

TACO BELL
AT
T1 TERMINAL AIRPORT, DELHI

DESIGN BRIEF REPORT (DBR)-R1

FOR

HVAC SYSTEM

DATED: 4th November'23

Architects

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1. **Introduction:**

The air-conditioning system using chilled water based Air-Handling Units is being designed for the proposed Taco Bell Restaurant to provide summer/monsoon cooling.

The design being proposed also envisages mechanical ventilation system for Kitchen and other similar spaces.

The report being presented has been divided into following two categories to deal separately with various systems.

- A) Comfort Air - Conditioning System.
- B) Mechanical Ventilation System.

A) **COMFORT AIR-CONDITIONING SYSTEM**

1.0 **Basis of Design:**

The various design parameters pertaining to air-conditioning system are being given hereunder:

a. **Orientation:**

Orientation of the building is as envisaged in layouts.

b. **Outside design conditions:**

The outside design conditions for **DELHI** are given hereunder:

Season	Dry Bulb Temperature	Wet Bulb Temperature
Summer	110 F (43.3 C) db	75 F (23.9 C) wb
Monsoon	95 F (35 C) db	83 F (28.3 C) wb
Winter	45 F (7.2 C) db	41 F (5 C) wb

c. **Inside design conditions**

Summer & Monsoon:

For BOH Area:

Around Cooking Ranges :

The temperature approximately one meter away from the cooking ranges shall generally be as under.

- Temperature : 75.2 ± 2° F (24±1°C)
- Relative Humidity : No Control

d. External Building Fabric detail:

The following details as regard to heat gain from external building fabric have been considered which are subject to further confirmation from Developers:

i. **For Walls** (230mm Brick Wall):

Overall Heat Transfer Co-efficient ("U" Value): 0.32 BTUs/Hr Sft F (1.82 Watt/SqM K)

ii. **For Roof Exposed to Sun (with 16mm thick closed cell elastomeric insulation):**

Overall Heat Transfer Co-efficient ("U" Value): 0.16 BTUs/Hr Sft F (0.91 Watt/SqM K).

e. Relevant International Codes and Standards:

Apart from the specific equipment standards and specifications, the following broad certifying agency/standards will be considered while designing the system:

- i. ASHRAE - American Society for Heating, Refrigerating and Air-conditioning Engineers –ASHRAE 1992 Edition.
- ii. SMACNA – Sheet Metal and Air Conditioning Contractors National Association.
- iii. UL - Underwriter's Laboratory, USA.
- iv. ANSI - American National Standards Institute
- v. NEMA - National Electrical Manufacturers Association
- vi. ETL - Electrical Testing Laboratories
- vii. NEC - National Electrical Code
- viii. NFC - National Fire Code
- ix. ISO - International Standards Organization

f. Fresh air replenishment:

Generally, as per ASHRAE Standard 62.1 – 2010 recommendations

- i. For Restaurant Area – 7.5Cfm/Person + 0.18Cfm/Sq. Ft

g. Design Data:

Space	Floor Area (Sft)	Height (Ft)	Occupancy (Persons)	Lighting Load (Watt/Sft)	Equipment Load (KW)	Appliances * (Sft)	Fresh Air (Cfm)
FIFTH FLOOR							
BOH	650	15.0	15	1.5	13.996KW (2.436KW Equipment Load - 11.6KW** @ 70% Diversity and 30% Heat Dissipation + 2.0KW For chiller & freezers - 2.5KW** @ 80% Diversity + 7.2KW For In-Line Machine - 9KW** @ 80% Diversity) + 0.2 WS- 1 @ 0.12KW + Printer etc.) + 2.16KW For 10.8KW Combi Oven with 20% heat dissipation + 20250 BTUs/Hr (7.5% Heat Dissipation from total 270000*** BTUs/Hr)	15	--
Total	650						-

* Appliances in the form of food warmers.

** As per Equipment data sheet received.

Notes :

- i. Design Data considered above is subject to further confirmation from Client's/ Architects end.

2.0 **Heat Loads and Proposed Equipment Selection**

Based on the interior plans and above design data the heat loads for the various spaces to be air-conditioned have been worked out and heat load results along with equipment selection are given hereunder:

Space	Floor Area (Sft)	Peak Heat Loads without including Fresh air Load (TR)		Dehumidified Air Quantity (Cfm)	Low Side Equipment Selection
		Summer	Monsoon		
FIFTH FLOOR					
BOH	650	8.3	7.6	4540	1x6000Cfm Ceiling suspended Chilled water based Air Handling Units with 6 Rows deep cooling coil.
Total	650	8.3	7.6	4540	

Assumptions:

The above heat load calculations and equipment selection have been considered adequate based on the following assumptions:

- a. Window frames to incorporate rubber gaskets to make them air tight
- b. Floor above & below of Floor being designed has been considered as simultaneously air-conditioned.
- e. Shops/Showrooms adjoining Taco Bell shall be simultaneously air conditioned.

3.0 **Noise Level**

Noise level in conditioned spaces due to all air conditioning equipment shall not exceed 52 dB at 125 Hz when measured at any point in occupied spaces less than 1500 mm above finish floor level and not closer than 1500 mm from any supply air register or 600 mm from any return air grille.

4.0 **System Design in Brief:**

- 4.1 Proposed Restaurant Area shall be air-conditioned using CHW based Air handling units.
- 4.2 Air distribution system wherever required shall comprise of GSS ductwork and extruded aluminium powder coated grilles and diffusers. Supply air ducting as well as return air ducting shall run above false ceiling spaces as shown in the design drawing. Supply air ducting shall be acoustically and thermally insulated as required.
- 4.3 Associated electrical work shall comprise of panels, power cabling, control cabling and necessary earthing.

B. MECHANICAL VENTILATION SYSTEM

1.0 Introduction:

Mechanical ventilation system for BOH shall comprise of Air washer for supply & Scrubber for exhaust.

2.0 Basis of Design & Equipment Selection:

The parameters being considered for mechanical ventilation system design have been furnished hereunder:

Floor/Space	Exhaust Air Quantity (Cfm)	Supply Air Quantity (Cfm)	Equipment Selection	
			For Exhaust Air	For Supply Air
Second Floor				
Fryer	1850	1600	4500Cfm Tapping Duct from	3000Cfm Tapping from Duct
Dish wash & MOP	965	800		
In- Line/ Dual Line Machine	1205	200		
Combi Oven	480	400		
Total	4500	3000		

C. COMMON PARAMETERS

1.0 Electrical Power Requirement

S. No.	System	Approximate Electrical Power requirement 415+10%V, 3Phase/1Phase
01.	Air Handling Units – 1x6000Cfm	1X2.2KW =2.2KW
	Total	2.2KW

2.0 Soft Make-up Water Requirement : Nil

3.0 Items to be provided by other agencies (Exclusions) :

The following activities associated with the said contract shall be carried out by other agencies under direct supervision of the AC contractor:

3.1 Civil Works :

All associated civil works listed below shall be carried out by civil /interior contractor:

- a. False ceiling work.

- b. Providing aluminium channel trough in the false ceiling for fixing of diffusers and GI frame work in walls/partitions for fixing of grilles.
- c. Providing opening in walls/slabs for crossing of ducts/piping and making them good & finished.

3.2 **Plumbing Works** :

All associated plumbing works listed below shall be carried out by plumbing contractor.

- a. Providing floor trap for termination of condensate drain piping associated with Split units to be carried out by the AC contractor.

3.3 **Electrical Works** :

All associated electrical works listed below shall be carried out by electrical contractor:

- a. Providing 415 ± 10 % volts, 50 Hz, 3 phase stabilised power supply along with earthing at each Air handling unit.
