**Electrical Breadth**

The Hearst Tower is currently served by (4)-4000 amp service takeoffs. Each takeoff is then served by one 6000A service switch. Secondary service to the building is 480/277 V, three phase from the primary transformers.

Since the building is set to achieve LEED Gold certification, steps were taken to make the electrical/lighting systems energy efficient. Occupancy sensors are installed throughout the tower and work to control the lighting system, shutting down the lights and unused electrical equipment when a space is unoccupied. Daylight sensors are also used in conjunction with the lighting controls to reduce energy use and maximize the use of natural light. Aside from the energy conservation benefits, studies have shown natural light improves productivity and occupant health.

*Electrical Equipment: Existing and Proposed*

The current chiller plant serving the Tower contains three electric centrifugal chillers. There are (2)-1200 ton chillers and (1)-400 ton chiller served by four headered chilled water pumps and four headered condenser water pumps. All eight pumps are 100 hp split-coupled, vertical inline centrifugal pumps.

Since chiller one and two (both 1200 ton) are so large and require a large electric power input, both chillers are connected directly to a service switch, service switch #2. Each chiller is fed from the switch by a 2000A fuse. The chillers are wired to the service switch using six sets of 3-#400 MCM with 1-#3/0 ground in six 3" conduits.

Chiller three, the smallest of the three, is fed from switchboard #1 using an 800A fuse. This chiller is wired with two sets of 3-#500 MCM with a #2/0 ground wire in two 3.5" conduits.

The proposed chiller plant contains three 600 ton steam driven absorption chillers. Since these chillers use steam as a power source, very little electric power is required. In addition to the annual energy savings calculated in the "System Simulation" section of this report, changing the chillers results in a large first cost savings. According to the chiller specifications provided by Carrier, the total electric current needed for the chillers is 30A. Therefore, the new chillers can be fed by a 40A fuse and 3-#6 wires with one #10 ground wire in 1" conduit.

The airside of the system analyzed in this report includes four large central air handling units located in the 28$^{th}$ floor mechanical equipment room. These units are designed for a maximum airflow of 110,000 cfm each, and therefore have very large supply fans. Each unit has 100 hp dual supply fans with 124A full load ampacity (FLA) each. The supply fans are wired using 3-#2/0 with one #4 ground wire in 2" conduit.

The return fans are separate from the air handling units and are also located in the 28th floor mechanical room. The return fans are 50hp 65A full load ampacity fans. These fans are wired using 3-#2/0 with a #8 ground in a 1.5" conduit. A complete motor control schedule describing the current equipment is provided in **Figure#**.

**Figure # Existing AHU Motor Control Schedule**

EXISTING MOTOR CONTROL CENTER SCHEDULE

| FLOOR MOUNTED | VOLTS: 460Y/265V | | BUS RATING: 2000A | | PHASE: 3 | WIRES: 4 |
|---|---|---|---|---|---|---|
| DESIGNATION | HP or (kW) | FULL LOAD AMP | STARTER NEMA SIZE | SWITCH SIZE | FUSE SIZE | FEEDER SIZE |
| PANEL HV-2B-M | (42.94kW) | 54 | – | 200AS | 200AF | 200 NG |
| AHU-2B-1-1 | 100 | 124 | – | 200AS | 175AF | 175 G |
| AHU-2B-1-2 | 100 | 124 | – | 200AS | 175AF | 175 G |
| AHU-2B-2-1 | 100 | 124 | – | 200AS | 175AF | 175 G |
| AHU-2B-2-2 | 100 | 124 | – | 200AS | 175AF | 175 G |
| AHU-2B-3-1 | 100 | 124 | – | 200AS | 175AF | 175 G |
| AHU-2B-3-2 | 100 | 124 | – | 200AS | 175AF | 175 G |
| AHU-2B-4-1 | 100 | 124 | – | 200AS | 175AF | 175 G |
| SPARE | 100 | 124 | – | 200AS | 175AF | – |
| SPARE | 100 | 124 | – | 200AS | 175AF | – |
| AHU-2B-4-2 | 100 | 124 | – | 200AS | 175AF | 175 G |
| RETURN FAN RF-2B-2 | 50 | 65 | – | 100AS | 100AF | 115 G |
| RETURN FAN RF-2B-3 | 50 | 65 | – | 100AS | 100AF | 115 G |
| RETURN FAN RF-2B-5 | 50 | 65 | – | 100AS | 100AF | 115 G |
| RETURN FAN RF-2B-6 | 50 | 65 | – | 100AS | 100AF | 115 G |
| EXHAUST FAN EF-2B-7 | 15 | 21 | 2 | 60AS | 60AF | 60 G |
| EXHAUST FAN EF-2B-8 | 7.5 | 11 | 1 | 30AS | 20AF | 20 G |
| EXHAUST FAN EF-2B-9 | 15 | 21 | 2 | 60AS | 60AF | 60 G |
| EXHAUST FAN EF-2B-10 | 0.5 | 1.1 | 1 | 30AS | 15AF | 20 G |
| HOT WATER HEATER | 15 | 19 | – | 30AS | 30AF | 30 G |
| SPARE | | – | 1 | 60AS | – | – |
| SPARE | 50 | 65 | – | 100AS | 100AF | – |
| SPARE | – | – | 1 | 100AS | – | – |
| PUMP MUP-2B-1 | 3 | 4.8 | 1 | 30AS | 15AF | 20 G |
| SPARE | – | – | 1 | 100AS | – | – |
| SPACES | – | – | – | – | – | – |
| TOTAL CONNECTED LOAD (AMPS) | | 1,697 | | | | |

The motor control center (MCC) described above will support a total connected load of 1697 amps. Using the 1.25 multiplier for wire sizing, the MCC requires six sets of 3-#500 MCM wires with one #250 MCM ground in six runs of 3.5" conduit.

The proposed air side changes will require much smaller AHU's than those currently installed in the Hearst Tower. The new system will contain (3)-40,000 cfm dedicated outdoor air units containing both a supply and return fan. The supply fans will be 50 hp, 77A full load ampacity and will be wired using 3-#2 with 1-#8 ground in 1.5" conduit. The return fans are slightly smaller, requiring only 50 hp and 65A (FLA). These fans require 3-#4 wires with 1-#8 ground wire in 1.5" conduit. A schedule showing the proposed equipment motor control is shown below in **Figure#**.

**Figure # Proposed Equipment Motor Control Schedule**

NEW MOTOR CONTROL CENTER SCHEDULE

| FLOOR MOUNTED | VOLTS: 480Y/265V | | BUS RATING: 2000A | | PHASE: 3 | WIRES: 4 |
|---|---|---|---|---|---|---|
| DESIGNATION | HP or (kW) | FULL LOAD AMP | STARTER NEMA SIZE | SWITCH SIZE | FUSE SIZE | FEEDER SIZE |
| PANEL HV-2B-M | (42.9kW) | 54 | – | 200AS | 200AF | 200 NG |
| AHU-2B-1-SF | 55 | 77 | – | 100AS | 100AF | 100 G |
| AHU-2B-1-RF | 50 | 65 | – | 100AS | 90AF | 85 G |
| AHU-2B-2-SF | 55 | 77 | – | 100AS | 100AF | 100 G |
| AHU-2B-2-RF | 50 | 65 | – | 100AS | 90AF | 85 G |
| AHU-2B-3-SF | 55 | 77 | – | 100AS | 100AF | 100 G |
| AHU-2B-3-RF | 50 | 65 | – | 100AS | 90AF | 85 G |
| SPARE | – | – | – | 100AS | 100AF | – |
| SPARE | – | – | – | 100AS | 90AF | – |
| EXHAUST FAN EF-2B-7 | 15 | 21 | 2 | 60AS | 60AF | 60 G |
| EXHAUST FAN EF-2B-8 | 7.5 | 11 | 1 | 30AS | 20AF | 20 G |
| EXHAUST FAN EF-2B-9 | 15 | 21 | 2 | 60AS | 60AF | 60 G |
| EXHAUST FAN EF-2B-10 | 0.5 | 1.1 | 1 | 30AS | 15AF | 20 G |
| HOT WATER HEATER | 15 | 19 | – | 30AS | 30AF | 30 G |
| SPARE | | – | 1 | 60AS | – | – |
| SPARE | 50 | 65 | – | 100AS | 100AF | – |
| SPARE | – | – | 1 | 100AS | – | – |
| PUMP MUP-2B-1 | 3 | 4.8 | 1 | 30AS | 15AF | 20 G |
| SPARE | – | – | 1 | 100AS | – | – |
| SPACES | – | – | – | – | – | – |

| TOTAL CONNECTED LOAD (AMPS) | 623 |
|---|---|

The proposed motor control center (MCC) will support a much lower connected load than the original, serving on 623 amps. Again, using the 1.25 multiplier for sizing wire, the MCC requires three sets of 3-#500 MCM with one #2/0 ground wire. The three sets will be placed in three runs of 3.5" conduit. **Figure#** shows a feeder schedule which explains the feeder sizing used in **Figure # &#.**

**Figure # Feeder Schedule**

FEEDER SCHEDULE

| FEEDER DESIGNATION | No. OF SETS | COPPER CONDUCTORS (75° C) PER SET | | | | | |
|---|---|---|---|---|---|---|---|
| | | PHASE CONDUCTORS | P PARTIAL NEUTRAL CONDUCTOR | N NEUTRAL CONDUCTOR | NN OVERSIZED NEUTRAL CONDUCTOR | G GROUND CONDUCTOR | I ISOLATED & EQUIPMENT GROUND CONDUCTOR |
| 15 | 1 | 3 # 12 | | 1 # 12 | 1 # 10 | 1 # 12 | 2 # 12 |
| 20 | 1 | 3 # 12 | | 1 # 12 | 1 # 8 | 1 # 12 | 2 # 12 |
| 30 | 1 | 3 # 10 | | 1 # 10 | 1 # 6 | 1 # 12 | 2 # 12 |
| 50 | 1 | 3 # 8 | | 1 # 8 | 1 # 2 | 1 # 12 | 2 # 12 |
| 60 | 1 | 3 # 6 | | 1 # 6 | 1 # 1 | 1 # 10 | 2 # 10 |
| 85 | 1 | 3 # 4 | | 1 # 4 | 1 # 2/0 | 1 # 8 | 2 # 8 |
| 100 | 1 | 3 # 2 | 1 # 8 | 1 # 2 | 1 # 3/0 | 1 # 8 | 2 # 8 |
| 115 | 1 | 3 # 2 | 1 # 6 | 1 # 2 | 1 # 4/0 | 1 # 8 | 2 # 8 |
| 130 | 1 | 3 # 1 | 1 # 6 | 1 # 1 | 1 # 300 | 1 # 6 | 2 # 6 |
| 150 | 1 | 3 # 1/0 | 1 # 4 | 1 # 1/0 | 2 # 1/0 | 1 # 6 | 2 # 6 |
| 175 | 1 | 3 # 2/0 | 1 # 2 | 1 # 2/0 | 2 # 2/0 | 1 # 4 | 2 # 4 |
| 200 | 1 | 3 # 3/0 | 1 # 2 | 1 # 3/0 | 2 # 3/0 | 1 # 4 | 2 # 4 |

*Cost Savings*

Thus far, only the nominal size differences between the wiring for the existing and proposed mechanical systems have been discussed. The differences in sizes do however equate to substantial first cost savings in some instances. The wiring currently installed throughout Hearst is of type THHN cooper, since this wire type is pretty standard, it will also be used with the redesigned system. The table below, **Table#**, shows the pricing differences between both systems. All cost data was found from R.S. Means 2005 sections 16120 "Conductors and Cable," and section 16132 'Conduit."

**Table # Wire and Conduit Cost Table**

**Existing System**

| Size | Item | Service | Unit Cost (per 100 L.F.) |
|---|---|---|---|
| 400 MCM | THHN Wire | Chiller 1&2 | 660 |
| #3/0 | THHN Wire | Chiller 1&2 GRND | 386 |
| 500 MCM | THHN Wire | Chiller 3 | 765 |
| #2/0 | THHN Wire | Chiller 3 GRND | 296 |
| #2/0 | THHN Wire | AHU-28-1,2,3,4-SF | 296 |
| #4 | THHN Wire | AHU-28-1,2,3,4-SF GRND | 136 |
| #2 | THHN Wire | AHU-28-1,2,3,4-RF | 178 |
| #8 | THHN Wire | AHU-28-1,2,3,4-RF GRND | 78 |

| Size | Item | Service | Unit Cost (per L.F.) |
|---|---|---|---|
| 3" | Conduit | Chiller 1&2 | 41.50 |
| 3.5" | Conduit | Chiller 3 | 49.50 |
| 2" | Conduit | AHU-28-1,2,3,4-SF | 20.50 |
| 1.5" | Conduit | AHU-28-1,2,3,4-RF | 16.40 |

**Proposed System**

| Size | Item | Service | Unit Cost (per 100 L.F.) |
|---|---|---|---|
| #6 | THHN Wire | Chiller 1,2,3 | 100 |
| #8 | THHN Wire | AHU-28-1,2,3 SF&RF GRND | 78 |
| #2 | THHN Wire | AHU-28-1,2,3 SF | 178 |
| #4 | THHN Wire | AHU-28-1,2,3 RF | 136 |

| Size | Item | Service | Unit Cost (per L.F.) |
|---|---|---|---|
| 1" | Conduit | Chiller 1,2,3 | 12.13 |
| 1.5" | Conduit | AHU-28-1,2,3 SF&RF | 16.40 |

From the cost tables above, it was determined that the wiring for Chiller 1&2 would cost about $391.00/linear foot each. Wiring for Chiller 3 would cost $150.00/ linear foot. With the proposed system requiring only a 40 amp feed each, wiring would only cost around $15.60/linear foot. Since the chillers would be located in the same space as the

existing chillers, the distance to the main electrical room from each chiller would be the same and these numbers can therefore be used to estimate cost savings.
Original design for chiller plant (2@$391.00+$150.00): $932.00/linear foot
Proposed design for chiller plant (3@$15.60): $46.80/linear foot

Therefore, the cost of wiring the new chiller plant is about 5% of the cost of the original plant.

The wiring cost for the original air handling units is approximately $213.00/ linear foot, while the new air system for all three units is $131.34/linear foot. The new air system results in a 40% savings in wiring costs.

All wire sizes were determined using the method described in Chapter 11 and Table 11.1 of "Electrical Systems in Buildings" (Hughes 1988). The tables provided within this chapter are replicated from the National Electric Code. Power requirements for the proposed equipment were found in the equipment specifications included in the Appendix section of this report.

Downsizing of the major mechanical equipment in the Hearst Tower resulted in large first cost savings of wiring and conduit. Installing equipment will less required power input allows circuit breaker frame size to be decreased which saves on panel board space and allows for easier installation; ultimately this results in lower cost circuit breakers with respect to both first cost and installation. Essentially the main goal of the proposed design was achieved, lowering the electrical consumption of the building and lessening the load on the district electric grid of NYC.

# Electrical Breadth

# Appendix A

Electrical Data for Semco Packaged Energy Recovery Unit
Electrical Wiring Schematic for Enthalpy Wheel
Fan Selection Table for DOAS AHU
Model 16NK Absoprtion Chiller Specifications

## Electrical Data

| HP | 3 Phase Full Load Amps | | | Minimum Efficiency Std. Motors | Minimum Efficiency High Eff. Motors |
|---|---|---|---|---|---|
| | 208V | 240V | 480V | | |
| 1/6 | 0.6 | 0.6 | 0.3 | - | - |
| 1/4 | 1.0 | 1.0 | 0.5 | - | - |
| 1/2 | 2.4 | 2.2 | 1.1 | - | - |
| 3/4 | 3.5 | 3.2 | 1.6 | 73 | - |
| 1 | 4.6 | 4.2 | 2.1 | 76.6 | 82.5 |
| 1-1/2 | 6.6 | 6.0 | 3.0 | 80 | 84 |
| 2 | 7.5 | 6.8 | 3.4 | 79.9 | 84 |
| 3 | 10.6 | 9.6 | 4.8 | 83.1 | 86.5 |
| 5 | 16.7 | 15.2 | 7.6 | 83.4 | 87.5 |
| 7-1/2 | 24.2 | 22 | 11 | 86.6 | 88.5 |
| 10 | 30.8 | 28 | 14 | 88.2 | 89.5 |
| 15 | 46.2 | 42 | 21 | 89.3 | 90.2 |
| 20 | 59.4 | 54 | 27 | 90.4 | 91 |
| 25 | 74.8 | 68 | 34 | 90.5 | 92.4 |
| 30 | 88.0 | 80 | 40 | 89.3 | 93 |
| 40 | 114 | 104 | 52 | 90 | 93 |
| 50 | - | 130 | 65 | 91.2 | 94.1 |
| 60 | - | - | 77 | 92 | 93.6 |
| 75 | - | - | 96 | 92.4 | 94.1 |
| 100 | - | - | 124 | 92.5 | 94.1 |
| **HP** | **3Ø Variable Frequency Drive (VFD)** | | | **Yaskawa Model #** | |
| 1/2 | 3.9 | 3.9 | - | CIMR-V7AM20P4 | |
| 1/2 | - | - | 1.6 | CIMR-V7AM40P2 | |
| 1 | 6.4 | 6.4 | - | CIMR-V7AM20P7 | |
| 1 | - | - | 4.7 | CIMR-V7AM40P7 | |
| | **Control Power Transformer (CPT)** | | | | |
| 150 VA | 0.7 | 0.6 | 0.4 | | |
| 500 VA | 2.4 | 2.0 | 1.0 | | |
| 3 KVA | 14.4 | 13.0 | 6.25 | | |

Note 1: To determine Minimum Circuit Ampacity, add the FLA's for each fan motor, the FLA of the constant speed wheel motor or the Variable Frequency Drive. Then add the CPT amps and 25 percent of the largest motor FLA.

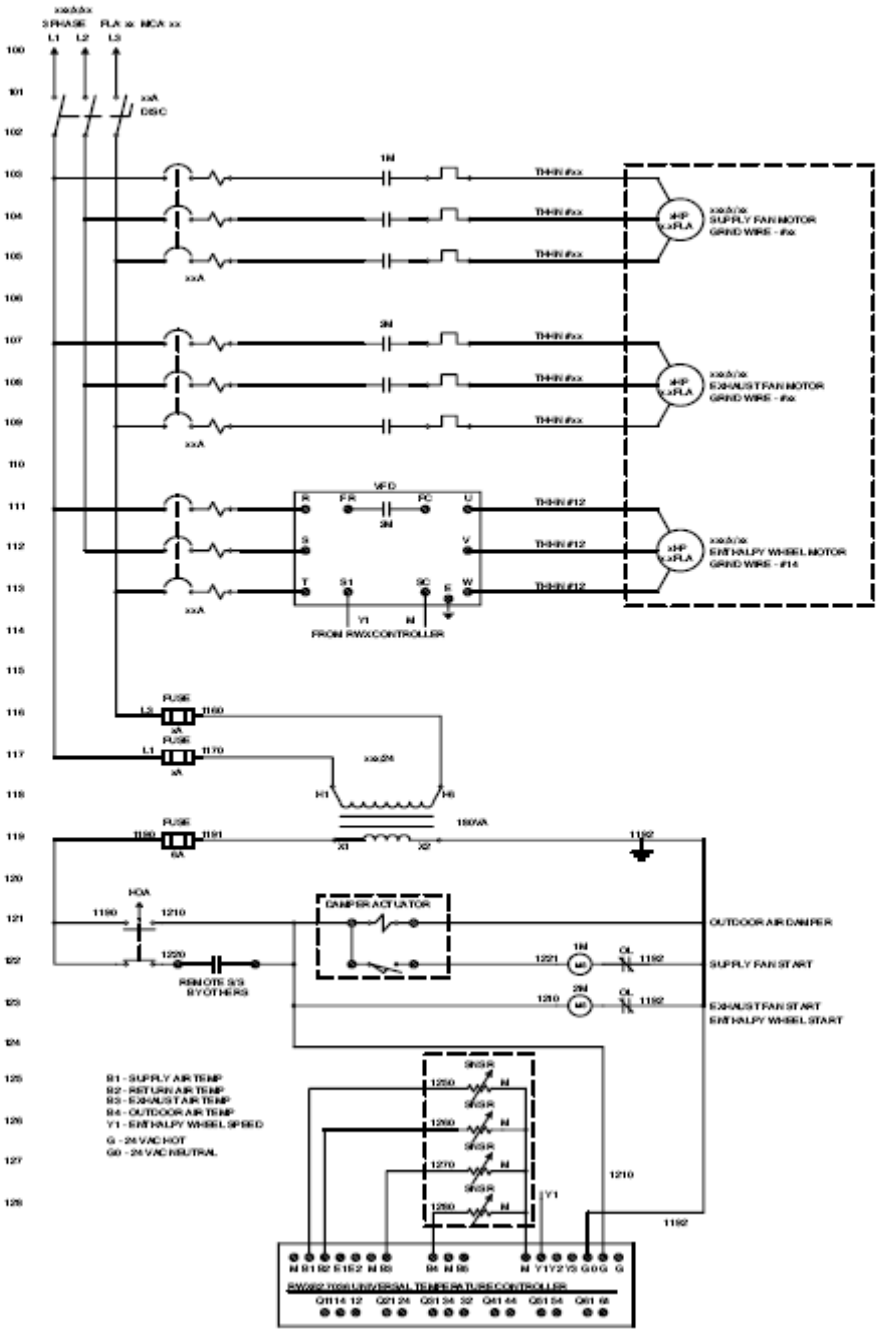
Note 2: Fuse Recommendations: Size fuses at the unit FLA and 75% of the largest motor FLA, then select the next larger size Dual-Element, Time-Delay Fuses (LOW-PEAK®, FUSETRON® or equivalent). If the fuses don't hold, consult N.E.C. for suitability of larger sized fuses.

Note 3: Use a 3KVA transformer for units with 120 volt lights. Otherwise use the 180 VA transformer.

**Electrical Data For Semco Packaged Energy Recovery Unit**

## Single Wheel Electrical Schematic

### Typical EP Series Unit with Variable Speed Wheel




**Electric Wiring Schematic for Single Enthalpy Wheel Configuration**

# Fan Selection Table for DOAS AHU

**Maximum 50 hp Motor** **SIZE 43X, 35XX**

| STATIC PRESSURE IN INCHES OF WATER | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1" SP | | 2" SP | | 3" SP | | 4" SP | | 5" SP | | 6" SP | | 7" SP | | 8" SP | | 10" SP | | 12" SP | |
| CFM | RPM | BHP | RPM | BHP | RPM | BHP | RPM | BHP | RPM | BHP | RPM | BHP | RPM | BHP | RPM | BHP | RPM | BHP | RPM | BHP |
| 12000 | | | | | | | | | | | | | | | | | | | | |
| 14300 | 371 | 3.17 | | | | | | | | | | | | | | | | | | |
| 16600 | 389 | 3.65 | | | | | | | | | | | | | | | | | | |
| 18900 | 411 | 4.22 | 516 | 8.46 | | | | | | | | | | | | | | | | |
| 21200 | 435 | 4.85 | 532 | 9.38 | 624 | 14.52 | | | | | | | | | | | | | | |
| 23500 | 458 | 5.50 | 551 | 10.38 | 634 | 15.74 | | | | | | | | | | | | | | |
| 25800 | 483 | 6.25 | 572 | 11.45 | 650 | 17.11 | 725 | 23.26 | | | | | | | | | | | | |
| 28100 | 508 | 7.04 | 595 | 12.64 | 669 | 18.62 | 738 | 24.95 | 807 | 31.80 | | | | | | | | | | |
| 30400 | 535 | 7.96 | 619 | 13.93 | 689 | 20.15 | 756 | 26.92 | 819 | 33.94 | 883 | 41.43 | | | | | | | | |
| 32700 | 562 | 8.93 | 643 | 15.29 | 712 | 21.92 | 774 | 28.82 | 835 | 36.25 | 893 | 43.85 | 954 | 52.15 | | | | | | |
| 35000 | 591 | 10.07 | 667 | 16.70 | 735 | 23.72 | 795 | 30.98 | 853 | 38.66 | 908 | 46.54 | 963 | 54.88 | 1020 | 63.77 | | | | |
| 37300 | 619 | 11.24 | 692 | 18.23 | 759 | 25.67 | 817 | 33.21 | 872 | 41.14 | 926 | 49.48 | 978 | 58.08 | 1029 | 66.91 | | | | |
| 39600 | 648 | 12.56 | 717 | 19.82 | 782 | 27.59 | 841 | 35.71 | 893 | 43.81 | 945 | 52.49 | 995 | 61.38 | 1043 | 70.40 | 1141 | 89.75 | | |
| 41900 | 678 | 14.04 | 744 | 21.63 | 806 | 29.68 | 864 | 38.15 | 916 | 46.76 | 965 | 55.59 | 1013 | 64.72 | 1060 | 74.19 | 1152 | 93.99 | 1247 | 115.09 |
| 44200 | 707 | 15.57 | 771 | 23.52 | 831 | 31.95 | 888 | 40.81 | 939 | 49.73 | 987 | 58.95 | 1033 | 68.39 | 1078 | 78.03 | 1166 | 98.34 | 1253 | 119.68 |
| 46500 | 737 | 17.29 | 799 | 25.59 | 856 | 34.28 | 911 | 43.41 | 963 | 52.93 | 1009 | 62.31 | 1054 | 72.14 | 1097 | 82.02 | 1182 | 102.84 | 1265 | 124.79 |
| 48800 | 767 | 19.14 | 827 | 27.76 | 882 | 36.80 | 936 | 46.36 | 986 | 56.07 | 1033 | 66.08 | 1076 | 76.05 | 1118 | 86.34 | 1201 | 107.93 | 1280 | 130.21 |
| 51100 | 797 | 21.11 | 855 | 30.04 | 908 | 39.39 | 960 | 49.23 | 1010 | 59.46 | 1056 | 69.74 | 1099 | 80.19 | 1140 | 90.82 | 1219 | 112.67 | 1296 | 135.57 |
| 53400 | 828 | 23.31 | 884 | 32.55 | 935 | 42.21 | 985 | 52.33 | 1034 | 62.94 | 1080 | 73.70 | 1122 | 84.39 | 1163 | 95.53 | 1239 | 117.86 | 1315 | 141.68 |
| 55700 | 858 | 25.58 | 913 | 35.20 | 963 | 45.25 | 1011 | 55.67 | 1058 | 66.49 | 1103 | 77.56 | 1146 | 88.91 | 1186 | 100.30 | 1261 | 123.48 | 1334 | 147.70 |
| 58000 | 889 | 28.08 | 942 | 37.99 | 991 | 48.42 | 1037 | 59.11 | 1083 | 70.30 | 1127 | 81.71 | 1169 | 93.32 | 1209 | 105.14 | 1283 | 129.07 | 1353 | 153.62 |
| 60300 | 920 | 30.75 | 972 | 41.06 | 1019 | 51.72 | 1064 | 62.80 | 1108 | 74.21 | 1151 | 85.95 | 1193 | 98.07 | 1233 | 110.36 | 1306 | 134.97 | | |

Class I = Max. 823 RPM Class II = Max. 1070 RPM Class III = Max. 1358 RPM *APF491*

**Legend:**

Class I = First white section
Class II = Blue shaded section
Class III = White section after blue section
Underlined figures indicate Maximum Static Efficiency

v3.5F

**Reference Specifications**

Project : Hearst Tower — Ref. US -06

Model name:16NK71 — 3 units

| | | | | | |
|---|---|---|---|---|---|
| Cooling capacity | | | | 600 | USRT |
| Chilled water | Inlet temperature | | | 55.0 | °F |
| | Outlet temperature | | | 41.0 | °F |
| | Flow rate | | | 1,029 | USgpm |
| | Pressure drop | | | 53.3 | ft.$H_2O$ |
| | Pass number (EVAP) | | | 5 | |
| | Connection diameter(ANSI) | | | 8 | inch |
| | Max. working pressure | | | 150 | psig |
| | Fouling factor | | | 0.0001 | $ft^2h°F/Btu$ |
| | Brine | | | 0.0 | % |
| Cooling water | Inlet temperature | | | 85.0 | °F |
| | Outlet temperature | | | 100.0 | °F |
| | Flow rate | | | 1,731 | USgpm |
| | Press. drop | | | 21.2 | ft.$H_2O$ |
| | Pass number (ABS/COND) | | | 3 + 2 | |
| | Connection diameter(ANSI) | | | 16 | inch |
| | Max. working pressure | | | 150 | psig |
| | Fouling factor | | | 0.00025 | $ft^2h°F/Btu$ |
| | Brine | | | 0.0 | % |
| Steam line | Condition | | | Saturated | |
| | Supply pressure | | | 114 | psig |
| | Consumption | | | 5,420 | lb/h |
| | Steam inlet connection(ANSI) | | | 6 | inch |
| | Drain outlet connection(ANSI) | | | 2-1/2 | inch |
| | Max. working pressure | | | 114 | psig |
| Electric | Power source | 3 Phase | 460 V | 60 | Hz |
| | Electric consumption | | 20.0813 kW | 23.6 | kVA |
| | Total electric current | | | 30.0 | A |
| | Motor output No.1 ABS pump | | 9.0 kW | 20.0 | A |
| | No.2 ABS pump | | 1.5 kW | 4.6 | A |
| | Refrigerant pump | | 1.3 kW | 3.1 | A |
| | Purge pump | | 0.75 kW | 1.45 | A |
| Overall dimensio | Length (L) | | | 254 | inch |
| | Width (W) | | | 130 | inch |
| | Height (H) | | | 136 | inch |
| | Space of tube removal | | | 237 | inch |
| Weight | Operation weight | | | 83,800 | lbs |
| | Max. shipping weight | | | 61,300 | lbs |
| | Total shipping weight | | | 72,800 | lbs |
| Shipping method | | | | 1 | section |

Note) 1) Electric consumption kW = 0.85 x KVA
2)Rated in accordance with ARI-560.