

# CASE STUDY HOSPITAL



**MAR CRAFT**  
CUSTOM HVAC SYSTEMS

## **MAR CRAFT CUSTOM HVAC SYSTEMS CREATES MULTIPLE TRU-CUSTOM SOLUTIONS FOR WASHINGTON UNIVERSITY & BARNES JEWISH HOSPITAL**

APPLICATION:..... University / Hospital

LOCATION:..... Missouri

CUSTOM HVAC SYSTEM SIZE:..... 42,000 CFM

### **MAR CRAFT TOTAL SOLUTION**

For 23 straight years, the client's hospital and the university have ranked among the best hospitals in America by U.S. News and World Report, including a top ranking in the 2015 Best Hospitals issue.

In 2015, as the hospital grew and expanded their footprint in the city and called on MarCraft Custom HVAC to provide a solution for their campus renewal project that is transforming the medical center through new construction and renovations.

Marcraft's indoor systems included 11 AHU's and 11 RAHU's with the RAHU's sitting above the AHU's. The penthouse system includes 2 AHU's and 2 RAHU's. Each level of the penthouse system was 2,300 sq. ft., making the total solution 4,600 sq. ft. Also included in the Penthouse system was a mixing box, a mixed air plenum, a mechanical room, a piping room, various platforms, and an open area with a hoist and ladders for accessing the platforms.

MarCraft's overall solution provided the hospitals with over 20 custom HVAC systems for their North and South Tower buildings in September of 2015 through February of 2016.

### **NOTEWORTHY**

- The University is the premier private University in the city area and is nationally recognized.
- The hospital is consistently in the top ten hospitals nationwide.
- MarCraft has many other AHUs installed and operational at the BJC campus that are not included in this case study.
- These units are full custom units built to a nationally recognized Consulting Engineering firm's specifications and expectations. Many specified requirements were based on getting LEED points for Green Building Practices.



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(800) 325-1303

11880 Dorsett Road,  
St. Louis, MO 63043

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## INDOOR HVAC SYSTEMS SPECIFICS: CONSTRUCTION

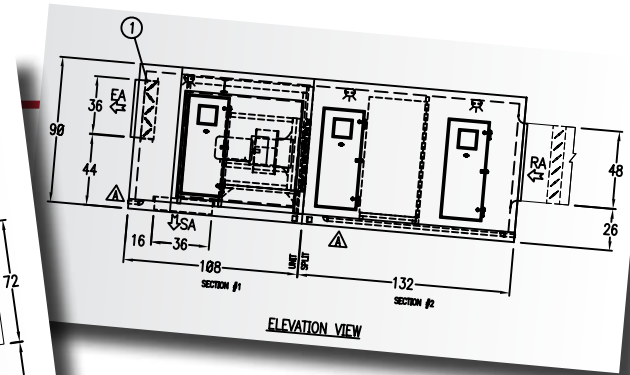
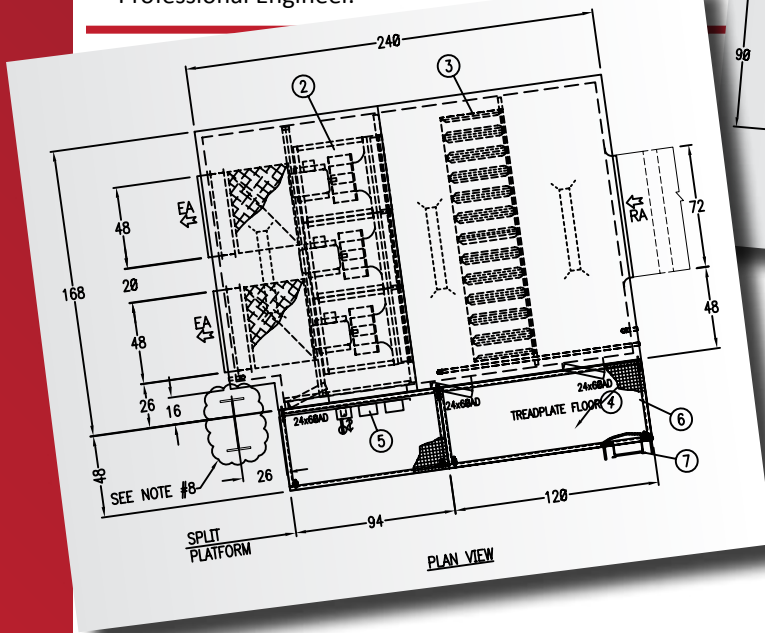
- 4" double wall casing w/ 3 pcf fiberglass insulation and Thermal Break. Inner and outside are G90 Galvanized, Exterior is not painted.
- Unit Base is 8" Structural C-Channel w/ C-Channel Cross bracing fully welded. 6" of Fiberglass insulation with exception of Cooling Coil Section which is 6" of Polyurethane Foam.
- Floor is 3/16" Aluminum Treadplate with full perimeter 3" lip. Floor is fully welded.
- Access Doors 4" w/ extruded aluminum frames, panels that match casing, Allegis Handle/Latching system, Viewport w/ dual Thermal Pane Safety Glass, Stainless Steel Continuous Piano Style Hinge, Dual Seal Sealing System for minimal leakage, Foam Insulation, and Thermal Break.
- AHUs are shipped in five sections, the RAHUs in three sections.
- Units meet specified Seismic Requirements and include calculations completed by a registered Professional Engineer.

## SPECIFICATIONS

- 42,000 CFM Supply Air, 14,000 CFM Min. OA for each AHU
- 34,000 CFM capability for each RAHU
- Units capable of 100% Economizer mode.

## FACTORY TESTING

- Electrical and/or Pneumatic component integrity testing including hi-pot electrical circuit testing.
- Fan Assembly testing and balancing.
- Coil Leak Tests.
- Optional Tests completed;
- Leakage and deflection testing. Leakage done both Positive and Negative.
  1. Air-Flow Testing
  2. Sound Testing



1. EA DAMPER
2. SUPPLY FAN ASSEMBLY
3. SOUND ATTENUATOR
4. SMOKE DAMPER
5. NON-FUSED DISCONNECT SWITCH
6. PLATFORM
7. ACCESS LADDER

## COMPONENTS

- Min. OA, OA, RA, EX, & Isolation (Smoke) Dampers to meet 12" wc pressure to 48" damper width. Dampers are Aluminum.
- Blender Wall after the mixing box.
- Filters are 2" 30% MERV-8 & 12" 65% MERV 11 Cartridge Type filters. Extra Filter wall is included for future cartridge type Carbon Filters.
- Heating Coil Assemblies – Hot Water, Copper Tube 0.035" Wall, Aluminum Fin, 0.008" Thick, Casing 304 SS, 2 Row, 7 Fin, 304 SS Slide Racks for coil removal.
- Dispersion grid type 304 SS Steam Humidifier with Floor Drain Pans above the floor and split into two pans side to side. Pan Drains are piped together and exit on one side of the unit. Control Valves, Traps, and Strainers ship loose for install by others.
- Cooling Coil Assemblies – Chilled Water, same as Heating Coil except; 8 Row, 9 Fin, Floor Drain Pans are above the floor and split into two pans side to side. Pan Drains are piped together and exit on one side of the unit.
- UV-C Lighting directly downstream of the cooling

coils, wired in conduit to externally mounted J-Box.

- Fan Array Assemblies that consist of stackable cube type Plenum Direct Drive Fans w/ perforated panels for sound control. Included are Aluminum Wheels - 12 blade Air Foil Backward Incline, TEFC Premium Efficiency motors inverter rated, Backdraft Dampers, Piezo Rings, and Protective Screens. Fans are wired in conduit to individual externally mounted Non-Fused Safety Type Disconnect Switches. A motor removal beam is included in the fan section.
- Sound Attenuators are included before the final filters in the AHUs and before the fans on the Return AHUs. Galvanized Steel Construction.
- Final Filter wall, 99.99% HEPA Filters, 1.0"wc initial pressure drop. HEPA filter frames 304 SS.
- Service Platforms, Ladders, and Safety Handrails for access to the RAHUs that are installed on top the AHUs. Ship disassembled for reassembly and installation on site by others.
- Units have 4' vaporproof fluorescent light fixtures with 2 x T8 bulbs, fast start.



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# CASE STUDY BJC

## PENTHOUSE ROOFTOP HVAC SYSTEM SPECIFICS:

(The same as indoor system except as indicated below)

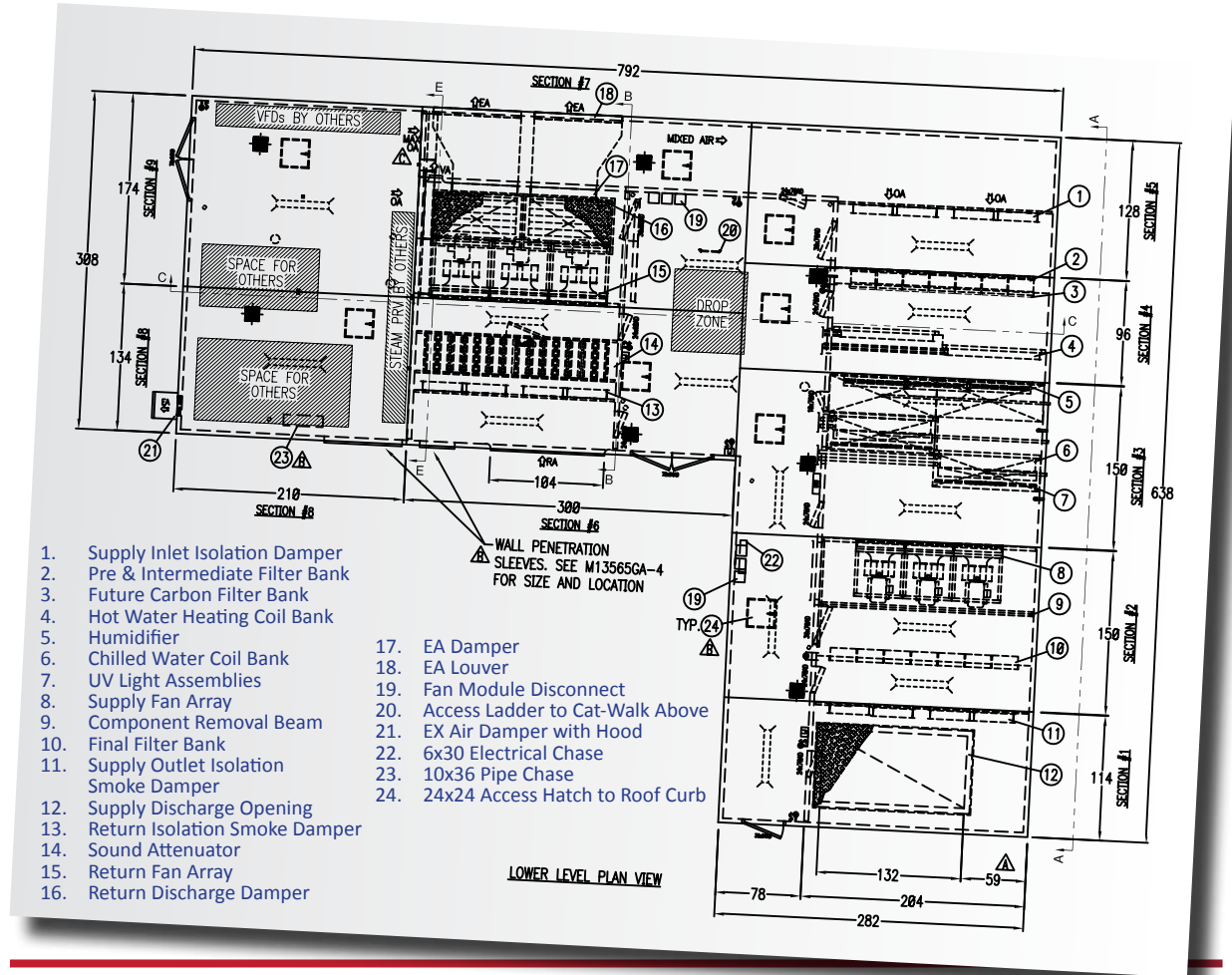
### CONSTRUCTION

- RAHUs are in a three level section with one RAHU both Top and Bottom and Mixing Box/Piping area in-between. Mixing Box feeds air into common Mixed Air Plenum that flows to both AHUs. RAHU-2 on top has an integral walking platform for access and maintenance.
- AHUs are stacked on top of one another. AHU-2 on top has an integral walking platform for access and maintenance.
- Walking platform flooring is the same 3/16" Fully welded Aluminum Treadplate that is in the AHUs/RAHUs.
- An area between the RAHUs and the AHUs is open and full height with a hoist for bringing components to the upper tier units. There is a ladder to access the upper sections and safety handrails all around.

- At one end of the Penthouse is an area that houses a Mechanical Room in the lower section and an OA plenum in the upper. The Mechanical Room will house electrical, control, and piping related items and is conditioned by the RAHUs.
- The Penthouse is "L" shaped and is comprised of 18 shippable sections. The tallest of which is 170"H. The widest is 174"W. The total usable square footage of the unit is around 4600 sq.ft..

### SPECIFICATIONS

- 54,000 CFM Supply Air,
- 18,000 CFM Min. OA for each AHU
- 42,000 CFM capability for each RAHU



### COMPONENTS

- RAHUs are in a three level section with one RAHU both Top and Bottom and Mixing Box/Piping area in-between. Mixing Box feeds air into common Mixed Air Plenum that flows to both AHUs. RAHU-2 on top has an integral walking platform for access and maintenance.
- AHUs are stacked on top of one another. AHU-2 on top has an integral walking platform for access and maintenance.
- Walking platform flooring is the same 3/16" Fully welded Aluminum Treadplate that is in the AHUs/RAHUs.

- An area between the RAHUs and the AHUs is open and full height with a hoist for bringing components to the upper tier units. There is a ladder to access the upper sections and safety handrails all around.
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Marcraft Custom HVAC Systems are Manufactured in the USA



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