



# Shopping Mall Air Distribution System

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**Abstract:-** The objective to design Heating, Ventilation & Air conditioning (HVAC) system for a commercial Building, with simultaneously controls its temperature, humidity, cleanliness, proper distribution, noise level, heat load calculation, fresh air, exhaust, duct design, pipe design, equipment selection and layout of accessories such as indoor and outdoor unit of the project. Cooling load will be calculated on E20 form.

**Indeed, today the emphasis is no more on understanding air conditioning ‘products’ but on creating ‘solutions’ and not just solutions, but ‘customized solutions’ that suit specific cooling needs of specific business and establishments**

## I. INTRODUCTION

HVAC (heating, ventilating, and air conditioning; also heating, ventilation, and air conditioning) is the technology of indoor and vehicular environmental comfort. Its goal is to provide thermal comfort and acceptable indoor air quality. HVAC system design is a sub discipline of mechanical engineering, based on the principles of thermodynamics, fluid mechanics, and heat transfer. Refrigeration is sometimes added to the field's abbreviation as HVAC&R or HVACR, or ventilating is dropped as in HACR (such as the designation of HACR-rated circuit breakers).

HVAC is important in the design of medium to large industrial and office buildings such as skyscrapers and in marine environments such as aquariums, where safe and healthy building conditions are regulated with respect to temperature and humidity, using fresh air from outdoors.

Ventilation includes both the exchange of air to the outside as well as circulation of air within the building. It is one of the most important factors for maintaining acceptable indoor air quality in buildings. Methods for ventilating a building may be divided into mechanical/forced and natural types.

## II. RELATED WORK

### Vapor Compression system:

A schematic flow diagram showing the basic components of vapor compress refrigeration system is shown in figure below some typical temperatures for air-conditioning applications are indicated.

Refrigerant fluid circulates through the piping and equipment to the direction shown. There are four processes that occur it flows through the system they are as follows.

## III. BUILDING SURVEY

**Orientation of building-** An accurate survey of the load components of the space to be air-conditioned is a basic requirement for a realistic estimation of cooling and heating loads, the compel and accuracy of this survey is the very foundation of the estimation, and its importance cannot be Mechanical and architectural drawingsThe following physical aspects must be considered.

**Orientation of building-** Location of the space to be air-conditioned with respect to Compass points-sun and wind effects. Nearby permanent structures-shading effects.

Reflective surfaces- water, sand and parking lots etc.

**Use if space(s)-** Office, Hospital, departmental store, specialty shop, machine shop and factory assembly plant etc.

**Physical dimensions of spaces (s) -** Length, width and height.

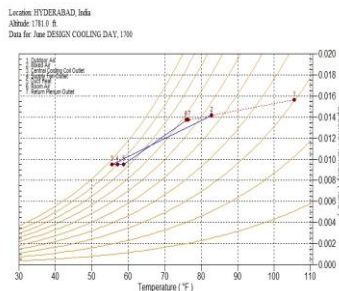
**Ceiling height-** Floor to floor height, floor to ceiling, clearance between suspended ceiling and beams.

- **Physical dimensions of spaces (s) -** Length, width and height.

- **Ceiling height-** Floor to floor height, floor to ceiling, clearance between suspended ceiling and beams.
- **Columns and beams-** size, depth also knee braces.
- **Construction materials-** Materials and thickness of wall, roof ceiling, floor and partitions and their relative's position in the structure.
- **Surrounding Conditions-** Exterior color of walls and roof shaded by adjacent building or sunlight space

**Doors-** Location, types, size and frequency of use.

- **Stairways, elevators and escalators-** Location temperature of space if open unconditioned area. Horsepower of machinery, ventilated or not.
- **People-** Number, duration of occupancy, nature of activity any special concentration. At times, it is required to estimate the number of people on the basis of square feet per person, or on average traffic.
- **Lighting, wattage at peak, Type-** Incandescent, fluorescent, recessed, exposed, if the lights are recessed, the type of air flow over the lights, exhaust return or supply, should be anticipated. At times, it is required to estimate the wattage on a basis of watts per sq. ft due to lack of extract information.
- **Motors-** location nameplate and brake horse power, and usage. The latter is of great significance and should be carefully evaluated. The power input or electric motors is not necessarily equal to the rated horsepower divided by the motor efficiency, frequently these motors may be operating under a continuous overload, or may be operating at less than rated capacity. It is always advisable to measure the power input wherever possible. This is especially important for industrial installation where the motor machine load is normally a major portion of the cooling load.



DESIGNATION	RECOMMENDED VELOCITIES IN M/MIN		
	Residences	Schools, Theatres and	Industrial building
Outdoor air	150	150	150
Filters	75	90	105
Heating coils	135	150	180
Air washers	150	150	150
Fan outlets	300 – 480	400 -	480 –
Main ducts	200 – 300	300 –	350 –
Branch ducts	180	180 –	240 –
Branch risers	150	180 –	240

#### IV. CONCLUSION

Based on the inputs & room data sheets and data Summary sheet the projected TONS will be calculated. To offset this load we propose to provide Air cooled Chillers with a standby option. Three will be as duty chiller while other one will be as standby.

The Air cooled Chillers and the pumps will be located in the Chiller plant room assigned for the purpose on the Roof Deck floor. The plant room will be duly ventilated. The FAN COIL UNITS' will also be located on the Roof Deck Floor.

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