



AIR COOLED  
CONDENSER

VC

TECHNICAL BULLETIN 9404

CITY OF L.A. E.T.L.

**REMOTE  
BELT DRIVE  
25 THRU 100 TONS**

## REMOTE AIR COOLED CONDENSER FEATURES

- Very efficient units designed for optimum heat transfer.
- Available in 11 models from 25 ton to 100 nominal tons, with corrosion resistant casing!
- All condensers are made with high grade seamless copper tubing, mechanically expanded into collared aluminum fins and tube sheets, providing maximum heat transfer.
- All models are made with 5/8" O.D. tubing in staggered pattern.
- All headers are made of heavy wall copper tubing brazed by high temperature process.
- Vertical air discharge, optional horizontal air discharge.
- Balanced fans and motors combination are sized for best efficiency, minimum noise level and minimized vibrations.
- All fan guards are zinc coated for long life. Fans are baffled to avoid any short circuiting during fan cycling.
- All motors are 208 or 230/3/60 or 460/3/60. All motors are TEFC.
- All coils are tested at 300 psig minimum.
- Available optional features includes:  
Multiple circuits - Integral subcooling - Fan cycling by ambient control - Fan cycling by pressure control - Flooded type head pressure control - Phenolic coated coil - Copper fins.

# SELECTION PROCEDURE

## A. SINGLE CIRCUIT

### Design condition:

Compressor Capacity: 300,000 BTUH  
 Condensing Temperature: 115°F  
 Evaporator Temperature: +20°F  
 Refrigerant: R-22  
 Ambient Air Temperature: 95°F  
 Compressor is open type. (Table 1)

- Multiply the compressor capacity by 1.26.  
 $300,000 \text{ BTUH} \times 1.26 \times 1.00 \text{ (ref. factor)} = 378,000 \text{ BTUH}$
- Determine the TD:  
 $115^\circ\text{F} - 95^\circ\text{F} = 20^\circ\text{F TD.}$
- Go to the Performance Data Table 4 under 20°F TD. The closest total heat of rejection above 378,000 is 414,200 BTUH.
- The right selection is: VC-400.

Compressor capacity multiplied by heat of compression factor equals total heat of rejection.

### SOLUTION:

- Determine the correction factor from Table 1 below at 115°F condensing temperature and +20°F evaporator temperature we read 1.26.

| TABLE 1                | OPEN COMPRESSOR        |      |      |      |      |      |      |      |      |      |
|------------------------|------------------------|------|------|------|------|------|------|------|------|------|
|                        | Evaporator Temperature |      |      |      |      |      |      |      |      |      |
| Condensing Temperature | +45                    | +40  | +30  | +20  | +10  | 0    | -10  | -20  | -30  | -40  |
| 90°                    | 1.10                   | 1.12 | 1.13 | 1.17 | 1.21 | 1.24 | 1.28 | 1.33 | 1.37 | 1.43 |
| 95°                    | 1.12                   | 1.14 | 1.15 | 1.19 | 1.23 | 1.26 | 1.30 | 1.35 | 1.40 | 1.45 |
| 100°                   | 1.13                   | 1.15 | 1.17 | 1.20 | 1.24 | 1.28 | 1.32 | 1.37 | 1.42 | 1.47 |
| 105°                   | 1.15                   | 1.16 | 1.18 | 1.22 | 1.26 | 1.30 | 1.35 | 1.40 | 1.45 | 1.50 |
| 110°                   | 1.16                   | 1.17 | 1.20 | 1.24 | 1.28 | 1.32 | 1.37 | 1.42 | 1.47 | 1.54 |
| 115°                   | 1.17                   | 1.18 | 1.22 | 1.26 | 1.30 | 1.35 | 1.40 | 1.45 | 1.50 | --   |
| 120°                   | 1.19                   | 1.20 | 1.24 | 1.28 | 1.32 | 1.37 | 1.42 | 1.47 | 1.53 | --   |
| 125°                   | 1.20                   | 1.22 | 1.26 | 1.30 | 1.34 | 1.39 | 1.45 | 1.50 | --   | --   |
| 130°                   | 1.21                   | 1.23 | 1.27 | 1.32 | 1.36 | 1.41 | 1.47 | 1.53 | --   | --   |

| TABLE 2                | SUCTION COOLED HERMETIC COMPRESSOR |      |      |      |      |      |      |      |      |      |
|------------------------|------------------------------------|------|------|------|------|------|------|------|------|------|
|                        | Evaporator Temperature             |      |      |      |      |      |      |      |      |      |
| Condensing Temperature | +45                                | +40  | +30  | +20  | +10  | 0    | -10  | -20  | -30  | -40  |
| 90°                    | 1.16                               | 1.18 | 1.22 | 1.26 | 1.31 | 1.36 | 1.42 | 1.49 | 1.58 | 1.67 |
| 95°                    | 1.17                               | 1.19 | 1.23 | 1.27 | 1.32 | 1.38 | 1.44 | 1.51 | 1.60 | 1.70 |
| 100°                   | 1.19                               | 1.21 | 1.25 | 1.29 | 1.34 | 1.40 | 1.46 | 1.53 | 1.62 | 1.73 |
| 105°                   | 1.20                               | 1.22 | 1.27 | 1.30 | 1.36 | 1.42 | 1.48 | 1.56 | 1.65 | 1.77 |
| 110°                   | 1.22                               | 1.24 | 1.28 | 1.33 | 1.38 | 1.44 | 1.50 | 1.58 | 1.68 | 1.80 |
| 115°                   | 1.23                               | 1.26 | 1.30 | 1.35 | 1.41 | 1.47 | 1.54 | 1.64 | 1.74 | 1.90 |
| 120°                   | 1.25                               | 1.27 | 1.32 | 1.37 | 1.43 | 1.50 | 1.57 | 1.65 | 1.80 | 2.00 |
| 125°                   | 1.27                               | 1.29 | 1.35 | 1.40 | 1.46 | 1.53 | 1.61 | 1.68 | --   | --   |
| 130°                   | 1.28                               | 1.31 | 1.37 | 1.43 | 1.49 | 1.56 | 1.64 | --   | --   | --   |

## B. MULTI-CIRCUITS SELECTION

Given: Compressor type is suction cooled hermetic (Table 2). Altitude is 2000 ft., Ambient air is 95°F.

| System # | Ref. | Evap. °F | Cond. °F | Compr. BTUH @Evap. (10°TD) | Heat of Compr. Factor (Table 2) | Altitude Factor (Table 6) | Refrig. Factor (Table 5) | Design TD. | Adjusted THR BTUH/1° TD |
|----------|------|----------|----------|----------------------------|---------------------------------|---------------------------|--------------------------|------------|-------------------------|
| 1        | 22   | 10       | 110      | 64800                      | x 1.38                          | x 1.05                    | 1.00                     | ÷ 15       | = 6260                  |
| 2        | 12   | 20       | 115      | 26900                      | x 1.35                          | x 1.05                    | .95                      | ÷ 20       | = 1811                  |
| 3        | 502  | -20      | 105      | 39100                      | x 1.56                          | x 1.05                    | .98                      | ÷ 10       | = 6276                  |
| 4        | 502  | -10      | 110      | 23900                      | x 1.50                          | x 1.05                    | .98                      | ÷ 15       | = 2459                  |

**TOTAL = 16,806**

Go to Table 4 @ 1° TD and select condenser with equal or more capacity than total: use VC-350

| <b>TABLE 3</b> |            | <b>SPECIFICATIONS</b> |                       |                 |                   |                    |                        |
|----------------|------------|-----------------------|-----------------------|-----------------|-------------------|--------------------|------------------------|
| <b>Model #</b> | <b>CFM</b> | <b>HP Motor</b>       | <b>Amps/Unit 230V</b> | <b>Fan Dia.</b> | <b>Inlet O.D.</b> | <b>Outlet O.D.</b> | <b>Approx. Net Wt.</b> |
| <b>VC 250</b>  | 17950      | (2) 2                 | 12.4                  | 36              | 2-1/8             | 1-3/8              | 1100                   |
| <b>VC 300</b>  | 27880      | (2) 3                 | 16.8                  | 42              | 2-1/8             | 1-3/8              | 1200                   |
| <b>VC 350</b>  | 29660      | (2) 3                 | 16.8                  | 42              | 2-1/8             | 1-3/8              | 1450                   |
| <b>VC 400</b>  | 28750      | (2) 3                 | 16.8                  | 42              | 2-1/8             | 1-3/8              | 1580                   |
| <b>VC 450</b>  | 28500      | (2) 3                 | 16.8                  | 48              | (2) 2-1/8         | (2) 1-5/8          | 1850                   |
| <b>VC 500</b>  | 28100      | (2) 3                 | 16.8                  | 48              | (2) 2-1/8         | (2) 1-5/8          | 2000                   |
| <b>VC 600</b>  | 34670      | (2) 5                 | 27.2                  | 48              | (2) 2-1/8         | (2) 1-5/8          | 2200                   |
| <b>VC 700</b>  | 44150      | (2) 7-1/2             | 40.8                  | 48              | (2) 2-1/8         | (2) 1-5/8          | 2390                   |
| <b>VC 800</b>  | 60800      | (2) 7-1/2             | 40.8                  | 48              | (2) 2-5/8         | (2) 2-1/8          | 2500                   |
| <b>VC 900</b>  | 59250      | (2) 7-1/2             | 40.8                  | 48              | (2) 2-5/8         | (2) 2-1/8          | 3440                   |
| <b>VC 1000</b> | 65930      | (3) 5                 | 40.8                  | 48              | (2) 2-5/8         | (2) 2-1/8          | 3700                   |

| <b>TABLE 4</b> |                                                        | <b>PERFORMANCE DATA</b> |            |            |            |            |  |
|----------------|--------------------------------------------------------|-------------------------|------------|------------|------------|------------|--|
| <b>Model #</b> | <b>Total Heat of Rejection (THR) — R22 (MBH) @ TD:</b> |                         |            |            |            |            |  |
|                | <b>1°</b>                                              | <b>10°</b>              | <b>15°</b> | <b>20°</b> | <b>25°</b> | <b>30°</b> |  |
| <b>VC 250</b>  | 12.70                                                  | 127.00                  | 190.50     | 254.00     | 317.50     | 381.00     |  |
| <b>VC 300</b>  | 14.80                                                  | 148.00                  | 222.00     | 296.00     | 370.00     | 444.00     |  |
| <b>VC 350</b>  | 17.72                                                  | 177.20                  | 265.80     | 354.40     | 443.00     | 531.60     |  |
| <b>VC 400</b>  | 20.71                                                  | 207.10                  | 310.60     | 414.20     | 517.80     | 621.30     |  |
| <b>VC 450</b>  | 23.29                                                  | 232.90                  | 349.35     | 465.80     | 582.25     | 698.70     |  |
| <b>VC 500</b>  | 25.32                                                  | 253.20                  | 379.80     | 506.40     | 633.00     | 759.60     |  |
| <b>VC 600</b>  | 30.46                                                  | 304.60                  | 456.90     | 609.20     | 761.50     | 913.80     |  |
| <b>VC 700</b>  | 36.17                                                  | 361.70                  | 542.58     | 723.45     | 904.25     | 1085.10    |  |
| <b>VC 800</b>  | 39.97                                                  | 399.73                  | 599.60     | 799.47     | 999.33     | 1199.20    |  |
| <b>VC 900</b>  | 45.66                                                  | 456.64                  | 684.97     | 913.29     | 1141.61    | 1369.94    |  |
| <b>VC 1000</b> | 50.57                                                  | 505.68                  | 758.52     | 1011.36    | 1264.20    | 1517.04    |  |

| <b>TABLE 5</b>        |      |
|-----------------------|------|
| <b>Refrig. Factor</b> |      |
| <b>R22</b>            | 1.00 |
| <b>R502</b>           | .98  |
| <b>R12</b>            | .95  |

| <b>TABLE 6</b>                    |       |
|-----------------------------------|-------|
| <b>Altitude Correction Factor</b> |       |
| <b>sea level</b>                  | 1.000 |
| <b>1000 ft.</b>                   | 1.030 |
| <b>2000 ft.</b>                   | 1.050 |
| <b>3000 ft.</b>                   | 1.075 |
| <b>4000 ft.</b>                   | 1.100 |
| <b>5000 ft.</b>                   | 1.125 |
| <b>6000 ft.</b>                   | 1.150 |
| <b>7000 ft.</b>                   | 1.175 |
| <b>8000 ft.</b>                   | 1.205 |
| <b>9000 ft.</b>                   | 1.230 |
| <b>10000 ft.</b>                  | 1.260 |

| <b>TABLE 7</b>          |            |            |            |             |             |             |
|-------------------------|------------|------------|------------|-------------|-------------|-------------|
| <b>T.D. SELECTIONS</b>  |            |            |            |             |             |             |
| <b>Ambient Temp.</b>    | <b>85°</b> | <b>90°</b> | <b>95°</b> | <b>100°</b> | <b>105°</b> | <b>110°</b> |
| <b>Recommended T.D.</b> | 25/30      | 20/25      | 20         | 15/20       | 15          | 10          |

## DIMENSIONAL DATA

| Model # | A       | B      | C  | D  | E  | F       | G      |
|---------|---------|--------|----|----|----|---------|--------|
| VC 250  | 89      | 59     | 46 | 28 | 18 | 81-3/4  | 51-3/4 |
| VC 300  | 119     | 59     | 48 | 30 | 18 | 111-3/4 | 51-3/4 |
| VC 350  | 119     | 59     | 48 | 30 | 18 | 111-3/4 | 51-3/4 |
| VC 400  | 119     | 59     | 48 | 30 | 18 | 111-3/4 | 51-3/4 |
| VC 450  | 119     | 59     | 48 | 30 | 18 | 111-3/4 | 51-3/4 |
| VC 500  | 119     | 59     | 48 | 30 | 18 | 111-3/4 | 51-3/4 |
| VC 600  | 146-1/2 | 59     | 48 | 30 | 18 | 139-1/4 | 51-3/4 |
| VC 700  | 146-1/2 | 83-1/2 | 52 | 30 | 22 | 139-1/4 | 76-1/4 |
| VC 800  | 146-1/2 | 83-1/2 | 52 | 30 | 22 | 139-1/4 | 76-1/4 |
| VC 900  | 146-1/2 | 83-1/2 | 52 | 30 | 22 | 139-1/4 | 76-1/4 |
| VC 1000 | 165     | 83-1/2 | 52 | 30 | 22 | 157-3/4 | 76-1/4 |

### Vertical Air Flow

For Horiz. Air Flow option: D X A = Base; B = Height

