

CLIENT OR COMPANY LOGO

THE PROJECT NAME

HVAC SYSTEM DESIGN REPORT



ISSUED FOR CONSTRUCTION

PREPARED BY:



HVAC SIMPLIFIED™

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1. INTRODUCTION

The document presents a summary of important and pertinent points, required to ensure consistency, conformity and quality of HVAC design. The designer or design contractor shall provide detail engineering of the complete HVAC system that includes but not limited to cooling load calculations, capacities & selection of HVAC equipment, specifications and associated duct works, chilled water piping, refrigerant piping & accessories etc. The design contractor shall comply with international and local codes & standards for detail engineering of HVAC system and shall be designed and constructed for **PROJECT NAME**.

The overall philosophy of the design shall be to satisfy human comfort and the required conditions for the safety, installed equipment and operating requirements.

2. SCOPE

The HVAC project scope of work shall consist of providing new HVAC equipment and systems as described here within. This design basis is based on the relevant Standards and Codes of Practice listed in the specified sections. The design contractor shall ensure that the following objectives are incorporated into the design:

- An economic 'fit for purpose' design.
- Consistency and standardization of design.
- Health, safety and environmental arrangements.

Design Contractor shall review, verify and finalize the design of these facilities.

3. CODES & STANDARDS

The following latest editions of codes & standards were followed in preparing the preliminary HVAC calculations, selecting the systems, sizing the equipment and preparing the HVAC conceptual design drawings for the **PROJECT NAME**.

3.1 International Codes & Standards

- International Mechanical Code (IMC)
- National Fire Protection Association (NFPA)
- American Society for Testing Materials (ASTM)
- American National Standards Institute Inc. (ANSI)
- American Society of Heating Ventilation Air Conditioning Engineers (ASHRAE)
- Air Conditioning and Refrigeration Institute (ARI)
- Sheet Metal and Air Conditioning Contractor's National Association (SMACNA)
- OSHA - Occupational Noise Exposure
- ANSI S1.4 - Specification for Sound Level Meters

3.2 Local Standards

- ANSI S1.4 - Specification for Sound Level Meters

4. DESIGN CONDITIONS

Location:	Inida
Latitude:	2X°XX' North
Longitude:	3X°0X' East
Altitude above sea level:	XX ft.

4.1 Design Outdoor Conditions

The following design outdoor conditions as per **STANDARDS** are utilized in carrying out the preliminary HVAC calculations.

Summer design Dry bulb Temperature : 115°F
 Mean coincident Wet bulb Temperature : 75°F
 Winter design Dry bulb Temperature : 59°F
 Mean Daily range : 14°F
 Wind speed/Direction : 93 mph / WNW

4.2 Indoor Design Conditions

The following table shows the indoor design conditions that shall be maintained in the building.

Table 1 Indoor Design Conditions

Space No.	Space Name	Summer		Winter		Remarks
		Temp (°F DBT)	Relative Humidity (%)	Temp (°F DBT)	Relative Humidity (%)	
1	Living Areas & Corridors	75 ± 2	50 ± 10	68 ± 2	30	
2	Bed Rooms	75 ± 2	50 ± 10	68 ± 2	30	
3	Mechanical Rooms	80 ± 2	-	-	-	Note A
4	Electrical Rooms	75 ± 2	-	-	-	Note A
5	Telecom Rooms	72 ± 2	50 ± 10	72 ± 2	30	Note A

Note A: Winter Heating Not Required.

5. BUILDING DESCRIPTION

The **PROJECT NAME** units are located in XXXX campus in XXXX, India. Each housing unit is two duplex consists of 2 living areas, 4 bed rooms, kitchens & toilets. U-values for walls and roof are assumed as 0.1 Btu / (h.ft²°F) maximum for the sake of heat load calculations. However, the detail design contractor shall determine the exact U-values based on the building construction type & materials.

6. DESCRIPTION OF HVAC SYSTEM

The HVAC System for the **PROJECT NAME** units are supplied by district cooling, the Variable Flow Distributed Secondary Chilled Water Pumps located at buildings A mechanical room, chilled water piping, valves and associated accessories. Chillers, Pumps, expansion tanks, air separator and chemical dosing tanks shall be located outside the buildings in the chiller yard.

The buildings shall be fully air conditioned by providing chilled water fan coil units (FCU) located in various units of the buildings for personnel comfort & independent ON/OFF and temperature control (cooling/heating) by space temperature sensors

located in the living areas & bed rooms. Chilled water distribution to the FCUs shall be variable flow and can be controlled through 2-way control valve located on the return side of cooling coil.

Supply air distribution shall be ducted while return is through plenum space above the ceiling, return air bell mouth duct distribution shall be ducted if required as indicate on the design drawings, return air shall be through ceiling/side wall return air registers/diffusers located within the space. All ducts shall be properly insulated.

Centrifugal ceiling mounted direct driven exhaust fans and ductworks shall be provided to exhaust air from toilets & laundry area, exhaust fan shall comply as technical specification section 15860, equipment and schedule and as indicated on the design drawings. The supply & return ductworks shall be insulated and access doors, hangers and all ductwork accessories shall be provided.

Fire dampers shall be installed in all fire rated walls that are identified on architectural drawings.

The chilled water distribution system shall consist of insulated steel. Isolation valves shall be installed at all equipment connections and all branch lines. All equipment shall be connected with hose connections or flexible connectors for vibration isolation. All piping shall be sized to reduce noise and vibration to allow for quiet operation. Secondary chilled water pipe work shall be routed from the mechanical room between Heat Exchangers, Chilled Water Pumps and Fan Coil Units.

7. DUCTWORK SIZING

All supply, return and exhaust ductwork have been sized according to the Equal Friction calculation method at 0.08 (in WG/100ft).

8. CHILLED WATER DISTRIBUTION

8.1 Chilled Water Pipe Sizing

Chilled Water supply and return piping is sized based ASHRAE chapter 22.5, velocity limit of 4 fps up to 2 in. pipe and smaller, and pressure drop limit of 4ft water/100ft for piping over 2 in.

8.2 Chilled Water Temperature

Chilled Water HVAC equipment selection are based on design supply chilled water temperature = 43.7°F and return chilled water temperature = 59.7°F.

9. ACOUSTIC CALCULATIONS

9.1 Noise Control

Noise control shall be designed to comply with the requirements of OSHA & ANSI standards.

The area noise level ranges specified shall not be exceeded by noise generated by the air conditioning equipment or systems.

All air conditioning equipment shall be selected to provide quiet and efficient operation. The selection of equipment shall be based on the lower level of the range stated as a

target value. Due regard shall be given to the additive effect of multiple noise sources within the spaces when considering the overall noise level to be achieved.

Where equipment noise levels cannot be achieved below the required level, duct or equipment mounted sound attenuators shall be used. Duct mounted attenuators shall be complete with bull noses and tapered exits to avoid high air pressure drops and regenerated noise.

Sound insulation material shall not be installed as internal linings to air conditioning and ventilation ductwork.

Where sound insulation is required to reduce noise break-in or out of a system, this shall be fixed to the outside of the ductwork, combined where necessary with the thermal insulation and vapor sealing requirements.

Fluid velocities in ducts and pipes shall be selected to ensure that flow generated noise does not cause the specified noise levels of the areas, through which they are routed, to be exceeded.

9.2 Vibration

Equipment design and selection shall minimize the generation of vibration.

All motive equipment shall be isolated from the building structure by the use of anti-vibration mountings, with an isolation efficiency of not less than 98%. These mountings shall be connected to the rest of the system, in which they are installed, with suitable flexible connections designed to minimize the transmission of vibration. Where necessary, in critical areas, the pipe work and ductwork shall be supported from adjustable spring hangers.

Anti-vibration mountings shall be of the spring, rubber in shear, or a combination of both to suit the vibration frequencies to be isolated. Spring mountings shall be of the enclosed type (with inspection slots) suitable for retaining the spring in position on failure.

Where equipment produces excessive out of balance forces, the equipment shall be mounted on inertial blocks, with the anti-vibration mountings supporting the blocks.

10. DUCT WORK AND PIPE WORK

Ductwork shall be designed, fabricated and installed in accordance with SMACNA standards.

All ductwork and pipe work passing through building fire/smoke walls, floors, etc., shall have the required rated fire/smoke stop installed, the rating shall be as stated on the building architectural drawings.

Ductwork & pipe work shall not cross above electrical or instrumentation cubicles.

11. INSULATION

Insulation shall be applied for the following purposes,

- Conservation of energy
- Personnel protection
- Acoustic protection
- Condensation prevention

Ducts and refrigerant pipes shall be insulated in accordance with SMACNA, ASHRAE associated references.

Rigid closed cell phenolic foam insulation sections shall be installed on pipe work and duct work to support the service. Duct and pipe work support shall be installed on the outside of the insulation. Fiberglass shall not be used as insulation.

Pipe work and ducts exposed in HVAC plant rooms or exposed in room areas shall be finished with aluminum jacket. External services exposed to the ambient shall be protected with an all-purpose weatherproof jacket.

12. CONTROL SYSTEM

The HVAC control scope shall include but not limited to the supply, installation, and test and commissioning of the HVAC System for the respective buildings in accordance with ASHRAE and applicable codes and standards and shall comply with project technical specification.

13. TESTING, ADJUSTING AND BALANCING

The Contractor shall perform the air conditioning balancing in accordance with applicable codes and Standards, contractor shall provide all test equipment's required to perform the work. Testing, Adjusting and balancing shall be accordance with project technical specification.