

# REGENCORE

*Energy Recovery Unit*



## RegenCore

RegenCore is a high effectiveness energy recovery unit. RegenCore recovers sensible energy during both heating and cooling seasons, and under select conditions, RegenCore also recovers latent energy. The new regenerating core product sets itself apart from other recovery devices with its fully tested design, industry leading effectiveness of up to 90% and no pre-heat requirement down to outdoor temperatures of -40°C/F.

PRC, PRCX, and PRCLC units are available in a wide range of sizes to accommodate each unique project's airflow requirements. The PRC's wide range of available airflows combined with its indoor and outdoor designs make it suitable for a multitude of applications. The PRCX is suited for outdoor installations with high airflow requirements. The PRCLC is a lighter duty unit for indoor use is an ideal option for use in compact spaces.

## Design Ranges

Unit Type	Static Pressure	Preheat Requirement	Carry-Over Leakage	Maximum Sensible Effectiveness <sup>1</sup>
PRC	1,000 to 22,500 CFM			
PRCX	22,500 to 40,000 CFM	No preheat down to -40°C/°F	2% to 4%	92%
PRCLC	250 to 2,000 CFM			

## Typical Applications

With no preheat required down to -40°C/F, the RegenCore has excellent owner payback when used in most applications. It is designed for applications that require high air-changes, high efficiency recovery and reduced energy consumption. Examples of suitable applications include: education facilities, sportsplex facilities, commercial office buildings, multi-story residential buildings, banks, warehouses, car dealerships, casinos and more.

## Energy Recovery Comparison



	RegenCore	Energy Wheel	Sensible Plates	Heat Pipe
<b>Recovery Type</b>	Sensible and Latent	Sensible and Latent	Sensible	Sensible
<b>Maximum Sensible Effectiveness</b>	92%	85%	70%	60%
<b>Carry-Over Leakage</b>	2% to 4%	1% to 3%	0%	0%
<b>Preheat Requirement</b>	Below -40°C/°F	Below -5°C /23°F	Below -5°C /23°F	Below -5°C /23°F

<sup>1</sup> Assumptions include ducted indoor units with 1 in. w.c. ESP, outdoor air at 35°F, return air at 70°F, including fan and motor loads. Effectiveness will vary based on air conditions.



## Features

### Cabinet

- S** Post and Panel construction
- S** 2" polyurethane foam insulation
- S** Thermally broken posts and assembly
- S** Galvanized or 1500 hour salt pray painted casings
- O** Acoustic liners

### Filters

- S** 2" MERV 8 to 13
- O** 12" MERV 12 to 16
- O** Aluminum mesh
- O** Washable media filters

### Fans

- S** AC direct drive backward curved plenum fans with VFD's
- S** ODP motors with shaft grounding
- S** EC direct drive motors
- S** Skid mounted on RIS isolators
- O** Airfoil plenum fans
- O** Spring isolation

### Inlets

- S** Louvers
- O** Weather hoods

### Changeover Dampers

- S** Ultra low-leak aluminum airfoil
- S** AC gear motors
- O** Insulated low leak aluminum airfoil

### Controls

- S** Constant air volume control
- S** DDC BACnet/MSTP or BACnet/IP
- S** Remote operable digital controller
- S** Internal airflow sensors
- O** Variable air volume control
- O** Unbalance airflow control (offset supply and exhaust)

### Cooling

- O** Chilled water
- O** DX cooling 8 to 128 tons, packaged or split

### Heating

- O** Hot water
- O** Electric heat
- O** Drum and Tube gas heat module
- O** Convolute Tube gas heat module

## Airflow Control Options

### Variable Air Volume Control

RegenCore can be designed for applications requiring VAV airflow.

- + Turndown to 20% of nominal airflow
  - Ex.: A unit with a nominal airflow of 1,000 CFM can modulate its supply and exhaust down to 200 CFM (20% of 1,000)
- + No preheat required down to -40°C/°F
- + Airflow measurement included
- + CFM measurements can be output to BMS
- + BMS can be connected to provide airflow set points

### Unbalanced Airflow Control

This option is suitable for applications where additional exhaust systems are used in conjunction with a RegenCore.

- + Supply and exhaust airflows can be unbalanced by up to 50%
  - Ex.: A unit with a supply airflow of 1,000 CFM would be able to maintain an exhaust airflow down to 500 CFM (50% of 1,000) or vice versa.
- + No preheat required down to -40°C/°F
- + Airflow measurement included
- + CFM measurements can be output to BMS
- + BMS can be connected to provide airflow set points

## Cabinet Options

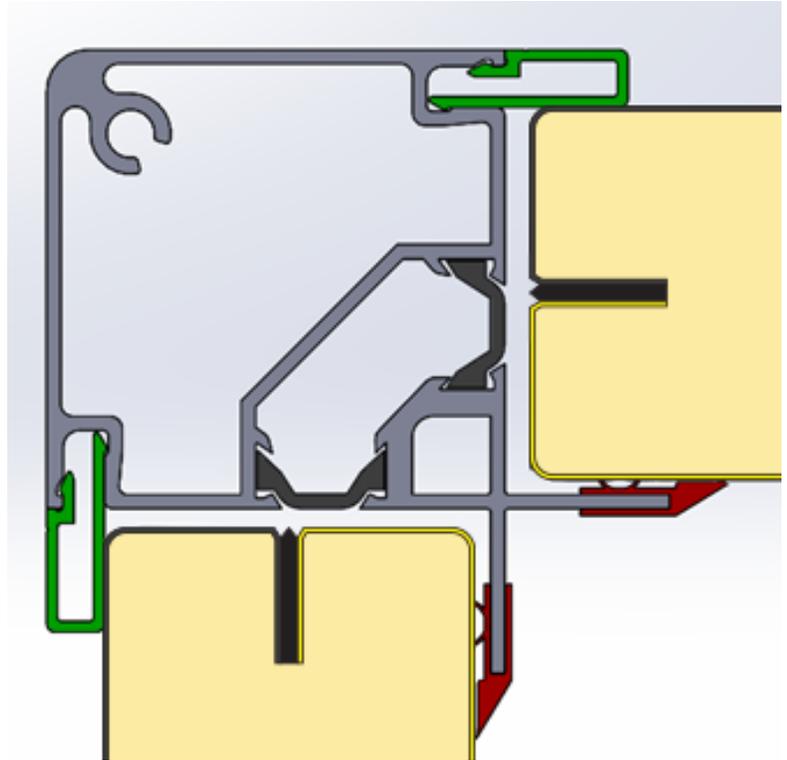
Post and Panel Options	
<b>Models</b>	<ul style="list-style-type: none"> <li>+ PRC</li> <li>+ PRC X</li> <li>+ PRCLC</li> </ul>
<b>Outer casing</b>	<ul style="list-style-type: none"> <li>+ 16 ga. to 22 ga.</li> <li>- Galvanized or galvanized with 1500 salt spray paint</li> <li>+ 14 ga. aluminum</li> </ul>
<b>Wall thickness and Insulation</b>	<ul style="list-style-type: none"> <li>+ 2" R11.5 polyurethane foam with thermally broken posts</li> <li>+ Thermally broken panels</li> </ul>
<b>Inner liner</b>	<ul style="list-style-type: none"> <li>+ 16 ga. to 20 ga. galvanized steel</li> <li>+ 14 ga. aluminum</li> </ul>
<b>Floor panel</b>	<ul style="list-style-type: none"> <li>+ 16 ga. galvanized or 304 stainless</li> </ul>
<b>Acoustic liner</b>	<ul style="list-style-type: none"> <li>+ 22 ga perforated galvanized with fiberglass insulation</li> </ul>
<b>Access</b>	<ul style="list-style-type: none"> <li>+ Removable panel and hinged door</li> </ul>
<b>Roof curb</b>	<ul style="list-style-type: none"> <li>+ 16" or 24" galvanized; Insulated or noninsulated</li> </ul>
<b>Inlet/Discharge location</b>	<ul style="list-style-type: none"> <li>+ Top, bottom, side, horizontal</li> </ul>
<b>Installation location</b>	<ul style="list-style-type: none"> <li>+ Outdoor on roof curb by SolutionAir</li> <li>+ Indoor on roof curb by SolutionAir</li> <li>+ On steel by others</li> <li>+ On curb by others</li> </ul>

# REGENCORE

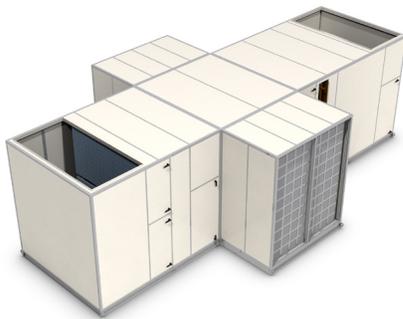
## Energy Recovery Unit

### Post and Panel Cabinet

- + Available on all PRC, PRCX, and PRCLC models
- + Standard thermally broken posts and assembly increases the thermal resistance of the cabinet, and reduces condensation and frosting
- + Configurable wall panel materials and exterior finish
- + Gasket system ensures smooth internal surfaces
- + The cabinets panels are removable from the unit exterior
- + Optional thermally broken panels



*Post and panel construction with optional thermally broken panels*



### Additional RegenCore Models

#### PRCX (22,500 to 40,000 CFM)

- + Designed for outdoor installations
- + Core sections located on base frames
- + Allows for easier core installation

#### PRCF (100-1,600 CFM)

- + Flexible design to fit in compact layouts
- + Lorem ipsum dolor sit amet

#### PRCLC (250 to 2000 CFM)

- + Compact design suitable for indoor installations in small spaces, such as mechanical rooms or closets
- + Maintains a no preheat requirement down to -40°C/F

## Packaged DX Cooling & Dehumidification

System Type	Cooling Output	Airflow <sup>1</sup>
Packaged or split	8 to 128 tons	3,000 to 42,500 CFM

### Features

**S** standard feature    **O** optional feature

#### Refrigerant System

- S** Scroll compressors
- S** 2-stage capacity control (from 8 to 12 tons)
- S** 4-stage capacity control (from 14 to 128 tons)
- S** Electronic expansion valves
- S** Factory tested cooling
- S** R-410A refrigerant
- O** Variable capacity control with digital scroll compressors (from 8 to 128 tons)
- O** Hot gas reheat
- O** Low ambient operation down to 7°C/45°F
- O** Extreme low ambient operation down to -40°C/°F
- O** Compressor vestibules

#### Coils

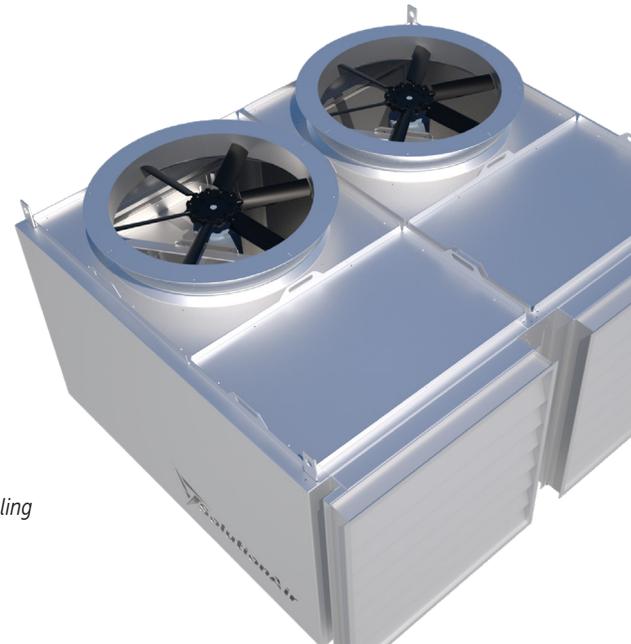
- S** Aluminum fin and copper tube
- S** Aluminum frames
- S** Low FPI evaporators (10 FPI)
- S** Low FPI condensers (12 FPI)

#### Controls

- S** Electronic expansion valves
- S** Remote operable digital controller
- S** Detect + Protect monitoring system
- S** Factory tested controls
- S** DDC BACnet/MSTP or BACnet/IP

#### Condensers

- S** High temperature rated condenser motors (70°C/154°F)
- S** Packaged cooling (8 to 128 tons)
- O** Split cooling (8 to 128 tons)



DX Cooling

## Detect + Protect Monitoring System

- + Actively monitors:
  - Refrigerant cycle operation (sub cool, superheat, line pressures)
  - Electronic expansion valves
  - Refrigerant charge
  - VFD operation
  - Cooling capacity
- + View alarms, turn the unit on or off, change operating set points remotely through digital controller over a virtual network interface.
- + View live performance and download logged data on the controller. No refrigerant gauges required.
- + Permanently connect to your system via LAN or when necessary via cellular modem.

Cool CIRCUIT A EEV 1			
	LP	HP	
Temp	55.4°F	116.3°F	↑
Pres	135 PSI	197 PSI	←
SUPHT	8.8°F	47.9°F	
	SubCooling	10.6°F	
Liquid Line Temp	58°F		↓
EEV:	58.0%	EVP Δ	20°F

## REGENCORE FLEX (PRCF)

### Features

**S** standard feature    **O** optional feature

### Cabinet

- S** 18 GA galvanized steel panels
- S** Lift off access panels
- S** Condensate drain connections
- O** Fiberglass insulation

### Filters

- O** MERV 8 to 12 final filter

### Fans

- S** ECM direct drive plenum fans

### Changeover Dampers

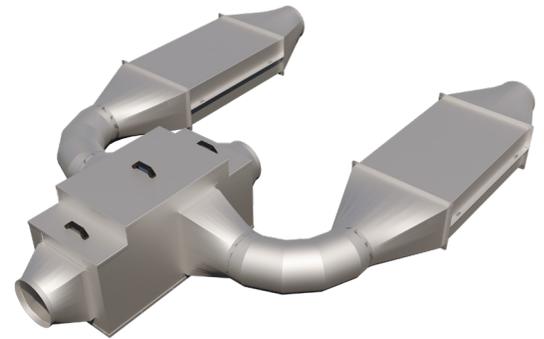
- S** Ultra low-leak aluminum airfoil
- S** DC closed loop stepper motor

### Heating

- O** Electric heat

### Controls

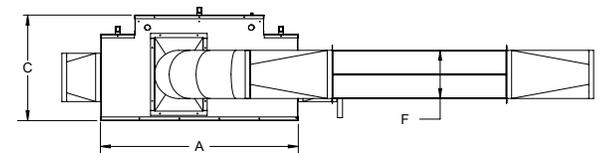
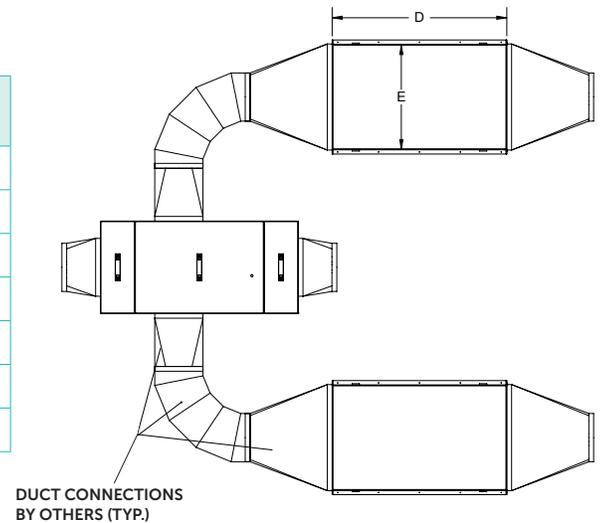
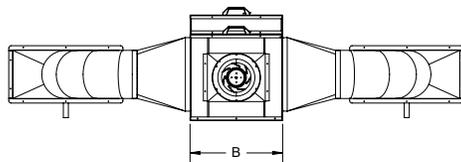
- S** Constant air volume control
- O** DDC BACnet/MSTP or BACnet/IP
- O** Remote operable digital controller
- O** Internal airflow sensors
- O** Variable air volume control
- O** Unbalance airflow control (offset supply and exhaust)



### PRCF Dimensions

PRCF Model	A	B	C	D	E	F	Weight (lbs)
250	41.00	17.20	22.00	36.00	13.27	8.19	208
375	41.00	19.20	22.00	36.00	19.38	8.19	244
500	41.00	19.20	22.00	36.00	21.75	8.19	258
700	41.00	19.20	28.00	36.00	21.75	12.00	525
1000	41.00	19.20	28.00	36.00	17.38	23.81	726
1500	41.00	19.20	38.00	36.00	26.00	23.81	1050
2000	50.00	27.20	44.00	36.00	32.25	23.81	1324

\* ALL UNITS IN INCHES, UNLESS OTHERWISE NOTED  
 \*\* ALL WEIGHTS (LBS) ARE ESTIMATED



## Supplementary Heating and Cooling

### Gas Heat

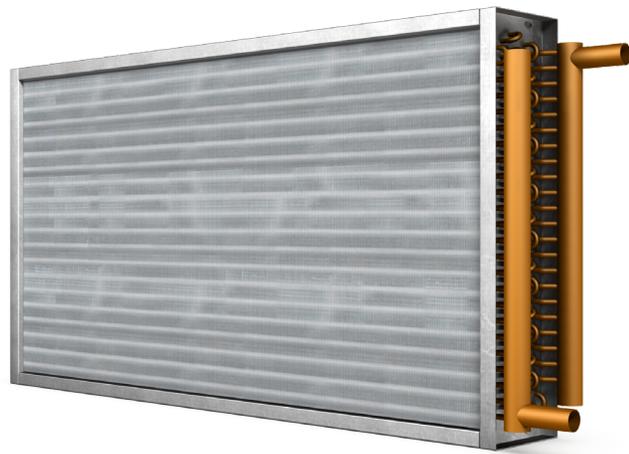
- + Stainless steel 3-pass and 4-pass drum and tube style heat exchanger
  - 15:1 turndown ratio
  - Design temperature rises from 110°F to 60°F
  - Design heat output from 60 MBH to 1440 MBH
- + Convolute tube style heat exchanger
  - Up to 20:1 turndown ratio
  - Design temperature rises from 110°F to 20°F
  - Design heat output from 250 MBH to 6000 MBH
  - Up to 90% efficient furnaces



*Gas heating*

### Hydronic Coils

- + Cooling, heating or changeover coils
- + Certified in accordance with AHRI standards



*Hydronic coil*

### Electric Heat

- + Integrated and pre-wired controls in NEMA-1 control panel
- + Thermal safety switches and fan interlocked heating elements are supplied for safe operation
- + Optional galvanized or stainless steel heater frames



*Electric heating*

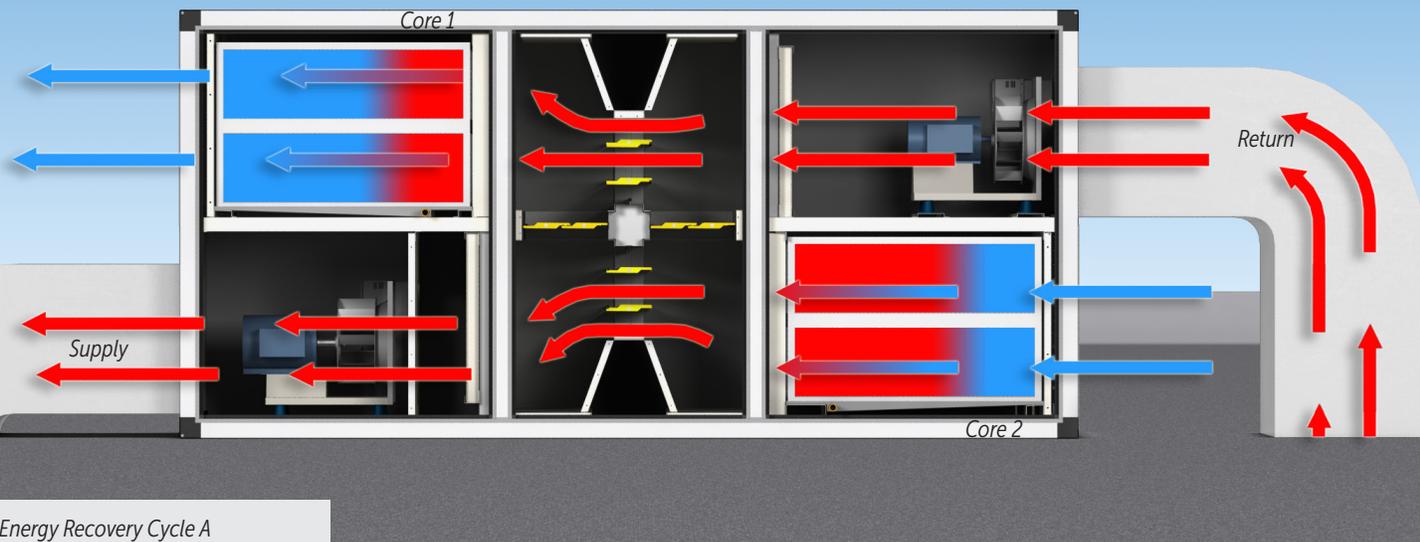
## PRC Operating Modes

### Energy Recovery

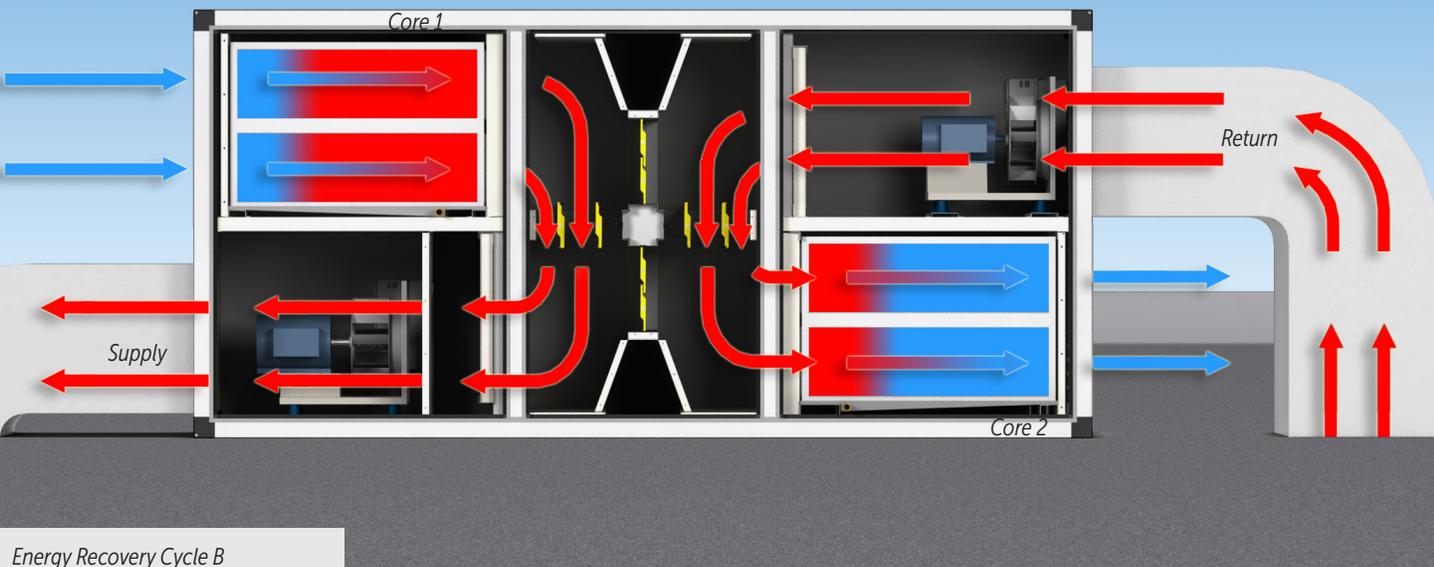
There are two stages to the energy recovery process. Below is an explanation of typical operation during winter conditions:

**Cycle A:** shows core 1 storing heat from return air being exhausted from the building. Core 2 is releasing the heat previously stored to condition the colder outdoor air to supply air.

**Cycle B:** During the cycle, dampers are re-positioned so the inverse occurs. Now core 1 is releasing heat it captured and stored during the cycle A. Core 2 is now recovering heat from the exhaust air.



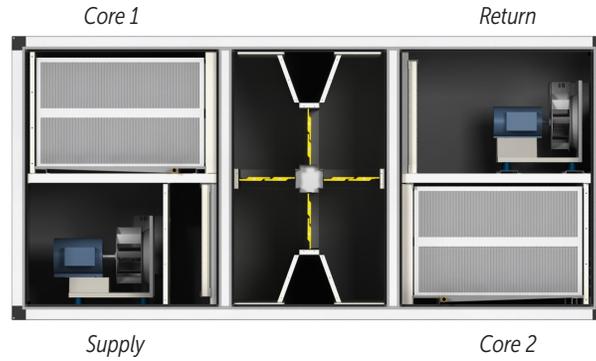
Energy Recovery Cycle A



Energy Recovery Cycle B

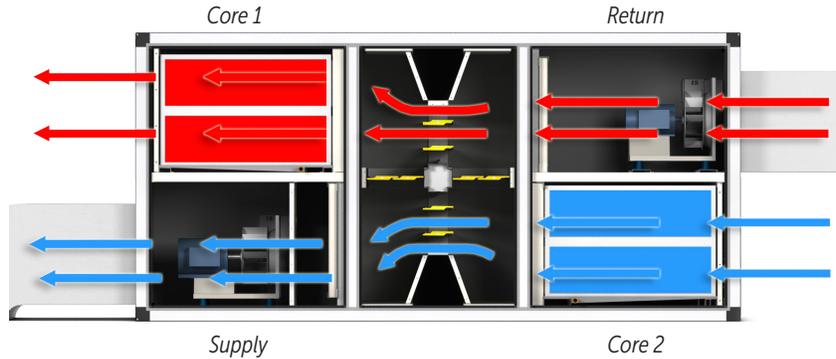
## Standby

The standby mode positions the dampers to isolate the building from outdoor conditions.



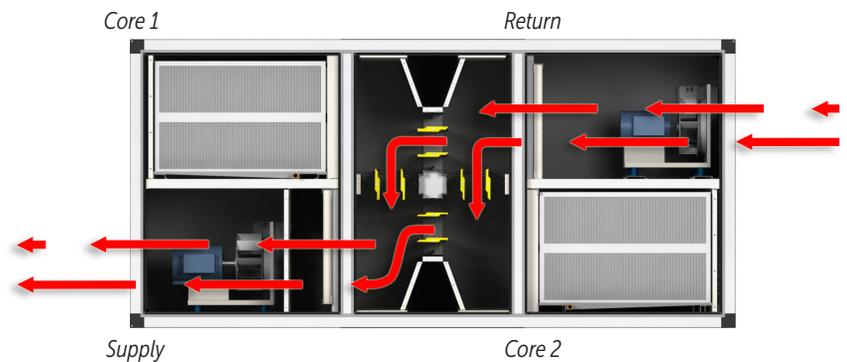
## Economizer

The economizer mode suspends the re-positioning of the dampers & energy recovery to use outdoor air for cooling. During this mode the dampers will reposition every 3 hours to self-clean the cores.



## Recirculation (Optional)

The recirculation mode positions the dampers to recirculate building air when the space is not occupied. Additional dampers are required for this mode.



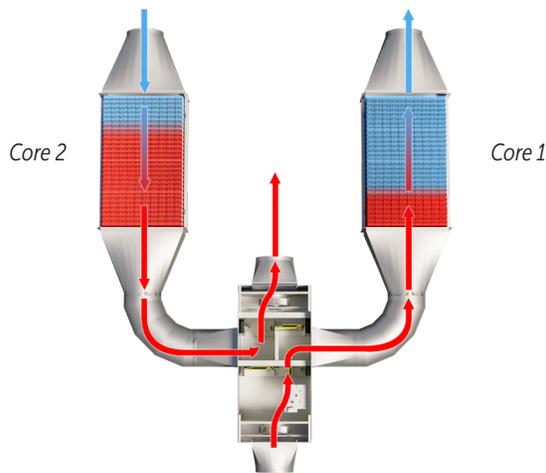
## PRCF Operating Modes

### Energy Recovery

There are two stages to the energy recovery process. Below is an explanation of typical operation during winter conditions:

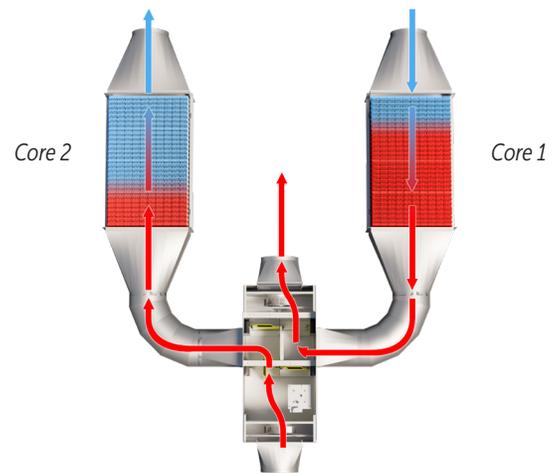
#### Cycle A

Core 1 storing heat from return air being exhausted from the building. Core 2 is releasing the heat previously stored to condition the colder outdoor air to supply air.



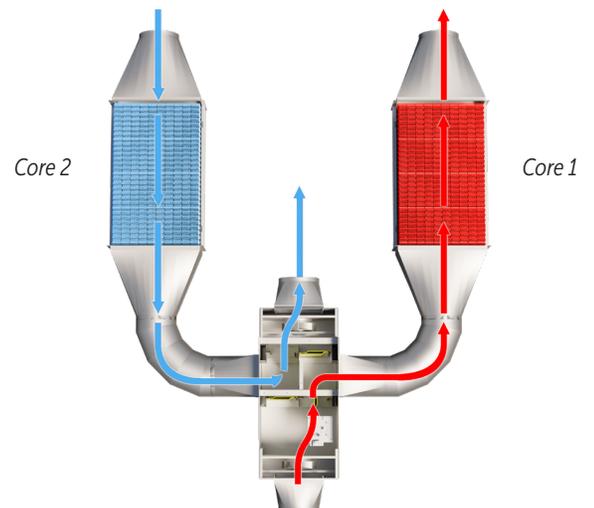
#### Cycle B

During this cycle, dampers are re-positioned so the inverse occurs. Now Core 1 is releasing heat captured and stored during Cycle A. Core 2 is recovering heat from the exhaust air.



#### Economizer

The economizer mode suspends re-positioning of the dampers and energy recovery to use outdoor air for cooling. During this mode, the dampers will reposition every 3 hours to self-clean the cores.



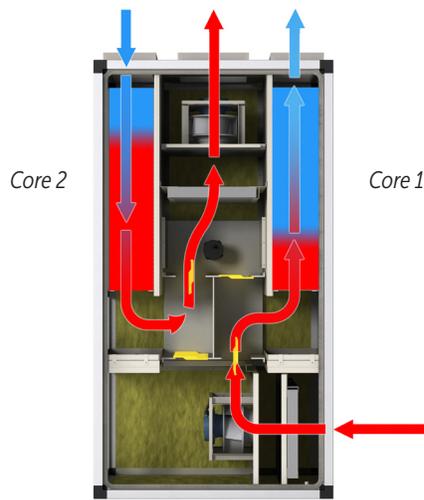
## PRCLC Operating Modes

### Energy Recovery

There are two stages to the energy recovery process. Below is an explanation of typical operation during winter conditions:

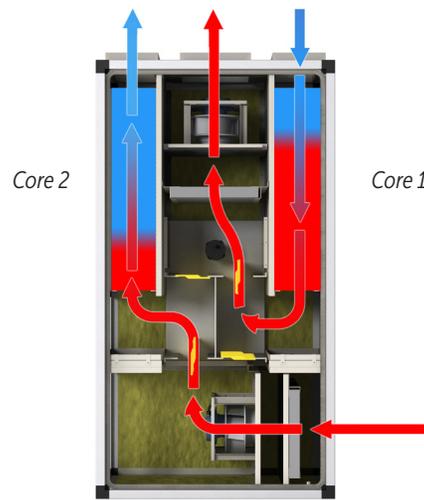
#### Cycle A

Core 1 storing heat from return air being exhausted from the building. Core 2 is releasing the heat previously stored to condition the colder outdoor air to supply air.



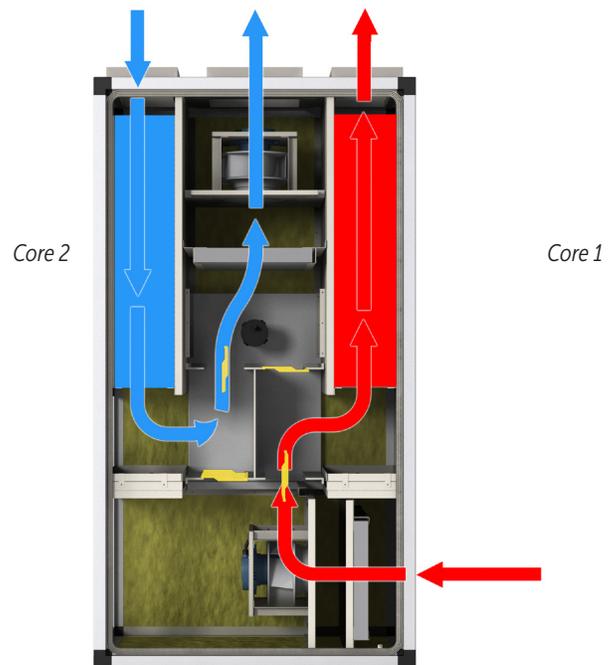
#### Cycle B

During this cycle, dampers are re-positioned so the inverse occurs. Now Core 1 is releasing heat captured and stored during Cycle A. Core 2 is recovering heat from the exhaust air.



#### Economizer

The economizer mode suspends re-positioning of the dampers and energy recovery to use outdoor air for cooling. During this mode, the dampers will reposition every 3 hours to self-clean the cores.



## Research and Development at SolutionAir

SolutionAir is committed to creating superior products through scientifically validated design. We have a host of facilities at our disposal that we have used to test our products in controlled, real world environments. They are the foundation that supports SolutionAir's dedication to relentless product innovation.

### Environmental Chamber

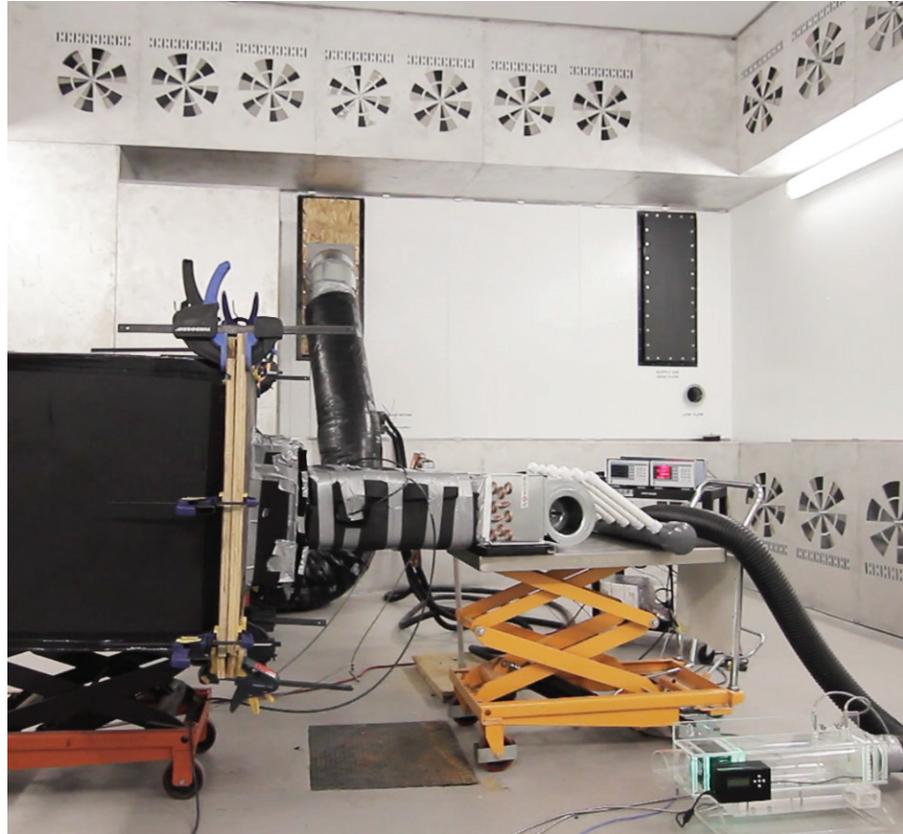
RegenCore units are tested to the highest industry standards via the Environmental Chamber. The chamber maintains temperatures ranging from  $-40^{\circ}\text{C}/\text{F}$  to  $+40^{\circ}\text{C}$  ( $104^{\circ}\text{F}$ ) and is paired with a configured SolutionAir air handling unit to simulate building return air by heating or cooling and introducing humidity. The chamber, air handling unit, and instrumentation allow for precise energy balances and accurate efficiency measurement making RegenCore the industry's only product with fully-tested indoor and outdoor performance data.



## Psychrometric Chamber

SolutionAir has built a state-of-the-art psychrometric lab to test heating and cooling for rooftop units and several complementary mechanical products:

- + Precise performance and longevity testing on configured rooftop units with packaged DX up to 26 tons.
- + Testing cooling coil and heating coil capacity in accordance with AHRI 440 and AHRI 410.
- + Room conditioning equipment capable of conditioning to a wide range of temperature and humidity set-points.
- + Water supply has an expanded range of temperature, flow and pressure capable of exceeding any of our products' fluid supply requirements.



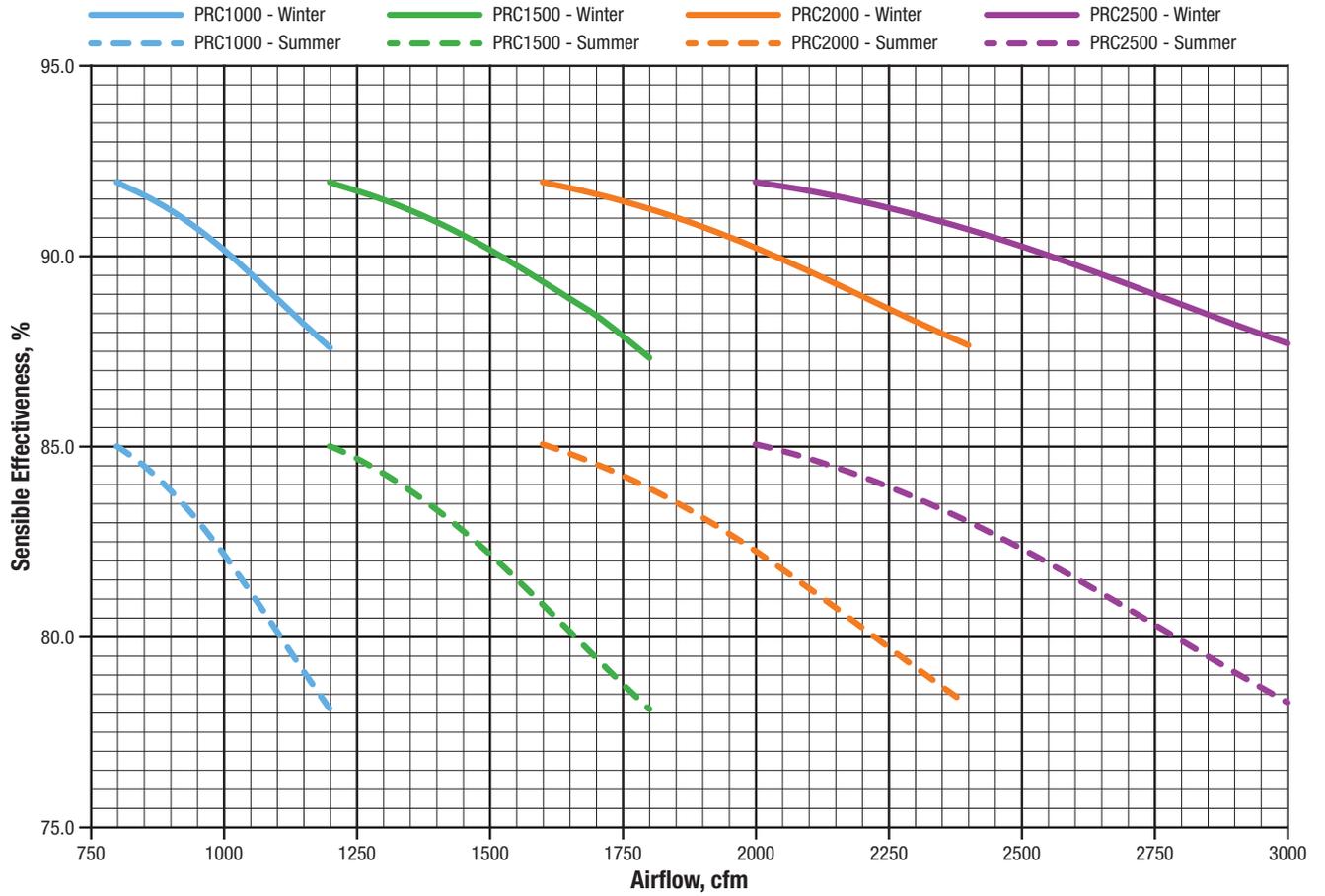
## Gas Testing Laboratory

A CSA certified Gas Laboratory allows SolutionAir to conduct product testing and safety certification in-house without the need for CSA personnel to be on site, resulting in:

- + Faster product development cycle.
- + Testing and certification of new products.
- + High quality results for customer demonstrations, configured units & control testing, training and site issue analysis.



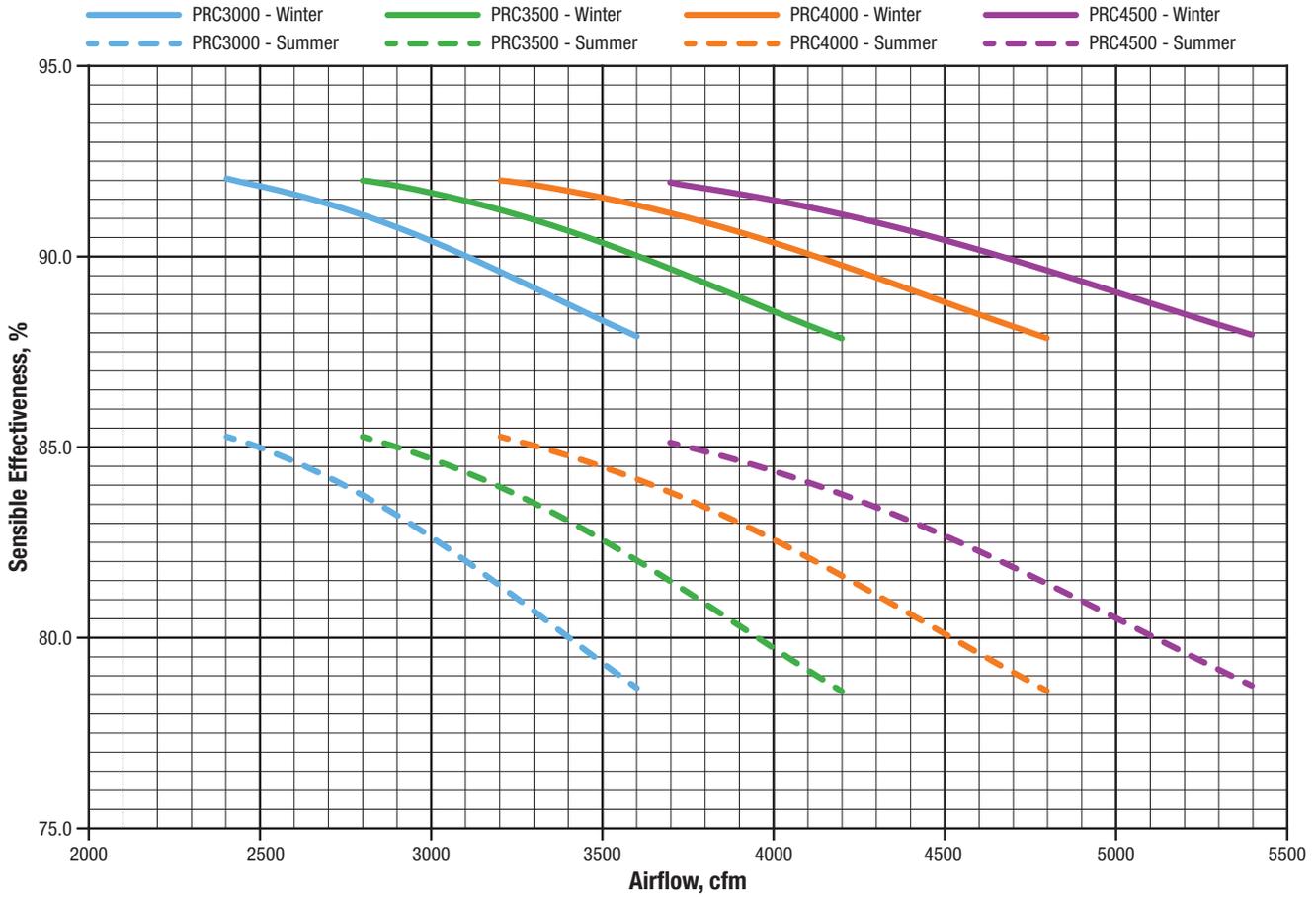
## PRC Performance Data



Effectiveness calculations include the following assumptions:

- + Ducted indoor units with 1 in. w.c. ESP
- + Winter outdoor air at 35°F, and return air at 70°F, inclusive of fan and motor loads
- + Summer outdoor air at 95°F, and return air at 75°F
- + Effectiveness will vary based on air conditions

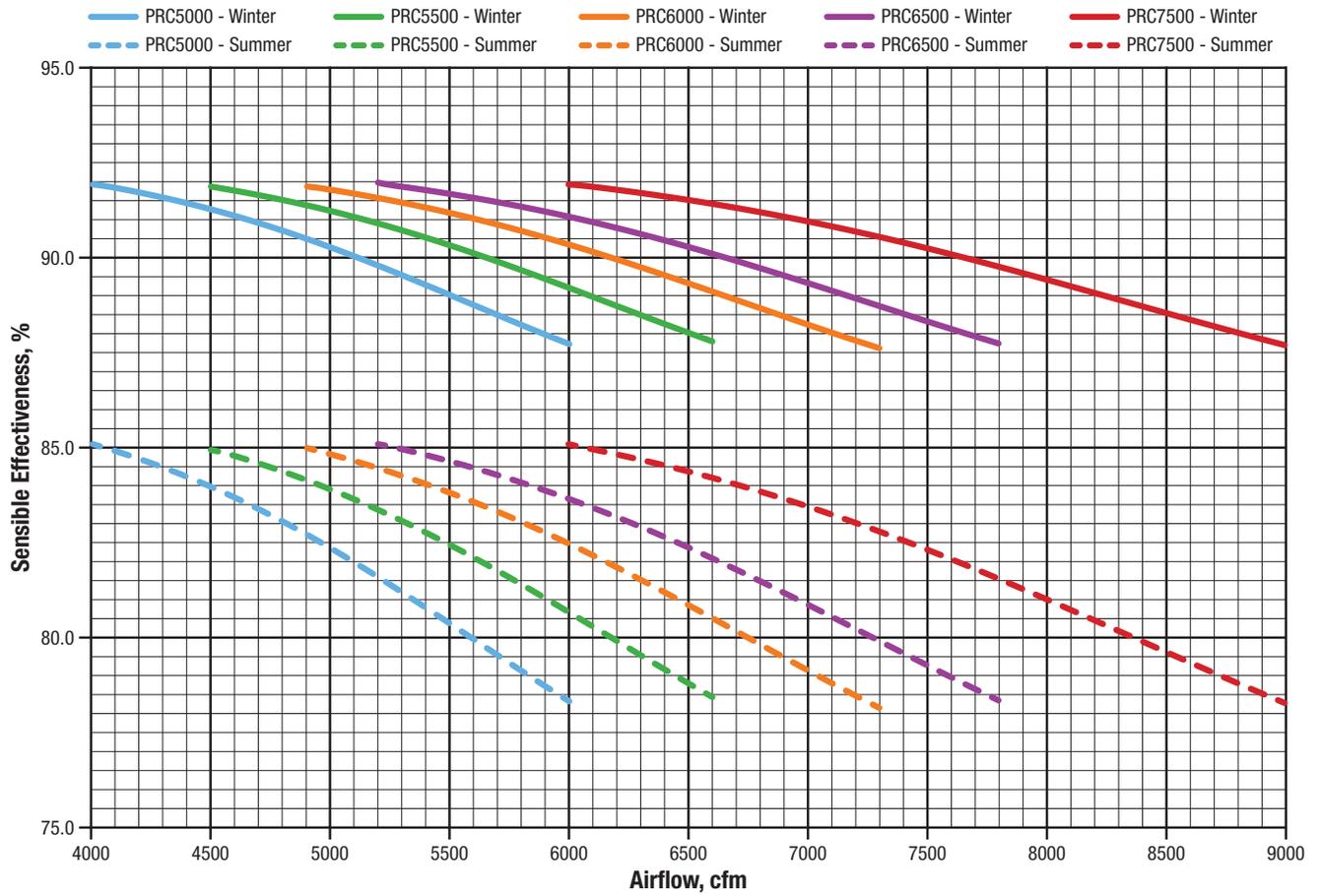
## PRC Performance Data



Effectiveness calculations include the following assumptions:

- + Ducted indoor units with 1 in. w.c. ESP
- + Winter outdoor air at 35°F, and return air at 70°F, inclusive of fan and motor loads
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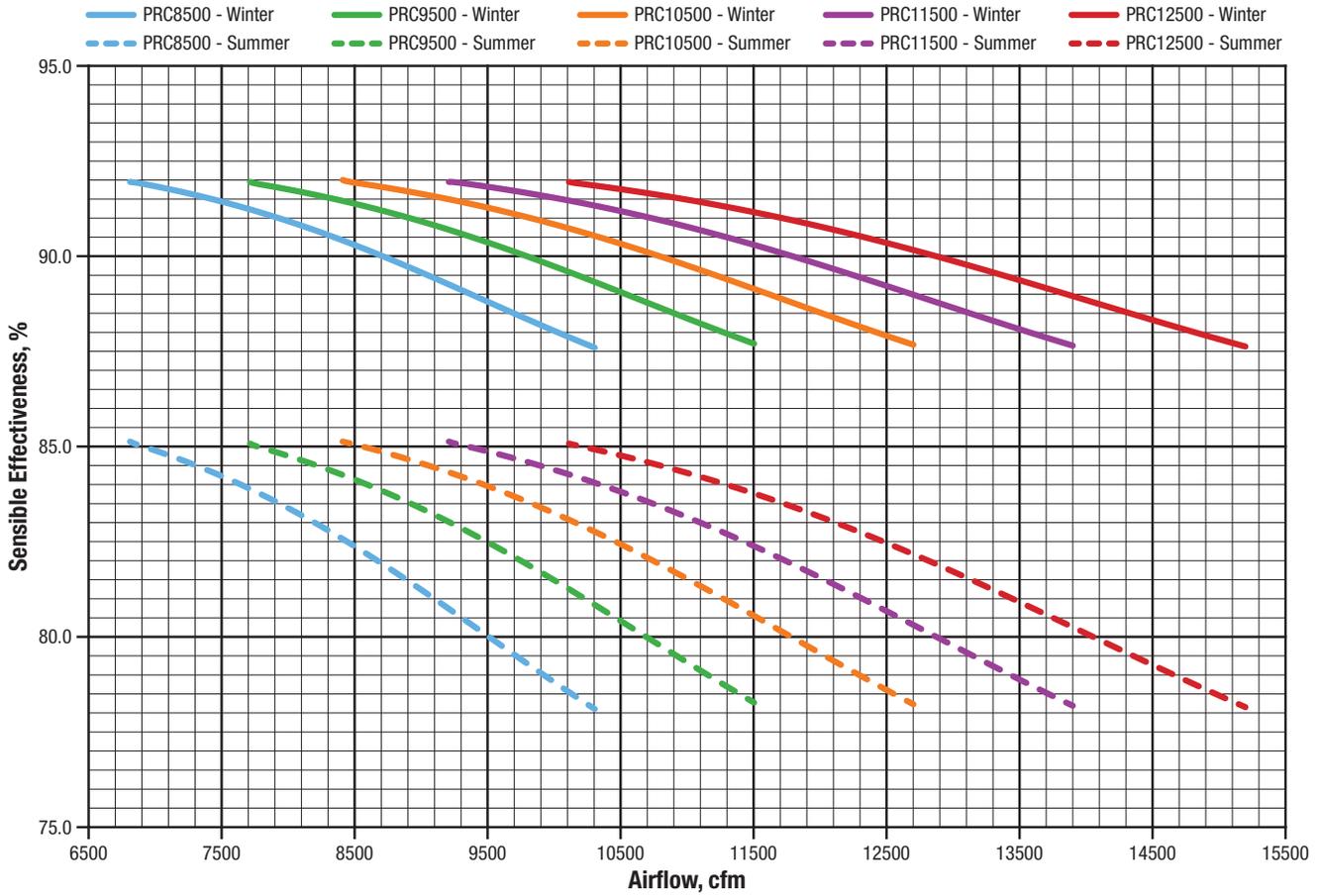
## PRC Performance Data



Effectiveness calculations include the following assumptions:

- + Ducted indoor units with 1 in. w.c. ESP
- + Winter outdoor air at 35°F, and return air at 70°F, inclusive of fan and motor loads
- + Summer outdoor air at 95°F, and return air at 75°F
- + Effectiveness will vary based on air conditions

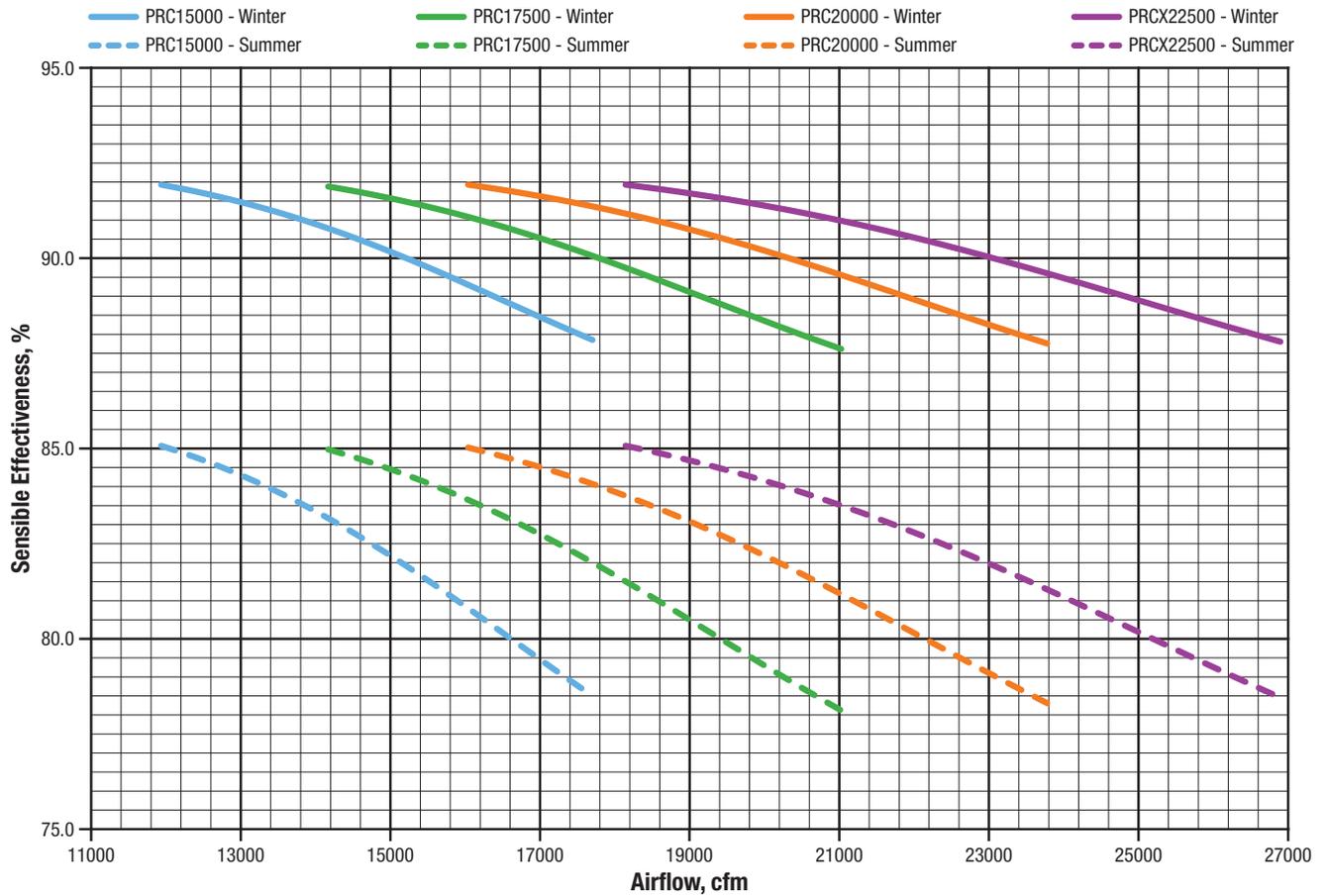
## PRC Performance Data



Effectiveness calculations include the following assumptions:

- + Ducted indoor units with 1 in. w.c. ESP
- + Winter outdoor air at 35°F, and return air at 70°F, inclusive of fan and motor loads
- + Summer outdoor air at 95°F, and return air at 75°F
- + Effectiveness will vary based on air conditions

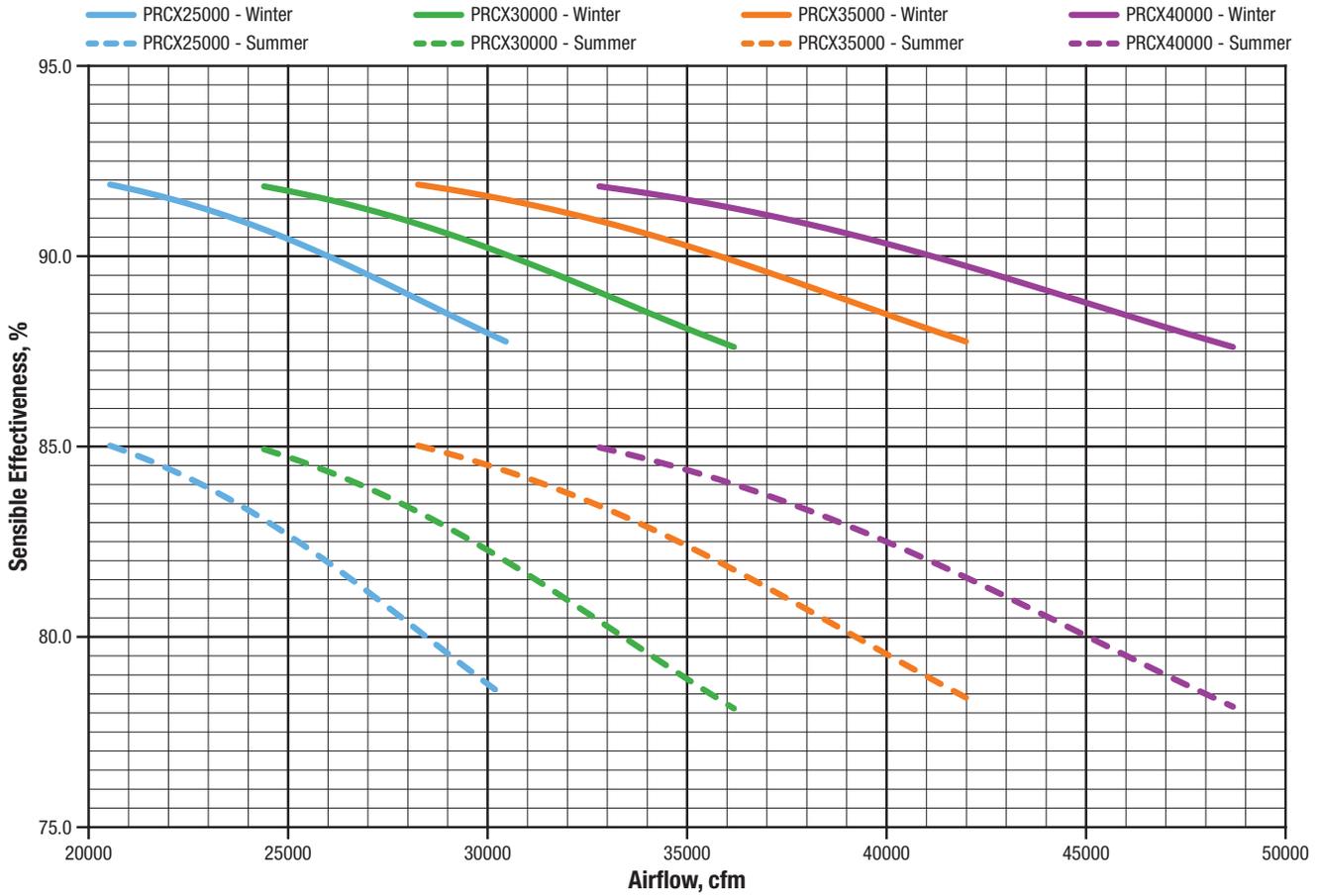
## PRC and PRCX Performance Data



Effectiveness calculations include the following assumptions:

- + Ducted indoor units with 1 in. w.c. ESP
- + Winter outdoor air at 35°F, and return air at 70°F, inclusive of fan and motor loads
- + Summer outdoor air at 95°F, and return air at 75°F
- + Effectiveness will vary based on air conditions

## PRCX Performance Data



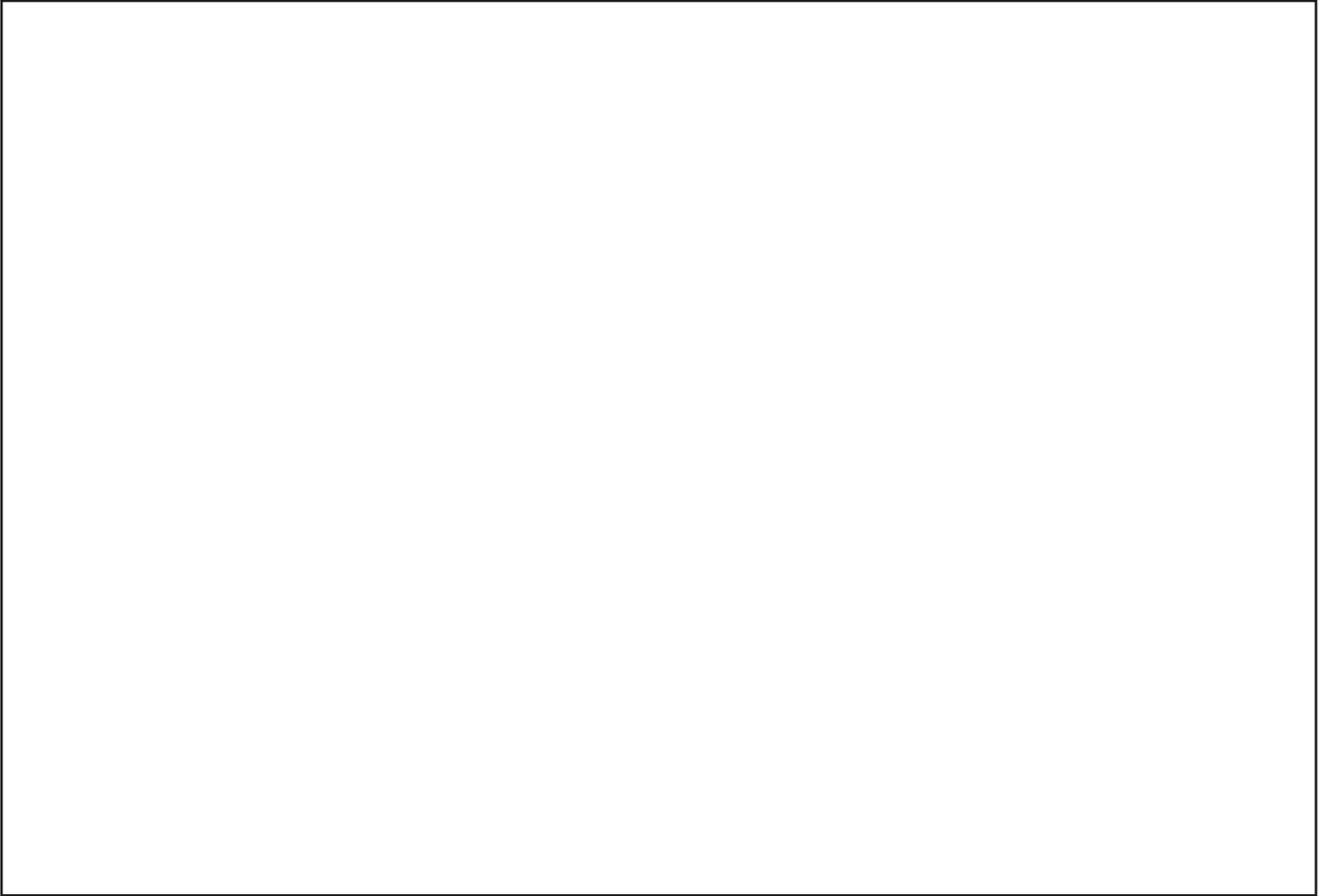
Effectiveness calculations include the following assumptions:

- + Ducted indoor units with 1 in. w.c. ESP
- + Winter outdoor air at 35°F, and return air at 70°F, inclusive of fan and motor loads
- + Summer outdoor air at 95°F, and return air at 75°F
- + Effectiveness will vary based on air conditions

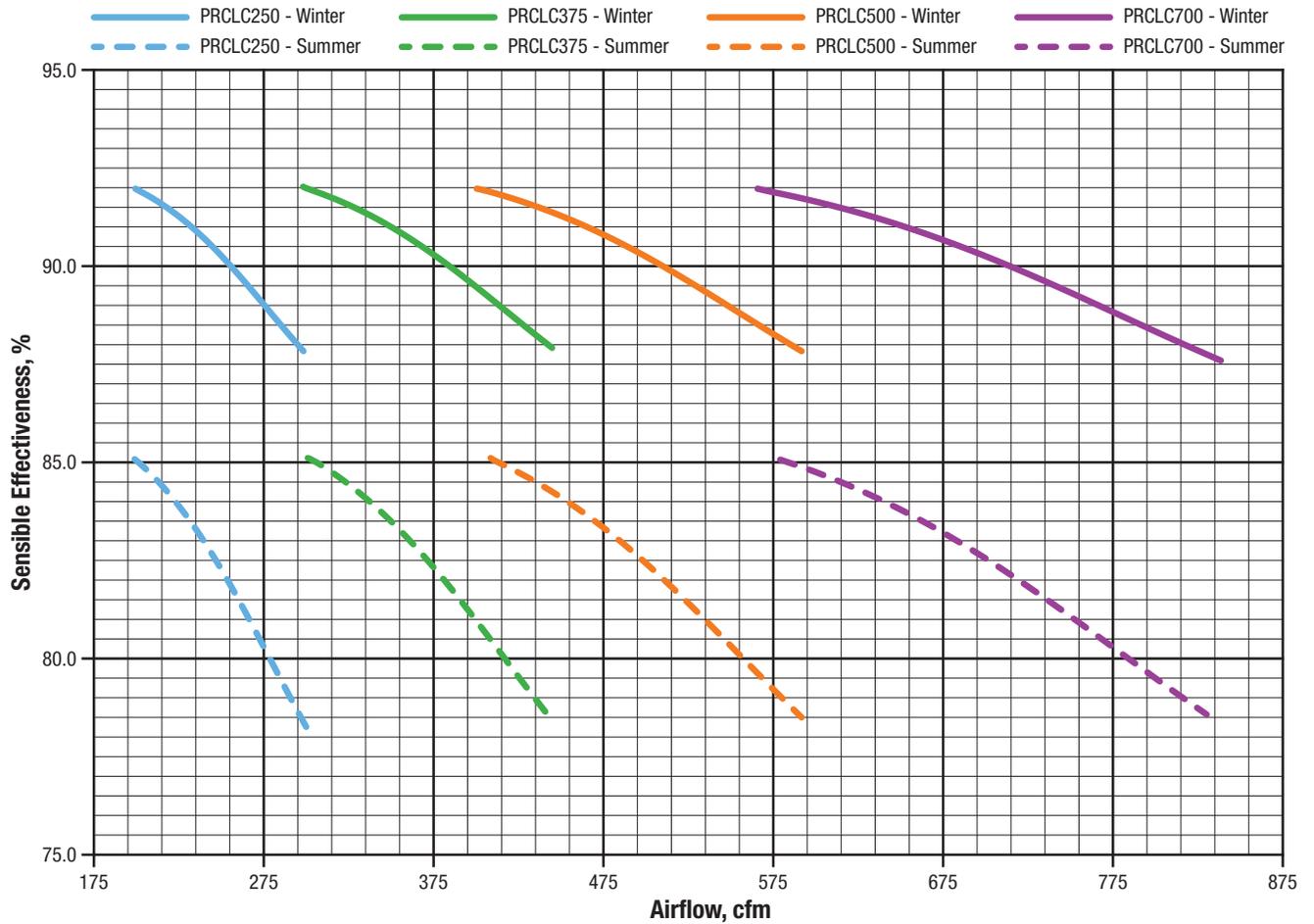
## **PRCF Performance Data**



## **PRCF Performance Data**



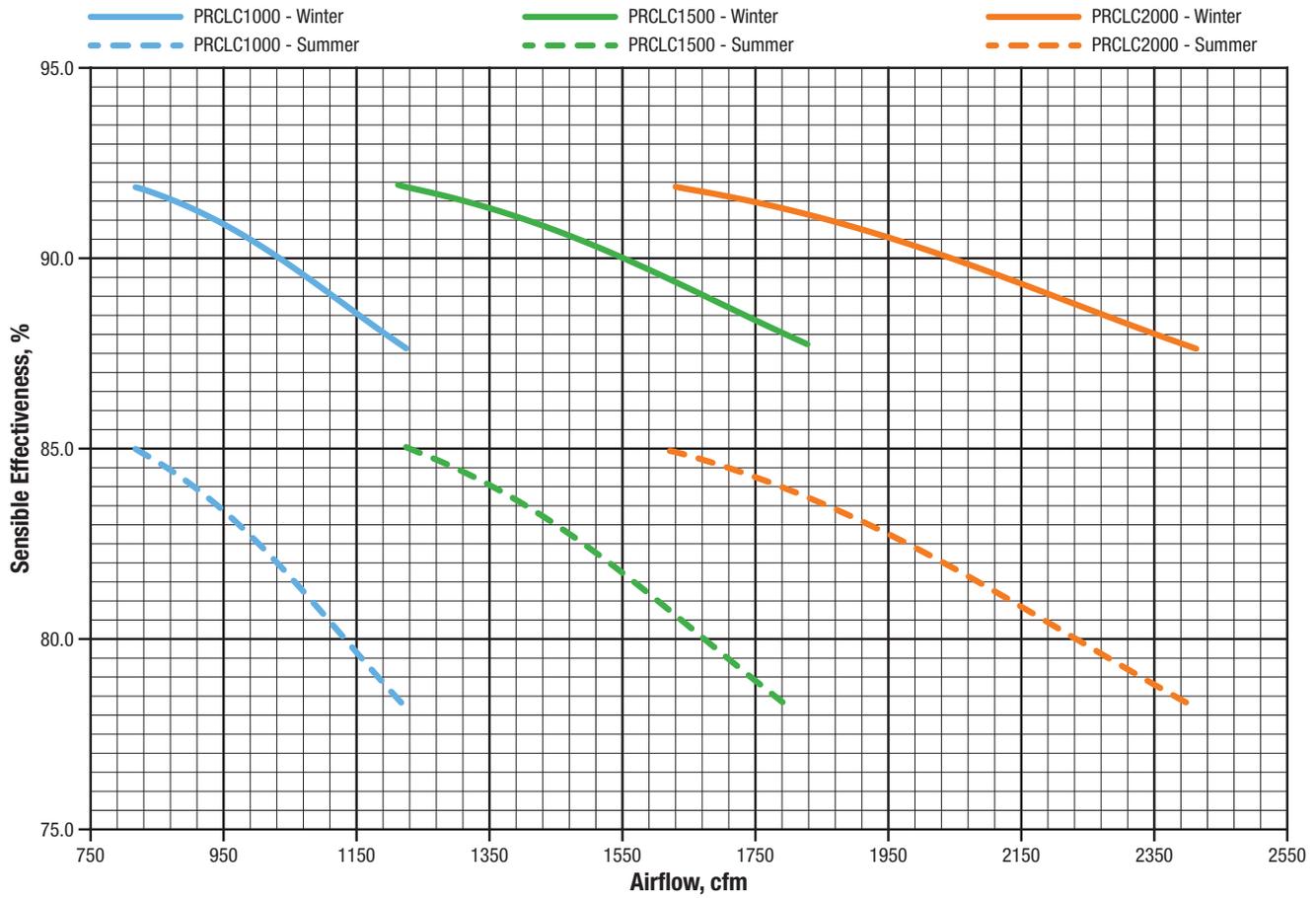
## PRCLC Performance Data



Effectiveness calculations include the following assumptions:

- + Ducted indoor units with 1 in. w.c. ESP
- + Winter outdoor air at 35°F, and return air at 70°F, inclusive of fan and motor loads
- + Summer outdoor air at 95°F, and return air at 75°F
- + Effectiveness will vary based on air conditions

## PRCLC Performance Data



Effectiveness calculations include the following assumptions:

- + Ducted indoor units with 1 in. w.c. ESP
- + Winter outdoor air at 35°F, and return air at 70°F, inclusive of fan and motor loads
- + Summer outdoor air at 95°F, and return air at 75°F
- + Effectiveness will vary based on air conditions







Product Improvement is a continuing endeavour at SolutionAir. Therefore, specifications are subject to change without notice. Consult your SolutionAir Sales Representative for current specifications or more detailed information. Not all products may be available in all geographic areas. The complete marketing package can be viewed online at [solutionairgroup.com](http://solutionairgroup.com).

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