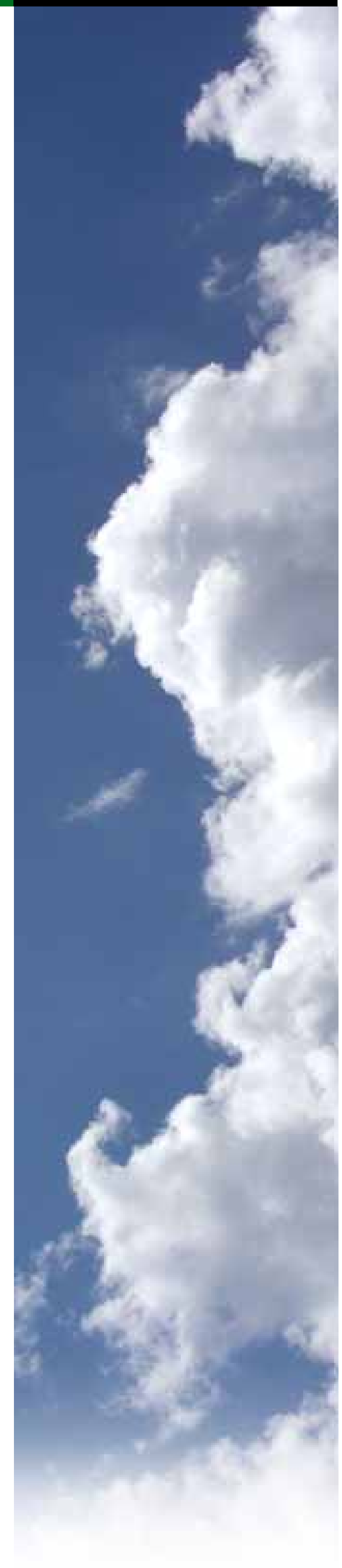


McQuay® Water Heating & High Capacity Booster Coils

Types HI-F5 & E-F5

ARI PERFORMANCE CERTIFIED™ ARI Standard 410

McQuay International

HI-F5 & E-F5 water heating and high capacity booster coils

SelectTOOLS™ for Contractor Coils

McQuay offers a wide variety of standard fin spacings, row and circuiting combinations. For optimum coil selection, McQuay's 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 McQuay representative for a coil selection that meets the most exacting specification.

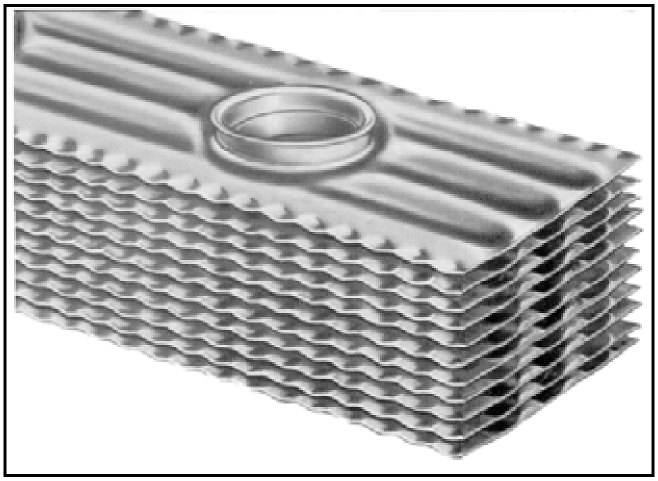
ARI certification

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

Note: Special application coils may be outside the scope of ARI Standard 410.

Contents

A pioneer in corrugated fin development



HI-F Means High Efficiency

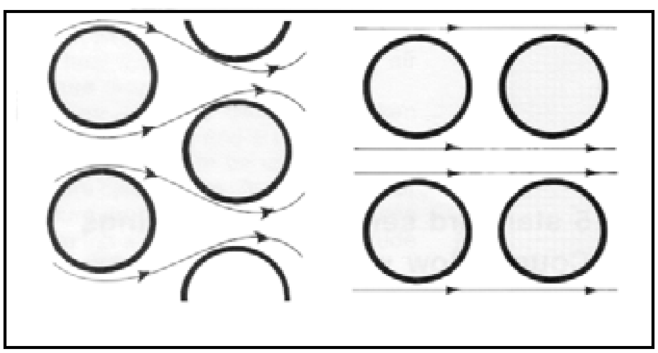
A principal factor governing fin heat transfer efficiency is the boundary layer film of air adhering to any fin surface. This boundary layer insulates the fin, severely reducing the rate of heat exchange.

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 new high 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.

Nomenclature

5W H - 10 02 C - 033.00 - 090.00

COIL TYPE
Water: 5M, 5W, 5K, 5P, 5Q
Booster: 5B

CIRCUITING

Water:

Q	=	1/4	Serpentine
H	=	1/2	Serpentine
L	=	3/4	Serpentine
S	=	1	Serpentine
M	=	1-1/2	Serpentine
D	=	2	Serpentine
B	=	3”	Tube Center

Booster:

S	=	1	Circuit
D	=	2	Circuit
B	=	3”	Tube Center

FINNED LENGTH (INCHES)

FIN HEIGHT (INCHES)

FIN DESIGN
B = 01, 02, 03 & 04 ROW E-F5
C = 01, 02, 03 & 04 ROW HI-F5

ROWS DEEP (01, 02, 03, 04)

FINS PER INCH
(06, 07, 08, 09, 10, 11, 12, 13, 14)

Standard availability chart

COIL TYPE			HOT WATER										CLEANABLE HOT WATER (REMOVABLE PLUG)									HOT WATER (BOOSTER)		
COIL MODEL			5MQ	5MH	5MS	5WB	5WQ	5WH	5WL	5WS	5WM	5WD	5KQ	5KH	5KS	5QQ	5QH	5QS	5PQ	5PH	5PS	5BB	5BS	5BD
SERPENTINE CIRCUIT			1/4	1/2	1	1*	1/4	1/2	3/4	1	1-1/2	2	1/4	1/2	1	1/4	1/2	1	1/4	1/2	1	1 Feed*	1 Feed	1 Feed
ROWS			1	1,2	2	1,2	1	1,2, 3,4	3,4	2,3,4	4	4	1	1,2	2	1	1,2	2	1	1,2	2	1,2	1,2	2
CONNECTION LOCATION			Same End Except 5WS 3-Row										Same End									Same End		
FIN HEIGHT 3" INCREMENT			*** 12- 54	12-54		12-42 (1 & 2 Row) & 12-54 (3 & 4 Row)							12-42									6-24		
1-1/2" INCREMENT FINNED LENGTH			12-141										12-141									6-60		
FINS	FIN TYPE	HI-F	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
		E-F	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	ALUMINUM	.0075	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
		.0095	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	COPPER	.006	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
		.0075	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
		.0095	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	SPACING (FPI)		6,7,8,9,10,11,12,13,14										6,7,8,9,10,11,12,13,14									6,7,8,9,10, 11,12,13,14		
TUBING	DIAMETER		5/8										5/8									5/8		
	FACE C/C		1.5			3.0	1.5						1.5									3.0	1.5	
	COPPER	.020*	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
		.025	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
		.035	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
		.049	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
HEADERS	STANDARD MAT'L**		Copper Tubing										Copper Tubing									Threaded Copper Fittings		
MAXIMUM STD.		P	250 Psig										250 Psig									250 Psig		
OPERATING LIMITS		T	300° F										300° F									300° F		

● Feature Available

* .020" is a nominal tube thickness
** Optional header materials are available; consult your representative.
*** Available in 6" increments.

Flexibility

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

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

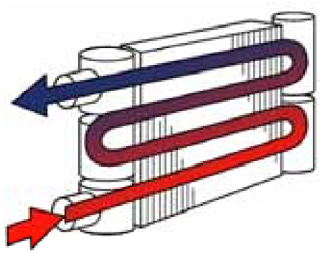
*Note: Special application coils may be outside the scope of ARI standard 410.

Circuiting arrangements

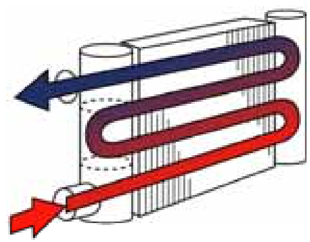
Hot water coil circuitings

Type 5WB, 5WQ, and 5WH coils are designed to produce high capacity with limited water quantity. High performance is achieved by the increased water velocity obtained from the circuiting of these coil types.

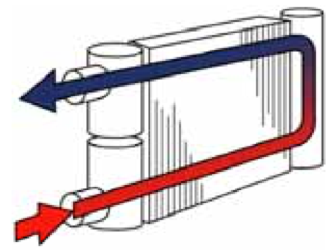
Type 5WL and 5WS coils are designed and engineered to meet most applications requiring normal water quantities and normal water pressure drop.
Type 5WM and 5WD coils are designed specifically for applications that require high water quantities and low water pressure drop.



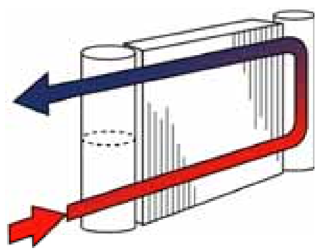
5WQ
1/4 SERPENTINE (1 ROW)



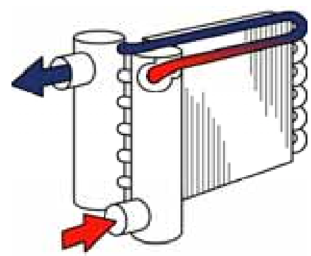
5WH
1/2 SERPENTINE (2 ROW)



5WH
1/2 SERPENTINE (1 ROW)



5WS
1 (SINGLE) SERPENTINE (2 ROW)

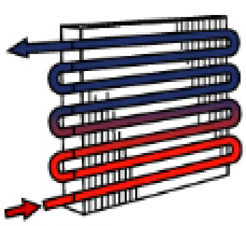


5MS
1 (SINGLE) SERPENTINE (2 ROW)

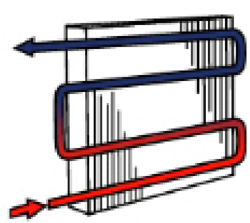
Hot water (booster) coil circuiting

Type 5BB, 5BS and 5BD hot water booster coils are designed for use in reheat applications and to produce very high capacities in a limited space. They are particularly suitable for installation in the supply duct to each room for individual room control.

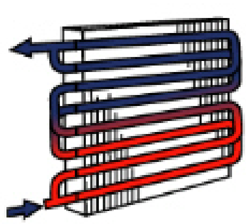
Type 5BB and 5BS coils are single circuited and are available in one and two rows deep. Type 5BD coils are double circuited and are available in two rows deep.



5BS
SINGLE FEED
(1, 2 ROW)

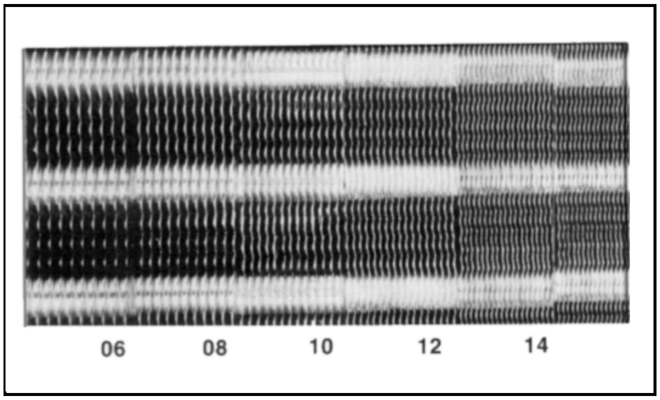


5BB
SINGLE FEED
(1, 2 ROW)



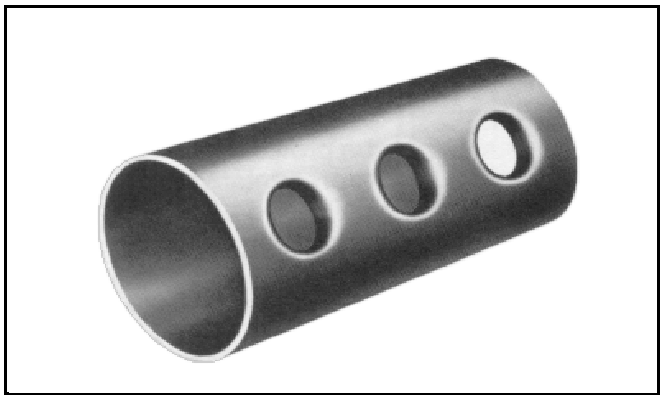
5BD
DOUBLE FEED (2 ROW)

Design features



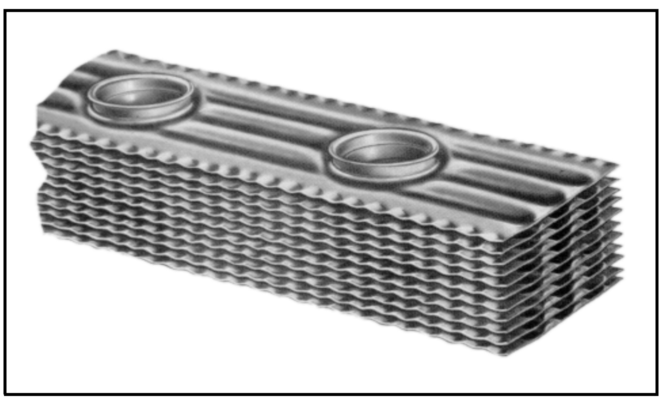
A variety of fin spacings

Standard water heating and booster coils are available with 06, 07, 08, 09, 10, 11, 12, 13 or 14 fins per inch. The wide variation in fin spacing permits accurate balancing of coil capacities with the design load.



Copper tube headers

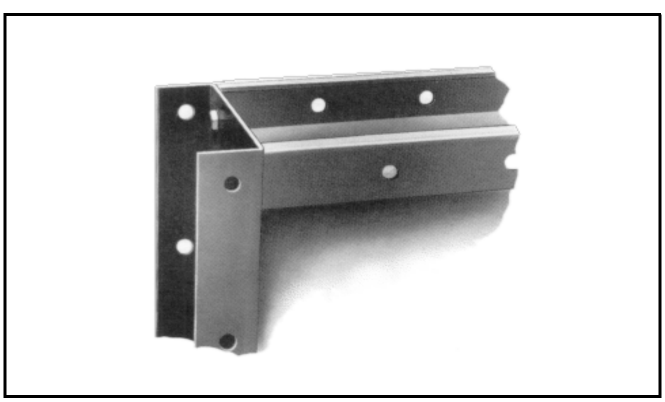
To provide extended coil life, 5W water heating coils are manufactured from heavy-gauge seamless drawn copper tube. Intruded tube holes provide maximum brazing surface for maximum strength. Copper tubes brazed to copper headers offer a combination of similar materials which eliminates unequal thermal expansion and greatly reduces stress in the tube-header joint.



Full fin collars

Efficient fin presses perform multi-stage operations to draw full fin collars with wide, smooth surfaces that completely cover coil tubes. Our full fin collars actually form a tube within a tube, yielding greater strength and maximum heat transfer.

Lack of sharp collar edges makes our coils easier to clean; smoother fin collars retard lint and dirt accumulations.



Flanged casings

Double flanged galvanized steel casings on all water heating coils provide greater strength and better support for easier coil stacking. Moving and handling operations are simplified by the heavy coil casings.

Top and bottom casing flanges are turned back to form two channel sections in a "box" shape, providing maximum strength and durability.

Hot water booster coils can be furnished with flanges for slip-and-drive fasteners or full flanged casings for standard installations.

General specifications - 5W and 5B coils

(1) Primary surface

Round seamless copper tubes on 1-1/2" or 3" centers. Cupro-nickel tubes are recommended for high pressure coils and for applications where water conditions tend to be corrosive.

(2) Secondary surface

Rippled-corrugated aluminum or copper, die-formed plate type fins.

2A. Fin collars are fully drawn to completely cover the tubes for maximum heat transfer and to provide accurate control of fin spacing.

(3) Headers

Extra-heavy, seamless copper tubing. Tube holes are intruded to provide 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. Headers are not used on type 5B booster coils.

(4) Connections

Unique hand connections are provided for left-hand or right-hand applications. Universal connections are also available for most coils.

Standard water coil connections:
Steel male pipe supply and return connections. Other materials available on request. (Red brass connections are recommended for coils used with non-ferrous piping.)

Booster coil connections:
Wrought copper, 1/2" NPT, supply and return connections.

(5) Brazing

All joints are brazed with copper brazing alloys.

(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 on the larger standard water coils to prevent damage in handling and shipment.

Vents

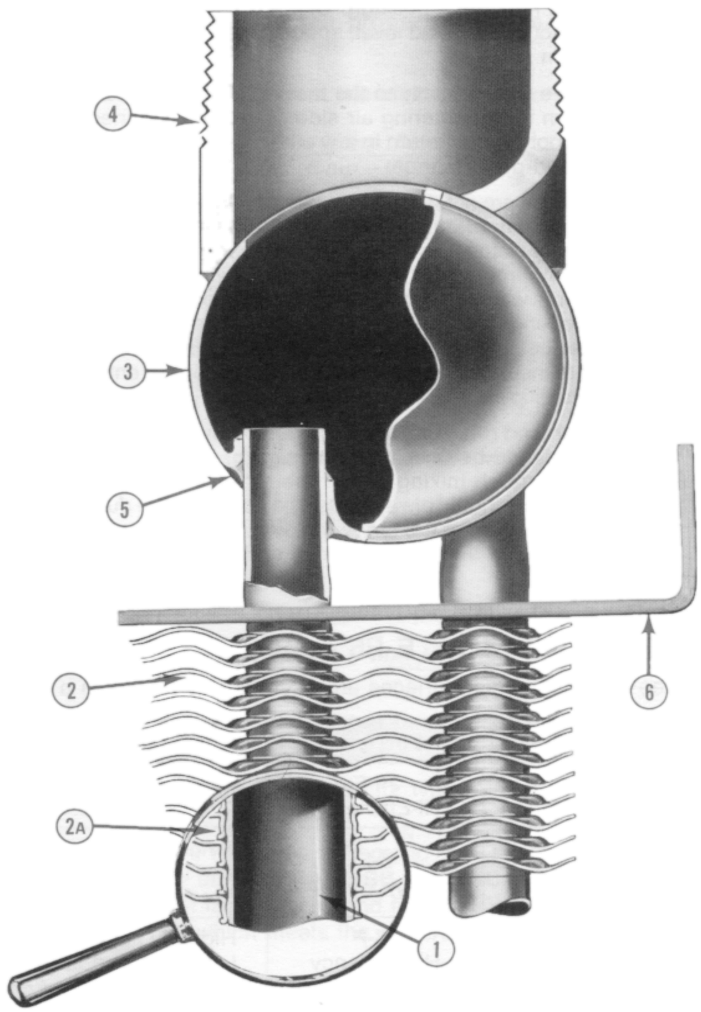
Furnished on all standard water coils.

Tests

Complete coil tested leak free under warm water containing special wetting agent at 315 psig air pressure.

Operating conditions

Standard coils are suitable for use up to 250 psig and temperatures up to 300° F for 5W and 5B coils. High pressure coils are suitable for use up to 400 psig and 400°F



Application recommendations

1. Piping should be in accordance with accepted industry standards.

2. When drainable coils are desired, tubes should be installed in a horizontal position. Use a spirit level. If the tubes cannot be installed level, special drain headers are available on request.

3. Connect the water supply to the leaving air side and the water return to the entering air side of the coil. Connecting the supply and/or return in any other manner will result in a reduced performance.

4. Hot water coils are not normally recommended for use with entering air temperatures below 40° F; however, special high pressure water coils have been used very successfully on high temperature hot water jobs with low entering air temperatures when correctly controlled. No control system can be depended on to be 100% safe against freeze-up with water coils. Glycol solutions or brines are the only freeze-safe media for operation of water coils for low entering air conditions.

5. When fresh and return air are to be heated by a hot water coil, care should be used in the design of the ductwork to provide thorough mixing before the air enters the coil.
   The return air should always enter the bottom of the duct. Fresh air should enter the top of the duct. The greater the distance between the point of mixing and entrance to the coil, the better the application.
   Temperature control elements should be located to sense the lowest temperature air that will enter the coil.
   Always install gasketed fresh air dampers which are automatically controlled to close whenever the water leaving the coil is too cool, or the fan stops. Care should be used in designing fresh air intakes to prevent stack effect (or wind) from forcing cold air through the coils when the fan is shut down. Two sets of dampers are frequently required. Continuous water circulation through the coils at all times is recommended when fresh air mixtures are used.
   Face and bypass dampers are recommended in preference to valves for controlling leaving air temperature from hot water coils used to heat fresh air mixtures.

6. Two-position or modulating valves can be used to control hot water coils on booster applications. Follow standard recommendations of the control manufacturer regarding sizing of valves and location of temperature controllers for these applications.

7. Pipe sizes 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 vs. E-F5 coils

Two different coil fin surfaces are offered. This results in a more economical coil selection for a given application.

Type.	Tube Dia.	Fin Type	Application
HI-F5	5/8"	HI-F Hi-Efficiency	Gives highest heat transfer rate for a given amount of surface.
E-F5	5/8"	E-F Energy Efficiency	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.

Cleanable coils

5W type water coils are also offered in a cleanable tube configuration. The cleanable coils are identical to 5W coils with the addition of removable plugs in the header(s) to facilitate tube cleaning. Type 5PQ, 5PH and 5PS coils have removable plugs on the coil connection end only.

Type 5QQ, 5QH and 5QS coils have removable plugs on the opposite connection end only. 5K, 5P and 5Q 1-row and 2-row cleanable water heating coils may be outside the scope of ARI standard 410.

Sample coil selection

Given:

SCFM (see page 10 for standard air)...........................6,000
Required BTUH...240,000
Entering air temperature.. 45°F
Entering water temperature.. 200°F
Gallons per minute ....16.0 GPM
Coil face ....24” x72”
Maximum pressure drop.......................................5.0 ft. H_20

Solution:

1. Determine coil face area:

$$\frac{24 \times 72}{144} = 12.0 \text{ sq. ft.}$$

2. Determine coil face velocity:

$$\frac{SCFM}{Face\ Area} = \frac{6{,}000}{12.0} = 500\ FPM$$

3. Determine air temperature rise:

$$\frac{BTUH}{1.09 \times SCFM} = \frac{24{,}000}{1.09 \times 6{,}000} = 36.7°F$$

4. Determine water temperature drop:

$$\frac{BTUH}{500 \times GPM} = \frac{240{,}000}{500 \times 16.0} = 30°F$$

5. Determine approximate number of feeds required:

Assume 4 GPM/feed for calculation purposes.

$$No.\ of\ Feeds = \frac{GPM}{GPM/feed} = \frac{16.0}{4} = 4$$

See Table 2, page 10, under 24 FH dimension to determine which coil type is available for the number of feeds desired (or closest to desired). Type 5WB and 5WQ 1-row coils have four feeds. Check type 5WB first because this is the most economical coil.

6. Determine water pressure drop: Follow the example on page 18. Read the header side and tube side pressure drop. In this example the header side pressure drop = 1.4 ft. H_20 and the tube side pressure drop = 2.2 ft. H_20. These pressure drops must be adjusted by using the temperature correction factors. At 185° F average water temperature this results in the following pressure drops: tube = 1.2 x 2.2 = 2.64; header = 1.48 x l.2 = 1.77. Therefore, the total pressure drop = 2.64 + 1.77 = 4.42 ft. H_2O.

7. Assuming a 1-row type 5WB coil will meet the requirements, the proper fin series must be determined as follows:

8. Determine heat transfer value, M_t:

a. $$\frac{Air\ Temp.\ Rise}{Ent.\ Water\ Temp. - Ent.\ Air\ Temp} = \frac{36.7}{200 - 45} = .237$$

b. $$\frac{Water\ Temp.\ Drop}{Air\ Temp. Rise} = \frac{30}{36.7} = .818$$

With values from steps a. and b. above, proceed to Figure 3, page 11, and find M_t = .33

9. Determine heat transfer value, R_{ft}:

$$Rows\ Deep = R_{ft} \times M_t \times \frac{FPM}{100}$$

Since we have assumed a 1-row coil:

$$Max.\ R_{ft} = \frac{1}{M_t \times \frac{FPM}{100}} = \frac{1}{.33 \times \frac{500}{100}} = \frac{1}{1.65} = .606$$

Proceed to the Figure 5, page 13, with 4 GPM/feed and:

$$Avg.\ H_2O\ Temp. = \frac{Ent.\ H_2O\ Temp. = Lvg.\ H_2O\ Temp.}{2}$$

$$= \frac{200 + 170}{2} = 185°F$$

and find R_{f1} = .183 for type 5WB coils.

R_{f2} must equal R_{ft} - R_{f1} = (.606 - .183) = .423 or less for a 1-row type 5WB coil to meet the requirements. Enter Rf_2 curve for type 5BB and 5WB coils, page 14 at 500 FPM face velocity and find that R_{f2} = .42 fin series 12, which meets the requirements.

10. Final coil selection:

The final selection is a 5WB -1201C-24 x 72 coil.

11. Determine air pressure drop: Follow the example on page 15. With 500 FPM, 12 fin series and a 1-row coil, the air pressure drop is .19 inches of water.

Table 1. Coil sizes (face area on sq. ft.)

FINNED-HEIGHT FH (INCHES)	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	126	132	138	141
*6	0.5	0.6	0.8	0.9	1.0	1.3	1.5	1.8	2.0	2.2	2.5														
*9	0.8	0.9	1.1	1.3	4.5	1.9	2.3	2.6	3.0	3.4	3.7														
12	1.0	1.3	1.5	1.8	2.0	2.5	3.00	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				
15		1.6	1.9	2.19	2.5	3.1	3.8	4.9	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				
18			2.3	2.62	3.0	3.8	4.5	5.3	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				
21				3.06	3.5	4.4	5.3	6.1	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				
24					40.0	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				
27						5.6	6.8	7.9	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				
30						6.3	7.5	8.8	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				
33							8.3	9.6	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				
36							9.0	10.5	12.0	13.5	15.0	16.5	18.0	19.5	21.0	22.5	24.0	25.5	27.0	28.5	30.0				
39								11.4	13.0	14.6	16.2	17.9	19.5	20.1	22.7	24.4	26.0	27.6	29.2	30.9	32.5				
42								12.3	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				
45									15.0	16.9	18.8	20.6	22.5	24.4	26.3	28.1	30.0	31.9	33.8	35.7	37.5	39.4	41.3	43.1	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	42.0	44.0	46.0	47.0
51										19.1	21.3	23.4	25.5	27.6	29.8	31.9	34.0	36.1	38.3	40.4	42.5	44.6	46.8	48.9	49.9
54										20.3	22.5	24.8	27.0	29.3	31.5	33.8	36.0	38.3	40.5	42.8	45.0	47.3	49.5	51.8	52.9

In addition to the standard fin lengths listed above, any required length can be supplied. * Standard on Type 5B coils

Booster Coil Sizes

Conversion of air volume to standard air

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 x* F_T *x* F_A
= *15,900 x 0.955 x 0.896*
= *13,600*

Where:
F_T = *Temperature Conversion Factor from Figure 1*

F_A = *Altitude Conversion Factor from Figure 2*

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 Figures 6 and 8 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 proper altitude use the following equation:

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

Figure 1.

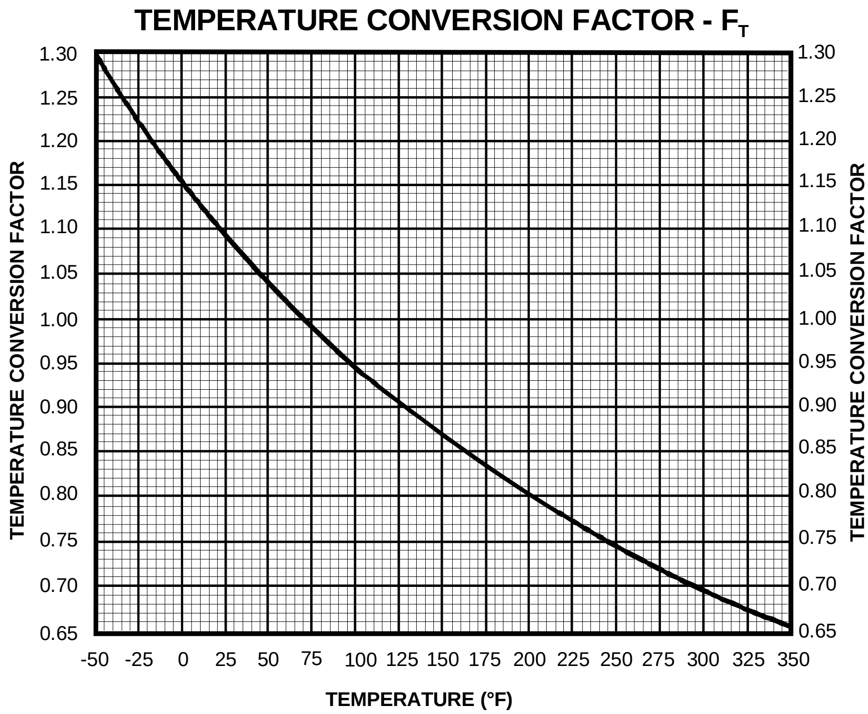
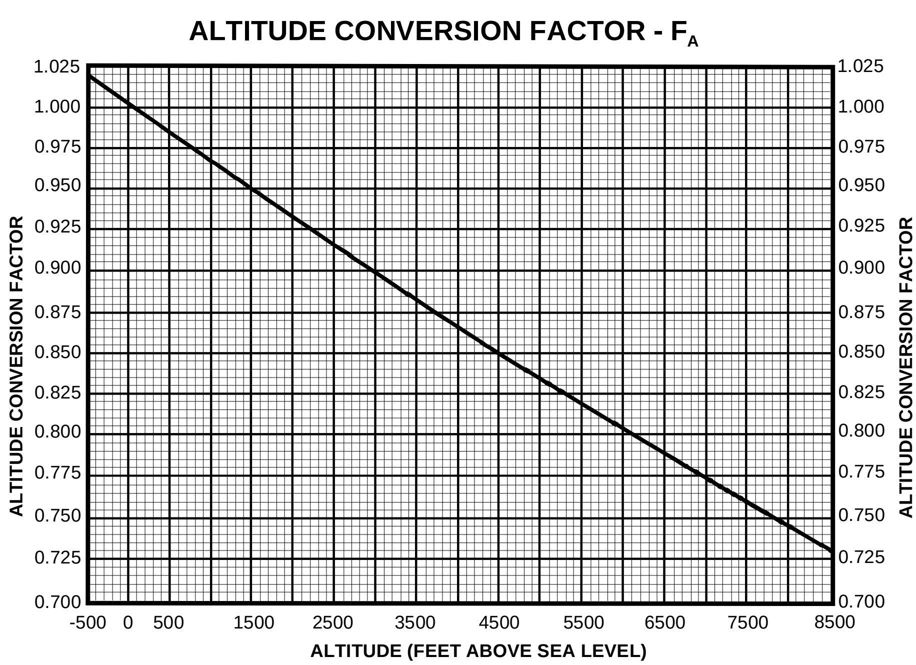


Figure 2.



General formulas

TOTAL BTUH — AIR SIDE:

Total BTUH = 1.09 x SCFM x (Lvg. Air Dry Bulb -Ent. Air Dry Bulb)

Where: 1.09 = (Sp Ht. of Air at 70°F) x (min./hr.) x Density Std. Air

.242 = Sp. Ht. of Moist Air at 70°F

60 = min./hr.

.075 = Density Std. Air in Lbs./Cu.Ft.

TOTAL BTUH — WATER SIDE:

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

Where: 500 = lbs./gal. x min/hr. x specific heat water

8.33 = lbs./gal.

60 = min./hr.

1 = specific heat water

INITIAL TEMPERATURE DIFFERENCE (ITD):

ITD = Ent. Water Temp. - Ent. Air Dry Bulb

MBH PER SQUARE FOOT OF FACE AREA:

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

LEAVING AIR TEMPERATURE:

$$\text{Lvg. Air Dry Bulb} = \text{Ent.Air Dry Bulb} + \frac{\text{Total BTUH}}{\text{1.09 x SCFM}}$$

WATER VELOCITY:

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

FACE AREA: $$FA = \frac{\text{SCFM}}{\text{Face Velocity (FPM)}}$$

FACE VELOCITY: $$FV = \frac{\text{SCFM}}{\text{Face Area (Sq. Ft.)}}$$

ROWS DEEP:

$$\text{Rows Deep} = R_{ft} \times M_t \times \frac{\text{Face Velocity (FPM)}}{100}$$

Table 2. Standard water coil circulating-Number of tubes fed

TYPE	ROWS	FH DIMENSIONS (INCHES)																
		6	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54
5BB, 5BS	1, 2	1	1	1	1	1	1	1	—	—	—	—	—	—	—	—	—	—
5BD	2	2	2	2	2	2	2	2	—	—	—	—	—	—	—	—	—	—
5MS	2	—	—	—	—	—	—	—	—	—	—	—	—	—	30	32	34	36
5MH	1, 2	—	—	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
5MQ	1	—	—	2	—	3	—	4	—	5	—	6	—	7	—	8	—	9
5WB, 5WQ	1	—	—	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	—	—	—	—
5WH	1, 2, 3, 4	—	—	4	5	6	7	8	9	10	11	12	13	14	15*	16*	17*	18*
5WB	2	—	—	4	4	6	7	8	9	10	11	12	13	14	—	—	—	—
5WL	3, 4	—	—	6	7	9	10	12	13	15	16	18	19	21	22	24	25	27
5WS	2	—	—	8	10	12	14	16	18	20	22	24	26	28	—	—	—	—
5WS	3, 4	—	—	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36
5WM	4	—	—	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54
5WD	4	—	—	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72

* 3 & 4 ROW COIL ONLY. SEE 5MH FOR 1 & 2 ROWS.

Heat transfer values

Figure 3. M_t, 1- and 2-row coils

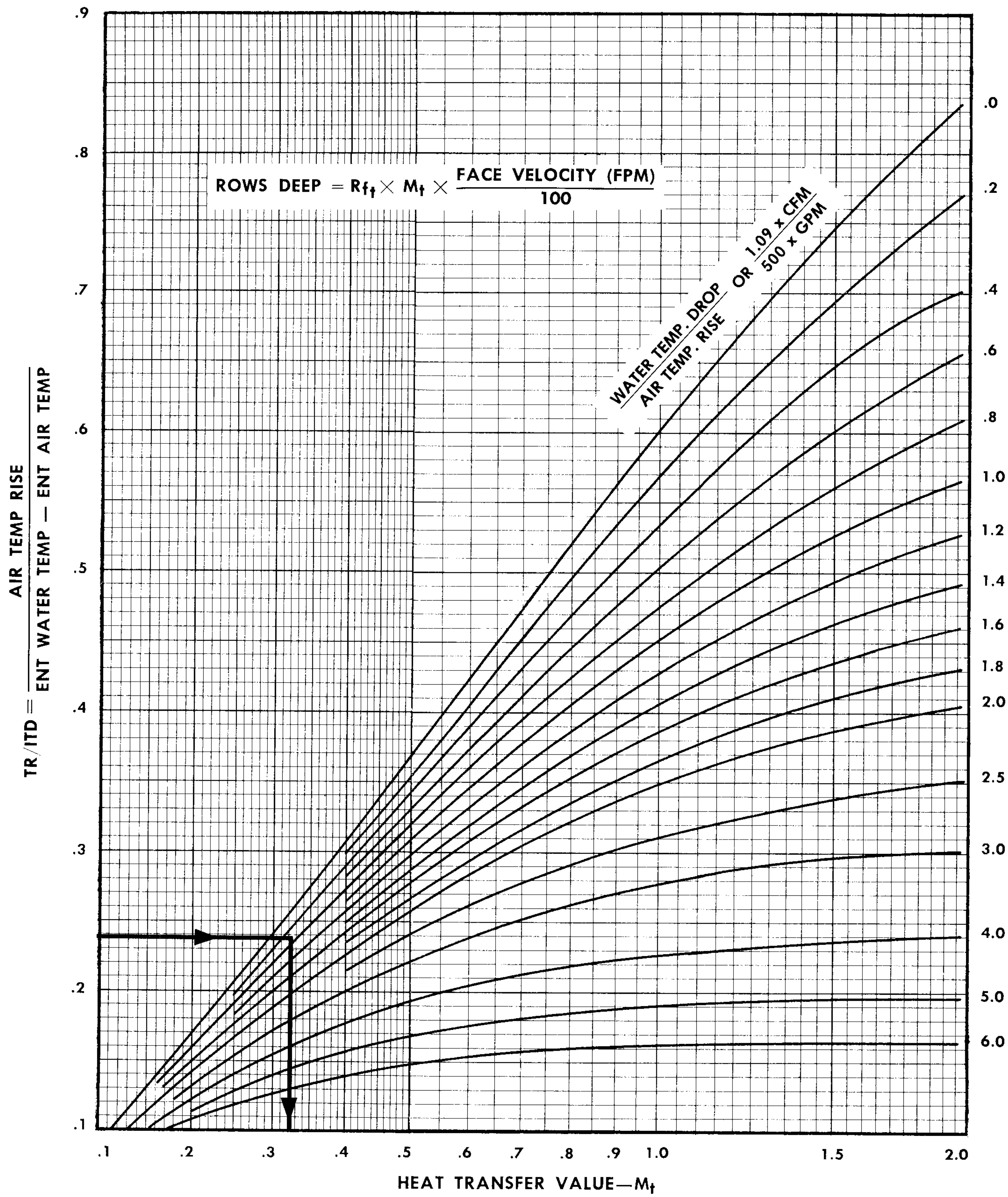
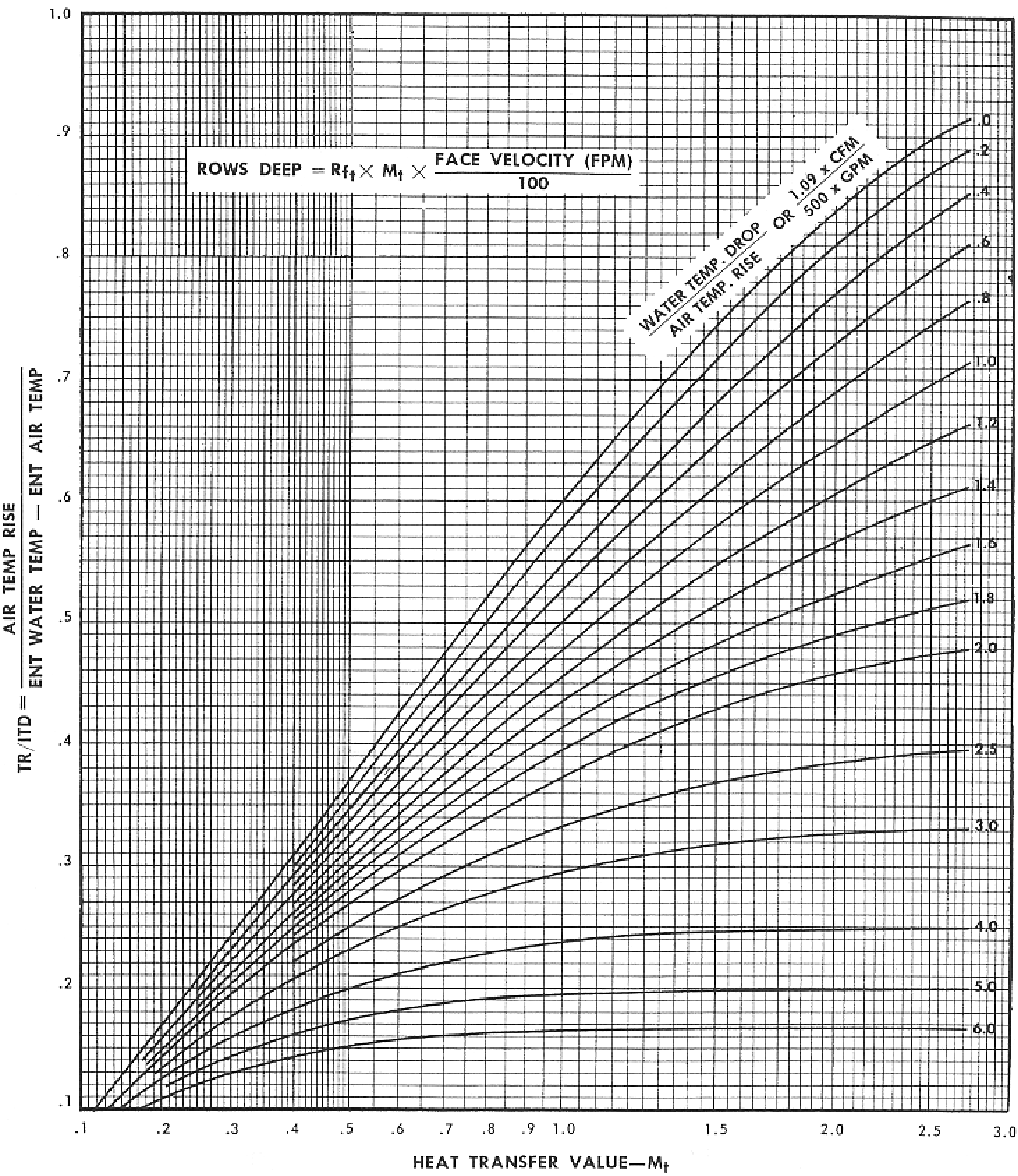
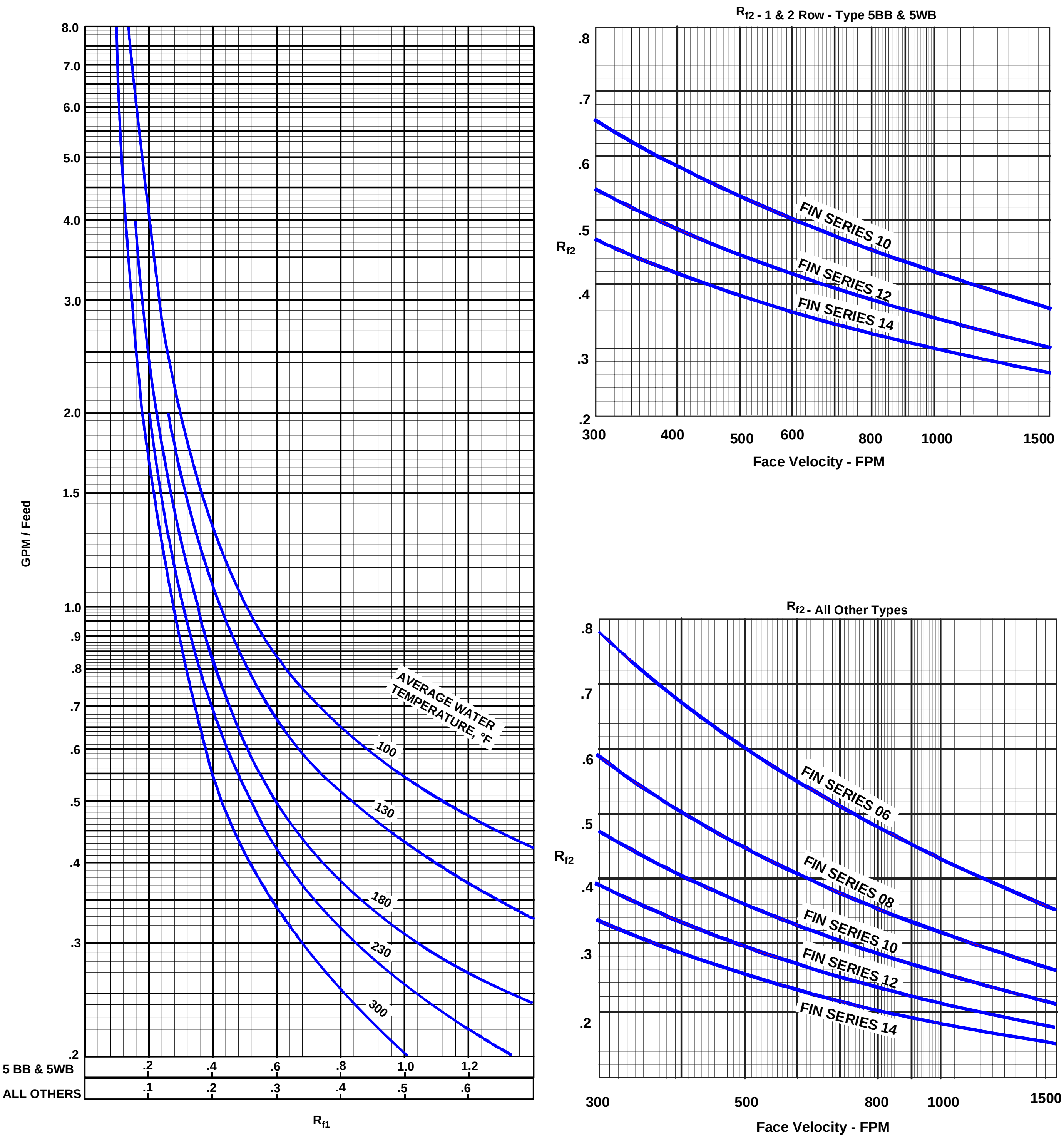


Figure 4. M_t, 3- and 4-row coils



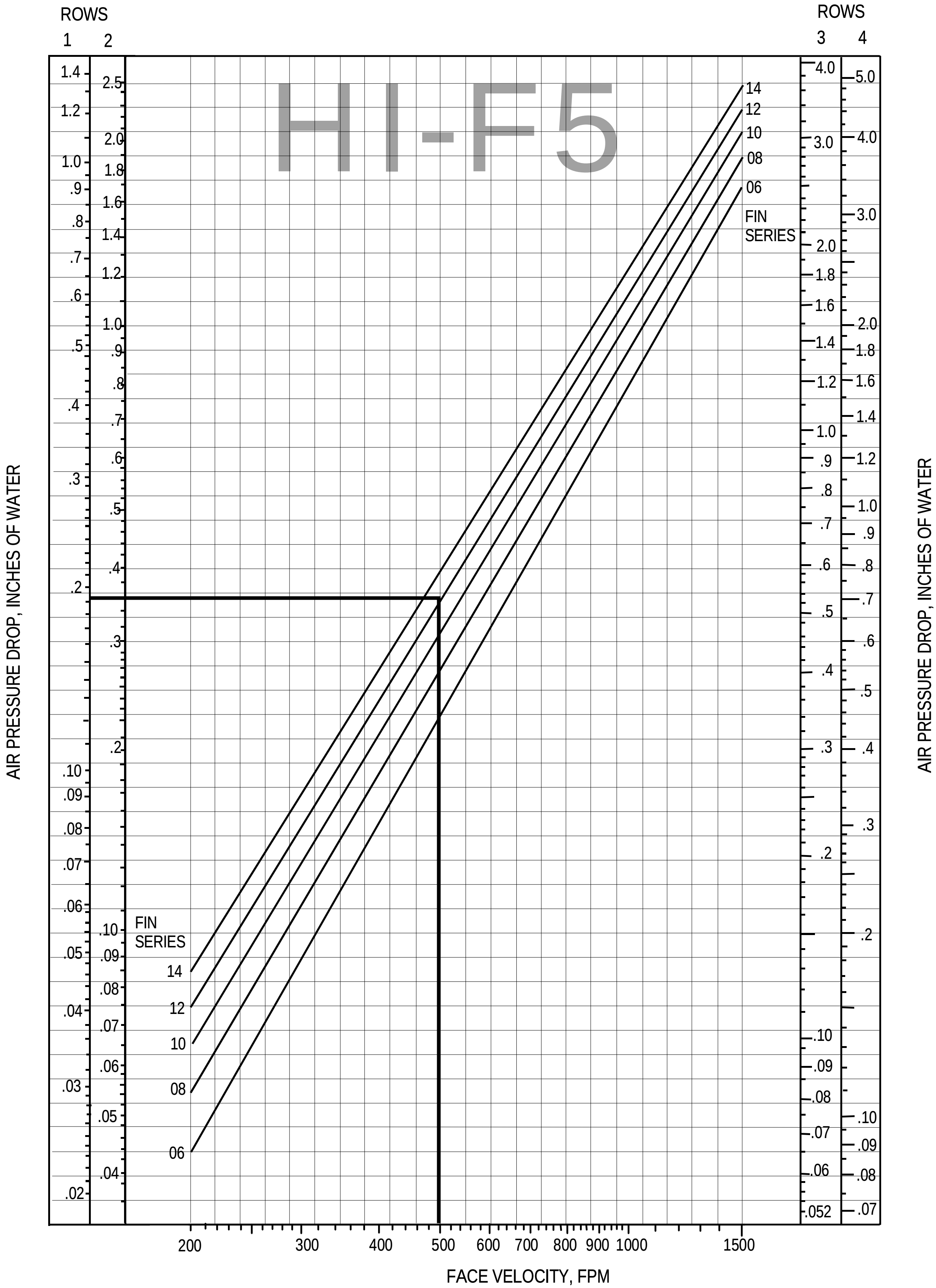
HI-F5 selection data

Figure 5. Heat transfer values - R_f, HI-F5 coils



NOTE: Heat transfer values for odd fin spacings may be found by interpolation.

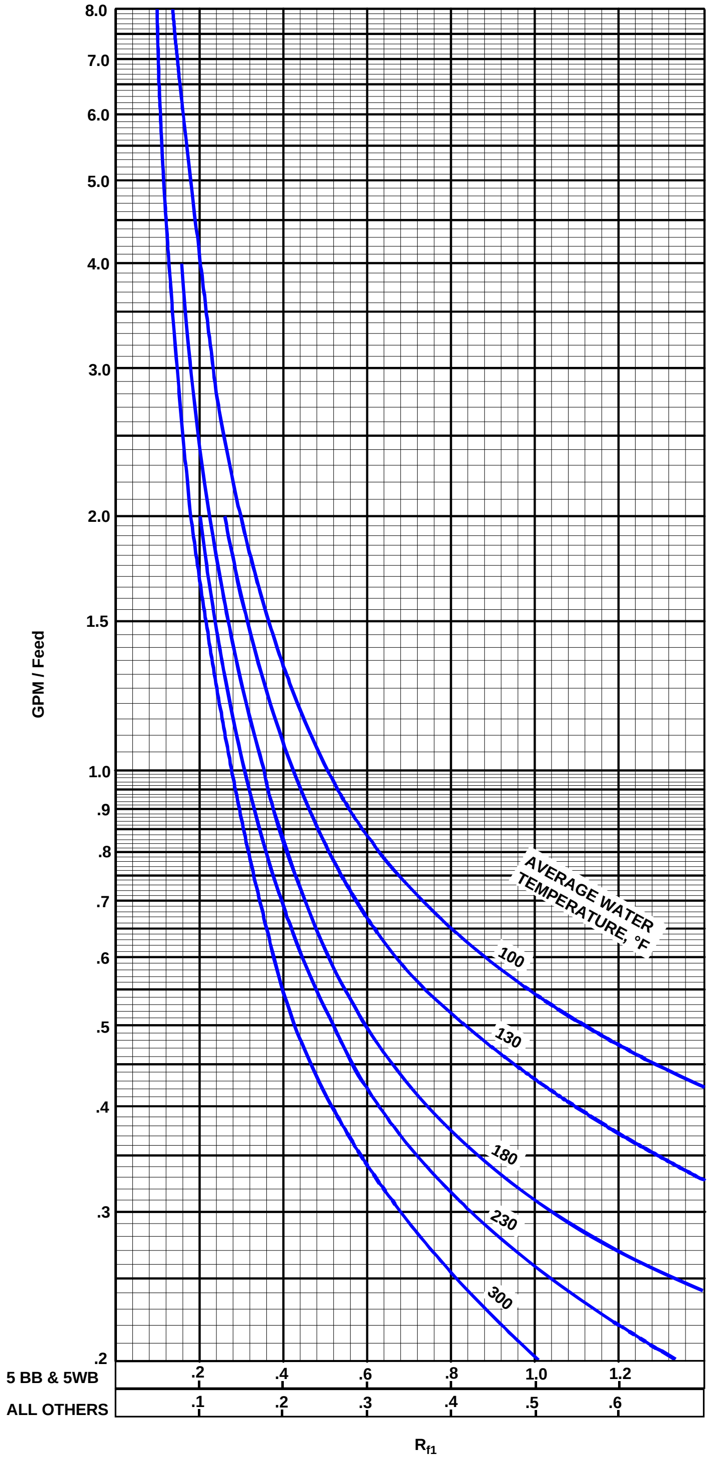
Figure 6. HI-F5 coils air pressure drop

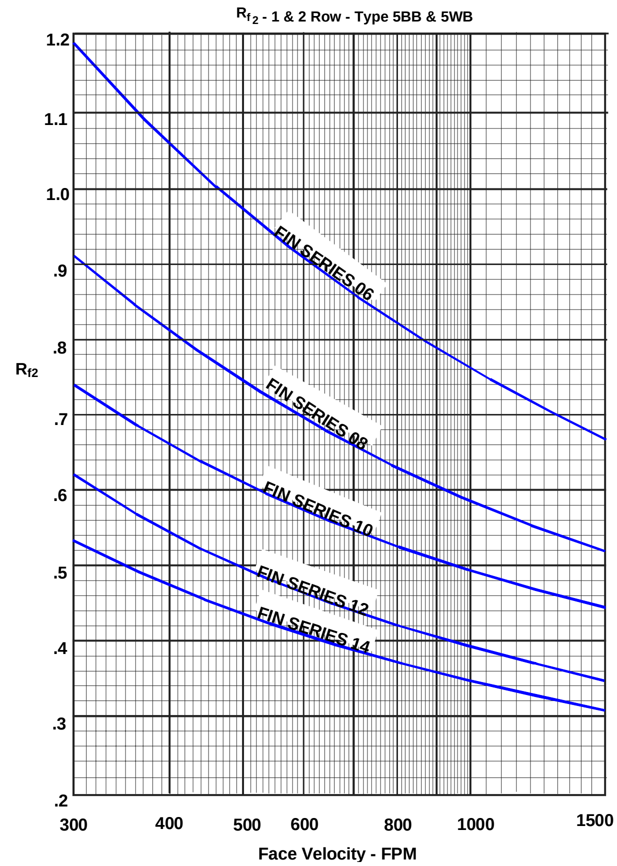


NOTE: AIR PRESSURE DROP VALUES FOR ODD FIN SPACINGS.

E-F5 selection data

Figure 7. Heat transfer values - R_f, E-F5 coils





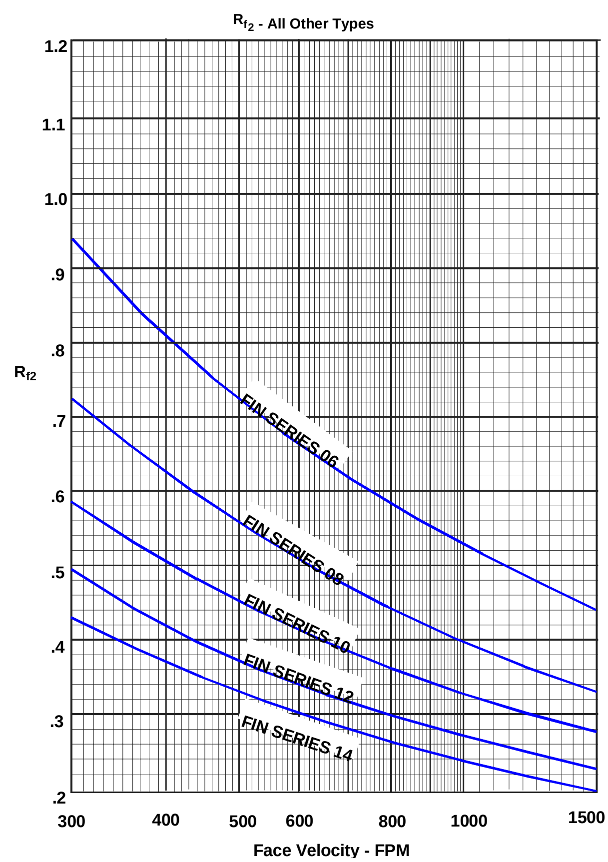
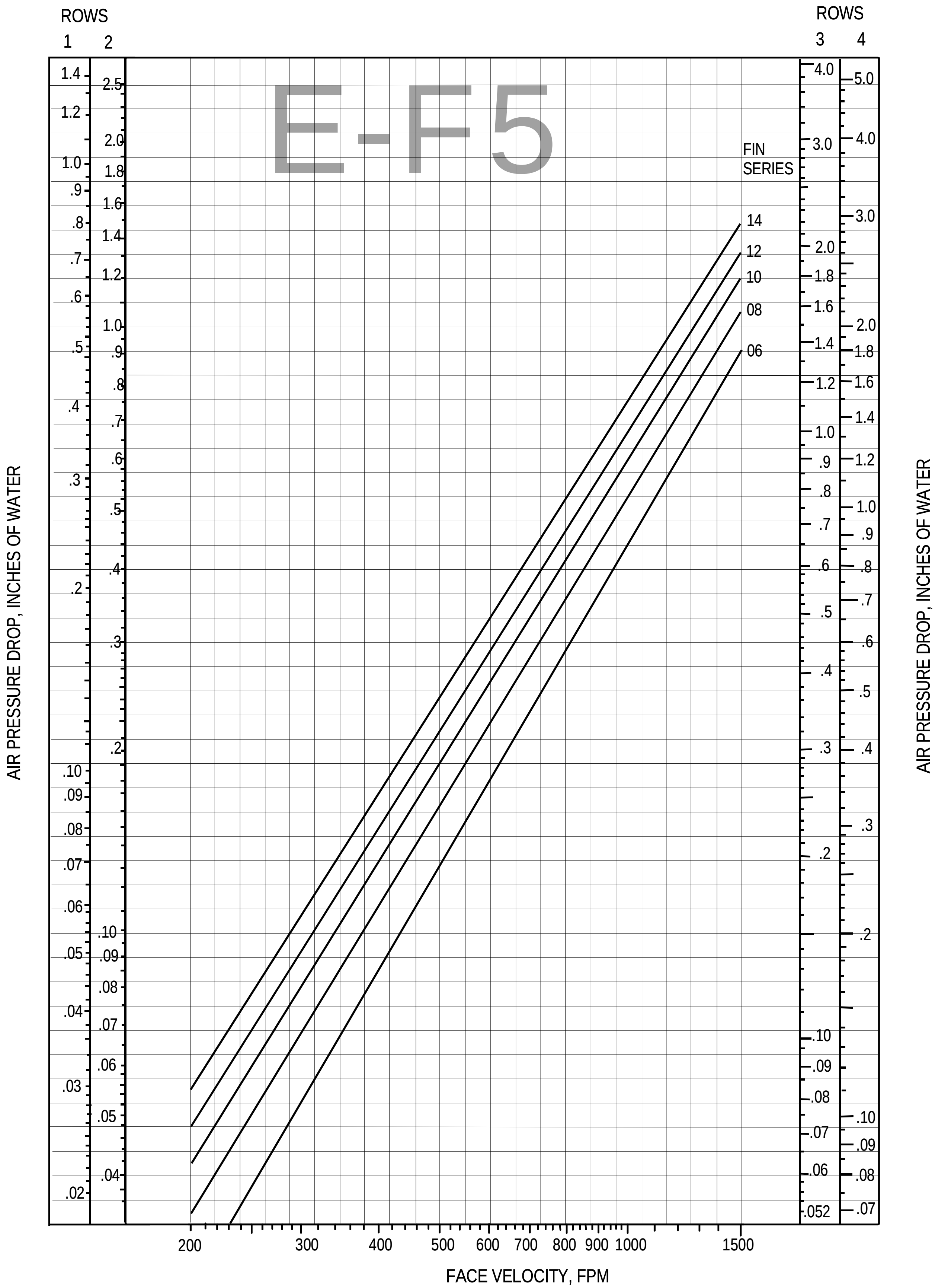


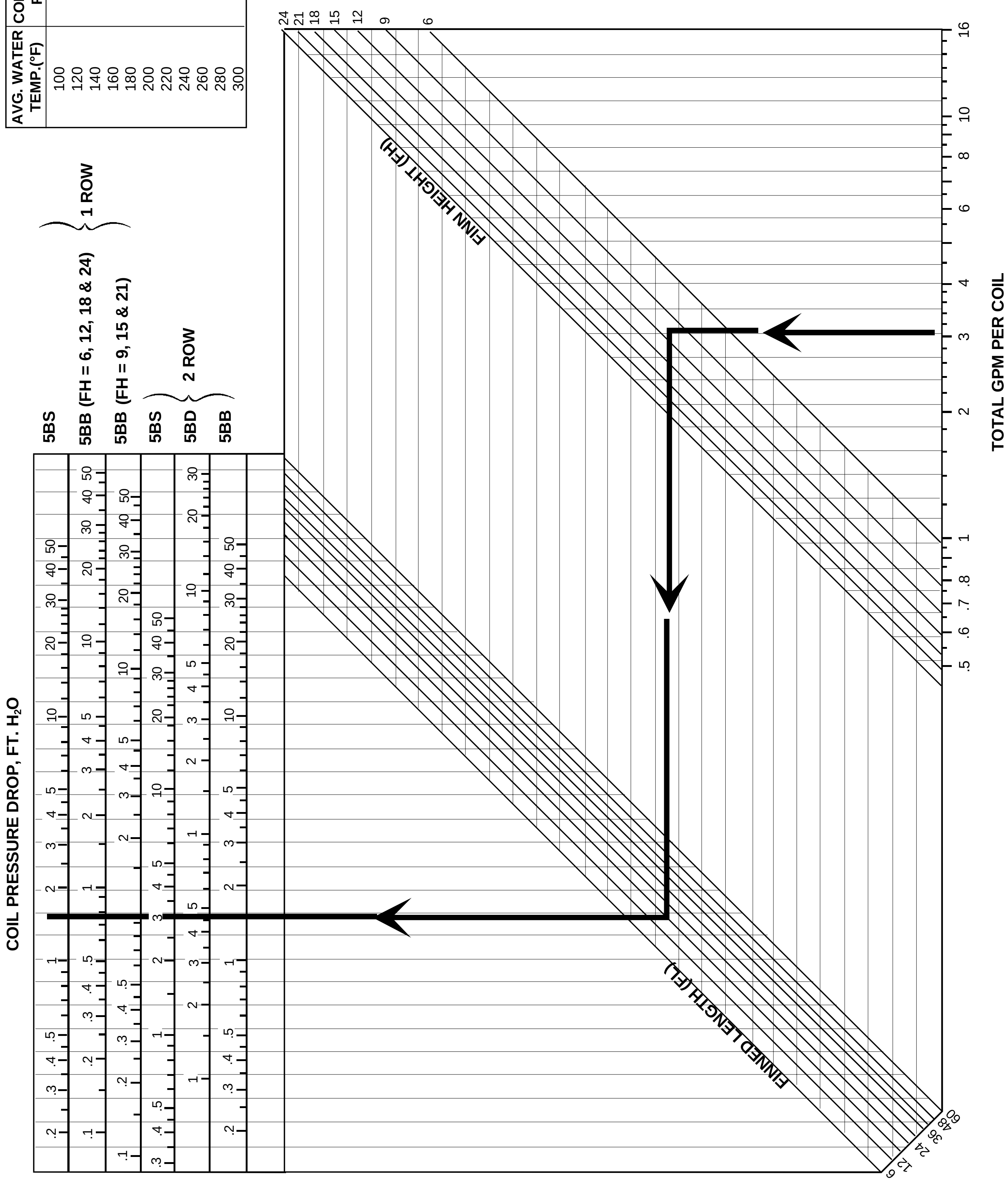
Figure 8. E-F5 coils air pressure drop



NOTE: AIR PRESSURE DROP VALUES FOR ODD FIN SPACINGS.

Water pressure drop

Figure 9. Water pressure drop, 5B coils



AVG. WATER TEMP.(°F)	CORRECTION FACTOR
100	1.36
120	1.31
140	1.27
160	1.23
180	1.20
200	1.19
220	1.17
240	1.16
260	1.15
280	1.15
300	1.14

Figure 10. Water pressure drop, 1- and 2-row 5W & 5M coils

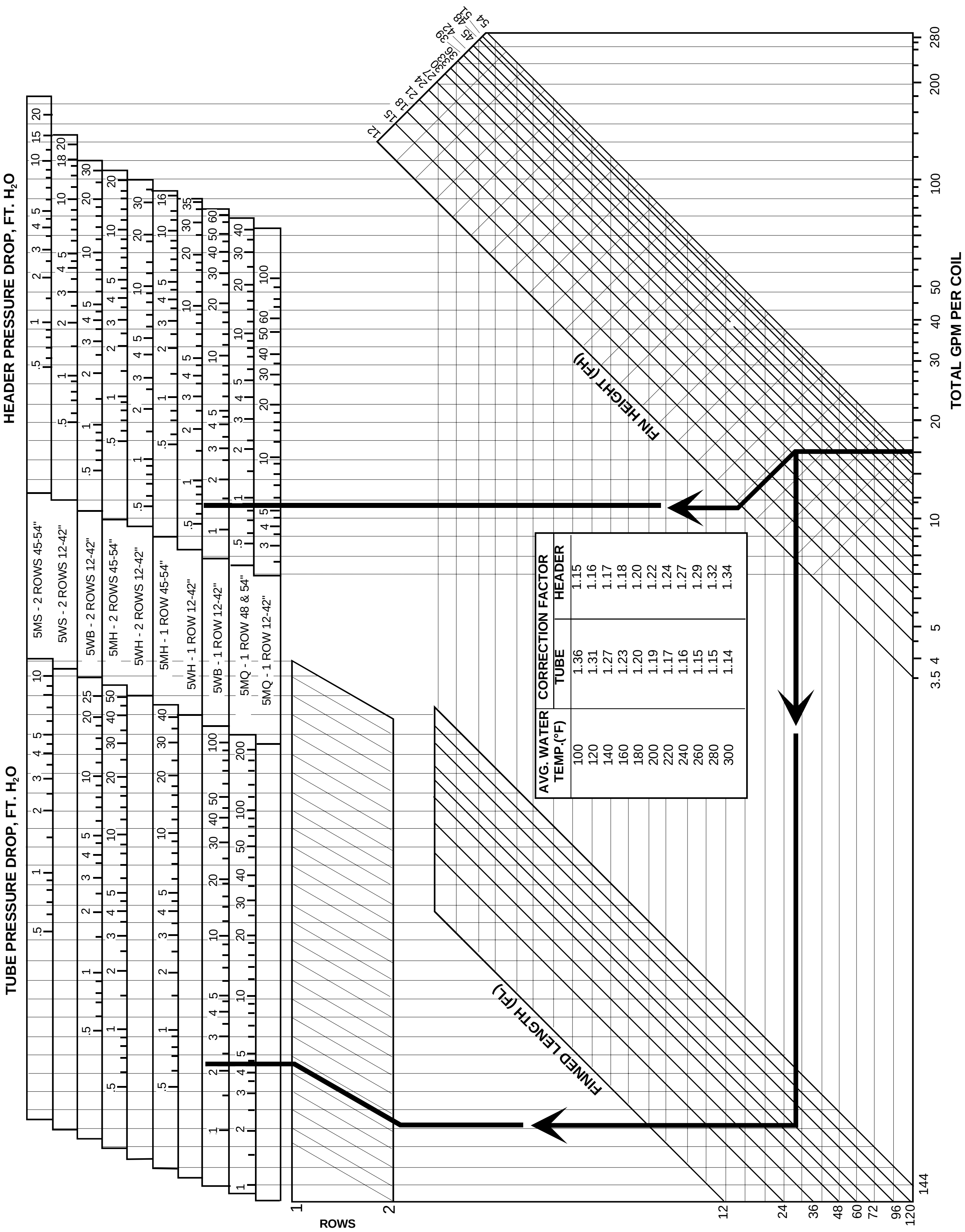
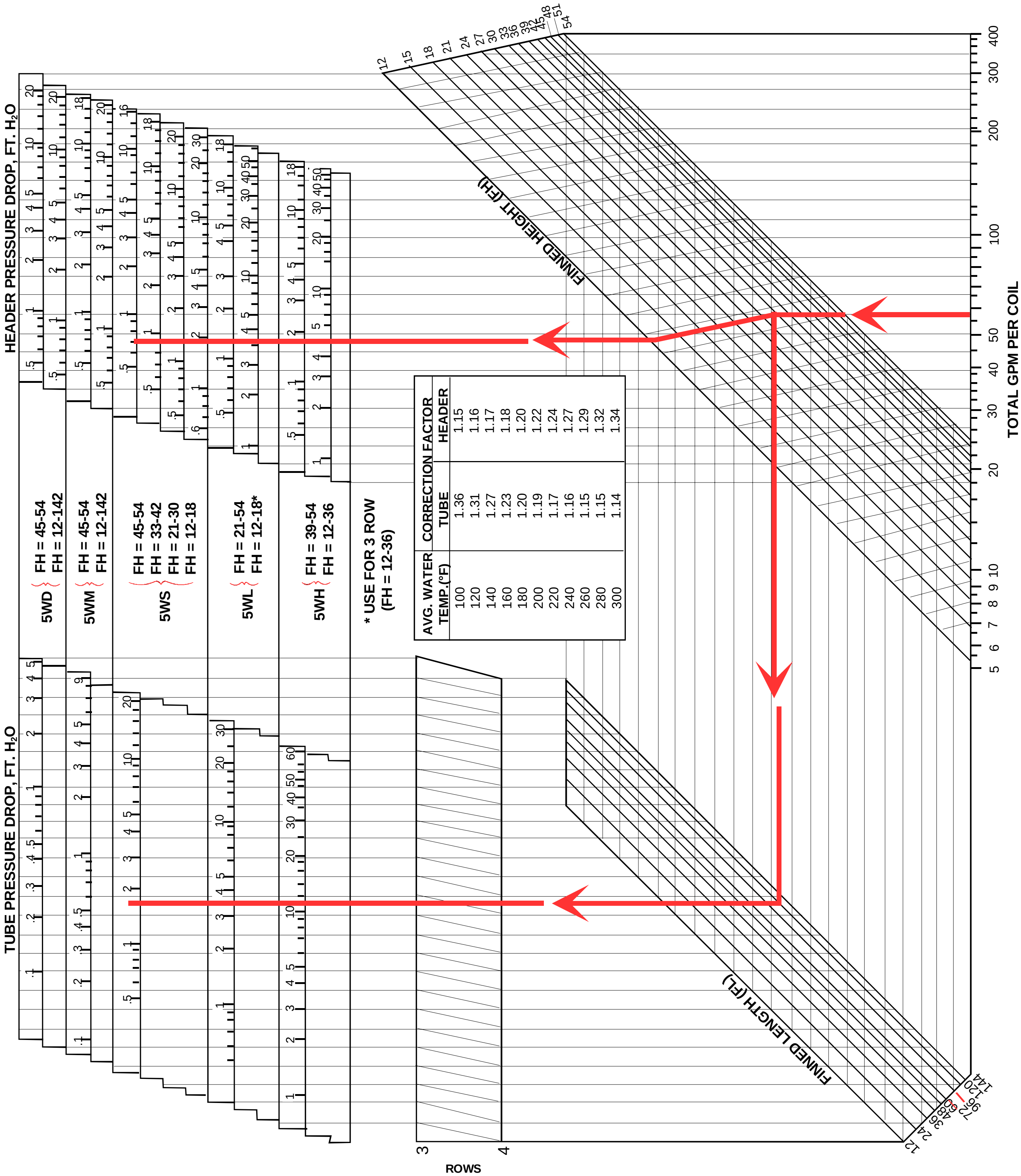


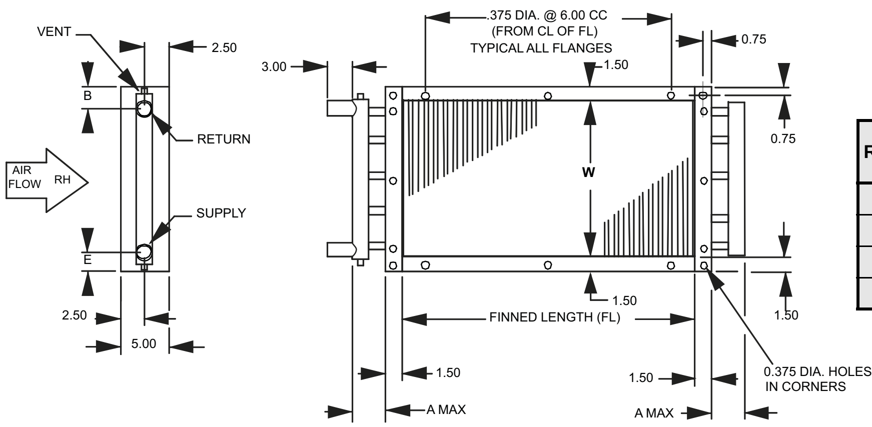
Figure 11. Water pressure drop, 3- and 4-row 5W coils



AVG. WATER TEMP. (°F)	CORRECTION FACTOR TUBE	CORRECTION FACTOR HEADER
100	1.36	1.15
120	1.31	1.16
140	1.27	1.17
160	1.23	1.18
180	1.20	1.20
200	1.19	1.22
220	1.17	1.24
240	1.16	1.27
260	1.15	1.29
280	1.15	1.32
300	1.14	1.34

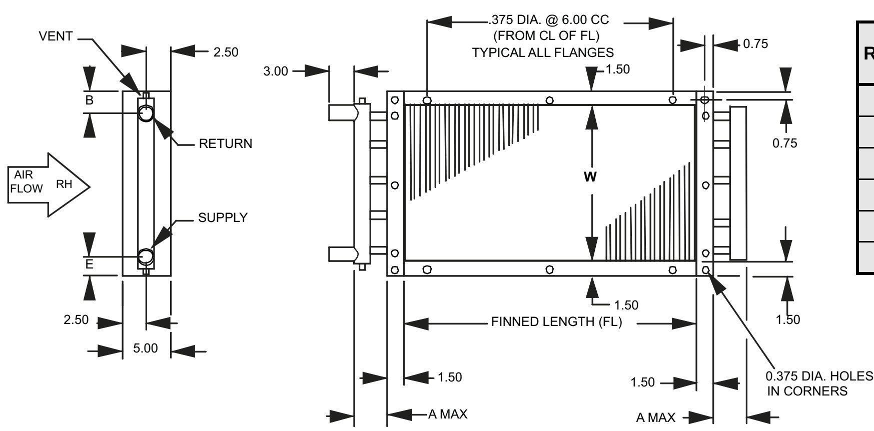
Dimensional data - HI-F5 & E-F5 coils

Figure 12. 5W coils - 1- and 2- row (12” to 42” fin height)



ROW	MODEL TYPE	CONN SIZE	A	B	E	W
1	5WH, 5WQ	1-1/2	2.75	2.67	2.67	12.00 - 42.00
1	5WB	1-1/2	2.75	3.42	3.42	12.00 - 42.00
2	5WH, 5WS	2-1/2	3.38	3.17	3.17	12.00 - 42.00
2	5WB	2-1/2	3.38	3.92	3.17	12.00 - 42.00

Figure 13. 5K, 5P, 5Q cleanable coils - 1- and 2 - row (12” to 42” fin height)



ROW	MODEL TYPE	CONN SIZE	A	B	E	W
1	5PH, 5PQ	1-1/2	2.75	2.67	2.67	12.00 - 42.00
1	5QH, 5QQ	1-1/2	2.75	2.67	2.67	12.00 - 42.00
1	5KH, 5KQ	1-1/2	2.75	2.67	2.67	12.00 - 42.00
2	5PH, 5PS	2-1/2	3.38	3.17	3.17	12.00 - 42.00
2	5QH, 5QS	2-1/2	3.38	3.17	3.17	12.00 - 42.00
2	5KH, 5KS	2-1/2	3.38	3.17	3.17	12.00 - 42.00

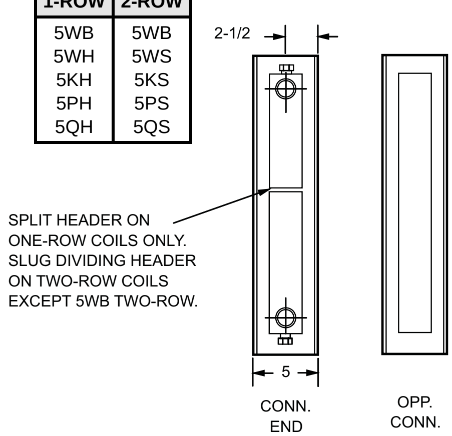
GENERAL NOTES (FIGURES 12 & 13):

1. VERTICAL OR HORIZONTAL AIRFOW MUST BE SPECIFIED.
2. ALL COILS DRAINABLE.
3. CONNECT COILS FOR COUNTER-FLOW, I.E., ENTERING WATER CONN. OR LEAVING WATER CONN.ON LEAV-ING AIR SIDE OF COIL.
4. CONNECTIONS ARE PIPE, NPT (EXT.).
5. ALL DIMENSIONS ARE IN INCHES.
6. CONNECTION LOCATION ± .125.
7. VENT 1/4 NPT.
8. TYPE 5KQ, 5KH & 5KS COILS HAVE REMOVABLE PLUGS ON BOTH ENDS.
9. TYPE 5PQ, 5PH & 5PS COILS HAVE REMOVABLE PLUGS ON CONNECTION END ONLY.
10. TYPE 5QQ, 5QH & 5QS COILS HAVE REMOVABLE PLUGS ON OPPOSITE CONNECTION END ONLY.
11. 5K, 5P & 5Q1- AND 2-ROW CLEANABLE HEATING COILS ARE OUTSIDE THE SCOPE OF ARI STANDARD 410.

Figure 14. Header arrangements

ALL DIMENSIONS ARE IN INCHES.

TYPE	
1-ROW	2-ROW
5WB	5WB
5WH	5WS
5KH	5KS
5PH	5PS
5QH	5QS



TYPE	
1-ROW	2-ROW
5WQ	5WH
5KQ	5KH
5PQ	5PH
5QQ	5QH

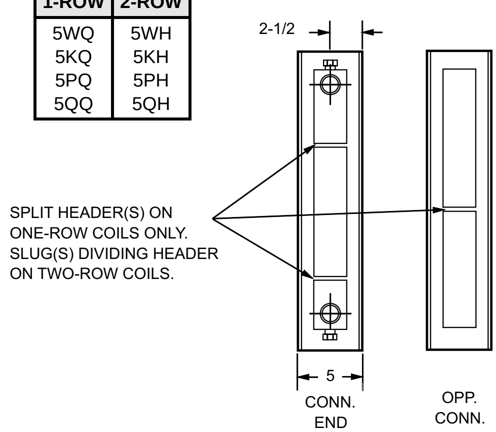
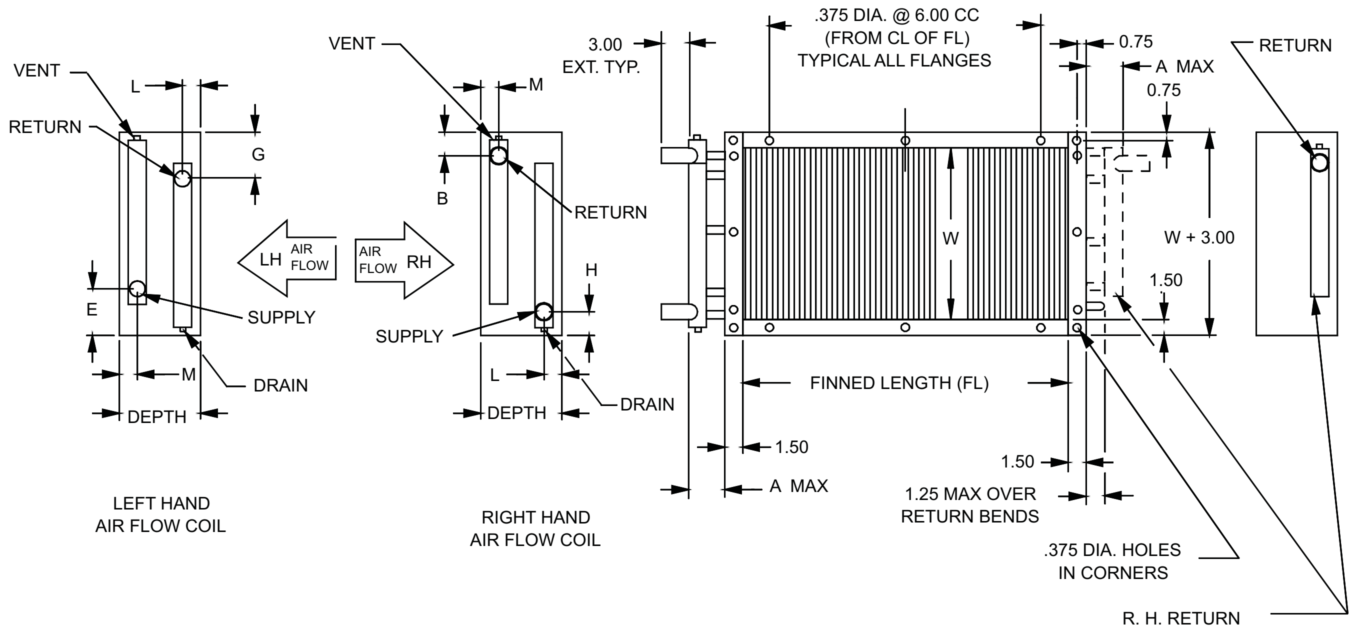


Figure 15. 5W coils - 3 and 4-row (12” to 54” fin height)



GENERAL NOTES:

1. VERTICAL OR HORIZONTAL AIRFOW MUST BE SPECIFIED.
2. ALL COILS DRAINABLE.
3. CONNECT COILS FOR COUNTERFLOW, I.E., ENTERING WATER CONN. OR LEAVING WATER CONN.ON LEAVING AIR SIDE OF COIL.
4. CONNECTIONS ARE PIPE, NPT (EXT.).
5. ALL DIMENSIONS ARE IN INCHES.
6. CONNECTION LOCATION ± .125.
7. VENT 1/4 NPT.

5WH COILS

ROW	3	4	AIR FLOW	W DIMENSIONS
DEPTH	6.00	7.50		
L	1.70	1.80	HORZ. & VERT. AIR FLOW	N/A
M	1.70	1.80		N/A
E	6.05	6.05	HORZ. AIR FLOW	12.00 - 36.00
G	5.30	6.05		
E	6.30	6.30		39.00 - 54.00
G	5.55	6.30		
E	6.05	6.05	VERT. AIR FLOW	12.00 - 36.00
G	5.30	6.05		
H	3.05	2.30		
E	6.30	6.30		39.00 - 54.00
G	5.55	6.30		
H	3.30	2.55		

HORIZONTAL AIR FLOW

CONN SIZE	A	B	H	W
1-1/2	*3.00	2.30	2.30	12.00 - 36.00
2	*3.50	2.55	2.55	39.00 - 54.00

VERTICAL AIR FLOW

CONN SIZE	A	B	W
1-1/2	*3.00	2.30	12.00 - 36.00
2	*3.50	2.55	39.00 - 54.00

* 3 ROW A = 3.50 FOR 1-1/2” CONN
4.00 FOR 2” CONN.

5WL COILS

ROW	DEPTH	CONN SIZE	A	B	E	G	H	L	M	W
3	6.00	1-1/2	3.00	2.30	4.55	3.80	2.30	1.70	1.70	12.00 — 36.00
	6.00	2	3.50	2.55	4.80	4.05	2.55	1.70	1.70	39.00 — 42.00
	7.50	2-1/2	3.63	2.80	5.05	4.30	2.80	2.20	1.80	45.00 — 54.00
4	7.50	1-1/2	3.00	2.30	4.55	4.55	2.30	1.80	1.80	12.00 — 18.00
	7.50	2	3.50	2.55	4.80	4.80	2.55	1.80	1.80	21.00 — 30.00
	7.50	2-1/2	3.63	2.80	5.05	5.05	2.80	1.80	1.80	33.00 — 54.00

5WS COILS

CONN SIZE	A	B	E	G	H	W
1-1/2	2.75	2.30	4.55	4.55	2.30	12.00 - 18.00
2	3.25	2.55	4.80	4.80	2.55	21.00 - 30.00
2-1/2	3.38	2.80	5.05	5.05	2.80	33.00 - 42.00
3	3.80	3.06	5.36	5.36	3.06	45.00 - 54.00

ROW	3	4
DEPTH	6.00	7.50
L	1.70	1.80
M	1.70	1.80

5WM COILS

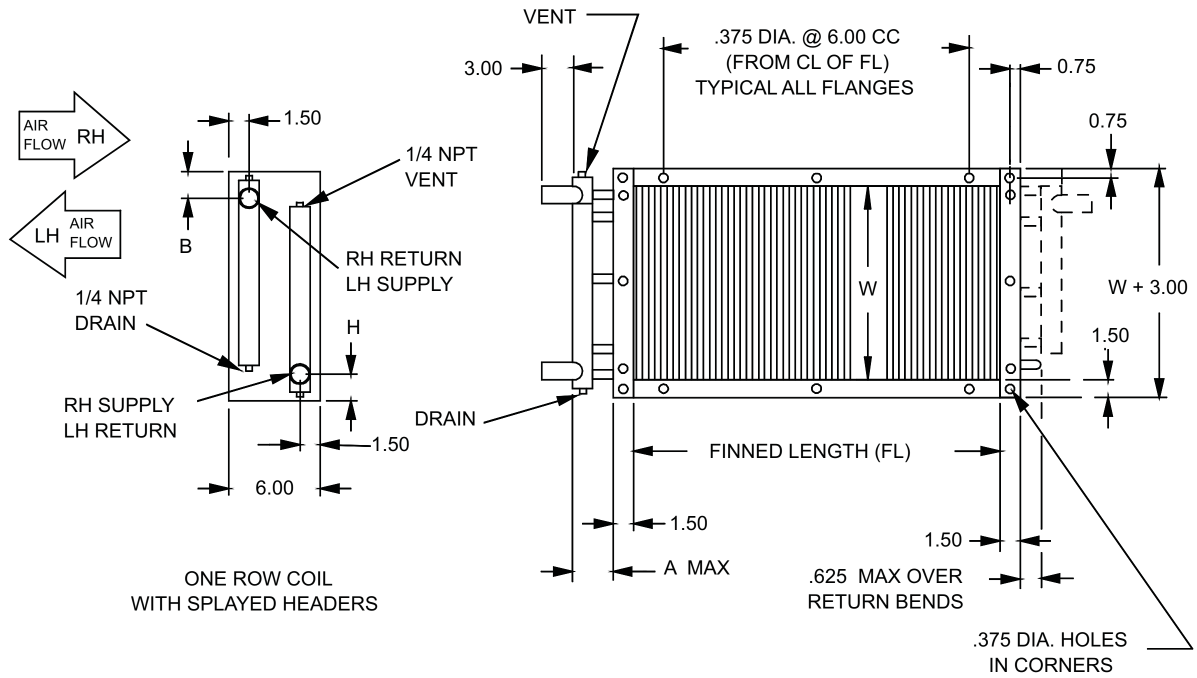
FIN HEIGHT	12.00 - 54.00
ROW	4
DEPTH	8.50
L	1.78
M	2.30
A	4.00

5WD COILS

FIN HEIGHT	12.00 - 54.00
ROW	4
DEPTH	8.50
L	1.78
M	2.30
A	3.75

CONN SIZE	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

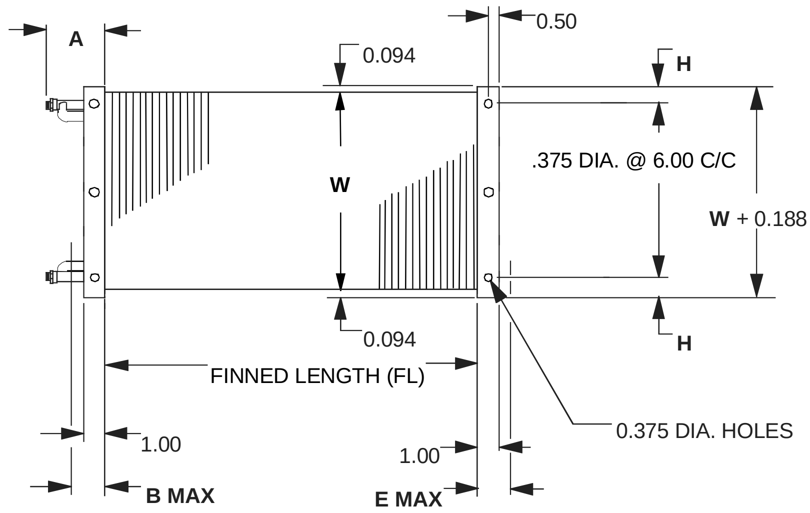
Figure 16. 5M Coils - 1- and 2-row with splayed headers (12” To 54” fin height)



TYPE	ROW	CONN SIZE	A	B	H	W
5MS	2	1-1/2	3.00	2.30	2.30	12.00 - 18.00
	2	2	3.50	2.55	2.55	21.00 - 30.00
	2	2-1/2	3.63	2.80	2.80	33.00 - 42.00
	2	3	4.00	3.11	3.11	45.00 - 54.00
5MH	2	1-1/2	3.00	2.30	2.30	12.00 - 36.00
	2	2	3.50	2.55	2.55	39.00 - 54.00
5MQ	1	1-1/2	3.00	2.67	2.67	12.00 - 54.00 ON 6.00 C/C
5MH	1	1-1/2	3.00	2.67	2.67	12.00 - 42.00 ON 3.00 C/C
	1	2	3.50	2.92	2.92	45.00 - 54.00 ON 3.00 C/C

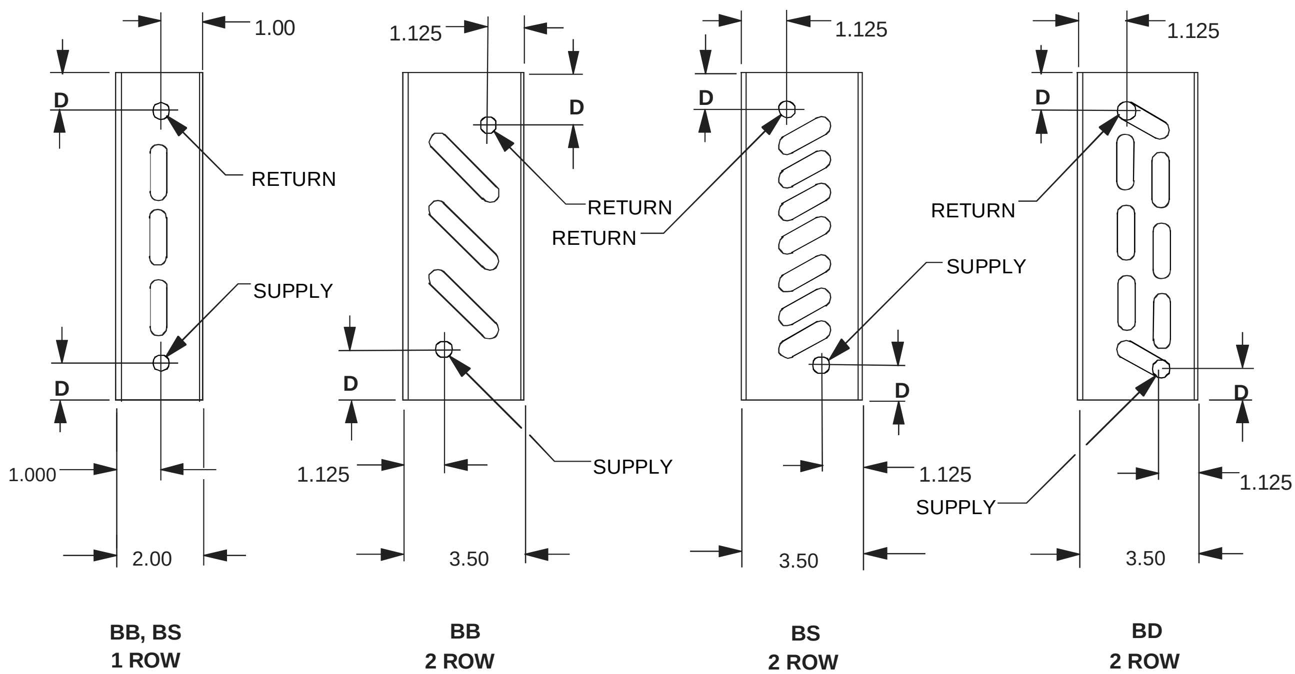
Dimensional data - booster coils

Figure 17. Flanged casing without side plates



GENERAL NOTES

1. CONNECTIONS ARE WROUGHT COPPER, 1/2 NPT (EXT.).
2. ALL DIMENSIONS ARE IN INCHES.
3. CONNECTION LOCATION ± .125.



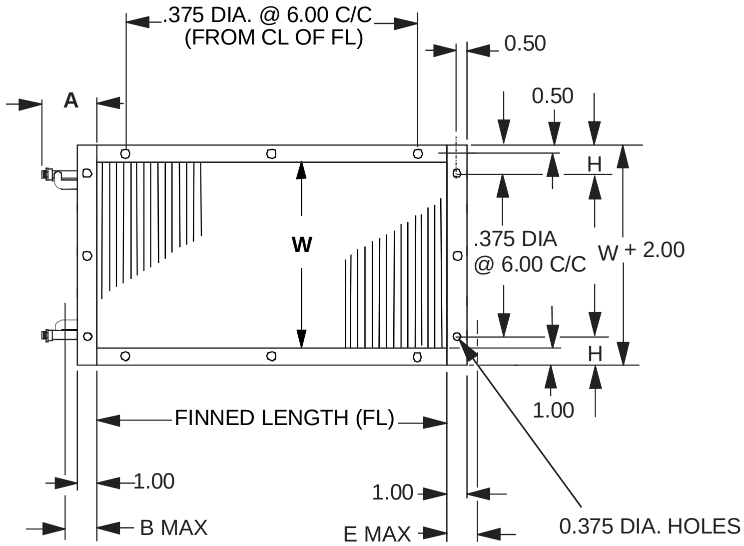
COIL DIMENSIONS

ROW	1			2		
TYPE	5BB		5BS	5BB	5BD	5BS
W DIM	6, 12, 18, 24	9, 15, 21	ALL	ALL	ALL	ALL
A	2.938	2.938	2.938	2.938	3.438	2.938
B	2.750	2.750	2.000	2.750	2.000	2.000
D	1.625	0.875	0.875	1.250	0.500	0.500
E	2.750	2.750	2.000	2.000	2.000	2.000

MOUNTING HOLE DIMENSIONS

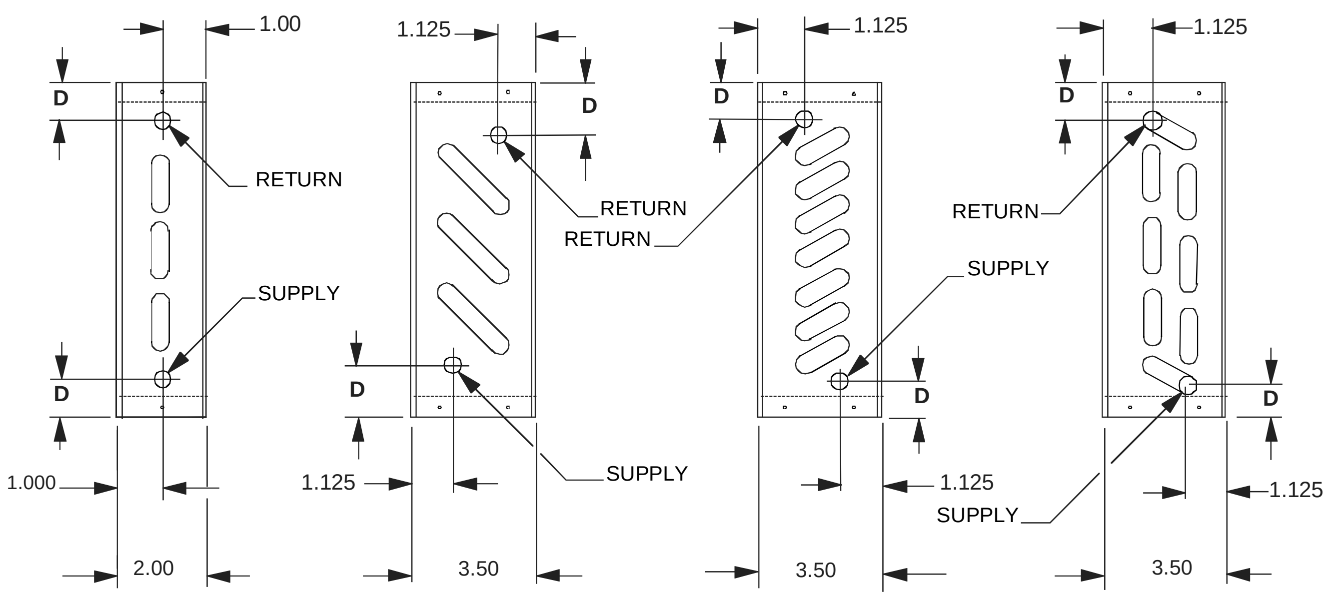
W	6	12, 18, 24	9, 15, 21
H	0.844	3.094	1.594

Figure 18. Flanged casing with side plates



GENERAL NOTES

1. CONNECTIONS ARE WROUGHT COPPER, 1/2 NPT (EXT.).
2. ALL DIMENSIONS ARE IN INCHES.
3. CONNECTION LOCATION ± .125.



BB, BS 1 ROW | **BB 2 ROW** | **BS 2 ROW** | **BD 2 ROW**

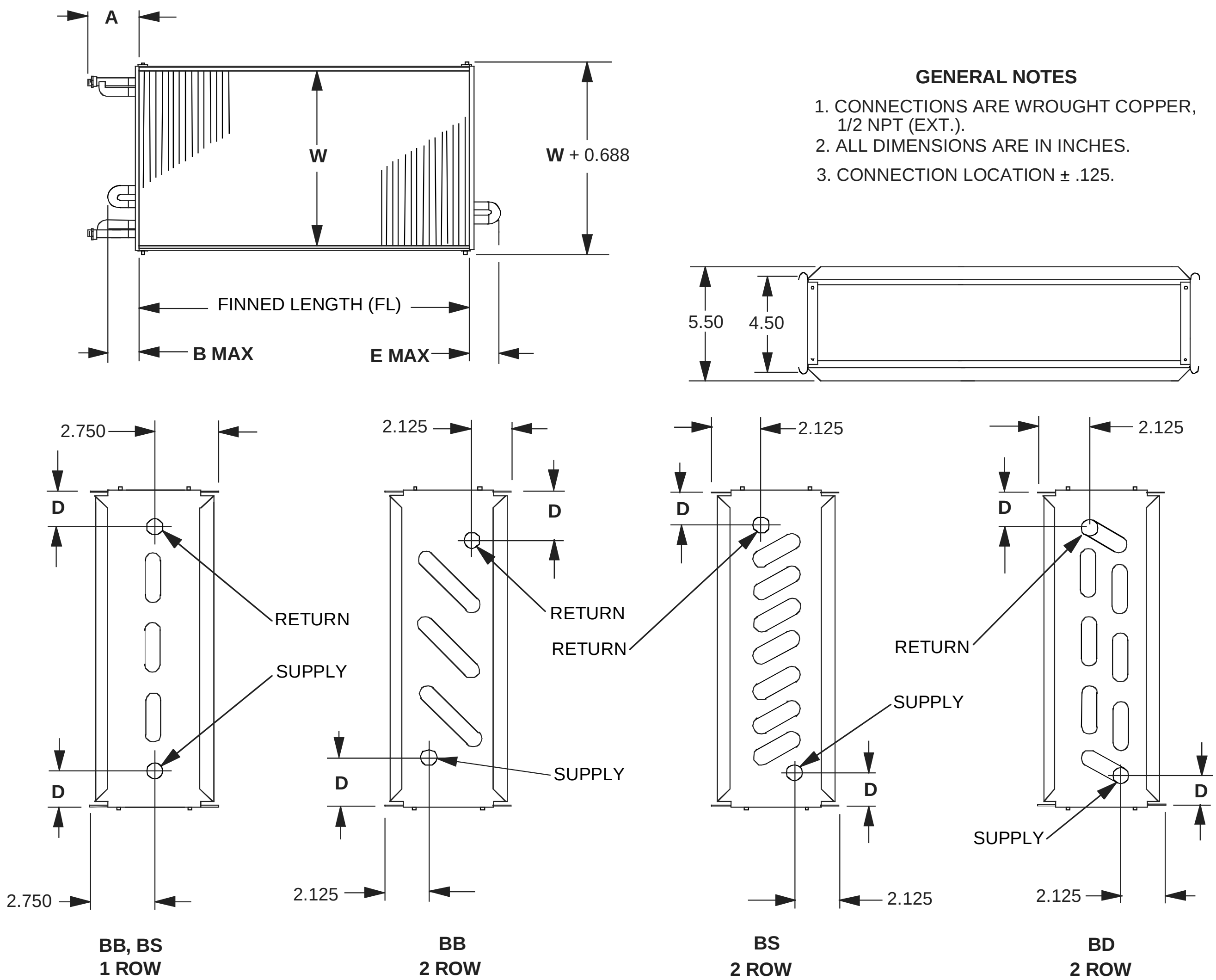
COIL DIMENSIONS

ROW	1			2		
TYPE	5BB		5BS	5BB	5BD	5BS
W DIM	6, 12, 18, 24	9, 15, 21	ALL	ALL	ALL	ALL
A	2.938	2.938	2.938	2.938	3.438	2.938
B	2.750	2.750	2.000	2.750	2.000	2.000
D	2.500	1.750	1.750	2.125	1.375	1.375
E	2.750	2.750	2.000	2.000	2.000	2.000

MOUNTING HOLE DIMENSIONS

W	6	12, 18, 24	9, 15, 21
H	1.000	1.000	2.500

Figure 19. Slip flange casing



COIL DIMENSIONS

ROW	1			2		
TYPE	5BB		5BS	5BB	5BD	5BS
W DIM	6, 12, 18, 24	9, 15, 21	ALL	ALL	ALL	ALL
A	2.938	2.938	2.938	2.938	3.438	2.938
B	2.750	2.750	2.000	2.750	2.000	2.000
D	1.625	0.875	0.875	1.250	0.500	0.500
E	2.750	2.750	2.000	2.000	2.000	2.000

Engineering guide specifications

Furnish and install as shown on the plans and as described in the tabulated specifications, McQuay ARI certified water cooling coils 5W, 5M or booster coil 5B. The coil shall be of extended surface, staggered tube, rippled plate fin type.

PRIMARY SURFACE: The primary surface shall be round seamless (5/8" O.D.) (1/2" O.D.) copper tube staggered in the direction of airflow. Tubes shall be on 1-1/2" or 3" centers. High pressure coils shall have cupro-nickel tubes and headers.

SECONDARY SURFACE: The secondary surface shall consist of rippled aluminum plate fins for higher capacity and structural strength. Fins shall have full drawn collars to provide a continuous surface cover over the entire tube for maximum heat transfer. Bare copper tube shall not be visible between fins. Tubes shall be mechanically expanded into the fins to provide a continuous primary to secondary compression bond over the entire finned length for maximum heat transfer rates.

CASINGS: Casings shall be constructed of continuous galvanized steel with 3/8" diameter bolt holes for mounting on 6" centers. Coil side plates shall be of reinforced flange type for greater strength and ease of stacking coils in banks (Booster coils shall be furnished with flanges for slip-and-drive fasteners or full flanged casings for standard installation.)

COILS: Coils shall have the connections located to permit (unique) (universal) mounting of the coil for (right- or left-)hand airflow and have equal pressure drop through all circuits. Coils shall be circuited to provide the maximum mean effective temperature difference for maximum heat transfer rates. All coils over 45" fin length shall be furnished with four fin angles to properly position the coil core.

WATER HEATING COILS: Headers shall be seamless copper tubing. The headers shall have intruded tube holes to provide large brazing surface for maximum strength and inherent flexibility. The complete 5W coils shall be tested with 315 pounds air under water and be suitable for operation at 250 psig and 300° F. High pressure coils shall be suitable for operation up to 400 psig and 400°F. Individual tube test and core tests before installation of headers is not considered satisfactory. Hydronic tests alone shall not be acceptable.

BOOSTER COILS: Connections on booster coils shall be 1/2" NPT wrought copper. The complete 5B coils shall be tested with 315 pounds air under water and shall be suitable for use up to 250 psig and 300°F.

CLEANABLE TUBE COILS: Cleanable coils shall have removable plugs on (the coil connection end) (the opposite coil connection end) (both ends). Headers on cleanable water heating coils shall be seamless copper tubing. The headers shall have intruded tube holes to provide a large brazing surface for maximum strength and inherent flexibility. The complete 5W coils shall be tested with 315 pounds air under water and shall be suitable for use up to 250 psig and 300° F. One -and two-row cleanable water heating coils may be outside the scope of ARI standard 410.

CAPACITIES: Coil capacities shall be as outlined in the tabulation and substantiated by computer generated output.

Suggested Water Coil Tabulation

Tag Number	Qty.	Type	Fin Series	Rows	Height (FH)	Length (FL)	Face Area	Face Velocity

CFM	Ent. Air Temp. (°F)	Lvg. Air Temp. (°F)	GPM	Ent. Water Temp. (°F)	Lvg. Water Temp. (°F)	Max. Water Press. Drop (Ft.)	Max Air Friction (In.H_20)

Notes

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