize field installation labor. The result is a semi-custom product at an attractive cost.

Indirect Gas-Fired Furnaces

The Greenheck furnace is designed for top-notch performance and long life, combining quality components with expert craftsmanship. Unique to our furnace is a **post purge cycle**, which runs the combustion fan after the unit is shut down to vent hot air and moisture out of the heat exchanger. The elimination of these corrosion catalysts adds years to the life of the heat exchanger.

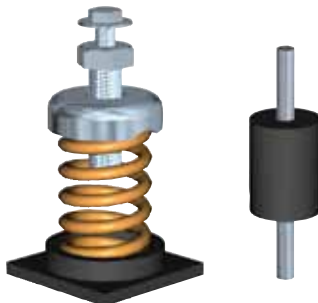


Other key features of our furnace are listed below:

- Power vented
- 80% thermal efficiency
- Seamless tubes
- Electronic staged gas controls
- Electronic modulating gas controls
- Aluminized steel or stainless steel heat exchanger
- Direct spark ignition system
- Easy access burner controls
- ETL Listed to ANSI Standard Z83.8
- Solid state automatic ignition module

Vibration Isolators

The entire fan and motor assembly is mounted on vibration isolators to minimize noise transmission into the building. Neoprene isolators are standard on all units, spring isolators are optional.



IGX-HV shown with horizontal discharge.

Reliable Fan Performance

Air performance ratings from Greenheck's third-party accredited test chamber ensure accurate data.

Fans are constructed of heavy gauge steel and designed for high efficiency and low sound levels. Wheels are statically and dynamically balanced to ensure vibration free operation.



Control Center

The control center includes the following standard components:

- Magnetic motor starter with solid state overload protection
- Control transformer
- Disconnect switch
- Separately fused motor
- Distribution terminal strip



Premium grade control components are selected for reliable operation. All electrical components are UL Listed, recognized or classified. Control centers are factory prewired for single point power connection.

Factory Wired and Tested

All units are tested prior to shipment. Units are checked for vibration and proper operation.

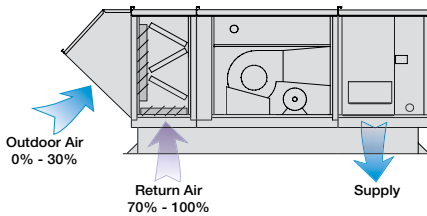


Heating and Ventilating Control

Three heating and ventilating options are available to provide proper tempering and fulfill varying requirements for fresh outdoor air. In all cases, heating and cooling functions are controlled by a room thermostat provided by Greenheck or a DDC system (by others).

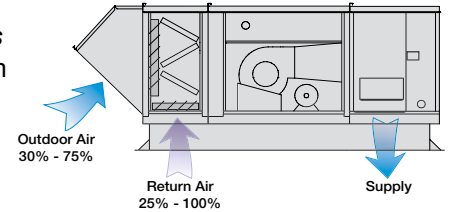
HV1: 0%-30% Minimum Outdoor Air

HV1 is the most common among heating and ventilating units, allowing you to set the minimum outdoor air volume between 0 and 30% of the total supply air volume. With the relatively low percentage of outdoor air, mixed air temperatures are mild and stable. 1-stage heating and/or cooling is recommended. (2-stage or electronic modulation is optional).



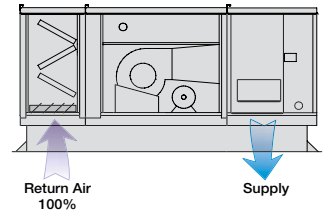
HV2: 30%-75% Minimum Outdoor Air

The HV2 option is required when the minimum outdoor air volume exceeds 30% of the total supply air volume. With higher outdoor air volumes, mixed air temperatures can vary greatly. **Accordingly, 2-stage heating and/or cooling is recommended.** Also, an airstream override thermostat is standard with HV2 to prevent cold air discharge (below 55° F) when the thermostat is satisfied. (electronic modulation is optional).



HV3: 100% Return Air

The HV3 option is available when no outdoor air is needed. With relatively stable return air conditions, **1-stage heating and/or cooling is strongly recommended.** (2-stage or electronic modulation is optional).



Thermostat Options

Basic bimetal thermostats with mercury switches or fully programmable electronic thermostats are available as part of your IGX-HV system. Match your heating, cooling, staging, and operational requirements to the appropriate thermostat.

TC1: 1-Stage Heating / Cooling

TC1 is a coiled bimetal thermostat used for single-stage heating, cooling or heating-cooling systems.



TC2: 2-Stage Heating

TC2 is a coiled bimetal thermostat used for 2-stage heating systems.



TC3: 2-Stage Heating / 2-Stage Cooling

TC3 is a coiled bimetal thermostat used for 2-stage heating, cooling, or heating-cooling systems. It includes an adjustable heat anticipator, stops, and a locking cover.



TC4: Programmable

TC4 has full seven-day program capability. The thermostat can be set for four times and eight temperature settings each day of the week. It can control up to two stages of heating and two stages of cooling.



TC5: Deluxe Programmable

TC5 has full seven-day program capability. The thermostat can be set for two occupied and two unoccupied times with adjustable temperature settings for each day of the week. It can control up to three stages of heating and two stages of cooling. The Intelligent Fan™ feature energizes the fan continuously during occupied mode and intermittently with a call for heating or cooling in unoccupied mode.



The mixing box (shown at right) includes outdoor air and return air low leakage control dampers in a face and bypass configuration. Either two-inch pleated or aluminum mesh filters are available within the mixing box section. Double-wall construction is optional.

A mixing box control option must be specified for every IGX-HV unit. Greenheck offers eight mixing box control options that accommodate a wide variety of applications. The economizer cooling and mixing box options are described below. Specify only one control box option per unit.

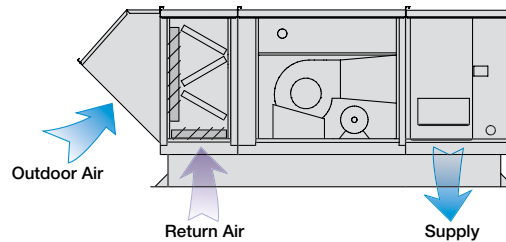


Mixing Box Controls with Economizer Cooling

The economizer controls package enables free cooling using outdoor air. All economizer cooling (EC) options include a modulating actuator for controlling outdoor and return air dampers, and a minimum outdoor air positioner. During a call for heating the economizer is locked out and the outdoor air damper holds at the minimum position.

EC1: Outdoor Temperature Reference

The economizer controller positions the mixing box dampers to achieve 55°F mixed temperature when the thermostat calls for cooling AND the outdoor air temperature is below the economizer set point. If outdoor air temperature is between 55°F and the economizer set point, the dampers will modulate to the 100% outdoor air position. Above the set point, the outdoor air damper is held at the minimum position. The set point is field adjustable and the outdoor air sensor is factory mounted.



EC3: Airstream Temperature Reference

The economizer controller compares the temperatures of the outdoor air and return air when the thermostat calls for cooling. The mixing box dampers are then positioned to maximize the airflow of the cooler airstream. When outdoor air temperature is sufficiently cool, the mixing box dampers will modulate to provide 55°F mixed air. The outdoor air sensor is factory mounted. The return air sensors are field installed.

EC2: Outdoor Enthalpy Reference

Same as EC1, except economizer set point is based on outdoor air enthalpy.

EC4: Airstream Enthalpy Reference

Same as EC3, except airstream *enthalpy* values are compared.

Mixing Box Controls (No Economizer)

In addition to the Economizer Cooling options described above, Greenheck offers four mixing box (MB) control options for applications where a factory provided economizer package is not desired.

MB1: Minimum Outdoor Air Positioner

The MB1 option includes a modulating actuator and potentiometer that control the outdoor air and return air damper positions. When the unit is energized, the dampers will travel to the position corresponding to the potentiometer setting, providing the desired amount of outdoor air. When the unit is powered off, the outdoor air damper closes to prevent backdrafting. To adjust the damper settings, simply dial the potentiometer (shown above) to desired operating position of the outdoor air damper.



MB2: 2-10 Volt External Signal

The MB2 option includes a modulating actuator that is controlled by an external 2-10 volt signal. This option is appropriate for applications that call for a building automation system that will control the mixing box dampers.

MB3: 4-20 mA External Signal

The MB3 option includes a modulating actuator that is controlled by an external 4-20 mA signal. Like the MB2 option, this option is appropriate for applications that call for a building automation system that will control the mixing box dampers.

MB4: Manual Quadrant

The MB4 option consists of a manual quadrant that enables the outdoor air and return air dampers to be secured into a single position. The primary function is to introduce the specified minimum outdoor air volume during operation. Dampers remain in the same position when the unit is powered off.



Evaporative Cooling

An evaporative cooling section includes a galvanized steel housing with a louvered intake, two inch aluminum mesh filters and a stainless steel evaporative cooling media housing. The evaporative cooling media is CELdek or GLASdek and has a depth of 12 inches for 90% cooling effectiveness.

Drain and overflow lines are conveniently stubbed through the side of the cooling section. The supply line connection is field located where convenient.

IGX-HV airflow capacity for evaporative cooling is up to 14,000 cfm. Below 9,000 cfm, evaporative cooling modules ship attached and factory wired. Field attachment is required for airflow above 9,000 cfm.

Mixing Box Controls:

Mixing box control option EC1 is recommended for use with evaporative cooling. On a call for cooling when the

outdoor air temperature is below the economizer set point, the dampers modulate to provide cool mixed temperatures down to 55°F. When the outdoor air is above the economizer set point, the evaporative cooling section is energized and the dampers travel to the 100% outdoor air position.



The mixing box options are NOT recommended in conjunction with evaporative cooling.

Cooling Coils

Model IGX-HV boasts the flexibility of chilled water or direct expansion (DX) cooling with capacity to 11,000 cfm. The cooling section includes the cooling coil, stainless steel drain pan and insulated double wall construction. Drain and coil connections are stubbed through the wall for convenience.

For proper coil sizing, use Greenheck's Computer Aided Product Selection (CAPS) program or contact your local representative. Four and six row coils are available.

Cooling coil sections are installed downstream of the mixing box section for a draw through arrangement. This provides a streamlined transition to adjacent IGX-HV sections. DX coils require remote condensing units.

Mixing Box Controls:

All mixing box and economizer control options are available with chilled water or DX cooling coils.

For economizer climates, the EC1 option is recommended. Mixing box options operate as described on page 4.

Thermostats:

The cooling coil and mixing box control options may use a 1-stage (chilled water or single-stage DX) or 2-stage (dual-stage DX) cooling thermostat.

The cooling coil and EC mixing box control options require a 2-stage cooling thermostat. Economizer represents the first stage of cooling and a single DX stage or chilled water coil represents the second stage of cooling.



Mixing Box Selection Guide

	EC Options				MB Options			
	EC1	EC2	EC3	EC4	MB1	MB2	MB3	MB4
No Cooling	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Evaporative Cooling	Yes	Yes	Not Recommended	Not Recommended	No	No	No	No
Chilled Water or DX Cooling	Yes*	Yes*	Yes*	Yes*	Yes	Yes	Yes	Yes

*Two-stage cooling thermostat required. Boldface type indicates factory recommended options.

Housing Size 12

Model	CFM		TOTAL STATIC PRESSURE in inches of WG						Maximum Furnace Size (Input MBH)
			0.50	0.75	1.00	1.25	1.50	1.75	
IGX-HV-108	800	RPM	993	1109	1216	1311	1399		100
		BHP	.21	.26	.31	.35	.40		
	1,000	RPM	1112	1228	1325	1415	1500	1579	150
		BHP	.34	.41	.47	.53	.59	.65	
	1,200	RPM	1238	1347	1445	1530			150
		BHP	.51	.59	.68	.75			
IGX-HV-109	1,500	RPM	880	1014	1140	1255	1361	1460	200
		BHP	.36	.45	.54	.63	.73	.84	
	2,000	RPM	1004	1113	1219	1321	1417	1510	250
		BHP	.65	.77	.90	1.0	1.1	1.3	
	2,500	RPM	1154	1244	1329	1419	1503	1587	250
		BHP	1.1	1.2	1.4	1.6	1.7	1.9	
IGX-HV-110	2,000	RPM	805	912	1013	1110	1199		250
		BHP	.48	.59	.71	.84	.96		
	2,500	RPM	906	995	1082	1166	1247	1325	250
		BHP	.79	.93	1.07	1.21	1.36	1.51	
	3,000	RPM	1014	1097	1172	1244	1315	1386	250
		BHP	1.22	1.39	1.55	1.72	1.88	2.05	

Housing Size 22

Model	CFM		TOTAL STATIC PRESSURE in inches of WG						Maximum Furnace Size (Input MBH)
			0.50	0.75	1.00	1.25	1.50	1.75	
IGX-HV-112	2,600	RPM	662	761	853	934	1009		350
		BHP	.58	.72	.86	1.0	1.2		
	3,500	RPM	756	839	920	993	1065	1133	500
		BHP	1.0	1.3	1.5	1.7	1.9	2.1	
	4,400	RPM	871	939	1006	1073	1137	1197	600
		BHP	1.8	2.1	2.4	2.6	2.9	3.1	
IGX-HV-115	5,000	RPM	671	741	808	871	931	986	600
		BHP	1.7	2.0	2.3	2.6	2.9	3.2	
	6,000	RPM	749	812	870	929	982	1035	600
		BHP	2.6	2.9	3.3	3.7	4.0	4.4	
	7,000	RPM	833	889	943	994	1044	1093	600
		BHP	3.7	4.2	4.6	5.0	5.5	5.9	

Housing Size 32

Model	CFM		TOTAL STATIC PRESSURE in inches of WG						Maximum Furnace Size (Input MBH)
			0.50	0.75	1.00	1.25	1.50	1.75	
IGX-HV-118	7,000	RPM	566	627	685	738	790	839	1,050
		BHP	2.1	2.5	2.8	3.2	3.6	4.0	
	8,500	RPM	636	690	740	790	836	880	1,200
		BHP	3.3	3.8	4.2	4.7	5.1	5.6	
	10,000	RPM	712	759	805	849	891	933	1,200
		BHP	5.0	5.5	6.1	6.6	7.1	7.7	
IGX-HV-120	10,000	RPM	542	590	634	678	723	765	1,200
		BHP	3.6	4.0	4.5	5.0	5.6	6.1	
	12,500	RPM	633	672	711	748	784	820	1,200
		BHP	6.3	6.9	7.5	8.1	8.7	9.3	
	15,000	RPM	731	763	795	829	861	892	1,200
		BHP	10.2	10.9	11.6	12.3	13.1	13.8	

Note: The air performance data shown does not include internal static pressure losses due to items such as filters, dampers and furnaces. For exact air performance data based on specific unit configuration, use the Greenheck CAPS selection program.

Air Filter Gauge

Indicates when filters become dirty. An indicator light may be wall/beam mounted or provided with a remote control panel.



Motorized Dampers

Discharge dampers are available to prevent backdrafts when the fan is not in operation. Mixing box dampers are factory mounted and wired.



Fan Spring Vibration Isolation

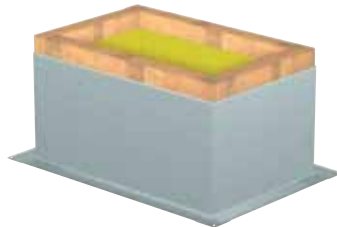
Spring vibration isolators are available in lieu of neoprene isolators for housing sizes H22 and H32 (fan sizes 112 and larger).

115 Volt Service Receptacle

A 115 volt GFCI outlet is mounted externally in a NEMA 3R box for the convenience of field service personnel. A separate 115 volt power source is required.

Roof Curbs

Factory provided roof curbs are available to ensure compatibility between the make-up air unit and roof curb. Standard construction is G90 galvanized steel.



Special Coatings

Greenheck's Permatec™ powder paint is available if a painted look is desired and recommended for outdoor installations near salt water shorelines. Decorative baked enamel paints are also available in a variety of colors to match existing building fixtures. Consult your Greenheck representative for paint selections.

Weatherhood

A galvanized steel mist eliminating intake hood is standard on outdoor IGX-HV models. The mist eliminating intake hood provides a double layer of protection against moisture entering the mixing box section.

Propane Gas Conversion Kit

Greenheck's indirect gas furnaces are ETL Listed for both natural gas or LP.

Duct Adapter

Duct adapters are optional with factory supplied curbs and provide an easy method for attaching ductwork to the curb.

Double Wall Construction

An interior metal liner is available to isolate insulation from the airstream. One-inch thick insulation is included with this option.

Gas Pressure Regulator

Required if building gas line pressure exceeds IGX-HV maximum inlet gas pressure of 14 in. wg.



Smoke Detector

A 12/24 VDC photoelectric smoke detector is available for duct mounting. Typical operating temperature range is 32° to 131°F (0° to 55°C).

Discharge Diffuser

Available as either 3-way diffuser for horizontal discharge or 4-way diffuser for downblast discharge.



3-Way Diffuser

Airstream Override

This option prevents the discharge air temperature from dropping below 55°F after the call for heating has ended.

Warm-Up Control

Available with the TC5 thermostat. The thermostat may be programmed to provide a warm-up cycle prior to the occupied start time. This ensures immediate comfort and proper air quality as people enter the occupied areas.



General: Heating and ventilating unit shall be as manufactured by Greenheck Fan Corporation or approved equal provided all specifications are met. Greenheck model IGX-HV is used as the basis of design. Performance shall be as scheduled on plans.

Furnace: Indirect gas-fired furnace shall be 80% efficient, ETL Listed and have a blow-through fan design. Furnace shall be capable of operation with natural or LP gas and have a power venting system with post purge cycle. The heat exchanger shall be constructed of aluminized steel or stainless steel. Standard furnace features shall include main gas pressure regulator, main gas valve, electronic staged controls, direct spark ignition system, high limit and a 24 volt control transformer. Furnace shall be insulated and have double-wall construction.

Temperature Control: Heating and cooling output shall be controlled by a room thermostat to maintain desired room temperature. Economizer control shall provide the first stage of cooling, where specified. Furnaces shall provide one or two stages of heat output control.

Unit Casing and Frames: All frames and panels shall be G90 galvanized steel. Where top panels are joined there shall be a standing seam to insure positive weather protection. All metal-to-metal surfaces exposed to the weather shall be sealed, requiring no caulking at jobsite. All components shall be easily accessible through removable doors.

Insulation: Models provided with a mixing box shall be insulated from the return section through to the supply discharge. Insulation shall be in accordance with NFPA 90A and tested to meet UL 181 erosion requirements. Double-wall shall be provided if specified.

Fan Section: Centrifugal fans shall be double-width, double-inlet. Fan and motor shall be mounted on a common base and shall be internally isolated. All blower wheels shall be statically and dynamically balanced. Ground and polished steel fan shafts shall be mounted in permanently lubricated ball bearings (up to size 118) or ball bearing pillow blocks (size 120 and larger). Bearings shall be selected for a minimum L_{10} life in excess of 100,000 hours at maximum cataloged speeds.

Motors and Drives: Motors shall be energy efficient, complying with EPACT standards, for single speed ODP and TE enclosures. Motors shall be permanently lubricated, heavy-duty type, matched to the fan load and furnished at the specified voltage, phase and enclosure. Drives shall be sized for a minimum of 150% of driven horsepower. Pulleys shall be cast and have machined surfaces, 10 horsepower and less shall be supplied with an adjustable drive pulley.

Our Warranty

Greenheck warrants this equipment to be free from defects in material and workmanship for a period of one year from the shipment date. Any units or parts which prove defective during the warranty period will be replaced at our option when returned to our factory, transportation prepaid. Motors are warranted by the motor manufacturer for a period of one year. Should motors furnished by Greenheck prove defective during this period, they should be returned to the nearest authorized motor service station. Greenheck will not be responsible for any removal or installation costs.

As a result of our commitment to continuous improvement, Greenheck reserves the right to change specifications without notice.

Electrical: All internal electrical components shall be prewired for single point power connection. All electrical components shall be UL Listed, Recognized or Classified where applicable and wired in compliance with the National Electrical Code. Control center shall include motor starter, control circuit fusing, control transformer for 24 VAC circuit, integral disconnect switch with separate motor fusing and terminal strip. Contactors, Class 20 adjustable overload protection and single-phase protection shall be standard.

Filter Section: Filters shall be mounted in a V-bank arrangement such that velocities across the filters do not exceed 550 ft./min. Filters shall be easily accessible through a removable access panel.

Weatherhood: Weatherhood shall be mist eliminating type, constructed of G90 galvanized steel. The weatherhood shall contain drainable blade louvers, backed by mist eliminating filters to prevent moisture intake.

Mixing Box: Mixing box shall contain outside air and return air dampers with low leakage, pressure activated, extruded vinyl blade seals, aluminum jamb seals, Belimo actuator and 30% efficient pleated filters in a V-bank arrangement. The mixing box shall modulate the amount of outdoor and return air by use of dampers. Input signal for return damper shall be from potentiometer, 2-10 volt signal, 4-20 mA signal or manual quadrant controller.

Evaporative Cooling Section: Evaporative cooling section shall include a galvanized steel housing with louvered intake, two-inch aluminum mesh filters and a stainless steel evaporative cooling module all provided by the make-up air unit manufacturer. The louver shall be stationary type with drainable blades, designed to withstand wind loads of 25 PSF. Evaporative cooling media shall consist of CELdek cellulose based material with a depth of 12 inches for a cooling effectiveness of 90%. Drain and overflow connections shall be piped through the side of the evaporative cooling section.

Cooling Coil: Direct expansion (DX) or chilled water coil shall be factory tested and rated in accordance with AHRI 410. Coils shall have copper tubes with permanently expanded aluminum fins, 12 fpi or less. DX coils shall be equipped with distributors to receive expansion valves at the liquid connections. Drain pans shall extend at least 12 inches downstream of coil and be sloped to drain connection.

