

## **7.2.5 c - Energy review to identify areas where energy wastage is highest (Audit Report)**



# CRESCON PROJECTS & SERVICES PVT LTD

VALUE ENGINEERING – CLIENT FOCUS – TEAMWORK – SAFETY

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**M/S CRESCON PROJECTS AND SERVICES PVT LTD**  
**ENGINEERING INNOVATORS**  
**A COMPLETE M.E.P. SERVICE PROVIDERS**



# DESIGN VALIDATION & PROPOSAL

## AC FOR AUDITORIUM

## AT

## CRESCENT INSTITUTE OF SCIENCE & TECHNOLOGY GST Rd, Vandalur, Tamil Nadu 603210

REVISION No	DATE	PREPARED BY	CHECKED BY
00	04.07.2019	A.Sameeullah	S.Syed Abdul Rahman



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## INTRODUCTION

**M/s. Crescon Projects & Services Pvt Ltd** is an India based Engineering Construction firm established in the year of 2011. They are Specialized in Industrial design, Project management and installation works, delivering a consistent quality and on-time completion in the following fields,

1. HVAC ( Heating ventilation and Air conditioning)
2. Fire Protection, Detection and Alarm System
3. Process Piping for Water, Oil & Gas system
4. Industrial Electrical System
5. Water Treatment Plants & Plumbing System.
6. Structural Fabrication and Erection works
7. ELV System (BMS,Public Address, CCTV, Data & Network etc.,)

The company is dedicated to hardcore Commitment to Client, Quality, Health, Safety & Environmental policies that will always ensure that its products and services fully meet the requirements of the customers.

## VISION & MISSION

Our vision is to become one of the leading Industrial Engineering Procurement and Construction (EPC) Company all over the Asia. To enhance our company as **Crescon Group of Companies** and to enter different verticals of businesses such as Manufacturing, Hospitality, Educational Institutions and Engineering Consultancy Services.

Our Strategy is to have close co-ordination with consultants and the clients to understand their requirements clearly and accomplish them on time with prime focus on Quality and Safety.

## OUR ESTEEMED CUSTOMERS





## Project Preface:

- Customer contacted M/s. Crescon through Telephone call for Study, Analyze and submit the detailed report about the AC system of Auditorium at CRESCENT INSTITUTE OF SCIENCE & TECHNOLOGY on 17th June 2019
- HVAC professionals Mr. S.Syed Abdul Rahumaan & Mr .A.Sameeullah were visited to **Crescent Institute** on 26<sup>th</sup> June 2019 for onsite study.
- M/s. Crescon professionals collect, review and analyze the Auditorium existing HVAC system thoroughly with the help of client engineers and found that existing system is not giving performance as designed initially.
- Based on the collected inputs, M/s. Crescon suggested few adequate methods to improve HVAC system.
- AC plant is installed and commissioned in the year 2004. Due to non regular maintenance the system is not giving the required performance as designed initially. M/s Crescon reviewed and analyzed in detail to get the required performance and listed out the observations and suggestions.



## **PROJECT BREIF:**

This Report is to describe and define the concepts to validate the design of HVAC system installed at Crescent institutes of science and technology, GST Road, Vandalur

### **Project Information:**

Client Name	: CRESCENT INSTITUTE OF SCIENCE & TECHNOLOGY
Location of the Plant	: GST Rd, Vandalur
Block / Building Name	: Auditorium
Type of work	: Air-conditioning works
Standards followed	: ASHRAE & ISHRAE





## CODES AND STANDARDS

### Filtration

The room filtration as per ASHRAE 62.1 & 52.2 2007 standards are as per the below schedule

Sr. No.	Area	Inside Temp&RH	Type of filter	Efficiency	Micron Level
1	Air conditioned	DBT:23±2°C & 55±5% RH	Pre filter	90%	10 Micron

### HVAC STANDARDS

HVAC STANDARDS	
ASHRAE Contents 1999 HVAC Fundamentals, Chapter 24	Power Plant Ventilations.
NBC 2016 Vol.2 (Part 8 Building Services)	Mechanical Ventilation for power plant/Engine room
BS : EN:779- 1993	Filter
IS : 655 – 1963	Metal Air Duct
IS : 277 – 1992	Galvanized sheet steel

### UNITS OF MEASUREMENTS:-

Air Flow Rate - CFM (cubic feet per minute)

Air flow Rate - m<sup>3</sup>/s. (Meter Cube per second)

Air flow Rate - m<sup>3</sup>/h. (Meter Cube per hour)

Heat dissipation - KW (Kilo watt)

Heat dissipation - Kcal/h (Kilo calorie per Hour)

Heat dissipation - BTU/H (British thermal unit per hour)

Area: -square feet or square meter

Duct sizes/work:-Millimeter or inches

Fan/duct pressure:- Pascal (Pa) or Inches of water column

Liquid flow rate - GPM(Gallon per minute) / LPS (Liters per second)

Pipe sizes:- Millimeter or Inches

Pump Head:- Meter of water column

Temperature:- Deg Fahrenheit (°F) or Deg Celsius (°C)

Velocity:-

FPM (feet per minute)

FPS (feet per second)

MPS (meter per second)



## Existing Equipment Details



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### CHILLER

MAKE – Blue Star

TR – 75 TR X 2 Nos (Working)

TYPE – Air-Cooled chillers with semi-hermetic reciprocating Compressors

### PRIMARY PUMP

HEAD – 210 US GPM @ 25 M head X 3 Nos(2 working + 1standby)

TYPE – Monobloc type, centrifugal pump

### AIR HANDLING UNIT

30 TR, 12000 cfm @ 50 mm SP for Auditorium – 2 Nos

20 TR, 8000 cfm @ 50 mm SP for Auditorium – 2 Nos

### CEILING SUSPENDED UNIT

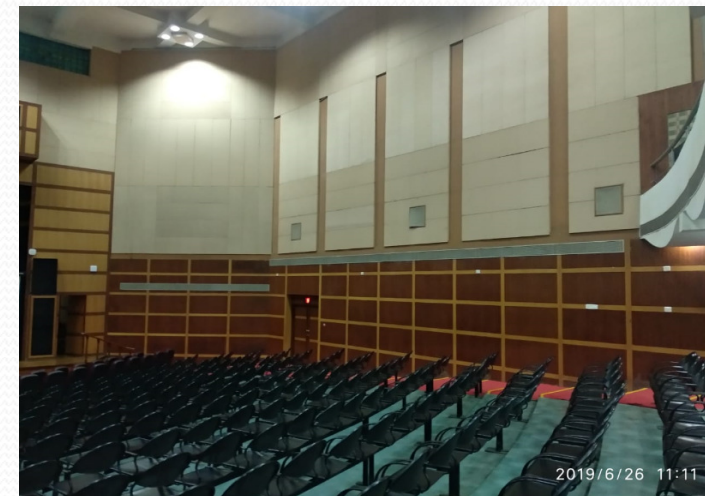
7.5 TR CSU unit @ 40 mm SP for stage – 2 Nos

## **Present condition of Site condition:**

- After switching on all the equipment at Unload conditions the return air temperature at seating area is measured as 26°C & Supply Air Grille Temperature is 24°C instead of maximum of 12-13°C after two hours of switching on the Chilled water system.
- There is no change in the temperature at stage.

## **Action to be taken:**

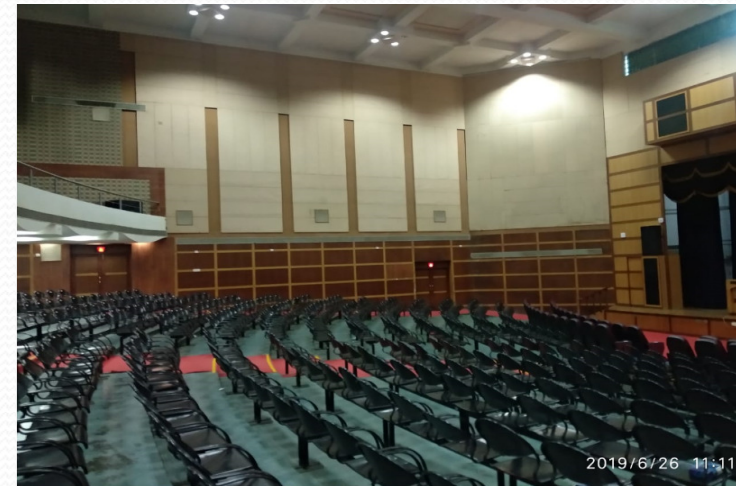
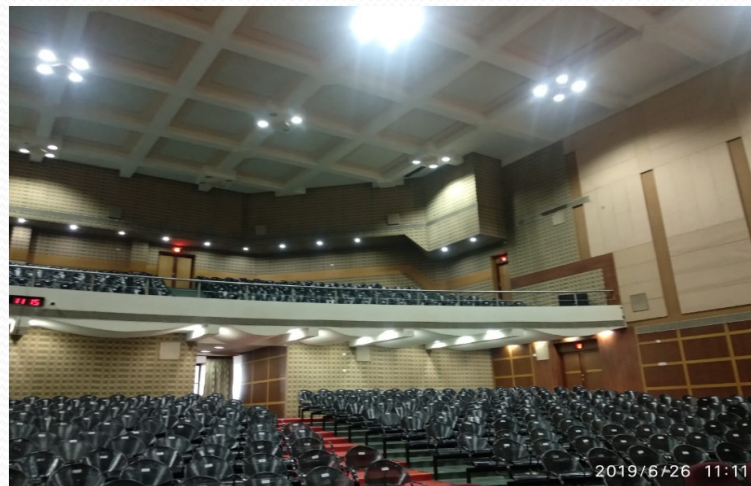
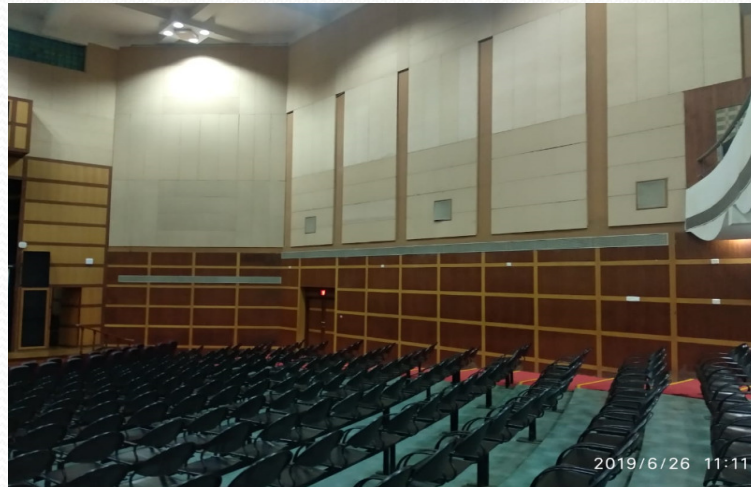
- Corrective measures to be taken as indicated below for AHU and chilled water equipment.
- All ducting and equipment serving the stage area has to be replaced.





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## AIR HANDLING UNIT PRESENT PERFORMANCE AND CONDITION:-

### **Present condition of AHU Coil:**

- As per Present site installation Chilled water inlet and outlet temperature are  $10.3^{\circ}\text{C}$  &  $12^{\circ}\text{C}$  respectively, instead of  $6^{\circ}\text{C}$  and  $11^{\circ}\text{C}$ , because of this there is not heat transfer being carried out.
- Present coil is fully covered with fungus and because of this no water is flowing properly.

### **Action to be taken:**

- AHU coil to be replaced with new coil and coil inlet and outlet temperature to be maintained as  $6^{\circ}\text{C}$  inlet and  $11^{\circ}\text{C}$



## Present condition of duct condition:

- As per Present site condition the supply air plenum has air leakage.

## Action to be taken:

- All leak to be patched up and has to be insulated properly but it is advised to replace the plenum itself for better lifetime.
- All unnecessary holes has to be closed.



### **Present condition of AHU Room:**

- Wall Acoustic insulations are damaged.

### **Action to be taken:**

- Damaged wall acoustic insulation to be properly patched up.



### **Present condition of AHU Piping:**

- Valve packages are not functioning properly.
- All valves and pipes has rusted.
- Drain pipe installed is damaged.

### **Action to be taken:**

- Valves packages has to be replaced.
- Drain pipes has to be replaced.



## Present condition of Ceiling Suspended unit:

- Ceiling suspended unit installed presently is unable to access which is being served to Auditorium stage.
- All filters are choked. We understand that there is no proper maintenance is involved since the installation.
- Performance of the equipment is also very less.

### Action to be taken:

- The equipment has to be replaced with new one and to be placed in a accessible place for proper maintenance.
- The equipment shall be replaced after rechecking the actual capacity as per heat load calculation.





## Present condition of chilled water Pumps:

- Mechanical seal of one pump is Damaged and because of this water is leaking.
- All Pumps are rusted.
- Performance of the equipment is also very less.



## Action to be taken:

- Mechanical seal can be replace but it is advised to replace all pumps since they are corroded and there is no performance.





## Present condition of Air cooled Chiller:

- Both chiller Performance condition is very less and has inlet and outlet temperature of  $10.3^{\circ}\text{C}$  &  $12^{\circ}\text{C}$  respectively, instead of  $6^{\circ}\text{C}$  &  $11^{\circ}\text{C}$ .
- There is no efficiency in the present compressor and it is resulting in unnecessary power consumption.

## Action to be taken:

- It is advised to change both the chillers as per the actual capacity for better performance.

## Conclusion:

- Both the air cooled chiller has to be replaced for better performance The chiller performance period is maximum of 12-15 years with the regular maintenance. Since the maintenance is not regular the chiller performance is very poor. So, we need to replace with the new chillers.
- Chilled water pumps are rusted and leakages are there due to poor maintenance. Hence all primary pumps has to be replaced. If we required we can use existing pump as standby one after confirming the quality of the existing pump status.
- AHU to be replaced or at least chilled water coil has to be replaced since all AHU Cooling coil tubes are covered with Scale (fungus).
- Ceiling suspended unit serving for stage has to be relocated and ducting has to be replaced.
- Wall acoustics patch up has to be done.
- AHU Plenum to be replaced.