



Coil Selection Guidelines

FOR EVAPORATOR APPLICATIONS

CSG_002_050222



Products that provide lasting solutions.

Coil Selection Guidelines

Introduction

Krack Evaporator Coils are designed for walk-in coolers and freezers ranging from convenience stores, supermarkets, restaurants and wineries, to food processing plants, warehouse distribution facilities, and more.

Some of the options include:

- A broad capacity range to maximize cooling coverage
- Multiple fins per inch providing a larger number of capacity increments for low and medium temperature applications
- Dual or variable speed EC motors
- Multiple refrigerants including glide and non-glide
- Factory-mounted components for easier installation
- Multiple coil coatings including Electrofin, Polyester, and Heresite coatings
- Stainless steel and insulated drain pans
- Painted white or black cabinets
- For added convenience:
KE2 Therm Solutions OEM Controller available on medium and high-profile evaporators.

Coil Selection Guidelines

General Guidelines

APPLICATION	T. D.	COIL	NOTES
Controlled Temperature	10 - 15°F	Low Silhouette	<ul style="list-style-type: none"> Multiple Units for Adequate Air Coverage Up to 18' Long = 1 Coil Up to 30' Long = 2 Coils Up to 40' Long = 3 Coils Estimating Guide: <ul style="list-style-type: none"> - Cooler: 100 SF / ton* - Freezer: 75 SF / ton*
Holding Warehouse	10 - 15°F	Low Silhouette or Heavy Duty	<ul style="list-style-type: none"> Forklift Operation Average Air Changes Product Load: <ul style="list-style-type: none"> - 10 - 15% of Total Load Some Warehouses (Seafood) May Require Copper Fin Coils Estimating Guide: <ul style="list-style-type: none"> - Cooler / Freezer: 200 - 300 SF / ton*
Produce Warehouse	7 - 10°F	Low Velocity, Low Silhouette, or Heavy Duty	<ul style="list-style-type: none"> High Seasonal Loads Heavy Product Load Additional Humidity May Be Required Estimating Guide: <ul style="list-style-type: none"> - Cooler / Freezer: 150 - 200 SF / ton*
Blast Cooler for Freezer	7 - 10°F	Heavy Duty	<ul style="list-style-type: none"> High Air Velocity, Heavy Infiltration Fast Defrost (4 - 6 FPI Coils) Product Spaced to Allow Air Circulation Equipment Sized to Extract All Interior Heat Box Temp Below Desired Product Temperature Multiple Units to Provide Capacity Control 1.5 Safety Factor Sometimes Applied to Handle Initial High Rate of Product Heat Evolution
Ice Cream Hardening	10°F	Heavy Duty	<ul style="list-style-type: none"> 10 Hour Pulldown with Product 30% Frozen and 1 Certain Percentage Overrun (Thickness of Ice Cream)
Controlled Temperature Beer Warehouse	15 - 20°F	Heavy Duty	<ul style="list-style-type: none"> Floating Box Temperature (40 - 72°F) Contingent on Average Monthly Dew Point Auxiliary Air Circulation May Be Required Due to High TD Heavy Loading - High Infiltration 20 - 30°F Pulldown for Beer
Candy Warehouse	20 - 25°F	Heavy Duty	<ul style="list-style-type: none"> Low Relative Humidity Auxiliary Air Circulation and Reheat May Be Required Vapor Barrier Essential
Prep Room	20°F	Low Velocity	<ul style="list-style-type: none"> Heavy Motor and Personnel Load Estimating Guide: <ul style="list-style-type: none"> - Cooler: 150 SF / ton*
Floral Box	8°F	Low Velocity	<ul style="list-style-type: none"> Light Loading Conditions Glass Walls Estimating Guide: <ul style="list-style-type: none"> - Cooler: 100 SF / ton*

SF = Floor Square Foot
Ton = 12,000 BTU/H

* Note: Ball park estimates.

All attempts should be made to obtain accurate job survey and subsequent refrigerant calculations.

Glass doors assumed on one long wall only.

Coil Selection Guidelines

Evaporator Application Guidelines

KRACK EVAPORATOR FAMILY	LOWEST MIDPOINT EVAPORATING TEMP (°F)	MINIMUM OPERATING TD (°F)	MAXIMUM OPERATING TD (°F) LOW TEMP	MAXIMUM OPERATING TD (°F) MED TEMP (2)	STANDARD AIR THROW (3) (FT)	AIR THROW - LONG THROW ADAPTERS (3) (FT)	MAXIMUM CEILING HEIGHT (4) (FT)
LH	-30	7	15	15	15 Each Side	N/A	12
GL (1)	+10	7	N/A	15	15 Each Side	N/A	12
GH (1)	+10	7	N/A	15	15 Each Side	N/A	12
KR	-30	7	15	15	20	30	12
MK	-30	7	15	15	30	60	20
MV	-30	7	15	N/A	45	75	20
MS	-30	8	15	15	60	100	25
SM	-30	8	15	15	60	100	35
SV	-30	8	15	N/A	80	120	35

Consult Krack design engineering for evaluation of coil applications outside of published guidelines.

Positive defrost (electric or hot gas) is required for rooms operating below 34°F.

(1) GL and GH evaporators have a minimum room temperature of 20°F and require electric or gas defrost with pan heat in rooms 32°F or colder.

(2) Maximum TD for medium temperature applications can be increased to 25°F when evaporating temperature is above +34°F.

Evaporator capacity is proportional to the published capacity at 10°F TD within the TD range shown above.

EXAMPLE CALCULATION:

$$\text{Evaporator Capacity} = \frac{(\text{Published Capacity}) \times (\text{Room Temperature} - \text{Midpoint Evaporating Temperature})}{10^\circ\text{F}}$$

(3) Published air throws are for open spaces without obstructions.

(4) Maximum ceiling height reflects typical WICF refrigeration loads and evaporator air flow required for proper air circulation. Placement in WICF taller than the maximum ceiling height shown above or or refrigeration loads lower than typical, may require additional fans to provide air circulation required to avoid warm spots.

MODEL	DESCRIPTION	HEIGHT (INCHES)
LH	Center Mount Low Height Dual Discharge Series	7.5
GL	Low Silhouette, Low Velocity Dual Discharge Series	12
GH	High Silhouette, Low Velocity Dual Discharge Series	18
KR	Low Profile Series	16
MK	Medium Profile Quiet Series	27
MV	Medium Profile High Velocity Series	27
MS	Medium Profile High Capacity Series	27
SM	Large Profile Series	40.5 to 52.5
SV	Large Profile High Velocity Series	40.5 to 52.5

Ice Formation

Once ice forms in an evaporator coil it keeps building more ice and eventually will lead to equipment failure if not manually defrosted.

Some symptoms of ice forming in the coil are:

- (1) Loss of air circulation and air throw
- (2) Loss of room temperature
- (3) No off-cycle time
- (4) Floodback
- (5) Water spitting out of the fans or coil on air defrost systems

Long term ice formation will crush the refrigerant tubes in the coil causing leaks and major equipment problems. If ice formation is suspected, carefully check the interior rows of the coil with a good light.

Ice formation usually starts at the bottom of the coil in the middle rows and can be difficult to detect. Any ice formation, however small, requires a manually assisted defrost. Clear 100% of the ice before placing a unit back into operation.

Coil Selection Guidelines

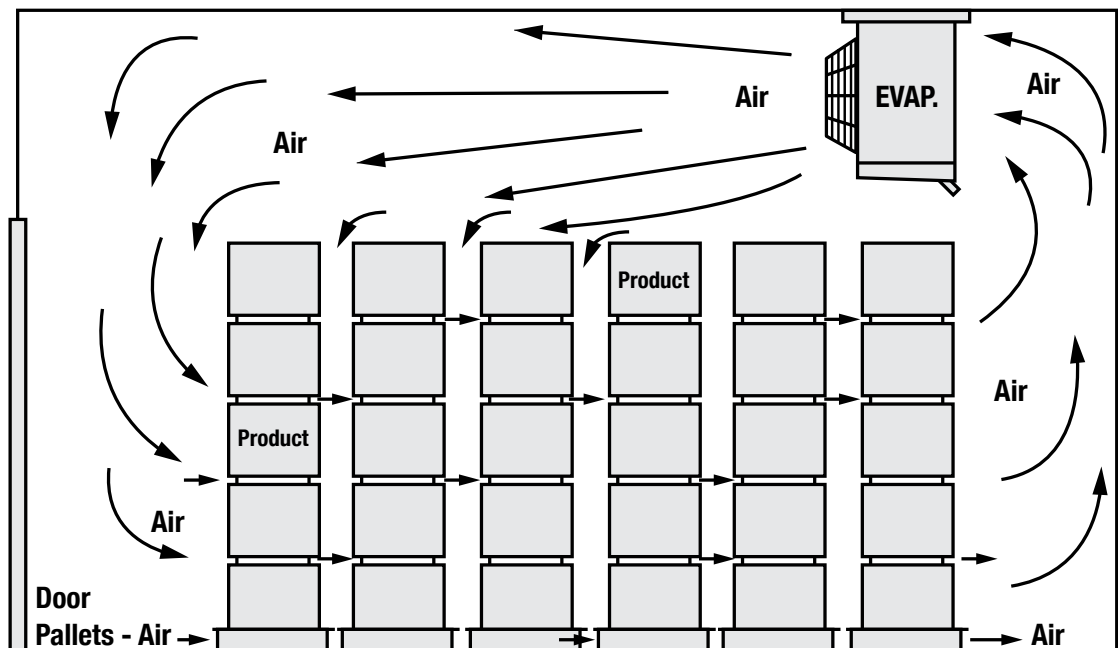
Product Loading and Air Circulation

Always allow space for good air throw, air circulation, air return, cleaning and servicing of the evaporator unit. Always leave air circulation space between the products and walls of the cooler. Leave space between the boxes or cartons of product for the fastest temperature reduction or freezing. The larger the mass of product, the longer it takes to remove heat from the center of that mass. Divide the mass with air circulation space so the circulating cold air can carry the heat away from the product faster. Baffles may be required to direct air to specific areas of a room. How the product is stacked will influence pulldown time and stable product temperature. Direct the air to flow over and through the product. Refer to the evaporator location recommendations on page 5 to 6. It is a good practice to avoid stacking product closer than 12 inches to the evaporator drain pan. The room size, layout, aisleways, height, door location, product stacking, and other factors influence the location of the evaporator. Locate evaporators so that the air pattern covers the entire room. Avoid placing evaporators above or close to doors.

Direct the air stream toward the door or down an aisle when possible. Use strip curtains on doors if they are open frequently or for extended periods. Minimize the entry of warm, humid air into the room.

There are always exceptions to the guidelines for general use storage cooler or freezers. Special exceptions could be the product, air velocity, temperature, humidity, process, people, or machinery involved. Tomatoes, bananas, flowers, meat cutting and processing, and many other products have special requirements. Work or process rooms with people involved may have specifications requiring special attention. Facilities with USDA or other inspections can have special regulations and recommend contacting the local inspector when selecting and locating equipment. Blast chill or blast freeze rooms may require special equipment or parts. Krack has many years of experience and is always ready to assist with special applications or projects.

Typical Evaporator Location in a Freezer



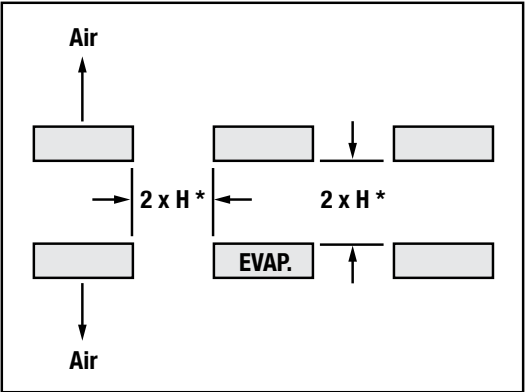
Coil Selection Guidelines

Locating and Mounting Walk-In Evaporators

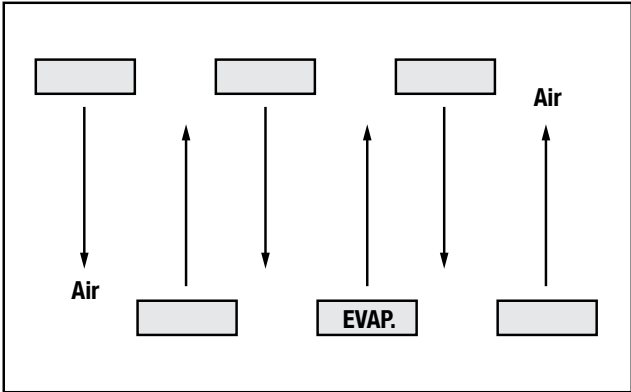
Locate evaporators for the air pattern to cover all of the room. Do not restrict the inlet or outlet air stream. Avoid placing evaporators above or close to doors. Direct the air stream toward the door when possible or arrange to blow down an aisle. Allow sufficient clearance for air circulation and servicing the unit.

The ceiling structure must have adequate strength to support all mechanical equipment, components, piping,

and personnel. Heavy zinc plated or stainless steel bolts should be used to mount evaporators. Krack recommends a minimum 5/16" diameter for all low profile and ceiling temp units. A minimum 1/2" diameter should be used with medium profile and the large units. Use flat washers next to hanger bars and tighten all fasteners securely. Hang all unit coolers level to ensure positive condensate draining. All drain lines must be trapped and sloped to drain quickly.

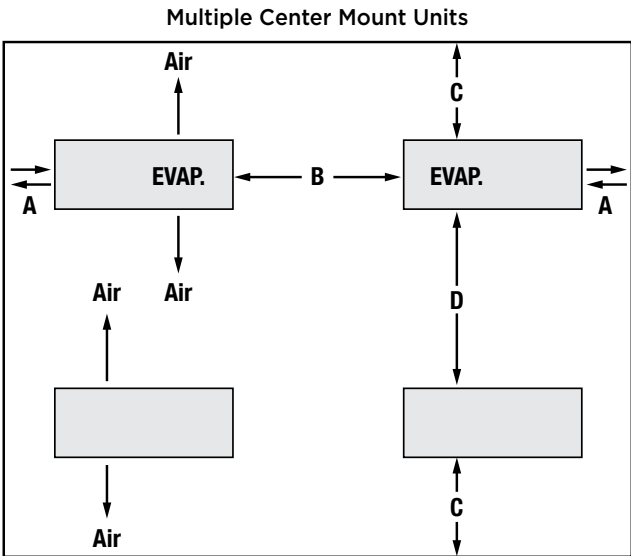
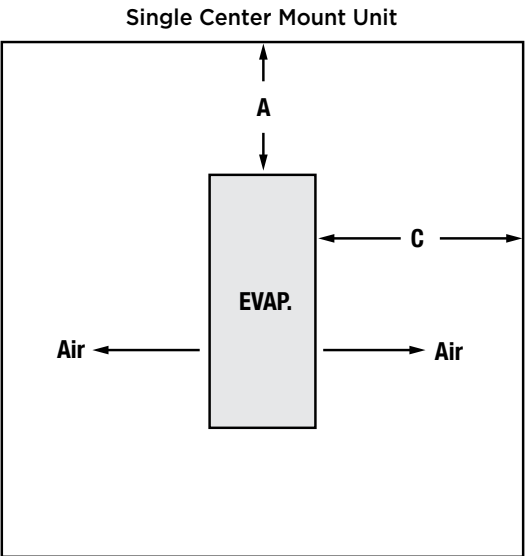


* Refer to table on next page for dimension "H".



TOP VIEWS -

Large coolers or freezers where one wall will not accommodate all evaporators or desired air throw is excessive. See recommended spacing table below.



Recommended Spacing for Center Mount Evaporators

A		B		C		D	
Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
1	8	2	16	3	12	8	24

Dimensions are in feet. One foot minimum between bottom of unit and top of product.

Coil Selection Guidelines

Locating Walk-In Evaporators

Minimum Dimension For Good Air Circulation And Evaporator Performance

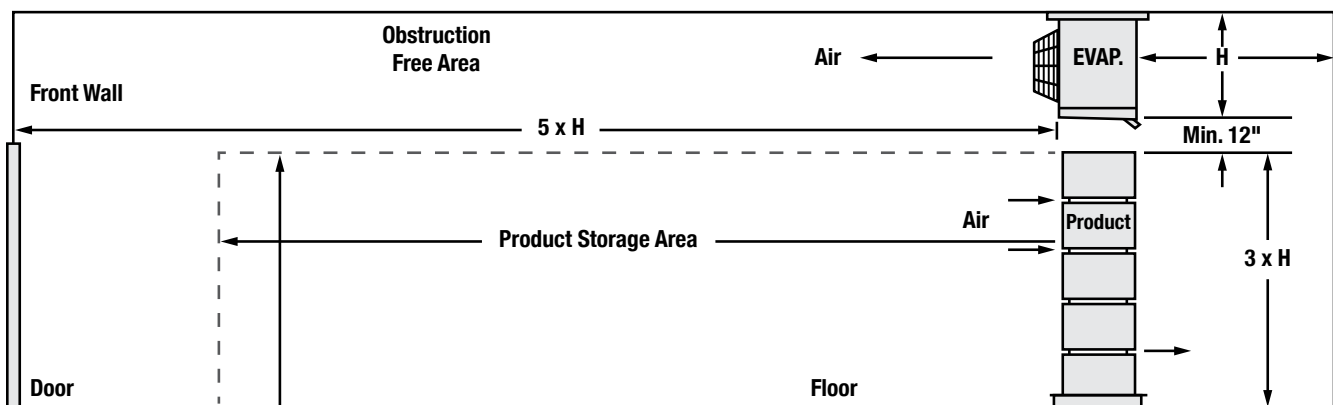
EVAPORATOR HEIGHT (Key Dim.) H (INCHES)	UNIT TO BACK WALL* 1 X H (INCHES)	UNIT TO SIDE WALL 1 X H (INCHES)	UNIT TO UNIT 2 X H (INCHES)	UNIT TO FRONT WALL 5 X H (INCHES)	UNIT TO FRONT WALL 3 X H (INCHES)
12	12	12	24	60	60 ±
15	15	15	30	75	60 ±
18	18	18	36	90	60 ±
24	24	24	48	120	72
30	30	30	60	150	90
36	36	36	72	180	108
42	42	42	84	210	126
48	48	48	96	240	144

H = Height of Evaporator

* Critical Minimum Dimension

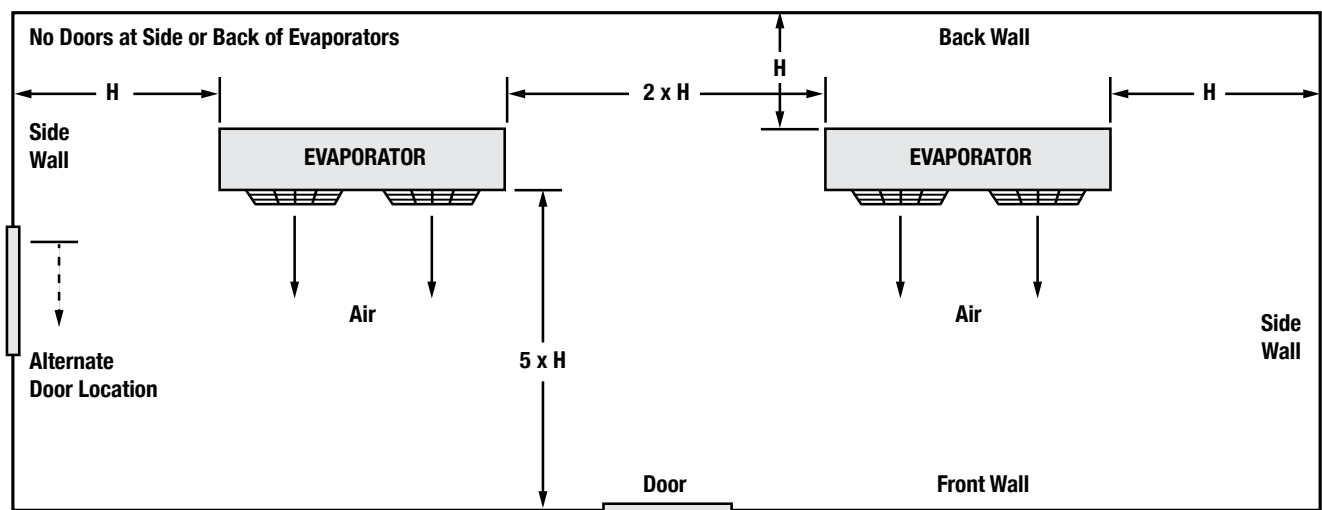
± Minimum Walk-In Height of 7'-0"

SIDE VIEW

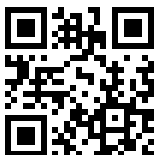


See above table for H dimension. Drawing is not to scale.

TOP VIEW



See above table for H dimension. Drawing is not to scale.



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