

Project: Cleanrooms Facility for Semiconductors Research

Clean Rooms Facility from IZO 4 : 9 :System

Quotation: BADRY CRT Quote No. 16201-00, Rev 00 - April 2021

(Mech., Elec. & Infra.) - Main Contractor :Client

Heat Load Calculations & Electrical Power Consumption

Heat Load

- a. **Total Area Heat Load** (including fresh air & human load – 4 person per room) : **105.00 TR**
b. **Equipment Heat Load** (List of equipment attached) : **34.15 TR**
c. **Sub-Sum (1) / Heat Load** (Summary of a & b) : **139.15 TR**
d. **Extra 15%** (including heat loss in chill water pipelines) : **20.85 TR**
e. **The Total Chillers Capacity** should be **160 TR**
f. **Considering 50 % Spare Capacity, The Recommended Capacity of Chillers: 250 TR = (8x30 TR)**
Throughout the year, except during peak summers, the total heat load will not exceed 160 TR.
Six chiller units can be operated on rotation basis and Two may be kept as standby
8 CHW Units (6 OPRT & 2 STBY)

Considerations:

- (i) 45° C as max temperature
(ii) 2° C as minimum temperature
(iii) Room temperature is taken as 21° C
(iv) The power load for each chiller is 32.0 KW at 100% load. (note: We have selected water cooled scroll chiller (R-407A) Of 32.5 TR)
(v) Fresh Air Requirement: 5000 CFM in clean labs + 1000 CFM in comfort zone
(vi) Considered 50 % spare capacity, recommended capacity of Chillers

SN	Equipment	Load
1	OPR CHWs / Operating Chiller Units 6X30 RT (Refrigeration Tons) with Pumps	192 KW
2	AHU-1 (40,000 CFM) with Heaters & Dehumidifiers	77 KW
3	AHU-2 (05,000 CFM) with Heaters & Dehumidifiers	14 KW
4	AHU-3 (40,000 CFM) with Heaters & Dehumidifiers	77 KW
5	AHU-4 (30,000 CFM) with Heaters & Dehumidifiers	65 KW
6	AHU-5 (40,000 CFM) with Heaters & Dehumidifiers	77 KW
7	AHU-6 (30,000 CFM) with Heaters & Dehumidifiers	65 KW
8	Air Make Up Unit	33 KW
9	CR Cleanroom LAB Equipments (Current & Future)	370 KW
10	CR Cleanroom Electrical Appliances (Lights, Sockets, Blowers, Extra)	30 KW
S1	Total Electrical Power Load	1000 KW

Electrical Load Notes:

- a. **AHU 1,2,3,4,5,6** : As per equipment specification. **Total Wattage 375 KW**. Peak electric heating load of 42 KW have been considered and included for heating of fresh air in AHUs during winters when ambient temperature is less than specified room temperature of 21 degree C. Max power load of Humidifiers / Dehumidifiers in **Makeup units 33 KW**
b. **CR LAB Equipment** Power Load: As per list = **370 KW**
c. **Light & Other Items (30 KW);**
Approx 400 lights of 40 W each in labs and in other space: 16 KW, Services Sockets : 4 KW, Exhaust Blowers, scrubber & Fume Hoods : 5 KW., Vacuum Pumps, Compressor for CDA, RO Plant, Chill water plant etc): 5 KW