

# Energy Recovery with Cooling & Heating Model ERT

- Commercial
- Institutional

- 1,800 to 10,000 cfm
- 3.0 in. wg external static pressure

## Cooling and Heating Options:

- Wrap Around Heatpipe
- Chilled Water
- DX
- Hot Water
- Electric Heat



## Model ERT

### Energy Recovery Ventilator With **Cooling & Heating**

The model ERT combines the benefits of the total energy wheel with supplemental heating and cooling. The result is a product that is specifically designed to process 100% outdoor air to desired supply conditions. Five sizes provide air flow capacities from 1,800 cfm to 10,000 cfm with external static pressures up to 3.0 in. wg. (for applications above this performance, refer to model APEX).

#### Single Point Wiring

is standard. A disconnect switch and low voltage terminal strip are provided.

#### Access Doors

provide easy access to blowers, energy wheel, filters and coil section for inspection and routine service.

**A Control Box** is furnished with motor starters for the supply blower, exhaust blower and wheel motors. Also included is a 24 volt control circuit.

#### Housing Construction

is heavy gauge steel with 1-inch foil faced insulation. Double wall construction is optional.

## Benefits

**Healthy Buildings:** Ventilate buildings adequately without losing control of indoor humidity levels. The ERT is capable of conditioning summer air to room design conditions. Also, it helps prevent overly dry winter air that can contribute to respiratory irritation.

**System Design Simplicity:** The ERT is designed specifically to provide outdoor air to the space at desired conditions. This effectively de-couples the outdoor air load from the building load, enabling the traditional VAV system to perform as it was intended – in response to building loads.

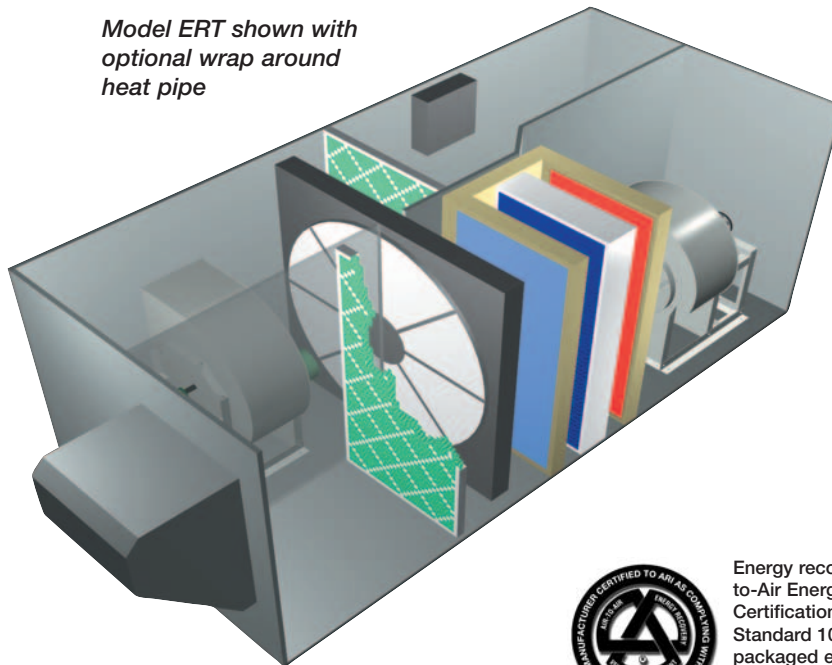
*Product operation is simple:*

- Fresh outdoor air is pre-conditioned by the total enthalpy wheel, recovering a majority of the energy from the exhaust air.
- The coil section further conditions the outdoor air to desired conditions (typically near room conditions).

#### The Coil Section

provides supplemental cooling or heating of the outdoor air after pre-conditioning by the energy wheel. Tempering options include chilled water, direct expansion, hot water, electric heat and wrap around heat pipes.

Model ERT shown with optional wrap around heat pipe



Energy recovery wheels certified by the ARI Air-to-Air Energy Recovery Ventilation Equipment Certification Program in accordance with ARI Standard 1060. Actual performance in packaged equipment may vary. Certified Ratings are available in the Certified Product Directory at <http://www.ari.org/directories/erv>

**Backward Inclined Blowers** are AMCA Licensed for Air Performance and offer high operating efficiencies, a non-overloading horsepower curve, and external pressure capabilities up to 3.0 in. wg. Adjustable sheaves allow accurate system balancing. Blowers are mounted on **isolation bases** with neoprene vibration isolators standard. Spring vibration isolators are optional.

**Load Reduction:** The energy wheel saves 3 to 4 tons of cooling AND 50-60 MBH of heating for every 1,000 cfm of outdoor air for many climates.

#### Low Maintenance:

Servicing is minimal. All components have a well established history of reliable operation.

**ASHRAE 62 Compliance:** By assuring that minimum outdoor air volumes are delivered to the room spaces, compliance with the ASHRAE 62 Standard is clearly demonstrated.

## Weather Hoods

A louvered intake hood with 2-inch aluminum mesh filters, and an exhaust hood with an integral backdraft damper are available.



## Dampers - Internally Mounted

A variety of motorized control dampers are available. Intake and exhaust dampers are internally mounted at the outdoor and exhaust air inlets. Dampers are factory wired to a single point power disconnect.



## Filters

Standard size 2-inch, pleated, medium efficiency filters and filter racks are available for outdoor air and/or exhaust air streams.

## Frost Control

In cold climates, the recovery wheel may develop frost, which will decrease airflow. Three factory mounted options are available to address frosting:

- **Timed Exhaust Frost Control**  
The timed exhaust frost control turns the supply blower off and on intermittently. Control is triggered by an outdoor air temperature set point in conjunction with an increased pressure drop across the energy wheel.
- **Modulating Wheel Frost Control**  
The modulating wheel frost control enables continuous unit operation. A variable frequency drive (VFD) reduces wheel speed when the outdoor air temperature falls below the frost threshold set point **and** upon an increase in the differential pressure across the energy wheel. The temperature and pressure differential set points are set at the factory, but are field-adjustable. The VFD will be fully programmed and wired at the factory.
- **Preheat Frost Control**  
The preheat frost control enables continuous unit operation. An electric heater warms the outdoor air above the frost threshold before it enters the energy recovery wheel. Control is triggered by an outdoor air temperature set point in conjunction with increased pressure drop across the energy wheel.

## Rotation Sensor

Senses when a wheel rotation failure occurs and sends a signal to an indicator light. The light is available on a remote control panel from the factory.

## Temperature Control Package

The temperature control package is specifically designed and programmed to optimize the performance of an ERT unit with supplemental cooling and heating. This option ensures that the outdoor air is conditioned to the desired discharge temperature and relative humidity. The controller and accompanying sensors are factory-mounted, wired, and programmed. Default settings are pre-programmed, but are easily field-adjustable.



## Economizer Control (Free Cooling)

When cool outdoor air is available, the energy wheel may be controlled to provide free cooling. Economizer operation can be initiated by the unit sensors alone or in conjunction with a call for cooling (field wired). Two factory installed options are available.

- **Wheel Off:** De-energizes the wheel when the outdoor temperature is below the field adjustable set point (enthalpy sensor also available). An automatic economizer override is included to engage the wheel for winter heating operation.
- **Wheel Modulation:** Modulates the energy recovery wheel to maintain a 55°F discharge temperature during economizer operation.

**Note:** Control centers in Greenheck energy recovery ventilators enable the control of the energy wheel and fans via 24-volt control signals (by others). Controls by others may be preferred when air handling units are equipped with an economizer section.

## Variable Air Volume

Model ERT utilizes belt driven blowers that are available with optional two speed motors. Variable frequency drives are also available.



## Additional accessories:

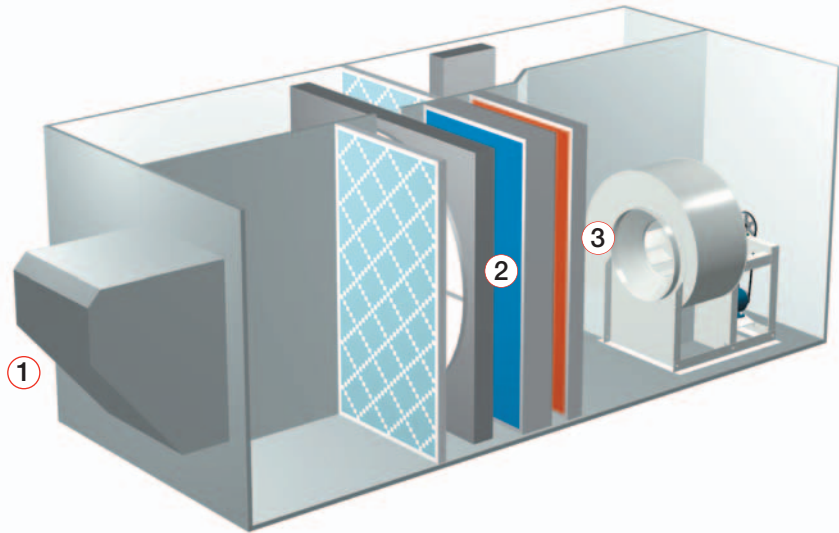
- Remote Panels
- GFCI Service Outlet (control power by others)
- Service Lights (control power by others)
- Spare Wheel Segments
- Sensible Only Wheel
- Roof Curbs
- Painted Exteriors
- Duct Flanges

# Cooling and Heating Capabilities

To expand the cooling and heating capabilities of the energy recovery wheel, a variety of tempering options are available. The coil section of the ERT accommodates a cooling coil, a heating coil, or both.

A description of the cooling and heating processes along with a psychrometric illustration is shown below. Cooling and heating coil options are also listed.

Consult the factory for coil selections or for tempering options not listed.



## COOLING

Supplemental cooling is recommended when the air conditions leaving the energy recovery wheel have not been cooled or dehumidified to the desired leaving conditions.

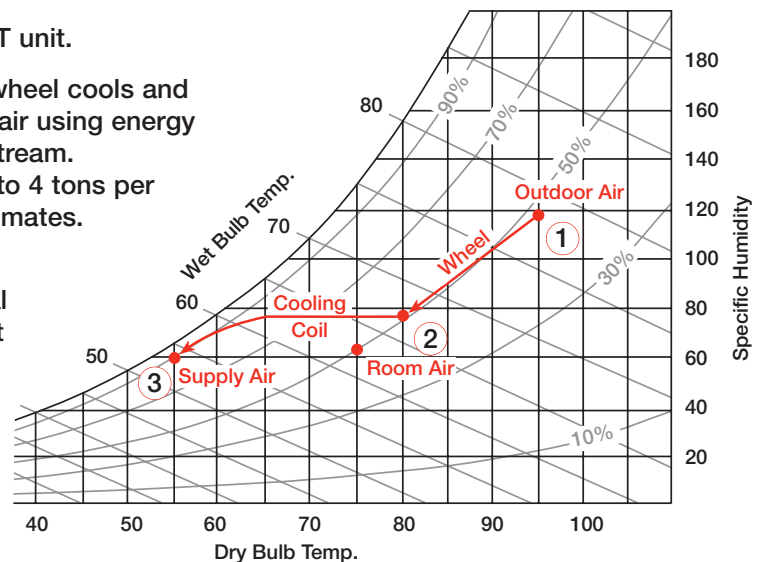
### Cooling Options

- Chilled Water
- Direct Expansion

### Re-heat Options

- Electric
- Hot Water

1. Outdoor air enters ERT unit.
2. The energy recovery wheel cools and dehumidifies outdoor air using energy from the exhaust air stream. Load is reduced by 3 to 4 tons per 1,000 cfm for many climates.
3. The cooling coil provides supplemental cooling to further treat the outdoor air to desired supply conditions.



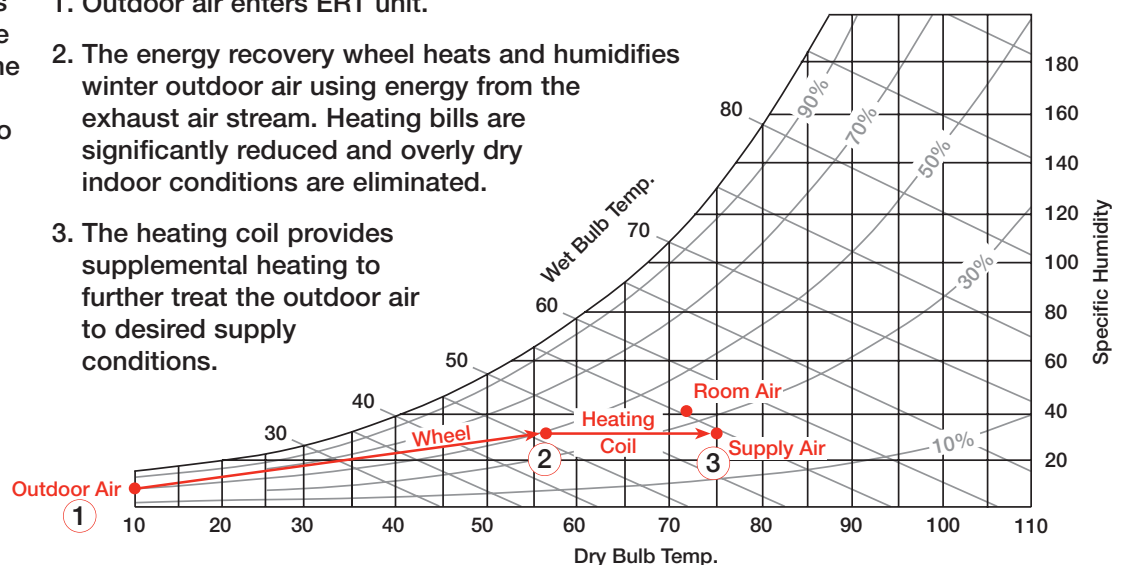
## HEATING

Supplemental heating is recommended when the air conditions leaving the energy recovery wheel have not been heated to the desired leaving conditions.

### Heating Options

- Electric
- Hot Water

1. Outdoor air enters ERT unit.
2. The energy recovery wheel heats and humidifies winter outdoor air using energy from the exhaust air stream. Heating bills are significantly reduced and overly dry indoor conditions are eliminated.
3. The heating coil provides supplemental heating to further treat the outdoor air to desired supply conditions.



Specifically designed to be the most efficient product for conditioning humid outdoor air to near room conditions. This unit provides excellent humidity control without over cooling and minimizes energy bills.

To accomplish this, Greenheck combined the energy recovery wheel and cooling coil with a wrap around heat pipe. The heat pipe reduces the cooling load and provides free re-heat.

### Cooling Options

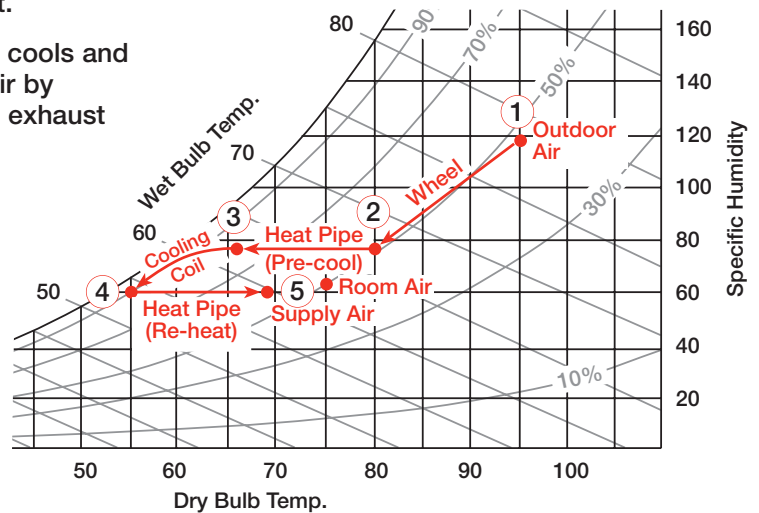
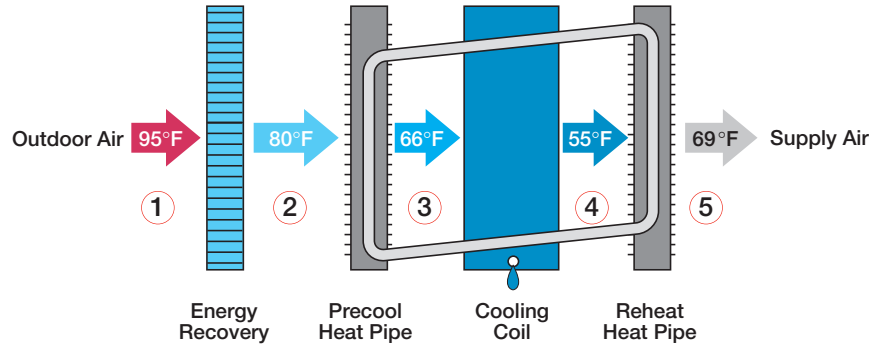
- Chilled Water
- Direct Expansion

*Supplemental heating for winter conditions is also available.*

### Heating Options

- Electric
- Hot Water

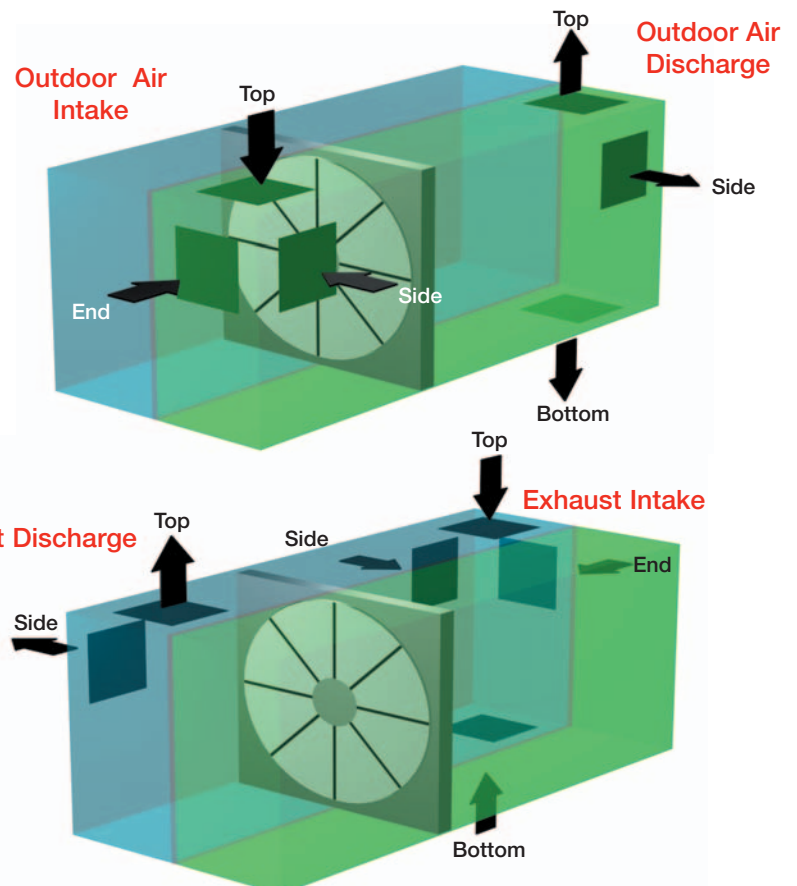
1. Outdoor air enters ERT unit.
2. The energy recovery wheel cools and dehumidifies the outdoor air by recovering energy from the exhaust air stream.
3. The first heat pipe section pre-cools the air.
4. The cooling coil further cools the air, wringing out moisture.
5. The second heat pipe section re-heats the air to about 70 degrees F.



## Intake & Discharge Options

Model ERT offers installation flexibility with a wide selection of intake and discharge locations. This accommodates various duct connection requirements for either rooftop or equipment room installations. The table below indicates the available intake and discharge locations for both supply air and exhaust air.

	Bottom	Top	Side	End
OA Intake		X	X	X
OA Discharge	X	X	X	
Exhaust Intake	X	X	X	X
Exhaust Discharge		X	X	



### ERT-52S

CFM	OV		EXTERNAL STATIC PRESSURE in inches of WG							
			0.50	0.75	1.00	1.50	2.00	2.50	3.00	3.50
1,800	976	RPM	941	1034	1130	1310	1472	1620	1756	1880
		BHP	0.42	0.55	0.69	1.00	1.34	1.70	2.07	2.45
2,400	1,302	RPM	1139	1215	1285	1422	1569	1703	1832	1950
		BHP	0.75	0.91	1.07	1.41	1.81	2.24	2.68	3.13
3,200	1,736	RPM	1421	1485	1545	1656	1762	1864	1973	2081
		BHP	1.48	1.68	1.88	2.29	2.73	3.19	3.70	4.24

### ERT-52H

CFM	OV		EXTERNAL STATIC PRESSURE in inches of WG							
			0.50	0.75	1.00	1.50	2.00	2.50	3.00	3.50
3,000	1,627	RPM	1282	1353	1413	1522	1621	1731	1833	1929
		BHP	1.00	1.18	1.34	1.68	2.03	2.43	2.85	3.28
3,800	2,061	RPM	1548	1611	1669	1771	1859	1943	2022	2105
		BHP	1.76	1.98	2.21	2.64	3.06	3.49	3.93	4.41
4,600	2,495	RPM	1821	1877	1930	2027	2113	2189		
		BHP	2.88	3.14	3.41	3.96	4.50	4.99		

### ERT-58H

CFM	OV		EXTERNAL STATIC PRESSURE in inches of WG							
			0.50	0.75	1.00	1.50	2.00	2.50	3.00	3.50
4,500	2,018	RPM	1281	1334	1382	1479	1571	1652	1732	1818
		BHP	1.76	1.99	2.23	2.73	3.25	3.73	4.24	4.83
5,250	2,355	RPM	1458	1508	1553	1635	1718	1799	1872	1940
		BHP	2.58	2.87	3.14	3.69	4.28	4.89	5.47	6.02
6,000	2,691	RPM	1638	1683	1726	1804	1874	1947		
		BHP	3.66	3.98	4.30	4.93	5.55	6.23		

### ERT-64H

CFM	OV		EXTERNAL STATIC PRESSURE in inches of WG							
			0.50	0.75	1.00	1.50	2.00	2.50	3.00	3.50
5,400	1,970	RPM	959	991	1021	1076	1129	1179	1228	1275
		BHP	2.19	2.44	2.71	3.22	3.73	4.25	4.76	5.28
6,100	2,226	RPM	1067	1096	1124	1176	1224	1270	1315	1358
		BHP	2.99	3.28	3.57	4.16	4.75	5.32	5.90	6.49
6,800	2,481	RPM	1177	1203	1229	1278	1323	1365	1407	1448
		BHP	3.96	4.31	4.63	5.29	5.94	6.60	7.24	7.88

### ERT-74H

CFM	OV		EXTERNAL STATIC PRESSURE in inches of WG							
			0.50	0.75	1.00	1.50	2.00	2.50	3.00	3.50
7,000	1,745	RPM	892	930	965	1043	1117	1186	1253	1316
		BHP	2.28	2.62	2.97	3.17	4.53	5.39	6.28	7.20
8,500	2,119	RPM	1046	1085	1117	1176	1241	1301	1363	1420
		BHP	3.67	4.10	4.52	5.36	6.26	7.19	8.21	9.25
10,000	2,493	RPM	1205	1239	1272	1326	1375	1431		
		BHP	5.58	6.09	6.60	7.58	8.57	9.63		

The above air performance data includes the pressure drop across the energy recovery wheel, but does *not* include pressure drop for filters or coils. Add filter and/or coil pressure drop (from tables below) to external static pressure to determine correct rpm and horsepower.

#### Filter Pressure Drop (30% eff.)

Model	CFM	Pressure Drop (inches wg)
ERT-52	1,800	0.08
	4,600	0.24
ERT-58	4,500	0.16
	6,000	0.27
ERT-64	5,400	0.22
	6,800	0.32
ERT-74	7,000	0.15
	10,000	0.24

#### Coil Pressure Drop

Model	CFM	Velocity (fpm)	Cooling Coil (inches wg)	Heating Coil (inches wg)
ERT-52	1,800	203	0.30	0.03
	4,600	520	1.00	0.11
ERT-58	4,500	386	0.46	0.06
	6,000	514	1.09	0.17
ERT-64	5,400	405	0.50	0.06
	6,800	510	1.07	0.16
ERT-74	7,000	377	0.65	0.07
	10,000	539	1.10	0.12

NOTE: Data assumes 6-row cooling coils and 1-row heating coils.

**General:** Energy Recovery Ventilator shall be as manufactured by “Greenheck” or approved equal provided all specifications are met. Greenheck Model ERT is basis of design. Units shall be listed per ANSI/UL 1995, Heating and Cooling Equipment. Energy transfer ratings of the energy recovery wheel shall be ARI Certified. Performance shall be as scheduled on plans. Exhaust discharge and outside air intake shall not be located on the same side on roof top units.

**Unit Casing and Frame:** Unit shall be of internal frame type construction of galvanized steel. Frame and panels shall be G90 galvanized steel. All panels exposed to the weather shall be a minimum of 18 gauge galvanized steel. Where top panels are joined there shall be a standing seam to insure positive weather protection. All metal-to-metal seams shall be sealed, requiring no caulking at job site. Permatecor exterior finish is available for outdoor units. Unit base to be designed for curb mounting. Unit base shall over hang the curb for a positive seal against water run-off.

**Weatherhoods:** Weatherhoods shall be the same finish as the unit. Outdoor air weatherhood shall incorporate a louvered design and moisture eliminator. Weatherhoods shall be tested in accordance with AMCA Standard 500-L to prevent water penetration up to 3 in/hr at 29 mph.

**Insulation:** Unit casing to be insulated with 1 inch fiberglass with Foil-Scrim-Kraft facing. Insulation shall meet requirements of NFPA 90A and tested to meet UL 181 erosion requirements. Insulation shall be secured to unit with waterproof adhesive and permanent mechanical fasteners.

**Energy Recovery Wheel:** Wheel shall be of the enthalpy type for both sensible and latent heat recovery and be designed to insure laminar flow. Energy transfer ratings must be ARI Certified to Standard 1060 and bear the ARI certification symbol for ARI Air-to-Air Energy Recovery Ventilation Equipment Certification Program based on ARI 1060. Ratings “in accordance with 1060” without certification are not acceptable. Desiccant shall be silica gel for maximum latent energy transfer. Wheel shall be constructed of lightweight polymer media to minimize shaft and bearing loads. Polymer media shall be mounted in a stainless steel rotor for corrosion resistance.

Wheel design shall consist of removable segments for ease of service and/or cleaning. Silica gel desiccant shall be permanently bonded to wheel media to retain latent heat capability after cleaning. Wheels with sprayed on desiccant coatings are not acceptable. Wheels with desiccant applied after wheel formation are not acceptable. Energy recovery device shall transfer moisture entirely in the vapor phase.

Energy recovery drive belt material shall be high strength urethane and shall be factory installed in a pre-stretched state, eliminating the need for field belt tension adjustment. Link style belts are not acceptable.

**Access Doors:** All components shall be easily accessible through removable hinged doors for exhaust, supply, filter, and damper compartments. Energy recovery wheels (smaller than 54 in.) shall be mounted in a slide-out track for ease of inspection, removal, and cleaning.

**Roof Curbs:** Roof curb to be supplied by unit manufacturer for field assembly. Curb shall consist of die formed galvanized steel sections. Curb shall be full perimeter type with gasketing provided for field installation between curb and unit base.

**Fan Sections:** Centrifugal blowers shall be backward inclined and housed in a scroll to maximize fan efficiency. Fans shall be AMCA certified for air performance. All blower wheels shall be statically and dynamically balanced. Ground and polished steel fan shafts shall be mounted in permanently sealed ball bearing pillow blocks. Bearings shall be selected for a minimum (L10) life in excess of 100,000 hours at maximum cataloged operating speeds. Blowers shall enable independent balancing of exhaust and supply airflow with adjustable sheaves for motors 10 horsepower and below. Fans shall be located in draw-through position in reference to the energy recovery wheel.

**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 of the fully machined cast type, keyed and securely attached to the fan wheel and motor shafts; 10 horsepower and less shall be supplied with an adjustable drive pulley. Energy wheel motors shall have integral overload protection.

**Filters:** Supply and exhaust air filters shall be 2-inch thick pleated fiberglass, 30% efficient and tested to meet UL Class 2. Filter racks shall be die-formed galvanized steel.

**Electrical:** All internal electrical components shall be factory wired for single point power connection. Units with electric reheat will be wired with independent power supply. All electrical components shall be UL Listed, Approved or Classified where applicable and wired in compliance with the National Electrical Code.

Weatherproof, integral door interlocking disconnect switch, motor starters, control circuit fusing, control transformer for 24 VAC circuit, and terminal strip shall be supplied as standard components in the control center. Motor starters consist of a contactor and Class 20 adjustable overload protection and shall be provided for all motors in the unit.

**Cooling Coil:** Direct expansion (DX) and chilled water coils shall be factory tested and rated in accordance with ARI 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.

**Wrap Around Heat Pipe:** Dehumidifier heat pipe shall precool the air leaving the wheel and reheat the air leaving the cooling coil in a wrap around configuration. Both heat exchangers shall be inside and integral to the equipment cabinet.

Coils shall have copper tubes with permanently expanded aluminum fins, 12 fpi or less. Heat transfer fluid shall be classified as Safety Group A1 in BDR/ASHRAE Std. 15-1989R.

**Hot Water Coil:** Hot water coil shall be factory tested and rated in accordance with ARI 410. Coils shall have copper tubes with permanently expanded aluminum fins, 12 fpi or less.

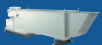
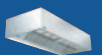
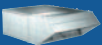
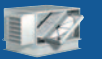
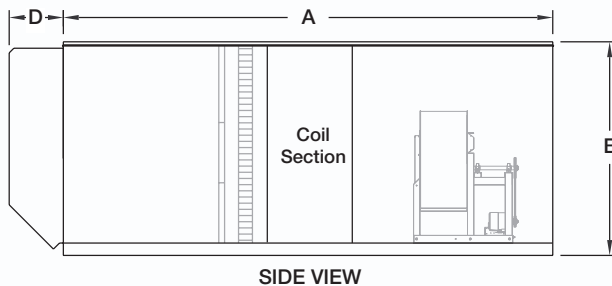
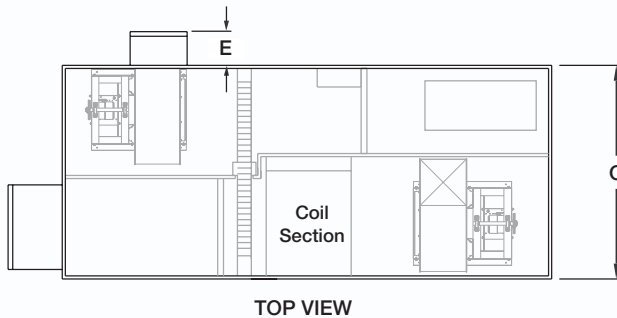
**Electric Heat:** Electric heat shall be UL listed and circuit fused per NEC (over 48 amps). Heater shall be SCR control, factory wired and installed. Control will be 24 volt with class 2 transformer. Standard air flow switch to shut down heater if air ceases to flow across heater.

Unit Size	A	B	C	D	E	*Weight
ERT-52	158	66	69	18	25	3,400
ERT-58	184	70	79	16	26	5,000
ERT-64	184	75	79	16	26	5,500
ERT-74	199	91	97	18	29	7,500

All dimensions shown are in inches. Actual weight is dependent upon unit configuration.

Clearance for service access is 36 inches minimum on all sides.

\* Does not include heat pipe.



## Our Warranty

Greenheck warrants this equipment to be free from defects in material and workmanship for a period of one year from the purchase date. The energy recovery wheel is warranted to be free from defects in material and workmanship for a period of five years from the purchase 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.*

**Greenheck P.O. Box 410 • Schofield, WI 54476-0410 • Phone (715) 359-6171 • [greenheck.com](http://greenheck.com)**