

BT

BARNHART TAYLOR

Custom Made
The Best Solution



BT EC - X - X - XX

Barnhart Taylor direct
or indirect evaporative
cooler module

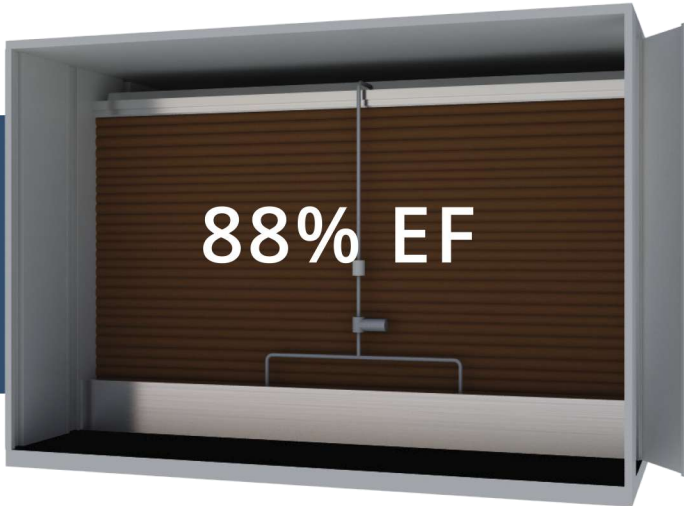
Model Number

- 00 - Standard Equipment
- 11 - Louvers
- 22 - Louvers with Filters
- 33 - Louvers with Damper
- 44 - Louvers with Filters and Dampers
- 55 - Damper
- 66 - Damper with Filters

- 0 - Indirect (Dry)
- 1 - Direct (Wet)
- 2 - Indirect / Direct



USA DESIGN CHART							
STATE	CITY	DB °F	WB °F	STATE	CITY	DB °F	WB °F
AL	BIRMINGHAM	95	78	MT	BILLINGS	94	66
	FLAGSTAFF	86	61		GREAT FALLS	91	64
AZ	PHOENIX	110	76	NE	LINCOLN	97	78
	TUCSON	105	72		OMAHA	96	78
AR	FORTSMITH	99	79	NV	LAS VEGAS	108	71
	LITTLE ROCK	98	80		RENO	95	63
CA	BACKERSFIELD	104	73	NM	ALBUQUERQUE, NM	96	65
	LOS ANGELES	84	70	NYC	ALBANY	88	75
	SACRAMENTO	100	72		BUFFALO	86	74
	SAN DIEGO	85	73		NEW YORK CITY	89	77
	SAN FRANCISCO	83	65	NC	GREENSBORO	92	77
CO	DENVER	93	65	RALEIGH	94	78	
	GRAND JUNCTION	97	65	ND	BISMARCK	93	74
	PUEBLO	98	68		FARGO	91	75
FL	JACKSONVILLE	95	80	OH	CINCINNATI	93	78
	ORLANDO	94	79		CLEVELAND	89	76
	PENSACOLA	94	81		COLUMBUS	91	77
GA	ATLANTA, GA	94	77	OK	OKLAHOMA CITY	99	77
ID	BOISE	97	66		TULSA	100	79
	COEUR D'ALENE	91	65	OR	PENDLETON	96	67
IL	CHICAGO	92	79		PORTLAND	91	69
	DECATUR	93	79	PA	PHILADELPHIA	93	78
	ROCKFORD	91	78		PITTSBURGH	89	75
IN	EVANSVILLE	94	79	SC	COLOMBIA	97	78
	INDIANAPOLIS	91	78		GREENVILLE	94	77
	SOUTH BEND	90	77	SD	RAPID CITY	95	71
IA	DES MOINES	93	78		SIOUX FALLS	93	77
	DUBUQUE	89	78	TN	KNOXVILLE	92	77
KS	SALINA	101	77		MEMPHIS	96	80
	WICHITA	101	77		NASHVILLE	94	78
KY	BOWLING GREEN	93	78	TX	AMARILLO	97	71
	LEXINGTON	91	77		DALLAS	101	78
	LOUISVILLE	93	79		EL PASO	101	70
	PADUCAH	95	80		HOUSTON	97	80
LA	NEW ORLEANS	94	81	UT	SAN ANTONIO	98	78
	SHREVEPORT	97	80		SALT LAKE CITY	97	67
MI	DETROIT	90	77	VA	RICHMOND	95	79
	GRAND RAPIDS	89	76		ROANOKE	92	75
	SAGINAW	90	77	WA	SEATTLE	85	66
MN	MINNEAPOLIS	91	77		SPOKANE	92	65
	ROCHESTER	88	76	WI	MADISON	90	77
MO	KANSAS CITY	96	79		MILWAUKEE	90	77
	SPRINGFIELD	95	78	WY	CASPER	93	63
	ST LOUIS	95	79		CHEYENNE	88	63



IDEAL COOLING SECTION TO PROVIDE PRE-COOLING + HUMIDITY IN BUILDINGS ADAPTED IN DUCT SYSTEMS

EXAMPLE: EL PASO TX TEMPERATURES 101°F/70°F

DT= DB - (EF (DB-WB))

DT= DISCHARGE TEMPERATURE

DB= DRY BULB

EF= CELDEL EFFICIENCY

WB= WET BULB

DB= 101 F (ASHRAE)

EF= 88% (12" MUNTERS CELDEK, V= 500 FPM EFFICIENCY)

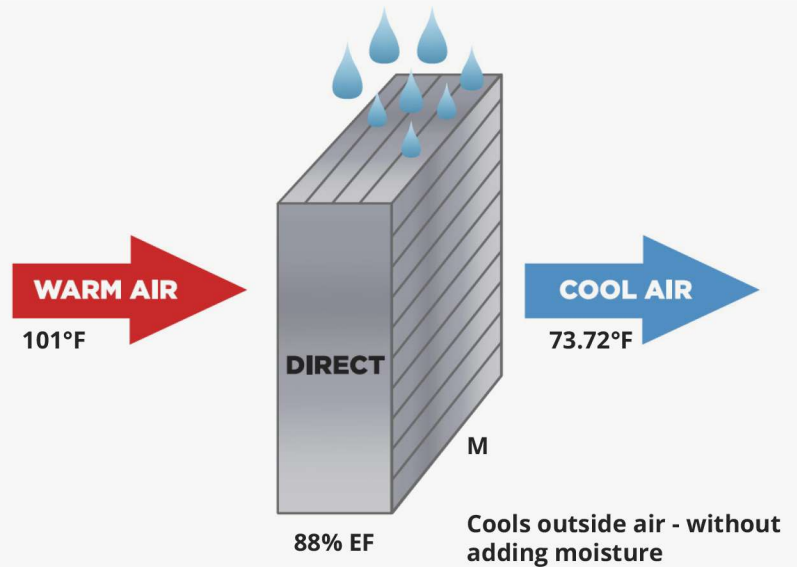
WB= 70° F (ASHRAE)

** VELOCITY = 500 (FPM) = BT MX DESIGN TEMPERATURE

DT= DB - (EF (DB-WB))

DT= 101 - (.88 (101-70))

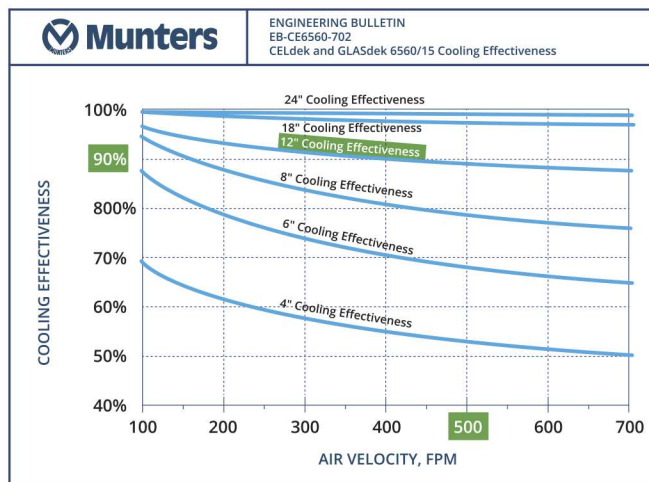
DT= 73.72° F



ACCESSORIES	CELDEK	ALUM FILTERS	MERV8 PLEATED	MERV11 PLEATED	MERV13 PLEATED	2 IN LOUVER	4 IN DRAIN LOUVER	DAMPER
DESIGN VELOCITY FPM	500	450	450	450	450	450	450	450
PRESSURE DROP (IN)	0.25	0.15	0.23	0.25	0.26	0.01	0.05	0.05

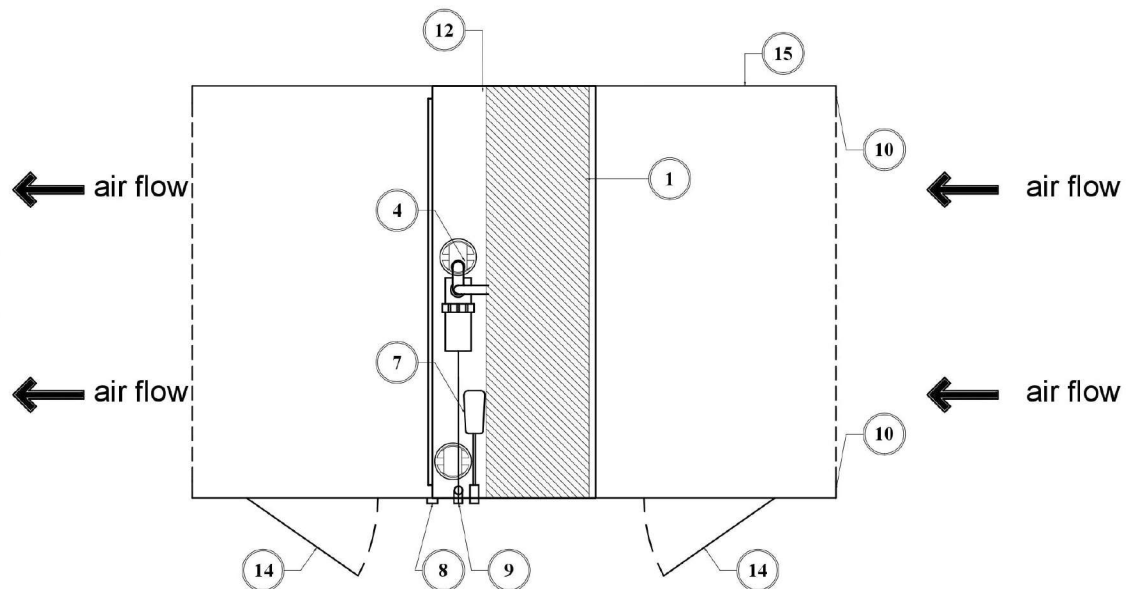
ACCESSORIES DIMENSIONS	
ACCESSORIES	INCHES
LV	6
LV + F	14
LV + F + D	24
LV= LOUVERS	
F = 2" FILTERS	
D = 4" DAMPERS	

PIPING MATERIAL	
PVC	
GALVANIZED	
COOPER	
STAINLESS STEEL	



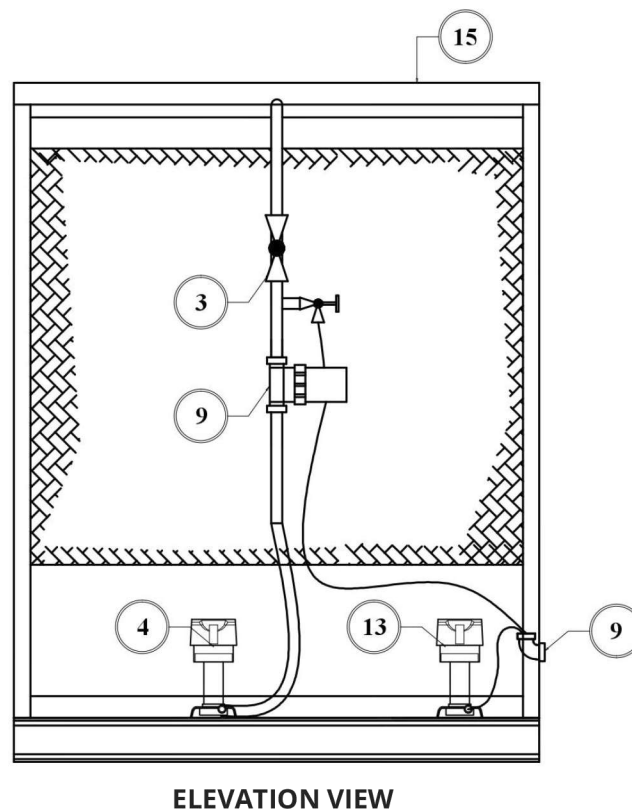
UNIT MODEL #	CFM	WIDTH	DEPTH B	HEIGHT C	MEDIA	SUMP G
PP - 8	8,000	4' 15"	21"	5'	48"	6"
PP - 10	10,000	5' 12"	21"	5'	48"	6"
PP - 12	12,000	6' 12"	21"	5'	48"	6"
PP - 14	14,000	7' 12"	21"	5'	48"	6"
PP - 16	16,000	8' 12"	21"	8'	48"	6"
PP - 18	18,000	6' 12"	21"	8'	72"	6"
PP - 20	20,000	80"	21"	8'	72"	6"
PP - 22	22,500	90"	21"	8'	72"	6"
PP - 24	24,000	100"	21"	8'	72"	12"
PP - 25	25,000	96"	21"	8'	72"	12"
PP - 27	27,000	108"	21"	8'	72"	12"
PP - 30	30,000	120"	21"	8'	72"	12"
PP - 33	33,000	132"	21"	8'	72"	12"
PP - 36	36,000	144"	21"	8'	72"	12"
PP - 38	38,500	154"	21"	8'	72"	12"
PP - 42	42,000	126"	21"	10'	72"	12"

ITEM	DESCRIPTION
1	MUNTERS CELDEK MEDIA
2	MUNTERS
3	FLOW REGULATING VALVE
4	CIRCULATION PUMP
5	DISTRIBUTION PIPE AND FILTER
6	BRONZE, BUTTERFLY VALVE
7	MAKE UP VALVE
8	DRAIN
9	OVER FLOW
10	FLANGED DUCT CONNECTION
11	WATER FILTER
12	AIR WASHER CASING
13	TIME FLUSH PUMP
14	ACCESS DOORS
15	SERVICE CASING



PLAN VIEW

ITEM	DESCRIPTION
3	FLOW REGULATING VALVE
4	CIRCULATION PUMP
9	OVER FLOW
13	TIME FLUSH PUMP
15	SERVICE CASING



PENTPAK

AVAILABLE OPTIONS / ACCESSORIES

INTAKE:

- METAL SCREEN
- LOUVER
- HOOD

FILTERS:

- NONE
- PERFECT PLEAT M8
- ALUMINUM
- HIGH EFFICIENCY FILTERS (MERV 11-15)

FILL & DRAIN KIT

MEDIA:

- 12" CELDEK
- 8" CELDEK
- 12" GLASDEK

MIST ELIMINATOR

- BT DESIGN

PIPING:

- PVC
- COPPER
- STAINLESS STEEL
- GALVANIZED

SUBMERSIBLE PUMP

CASING / FINISHING:

- GALVANIZED
- STAINLESS STEEL + WET SECTION
- 100% STAINLESS STEEL

2- POSITION INLET DAMPER

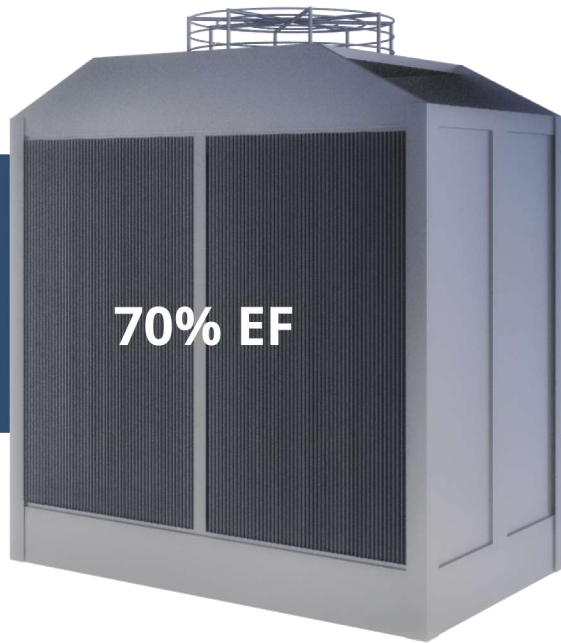
- MOTORIZED OR MANUAL DAMPER

WATER INDUCTOR

- PREVENTS SEDIMENT INCRUSTATION ON COOLING MEDIA
- 20 YEAR WARRANTY
- WITHOUT MAINTENANCE

FLANGES (DUCT CONNECTOR)

TIMED FLUSH SYSTEM WITH CHRONOMETER



PROVIDES COMFORT COOLING IN MANY CLIMATES WITHOUT THE USE OF COMPRESOR. STAGE II MODULE CAN BE LOCATED AT OUTSIDE AIR INTAKE ON CHILLED WATER SYSTEMS

EXAMPLE: EL PASO TX TEMPERATURES 101°F/70°F

DT= DB - (EF (DB-WB))

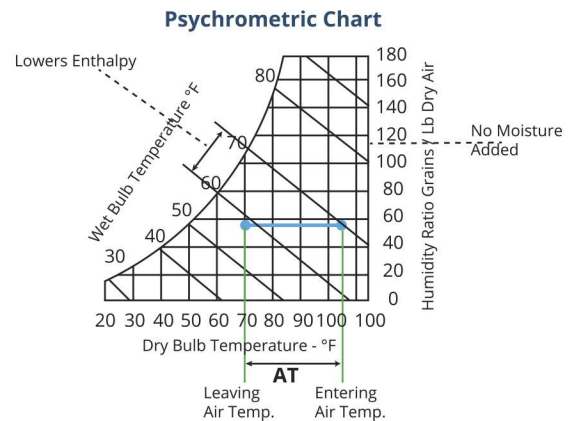
DT= DISCHARGE TEMPERATURE
 DB= DRY BULB
 EF= CELDEK EFFICIENCY
 WB= WET BULB

Indirect Stage:

DB= 101° F
 EF= 70% (BARNHART TAYLOR INTERCELL EFFICIENCY)
 WB= 70° F

TD= DB - (EF (DB-WB))

TD= 101 - (.70 (101 - 70))
TD= 79.3 °F



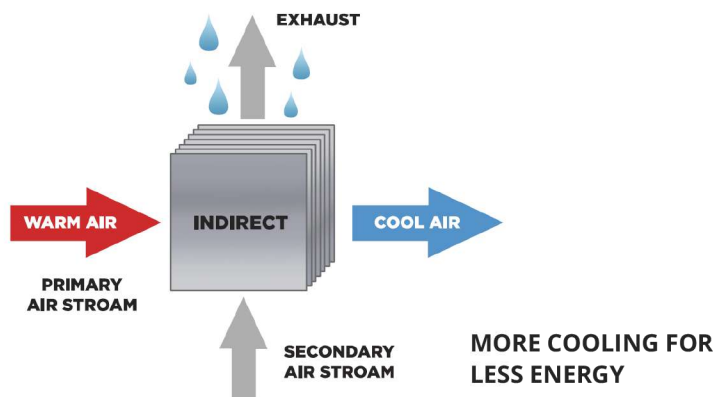
How the Stage II Works

Air flows through corrosion proof polymer heat exchanger in both vertical and horizontal air passages.

Water is evaporated in the vertical passages to cool the plates.

Outside air flowing in the alternating horizontal passages is then cooled by the plates without addition of moisture to the air streaming.

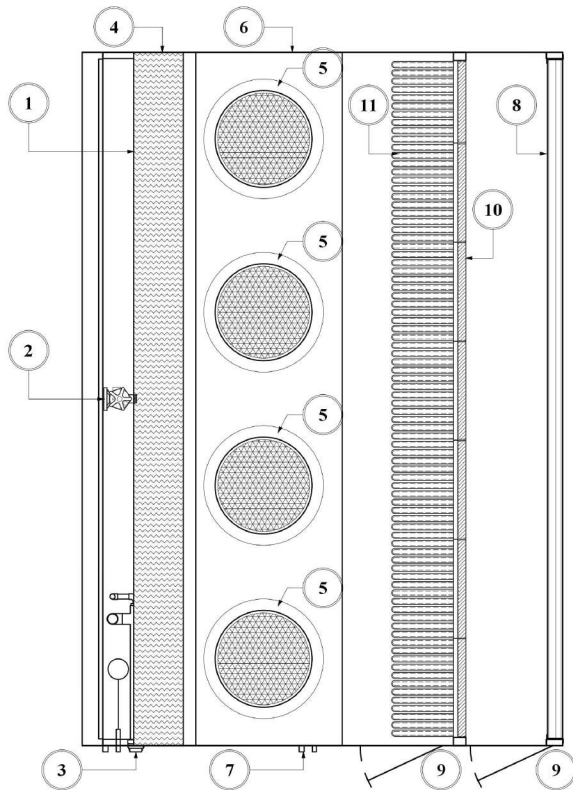
This process makes the stage II ideally for use in refrigerated air conditioning system.



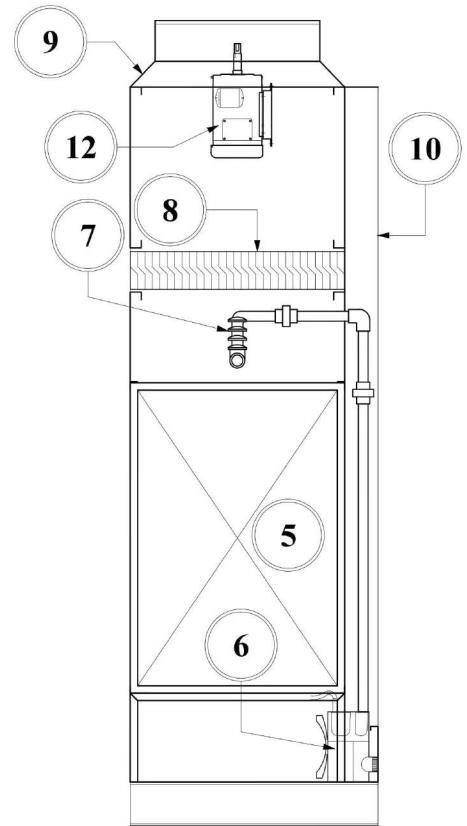
ACCESSORIES	INTERCELL	ALUM FILTERS	MERV8 PLEATED	MERV11 PLEATED	MERV13 PLEATED	2 IN LOUVER	4 IN DRAIN LOUVER	DAMPER
DESIGN VELOCITY (FPM)	420	450	450	450	450	450	450	450
PRESSURE DROP (IN)	0.5	0.15	0.25	0.25	0.26	0.05	0.1	0.05

ACCESSORIES DIMENSIONS	
ACCESSORIES	INCHES
LV	6
LV + F	14
LV + F + D	24
LV= LOUVERS	
F= 2" FILTERS	
D= 4" DAMPERS	

PIPING MATERIAL
PVC
GALVANIZED
COOPER
STAINLESS STEEL



PLAN VIEW



ELEVATION VIEW

ITEM	DESCRIPTION
1	EVAPORATIVE COOLING MEDIA
2	PUMP
3	PLUMBING
4	CASING
5	DISCHARGE CONE SECONDARY AIR FANS
6	HEAT EXCHANGER CASING
7	OVERFLOW CONNECTIONS
8	LOUVERS
9	ACCESS DOORS
10	THICK DISPOSABLE
11	DEEP BAG FILTERS
12	SECONDARY AIR FAN MOTORS

MODEL	FC (SFT)	FC REAL (SFT)	FLOW (CFM*)	L (FT)	W (IN)	H (FT)	# PUMPS	PUMPS AMP 'S	EXHAUST FAN FLOW	# FANS*	FAN HP
BIEC 01	9	9.75	4095	5	30	5	1	6.3	1228.5	2	0.5
BIEC 02	11	11.7	4914	6	30	5	1	6.3	1474.2	2	0.5
BIEC 03	13	13.65	5733	7	30	5	1	6.3	1719.9	3	0.5
BIEC 04	15	15.6	6552	8	30	5	1	6.3	1965.6	3	0.5
BIEC 05	17	17.5	7350	5	54	8	1	6.3	2205	2	0.5
BIEC 06	17	17.55	7371	9	30	5	1	6.3	2211.3	3	0.5
BIEC 07	19	19.5	8190	10	30	5	1	6.3	2457	3	0.5
BIEC 08	21	21	8820	6	54	8	1	6.3	2646	2	0.5
BIEC 09	21	21.45	9009	11	30	5	1	6.3	2702.7	4	0.5
BIEC 10	23	23.4	9828	12	30	5	1	6.3	2948.4	4	0.5
BIEC 11	24	24.5	10290	7	54	8	1	6.3	3087	3	0.5
BIEC 12	28	28	11760	8	54	8	1	6.3	3528	3	0.5
BIEC 13	30	30	12600	5	42	8	1	6.3	5040	2	1
BIEC 14	31	31.5	13230	9	54	8	1	6.3	3969	3	1
BIEC 15	35	35	14700	10	54	8	1	6.3	4410	3	1
BIEC 16	36	36	15120	6	42	8	1	6.3	6048	2	1
BIEC 17	38	38.5	16170	11	54	8	1	6.3	4851	4	1
BIEC 18	42	42	17640	7	42	8	1	6.3	7056	3	1
BIEC 19	42	42	17640	12	54	8	1	6.3	5292	4	1
BIEC 20	48	48	20160	8	42	8	1	6.3	8064	3	1
BIEC 21	54	54	22680	9	42	8	1	6.3	9072	3	1
BIEC 22	60	60	25200	10	42	8	1	6.3	10080	3	1
BIEC 23	66	66	27720	11	42	8	1	6.3	11088	4	1
BIEC 24	72	72	30240	12	42	8	1	6.3	12096	4	1

INTERCELL

AVAILABLE OPTIONS / ACCESSORIES

INTAKE:

- METAL SCREEN
- LOUVER
- HOOD

FILTERS:

- NONE
- PERFECT PLEAT M8
- ALUMINUM
- HIGH EFFICIENCY FILTERS (MERV 11-15)

FILL & DRAIN KIT

MEDIA:

- 12" CELDEK
- 8" CELDEK
- 12" GLASDEK

MIST ELIMINATOR

- BT DESIGN

WATER INDUCTOR

- PREVENTS SEDIMENT INCRUSTATION ON COOLING MEDIA
- 20 YEAR WARRANTY
- WITHOUT MAINTENANCE

PIPING:

- PVC
- COPPER
- STAINLESS STEEL
- GALVANIZED

SUBMERSIBLE PUMP

CASING / FINISHING:

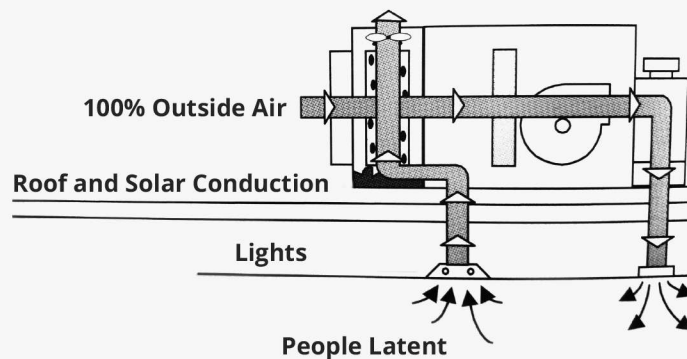
- GALVANIZED
- STAINLESS STEEL + WET SECTION
- 100% STAINLESS STEEL

2- POSITION INLET DAMPER

- MOTORIZED OR MANUAL DAMPER

FLANGES (ALUMINUM CONNECTOR)

TIMED FLUSH SYSTEM WITH CHRONOMETER



70% EF

88% EF



A DIRECT EVAPORATIVE (PENTPAK) SECTION CAN BE ADDED TO THE INTERCELL TO PRODUCE EVEN COOLER AIR

EXAMPLE: EL PASO TX TEMPERATURES 101°F/70°F

DT= DISCHARGE TEMPERATURE

DB= DRY BULB

EF= CELDEK EFFICIENCY

WB= WET BULB

INDIRECT + DIRECT

Indirect Stage:

DB= 101° F

EF= 70% (BARNHART TAYLOR INTERCELL EFFICIENCY)

WB= 70° F

TD= DB - (EF (DB-WB))

TD= 101 - (.70 (101- 66))

TD= 76.5° F

Direct Stage:

DB= 76.5° F

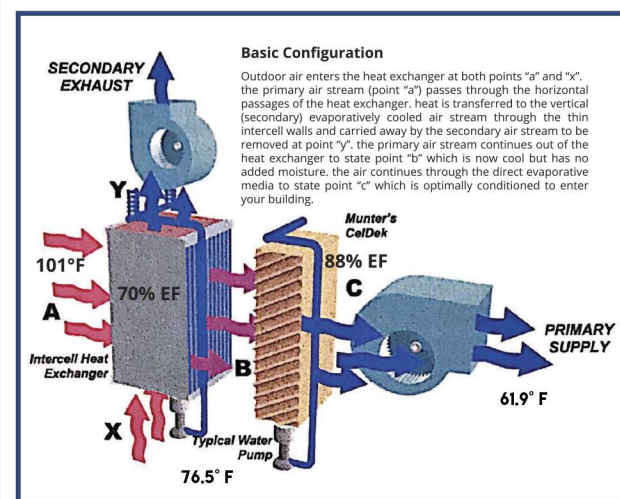
EF= 88% (12" MUNTERS CELDEK, V= 500 FPM EFFICIENCY)

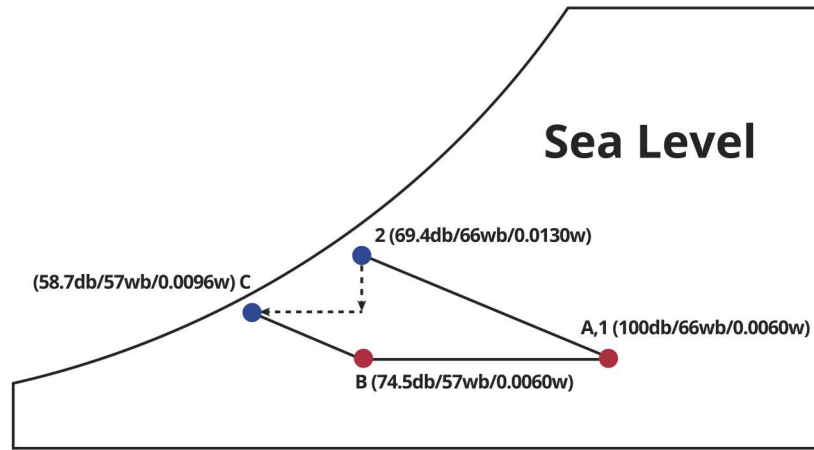
WB= 70° F

TD= DB - (EF (DB-WB))

TD= 76.5° - (.88 (76.5 - 60))

TD= 61.9° F





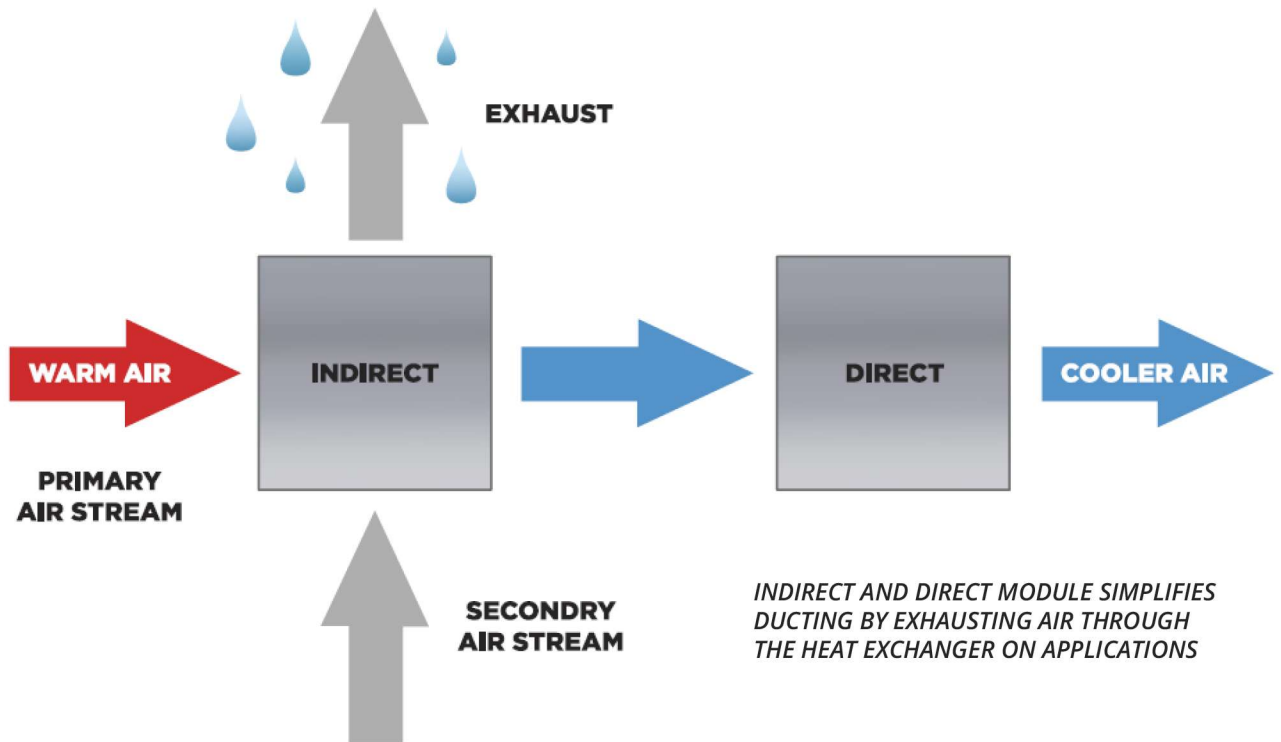
Comparison of Single Stage Evaporative Cooling vs. 2-Stage

Direct Evaporative Media Only (State point 1-2)

This air stream starts at state point "a.1" (see psychrometric chart above). the air passes through a direct evaporative media such as munter's celdek. evaporating water passing over the media collects heat from the air stream. at 90% direct evaporative efficiency, the air cools to state point "2". this air stream is moved down to a lower dry bulb, but has also gained significant moisture content.

2-Stage Indirect and Direct Evaporative Media (State Point A-B-C)

This system is a combination including barnhart taylor intercell plate-to-plate heat exchanger and a direct evaporative section such as munter's celdek. water and air mix in the vertical (secondary) sections of the heat exchanger where exaporation takes place, thus carrying heat away. the heat is extracted from the horizontal (primary) air stream. starting at state point "a.1"; the main air stream passes through the narrow cool passages of the heat exchanger. improved thermal transfer walls and "mixing" studs cause the primary air stream to give up a portion of its sensible heat to the secondary air stream. when the primary air stream exits the heat exchanger, it is at state point "b". this air has been cooled to a lower dry bulb temperature, but has not gained any moisture. the air is now prime for direct evaporative cooling. state point "c" is the condition of the air ready to enter your building. compared to point "2" (for direct evaporative only), the 2-stage air has a much lower dry bulb as well as an overall lower moisture content.



INDIRECT AND DIRECT MODULE SIMPLIFIES DUCTING BY EXHAUSTING AIR THROUGH THE HEAT EXCHANGER ON APPLICATIONS

MODEL	FC (SFT)	FC REAL (SFT)	FLOW (CFM*)	L (FT)	W (IN)	H (FT)	# PUMPS	PUMPS AMP 'S	EXHAUST FAN FLOW	# FANS*	FAN HP
BIEC 01	9	9.75	4095	5	51	5	2	6.3	1228.5	2	0.5
BIEC 02	11	11.7	4914	6	51	5	2	6.3	1474.2	2	0.5
BIEC 03	13	13.65	5733	7	51	5	2	6.3	1719.9	3	0.5
BIEC 04	15	15.6	6552	8	51	5	2	6.3	1965.6	3	0.5
BIEC 05	17	17.5	7350	5	75	8	2	6.3	2205	2	0.5
BIEC 06	17	17.55	7371	9	51	5	2	6.3	2211.3	3	0.5
BIEC 07	19	19.5	8190	10	51	5	2	6.3	2457	3	0.5
BIEC 08	21	21	8820	6	75	8	2	6.3	2646	2	0.5
BIEC 09	21	21.45	9009	11	51	5	2	6.3	2702.7	4	0.5
BIEC 10	23	23.4	9828	12	51	5	2	6.3	2948.4	4	0.5
BIEC 11	24	24.5	10290	7	75	8	2	6.3	3087	3	0.5
BIEC 12	28	28	11760	8	75	8	2	6.3	3528	3	0.5
BIEC 13	30	30	12600	5	63	8	2	6.3	5040	2	1
BIEC 14	31	31.5	13230	9	75	8	2	6.3	3969	3	1
BIEC 15	35	35	14700	10	75	8	2	6.3	4410	3	1
BIEC 16	36	36	15120	6	63	8	2	6.3	6048	2	1
BIEC 17	38	38.5	16170	11	75	8	2	6.3	4851	4	1
BIEC 18	42	42	17640	7	63	8	2	6.3	7056	3	1
BIEC 19	42	42	17640	12	75	8	2	6.3	5292	4	1
BIEC 20	48	48	20160	8	63	8	2	6.3	8064	3	1
BIEC 21	54	54	22680	9	63	8	2	6.3	9072	3	1
BIEC 22	60	60	25200	10	63	8	2	6.3	10080	3	1
BIEC 23	66	66	27720	11	63	8	2	6.3	11088	4	1
BIEC 24	72	72	30240	12	63	8	2	6.3	12096	4	1

FEATURES & BENEFITS

PENT PAK

- 88% EFFICIENCY
- WATER FILTER
- STAINLESS STEEL 304 WET SECTION
- TIMED FLUSH SYSTEM
- 12" / 8" COOLING MEDIA
- PUMP PROTECTOR
- FLEXIBLE CONNECTORS
- OPTIONAL PIPING MATERIALS AVAILABLE (PVC, COPPER OR S.S.)
- GALVANIZED LOUVERS
- VOLUME CONTROL OPTIONS (Motorized or manual dampers)
- FILTER OPTIONS (MERV 8 – MERV 15)

INTERCELL

- 70% EFFICIENCY
- HIGH EFFICIENCY SECONDARY AXIAL FAN
- CASING: STAINLESS STEEL
- MIST ELIMINATOR
- OPTIONAL PIPING MATERIALS AVAILABLE (PVC, COPPER OR S.S.)
- GALVANIZED LOUVERS
- VOLUME CONTROL OPTIONS (MOTORIZED OR MANUAL DAMPERS)
- FILTER OPTIONS (MERV 8 – MERV 15)

XCELL UNITS (2-STAGE)

- ALL BENEFITS FROM PENT PAK AND INTERCELL COMBINED
- ΔT: 30F APROX. (DEPENDS OF THE OUTSIDE AIR)
- BUILT IN ECONOMIZER FUNCTION
- SEPARATE PRIMARY AND SECONDARY WATER CIRCUITS FOR OPTIMUM EFFICIENCY (STAINLESS STEEL)
- AUTOMATED WATER QUALITY MANAGEMENT SYSTEM, FIELD ADJUSTABLE FOR SPECIFIC SITE REQUIREMENTS
- WATER LIMIT SWITCHES FOR PUMP PROTECTION
- LOW MAINTENANCE
- PROVIDES EXCEPTIONAL PERFORMANCE
- HIGH EFFICIENCY COOLONG SYSTEM WITHOUT COMPRESSOR NEED
- OPTIONAL PIPING MATERIALS AVAILABLE (PVC, COPPER OR S.S.)
- GALVANIZED LOUVERS
- VOLUME CONTROL OPTIONS (MOTORIZED OR MANUAL DAMPERS)
- FILTER OPTIONS (MERV 8 – MERV 15)
- HIGH EFFICIENCY SECONDARY AXIAL FAN

CONTACT US FOR CUSTOM CONFIGURATION

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