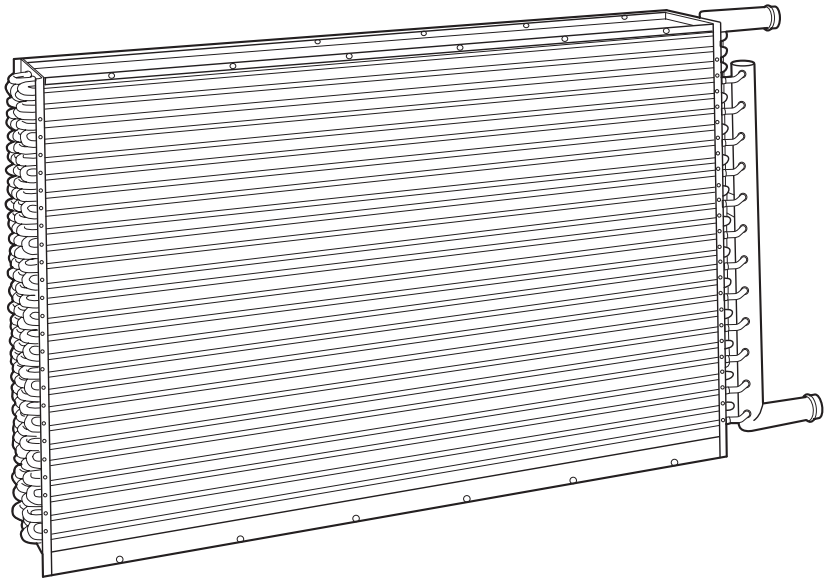
Carrier®

Product Data

NU-FIN™ 28BC,BH,BB,BD,BF,BX,BZ Separate Sale Plate Fin Water, Direct Expansion and Non-Freeze Steam Coils

NU-FIN™ COILS



Nu-Fin coils offer:

- Plate fin design with $^{1}/_{2}$ or $^{5}/_{8}$-in. diameter copper tubes
- Chilled water, hot water, direct expansion, and distributing steam coils in lengths from 24 in. to 144 in. (in one-inch increments)
- Chilled, hot water, and direct expansion coils available in heights from 15 to 55 in.
- Hot water booster coil lengths range from 12 to 42 in. with heights from 5 to 15 inches.
- 28BC,BH,BB,BX coils are available in aluminum or copper fin spacings of 8, 11, or 14 fins per inch.
- 28BD,BF coils are available in aluminum or copper fin spacings of 8, 12, or 14 fins per inch.
- 28BZ coils are available in aluminum or copper fin spacings of 6, 9, or 12 fins per inch.
- Cooling coils are available in 4, 6, 8, or 10 rows. Heating coils are available in 1 or 2 rows.
- Inner distributing steam coils are available for horizontal or vertical applications and only in a 1-row configuration.

Features/Benefits

Carrier's 28B Series coils offer a wide range of sizes. Top quality chilled water cooling coils and hot water heating coils are offered with options that provide a custom fit for your application.

Optimized headers

All chilled and hot water coil headers are constructed from rugged steel pipe (optional non-ferrous headers are available) and precisely sized to minimize fluid pressure loss.

Features/Benefits (cont)

Quality control tests

Carrier Nu-Fin™ coils are quality-inspected continuously during the manufacturing process to ensure the most reliable performance possible. Once the coil is assembled and ready for shipping, a final quality control check is made. Each Nu-Fin coil is submerged and pressurized to 450 psig in Carrier's custom-designed testing chamber. This is called a burst test. The coil is then tested at 250 psig for leaks. Both tests ensure delivery of a quality coil. If a coil does not fail at the factory, it should not fail in your air-handling system.

Additional information

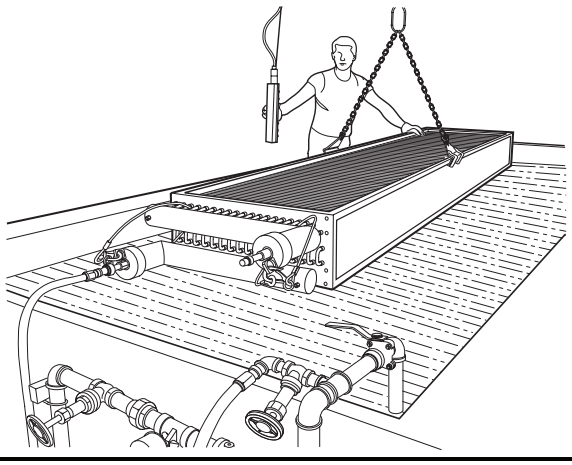
For additional information or technical assistance:

Telephone: 1.800.225.COIL (2645)

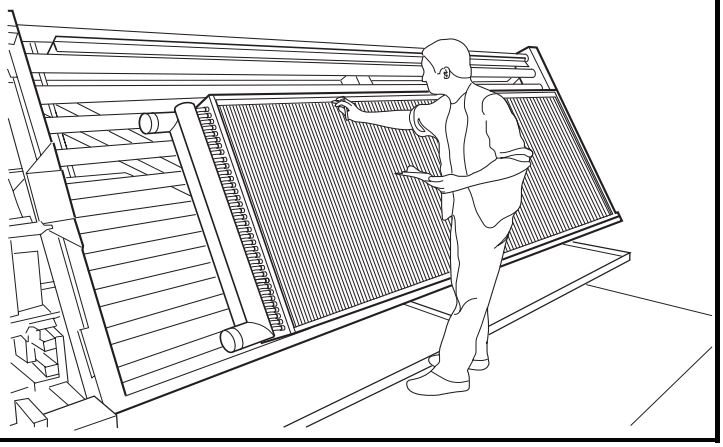
Email: rcd.coil@carrier.utc.com

Table of contents

LEAK-TESTED COILS



QUALITY INSPECTION



Selection procedure

Computerized coil selection

The Product and Systems Electronic Catalog is a series of computer programs used to select products and systems offered by Carrier. The program is designed to run on an IBM-compatible personal computer.

The Nu-Fin™ Coil Selection program is one of the electronic catalog programs. This program is designed to select and generate performance ratings for the Nu-Fin coils.

To use the Nu-Fin program, follow the 3 basic steps described below.

Step 1 — Select program parameters.

Since the Nu-Fin Coil Selection program can be used for selection of any Carrier coils, certain parameters must be specified when using the program to select Nu-Fin coils. The following must be selected on the input screen:

- Application on which rating calculation will be based (hot water, chilled water, direct expansion, or steam).

Step 2 — Define criteria.

The criteria on which the rating calculations will be based must be specified on the input screen. The criteria consist of an identification name (tag name), installation site data, design condition, equipment data and calculation guidelines.

To define the criteria, position the highlighted bar on the item value to be entered or modified. Listed below are the different ways data may be entered or modified:

- Numeric value — Enter the desired value.
- List item value — These data items are specified by pressing the corresponding code of the desired item value as shown on the pop-up window.
- Text value — Enter the desired characters.

Once all the desired data items have been modified or entered, press <calculate> to exit the input screen. The program will perform an error checking routine to verify the criteria that has been entered. If an error is detected, the program will display the corresponding error message and you will be given an opportunity to modify the data. If there are no errors, the program will proceed to the calculation routines.

Step 3 — Select Coil.

The last step in using the Nu-Fin Coil Selection program involves reviewing the results of the rating calculations, selecting coils, and printing the summary result. Different procedures must be followed, depending on the program mode that was selected in Step 1.

The output screen for coil selections offers 2 modes of display:

1. 4-item mode — This mode displays all the calculated coils and values of the 4 selected items in their specified order. You may change each of the criteria by modifying the header of each column. Clicking the corresponding button changes the order of display (ascending to descending).
2. Browse mode — This mode allows coil selection by viewing detailed performance data for the specified coil. The coils are arranged using a 4-way sort as specified in the sort criteria dialog. The spreadsheet format allows side-by-side comparison of each coil's performance. It may be necessary to scroll down the page to view all of the data. Columns may be enlarged by cursor click and drag to view truncated part numbers.

NOTE: The Nu-Fin Coil Selection software may be downloaded at www.carrier-commercial.com.

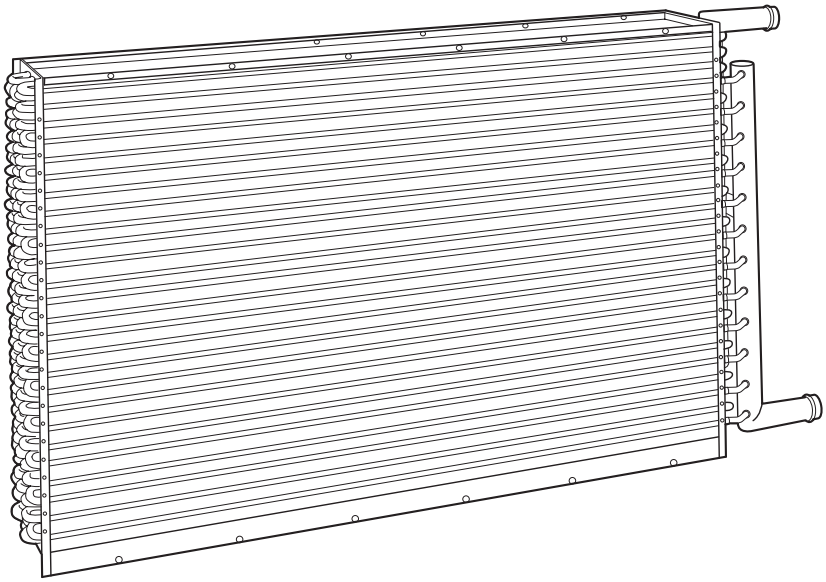
Features

28BC cooling coils ($1/2$-in.)

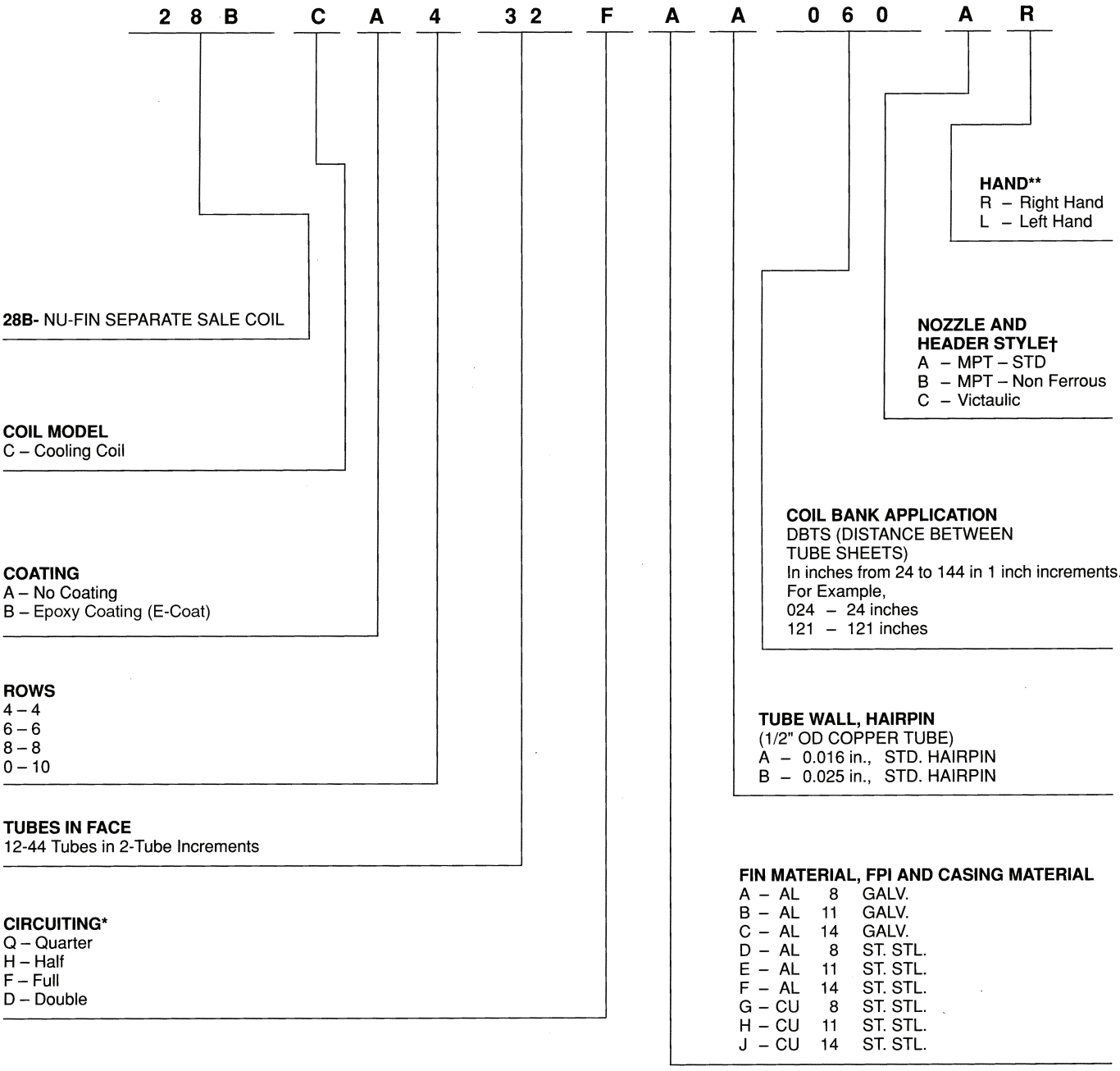
The 28BC cooling coils are designed primarily for air cooling applications using chilled water or brine. They can also be used as heating coils, on low temperature hot water applications only. The coils are available with aluminum or copper fins. Galvanized or stainless steel casings provide added durability. Headers are sized to match maximum coil capacity.

- 15-in. to 55-in. coil height (in $2 1/2$-in. increments)
- 24-in. to 144-in. long finned tube (in one-in. increments)
- 4, 6, 8, or 10 rows
- 8, 11, or 14 fins per in.
- Working pressure up to 300 psig at 200 F (175 psig at 400 F)
- Hydrostatically tested at 450 psig
- Non-trapping circuit design
- Standard 0.016-in. or optional 0.025-in. tube wall thickness
- Standard MPT or optional Victaulic grooved headers
- Non-ferrous headers and nozzles available
- Available in full, half, quarter, and double circuiting to meet your design requirements
- Stainless steel casings are automatically provided when copper fins are specified.

28BC



Model number nomenclature — 28BC



LEGEND

TIF — Tubes-in-Face

*Quarter circuit available for 4-row coils with TIF = 12, 16, 20, 24, 28, 32, 36, 40, 44 only. Half, full, or double circuit available with any 4, 6, 8, or 10 row.

†

CIRCUIT	NOMINAL PIPE SIZE (in.)
Q	$1\frac{1}{2}$
F	$2\frac{1}{2}$
H	$2\frac{1}{2}$
D	3

**Hand is determined by the location of coil connections when viewed while facing the coil air inlet.

NOTE: Example shown is for a 4-row cooling coil, not coated; 32 tubes-in-face; a full circuit, with 8 aluminum fins per inch and galvanized casing; and $\frac{1}{2}$-in. OD copper tubes with 0.016-in. wall thickness. The coil is 60 in. long between tube sheets and has right-hand, $2\frac{1}{2}$-in. MPT standard steel headers.

Physical data — 28BC

The nomograph shown on the next page can be used to determine coil volumes and weights for both the 28BC and 28BH coils. The following example shows how to use the nomograph and is based on the coil selection shown in Model Number Nomenclature on page 5.

Coil volume

Enter nomograph at finned tube length of 60 inches. Draw a straight line through the 32 tubes-in-face volume point, to find the multiplier of 3.0. Refer to the Volume and Weight Factors table and find the core volume factor for a 4-row, 8 fin/in. coil is 2.13.

Core volume = 2.13 x 3.0
= 6.3 gal

To find header volume, enter the nomograph at the headers line at 32 tubes-in-face. Draw a straight line through the 32 tubes-in-face volume point to find the multiplier of 7.7. Refer to the Volume and Weight Factors table and find the header volume factor for a $2^1/_2$-in. header is 0.26.

Header volume = 0.26 x 7.7
= 2.0 gal

Total coil volume = 6.3 + 2.0
= 8.3 gal

Coil weight

Enter the nomograph at finned tube length of 60 inches. Draw a straight line through the 32 tubes-in-face weight point, to find the multiplier of 3.05. Refer to the Volume and Weight factors table and find the core weight factor for a 4-row, 8 fin/in. coil is 62.5.

Core weight = 62.5 x 3.05
= 190.6 lb

To find header weight, enter the nomograph at the headers line at 32 tubes-in-face. Draw a straight line through the 32 tubes-in-face weight point to find the multiplier of 7.9. Refer to the Volume and Weight Factors table and find the header weight factor for a $2^1/_2$-in. coil is 7.14.

Header weight = 7.14 x 7.9
= 56.4 lb

Total coil weight = 190.6 + 56.4
= 247 lb

VOLUME AND WEIGHT FACTORS

VOLUME					WEIGHT			
Coil Rows*	Core	Header (in.)			Core†	Header (in.)		
		$1^1/_2$	$2^1/_2$	3		$1^1/_2$	$2^1/_2$	3
4	2.13	.11	.26	.40	62.5	3.68	7.14	9.15
6	3.19				93.1			
8	4.25				123.1			
10	5.32				153.1			

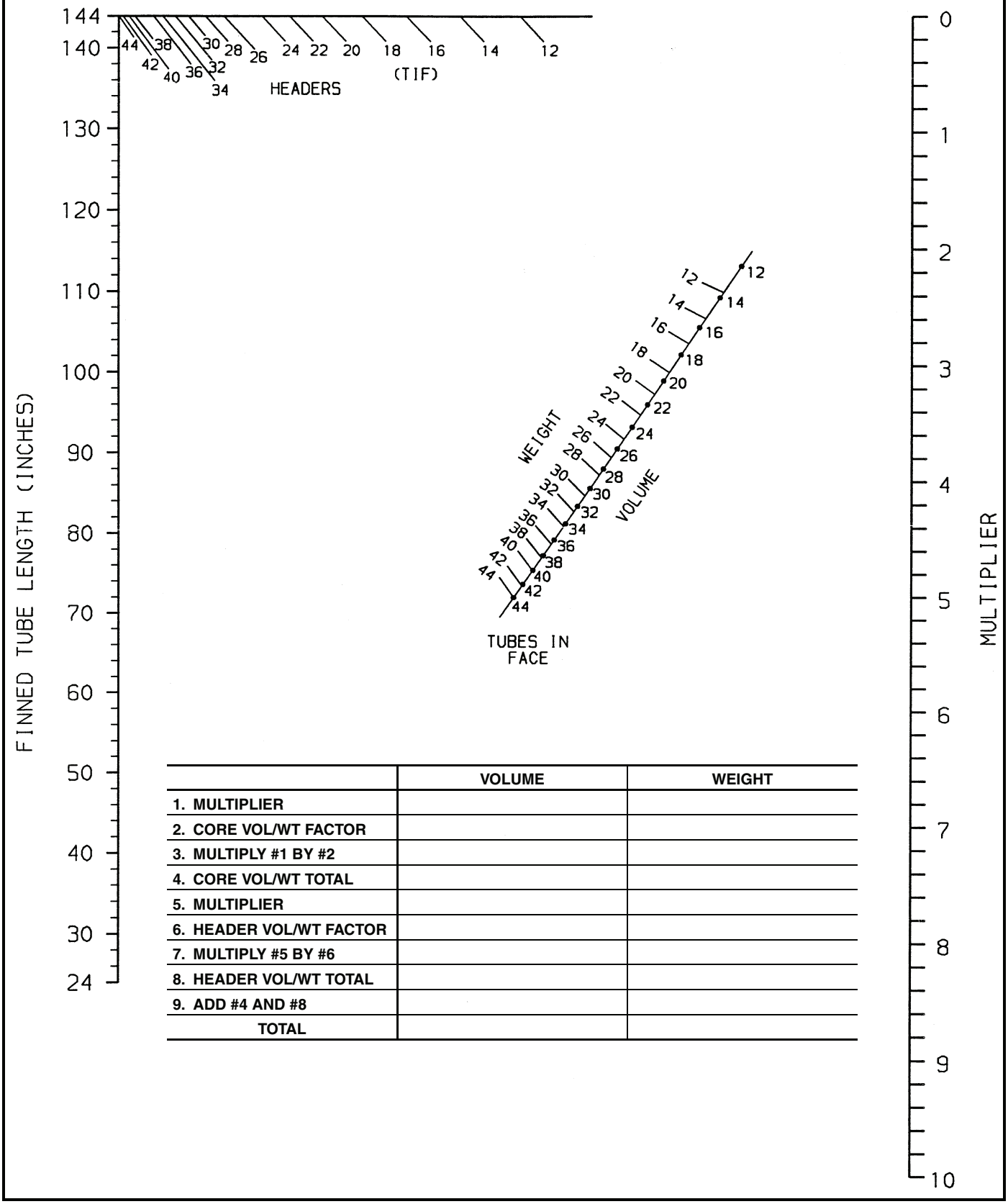
*One and 2-row coils are available upon request.
†Weight core factors are for 8 aluminum fins per inch. For copper fins, multiply by 1.2; for 11 FPI, multiply by 1.04; for 14 FPI, multiply by 1.08.

NOTE: Header factors are consistent regardless of number of rows. For header pipe size, refer to the following table:

HEADER SIZE

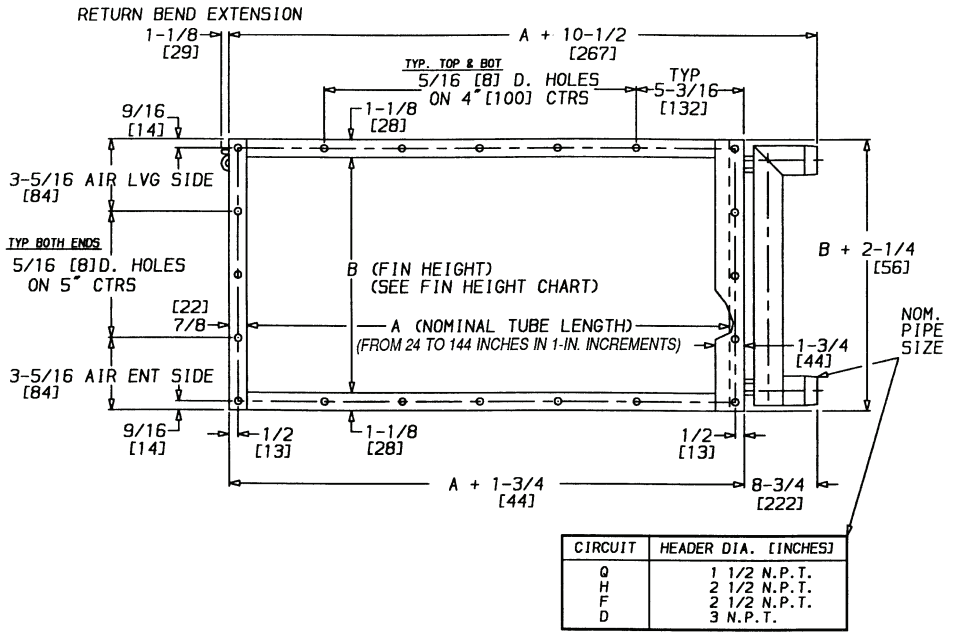
COOLING COILS		HEATING COILS	
Circuit	Nominal Pipe Diam (in.)	Circuit	Nominal Pipe Diam (in.)
Quarter	$1^1/_2$	Half	$1^1/_2$
Half	$2^1/_2$	Full	$2^1/_2$
Full	$2^1/_2$		
Double	3		

COIL VOLUME AND WEIGHT NOMOGRAPH



	VOLUME	WEIGHT
1. MULTIPLIER		
2. CORE VOL/WT FACTOR		
3. MULTIPLY #1 BY #2		
4. CORE VOL/WT TOTAL		
5. MULTIPLIER		
6. HEADER VOL/WT FACTOR		
7. MULTIPLY #5 BY #6		
8. HEADER VOL/WT TOTAL		
9. ADD #4 AND #8		
TOTAL		

Dimensions — 28BC



CIRCUIT	HEADER DIA. [INCHES]
Q	1 1/2 N.P.T.
H	2 1/2 N.P.T.
F	2 1/2 N.P.T.
D	3 N.P.T.

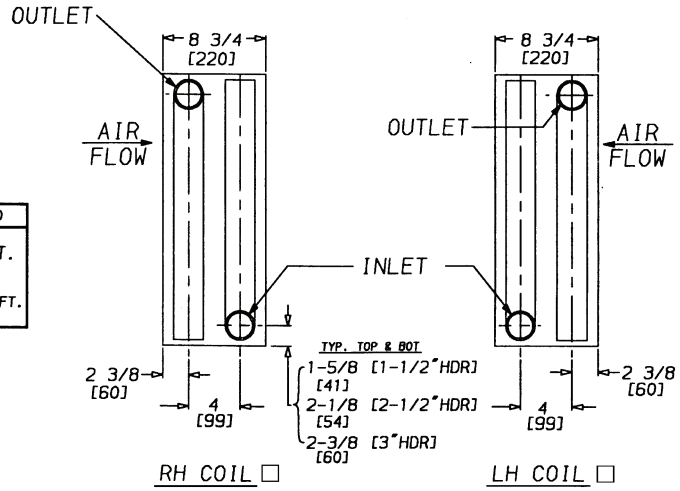
FIN HEIGHT	
TIF	B
12	15 [381]
14	17-1/2 [444]
16	20 [508]
18	22-1/2 [571]
20	25 [635]
22	27-1/2 [698]
24	30 [762]
26	32-1/2 [825]
28	35 [889]
30	37-1/2 [952]
32	40 [1016]
34	42-1/2 [1079]
36	45 [1143]
38	47-1/2 [1206]
40	50 [1270]
42	52-1/2 [1333]
44	55 [1397]

FACE AREA (SQ. FT.)

$\frac{A \times B}{144}$ = SQ. FT.

EXAMPLE:

$\frac{50 \times 30}{144}$ = 10 1/2 SQ.FT.



LEGEND

TIF — Tubes-in-face

NOTES:

1. Quarter circuit available for (4) row coil only with TIF of 12, 16, 20, 24, 28, 32, 36, 40, 44. Half, full, or double circuit available with any 4, 6, 8, or 10 row.
2. Dimensions are in inches; dimensions in [ ] are in millimeters.
3. Submittal prints are obtainable within the Nu-Fin™ coil selection software.

Performance data — 28BC

28BC COOLING CAPACITIES*

ROWS	CIRCUIT TYPE	FINS PER IN.	TOTAL CAPACITY (Btuh/ sq ft)	WATER TEMP RISE (F)	LEAVING AIR DB TEMP (F)	LEAVING AIR WB TEMP (F)	WATER PRESSURE DROP (ft wg)	AIR PRESSURE DROP (DRY) (in. wg)
4	Quarter	8	9,172	22.8	64.3	61.4	25.3	0.37
		11	10,062	25.0	62.6	60.8		0.45
		14	10,598	26.3	61.6	60.5		0.52
	Half	8	11,678	14.5	62.6	59.8	13.5	0.37
		11	13,137	16.3	60.5	58.8		0.45
		14	14,034	17.4	59.3	58.2		0.52
	Full	8	13,603	8.4	61.2	58.5	9.3	0.37
		11	15,528	9.6	58.8	57.2		0.45
		14	16,689	10.4	57.4	56.4		0.52
	Double	8	14,828	4.6	60.3	57.7	7.6	0.37
		11	17,064	5.3	57.7	56.1		0.45
		14	18,353	5.7	56.2	55.2		0.52
6	Half	8	14,250	17.7	59.4	58.1	19.3	0.55
		11	15,686	19.5	57.7	57.1		0.67
		14	16,532	20.5	56.8	56.5		0.79
	Full	8	17,051	10.6	57.4	56.1	12.2	0.55
		11	19,050	11.8	55.2	54.7		0.67
		14	20,206	12.5	54.1	53.8		0.79
	Double	8	18,846	5.8	56.0	54.8	9.1	0.55
		11	21,170	6.6	53.6	53.1		0.67
		14	22,473	7.0	52.4	52.1		0.79
8	Half	8	16,014	19.9	57.4	56.8	25.1	0.74
		11	17,356	21.5	56.1	55.9		0.90
		14	18,115	22.5	55.4	55.4		1.05
	Full	8	19,535	12.1	54.9	54.3	15.1	0.74
		11	21,493	13.3	53.1	52.9		0.90
		14	22,591	14.0	52.1	52.0		1.05
	Double	8	21,715	6.7	53.2	52.7	10.5	0.74
		11	23,939	7.4	51.2	51.0		0.90
		14	25,039	7.8	50.2	50.1		1.05
10	Half	8	17,294	21.5	56.2	55.9	30.9	0.92
		11	18,521	23.0	55.1	55.1		1.12
		14	19,209	23.8	54.6	54.6		1.31
	Full	8	21,400	13.3	53.2	52.9	18.1	0.92
		11	23,247	14.4	51.6	51.5		1.12
		14	24,256	15.1	50.7	50.7		1.31
	Double	8	23,843	7.4	51.3	51.0	12.0	0.92
		11	25,845	8.0	49.5	49.4		1.12
		14	26,821	8.3	48.7	48.6		1.31

LEGEND

DB — Dry Bulb
WB — Wet Bulb

*Ratings based on 80 F dry bulb, 67 F wet bulb entering air temperature; 500 ft/min entering air velocity; and 45 F entering water temperature — 4 ft/sec. For capacities at other conditions, use Nu-Fin™ coil selection program.

NOTE: Data based on finned tube length of 84 in. and 28 tubes-in-face.

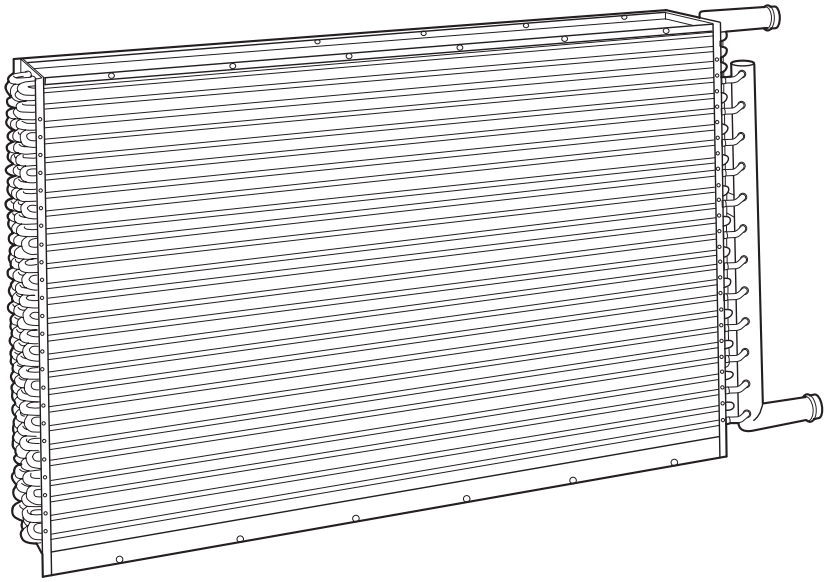
Features

28BH heating coils ($1/2$-in.)

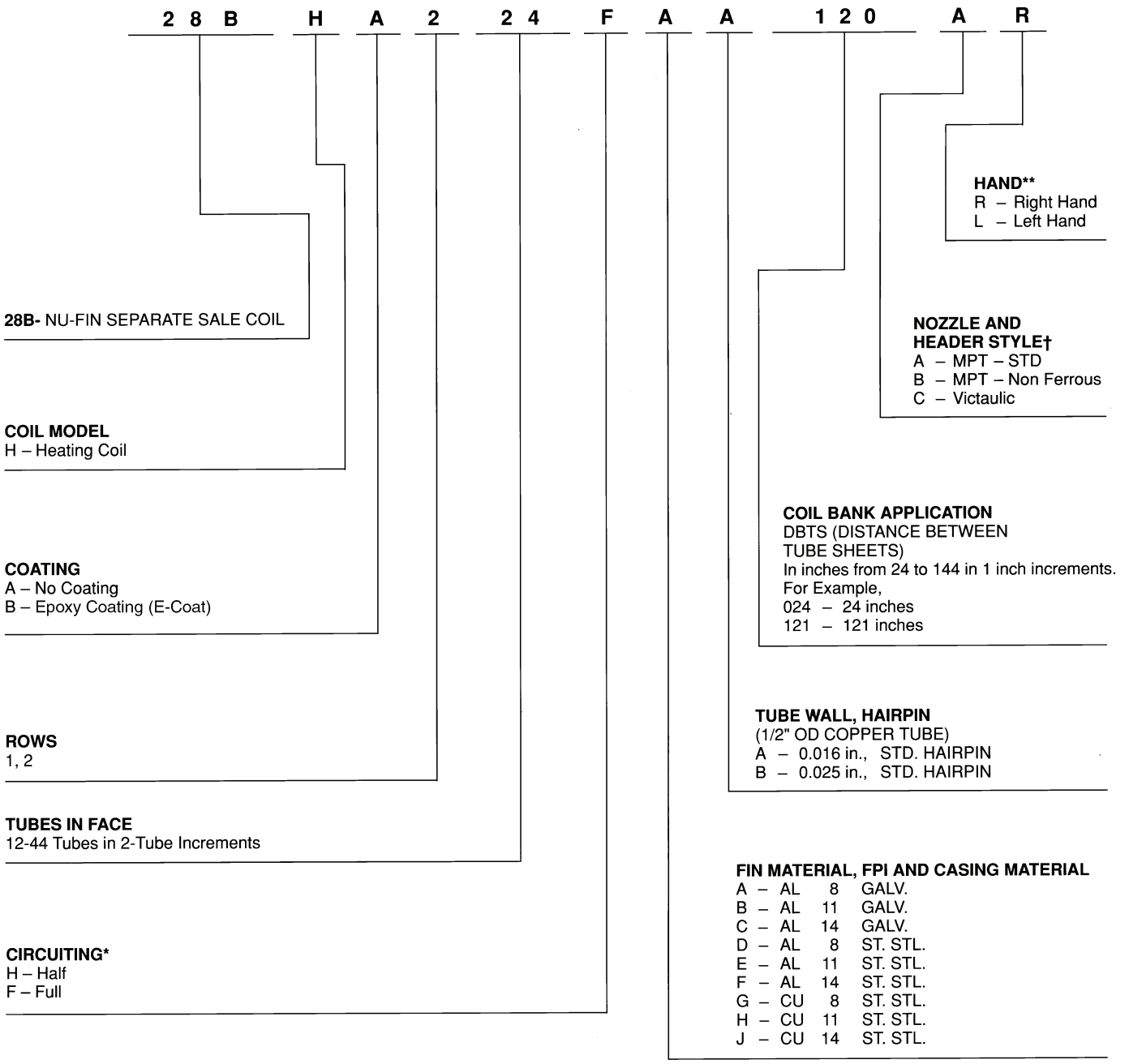
The 28BH heating coils are designed for air heating applications using hot water or brine only. The coils are available with aluminum or copper fins. Galvanized or stainless steel casings provide added durability. Headers are sized to match maximum coil capacity.

- 15-in. to 55-in. coil height (in $2 1/2$-in. increments)
- 24-in. to 144-in. long finned tube (in one-in. increments)
- 1 or 2 rows
- 8, 11, or 14 fins per in.
- Working pressure up to 175 psig at 400 F (300 psig at 200 F)
- Hydrostatically tested at 450 psig
- Non-trapping circuit design
- Standard 0.016-in. or optional 0.025-in. tube wall thickness
- Standard MPT or optional Victaulic grooved headers
- Non-ferrous headers and nozzles available
- Available in full or half circuiting to meet your design requirements
- Stainless steel casings are automatically provided when copper fins are specified

28BH



Model number nomenclature — 28BH



*Half circuit available for 1-row or 2-row coils; full circuit available for 2-row only.

†

CIRCUIT	NOMINAL PIPE SIZE (in.)
H	1 1/2
F	2 1/2

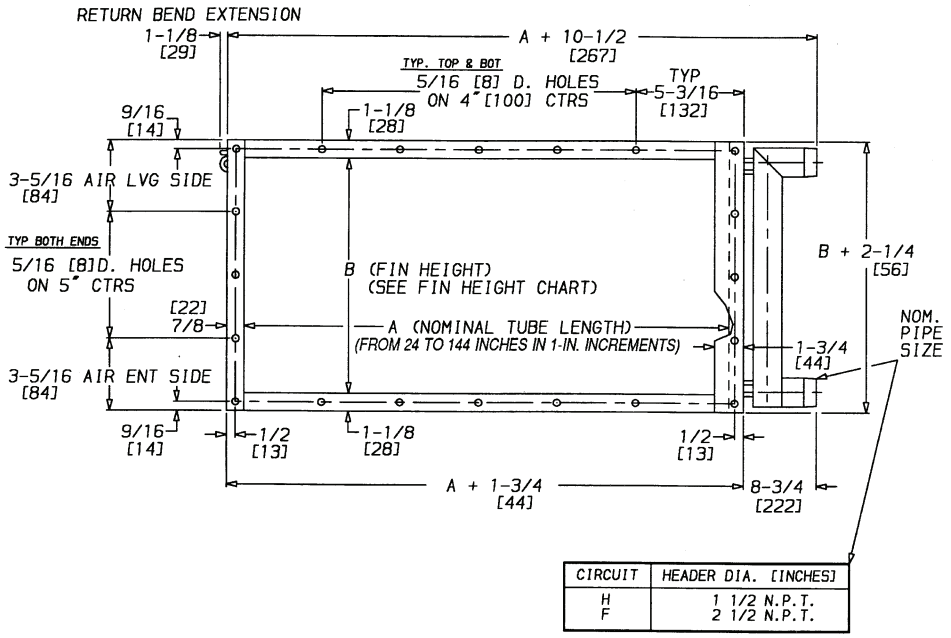
**Hand is determined by the location of coil connections when viewed while facing the coil air inlet.

NOTE: Example shown is for a 2-row heating coil, not coated; 24 tubes-in-face; a full circuit, with 8 aluminum fins per inch and galvanized casing; and copper tubes with 0.016-in. wall thickness. The coil is 120 in. long between tube sheets and has right-hand, 2 1/2-in. MPT standard steel headers.

Physical data — 28BH

For 28BH coil volumes and weights, refer to nomograph on page 7.

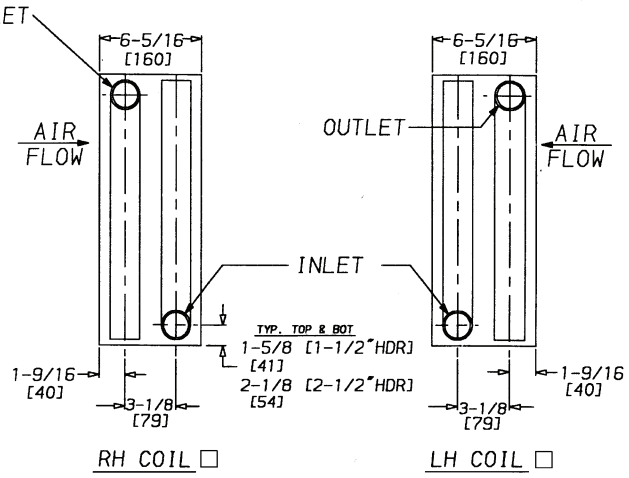
Dimensions — 28BH



CIRCUIT	HEADER DIA. [INCHES]
H	1 1/2 N.P.T.
F	2 1/2 N.P.T.

FIN HEIGHT	
TIF	B
12	15 [381]
14	17-1/2 [444]
16	20 [508]
18	22-1/2 [571]
20	25 [635]
22	27-1/2 [698]
24	30 [762]
26	32-1/2 [825]
28	35 [889]
30	37-1/2 [952]
32	40 [1016]
34	42-1/2 [1079]
36	45 [1143]
38	47-1/2 [1206]
40	50 [1270]
42	52-1/2 [1333]
44	55 [1397]

FACE AREA (SQ. FT.)
$\frac{A \times B}{144}$ = SQ. FT.
EXAMPLE: $\frac{50 \times 30}{144}$ = 10 1/2 SQ.FT.



LEGEND

TIF — Tubes-in-face

NOTES:
1. Half circuit available for 1-row or 2-row coils; full circuit available for 2-row only.
2. Dimensions are in inches; dimensions in [ ] are in millimeters.
3. Submittal prints are obtainable within the Nu-Fin™ coil selection software.

Performance data — 28BH

28BH HEATING CAPACITIES*

ROWS	CIRCUIT TYPE	FINS PER IN.	TOTAL CAPACITY (Btuh/ sq ft)	WATER TEMP DROP (F)	LEAVING AIR DB TEMP (F)	WATER PRESSURE DROP (ft wg)	AIR PRESSURE DROP (DRY) (in. wg)
1	Half	8	19,077	23.68	84.92	6.87	0.35
		11	23,301	28.92	90.44		0.41
		14	26,285	32.63	94.34		0.48
2	Half	8	28,379	35.23	97.08	9.16	0.38
		11	33,552	41.65	103.83		0.43
		14	37,215	46.19	108.62		0.52
	Full	8	30,679	19.04	100.08	5.74	0.38
		11	36,828	22.86	108.11		0.43
		14	41,288	26.62	113.94		0.52

LEGEND

DB — Dry Bulb

*Ratings based on 60 F dry bulb, 67 F wet bulb entering air temperature; 700 ft/min entering air velocity; and 180 F entering water temperature — 4 ft/sec. For capacities at other conditions, use Nu-Fin™ coil selection program.

NOTE: Data based on finned tube length of 84 in. and 28 tubes-in-face.

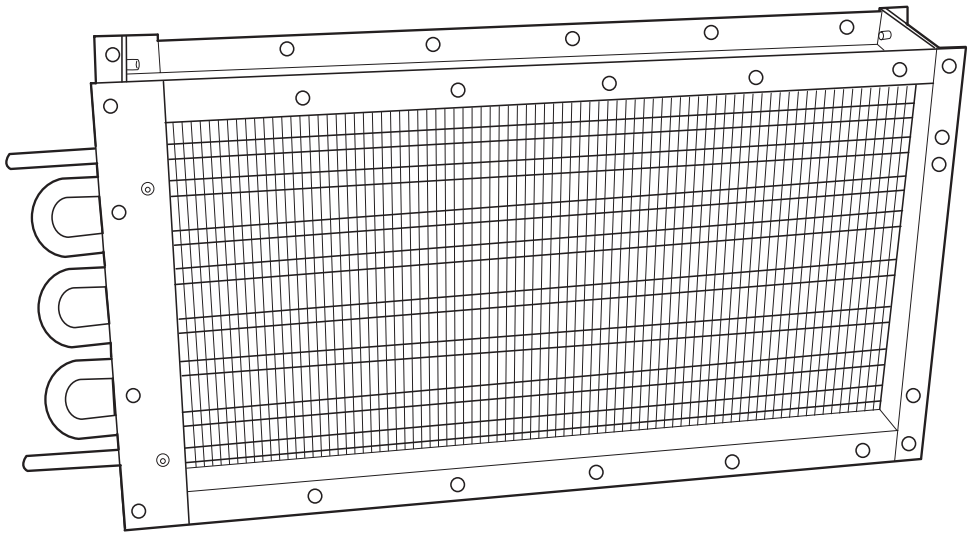
Features

28BB booster coils ($1/2$-in.)

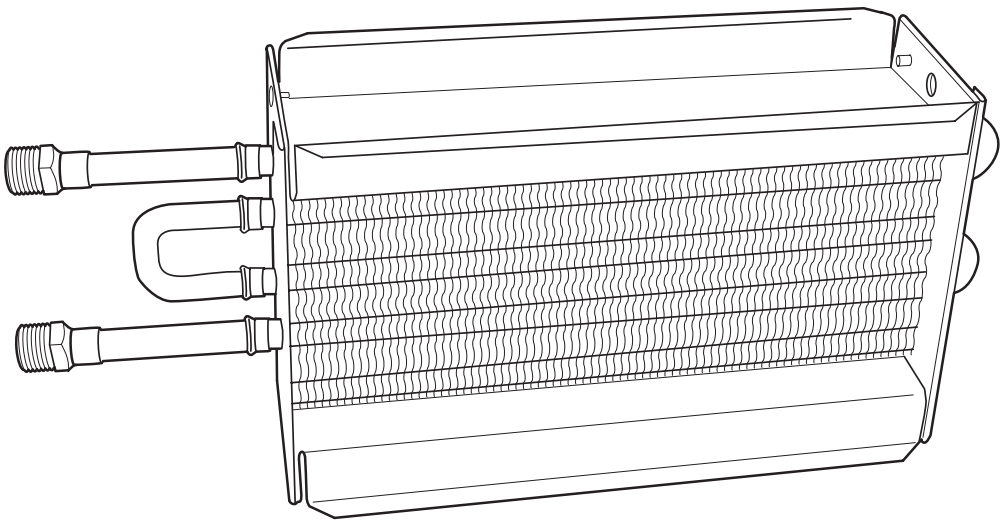
The 28BB hot water booster coils are designed for air heating applications using hot water. The coils are available with aluminum or copper fins; galvanized or stainless steel casings provide durability.

- Height from 5 in. to 15 in.
- Fin lengths from 12 in. to 42 in.
- 1 or 2 rows
- 8, 11, or 14 fins per in.
- Working pressure up to 300 psig at 200 F (175 psig at 400 F)
- Hydrostatically tested at 450 psig
- Standard 0.016-in. or optional 0.025-in. tube wall thickness
- Drive clip or flanged casings
- Sweat or pipe connections
- Stainless steel casings are automatically provided when copper fins are specified.

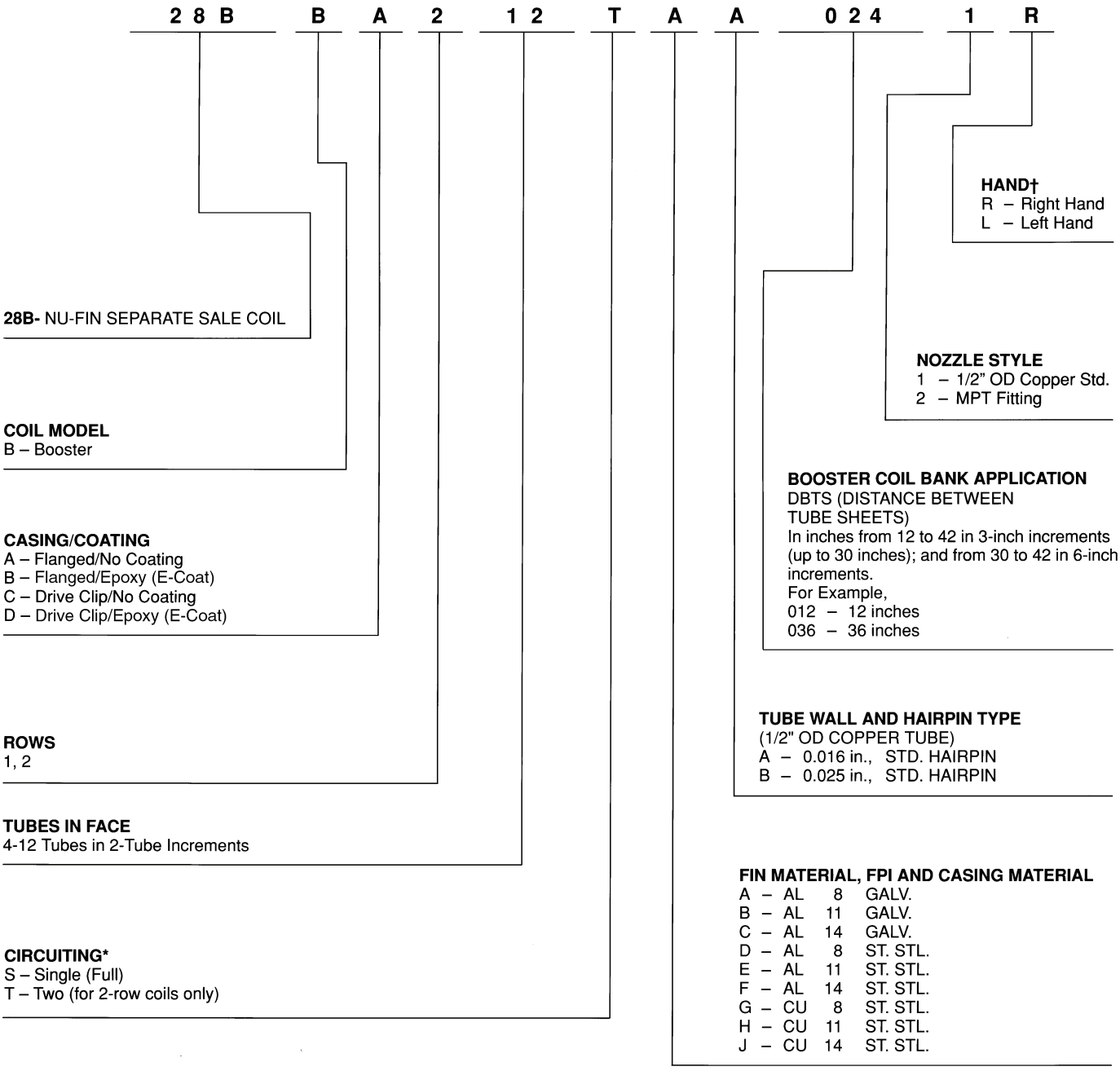
FLANGED CASING



DRIVE CLIP CASING



Model number nomenclature — 28BB



*Two circuits available with 2-row coils only.
†Hand is determined by the location of coil connection when viewed while facing the coil air inlet.

NOTE: Example shown is for a 2-row booster coil with flanged casing; 12 tubes-in-face; 2 circuits, with 8 aluminum fins per inch and galvanized casings; and $^1/_2$-in. OD copper tubes with 0.016-in. wall thickness. The coil is 24 in. long between tube sheets, with right-hand $^1/_2$-in. OD copper stubout for field-supplied sweat connection.

Physical data — 28BB

28BB BOOSTER DRY COIL WEIGHTS (lb) — ALUMINUM FINS

TUBE LENGTH (in.)	1-ROW COILS TUBES IN FACE					TUBE LENGTH (in.)	2-ROW COILS TUBES IN FACE				
	4	6	8	10	12		4	6	8	10	12
12	4.1	5.3	6.5	7.7	8.8	**12**	5.8	7.8	9.8	11.8	13.8
15	4.9	6.3	7.6	9.0	10.3	**15**	6.9	9.3	11.6	14.0	16.3
18	5.7	7.2	8.7	10.3	11.8	**18**	8.1	10.7	13.4	16.1	19.9
21	6.5	8.2	9.9	11.6	13.2	**21**	9.2	12.2	15.2	18.3	21.3
24	7.3	9.1	11.0	12.9	14.7	**24**	10.3	13.7	17.1	20.4	23.9
27	8.1	10.1	12.1	14.2	16.2	**27**	11.4	15.1	18.9	22.6	26.3
30	9.9	11.1	13.3	15.4	17.6	**30**	12.6	16.6	20.7	24.7	28.8
36	10.4	13.0	15.5	18.0	20.6	**36**	14.8	19.6	24.3	29.0	33.8
42	12.0	14.9	17.8	20.6	23.5	**42**	17.1	22.5	27.9	33.3	38.7

NOTE: Weights shown are for unit with copper tube, 8 fins/in.

FOR	MULTIPLY WEIGHT BY
11 fins/in.	1.03
14 fins/in.	1.06

28BB BOOSTER DRY COIL WEIGHTS (lb) — COPPER FINS

TUBE LENGTH (in.)	1-ROW COILS TUBES IN FACE					TUBE LENGTH (in.)	2-ROW COILS TUBES IN FACE				
	4	6	8	10	12		4	6	8	10	12
12	4.5	5.9	7.2	8.6	9.9	**12**	6.5	8.9	11.3	13.7	16.0
15	5.4	7.0	8.5	10.1	11.7	**15**	7.8	10.6	13.5	16.3	19.1
18	6.3	8.0	9.8	11.6	13.4	**18**	9.2	12.4	15.6	18.9	22.1
21	7.1	9.1	11.1	13.2	15.2	**21**	10.5	14.1	17.8	21.5	23.1
24	8.0	10.2	12.5	14.7	16.9	**24**	11.8	15.9	20.0	24.1	28.2
27	8.9	11.3	13.8	16.2	19.6	**27**	13.1	17.6	22.2	26.7	31.2
30	9.8	12.4	15.1	17.7	20.4	**30**	14.4	19.4	24.3	29.3	34.3
36	11.5	14.6	17.7	20.8	23.9	**36**	17.0	22.8	28.7	34.5	40.3
42	13.3	25.1	31.7	38.4	45.0	**42**	19.6	26.3	33.0	39.7	46.4

NOTE: Weights shown are for unit with copper tube, 8 fins/in.

FOR	MULTIPLY WEIGHT BY
11 fins/in.	1.08
14 fins/in.	1.14

28BB COIL VOLUME (gal)*

1-ROW COILS

LENGTH (in.)	TUBES IN FACE				
	4	6	8	10	12
12	0.6	0.9	1.2	1.5	1.8
15	0.7	1.1	1.4	1.8	2.1
18	0.8	1.2	1.6	2.1	2.5
21	0.9	1.4	1.9	2.4	2.8
24	1.1	1.6	2.1	2.6	3.2
27	1.2	1.8	2.4	2.9	3.5
30	1.3	1.9	2.6	3.2	3.9
36	1.5	2.3	3.1	3.8	4.6
42	1.8	2.6	3.5	4.4	5.3

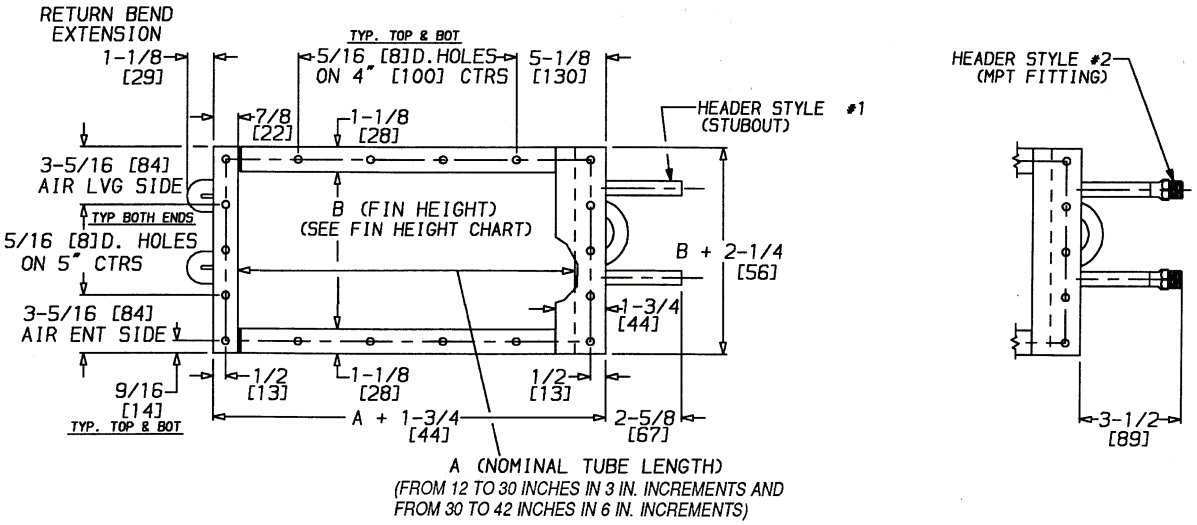
2-ROW COILS

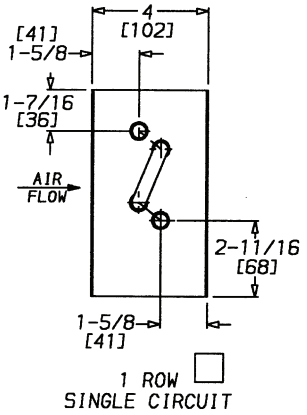
LENGTH (in.)	TUBES IN FACE				
	4	6	8	10	12
12	1.2	1.8	2.4	2.9	3.5
15	1.4	2.1	2.8	3.5	4.2
18	1.6	2.5	3.3	4.1	4.9
21	1.9	2.8	3.8	4.7	5.6
24	2.1	3.2	4.2	5.3	6.3
27	2.4	3.5	4.7	5.9	7.1
30	2.6	3.9	5.2	6.5	7.8
36	3.1	4.6	6.1	7.6	9.2
42	3.5	5.3	7.1	8.8	10.6

*One gal = 8.3 lb.

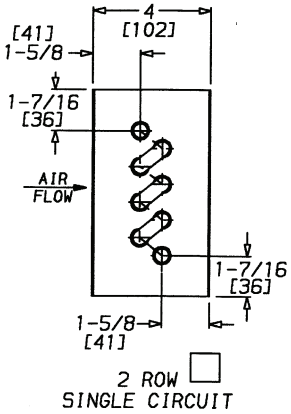
Dimensions — 28BB

28BB BOOSTER COIL WITH FLANGED CASING

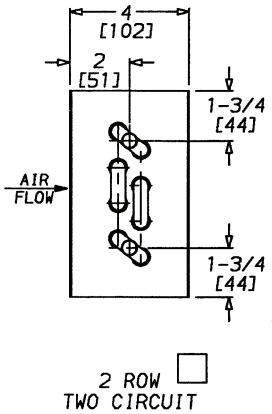




1 ROW SINGLE CIRCUIT



2 ROW SINGLE CIRCUIT



2 ROW TWO CIRCUIT

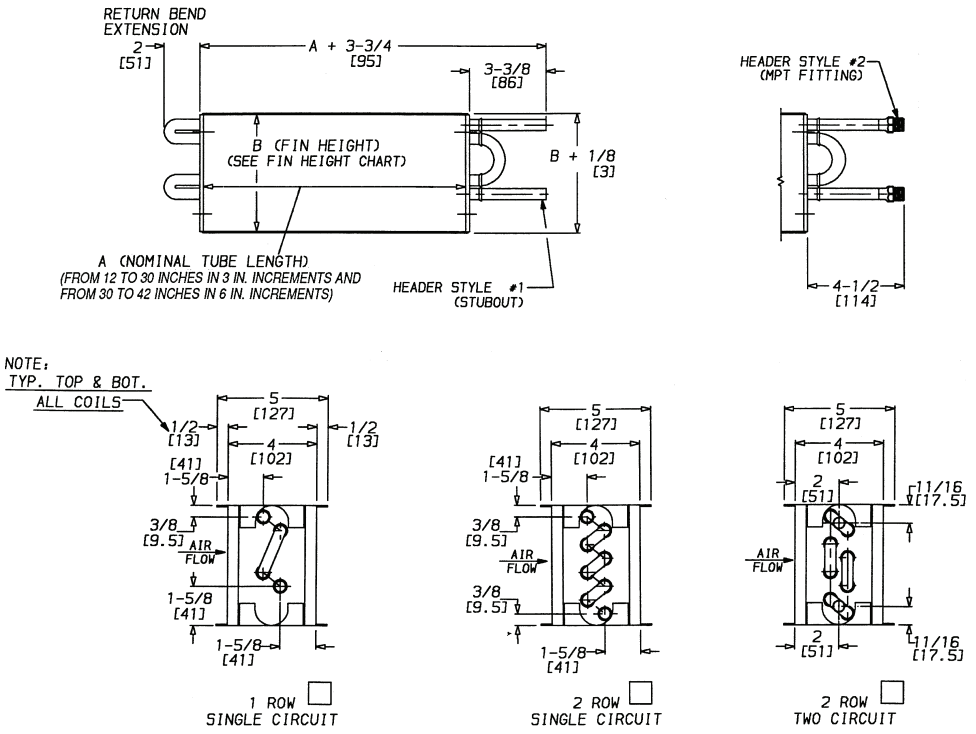
FIN HEIGHT	
TIF	B
4	5 [127]
6	7-1/2 [190]
8	10 [254]
10	12-1/2 [317]
12	15 [381]

FACE AREA (SQ. FT.)
$\frac{A \times B}{144}$ = SQ. FT.
EXAMPLE:
$\frac{27 \times 15}{144}$ = 2.8 SQ.FT.

NOTES:
1. Dimensions are inches, dimensions in [ ] are in millimeters.
2. Submittal prints are obtainable within the Nu-Fin™ coil selection software.

Dimensions — 28BB (cont)

28BB BOOSTER COIL WITH DRIVE CLIP CASING



FIN HEIGHT	
TIF	B
4	5 [127]
6	7-1/2 [190]
8	10 [254]
10	12-1/2 [317]
12	15 [381]

FACE AREA (SQ. FT.)
$\frac{A \times B}{144}$ = SQ. FT.
EXAMPLE:
$\frac{27 \times 15}{144}$ = 2.8 SQ.FT.

NOTES:
1. Dimensions are inches, dimensions in [ ] are in millimeters.
2. Submittal prints are obtainable from within the Nu-Fin™ coil selection software.

Performance data — 28BB

28BB HEATING CAPACITIES*

ROWS	CIRCUIT TYPE	FINS PER IN.	TOTAL CAPACITY (Btuh/ sq ft)	WATER TEMP DROP (F)	LEAVING AIR DB TEMP (F)	WATER PRESSURE DROP (ft wg)	AIR PRESSURE DROP (DRY) (in. wg)
1	Single	8	9,629	20.49	72.58	4.40	0.17
		11	11,792	25.09	75.41		0.20
		14	13,365	28.43	77.46		0.23
2	Single	8	25,444	54.13	93.24	8.82	0.37
		11	29,446	62.65	98.47		0.43
		14	32,158	68.42	102.01		0.51
	Two	8	29,022	30.87	97.92	4.42	0.38
		11	34,456	36.65	105.01		0.43
		14	38,337	40.78	110.08		0.52

LEGEND

DB — Dry Bulb

*Ratings based on 60 F dry bulb entering air temperature, 700 ft/min entering air velocity; and 180 F entering water temperature — 4 ft/sec. For capacities at other conditions, use Nu-Fin coil selection program.

NOTE: Data based on finned tube length of 24 in. and 12 tubes-in-face.

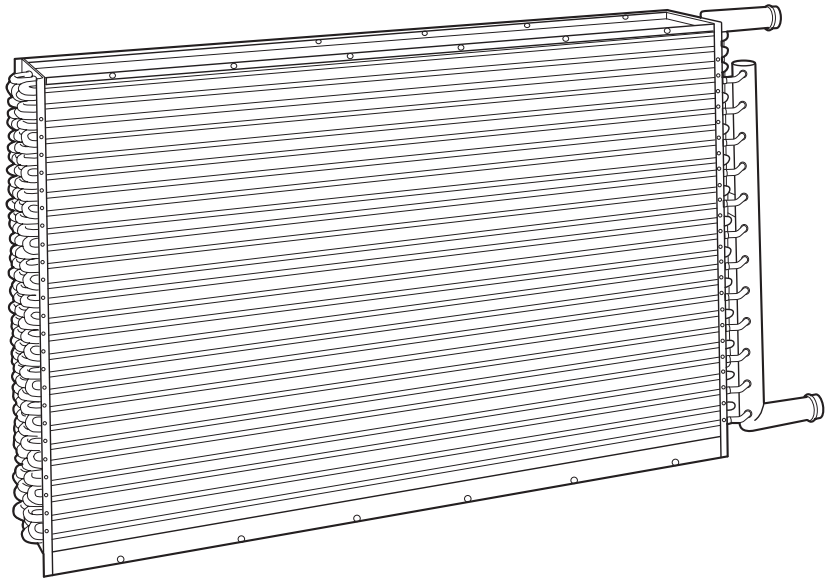
Features

28BD cooling coils ($^5/_8$-in.)

The 28BD cooling coils are designed primarily for air cooling applications using chilled water or brine. They can also be used as heating coils, on low temperature hot water applications only. The coils are available with aluminum or copper fins. Galvanized or stainless steel casings provide added durability. Headers are sized to match maximum coil capacity.

- 18-in. to 54-in. coil height (in 3 in. increments)
- 24-in. to 144-in. long finned tube (in one-in. increments)
- 4, 6, or 8 rows
- 8, 12, or 14 fins per in.
- Working pressure up to 300 psig at 200 F (175 psig at 400 F)
- Hydrostatically tested at 450 psig
- Non-trapping circuit design
- Standard 0.020-in. or optional 0.032-in. tube wall thickness
- Optional MPT or optional Victaulic grooved headers
- Non-ferrous headers and MPT nozzles are standard
- Available in full, half, and double circuiting to meet your design requirements
- Stainless steel casings are automatically provided when copper fins are specified.

28BD



Model number nomenclature — 28BD

28B D A 4 32 F A B 060 B R

28B – Nu-Fin Separate Sale Coil

Coil Model
D – Cooling Coil

Coating
A – No Coating
B – Epoxy Coating (E-Coat)

Rows
4 – 4
6 – 6
8 – 8

Tubes in Face
12-36 Tubes in 2-Tube Increments

Circuiting
H – Half
F – Full
D – Double

*

CIRCUIT	NOMINAL PIPE SIZE (in.)
F	$2^1/_2$
H	$2^1/_2$
D	3

Fin Material, FPI and Casing Material
A – AL 8 Galv.
B – AL 12 Galv.
C – AL 14 Galv.
D – AL 8 St. Stl.
E – AL 12 St. Stl.
F – AL 14 St. Stl.
G – CU 8 St. Stl.
H – CU 12 St. Stl.
J – CU 14 St. Stl.

Tube Wall, Hairpin
(5/8-in. OD Copper Tube)
B – 0.020-in., Std. Hairpin
C – 0.035-in., Std. Hairpin

Coil Bank Application
DBTS (Distance Between Tube Sheets)
In inches from 24 to 144 in 1 inch increments. For Example,
024 - 24 inches
121 - 121 inches

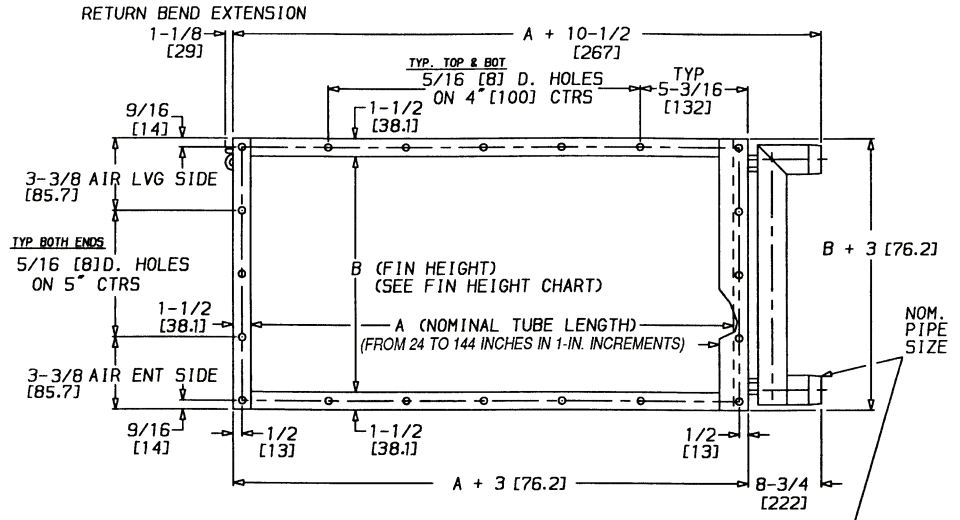
Nozzle and Header Style*
A – MPT – Steel Optional
B – MPT – Non-Ferrous – Std.
C – Victaulic

Hand†
R – Right Hand
L – Left Hand

†Hand is determined by the location of coil connections when viewed while facing the coil air inlet.

NOTE: Example shown is for a 4-row cooling coil, not coated; 32 tubes-in-face; a full circuit, with 8 aluminum fins per inch and galvanized casing; and $^5/_8$-in. OD copper tubes with 0.020-in. wall thickness. The coil is 60 in. long between tube sheets and has right-hand, $2^1/_2$-in. MPT non-ferrous headers.

Dimensions — 28BD



CIRCUIT	HEADER DIA. [INCHES]
H	2 1/2 N.P.T.
F	2 1/2 N.P.T.
D	3 N.P.T.

LEGEND

TIF — Tubes-in-Face

NOTES:
1. Half, full, or double circuit available with any 4, 6, or 8 row.
2. Dimensions are in inches; dimensions in [ ] are in millimeters.

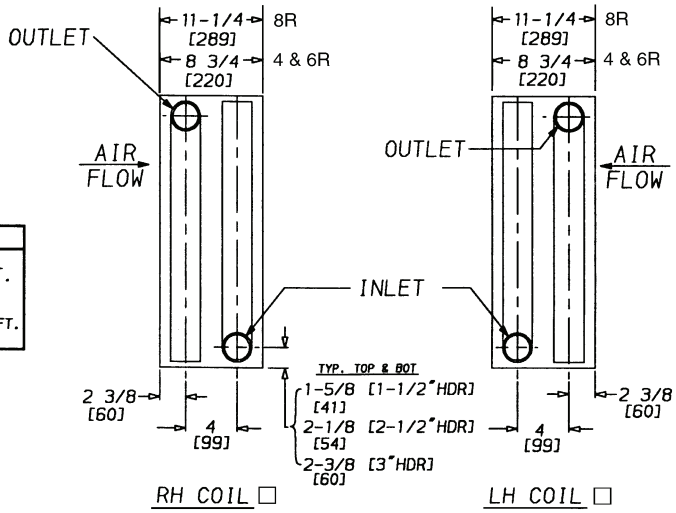
FIN HEIGHT	
TIF	**B**
12	18.00 [457]
14	21.00 [533]
16	24.00 [610]
18	27.00 [686]
20	30.00 [762]
22	33.00 [838]
24	36.00 [914]
26	39.00 [991]
28	42.00 [1067]
30	45.00 [1143]
32	48.00 [1219]
34	51.00 [1295]
36	54.00 [1372]

FACE AREA (SQ. FT.)

$\frac{A \times B}{144}$ = SQ. FT.

EXAMPLE:

$\frac{50 \times 30}{144}$ = 10 1/2 SQ.FT.



Performance data — 28BD

28BD COOLING PERFORMANCE*

ROWS	CIRCUIT TYPE	FINS PER IN.	TOTAL CAPACITY (Btuh/ sq ft)	WATER TEMP DROP (F)	LEAVING AIR DB TEMP (F)	LEAVING AIR WB TEMP (F)	WATER PRESSURE DROP (ft wg)	AIR PRESSURE DROP (DRY) (in. wg)
4	Half	8	13.327	12.8	61.44	58.70	11.3	0.45
		12	15.275	14.7	59.14	57.37		0.61
		14	16.139	15.5	57.83	56.76		0.71
	Full	8	15.327	7.4	59.99	57.34	7.9	0.50
		12	17.980	8.6	57.15	55.46		0.65
		14	18.910	9.1	55.80	54.78		0.79
	Double	8	16.456	4.0	59.15	56.55	7.3	0.50
		12	19.639	4.7	55.88	54.25		0.68
		14	20.565	4.9	54.54	53.56		0.84
6	Half	8	16.243	15.6	57.96	56.69	16.3	0.65
		12	18.158	17.4	55.98	55.33		0.91
		14	18.991	18.2	55.03	54.72		1.06
	Full	8	19.031	9.1	55.90	54.70	10.4	0.73
		12	21.744	10.4	53.28	52.67		0.98
		14	23.568	10.9	52.23	51.95		1.19
	Double	8	20.143	6.4	55.05	53.88	8.1	0.75
		12	23.121	7.4	52.20	51.61		1.01
		14	24.037	7.6	51.16	50.89		1.24
8	Half	8	18.252	17.5	55.85	55.26	21.3	0.86
		12	20.053	19.3	54.18	53.94		1.21
		14	20.817	20.0	53.45	53.37		1.41
	Full	8	21.645	10.4	53.29	52.75	13.0	0.97
		12	24.212	11.6	50.97	50.76	13.0	1.31
		14	25.009	12.0	50.20	50.12	12.9	1.60
	Double	8	23.525	5.6	51.82	51.30	9.8	1.00
		12	26.101	6.3	49.45	49.24		1.36
		14	26.916	6.5	48.64	48.57		1.69

LEGEND

DB — Dry Bulb
WB — Wet Bulb

*Ratings based on 80 F dry bulb and 67 F wet bulb entering air temperature; 500 ft/min entering air velocity; and 45 F entering water temperature at velocity of 4 fps. Use Nu-Fin™ coil selection software for your specific design conditions.

NOTE: Data based on finned tube length of 84 in. and 28 tubes-in-face.

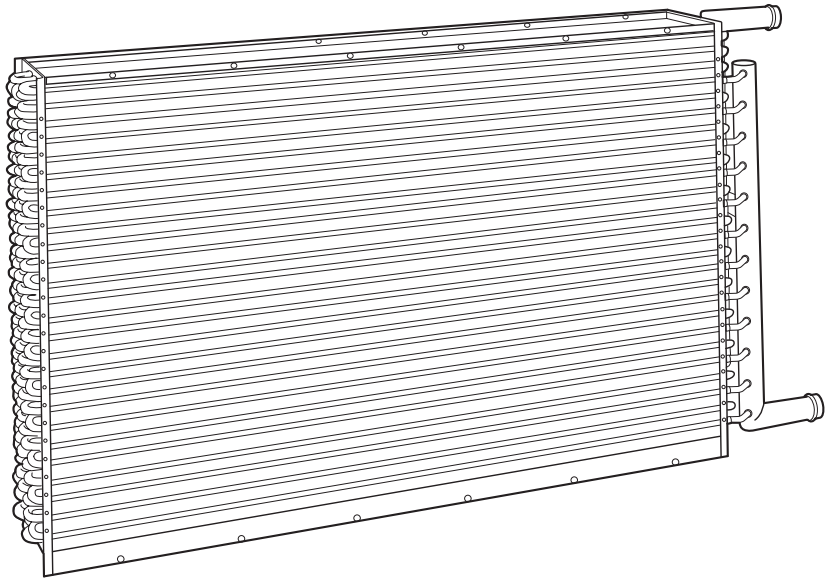
Features

28BF heating coils ($^5/_8$-in.)

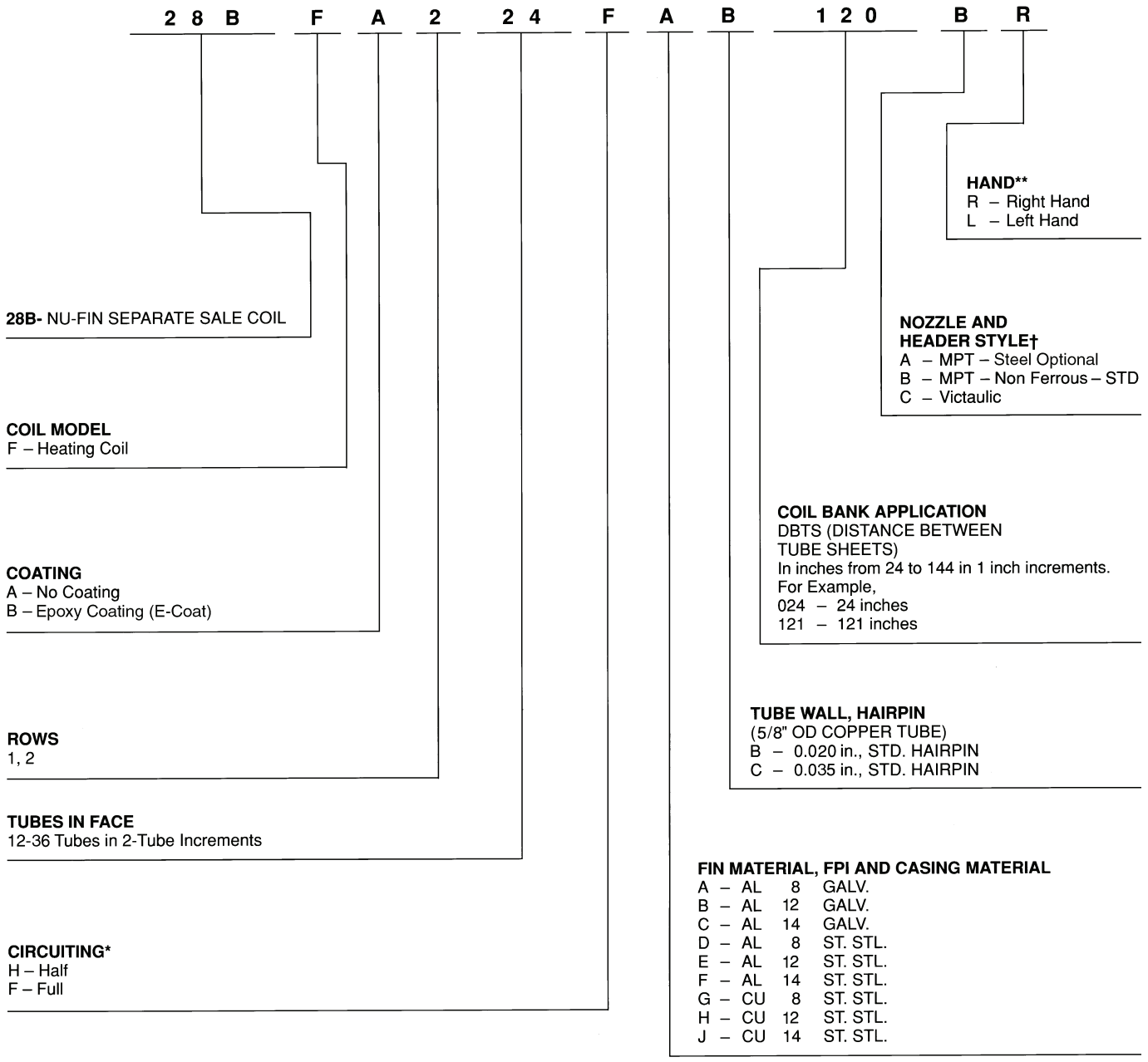
The 28BF heating coils are designed for air heating applications using hot water or brine only. The coils are available with aluminum or copper fins. Galvanized or stainless steel casings provide added durability. Headers are sized to match maximum coil capacity.

- 18-in. to 54-in. coil height (in 3-in. increments)
- 24-in. to 144-in. long finned tube (in one-in. increments)
- 1 or 2 rows
- 8, 12, or 14 fins per in.
- Working pressure up to 175 psig at 400 F (300 psig at 200 F)
- Hydrostatically tested at 450 psig
- Non-trapping circuit design
- Standard 0.020-in. or optional 0.035-in. tube wall thickness
- Standard MPT or optional Victaulic grooved headers
- Non-ferrous headers and nozzles available
- Available in full or half circuiting to meet your design requirements
- Stainless steel casings are automatically supplied when copper fins are specified.

28BF



Model number nomenclature — 28BF



*Half circuit available for 1-row or 2-row coils; full circuit available for 2-row only.

†

CIRCUIT	NOMINAL PIPE SIZE (in.)
H	$1^1/_2$
F	$2^1/_2$

**Hand is determined by the location of coil connections when viewed while facing the coil air inlet.

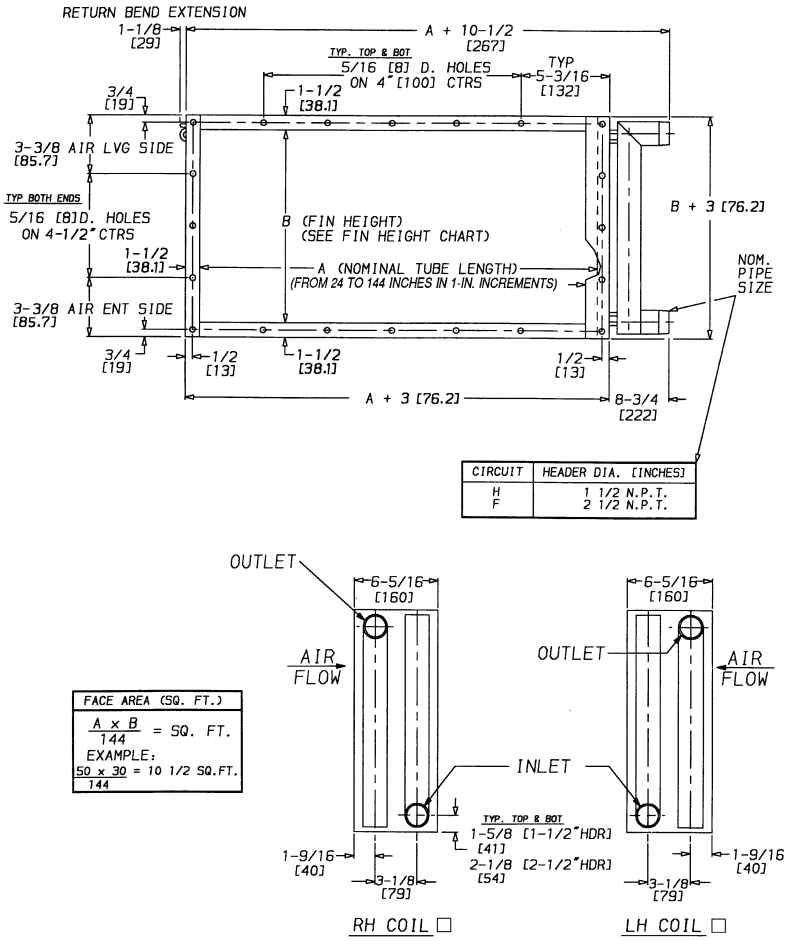
NOTE: Example shown is for a 2-row heating coil, not coated; 24 tubes-in-face; a full circuit, with 8 aluminum fins per inch and galvanized casing; $^5/_8$-in. copper tubes with 0.020-in. wall thickness. The coil is 120 in. long between tube sheets and has right-hand, $2^1/_2$-in. MPT non-ferrous headers.

Dimensions — 28BF

LEGEND

TIF — Tubes-in-face

NOTES:
1. Half circuit available for 1-row or 2-row coils; full circuit available for 2-row only.
2. Dimensions are in inches; dimensions in [ ] are in millimeters.
3. Submittal prints are obtainable from within the Nu-Fin™ coil selection software.



FIN HEIGHT	
TIF	**B**
12	18.00 [457]
14	21.00 [533]
16	24.00 [610]
18	27.00 [686]
20	30.00 [762]
22	33.00 [838]
24	36.00 [914]
26	39.00 [991]
28	42.00 [1067]
30	45.00 [1143]
32	48.00 [1219]
34	51.00 [1295]
36	54.00 [1372]

Performance data — 28BF

28BF HEATING CAPACITIES*

ROWS	CIRCUIT TYPE	FINS PER IN.	TOTAL CAPACITY (Btuh/ sq ft)	WATER TEMP DROP (F)	LEAVING AIR DB TEMP (F)	WATER PRESSURE DROP (ft wg)	AIR PRESSURE DROP (in. wg)
1	Half	8	19.545	18.9	85.53	7.4	0.14
		12	24.972	24.1	92.62		0.18
		14	27.427	26.5	95.83		0.21
2	Half	8	31.680	30.6	101.39	9.0	0.26
		12	39.026	37.7	110.98		0.36
		14	42.570	41.1	115.62		0.45
	Full	8	33.802	16.3	104.16	4.8	0.26
		12	42.623	20.4	115.21		0.36
		14	46.445	22.4	120.68		0.45

LEGEND

DB — Dry Bulb

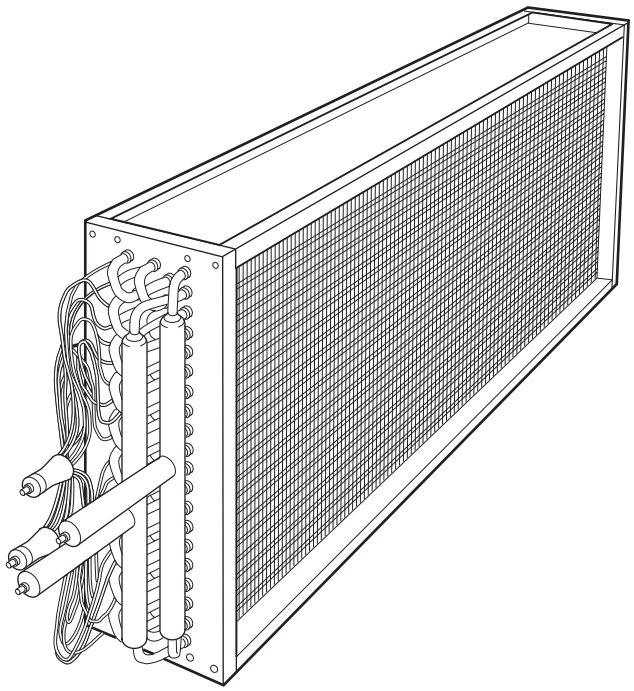
*Ratings based on 60 F dry bulb entering air temperature, 700 ft/min entering air velocity; and 180 F entering water temperature at velocity of 4 fps. Use Nu-Fin coil selection software for your specific design conditions.

NOTE: Data based on finned tube length of 84 in. and 28 tubes-in-face.

Features

28BX direct-expansion cooling coils

28BX DIRECT-EXPANSION COIL



Nu-Fin™ direct-expansion (DX) cooling coils offer the advantages of installation ease, design flexibility and total economy. . .plus optimization of coil performance. Coils are available in 4, 6, or 8 row configurations, with 8, 11, or 14 aluminum fins per inch on $^1/_2$-in. OD copper tubes to provide the needed coil surface for load and duty requirements.

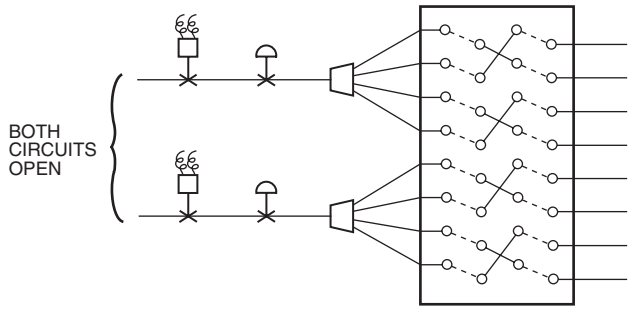
The Nu-Fin coil surface has tubes mechanically expanded into the fins so there is firm fin and tube bonding for peak thermal performance. Choose from 2 or more circuitings for each coil surface for maximum thermal performance with minimal refrigerant pressure drop. For easy installation, liquid and suction connections are always on the same end, regardless of circuiting. And for full mix-match design flexibility, all DX coils have at least 2 splits; a coil can be matched with one or 2 compressors for independent refrigerant systems. Factory-installed distributor nozzles are also available as a field-installed option to minimize field labor while optimizing distributor performance.

Carrier intertwined circuiting means even greater coil efficiency and dependability

Intertwined circuiting is Carrier's geometrically balanced tube arrangement that allows the refrigerant to feed evenly across the coil face. This optimizes circuit loading and superheat, and produces uniform fin temperature and performance.

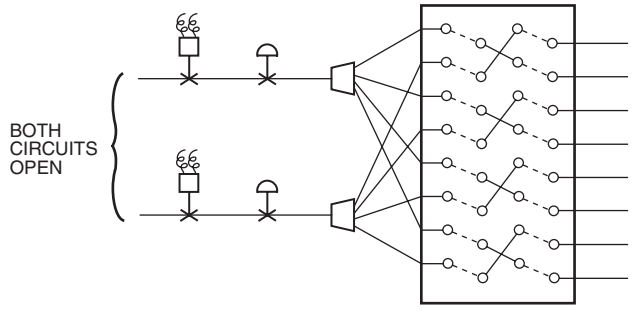
When operating at full load, each split of the intertwined full face active coil has equal capacity because half the tubes in each row are supplied by each distributor. Equal coil capacity is important when separate compressors are piped to the splits because each system then has an equal suction temperature, resulting in outstanding performance where leaving air temperature must be controlled, as in multizone or variable volume applications.

FACE SPLIT COIL



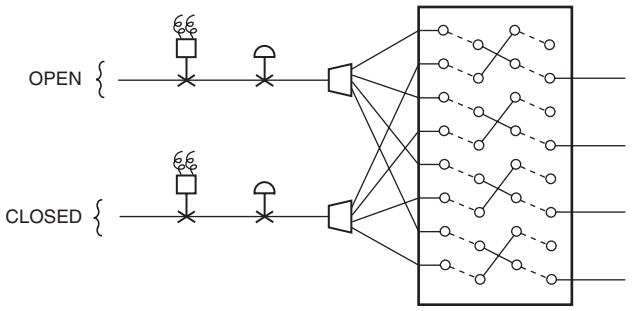
Separate intertwined circuiting on upper and lower part of coil.

INTERTWINED FULL FACE ACTIVE COIL — FULL LOAD (Equivalent Row Split)

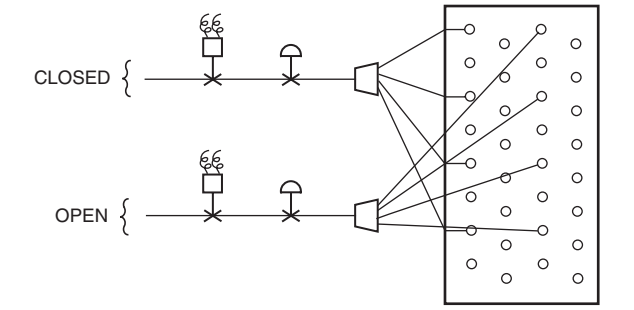


Intertwined circuiting across full coil face.

INTERTWINED FULL FACE ACTIVE COIL — PART LOAD
(Equivalent Row Split)



CONVENTIONAL ROW-SPLIT COIL — PART LOAD



When operating at part load, either split may be shut down without concern for system conditions such as re-evaporation of condensate. The working split maintains up to 70% of the total capacity of the coil because the entire fin surface remains cold — allowing compression equipment to run at high suction and to operate at more efficient temperatures.

Two disadvantages to conventional row split coils include:

- Since the downstream split must usually be "first ON/ last OFF" suction, the controls and piping need extra care to assure this operation.
- Conventional row split coils do not have the high part-load capacity that allows the compression equipment to operate at higher efficiencies.

Full load selection considerations

To achieve best performance, intertwined DX coils should be selected so that the full load section yields a loading of between 0.8 tons per circuit and 2.0 tons per circuit. Although this is the recommended range for best performance, these coils may be used to a loading rate as high as 3.0 tons per circuit.

The DX coils are available in 2 arrangements: face split and full face active (equivalent row split). The face split coil is more commonly used in air conditioning applications which use constant airflow and space temperature or return air control.

The full face active coil is most generally used in applications involving variable airflow through the coils such as multizone or VAV (variable air volume) systems. This allows for leaving-air temperature control so that variable volume room air terminals or zoning dampers of a multizone air-handling unit can be used to control space temperature.

In some applications where humidity control is required, the face split coil is the best selection as it reduces the leaving temperature of the air it is treating to a temperature where dehumidification occurs at part load. This would not occur with a full face active or a conventional row split coil.

Part-load operation

Consideration of the system operation at partial load conditions is extremely important both from the standpoint of maintaining space conditions and assuring reliable and extended performance of the compression equipment. Proper system design requires that operation at both design and minimum load conditions be evaluated. This is particularly important when there are wide variations in load.

After and during the selection of a coil for full load operation, 2 part-load considerations must be kept in mind. The coil must be selected so that oil will be returned to the compressor at minimum load conditions. This can be accomplished by judicious selection of the proper circuiting and control of coil splits to maintain a minimum circuit loading of 0.4 tons/circuit.

The second part-load consideration and possibly the most important is the checking of minimum coil refrigerant temperature. It is important that the refrigerant temperature in the coil, at full load, be high enough so that as the system unloads, the refrigerant temperature does not go below those shown in the table following. Operation at lower temperatures will allow frost to form on the coil.

Selection and operation of coils below refrigerant saturated suction temperatures listed may result in frost formation and eventual coil airflow restriction.

MINIMUM REFRIGERANT SATURATED SUCTION TEMPERATURE FOR FROST PREVENTION (F)

ENT WET-BULB (F)	COIL FACE VELOCITY (fpm)														
	300			400			500			600			700		
	Number of Rows														
	4	6	8	4	6	8	4	6	8	4	6	8	4	6	8
65	25	28	28	24	27	28	23	25	27	23	23	26	23	23	25
70	25	28	29	23	26	28	23	23	27	23	23	26	23	23	25
75	24	27	29	23	24	28	23	23	26	23	23	25	23	23	24
80	23	26	29	23	23	27	23	23	26	23	23	24	23	23	23

Model number nomenclature — 28BX

28B X A 4 32 F A A 060 X R

28B – Nu-Fin Separate Sale Coil

Coil Model
X – Direct Expansion

Coating
A – No Coating
B – Epoxy Coating (E-Coat)

Rows
4 – 4
6 – 6
8 – 8

Tubes in Face
12-44 Tubes in 2-Tube Increments

Circuiting*
B – Face Split Half
C – Face Split Full
D – Double
E – Row Split Quarter
F – Row Split Half
G – Row Split Full

*Circuiting — Use the Nu-Fin™ Coil Selection Software to determine the appropriate circuiting for your specific application.
†Hand — All direct expansion coils are built right hand and rotated 180 degrees for left-hand applications.
**X is default if no other size is specified.

Fin Material, FPI and Casing Material
A – AL 8 Galv.
B – AL 11 Galv.
C – AL 14 Galv.
D – AL 8 St. Stl.
E – AL 11 St. Stl.
F – AL 14 St. Stl.
G – CU 8 St. Stl.
H – CU 11 St. Stl.
J – CU 14 St. Stl.

Tube Wall, Hairpin
(1/2-in. OD Copper Tube)
A – 0.016-in., Std. Hairpin
B – 0.025-in., Std. Hairpin

Coil Bank Application
DBTS (Distance Between Tube Sheets)
In inches from 24 to 144 in 1 inch increments. For Example,
024 - 24 inches
121 - 121 inches

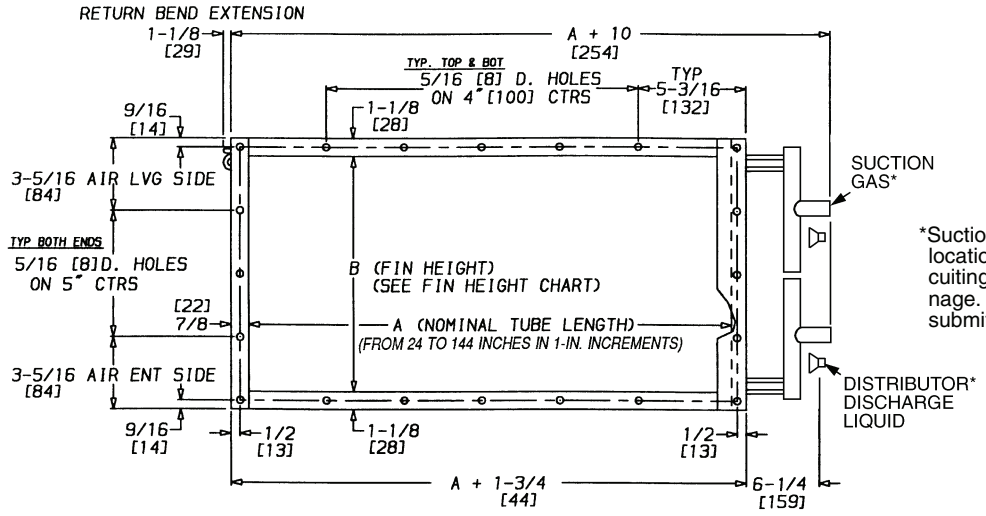
Distribution Nozzle Orifice Size**

B – #3/4	**J –** #5	**R –** #20
C – #1	**K –** #6	**S –** #25
D – #1-1/2	**L –** #8	**T –** #30
E – #2	**M –** #10	**U –** #35
F – #2-1/2	**N –** #12	**V –** #40
G – #3	**P –** #15	**W –** #50
H – #4	**Q –** #17	**X –** #3

(See Chart on page 29)

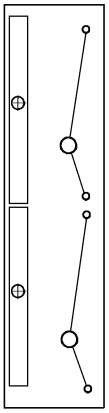
Hand Orientation†

Dimensions — 28BX

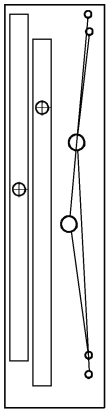


*Suction distributor sizes and locations are dependent on circuiting and total application tonnage. Contact Carrier for submittal data (1.800.225.2645).

FIN HEIGHT	
TIF	B
12	15 [381]
14	17-1/2 [444]
16	20 [508]
18	22-1/2 [571]
20	25 [635]
22	27-1/2 [698]
24	30 [762]
26	32-1/2 [825]
28	35 [889]
30	37-1/2 [952]
32	40 [1016]
34	42-1/2 [1079]
36	45 [1143]
38	47-1/2 [1206]
40	50 [1270]
42	52-1/2 [1333]
44	55 [1397]



TYPICAL FACE SPLIT COIL



TYPICAL ROW SPLIT COIL

FACE AREA (SQ. FT.)
$\frac{A \times B}{144}$ = SQ. FT.
EXAMPLE:
$\frac{50 \times 30}{144}$ = 10 1/2 SQ.FT.

NOTE: Dimensions are in inches; dimensions in [ ] are in millimeters.

CODE	NOZZLE SIZE	MIN TONS	NOM. TONS	MAX TONS
B	3/4	0.46	0.91	1.80
C	1	0.60	1.20	2.40
D	1 1/2	0.90	1.80	3.60
E	2	1.20	2.40	4.80
F	2 1/2	1.50	3.00	6.00
G	3	1.80	3.60	7.20
H	4	2.45	4.90	9.80
J	5	3.00	6.00	12.00
K	6	3.60	7.20	14.40
L	8	4.75	9.50	19.00
M	10	5.70	11.80	23.50
N	12	5.90	14.20	28.20
P	15	8.70	17.50	35.00
Q	17	10.00	20.00	39.50
R	20	11.80	23.60	47.20
S	25	14.80	29.60	52.20
T	30	17.10	34.20	68.40
U	35	20.50	41.00	82.00
V	40	22.80	45.60	91.20
W	50	29.70	59.30	118.60
X†	3	1.80	3.60	7.20

†X = Default nozzle when none are specified.

Performance data — 28BX

28BX COOLING CAPACITIES*

ROWS	CIRCUIT TYPE	FINS PER IN.	TOTAL CAPACITY (Btuh/ sq ft)	LEAVING AIR DB TEMP (F)	LEAVING AIR WB TEMP (F)	AIR PRESSURE DROP (in. wg)
4	Half	8	16.670	59.13	56.40	0.52
		11	18.317	57.24	55.22	0.61
		14	19.649	55.63	54.24	0.64
	Full	8	16.923	58.94	56.22	0.52
		11	18.954	56.75	54.76	0.61
		14	20.759	54.77	53.42	0.64
6	Half	8	19.299	55.80	54.50	0.76
		11	20.618	54.36	53.52	0.88
		14	21.745	53.15	52.67	0.93
	Full	8	22.467	53.32	52.12	0.78
		11	24.550	51.24	50.49	0.91
		14	26.211	49.57	49.15	0.96
8	Full	8	25.903	49.94	49.40	1.03
		11	27.711	48.20	47.91	1.21
		14	29.183	46.80	46.67	1.28
	Double	8	24.891	50.77	50.22	1.03
		11	26.792	48.97	48.68	1.21
		14	28.398	47.47	47.34	1.28

LEGEND

DB — Dry Bulb
WB — Wet Bulb

*Ratings based on 80 F dry bulb, 67 F wet bulb entering air temperature; 500 ft/min entering air velocity; 40 F saturated suction temperature; 120 F condensing temperature. Use Nu-Fin™ coil selection software for your specific design conditions.

NOTE: Data based on finned tube length of 84 in. and 28 tubes-in-face.

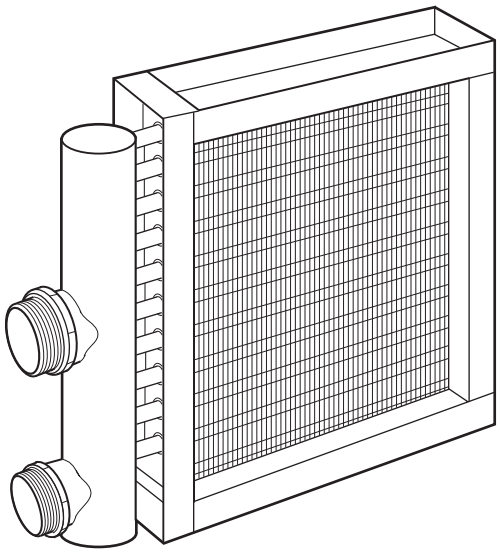
Features

28BZ steam distributing coils

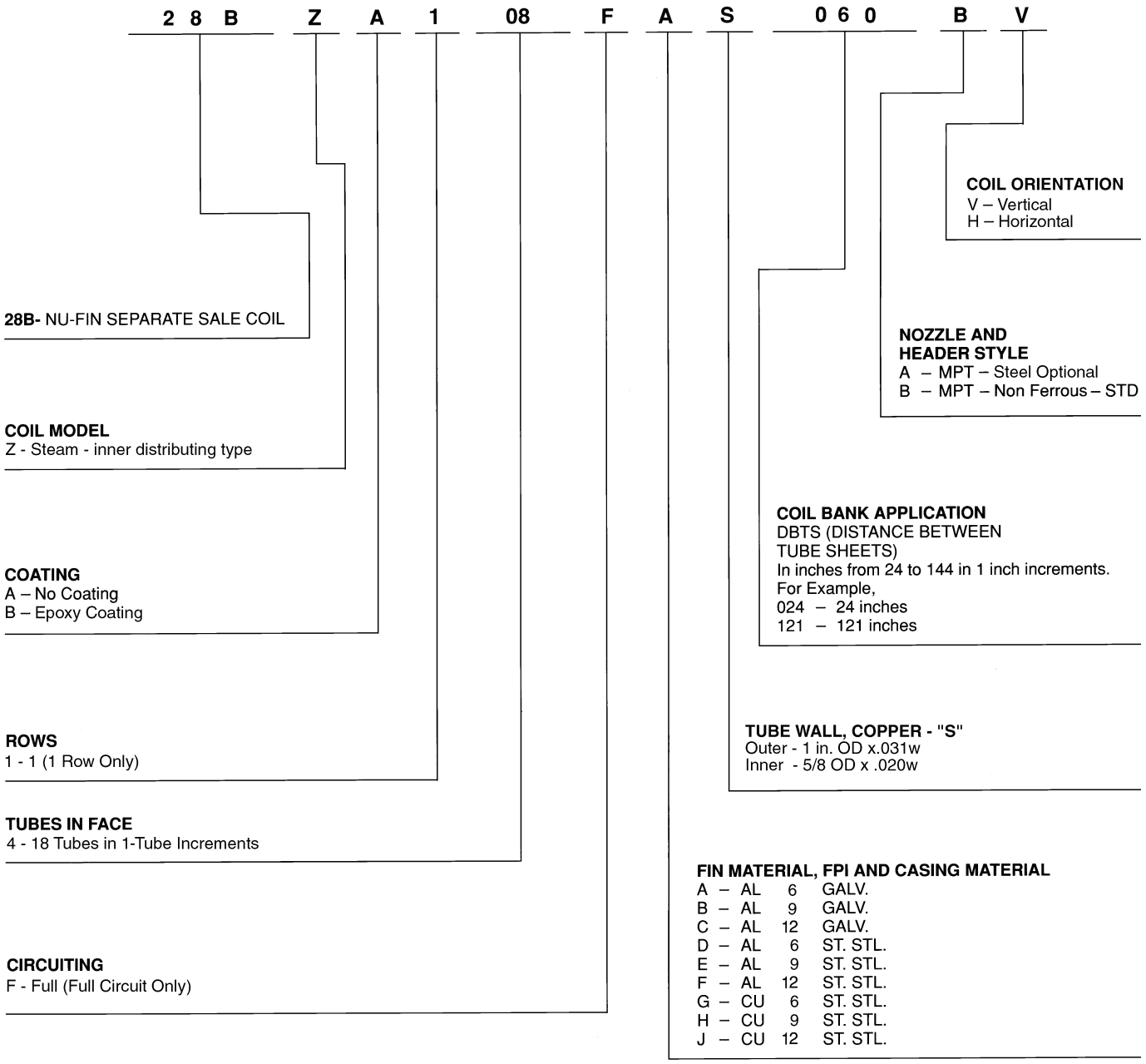
The 28BZ coils are designed for air heating applications using steam. The coils are available with aluminum or copper fins and galvanized or stainless steel casings for added durability and long service life. Headers are sized to match maximum coil capacity.

- 12-in. to 54-in. coil fin height (3-in. increments)
- 24-in. to 144-in. fin length (1-in. increments)
- 6, 9, or 12 fins per inch (aluminum or copper)
- Hydrostatically tested at 450 psig
- Pitched for positive condensate return
- Non-ferrous or steel headers (MPT connections).
- Stainless steel casings automatically provided when copper fins are specified.

28BZ



Model number nomenclature — 28BZ



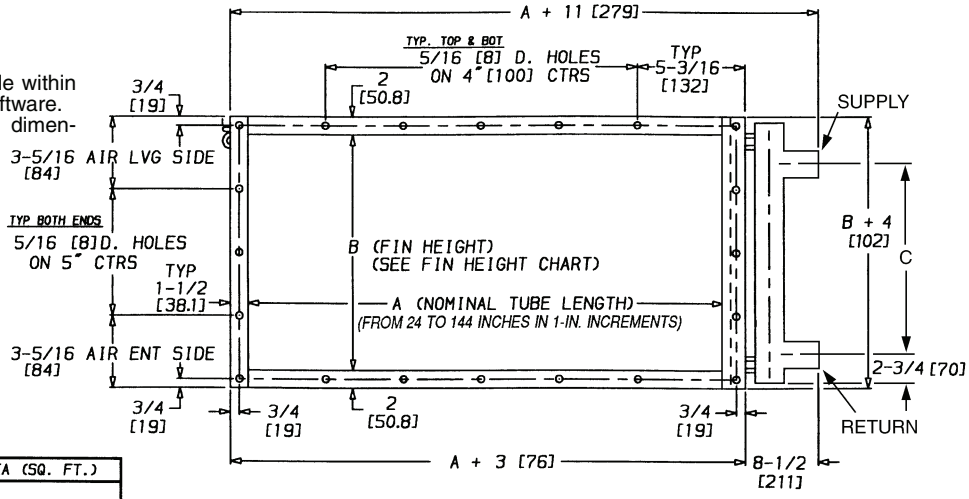
NOTE: Example shown is for a 1-row steam coil, non-coated, 8 tubes-in-face, non-ferrous nozzle and header, 6 aluminum fins per inch and galvanized casing. The coil is 60-in. between tube sheets with vertical mounting orientation.

Dimensions — 28BZ non-freeze steam

LEGEND

TIF — Tubes-in-Face

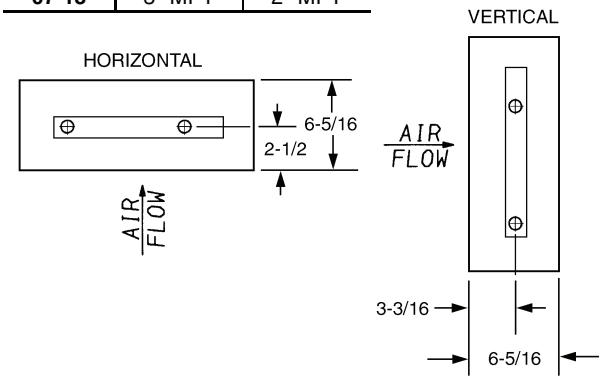
NOTES:
1. Submittal prints are obtainable within the Nu-Fin™ coil selection software.
2. Dimensions are in inches; dimensions in [ ] are in millimeters.



FACE AREA (SQ. FT.)
$\frac{A \times B}{144}$ = SQ. FT.
EXAMPLE:
$\frac{50 \times 30}{144}$ = 10 1/2 SQ.FT.

FIN HEIGHT		CONN. LOC
TIF	**B**	**C**
04	12.00 [305]	8.50 [216]
05	15.00 [381]	11.50 [292]
06	18.00 [457]	14.50 [368]
07	21.00 [533]	17.50 [445]
08	24.00 [610]	20.50 [521]
09	27.00 [686]	23.50 [597]
10	30.00 [762]	26.50 [673]
11	33.00 [838]	29.50 [749]
12	36.00 [914]	32.50 [826]
13	39.00 [991]	35.50 [902]
14	42.00 [1067]	38.50 [978]
15	45.00 [1143]	41.50 [1054]
16	48.00 [1219]	44.50 [1130]
17	51.00 [1295]	47.50 [1207]
18	54.00 [1372]	50.50 [1283]

HEADER SIZE		
TIF	**SUPPLY**	**RETURN**
04-06	$2^1/_2$" MPT	$1^1/_2$" MPT
07-18	3" MPT	2" MPT



Performance data — 28BZ

28BZ HEATING PERFORMANCE*

ROWS	CIRCUIT TYPE	FINS PER IN.	TOTAL CAPACITY (Btuh/ sq ft)	LEAVING AIR DB TEMP (F)	AIR PRESSURE DROP (in. wg)
1	Full	6	18.504	83.57	0.10
		9	24.725	92.21	0.13
		12	30.718	99.55	0.17

LEGEND

DB — Dry Bulb

*Ratings based on 60 F dry bulb entering air temperature; 700 ft/min entering air velocity and 5 psig steam. Use Nu-Fin Coil Selection Software for your specific design conditions.

NOTE: Data based on finned tube length of 84 in. and 12 tubes-in-face.

Application data

Coils

A coil, as the term is used with air-handling equipment, is a heat exchange device. A heating or cooling medium passes through the coil, where it either rejects heat to, or absorbs heat from, the airstream passing over the coil, depending upon the relative temperatures of medium and airstream.

Coil component definitions

Tube — The tube is a small-diameter pipe through which the heating or cooling medium passes as it rejects or absorbs heat. Coil tubes are generally constructed of copper.

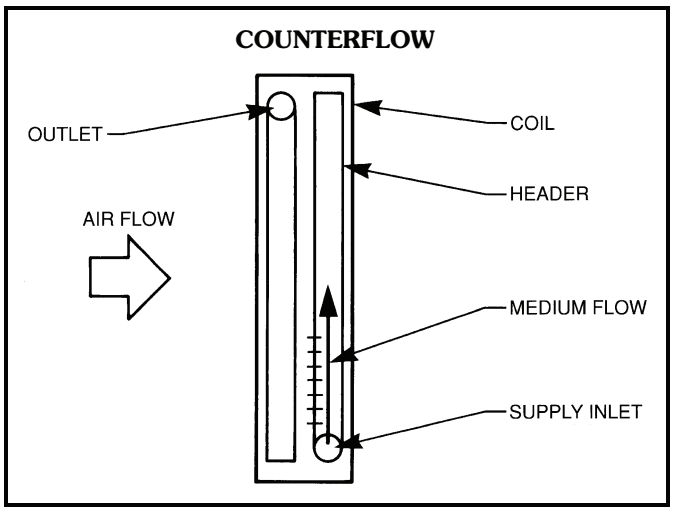
Fin — The coil fin is a thin metal plate attached to the tube to improve the heat transfer efficiency from medium to airstream. Typically, it is made of either aluminum or copper.

Header — The header is a distributor of the heating or cooling medium to the tubes. Headers are typically constructed of steel pipe and sized to the capacity of the coil.

Casing — The casing is the framework of the coil and is designed to be the supporting structure. Usually fabricated from galvanized steel, the casing is also available in stainless steel, which may be required in corrosive environments.

Connection nozzles — Connection nozzles are pipe stubs on the headers, where the heating or cooling medium enters and leaves the coils. Coils are normally piped for counterflow to obtain maximum heat transfer abilities.

Tube face — Tube face is the number of tubes in any one coil row. Coils are typically available in 4, 6, 8, or 10-row configurations.



Number of passes — The number of times that the fluid flows through the tubes in the airstream.

Circuiting — Circuiting is the medium of flow through the coil tubes. Optional full, double, half, or quarter circuits are used to obtain various coil efficiencies.

Face area — The working area of the coil is defined as the width x length of the finned area through which air passes.

Face velocity — Face velocity is the air velocity in fpm across the finned or face area of a coil. It is determined by dividing the air volume in cfm by the coil face area in square feet.

$$\text{Face Velocity (Fpm)} = \frac{\text{Air Volume (Cfm)}}{\text{Coil Face Area (Sq Ft)}}$$

When selecting a coil size, the first step is to determine the maximum allowable face velocity. This value is determined primarily by the following criteria:

1. Avoidance of moisture carryover into the ductwork
2. Air pressure drop across the coil
3. Heat transfer efficiency

1/2-in. COOLING COIL AIR FRICTION (in. wg)

ROWS	FINS/IN.	FACE VELOCITY (fpm)				
		300	400	500	600	700
4	8	0.15	0.25	0.37	0.51	0.66
	11	0.19	0.31	0.45	0.61	0.79
	14	0.23	0.36	0.52	0.70	0.90
6	8	0.23	0.38	0.55	0.76	1.00
	11	0.29	0.46	0.67	0.91	1.18
	14	0.34	0.55	0.79	1.06	1.36
8	8	0.30	0.50	0.74	1.02	1.33
	11	0.38	0.62	0.90	1.22	1.57
	14	0.46	0.73	1.05	1.41	1.81
10	8	0.38	0.63	0.92	1.27	1.66
	11	0.48	0.77	1.12	1.52	1.97
	14	0.57	0.91	1.31	1.76	2.26

1/2-in. HEATING COIL AIR FRICTION (in. wg)

ROWS	FINS/IN.	FACE VELOCITY (fpm)								
		300	400	500	600	700	800	900	1000	1100
1 and 2	8	0.08	0.13	0.19	0.26	0.34	0.43	0.53	0.64	0.75
	11	0.09	0.15	0.22	0.30	0.39	0.50	0.61	0.72	0.85
	14	0.12	0.19	0.27	0.37	0.47	0.59	0.71	0.85	0.99
4	8	0.15	0.25	0.37	0.51	0.66	0.84	1.03	1.24	1.46
	11	0.19	0.31	0.45	0.61	0.79	0.98	1.20	1.43	1.67
	14	0.23	0.36	0.52	0.70	0.90	1.12	1.36	1.61	1.88

The maximum allowable air velocity without moisture carryover into the ductwork depends on the type and spacing of the finned surface, the amount of moisture on the coil, and the geometry between coil and fan inlet or ductwork. Since coil moisture conditions vary, and coil versus duct geometry varies, the specified maximum face velocity should allow for these variations. Use the Nu-Fin™ coil selection software to determine potential moisture carryover for your specific application.

Fan horsepower is also affected by face velocity, since the air resistance across the coil varies roughly as the square of the face velocity.

In variable volume applications, the system generally operates below peak air volume for extended periods. In such cases, the design face velocity is commonly selected at the higher end of the suggested range.

Ethylene glycol

The effects of ethylene glycol on coil capacity and pressure drop can be determined from Carrier's computerized coil selection and performance programs.

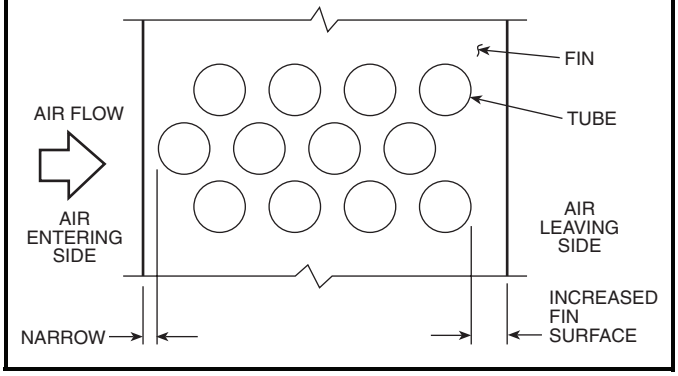
Installation

Coils designed for a built-up system are required to have intermediate drain pans located between individual coils, as shown in Built-Up System sketch on page 36.

To reduce the effect of moisture carryover into the downstream ductwork, water from the drain pans is carried to the sides to be drained by piping to the pan below. This keeps the water out of the airstream.

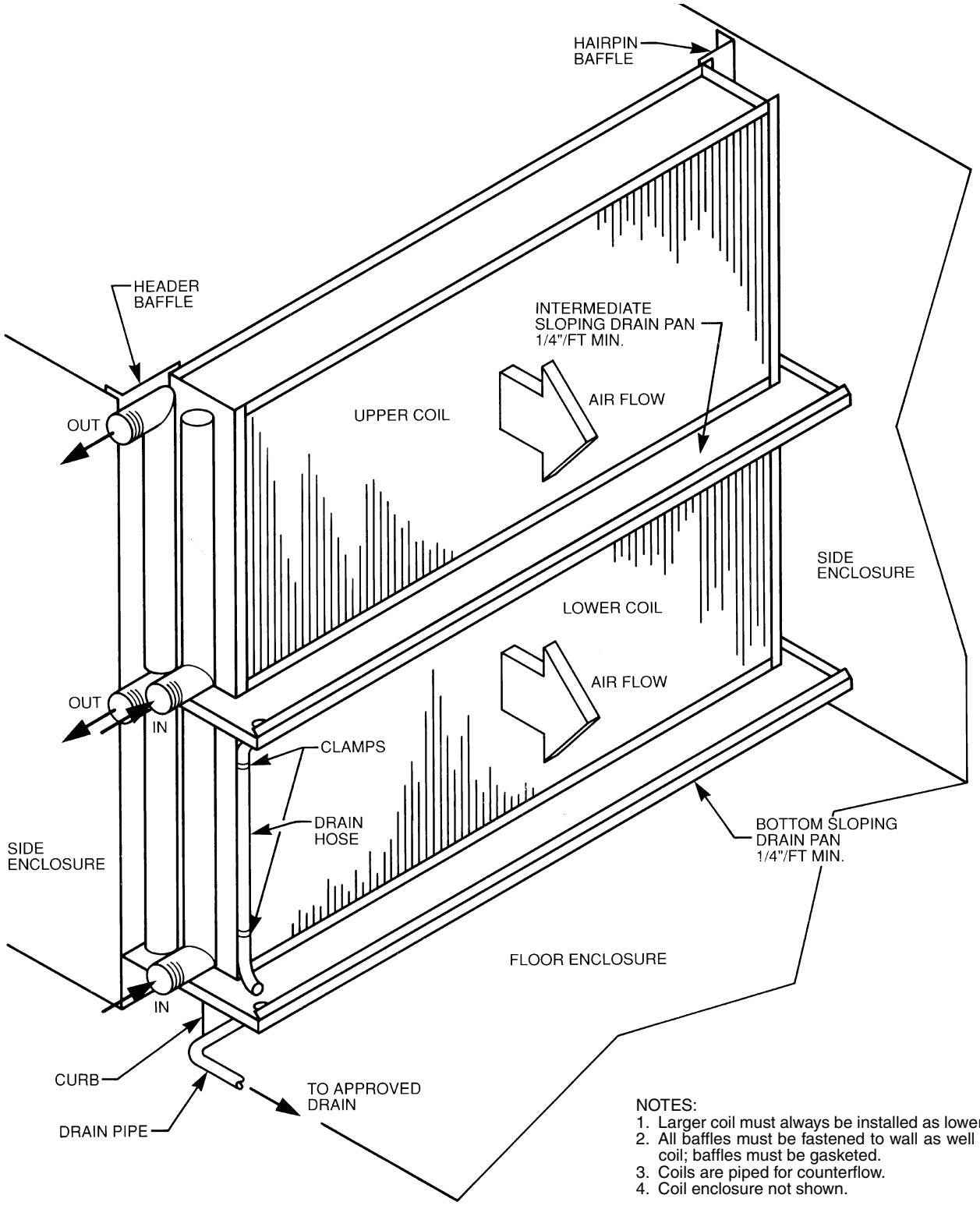
The effects of proper coil orientation in relation to airflow is equally important. Carrier's Nu-Fin coil is designed with more material on the air-leaving side of the fin than on the air-entering side. This design provides increased surface area for the moisture to adhere to the fin.

NU-FIN COIL DESIGN (1/2-in. Only)



Application data (cont)

STACKED COIL BUILT-UP SYSTEM



NOTES:
1. Larger coil must always be installed as lower coil.
2. All baffles must be fastened to wall as well as to coil; baffles must be gasketed.
3. Coils are piped for counterflow.
4. Coil enclosure not shown.

Guide specifications

Nu-Fin™ Separate Sale, Plate Fin Water, Direct Expansion and Non-Freeze Steam Coils

HVAC Guide Specifications

Carrier Model: **28BC,BH,BB,BD,BF,BX,BZ**

Part 1 — General

1.01 SYSTEM DESCRIPTION

Plate fin coils designed for air cooling applications, using chilled water, refrigerant, or brine, or air heating applications, using hot water or brine. Coils shall be supplied by Carrier, the specified manufacturer.

1.02 QUALITY ASSURANCE

Coils shall be hydrostatically tested at 450 psig air pressure for burst protection and at 250 psig for leakage failure.

1.03 DELIVERY, STORAGE, AND HANDLING

A. Coils shall be crated at the factory and shipped.

B. Booster coils shall be individually packaged and palletized.

C. Each coil shall be identified with individual "marked for" label.

D. Each coil shall be shipped with an airflow label.

E. Coils shall be stored and handled in accordance with the coil manufacturer's instructions.

Part 2 — Products

2.01 EQUIPMENT

A. General:

1. All coils shall have mill galvanized steel casings or optional stainless steel casings.
2. $1/2$-in. plate fins shall be wavy with an offset fin design for maximum heat transfer performance, as well as maximum moisture collection capability to prevent blowoff.
3. All $5/8$-in. plate fins shall be $1 1/2$-in. equilateral corrugated design.
4. All 1-in. plate fins shall be embossed.
5. All $1/2$-in. fin spacing shall be 8, 11, or 14 fins per inch.
6. All $5/8$-in. fin spacing shall be 8, 12, or 14 fins per inch.
7. 1-in. fin spacing shall be 6, 9, or 12 fins per inch.
8. Coils shall have the capability to be used in right-hand or left-hand applications.
9. Coils shall be piped counterflow to the airflow (inlet at bottom and outlet at top) to ensure maximum heat transfer.

B. Header Assembly:

1. Headers and connection nozzles shall be either steel or non-ferrous material. Cast iron headers are not acceptable when supplied with female pipe threads. Female pipe thread connections are prone to breakage when piping connections are terminated.
2. Water headers shall be sized at the factory to match coil capacity using $1 1/2$-in., $2 1/2$-in., or 3-in. nominal diameter pipe.
3. Header nozzles shall be either ASTM B88 copper or steel.
4. Drain and vent connections shall be located on the water connection nozzles. Vents and drains that are installed in coil return or supply bends promote tube fatigue and shall not be allowed.
5. Connection nozzles (inlet and outlet) shall be on the same end of the coil.
6. Nozzle-to-header connections shall be welded for steel and brazed for non-ferrous materials.
7. Male pipe thread connections shall be provided as standard. Victaulic connection shall be an approved equal.
8. Coils shall be shipped with protective caps on the nozzle ends.
9. Coils shall be drainable with non-trapping circuits.
10. No turbulence-promoting devices shall be permitted inside the tubes.

C. Tube Sheets:

1. Tube sheets shall be manufactured using 14-gage, ASTM A525-G60 galvanized steel or 14-gage 304L stainless steel.
2. Coil shall provide a mounting flange mechanically attached to the tube sheet, with $5/16$-in. diameter mounting holes center to center for sturdy, accurate installation of the coil.
3. Drive clips shall be available for booster coils.

D. Hairpin and Copper Tubes:

1. Hairpins on tubes shall be UNS C12200 copper $1/2$-in. OD. Tolerances shall conform to ASTM B-251.
2. Coil shall be manufactured using 180-degree continuous hairpin bends to reduce leak possibilities.

E. Side Casings:

1. Side casings shall be 16-gage ASTM A525 G60 galvanized steel riveted to the tube sheet. Approved option shall be 16-gage 304L stainless steel casings. Stainless steel shall be standard when copper fins are specified.
2. Casings designed without center and end supports shall not be allowed.
3. Cooling and heating coils shall have box flanges for strength and to facilitate stacking.

Guide specifications (cont)

F. Fin Pack:

1. The fin pack shall provide 8, 11, 12, or 14, or 6, 9, or 12 fins per inch.
2. Fins shall be either 1100-0 aluminum alloy or ASTM B-152 copper.
3. All $^1/_2$-in. fin shall be wavy using offset petal spacing collars with additional material downstream.
4. All $^5/_8$-in. fin shall be $1^1/_2$-in. equilateral corrugated design.
5. All 1-in. fin shall be embossed.
6. Copper fin packs shall be provided with stainless steel casings.

G. Chilled or Hot Water Coils:

1. Coils shall have working pressures of 300 psig at 200 F for chiller water, or 175 psig at 400 F for hot water applications.
2. Coils shall be available with 4, 6, 8, or 10 rows of cooling capacity, or 1 or 2 rows of heating capacity.
3. Coils shall be available from manufacturer in lengths as specified, up to 144 inches, in 1-in. increments.

H. Steam Distributing Coils:

Steam distributing coils (non-freeze type) shall be aluminum plate fins with an outer copper tube diameter of one inch with a $^5/_8$-in. diameter inner distributing tube, galvanized steel casings and steel headers. Working pressure shall be 175 psig at 400 F.

I. Direct-Expansion Coils:

Direct-expansion coils shall be aluminum plate fins with belled collars and bonded to $^1/_2$-in. OD copper tubes by mechanical expansion. Coils shall be provided with pressure type brass distributors with solder-type connections and shall have a minimum of 2 distributors. Coils for full face active or face split operation shall have intertwined circuits for equal loading on each circuit. Suction and discharge connections shall be on the same end. After testing, coils shall be dehydrated and charged with dry air. Coils shall be designed and tested in accordance with American National Standards Safety Code for Mechanical Refrigeration (ANSI/ASHRAE 15).