**PART 1- GENERAL**

* 1. **Summary**

This section describes the active chilled beams.

**1.02 Submittals**

Submit product data for all items complete with the following information:

1. Operating weights and dimensions of all unit assemblies.

2. Performance data, including sensible and latent cooling capacities, nozzle types, primary and total supply (primary plus induced) airflow rates, chilled (and where applicable hot) water flow rates, noise levels in octave bands, air and water side pressure losses and maximum discharge air throw values.

3. Construction details including manufacturers recommendations for installation, mounting and connection.

**PART 2- PRODUCTS**

**2.01 General**

Materials and products required for the work of this section shall not contain asbestos, polychlorinated biphenyls (PCB) or other hazardous materials identified by the engineer or owner.

**2.02 Design**

1. Furnish and install TITUS CBAC exposed bulkhead active chilled beams of sizes and capacities as indicated on the drawings and within the mechanical equipment schedules. The quantity and length of the beams shall be as shown on the drawings, without EXCEPTION. The beams shall be constructed and delivered to the job site as single units.
2. Diffusers shall be provided with external cabinet wrapper constructed of a minimum 20 gauge galvanized steel. Cabinet shall have pre-punched openings for supply and induction grilles with corresponding grille mounting holes.
3. The bottom of the beam shall incorporate a separate grille for room air induction section, comprised of 50% free area perforated material (*optional linear bar type, louvered type, or eggcrate type*).
4. The diffuser shall be supplied with a supply grille of adjustable, aluminum extruded, louvered airfoil type (*optional linear bar type).*
5. The external cabinet, supply grille and induction grille sections shall be finished in white powder coat paint or as specified by the architect.
6. The beams shall consist of a minimum 20 gauge galvanized steel housing encasing the integral sensible cooling coil and a plenum feeing a series of induction nozzles. A single duct connection shall be provided on either the side or top of the unit. The use of multiple duct connections is NOT ACCEPTABLE.
7. Each beam shall be provided with a pressure tap that may be used to measure the pressure differential between the primary air plenum and the room. Airflow calibration charts that relate this pressure differential reading with the primary and beam supply airflow rates shall be furnished with the beams.
8. Beams shall be provided with connections for either 2 or 4 pipe water connections as indicated on plans and schedules. Four pipe configurations shall require separate supply and return connections for chilled and hot water. The coil shall be mounted horizontally and shall be manufactured with seamless copper tubing (½” outside diameter) with minimum .016 inch wall thickness mechanically fixed to aluminum fins. The aluminum fins shall be limited to no more than ten (10) fins per inch. The coil shall have a working pressure of at least 360 PSI, and be factory tested for leakage at a minimum pressure of 500 PSI. Each chilled beam shall be provided with factory integrated manual air vents. (*OPTIONAL, coil shall be provided with factory integrated drain fittings.)* Unless otherwise specified, coil connections shall be bare copper for field sweating to the water supply circuit. Connections shall face upwards, be located near the left end of the beam (when viewing into the primary air connection). (*OPTIONAL, the chilled water coil shall be provided with NPT male threaded fittings*. *These fittings must be suitable for field connection to a similar NPT female flexible hose spigot and shall be at least 1½” long to facilitate field connection (by others).*
9. Beams shall be delivered clean, flushed and capped to prevent ingress of dirt

**2.03 Performance**

1. All performance shall be in compliance with that shown on the equipment schedule. Acoustical testing shall have been performed in accordance with ASHRAE Standard 200-2015.
2. Coils shall be rated in accordance with ARI Standard 410, but their cooling and heating capacities shall be established in accordance to ASHRAE Standard 200-2015 for the specific application on the inlet side of the submitted chilled beam.
3. Chilled water flow rates to the beams shall be limited to that which results in a maximum ten (10) foot head loss. Water flow velocities through the beam shall not exceed 4 FPS.

**PART 3- EXECUTION**

* 1. **Installation**

1. Coordinate the size, tagging and capacity of the beams to their proper location.
2. Chilled beams shall be independently suspended from the structure above by a four (4) threaded rods of ⅜” diameter (provided by the installing contractor). The upper end of the rods shall be suspended from strut channels that are a) mounted perpendicular to the beam length and b) at least four inches wider than the beam to facilitate relocation of the threaded rods along their length. The beam shall then be positioned above the acoustical ceiling grid and lowered into the grid module by adjusting the nuts connecting the threaded rods to the beam.
3. Before connecting the supply water system(s) to the beams, contractor shall flush the piping system(s) to assure that all debris and other matter have been removed.
4. Contractor shall perform connection of beams to the chilled water circuit by method specified (hard connection using sweated connection or connection using flexible hoses).
5. Flexible connector hoses shall be furnished by others (*optionally by the manufacturer*). Hoses shall be twenty four (12, 18, or 24) inches in length and suitable for operation with a bend radius as small as five (5) inches. Connector hoses shall consist of a PTFE lined hose with a wire braided jacket. The hoses shall be suitable for operation in an environment between -40 and 200˚F, rated for a least 300 PSI and tested for leakage at a minimum pressure of 360 PSI. Contractor shall assure that the chilled water supplying the beams has been properly treated in accordance to BSRIA publication AG 2/93.
6. Contractor shall mount external cabinet using alignment strips and rails provided. Then cabinet access panels shall be installed using supplied tool-less snap-in fasteners.
7. No power or direct control connections shall be required for the operation of the chilled beam.
	1. **Cleaning and Protection**

1. Air and water connections shall be covered before shipment and remain so until final installation. Damaged material due to improper site protection shall be cause for rejection.
2. Clean equipment, repair damaged finishes as required to restore beams to as-new appearance.