

**LAWRENCE SCHOOL
BARNES HALL
SITE AT SANAWAR**

DESIGN BASIS REPORT

FOR

HVAC

DATE : R0- April 27, 2026

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A) INTRODUCTION:

1) General:

The proposed building use for Auditorium.

Air Conditioned Area Statement Equipment and Lighting Detail:-

ZONE	AREA	OCCUPANCY	EQPT	LIGHT
	SQFT	Nos.	kW	W/sft
STAGE	1044	30	20	0
AUDITORIUM	1861	190	20	0
AUDITORIUM BALCONY	1001	64	0	1
AUDITORIUM LOWER LVL	699	30	0	1
AV ROOM	188	2	8	1.5

Services-

1) Air-Conditioning

Detailed elaboration of above services is stated (in different sequence) in Respective sections of the report.

1 GENERAL DESIGN PARAMETERS

Design is based on following assumptions:

B) HVAC SYSTEM

1. PREAMBLE

Project objectives

The project objective is to provide an efficient air distribution system to satisfy the requirements of the occupants including compliance to all statutory regulations.

Broad Concept of Services

The Services Systems for the project have been conceptualized based on the Acceptable design standards to produce a concept which is an integrated whole. Conservation Of energy, optimization of resources, eco-friendliness and State of the art technology shall be The key factors in the design concept to ensure least downtime and reduce maintenance hassles.

MODE OF OPERATION/PHILOSOPHY OF THE SYSTEM

We propose Air-cooled Inverter Scroll Chiller and Heat Pump with Chilled Water Ceiling Suspended AHU in all area. The location of chiller proposed on top of the Lift block as suggested.

Also we proposed the smoke extract system in case of fire for removing hazardous smoke from inside of auditorium.

The exhaust fan for stage area while running the show if there is any fog or smoke concept.

Scope of Work

Broadly the scope considered in this design report includes the following:

- Air Conditioning

2. STANDARD FOLLOWED

The following mentioned standard will be followed while designing the HVAC Systems:

REFERENCE STANDARDS

- i. Relevant BIS Standards.
- ii. ASHRAE Standards.
- iii. Duct construction standards as per relevant BIS Codes and SMACNA.
- iv. National Building Code of India- 2016.
- v. Motors, Cabling, wiring and accessories as per BIS standards.

1. **BASIS OF DESIGN**

Site location : Delhi

4.1 Outdoor Design Conditions:

The outdoor design conditions have been considered as follows.

		<u>SUMMER</u>
1.	Outside Design Condition	34.0 °C DB, 13.8 C WB (93.2 ° F DB; 57 ° F WB)
2.	Inside Design Condition	22.0 °C (71.6 ° F DB) with RH around 65% but no positive control for RH
3.	Outside Air Intake For Office Area	5 CFM/person + 0.06 CFM/ SQFT.

5. **ASSUMPTIONS AND ITS BASIS**

5.1 Assumptions for HVAC Loads

Building Data:

Proposed Building construction data is as follows:

WALLS	
For Exposed Wall - Audi	U = 0.2 Btu / Hr. Sqft deg. F
For Exposed Wall	U = 0.36 Btu / Hr. Sqft deg. F
For Glass	U = 0.3 Btu / Hr. Sqft deg. F
For Roof	U = 0.25 Btu / Hr. Sqft deg. F

6. CALCULATIONS

6.1 Estimated Air Conditioned Loads:

ZONE	FRESH AIR	TR	DCFM
	CFM		
STAGE	213	11	6617
AUDITORIUM	1062	20.07	10392
AUDITORIUM BALCONY	380	4.92	2307
AUDITORIUM LOWER LVL	192	2.61	1261
AV ROOM	21	3.47	2162

6.2 Proposed AC Configuration:

We have proposed the following equipment's along with the assumed electrical load provision for the Unit's fans etc. as under:

ZONE	KAS CONFIG				TYPE OF AHU	Qty. OF AHU	ELECTRICAL LOAD PER FEEDER IN KW	TOTAL KW	FEEDER NOS	PHASE
	TR EACH	CF M EAC H	NO. OF ROWS OF COIL	COIL FACE AREA (SFT)						
STAGE	5.5	3500	4	7	CEILING SUSPENDED AHU	2	3	6	2	3
AUDITORIUM	13	6500	4	13	CEILING SUSPENDED AHU	2	7.5	15	2	3
AUDITORIUM BALCONY			4							
AUDITORIUM LOWER LVL	3	1300	4	2.6	CEILING SUSPENDED AHU	1	1.1	1.1	1	3
AV ROOM	4	2200	4	4.4	CEILING SUSPENDED AHU	1	2.2	2.2	1	3

VENTILATION SHEET-:

SMOKE EXHAUST EMERGENCY SUPPLY							
ZONE	CFM	FAN CFM	QTY OF FAN	TYPE OF FAN	ELECTRICAL LOAD IN Kw	TOTAL ELEC LOAD	PHASE
AUDITORIUM	11878	12000	1	TDA-F	7.5	7.5	3