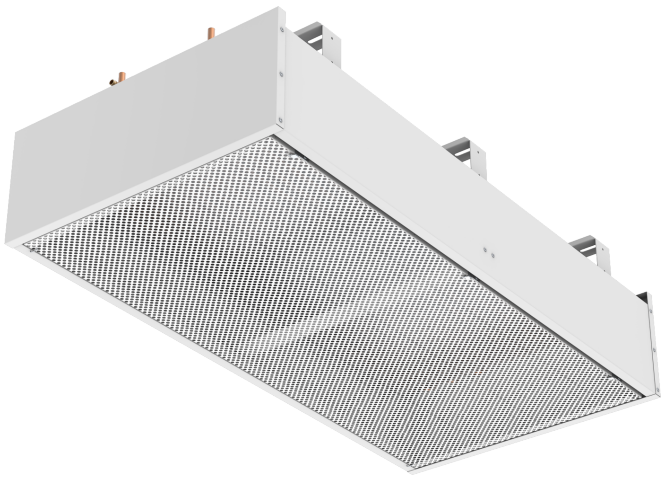
INTRODUCTION

The BEP is ideal for exposed installations or can be integrated into layin ceiling systems for concealed installations. For applications with low ceilings or limited ceiling plenum height the low profile design excels at satisfying sensible cooling.

The system provides comfortable and effective sensible cooling to the space with ultra-quiet, natural convection–driven operation. It offers flexibility with perforated or linear bar grille options for exposed models and supports exposed, recessed, or concealed installation. Designed for quick and simple setup, it is available in nominal lengths up to 10 feet and includes ½" sweat or ½" MPT coil connections for versatile piping compatibility.



MODEL

BEP - Exposed Linear Passive Chilled Beam

FINISHES

- Standard Finish - #WHT British White
- Optional Finish - #BLK Black

APPLICATION

Passive chilled beams are primarily used to provide sensible cooling in perimeter zones and comfortable sensible cooling within interior zones. The primary mode of heat transfer is by natural convection, with a percentage of heat transfer transmitted through radiation. During cooling, warm room air rises to the ceiling area; cool air around the coil sinks down to the occupied area as a result of the higher density. As the cool air descends in to the space, more warm air is drawn over the coil creating a convective current that drives the system.

The airflow pattern generated from a passive beam is unidirectional with direct downward projection from the bottom of the beam. As the thermal buoyancy of the cool air drives the airflow down into space it will begin to mix with ambient room air and diffuse throughout the space. To maximize occupant comfort with passive beam systems, stationary or seated occupants should not be positioned directly under a beam. Passive beams should be installed in aisles, walkways or corridors, or at least 15' above the occupied space to prevent instances of occupant discomfort.

When using passive chilled beams, ventilation and latent cooling loads are addressed by a separate primary air system. Primary air systems could be traditional mixed air distribution, underfloor air distribution or displacement ventilation systems. As the primary air system is not used to address the entire cooling load the total system fan energy is reduced improving overall energy efficiency of the building. Applications with low latent cooling loads could use 100% outdoor air allowing for use of a dedicated outdoor air system with energy recovery further reducing total system energy consumption.

BEP

Exposed, Linear Passive Chilled Beam

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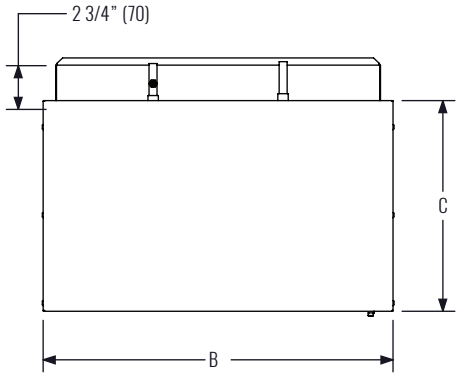
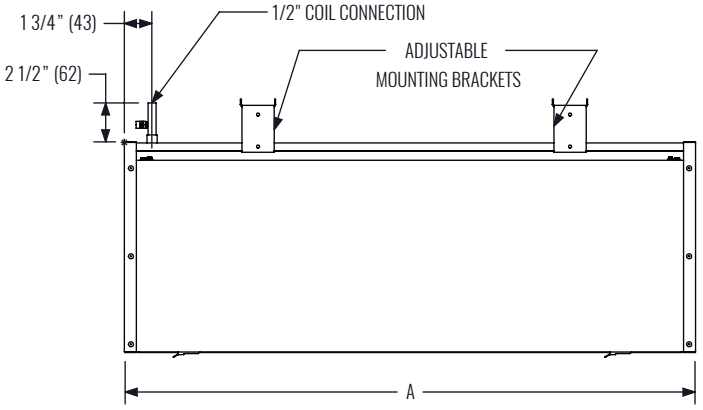
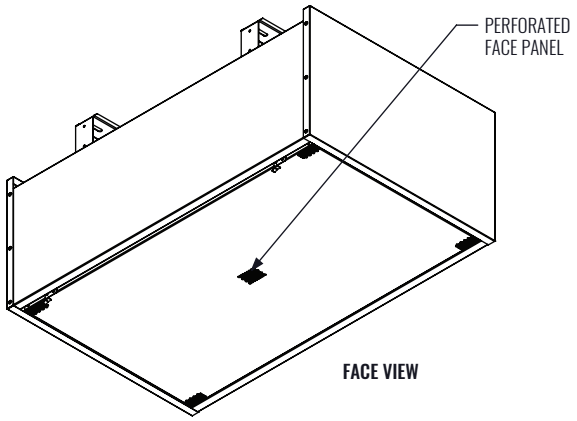
DIMENSIONAL DATA





SIDE VIEW



FACE VIEW

NOMINAL LENGTH	A
2 ft	23 7/8" (607)
3 ft	35 7/8" (911)
4 ft	47 7/8" (1216)
5 ft	59 7/8" (1520)
6 ft	71 7/8" (1825)
7 ft	83 7/8" (2130)
8 ft	95 7/8" (2435)
9 ft	107 7/8" (2740)
10 ft	119 7/8" (3045)

NOMINAL WIDTH	B
13"	12 3/4" (324)
18"	17 3/4" (425)
24"	23 3/4" (450)

NOMINAL HEIGHT	C
8"	9 1/8" (232)
10"	11 1/8" (283)
12"	13 1/8" (333)

NOTE: Dimensions in parentheses are in millimeters.

SENSIBLE COOLING CAPACITY

CHILLED WATER FLOW RATE, GPM													
NOMINAL LENGTH ft	NOMINAL WIDTH in	0.75		1.0		1.25		1.5		1.75		2.00	
		Q_{SENS} Btu/h	ΔP_W ft wg	Q_{SENS} Btu/h	ΔP_W ft wg	Q_{SENS} Btu/h	ΔP_W ft wg	Q_{SENS} Btu/h	ΔP_W ft wg	Q_{SENS} Btu/h	ΔP_W ft wg	Q_{SENS} Btu/h	ΔP_W ft wg
4	13	637	0.33	691	0.75	733	1.17	765	1.62	785	2.16	795	2.69
	18	859	0.46	932	1.06	989	1.64	1,032	2.26	1,060	3.02	1,073	3.77
	24	1,163	0.60	1,212	1.36	1,261	2.11	1,310	2.91	1,359	3.88	1,408	4.84
6	13	955	0.45	1,036	1.05	1,100	1.63	1,147	2.24	1,178	2.97	1,193	3.70
	18	1,289	0.63	1,398	1.46	1,484	2.28	1,548	3.13	1,590	4.16	1,610	5.18
	24	1,745	0.81	1,818	1.88	1,892	2.93	1,964	4.02	2,038	5.34	2,111	6.66
8	13	1,273	0.57	1,381	1.34	1,467	2.08	1,529	2.85	1,571	3.78	1,591	4.71
	18	1,719	0.79	1,864	1.87	1,979	2.91	2,064	4.00	2,120	5.30	2,147	6.59
	24	2,326	1.02	2,424	2.41	2,522	3.75	2,619	5.14	2,717	6.81	2,815	8.47
10	13	1,592	0.68	1,727	1.63	1,833	2.54	1,912	3.47	1,963	4.59	1,988	5.71
	18	2,148	0.96	2,330	2.28	2,473	3.55	2,580	4.86	2,650	6.43	2,683	8.00
	24	2,908	1.23	3,030	2.94	3,153	4.56	3,274	6.25	3,396	8.27	3,519	10.28

PERFORMANCE DATA

PERFORMANCE BASED ON:

- Unit height of 10". Correction factors for other unit heights are shown in table 1 below.
- Distance (Y) between top of beam and horizontal surface equal to 30% of coil width (W). For other values of Y/W see table 2 below.
- Free area for room air to enter ceiling cavity equal to free area of beam discharge into space.
- Based on an 18°F ΔT between entering air and entering chilled water. Correction factors for other ΔT values are shown in table 4 below.

TABLE 1: CORRECTION FOR UNIT HEIGHT

UNIT HEIGHT	8	10	12
MULTIPLY TABLE VALUE BY:	0.95	1.00	1.05

TABLE 2: CORRECTION FOR DISTANCE BELOW STRUCTURE VERSUS UNIT WIDTH (Y/W)

Y/W	0.10	0.20	0.30	0.40	0.50
MULTIPLY TABLE VALUE BY:	0.66	0.92	1.00	1.03	1.04

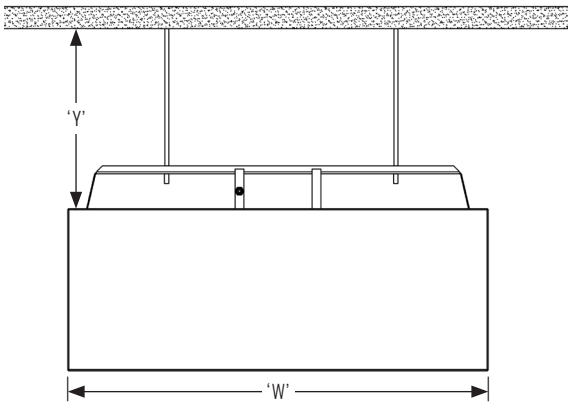


TABLE 3: CORRECTION FOR (ΔT) BETWEEN ENTERING AIR* AND ENTERING CHILLED WATER

ACTUAL ΔT	10	12	14	16	18	20	22	24
MULTIPLY TABLE VALUE BY:	0.56	0.67	0.78	0.89	1.00	1.11	1.22	1.33

*NOTES: Entering air temperature is typically 2-3°F above room temperature for exposed and standard recessed installations. When beams are installed above a adjacent to the perimeter glazing, entering air temperature is typically 5 to 7°F above that of the room.

LEGEND:

Q_{SENS} = Sensible Capacity, Coil [Btu/h]

ΔP_w = Water coil pressure drop [ft wg]

ENGINEERING SPECIFICATION & CONFIGURATION

Furnish and install active chilled beams in the sizes, configurations and capacities indicated on the project schedules and plans. Unit shall comprise a primary air connection, a pressurized inlet plenum feeding a series of room air induction nozzles and an associated heat transfer coil contained in a single unit housing. A hinged perforated room air induction grille shall be provided for easy access to the unit heat transfer coil.

UNIT CASING

The unit casing shall be constructed from a minimum 22-gauge galvannealed sheet steel. Units shall have a maximum casing height of 9 7/8".

FACE

The face of the beam shall consist of a perforated room air induction section of 50% free area flanked by linear supply slots. Face and frame styles shall be designed for flush integration into a standard 24" wide module T-bar lay-in ceiling. The face section shall include hinged fastening that allows the face to be swung opened for coil cleaning.

FINISH

The entire visible face sections and all visible internal surfaces shall be finished in white powder coat paint or as specified by the architect (OPTIONAL). Concealed surfaces shall be G90 galvannealed steel.

PRIMARY AIR INLETS

Manufacturer shall provide round or oval inlet collars of diameter(s) as indicated on the project plans and schedules and suitable for connection to common flexible or rigid ductwork sizes. The inlet collar shall be roll-formed to facilitate the connection of flexible or rigid ductwork. Inlet location may be side or top as indicated on the project plans and schedules. Nozzles shall be of a fixed size, selected with respect to cooling and heating requirements, and constructed of formed sheet metal.

PRIMARY AIR PLENUM PRESSURE TAP

A plenum air pressure tap shall be mounted within the pressurized plenum for measuring the pressure differential between the primary air plenum and the room. The pressure tap manometer connection port shall be fitted to the end of a plastic tube accessible from the diffuser face. Airflow calibration charts that relate the pressure differential reading with the primary airflow rates, shall be furnished with the IOM's.

MOUNTING RAILS

Factory installed mounting rails shall incorporate slotted holes for hanging using threaded rods.

HYDRONIC HEAT TRANSFER COIL

Integral heat transfer coils shall be provided with connections for either 2 or 4 pipe water connections as indicated on plans and schedules. Four pipe configurations shall require separate supply and return connections for chilled and hot water. The coil shall be mounted horizontally and shall be manufactured with seamless copper tubing (1/2" or 3/4" outside diameter as indicated on the plans and schedules) with minimum .016" wall thickness mechanically fixed to aluminum fins. The aluminum fins shall be limited to no more than ten (10) fins per inch. The coil shall have a working pressure of at least 360 PSI, and be factory tested for leakage at a minimum pressure of 500 PSI.

Each chilled beam shall be provided with factory integrated manual air vents.

COILS

- **(Optional)** Coil shall be provided with factory integrated drain fittings. Unless otherwise specified, coil connections shall be bare copper for field sweating to the water supply circuit(s).
- **(Optional)** The chilled water coil shall be provided with NPT male threaded fittings. These fittings must be suitable for field connection to a similar NPT female flexible hose spigot and shall be at least 1 1/2" long to facilitate field connection (by others).

Connections shall face upwards to avoid issues with coordination of ceiling installation. The coil shall be rated and certified in accordance with AHRI Standard 410.

PACKAGING

Beams shall be delivered to site clean with hydronic coils flushed and fitted with protective caps. Protective film shall be applied to the entire beam face to prevent ingress of dirt. Units shall be shipped to site in cartons and labeled with identification tagging.

THE MANUFACTURER SHALL PROVIDE THE FOLLOWING ACCESSORIES

- **(Optional) Lint Screens:** Manufacturer shall provide zinc plated steel mesh lint screens with galvannealed frames fitted to the heat exchange coils.
- **(Optional) Water Connection Hoses:** Manufacturer shall provide 1/2" or 3/4" dia. x (12"), (18") or (24") long stainless-steel braided hoses with female swivel connections. Hoses shall be constructed with a KEV-LAR® reinforced EPDM core with stainless steel ferrules. Hoses shall be tested for working pressures up to 400 PSIG (at max. operating temperature of 248°F) with a burst pressure of 1600 PSIG.
- **(Optional) Airflow Regulators:** Manufacturer shall supply UL94 V-0 rated ABS polymer and UL2043 listed constant volume regulators (BFR's). BFR's shall be designed to fit inside rigid round ductwork and located at a minimum distance of three duct diameters upstream of the active chilled beam primary air inlet.

ENGINEERING SPECIFICATION & CONFIGURATION

1. **SERIES: (XXX)**
   BEP - Exposed, Linear Passive Chilled Beam

2. **BEAM WIDTH: (XX)**
   13 - 13” Width
   18 - 18” Width
   24 - 24” Width

3. **BEAM LENGTH: (XX)**
   2 - 2 ft
   3 - 3 ft
   4 - 4 ft
   5 - 5 ft
   6 - 6 ft
   7 - 7 ft
   8 - 8 ft
   9 - 9 ft
   10 - 10 ft

4. **BEAM HEIGHT: (XX)**
   08 - 8” Height
   10 - 10” Height
   12 - 12” Height

5. **COIL ACC1: (X)**
   M - Manual Air Vent

6. **COIL ACC2: (X)**
   0 - None
   D - Drain Pan

7. **PIPING TYPE: (XXX)**
   SWT - Sweat
   MPT - 1/2” Male Pipe Thread
   3PT - 3/4” Male Pipe Thread

8. **FACE PATTERN: (XX)**
   CP - Circular Perforation

9. **FINISH: (XXX)**
   WHT - British White
   BLK - Black

SAMPLE CONFIGURATION: BEP - 13 - 2 - 8 - M - 0 - SWT - CP - WHT