PRE-COOLERS

Manufacturer of custom cooling products and highly efficent replacement media for Evaporative Cooling systems.

COOL EDGE™

COOL EDGE™
MANUFACTURER OF CUSTOM COOLING PRODUCTS

HISTORY

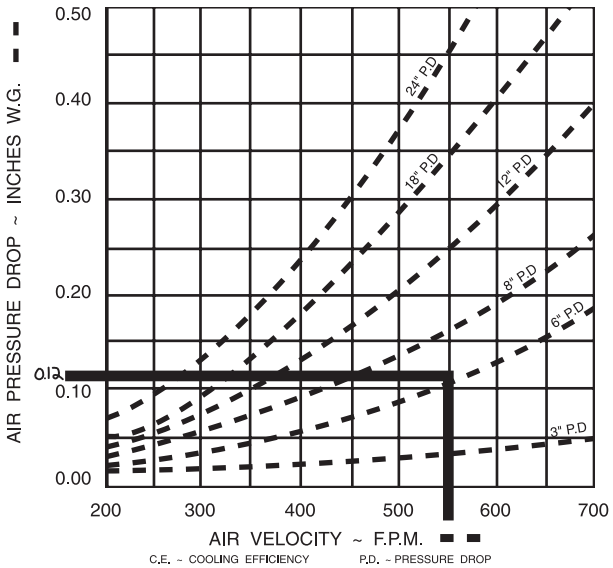
Cool Edge has been combining the experience of over 15 years in the business with creative ideas to lead the industry in evaporative cooling systems. Evaportation is one of the simplist and oldest methods of cooling air. With our continued technological advances, the simple principles of evaporative cooling remain the most cost-efficient method for environmental temperature control. Direct evaporative systems rely entirely on the evaporation or water for their cooling process. With that in mind, we have paid particular attention to the design of our pre-coolers from the special engineered casing with superior reservoir recycling systems or single pass systems to the specialized media and overall controls.

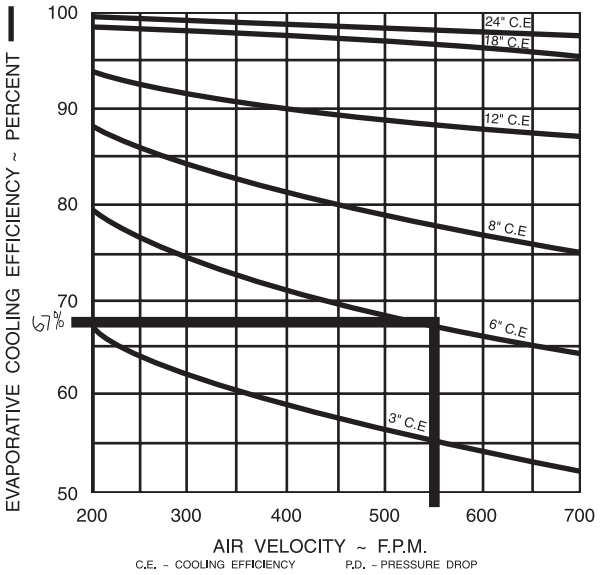
This catalog and information is intended to help maximize the service life and performance of your current equipment while increasing efficiency and temperature control.

Theory of Operation

Direct evaporative systems rely entirely on the evaporation of water for their cooling process. Water is supplied to the top of the media and allowed to trickle down. As the water is soaking in and spreading over the highly absorbant surface of the CELdek® media, air is pulled in through the fluted openings by the existing unit's fan. This induces the turbulent mixing of air and water for optimum heat transfer. The evaporation of the water removes heat from the inlet air, which results in dropping air temperatures. This drop in air temperature before it flows through the condenser coils increases the operating efficiency of the unit. Increased efficiency leads to energy savings and extending the unit's life. Pre-coolers can be used in applications such as: air-conditioning and refrigeration systems, chillers and fresh air makeup systems. With the installation of a fan, they can also be used in green houses and to cool livestock and poultry and other applications where efficient cooling is needed. Pre-coolers are low maintenance and will usually pay for themselves by increased cooling efficiency, resulting in extending the life of the unit as well as energy savings. Evaporate systems are operated in ambients above 75 degrees F dry bulb.

The amount of cooling is spoke of in terms of evaporative efficiency. Velocity of air through the Media and the depth of that Media, determine the evaporative efficiency. Direct evaporation occurs only in the parameter of the wet bulb depression.





ABBREVIATIONS

EDBT = Entering Dry Bulb Temperature (Before Cooling Pad)
LDBT = Leaving Dry Bulb Temperature (After Cooling Pad)
WDT = Wet Bulb Temperature (Same Before and After Pad)
CFM = Cubic Feet Per Minute
W = Width of Pad Wall In Feet
H = Height Of Pad Wall In Feet
FA = Free Area Is Area Not Covered By Casing

EXAMPLE: Design @ 117°F DB/78°F WB @ 550 fpm

EVAPORATIVE COOLING EFFICIENCY

$$\text{EFFICIENCY} = 100\% \times \frac{\text{LDBT-WBT}}{\text{EDBT-WBT}}$$

$$\text{BT} = \text{EDBT} - \frac{E\%}{100\%} \times (\text{EDBT} - \text{WBT}) = 117 - \left[\frac{67\%}{100\%}(117-78)\right] = 90.9^{\circ}\text{F DB}$$

AIR VELOCITY

$$\text{FEET PER MINUTE} = \frac{\text{CFM}}{\text{W x H}} \quad \frac{\text{CONDENSER CFM}}{\text{(SQ. FT. OF FA)}} = \text{FPM VELOCITY}$$

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COOL EDGE
MANUFACTURER OF CUSTOM COOLING PRODUCTS ™

COOL EDGE STANDARD SINGLE PASS MODEL

- **Up To 30% Increase In Energy Savings**
- **Extends the Life of Your Equipment While Reducing Expensive Maintenance Costs**
- **Increases Cooling Capacity By At Least 10%**

CASE CONSTRUCTION AND MEDIA

The Cool Edge single pass model pre-cooler, up to a maximum height of 72", is available in ABS plastic with ultra-violet inhibitors or optional stainless steel housing. The ABS plastic housing is only available in 5" or 7" depth allowing use of either 3", 4" or 6" pad depth. For units over 72" in height, a stainless steel housing is required. Also units requiring pad depth of 7"-24" requires stainless steel housing. Cool Edge uses CELdek® media which is manufactured from a high cellulose material with a unique cross-fluted design which induces highly turbulent mixing of air and water for optimum heat and moisturetransfer.

"A" Series = with controls

"B" Series = without controls

The water distribution system is constructed to assure even water distribution to pad surface below. Adjustment should be made to coincide with 90% pad saturation on warmest day.

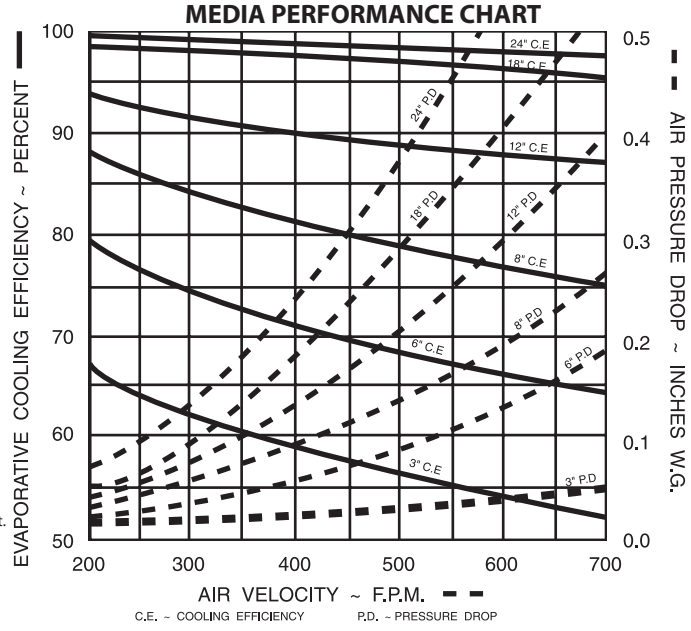
CONTROLS

Different options of controls are available depending on application and can include needle valves and intermittent water (pulsing) devices. Units less than 20 tons are supplied with a 24V solenoid valve and activated by either a pressure or thermostat control depending on application.

A-Series controls include the 24V solenoid valve. Pressure or thermostat controls are additional cost.

The P, S - 50, 70 Models are single pass systems and require the installation of a drain line to an existing condensate drain or waste vent. Recirculating systems are available on the CE-100 Models.

MEDIA PERFORMANCE CHART



Each Cool Edge system is custom-made with individual customer needs and specifications accommodated. Multiple unit systems, pad thickness, electrical components, pressure switch or thermostats are but a few of the "custom" features available.

P = ABS Plastic Housing
S = Stainless Steel Housing

50 = 5" Case
70 = 7" Case

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COOL EDGE STANDARD CE-100 MODELS

- **Up To 30% Increase In Energy Savings**
- **Extends the Life of Your Equipment While Reducing Expensive Maintenance Costs**
- **Increases Cooling Capacity By At Least 10%**

CASE CONSTRUCTION AND MEDIA

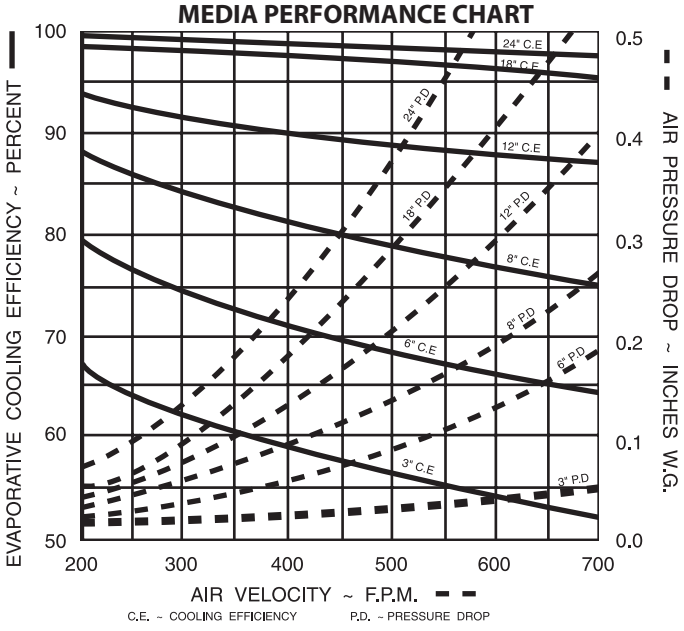
Cool Edge pre-coolers are made of stainless steel housing with some ABS plastic components. Cool Edge uses CELdek® media which is manufactured from a high cellulose material with a unique cross-fluted design which induces highly turbulent mixing of air and water for optimum heat and moisture transfer. Case standard depth is 7". Will accomodate 3" to 6" media. CE-100 housing is available to accomodate media up to 24" in depth.

RESERVOIR SYSTEM

The CE-100 units have a reservoir that runs the entire width of the pre-cooler and is large enough to house a submersible pump and float. These units are excellent in conserving water while minimizing mineral deposit buildup due to the 1 1/2gallon per foot capacity. As the water evaporates, minerals will tend to concentrate in the bottom of the reservoir and should be flushed out periodically. To ensure long pad life, when flusing the reservoir, rinse the media with fresh water. The media can become fragile when wet, so special care should be taken while handling. A bleed off tee can be installed in some applications to help minimize the accumulation of mineral deposits. These units require an additional support due to the large capacity of reservoir.

"A" Series = with controls / "B" Series = without controls
The water distribution system is constructed to assure even water distribution to pad surface below.
Adjustment should be made to coincide with 90% pad saturation on warmest day.

MEDIA PERFORMANCE CHART



CONTROLS

Different options of controls are available. Units are available for a submersible pump and activated by either a pressure or thermostat control depending on application.

The CE-100 Models has an overflow fitting which may require the installation of a drain line to an existing condensate drain or waste vent. Recirculating systems are available on the CE-100 Models.

Each Cool Edge system is custom-made with individual customer needs and specifications accommodated. Multiple unit systems, pad thickness, electrical components, pressure switch or thermostats are but a few of the "custom" features available.

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EVAPORATIVE COOLING PADS

CELdek is made from a special high celluslose material, which is impregnated to resist degradation. CAUTION: Do not expose to sparks or flame - this material is flammable when dry. GLASdek is made from glass matt and rigidfying agents. GLASdek is fire rated with UL900, Class II for depths up to 12".

- Wide Range of Cooling Applications -

The CELdek unique cross-fluted design of the pads induces highly turbulent mixing of air and water for optimum heat and moisture transfer. CELdek further enhances this design using unequal angles in the slope of the corrugations. The 45˚ and 15˚ corrugations are offset to continually direct the water to the air entry side of the pad.

This results in:

High cooling efficiency - up to 90% in the 400-500 FPM velocity range for a 12" depth of CELdek ... slightly higher in GLASdek. These pads (flute size 6560/15) contain 123 square feet of cooling surface in every cubic foot (440 square meters per cubic meter).

Much higher face velocity - The natural tendancy is for the air to push the water out of the pad. Because of the unequal angle the maximum are velocity without water carryover is approximately 700 FPM. Most engineers design systems for an average velocity of 550 FPM or less to allow for variance in air distribution.

Self-cleaning design - Munters, CELdek and GLASdek resist clogging due to atmosphere dust or sand. When the recirculating water is turned on, especially with out air flow, the water flushes the surface with more flushing at the entering side where debris normally accumulates. This also serves to reduce mineral build-up.

SIZES AVAILABLE

CELdek and GLASdek evaporative cooling pads are installed side-by-side with no intermittent joints or framing. Maximum size is: 24" D x 12" W x 72" H. The CELdek pads can be cut down to 3", 4", 6", 8", 12", or 18" or custom cut in depth and to any height in multiples of 12" up to 72". GLASdek pads have a minimum 4" depth. For taller pad walls, the media can be stacked to a height of 12', using intermediate supports along the horizontal joints.

WATER DISTRIBUTION

Water flow is based on the depth of the pad. Both CELdek and GLASdek require 1.5 gallons per minute per square foot of horizontal surface area . For installations having intensive evaporation and pads taller than 72 inches, an additional 10-20% of water may be required.

DISTIBUTION PADS

Distribution pads supplied in 2" or 3" sections of cross-fluted pads with special edge reinforcement, are made to disperse the water laterally across the top of the pad. For more information, please contact us.

SCALE CONTROL

Scale formation looks like frost and normally slows up the air entry side of the pad. To prevent scale formation, a bleed-off equal to 10-50% of the amount of water evaporated may be required. The exact amount will depend on the pH and hardness of the water. Once the bleed-off rate is established, the scale can be controlled.

ALGAE CONTROL

Although algae may grow on a HumiCool evaporative cooling pad, it will not cause deterioration or rot. But, if allowed to grow freely, it may eventually clog the passages and inhibit the flow of air. Algae buildup is controlled by implementing simple maintenance techniques. The program should be started early. For more information, please contact us.

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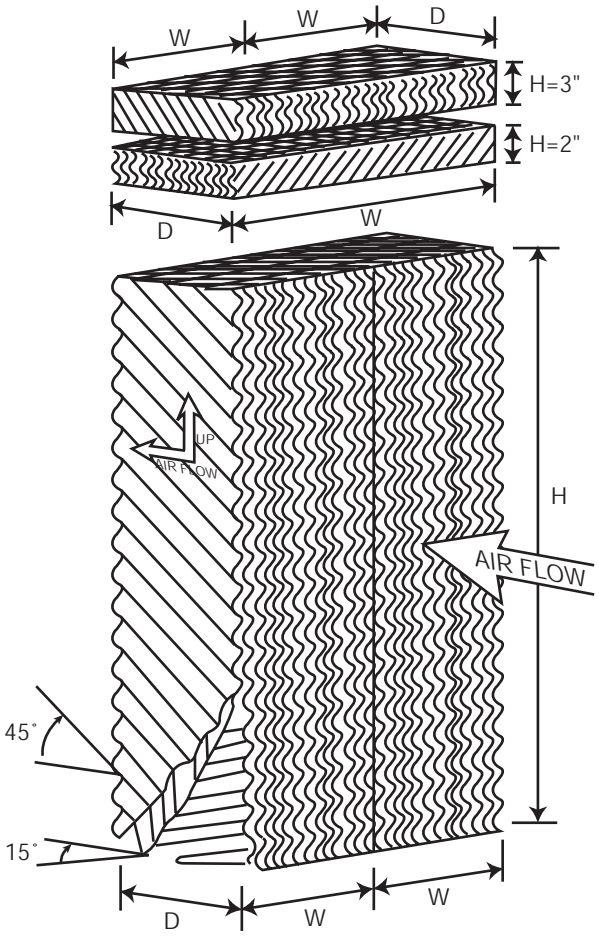

STANDARD DIMENSIONS

Distribution Pads: To fit flush on top of media

CAUTION: Do not expose Celdek evaporative cooling pads to sparks, open flame, welding spatter, temperatures in excess of 350˚f, or other sources which may ignite the paper. New GLASdek will not readily ignite unless exposed to a direct flame or extremely high temperatures for an extended period of time.

DISTRIBUTION PAD Standard Sizes

W - 12", 24", 30", 36", 48" ,60", 72"
H - 2", 3"
D - 4", 6", 8", 12"

CELdek (minimum 3" Depth)* GLASdek (minimum 3" Depth) Standard Sizes**

W - 12"
H - 24", 30", 36", 48", 60", 72"
D - 3"*, 4"**, 6", 8", 12", 24"
Please Specify W x H x D

Pads can be cut to any divisor of the standard heights. Odd heights are charged at the next larger standard size. Please inquire regarding the availability of 16" and 18" depths.

When ordering, we require the following sequence of dimensions: **Width x Height x Depth**

SPECIFICATIONS FOR CELdek AND GLASdek 6560/15

Condition	CELdek	CELdek
Angles	45˚ and 15˚	45˚ and 15˚
Base Sheet	Cellulose	Glass Matt
Maximum Intermittent Water Temperature	130˚F	130˚F
Maximum Intermittent Air Temperperature	300˚F	300˚F
Maximum Continuous Air Temperature	150˚F	150˚F
Maximum Continuous Water Temperature	100˚F	100˚F
pH Range	6-9	6-9
Dry Weight	2.4 lb/ft3	1.4 lb/ft3
Wet Weight	5.6 lb/ft3	7.0 lb/ft3
Operating Weight	6.0 lb/ft3	9.0 lb/ft3
Water Load (gpm/sq.ft.)	1.5	1.5
Maximum Size WxHxD	12" x 72" x 24"	12" x 72" x 24"
Fire Rating, UL	None	900 Class II
Flame Spread Index, E84-81a	450	5

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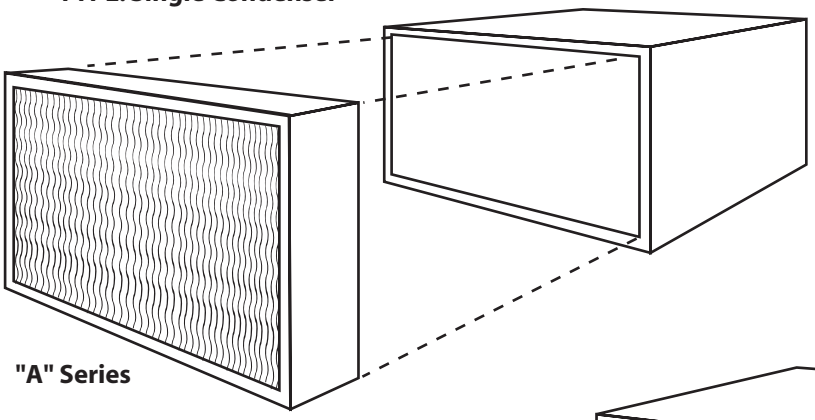
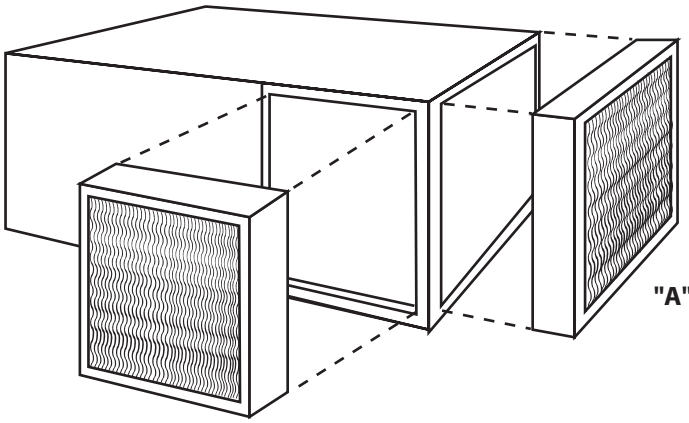
TYPE: Single Condenser



"A" Series

Illustrations shown are of P and/or S Model.

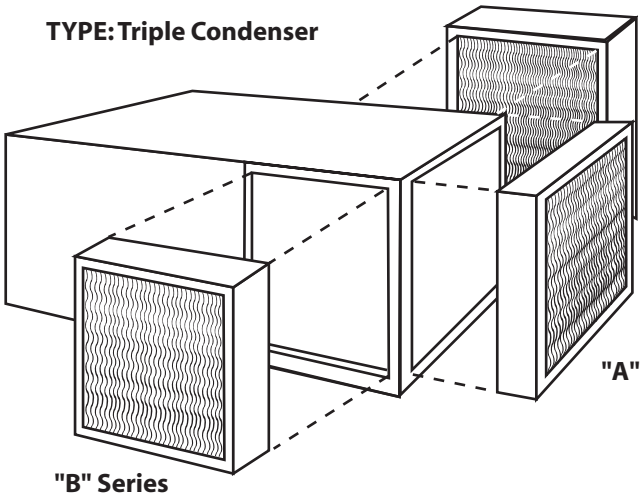
TYPE: Double Condenser



"A" Series

"B" Series

TYPE: Triple Condenser



"B" Series

"A" Series

"B" Series

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COOL EDGE™
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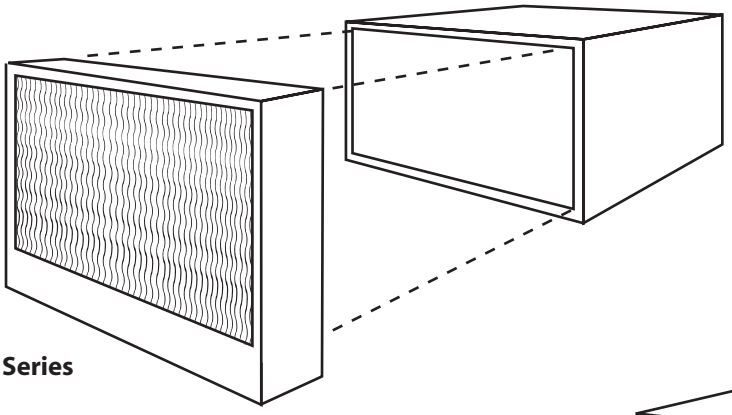
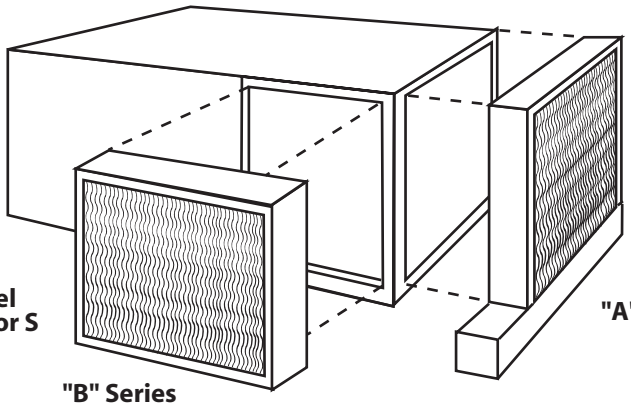
TYPE: Single Condenser



"A" Series

Illustrations shown are of P and/or S Model.

TYPE: Double Condenser

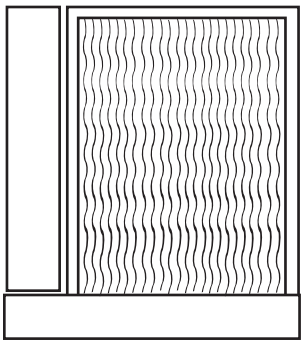


Model CE-101

Model P and/or S

"A" Series

"B" Series



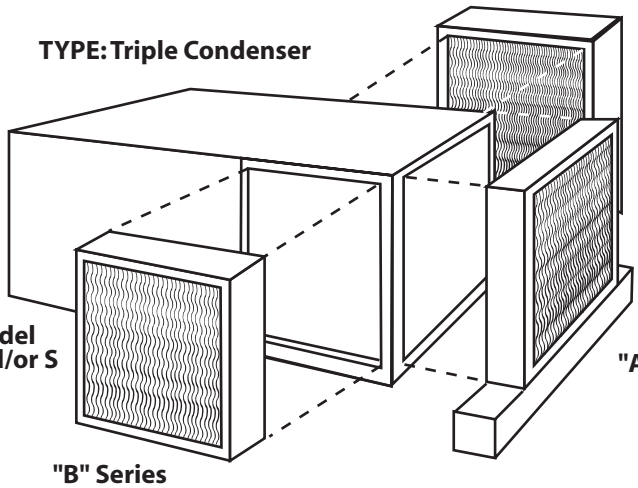
Model P and/or S, side view

Model CE-101, front view

Pre-cooler showing over-lapping.

This system shows the use of two different models to make use of a common sump. On large units, each pre-cooler has to have its own reservoir.

TYPE: Triple Condenser



"B" Series

Model CE-102

"A" Series

Model P and/or S

"B" Series

Different options can be utilized to obtain customer's needs.

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MAINTENANCE

MEDIA

If excessive deposits of minerals or salts begin to build on the air entering edge of the Media, there may be one or two solutions.

1. Water flow dow the Media is not sufficient enough to wash debris from the surface. Adjust manual flow valve to create more flow.

2. The water is excessively hard with latent minerals. A water conditioning system should be installed if conditions warrant.

The Media face can be cleaned while water is flowing by brushing it with a soft bristled brush in an up and down direction. After brushing, rinse Media with water, remove Media and flush out pan and sump. Replace Media with blue dye edge top and on the leaving edge of air flow. On 6" or thicker pads, refer to the arrows indicating the direction of air flow. (Special care shuld be taken while handling wet Media). If Media is replaced improperly, it could cause condenser damage.

CAUTION: Do not attempt to clean Media by brushing side to side, this will damage Media.

If deposits are too hard for normal brush cleaning, use a Calgonite type condenser coil cleaner. Flush Media after application and brushing.

CAUTION: Do not use an acid base cleaner. Use of such chemicals will destroy bonding glues and resins in Media.

All Cool Egde CE-100 Model pre-coolers should be flushed out and cleaned periodically to remove any algae or mineral deposits. In winter, turn off water and electrical power to all model pre-coolers and drain lines to prevent any damage from freesing or splitting. On the CE-100 Model also drain reservoir of water by removing overflow tube.

CASING AND VALVE

1. Flush debris from bottom of the cell casing or sump at least twice a year.

2. If a valve or tubing becomes plugged, back flush it with the existing water line.

WINTERIZATION

Where danger of freezing exists, the water supply line must be disconnected and allowed to drain below roof line. Drain sump on recirculating models. Loosen fitting at outlet of solenoid valve to drain any water in distribution tubes and internal plumbing.

CEL dek Media should be removed if ice or snow storms are anticipated to prevent damage to Media from freezing and thawing.

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HOW TO ORDER AND SIZE A PRE-COOLER

5" and 7" Housing is a standard size which accommodates 3" or 4" media for air coditioning and 6" media for refrigeration. Units can be manufactured to house up to 24" media depth.

The following information will be needed:

Ask for the application (Whether it is for air conditioning, refrigeration, chillers, etc.)

Make and Model of Unit

Mounting Dimensions

CFM:

If the customer has only the coil size or opening size of the unit then:

add 5" to the height measurement for Standard P and/or S Model

add an additional 4" to the height measurement for CE-100 Model with reservoir (total of 9")

add 6" to the width measurement for either P and/or S or CE-100 Model

NOTE: You will need 1.5 square feet of pre-cooler per ton. (Maximum to 550 feet per minute per square foot to prevent water carry over.)

Is the unit a multi-coiled group?

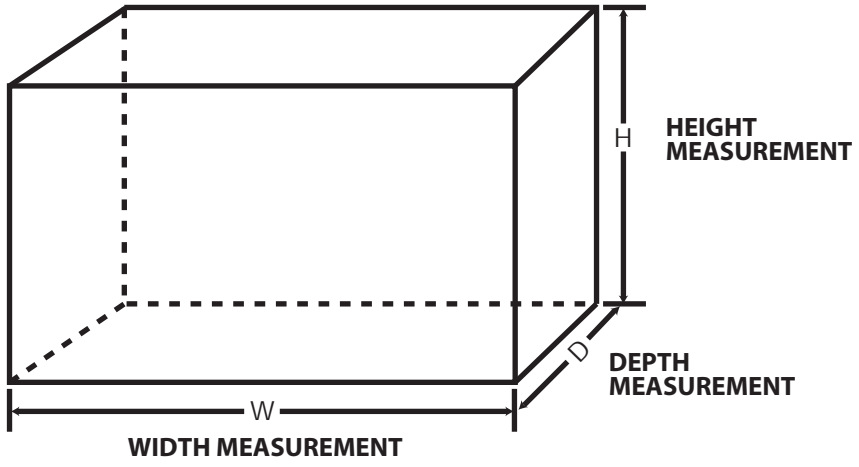
This would mean that one pre-cooler would be needed for each coil section of the unit.

For example: If a unit has coils on 2 sides, the main pre-cooler would be an "A" series pre-cooler with all the necessary controls and the other unit(s) would be "B" series units with only a needle valve for controlling the water flow over its own media section.

Please call if you need additional information.

PLEASE NOTE: This unit is Custom Built to Your Specifications and consequently there is a NO RETURN and NO REFUND policy by Cool Edge! Please double check your measurements ... specify Width, Height, and Depth.

When ordering, we require the following sequence of dimensions:
Width, Height, Depth.



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WARRANTY

This warranty is extended by Cool Edge to the original purchaser who owns the building this unit serves and to any succeeding owner.

Cool Edge pre-coolers carry a three year warranty on the case, two years on the pads and one year on all other parts from the date of purchase (dealer receipt required). Upon immediate written motification, Cool Edge, at its option, will (a) provide a replacement part; (b) provide parts or any components to repair the defective part; or (c) provide a replacement. Any local transportation, related service, labor, diagnosis calls, cost of returning the defective part to Cool Edge and related items are not included. This is Cool Edge's sole and exclusive warranty. Purchaser's sole and exclusive remedy, whether based upon warranty, contract, or negligence, will be to proceed under this warranty.

Replacement parts are warranted for the remainder of the original product warranty, or for one year, whichever is longer. Cool Edge may require that the defective parts be returned to verify and identify the cause of the defect.

Any equipment descriptions, specifications, samples, models, bulletins or similar material used in connection with this sale are for the sole purpose of identifyinh the product and are not to be construced as express warranties.

PLEASE NOTE THAT WARRANTY COVERS MANUFACTURING DEFECTS ONLY and does not cover failure of your pre-cooler if it is damaged due to improper installation or service procedures or if it is altered, tampered with or damaged by any cause beyond Cool Edge control, or is not operated in accordance with Cool Edge's printed instructions. This warranty is invalid for any product installed outside the adjacent continental United States. In no event shall cool Edge be liable for incidental or consequential damages including, without limitation, damages arising from Cool Edge's negligence nor for your expenses while this product is out of operation. In no event shall any implied warranty of merchantability or fitness for use exceed the term of the limited warranty stated above.

Cool Edge reserves the right to make changes in deisgn or additions to or improvements in its equipment without obligation to install such additions or improvements on equipment previously manufactured.

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