



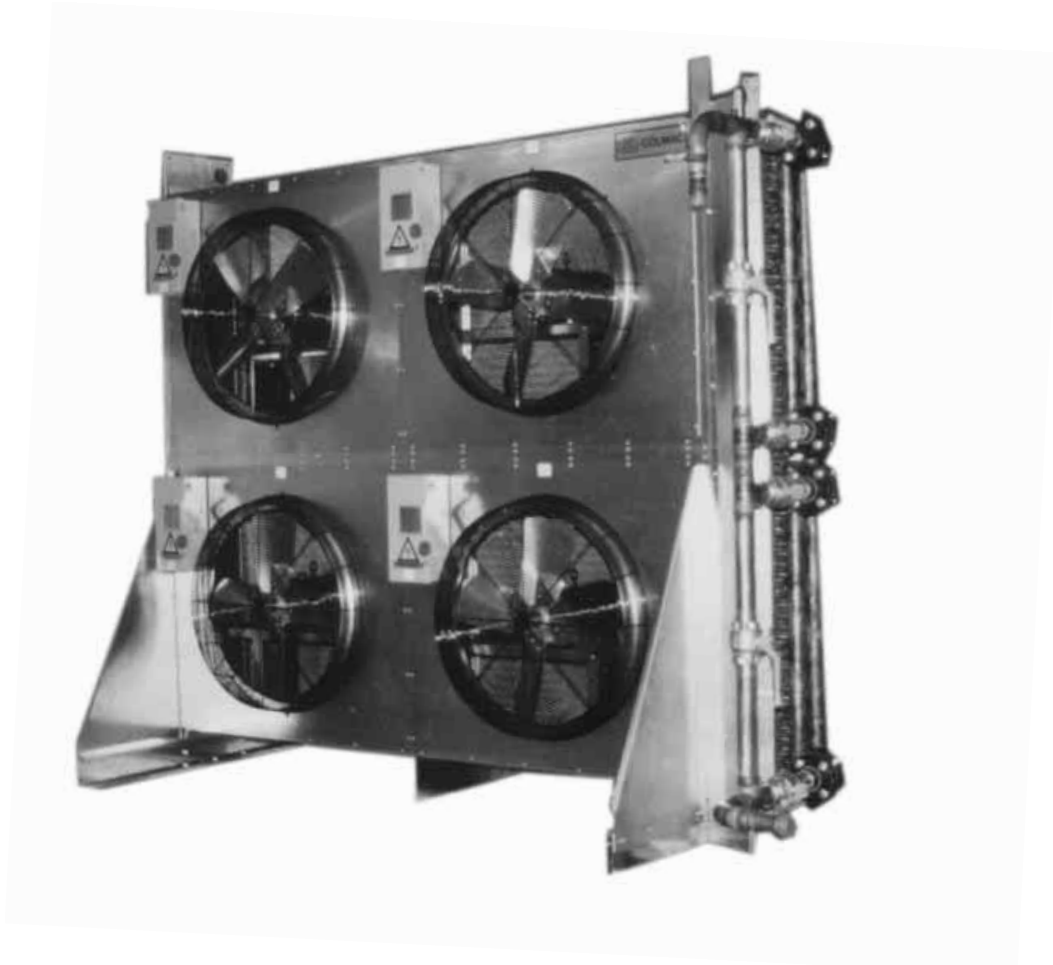
Manufacturing Inc.

AIR-COOLED
FLUID COOLERS

FEBRUARY 1, 1999
REVISED

DIRECT DRIVE REMOTE AIR COOLED FLUID COOLERS

33 MODELS



**Model AFV with Vertical Air Discharge.
Also available in AFH Models with Horizontal Discharge.**



Colmac coils are rated in accordance with standard industry practice.

SPECIFY COLMAC QUALITY

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STANDARD FEATURES:

Colmac AFV/AFH model air-cooled fluid coolers are designed to provide cooling of Water, Ethylene Glycol/Water and Propylene Glycol/Water mixtures in a variety of closed-loop applications. Closed-loop cooling eliminates the cost of fluid treatment usually associated with the use of cooling towers.

- Wide range of models and capacities - 33 models.
- Corrosion resistant construction - Mill galvanized housing, powder coated steel fan guards, aluminum fan blades on 3/4 Hp models, galvanized steel fan blades on 1 & 2 Hp models. Low speed, fully guarded fans for quiet operation.
- Built-in lifting eyes, and easy-to-install legs, make rigging and installation fast.
- Low noise, 850 RPM fans, on 1 & 2 Hp models.
- Compartmented fans to prevent short circuiting of air during fan cycling.
- Units designed for efficient fan cycle control.
- Versatile cabinet design for vertical or horizontal airflow.
- Coil is made of 1/2" dia seamless copper tubes, and high efficiency aluminum plate fins, with self-spacing collars.
- Exclusive Colmac "Full Floating Core" coil support system eliminates tubesheet leaks by shifting support of the coil core from tubes to fins. Special "Wear Guards" allow expansion and contraction of fins and tubes without chafing or wearing of tubes, or fins.
- Heavy duty rigid foot-mounted direct drive fan motors with moisture protected rainshields (slingers) are internally protected single or three phase on models 62 thru 384 (3/4 Hp), internally protected three phase only on models 119 thru 1271 (1 Hp), and three phase externally protected only on models 1425 thru 1625 (2 Hp). Motors are rated for 150°F maximum air temperature over the motor.
- Weatherproof electrical enclosure features single point field wiring, and is easily accessible for fast installation.

OPTIONS:

- Copper fins, or Polycoat Fins for corrosion resistance.
- Stainless or galvanized steel fan blades or cast aluminum.
- Stainless steel housing.
- Factory mounted and wired fused disconnect.
- Factory wired fan cycle/fan speed control.
- Customer specified control systems.
- Baked phenolic coating available
- UL 508 listed electrical panels
- CSA listing available

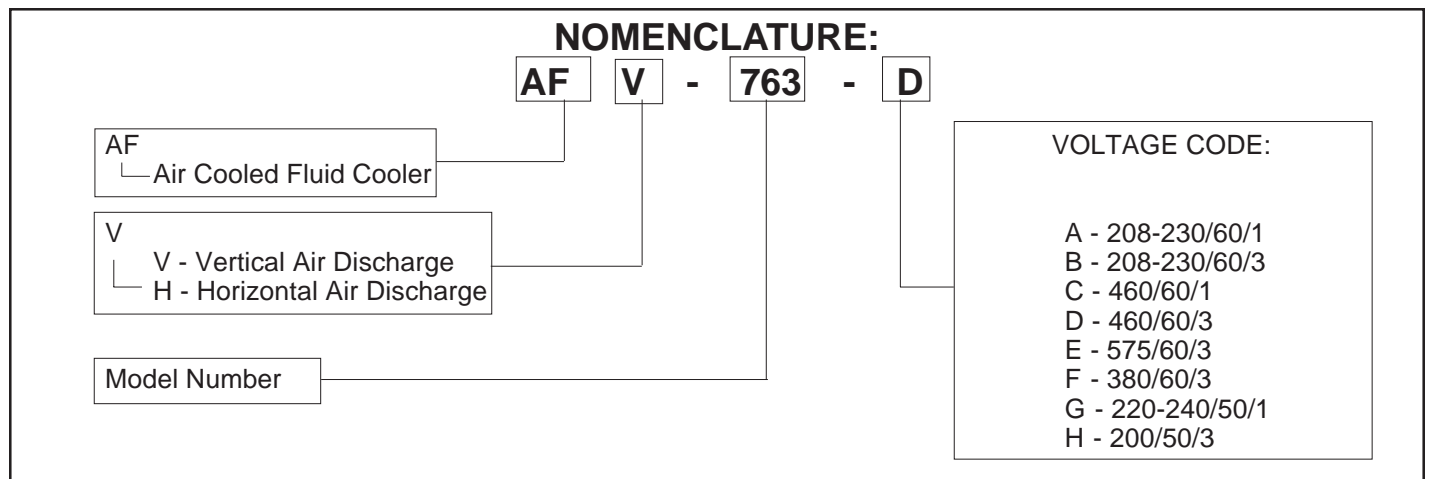


TABLE 1
AFV/AFH PHYSICAL SPECIFICATIONS

| Model | Fan Dia. in. | No. Fans | CFM | Coil Face | Rows Deep | Fins/ Inch | Internal Vol. Cu/Ft. | Wt. (lbs.) of 40% Glycol Mixture @ 135°F | | Dry Wt. lbs. |
|-------|--------------|----------|--------|-----------|-----------|------------|----------------------|--|---------|--------------|
| | | | | | | | | Ethel. | Propyl. | |
| 62 | 24 | 1 | 6310 | 35 x 48 | 2 | 14 | 0.324 | 21.0 | 20.5 | 330 |
| 84 | 24 | 1 | 6039 | 35 x 48 | 3 | 14 | 0.487 | 31.5 | 30.8 | 357 |
| 96 | 24 | 1 | 5734 | 35 x 48 | 4 | 14 | 0.649 | 42.0 | 41.1 | 383 |
| 167 | 24 | 2 | 12078 | 35 x 96 | 3 | 14 | 0.936 | 60.6 | 59.3 | 589 |
| 192 | 24 | 2 | 11468 | 35 x 96 | 4 | 14 | 1.25 | 80.9 | 79.1 | 643 |
| 251 | 24 | 3 | 18117 | 35 x 144 | 3 | 14 | 1.39 | 90.0 | 88.0 | 863 |
| 288 | 24 | 3 | 17202 | 35 x 144 | 4 | 14 | 1.85 | 119.8 | 117.1 | 944 |
| 307 | 24 | 4 | 24800 | 35 x 192 | 3 | 11 | 1.84 | 119.1 | 116.5 | 1056 |
| 335 | 24 | 4 | 24156 | 35 x 192 | 3 | 14 | 1.84 | 119.1 | 116.5 | 1096 |
| 384 | 24 | 4 | 22936 | 35 x 192 | 4 | 14 | 2.45 | 158.6 | 155.1 | 1203 |
| 119 | 30 | 1 | 8620 | 45 x 54 | 3 | 14 | 0.698 | 45.2 | 44.2 | 513 |
| 127 | 30 | 1 | 8090 | 45 x 54 | 4 | 14 | 0.931 | 60.3 | 58.9 | 552 |
| 223 | 30 | 2 | 18060 | 45 x 108 | 3 | 11 | 1.35 | 87.4 | 85.5 | 815 |
| 238 | 30 | 2 | 17240 | 45 x 108 | 3 | 14 | 1.35 | 87.4 | 85.5 | 843 |
| 254 | 30 | 2 | 16180 | 45 x 108 | 4 | 14 | 1.80 | 116.5 | 114.0 | 921 |
| 357 | 30 | 3 | 25860 | 45 x 162 | 3 | 14 | 2.00 | 129.5 | 126.6 | 1242 |
| 381 | 30 | 3 | 24270 | 45 x 162 | 4 | 14 | 2.66 | 172.2 | 168.4 | 1358 |
| 446 | 30 | 4 | 36120 | 45 x 216 | 3 | 11 | 2.65 | 171.5 | 167.8 | 1516 |
| 476 | 30 | 4 | 34480 | 45 x 216 | 3 | 14 | 2.65 | 171.5 | 167.8 | 1572 |
| 509 | 30 | 4 | 32360 | 45 x 216 | 4 | 14 | 3.53 | 228.5 | 223.5 | 1728 |
| 595 | 30 | 5 | 43100 | 45 x 270 | 3 | 14 | 3.30 | 213.6 | 208.9 | 1971 |
| 636 | 30 | 5 | 40450 | 45 x 270 | 4 | 14 | 4.40 | 284.8 | 278.6 | 2165 |
| 714 | 30 | 6 | 51720 | 90 x 162 | 3 | 14 | 4.00 | 258.9 | 253.2 | 2374 |
| 763 | 30 | 6 | 48540 | 90 x 162 | 4 | 14 | 5.32 | 344.4 | 336.8 | 2607 |
| 893 | 30 | 8 | 72240 | 90 x 216 | 3 | 11 | 5.30 | 343.1 | 335.5 | 2927 |
| 952 | 30 | 8 | 68960 | 90 x 216 | 3 | 14 | 5.30 | 343.1 | 335.5 | 3040 |
| 1017 | 30 | 8 | 64720 | 90 x 216 | 4 | 14 | 7.06 | 457.0 | 447.0 | 3351 |
| 1116 | 30 | 10 | 90300 | 90 x 270 | 3 | 11 | 6.60 | 427.2 | 417.8 | 3661 |
| 1190 | 30 | 10 | 86200 | 90 x 270 | 3 | 14 | 6.60 | 427.2 | 417.8 | 3803 |
| 1271 | 30 | 10 | 80900 | 90 x 270 | 4 | 14 | 8.80 | 569.6 | 557.1 | 4191 |
| 1425 | 36 | 10 | 111900 | 90 x 270 | 3 | 14 | 6.60 | 427.2 | 417.8 | 4368 |
| 1502 | 36 | 10 | 101600 | 90 x 270 | 4 | 14 | 8.80 | 569.6 | 557.1 | 4756 |
| 1625 | 36 | 10 | 88000 | 90 x 270 | 6 | 14 | 13.20 | 854.4 | 835.7 | 5532 |

Notes:

1. Weight of Liquid is calculated as follows:
Wt. Liquid (lbs) = Internal Vol. (cu. ft.) x Liquid Density(lbs/cu ft)
2. Operating Weight = Dry Weight + Weight Liquid
3. Units having finned length up to 216" use 1/2 x 0.016 copper tubes.
Units having finned length of 270" use 1/2 x 0.025 copper tubes.

TABLE 2
AFV/AFH ELECTRICAL SPECIFICATIONS

| Model | Fan dia.,in. | No. Fan | Fan Hp | Total FLA/60 Hz Supply | | | | Total FLA/50 Hz Supply | |
|-------|-----------------|------------|-----------|------------------------|-----------|--------|-------|------------------------|-------|
| | | | | 208-230/1 | 208-230/3 | 460/1 | 460/3 | Note 3 200/3 | 400/3 |
| 62 | 24 | 1 | 3/4 | 3.9 | 3.40 | 1.9 | 1.55 | 4.2 | 2.1 |
| 84 | 24 | 1 | 3/4 | 3.9 | 3.40 | 1.9 | 1.55 | 4.2 | 2.1 |
| 96 | 24 | 1 | 3/4 | 3.9 | 3.40 | 1.9 | 1.55 | 4.2 | 2.1 |
| 167 | 24 | 2 | 3/4 | 7.8 | 6.80 | 3.8 | 3.10 | 8.4 | 4.2 |
| 192 | 24 | 2 | 3/4 | 7.8 | 6.80 | 3.8 | 3.10 | 8.4 | 4.2 |
| 251 | 24 | 3 | 3/4 | 11.7 | 10.20 | 5.7 | 4.65 | 12.6 | 6.3 |
| 288 | 24 | 3 | 3/4 | 11.7 | 10.20 | 5.7 | 4.65 | 12.6 | 6.3 |
| 307 | 24 | 4 | 3/4 | 15.6 | 13.60 | 7.6 | 6.20 | 16.8 | 8.4 |
| 335 | 24 | 4 | 3/4 | 15.6 | 13.60 | 7.6 | 6.20 | 16.8 | 8.4 |
| 384 | 24 | 4 | 3/4 | 15.6 | 13.60 | 7.6 | 6.20 | 16.8 | 8.4 |
| 119 | 30 | 1 | 1 | note 1 | 5.6 | note 1 | 2.8 | 4.2 | 2.1 |
| 127 | 30 | 1 | 1 | " | 5.6 | " | 2.8 | 4.2 | 2.1 |
| 223 | 30 | 2 | 1 | " | 11.2 | " | 5.6 | 8.4 | 4.2 |
| 238 | 30 | 2 | 1 | " | 11.2 | " | 5.6 | 8.4 | 4.2 |
| 254 | 30 | 2 | 1 | " | 11.2 | " | 5.6 | 8.4 | 4.2 |
| 357 | 30 | 3 | 1 | " | 16.8 | " | 8.4 | 12.6 | 6.3 |
| 381 | 30 | 3 | 1 | " | 16.8 | " | 8.4 | 12.6 | 6.3 |
| 446 | 30 | 4 | 1 | " | 22.4 | " | 11.2 | 16.8 | 8.4 |
| 476 | 30 | 4 | 1 | " | 22.4 | " | 11.2 | 16.8 | 8.4 |
| 509 | 30 | 4 | 1 | " | 22.4 | " | 11.2 | 16.8 | 8.4 |
| 595 | 30 | 5 | 1 | " | 28.0 | " | 14.0 | 21.0 | 10.5 |
| 636 | 30 | 5 | 1 | " | 28.0 | " | 14.0 | 21.0 | 10.5 |
| 714 | 30 | 6 | 1 | note 1 | 33.6 | note 1 | 16.8 | 25.2 | 12.6 |
| 763 | 30 | 6 | 1 | " | 33.6 | " | 16.8 | 25.2 | 12.6 |
| 893 | 30 | 8 | 1 | " | 44.8 | " | 22.4 | 33.6 | 16.8 |
| 952 | 30 | 8 | 1 | " | 44.8 | " | 22.4 | 33.6 | 16.8 |
| 1017 | 30 | 8 | 1 | " | 44.8 | " | 22.4 | 33.6 | 16.8 |
| 1116 | 30 | 10 | 1 | " | 56.0 | " | 28.0 | 42.0 | 21.0 |
| 1190 | 30 | 10 | 1 | " | 56.0 | " | 28.0 | 42.0 | 21.0 |
| 1271 | 30 | 10 | 1 | " | 56.0 | " | 28.0 | 42.0 | 21.0 |
| 1425 | 36 | 10 | 2 | note 1 | 86.0 | note 1 | 43.0 | 93.7 | 46.9 |
| 1502 | 36 | 10 | 2 | " | 86.0 | " | 43.0 | 93.7 | 46.9 |
| 1625 | 36 | 10 | 2 | " | 86.0 | " | 43.0 | 93.7 | 46.9 |

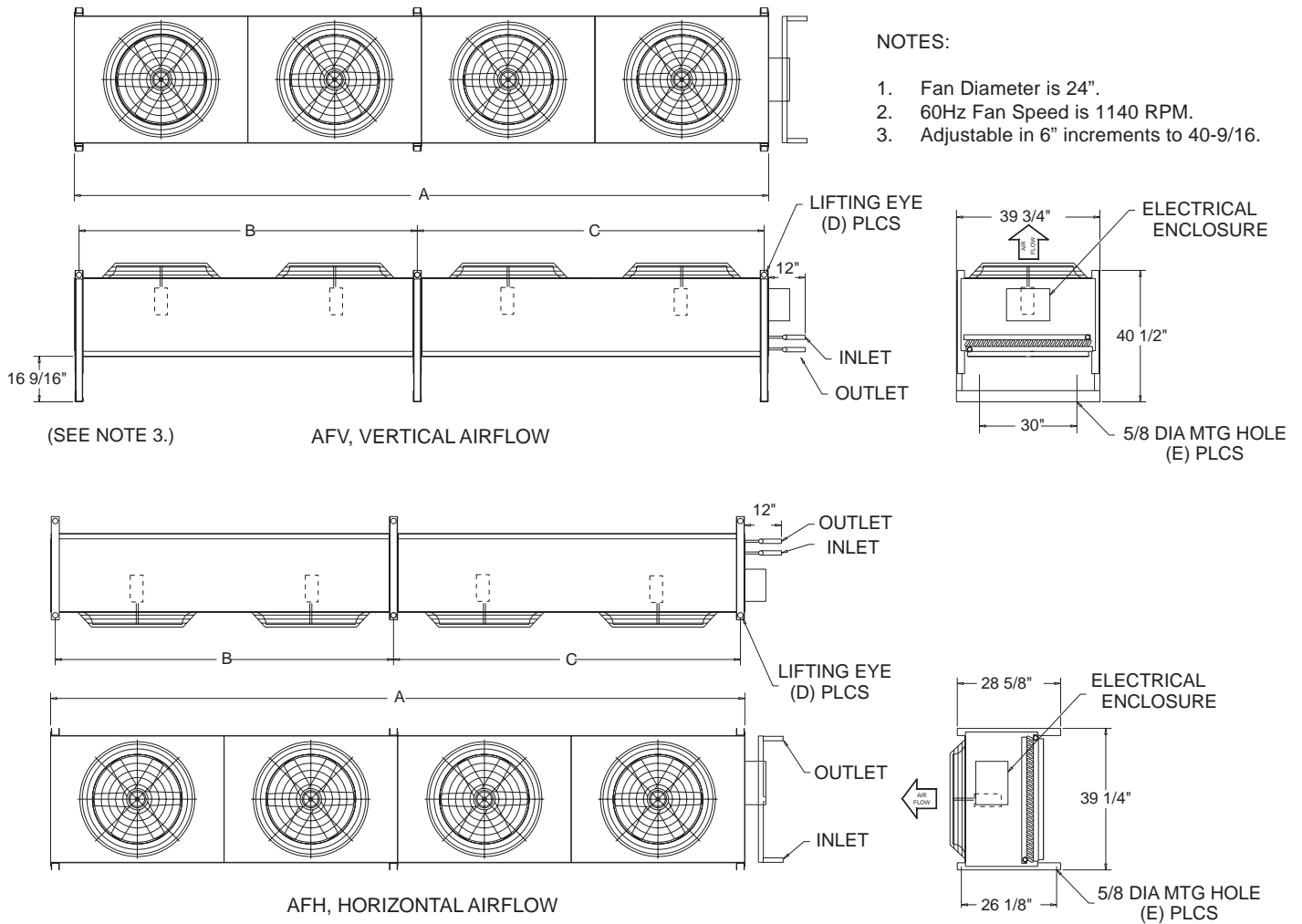
Notes:

1. These units not available for single phase supply.
2. Models 62 through 384 (24" Fans)
Standard motors are 3/4 HP, 1140 RPM ODP, 60 Hz with internal thermal overload protection.

Models 119 through 1271 (30" Fans)
Standard motors are 1 HP, 850 RPM ODP, 60 Hz with internal thermal overload protection.

Models 1425 through 1625 (36" Fans)
Standard motors are 2 HP, 850 RPM TEFC, 60 Hz without internal thermal overload protection.
3. For 50 Hz operation:
(see Page 10)
 - 1 HP motors are used in lieu of 3/4 HP.
 - 1-1/2 HP motors are used in lieu of 1 HP.
 - 2 HP motors are 950 RPM, 2 HP.

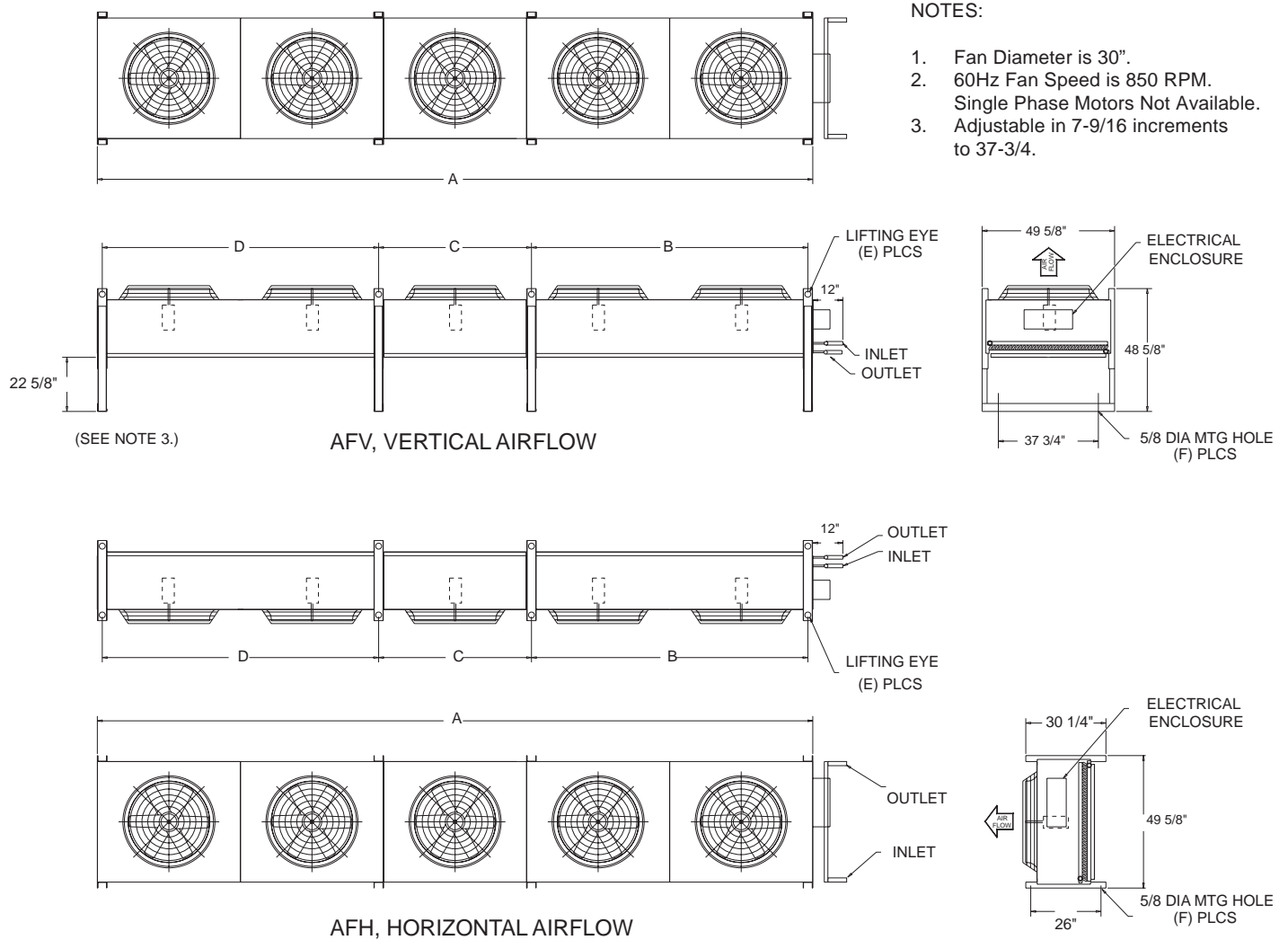
FIGURE 1
PHYSICAL DIMENSIONS, Models 62 thru 384
(24" dia fans)



DIMENSIONS

| MODEL | NO. FANS | A | B | C | D | E | MAX. INLET/OUTLET CONN. SIZE, MPT |
|-------|----------|-----|----|----|---|---|--------------------------------------|
| 62 | 1 | 48 | 46 | - | 4 | 4 | 3 |
| 84 | 1 | 48 | 46 | - | 4 | 4 | 3 |
| 96 | 1 | 48 | 46 | - | 4 | 4 | 3 |
| 167 | 2 | 96 | 94 | - | 4 | 4 | 3 |
| 192 | 2 | 96 | 94 | - | 4 | 4 | 4 |
| 251 | 3 | 144 | 94 | 48 | 6 | 6 | 4 |
| 288 | 3 | 144 | 94 | 48 | 6 | 6 | 4 |
| 307 | 4 | 192 | 94 | 96 | 6 | 6 | 4 |
| 335 | 4 | 192 | 94 | 96 | 6 | 6 | 4 |
| 384 | 4 | 192 | 94 | 96 | 6 | 6 | 4 |

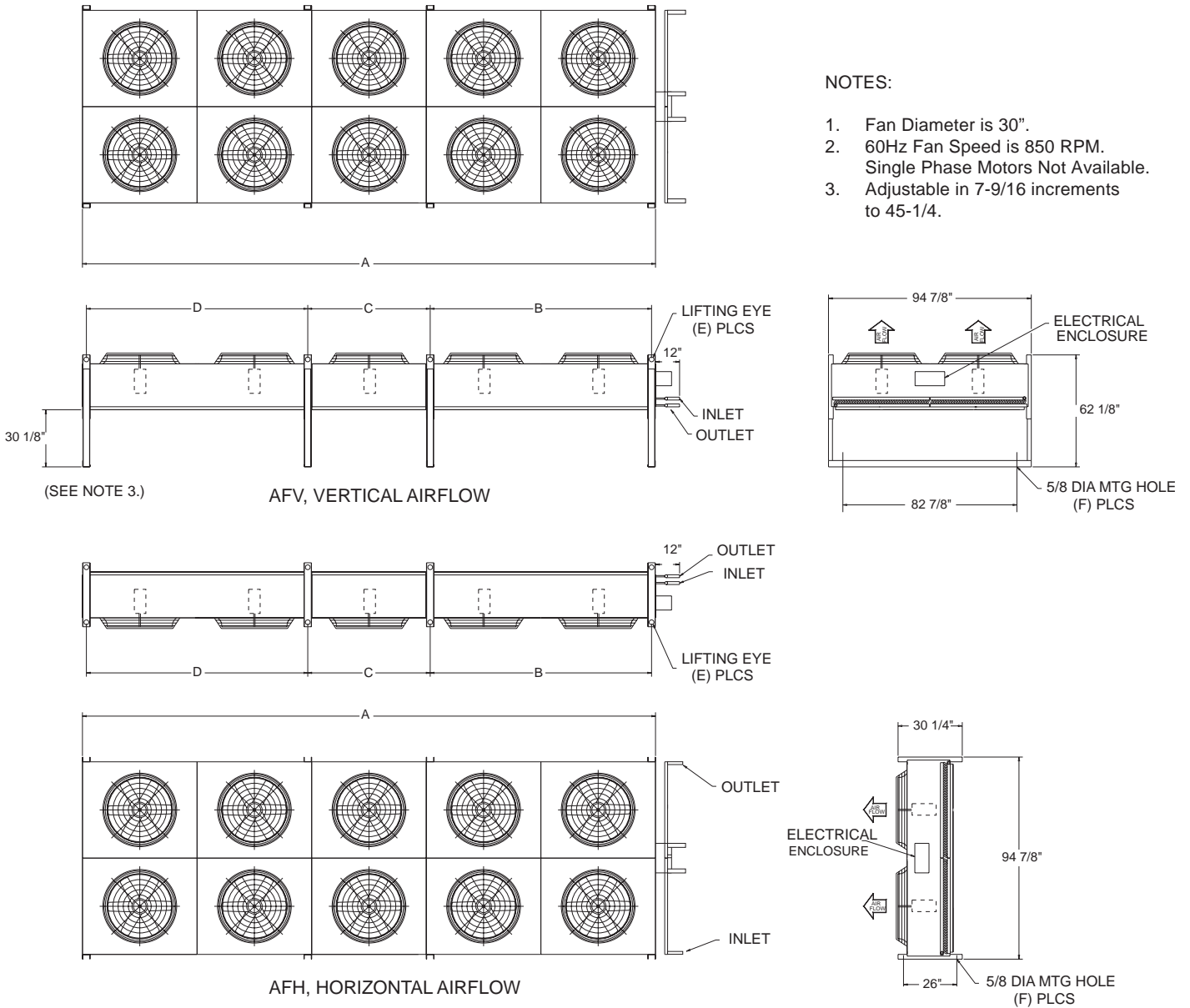
FIGURE 2
PHYSICAL DIMENSIONS, Models 119 thru 636
(30" dia fans)



DIMENSIONS

| MODEL | NO. FANS | A | B | C | D | E | F | MAX. INLET/OUTLET CONN. SIZE, MPT |
|-------|----------|-----|---------|--------|---------|---|---|--------------------------------------|
| 119 | 1 | 54 | 50 1/2 | - | - | 4 | 4 | 4 |
| 127 | 1 | 54 | 50 1/2 | - | - | 4 | 4 | 4 |
| 223 | 2 | 108 | 104 1/2 | - | - | 4 | 4 | 4 |
| 238 | 2 | 108 | 104 1/2 | - | - | 4 | 4 | 4 |
| 254 | 2 | 108 | 104 1/2 | - | - | 4 | 4 | 4 |
| 357 | 3 | 162 | 104 1/2 | - | 54 | 6 | 6 | 4 |
| 381 | 3 | 162 | 104 1/2 | - | 54 | 6 | 6 | 4 |
| 446 | 4 | 216 | 104 1/2 | - | 108 | 6 | 6 | 4 |
| 476 | 4 | 216 | 104 1/2 | - | 108 | 6 | 6 | 4 |
| 509 | 4 | 216 | 104 1/2 | - | 108 | 6 | 6 | 4 |
| 595 | 5 | 270 | 104 1/2 | 57 1/2 | 104 1/2 | 8 | 8 | 4 |
| 636 | 5 | 270 | 104 1/2 | 57 1/2 | 104 1/2 | 8 | 8 | 4 |

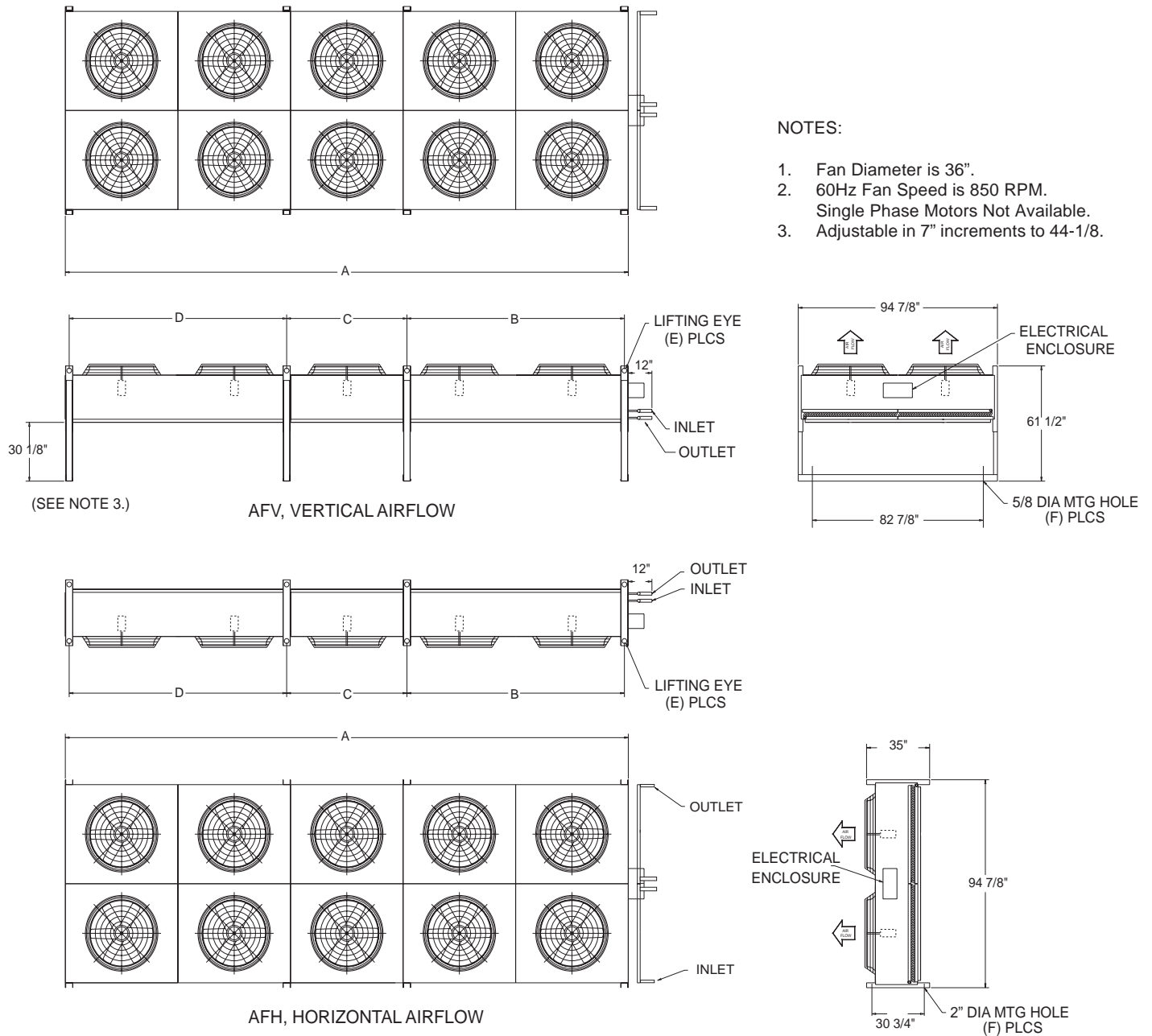
FIGURE 3
PHYSICAL DIMENSIONS, Models 714 thru 1271
(30" dia fans)



DIMENSIONS

| MODEL | NO. FANS | A | B | C | D | E | F | MAX. INLET/OUTLET CONN. SIZES, MPT |
|-------|----------|-----|---------|--------|---------|---|---|---------------------------------------|
| 714 | 6 | 162 | 104 1/2 | - | 54 | 6 | 6 | 5 |
| 763 | 6 | 162 | 104 1/2 | - | 54 | 6 | 6 | 6 |
| 893 | 8 | 216 | 104 1/2 | - | 108 | 6 | 6 | 5 |
| 952 | 8 | 216 | 104 1/2 | - | 108 | 6 | 6 | 5 |
| 1017 | 8 | 216 | 104 1/2 | - | 108 | 6 | 6 | 6 |
| 1116 | 10 | 270 | 104 1/2 | 57 1/2 | 104 1/2 | 8 | 8 | 5 |
| 1190 | 10 | 270 | 104 1/2 | 57 1/2 | 104 1/2 | 8 | 8 | 5 |
| 1271 | 10 | 270 | 104 1/2 | 57 1/2 | 104 1/2 | 8 | 8 | 6 |

FIGURE 4
PHYSICAL DIMENSIONS, Models 1425 thru 1625
(36" dia fans)



NOTES:

1. Fan Diameter is 36".
2. 60Hz Fan Speed is 850 RPM.
Single Phase Motors Not Available.
3. Adjustable in 7" increments to 44-1/8.

DIMENSIONS

| MODEL | NO. FANS | A | B | C | D | E | F | MAX. INLET/OUTLET CONN. SIZES, MPT |
|-------|----------|-----|---------|--------|---------|---|---|---------------------------------------|
| 1425 | 10 | 270 | 104 1/4 | 57 3/4 | 104 1/4 | 8 | 8 | 5 |
| 1502 | 10 | 270 | 104 1/4 | 57 3/4 | 104 1/4 | 8 | 8 | 6 |
| 1625 | 10 | 270 | 104 1/4 | 57 3/4 | 104 1/4 | 8 | 8 | 6 |

OPERATION WITH 50 Hz POWER

COLMAC AFV and AFH fluid coolers are designed to operate with either 60 Hz, or 50 Hz supply power. Cooling capacity for 50 Hz operation will be the same as capacity for 60 Hz operation, since COLMAC uses fan blades matched to the 50 Hz rotational speed of 950 RPM.

Motor horsepower on most models will be different, however. The 60 Hz, 3/4 HP motors will be replaced with 1.0 HP motors, and 60 Hz, 1.0 HP motors will be replaced with 1.5 HP motors for 50 Hz operation.

50 Hz FAN SPEED/SOUND LEVEL:

Operation of fluid coolers at 50 Hz will change the rotational speed of the fans. All fans will turn at 950 RPM. The 24 in. dia. fans will turn slower than those used for 60 Hz operation, and will run quieter. The 30 and 36 in. dia. fans will turn faster than those used for 60 Hz operation and will be somewhat louder. Fan and tip speeds, and sound levels for 60 Hz and 50 Hz are shown in tables 3 and 4.

**TABLE 3
FAN SPEEDS**

| Models | Fan Dia | 60 Hz | | 50 Hz | |
|----------------|---------|---------|-------------|---------|-------------|
| | | Fan RPM | Tip Spd FPM | Fan RPM | Tip Spd FPM |
| 62 thru 384 | 24" | 1140 | 7163 | 950 | 5969 |
| 119 thru 1271 | 30" | 850 | 6676 | 950 | 7464 |
| 1425 thru 1625 | 36" | 850 | 8011 | 950 | 8958 |

**TABLE 4
AFV/AFH SOUND LEVELS (Approx.)***

| No. Fans | 60 Hz Operation | | | | 50 Hz Operation | | | |
|---------------|------------------------------|-----|-----|------|------------------------------|-----|-----|------|
| | dBA @ Distance from Unit, Ft | | | | dBA @ Distance from Unit, Ft | | | |
| | 5' | 25' | 50' | 100' | 5' | 25' | 50' | 100' |
| 24 dia | | | | | | | | |
| 1 | 70 | 56 | 50 | 44 | 66 | 52 | 46 | 40 |
| 2 | 73 | 59 | 53 | 47 | 69 | 55 | 49 | 43 |
| 3 | 75 | 61 | 55 | 49 | 71 | 57 | 51 | 45 |
| 4 | 76 | 62 | 56 | 50 | 72 | 58 | 52 | 46 |
| 30 dia | | | | | | | | |
| 1 | 69 | 55 | 49 | 43 | 71 | 57 | 51 | 45 |
| 2 | 72 | 58 | 52 | 46 | 74 | 60 | 54 | 48 |
| 3 | 74 | 60 | 54 | 48 | 76 | 62 | 56 | 50 |
| 4 | 75 | 61 | 55 | 49 | 77 | 63 | 57 | 51 |
| 5 | 76 | 62 | 56 | 50 | 78 | 64 | 58 | 52 |
| 6 | 77 | 63 | 57 | 51 | 79 | 65 | 59 | 53 |
| 8 | 78 | 64 | 58 | 52 | 80 | 66 | 60 | 54 |
| 10 | 79 | 65 | 59 | 53 | 81 | 67 | 61 | 55 |
| 36 dia | | | | | | | | |
| 10 | 85 | 71 | 65 | 59 | 87 | 73 | 67 | 61 |

*Based on free field sound data, with no background noise.

SELECTION PROCEDURE:

The selection of a COLMAC AFV/AFH fluid cooler is mostly graphical and is easy to make.

Glossary of Terms

| | | |
|--------------------|---|---|
| ACF | = | Altitude Correction Factor (Fig. 9) |
| CCF | = | Capacity Corr. Factor, Fluid Mixture (Fig. 6) |
| EAT | = | Entering Air Temp. |
| EFT | = | Entering Fluid Temp. |
| FF | = | Flow factor (Figs. 10 thru 16) |
| FHF | = | Fluid Heat Factor (Fig. 5) |
| GPM | = | Gallons per Minute |
| LAT | = | Leaving Air Temp. |
| LFT | = | Leaving Fluid Temp. |
| LF | = | Length factor (Figs. 10 thru 16) |
| MBH | = | BTUH x 1000 |
| ΔP_{fluid} | = | Fluid Pressure Drop, psi (Fig. 7) |
| PDF | = | Pressure Drop Factor (Fig. 8) |

Step 1. Calculate Avg Fluid Temp., AFT.

$$AFT = (EFT + LFT) / 2$$

Step 2. Calculate Fluid ΔT .

$$\Delta T = EFT - LFT$$

Step 3. Calculate temperature difference, TD

$$TD = EFT - EAT$$

Step 4. Find Fluid Heat Factor, FHF, (Fig. 5).

Step 5. Calculate MBH required per degree of temperature difference.

$$MBH / TD = (GPM \times \Delta T \times FHF) / TD$$

Step 6. Correct MBH / TD with CCF (Fig. 6) and ACF (Fig. 9).

$$MBH / TD = (MBH / TD) \times CCF \times ACF$$

Step 7. Choose Model, using GPM and MBH / TD in Figs. 10 thru 16.

** (Use Models whose performance curves fall on, or above MBH / TD)

Step 8. Find Fluid Pressure Drop:

- Using GPM, find FF and LF from Figure used in step 7.
- Using FF and LF, go to Fig. 7, to find ΔP_{fluid} .

Step 9. Correct Fluid Pressure Drop with PDF (Fig. 8).

$$\Delta P_{fluid} = \Delta P_{fluid} \times PDF$$

Step 10. (Optional) Unit capacity can be approximated by the following method:

$$MBH \text{ actual} = \frac{MBH/TD \text{ (Curve value)}}{CCF \times ACF} \times TD$$

EXAMPLE

1. $AFT = (125 + 115.5) / 2$
 $AFT = 120.3^{\circ}F$

2. $\Delta T = 125 - 115.5$
 $\Delta T = 9.5^{\circ}F$

3. $TD = 125 - 95$
 $TD = 30^{\circ}F$

4. From Fig. 5, we see that $FHF = 0.466$

5. Calculate $MBH / TD = (GPM \times \Delta T \times FHF) / TD$
 $MBH/TD = (80 \times 9.5 \times 0.466) / 30$
 $MBH/TD = 11.8$

6. Correcting capacity for 30% Eth. Gly. and 2,000 ft alt. using CCF (Fig. 6) and ACF (Fig. 9):
 $CCF = 1.002$ and $ACF = 1.04$

$MBH/TD = 11.8 \times 1.002 \times 1.04$
 $MBH/TD = 12.3$

7. Looking at Fig. 11, using 80 GPM and 12.3 MBH/TD:

a. Choose AFV-254 At 80 GPM, it's performance is 12.9 MBH/TD, which is greater than 12.3

b. Using diagrams in Fig. 11 for Flow Factor (above) and Length Factor, (side):
 for AFV-254 (Fig. 11): $FF = 3.33$
 $LF = 648$

8. Looking at Fig. 7, using 80 GPM, $FF = 3.33$ and $LF = 648$

$\Delta P_{fluid} = 7.5$

9. Correct for ΔP_{fluid} for 30% Eth. Gly mixture at $120^{\circ}f$ using Fig. 8: $PDF = 1.175$

$\Delta P_{fluid} = \Delta P_{fluid} \times PDF$
 $\Delta P_{fluid} = 1.175 \times 7.5$

$\Delta P_{fluid} = 8.8 \text{ psi}$

10. Actual Unit Capacity at 80 GPM, $120^{\circ}F$ AFT, $30^{\circ}TD$, and 30% Ethylene glycol, is approximately:

$$MBH \text{ actual} = \frac{MBH / TD}{CCF \times ACF} \times TD = \frac{12.9 \text{ MBH}/TD}{1.002 \times 1.04} \times 30$$

$MBH \text{ actual} = 371.37$

Given: % Glycol = 30% Ethylene Glycol
 GPM = 80
 $EFT = 125^{\circ}F$
 $LFT = 115.5^{\circ}F$
 $EAT = 95^{\circ}F$
 Alt. = 2,000 ft

Notes:

1. The selection procedure is optimized for system performance while keeping fluid pressure drops below a reasonable maximum (less than 12 PSI). If calculated ΔP_{fluid} is greater than that desired, it is possible to make another selection on COLMAC's CoilPRO III software, using a "Hot Water/Sensible Cooling" coil, or have COLMAC's Factory Sales people assist in making another circuiting selection.
2. Flow Factors greater than 3.5 are not recommended, and are not represented in Figs. 10 thru 16.
3. See Table 5. for suggested inlet/outlet pipe sizing.

TABLE 5.

| Gallons Per Minute | Suggested Inlet/Outlet Connection Size, MPT |
|--------------------|---|
| 2 - 6 | 1" |
| 7 - 12 | 1 1/4" |
| 13 - 20 | 1 1/2" |
| 21 - 40 | 2" |
| 41 - 80 | 2 1/2" |
| 81 - 120 | 3" |
| 121 - 260 | 4" |
| 261 - 700 | 6" |

* Based on mean head loss of 2.5ft / 100ft, ASHRAE Fundamentals Handbook, 1993

OPTIONAL FAN CONTROL

COLMAC offers FC Fan Cycling and MS Modulated Speed control packages to compliment the selection of any fluid cooler. Such controls may be used to maintain the desired Leaving Fluid Temperature regardless of operating conditions, or seasons.

FC fan cycling controls will stop rotation of one or more fans in incremental stages to maintain temperature.

MS controls will slow rotation of one or more fans to maintain temperature. On multiple fan models, a combination of Modulation and Cycling is used. If the fluid temperature falls below the point at which the Modulating fan(s) can maintain temperature, one or more additional fans will be shut off and the remaining Modulating fans will gain more speed until the desired fluid temperature is reached.

Note: Because MS controls affect motor winding temperature, please consult the Factory for application information and pricing.

FIGURE 5

FLUID HEAT FACTORS, FHF

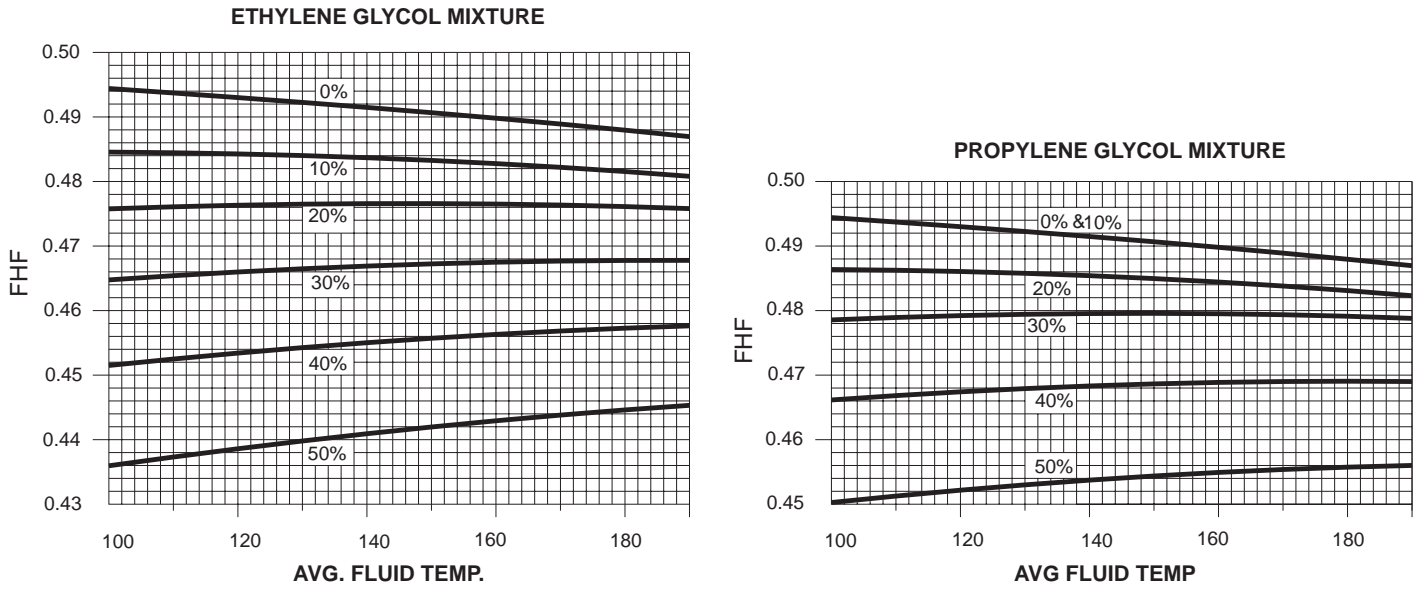


FIGURE 6

CAPACITY CORRECTION FACTORS, CCF

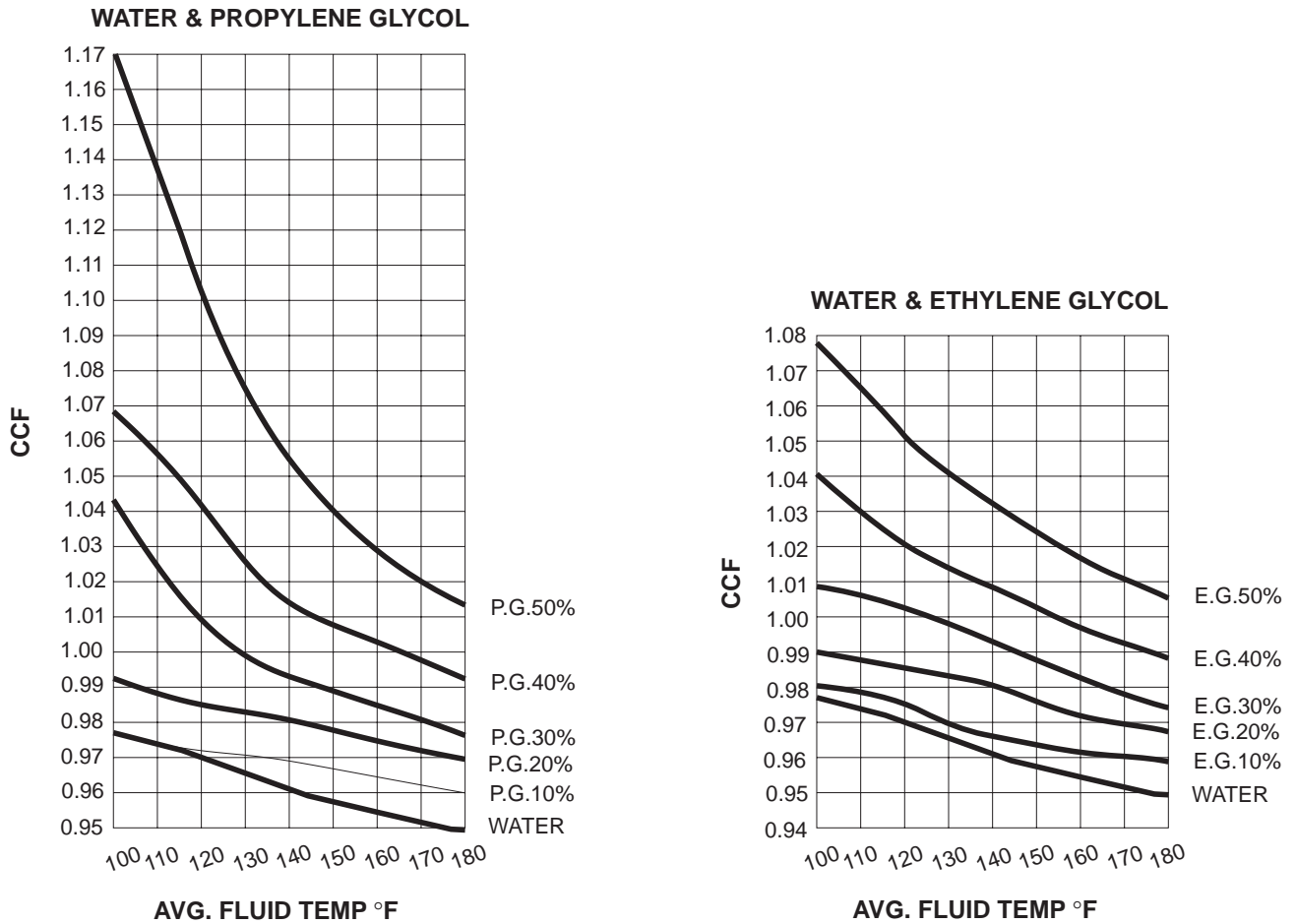
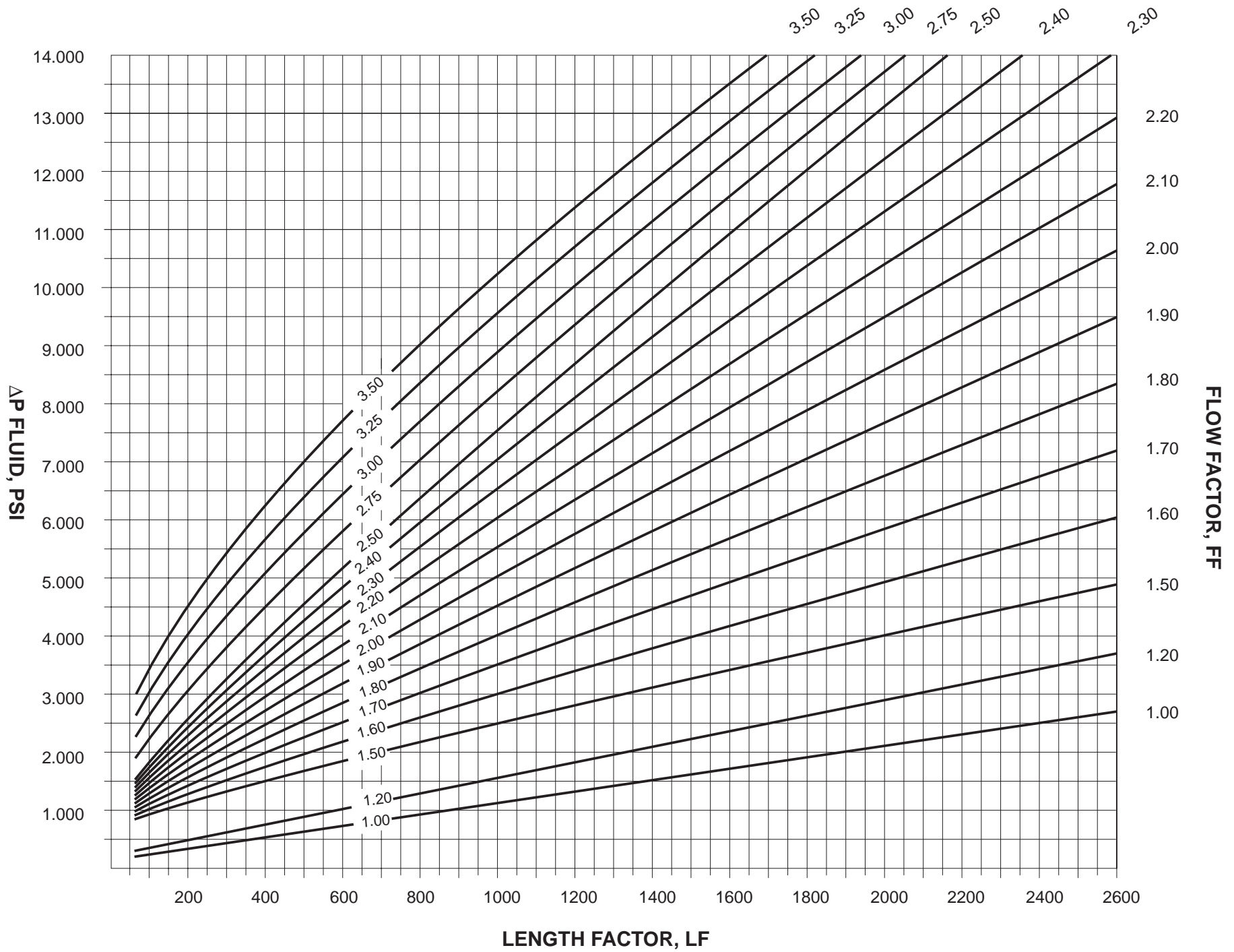
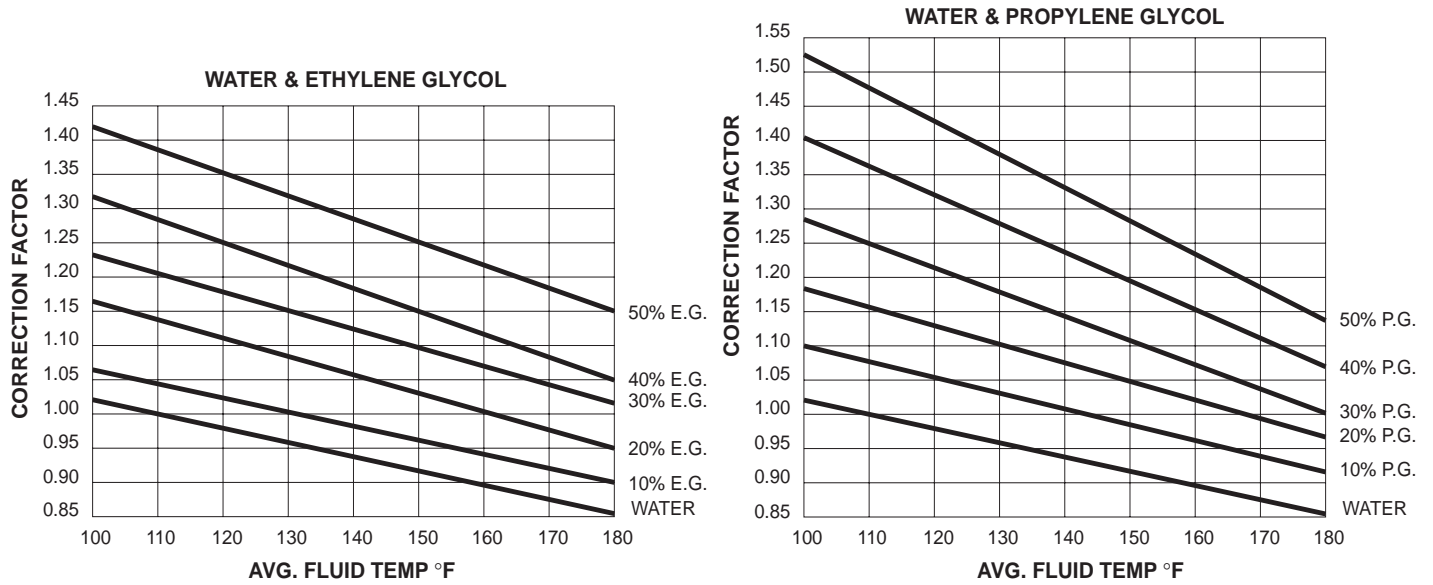


FIGURE 7
FLUID PRESSURE DROP, ΔP FLUID



**FIGURE 8
CORRECTION FACTOR, PDF
FLUID PRESSURE DROP**



**FIGURE 9
ALTITUDE CORRECTION FACTOR**

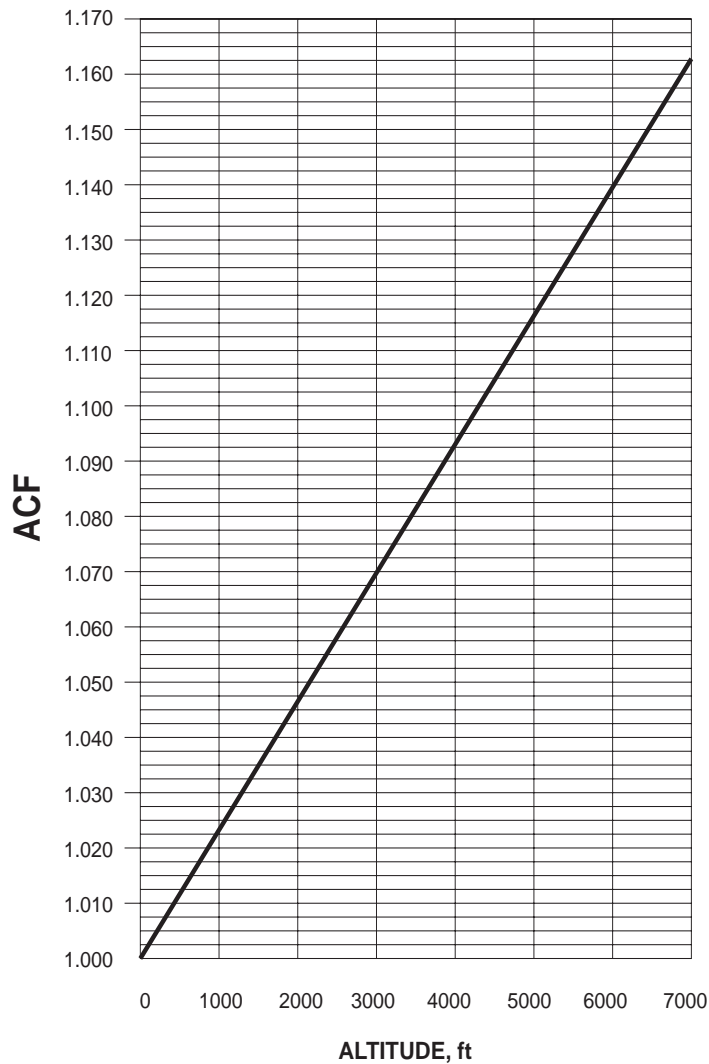
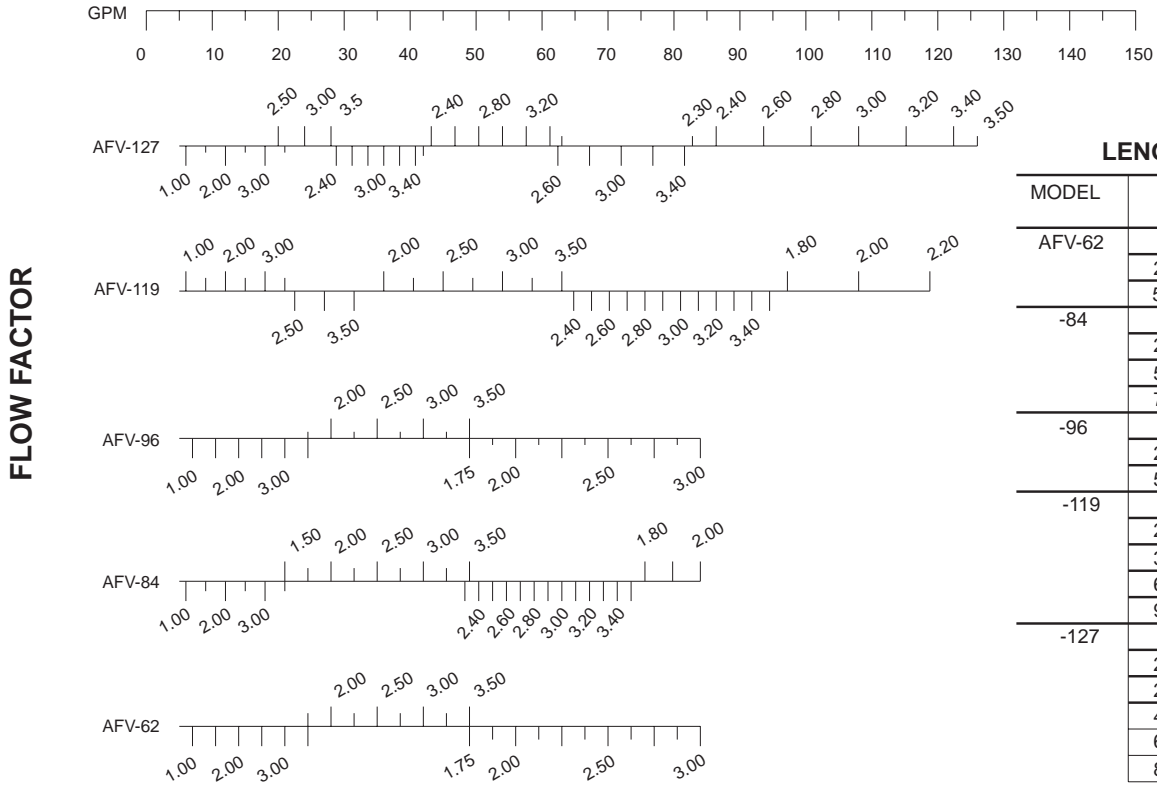


FIGURE 10 CAPACITY - 1 FAN FLUID COOLERS



LENGTH FACTOR

| MODEL | GPM | LENGTH FACTOR |
|--------|----------|---------------|
| AFV-62 | 5 - 25 | 384 |
| | 26 - 49 | 192 |
| | 50 - 80 | 96 |
| -84 | 5 - 21 | 672 |
| | 22 - 49 | 288 |
| | 50 - 74 | 192 |
| -96 | 5 - 25 | 786 |
| | 26 - 49 | 384 |
| | 50 - 80 | 192 |
| -119 | 5 - 21 | 972 |
| | 22 - 31 | 648 |
| | 32 - 63 | 324 |
| | 64 - 94 | 216 |
| -127 | 5 - 21 | 1296 |
| | 22 - 28 | 972 |
| | 29 - 42 | 648 |
| | 43 - 64 | 432 |
| | 65 - 85 | 324 |
| | 86 - 120 | 216 |

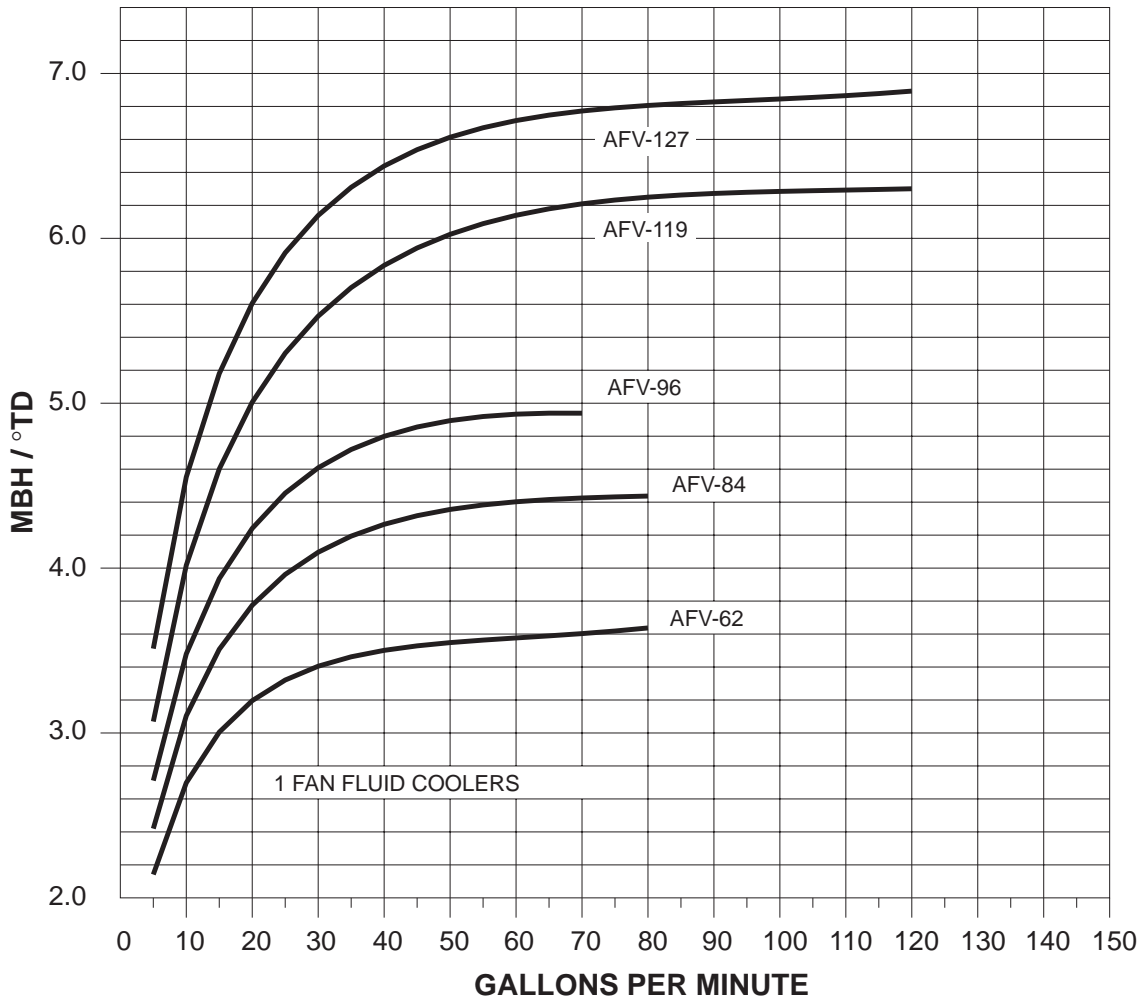
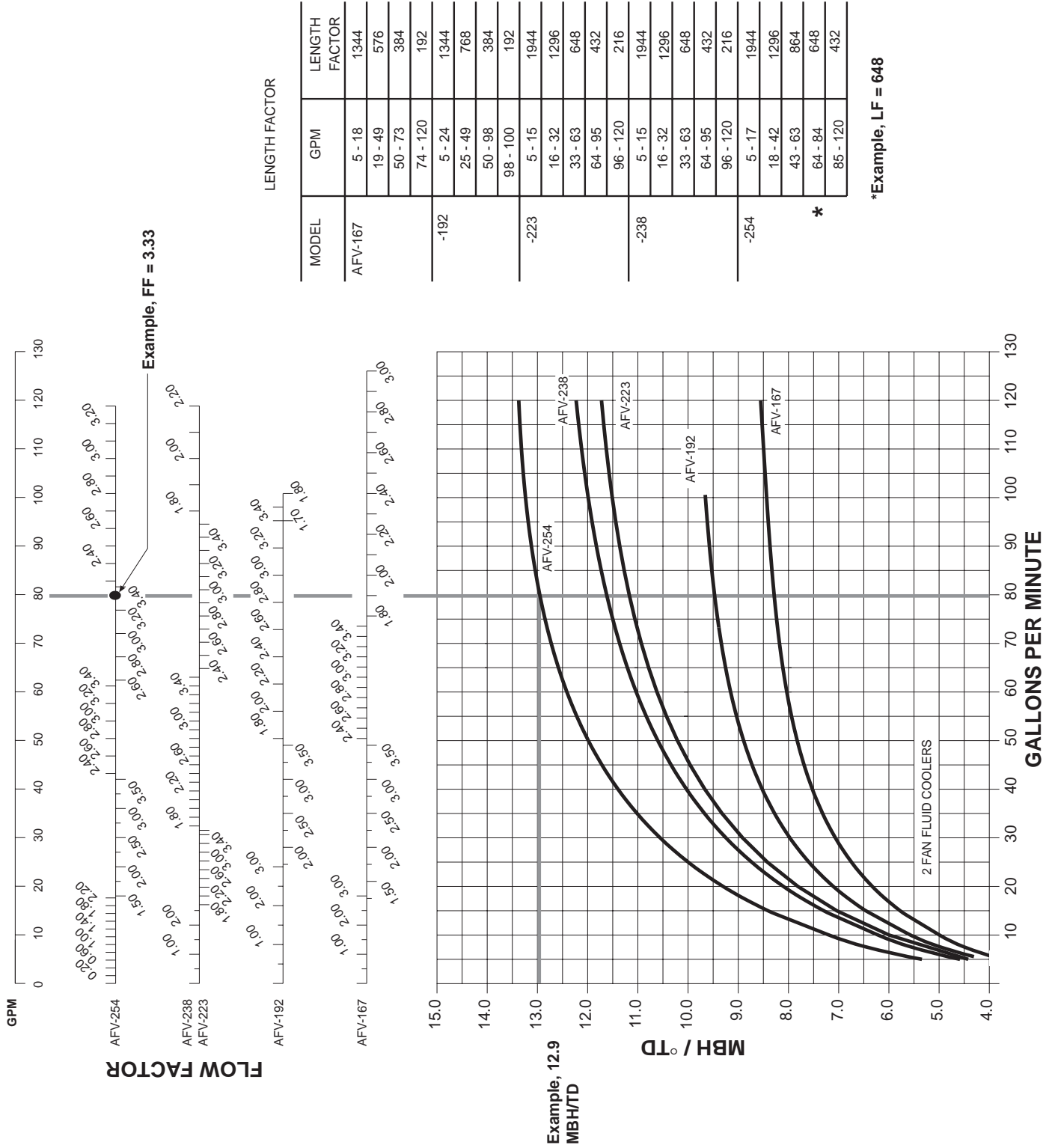
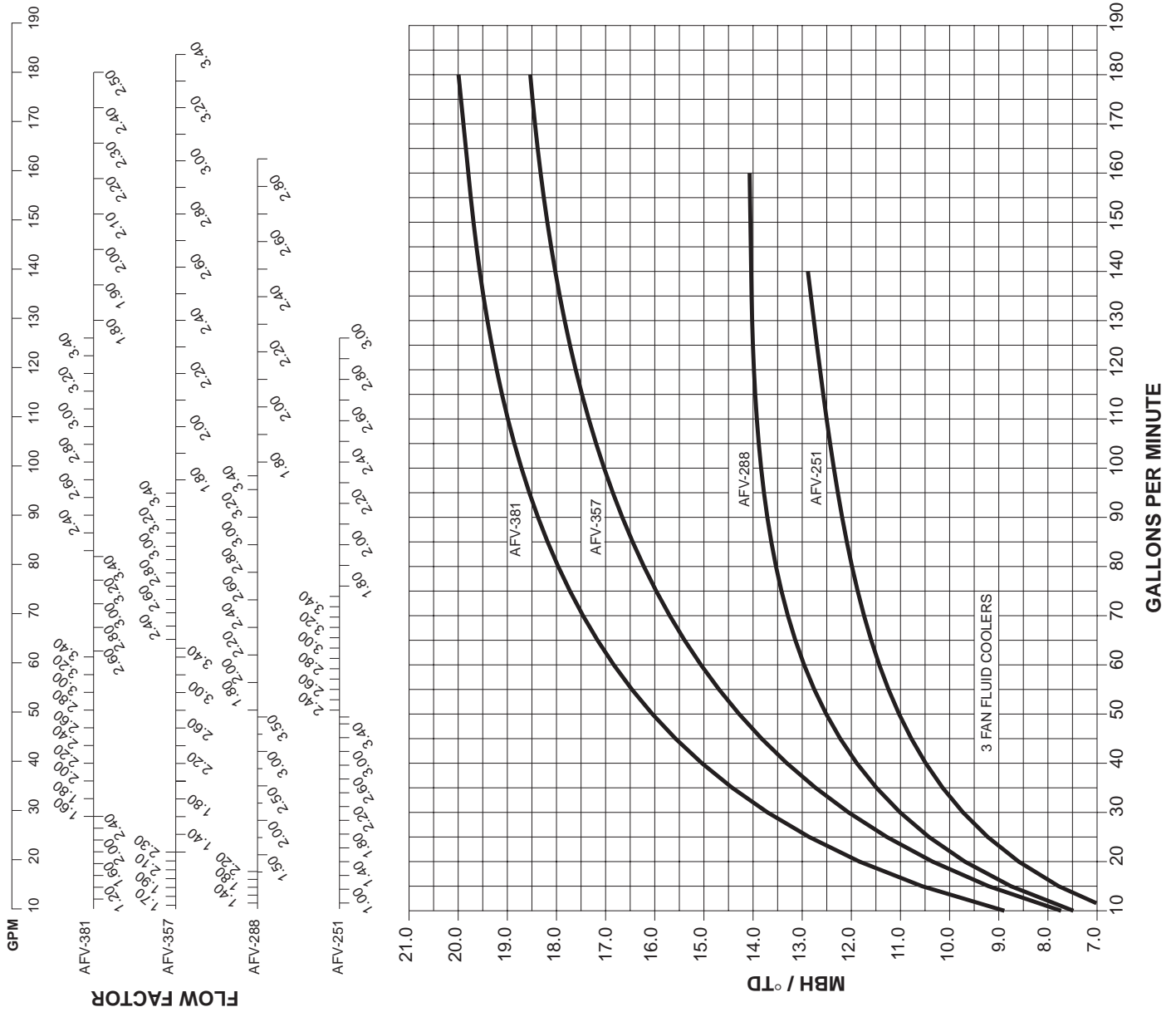


FIGURE 11 CAPACITY - 2 FAN FLUID COOLERS



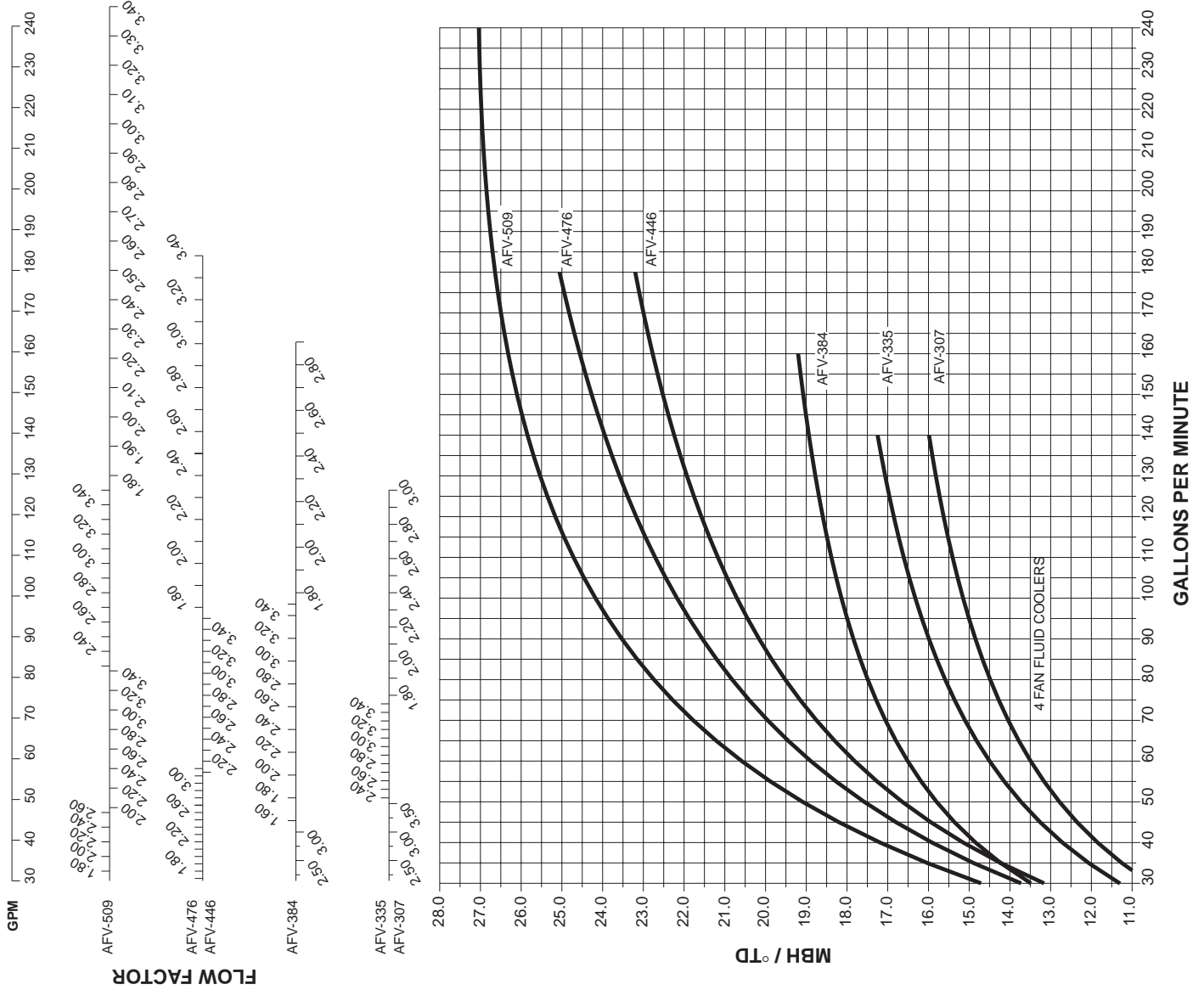
*Example, LF = 648

FIGURE 12 CAPACITY - 3 FAN FLUID COOLERS



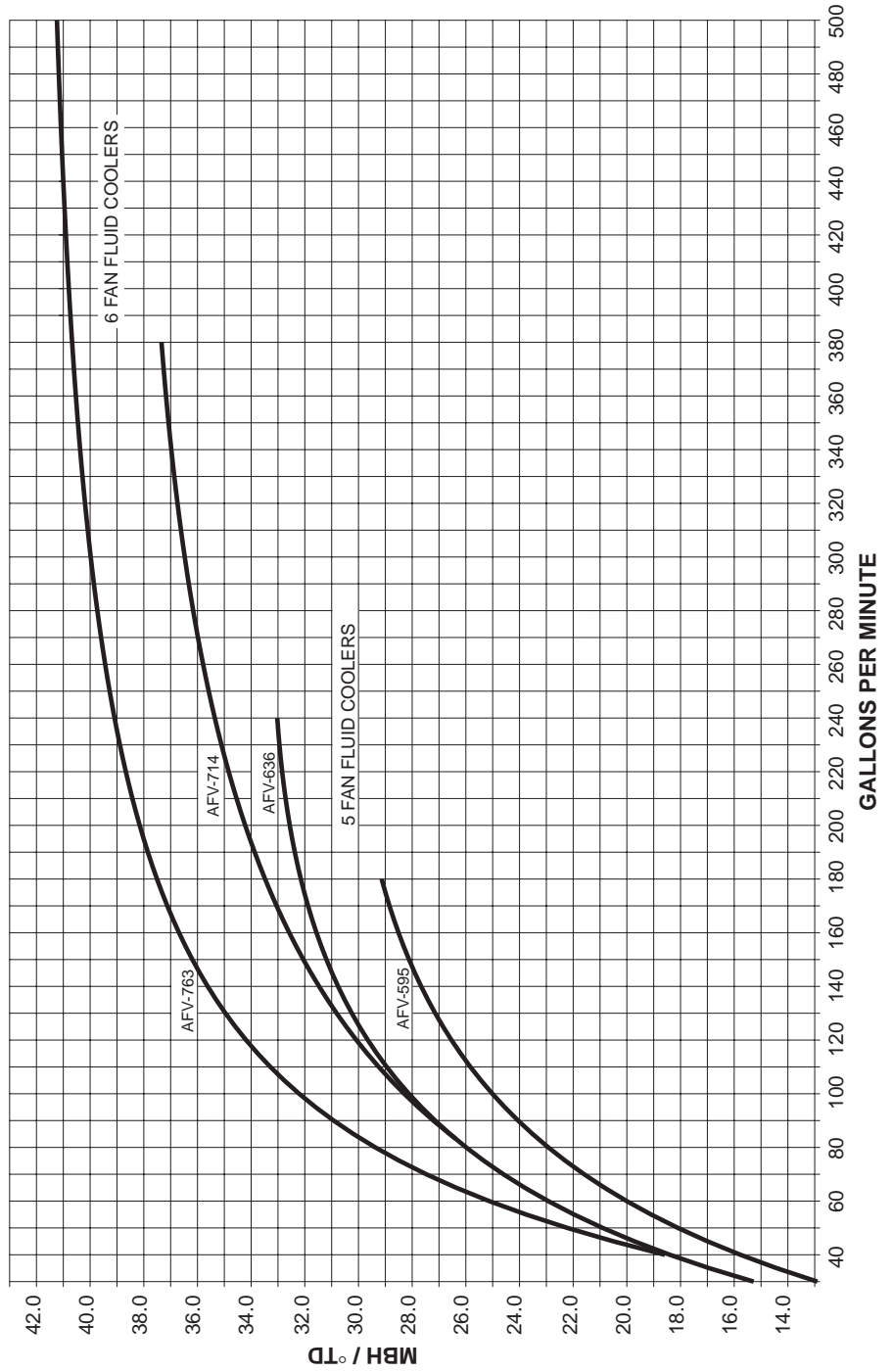
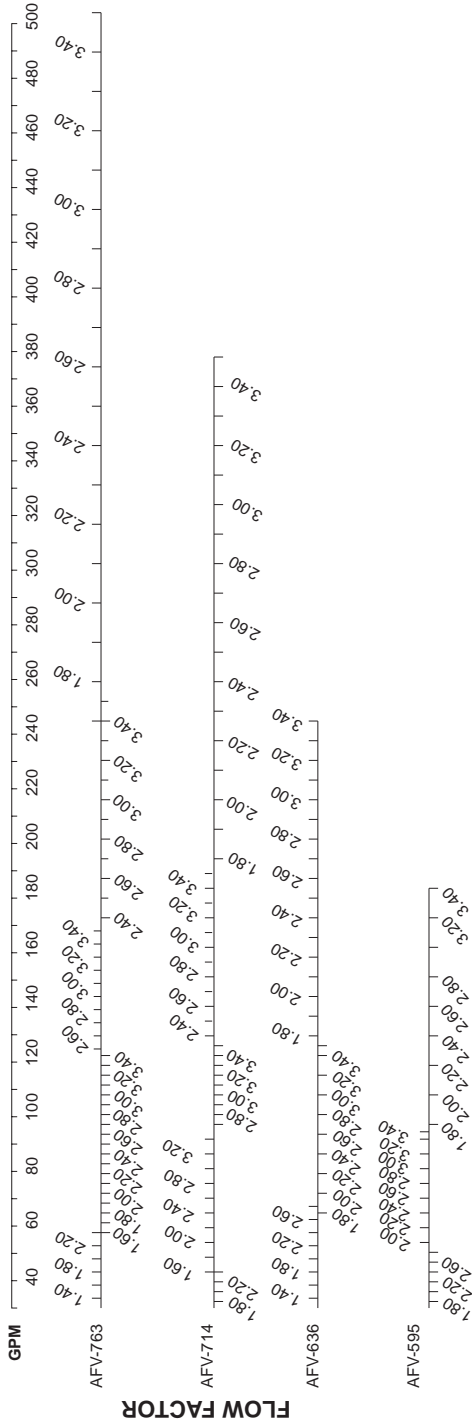
| MODEL | GPM | LENGTH FACTOR |
|---------|----------|---------------|
| AFV-251 | 5 - 49 | 864 |
| | 50 - 73 | 576 |
| | 74 - 140 | 288 |
| -288 | 5 - 18 | 2016 |
| | 19 - 49 | 1152 |
| | 50 - 98 | 576 |
| -357 | 98 - 160 | 288 |
| | 5 - 21 | 1944 |
| | 22 - 63 | 972 |
| -381 | 64 - 95 | 648 |
| | 96 - 180 | 324 |
| | 5 - 29 | 1944 |
| -381 | 30 - 63 | 1296 |
| | 64 - 84 | 972 |
| | 85 - 126 | 648 |
| -381 | 127-180 | 324 |

FIGURE 13 CAPACITY - 4 FAN FLUID COOLERS



| LENGTH FACTOR | | |
|---------------|----------|---------------|
| MODEL | GPM | LENGTH FACTOR |
| AFV-307 | 5 - 49 | 1152 |
| | 50 - 73 | 768 |
| | 74 - 140 | 384 |
| -384 | 5 - 42 | 1536 |
| | 43 - 98 | 768 |
| | 99 - 160 | 384 |
| -446 | 5 - 57 | 1296 |
| | 58 - 94 | 864 |
| | 95 - 180 | 432 |
| -509 | 5 - 47 | 1728 |
| | 48 - 81 | 1296 |
| | 82 - 126 | 864 |
| 126-240 | 432 | |

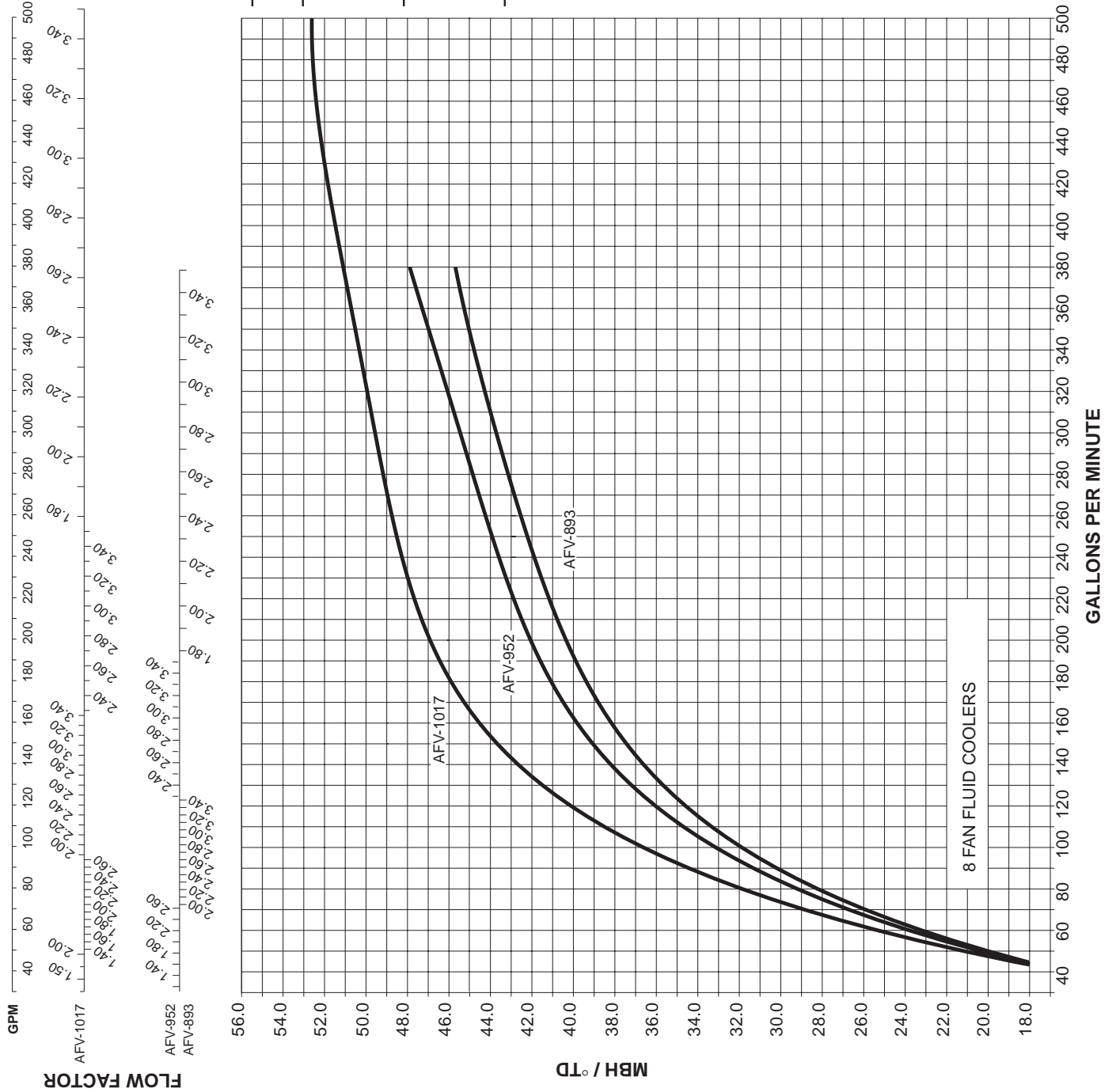
FIGURE 14 CAPACITY - 5 AND 6 FAN FLUID COOLERS



LENGTH FACTOR

| MODEL | GPM | LENGTH FACTOR |
|---------|----------|---------------|
| AFV-595 | 30 - 51 | 1620 |
| | 52 - 94 | 1080 |
| -636 | 95 - 180 | 540 |
| | 30 - 67 | 1620 |
| -714 | 68 - 126 | 1080 |
| | 127-240 | 540 |
| -763 | 30 - 43 | 1944 |
| | 44 - 92 | 1296 |
| | 93 - 126 | 972 |
| | 127-189 | 648 |
| | 190-380 | 324 |
| | 30 - 58 | 1944 |
| | 59 - 122 | 1296 |
| | 123-168 | 972 |
| | 169-252 | 648 |
| | 253-500 | 324 |

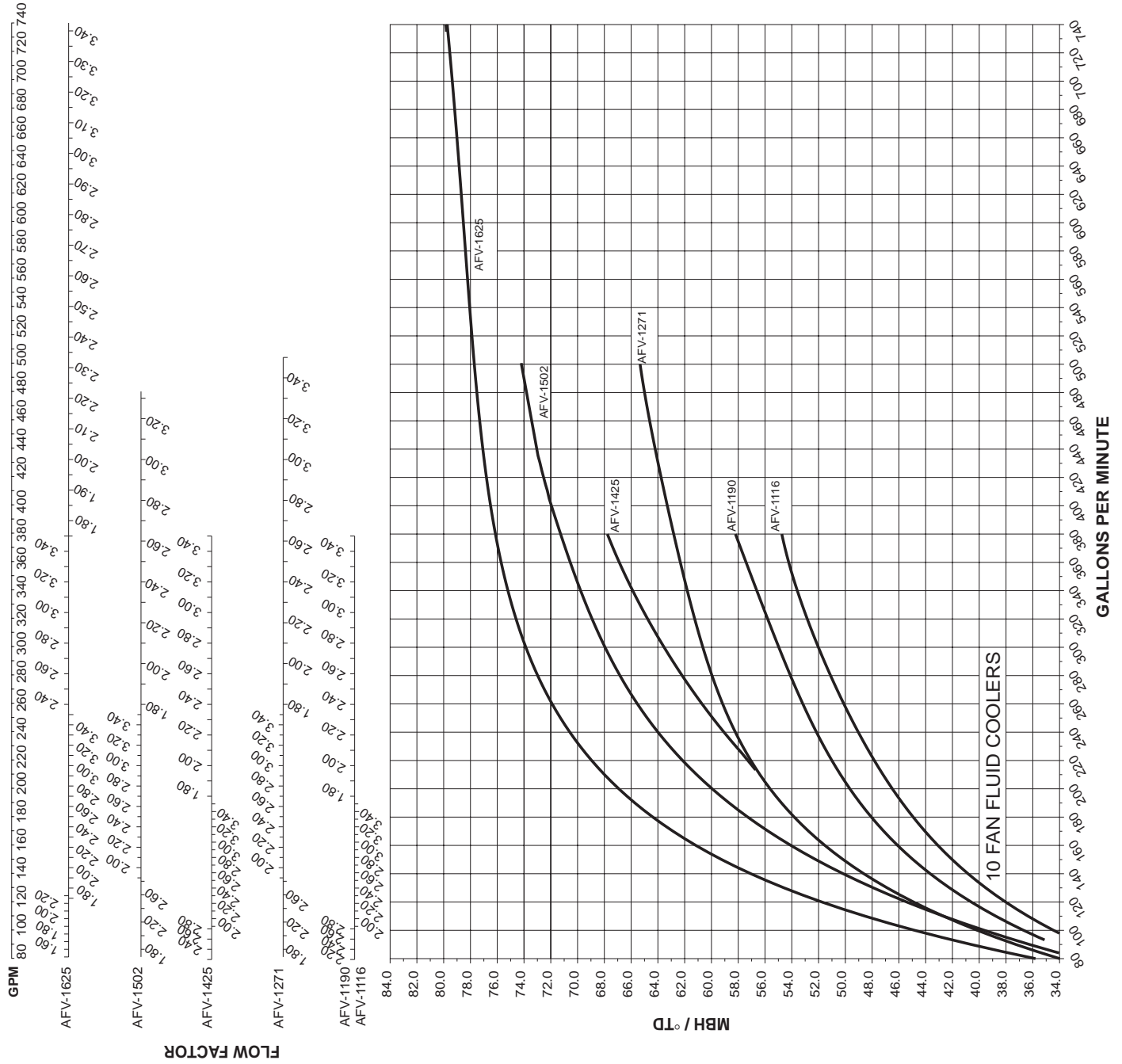
FIGURE 15 CAPACITY - 8 FAN FLUID COOLERS



LENGTH FACTOR

| MODEL | GPM | LENGTH FACTOR |
|---------|----------|---------------|
| AFV-893 | 30 - 70 | 1728 |
| | 71 - 122 | 1296 |
| | 123-189 | 864 |
| | 190-380 | 432 |
| -952 | 30 - 70 | 1728 |
| | 71 - 122 | 1296 |
| | 123-189 | 864 |
| | 190-380 | 432 |
| -1017 | 30 - 50 | 2592 |
| | 51 - 94 | 1728 |
| | 95 - 163 | 1296 |
| | 164-252 | 864 |
| 253-500 | 432 | |

FIGURE 16 CAPACITY - 10 FAN FLUID COOLERS

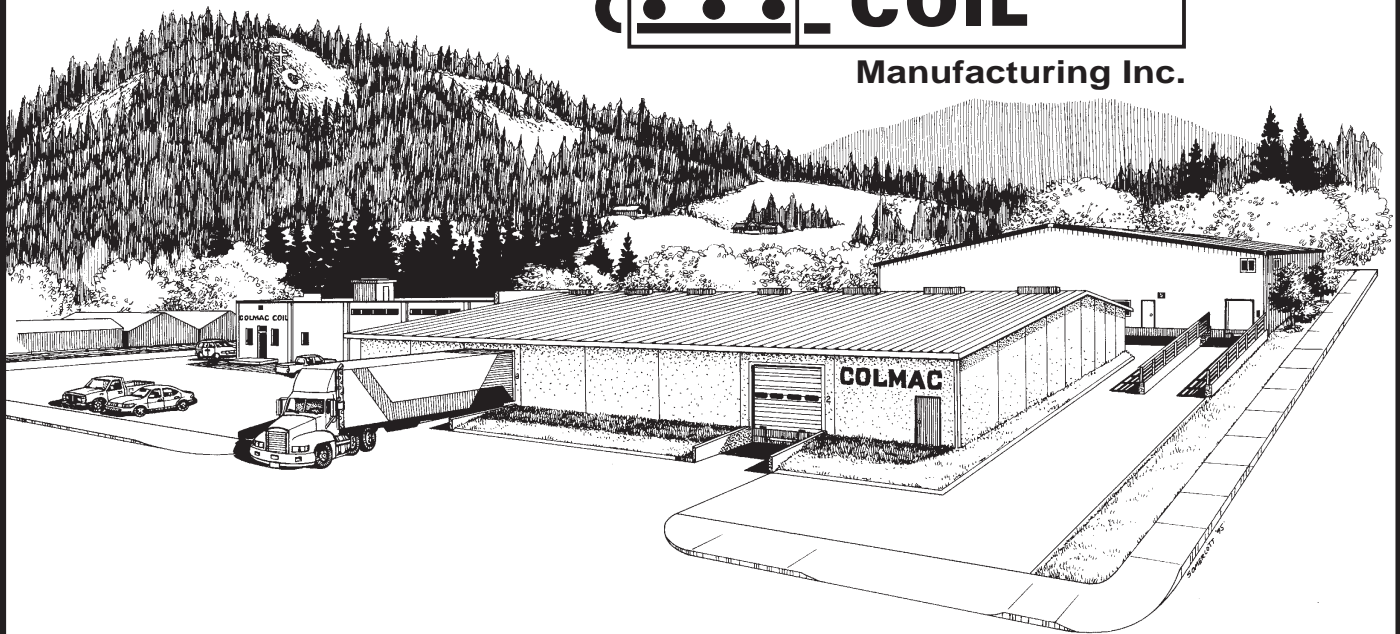


LENGTH FACTOR

| MODEL | GPM | LENGTH FACTOR |
|----------|---------|---------------|
| AFV-1116 | 80-101 | 1620 |
| | 102-189 | 1080 |
| | 190-378 | 540 |
| -1190 | 80-101 | 1620 |
| | 102-189 | 1080 |
| | 190-378 | 540 |
| -1271 | 80-134 | 1620 |
| | 135-252 | 1080 |
| | 253-500 | 540 |
| -1425 | 80-101 | 1620 |
| | 102-189 | 1080 |
| | 190-378 | 540 |
| -1502 | 80-134 | 1620 |
| | 135-252 | 1080 |
| | 253-500 | 540 |
| -1625 | 80-151 | 2160 |
| | 152-202 | 1620 |
| | 203-378 | 1080 |
| | 379-740 | 540 |



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