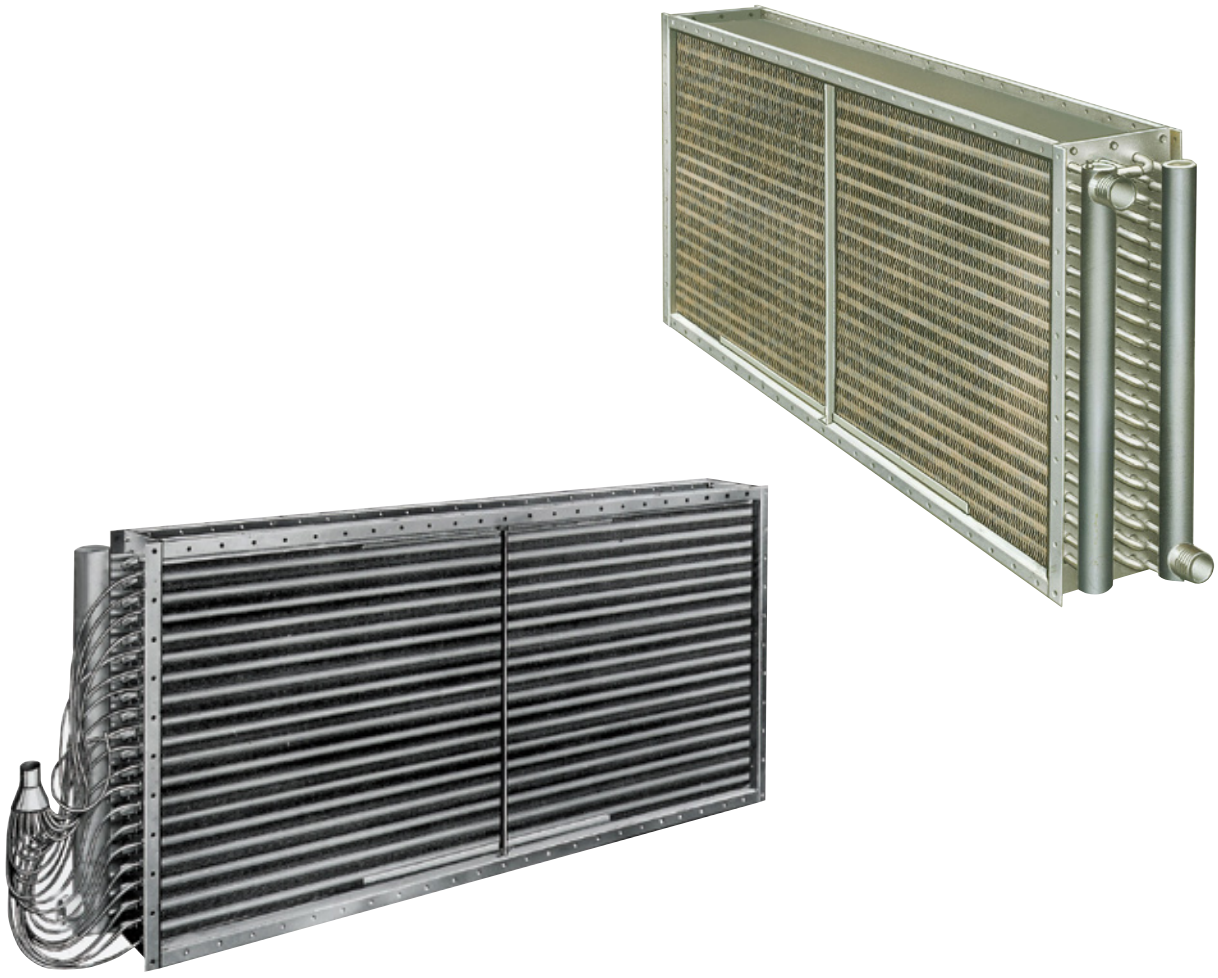
DAIKIN

Catalog 411-9

Water Cooling and Evaporator Coils

Types HI-F5 and E-F5



HI-F5 and E-F5 Water Cooling and Evaporator Coils

Daikin SelectTools™ for Contractor Coils

Daikin offers a wide variety of standard fin spacings, row and circuiting combinations. For optimum coil selection, Daikin SelectTools™ for Contractor Coils selection program makes it easy to select the most economical standard or special application coil to meet your job requirements.

Contact your local Daikin representative for a coil selection that meets the most exacting specification.

AHRI Certification

Daikin water cooling coils are certified in accordance with the forced circulation air cooling and air heating coil certification program, which is based on AHRI Standard 410.

NOTE: Special application coils may be outside the scope of AHRI Standard 410.

Nomenclature

5W S - 10 06 C - 18 × 45

Coil Type
Water: 5M, 5W
Evaporator: 5E

Circuiting

Water:	Evaporator:
H = 1/2 Serpentine	N= Normal
L = 3/4 Serpentine	F = Face Control
S = 1 Serpentine	R = Row Control
M = 1-1/2 Serpentine	J = Interlaced
D = 2 Serpentine	K = Interlaced Face Control

Finned Length (Inches)

Fin Height (Inches)

Fin Design
C = HI-F5
B = E-F5
A = Flat

Rows Deep
(02, 03, 04, 05, 06, 08, 10, 12)

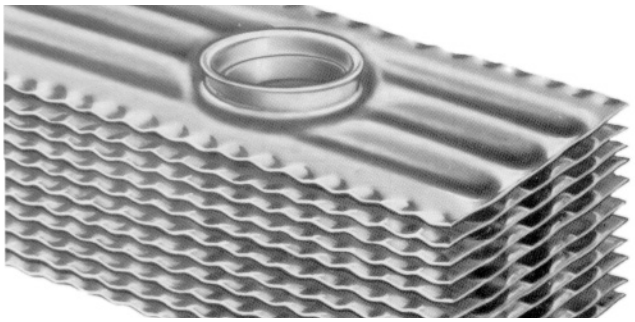
Fins per Inch
(06, 07, 08, 09, 10, 11, 12, 13, 14)

A Pioneer in Corrugated Fin Development

HI-F Means High Efficiency

A principal factor governing fin heat transfer efficiency is the boundary layer film of air adhering to any fin surface. This boundary layer insulates the fin, severely reducing the rate of heat exchange.

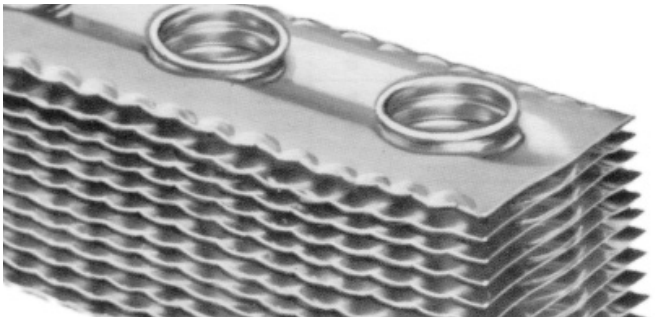
The advanced rippled-corrugated HI-F design creates a state of continuous turbulence which effectively reduces the boundary layer formation. The exclusive rippled edge instantly deflects the incoming air to create initial turbulence. A succession of corrugations across the fin depth, in conjunction with the staggered tubes, increases the turbulating effect and eliminates the “dead spots” behind the tubes. In this manner, the HI-F design establishes a high standard in heat transfer efficiency yielding sharply increased performance. The rippled fin edge also strengthens the fin edge and provides a pleasing overall appearance.



E-F Means Energy Efficient

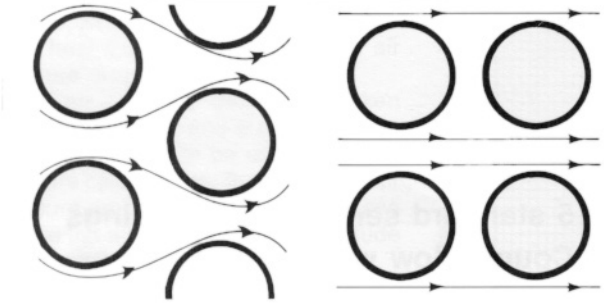
The term “energy efficient,” which is used to describe how well a system utilizes energy, has become a common expression in the HVAC industry.

With costs of energy rising, the need for cutting operating expenses is apparent. Lowering the air pressure drop across the face of the coil will reduce the fan brake horsepower requirement and fan motor electrical demand. The need to cut operating energy expenses is met by the E-F fin surface. The smoother fin design of the E-F surface results in lower operating costs over the life of the equipment.



Staggered Tube Design For High Performance

The more moving air in contact with the tubes in the coil, the more performance obtained from the total available surface. The staggered tube design exposes the tubes to more moving air than the in-line design. The geometry of the staggered tube design also allows the rows to be spaced closer together. This results in a more compact coil providing higher capacities.



Design Features

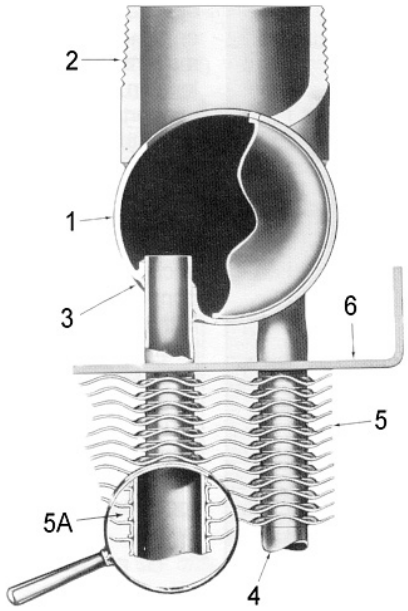
General

Vents and Drains - Furnished on all water coils.

Tests - Complete coil tested leak free under warm water containing special wetting agent at 315 psig air pressure for 5W, 5M and 5E coils.

Operating Conditions - Standard coils are suitable for use up to 250 psig and temperatures up to 300°F for 5W, 5M and 5E coils. Special high pressure construction is available for 5W coils (consult factory).

Figure 1: 5E, 5M, 5W Coil Components



5E, 5M, 5W Coils

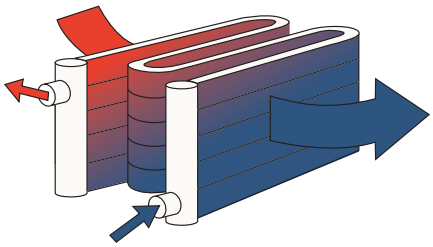
1. **Headers** - Extra-heavy seamless copper tubing. Tube holes are intruded to provide the maximum brazing surface for added strength. Header end caps are heavy-gauge, die-formed copper. Cupro-nickel headers and Monel end caps are available for special applications.
2. **Connections** - Unique hand or universal connections can be provided. Connection type must be specified. Water Coil Connections: Steel male pipe supply and return connections. Other materials available on request (red brass connections recommended on type 5W coils when used with non-ferrous piping). Evaporator Coil Connections: Male sweat type. Liquid connections are brass and suction connections are copper.
3. **Brazing** - All joints are brazed with copper brazing alloys.
4. **Primary Surface** - Round seamless copper tubes on 1-1/2" centers. Cupro-nickel tubes are recommended for applications where high acid or sand content tends to be corrosive or erosive.
5. **Secondary Surface** - HI-F or E-F rippled aluminum or copper die-formed plate type fins.

   5A. **Fin Collars** - Full drawn to completely cover the tubes for maximum heat transfer and to provide accurate control of fin spacing.
6. **Casing** - Die-formed, heavy-gauge, continuous galvanized steel with reinforced mounting flanges. (Other materials available on request.) Intermediate tube sheets position the core assembly to help prevent damage in shipment.

Circuiting Arrangements

Figure 2: Chilled Water Circuitings

- Six standard serpentine circuitings
- Counterflow water circuits
- Unique or universal hand of connection (all cooling coils)



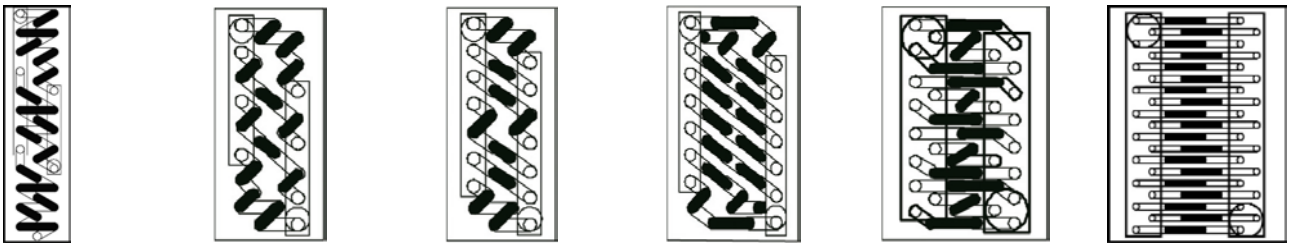
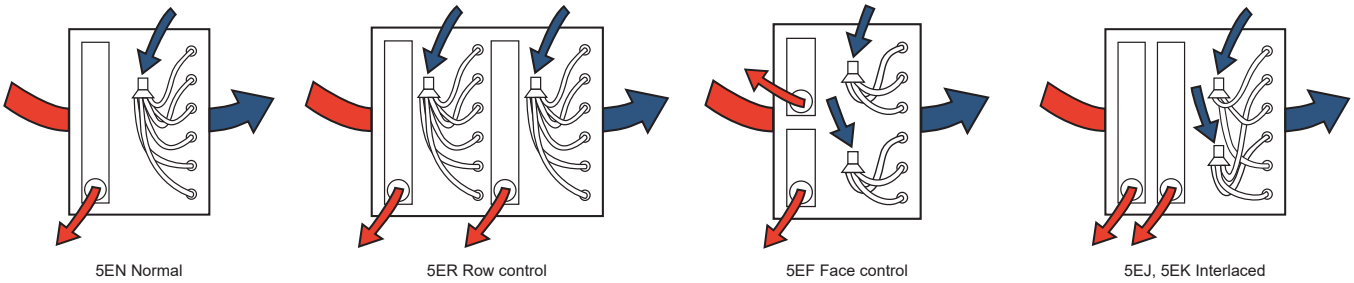


Figure 3: Evaporator Coil Circuitings



NOTE: See page 24 for exact number and location of coil connections.

Flexibility

Along with the standard offerings, optional materials and special configurations are provided to meet many different needs. Extra long finned lengths, intermediate tube supports, along with a wide variety of tube wall and fin thicknesses are available. Casings can be constructed of heavy steel, aluminum, stainless steel or copper. Optional connection materials such as steel, Monel, red brass or copper (sweat) are offered along with butt-weld or flange type connections. Coil coatings are phenolic or Electro Fin.

These are just a few of the options and specials that can be provided. Consult your local Daikin representative for your special coil needs.

NOTE: Special application coils may be outside the scope of AHRI standard 410.

Table 1: Standard Availability Chart

Coil type			Chilled water								Evaporator				
Coil model			5MH	5MS	5WH	5WH	5WL	5WS	5WM	5WD	5EN	5EF	5ER	5EJ	5EK
Serpentine circuit			1/2	1	1/4	1/2	3/4	1	1-1/2	2	Normal	Face	Row	Interlaced	
Rows			2		3,4,5,6,8,10,12				4,5,6 8,10,12	4,6,8 10,12	2,3,4,5,6,8,10		6	3,4,6,8	4,8
Connection location			Same end except 5WS 3,5 row; 5WD 6,10 row								Same end				
Fin height 3" increment			12" to 54"								12" to 54"			15" to 54"	
Fin length 0.10" increment			12" to 216"								12" to 161" (up to 216" with manufacturing approval)				
Fin spacing (FPI)			6 to 14								6 to 14				
Fins	Fin type	HI-F	•	•	•	•	•	•	•	•	•	•	•	•	•
		E-F	•	•	•	•	•	•	•	•	•	•	•	•	•
		Flat	•	•	•	•	•	•	•	•	•	•	•	•	•
	Aluminum	0.0075	•	•	•	•	•	•	•	•	•	•	•	•	•
		0.0095	•	•	•	•	•	•	•	•	•	•	•	•	•
	Copper	0.006	•	•	•	•	•	•	•	•	•	•	•	•	•
		0.0075	•	•	•	•	•	•	•	•	•	•	•	•	•
		0.0095	•	•	•	•	•	•	•	•	•	•	•	•	•
Tubing	Copper	0.020[1]	•	•	•	•	•	•	•	•	•	•	•	•	•
		0.025	•	•	•	•	•	•	•	•	•	•	•	•	•
		0.035	•	•	•	•	•	•	•	•	•	•	•	•	•
		0.049	•	•	•	•	•	•	•	•					
Tubing diameter			5/8"								5/8"				
Tubing face C/C			1.5								1.5				
Headers standard mat'l[2]			Copper tubing								Copper tubing				
Maximum std. operating limits		P	250 psig								250 psig				
		T	300°F								300°F				

• Feature available
1. 0.020 is a nominal tube thickness.
2. Optional header materials are available. Consult your local Daikin Sales Representative.

Table 2: HI-F5 versus E-F5

Type	Tube Diameter	Fin Type	Application
HI-F5	5/8"	HI-F Hi-Efficiency	Provides highest heat transfer rate for a given amount of surface.
E-F5	5/8"	E-F Energy Efficient	Smoother fin corrugation than the HI-F5 results in a lower air pressure drop and lower fan BHP requirements. The cost of additional surface can be amortized by the KW savings.

Table 3: Standard Water Coil Circulating (Number of Tubes Fed) for Calculating Water Velocity for Types 5W and 5M Coils

Type	Rows	Fin Height (Inches)														
		12	15	18	21	24	27	30	33	36	39	42	45	48	51	54
5MS	2	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36
5MH	2	4	5	6	7	8	9	10	11	12	26	14	15	16	17	18
5WH	3, 4, 5, 6, 8, 10, 12	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
5WL	3, 4, 5, 6, 8, 10, 12	6	7	9	10	12	13	15	16	18	19	21	22	24	25	27
5WS	3, 4, 5, 6, 8, 10, 12	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36
5WM	4, 5, 6, 8, 10, 12	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54
5WD	4, 6, 8, 10, 12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72

Table 4: Coil Sizes Face Area in Square Feet

Fin Height	Finned Length – FL (Inches)																							
	12	15	18	21	24	30	36	42	48	54	60	66	72	78	84	90	96	102	108	114	120	129	135	141
12	1.0	1.25	1.6	1.75	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0	10.7	11.2	11.7
15	—	1.56	1.87	2.19	2.50	3.12	3.75	4.87	5.0	5.6	6.2	6.9	7.5	8.1	8.7	9.4	10.0	10.6	11.2	11.9	12.5	13.4	14.0	14.7
18	—	—	2.25	2.62	3.0	3.75	4.5	5.25	6.0	6.7	7.5	8.2	9.0	9.7	10.5	11.2	12.0	12.7	13.5	14.2	15.0	16.1	16.9	17.6
21	—	—	—	3.06	3.50	4.37	5.25	6.12	7.0	7.9	8.7	9.6	10.5	11.4	12.2	13.1	14.0	14.9	15.7	16.6	17.5	18.8	19.7	20.5
24	—	—	—	—	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0	18.0	19.0	20.0	21.5	22.5	23.5
27	—	—	—	—	—	5.62	6.75	7.87	9.0	10.1	11.2	12.4	13.5	14.6	15.7	16.9	18.0	19.1	20.2	21.4	22.5	24.1	25.3	26.4
30	—	—	—	—	—	—	7.50	8.75	10.0	11.2	12.5	13.7	15.0	16.2	17.5	18.7	20.0	21.2	22.5	23.7	25.0	26.8	28.0	29.5
33	—	—	—	—	—	—	8.25	9.62	11.0	12.4	13.7	15.1	16.5	17.9	19.2	20.6	22.0	23.4	24.7	26.1	27.5	29.6	30.9	32.3
36	—	—	—	—	—	—	9.0	10.5	12.0	13.5	15.1	16.5	18.0	19.5	21.0	22.5	24.0	25.5	27.0	28.5	30.0	32.2	33.8	35.2
39	—	—	—	—	—	—	—	11.37	13.0	14.6	16.2	17.9	19.5	20.1	22.7	24.4	26.0	26.7	29.2	30.9	32.5	34.9	36.5	38.2
42	—	—	—	—	—	—	—	12.25	14.0	15.7	17.5	19.2	21.0	22.7	24.5	26.2	28.0	29.7	31.5	33.2	35.0	37.6	39.4	41.0
45	—	—	—	—	—	—	—	—	15.0	16.8	18.7	20.6	22.5	24.4	26.2	28.1	30.0	31.9	33.7	35.6	37.5	40.3	42.2	44.1
48	—	—	—	—	—	—	—	—	16.0	18.0	20.0	22.0	24.0	26.0	28.0	30.0	32.0	34.0	36.0	38.0	40.0	43.0	45.0	47.0
51	—	—	—	—	—	—	—	—	17.0	19.1	21.2	23.3	25.5	27.6	29.7	31.8	34.0	36.1	38.2	40.4	42.5	45.7	47.8	49.9
54	—	—	—	—	—	—	—	—	—	20.2	22.4	24.8	27.0	29.2	31.4	33.8	36.0	38.2	40.4	42.8	45.0	48.2	50.6	52.8

NOTE: In addition to the standard finned lengths listed above, any required finned length can be supplied.

General Considerations

The cooling process should always be plotted on a psychrometric chart to be sure that desired psychrometric changes are feasible.

When selecting a coil, it should be remembered that if the required leaving wet bulb temperature is attained, the total load is satisfied and vice versa. Also, when the required leaving dry bulb temperature is met, the sensible load requirement is satisfied.

A coil must meet both the total and sensible load requirement in order to achieve the conditions desired in the space to be cooled. Normally, the total load capacity is checked first. However, the leaving dry bulb should always be checked. When the sensible to total load ratio (S/T ratio) is low, the coil selection is normally controlled by the total load even though the sensible cooling capacity may exceed the requirement. In some cases, if the leaving dry bulb temperature is too low, reheat may be required.

When the S/T ratio is high, the coil selection is normally controlled by the sensible cooling even though the total capacity may exceed that required. If the total capacity far exceeds the requirement, a recheck on the system should be made to be sure sufficient system capacity is available.

Normal cooling coil face velocities range from 300 to 700 FPM. For most applications, 500 to 600 FPM is recommended. See the individual air pressure drop curves (Figure 6 on page 22 and Figure 7 on page 23). to determine under what conditions moisture carryover might be a consideration.

Water velocity in the tubes of approximately 3 to 6 FPS is desirable to attain high heat transfer rates with a reasonable water pressure drop. Water velocity above 8 FPS may cause erosion in copper tube coils.

Cooling coils should not normally exceed 54" fin height as the condensate draining from the top portion of the coil tends to load up on the lower portion of the coil and a significant reduction in airflow and performance may result. Where the fin height exceeds 54", we recommend two or more coils banked one above the other and installed in accordance with the recommendations shown below.

Cooling coils are normally selected to have a finned length of three to four times the fin height for economy. Coils of several different face dimensions are usually available to meet the required face area.

Two different corrugated coil surfaces are offered to provide the most economical coil for a given application.

Application Recommendations

Water Cooling Coils

1. Piping should be in accordance with accepted industry standards.
2. When drainable coils are desired, tubes should be installed in a horizontal position using a spirit level. If the tubes cannot be installed level, special drain headers are available on request.
3. Coils are unique for either right- or left-hand airflow. The coil hand must be specified. **Connect the water supply to the connection on the air leaving side and the water return to the connection on the air entering side.**
4. When cooling coils are banked two or three high, a drain gutter should be installed on the air leaving side of each coil to collect the condensate. On high latent installations, the condensate draining from top coils would load the lower coils with condensate and a reduction in airflow and performance may result. All individually installed water cooling coils and the bottom coils of all cooling coil banks should be mounted in drain pans extending at least 10 inches from the leaving air edge of the coil.
5. When fresh air and return air are to be cooled by a water coil, care should be exercised in the design of the ductwork to provide thorough mixing before the air enters the coil. If large quantities of fresh air below 40°F are introduced into the system, steam distributing coils should be installed in the fresh air duct or mixing plenum as preheaters to raise the air temperature to a minimum of 40°F.

   This holds true unless the water coil is drained and filled with antifreeze. Even though the coil is drained, there may be enough water remaining to cause freeze damage. The coil should be drained and flushed with antifreeze. On any system that has fresh air introduced in the winter season, all possible precaution must be taken to prevent freezing.
6. Control of water cooling coils can be accomplished by two-position control valves, modulating valves, three-way valves, face and bypass dampers, or a combination of these controls. Follow the recommendations of the control manufacturer regarding types, sizing and locations.
7. The pipe size for the system must be selected on the basis of the head (pressure) available from the circulating pump. It is recommended that the velocity should not generally exceed 8 feet per second and that the pressure drop should be approximately 3 feet of water per 100 feet of pipe.

HI-F5 and E-F5 Water Cooling Coils

HI-F5 and E-F5 water cooling coils are designed for use with chilled or well water on comfort cooling, process, dehumidifying and special applications. All water cooling coils have vents and drains to aid drainability.

5W water cooling coils are designed for general purpose cooling. All 5W coils have heavy-gauge seamless drawn copper tube headers with carbon steel connections. This proven header design can lengthen coil life by providing necessary header flexibility to compensate for normal expansion and contraction during operation. Intermediate drain headers are available for coils that cannot be installed level.

General Formulas

Total BTUH:

Total BTUH = 4.5 × SCFM × (Total Heat Ent. Air Total Heat Lvg. Air)

Where: *4.5 = Density Std. Air × Min./hr.*
Density Std. Air = 0.075 lbs/cu. ft.
Minutes/hr. = 60

Total BTUH:

Total BTUH = 500 × GPM × (Lvg. Water Temp. Ent. Water Temp.)

Where: *500 = lbs./gal. × min./hr. × Specific heat water*
Lbs./gal. = 8.33
Min./hr. = 60
Specific Heat Water = 1

Sensible BTUH:

Sensible BTUH = 1.09 × SCFM × (Ent. Air DB -Lvg. Air DB)

Where: *1.09 = (Specific heat of air at 70°F) × (Min/hr.) × Density Std. Air*
Specific heat of air = .242 at 70°F
Min./hr. = 60
Density Std. Air = .075 lbs./cu ft.

Sensible Total Ratio:

$$S/T\ Ratio = \frac{Sensible\ BTUH}{Total\ BTUH}$$

Water Velocity:

$$5/8"\ Tubes:\ Water\ Velocity\ FPS = \frac{1.07 \times GPM}{No.\ of\ Tubes\ Fed}$$

Face Velocity:

$$F.V. = \frac{SCFM}{Face\ Area\ (Sq.\ Ft.)}$$

Face Area:

$$F.A. = \frac{SCFM}{Face\ Velocity\ (FPM)}$$

MBH per Square Foot of Face Area:

$$MBH/Sq.\ Ft. = \frac{Total\ BTUH}{Face\ Area\ (Sq.\ Ft.) \times 1000}$$

Example Water Cooling Coil Rating

The capacity data tables in this catalog rate a given coil at the AHRI conditions. For example, rate the following coil:

Coil model	5WS0804C
Coil size	24×48
Entering dry bulb	80°F
Entering wet bulb	67°F
Entering water temperature	45°F
Airflow	500 feet per minute
Water velocity	4 feet per second

In Table 12 on page 16 find the 4-row coils, 24 × 48 inches. Follow the 5WS, 1 Serpentine column down until you reach the 08 fpi (8 fins per inch) row. This coil will provide 138.52 MBH with 57.5°F leaving dry bulb temperature and 56.0°F leaving wet bulb temperature.

Next, calculate the coil GPM:

$$\frac{FPS \times No.\ Circuits}{1.07\ (5/8\ tubes)} = GPM$$

$$\frac{4 \times 16}{1.07} = 60\ GPM$$

Where: *FPS = Feet per second water velocity*
Circuits = Number of tubes fed with 1.5" tube centers.
24" high coil/1.5" = 16 tubes; from page 7, table 1. single serpentine feeds all 16 tubes.

Find the water and air pressure drops by following the examples on Figure 8 on page 24 and Figure 6 on page 22 respectively. For our example, coil rating the water pressure drop equals 5.4 feet and the air pressure drop equals 0.68 inches w.g.

To select a water cooling coil to meet specific performance requirements, contact your local Daikin representative.

HI-F5 and E-F5 Evaporator Coils

HI-F5 and E-F5 evaporator coils are designed and engineered for efficient operation with either Refrigerant 22, R407C, R410A or 134a. (R407C, R410A and R-134a coils are not AHRI certified.) The performance capabilities are excellent for comfort cooling, process refrigeration, and moisture control dehumidifying.

Direct expansion type 5E evaporator coils are engineered and designed to deliver the maximum possible heat transfer efficiency under all operating conditions. The wide variety of circuiting available offers the opportunity to provide the best circuit for peak coil performance. All evaporator coils are counterflow circuited and equipped with pressure type distributors and all refrigerant distributor tubes are of equal length to provide equal distribution of refrigerant to each circuit.

Capacity Reduction Applications

To achieve energy economy, compressors with capacity reduction capability have become an industry standard. Balancing the evaporator coil capacity to the compressor capacity requires the use of face, row or interlaced control coils. To achieve face control, two coils are mounted one above the other and piped to separate refrigerant circuits. A single coil can also be provided with two distributors and two sets of suction connections in a face split configuration.

Row control is achieved by placing one coil in front of the other or by installing a single coil with two separate refrigerant circuits. The first few rows of coil are circuited together and provided with distributor and suction connections. The balance of the coil rows are provided with a second set of distributor and suction connections.

Interlaced control offers the optimum in capacity reduction. Interlaced coils provide higher part load capability than face or row control coils. The unique interlaced circuiting allows the entire face and depth of the coil to be active under part load conditions. Interlaced coils offer higher part load capacity because when only one circuit is active heat transfer is enhanced by additional fin surface that would normally be associated with the other refrigerant circuit.

Face Control, 5EF

Many standard 5E evaporator coils with normal circuiting (5EN) are furnished with two distributors and two sets of suction connections. Coils with the number of circuits marked with an asterisk (*) in the circuiting availability Table 8 and Table 9 on page 14 are normally furnished suitable for 50% capacity reduction face control.

Face control (5EF) coils are also offered to accommodate 50% capacity reduction face control applications. For circuiting availability, refer Table 8 on page 14.

Row Control, 5ER

Coils used for row control cannot always be circuited for the reduction capacities desired because of physical limitations. For this reason, row control capacity reduction is offered as standard for 6-row coils only as indicated in Table 14 on page 20. Six-row coils are split 2 rows and 4 rows which offers approximately 50% reduction per split.

Interlaced Control, 5EJ & 5EK

Interlaced control coils are offered in two configurations, 5EJ and 5EK. 5EJ coils are provided with two distributors and two sets of suction connections. 5EK coils offer a combination interlaced/face split capacity reduction capability. Four separate refrigerant circuits are provided, each with an individual set of distributor and suction connections. Circuiting availability is presented in Table 9 on page 14.

Example Evaporator Coil Rating

The capacity data tables in this catalog rate a given coil at the ARI conditions. For example, rate the following coil:

Coil model	5EN0804C
Coil size	24×48
Entering dry bulb	80°F
Entering wet bulb	67°F
Suction temperature	40°F
Airflow	500 feet per minute
Refrigerant	R-22

In Table 14 on page 20, find the HI-F5 5/8" coils, 24×48 inches, with R-22. Follow the 4-row column down until you reach the 8 fpi (8 fins per inch) row. This coil will provide 148.03 MBH with 56.6°F leaving dry bulb temperature and 55.1°F leaving wet bulb temperature. Find the air pressure drop for this coil by following the example in Figure 6 on page 22. For our example coil rating the air pressure drop equals 0.68 inches w.g.

To select an evaporator coil to meet specific performance requirements, contact your local representative.

Conversion of Air Volume to Standard Air

Figure 4: Temperature Conversion Factor

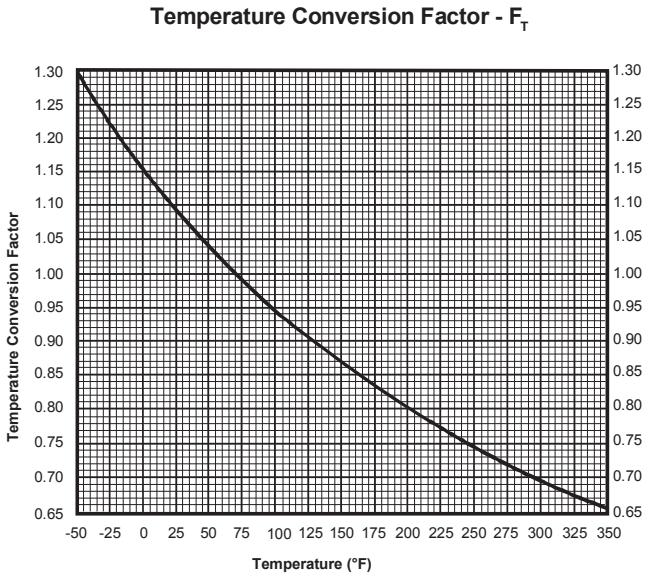
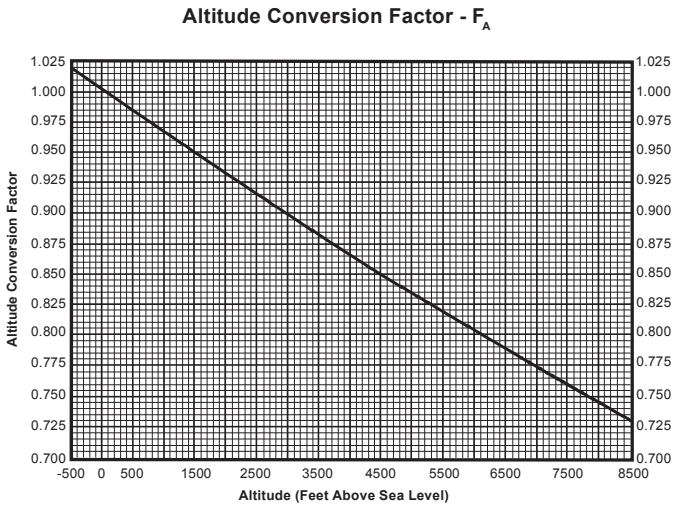


Figure 5: Altitude Conversion Factor



When the specified air volume (CFM) is given at any temperature other than 70° F or any altitude other than sea level, these charts should be used for correction before using the capacity and pressure drop tables which are based on CFM at standard air conditions.

Example:

To convert 15,900 CFM of air at 95°F and at 3,000 feet altitude to standard conditions:

CFM of Standard Air
= CFM of Specified Air × F_T × F_A
= 15,900 × 0.955 × 0.896
= 13.6

Where:
F_T = Temperature Conversion Factor
F_A = Altitude Conversion Factor

The CFM of standard air should be used to determine face velocity through the coil, which in turn is used to determine heat transfer values, and the air pressure drop through the coil.

The air pressure drop value taken from Figure 4 and Figure 5 must be converted to altitude to be used for static pressure calculations. To convert the air pressure drop from standard air at sea level to the air pressure drop at altitude use the following equation:

$$\text{Pressure Drop at Altitude} = \frac{\text{Pressure Drop at Sea Level}}{F_T \times F_A}$$

Total Heat (Enthalpy)

Table 5: Heat Content (BTU) of 1 Lb. of Dry Air Saturated with Water Vapor

Wet Bulb (°F)	Standard Atmospheric Pressure 29.921 Inches Hg									
	Tenths of Degrees									
	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
35	13.01	13.05	13.09	13.14	13.18	13.22	13.27	13.31	13.35	13.39
36	13.44	13.48	13.52	13.57	13.61	13.66	13.70	13.74	13.79	13.83
37	13.87	13.92	13.96	14.01	14.05	14.10	14.14	14.19	14.23	14.27
38	14.32	14.36	14.41	14.45	14.50	14.54	14.59	14.63	14.68	14.73
39	14.77	14.82	14.86	14.91	14.95	15.00	15.05	15.09	15.14	15.18
40	15.23	15.28	15.32	15.37	15.42	15.46	15.51	15.56	15.60	15.65
41	15.70	15.74	15.79	15.84	15.89	15.93	15.98	16.03	16.08	16.12
42	16.17	16.22	16.27	16.32	16.37	16.41	16.46	16.51	16.56	16.61
43	16.66	16.71	16.75	16.80	16.85	16.90	16.95	17.00	17.05	17.10
44	17.15	17.20	17.25	17.30	17.35	17.40	17.45	17.50	17.55	17.60
45	17.65	17.70	17.75	17.80	17.85	17.91	17.96	18.01	18.06	18.11
46	18.16	18.21	18.26	18.32	18.37	18.42	18.47	18.52	18.58	18.63
47	18.68	18.73	18.79	18.84	18.89	18.95	19.00	19.05	19.10	19.16
48	19.21	19.26	19.32	19.37	19.43	19.48	19.53	19.59	19.64	19.70
49	19.75	19.81	19.86	19.92	19.97	20.03	20.08	20.14	20.19	20.25
50	20.30	20.36	20.41	20.47	50.52	20.58	20.64	20.69	20.75	20.81
51	20.86	20.92	20.98	21.03	21.09	21.15	21.21	21.26	21.32	21.38
52	21.44	21.49	21.55	21.61	21.67	21.73	21.79	21.84	21.90	21.96
53	22.02	22.08	22.14	22.20	22.26	22.32	22.38	22.44	22.50	22.56
54	22.61	22.68	22.74	22.80	22.86	22.92	22.98	23.04	23.10	23.16
55	23.22	23.28	23.34	23.41	23.47	23.53	23.59	23.65	23.72	23.78
56	23.84	23.90	23.97	24.03	24.10	24.16	24.22	24.29	24.35	24.42
57	24.48	24.54	24.61	24.67	24.74	24.80	24.86	24.93	24.99	25.06
58	25.12	25.19	25.25	25.32	25.38	25.45	25.52	25.58	25.65	25.71
59	25.78	25.85	25.92	25.98	26.05	26.12	26.19	26.26	26.32	26.39
60	26.46	26.53	26.60	26.67	26.74	26.80	26.87	26.94	27.01	27.08
61	27.15	27.22	27.29	27.36	27.43	27.50	27.57	27.64	27.71	27.78
62	27.85	27.92	27.99	28.07	28.14	28.21	28.28	28.35	28.43	28.50
63	28.57	28.64	28.72	28.79	28.87	28.94	29.01	29.09	29.16	29.24
64	29.31	29.83	29.46	29.53	29.61	29.68	29.76	29.83	29.91	29.98
65	30.06	30.16	30.21	30.29	30.37	30.44	30.52	30.60	30.68	30.75
66	30.83	30.91	30.99	31.07	31.15	31.22	31.30	31.38	31.46	31.54
67	31.62	31.70	31.78	31.86	31.94	32.02	32.10	32.18	32.26	32.34
68	32.42	32.50	32.59	32.67	32.75	32.83	32.92	33.00	33.08	33.17
69	33.25	33.33	33.42	33.50	33.59	33.67	33.75	33.84	33.92	34.00
70	34.09	34.18	34.26	34.35	34.43	34.52	34.61	34.69	34.79	34.86
71	34.95	35.04	35.13	35.21	35.30	35.39	35.48	35.57	35.65	35.74
72	35.83	35.92	36.01	36.10	36.19	36.28	36.38	36.47	36.56	36.65
73	39.74	36.83	36.92	37.02	37.11	37.20	37.29	37.38	37.48	37.57
74	37.66	37.75	37.85	37.94	38.04	38.13	38.23	38.32	38.42	38.51
75	38.61	38.71	38.80	38.90	39.00	39.09	39.19	39.28	39.38	39.47
76	39.57	39.67	39.77	39.87	39.88	40.07	40.17	40.27	40.37	40.47
77	40.57	40.67	40.77	40.87	40.97	41.07	41.18	41.28	41.38	41.48
78	41.58	41.68	41.79	41.89	42.00	42.10	42.20	42.31	42.41	42.52
79	42.62	42.73	42.83	42.94	43.05	43.15	43.26	43.37	43.48	43.58
80	43.69	43.80	43.91	44.02	44.13	44.23	44.34	44.45	44.56	44.67
81	44.78	44.89	45.00	45.12	45.23	45.34	45.45	45.56	45.68	45.79
82	45.90	46.01	46.13	46.24	46.36	46.47	46.58	46.70	46.81	46.93
83	47.04	47.16	47.28	47.39	47.51	47.63	47.75	47.87	47.98	48.10
84	48.22	48.34	48.46	48.58	48.70	48.82	48.95	49.07	49.19	49.31
85	49.43	49.55	49.68	49.80	49.92	50.04	50.17	50.29	50.41	50.54

NOTE: Use wet bulb temperature only in determining total heat. Compiled from data in ASHRAE Handbook of Fundamentals 2001.

General Formulas

Total BTUH:

Total BTUH = 4.5 × SCFM × (Total Heat Ent. Air Total Heat Lvg. Air)

Where: *4 .5 = Density Std. Air × Min. / hr.*
Density Std. Air = 0.075 lbs / cu. ft.
Minutes/hr. = 60

Sensible BTUH:

Sensible BTUH = 1.09 × SCFM × (Ent. Air DB Lvg. Air DB)

Where: *1.09 = (Specific heat of air at 70° F) × (Min/hr.) × Density Std. Air*
Specific heat of air = 0.242 at 70° F
Minutes/hr. = 60
Density Std. Air = 0.075 lbs. / cu ft.

Sensible Total Ratio:

$$S/T\ Ratio. = \frac{Sensible\ BTUH}{Total\ BTUH}$$

Distributor and Suction Connection Size Selection

Distributor, nozzle and suction connection selection is best accomplished by the use of Daikin SelectTools™ for Contractor Coils selection program. The program output includes coil nomenclature that designates the distributor, nozzle and suction connection sizes. The 3-digit distributor code gives distributor selection information. The first digit designates the distributor tube size, either a 7 for 1/4 inch tubes or 8 for 5/16 inch tubes. The last two digits designate the number of circuits in the coil. The 2-digit nozzle code number gives the nozzle size required for the distributor and is also used to determine the suction connection size for the coil. Examples are listed in Table 5. Suction connections sizes for the various evaporator coil types are listed in Table 6. Evaporator coil circuiting availability is presented in Tables 7A and 7B. Liquid line (distributor) sizes are presented in Table 8.

Table 6: Rating Distributor and Nozzle Information

Information	Examples
Distributor: • First digit designates distributor tube size. • Last two digits designate number of circuits.	715
Nozzle: Digits designate distributor nozzle size.	17

Table 7: Suction Connection Sizes

Coil Type	Number of Circuits (NC)*	Nozzle Number		
		01 thru 12	15 thru 25	30 thru 50
5EN	2–30	(1) 1-5/8	(1) 2-1/8	(1) 2-5/8
	32–54	(2) 1-5/8	(2) 2-1/8	(2) 2-5/8
5ER	4–60	(2) 1-5/8	(2) 2-1/8	(2) 2-5/8
	4–72	(4) 1-5/8	(4) 2-1/8	(2) 2-5/8
5EF	5–54	(2) 1-5/8	(2) 2-1/8	(4) 2-5/8
5EJ	4–36	(2) 1-5/8	(2) 2-1/8	(2) 2-5/8
5EK	28–72	(4) 1-5/8	(4) 2-1/8	(4) 2-5/8

* These coils are normally furnished with two distributors for 5EN coils. See dimensional drawings on page 24.

Table 8: Circuiting Availability – 5EN, 5EF and 5ER Coils

Fin Height (FH)	Number of Circuits–Nc																								
	5EN and 5EF Coils																						5ER Coils		
	2 Rows			3 Rows		4 Rows			5 Rows			6 Rows					8 Rows			10 Rows			6 Rows			
12	2	4	8†	2	4	2	4	8†	2	4	6†	2	4	6†	8†	12†	2	4	8†	2	4	8	4	8	12	16
15	—	5†	10	—	5†	—	5†	10	—	5†	8	—	5†	—	10	15	—	5†	10	—	5	10	—	10	15	20
18	3	6	12	3	6	3	6	12	3	6	10	3	6	9	12	18	3	6	12	3	6	12	6	12	18	24
21	—	7	14	—	7	—	7	14	—	7	11	—	7	—	14	21	—	7	14	—	—	—	—	14	21	28
24	4	8	16	4	8	4	8	16	4	8	13	4	8	12	16	24	4	8	16	4	8	16	8	16	24	32
27	—	9	16	—	9	—	9	18	—	9	15	—	9	—	18	27	—	9	18	—	—	—	9	18	27	36
30	5	10	20	5	10	5	10	20	5	10	16	5	10	15	20	30	5	10	20	5	10	20	10	20	30	40
33	—	11	22	—	11	—	11	22	—	11	18	—	11	—	22	33*	—	11	22	—	—	—	11	22	33	44
36	6	12	24	6	12	6	12	24	6	12	20	6	12	18	24	36*	6	12	24	6	12	24	12	24	36	48
39	—	13	26	—	13	—	13	26	—	13	21	—	13	—	26	39*	—	13	26	—	—	—	13	26	39	52
42	7	14	28	7	14	7	14	28	7	14	23	7	14	21	28	42*	7	14	28	7	14	28	14	28	42	56
45	—	15	30	—	15	—	15	30	—	15	25	—	15	—	30	45*	—	15	30	—	—	—	15	30	45	60
48	8	16	32*	8	16	8	16	32*	8	16	26	8	16	24	32*	48*	8	16	32*	8	16	32*	16	32	64	—
51	—	17	34*	—	17	—	17	34*	—	17	28	—	17	—	34*	51*	—	17	34*	—	—	—	—	34	—	68
54	—	18	36*	9	18	9	18	36*	9	18	30	9	18	27	36*	54*	9	18	36*	9	18	36*	18	36	—	72

*These coils are normally furnished with two distributors for 5EN coils. See dimensional drawings on page 24.
†These coils are not available with universal connections
5EF coils available only in shaded area

Table 9: Circuiting Availability – 5EJ AND 5EK COILS

Fin Height (FH)	Number of Circuits — Nc											
	5EJ COILS										5EK COILS	
	3 Rows		4 Rows			6 Rows			8 Rows		4 Rows	8 Rows
21	—	7	—	7	14	—	7	14	—	7	14	28	28
24	4	8	4	8	16	4	8	16	4	8	16	32	32
27	—	9	—	9	18	—	9	18	—	9	18	36	36
30	5	10	5	10	20	5	10	20	5	10	20	40	40
33	—	11	—	11	22	—	11	22	—	11	22	44	44
36	6	12	6	12	24	6	12	24	6	12	24	48	48
39	—	13	—	13	26	—	13	26	—	13	26	52	52
42	7	14	7	14	28	7	14	28	7	14	28	56	56
45	—	15	—	15	30	—	15	30	—	15	30	60	60
48	8	16	8	16	32	8	16	32	8	16	32	64	64
51	—	17	—	17	34	—	17	34	—	17	34	68	68
54	9	18	9	18	36	9	18	36	9	18	36	72	72

Table 10: Liquid Connection (Distributor) Sizes

5EN Coils									
		Number of Circuits–Nc							
Tube Size	1/4"	2–3	4–8	9–10	11–18	19–30	32–36	39–54	
	5/16"	—	2–6	7–8	9–15	16–30	—	32–54	
Connection Qty.and Size		(1) 5/8	(1) 7/8	(1) 1-1/8	(1) 1-3/8	(1) 1-5/8	(1) 1-3/8	(1) 1-5/8	
5EF Coils									
		Number of Circuits–Nc							
Tube Size	1/4"	5–6	7	—	8–16	—	18–20	21	22–36	39–54
	5/16"	—	—	5–7	8–12	13	14–16	—	18–30	32–54
Connection Qty.and Size		(2) 5/8	(1) 5/8 (1) 7/8	(2) 7/8	(2) 7/8	(1) 7/8 (1) 1-1/8	(2) 1-1/8	(1) 1-1/8 (1) 1-3/8	(2) 1-3/8	(2) 1-5/8
5EJ Coils									
		Number of Circuits–Nc							
Tube Size	1/4"	4–6	7	8–16	17	18–20	—	22–36	—
	5/16"	—	—	4–12	13	14–16	17	18–30	32–36
Connection Qty.and Size		(2) 5/8	(1) 5/8 (1) 7/8	(2) 7/8	(1) 7/8 (1) 1-1/8	(2) 1-1/8	(1) 1-1/8 (1) 1-3/8	(2) 1-3/8	(2) 1-5/8
5EK Coils									
		Number of Circuits–Nc							
Tube Size	1/4"	27–31	—	35	39	43	47–71	—	—
	5/16"	—	27	—	31	35	39–59	63	67–71
Connection Qty.and Size		(4) 7/8	(3) 1-1/8 (1) 7/8	(3) 1-1/8 (1) 7/8	(4) 1-3/8	(3) 1-3/8 (1) 1-1/8	(4) 1-3/8	(3) 1-5/8 (1) 1-3/8	(4) 1-5/8

Table 11: Liquid Connection (Distributor) Sizes 5ER Coils (06 Rows Only)

Fin Height (FH)	1/4" Tube								5/16" Tube							
	Nc	Conns	Nc	Conns	Nc	Conns	Nc	Conns	Nc	Conns	Nc	Conns	Nc	Conns	Nc	Conns
12	4	(2) 5/8	8	(2) 7/8	12	(2) 7/8	16	(2) 7/8	4	(2) 7/8	8	(2) 7/8	12	(2) 7/8 (1) 1-1/8	16	(2) 1-1/8
15	—	—	10	(2) 7/8	15	(1) 7/8 (1) 1-1/8	20	(2) 7/8	—	—	10	(2) 7/8	15	(1) 7/8 (1) 1-3/8	20	(2) 1-3/8
18	6	(2) 5/8	12	(2) 7/8	18	(1) 7/8 (1) 1-3/8	24	(2) 1-3/8	6	(2) 7/8	12	(2) 7/8	18	(1) 7/8 (1) 1-3/8	24	(2) 1-3/8
21	—	—	14	(2) 7/8	21	(1) 7/8 (1) 1-3/8	28	(2) 1-3/8	—	—	14	(2) 1-1/8	21	(1) 1-1/8 (1) 1-3/8	28	(2) 1-3/8
24	08	(2) 7/8	16	(2) 7/8	24	(1) 7/8 (1) 1-3/8	32	(2) 1-3/8	08	(2) 7/8	16	(2) 1-1/8	24	(1) 1-1/8 (1) 1-5/8	32	(2) 1-5/8
27	09	(1) 5/8 (1) 7/8	18	(2) 1-1/8	27	(1) 1-1/8 (1) 1-3/8	36	(2) 1-3/8	09	(2) 7/8	18	(2) 1-3/8	27	(1) 1-3/8 (1) 1-5/8	36	(2) 1-5/8
30	10	(2) 7/8	20	(2) 1-1/8	30	(1) 1-1/8 (1) 1-5/8	40	(2) 1-5/8	10	(2) 7/8	20	(2) 1-3/8	30	(1) 1-3/8 (1) 1-5/8	40	(2) 1-5/8
33	11	(2) 7/8	22	(2) 1-3/8	33	(1) 1-3/8 (1) 1-5/8	44	(2) 1-5/8	11	(1) 7/8 (1) 1-1/8	22	(2) 1-3/8	33	(1) 1-3/8 (1) 1-5/8	44	(2) 1-5/8
36	12	(2) 7/8	24	(2) 1-3/8	36	(1) 1-3/8 (1) 1-5/8	48	(2) 1-3/8	12	(2) 7/8	24	(2) 1-3/8	36	(1) 1-3/8 (1) 1-5/8	48	(2) 1-5/8
39	13	(2) 7/8	26	(2) 1-3/8	39	(1) 1-3/8 (1) 1-5/8	52	(2) 1-5/8	13	(1) 7/8 (1) 1-1/8	26	(2) 1-3/8	39	(1) 1-3/8 (1) 1-5/8	52	(2) 1-5/8
42	14	(2) 7/8	28	(2) 1-3/8	42	(1) 1-3/8 (1) 1-5/8	56	(2) 1-5/8	14	(2) 1-1/8	28	(2) 1-3/8	42	(1) 1-3/8 (1) 1-5/8	56	(2) 1-5/8
45	15	(1) 7/8 (1) 1-1/8	30	(2) 1-3/8	45	(1) 1-3/8 (1) 1-5/8	60	(2) 1-5/8	15	(1) 7/8 (1) 1-3/8	30	(2) 1-3/8	45	(1) 1-3/8 (1) 1-5/8	60	(2) 1-5/8
48	16	(2) 7/8	32	(2) 1-3/8	—	—	64	(4) 1-3/8	16	(2) 1-1/8	32	(2) 1-5/8	—	—	64	(4) 1-5/8
51	—	—	34	(2) 1-3/8	—	—	68	(4) 1-3/8	—	—	34	(2) 1-5/8	—	—	68	(4) 1-5/8
54	18	(2) 1-1/8	36	(2) 1-3/8	—	—	72	(4) 1-3/8	18	(2) 1-3/8	36	(2) 1-5/8	—	—	72	(4) 1-5/8

Table 12: HI-F5 5/8 Water Cooling AHRI Coil Capacity Data

Entering Air Temperature: 80°F/67°F	Entering Water Temperature: 45°F		Water Velocity: 4 Feet Per Second		Air Velocity: 500 FPM					
FPI	2-Row – 24" × 48" Face Area				3-Row – 24" × 48" Face Area					
	5MH 1/2 Serpentine		5MS 1 Serpentine		5WH 1/2 Serpentine		5WL 3/4 Serpentine		5WS 1 Serpentine	
	MBH	LVG DB/WB	MBH	LVG DB/WB	MBH	LVG DB/WB	MBH	LVG DB/WB	MBH	LVG DB/WB
6	69.09	67.9/61.7	72.58	67.6/61.5	95.09	63.6/59.7	99.12	63.3/59.3	101.38	63.1/59.1
7	74.89	66.7/61.3	79.35	66.3/60.9	101.88	62.4/59.1	106.34	62.0/58.7	108.99	61.7/58.5
8	79.99	65.6/60.9	85.10	65.2/60.5	107.94	61.3/58.6	113.20	60.8/58.2	115.53	60.6/58.0
9	84.75	64.6/60.5	89.95	64.2/60.1	113.36	60.3/58.1	118.86	59.8/57.7	121.80	59.6/57.4
10	88.84	63.8/60.2	94.74	63.2/59.7	118.23	59.5/57.7	123.96	59.0/57.2	127.01	58.7/57.0
11	92.58	63.0/59.9	98.87	62.4/59.3	122.62	58.8/57.3	128.58	58.3/56.8	131.73	58.0/56.6
12	96.01	62.3/59.6	102.68	61.7/59.0	126.60	58.2/57.0	132.76	57.6/56.5	136.01	57.3/56.2
13	98.83	61.8/59.4	106.20	61.0/58.7	130.21	57.7/56.7	136.57	57.1/56.1	139.92	56.8/55.8
14	101.77	61.2/59.1	109.44	60.5/58.5	133.50	57.2/56.4	140.05	56.6/55.8	143.48	56.3/55.5
FPI	4-Row – 24" × 48" Face Area									
	5WH 1/2 Serpentine		5WL 3/4 Serpentine		5WS 1 Serpentine		5WM 1-1/2 Serpentine		5WD 2 Serpentine	
	MBH	LVG DB/WB	MBH	LVG DB/WB	MBH	LVG DB/WB	MBH	LVG DB/WB	MBH	LVG DB/WB
6	114.60	60.7/58.0	120.03	60.2/57.6	123.16	59.9/57.3	126.17	59.6/57.0	127.67	59.5/56.9
7	122.00	59.5/57.4	128.54	58.9/56.8	131.46	58.6/56.6	134.82	58.3/56.3	136.50	58.1/56.1
8	128.48	58.4/56.8	135.37	57.8/56.2	138.52	57.5/56.0	142.28	57.1/55.6	144.11	57.0/55.5
9	134.19	57.6/56.3	141.40	56.9/55.7	145.22	56.5/55.4	148.83	56.2/55.0	150.52	56.0/54.9
10	139.25	56.8/55.9	147.02	56.1/55.2	150.55	55.8/54.9	154.78	55.4/54.5	156.52	55.2/54.3
11	144.09	56.2/55.5	151.34	55.5/54.8	155.61	55.1/54.4	159.79	54.7/54.0	161.91	54.5/53.8
12	147.84	55.7/55.1	155.82	54.9/54.4	160.01	54.5/54.0	164.27	54.1/53.6	166.43	53.9/53.4
13	151.37	55.2/54.8	159.68	54.4/54.0	163.95	54.0/53.6	168.30	53.6/53.2	170.49	53.4/53.0
14	154.69	54.8/54.5	163.15	54.0/53.7	167.51	53.6/53.3	171.93	53.2/52.9	174.15	53.0/52.7
FPI	5-Row – 24" × 48" Face Area									
	5WH 1/2 Serpentine		5WL 3/4 Serpentine		5WS 1 Serpentine		5WM 1-1/2 Serpentine			
	MBH	LVG DB/WB	MBH	LVG DB/WB	MBH	LVG DB/WB	MBH	LVG DB/WB		
6	130.50	58.4/56.7	137.28	57.8/56.1	141.19	57.5/55.7	144.98	57.1/55.4		
7	138.17	57.3/56.0	146.35	56.5/55.3	149.71	56.2/55.0	153.92	55.8/54.6		
8	144.95	56.3/55.4	152.90	55.6/54.7	157.48	55.1/54.2	161.50	54.8/53.9		
9	150.54	55.5/54.9	158.98	54.7/54.1	163.38	54.3/53.7	167.98	53.9/53.3		
10	155.77	54.9/54.4	164.64	54.0/53.6	169.25	53.6/53.2	174.06	53.1/52.7		
11	160.05	54.4/54.0	169.30	53.5/53.1	174.04	53.0/52.7	178.80	52.6/52.2		
12	164.01	53.9/53.6	173.48	53.0/52.8	178.29	52.5/52.3	183.08	52.1/51.8		
13	167.54	53.5/53.3	177.19	52.6/52.4	182.06	52.1/51.9	186.87	51.7/51.5		
14	170.71	53.2/53.0	180.51	52.3/52.1	185.41	51.8/51.6	190.21	51.3/51.1		
FPI	6-Row – 24" × 48" Face Area									
	5WH 1/2 Serpentine		5WL 3/4 Serpentine		5WS 1 Serpentine		5WM 1-1/2 Serpentine		5WD 2 Serpentine	
	MBH	LVG DB/WB	MBH	LVG DB/WB	MBH	LVG DB/WB	MBH	LVG DB/WB	MBH	LVG DB/WB
6	143.87	56.7/55.5	152.24	55.9/54.7	155.85	55.6/54.4	160.68	55.1/54.0	162.87	54.9/53.7
7	151.49	55.6/54.8	160.61	54.7/54.0	164.77	54.3/53.6	169.22	53.9/53.2	171.92	53.7/52.9
8	158.05	54.7/54.2	167.54	53.8/53.3	172.44	53.4/52.9	176.95	52.9/52.4	179.40	52.7/52.2
9	163.73	54.0/53.7	173.55	53.1/52.7	178.54	52.6/52.3	183.49	52.1/51.8	185.62	51.9/51.6
10	168.67	53.5/53.2	178.74	52.5/52.3	183.78	52.0/51.8	188.74	51.5/51.3	191.12	51.3/51.1
11	173.00	53.0/52.8	183.25	52.0/51.8	188.31	51.5/51.3	193.20	51.1/50.9	196.05	50.8/50.6
12	176.81	52.6/52.4	187.18	51.6/51.4	192.22	51.1/50.9	197.56	50.6/50.4	200.04	50.4/50.2
13	180.20	52.3/52.1	190.63	51.3/51.1	195.99	50.8/50.6	201.07	50.3/50.1	203.52	50.0/49.8
14	183.21	52.0/51.8	193.66	51.0/50.8	199.10	50.5/50.3	204.14	50.0/49.8	206.56	49.7/49.5

Table 12 continued: E-F5 5/8 Water Cooling AHRI Coil Capacity Data

Entering Air Temperature: 80°F/67°F	Entering Water Temperature: 45°F		Water Velocity: 4 Feet Per Second						Air Velocity: 500 FPM	
FPI	8-Row – 24" × 48" Face Area									
	5WH 1/2 Serpentine		5WL 3/4 Serpentine		5WS 1 Serpentine		5WM 1-1/2 Serpentine		5WD 2 Serpentine	
	MBH	LVG DB/WB	MBH	LVG DB/WB	MBH	LVG DB/WB	MBH	LVG DB/WB	MBH	LVG DB/WB
6	164.44	54.1/53.6	174.83	53.1/52.6	179.48	52.7/52.2	184.69	52.2/51.7	187.21	51.9/51.4
7	171.98	53.2/52.9	182.70	52.2/51.9	187.88	51.7/51.4	193.09	51.2/50.9	195.71	50.9/50.6
8	178.31	52.5/52.3	189.18	51.4/51.2	194.78	50.9/50.7	199.77	50.4/50.2	202.36	50.1/49.9
9	183.68	52.0/51.8	194.53	50.9/50.7	200.29	50.4/50.2	205.52	49.8/49.6	207.72	49.6/49.4
10	188.26	51.5/51.3	199.46	50.4/50.2	204.89	49.9/49.7	209.88	49.4/49.2	212.71	49.1/48.9
11	192.22	51.1/50.9	203.42	50.0/49.8	208.71	49.5/49.3	214.07	49.0/48.8	216.56	48.7/48.5
12	195.64	50.8/50.6	206.80	49.7/49.5	212.30	49.1/48.9	217.20	48.6/48.4	219.44	48.4/48.2
13	198.60	50.5/50.3	209.62	49.4/49.2	215.27	48.8/48.6	219.92	48.4/48.2	222.41	48.1/47.9
14	201.15	50.3/50.1	212.49	49.1/48.9	217.67	48.6/48.4	222.54	48.1/47.9	224.74	47.9/47.7
FPI	10-Row – 24" × 48" Face Area									
	5WH 1/2 Serpentine		5WL 3/4 Serpentine		5WS 1 Serpentine		5WM 1-1/2 Serpentine		5WD 2 Serpentine	
	MBH	LVG DB/WB	MBH	LVG DB/WB	MBH	LVG DB/WB	MBH	LVG DB/WB	MBH	LVG DB/WB
6	179.94	52.4/52.1	191.15	51.3/51.1	197.01	50.7/50.5	201.98	50.2/50.0	204.59	49.9/49.7
7	187.12	51.6/51.4	198.61	50.5/50.3	204.22	50.0/49.8	209.34	49.4/49.2	211.96	49.2/49.0
8	192.65	51.1/50.9	204.48	49.9/49.7	210.16	49.4/49.2	215.64	48.8/48.6	217.41	48.6/48.4
9	197.48	50.6/50.4	209.09	49.5/49.3	214.88	48.9/48.7	219.76	48.4/48.2	221.88	48.2/48.0
10	201.85	50.2/50.0	213.45	49.0/48.8	218.75	48.5/48.3	223.73	48.0/47.8	225.94	47.7/47.5
11	204.73	49.9/49.7	216.83	48.7/48.5	221.93	48.1/47.9	226.78	47.6/47.4	228.86	47.4/47.2
12	207.93	49.6/49.4	219.69	48.4/48.2	224.85	47.8/47.6	229.29	47.4/47.2	231.21	47.2/47.0
13	210.52	49.3/49.1	222.13	48.1/47.9	227.17	47.6/47.4	231.37	47.2/47.0	233.39	46.9/46.7
14	212.81	49.1/48.9	224.21	47.9/47.7	229.14	47.4/47.2	233.08	47.0/46.8	235.11	46.8/46.6
FPI	12-Row – 24" × 48" Face Area									
	5WH 1/2 Serpentine		5WL 3/4 Serpentine		5WS 1 Serpentine		5WM 1-1/2 Serpentine		5WD 2 Serpentine	
	MBH	LVG DB/WB	MBH	LVG DB/WB	MBH	LVG DB/WB	MBH	LVG DB/WB	MBH	LVG DB/WB
6	191.55	51.2/51.0	203.64	50.0/49.8	209.47	49.4/49.2	214.50	48.9/48.7	217.26	48.6/48.
7	198.10	50.6/50.4	210.29	49.3/49.1	215.83	48.8/48.6	220.70	48.3/48.1	223.13	48.0/47.8
8	203.53	50.0/49.8	215.50	48.8/48.6	220.80	48.3/48.1	225.79	47.7/47.5	227.72	47.5/47.3
9	207.66	49.6/49.4	219.69	48.4/48.2	224.95	47.8/47.6	229.46	47.4/47.2	231.38	47.2/47.0
10	211.30	49.2/49.0	223.09	48.0/47.8	228.17	47.5/47.3	232.33	47.1/46.9	234.40	46.8/46.6
11	214.39	48.9/48.7	225.87	47.7/47.5	230.79	47.2/47.0	234.87	46.8/46.6	236.71	46.6/46.4
12	217.06	48.7/48.5	228.43	47.5/47.3	232.92	47.0/46.8	236.84	46.6/46.4	238.32	46.4/46.2
13	219.39	48.4/48.2	230.44	47.3/47.1	234.65	46.8/46.6	238.32	46.4/46.2	239.85	46.3/46.1
14	221.43	48.2/48.0	232.14	47.1/46.9	236.33	46.6/46.4	239.55	46.3/46.1	241.06	46.1/45.9

Table 13: E-F5 5/8 Water Cooling AHRI Coil Capacity Data

80°F/67°F Entering Air Temperature	45°F Entering Water Temperature		4 Feet Per Second Water Velocity		500 FPM Air Velocity					
FPI	2-Row – 24" × 48" Face Area				3-Row – 24" × 48" Face Area					
	5MH 1/2 Serpentine		5MS 1 Serpentine		5WH 1/2 Serpentine		5WL 3/4 Serpentine		5WS 1 Serpentine	
	MBH	LVG DB/WB	MBH	LVG DB/WB	MBH	LVG DB/WB	MBH	LVG DB/WB	MBH	LVG DB/WB
6	59.04	70.2/62.5	61.53	70.0/62.3	87.65	65.3/60.3	91.29	64.9/60.0	93.09	64.8/59.8
7	64.41	69.2/62.1	67.61	68.9/61.9	93.93	64.1/59.8	98.05	63.7/59.4	100.10	63.5/59.2
8	69.59	68.2/61.7	73.11	67.8/61.4	99.41	63.1/59.3	104.04	62.7/58.9	106.33	62.5/58.7
9	74.07	67.3/61.4	78.39	66.9/61.0	104.34	62.2/58.9	109.37	61.7/58.5	111.88	61.5/58.3
10	78.10	66.4/61.0	82.91	66.0/60.6	108.82	61.4/58.5	114.04	60.9/58.1	116.86	60.7/57.8
11	81.76	65.7/60.7	87.04	65.2/60.3	112.90	60.7/58.2	118.32	60.2/57.7	121.36	59.9/57.5
12	85.08	65.0/60.5	90.82	64.5/60.0	116.64	60.0/57.9	122.46	59.5/57.4	125.43	59.2/57.1
13	88.20	64.3/60.2	94.28	63.8/59.7	120.07	59.5/57.6	126.06	58.9/57.0	129.08	58.6/56.8
14	90.99	63.7/60.0	97.47	63.2/59.5	123.24	59.0/57.3	129.39	58.4/56.8	132.65	58.1/56.5
FPI	4-Row – 24" × 48" Face Area									
	5WH 1/2 Serpentine		5WL 3/4 Serpentine		5WS 1 Serpentine		5WM 1-1/2 Serpentine		5WD 2 Serpentine	
	MBH	LVG DB/WB	MBH	LVG DB/WB	MBH	LVG DB/WB	MBH	LVG DB/WB	MBH	LVG DB/WB
6	105.97	62.4/58.8	111.38	61.9/58.3	113.99	61.6/58.1	116.60	61.4/57.9	117.91	61.3/57.8
7	113.23	61.1/58.1	118.85	60.6/57.7	121.78	60.4/57.4	124.71	60.1/57.2	126.18	59.9/57.0
8	119.21	60.1/57.6	125.37	59.6/57.1	128.59	59.3/56.8	131.81	59.0/56.5	133.43	58.8/56.4
9	124.54	59.2/57.2	131.06	58.6/56.6	134.59	58.3/56.3	138.08	58.0/56.0	139.82	57.8/55.8
10	129.32	58.5/56.8	136.42	57.8/56.1	139.92	57.5/55.8	143.63	57.2/55.5	145.49	57.0/55.3
11	133.63	57.8/56.4	140.98	57.1/55.7	144.67	56.8/55.4	148.68	56.4/55.0	150.35	56.3/54.9
12	137.54	57.2/56.0	145.11	56.5/55.4	149.21	56.1/55.0	153.04	55.8/54.7	155.08	55.6/54.5
13	141.09	56.7/55.7	149.21	56.0/55.0	152.66	55.6/54.7	157.05	55.2/54.3	159.16	55.0/54.1
14	144.57	56.3/55.4	152.11	55.5/54.7	156.50	55.1/54.3	160.67	54.7/54.0	162.85	54.5/53.8
FPI	5-Row – 24" × 48" Face Area									
	5WH 1/2 Serpentine		5WL 3/4 Serpentine		5WS 1 Serpentine		5WM 1-1/2 Serpentine			
	MBH	LVG DB/WB	MBH	LVG DB/WB	MBH	LVG DB/WB	MBH	LVG DB/WB		
6	121.48	60.1/57.4	128.21	59.4/56.9	131.57	59.1/56.6	134.93	58.8/56.3		
7	135.22	57.9/56.2	136.03	58.2/56.2	139.76	57.9/55.8	143.47	57.5/55.5		
8	140.71	57.1/55.8	142.78	57.2/55.6	147.08	56.8/55.2	150.64	56.4/54.9		
9	145.67	56.3/55.3	149.21	56.3/55.0	152.69	55.9/54.7	157.26	55.5/54.3		
10	149.95	55.8/54.9	153.95	55.6/54.6	157.97	55.2/54.2	162.87	54.7/53.7		
11	149.95	55.8/54.9	158.63	54.9/54.1	162.94	54.5/53.7	167.82	54.1/53.3		
12	153.99	55.2/54.6	163.04	54.4/53.7	167.82	53.9/53.3	172.19	53.5/52.9		
13	157.40	54.8/54.3	166.64	53.9/53.4	171.40	53.4/53.0	176.08	53.0/52.5		
14	160.60	54.4/54.0	170.03	53.5/53.1	174.85	53.0/52.6	179.68	52.5/52.2		
FPI	6-Row – 24" × 48" Face Area									
	5WH 1/2 Serpentine		5WL 3/4 Serpentine		5WS 1 Serpentine		5WM 1-1/2 Serpentine		5WD 2 Serpentine	
	MBH	LVG DB/WB	MBH	LVG DB/WB	MBH	LVG DB/W	MBH	LVG DB/WB	MBH	LVG DB/WB
6	134.88	58.2/56.3	142.46	57.5/55.6	146.79	57.0/55.2	150.34	56.7/54.9	152.06	56.5/54.7
7	142.35	57.0/55.6	150.35	56.3/54.9	154.45	55.9/54.5	159.17	55.5/54.1	161.33	55.2/53.9
8	148.44	56.1/55.1	157.16	55.3/54.3	161.63	54.9/53.9	166.54	54.4/53.4	168.83	54.2/53.2
9	154.17	55.4/54.5	163.35	54.5/53.7	168.37	54.0/53.2	172.97	53.6/52.8	175.21	53.4/52.6
10	158.81	54.7/54.1	168.49	53.8/53.2	173.24	53.4/52.8	178.28	52.9/52.3	180.74	52.6/52.1
11	163.12	54.2/53.7	173.04	53.2/52.8	178.07	52.8/52.3	182.97	52.3/51.8	185.47	52.0/51.6
12	166.96	53.7/53.4	177.08	52.7/52.4	182.17	52.3/51.9	187.04	51.8/51.5	189.56	51.5/51.2
13	170.42	53.3/53.0	180.69	52.3/52.1	185.80	51.8/51.6	190.70	51.3/51.1	193.53	51.1/50.8
14	173.53	53.0/52.8	183.92	52.0/51.8	189.02	51.5/51.3	194.37	50.9/50.7	196.82	50.7/50.5

Table 13 continued: HI-F5 5/8 Water Cooling AHRI Coil Capacity Data

80°F/67°F Entering Air Temperature	45°F Entering Water Temperature		4 Feet Per Second Water Velocity				500 FPM Air Velocity			
FPI	8-Row – 24" × 48" Face Area									
	5WH 1/2 Serpentine		5WL 3/4 Serpentine		5WS 1 Serpentine		5WM 1-1/2 Serpentine		5WD 2 Serpentine	
	MBH	LVG DB/WB	MBH	LVG DB/WB	MBH	LVG DB/WB	MBH	LVG DB/WB	MBH	LVG DB/WB
6	155.56	55.4/54.4	165.08	54.5/53.5	170.14	54.0/53.1	175.08	53.5/52.6	177.50	53.3/52.4
7	162.83	54.4/53.8	173.18	53.4/52.8	178.15	53.0/52.3	183.32	52.5/51.8	185.82	52.2/51.6
8	169.03	53.6/53.2	179.67	52.6/52.2	184.73	52.1/51.7	189.99	51.6/51.2	192.92	51.3/50.9
9	174.37	53.0/52.7	185.27	51.9/51.6	190.40	51.4/51.1	196.08	50.9/50.6	198.70	50.6/50.3
10	179.02	52.5/52.2	189.99	51.4/51.2	195.72	50.8/50.6	200.93	50.3/50.1	203.54	50.0/49.8
11	183.09	52.0/51.8	194.03	51.0/50.8	199.85	50.4/50.2	205.01	49.9/49.7	207.57	49.6/49.4
12	186.68	51.7/51.5	197.95	50.6/50.4	203.46	50.0/49.8	208.45	49.5/49.3	211.33	49.2/49.0
13	189.87	51.4/51.2	201.16	50.3/50.1	206.58	49.7/49.5	211.98	49.2/49.0	214.43	48.9/48.7
14	192.71	51.1/50.9	203.99	50.0/49.8	209.24	49.5/49.3	214.75	48.9/48.7	217.32	48.6/48.4
FPI	10-Row – 24" × 48" Face Area									
	5WH 1/2 Serpentine		5WL 3/4 Serpentine		5WS 1 Serpentine		5WM 1-1/2 Serpentine		5WD 2 Serpentine	
	MBH	LVG DB/WB	MBH	LVG DB/WB	MBH	LVG DB/WB	MBH	LVG DB/WB	MBH	LVG DB/WB
6	171.32	53.5/53.0	182.28	52.4/51.9	187.43	51.9/51.4	193.17	51.3/50.9	195.78	51.1/50.6
7	178.37	52.6/52.3	189.48	51.5/51.2	195.21	51.0/50.7	200.74	50.4/50.1	203.36	50.1/49.8
8	184.31	51.9/51.7	195.86	50.8/50.6	201.30	50.3/50.1	206.73	49.7/49.5	209.25	49.5/49.3
9	189.35	51.4/51.2	200.93	50.3/50.1	206.48	49.7/49.5	211.96	49.2/49.0	214.57	48.9/48.7
10	193.27	51.0/50.8	205.18	49.9/49.7	210.93	49.3/49.1	215.96	48.8/48.6	218.37	48.5/48.3
11	196.94	50.7/50.5	208.97	49.5/49.3	214.49	48.9/48.7	219.30	48.4/48.2	222.01	48.1/47.9
12	200.14	50.4/50.2	212.15	49.2/49.0	217.55	48.6/48.4	222.61	48.1/47.9	224.85	47.8/47.6
13	203.12	50.1/49.9	214.91	48.9/48.7	220.17	48.3/48.1	225.12	47.8/47.6	227.23	47.6/47.4
14	205.41	49.8/49.6	217.32	48.6/48.4	222.42	48.1/47.9	227.28	47.6/47.4	229.32	47.4/47.2
FPI	12-Row – 24" × 48" Face Area									
	5WH 1/2 Serpentine		5WL 3/4 Serpentine		5WS 1 Serpentine		5WM 1-1/2 Serpentine		5WD 2 Serpentine	
	MBH	LVG DB/WB	MBH	LVG DB/WB	MBH	LVG DB/WB	MBH	LVG DB/WB	MBH	LVG DB/WB
6	183.74	52.0/51.8	195.52	50.9/50.6	200.96	50.3/50.1	206.45	49.8/49.5	208.97	49.5/49.3
7	190.08	51.4/51.2	202.24	50.2/50.0	207.52	49.6/49.4	213.40	49.0/48.8	216.02	48.8/48.6
8	195.53	50.8/50.6	207.54	49.6/49.4	213.72	49.0/48.8	218.45	48.5/48.3	221.15	48.2/48.0
9	200.09	50.4/50.2	212.34	49.1/48.9	217.81	48.6/48.4	222.90	48.0/47.8	225.26	47.8/47.6
10	203.92	50.0/49.8	216.13	48.7/48.5	221.37	48.2/48.0	226.31	47.7/47.5	228.52	47.5/47.3
11	207.17	49.7/49.5	219.31	48.4/48.2	224.62	47.9/47.7	229.08	47.4/47.2	231.10	47.2/47.0
12	210.03	49.4/49.2	222.00	48.1/47.9	227.18	47.6/47.4	231.44	47.2/47.0	233.54	46.9/46.7
13	212.53	49.1/48.9	224.30	47.9/47.7	229.35	47.4/47.2	233.59	46.9/46.7	235.43	46.7/46.5
14	214.75	48.9/48.7	226.26	47.7/47.5	231.19	47.2/47.0	235.27	46.7/46.5	236.96	46.6/46.4

Table 14: HI-F5 and E-F5 Evaporator Coil Capacity Data

Based on 80°F db/67° F wb entering air	40° F saturated suction		500 FPM coil face velocity		All capacity databased on 24" × 48" coil face area			
FPI	2-Row – 24" × 48" Face Area							
	R-22				R-134a*			
	HI-F5 Surface		E-F5 Surface		HI-F5 Surface		E-F5 Surface	
	MBH	LVG DB/WB	MBH	LVG DB/WB	MBH	LVG DB/WB	MBH	LVG DB/WB
6	76.84	67.0/61.1	62.84	69.8/62.2	63.54	68.2/62.2	51.14	70.9/63.1
7	83.82	65.7/60.6	69.64	68.7/61.7	69.55	67.0/61.7	57.28	69.8/62.7
8	90.01	64.6/60.1	75.81	67.6/61.2	74.74	65.9/61.3	62.73	68.8/62.2
9	95.49	63.6/59.6	81.42	66.6/60.8	79.27	65.0/60.9	67.59	67.8/61.9
10	100.36	62.7/59.2	86.54	65.7/60.4	83.29	64.2/60.6	71.93	67.0/61.5
11	104.70	61.9/58.9	91.19	64.8/60.0	86.74	63.4/60.3	75.81	66.2/61.2
12	108.59	61.2/58.5	95.42	64.0/59.6	89.83	62.8/60.1	79.29	65.5/60.9
13	112.08	60.5/58.2	99.28	63.3/59.3	92.62	62.2/59.9	82.44	64.8/60.7
14	115.30	60.0/58.0	102.82	62.7/59.0	95.13	61.7/59.7	85.28	64.2/60.5
FPI	3-Row – 24" × 48" Face Area							
	R-22				R-134a*			
	HI-F5 Surface		E-F5 Surface		HI-F5 Surface		E-F5 Surface	
	MBH	LVG DB/WB	MBH	LVG DB/WB	MBH	LVG DB/WB	MBH	LVG DB/WB
6	108.52	62.4/58.5	100.09	64.1/59.2	89.24	64.2/60.1	83.50	65.6/60.6
7	115.89	61.1/57.9	107.20	62.9/58.7	94.06	63.1/59.7	88.39	64.6/60.2
8	122.07	60.0/57.4	113.29	61.8/58.1	97.94	62.2/59.4	92.43	63.7/59.9
9	127.29	59.1/56.9	118.55	60.9/57.7	—	—	95.80	62.9/59.6
10	131.73	58.3/56.6	123.11	60.1/57.3	—	—	98.63	62.3/59.4
11	135.54	57.6/56.2	127.10	59.4/57.0	—	—	—	—
12	138.84	57.1/55.9	130.60	58.8/56.7	—	—	—	—
13	—	—	133.69	58.2/56.4	—	—	—	—
14	—	—	136.44	57.7/56.1	112.31	59.1/58.2	—	—
FPI	4-ROW – 24" × 48" Face Area							
	R-22				R-134a*			
	HI-F5 Surface		E-F5 Surface		HI-F5 Surface		E-F5 Surface	
	MBH	LVG DB/WB	MBH	LVG DB/WB	MBH	LVG DB/WB	MBH	LVG DB/WB
6	130.03	59.3/56.7	119.30	61.1/57.6	106.55	61.4/58.7	96.69	63.2/59.5
7	139.72	57.8/55.9	128.35	59.7/56.9	115.44	60.0/58.0	105.09	61.9/58.8
8	148.03	56.6/55.1	136.30	58.5/56.2	122.83	58.9/57.3	112.31	60.7/58.2
9	155.21	55.6/54.5	143.30	57.5/55.5	129.19	58.0/56.8	118.56	59.8/57.7
10	161.44	54.7/53.9	149.47	56.6/55.0	134.71	57.2/56.3	124.05	59.0/57.2
11	166.89	54.0/53.4	154.96	55.8/54.5	139.54	56.6/55.9	128.87	58.2/56.8
12	171.83	53.4/52.9	159.85	55.1/54.0	143.78	56.0/55.5	133.15	57.6/56.4
13	176.11	52.9/52.5	164.25	54.5/53.6	147.52	55.6/55.2	136.98	57.1/56.1
14	179.95	52.4/52.1	168.19	54.0/53.3	150.84	55.2/54.9	140.42	56.6/55.8
FPI	5-ROW – 24" × 48" Face Area							
	R-22				R-134a*			
	HI-F5 Surface		E-F5 Surface		HI-F5 Surface		E-F5 Surface	
	MBH	LVG DB/WB	MBH	LVG DB/WB	MBH	LVG DB/WB	MBH	LVG DB/WB
6	155.40	56.1/54.4	144.28	57.9/55.4	132.21	58.3/56.5	123.04	59.9/57.3
7	165.09	54.7/53.5	153.69	56.5/54.6	140.05	57.1/55.8	130.87	58.7/56.6
8	173.15	53.6/52.8	161.71	55.4/53.9	146.45	56.2/55.2	137.40	57.7/56.1
9	179.93	52.7/52.1	168.58	54.4/53.2	151.82	55.4/54.8	142.91	56.9/55.6
10	185.67	52.0/51.6	174.52	53.6/52.7	156.26	54.8/54.4	147.59	56.2/55.1
11	190.57	51.4/51.1	179.69	52.9/52.2	160.03	54.3/54.0	151.61	55.6/54.8
12	194.80	50.9/50.7	184.21	52.3/51.7	163.27	53.9/53.7	155.08	55.1/54.5
13	198.60	50.5/50.3	188.19	51.8/51.3	166.07	53.7/53.5	158.11	54.7/54.2
14	201.85	50.2/50.0	191.72	51.4/51.0	168.52	53.4/53.2	160.78	54.3/53.9

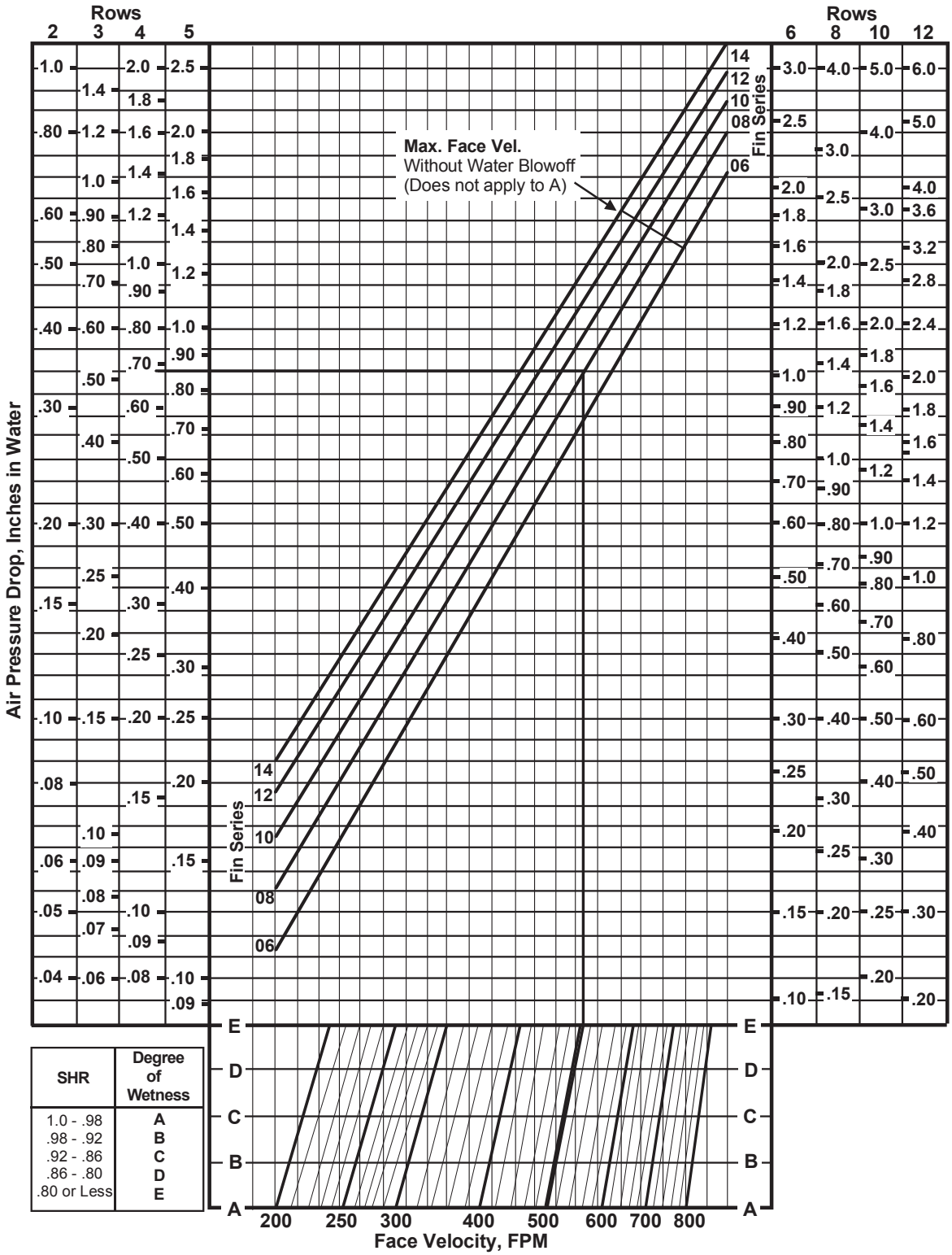
* R-134a coils are not AHRI certified.

Table 14 continued: HI-F5 and E-F5 Evaporator Coil Capacity Data

Based on 80°F db/67° F wb entering air	40° F saturated suction		500 FPM coil face velocity		All capacity databased on 24" × 48" coil face area			
FPI	6-ROW – 24" × 48" Face Area							
	R-22				R-134a*			
	HI-F5 Surface		E-F5 Surface		HI-F5 Surface		E-F5 Surface	
	MBH	LVG DB/WB	MBH	LVG DB/WB	MBH	LVG DB/WB	MBH	LVG DB/WB
6	174.14	53.8/52.7	163.46	55.4/53.7	147.44	56.3/55.2	139.47	57.7/55.9
7	183.14	52.6/51.8	172.51	54.1/52.8	153.99	55.4/54.6	146.29	56.7/55.3
8	190.43	51.6/51.1	180.03	53.1/52.1	159.16	54.6/54.1	151.80	55.8/54.8
9	196.41	50.9/50.5	186.33	52.3/51.5	163.30	54.1/53.7	156.32	55.2/54.4
10	201.36	50.3/50.0	191.66	51.6/51.0	166.76	53.6/53.4	160.07	54.6/54.0
11	205.50	49.8/49.6	196.21	51.0/50.6	170.93	53.2/53.0	163.22	54.2/53.7
12	208.93	49.5/49.3	200.12	50.5/50.2	175.32	52.8/52.6	165.89	53.8/53.5
13	212.10	49.2/49.0	203.51	50.1/49.8	179.14	52.4/52.2	168.18	53.5/53.3
14	215.50	48.8/48.6	206.47	49.7/49.5	182.49	52.1/51.9	171.72	53.1/52.9
FPI	8-ROW – 24" × 48" Face Area							
	R-22				R-134a*			
	HI-F5 Surface		E-F5 Surface		HI-F5 Surface		E-F5 Surface	
	MBH	LVG DB/WB	MBH	LVG DB/WB	MBH	LVG DB/WB	MBH	LVG DB/WB
6	197.10	50.9/50.5	188.44	52.2/51.3	160.43	54.5/54.0	155.17	55.4/54.5
7	204.00	50.1/49.8	195.84	51.2/50.6	164.50	53.9/53.6	159.71	54.7/54.0
8	209.31	49.4/49.2	201.67	50.4/50.0	171.76	53.1/52.9	163.18	54.2/53.7
9	215.69	48.8/48.6	206.37	49.8/49.5	178.73	52.5/52.3	166.70	53.7/53.4
10	221.15	48.2/48.0	210.54	49.3/49.1	184.51	51.9/51.7	172.81	53.0/52.8
11	225.74	47.8/47.6	215.32	48.8/48.6	189.42	51.4/51.2	178.10	52.5/52.3
12	229.66	47.3/47.1	219.58	48.4/48.2	193.61	51.0/50.8	182.63	52.1/51.9
13	233.02	47.0/46.8	223.23	48.0/47.8	197.24	50.7/50.5	186.60	51.7/51.5
14	235.99	46.7/46.5	226.49	47.7/47.5	200.40	50.3/50.1	190.10	51.4/51.2
FPI	10-ROW – 24" × 48" Face Area							
	R-22				R-134a*			
	HI-F5 Surface		E-F5 Surface		HI-F5 Surface		E-F5 Surface	
	MBH	LVG DB/WB	MBH	LVG DB/WB	MBH	LVG DB/WB	MBH	LVG DB/WB
6	218.96	48.5/48.3	208.83	49.7/49.3	188.52	51.5/51.3	178.62	52.8/52.3
7	227.18	47.6/47.4	217.47	48.7/48.4	196.59	50.7/50.5	186.80	51.8/51.5
8	233.67	46.9/46.7	224.42	47.9/47.7	203.00	50.1/49.9	193.67	51.0/50.8
9	238.82	46.4/46.2	230.09	47.3/47.1	208.18	49.6/49.4	199.22	50.5/50.3
10	243.17	45.9/45.7	234.77	46.8/46.6	212.43	49.1/48.9	203.86	50.0/49.8
11	246.68	45.5/45.3	238.68	46.4/46.2	215.96	48.8/48.6	207.78	49.6/49.4
12	249.63	45.2/45.0	241.98	46.0/45.8	218.93	48.5/48.3	211.12	49.3/49.1
13	252.11	44.9/44.7	244.79	45.7/45.5	221.46	48.2/48.0	214.00	49.0/48.8
14	254.23	44.7/44.5	247.25	45.4/45.2	223.62	48.0/47.8	216.51	48.7/48.5

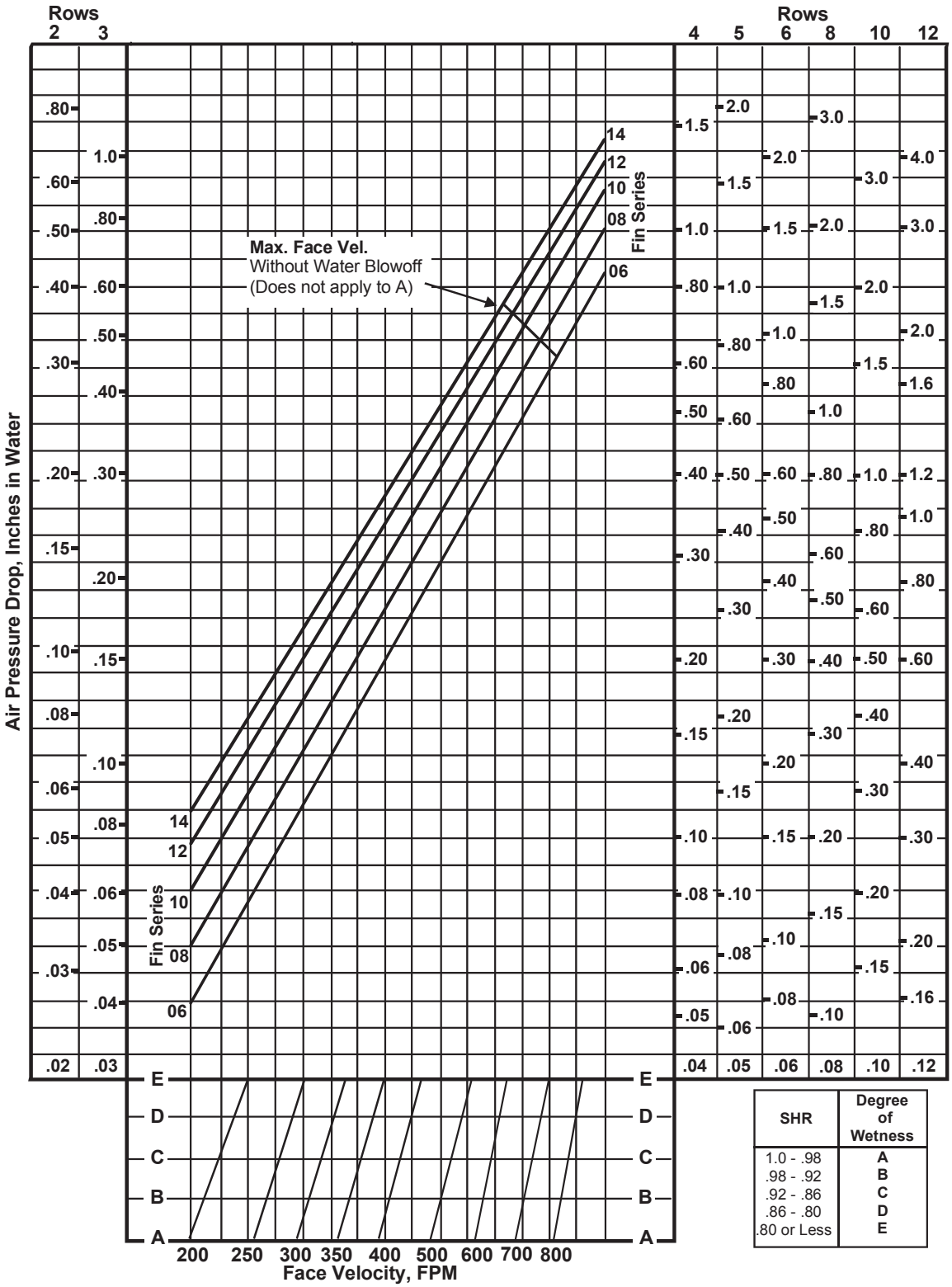
* R-134a coils are not AHRI certified.

Figure 6: HI-F5 Coils Air Pressure Drop



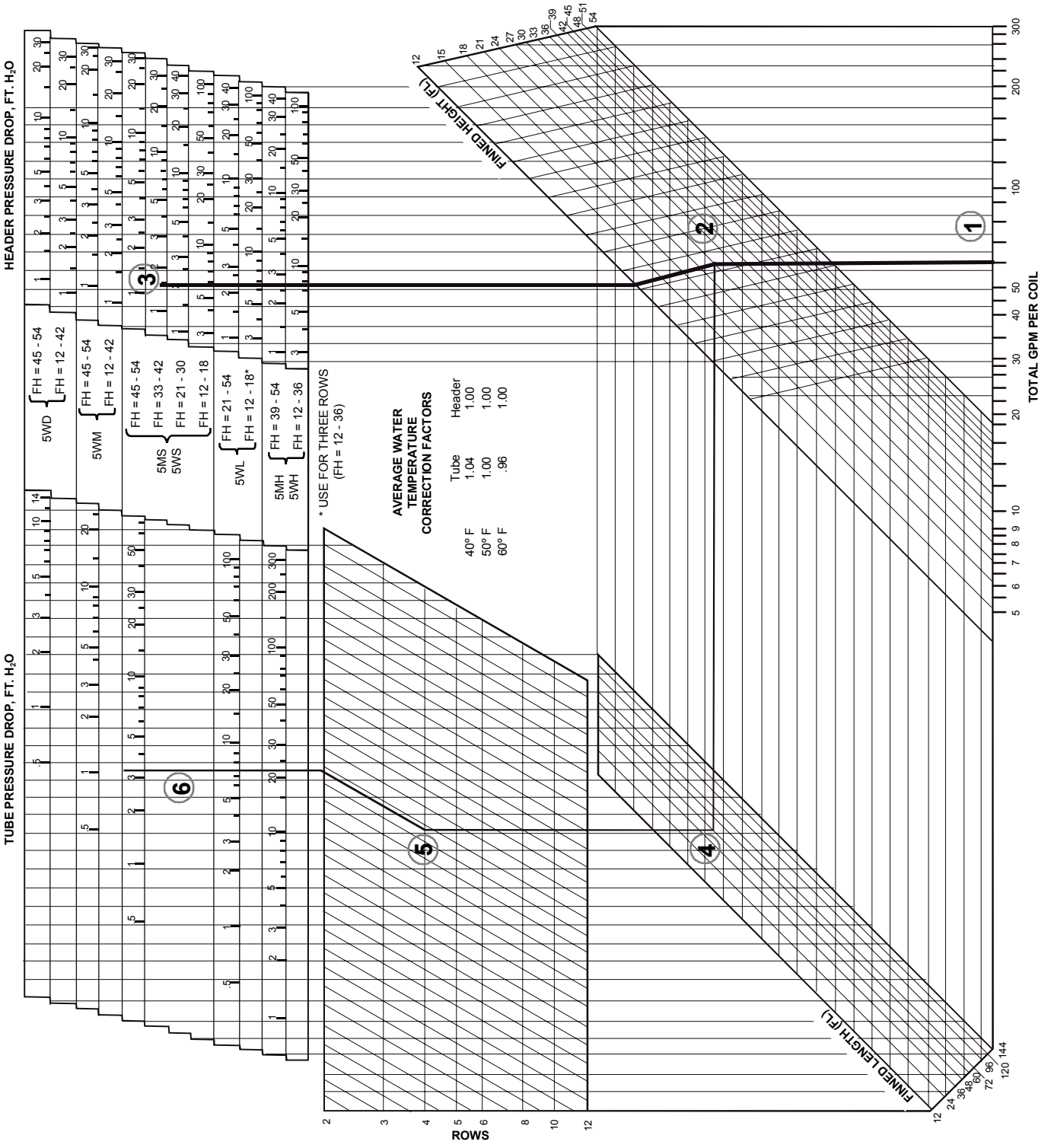
NOTE: The letters A, B, C, D or E indicate the degree of wetness at which the coil would be operating. Dry coils are shown by the letter A, wetcoils by the letter E. Intermediate conditions are shown by the letters B, C and D. Air pressure drop for odd fin spacings may be found by interpolation.

Figure 7: E-F5 Coils Air Pressure Drop



NOTE: The letters A, B, C, D or E indicate the degree of wetness at which the coil would be operating. Dry coils are shown by the letter A, wetcoils by the letter E. Intermediate conditions are shown by the letters B, C and D. Air pressure drop for odd fin spacings may be found by interpolation.

Figure 8: HI-F5 and E-F5 Coils Water Pressure Drop 5W Coils



5M Water Cooling Coils (12" to 54" FH)

Figure 9: 2 Row Water Cooling Coils with Splayed Headers Dimensions

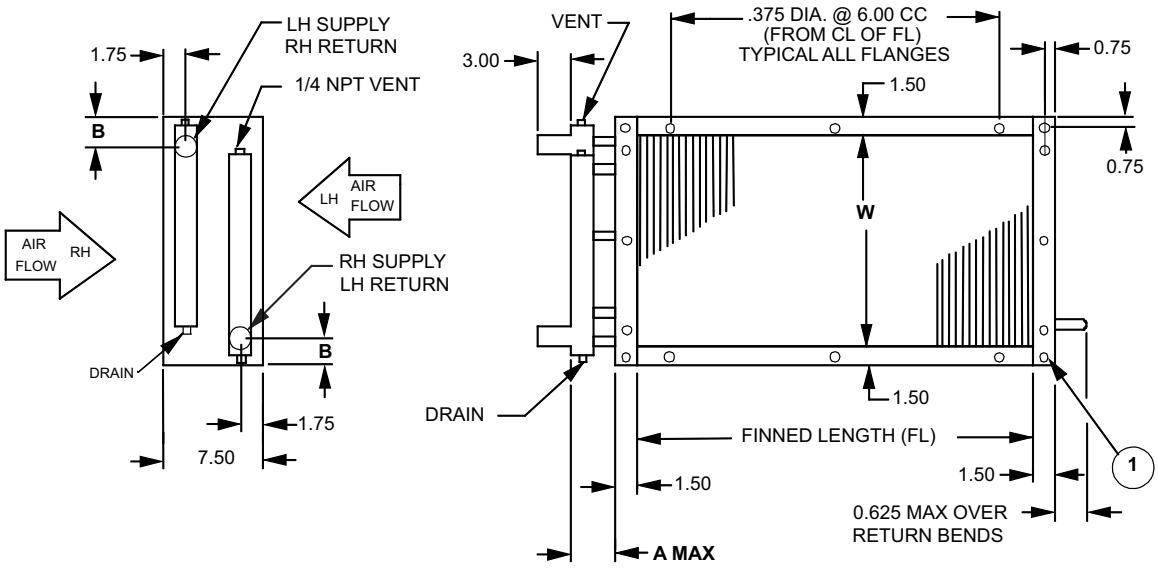


Table 15: 5MS and 5MH Variable Dimensions

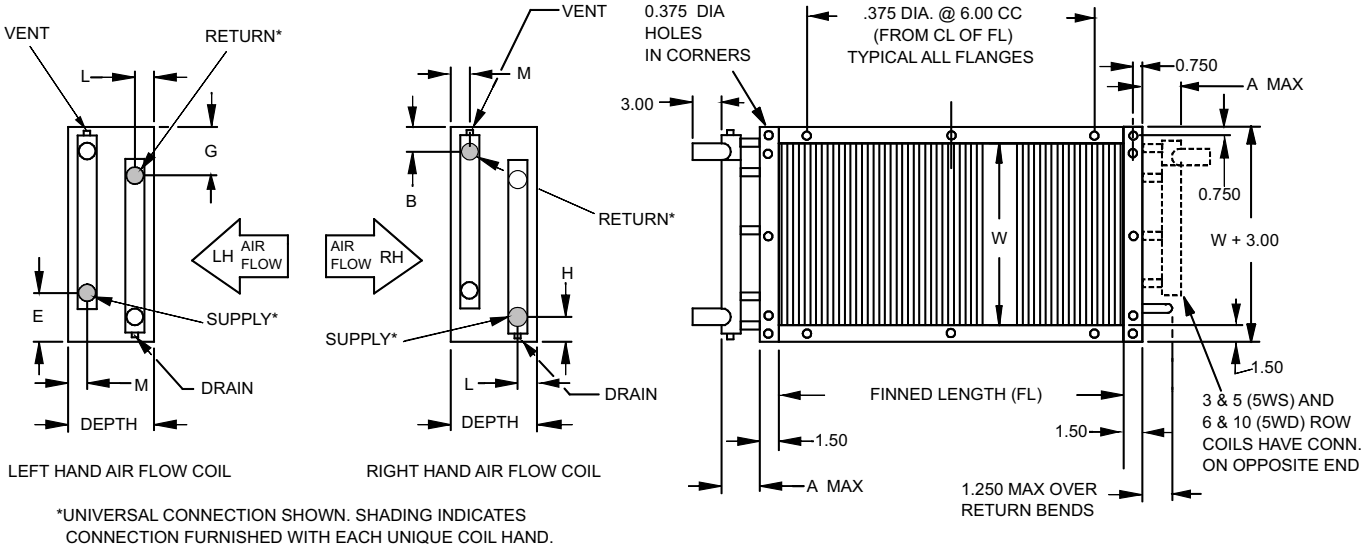
Model Type	Conn Size	A	B	H	W
5MS	1-1/2	3.0	2.297	2.297	12.0–18.0
	2	3.5	2.547	2.547	21.0–30.0
	2-1/2	3.625	2.797	2.797	33.0–42.0
	3	4.0	3.109	3.109	45.0–54.0
5MH	1-1/2	3.0	2.297	2.297	12.0–36.0
	2	3.5	2.547	2.547	39.0–54.0

General Notes:

1. 3/8” Diameter holes in corner.
2. Connect coils for counterflow; i.e., Entering water connection on leaving side of coil. Connection designation shown is for right-hand applications. For left-hand applications, reverse indicated direction of water flow; i.e., Supply connection becomes return connection.
3. All dimensions in inches.
4. Coils have 1/4” vents and drains.

5W Water Cooling Coils – 3 through 12 Rows (12" to 54" FH)

Figure 10: 5W Coil Dimensions



*UNIVERSAL CONNECTION SHOWN. SHADING INDICATES CONNECTION FURNISHED WITH EACH UNIQUE COIL HAND.

Table 16: 5WH — 1/2 Serpentine Dimensions

Conn Size	Vertical Air Flow			Horizontal Air Flow				3 Row – A
	A	B	W	A	B	H	W	
1-1/2	3.00*	2.30	12.0–36.0	3.00*	2.30	2.30	12.0–36.0	3.50
2	3.50*	2.55	39.0–54.0	3.50*	2.55	2.55	39.0–54.0	4.00

Horz. & Vert. Air Flow	W	Row	3	4	5	6	8	10	12
		Depth	6.0	7.5	8.5	10.0	12.5	15.0	18.0
	N/A	L	1.70	1.80	1.66	1.75	1.69	1.66	1.86
	N/A	M	1.70	1.80	1.66	1.75	1.69	1.66	1.86
Horz. Air Flow	12.0–36.0	E	6.05	6.05	6.05	6.05	7.55	7.55	7.55
		G	5.30	6.05	6.80	6.05	7.55	7.55	7.55
	39.0–54.0	E	6.30	6.30	6.30	6.30	7.80	7.80	7.80
		G	5.55	6.30	7.05	6.30	7.80	7.80	7.80
Vert. Air Flow	12.0–36.0	E	6.05	6.05	4.55	4.55	4.55	4.55	4.55
		G	5.30	6.05	3.80	3.05	3.05	3.05	3.05
		H	3.05	2.30	3.05	3.80	3.80	3.80	3.80
	39.0–54.0	E	6.30	6.30	4.80	4.80	4.80	4.80	4.80
		G	5.55	6.30	4.05	3.30	3.30	3.30	3.30
		H	3.30	2.55	3.30	4.05	4.05	4.05	4.05

Table 17: 5WL — 3/4 Serpentine Dimensions

Conn Size	Row	Depth	A	B	E	G	H	L	M	W
1-1/2	3	6.0	3.00	2.30	4.55	3.80	2.30	1.70	1.70	12.0–36.0
2		6.0	3.50	2.55	4.80	4.05	2.55	1.70	1.70	39.0–42.0
2-1/2		7.5	3.63	2.80	5.05	4.30	2.80	2.20	1.80	45.0–54.0

Row	4	5	6	8	10	12
Depth	7.5	8.5	10.0	12.5	15.0	18.0
L	1.80	1.66	1.75	1.70	1.66	1.86
M	1.80	1.66	1.75	1.70	1.66	1.86

Conn Size	A	B	E	G	H	W	5 & 12 Row – A	5 Row – G	12 Row – G
1-1/2	3.00	2.30	4.55	4.55	2.30	12.0–18.0	3.50	3.80	6.05
2	3.50	2.55	4.80	4.80	2.55	21.0–30.0	4.00	4.05	6.30
2-1/2	3.63	2.80	5.05	5.05	2.80	33.0–54.0	4.13	4.30	6.55

Table 18: 5WS — 1 Serpentine Dimensions

Conn Size	A	B	E	G	H	W	3 & 5 Row – G & E
1-1/2	2.75	2.30	4.55	4.55	2.30	12.00–18.00	2.30
2	3.25	2.55	4.80	4.80	2.55	21.00–30.00	2.55
2-1/2	3.80	2.80	5.05	5.05	2.30	33.00–42.00	2.80
3	3.80	3.06	5.40	5.40	3.06	45.00–54.00	3.06

Row	3	4	5	6	8	10	12
Depth	6.0	7.5	8.5	10.0	12.5	15.0	18.0
L	1.70	1.80	1.66	1.75	1.70	1.66	1.86
M	1.70	1.80	1.66	1.75	1.70	1.66	1.86

Table 19: 5WM — 1-1/2 Serpentine Dimensions

Fin Height	12.0–54.0					
Row	4	5	6	8	10	12
Depth	8.5	8.5	10.0	12.5	15.0	18.0
L	1.78	2.30	2.41	3.40	2.30	2.50
M	2.30	2.30	2.40	2.36	2.30	2.50
A	4.00	—	—	—	—	—

Conn Size	4 Thru 12 Row						
	A	B	E	G	H	W	8 Row – A
2-1/2	4.13	2.80	3.55	3.55	2.80	12.00–42.00	3.63
3	4.50	3.06	3.80	3.80	3.06	45.00–54.00	4.00

Table 20: 5WD — 2 Serpentine Dimensions

Fin Height	12.0–54.0				
Row	4	6	8	10	12
Depth	8.5	10.0	12.5	15.0	18.0
L	1.78	2.40	2.36	2.30	2.50
M	2.30	2.40	2.36	2.30	2.50
A	3.75	—	—	—	—

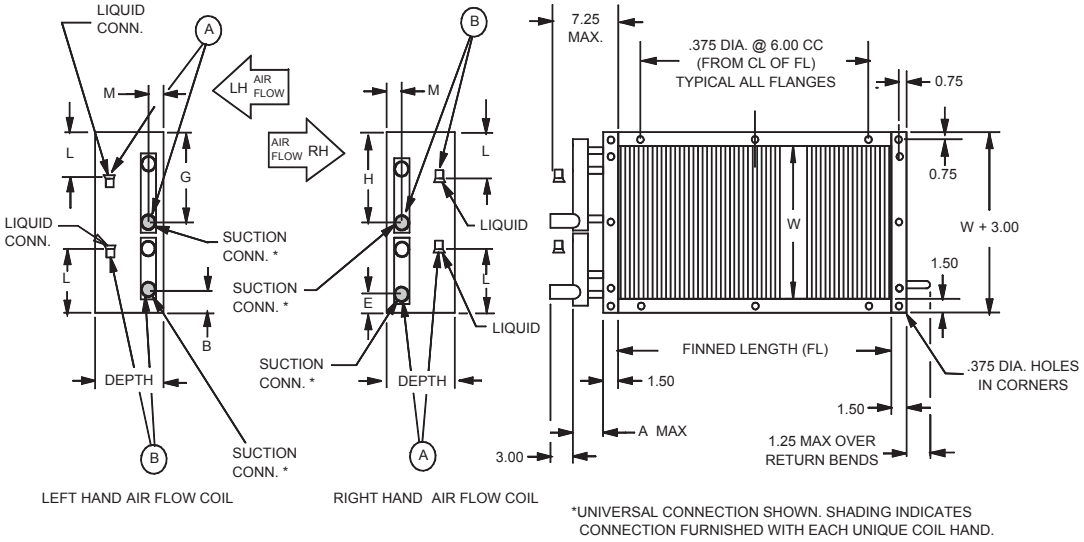
Conn Size	4 Thru 12 Row					
	A	B	E	G	H	W
2-1/2	3.38	2.80	2.80	2.80	2.80	12.00–42.00
3	3.75	3.06	3.06	3.06	3.06	45.00–54.00

General Notes:

1. Vertical or horizontal airflow must be specified.
2. All coils drainable.
3. Connect coils for counterflow; i.e., Entering water connection on leaving air side of coil.
4. Connections are pipe, NPT (ext.).
5. All dimensions in inches.
6. Connection location ± 0.125
7. Vent and drain, 1/4 NPT.

5EF Evaporator Coils – 2 through 12 Rows (12" to 54")

Figure 11: 5EF Evaporator Coil Dimensions



*UNIVERSAL CONNECTION SHOWN. SHADING INDICATES CONNECTION FURNISHED WITH EACH UNIQUE COIL HAND.

Table 21: 5EF Variable Dimensions

Serpentine Circuit	Row	2	3	4	5	6	8	10	12
	Depth	7.5	6.0	7.5	8.5	10.0	12.5	15.0	18.0
1/2	M	1.80	1.70	1.80	1.66	1.75	1.70	1.66	1.86
3/4	M	N/A	N/A	N/A	N/A	1.75	N/A	N/A	N/A
5/6	M	N/A	N/A	N/A	1.66	N/A	N/A	N/A	N/A
1/1	M	1.80	N/A	1.80	N/A	1.75	1.70	1.66	1.86
1-1/2	M	N/A	N/A	N/A	N/A	2.41	N/A	N/A	N/A

Serpentine Circuit	B	E	G	H	L	W
1/2	2.80	5.05	N/A	N/A	Note 6	15.0–54.0
3/4	2.80	3.55	N/A	N/A	Note 6	12.0–54.0 on 6.00 Increments
5/6	2.80	3.55	N/A	N/A	Note 6	12.0–54.0
1/1	2.80	3.55	W ÷ 2 + 0.20	W ÷ 2 - 0.53	Note 6	12.0–54.0
1-1/2	2.80	3.55	W ÷ 2 + 0.25	W ÷ 2 - 1.25	Note 6	12.0–54.0

1/2 Serpentine		
Dimension	**W Dimensions**	**Calculations**
G	18.0 + 6.0	W ÷ 2 + 0.20
	15.0 + 6.0	W ÷ 2 + 1.70
H	18.0 + 6.0	W ÷ 2 - 2.05
	15.0 + 6.0	W ÷ 2 - 3.55
3/4 Serpentine		
Dimension	**W Dimensions**	**Calculations**
G	12.0 + 12.0	W ÷ 2 + 0.20
	18.0 + 12.0	W ÷ 2 + 1.70
H	12.0 + 12.0	W ÷ 2 - 0.55
	18.0 + 12.0	W ÷ 2 - 2.05
5/6 Serpentine		
Dimension	**W Dimensions**	**Calculations**
G	12.0, 15.0, 18.0, 30.0, 33.0, 36.0, 48.0, 51.0, 54.0	W ÷ 2 + 0.20
	21.0, 24.0, 27.0, 39.0, 42.0, 45.0	W ÷ 2 + 1.70
H	12.0, 15.0, 18.0, 30.0, 33.0, 36.0, 48.0, 51.0, 54.0	W ÷ 2 - 0.55
	21.0, 24.0, 27.0, 39.0, 42.0, 45.0	W ÷ 2 - 2.05

General Notes:

1. Vertical or horizontal air flow must be specified.
2. Connect coils for counterflow, i.e., Entering liquid connection on leaving air side of coil.
3. Connections are copper sweat.
4. All dimensions are in inches.
5. Connection location ± 0.125.
6. **L** = 1/4 of width dimension ± 0.25
7. 0.25 O.D. Equalizer line on each header.
8. **A** & **B** indicates suction header and liquid connection that are used together to form a circuit.

5EJ Evaporator Coils – 3 through 10 Rows (12" to 54" FH)

Figure 12: 5EJ Evaporator Coil Dimensions

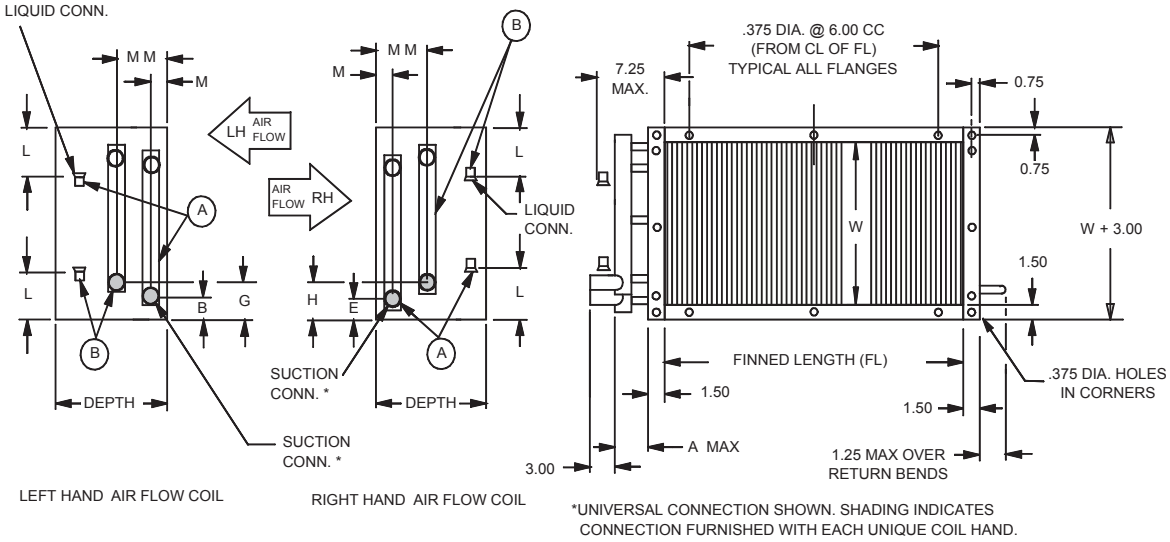


Table 22: 5EJ Variable Dimensions

Serpentine Circuit	Row	3	4	6	8	10
	Depth	8.5	8.5	10.0	12.5	15.0
1/8 – 1/8	M	1.66	1.66	1.75	1.70	1.63
	M M	4.91	4.91	5.00	4.95	4.86
1/4 – 1/4	M	1.66	1.66	1.75	1.70	1.63
	M M	4.91	4.91	5.00	4.96	4.88
1/2 – 1/2	M	N/A	1.66	1.75	1.70	1.63
	M M	N/A	4.91	5.00	4.95	4.88

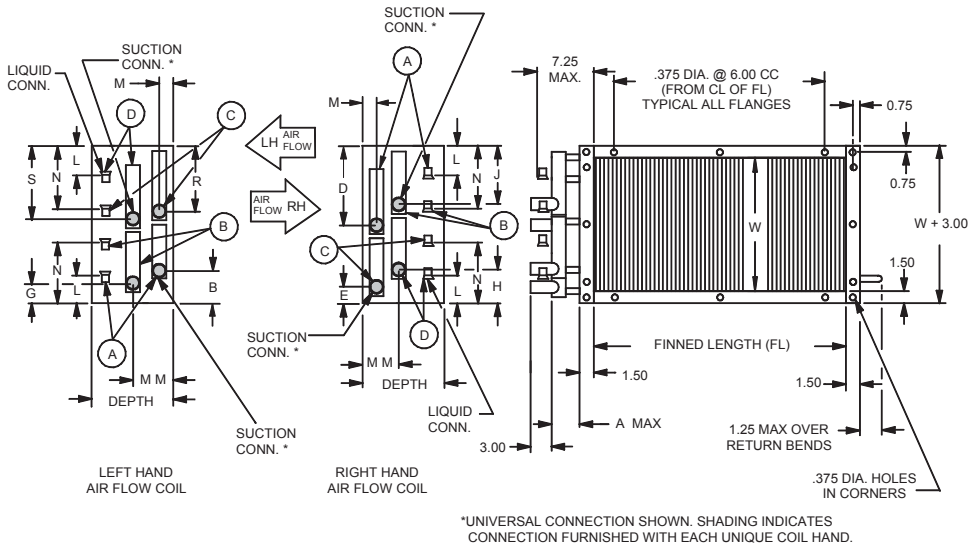
Serpentine Circuit	W	B	E	G	H	L	W
1/8 – 1/8	24.0 + 12.0	2.80	14.05	8.80	8.05	Note 6	24.0, 36.0, 48.0
	30.0 + 12.0	2.80	8.05	8.80	14.05	Note 6	30.0, 42.0, 54.0
1/4 – 1/4	12.0 + 6.0	2.80	8.05	5.80	5.05	Note 6	12.0 – 54.0
	15.0 + 6.0	2.80	5.05	5.80	8.05	Note 6	15.0 – 51.0
1/2 – 1/2	N/A	2.80	5.05	4.30	3.55	Note 6	12.0 – 54.0

General Notes:

1. Vertical or horizontal air flow must be specified.
2. Connect coils for counterflow, i.e., Entering liquid connection on leaving air side of coil.
3. Connections are copper sweat.
4. All dimensions are in inches.
5. Connection location ± 0.125.
6. **L** = 1/4 of width dimension ± 0.25
7. 0.25 O.D. Equalizer line on each header.
8. **A** & **B** indicates suction header and liquid connection that are used together to form a circuit.
9. Universal connections not available on 12.0” and 15.0” fin height.

5EK Evaporator Coils – 4 and 8 Row (15" to 54" FH)

Figure 13: 5EK Evaporator Coil Dimensions



*UNIVERSAL CONNECTION SHOWN. SHADING INDICATES CONNECTION FURNISHED WITH EACH UNIQUE COIL HAND.

Table 23: 5EK Variable Dimensions

Serpentine Circuit	Row	4	8
	Depth	8.5	12.5
1/1 – 1/1	M	1.63	1.69
	M M	4.88	4.94

Serpentine Circuit	B	D	E	G	H	J	L	N	R	S	W
1/1 – 1/1	2.81	FH ÷ 2 - 0.55	3.55	3.55	2.81	FH ÷ 2 + 0.22	Note 6	Note 7	FH ÷ 2 + 0.22	FH ÷ 2 - 0.55	15.0 – 54.0

General Notes:

1. Vertical or horizontal air flow must be specified.
2. Connect coils for counterflow, i.e., Entering liquid connection on leaving air side of coil.
3. Connections are copper sweat.
4. All dimensions are in inches.
5. Connection location ± 0.125.
6. **L** = 1/6 of width dimension ± 0.250
7. **N** = 1/3 of width dimension ± 0.250
8. 0.250 O.D. Equalizer line on each header.
9. **A**, **B**, **C** and **D** indicates suction header and liquid connection that are used together to form a circuit.
10. Universal connections not available on 15.0" and 18.0" fin height.

5EN Evaporator Coils – 2 through 12 Rows (12" to 54" FH)

Figure 14: 5EN — 1/4 to 1-1/2 Serpentine

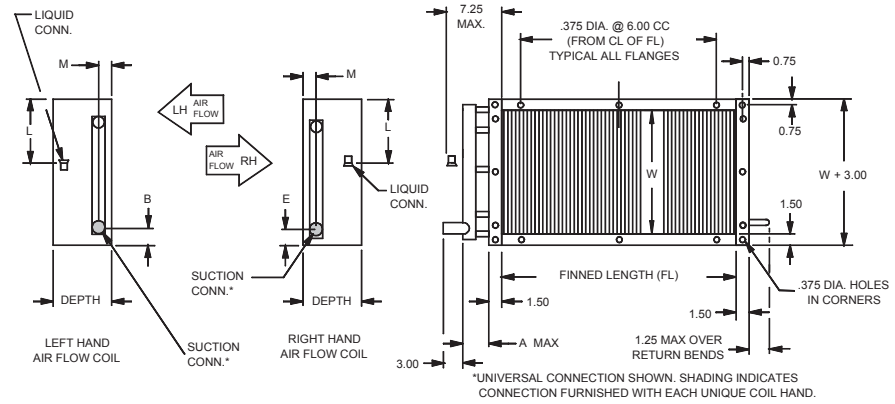


Figure 15: 5EN — 1-1/2 Serpentine 33" to 54" FH

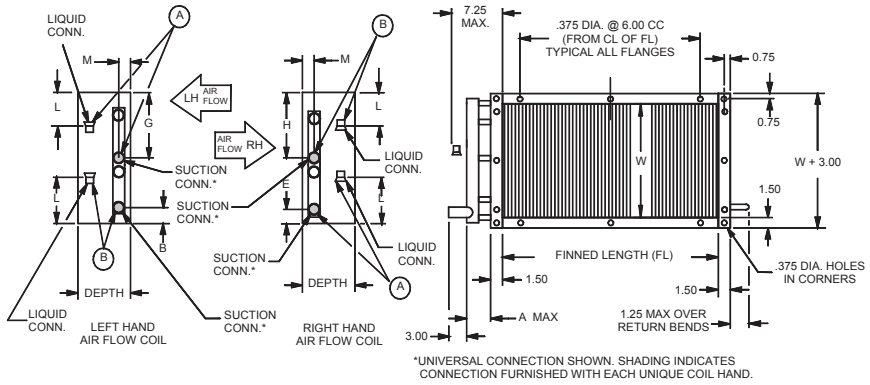


Table 24: 5EN Variable Dimensions

Serpentine Circuit	Row	2	3	4	5	6	8	10	12
	Depth	7.5	6.0	7.5	8.5	10.0	12.5	15.0	18.0
1/4	M	1.80	1.70	1.80	1.66	1.75	1.70	1.66	1.86
1/2	M	1.80	1.70	1.80	1.66	1.75	1.70	1.66	1.86
3/4	M	N/A	N/A	N/A	N/A	1.75	N/A	N/A	N/A
5/6	M	N/A	N/A	N/A	1.66	N/A	N/A	N/A	N/A
1/1	M	1.80	N/A	1.80	N/A	1.75	1.70	1.66	1.86
1-1/2	M	N/A	N/A	N/A	N/A	2.41	N/A	N/A	N/A

Serpentine Circuit	B	E	G	H	L	W
1/4 2 Row	2.80	8.05	N/A	N/A	Note 6	12.0–54.0
1/4 4-12 Row	5.80	5.05	N/A	N/A	Note 6	12.0–54.0
1/2	2.80	5.05	N/A	N/A	Note 6	12.0–54.0
3/4	2.80	3.55	N/A	N/A	Note 6	12.0–54.0 on 6.0 Increments
5/6	2.80	3.55	N/A	N/A	Note 6	12.0–54.0
1/1	2.80	3.55	N/A	N/A	Note 6	12.0–54.0
1-1/2	2.80	3.55	N/A	N/A	Note 6	12.0–30.0
1-1/2	2.80	3.55	W ÷ 2 + 0.25	W ÷ 2 - 1.25	Note 6	33.0–54.0

General Notes:

1. Vertical or horizontal air flow must be specified.
2. Connect coils for counterflow, i.e., Entering liquid connection on leaving air side of coil.
3. Connections are copper sweat.
4. All dimensions are in inches.
5. Connection location ± 0.125.
6. **L** = 1/4 of width dimension ± 0.25
7. 0.25 O.D. Equalizer line on each header.
8. **A** & **B** indicates suction header and liquid connection that are used together to form a circuit.

5ER Evaporator Coils – 6 Row (12" to 54" FH)

Figure 16: 5ER — 1/6 TO 1/1 SERPENTINE

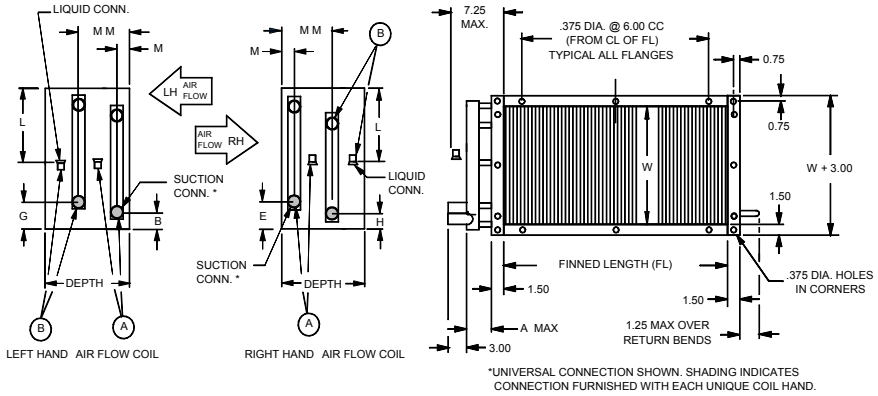


Figure 17: 5ER — 1/1 SERPENTINE - 48" TO 54" FH

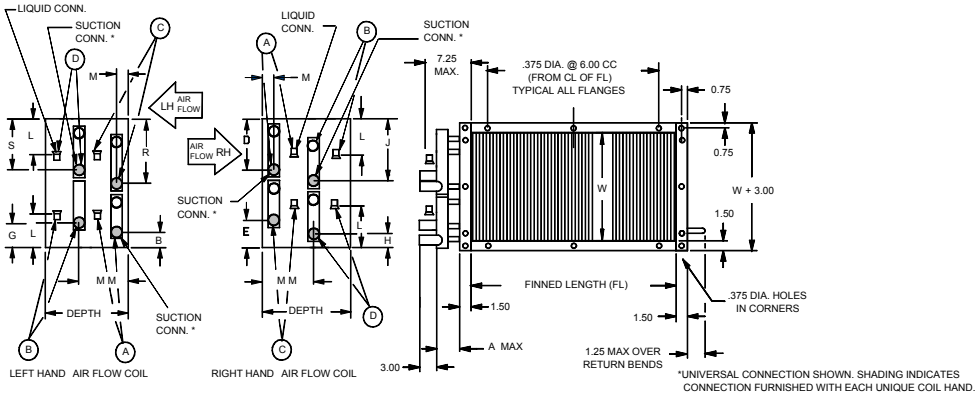


Table 25: 5ER Variable Dimensions

Serpentine Circuit	Row	6
	Depth	10.0
1/4 – 1/4	M	1.75
	M M	5.66
1/6 – 1/3	M	1.75
	M M	5.66
1/5 – 1/3	M	1.75
	M M	5.66
1/2 – 1/2	M	1.75
	M M	5.66
1/2 – 1/1	M	1.75
	M M	5.66
1/1 – 1/1	M	1.75
	M M	5.66

General Notes:

1. Vertical or horizontal air flow must be specified.
2. Connect coils for counterflow, i.e., Entering liquid connection on leaving air side of coil.
3. Connections are copper sweat.
4. All dimensions are in inches.
5. Connection location ± 0.125.
6. **L** = 1/4 of width dimension ± 0.25
7. 0.25 O.D. Equalizer line on each header.
8. **A**, **B**, **C** and **D** indicates suction header and liquid connection that are used together to form a circuit.

Serpentine Circuit	B	D	E	G	H	J	L	R	S	W
1/4 – 1/4	5.80	N/A	5.04	6.54	4.30	N/A	Note 6	N/A	N/A	12.0 – 54.0 on 6.00 Increments
1/6 – 1/3	5.80	N/A	8.05	3.55	5.80	N/A	Note 6	N/A	N/A	27.0 & 45.0
1/5 – 1/3	7.30	N/A	8.05	5.05	5.80	N/A	Note 6	N/A	N/A	33.0
	5.80	N/A	8.05	6.55	5.80	N/A	Note 6	N/A	N/A	39.0
1/2 – 1/2	2.80	N/A	5.05	3.55	4.30	N/A	Note 6	N/A	N/A	12.0 – 54.0
1/2 – 1/1	2.80	N/A	5.05	3.55	2.80	N/A	Note 6	N/A	N/A	12.0 – 45.0
1/1 - 1/1	2.80	N/A	3.55	3.55	2.80	N/A	Note 6	N/A	N/A	12.0 – 45.0
	2.80	FH ÷ 2 - 0.53	3.55	3.55	2.80	FH ÷ 2 + 0.19	Note 6	FH ÷ 2 + 0.19	FH ÷ 2 - 0.53	48.0 – 54.0

Water Cooling Coils

PART 1: GENERAL

1.01 SECTION INCLUDES

A. Water Cooling Coil(s).
   1. 5WS, 5MS, 5WD, 5WH, 5MH, 5WQ, 5WL, 5WM Coil Types.

1.02 SUBMITTALS

A. Shop Drawings: Indicate coil fin height & length AND overall height, length and depth, connection sizes & location, flange mounting dimensions, and direction of airflow.

B. Product Data.
   1. Certification - Acceptable coils are to be certified in accordance with ARI Standard 410 and bear the ARI label. Coils exceeding the scope of the manufacturer's certification and/or the range of ARI's standard rating conditions will be considered provided the manufacturer is a current member of the ARI Air-Cooling and Air-Heating Coils certification programs and that the coils have been rated in accordance with ARI Standard 410. Manufacturer must be ISO 9002 certified.
   2. Identify fin, tube & casing material type and thickness.
   3. Show coil weight (shipping & operating).
   4. State air and water flow amounts with its associated pressure drops.
   5. Indicate entering & leaving air and water temperatures.

1.03 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing water cooling coils specified in this section must show a minimum five years experience and issues complete catalog data.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site.

B. Accept products on site on factory-installed shipping skids. Inspect for damage.

C. Store in a clean dry place and protect from weather and construction traffic. Handle carefully to avoid damage.

PART 2: PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Daikin Applied.

B. Super Radiator.

C. Trane.

D. Carrier.

E. York.

2.02 GENERAL DESCRIPTION

A. Furnish as shown on plans and as described in the specification, Daikin Applied Water Cooling Coils.

B. Coils to have extended surface, staggered tube, and plate fin design.

2.03 HEADERS

A. Made of seamless copper tubing to assure compatibility with primary surface.

B. Headers to have intruded tube holes to provide maximum brazing surface for tube to header joint, strength, and inherent flexibility. Header diameter should vary with fluid flow requirements.

C. Vent and drain plugs shall be provided on the coil header. For certain replacement air handler (Vision/ Skyline & some LSL models) coils the plugs will be provided on the coil connections.

2.04 CONNECTIONS

A. Coil connection should be compatible with the piping to the coil to minimize chance of "galvanic action/ electolysis".

B. Connections shall be a diameter adequate for specified gpm flow.
   1. The connections are located to permit [universal] [right hand] [left hand] mounting of the coil and assure equal pressure through all the circuits.

C. Connection and material type.
   1. Connection material to be [carbon steel pipe] [copper tube] [red brass pipe]. Connection type to be [threaded] [Victaulic] [butt welded] [outside diameter female (ODS) sweat] [outside diameter male (ODM) sweat].

D. Coils are circuited to provide maximum mean effective temperature difference for heat transfer rates.

E. Coils, greater than 2 rows, must be arranged for counter flow.

2.05 TESTING AND PRESSURE RATINGS

A. Completed coils are tested at a minimum of 315 PSIG air pressure while submerged in warm water.

B. Hydronic tests alone are not acceptable.

C. C. Standard coil construction is rated for 250 PSIG working pressure at 300 degrees F.

2.06 CAPACITY

A. Coil capacity shall be as outline on the project schedule and confirmed with computer generated output.

B. Application.

1. Cooling.

C. Fluid Type.

1. [Water] [Ethylene Glycol] [Propylene Glycol].

2.07 PRIMARY SURFACE

A. Tubes to be 5/8" O.D., staggered in direction of airflow, and must be on 1½" tube centers.

B. Wall thickness to be [0.020"] [0.025"] [0.035"] [0.049"] nominal [copper] [admiralty copper] [cupro-nickel] and water pressure drop of coil selection adjusted to wall thickness specified.

C. Tubes to be mechanically expanded in to fin collars to provide a continuous primary to secondary compression bond over entire coil length, assuring maximum heat transfer.

D. Coil Tube Type.

1. Standard [smooth bore] [smooth bore with internal brass spring turbospirals].

2.08 SECONDARY SURFACE

A. Plate style fins shall be corrugated for high capacity and structural strength.

1. Fin thickness shall be [0.0075"] [0.0095"] [0.006"] [aluminum] [copper].

B. The fins to have collars to determine fin spacing per inch and support the heat transfer bond to primary surface. Tubing should not be visible between the fins.

1. Fin Style to be a [Flat] [New Ripple] [Hi-F] fin type.

2.09 COIL TYPE & SERPENTINE

A. [5WH - Half Serpentine] [5WS - Single Serpentine] [5MS - Single Serpentine with Splayed Headers] [5WD - Double Serpentine] [5MH - Half Serpentine with Splayed Headers] [5WQ - Quarter Serpentine] [5WL - Three Quarter Serpentine] [5WM - One and One Half Serpentine].

B. Coils available from 12" to 54" fin height on 1.5" tube centers and on 3" increments.

C. All water cooling coils with standard 0.020" nominal copper tubing available from 12" to 216" fin length in two decimal point increments. For other tube material types the maximum tube length is 180".

2.10 CASINGS

A. Casing Style

1. [Contractor Coil with flanged casing] [Contractor Coil uncased] [Air Handler unit coil w/ flanged casing designed for [LSL/MSL] [Vision®/Skyline®] [Roofpak] replacement applications] [Air Handler unit coil uncased designed for [LSL/LHD] [Vision®/Skyline®] replacement applications].

B. Casing Material.

1. [Galvanized Steel] [Copper] [Aluminum] [Stainless Steel].

2.11 PROTECTIVE COATINGS

A. [None, specified coil and casing material only] [Entire coil assembly coated with an epoxy coating. The coating shall be electrodeposited to obtain a nominal dry film thickness of 0.001" +/- 0.0002" (mils). The coating shall be free from voids, checks, cracks, and blisters. The quality and application shall be such that any portion of the coil will meet a minimum 2000 hours of 5% salt spray testing to American society for Testing and materials (ASTM) B117 under the following criteria: A) No loss of coating adhesion and no evidence of attack to the fin proper. Only 5% of the fin collars may show corrosion product. B) Complete deterioration of the sample in any location is considered failure of the part on this test, and shall be cause for rejection].

2.12 PACKAGING

A. [Coil(s) to be fully crated in a wood enclosure with protective cardboard covering the finned area] [Coil(s) to be fully crated in a wood enclosure with protective cardboard covering the finned area. The wood enclosure shall be capable of being removed and re-used (Note: Must be used for coated coils)].

PART 3: EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's recommendations.

Evaporator Coils

PART 1: GENERAL

1.01 SECTION INCLUDES

A. Evaporator (DX) Cooling Coils.
   1. 5EN, 5EF, 5ER, 5EJ, 5EK Coil Types.

1.02 SUBMITTALS

A. Shop Drawings: Indicate coil fin height & length AND overall height, length and depth, connection sizes & location, flange mounting dimensions, and direction of airflow.

B. Product Data.
   1. Certification - Acceptable coils are to be certified in accordance with ARI Standard 410 and bear the ARI label. Coils exceeding the scope of the manufacturer's certification and/or the range of ARI's standard rating conditions will be considered provided the manufacturer is a current member of the ARI Air-Cooling and Air-Heating Coils certification programs and that the coils have been rated in accordance with ARI Standard 410. Manufacturer must be ISO 9002 certified.
   2. Identify fin, tube & casing material type and thickness.
   3. Show coil weight (shipping & operating).
   4. State airflow and air pressure drop.
   5. Indicate entering & leaving air temperatures and refrigerant temperature (SST).

1.03 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing evaporator (DX) coils specified in this section must show a minimum five years experience and issues complete catalog data.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site.

B. Accept products on site on factory-installed shipping skids. Inspect for damage.

C. Store in a clean dry place and protect from weather and construction traffic. Handle carefully to avoid damage.

PART 2: PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Daikin Applied.

B. Super Radiator.

C. Trane.

D. Carrier.

E. York.

2.02 GENERAL DESCRIPTION

A. Furnish as shown on plans and as described in the specification, Daikin Applied Evaporator (DX) Cooling Coils.

B. Coils to have extended surface, staggered tube, and plate fin design.

2.03 HEADERS

A. Made of seamless copper tubing to assure compatibility with primary surface.

B. Headers to have intruded tube holes to provide maximum brazing surface for tube to header joint, strength, and inherent flexibility. Header diameter should vary with refrigerant flow requirements.

2.04 CONNECTIONS

A. Coils to be furnished with brass distributor(s) of the pressure type for the liquid connection. Suction connection(s) are copper O.D. sweat. Both connections are designed to insure proper loading per circuit and avoid loss in coil capacity.

B. Coils must be arranged for counter flow, the distributor on leaving air side and suction connection at the bottom of the header on the entering air side.
   1. The connections are located to permit [universal] [right hand] [left hand] mounting of the coil and assure equal pressure through all the circuits.

2.05 TESTING AND PRESSURE RATINGS

A. Completed coils are tested at a minimum of 315 PSIG air pressure while submerged in warm water.

B. Hydrostatic tests alone are not acceptable.

C. Coils are dehydrated prior to shipment and then liquid connection (distributor) and suction connections capped for shipment.

D. Standard coil construction is rated for 250 PSIG working pressure at 300 degrees F.

2.06 CAPACITY

A. Coil capacity shall be as outline on the project schedule and confirmed with computer generated output.

B. Refrigerant Type.

1. Refrigerant [R410A] [R-22] [R-134a].

2.07 PRIMARY SURFACE

A. Tubes to be 5/8" O.D. copper, staggered in direction of airflow, and must be on 1½" tube centers.

B. B. Wall thickness to be [0.020"] [0.025"] [0.035"] nominal and water pressure drop of coil selection adjusted to wall thickness specified.

C. Tubes to be mechanically expanded in to fin collars to provide a continuous primary to secondary compression bond over entire coil length, assuring maximum heat transfer.

2.08 SECONDARY SURFACE

A. Plate style fins shall be corrugated for high capacity and structural strength.

B. Fin thickness shall be [0.0075"] [0.006"] [0.0095"] [aluminum] [copper].

C. The fins to have collars to determine fin spacing per inch and support the heat transfer bond to primary surface. Copper tubing should not be visible between the fins.

D. Fin Style to be a [Flat] [New Ripple] [Hi-F] fin type.

2.09 COIL TYPE & CIRCUITING

A. [5EN - Single circuit coil. (Note: For coils requiring more than 30 distributor feeds, the header connection will be split 50/50.)] [5EF - Two circuit face split (50/50) coil. (Note: For large coils requiring more than 60 distributor feeds, the coil will be face split 33/33/33.)] [5EJ - Two circuit interlaced split (50/50) coil. (Note: For large coils requiring more than 60 distributor feeds, the coil will be split 25/25/25/25.)] [5EK - Four circuit interlaced & face split (25/25/25/25) coil.] [5ER - Two circuit row split (50/50) coil. [Note: 6 row coil only]]

B. Evaporator coils available from 12" to 54" fin height on 1.5" tube centers and on 3" increments.

C. All evaporator (DX) coils available from 12" to 216" fin length in two decimal point increments.

2.10 CASINGS

A. Casing Style

1. [Contractor Coil with flanged casing.] [Air Handler unit coil w/ flanged casing designed for [LSL/MSL] [Vision/Skyline] [Roofpak] replacement applications.]

B. Casing Material.

1. [Galvanized Steel.] [Copper.] [Aluminum.] [Stainless Steel.]

2.11 PROTECTIVE COATINGS

A. [None, specified coil and casing material only.] [Entire coil assembly coated with an epoxy coating. The coating shall be electrodeposited to obtain a nominal dry film thickness of .001" +/- .0002" (mils). The coating shall be free from voids, checks, cracks, and blisters. The quality and application shall be such that any portion of the coil will meet a minimum 2000 hours of 5% salt spray testing to American society for Testing and materials (ASTM) B117 under the following criteria: A) No loss of coating adhesion and no evidence of attack to the fin proper. Only 5% of the fin collars may show corrosion product. B) Complete deterioration of the sample in any location is considered failure of the part on this test, and shall be cause for rejection.]

2.12 PACKAGING

A. [Coil(s) to be fully crated in a wood enclosure with protective cardboard covering the finned area.] [Coil(s) to be fully crated in a wood enclosure with protective cardboard covering the finned area. The wood enclosure shall be capable of being removed and re-used (Note: Must be used for coated coils.)]

PART 3: EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's recommendations.

Daikin Applied Training and Development

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