Section 23 36 19 CHILLED BEAMS

## PART 1 - GENERAL

1.01 SUMMARY

A. Furnish and install chilled beams as specified herein and as indicated on the drawings, complete with all hardware and accessories required for a complete and operating system, and in accordance with the requirements of the Contract Documents.

B. Section includes Active and Passive Chilled Beams as scheduled on drawings.

1.02 RELATED SECTIONS

A. Common work results for HVAC.

B. Common work results for Electrical.

1.03 SUBMITTALS

A. Provide Submittals in accordance with administrative requirements.

B. Provide selection data report showing

1. Model numbers

2. Three-dimensional room views indicating chilled beam placement and resulting isovels

3. Dimensions: Air connection size, module size, water connection size, unit weight, water volume in coil

4. Factory settings: capacity setup, air flow configuration, nozzle settings

5. Performance, based on stated room temperature, primary air temperature and flow rate, water supply temperature, water flow rate, maximum occupied zone air velocity: temperature-dependent minimum distances required between units and from units to nearest wall; induced airflow rate; nozzle pressure; sound level (NC) at maximum, and minimum occupied airflow; total air pressure drop, calculated outlet air temperature , certified capacity (Btuh) with overall chilled beam dimensions, air duct connection location and sizes, water pipe connection locations and sizes, electrical connections and locations, construction and finishes.

6. Provide schedule showing the following parameters for each chilled beam: location, quantity, model, module size, nozzle setting, capacity setting, certified cooling capacity and pressure drop of coil at indicated delta-T and water flow rate, cooling capacity of primary air at indicated delta-T and airflow rate, pressure drop across the nozzles and the chilled beam sound level (NC.)

7. Provide certified Environmental Product Declaration.

1.04 QUALITY ASSURANCE

A. Reference Codes and Standards

B. EUROVENT 2/C/001-2007 “Rating Standard for Active Chilled Beams.”

C. EN 15116, December 2004, “Determination of cooling capacity of Active Chilled Beams.”

D. ISO 5135, “Acoustics -- Determination of sound power levels of noise from air-terminal devices, air-terminal units, dampers and valves by measurement in a reverberation room.”

E. ISO 3741, “Acoustics -- Determination of sound power levels of noise sources using sound pressure -- Precision methods for reverberation rooms.”

F. ANSI/ASHRAE Standard 55-2004, “Thermal Environmental Conditions for Human Occupancy.”

1.05 DELIVERY, STORAGE AND HANDLING

A. Storage and protection

1. Store equipment away from construction areas where it may be damaged and protected from harmful weather conditions.

2. Do not remove factory packaging material until chilled beam is ready to be installed.

1.06 WARRANTY

A. Manufacturer to provide minimum one year parts warranty from date of startup or 18 months from date of shipment.

## PART 2 – PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with project plans and specifications the following manufacturers are approved to supply products:

1.Swegon

2.02 CONFIGURATION

A. Where indicated on drawings, supply 2-way throw active chilled beams designed to fit in a 24” ceiling grid, suspended below the ceiling or surface mounted to the ceiling.

B. Where indicated on drawings, supply 4-way throw active chilled beams designed to fit in a 24” ceiling grid, suspended below the ceiling or surface mounted to the ceiling.

C. Where indicated on drawings, supply 1-way throw active chilled beams designed to be mounted in sidewall or bulkhead.

D. Where indicated on drawings, supply passive chilled beams designed to be suspended below the ceiling.

2.03 CONSTRUCTION

A. Chilled beam casing to be constructed of high-strength sheet steel, designed and mechanically assembled to lie flat in the ceiling and prevent sagging when installed according to the manufacturer’s instructions.

B. Finish room-side face plate, frame, and discharge shall be RAL-9003 white, or other finish as specified by the project architect. Manufacturer to supply samples of optional colors.

C. Provide beams with coil access for cleaning and maintenance by means of hinged or removable faceplates. [Provide 4-way chilled beams with drop-down coil allowing access to both sides of the coil.] Include safety cables.

D. Faceplate for 2-way and 4-way chilled beams shall be perforated with circular holes arranged in a triangular hole pattern. [PARASOL, PARASOL Zenith only] Provide chilled beams with Pattern PD (circular holes arranged in square pattern with graduated border) or Pattern PE (square holes arranged in square pattern with graduated border).

E. [PARAGON only] Adjustable-pattern discharge and fixed-pattern return air grilles for 1-way chilled beams shall ship loose. Return grilles shall allow access to the coil for cleaning. The grille finish shall be RAL 9003 white.

F. Supply slotted brackets for suspension by threaded rod by others or by the manufacturer. Slots to provide lateral flexibility during installation.

G. Induction air inlet and chilled beam discharge slot to be sealed with adhesive film, and the supply air connection shall be covered at the factory to prevent shipping, handling, and construction dust and debris from entering the chilled beam.

H. [PARASOL Zenith only] Where indicated that chilled beams are to be suspended below the ceiling, furnish manufacturer’s Design kit and Coanda wings to conceal chilled beam components while still allowing access, and to provide Coanda effect in the absence of an adjacent ceiling. The design kit and Coanda frame shall be finished to match the chilled beam.

I. [ADRIATIC models only] Where indicated, provide KA accessory casing to conceal the primary air duct and water pipes. Include fittings to facilitate vertical connection of primary air duct and water pipes. The casing finish shall match the chilled beam.

J. [PACIFIC only] Where indicated, provide 2-way chilled beams with Model SA integral auxiliary supply air diffuser. The diffuser shall have the same appearance and finish as the beam.

K. [PACIFIC only] Where indicated, provide chilled beams with model EA return air device with the same appearance and finish as chilled beams. The return air device shall be integrated into the supply air beam.

2.04 COIL

1. Chilled and hot water coils shall be seamless copper tubing expanded into aluminum fins. Coils shall meet scheduled capacity. Coils shall be rated for 250 PSI operating pressure. Supply and return connections shall be at the same end of the unit.
2. Chilled beam water connections shall be copper, ½” NPT, recessed from chilled beam casing and clearly mapped on a label fixed to the chilled beam.

2.05 AIRFLOW CONTROL

1. Active beams shall include field-adjustable induction nozzles.
[PACIFIC and PARASOL models only] Nozzles shall be mechanically formed into sheet metal and be of fixed size to correlate with k-factors indicated on the Chilled Beam Schedule. Nozzles shall be factory set according to the Chilled Beam Schedule and shall be field adjustable by means of a sliding plate.
[ADRIATIC, PARAGON, and PARASOL Zenith models only] Nozzles shall be mechanically formed into sheet metal. Provide indexed knobs with linkage to sliding plate for field adjustment of nozzles. K factor values shall be provided in the submittal. Where indicated on drawings, provide beams with actuators for continual adjustment of the nozzles according to a control signal from BMS or room controller by others. Actuators shall be powered with 24 VAC and accept a 0-10Vdc signal to adjust the k factor to achieve VAV/DCV control. Control signal shall be provided by work of other sections.
2. Active chilled beams integrated into the ceiling shall include field-adjustable air pattern control, accomplished by means of factory-installed directional vanes, indexed over the range of -40 to +40 degrees from horizontal in 10-degree fixed increments. . [PARAGON only] Horizontal discharge chilled beams shall have field-adjustable horizontal and vertical air pattern control.
3. [ADRIATIC only] Active chilled beams mounted to the bottom of or suspended from the ceiling shall not require Coanda wings to meet the performance scheduled in the submittals.
4. Provide chilled beam with air pressure measurement tap and hose for the purpose of measuring pressure and calculating flow rate. Hose to be accessible from room-side of the chilled beam with faceplate closed. Chilled beam k-factor shall be labeled on chilled beam hose.

2.06 CONTROLS

1. [option – CHILLED BEAM CONTROLS BY OTHERS]
	1. All control valves, actuators, and temperature sensors shall be provided by the controls contractor.
	2. Control devices and operational sequence are the responsibility of the controls contractor as specified in the section titled “Automatic Temperature Controls”.
2. [option – constant volume, control sequence by others]
	1. Constant volume chilled beams shall be supplied with factory-installed:
	2. 24-volt two-way, two-position thermal actuators and control valves wired to a terminal strip.
	3. dewpoint sensor mounted on chilled water coil and wired to a terminal strip.
	4. Supply each constant volume active beam with a Swegon CRP manual commissioning damper shipped loose for field installation in the ductwork. Each damper shall have a locking knob to adjust airflow.
	5. Control devices and operational sequence are the responsibility of the controls contractor as specified in the section titled “Automatic Temperature Controls”.

2.07 ACCESSORIES [delete unnecessary accessories]

1. Supply each beam with 24” steel braided hoses rated for 150 psi. Hoses shall have push-fit ½” NPT connection [option 1/2” NPT compression fitting], [option: supply each chilled beam with ½” NPT fittings, for hoses supplied by others.
2. Include an automatic air vent with a push-on connection for field installation on each beam.

PART 3 – EXECUTION

3.01 INSTALLATION

1. Install according to manufacturer’s instructions and details on drawings.
2. Coordinate installation with ceiling installer to facilitate required access to chilled beam for installation and connection to air and water supply.
3. Plumbing contractor is responsible for connecting chilled beam to water supply, filling, bleeding, and pressure testing, and for assuring the chilled beam design water flows are available for startup and balancing.
4. Balancing to be conducted by an independent agency, as described in Section 1.