

WATER HEATING COILS 5/8" OD TUBE



**Type BW
Hot Water Coils**



"The Heat Transfer Experts"

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FEATURES

GENERAL

Colmac Type BW Hot Water Coils are certified under ARI Standard 410. Capacities for coils having 3 or more rows are based on counterflow circuiting of water with respect to airflow. Sizing curves are based on standard air conditions, that is an air density of .075 lbs. cu. ft. with specific heat of .241."

Coils tested to 350 psig dry air under water.

TUBES:

5/8" O.D. seamless copper tubes are on 1 1/2" centers. Tubes are expanded into full length fin collars to form a tight mechanical bond. 90-10 Cupro-Nickel or Brass is available for high pressure and/or corrosive applications.

FINS:

Aluminum (1100 alloy) configured plate type fins are standard (flat plate fins available). Optional fin materials include copper and polyester-coated aluminum. 6 through 14 fins per inch, Type WF and WR, ARI certified (4 fins per inch available).

HEADERS:

Seamless copper tube, sized to minimize water pressure drop (Carbon Steel or Cupro-Nickel materials available).

CONNECTIONS:

Standard connections for basic water coils are Wrot copper M.P.T (Steel or Brass available on Basic Water Coils).

CASING:

Type BW-Basic Water Coils

Galvanized steel with extruded tubesheet holes for minimum tube wear at tubesheets.

BRAZING:

All joints brazed with high temperature copper based alloy.

GUIDE TO COIL NOMENCLATURE

À
À

BW
L
24
48
4R
8F
WR
L
100

Type of Coil
 BW - Basic Water
 BS - Basic Steam

Tube Size
 L - 5/8 Inch O.D.

Finned Height
 6 through 72 inches
 Note: Finned height is equal to the number of: 5/8" tubes high x 1.5

Finned Length
 6 through 240 inches

Rows Deep
 1 through 8

Fin Depth (in direction of Airflow)
 5/8" Rows x 1.2990

Coil Circuiting

Water/Steam/Condenser
 200 - Double
 150 - One and one half
 100 - Full
 075 - Three Quarters
 067 - Two Thirds
 050 - Half
 033 - One Third
 025 - Quarter
 SPE - Special: Can be shown as a percentage as above (038, 167, etc.) or as Feeds/Passes.

Header Location
 R - Right Hand
 L - Left Hand
 S - Standard (Steam)
 N - No Header

Note – A **Right** or **Left** hand Coil is determined by the location of the Outlet Connection, when facing in the same direction as the air flow.

Fin Patterns
 FF - Flat Fin, Flat Edge
 FR - Flat Fin, Ripple Edge
 WF - Waffle Fin, Flat Edge
 WR - Waffle Fin, Ripple Edge

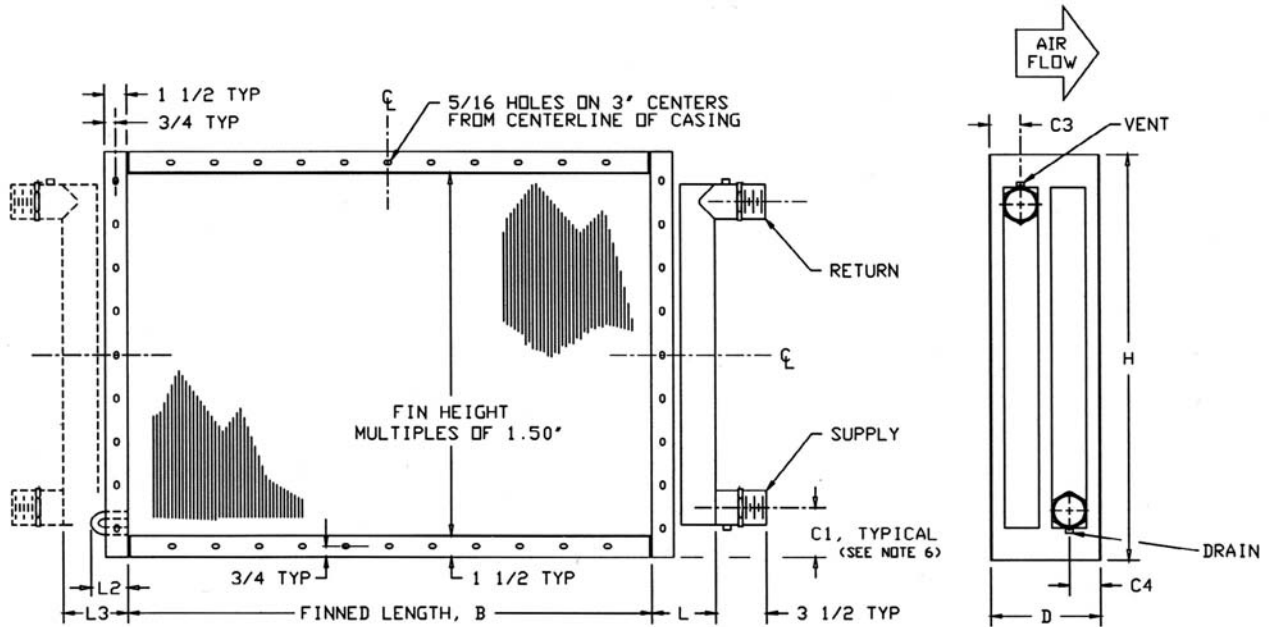
Fins per Inch
 6 through 14

Tubes High is Determined by Dividing Finned Height by 1.50".

Note – A **Right** or **Left** hand Coil is determined by the location of the Outlet Connection when facing in the same direction as the air flow.

DIMENSIONS

5/8" Basic Water Coils



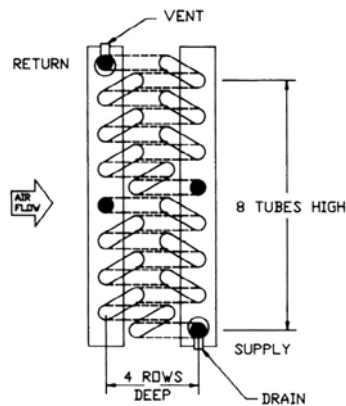
Rows	Circuiting	Fin Height				L	Note 5	D	C3/C4	Basic Water		Cleanable Removable Plugs Opposite Supply End		Cleanable Removable Plugs Both Ends	
		6 to 17 in. Supply & Return MPT	18 to 29 in. Supply & Return MPT	30 to 43 in. Supply & Return MPT	44 + in. Supply & Return MPT					L2	L3	L2	L3	L2	L3
1	Full **	1	1 1/4	1 1/2	2	Note 3	4 1/2	2 1/4	—	Note 1	—	—	—	—	
	Partial	1	1 1/4	1 1/2	2	Note 4	4 1/2	1 1/8	2 1/2	—	—	—	—	—	
2	Double **	2 1/2	2 1/2	2	2 1/2	Note 3	6	3	—	Note 1	—	—	—	—	
	Full / Partial	1 1/2	2	2	2 1/2	Note 4	6	1 1/2	2 1/2	—	3 3/4	—	—	—	
3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	Full / Partial	1 1/2	2	2	2 1/2	Note 3	7	2 1/4	—	Note 1	—	Note 2	—	Note 2	
4	Double	2 1/2	2 1/2	2 1/2	3	Note 3	8 1/2	3	2 1/2	—	3 3/4	—	3 3/4	—	
	Full / Partial	1 1/2	2	2 1/2	3	Note 3	8 1/2	2 1/4	2 1/2	—	3 3/4	—	3 3/4	—	
6	Double **	2 1/2	2 1/2	2 1/2	3	Note 3	11	3	—	Note 1	—	Note 2	—	Note 2	
	Full / Partial	1 1/2	2	2 1/2	3	Note 3	11	2 1/4	2 1/2	—	3 3/4	—	3 3/4	—	
8	Double	2 1/2	2 1/2	2 1/2	3	Note 3	13 1/2	2 7/8	2 1/2	—	3 3/4	—	3 3/4	—	
	Full / Partial	1 1/2	2	2 1/2	3	Note 3	13 1/2	2 1/4	2 1/2	—	3 3/4	—	3 3/4	—	
10	Double **	2 1/2	2 1/2	2 1/2	3	Note 3	16	2 7/8	—	Note 1	—	Note 2	—	Note 2	
	Full / Partial	1 1/2	2	2 1/2	3	Note 3	16	2 1/4	2 1/2	—	3 3/4	—	3 3/4	—	

**Will result in Opposite End Connections.

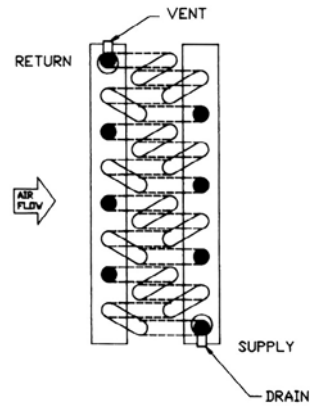
Notes:

1. Same as appropriate "L".
2. Add 1 3/4" to appropriate "L".
3. 2 1/2" plus Header Nominal OD.
4. 3" plus Header Nominal OD.
5. Consult Factory for "D" when using cleanable return bends
6. C1 & C2 = Flange + 1/2 Conn. Nom. OD.
7. Circuiting over "Full" requires 2 1/2 or larger headers.
8. Intermediate tube sheets provided when finned length exceeds 54".

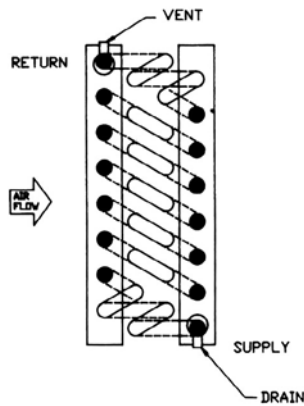
Circuiting Basic Water Coils



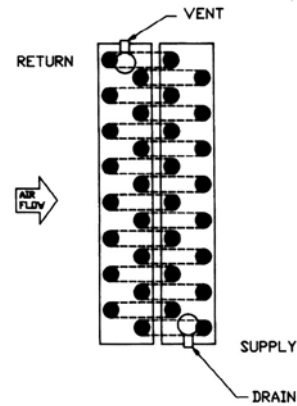
QUARTER CIRCUIT (25)



HALF CIRCUIT (50)



FULL CIRCUIT (10)



DOUBLE CIRCUIT (00)

NOTES:

- Number of tubes is calculated as fin height divided by 1.5:

$$\text{No. tubes high} = \frac{\text{Fin Height}}{1.5}$$
 - To find the number of feeds for a given coil circuiting, multiply the number of tubes high as follows:

$$\text{Feeds} = \text{No. tubes high} \times .25(1/4 \text{ CT})$$

$$\text{Feeds} = \text{No. tubes high} \times .50(1/2 \text{ CT})$$

$$\text{Feeds} = \text{No. tubes high} \times 1.0(\text{FULL CT})$$

$$\text{Feeds} = \text{No. tubes high} \times 2.0(\text{DBL CT})$$
 - Right hand connections are shown in the above diagrams. Hand of connections is determined by the location of the Outlet(return) connection when facing in the same direction as airflow.
 - Quarter circuiting gives the highest water velocity, heat transfer, and pressure drop for given coil size, while doubling circuiting gives the lowest.
 - Coils may be substantially cleared of water by draining, and blowing through the tubes with compressed air, however, absolute freeze protection can only be insured by flushing the coil system with anti-freeze solution of the appropriate concentration.
 - Coils will have the same end connections provided the number of passes is even.

$$\text{No. of passes} = \frac{\text{No. tubes high} \times \text{rows deep}}{\text{No. of Feeds}}$$
- If number of passes is an odd number, opposite end connections will result.

USEFUL EQUATIONS

A. Total BTUH – Airside

$$\text{BTUH} = 1.085 \times \text{SCFM} \times \text{TR}$$

Where TR = air temp. rise = lvg. air dry bulb – ent. air dry bulb

Note: SCFM is airflow at standard conditions. To convert actual CFM to SCFM, use multipliers given in Tables 1 and 2.

B. Total BTUH – Waterside

$$\text{BTUH} = 500 \times \text{GPM} \times \text{WTD}$$

Where WTD – water temp. drop = ent. water temp. – lvg. water temp.

C. Mass Ratio, M

$$M = \frac{\text{WTD}}{R} = \frac{1.085 \times \text{SCFM}}{500 \times \text{GPM}}$$

D. Initial Temperature Difference, TD

$$\text{TD} = \text{Ent. water temp.} - \text{Ent. air temp.}$$

E. Airside Effectiveness, E

$$E = \frac{\text{TR}}{\text{TD}}$$

F. Face Area, FA (ft²)

$$\text{FA} = \frac{\text{Fin Height} \times \text{Finned Length}}{144}$$

G. Face Velocity, SFPM = $\frac{\text{SCFM}}{\text{FA}}$

H. Water Velocity, Vw

$$\text{Vw} = \frac{\text{GPM}}{\text{FEED}} \times 1.194$$

Where $\frac{\text{GPM}}{\text{FEED}} = \frac{\text{Total GPM}}{\text{No. of Feeds}}$

I. Leaving Air Temperature, LAT

$$\begin{aligned} \text{LAT} &= \text{Ent. air temp.} + \frac{\text{BTUH}}{1.085 \times \text{SCFM}} \\ &= \text{Ent. air temp.} + \text{TR} \end{aligned}$$

J. Rows = $\frac{\text{Rt} \times \text{Co} \times \text{SFPM}}{100}$

K. BTUH = 1.085 x SCFM x E x TD

Note: Use this equation to calculate coil performance. Find effectiveness, E, from figures 5, 6 or 7 using calculated values of M and Co.

L. Co = $\frac{\text{Rows} \times 100}{\text{Rt} \times \text{SFPM}}$

M. Rt = R1 + R2

NOTES:

1. Water temperature drop (WTD) should be limited to 20 degrees F for most applications. Smaller WTD's mean higher gpm for a given BTUH and higher pressure drop.
2. Leaving air temperature should be kept 5 or more degrees below entering water temperature.
3. For the most cost effective selection, use the highest fins per inch allowable. Normally, gpm/feed should be kept at around 4 and face velocity from 500 to 1000 sfpm.

Standard Air Volume

Altitude Correction, F3
Table 1

ALTITUDE			
ALT	F3	ALT	F3
0	1.000	5000	0.826
500	0.981	5500	0.811
1000	0.962	6000	0.796
1500	0.944	6500	0.781
2000	0.926	7000	0.766
2500	0.908	7500	0.751
3000	0.891	8000	0.736
3500	0.875	8500	0.722
4000	0.858	9000	0.708
4500	0.842	9500	0.694
5000	0.826	10000	0.680

Temperature Correction, F4
Table 2

TEMPERATURE, DEG F							
TEMP	F4	TEMP	F4	TEMP	F4	TEMP	F4
0	1.152	100	0.946	200	0.803	300	0.698
10	1.128	110	0.930	210	0.791	310	0.689
20	1.104	120	0.914	220	0.779	320	0.680
30	1.082	130	0.898	230	0.768	330	0.671
40	1.060	140	0.883	240	0.757	340	0.662
50	1.039	150	0.869	250	0.746	350	0.654
60	1.019	160	0.855	260	0.736	360	0.646
70	1.000	170	0.841	270	0.726	370	0.638
80	0.982	180	0.828	280	0.716	380	0.631
90	0.964	190	0.815	290	0.707	390	0.624
100	0.946	200	0.803	300	0.698	400	0.617

To convert from actual CFM to SCFM (STD AIR):

$$\text{SCFM} = \text{CFM} \times \text{F3} \times \text{F4}$$

Example:

Convert 2000 CFM at 500 ft. and 80°F to SCFM.

F3 for 500 ft. elev. = .826

F4 for 80°F = .982

$$\text{So, SCFM} = 2000 \times .826 \times .982 = \underline{\underline{1622}}$$

SELECTION PROCEDURE

To illustrate the coil selection procedure, the following example problem is given:

Given:	Total BTUH:	65,100
	SCFM:	1,500
	Ent. Air Temp. (° F):	60
	GPM:	6.5
	Ent. Water Temp. (° F):	160
	Coil Size:	12" FH x 24" FL
	Max. Water Press Drop:	10 ft. H ₂ O
	Max Air Press Drop:	.5 in. H ₂ O

SOLUTION:

A) First, determine the lowest number of feeds possible without exceeding the water pressure drop. To do so, a number of feeds must be assumed and the gpm/feed and water velocity calculated. Divide gpm by 4 to find an initial number of feeds.

$$\text{No. feeds} = \frac{6.5}{4} = 1.625 (\text{or about } 2)$$

$$\text{Initial gpm/feed} = \frac{6.5}{2} = 3.25$$

At this point, rows must also be assumed. Let coil rows = 2.

B) Calculate water pressure drop by following the example on page 15, and using Figure 10 and Tables 3 through 8.

Water pressure drop, WPD = 5.76 ft. H₂O
(This is within our limit of 10 ft. and is acceptable.)

C) From figure 1, find R1 for gpm/feed = 3.25

$$R1 = .11$$

D) Calculate the face area, FA

$$\begin{aligned} \text{FA} &= \frac{\text{FH} \times \text{FL}}{144} \\ &= \frac{12 \times 24}{144} = 2.0 \text{ ft}^2 \end{aligned}$$

E) Calculate face velocity, FV

$$\begin{aligned} \text{FV} &= \frac{\text{SCFM}}{\text{FA}} \\ &= \frac{1500}{2} = 750 \text{ SFPM} \end{aligned}$$

F) Calculate the mass ratio, M

$$\begin{aligned} M &= \frac{1.085 \times \text{SCFM}}{500 \times \text{GPM}} \\ &= \frac{1.085 \times 1500}{500 \times 6.5} = .50 \end{aligned}$$

G) Calculate air temperature rise, TR

$$\begin{aligned} \text{TR} &= \frac{\text{BTUH}}{1.085 \times \text{SCFM}} \\ &= \frac{65100}{1.085 \times 1500} = 40 \text{ }^\circ\text{F} \end{aligned}$$

H) Calculate effectiveness, E

$$\begin{aligned} E &= \frac{\text{TR}}{\text{TD}} \\ &= \frac{40}{160 - 60} = .40 \end{aligned}$$

I) Find Co from figure 6, using

M and E:

$$Co = .58$$

J) Calculate total resistance, Rt

$$Rt = \frac{\text{Rows} \times 100}{Co \times \text{SFPM}} = \frac{2 \times 100}{.58 \times 750} = .4598$$

K) Calculate R2

$$\begin{aligned} R2 &= Rt - R1 \\ &= .4598 - .11 = .3498 \end{aligned}$$

L) Select fin spacing from Figures 3 or 4, on page 10. The calculated value of R2 (from step "K") must fall on or above the selected FPI line. For the example, pick 10 fins per inch from Figure 3.

M) Air pressure drop is calculated using A1 from Figure 8, A1 = .195

$$\begin{aligned} \text{APD} &= A1 \times \text{Rows} \\ &= .195 \times 2 = .39 \text{ inches H}_2\text{O} \end{aligned}$$

(This is within the limit of .5 inches given in the example and is acceptable.)

N) In summary, the selection is 2 row, 10 fin per inch

Figure 1
 R_1 - 1 & 2 Row Coils

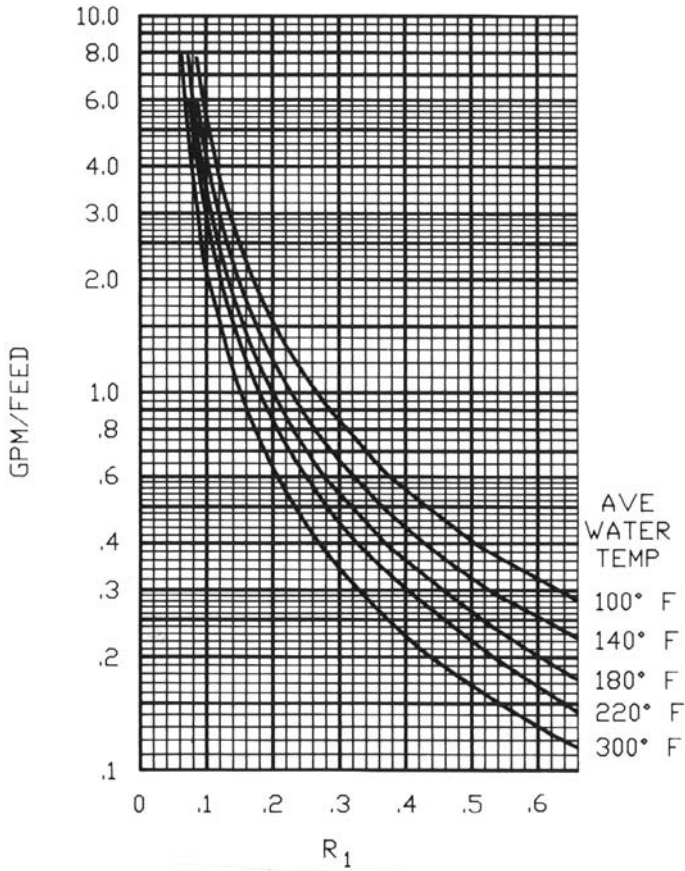


Figure 3
 R_2 - 1 & 2 Row Coils
 Type WF or WR Fins

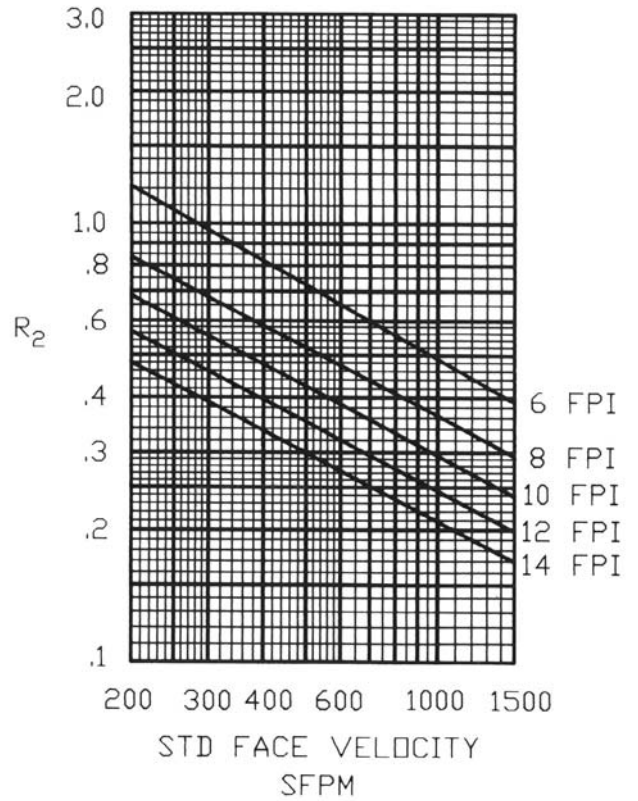


Figure 2
 R_2 - 3 & 4 Row Coils

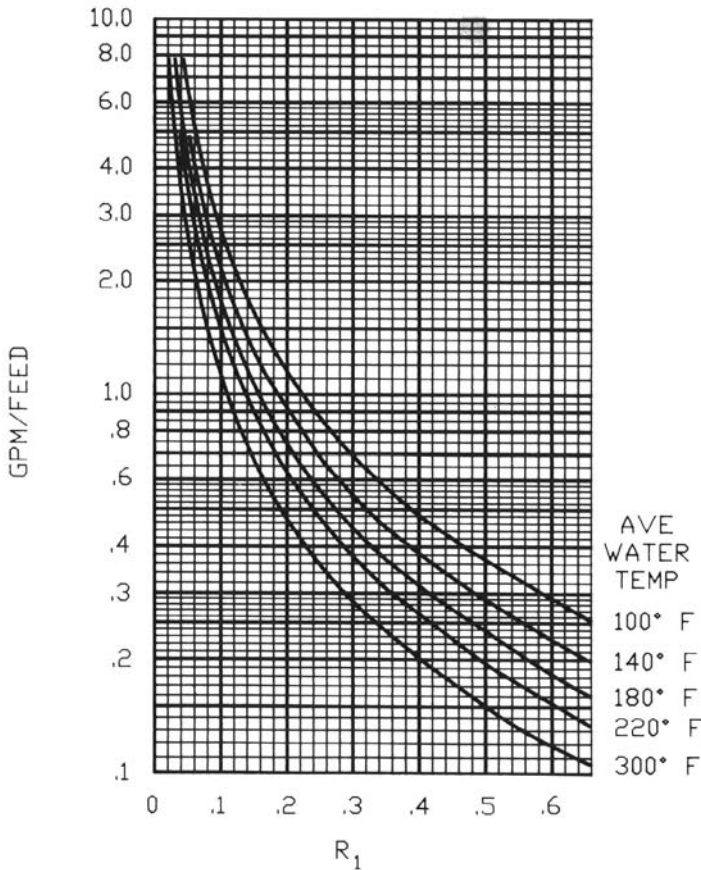
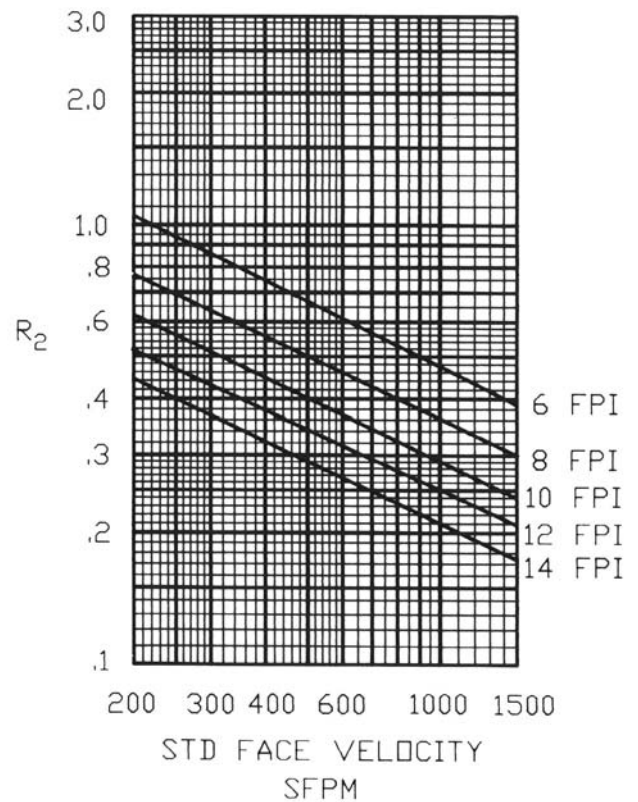
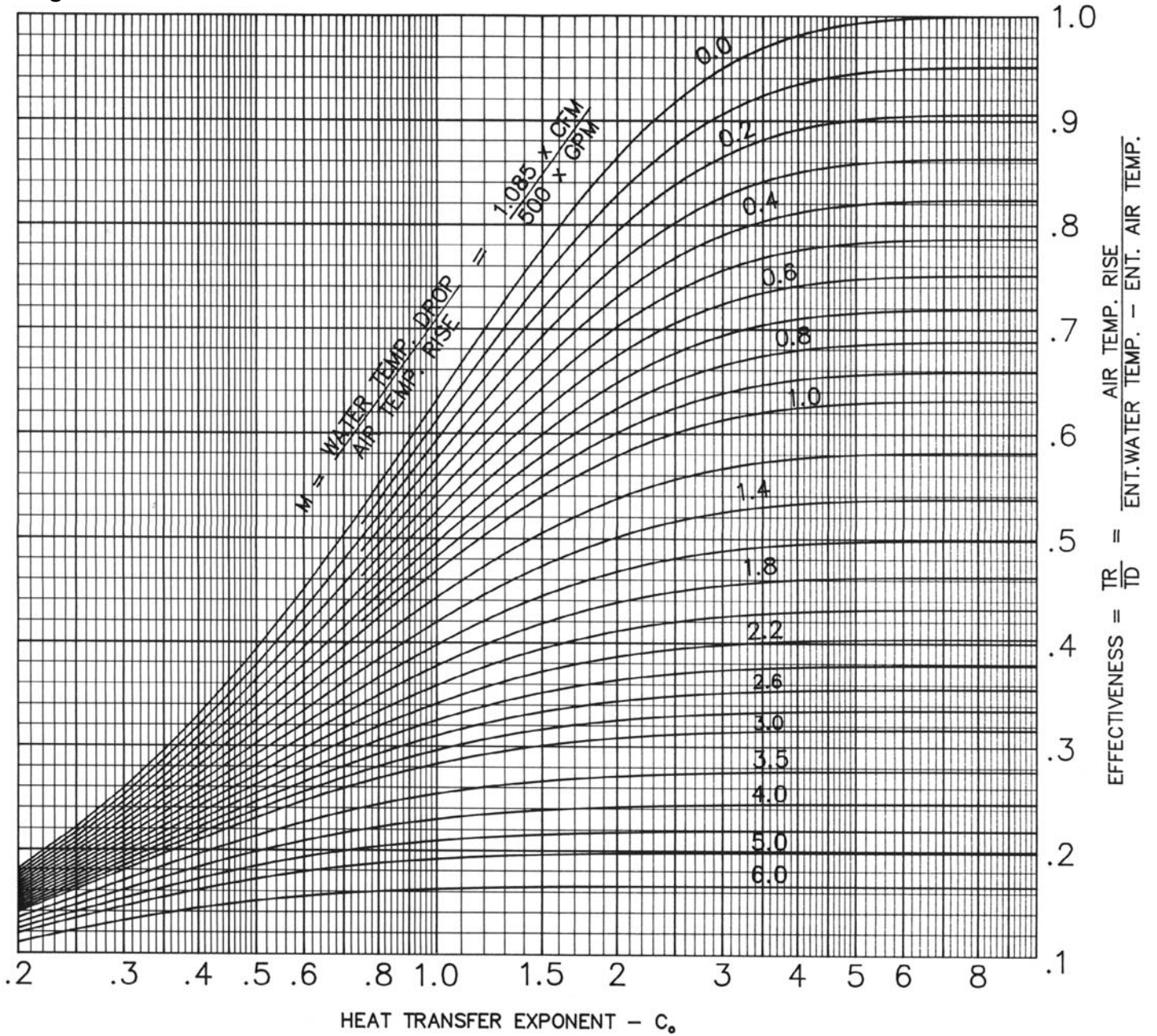


Figure 4
 R_2 - 3 & 4 Row Coils
 Type WF or WR Fins



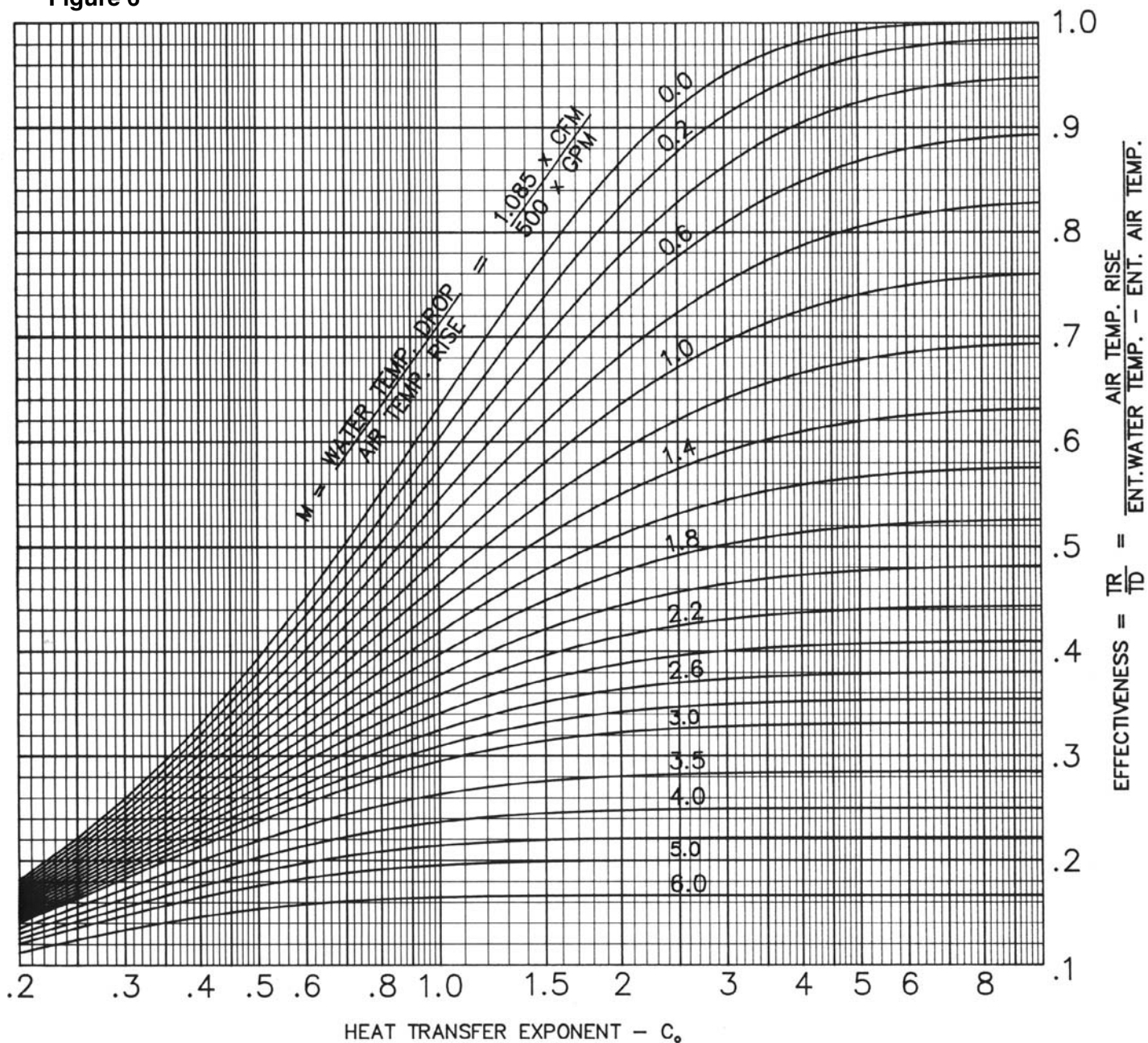
HEAT TRANSFER EXPONENT – C_o 1 ROW WATER HEATING COILS

Figure 5



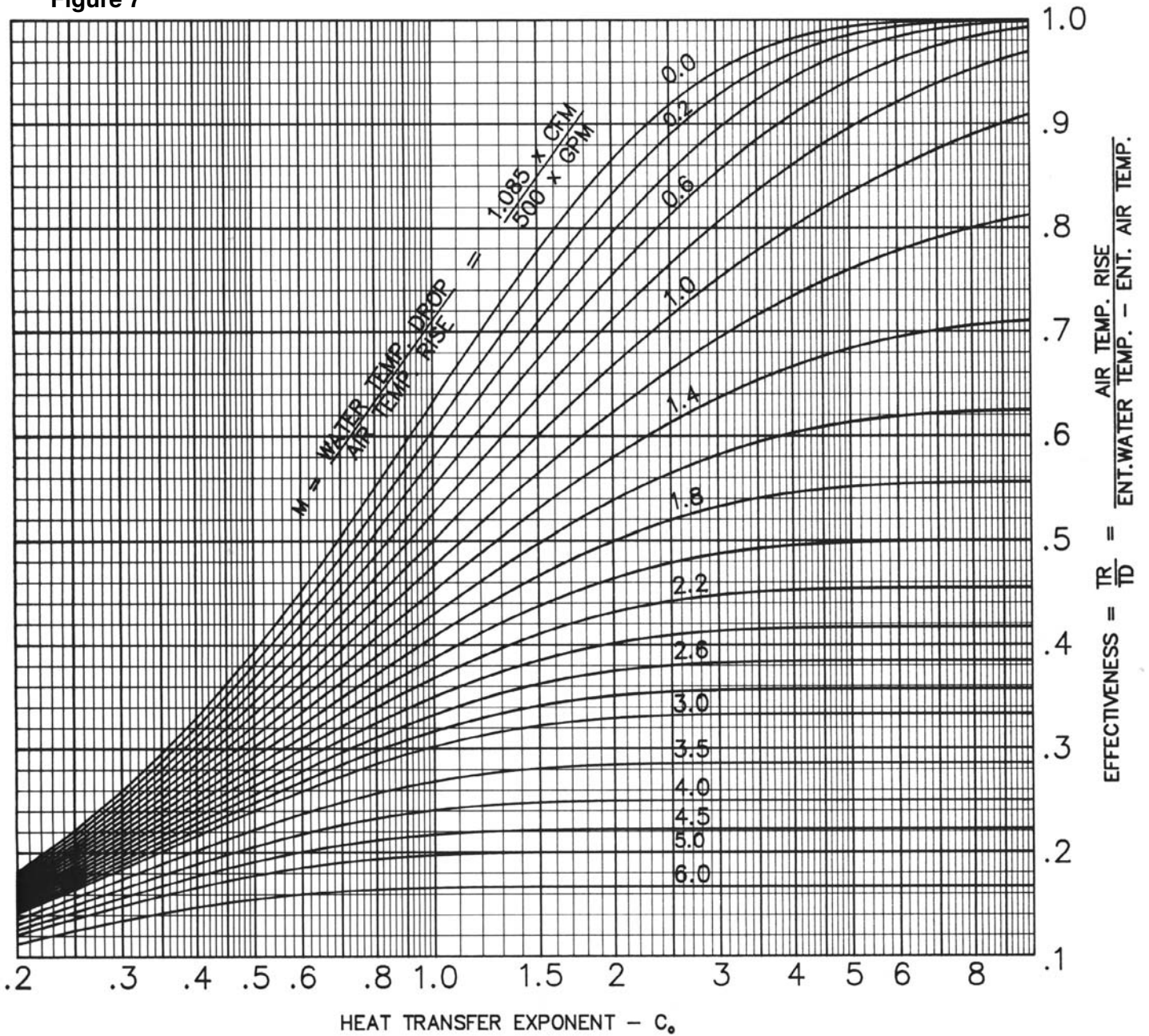
HEAT TRANSFER EXPONENT – C_o 2 ROW WATER HEATING COILS

Figure 6

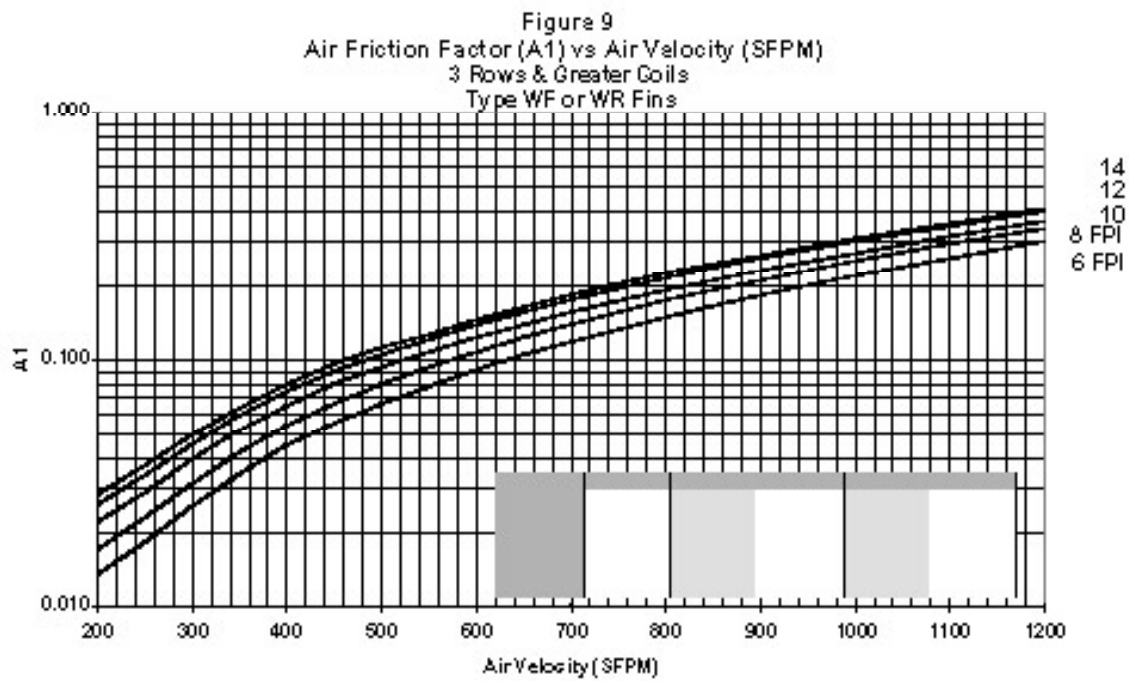
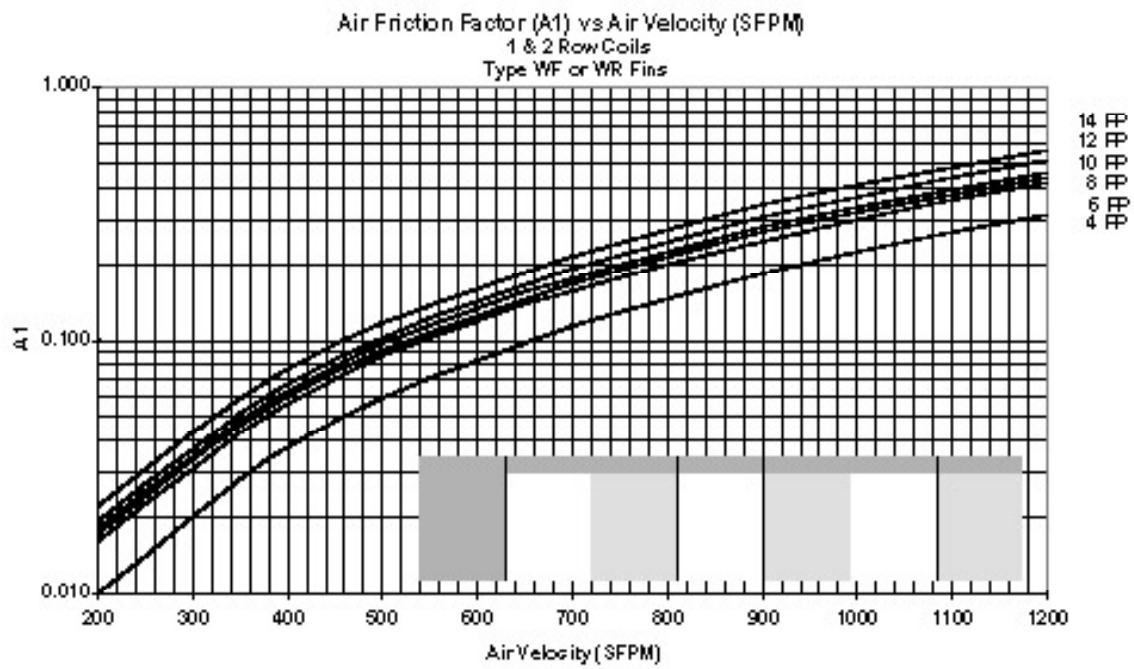


HEAT TRANSFER EXPONENT – C_o 3 & 4 ROW WATER HEATING COILS

Figure 7



Air Friction



WATER PRESSURE DROP

Water pressure drop is calculated using the following formula:

$$WPD = (HPD + LE \times F1) \times Ft$$

where WPD = water pressure drop, ft. H₂O

HPD = header pressure drop, ft. H₂O

LE = equivalent circuit length, ft.

F1 = water friction factor

Ft = water temperature factor

EXAMPLE:

Using data from the example on page 12:

Given:

Coil size:	12" FH x 24" FL
GPM:	6.5
Ent. water temp:	160
Total BTUH:	65100
No. feeds:	2
Rows:	2

SOLUTION:

A) Calculate water velocity,

$$V_w = \frac{\text{gpm}}{\text{no. feeds}} \times 1.194 = \frac{6.5}{2} \times 1.194 = 3.88 \text{ fps}$$

B) From figure 10, find F1 for 3.88 fps,

$$F1 = .127$$

C) Determine header pressure drop, HPD. Use tables 3 through 6 for type BW coils:

$$HPD = 0.34$$

D) Calculate average water temperature by the following formula:

$$T_{\text{ave}} = \text{ent. water} - WTD \times 1/2$$

$$\text{where } WTD = \frac{\text{TOTAL BTUH}}{500 \times \text{GPM}}$$

$$WTD = \frac{65100}{500 \times 6.5} = 20^\circ\text{F}$$

$$T_{\text{ave}} = 160 - 20 \times 1/2 = 150^\circ\text{F}$$

E) From Table 7, find Ft

$$Ft = .775$$

F) Calculate equivalent circuit length, LE, using the following:

$$LE = .0833 \times \left[\left(\frac{FL \times FH \times \text{Rows}}{1.5 \times \text{no. feeds}} \right) + 18 \times \left(\frac{FH \times \text{Rows}}{1.5 \times \text{no. feeds}} - 1 \right) \right]$$

$$LE = .0833 \times \left[\left(\frac{24 \times 12 \times 2}{1.5 \times 2} \right) + 18 \times \left(\frac{12 \times 2}{1.5 \times 2} - 1 \right) \right]$$

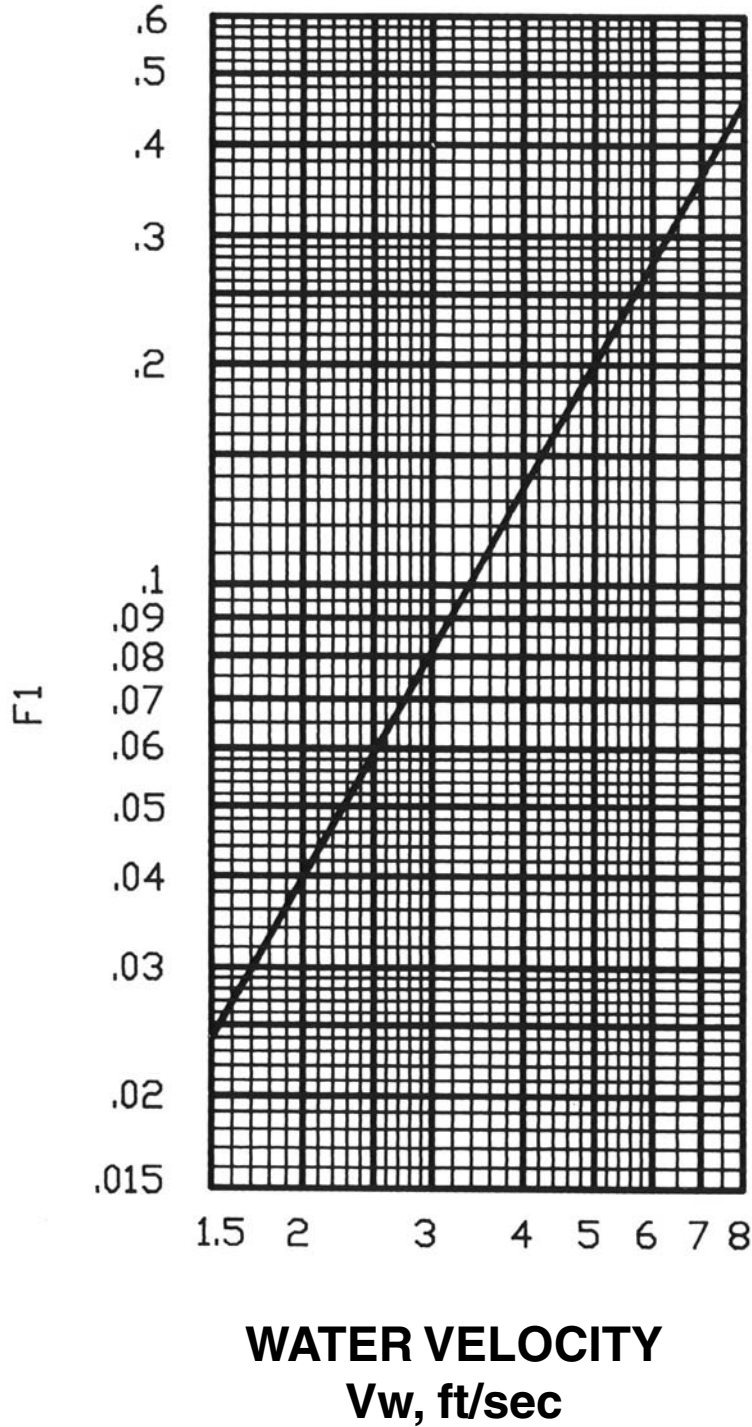
$$= 26.5 \text{ ft.}$$

G) Calculate water pressure drop,

$$WPD = (0.34 + 26.5 \times .127) \times .775$$

$$WPD = 2.87 \text{ ft.}$$

Figure 10
WATER FRICTION FACTOR, F1



Type BW

Header Pressure Drop HPD, ft H₂O

Table 3
Double Circuit
Water Velocity, FPS

No. Tubes High	1	2	3	4	6	8
8	.22	.83	1.85	3.22	7.20	12.75
10	.33	1.30	2.85	5.00	10.20	19.98
12	.16	.57	1.21	2.11	4.50	7.75
14	.22	.77	1.65	2.80	6.05	10.50
16	.27	.98	2.11	3.60	7.75	13.45
18	.33	1.21	2.64	4.50	9.80	17.00
20	.15	.55	1.18	2.00	4.15	7.00
22	.18	.64	1.39	2.35	4.90	8.40
24	.23	.76	1.61	2.74	5.80	9.99
26	.25	.88	1.88	3.20	6.75	11.40
28	.29	1.01	2.15	3.60	7.70	13.10
30	.14	.50	1.05	1.80	3.79	6.40
32	.16	.56	1.19	2.00	4.20	7.10
34	.18	.62	1.30	2.25	4.70	7.99
36	.20	.70	1.46	2.50	5.20	8.98

Table 4
Full Circuit
Water Velocity, FPS

No. Tubes High	1	2	3	4	6	8
8	.07	.27	.61	1.07	2.40	4.22
10	.11	.42	.94	1.66	3.70	6.50
12	.05	.19	.41	.72	1.59	2.74
14	.07	.25	.56	.99	2.12	3.70
16	.09	.33	.72	1.24	2.74	4.78
18	.11	.41	.91	1.59	3.42	6.00
20	.05	.20	.44	.75	1.64	2.82
22	.07	.25	.53	.91	1.97	3.35
24	.08	.29	.62	1.08	2.30	4.00
26	.09	.34	.73	1.24	2.70	4.64
28	.10	.39	.84	1.44	3.09	5.28
30	.05	.19	.41	.70	1.50	2.60
32	.06	.21	.46	.78	1.70	2.92
34	.06	.24	.51	.87	1.89	3.30
36	.07	.27	.57	.99	2.25	3.65

Table 5
Half Circuit
Water Velocity, FPS

No. Tubes High	1	2	3	4	6	8
8	.03	.12	.27	.48	1.08	1.75
10	.05	.15	.42	.75	1.65	2.89
12	.02	.09	.19	.33	.72	1.26
14	.03	.12	.25	.44	.98	1.75
16	.04	.15	.33	.57	1.26	2.17
18	.05	.19	.41	.72	1.59	2.75
20	.03	.11	.24	.42	.92	1.62
22	.03	.13	.29	.51	1.11	1.95
24	.04	.15	.34	.60	1.31	2.30
26	.05	.18	.41	.69	1.54	2.71
28	.05	.21	.46	.82	1.79	3.12
30	.03	.11	.23	.40	.88	1.52
32	.03	.12	.26	.45	1.00	1.75
34	.04	.14	.30	.52	1.10	1.95
36	.04	.15	.33	.57	1.25	2.20

Table 6
Quarter Circuit
Water Velocity, FPS

No. Tubes High	1	2	3	4	6	8
8	.02	.08	.19	.34	.75	1.31
12	.01	.05	.12	.22	.48	.86
16	.02	.10	.22	.39	.86	1.52
20	.02	.08	.18	.32	.72	1.27
24	.03	.12	.26	.46	1.01	1.80
28	.04	.16	.35	.63	1.40	2.50
32	.02	.09	.20	.35	.78	1.36
36	.03	.11	.25	.44	.99	1.73

Table 7
Water Friction Temperature Correction Factor, F_t

AVE. WATER TEMP. M ° F	100	140	180	200	220	240	260
CORRECTION FACTOR	.88	.79	.73	.70	.68	.65	.63

COIL WEIGHTS – DRY – POUNDS

FINNED LENGTH INCHES

Rows	Fin Height	12	18	24	30	36	42	48	54	60	66	72	78	84	90	96	102	108	114	120
1	12	17	20	23	27	30	34	37	41	44	47	51	54	58	61	64	68	71	75	78
	15	19	23	27	31	34	38	42	46	50	53	57	61	65	69	72	76	80	84	88
	18	22	26	30	34	38	43	47	51	55	59	64	68	72	76	80	84	89	93	97
	21	27	32	36	41	45	50	54	59	64	68	73	77	82	86	91	96	100	105	109
	24	30	35	40	45	50	55	59	64	69	74	79	84	89	94	99	104	109	114	119
	27	33	38	43	49	54	59	65	70	76	81	86	92	97	102	108	113	118	124	129
	30	42	48	54	60	65	71	77	83	88	94	100	106	111	117	123	129	134	140	146
	33	46	52	58	64	70	76	83	89	95	101	107	113	119	126	132	138	144	150	156
36	49	56	62	69	75	82	88	95	102	108	115	121	128	134	141	147	154	160	167	
2	12	20	25	30	35	40	45	50	55	60	64	69	74	79	84	89	94	99	104	109
	15	23	29	35	40	46	52	58	63	69	75	81	86	92	98	104	109	115	121	127
	18	26	33	39	46	52	59	66	72	79	85	92	98	105	111	118	124	131	137	144
	21	32	40	47	54	62	69	76	84	91	98	106	113	120	127	135	142	149	157	164
	24	36	44	52	60	68	76	84	93	101	109	117	125	133	141	149	157	165	173	181
	27	40	49	57	66	75	84	93	102	111	120	128	137	146	155	164	173	182	190	199
	30	50	60	69	79	89	98	108	118	127	137	147	156	166	176	185	195	205	214	224
	33	54	65	75	86	96	107	117	127	138	148	159	169	180	190	200	211	221	232	242
36	59	70	81	92	103	115	126	137	148	160	171	182	193	204	216	227	238	249	260	
4	12	28	37	45	54	62	71	79	88	96	105	113	122	130	139	147	155	164	172	181
	15	33	43	53	63	73	83	93	103	114	124	134	144	154	164	174	184	194	204	214
	18	38	50	61	73	85	96	108	119	131	143	154	166	178	189	201	212	224	236	247
	21	46	59	72	86	99	112	125	138	151	165	178	191	204	217	230	244	257	270	283
	24	51	66	81	95	110	125	140	154	169	184	199	213	228	243	258	272	287	302	316
	27	57	73	89	106	122	138	155	171	187	203	220	236	252	269	285	301	318	334	350
	30	69	87	105	123	140	158	176	194	212	230	248	265	283	301	319	337	355	373	390
	33	75	94	114	133	153	172	191	211	230	250	269	289	308	327	347	366	386	405	424
36	81	102	123	144	165	186	207	228	249	270	291	312	333	354	375	396	417	438	459	
6	12	36	48	60	72	84	96	108	121	133	145	157	169	181	193	205	217	229	241	253
	15	43	58	72	86	101	115	129	144	158	172	187	201	216	230	244	259	273	287	302
	18	50	67	83	100	117	133	150	167	184	200	217	234	250	267	284	301	317	334	351
	21	60	79	98	117	136	155	174	193	212	231	250	269	288	307	326	345	364	383	402
	24	67	88	109	131	152	174	195	216	238	259	280	302	323	345	366	387	409	430	451
	27	74	98	121	145	169	193	216	240	264	287	311	335	359	382	406	430	453	477	501
	30	88	114	140	166	192	218	244	270	296	322	349	375	401	427	453	479	505	531	557
	33	96	124	152	181	209	238	266	294	323	351	380	408	436	465	493	522	550	578	607
36	103	134	165	196	226	257	288	319	349	380	411	442	472	503	534	565	595	626	657	
8	12	45	60	76	91	107	122	138	153	169	185	200	216	231	247	262	278	293	309	325
	15	53	72	91	109	128	147	165	184	203	221	240	259	277	296	315	333	352	371	389
	18	62	84	105	127	149	171	193	214	236	258	280	301	323	345	367	389	410	432	454
	21	73	98	123	148	173	198	223	248	272	297	322	347	372	397	422	447	472	497	522
	24	82	110	138	166	194	222	250	278	306	334	362	390	418	446	474	502	530	558	586
	27	91	122	153	184	216	247	278	309	340	371	403	434	465	496	527	558	589	621	652
	30	107	141	175	210	244	278	312	347	381	415	449	484	518	552	587	621	655	689	724
	33	116	154	191	228	266	303	341	378	415	453	490	528	565	602	640	677	715	752	789
36	126	166	207	247	288	328	369	409	450	490	531	571	612	652	693	734	774	815	855	

NOTES:

1. FOR WATER COIL OPERATING WEIGHTS, ADD DRY COIL WEIGHT TO 1.32 X FACE AREA X ROWS
 [(WOP = WDRY + (1.32 X FDA X 12))]
2. WEIGHTS BASED ON 10 FPI COILS; VARIANCE FOR 6, 8, AND 12 FPI IS LESS THAN 5% OF LISTED WEIGHT.



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Heat Pipes for Heat Recovery



Dry Coolers for Glycol or Gas Cooling



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CRN



CSA

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