# Coil Data: THH Series

## COILS

Titus offers hot water, chilled water, direct expansion (DX) coils for specific application with all THH Series Fan Coil Units. Strict on-site inspection before, during, and after installation guarantees the highest quality and performance available.

### Standard Features

- Cooling - 3, 4 or 6 row chilled water or DX
- Heating - 1, 2, 3 or 4 row hot water
- 8 total rows of cooling and heating coils maximum
- ½" O.D. seamless copper tubes
- 0.016" tube wall thickness
- High efficiency aluminum fin surface for optimizing heat transfer, pressure drop and carryover
- Left or right hand connections
- Manual air vents

### Optional Features

- Automatic air vents
- Stainless steel coil casings
- DX coils are heat pump compatible

Titus offers fan coil rating and selection program, TEAMS for complete unit, coil and sound selection. See your representative for more information.

## NOMINAL COIL CONNECTION SIZES

| Unit Size | Coil Type | | | | | | |
|---|---|---|---|---|---|---|---|
| | Water | | | | | Steam | |
| | 1 Row | 2 Row | 3 Row | 4 Row | 6 Row | 1 Row | 2 Row |
| 06 | 5/8 [16] | 5/8 [16] | 7/8 [22] | 7/8 [22] | 7/8 [22] | 5/8 [16] | 7/8 [22] |
| 08 | 5/8 [16] | 5/8 [16] | 7/8 [22] | 7/8 [22] | 7/8 [22] | 5/8 [16] | 7/8 [22] |
| 10 | 5/8 [16] | 5/8 [16] | 7/8 [22] | 7/8 [22] | 7/8 [22] | 5/8 [16] | 7/8 [22] |
| 12 | 5/8 [16] | 7/8 [22] | 7/8 [22] | 7/8 [22] | 1 1/8 [29] | 7/8 [22] | 7/8 [22] |
| 14 | 5/8 [16] | 7/8 [22] | 7/8 [22] | 1 1/8 [29] | 1 1/8 [29] | 7/8 [22] | 1 1/8 [29] |
| 16 | 5/8 [16] | 7/8 [22] | 7/8 [22] | 1 1/8 [29] | 1 1/8 [29] | 7/8 [22] | 1 1/8 [29] |
| 18 | 5/8 [16] | 7/8 [22] | 1 1/8 [29] | 1 1/8 [29] | 1 1/8 [29] | 7/8 [22] | 1 1/8 [29] |
| 20 | 5/8 [16] | 7/8 [22] | 1 1/8 [29] | 1 1/8 [29] | 1 1/8 [29] | 7/8 [22] | 1 1/8 [29] |

Notes:

1. All dimensional data is outside diameter (O.D.), measured in inches [millimeters]
2. See submittal drawings for connection locations
3. Connection sizes are for standard circuit coils. Consult factory for special applications.
4. Direct Expansion (DX) suction header connection sizes are either 5/8" [16mm] or 7/8" [22mm]. Refer to coil selection
5. DX coils include a fixed orifice distributor for multi-circuited coils. A DX coil with a single circuit requires no distributor. Thermal expansion valves (TXV's) are field supplied by others.

## THH FACE AREA, FREE AREA AND FILTER SIZES

| Unit Size | Coil Face Area | Nominal Filter Sizes | 1" Throwaway Face Area | 1" Pleated Gross Media Area | 2" Pleated Gross Media Area |
|---|---|---|---|---|---|
| 06 | 1.56 [0.15] | (1) 16 x 16 [406 x 406] | 1.62 [.0.15] | 4.0 [0.37] | 5.4 [0.50] |
| 08 | 2.08 [0.19] | (1) 16 x 20 [406 x 508] | 2.04 [0.19] | 4.8 [0.45] | 6.8 [0.63] |
| 10 | 2.50 [0.23] | (1) 16 x 25 [406 x 635] | 2.57 [0.24] | 6.0 [0.56] | 8.5 [0.79] |
| 12 | 3.02 [0.28] | (2) 16 x 16 [406 x 406] | 3.23 [0.30] | 8.0 [0.74] | 10.4 [0.97] |
| 14 | 3.54 [0.33] | (1) 16 x 16 & 16 x 20 (1) [406 x 406] & (1) [406 x 508] | 3.65 [0.34] | 8.0 [0.74] | 12.2 [1.13] |
| 16 | 4.06 [0.38] | (2) 16 x 20 [406 x 508] | 4.08 [0.38] | 9.6 [0.89] | 13.4 [1.24] |
| 18 | 4.58 [0.43] | (1) 16 x 20 & 16 x 25 (1) [406 x 508 & (1) [406 x 635] | 4.61 [0.43] | 10.8 [1.00] | 14.3 [1.33] |
| 20 | 5.00 [0.46] | (2) 16 x 25 [406 x 635] | 5.14 [0.48] | 12.0 [1.11] | 17.0 [1.58] |

Notes:

1. Face and free areas are in square feet [square meters]
2. Filter sizes are in inches [millimeters]

## PHYSICAL DATA

### AHRI STANDARD RATINGS

| Model/Size | AHRI 440 Certified | Coil | | Airflow CFM (Dry Flow) | Cooling Capacity | | Water | | Power Input (Watts) |
|---|---|---|---|---|---|---|---|---|---|
| | | Rows | FPI | | QT (BTUH) | QS (BTUH) | Flow Rate (GPM) | WPD (ft-wg) | |
| THHC 06 | * | 4 | 10 | 674 | 20549 | 15710 | 4.1 | 5.81 | 247 |
| THHC 08 | * | 4 | 10 | 872 | 24299 | 18090 | 4.9 | 7.29 | 375 |
| THHC 10 | * | 4 | 10 | 1036 | 30600 | 22899 | 6.1 | 6.86 | 457 |
| THHC 12 | * | 4 | 10 | 1361 | 42650 | 32159 | 8.5 | 6.34 | 494 |
| THHC 14 | | 4 | 10 | 1856 | 51080 | 40340 | 10.2 | 4.86 | 750 |
| THHC 16 | | 4 | 10 | 2053 | 60689 | 46490 | 12 | 7.15 | 914 |
| THHC 18 | | 4 | 10 | 2159 | 67819 | 50770 | 13.6 | 9.38 | 914 |
| THHC 20 | | 4 | 10 | 2292 | 73930 | 54779 | 14.7 | 11.65 | 914 |
| THHP 06 | * | 4 | 10 | 669 | 20299 | 15560 | 4 | 5.64 | 247 |
| THHP 08 | * | 4 | 10 | 950 | 25889 | 19389 | 5.2 | 8.03 | 375 |
| THHP 10 | * | 4 | 10 | 1001 | 30180 | 22420 | 6.1 | 6.87 | 457 |
| THHP 12 | * | 4 | 10 | 1437 | 44169 | 33509 | 8.8 | 6.68 | 494 |
| THHP 14 | | 4 | 10 | 1825 | 50779 | 39939 | 10.2 | 4.86 | 750 |
| THHP 16 | | 4 | 10 | 1852 | 56810 | 43029 | 11.3 | 6.4 | 914 |
| THHP 18 | | 4 | 10 | 1915 | 62750 | 46369 | 12.4 | 8.18 | 914 |
| THHP 20 | | 4 | 10 | 1999 | 68059 | 49580 | 13.6 | 10.06 | 914 |
| THHE 06 | * | 4 | 10 | 594 | 18639 | 14149 | 3.7 | 4.98 | 247 |
| THHE 08 | * | 4 | 10 | 740 | 21719 | 15909 | 4.4 | 6.27 | 375 |
| THHE 10 | * | 4 | 10 | 845 | 26469 | 19479 | 5.2 | 5.49 | 457 |
| THHE 12 | * | 4 | 10 | 1193 | 38970 | 29020 | 7.8 | 5.5 | 494 |
| THHE 14 | | 4 | 10 | 1491 | 43880 | 33979 | 8.7 | 3.69 | 750 |
| THHE 16 | | 4 | 10 | 1665 | 52950 | 39669 | 10.5 | 5.69 | 914 |
| THHE 18 | | 4 | 10 | 1762 | 60000 | 43779 | 12 | 7.84 | 914 |
| THHE 20 | | 4 | 10 | 1855 | 64690 | 46790 | 12.8 | 9.13 | 914 |

Notes:

1. Based on 80°F DB and 67°F WB EAT, 45°F EWT, 10°F temperature rise, high fan speed. Motor type is PSC and motor voltage is 115/1/60. Airflow under dry coil conditions. All models tested at 0.05" external static pressure.
2. Airflow rate CFM on sizes 14 through 20 exceed maximum ratings in AHRI 440 and are therefore not certified

## PHYSICAL DATA

### HEATING CAPACITY

| Unit Type | Unit Size | Nom CFM | 1 Row | | | 2 Row | | | 3 Row | | | 4 Row | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | QS (MBH) | GPM | WPD | QS (MBH) | GPM | WPD | QS (MBH) | GPM | WPD | QS (MBH) | GPM | WPD |
| THHC | 06 | 767 | 16.4 | 0.8 | 0.35 | 27.3 | 1.4 | 1.33 | 41.1 | 2.1 | 0.79 | 57.7 | 3.0 | 14.49 |
| | 08 | 994 | 22.8 | 1.2 | 0.72 | 43.3 | 2.2 | 1.46 | 54.0 | 2.8 | 0.86 | 73.9 | 3.8 | 8.54 |
| | 10 | 1145 | 27.4 | 1.4 | 1.15 | 53.4 | 2.7 | 0.32 | 65.8 | 3.4 | 1.42 | 88.7 | 4.5 | 13.73 |
| | 12 | 1508 | 35.3 | 3.0 | 14.49 | 70.7 | 3.5 | 0.51 | 85.1 | 4.2 | 1.02 | 115.2 | 5.7 | 11.06 |
| | 14 | 2038 | 42.4 | 2.2 | 1.09 | 91.4 | 4.7 | 0.98 | 101.1 | 5.2 | 0.65 | 127.1 | 6.5 | 14.01 |
| | 16 | 2256 | 48.9 | 2.5 | 1.57 | 104.8 | 5.4 | 1.40 | 116.9 | 6.0 | 0.93 | 163.8 | 8.4 | 6.09 |
| | 18 | 2371 | 54.4 | 2.8 | 2.11 | 101.1 | 5.2 | 0.28 | 128.3 | 6.6 | 1.21 | 177.4 | 9.1 | 7.79 |
| | 20 | 2516 | 62.0 | 3.2 | 0.34 | 125.6 | 6.4 | 2.30 | 146.3 | 7.5 | 10.87 | 190.9 | 9.8 | 9.61 |
| THHP | 06 | 733 | 15.8 | 0.8 | 0.33 | 25.9 | 1.3 | 1.20 | 41.4 | 2.1 | 0.81 | 57.4 | 2.9 | 14.30 |
| | 08 | 995 | 22.0 | 1.1 | 0.67 | 41.0 | 2.1 | 1.31 | 58.0 | 3.0 | 0.98 | 77.5 | 4.0 | 9.35 |
| | 10 | 1093 | 26.8 | 1.4 | 1.10 | 51.2 | 2.6 | 0.30 | 65.0 | 3.3 | 1.39 | 86.1 | 4.4 | 13.02 |
| | 12 | 1525 | 34.8 | 1.8 | 2.05 | 69.7 | 3.6 | 0.53 | 88.5 | 4.5 | 1.18 | 118.1 | 6.1 | 12.48 |
| | 14 | 1972 | 41.5 | 2.1 | 1.05 | 88.3 | 4.5 | 0.92 | 102.6 | 5.3 | 0.67 | 125.1 | 6.4 | 13.67 |
| | 16 | 2076 | 47.5 | 2.4 | 1.50 | 101.3 | 5.2 | 1.31 | 111.4 | 5.7 | 0.85 | 152.3 | 7.8 | 5.31 |
| | 18 | 2174 | 52.8 | 2.7 | 2.00 | 97.5 | 5.0 | 0.27 | 121.3 | 6.2 | 1.09 | 163.8 | 8.4 | 6.70 |
| | 20 | 2280 | 60.0 | 3.1 | 0.32 | 121.1 | 6.2 | 2.15 | 136.4 | 7.0 | 9.49 | 173.8 | 8.9 | 8.05 |
| THHE | 06 | 681 | 15.5 | 0.8 | 0.33 | 25.3 | 1.3 | 1.16 | 38.8 | 2.0 | 0.72 | 53.7 | 2.8 | 12.63 |
| | 08 | 861 | 21.2 | 1.1 | 0.62 | 39.4 | 2.0 | 1.22 | 50.8 | 2.6 | 0.77 | 68.1 | 3.5 | 7.32 |
| | 10 | 989 | 25.8 | 1.3 | 1.03 | 48.8 | 2.5 | 0.27 | 60.0 | 3.1 | 1.19 | 79.4 | 4.1 | 11.17 |
| | 12 | 1353 | 33.8 | 1.7 | 1.94 | 67.0 | 3.4 | 0.49 | 79.6 | 4.1 | 0.97 | 106.8 | 5.5 | 10.31 |
| | 14 | 1628 | 38.5 | 2.0 | 0.91 | 81.1 | 4.2 | 0.79 | 89.7 | 4.6 | 0.52 | 109.9 | 5.6 | 10.66 |
| | 16 | 1863 | 45.1 | 2.3 | 1.36 | 94.9 | 4.9 | 1.16 | 104.6 | 5.4 | 0.76 | 144.6 | 7.4 | 4.81 |
| | 18 | 1986 | 50.3 | 2.6 | 1.83 | 91.1 | 4.7 | 0.23 | 115.8 | 6.0 | 1.00 | 157.8 | 8.1 | 6.27 |
| | 20 | 2086 | 57.0 | 2.9 | 0.30 | 113.9 | 5.9 | 1.92 | 130.4 | 6.7 | 8.70 | 168.3 | 8.6 | 7.56 |

Notes:

1. Based on 70°F DB EAT, 180°F EWT, 40°F temperature drop, high fan speed
2. THHP performance data varies from THHC and THHP units

## PHYSICAL DATA

### THH UNIT WEIGHT DATA

| Component | | Unit Size | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 06 | 08 | 10 | 12 | 14 | 16 | 18 | 20 |
| THHC Base Unit | | 68 [31] | 73 [33] | 77 [35] | 114 [52] | 119 [54] | 124 [56] | 128 [58] | 132 [60] |
| THHP Base Unit | | 87 [40] | 95 [43] | 101 [46] | 141 [64] | 150 [68] | 157 [71] | 164 [75] | 170 [77] |
| THHP With Mixing Box | | 119 [54] | 132 [60] | 144 [65] | 189 [86] | 204 [93] | 217 [99] | 229 [104] | 246 [112] |
| THHE Base Unit | | 137 [62] | 146 [66] | 158 [72] | 202 [92] | 219 [99] | 228 [103] | 240 [109] | 250 [113] |
| Coil Rows | 1 Row - Dry | 5 [2] | 6 [3] | 7 [3] | 8 [4] | 10 [5] | 10 [5] | 11 [5] | 12 [5] |
| | 1 Row - Wet | 7 [3] | 9 [4] | 10 [5] | 11 [5] | 14 [6] | 14 [6] | 16 [7] | 17 [8] |
| | 2 Row - Dry | 11 [5] | 13 [6] | 14 [6] | 16 [7] | 20 [9] | 20 [9] | 22 [10] | 24 [11] |
| | 2 Row - Wet | 14 [6] | 18 [8] | 20 [9] | 23 [10] | 27 [12] | 28 [13] | 32 [15] | 35 [16] |
| | 3 Row - Dry | 16 [7] | 19 [9] | 21 [10] | 24 [11] | 30 [13] | 30 [13] | 33 [15] | 36 [16] |
| | 3 Row - Wet | 21 [10] | 27 [12] | 30 [13] | 34 [15] | 41 [19] | 42 [19] | 48 [22] | 52 [24] |
| | 4 Row - Dry | 21 [10] | 25 [12] | 29 [13] | 33 [15] | 40 [18] | 40 [18] | 44 [20] | 48 [22] |
| | 4 Row - Wet | 27 [12] | 35 [16] | 41 [19] | 46 [21] | 54 [25] | 56 [26] | 64 [29] | 69 [31] |
| | 5 Row - Dry | 26 [12] | 30 [13] | 34 [15] | 38 [17] | 42 [19] | 46 [21] | 50 [23] | 54 [25] |
| | 5 Row - Wet | 33 [15] | 39 [18] | 45 [21] | 51 [23] | 57 [26] | 63 [29] | 70 [32] | 77 [35] |
| | 6 Row - Dry | 32 [15] | 38 [17] | 43 [20] | 49 [23] | 59 [27] | 61 [28] | 67 [30] | 71 [32] |
| | 6 Row - Wet | 42 [19] | 53 [24] | 61 [28] | 69 [31] | 80 [36] | 85 [39] | 97 [44] | 103 [47] |
| | 7 Row - Dry | 38 [17] | 42 [19] | 48 [22] | 54 [25] | 60 [28] | 66 [30] | 72 [33] | 78 [35] |
| | 7 Row - Wet | 49 [23] | 56 [26] | 63 [29] | 70 [32] | 77 [35] | 84 [38] | 91 [42] | 98 [45] |
| | 8 Row - Dry | 43 [20] | 49 [23] | 55 [26] | 61 [28] | 67 [30] | 73 [33] | 79 [36] | 85 [39] |
| | 8 Row - Wet | 55 [26] | 63 [29] | 71 [32] | 79 [36] | 87 [40] | 95 [43] | 103 [47] | 111 [50] |

Note: Unit weight data is in pounds [kilograms]

# Electric Heat

Titus offers electric heating coils for specific application with all Horizontal High Performance Fan Coil units. This allows the flexibility to provide an unrivaled amount of electric heat options in one complete package.

## Standard Features

- » ETL-Listed as an assembly for safety compliance
- » Single point power connection
- » Mounted in preheat position
- » Automatic reset primary and backup secondary thermal limits
- » Internal wiring rated at 105°C
- » Integral electric heat assembly with removable element for easy service

## Optional Features

- » Silent solid state relays on heaters up to 18 amps
- » Door interlocking disconnect switch
- » Main fusing

## Useful Formulas

$$kW^* = \frac{CFM \times \Delta T \times 1.085^{**}}{3413}$$

$$1Ø\ AMPs = \frac{kW \times 1000}{Volts}$$

* 1kW = 3413 BTU/H
** Capacity at sea level
Altitude Considerations:
Reduce by 0.034 for each 1000 ft. of altitude above sea level.

Example: 5000 ft./1000 ft. = 5
5 x 0.034 = 0.17
1.085 - 0.17 = 0.915

## Electrical Calculations Information

1. Contact your local Titus sales office
2. Non-Fused Door Interlock Disconnect Switch shall be sized according to MCA
3. Fused Door Interlock Disconnect Switch and Main Fusing shall be sized according to MOP

## THH ELECTRIC HEAT SELECTION CHART (AMPS)

| Unit Size | MBH | 6.8 | 8.5 | 10.2 | 11.9 | 13.7 | 17.1 | 20.5 | 23.9 | 27.3 | 30.7 | 34.1 | 41.0 | 47.8 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | KW | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | 5.0 | 6.0 | 7.0 | 8.0 | 9.0 | 10.0 | 12.0 | 14.0 |
| | Volts | AMPS | | | | | | | | | | | | |
| 06 | 115 | 17.4 | 21.7 | 26.1 | 30.4 | 34.8 | | | | | | | | |
| | 208 | 9.6 | 12.0 | 14.4 | 16.8 | 19.2 | | | | | | | | |
| | 230 | 8.7 | 10.9 | 13.0 | 15.2 | 17.4 | | | | | | | | |
| | 277 | 7.2 | 9.0 | 10.8 | 12.6 | 14.4 | | | | | | | | |
| 08 | 115 | 17.4 | 21.7 | 26.1 | 30.4 | 34.8 | 43.5 | | | | | | | |
| | 208 | 9.6 | 12.0 | 14.4 | 16.8 | 19.2 | 24.0 | 28.8 | | | | | | |
| | 230 | 8.7 | 10.9 | 13.0 | 15.2 | 17.4 | 21.7 | 26.1 | | | | | | |
| | 277 | 7.2 | 9.0 | 10.8 | 12.6 | 14.4 | 18.1 | 21.7 | | | | | | |
| 10 | 115 | 17.4 | 21.7 | 26.1 | 30.4 | 34.8 | 43.5 | | | | | | | |
| | 208 | 9.6 | 12.0 | 14.4 | 16.8 | 19.2 | 24.0 | 28.8 | 33.7 | | | | | |
| | 230 | 8.7 | 10.9 | 13.0 | 15.2 | 17.4 | 21.7 | 26.1 | 30.4 | | | | | |
| | 277 | 7.2 | 9.0 | 10.8 | 12.6 | 14.4 | 18.1 | 21.7 | 25.3 | | | | | |
| 12 | 115 | | | | | 34.8 | 43.5 | | | | | | | |
| | 208 | | | | | 19.2 | 24.0 | 28.8 | 33.7 | 38.5 | 43.3 | | | |
| | 230 | | | | | 17.4 | 21.7 | 26.1 | 30.4 | 34.8 | 39.1 | | | |
| | 277 | | | | | 14.4 | 18.1 | 21.7 | 25.3 | 28.9 | 32.5 | | | |
| 14 | 115 | | | | | 34.8 | 43.5 | | | | | | | |
| | 208 | | | | | 19.2 | 24.0 | 28.8 | 33.7 | 38.5 | 43.3 | 48.1 | | |
| | 230 | | | | | 17.4 | 21.7 | 26.1 | 30.4 | 34.8 | 39.1 | 43.5 | | |
| | 277 | | | | | 14.4 | 18.1 | 21.7 | 25.3 | 28.9 | 32.5 | 36.1 | | |
| 16 | 115 | | | | | 34.8 | 43.5 | | | | | | | |
| | 208 | | | | | 19.2 | 24.0 | 28.8 | 33.7 | 38.5 | 43.3 | 48.1 | 57.7 | |
| | 230 | | | | | 17.4 | 21.7 | 26.1 | 30.4 | 34.8 | 39.1 | 43.5 | 52.2 | |
| | 277 | | | | | 14.4 | 18.1 | 21.7 | 25.3 | 28.9 | 32.5 | 36.1 | 43.3 | |
| 18 | 115 | | | | | 34.8 | 43.5 | | | | | | | |
| | 208 | | | | | 19.2 | 24.0 | 28.8 | 33.7 | 38.5 | 43.3 | 48.1 | 57.7 | |
| | 230 | | | | | 17.4 | 21.7 | 26.1 | 30.4 | 34.8 | 39.1 | 43.5 | 52.2 | |
| | 277 | | | | | 14.4 | 18.1 | 21.7 | 25.3 | 28.9 | 32.5 | 36.1 | 43.3 | |
| 20 | 115 | | | | | 34.8 | 43.5 | | | | | | | |
| | 208 | | | | | 19.2 | 24.0 | 28.8 | 33.7 | 38.5 | 43.3 | 48.1 | 57.7 | 67.3 |
| | 230 | | | | | 17.4 | 21.7 | 26.1 | 30.4 | 34.8 | 39.1 | 43.5 | 52.2 | 60.9 |
| | 277 | | | | | 14.4 | 18.1 | 21.7 | 25.3 | 28.9 | 32.5 | 36.1 | 43.3 | 50.5 |

Notes:

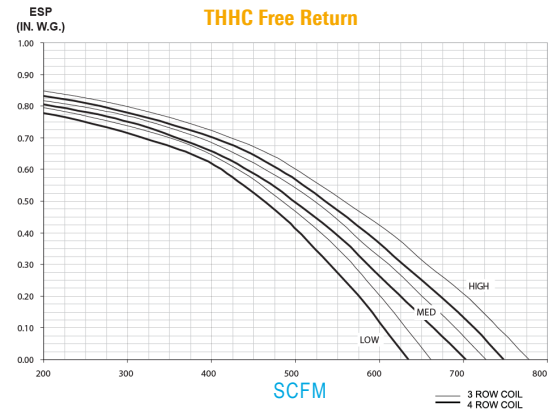
1. Shaded areas indicate kW and voltage options not available
2. Available voltages are single phase, 60 hertz
3. Heaters over 48 AMPs are subdivided and fused per NEC

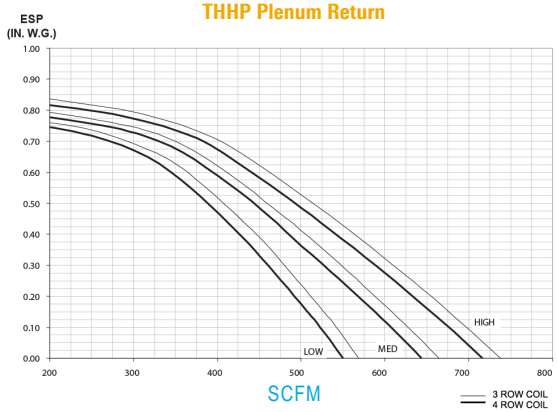
# Fan Curves / PSC Motor

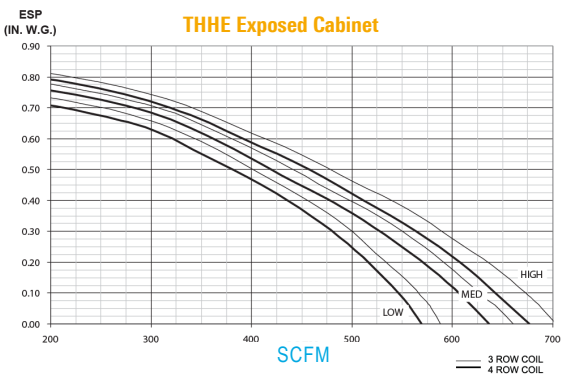
## GENERAL FAN NOTES, PSC MOTORS

1. Fan curves depict actual performance of each motor tap without any additional fan balance adjustment. Actual capacities which fall below each curve can be obtained by adding an adjustment device. Units should not be run prior to installation of downstream ductwork; otherwise, damage to the motor may result.
2. Titus Fan Coil Units are equipped with permanent split-capacitor (PSC) motors with three separate taps (High, Medium and Low which provide variable horsepower outputs. Most often, size selections are conservative and actual CFM requirements and/or external static pressure requirements are lower than those specified. In this case, the unit fan motor can be run at low or medium tap, substantially reducing the operating cost of the unit.
3. All fan curves are for 115/1/60 motors and include pressure losses for cabinet, electric heater, and 3 or 4 row coil. Plenum units include a clean 1" throwaway filter. For other coil configurations, adjust performance curves based on pressure losses for the coils as selected with the Titus TEAMS Coil Selection Program.
4. See page 92 for fan motor electrical data
5. For additional high static pressure applications and rating points, contact Titus

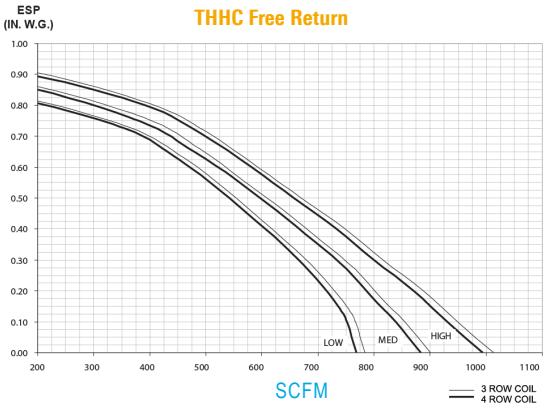
### SIZE 06

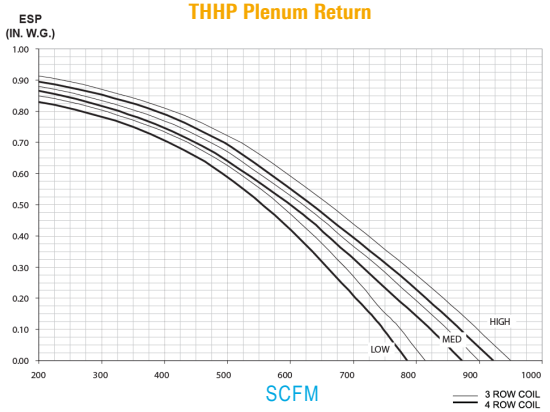


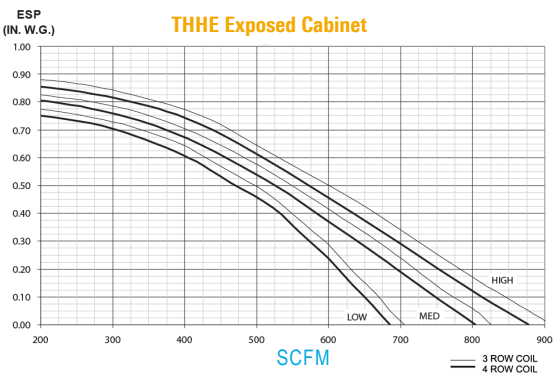




### SIZE 08



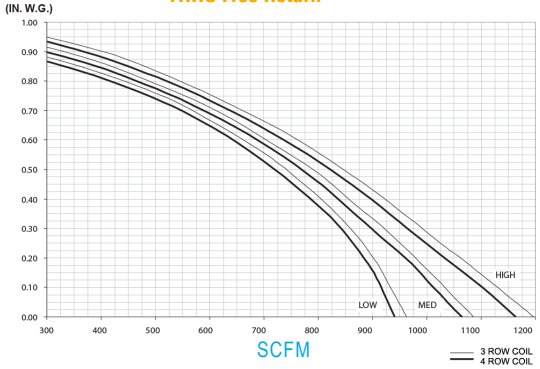



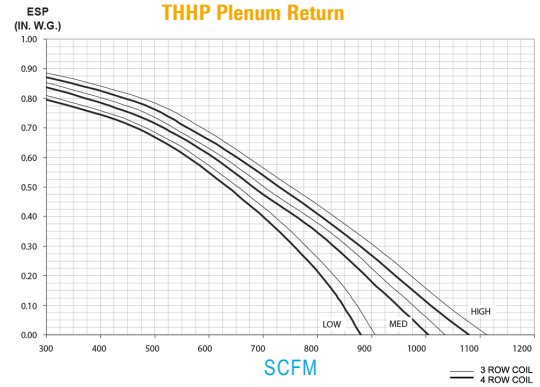
## FAN CURVES / PSC MOTOR

### SIZE 10

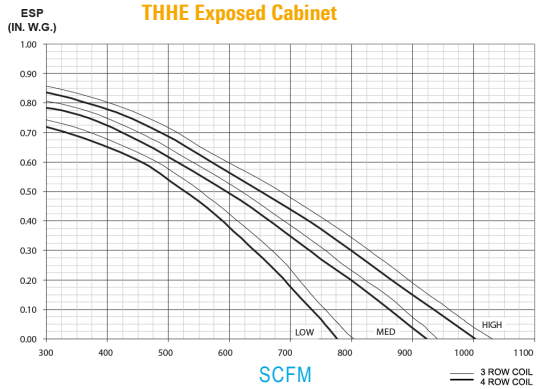
#### THHC Free Return




#### THHP Plenum Return




#### THHE Exposed Cabinet




### SIZE 12

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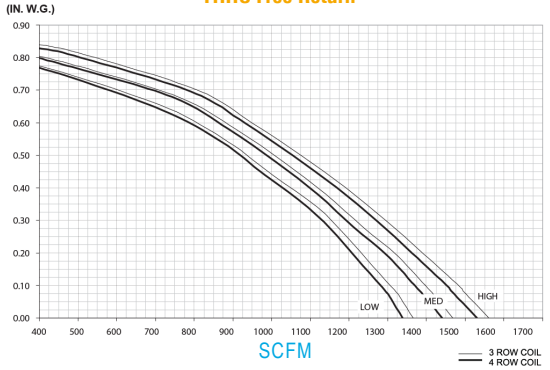
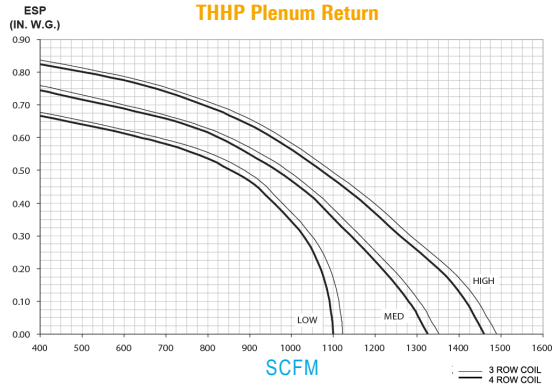
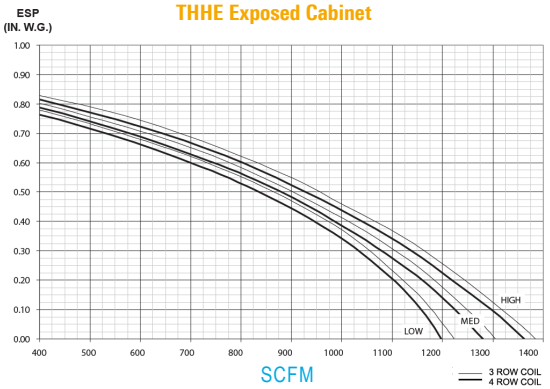



#### THHP Plenum Return



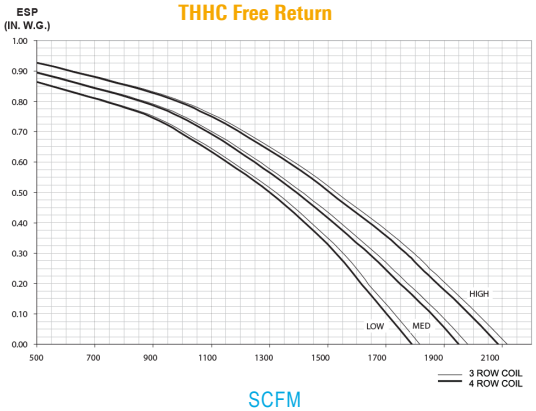

#### THHE Exposed Cabinet



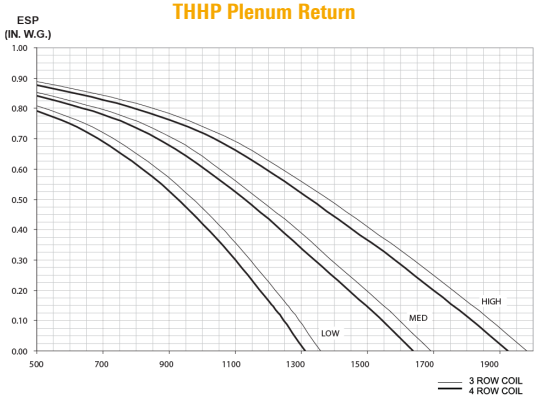
## FAN CURVES / PSC MOTOR

### SIZE 14

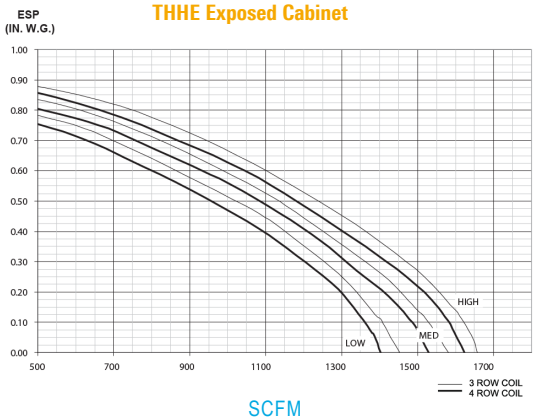
#### THHC Free Return




#### THHP Plenum Return

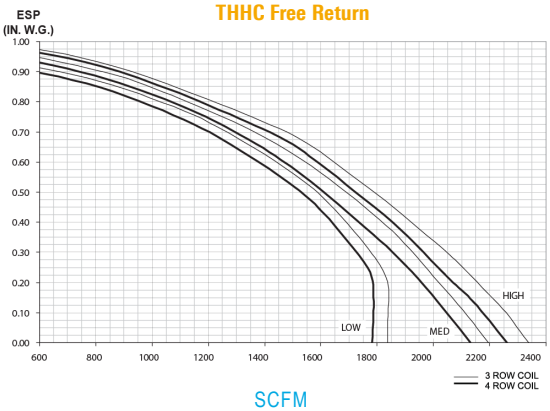



#### THHE Exposed Cabinet

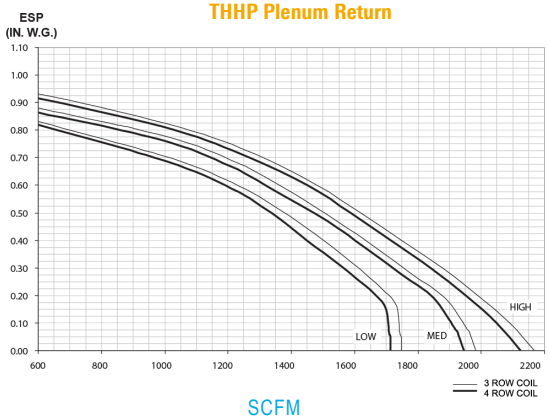



### SIZE 16

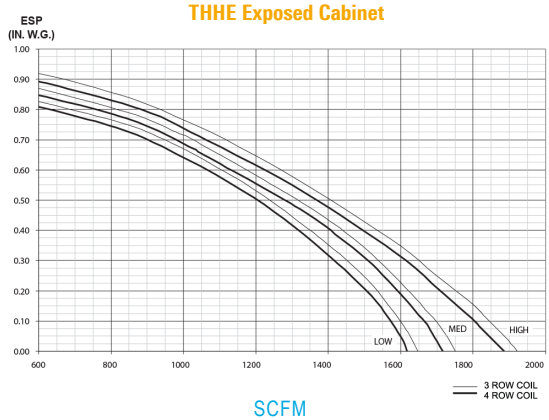
#### THHC Free Return




#### THHP Plenum Return



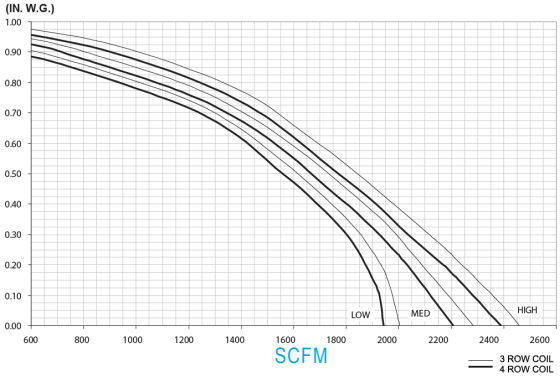

#### THHE Exposed Cabinet



## FAN CURVES / PSC MOTOR

### SIZE 18

#### THHC Free Return

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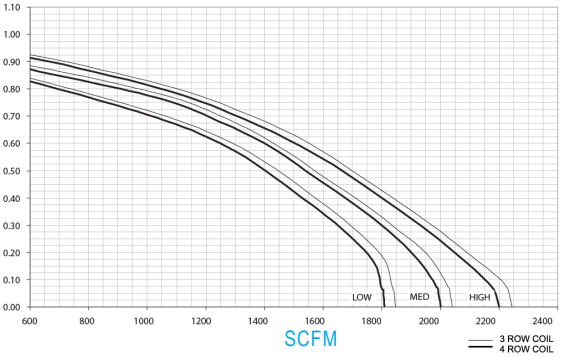


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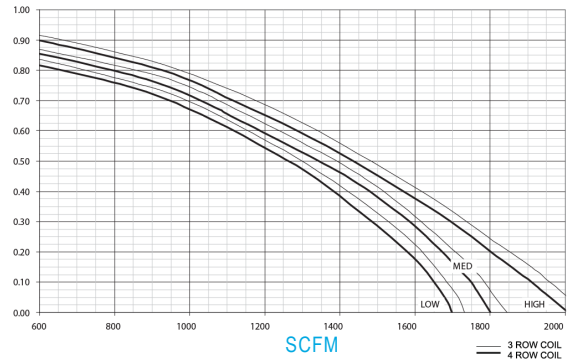
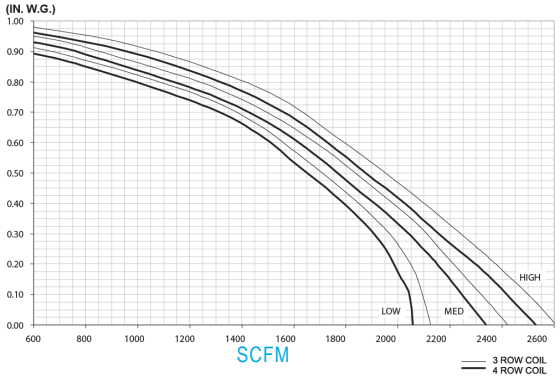
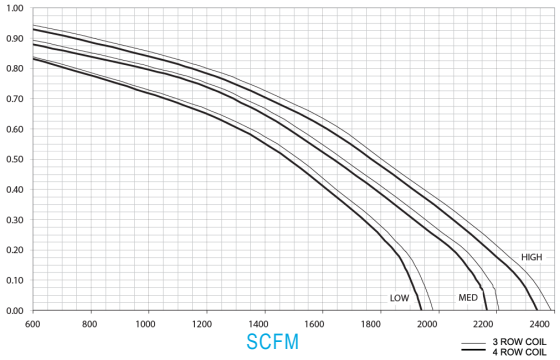



### SIZE 20

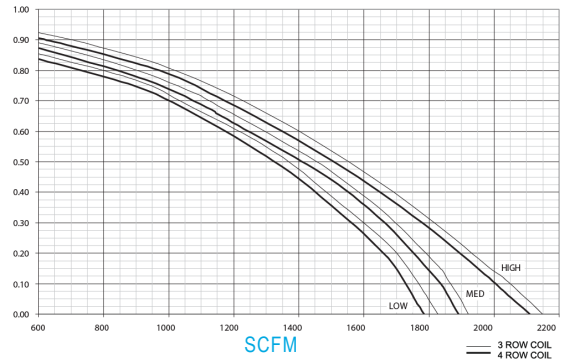
#### THHC Free Return




#### THHP Plenum Return




#### THHE Exposed Cabinet



# ECM™ Fan Motor Option

Note: Contact Titus regarding EC motor data before project submission

## THE ENERGY EFFICIENT SOLUTION

Titus offers an alternative to the PSC motor that significantly increases the operating efficiency of fan coil units. This motor is frequently referred to as an ECM (electronically commutated motor). It is a brushless DC (BLDC) motor utilizing a permanent magnet rotor. The motor has been in production for years and is commonly used in residential HVAC units. Fan speed control is accomplished through a microprocessor based variable speed controller (inverter) integral to the motor. The motor provides peak efficiency ratings between 70 & 80% for most applications.

## ECM FEATURES AND BENEFITS

Ultra-High Motor & Controller Energy Efficiency DC motors are significantly more efficient than AC motors. Due to the permanent magnet, DC design, the ECM maintains approximately 75% efficiency at all speeds.

### Pressure Independent Fan Volume

The integral microprocessor based controller includes a feature that provides sensorless (no external feedback) constant airflow operation by automatically adjusting the speed and torque in response to system pressure changes. This breakthrough will no doubt have far reaching benefits and endless applications. For starters, the fan volume supplied to the space will not significantly change as a filter becomes loaded. The air balance process will become simpler and more accurate since the fan volume will not need to be re-adjusted after the diffuser balance is accomplished.

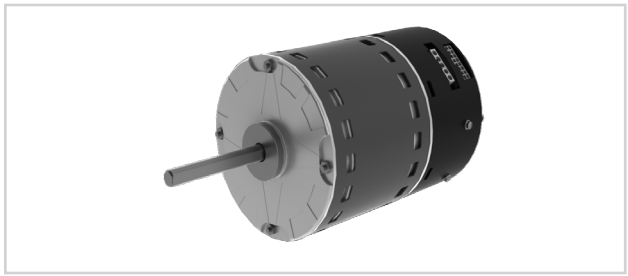
### Factory Calibrated Fan Volume

Due to the pressure independent feature, the fan capacity is calibrated at the factory at the nominal airflow rate. Within the published flow rate and external pressure limits, the fan motor will automatically adjust to account for the varying static pressure requirements associated with different unit configurations and downstream duct configurations. This feature should not preclude the final field air balance verification process during the commissioning stage of a project. An electronic (PWM) speed control device is provided to allow field changes of the fan capacity as the need arises. Fan volume can be field calibrated in two fashions. First, a potentiometer is provided allowing manual adjustment using an instrument type screwdriver. In addition, the fan volume can be calibrated through the BMS using an analog output (2 to 10VDC typical) to the speed controller. A fan volume verses DC volts calibration chart is provided.

### Designer / Owner Flexibility

The ECM incorporates ball bearings in lieu of sleeve bearings typically utilized with an induction motor. Unlike a sleeve bearing motor, the ECM does not have a minimum RPM requirement for bearing lubrication.

This allows it to operate over a much wider speed range. A reduced spare parts inventory is another plus.



### Custom Applications — Programmable Fan Operation

Boundless control opportunities arise due to the controllability of a DC motor combined with an integral microprocessor. Various input signals can direct the motor to behave in an applicationspecific mode. For instance, multiple discrete fan capacities can be achieved. In addition, the fan speed can be varied in response to the space temperature load. The fan is also programmed for a soft start. The motor starts at a low speed and slowly TEAMSs up to the required speed.

### Extended Motor Life

The high motor efficiency provides a significantly reduced operating temperature compared to an induction motor. The lower temperature increases the longevity of all electrical components and therefore the life of the motor. The ball bearings do not require lubrication and do not adversely impact the motor life. Most fan coil applications will provide a PSC motor life between 60,000 and 100,000 hours. Expected ECM motor life will be considerably longer than a PSC motor, due to the reduced operating temperature and ball bearing components.

### Application

Most variable speed electronic devices, including the ECM operate with a rectified and filtered AC power. As a result of the power conditioning, the input current draw is not sinusoidal; rather, the current is drawn in pulses at the peaks of the AC voltage. This pulsating current includes high frequency components called harmonics. Harmonic currents circulate on the delta side of a Delta-Wye distribution transformer. On the Wye side of the transformer, these harmonic currents are additive on the neutral conductor. A transformer used in this type of application must be sized to carry the output KVA that will include the KVA due to circulating currents.

Careful design must be provided when connecting single-phase products to three-phase systems to avoid potential problems such as overheating of neutral wiring conductors, connectors, and transformers. In addition, design consideration must be provided to address the degradation of power quality by the creation of wave shape distortion. In summary, proper consideration must be given to the power distribution transformer selection and ground neutral conductor design to accommodate the 3-phase neutral AMPs shown in the adjacent table. Specific guidelines are available from the factory.

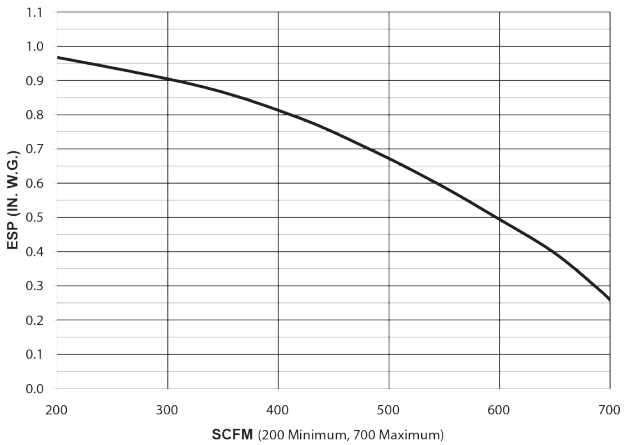
# Fan Curves / ECM™ Motor

Note: Contact Titus regarding EC motor data before project submission

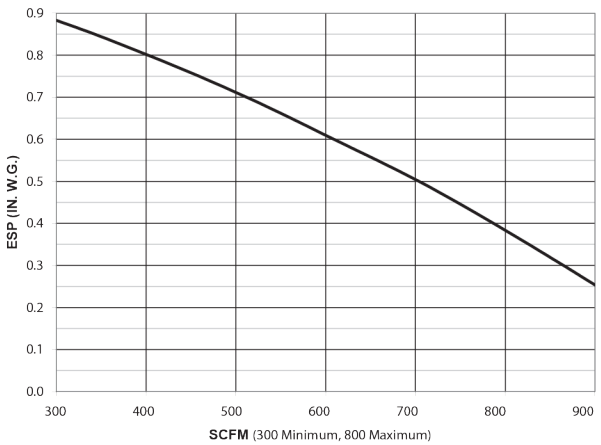
## GENERAL FAN NOTES, ECM MOTORS

1. Fan curves depict actual performance at the maximum speed of the ECM motor. Depending upon external static pressure, flow rates are achievable anywhere within the curve boundary by adjusting the motor speed through the electronic interface control board.
2. Airflow rates will be constant for varying degrees of external static pressure caused by filter loading or other duct system variables once the electronic interface control board is set to desired flow rate
3. Fan curves compensate for the pressure losses of the unit cabinet, coil rows, and a loaded throwaway filter For job specific fan curves please run the Titus TEAMS Coil Selection Program.
4. ECM motors operate using a rectified AC power source that is converted to a non-sinusoidal DC power wave form. Harmonic distortion may occur and circulate on the power distribution system. Circulating harmonic currents are potentially additive on the neutral conductors of 3-phase, 4-wire Wye distribution systems. Neutral conductors must be engineered to account for the additional current (amperes) encountered.
5. See page 92 for ECM motor electrical data

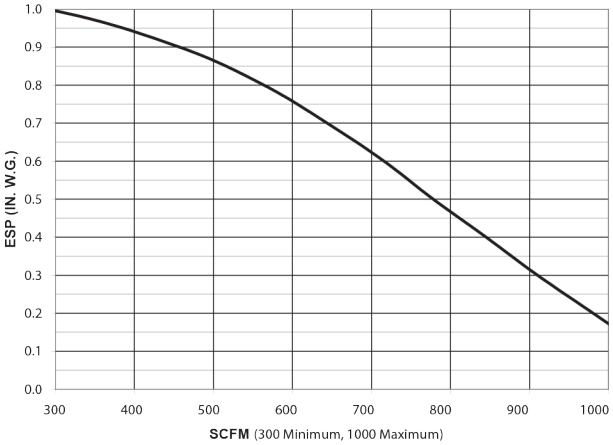
**THHP Size 06 with 1/3 HP ECM Motor**



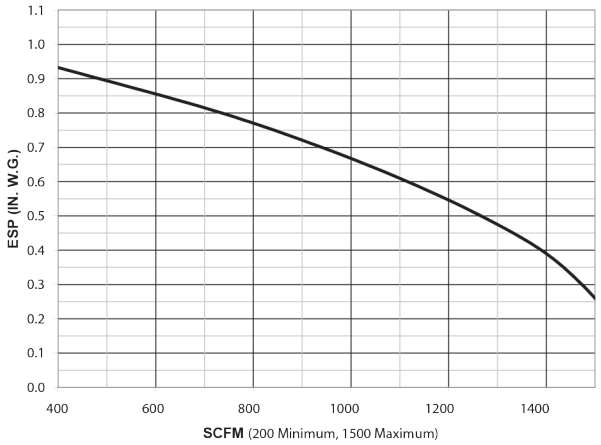

**THHP Size 08 with 1/3 HP ECM Motor**




**THHP Size 10 with 1/3 HP ECM Motor**



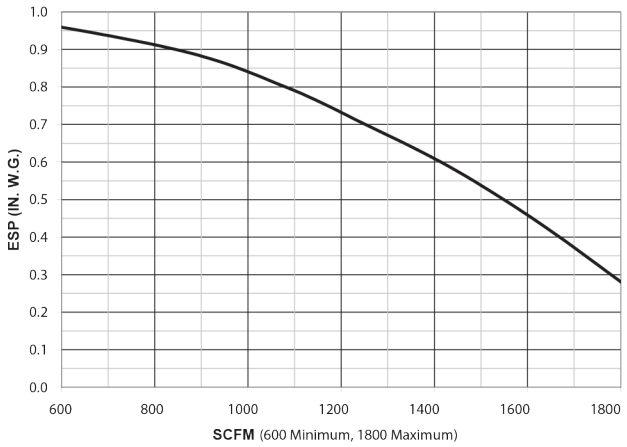

**THHP Size 12 with 1/3 HP ECM Motor**



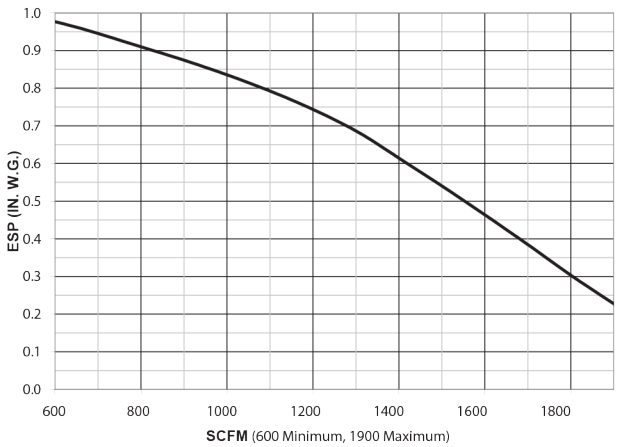
## FAN CURVES / ECM MOTOR

Note: Contact Titus regarding EC motor data before project submission

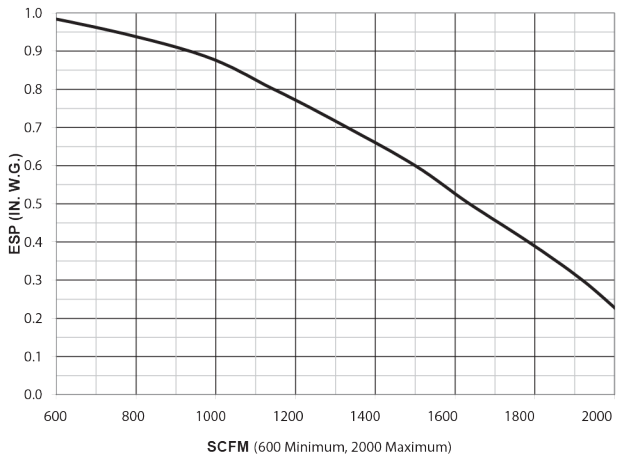
### THHP Size 14 with 1/3 HP ECM Motor




### THHP Size 16 with 1/3 HP ECM Motor




### THHP Size 18 & 20 with (2) 1/3 HP ECM Motor




## ECM™ AIRFLOW

| Unit Size | Factory Set CFM | CFM Range | |
|---|---|---|---|
| | | Min. | Max. |
| 06 | 600 | 200 | 700 |
| 08 | 800 | 300 | 900 |
| 10 | 1000 | 300 | 1000 |
| 12 | 1200 | 400 | 1500 |
| 14 | 1400 | 600 | 1800 |
| 16 | 1600 | 600 | 1900 |
| 18 | 1800 | 600 | 2000 |
| 20 | 2000 | 600 | 2000 |

# Motor and Fan Data

Note: Contact Titus regarding EC motor data before project submission

## MOTOR AND FAN DATA

| Unit Size | Fan Speed | Motor HP (Quality) | | # Of Fan | AMPs @120/1/60 | | | AMPs @208-230/1/60 | | | AMPs @277/1/60 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | PSC | ECM | | PSC | ECM | | PSC | ECM | |
| | | PSC | ECM | | | FLA | 3-Phase Neutral Current | | FLA | 3-Phase Neutral Current | | FLA | 3-Phase Neutral Current |
| 06 | High | (1) 1/6 | (1) 1/3 | 1 | 2.6 | 5.0 | 8.7 | 1.1 | 2.8 | 4.8 | 0.9 | 2.6 | 4.5 |
| | Medium | (1) 1/8 | | | 2.1 | | | 0.9 | | | 0.8 | | |
| | Low | (1) 1/10 | | | 1.8 | | | 0.6 | | | 0.7 | | |
| 08 | High | (1) 1/4 | (1) 1/3 | 1 | 3.8 | 5.0 | 8.7 | 1.6 | 2.8 | 4.8 | 1.3 | 2.6 | 4.5 |
| | Medium | (1) 1/6 | | | 3.3 | | | 1.0 | | | 0.8 | | |
| | Low | (1) 1/8 | | | 2.6 | | | 0.8 | | | 0.7 | | |
| 10 | High | (1) 1/4 | (1) 1/3 | 1 | 4.9 | 5.0 | 8.7 | 2.2 | 2.8 | 4.8 | 1.9 | 2.6 | 4.5 |
| | Medium | (1) 1/5 | | | 4.1 | | | 1.5 | | | 1.2 | | |
| | Low | (1) 1/6 | | | 3.2 | | | 1.1 | | | 0.8 | | |
| 12 | High | (2) 1/6 | (2) 1/3 | 2 | 5.2 | 10.0 | 17.3 | 2.2 | 5.6 | 9.7 | 1.8 | 5.2 | 9.0 |
| | Medium | (2) 1/8 | | | 4.2 | | | 1.8 | | | 1.6 | | |
| | Low | (2) 1/10 | | | 3.6 | | | 1.2 | | | 1.4 | | |
| 14 | High | (2) 1/4 | (2) 1/3 | 2 | 7.6 | 10.0 | 17.3 | 3.2 | 5.6 | 9.7 | 2.6 | 5.2 | 9.0 |
| | Medium | (2) 1/6 | | | 6.6 | | | 2.0 | | | 1.6 | | |
| | Low | (2) 1/8 | | | 5.2 | | | 1.6 | | | 1.4 | | |
| 16 | High | (2) 1/4 | (2) 1/3 | 2 | 9.8 | 10.0 | 17.3 | 4.4 | 5.6 | 9.7 | 3.8 | 5.2 | 9.0 |
| | Medium | (2) 1/5 | | | 8.2 | | | 3.0 | | | 2.4 | | |
| | Low | (2) 1/6 | | | 6.4 | | | 2.2 | | | 1.6 | | |
| 18 | High | (2) 1/4 | (2) 1/3 | 2 | 9.8 | 10.0 | 17.3 | 4.4 | 5.6 | 9.7 | 3.8 | 5.2 | 9.0 |
| | Medium | (2) 1/5 | | | 8.2 | | | 3.0 | | | 2.4 | | |
| | Low | (2) 1/6 | | | 6.4 | | | 2.2 | | | 1.6 | | |
| 20 | High | (2) 1/4 | (2) 1/3 | 2 | 9.8 | 10.0 | 17.3 | 4.4 | 5.6 | 9.7 | 3.8 | 5.2 | 9.0 |
| | Medium | (2) 1/5 | | | 8.2 | | | 3.0 | | | 2.4 | | |
| | Low | (2) 1/6 | | | 6.4 | | | 2.2 | | | 1.6 | | |

Notes:

1. Motor electrical data is nameplate data. Actual data will vary with application.
2. Motors nameplated for 208-230/1/60. Data is at 230 volts.
3. ECM motors operated on 208/1/60 power result in reduced airflow

## SOUND DATA

| Unit Size | Motor Speed | Motor RPM | UNIT SCFM (ECM) | UNIT SCFM (PSC) | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 06 | High | 1161 | 768 | 722 | 69 | 67 | 65 | 65 | 61 | 63 | 55 |
| | Medium | 965 | 589 | 622 | 66 | 62 | 62 | 59 | 57 | 54 | 47 |
| | Low | 678 | 403 | 502 | 58 | 53 | 55 | 50 | 46 | 44 | 33 |
| 08 | High | 1118 | 887 | 1030 | 72 | 69 | 68 | 67 | 65 | 65 | 56 |
| | Medium | 924 | 710 | 948 | 67 | 63 | 63 | 61 | 60 | 57 | 48 |
| | Low | 699 | 495 | 795 | 61 | 57 | 58 | 54 | 51 | 47 | 38 |
| 10 | High | 1118 | 999 | 1074 | 73 | 70 | 69 | 69 | 67 | 65 | 58 |
| | Medium | 911 | 791 | 988 | 68 | 64 | 65 | 63 | 62 | 57 | 48 |
| | Low | 689 | 563 | 785 | 62 | 60 | 60 | 56 | 54 | 49 | 39 |
| 12 | High | 1142 | 1552 | 1543 | 74 | 73 | 70 | 71 | 67 | 67 | 60 |
| | Medium | 920 | 1185 | 1275 | 69 | 67 | 65 | 64 | 62 | 59 | 50 |
| | Low | 708 | 862 | 1001 | 64 | 61 | 61 | 57 | 55 | 52 | 41 |
| 14 | High | 1109 | 1832 | 1978 | 74 | 72 | 70 | 71 | 67 | 66 | 58 |
| | Medium | 896 | 1458 | 1847 | 70 | 68 | 65 | 65 | 63 | 60 | 51 |
| | Low | 677 | 1044 | 1565 | 64 | 60 | 60 | 58 | 55 | 51 | 40 |
| 16 | High | 1120 | 2026 | 2000 | 75 | 73 | 71 | 70 | 68 | 69 | 58 |
| | Medium | 906 | 1606 | 1851 | 69 | 66 | 65 | 66 | 63 | 59 | 49 |
| | Low | 680 | 1145 | 1556 | 64 | 61 | 59 | 58 | 54 | 51 | 40 |
| 18 | High | 1112 | 2057 | 2058 | 74 | 71 | 69 | 71 | 68 | 66 | 58 |
| | Medium | 875 | 1608 | 1878 | 68 | 64 | 64 | 64 | 62 | 57 | 48 |
| | Low | 669 | 1168 | 1538 | 63 | 61 | 59 | 57 | 54 | 50 | 39 |
| 20 | High | 1111 | 2099 | 2145 | 74 | 72 | 69 | 71 | 67 | 66 | 58 |
| | Medium | 886 | 1647 | 1935 | 70 | 67 | 64 | 65 | 63 | 60 | 50 |
| | Low | 660 | 1167 | 1545 | 64 | 59 | 59 | 58 | 53 | 50 | 39 |