

**AIRFIT 2 300**

**Active Chilled Beams**



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## Introduction

The Barcol-Air chilled beam systems are designed to achieve a comfortable indoor climate with low energy consumption and a low ceiling void height. The systems provide cooling, heating, ventilation and humidity control with low noise and minimal maintenance.



## System Technology

Barcol-Air active chilled beams integrate the primary air distribution function with the secondary air heat exchange using a proprietary air nozzle technology to induce secondary room air into the unit and through the heat exchanger before mixing with the primary air. The resulting mixture of primary air and induced secondary room air is then supplied to the room through the contoured diffusers which are designed to keep the air close to the ceiling using the Coanda effect.

Barcol-Air's AIRFIT 2 300 series active chilled beams units are designed with a nominal width of 300 mm to integrate with the ceiling grids of the more popular ceiling configurations. Standard unit lengths are nominally 1,200 mm to 3,000 mm in 300 mm increments but special lengths are also available to match with specific ceiling requirements.

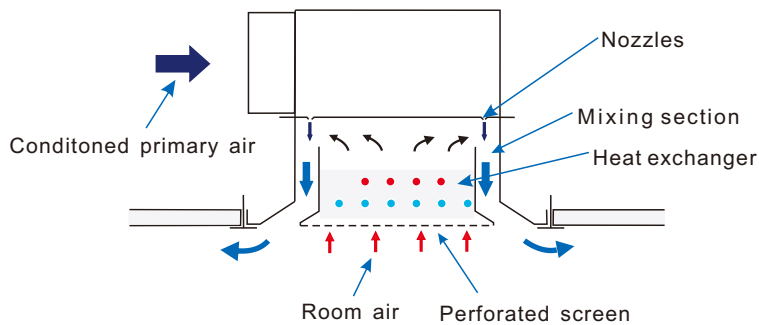


Figure 2: Operating Principal of the Active Chilled Beam

## System Concept

The principle of the active chilled beam system is to use terminal chilled water heat exchangers in the ceiling to offset the room sensible cooling loads or to provide sensible heating. The ventilation and humidity control requirements are taken care of by using separate primary conditioned air supplied by a central air handling unit.

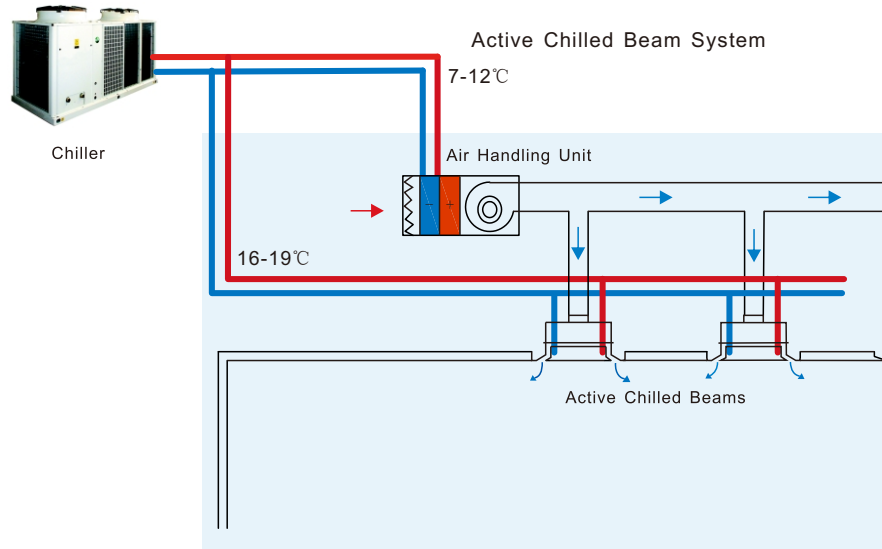


Figure 3: Active Chilled Beam System

Due to the relatively high supply chilled water temperatures, about 16 deg C, the heat exchangers operate dry, avoiding many of the maintenance and health concerns that are associated with other systems that use terminal heat exchangers such as fan coil units.

The system provides large energy savings because the amount of air to be circulated around the building can be reduced to close to that required for ventilation and humidity control only, resulting in large reductions in air handling unit fan power and energy consumption.

Further energy savings result from the use of high chilled water temperatures serving the heat exchangers. This can allow the water chiller to operate at higher water temperatures, improving chiller operating efficiency and energy consumption.

## Air distribution

The specific shape of the supply slot diffusers creates two opposing discharge air flows from the active chilled beam along the suspended ceiling. The velocity of the supply air along the suspended ceiling creates the Coanda-effect whereby velocity differences in the cool air stream press the air stream against the suspended ceiling, thereby extending the air throw and preventing the cool air from dropping into the comfort zone prematurely. It is important, with such air patterns, that the suspended ceiling is flat and free of any obstacles, especially light fixtures situated close to the slots, because these can disturb the Coanda-effect.

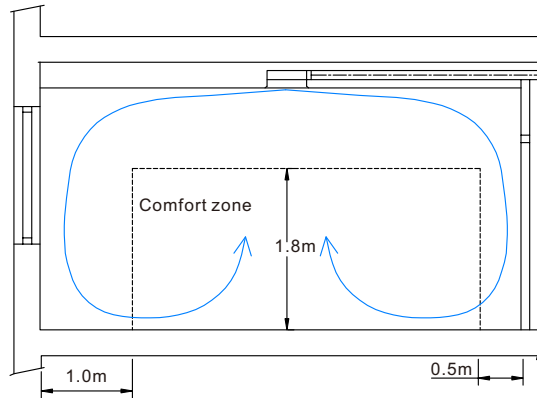


Figure 4: AIRFIT – Air Distribution

## Facade-orientation

Orientation of the active chilled beam with regard to the facade has no influence on the operation. There are two common installation arrangements, perpendicular or parallel to the facade. The choice between perpendicular and parallel will be determined by:

- Aesthetics (fitting into the pattern of the suspended ceiling).
- Level of flexibility to create offices within the floor plan.
- Number of active chilled beams required.
- Available distance for the air throw. The air must have the opportunity to mix with the room air before impinging on a wall or an opposing air stream from another chilled beam.
- Disturbances in the suspended ceiling which might influence air pattern, like lighting fixtures.
- Disturbances in the facade or floor, like radiators or floor convectors that could influence the air pattern.

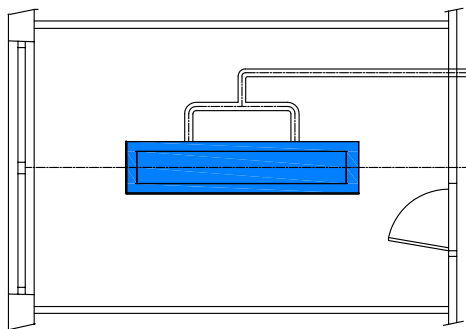


Figure 5: Perpendicular to Facade

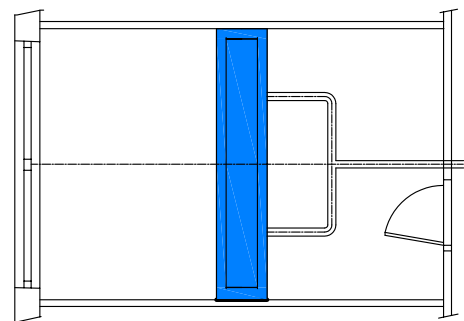


Figure 6: Parallel to Facade

## Product Features

### High capacity with multi choice nozzles

The AIRFIT 2 300 series active chilled beams have a choice of 8 nozzle configurations designed to provide high induction rates for the secondary room air and thereby high cooling and heating capacities. This makes them suitable for application in a building's perimeter zones requiring higher cooling capacities as well as internal zones. Nozzles are factory installed and can be blanked if one side discharge is required.



Figur 7: High Efficiency Air Nozzles

### Low Height:

The AIRFIT 2 300 series has a maximum height of 210 mm allowing the use of reduced height ceiling voids to maximize ceiling heights. Alternatively the building slab to slab height can be reduced allowing more floors in a given building height.

### Flexible Sizes

Units are available with lengths between 1200 mm and 3000 mm to match with most ceiling configurations. Unit lengths can also be tailored to match exact installation requirement.

### Aesthetic Choices

The AIRFIT series can be supplied with perforated return air diffusers or linear slot diffusers to match the aesthetic requirements of the building. Exposed metal surfaces are powder painted. The standard finish colour is RAL 9010 with 20% gloss. Other RAL colours can be supplied to match project requirements. Units can also be supplied with perforated centre diffusers or alternatively diffusers with linear blades.



Figure 8: Perforated Diffuser



Figure 9: Linear Blade Diffuser

1. 颜色与左图一样。  
2. 图片拉窄点，看起来是300宽而不是600宽。

### Simple mounting:

Units can be easily suspended from the concrete slab above using threaded rod or hanging wire support systems to match with metal panel, fiber board or plaster ceilings. Units can also be installed without false ceilings.

### Low noise:

The efficiently shaped nozzles create maximum induction with low sound levels.

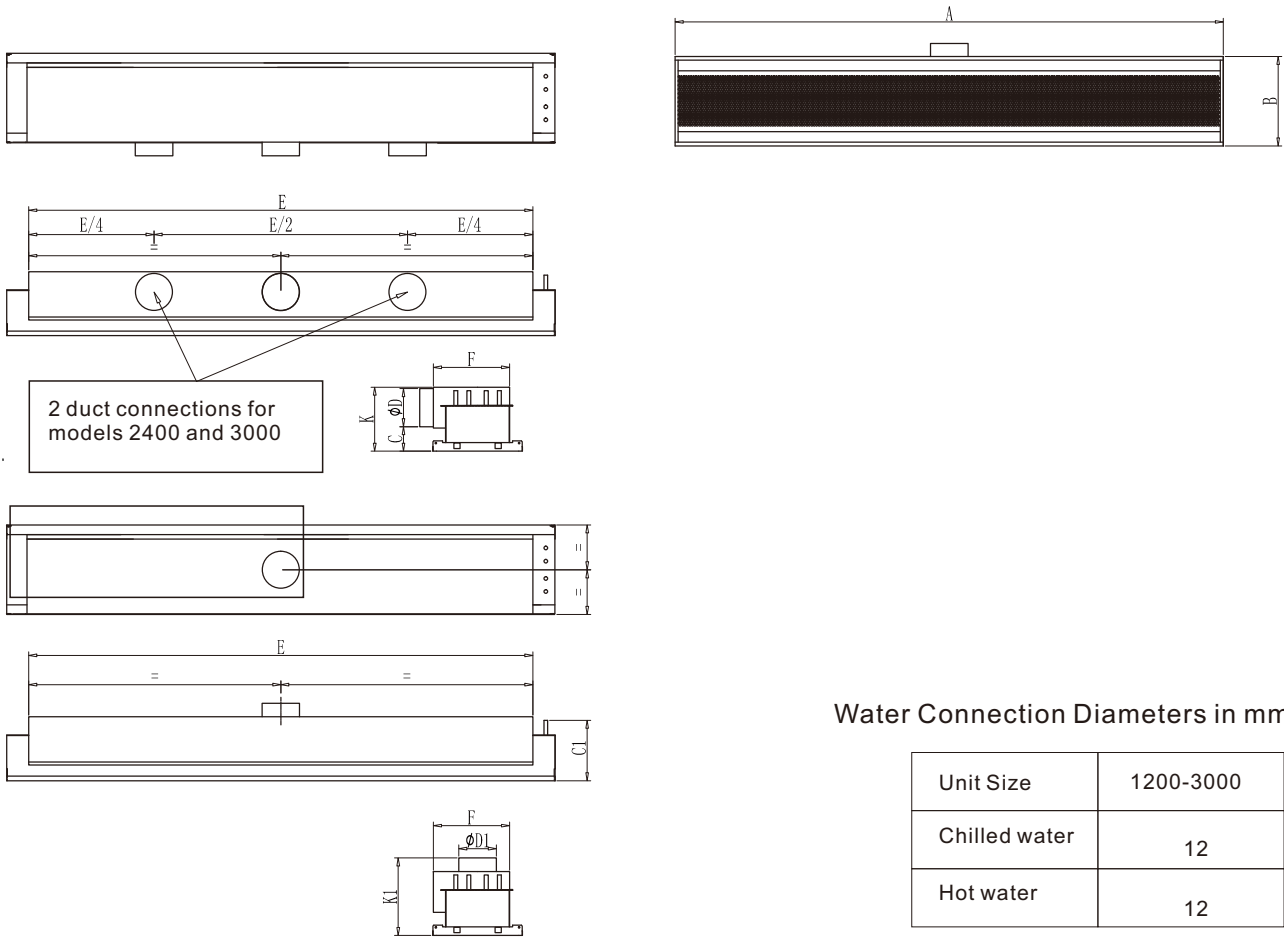
### Low maintenance:

The AIRFIT 2 300 series active chilled beam has no filter, fan, drain pan or any other moving parts and maintenance is limited to cleaning the exposed metal surfaces and cleaning any dust from the heat exchanger every 2 to 5 years depending on the cleanliness of the supply air. The heat exchanger can be easily accessed by dropping down the centre perforated diffuser which is equipped with a safety hanging wires, and then removing any dust with a vacuum cleaner.

### Controls:

The active chilled beam can be supplied with constant air volume controllers for the primary air, water control valves with room control sensors as well as balancing and isolation valves and condensation sensors.

## Dimension AIR-FIT 2 300



Water Connection Diameters in mm

Unit Size	1200-3000
Chilled water	12
Hot water	12

Table1: Dimensional data AIR-FIT 2 300

Size	1200	1500	1800	2400	3000
A	1195	1495	1795	2395	2995
B	295	295	295	295	295
C	80	80	80	80	80
C1	200	200	200	200	200
D	1 x $\varnothing 123$	1 x $\varnothing 123$	1 x $\varnothing 123$	2 x $\varnothing 123$	2 x $\varnothing 123$
D1	1 x $\varnothing 123$	1 x $\varnothing 123$	1 x $\varnothing 123$	1 x $\varnothing 158$	1 x $\varnothing 198$
E	1054	1354	1654	2254	2854
F	250	250	250	250	250
K	210	210	210	210	210
K1	255	255	255	255	255
Weight (kg) <sup>4</sup>	15	18	21	29	36

1. Dimensions in mm.
2. On request, Barcol-Air can provide air connectors on the short side of the plenum.
3. Intermediate lengths are available on request.



Barcol-Air AIRFIT 2 300 series active chilled beams shall be used to compensate for the external and internal heat loads of the building and shall maintain the thermal comfort in the room within the specified comfort and noise criteria.

### Functional description

- Primary air will be supplied by the fresh air handling unit to the chilled beam air plenum box. The primary air shall then pass through the induction nozzles into the mixing section to mix with the induced room air before being distributed into the room by two slot diffusers.
- Induction nozzles shall induce air from the room through the inlet air diffuser and then through the fin and tube cooling/heating heat exchanger before mixing with the primary air and being supplied to the room. The induction nozzles shall be factory installed to provide the required unit capacity with the specified primary airflow, air inlet pressure and noise level.
- Heat exchangers shall be 2-pipe type for cooling only or cooling/heating changeover systems or 4 pipe type for systems with separate cooling and heating circuits.
- The units shall incorporate two linear slot air supply diffusers and shall be designed so that the supply air is discharged horizontally across the ceiling using the Coanda effect to increase the air throw of the units and to ensure the air mixing with the room air above the occupied zone. The inlet air diffuser for the room air shall be perforated or provided with linear bar air inlet grille and shall be easily removable for cleaning the heat exchanger and shall be provided with a safety hanging wires.

### Construction of the chilled beam:

- The primary air plenum box shall be manufactured from galvanized sheet steel and shall have one or more circular air spigot connectors to ensure the inlet air velocity does not exceed 2 m/s. The plenum should be internally insulated to prevent condensation if the primary supply air temperature is less than the surrounding air dew point temperature.
- The nozzle plate and chilled beam body shall be manufactured from galvanized steel with a minimum thickness of 0.8mm.
- The heat exchangers shall be made from seamless copper tubes with aluminum fins and shall have 12 **or 15 mm** diameter water connections depending on unit's size and connections. The heat exchangers shall be suitable to operate at 15 bar working pressure and shall be factory pressure tested at 20 bar pressure. 去掉
- The supply air diffuser and room air inlet diffuser shall be manufactured from galvanized steel with a minimum thickness of 1.0 mm and shall be finished with polyester powder paint to RAL9010 with 20% gloss or with an alternative finish to be specified.

### Dimensions

Width: The chilled beam shall be 295 mm wide.

Length: The units shall be 1200, 1500, 1800, 2400 and 3000 mm long or any intermediate length by special order.

Height: The height of the chilled beam (including distribution plenum) shall not be more than 210mm.

### Installation

The chilled beam shall have 7 mm diameter mounting holes for suspension by 6mm diameter threaded rod or suspension wires.

### Selection

Please contact with our sales representative for individual project selection.

