4. ROOM LOAD SUMMARY

4-1. PAC-1 (NW-SYSTEM)

1) ROOM PEAK LOAD (1)

NO	ROOM NAME	AREA (m^2)	VOLUME (m^3)	PEOPLE	PEAK LOAD R.S.H (kcal/H)	PEAK LOAD R.T.H (kcal/H)	INDICATED A.D.P(°C)	DEHUM AIR (m^3/H)	OUT AIR (m^3/H)
1F G02	ENTRANCE & ENTRANCE HALL	84.0	240.63	—	4.967	5.285	12.5	1.660	460
	SUB TOTAL	84.0	240.63	—	4.967	5.285		1.660	460
2F F02	SECRATARY ROOM	16.0	40.0	2	1.593	1.736	12.3	530	50
F02	ASSISTANT SUPERINTENDENT RM.	42.25	126.75	4	6.610	6.895	12.6	2.210	100
F01	SUPERINTENDENT RM	84.5	253.5	8	10716	11.285	12.5	3.580	200
F01	SECRATARY ROOM	24.0	60.0	4	1.856	2142	11.8	620	100
F07	TELCOMUNICATION ROOM	52.25	156.75	5	4.872	5.228	12.4	1.630	125
F04	CANTEEN	78.5	251.18	15	14403	16.360	11.9	4810	1.695
	SUB TOTAL	297.5	888.18	38	40.050	43.645		13.380	2270
3F S02	SECRATARY ROOM	16.0	40.0	2	927	1070	11.8	310	50
S02	ASSISTANT SUPERINTENDENT RM	42.25	160.55	4	5.306	5591	12.5	1770	100
S01	SECRATARY ROOM	16.0	40.0	2	1.130	1.273	12.0	380	50
S01	ASSISTANT SUPERINTENDENT RM	42.25	160.55	4	4.239	4523	12.5	1.420	100
S03C	JUNIOR ENGINEER ROOM	68.25	225.55	6	4.976	5402	12.3	1.660	150
S03b	DITTO	68.25	225.55	6	5.196	5622	12.3	1.740	150
S03a	DITTO	62.25	200.55	6	7.970	8397	12.5	2.660	150
	SUB TOTAL	315.25	1052.75	30	29.744	31.878		9.940	750

1083

1) ROOM PEAK LOAD (2)

NO	ROOM NAME	AREA (m^2)	VOLUME (m^3)	PEOPLE	PEAK LOAD R.S.H (Kcal/H)	PEAK LOAD R.T.H (Kcal/H)	INDICATED A.D.P(°c)	DEHUM AIR (m^3/H)	OUT AIR (m^3/H)
4F To1e	JUNIOR ENGINEER ROOM	68.25	225.55	6	9.579	10,005	12.6	3.200	150
To1d	DITTO	68.25	225.55	6	8.116	8.542	12.6	2.710	150
To1c	DITTO	68.25	225.55	6	7.979	8.405	12.6	2660	150
To1b	DITTO	68.25	225.55	6	8.125	8.551	12.6	2.710	150
To1a	DITTO	60.25	205.55	6	10916	11.343	12.6	3.640	150
	SUB TOTAL	333.25	1107.75	30	44.715	46.846		14.920	750
PAC-1	TOTAL	1030	3289.31	98	119.476	127.654	12.5	39.900	4.230
					SHF=0.94				

2). PEAK LOAD TIME (1)

NO.	ROOM NAME	3:00 E.R.S.H (Kcal/h)	3:00 E.R.T.H (Kcal/h)	5:00 E.R.S.H (Kcal/h)	5:00 E.R.T.H (Kcal/h)	6:00 E.R.S.H (Kcal/h)	6:00 E.R.T.H (Kcal/h)
1F. G02	ENTRANCE & ENTRANCE HALL	* 4.967	* 5.285	4706	5.021	4.428	4.740
	SUB TOTAL	4.967	5.285	4706	5.021	4.428	4.740
2F F02	SECRATARY ROOM	* 1.593	* 1.736	1.520	1.663	1.336	1.478
F02	ASSISTANT SUPERINTENDENT RM.	6.184	6.968	* 6.610	* 6.895	6.417	6.700
F01	SUPERINTENDENT RM.	9.598	10.169	* 10.716	* 11.285	10.417	10.985
F01	SECRATARY ROOM	* 1.856	* 2.142	1.723	2.008	1.581	1.865
F07	TELCOMUNICATION ROOM	4.277	4.634	* 4872	* 5.228	4843	5.198
F04	CANTEEN PEAK 4:00	14.152	16.133	13.964	15.921	12.738	14.395
	SUB TOTAL	37.660	41.282	39.405	43.000	37.332	40.621
3F S02	SECRATARY ROOM	* 927	* 1.070	884	1027	840	982
S02	ASSISTANT SUPERINTENDENT RM.	4.687	4.971	* 5306	* 5.591	5.304	5.587
S01	SECRATARY ROOM	* 1.130	* 1.273	1.067	1.210	1.003	1.145
S01	ASSISTANT SUPERINTENDENT RM.	3078	3.363	4.187	4.470	* 4.239	* 4.523
S03C	JUNIOR ENGINEER ROOM	3.823	4.251	4.928	5.355	* 4.976	* 5402
S03b	DITTO	4.095	4.523	4807	5.234	* 5.196	* 5.622
S03a	DITTO	7.013	7441	* 7.970	* 8.397	7.559	7.985
	SUB TOTAL	24.753	26.892	29.149	31.284	29.117	31.246

2). PEAK LOAD TIME (2)

NO.	ROOM NAME	3:00		5:00		6:00	
		E.R.S.H (Kcal/H)	E.R.T.H (Kcal/H)	E.R.S.H (Kcal/H)	E.R.T.H (Kcal/H)	E.R.S.H (Kcal/H)	E.R.T.H (Kcal/H)
4F To1e	JUNIOR ENGINEER ROOM	8083	8511	9.541	9.968	* 9.579	* 10.005
To1d	DITTO	6.465	6.893	7.990	8.417	* 8.116	* 8.542
To1c	DITTO	6.294	6.722	7.835	8.262	* 7.979	* 8.405
To1b	DITTO	6.475	6.903	7.999	8.426	* 8.125	* 8.551
To1a	DITTO	9.576	10.004	* 10.916	* 11.343	10.595	11.001
	SUB TOTAL	36.893	39.033	44.281	46.416	44.374	46.504
PAC-1	TOTAL	104.273	112.492	* 117.541	* 125.721	115.251	123.111

9601

4-2 PAC-2 (SE-SYSTEM)

1) ROOM PEAK LOAD

NO	ROOM NAME	AREA (m^2)	VOLUME (m^3)	PEOPLE	PEAK LOAD R.S.H (Kcal/H)	PEAK LOAD R.T.H (Kcal/H)	INDICATED A.D.P(°)	DEHUM AIR (m^3/H)	OUT AIR (m^3/H)
2F F03	CONFERENCE ROOM	84.5	253.5	16	9658	10.792	12.1	3.220	400
F09	CORRIDOR	87.25	218.13	-	6.523	6.523	13.2	2180	-
	SUB TOTAL	171.75	491.63	16	16.181	17315		5400	400
3F S05d	EXCUTIVE ENGINEER ROOM	21.13	80.29	2	1.926	2.069	12.3	640	50
S05c	DITTO	21.13	80.29	2	1.709	1.852	12.3	570	50
S05b	DITTO	21.13	80.29	2	1.709	1.852	12.3	570	50
S05a	DITTO	21.13	80.29	2	2010	2153	12.3	670	50
S04	PRAY ROOM	42.25	160.55	12	5809	6.664	11.8	1940	300
S06	CORRIDOR	101.5	253.75	-	5.102	5102	13.2	1700	-
	SUB TOTAL	228.27	735.46	20	18.265	19.692		6090	500
4F T03d	EXCUTIVE ENGINEER ROOM	21.13	80.29	2	2.770	2912	12.5	920	50
T03c	DITTO	21.13	80.29	2	2503	2646	12.5	840	50
T03b	DITTO	21.13	80.29	2	2503	2646	12.5	840	50
T03a	DITTO	21.13	80.29	2	2873	3015	12.5	960	50
T02	LIBRARY & STRAGE ROOM	42.25	160.55	4	7009	7293	12.6	2340	100
T04	CORRIDOR	101.5	253.75	-	7963	7963	13.2	2660	-
	SUB TOTAL	228.27	735.46	12	25621	26475		8560	300
PAC-2 TOTAL		628.29	1942.55	48	60.067	63482	SELCTED 12.5°C	20.050	1.200

SHF = 0.95

2). PEAK LOAD TIME

NO.	ROOM NAME	2:00 E.R.S.H (Kcal/h)	2:00 E.R.T.H (Kcal/h)	3:00 E.R.S.H (Kcal/h)	3:00 E.R.T.H (Kcal/h)	4:00 E.R.S.H (Kcal/h)	4:00 E.R.T.H (Kcal/h)
2F F03	CONFERENCE ROOM	* 9.658	* 10.792	9.616	10.752	9047	10.180
F09	CORRIDOR	6.378	6.378	* 6.523	* 6.523	6.378	6.378
	SUB TOTAL	16.036	17.170	16.139	17.275	15.425	16.558
3F S05d	EXCUTIVE ENGINEER ROOM (PEAK 12:00)	1.614	1.942	1.791	1.934	1.703	1.845
S05c	DITTO (PEAK 12:00)	1.673	1.815	1.517	1.660	1.438	1.580
S05b	DITTO (PEAK 12:00)	1.673	1.815	1.517	1.660	1.438	1.580
S05a	DITTO	1.905	1.950	1.897	2.040	1808	1.950
S04	PRAY ROOM	5.652	6.502	* 5.809	* 6664	5.764	6.614
S06	CORRIDOR	4.969	4.969	* 5102	* 5102	5.038	5038
	SUB TOTAL	17.486	18.993	17.633	19.060	17.189	18.607
4F T03d	EXCUTIVE ENGINEER ROOM	2.669	2.811	2.737	2880	* 2770	* 2.912
T03c	DITTO	2.401	2.543	2463	2.606	* 2503	* 2646
T03b	DITTO	2.401	2.543	2463	2606	* 2503	* 2.646
T03a	DITTO	2.772	2.914	2.843	2.986	* 2.878	* 3015
T02	LIBRARY & STRAGE ROOM	5.447	5.731	6.886	7172	* 7009	* 7293
T04	CORRIDOR	7.378	7.378	7.806	7806	* 7.963	* 7963
	SUB TOTAL	23.068	23.920	25.198	26.056	25.626	26.475
PAC-2 TOTAL		36.590	60.083	* 38.970	* 62.391	58.740	61.640

COOLING AND DEHUMIDIFYING ESTIMATE (METRIC)

Inquiring No. | Inquired By | Sheet No. 12
Job Name | Address | Date Original | Revision | Person in Charge
Space Used For ENTRANCE · ENTRANCE HALL (607) PAC-1 SYSTEM
Size m × m = 84.0 m² × m (H) = 240.63 m³

Item	Area or Quantity	Sun Gain or Temp. Diff.	Factor	Kcal/h MAX	3:00	5:00	6:00
SOLAR GAIN — GLASS							
	m² ×		×				
	m² ×		×				
	m² ×		×				
	m² ×		×				
	m² ×		×				
SOLAR & TRANS GAIN—WALLS & ROOF							
Wall	m² ×		×				
	m² ×		×				
	m² ×		×				
	m² ×		×				
Roof—Sun	m² ×		×				
Roof—Shaded	m² ×		×				
TRANS. GAIN—EXCEPT WALLS & ROOF							
Glass	15.5 m² ×	9.1 ×	3.8		536	486	433
Ceiling	16.0 m² ×	9.1 ×	1.4		204	185	165
~~Door~~ Floor	6.8 m² ×	18.2 ×	1.6		198	180	160
Partition (1)	21.6 m² ×	18.2 ×	1.8		708	642	572
(2)	3.2 m² ×	26.0 ×	1.8		150	150	150
(3)	30.0 m² ×	9.1 ×	2.5		683	619	552
Infiltration	CMH ×	deg ×	0.29				
INTERNAL HEAT							
People	People ×						
Kw	Kw ×	×	860				
Lights	84.0 ×	20 W ×	1.08		1815	1815	1815
Appliances etc.							
Credit for Thermal Storage	m² ×	deg ×		(−)		(−)	
			Sub Total				
Safety Factor			%				
Room Sensible Heat Sub Total					4794	4077	3847
Supply Duct Heat Gain	Supply Duct +Leak Loss	Fan +HP	=10%		430	408	385
Bypass Outside Air	460 CMH × 18.7 deg × 0.1 B.F × 0.29				243	221	196
Effective Room Sensible Heat					4967	4706	4428
ROOM LATENT HEAT							
Infiltration	CMH ×	g/kg ×	0.72				
People	1 People ×						
Steam	kg/h ×		540				
Appliances etc.							
Vapor Trans.							
			Sub Total				
Safety Factor			%				
Room Latent Heat Sub Total							
Supply Duct Leakage Loss			%				
Bypass Outside Air	460 CMH × 9.6 g/kg × 0.1 BF × 0.72				318	315	312
Effective Room Latent Heat					318		
Effective Room Total Heat					5285	5021	4740
OUTSIDE AIR HEAT					(63)		
Sensible:	CMH ×	deg × (1 − BF) × 0.29					
Latent:	CMH ×	g/kg × (1 − BF) × 0.72					
Grand Total Heat Sub Total							
Return Duct Heat Gain +	Return Duct Leak Gain +	Pump H.P +	Pipe Gain = %				
(U.S.R.T) Grand Total Heat							

Estimate For		AM / PM	Peak Load			AM / PM 3
Hours of Operation	Hour (		~			)
Outside Design Conditions		DB °C	WB °C	%RH	DP °C	g/kg
Conditions	Outside	42.7	28.6	37		19.0
	Room	24.0	17.1	50		9.4
	Difference	18.7	×××	×××	×××	9.6
Blind	Non-existence (outside, inside) L. M. D					
Glass	Ordinary. Thick. Absorbent. %. Double					
Color	Light. Medium. Dark.					
Weight	kg/m² (Floor)				kg/m² (Wall)	
Internal Heat	W/m²				m²/People	

Infiltration		
Swinging		
Revolving Doors	People × CMH/Per.	
Open Doors	Doors × CMH/Door	
Exhaust Air		
Crack	m × CMH/m	
Infiltration	CMH ■	
Ventilation		
People ×	CMH/Per.	
m² ×	CMH/m²	
Ventilation	CMH ■	460

SENSIBLE HEAT FACTOR

E.S.H.F = 4967 (ERSH) / 5285 (ERTH) = 0.94 (12.5°C)

DEHUMIDIFIED AIR

Apparatus Dewpoint 12.5 °C

4967 (ERSH) / (1.20 RM − 12.5 ADP)(1 − 0.1 BF) × 0.29 = 1,660 CMH

NOTES

- PARTITION
  - (1): 10.0 × 2.5 − 1.7 × 2.0 = 21.6
  - (2): 2.0 × 2.5 − 0.9 × 2.0 = 3.2
  - (3): 12.0 × 2.5 = 30.0
- GLASS (IN): 6.2 × 2.5 = 15.5
- DOOR (IN): 1.7 × 2.0 × 2 = 6.8
- CEILING: 4.0 × 4.0 + 6.0 = 22.0
- SR: 12.0 × 6.5 + 2.0 × 3.0 = 84.0
- VR: 6.5 × 3.5 × 2.5 + (8.5 × 6.5 + 2.0 × 3.0) × 3.0 = 240.63

FORM E-2DE

COOLING AND DEHUMIDIFYING ESTIMATE (METRIC)

Inquiring No. | Inquired By | Sheet No. 13
Job Name | Address | Date Original
Space Used For SECRATARY ROOM (F02) PAC-1 SYSTEM | Revision
Size 4.0 m × 4.0 m = 16.0 m² × 2.5 m(H) = 40 m³ | Person in Charge

Item	Area or Quantity	Sun Gain or Temp. Diff.	Factor	Kcal/h MAX 3:00	Correction 5:00	Correction 6:00
SOLAR GAIN — GLASS						
	m² ×	×				
	m² ×	×				
	m² ×	×				
	m² ×	×				
	m² ×	×				
SOLAR & TRANS GAIN—WALLS & ROOF						
Wall	m² ×	×				
	m² ×	×				
	m² ×	×				
	m² ×	×				
Roof—Sun	m² ×	×				
Roof—Shaded	m² ×	×				
TRANS. GAIN—EXCEPT WALLS & ROOF						
Glass	m² ×	×				
Ceiling	m² ×	×				
Floor	16.0 m² ×	13.2	× 2.5	528	508	388
Partition (1)	10.2 m² ×	9.1	× 1.8	167	152	135
(2)	12.0 m² ×	9.1	× 2.5	273	248	221
Door	1.8 m² ×	9.1	× 1.6	27	24	22
Infiltration	CMH ×	deg ×	0.29			
INTERNAL HEAT						
People	2 People ×	41		82	82	82
Kw	Kw ×	×	860			
Lights	16.0 × 20 W ×		1.08	346	346	346
Appliances Etc.						
Credit for Thermal Storage	m² ×	deg ×		(—)	(—)	
			Sub Total			
Safety Factor			%			
Room Sensible Heat Sub Total				1423	1360	1194
Supply Duct Heat Gain	Supply Duct +Leak Loss	Fan +HP	=10%	143	136	120
Bypass Outside Air	50 CMH × 18.2 deg × 0.1 BF × 0.29			27	24	22
Effective Room Sensible Heat				1593	1520	1336
ROOM LATENT HEAT						
Infiltration	CMH ×	g/kg ×	0.72			
People	2 People ×	49		98	98	98
Steam	kg/h ×		540			
Appliances Etc.						
Vapor Trans.						
			Sub Total	98	98	98
Safety Factor			%			
Room Latent Heat Sub Total						
Supply Duct Leakage Loss			10%	10	10	10
Bypass Outside Air	50 CMH × 9.6 g/kg × 0.1 BF × 0.72			35	35	34
Effective Room Latent Heat				143	143	142
Effective Room Total Heat				1736	1663	1498
OUTSIDE AIR HEAT				(109)		
Sensible:	CMH ×	deg × (1 − BF) × 0.29				
Latent:	CMH ×	g/kg × (1 − BF) × 0.72				
Grand Total Heat Sub Total						
Return Duct Heat Gain +	Return Duct Leak Gain +	Pump H.P +	Pipe Gain = %			
(U.S.R.T) GRAND TOTAL HEAT						

Estimate For.	AM / PM	Peak Load	AM / PM	3	
Hours of Operation	Hour (	~	)		
Outside Design Conditions		°DB	°WB	%RH	
Conditions	DB °C	WB °C	%RH	DP °C	g/kg
Outside	42.2	28.6	37		19.0
Room	24.0	17.1	50		9.4
Difference	18.2	×××	×××	×××	9.6
Blind	Non-existence (outside, inside) L M D				
Glass	Ordinary, Thick, Absorbent, % Double				
Color	Light, Medium, Dark.				
Weight	kg/m²(Floor)		kg/m²(Wall)		
Internal Heat	W/m²		m²/People		

Infiltration

Swinging		
Revolving Doors	People ×	CMH/Per.
Open Doors	Doors ×	CMH/Door
Exhaust Air		
Crack	m ×	CMH/m
Infiltration	CMH ■	

Ventilation

2 People ×	25	CMH/Per. 50
m² ×		CMH/m²
Ventilation	CMH ■	50

Sensible Heat Factor

E.S.H.F = 1.593 (ERSH) / 1736 (ERTH) = 0.92 (12.3°C)

Dehumidified Air

Apparatus Dewpoint 12.5 °C

1.593 (ERSH) / (24 RM − 12.5 ADP)(1 − BF) × 0.29 = 530 CMH

NOTES

- PARTITION:
  - (1) : 4.0 × 3.0 − 1.8 = 10.2
  - (2) : 4.0 × 3.0 = 12.0
- FLOOR : 4.0 × 4.0 = 16.0
- DOOR : 0.9 × 2.0 = 1.8

FORM E-20E

COOLING AND DEHUMIDIFYING ESTIMATE (METRIC)

Inquiring No. | Inquired By | Sheet No. 14
Job Name | Address | Date Original | Revision | Person in Charge
Space Used For ASSISTANT SUPERINTENDENT ROOM (F02) PAC-1 SYSTEM
Size 6.5 m × 6.5 m = 42.25 m² × 3.0 m(H) = 126.75 m³

Item	Area or Quantity	Sun Gain or Temp. Diff.	Factor	Kcal/h MAX 5:00	Correction 3:00	Correction 6:00
SOLAR GAIN — GLASS						
NE)	6.9 m²	× 366 × 0.13	× 1/0.85 × 0.94 × 0.65	236	291	200
NW)	5.4 m²	× 366 × 0.13	× 1/0.85 × 0.94 × 0.65	924	483	923
	m²	×	×			
	m²	×	×			
	m²	×	×			
SOLAR & TRANS GAIN—WALLS & ROOF						
Wall (NE)	19.1 m²	× 13.0	× 2.1	522	478	542
(NW)	20.6 m²	× 19.5	× 2.1	844	584	1004
	m²	×	×			
	m²	×	×			
Roof—Sun	m²	×	×			
Roof—Shaded	m²	×	×			
TRANS. GAIN—EXCEPT WALLS & ROOF						
Glass	12.3 m²	× 16.5	× 5.1	1035	1,142	923
Ceiling	m²	×	×			
Floor	42.25 m²	× 11.5	× 2.5	1215	1395	1025
Partition	7.5 m²	× 8.25	× 1.8	112	123	100
Infiltration	CMH ×	deg ×	0.29			
INTERNAL HEAT						
People	4 People × 41			164	164	164
Kw	Kw ×	×	860			
Lights	42.25 × 20	W ×	1.08	913	913	913
Appliances Etc.						
Credit for Thermal Storage	m² ×	deg ×		(−)	(−)	
			Sub Total			
Safety Factor			%			
Room Sensible Heat Sub Total				5965	5573	5794
Supply Duct Heat Gain	Supply Duct +Leak Loss	Fan +HP	=10%	597	558	580
Bypass Outside Air	100 CMH × 1.65 deg × 0.1 BF × 0.29			48	53	43
Effective Room Sensible Heat			■	6610	6184	6417
ROOM LATENT HEAT						
Infiltration	CMH ×	g/kg ×	0.72			
People	4 People × 49			196	196	196
Steam		kg/h ×	540			
Appliances etc.						
Vapor Trans.						
			Sub Total			
Safety Factor			%			
Room Latent Heat Sub Total						
Supply Duct Leakage Loss			10 %	20	20	20
Bypass Outside Air	100 CMH × 9.5 g/kg × 0.1 BF × 0.72			69	70	68
Effective Room Latent Heat			■	285	284	283
Effective Room Total Heat			◙	6895	6468	6700
OUTSIDE AIR HEAT				(164)		
Sensible:	CMH ×	deg × (1 − BF) × 0.29				
Latent:	CMH ×	g/kg × (1 − BF) × 0.72				
Grand Total Heat Sub Total						
Return Duct Heat Gain	+ Return Duct Leak Gain	− Pump H.P	÷ Pipe Gain = %			
(U.S.R.T) Grand Total Heat			◙			

Estimate For.	AM / PM	Peak Load	AM / PM
Hours of Operation	Hour (–)		

Outside Design Conditions	DB °C	WB °C	%RH	DP °C	g/kg
Conditions					
Outside	40.5	28.2	39		18.9
Room	24.0	17.1	50		9.4
Difference	16.5	×××	×××	×××	9.5

Blind	Non-existence (outside, inside)	L. M. D
Glass	Ordinary, Thick, Absorbent.	%. Double
Color	Light, Medium, Dark.	
Weight	kg/m²(Floor)	kg/m²(Wall)
Internal Heat	W/m²	m²/People

Infiltration

Swinging		
Revolving Doors	People × CMH/PER.	
Open Doors	Doors × CMH/DOOR	
Exhaust Air		
Crack	m × CMH/m	
Infiltration	CMH ■	

Ventilation

4 People ×	25 CMH/PER.	100
m² ×	CMH/m²	
Ventilation	CMH ■	100

Sensible Heat Factor

$$E.S.H.F = \frac{6610\ (ERSH)}{6895\ (ERTH)} = 0.96\ (12.6°C)$$

Dehumidified Air

Apparatus Dewpoint 12.5 °C

$$\frac{6610\ (ERSH)}{(24RM - 12.ADP)(1 - 0.1BF) \times 0.29} = 2210\ CMH$$

NOTES

- GLASS (NE) : 1.5 × 1.8 + 1.5 × 2.8 = 6.9
  (NW) : 1.5 × 1.8 × 2 = 5.4
- WALL (NE) : 6.5 × 4.0 − 6.9 = 19.1
  (NW) : 6.5 × 4.0 − 5.4 = 20.6
- PARTITION : 2.5 × 3.0 = 7.5
- FLOOR : SR

FORM E-20E

COOLING AND DEHUMIDIFYING ESTIMATE (METRIC)

Inquiring No. | Inquired By | Sheet No. 15
Job Name | Address | Date Original | Revision | Person in Charge
Space Used For SUPERINTENDENT ROOM (F01) | PAC-1 System
Size 13.0 m × 6.5 m = 84.5 m² × 3.0 m (H) = 253.5 m³

Item	Area or Quantity	Sun Gain or Temp. Diff.	Factor	Kcal/h MAX 5:00	3:00	6:00
SOLAR GAIN — GLASS					Correction	
(NW)	12.3 m²	× 366 × 0.65/0.85	× 0.94 × 0.65	2104	1101	2072
	m²	×	×			
	m²	×	×			
	m²	×	×			
	m²	×	×			
SOLAR & TRANS GAIN—WALLS & ROOF						
WALL (NW)	39.7 m²	× 195	× 2.1	1626	1126	1935
	m²	×	×			
	m²	×	×			
	m²	×	×			
Roof—Sun	m²	×	×			
Roof—Shaded	m²	×	×			
TRANS. GAIN—EXCEPT WALLS & ROOF						
Glass	12.3 m²	× 16.5	× 5.1	1053	1142	923
Ceiling	m²	×	×			
Floor	84.5 m²	× 11.5	× 2.5	2430	2789	2050
Partition	17.7 m²	× 8.25	× 1.8	263	210	235
Door	1.8 m²	× 8.25	× 1.6	24	27	22
Infiltration	CMH ×	deg ×	0.29			
INTERNAL HEAT						
People	8 People × 41			328	328	328
Kw	Kw ×	×	860			
Lights	84.5 × 20 W ×		1.08	1826	1826	1826
Appliances etc.						
Credit for Thermal Storage	m² ×	deg ×		(—)	(—)	
			Sub Total			
Safety Factor			%			
Room Sensible Heat Sub Total				9654	8629	9391
Supply Duct Heat Gain	Supply Duct +Leak Loss	Fan +HP	=10%	966	863	940
Bypass Outside Air	200 CMH	16.5 deg × 0.1 BF × 0.29		96	(06)	86
Effective Room Sensible Heat ■				10716	9598	10417
ROOM LATENT HEAT						
Infiltration	CMH ×	g/kg ×	0.72			
People	8 People × 49			392		
Steam		kg/h ×	540			
Appliances etc.						
Vapor Trans.						
			Sub Total			
Safety Factor			%			
Room Latent Heat Sub Total				392	392	392
Supply Duct Leakage Loss			10%	40	40	40
Bypass Outside Air	200 CMH × 9.5 g/kg × 0.1 BF × 0.72			137	139	136
Effective Room Latent Heat ■				569	571	568
Effective Room Total Heat ▣				11285	10169	10985
OUTSIDE AIR HEAT				(134)		
Sensible:	CMH ×	deg × (1 − BF) × 0.29				
Latent:	CMH ×	g/kg × (1 − BF) × 0.72				
Grand Total Heat Sub Total						
Return Duct Heat Gain +	Return Duct Leak Gain −	Pump H.P ±	Pipe Gain = %			
(U.S.R.T) GRAND TOTAL HEAT ▣						

Estimate For.	AM / PM	Peak Load	AM / PM 5'
Hours of Operation	Hour (	–	)
Outside Design Conditions	°CDB	°CWB	%RH
Conditions:	DB °C	WB °C	%RH	DP °C	g/kg
Outside	40.5	28.2	39		18.9
Room	24.0	17.1	50		9.4
Difference	16.5	×××	×××	×××	9.5
Blind	(NON-EXISTENCE/OUTSIDE, INSIDE) L. M. D				
Glass	ORDINARY. THICK. ABSORBENT. % . DOUBLE				
Color	LIGHT. MEDIUM. DARK.				
Weight	kg/m²(FLOOR)			kg/m²(WALL)	
Internal Heat	W/m²			m²/PEOPLE	

INFILTRATION

Swinging		
Revolving Doors	People × CMH/PER.	
Open Doors	Doors × CMH/DOOR	
Exhaust Air		
Crack	m × CMH/m	
Infiltration	CMH ■	

VENTILATION

8 People ×	25 CMH/PER.	200
1 m² ×	CMH/m²	
Ventilation	CMH ■	200

SENSIBLE HEAT FACTOR

E.S.H.F = 10716 (ERSH) / 11285 (ERTH) = 0.95 (12.5°C)

DEHUMIDIFIED AIR

Apparatus Dewpoint 12.5 °C

10716 (ERSH) / (24 RM − 12.5 ADP)(1 − BF) × 0.29 = 3,580 CMH

NOTES

- GLASS (NW) : 1.5 × 1.8 × 3 + 1.5 × 2.8 = 12.3
- WALL (NW) : 13.0 × 4.0 − 12.3 = 39.7
- PARTITION : 6.5 × 3.0 − 1.8 = 17.7
- DOOR : 0.9 × 2.0 = 1.8
- FLOOR : SR

FORM E-20E

COOLING AND DEHUMIDIFYING ESTIMATE (METRIC)

INQUIRING NO. | INQUIRED BY | SHEET NO. 16
JOB NAME | ADDRESS | DATE ORIGINAL
SPACE USED FOR SECRATARY ROOM (F01) PAC-1 SYSTEM | REVISION
SIZE m × 8.0 m = 24.0 m² × 2.5 m(H) = 60 m³ | PERSON IN CHARGE

ITEM	AREA OR QUANTITY	SUN GAIN OR TEMP. DIFF.	FACTOR	Kcal/h MAX 3:00	CORRECTION 5:00	CORRECTION 6:00
SOLAR GAIN — GLASS						
	m² ×	×				
	m² ×	×				
	m² ×	1 ×				
	m² ×	×				
	m² ×	×				
SOLAR & TRANS GAIN—WALLS & ROOF						
WALL	m² ×	×				
	m² ×	×				
	m² ×	×				
	m² ×	×				
ROOF—SUN	m² ×	×				
ROOF—SHADED	m² ×	×				
TRANS. GAIN—EXCEPT WALLS & ROOF						
GLASS	m² ×	×				
CEILING	m² ×	×				
FLOOR	24.0 m² ×	13.2 ×	2.5	792	690	582
PARTITION	10.0 m² ×	9.1 ×	1.8	164	149	133
INFILTRATION	CMH ×	deg ×	0.29			
INTERNAL HEAT						
PEOPLE	4 PEOPLE ×	41		164	164	164
KW	KW ×	×	860			
LIGHTS	24.0 × 20 W ×		1.08	519	519	519
APPLIANCES ETC.						
CREDIT FOR THERMAL STORAGE	m² ×	deg ×		(—)		(—)
			SUB TOTAL			
SAFETY FACTOR			%			
ROOM SENSIBLE HEAT SUB TOTAL				1639	1522	1398
SUPPLY DUCT HEAT GAIN	SUPPLY DUCT +LEAK LOSS	FAN +HP	=10%	164	153	140
BYPASS OUTSIDE AIR	100 CMH × 18.2 deg × 0.1 BF × 0.29			53	48	43
EFFECTIVE ROOM SENSIBLE HEAT				1856	1723	1581
ROOM LATENT HEAT						
INFILTRATION	CMH ×	g/kg ×	0.72			
PEOPLE	4 PEOPLE × 49			196		
STEAM		kg/h ×	540			
APPLIANCES ETC.						
VAPOR TRANS.						
			SUB TOTAL			
SAFETY FACTOR			%			
ROOM LATENT HEAT SUB TOTAL				196	196	196
SUPPLY DUCT LEAKAGE LOSS			10 %	20	20	20
BYPASS OUTSIDE AIR	100 CMH × 9.6 g/kg × 0.1 BF × 0.72			70	67	68
EFFECTIVE ROOM LATENT HEAT				286	285	284
EFFECTIVE ROOM TOTAL HEAT				2142	2008	1865
OUTSIDE AIR HEAT				(89)		
SENSIBLE:	CMH ×	deg × (1 − BF) × 0.29				
LATENT:	CMH ×	g/kg × (1 − BF) × 0.72				
GRAND TOTAL HEAT SUB TOTAL						
RETURN DUCT HEAT GAIN + RETURN DUCT LEAK GAIN − PUMP H.P + PIPE GAIN = %						
(U.S.R.T) GRAND TOTAL HEAT						

ESTIMATE FOR.	AM / PM	PEAK LOAD	AM / PM 3
HOURS OF OPERATION	Hour (–)		

OUTSIDE DESIGN CONDITIONS	°CDB	°CWB	%RH

CONDITIONS	DB °C	WB °C	%RH	DP °C	g/kg
OUTSIDE	42.2	28.6	39		19.0
ROOM	24.0	17.1	50		9.4
DIFFERENCE	18.2	×××	×××	×××	9.6

BLIND (NON-EXISTENCE (OUTSIDE. INSIDE) L. M. D
GLASS (ORDINARY. THICK. ABSORBENT. %. DOUBLE
COLOR (LIGHT. MEDIUM. DARK.
WEIGHT kg/m²(FLOOR) kg/m²(WALL)
INTERNAL HEAT W/m² m²/PEOPLE

INFILTRATION
SWINGING
REVOLVING DOORS PEOPLE × CMH/PER.
OPEN DOORS DOORS × CMH/DOOR
EXHAUST AIR
CRACK m × CMH/m
INFILTRATION CMH ■

VENTILATION
4 PEOPLE × 25 CMH/PER. 100
m² × CMH/m²
VENTILATION CMH ■ 100

SENSIBLE HEAT FACTOR
E.S.H.F = 1856 (ERSH) / 2142 (ERTH) = 0.87 (11.8°C)

DEHUMIDIFIED AIR
APPARATUS DEWPOINT 12.5 °C
1856 (ERSH) / (24 RM - 12, ADP)(1 − 0.1 BF) × 0.29 = 620 CMH

NOTES
SR: 6.5 × 4.0 − 2.0 = 24.0
· PARTITION : 4.0 × 2.5 = 10.0
· FLOOR : SR.

FORM E-20E
10/3

COOLING AND DEHUMIDIFYING ESTIMATE(METRIC)

Inquiring No.   Inquired By   Sheet No. 17

Job Name   Address   Date Original

Revision

Space Used For TELECOMUNICATION ROOM (F07) PAC-1 SYSTEM   Person in Charge

Size m× m= 52.25 m² × 3 m(H)= 156.75 m³

Item	Area or Quantity	Sun Gain or Temp. Diff	Factor	Kcal/h MAX 5:00	Correction 3:00	Correction 6:00
SOLAR GAIN — GLASS						
(NW)	5.4 m²×	366 ×0.65/0.85	× 0.94 ×0.65	925	484	910
	m²×		×			
	m²×		×			
	m²×		×			
	m²×		×			
SOLAR & TRANS GAIN—WALLS & ROOF						
Wall (NW)	20.6 m²×	19.5	× 2.1	844	584	1004
	m²×		×			
	m²×		×			
	m²×		×			
Roof—Sun	m²×		×			
Roof—Shaded	m²×		×			
TRANS. GAIN—EXCEPT WALLS & ROOF						
Glass	m²×		×			
Ceiling	m²×		×			
Floor	19.5 m²×	11.5	× 2.5	561	644	473
Partition	45.4 m²×	8.25	× 1.8	675	744	601
Door	2.6 m²×	8.25	× 1.6	35	38	31
Infiltration	CMH×	deg×	0.29			
INTERNAL HEAT						
People	5 People× 41			205	205	205
Kw	Kw×		× 860			
Lights	52.25 × 20 W×		1.08	1129	1129	1129
Appliances Etc.						
Credit for Thermal Storage	m²×	deg×		(−)	(−)	
			Sub Total			
Safety Factor			%			
Room Sensible Heat Sub Total				4374	3828	4353
Supply Duct Heat Gain + Supply Duct Leak Loss + Fan HP			10 %	438	383	436
Bypass Outside Air	125 CMH× 16.5 deg× 0.1	BF×0.29		60	66	54
EFFECTIVE ROOM SENSIBLE HEAT				4872	4277	4843
ROOM LATENT HEAT						
Infiltration	CMH×	g/kg×	0.72			
People	5 People× 49			245	245	245
Steam		kg/h×	540			
Appliances Etc.						
Vapor Trans.						
			Sub Total			
Safety Factor			%			
Room Latent Heat Sub Total						
Supply Duct Leakage Loss			10 %	25	25	25
Bypass Outside Air 125 CMH× 9.5 g/kg×0.1 BF×0.72				86	87	85
EFFECTIVE ROOM LATENT HEAT				356	357	355
EFFECTIVE ROOM TOTAL HEAT				5228	4634	5198
OUTSIDE AIR HEAT				(101)		
Sensible:	CMH×	deg×(1−	BF)×0.29			
Latent:	CMH×	g/kg×(1−	BF)×0.72			
Grand Total Heat Sub Total						
Return Duct Heat Gain + Return Duct Leak Gain + Pump H.P + Pipe Gain			= %			
(U.S.R.T.) GRAND TOTAL HEAT						

Estimate For. AM/PM   Peak Load AM/PM 5

Hours of Operation Hour (~)

Outside Design Conditions °CDB °CWB %RH

Conditions	DB °C	WB °C	%RH	DP °C	g/kg
Outside	40.5	28.2	39		18.9
Room	24.0	17.1	50		6.4
Difference	16.5	×××	×××	×××	9.5

Blind	NON-EXISTENCE(OUTSIDE, INSIDE) L. M. D
Glass	ORDINARY, THICK, ABSORBENT. %, DOUBLE
Color	LIGHT, MEDIUM, DARK.
Weight	kg/m²(FLOOR) kg/m²(WALL)
Internal Heat	W/m² m²/PEOPLE

INFILTRATION	
Swinging	
Revolving Doors People× CMH/PER.	
Open Doors Doors× CMH/DOOR	
Exhaust Air	
Crack m× CMH/m	
Infiltration CMH	
VENTILATION	
5 People× 25 CMH/PER.	125
m²× CMH/m²	
Ventilation CMH	125

SENSIBLE HEAT FACTOR

$$E.S.H.F = \frac{4.872 \text{ (ERSH)}}{5228 \text{ (ERTH)}} = 0.93 \ (12.4^\circ C)$$

DEHUMIDIFIED AIR

Apparatus Dewpoint 12.5 °C

$$\frac{4.872 \text{ (ERSH)}}{(24 \text{ RM} - 12.5 \text{ ADP})(1 - 0.1 \text{ BF}) \times 0.29} = 1.630 \text{ CMH}$$

NOTES

SR : 10.5 × 6.5 − 4.0×4.0 = 52.25

· GLASS (NW) : 1.5 × 1.8 × 2 = 5.4

· WALL (NW) : 6.5 × 4.0 − 5.4 = 20.6

· PARTITION : 16.0 × 3.0 − 2.6 = 45.4

· FLOOR : 3.0 × 6.5 = 19.5

· DOOR : 1.3 × 2.0 = 2.6

1014

FORM E-20E

COOLING AND DEHUMIDIFYING ESTIMATE (METRIC)

Inquiring No. | Inquired By | Sheet No. 18
Job Name | Address | Date Original
Space Used For CANTEEN (F04) | PAC-1 SYSTEM | Revision
Size m × m = 78.5 m² × 3.8, 2.5 m(H) = 251.18 m³ | Person in Charge

Item	Area or Quantity	Sun Gain or Temp. Diff.	Factor	Kcal/h MA 4:00	3:00	5:00
SOLAR GAIN — GLASS						
(NW)	5.4 m²	366 × 0.52	0.85 × 0.94 × 0.65	739	484	925
(SW)	12.3 m²	252 × 0.64	0.85 × 0.94 × 0.65	1426	1560	1115
	m²	×	×			
	m²	×	×			(910)
	m²	×	×			(580)
SOLAR & TRANS GAIN—WALLS & ROOF						
Wall (NW)	20.6 m²	15.4	× 2.1	667	584	844
(SW)	39.7 m²	18.6	× 2.1	1551	1318	1601
	m²	×	×			
	m²	×	×			(1004)
Roof—Sun	m²	×	×			(1626)
Roof—Shaded	m²	×	×			
TRANS. GAIN—EXCEPT WALLS & ROOF						(1327)
Glass	17.7 m²	17.7	× 5.1	1598	1643	1490
Ceiling	m²	×	×			(1904)
Floor	78.5 m²	12.7	× 2.5	2493	2591	2257
Partition (1)	26.6 m²	8.85	× 1.8	424	436	395
(2)	24.7 m²	17.7	× 2.5	1093	1124	1019
						(352)
Infiltration	CMH	deg	× 0.29			(908)
INTERNAL HEAT						
People	15 People	× 41		615	615	615
Kw	Kw	×	× 860			
Lights	78.5 × 20	W	× 1.08	1696	1696	1696
Appliances Etc.						
Credit for Thermal Storage	m²	deg	× (−)		(−)	
			Sub Total			
Safety Factor			%			(10922)
Room Sensible Heat Sub Total				12302	12051	11957
Supply Duct Heat Gain	Supply Duct +Leak Loss	Fan +HP	=10%	1231	1206	(1093) 1196
Bypass Outside Air	1695 CMH	17.7 deg	× 0.1 B.F × 0.29	870	895	811
Effective Room Sensible Heat ■				14403	14152	13964
ROOM LATENT HEAT						(12738)
Infiltration	CMH	g/kg	× 0.72			
People	15 People	× 49		735		
Steam		kg/h	× 540			
Appliances etc.						
Vapor Trans.						
			Sub Total			
Safety Factor			%			
Room Latent Heat Sub Total				735	735	735
Supply Duct Leakage Loss			10 %	74	74	74
Bypass Outside Air	1695 CMH	9.4 g/kg	× 0.1 BF × 0.72	1148	1172	1148
Effective Room Latent Heat ■				1957	1981	1957
Effective Room Total Heat ▣				16360	16133	15921
OUTSIDE AIR HEAT				(209)		
Sensible:	CMH	deg	× (1 − BF) × 0.29			
Latent:	CMH	g/kg	× (1 − BF) × 0.72			
Grand Total Heat Sub Total						
Return Duct Heat Gain + Return Duct Leak Gain − Pump H.P ÷ Pipe Gain			= %			
(U.S.R.T) Grand Total Heat ▣						

Estimate For: AM / PM — Peak Load — AM / PM 4

Hours of Operation: Hour (–)

Outside Design Conditions	DB °C	WB °C	%RH	DP °C	g/kg
Outside	41.7	28.4	38		18.8
Room	24.0	17.1	50		9.4
Difference	17.7	×××	×××	×××	9.4

Blind: Non-existence (outside, inside) L M D
Glass: Ordinary. Thick. Absorbent. %. Double
Color: Light. Medium. Dark.
Weight: kg/m²(Floor) kg/m²(Wall)
Internal Heat: W/m² m²/People

INFILTRATION
Swinging
Revolving Doors People× CMH/per.
Open Doors Doors× CMH/door
Exhaust Air
Crack m× CMH/m
Infiltration CMH ■

VENTILATION
15 People× 2.5 CMH/per.
i m²× CMH/m²
Ventilation CMH ■ 1695

SENSIBLE HEAT FACTOR
E.S.H.F = 14403 (ERSH) / 16360 (ERTH) = 0.88 (11.9°C)

DEHUMIDIFIED AIR
Apparatus Dewpoint 12.5 °C
14,403 (ERSH) / 84 RM·(12.5 ADP)(1 − BF)×0.29 = 4810 CMH

NOTES

SR: 13.0 × 6.5 − 1.5 × 4.0 = 78.5

• GLASS (NW): 1.5 × 1.8 × 2 = 5.4
(SW): 1.5 × 1.8 × 3 + 1.5 × 2.8 = 12.3

• WALL (NW): 6.5 × 4.0 − 5.4 = 20.6
(SW): 13.0 × 4.0 − 12.3 = 39.7

• PARTITION
(1): 7.0 × 3.8 = 26.6
(2): 6.5 × 3.8 = 24.7

• FLOOR: SR

VR = 6.5 × 6.5 × 3.8 + (6.5 × 6.5 − 1.5 × 4) × 2.5
= 251.18

(6:00): 14,395

FORM E-20E

COOLING AND DEHUMIDIFYING ESTIMATE (METRIC)

Inquiring No. | Inquired By | Sheet No. 19
Job Name | Address | Date Original
Space Used For SECRATARY ROOM (502) PAC-1 SYSTEM | Revision
Size 4.0 m × 4.0 m = 16.0 m² × 2.5 m(H) = 40 m³ | Person in Charge

Item	Area or Quantity	Sun Gain or Temp. Diff.	Factor	Kcal/h MAX 3:00	Correction 5:00	Correction 6:00
SOLAR GAIN — GLASS						
	m²×	×				
	m²×	×				
	m²×	×				
	m²×	×				
	m²×	×				
SOLAR & TRANS GAIN—WALLS & ROOF						
Wall	m²×	×				
	m²×	×				
	m²×	×				
	m²×	×				
Roof—Sun	m²×	×				
Roof—Shaded	m²×	×				
TRANS. GAIN—EXCEPT WALLS & ROOF						
Glass	m²×	×				
Ceiling	m²×	×				
Floor	m²×	×				
Partition (1)	8.2 m²×	9.1 ×	1.8	135	122	109
(2)	10.0 m²×	9.1 ×	2.5	228	207	184
Door	1.8 m²×	9.1 ×	1.6	27	24	22
Infiltration	CMH×	deg×	0.29			
INTERNAL HEAT						
People	Z People×	4.1		82	82	82
Kw	Kw×	×	860			
Lights	16.0 × 20	W×	1.08	346	346	346
Appliances etc.						
Credit for Thermal Storage	m²×	deg×		(−)		(−)
			Sub Total			
Safety Factor			%			
Room Sensible Heat Sub Total				818	781	743
Supply Duct Heat Gain	Supply Duct +Leak Loss	Fan −HP	=10%	82	79	75
Bypass outside air	50 CMH× 18.2 deg× 0.1 BF× 0.29			27	24	22
EFFECTIVE ROOM SENSIBLE HEAT			■	927	884	840
ROOM LATENT HEAT						
Infiltration	CMH×	g/kg×	0.72			
People	Z People×	49		98		
Steam	kg/h×		540			
Appliances etc.						
Vapor trans.						
			Sub Total			
Safety Factor			%			
Room Latent Heat Sub Total				98	98	98
Supply Duct Leakage Loss			10 %	10	10	10
Bypass Outside Air	50 CMH× 9.6 g/kg× 0.1 BF× 0.72			35	35	34
EFFECTIVE ROOM LATENT HEAT			■	143	143	142
EFFECTIVE ROOM TOTAL HEAT			▣	1070	1027	982
OUTSIDE AIR HEAT				(69)		
Sensible:	CMH×	deg× (1 − BF)× 0.29				
Latent:	CMH×	g/kg× (1 − BF)× 0.72				
Grand Total Heat Sub Total						
Return Duct Heat Gain + Return Duct Leak Gain + Pump H.P + Pipe Gain			= %			
(U.S.R.T) GRAND TOTAL HEAT			▣			

Estimate For.	AM / PM	Peak Load	AM / PM 3
Hours of Operation	Hour (	−	)

Outside Design Conditions		°CDB	°CWB	%RH		
Conditions	DB °C	WB °C	%RH	DP °C	g/kg	
Outside	42.2	28.6	37		19.0	
Room	24.0	17.1	50		9.4	
Difference		×××	×××	×××	9.6	

Blind	Non-existence (outside, inside)	L. M. D
Glass	Ordinary. Thick. Absorbent.	%. Double
Color	Light. Medium. Dark.	
Weight	kg/m²(Floor)	kg/m³(Wall)
Internal Heat	W/m²	m³/People

Infiltration			
Swinging			
Revolving Doors	People×	CMH/PER.	
Open Doors	Doors×	CMH/DOOR	
Exhaust Air			
Crack	m×	CMH/m	
Infiltration	CMH ■		

Ventilation			
Z People×	25	CMH/PER.	50
m²×		CMH/m²	
Ventilation	CMH ■		50

Sensible Heat Factor

E.S.H.F = 927 (ERSH) / 1070 (ERTH) = 0.87 (11.8°C)

Dehumidified Air

Apparatus Dewpoint 12.5 °C

927 (ERSH) / (1.24 RM − 12.5 ADP)(1 − 0.1 BF)× 0.29 = 310 CMH

NOTES

- PARTITION
  (1) 4.0 × 2.5 − 1.8 = 8.2
  (2) 4.0 × 2.5 = 10.0
- DOOR : 0.9 × 2.0 = 1.8

9101

FORM E-20E

COOLING AND DEHUMIDIFYING ESTIMATE (METRIC)

INQUIRING NO. | INQUIRED BY | SHEET NO. 20
JOB NAME | ADDRESS | DATE ORIGINAL
SPACE USED FOR ASSISTANT SUPERINTENDENT ROOM (502) PAC-1 SYSTEM | REVISION
SIZE 6.5 m × 6.5 m = 42.25 m² × 3.8 m(H) = 160.55 m³ | PERSON IN CHARGE

ITEM	AREA OR QUANTITY	SUN GAIN OR TEMP. DIFF.	FACTOR	Kcal/h MAX 5:00	3:00	6:00
SOLAR GAIN — GLASS					CORRECTION	
(NE)	6.9 m²	× 366 × 0.13/0.85 ×	0.94 × 0.65	236	291	200
(NW)	5.4 m²	× 366 × 0.65/0.85 ×	0.94 × 0.65	925	484	910
	m²	×	×			
	m²	×	×			
	m²	×	×			
SOLAR & TRANS GAIN—WALLS & ROOF						
WALL (NE)	19.1 m²	× 13.0	× 2.1	522	478	542
(NW)	20.6 m²	× 19.5	× 2.1	844	584	1004
	m²	×	×			
	m²	×	×			
ROOF—SUN	m²	×	×			
ROOF—SHADED	m²	×	×			
TRANS. GAIN—EXCEPT WALLS & ROOF						
GLASS	12.3 m²	× 16.5	× 5.1	1035	1142	923
CEILING	m²	×	×			
FLOOR	m²	×	×			
PARTITION	9.5 m²	× 8.25	× 1.8	141	156	126
INFILTRATION	CMH	× deg	× 0.29			
INTERNAL HEAT						
PEOPLE	4 PEOPLE	× 41		164	164	164
KW	Kw	×	× 860			
LIGHTS	42.25 × 20 W	×	1.08	913	913	913
APPLIANCES ETC.						
CREDIT FOR THERMAL STORAGE	m²	× deg	×	(−)	(−)	
			SUB TOTAL			
SAFETY FACTOR			%			
ROOM SENSIBLE HEAT SUB TOTAL				4780	4212	4782
SUPPLY DUCT HEAT GAIN	SUPPLY DUCT +LEAK LOSS	FAN −HP	=10%	478	422	479
BYPASS OUTSIDE AIR	100 CMH × 16.5 deg × 0.1 B.F × 0.29			48	53	43
EFFECTIVE ROOM SENSIBLE HEAT ■				5306	4687	5304
ROOM LATENT HEAT						
INFILTRATION	CMH	× g/kg	× 0.72			
PEOPLE	4 PEOPLE	× 49		196		
STEAM	kg/h	×	540			
APPLIANCES ETC.						
VAPOR TRANS.						
			SUB TOTAL			
SAFETY FACTOR			%			
ROOM LATENT HEAT SUB TOTAL				196	196	196
SUPPLY DUCT LEAKAGE LOSS			10 %	20	20	20
BYPASS OUTSIDE AIR	100 CMH × 95 g/kg × 0.1 BF × 0.72			69	70	68
EFFECTIVE ROOM LATENT HEAT ■				285	284	283
EFFECTIVE ROOM TOTAL HEAT ▣				5591	4971	5587
OUTSIDE AIR HEAT				(133)		
SENSIBLE:	CMH × deg × (1 − BF) × 0.29					
LATENT:	CMH × g/kg × (1 − BF) × 0.72					
GRAND TOTAL HEAT SUB TOTAL						
RETURN DUCT HEAT GAIN	+ RETURN DUCT LEAK GAIN	− PUMP H.P	+ PIPE GAIN = %			
(U.S.R.T) GRAND TOTAL HEAT ▣						

ESTIMATE FOR.	AM / PM	PEAK LOAD	AM / PM
HOURS OF OPERATION	Hour (~)		

OUTSIDE DESIGN CONDITIONS	°CDB	°CWB	%RH

CONDITIONS	DB °C	WB °C	%RH	DP °C	g/kg
OUTSIDE	40.5	28.2	39		19.0
ROOM	24.0	17.1	50		9.4
DIFFERENCE	16.5	×××	×××	×××	9.6

BLIND: NON-EXISTENCE (OUTSIDE, INSIDE) L M D
GLASS: ORDINARY. THICK. ABSORBENT. %. DOUBLE
COLOR: LIGHT. MEDIUM. DARK.
WEIGHT: kg/m²(FLOOR) kg/m²(WALL)
INTERNAL HEAT: W/m² m²/PEOPLE

INFILTRATION

SWINGING
REVOLVING DOORS PEOPLE× CMH/PER.
OPEN DOORS DOORS× CMH/DOOR
EXHAUST AIR
CRACK m× CMH/m
INFILTRATION CMH ■

VENTILATION

4 PEOPLE × 25 CMH/PER. = 100
m² × CMH/m²
VENTILATION CMH ■ 100

SENSIBLE HEAT FACTOR

E.S.H.F = 5306 (ERSH) / 5591 (ERTH) = 0.95 (12.5°C)

DEHUMIDIFIED AIR

APPARATUS DEWPOINT 12.5 °C

5306 (ERSH) / (24RM − 12.5ADP)(1 − 0.BF) × 0.29 = 1770 CMH

NOTES

- GLASS (NE): 1.5 × 1.8 + 1.5 × 2.8 = 6.9
  (NW): 1.5 × 1.8 × 2 = 5.4
- WALL (NE): 6.5 × 4.0 − 6.9 = 19.1
  (NW): 6.5 × 4.0 − 5.4 = 20.6
- PARTITION: 2.5 × 3.8 = 9.5

FORM E-20E

COOLING AND DEHUMIDIFYING ESTIMATE (METRIC)

Inquiring No. | Inquired By | Sheet No. 21
Job Name | Address | Date Original | Revision | Person in Charge
Space Used For SECRATARY ROOM (501) PAC-1 SYSTEM
Size 4.0 m × 4.0 m = 16.0 m² × 2.5 m(H) = 40 m³

Item	Area or Quantity	Sun Gain or Temp. Diff.	Factor	Kcal/h MAX 3:00	Correction 5:00	Correction 6:00
SOLAR GAIN — GLASS						
	m² ×		×			
	m² ×		×			
	m² ×		×			
	m² ×		×			
	m² ×		×			
SOLAR & TRANS GAIN—WALLS & ROOF						
Wall	m² ×		×			
	m² ×		×			
	m² ×		×			
	m² ×		×			
Roof—Sun	m² ×		×			
Roof—Shaded	m² ×		×			
TRANS. GAIN—EXCEPT WALLS & ROOF						
Glass	m² ×		×			
Ceiling	m² ×		×			
Floor	16.0 m² ×	9.1 ×	1.7	248	225	200
Partition	18.2 m² ×	9.1 ×	1.8	299	271	241
DOOR	1.8 m² ×	9.1 ×	1.6	27	24	22
Infiltration	CMH ×	deg ×	0.29			
INTERNAL HEAT						
People	2 People ×	41		82	82	82
Kw	Kw ×	×	860			
Lights	16.0 × 20	W ×	1.08	346	346	346
Appliances Etc.						
Credit for Thermal Storage	m² ×	deg ×		(—)	(—)	
			Sub Total			
Safety Factor			%			
Room Sensible Heat Sub Total				1002	948	891
Supply Duct Heat Gain	Supply Duct +Leak Loss	FAN +HP	=10%	101	95	90
Bypass Outside Air	50 CMH × (18.2 deg − 9.1) × 0.29			27	24	22
Effective Room Sensible Heat				1130	1067	1003
ROOM LATENT HEAT						
Infiltration	CMH ×	g/kg ×	0.72			
People	2 People ×	49		98		
Steam	kg/h ×		540			
Appliances etc.						
Vapor Trans.						
			Sub Total			
Safety Factor			%			
Room Latent Heat Sub Total				98	98	98
Supply Duct Leakage Loss			10 %	10	10	10
Bypass Outside Air	50 CMH × 9.6 g/kg × 0.1 BF		× 0.72	35	35	34
Effective Room Latent Heat				143	143	142
Effective Room Total Heat				1273	1210	1145
OUTSIDE AIR HEAT				(80)		
Sensible:	CMH ×	deg × (1 − BF) × 0.29				
Latent:	CMH ×	g/kg × (1 − BF) × 0.72				
Grand Total Heat Sub Total						
Return Duct Heat Gain + Return Duct Leak Gain − Pump H.P − Pipe Gain			= %			
(U.S.R.T) Grand Total Heat						

Estimate For	AM / PM	Peak Load	AM / PM		
Hours of Operation	Hour (—)				
Outside Design Conditions		°DB	°WB	%RH	
Conditions	DB °C	WB °C	%RH	DP °C	g/kg
Outside	42.2	28.6	37		19.0
Room	24.0	17.1	50		9.4
Difference	18.2	×××	×××	×××	9.6
Blind	Non-Existence (Outside, Inside)				L. M. D
Glass	Ordinary, Thick, Absorbent,				%. Double
Color	Light, Medium, Dark.				
Weight	kg/m² (Floor)				kg/m² (Wall)
Internal Heat	W/m²				m²/People

Infiltration

Swinging		
Revolving Doors	People ×	CMH/Per.
Open Doors	Doors ×	CMH/Door
Exhaust Air		
Crack	m ×	CMH/m
Infiltration	CMH ■	

Ventilation

2 People ×	25 CMH/Per.	50
m² ×	CMH/m²	
Ventilation	CMH ■	50

Sensible Heat Factor

E.S.H.F = 1130 (ERSH) / 1273 (ERTH) = 0.89 (12.0°)

Dehumidified Air

Apparatus Dewpoint 12.5 °C

1130 (ERSH) / [24RM − (25ADP)(1 − 0.1BF) × 0.29] = 380 CMH

NOTES

- PARTITION: 8.0 × 2.5 − 1.8 = 18.2
- DOOR : 0.9 × 2.0 = 1.8
- FLOOR : SR.

FORM E-20E

COOLING AND DEHUMIDIFYING ESTIMATE (METRIC)

Inquiring No. | Inquired By | Sheet No. 22
Job Name | Address | Date Original
Space Used For ASSISTANT SUPERINTENDENT ROOM (501) PAC-1 SYSTEM | Revision | Person In Charge
Size 6.5 m × 6.5 m = 42.25 m² × 3.8 m(H) = 160.55 m³

Item	Area or Quantity	Sun Gain or Temp. Diff.	Factor	Kcal/h MAX 6:00	Correction 3:00	Correction 5:00
SOLAR GAIN — GLASS						
(NW)	6.9 m²	× 366 × 0.64/0.85	× 0.94 × 0.65	1162	618	1180
	m²	×	×			
	m²	×	×			
	m²	×	×			
	m²	×	×			
SOLAR & TRANS GAIN—WALLS & ROOF						
Wall (NW)	19.1 m²	× 23.2	× 2.1	931	258	783
	m²	×	×			
	m²	×	×			
	m²	×	×			
Roof—Sun	m²	×	×			
Roof—Shaded	m²	×	×			
TRANS. GAIN—EXCEPT WALLS & ROOF						
Glass	6.9 m²	× 14.7	× 5.1	518	641	581
Ceiling	m²	×	×			
Floor	m²	×	×			
Partition	9.5 m²	× 7.35	× 1.8	126	156	141
Infiltration	CMH ×	deg ×	0.29			
INTERNAL HEAT						
People	4 People ×	41		164	164	164
Kw	Kw ×	×	860			
Lights	42.25 × 20	W ×	1.08	913	913	913
Appliances Etc.						
Credit for Thermal Storage	m² ×	deg ×		(—)	(—)	
			Sub Total			
Safety Factor			%			
Room Sensible Heat Sub Total				3814	2750	3762
Supply Duct Heat Gain	Supply Duct +Leak Loss	Fan +HP	= 10%	382	275	377
Bypass Outside Air	100 CMH × 14.9 dee × 0.1 BF × 0.29			43	53	48
Effective Room Sensible Heat				4239	3078	4187
ROOM LATENT HEAT						
Infiltration	CMH ×	g/kg ×	0.72			
People	4 People ×	49		196		
Steam		kg/h ×	540			
Appliances Etc.						
Vapor Trans.						
			Sub Total			
Safety Factor			%			
Room Latent Heat Sub Total				196	196	196
Supply Duct Leakage Loss			10 %	20	20	20
Bypass Outside Air	100 CMH × 9.4 g/kg × 0.1 BF × 0.72			68	70	69
Effective Room Latent Heat				284	285	283
Effective Room Total Heat				4523	3363	4470
OUTSIDE AIR HEAT				(107)		
Sensible:	CMH ×	deg × (1 − BF) × 0.29				
Latent:	CMH ×	g/kg × (1 − BF) × 0.72				
Grand Total Heat Sub Total						
Return Duct Heat Gain + Return Duct Leak Gain + Pump H.P + Pipe Gain			= %			
(U.S.R.T) Grand Total Heat						

Estimate For	AM / PM	Peak Load	AM / PM 6
Hours of Operation	Hour (	—	)

Outside Design Conditions	DB °C	WB °C	%RH	DP °C	g/kg
Conditions					
Outside	38.7	27.6	43		18.8
Room	24.0	17.1	50		9.9
Difference	14.7	×××	×××	×××	9.9

Blind	Non-existence (outside, inside)	L. M. D
Glass	Ordinary. Thick. Absorbent.	%. Double
Color	Light. Medium. Dark.	
Weight	kg/m² (floor)	kg/m² (wall)
Internal Heat	W/m²	m²/People

INFILTRATION

Swinging		
Revolving Doors	People × CMH/Per.	
Open Doors	Doors × CMH/Door	
Exhaust Air		
Crack	m × CMH/m	
Infiltration	CMH ■	

VENTILATION

4 People ×	25 CMH/Per.	100
m² ×	CMH/m²	
Ventilation	CMH ■	100

SENSIBLE HEAT FACTOR

E.S.H.F = 4239 (ERSH) / 4523 (ERTH) = 0.94 (12.5°C)

DEHUMIDIFIED AIR

Apparatus Dewpoint 12.5 °C

4239 (ERSH) / (24 RM − 12.5 ADP)(1 − 0.1 BF) × 0.29 = 1420 CMH

NOTES

- GLASS (NW) : 1.5 × 1.8 + 1.5 × 2.8 = 6.9
- WALL (NW) : 6.5 × 4.0 − 6.9 = 19.1
- PARTITION : 2.5 × 3.8 = 9.5

10/9

FORM E-20E

COOLING AND DEHUMIDIFYING ESTIMATE (METRIC)

Inquiring No. | Inquired By | Sheet No. 23
Job Name | Address | Date Original | Revision | Person in Charge
Space Used For: JUNIOR ENGINEER ROOM (S03C) PAC-1 SYSTEM
Size: 10.5 m × 6.5 m = 68.25 m² × 3.8, 2.5m(H) = 225.55 m³

Item	Area or Quantity	Sun Gain or Temp. Diff.	Factor	Kcal/h MAX 6:00	Correction 3:00	Correction 5:00
SOLAR GAIN — GLASS						
(NW)	6.9 m²	× 366 × 0.64 / 0.85 ×	0.94 × 0.65	1162	618	1180
	m²	×				
	m²	×				
	m²	×				
	m²	×				
SOLAR & TRANS GAIN—WALLS & ROOF						
Wall (NW)	19.1 m²	× 23.2	× 2.1	931	258	783
	m²	×				
	m²	×				
	m²	×				
Roof—Sun	m²	×				
Roof—Shaded	m²	×				
TRANS. GAIN—EXCEPT WALLS & ROOF						
Glass	6.9 m²	× 14.7	× 5.1	518	641	581
Ceiling	m²	×				
Floor	m²	×				
Partition	10.0 m²	× 7.35	× 1.8	133	164	149
Infiltration	CMH ×	deg ×	0.29			
INTERNAL HEAT						
People	6 People ×	41		246	246	246
Kw	Kw ×		860			
Lights	68.25 × 20 W ×		1.08	1475	1475	1475
Appliances etc.						
Credit for Thermal Storage	m² ×	deg ×		(—)	(—)	(—)
			Sub Total			
Safety Factor			%			
Room Sensible Heat Sub Total				4465	3402	4414
Supply Duct Heat Gain	Supply Duct +Leak Loss	+HP	=10%	447	341	442
Bypass Outside Air	150 CMH > 14.7 deg > 0.1 B.F > 0.29			64	80	72
Effective Room Sensible Heat ■				4976	3823	4928
ROOM LATENT HEAT						
Infiltration	CMH ×	g/kg ×	0.72			
People	6 People ×	49		294		
Steam		kg/h ×	540			
Appliances etc.						
Vapor Trans.						
			Sub Total			
Safety Factor			%			
Room Latent Heat Sub Total				294	294	294
Supply Duct Leakage Loss			10%	30	30	30
Bypass Outside Air	15 CMH × 9.4 g/kg × 0.1 BF × 0.72			102	104	103
Effective Room Latent Heat ■				426	428	427
Effective Room Total Heat ▣				5402	4251	5355
OUTSIDE AIR HEAT						
Sensible:	CMH ×	deg × (1 — BF) × 0.29				
Latent:	CMH ×	g/kg × (1 — BF) × 0.72				
Grand Total Heat Sub Total						
Return Duct Heat Gain + Return Duct Leak Gain + Pump H.P + Pipe Gain = %						
(U.S.R.T) Grand Total Heat ▣						

Estimate For.	AM / PM	Peak Load	AM / PM 6
Hours of Operation	Hour (	~	)

Outside Design Conditions	DB °C	WB °C	%RH	DP °C	g/kg
Outside	38.7	27.6	43		18.8
Room	24.0	17.1	50		9.4
Difference	14.7	×××	×××	×××	9.4

Blind	(Non-existence / Outside, Inside)	L M D
Glass	Ordinary, Thick, Absorbent.	%. Double
Color	Light, Medium, Dark.	
Weight	kg/m²(Floor)	kg/m²(Wall)
Internal Heat	W/m²	m²/People

Infiltration

Swinging		
Revolving Doors	People × CMH/PER.	
Open Doors	Doors × CMH/Door	
Exhaust Air		
Crack	m × CMH/m	
Infiltration	CMH ■	

Ventilation

6 People ×	25 CMH/PER.	150
m² ×	CMH/m²	
Ventilation	CMH ■	150

Sensible Heat Factor

E.S.H.F = 4.976 (ERSH) / 6402 (ERTH) = 0.82 (12.3°C)

Dehumidified Air

Apparatus Dewpoint 12.5 °C

4.977 (ERSH) / (24RM − 12.5ADP)(1 − 0.1BF) × 0.29 = 1,660 CMH

NOTES

VR = 6.5×6.5×3.8 + 6.5×4.0×2.5
= 225.55

- GLASS (NW): 1.5×1.8 + 1.5×2.8 = 6.9
- WALL (NW): 6.5×4.0 − 6.9 = 19.1
- PARTITION: 4.0 × 2.5 = 10.0

FORM E-20i

COOLING AND DEHUMIDIFYING ESTIMATE (METRIC)

Inquiring No. | Inquired By | Sheet No. 21
Job Name | Address | Date Original | Revision | Person in Charge
Space Used For: JUNIOR ENGINEER ROOM (S03 b) — PAC-1 SYSTEM
Size: m × m = 68.25 m² × 3.8, 2.5 m(H) = 225.55 m³

Item	Area or Quantity	Sun Gain or Temp. Diff.	Factor	Kcal/h MAX 6:00	Correction 3:00	Correction 5:00
SOLAR GAIN — GLASS						
(NW) 6.9	m² × 366 × 0.64/8*	×	0.94 × 0.65	1162	618	1180
	m² ×	×				
	m² ×	×				
	m² ×	×				
	m² ×	×				
SOLAR & TRANS GAIN—WALLS & ROOF						
Wall (NW) 19.1	m² × 23.2	×	2.1	931	258	783
	m² ×	×				
	m² ×	×				
	m² ×	×				
Roof—Sun	m² ×	×				
Roof—Shaded	m² ×	×				
TRANS. GAIN—EXCEPT WALLS & ROOF						
Glass 6.9	m² × 14.7	×	5.1	518	641	246
Ceiling	m² ×	×				
Floor 16.0	m² × 7.35	×	1.7	200	248	225
Partition 16.0	m² × 7.35	×	1.8	133	164	149
Infiltration	CMH ×	deg ×	0.29			
INTERNAL HEAT						
People	6 People × 41			246	246	246
Kw	Kw ×	×	860			
Lights	68.25 × 20	W ×	1.08	1475	1475	1475
Appliances etc.						
Credit for Thermal Storage	m² ×	deg ×		(–)		(–)
			Sub Total			
Safety Factor			%			
Room Sensible Heat Sub Total				4665	3650	4304
Supply Duct Heat Gain	Supply Duct +Leak Loss	Fan +HP	=10%	467	365	431
Bypass Outside Air	150 CMH > 14.7 deg > 0.1 B.F. > 0.29			64	80	72
Effective Room Sensible Heat				5196	4095	4807
ROOM LATENT HEAT						
Infiltration	CMH ×	g/kg ×	0.72			
People	6 People × 49			294		
Steam		kg/h ×	540			
Appliances etc.						
Vapor Trans.						
			Sub Total			
Safety Factor			%			
Room Latent Heat Sub Total				294	294	294
Supply Duct Leakage Loss			10 %	30	30	30
Bypass Outside Air	150 CMH × 9.4 g/kg × 0.1 BF × 0.72			102	104	103
Effective Room Latent Heat				426	428	427
Effective Room Total Heat				5622	4523	5234
OUTSIDE AIR HEAT						
Sensible:	CMH ×	deg × (1 – BF) × 0.29				
Latent:	CMH ×	g/kg × (1 – BF) × 0.72				
Grand Total Heat Sub Total						
Return Duct Heat Gain + Return Duct Leak Gain		Pump H.P + Pipe Gain	= %			
(U.S.R.T) Grand Total Heat						

Estimate For	AM / PM	Peak Load	AM / PM 6
Hours of Operation	Hour (–)		

Outside Design Conditions	DB °C	WB °C	%RH	DP °C	g/kg
Outside	38.7	27.6	43		18.8
Room	24.0	17.1	50		9.4
Difference	14.7	×××	×××	×××	9.4

Blind	Non-existence (outside, inside)	L. M. D
Glass	Ordinary. Thick. Absorbent.	%. Double
Color	Light. Medium. Dark.	
Weight	kg/m² (floor)	kg/m² (wall)
Internal Heat	W/m²	m²/People

INFILTRATION

Swinging			
Revolving Doors	People ×	CMH/Per.	
Open Doors	Doors ×	CMH/Door	
Exhaust Air			
Crack	m ×	CMH/m	
Infiltration		CMH ■	

VENTILATION

6 People ×	25	CMH/Per.	150
m² ×		CMH/m²	
Ventilation		CMH ■	150

SENSIBLE HEAT FACTOR

E.S.H.F = 5196 (ERSH) / 5622 (ERTH) = 0.92 (12.3°C)

DEHUMIDIFIED AIR

Apparatus Dewpoint 12.5 °C

5196 (ERSH) / (24 RM – 12.5 ADP)(1 – BF) × 0.29 = 1740 CMH

NOTES

- VR = 6.5 × 6.5 × 3.8 + 6.5 × 4.0 × 2.5 = 225.55
- GLASS (NW): 1.5 × 1.8 + 1.5 × 2.8 = 6.9
- WALL (NW): 6.5 × 4.0 – 6.9 = 19.1
- PARTITION: 4.0 × 2.5 = 10.0
- FLOOR: 4.0 × 4.0 = 16.0

FORM E-20E

COOLING AND DEHUMIDIFYING ESTIMATE(METRIC)

Inquiring No. | Inquired By | Sheet No. 25
Job Name | Address | Date Original | Revision | Person in Charge
Space Used For JUNIOR ENGINEER ROOM (503a) PAC-1 SYSTEM
Size m× m= 62.25 m² ×3.8, 2.5 m(H)= 200.55 m³

Item	Area or Quantity	Sun Gain or Temp. Diff.	Factor	Kcal/h MAX 5:00	Correction 3:00	Correction 6:00
SOLAR GAIN — GLASS						
(NN) 6.9	m²×	366×0.65/0.85×	0.94×0.65	1180	618	1162
(SW) 8.1	m²×	252×0.50/0.85×	0.94×0.65	734	1028	382
	m²×	×				
	m²×	×				
	m²×	×				
SOLAR & TRANS GAIN—WALLS & ROOF						
Wall (NW) 19.1	m²×	19.5	× 2.1	783	258	931
(SW) 33.9	m²×	19.2	× 2.1	1367	1125	1389
	m²×	×				
	m²×	×				
Roof—Sun	m²×	×				
Roof—Shaded	m²×	×				
TRANS. GAIN—EXCEPT WALLS & ROOF						
Glass 16.0	m²×	16.5	× 5.1	1263	1393	1125
Ceiling	m²×	×				
Floor	m²×	×				
Partition 17.6	m²×	8.25	× 1.8	262	289	233
Infiltration	CMH×	deg×	0.29			
INTERNAL HEAT						
People	6 People×	41		246	246	246
Kw	Kw×	×	860			
Lights	62.25 × 20	W×	1.08	1345	1345	1345
Appliances etc.						
Credit for Thermal Storage	m²×	deg×		(—)	(—)	
			Sub Total			
Safety Factor			%			
Room Sensible Heat Sub Total				7180	6302	6813
Supply Duct Heat Gain	Supply Duct +Leak Loss	Fan +HP	=10%	718	631	682
Bypass outside air 150 CMH× 16.5 deg× 0.1 BF×0.29				72	80	64
Effective Room Sensible Heat ■				7970	7013	7559
ROOM LATENT HEAT						
Infiltration	CMH×	g/kg×	0.72			
People	6 People×	49		294		
Steam		kg/h×	540			
Appliances etc.						
Vapor trans.						
			Sub Total			
Safety Factor			%			
Room Latent Heat Sub Total				294	294	294
Supply Duct Leakage Loss			10 %	30	30	30
Bypass Outside Air 150 CMH× 9.5 g/kg×0.1 BF×0.72				103	104	102
Effective Room Latent Heat ■				427	428	426
Effective Room Total Heat ▣				8397	7441	7985
OUTSIDE AIR HEAT				(135)		
Sensible:	CMH×	deg×(1−	BF)×0.29			
Latent:	CMH×	g/kg×(1−	BF)×0.72			
Grand Total Heat Sub Total						
Return Duct Heat Gain + Return Duct Leak Gain		+ Pump H.P	+ Pipe Gain = %			
(U.S.R.T) GRAND TOTAL HEAT ▣						

Estimate For.	AM / PM	Peak Load	AM / PM
Hours of Operation	Hour (	~	)

Outside Design Conditions	DB ℃	WB ℃	%RH	DP ℃	g/kg
Outside	40.5	28.2	39		18.9
Room	24.0	17.1	50		9.4
Difference	16.5	×××	×××	×××	9.5

Blind	Non-Existence(Outside, Inside)	L. M. D
Glass	Ordinary, Thick. Absorbent.	%. Double
Color	Light. Medium. Dark.	
Weight	kg/m²(Floor)	kg/m²(Wall)
Internal Heat	W/m²	m²/People

Infiltration		
Swinging		
Revolving Doors	People× CMH/Per.	
Open Doors	Doors× CMH/Door	
Exhaust Air		
Crack	m× CMH/m	
Infiltration	CMH ■	
Ventilation		
6 People×	25 CMH/Per.	150
m²×	CMH/m²	
Ventilation	CMH ■	150

SENSIBLE HEAT FACTOR

E.S.H.F = 7970 (ERSH) / 8397 (ERTH) = 0.95 (12.5°C)

DEHUMIDIFIED AIR

Apparatus Dewpoint 12.5 ℃

7970 (ERSH) / (24RM − 12.5ADP)(1 − BF)×0.29 = 2,660 CMH

NOTES

SR = 6.5×10.5 − 1.5×4 = 62.25

VR = 6.5×6.5×3.8 + 4.0×4.0×2.5 = 200.55

- GLASS
  (NW) = 1.5×1.8 + 1.5×2.8 = 6.9
  (SW) = 1.5×1.8×3 = 8.1
- WALL
  (NW): 6.5×4.0 − 6.9 = 19.1
  (SW): 10.5×4.0 − 8.1 = 33.9
- PARTITION: 4.0×2.5 + 2.0×3.8 = 17.6

FORM E-20E

COOLING AND DEHUMIDIFYING ESTIMATE(METRIC)

SHEET No. 26
DATE ORIGINAL
REVISION
PERSON IN CHARGE

INQUIRING No. INQUIRED BY
JOB NAME ADDRESS
SPACE USED FOR JUNIOR ENGINEER ROOM (Toile) PAC - 1 SYSTEM
SIZE 10.5 m× 6.5 m= 68.25 m² × 2.5, 3.8 m(H)= 225.55 m³

ITEM	AREA OR QUANTITY	SUN GAIN OR TEMP. DIFF.	FACTOR	Kcal/h	CORRECTION	
SOLAR GAIN — GLASS				MAX 6:00	3:00	5:00
(NE)	6.4 m²×	366×0.11/0.85×	0.94×0.65	157	228	185
(NW)	6.9 m²×	366×0.64/0.85×	0.94×0.65	1162	618	1180
	m²×	×				
	m²×	×				
	m²×	×				
SOLAR & TRANS GAIN—WALLS & ROOF						
WALL (NE)	20.6 m²×	13.5 ×	2.1	584	515	563
(NW)	19.1 m²×	23.2 ×	2.1	931	258	783
	m²×	×				
	m²×	×				
ROOF—SUN	42.25 m²×	28.5 ×	1.7	2047	1724	1997
ROOF—~~SHADED~~	26.0 m²×	28.5 ×	1.1	816	687	795
TRANS. GAIN—EXCEPT WALLS & ROOF						
GLASS	12.3 m²×	14.7 ×	5.1	923	1142	1036
CEILING	m²×	×				
FLOOR	10.0 m²×	7.35 ×	1.7	125	155	141
PARTITION	10.0 m²×	7.35 ×	2.5	184	228	207
INFILTRATION	CMH×	deg×	0.29			
INTERNAL HEAT						
PEOPLE	6 PEOPLE×	41		246	246	246
Kw	Kw×	×	860			
LIGHTS	68.25×20 W×		1.08	1475	1475	1475
APPLIANCES ETC.						
CREDIT FOR THERMAL STORAGE	m²×	deg×		(−)	(−)	
			Sub Total			
SAFETY FACTOR			%			
ROOM SENSIBLE HEAT SUB TOTAL				8650	7275	8608
SUPPLY DUCT HEAT GAIN	SUPPLY DUCT +LEAK LOSS	FAN +HP	=10%	865	728	861
BYPASS OUTSIDE AIR	150 CMH×	14.7 deg×	0.1 B.F×0.29	64	80	72
EFFECTIVE ROOM SENSIBLE HEAT ■				9579	8083	9541
ROOM LATENT HEAT						
INFILTRATION	CMH×	g/kg×	0.72			
PEOPLE	6 PEOPLE×	49		294		
STEAM		kg/h×	540			
APPLIANCES ETC.						
VAPOR TRANS.						
			Sub Total			
SAFETY FACTOR			%			
ROOM LATENT HEAT SUB TOTAL				294	294	294
SUPPLY DUCT LEAKAGE LOSS			10 %	30	30	30
BYPASS OUTSIDE AIR	150 CMH×	9.4 g/kg×	0.1 BF×0.72	102	104	103
EFFECTIVE ROOM LATENT HEAT ■				426	428	427
EFFECTIVE ROOM TOTAL HEAT ■				10005	8511	9968
OUTSIDE AIR HEAT				(147)		
SENSIBLE:	CMH×	deg×(1−	BF)×0.29			
LATENT:	CMH×	g/kg×(1−	BF)×0.72			
GRAND TOTAL HEAT SUB TOTAL						
RETURN DUCT HEAT GAIN +	RETURN DUCT LEAK GAIN −	PUMP H.P +	PIPE GAIN = %			
(U.S.R.T) GRAND TOTAL HEAT ■						

ESTIMATE FOR: AM PM — PEAK LOAD AM PM 6

HOURS OF OPERATION Hour (~)

OUTSIDE DESIGN CONDITIONS	CDB	CWB	%RH		
CONDITIONS	DB ℃	WB ℃	%RH	DP ℃	g/kg
OUTSIDE	38.7	27.6	43		18.8
ROOM	24.0	17.1	50		9.4
DIFFERENCE	14.7	×××	×××	×××	9.4

BLIND: NON-EXISTENCE(OUTSIDE. INSIDE) L. M. D.
GLASS: ORDINARY. THICK. ABSORBENT. %. DOUBLE
COLOR: LIGHT. MEDIUM. DARK.
WEIGHT: kg/m²(FLOOR) kg/m²(WALL)
INTERNAL HEAT: W/m² m²/PEOPLE

INFILTRATION

SWINGING
REVOLVING DOORS PEOPLE× CMH/PER.
OPEN DOORS DOORS× CMH/DOOR
EXHAUST AIR
CRACK m× CMH/m
INFILTRATION CMH ■

VENTILATION

6 PEOPLE× 25 CMH/PER. 150
m²× CMH/m²
VENTILATION CMH ■ 150

SENSIBLE HEAT FACTOR

E.S.H.F= 9579 (ERSH) / 10.005 (ERTH) = 0.96 (12.6℃)

DEHUMIDIFIED AIR

APPARATUS DEWPOINT 12.5 ℃

9579 (ERSH) / (24 RM−12.5 ADP)(1−0.1 BF)×0.29 = 3.200 CMH

NOTES

GLASS (NE): 1.5×1.8×2 = 6.4
(NW): 1.5×1.8+1.5×2.8 = 6.9

WALL (NE): 6.5×4.0−6.4 = 20.6
(NW): 6.5×4.0−6.9 = 19.1

PARTITION: 4.0×2.5 = 10.0
FLOOR: 4.0×2.5 = 10.0
ROOF (1): 4.0×6.5 = 26.0
(2): 6.5×6.5 = 42.25
VR: 6.5×4.0×2.5+6.5×6.5×3.8 = 225.55

1023

FORM E-201

COOLING AND DEHUMIDIFYING ESTIMATE (METRIC)

INQUIRING NO. | INQUIRED BY | SHEET NO. 27
JOB NAME | ADDRESS | DATE ORIGINAL
SPACE USED FOR JUNIOR ENGINEER ROOM (Toilet) PAC - 1 SYSTEM | REVISION
SIZE 10.5 m × 6.5 m = 68.25 m² × m(H) = 225.55 m³ | PERSON IN CHARGE

ITEM	AREA OR QUANTITY	SUN GAIN OR TEMP. DIFF.	FACTOR	Kcal/h MAX 6:00	CORRECTION 3:00	CORRECTION 5:00
SOLAR GAIN — GLASS						
(NW)	6.9 m²	× 366 × 0.64/0.85 ×	0.94 × 0.65	1162	618	1180
	m²	×	×			
	m²	×	×			
	m²	×	×			
	m²	×	×			
SOLAR & TRANS GAIN—WALLS & ROOF						
WALL (NW)	19.1 m²	× 23.2	× 2.1	931	258	783
	m²	×	×			
	m²	×	×			
	m²	×	×			
	m²	×	×			
ROOF — SUN	42.25 m²	× 28.5	× 1.7	2047	1724	1997
ROOF — ~~SHADED~~	26.° m²	× 28.5	× 1.1	816	687	795
TRANS. GAIN—EXCEPT WALLS & ROOF						
GLASS	6.9 m²	× 14.7	× 5.1	518	641	581
CEILING	m²	×	×			
FLOOR	10.° m²	× 7.35	× 1.7	125	155	141
PARTITION	m²	×	×			
INFILTRATION	CMH	× deg	× 0.29			
INTERNAL HEAT						
PEOPLE	6 PEOPLE	× 41		246	246	246
KW	KW	×	× 860			
LIGHTS	68.25 × 20	W	× 1.08	1475	1475	1475
APPLIANCES ETC.						
CREDIT FOR THERMAL STORAGE	m²	× deg	×	(-)	(-)	
			SUB TOTAL			
SAFETY FACTOR			%			
ROOM SENSIBLE HEAT SUB TOTAL				7320	5804	7198
SUPPLY DUCT HEAT GAIN	SUPPLY DUCT +LEAK LOSS	FAN +HP	=10%	732	581	720
BYPASS OUTSIDE AIR	150 CMH × 14.7 deg × 0.1 BF × 0.29			64	80	72
EFFECTIVE ROOM SENSIBLE HEAT ■				8116	6465	7990
ROOM LATENT HEAT						
INFILTRATION	CMH	× g/kg	× 0.72			
PEOPLE	6 PEOPLE	× 49		294	294	294
STEAM	kg/h	×	540			
APPLIANCES ETC.						
VAPOR TRANS.						
			SUB TOTAL			
SAFETY FACTOR			%			
ROOM LATENT HEAT SUB TOTAL				294	294	294
SUPPLY DUCT LEAKAGE LOSS			10 %	30	30	30
BYPASS OUTSIDE AIR	150 CMH × 9.4 g/kg × 0.1 BF × 0.72			102	104	103
EFFECTIVE ROOM LATENT HEAT ■				426	428	427
EFFECTIVE ROOM TOTAL HEAT ▣				8542	6893	8417
OUTSIDE AIR HEAT						
SENSIBLE:	CMH ×	deg × (1 − BF) × 0.29				
LATENT:	CMH ×	g/kg × (1 − BF) × 0.72				
GRAND TOTAL HEAT SUB TOTAL						
RETURN DUCT HEAT GAIN + RETURN DUCT LEAK GAIN + PUMP H.P + PIPE GAIN = %						
(U.S.R.T) GRAND TOTAL HEAT ▣						

ESTIMATE FOR.	AM / PM	PEAK LOAD	AM / PM 6
HOURS OF OPERATION	HOUR (	~	)
OUTSIDE DESIGN CONDITIONS	°CDB	°CWB	%RH
CONDITIONS	DB °C	WB °C	%RH	DP °C	g/kg
OUTSIDE	38.7	27.6	43		18.8
ROOM	24.0	17.1	50		9.4
DIFFERENCE	14.7	×××	×××	×××	9.4
BLIND	NON-EXISTENCE (OUTSIDE, INSIDE) L. M. D				
GLASS	ORDINARY. THICK. ABSORBENT. %. DOUBLE				
COLOR	LIGHT. MEDIUM. DARK.				
WEIGHT	kg/m²(FLOOR)		kg/m²(WALL)		
INTERNAL HEAT	W/m²		m²/PEOPLE		

INFILTRATION		
SWINGING		
REVOLVING DOORS	PEOPLE × CMH/PER.	
OPEN DOORS	DOORS × CMH/DOOR	
EXHAUST AIR		
CRACK	m × CMH/m	
INFILTRATION	CMH ■	
VENTILATION		
6 PEOPLE ×	25 CMH/PER.	150
m² ×	CMH/m²	
VENTILATION	CMH ■	150

SENSIBLE HEAT FACTOR

E.S.H.F = 8116 (ERSH) / 8542 (ERTH) = 0.95 (12.6°C)

DEHUMIDIFIED AIR

APPARATUS DEWPOINT 12.5 °C

8116 (ERSH) / (74 RM − 12.5 ADP)(1 − 0.1 BF) × 0.29 = 2710 CMH

NOTES

1. GLASS (NW) : 1.5 × 1.8 + 1.5 × 2.8 = 6.9
2. WALL (NW) : 6.5 × 4.0 − 6.9 = 19.1
3. FLOOR : 4.0 × 2.5 = 10.0
4. ROOF (1) : 4.0 × 6.5 = 26.0
   (2) : 6.5 × 6.5 = 42.25

FORM E-20E

10 24

COOLING AND DEHUMIDIFYING ESTIMATE (METRIC)

Inquiring No. | Inquired By | Sheet No. 28
Job Name | Address | Date Original | Revision | Person in Charge
Space Used For JUNIOR ENGINEER ROOM (TO1 C) | PAC-1 SYSTEM
Size 10.5 m × 6.5 m = 68.25 m² × m(H) = 225.55 m³

Item	Area or Quantity	Sun Gain or Temp. Diff.	Factor	Kcal/h MAX 6:00	3:00	5:00
SOLAR GAIN — GLASS						
(NW)	6.9 m²	× 366 × 64/68.25 ×	0.94 × 0.65	1162	618	1180
	m²	×	×			
	m²	×	×			
	m²	×	×			
	m²	×	×			
SOLAR & TRANS GAIN—WALLS & ROOF						
Wall (NW)	19.1 m²	× 23.2	× 2.1	931	258	783
	m²	×	×			
	m²	×	×			
	m²	×	×			
	m²	×	×			
Roof—Sun	42.25 m²	× 28.5	× 1.7	2047	1724	1997
Roof—Shaded	26.0 m²	× 28.5	× 1.1	816	687	795
TRANS. GAIN—EXCEPT WALLS & ROOF						
Glass	6.9 m²	× 14.7	× 5.1	518	641	581
Ceiling	m²	×	×			
Floor	m²	×	×			
Partition	m²	×	×			
Infiltration	CMH	× deg	× 0.29			
INTERNAL HEAT						
People	6 People	× 41		246	246	246
Kw	Kw	×	× 860			
Lights	68.25	× 20 W	× 1.08	1475	1475	1475
Appliances etc.						
Credit for Thermal Storage	m²	× deg	×	(−)	(−)	
			Sub Total			
Safety Factor			%			
Room Sensible Heat Sub Total				7195	5649	7057
Supply Duct Heat Gain	Supply Duct +Leak Loss	FAN +HP	=10%	720	565	706
bypass outside air	6 CMH	× 14.7 deg × 0.1 BF × 0.29		64	80	72
Effective Room Sensible Heat				7979	6294	7835
ROOM LATENT HEAT						
Infiltration	CMH	× g/kg	× 0.72			
People	6 People	× 49				
Steam	kg/h	× 540		294		
Appliances etc.						
Vapor trans.						
			Sub Total			
Safety Factor			%			
Room Latent Heat Sub Total				294	294	294
Supply Duct Leakage Loss			10 %	30	30	30
Bypass Outside Air	150 CMH	× 9.4 g/kg × 0.1 BF	× 0.72	102	104	103
Effective Room Latent Heat				426	428	427
Effective Room Total Heat				8405	6722	8262
OUTSIDE AIR HEAT				(124)		
Sensible:	CMH	× deg	× (1 − BF) × 0.29			
Latent:	CMH	× g/kg	× (1 − BF) × 0.72			
Grand Total Heat Sub Total						
Return Duct Heat Gain + Return Duct Leak Gain + Pump H.P + Pipe Gain			= %			
(U.S.R.T) Grand Total Heat						

Estimate For.	AM	PM	Peak Load	AM PM 6
Hours of Operation	Hour (	~	)	
Outside Design Conditions	°CDB	°CWB	%RH	
Conditions	DB °C	WB °C	%RH	DP °C	g/kg
Outside	38.7	29.6	43		18.8
Room	24.0	17.1	50		9.4
Difference	14.7	×××	×××	×××	9.4
Blind	Non-existence (outside, inside) L. M. D				
Glass	Ordinary. Thick. Absorbent. %. Double				
Color	Light. Medium. Dark.				
Weight	kg/m² (floor)			kg/m² (wall.)	
Internal Heat	W/m²			m³/People	

Infiltration
Swinging
Revolving Doors People × CMH/per.
Open Doors Doors × CMH/door
Exhaust Air
Crack m × CMH/m.
Infiltration CMH ■

Ventilation
6 People × 25 CMH/per. = 150
m² × CMH/m²
Ventilation CMH ■ 150

Sensible Heat Factor
E.S.H.F = 7979 (ERSH) / 8405 (ERTH) = 0.95 (12.6°C)

Dehumidified Air
Apparatus Dewpoint 12.5 °C

(ERSH) / 24 RM − 12.5 ADP)(1 − 0.1 BF) × 0.29 = 2,670 CMH

NOTES

VR = 4.0 × 6.5 × 2.5 + 6.5 × 6.5 × 3.8
= 225.55

GLASS (NW) : 1.5 × 1.8 + 1.5 × 2.8 = 6.9
WALL (NW) : 6.5 × 4.0 − 6.9 = 19.1
ROOF (1) : 4.0 × 6.5 = 26.0
(2) : 6.5 × 6.5 = 42.25

1025

FORM E-20E

COOLING AND DEHUMIDIFYING ESTIMATE (METRIC)

Inquiring No. | Inquired By | Sheet No. 29
Job Name | Address | Date Original | Revision | Person in Charge
Space Used For JUNIOR ENGINEER ROOM (TOI 6) PAC - 1 SYSTEM
Size 10.5 m × 6.5 m = 68.25 m² × 2.5 3.8 m(H) = 225.55 m³

Item	Area or Quantity	Sun Gain or Temp. Diff.	Factor	Kcal/h MAX 6:00	Correction 3:00	Correction 5:00
SOLAR GAIN — GLASS						
(NW) 6.9	m² × 366	× 0.64/0.85	× 0.94 × 0.65	1162	618	1180
	m² ×		×			
	m² ×		×			
	m² ×		×			
	m² ×		×			
SOLAR & TRANS GAIN—WALLS & ROOF						
Wall (NW) 19.1	m² ×	23.2	× 2.1	931	258	783
	m² ×		×			
	m² ×		×			
	m² ×		×			
Roof—Sun 42.25	m² ×	28.5	× 1.7	2047	1724	1997
Roof—~~Shaded~~ 26.0	m² ×	28.5	× 1.1	816	687	795
TRANS. GAIN—EXCEPT WALLS & ROOF						
Glass 6.9	m² ×	14.7	× 5.1	518	641	581
Ceiling	m² ×		×			
Floor	m² ×		×			
Partition 10.0	m² ×	7.35	× 1.8	133	164	149
Infiltration	CMH ×	deg ×	0.29			
INTERNAL HEAT						
People	6 People ×	41		246	246	246
Kw	Kw ×		× 860			
Lights	68.25 × 20 W ×		1.08	1475	1475	1475
Appliances Etc.						
Credit for Thermal Storage	m² ×	deg ×		(—)	(—)	
			Sub Total			
Safety Factor			%			
Room Sensible Heat Sub Total				7328	5813	7206
Supply Duct Heat Gain	Supply Duct +Leak Loss		Fan +HP 10%	733	582	721
Bypass Outside Air	150 CMH × 14.7 deg × 0.1 BF × 0.29			64	80	72
Effective Room Sensible Heat ■				8125	6475	7999
ROOM LATENT HEAT						
Infiltration	CMH ×	g/kg ×	0.72			
People	6 People ×	49		294		
Steam		kg/h ×	540			
Appliances Etc.						
Vapor Trans.						
			Sub Total			
Safety Factor			%			
Room Latent Heat Sub Total				294	294	294
Supply Duct Leakage Loss			10 %	30	30	30
Bypass Outside Air	150 CMH × 94 g/kg × 0.1 BF × 0.72			102	104	103
Effective Room Latent Heat ■				426	428	427
Effective Room Total Heat ▣				8551	6903	8426
OUTSIDE AIR HEAT				(126)		
Sensible:	CMH ×	deg × (1 − BF) × 0.29				
Latent:	CMH ×	g/kg × (1 − BF) × 0.72				
Grand Total Heat Sub Total						
Return Duct Heat Gain +	Return Duct Leak Gain +	Pump H.P +	Pipe Gain = %			
(U.S.R.T) Grand Total Heat ▣						

Estimate For.	AM / PM	Peak Load	AM / PM 6
Hours of Operation	Hour (	–	)

Outside Design Conditions	DB °C	WB °C	%RH	DP °C	g/kg
Conditions					
Outside	38.7	29.6	43		18.8
Room	24.0	17.1	50		9.4
Difference	14.7	×××	×××	×××	9.4

Blind	Non-existence (outside, inside)	L. M. D
Glass	Ordinary, Thick, Absorbent,	%. Double
Color	Light, Medium, Dark,	
Weight	kg/m² (floor)	kg/m² (wall)
Internal Heat	W/m²	m²/People

Infiltration

Swinging		
Revolving Doors	People × CMH/Per	
Open Doors	Doors × CMH/Door	
Exhaust Air		
Crack	m × CMH/m	
Infiltration	CMH ■	

Ventilation

6 People ×	25 CMH/Per.	150
m² ×	CMH/m²	
Ventilation	CMH ■	150

Sensible Heat Factor

E.S.H.F = 8125 (ERSH) / 8551 (ERTH) = 0.95 (12.6°C)

Dehumidified Air

Apparatus Dewpoint 12.5 °C

8125 (ERSH) / (24RM − 12.5ADP)(1 − 0.BF) × 0.29 = 2.710 CMH

NOTES

GLASS (NW) : 1.5 × 1.8 + 1.5 × 2.8 = 6.9
WALL (NW) : 6.5 × 4.0 − 6.9 = 19.1
ROOF (1) : 4.0 × 6.5 = 26.0
(2) : 6.5 × 6.5 = 42.25

· PARTITION : 4.0 × 2.5 = 10.0

VR = 4.0 × 6.5 × 2.5 + 6.5 × 6.5 × 3.8 = 225.55

FORM E-20E

COOLING AND DEHUMIDIFYING ESTIMATE (METRIC)

Inquiring No. | Inquired By | Sheet No. 30
Job Name | Address | Date Original
Space Used For JUNIOR ENGINEER ROOM (To ta) PAC-1 System | Revision
Size m × m = 60.25 m² × 2.5, 3.8 m(H) = 205.55 m³ | Person in Charge

Item	Area or Quantity	Sun Gain or Temp. Diff.	Factor	Kcal/h MAX 5:00	3:00	6:00
SOLAR GAIN — GLASS						
(NW). 6.9	m²× 366 × 0.65/0.85 × 0.94 × 0.65			1180	618	1162
(SW) 8.1	m²× 252 × 0.5/0.85 × 0.94 × 1.65			734	1028	982
	m²×	×				
	m²×	×				
	m²×	×				
SOLAR & TRANS GAIN—WALLS & ROOF						
Wall (NW) 19.1	m²×	19.5 ×	2.1	783	258	931
(SW) 33.9	m²×	19.2 ×	2.1	1367	1125	1389
	m²×	×				
	m²×	×				
Roof—Sun 42.25	m²×	29.8 ×	1.7	1997	1724	2047
Roof—Shaded 18.0	m²×	29.8 ×	1.1	551	476	565
TRANS. GAIN—EXCEPT WALLS & ROOF						
Glass 15.0	m²×	16.5 ×	5.1	1263	1393	1125
Ceiling	m²×	×				
Floor	m²×	×				
Partition 17.6	m²×	8.25 ×	1.8	262	289	233
Infiltration	CMH ×	deg ×	0.29			
INTERNAL HEAT						
People	6 People × 41			246	246	246
Kw	Kw ×	×	860			
Lights	60.25 × 20 W ×		1.08	1475	1475	1475
Appliances Etc.						
Credit for Thermal Storage	m²×	deg ×		(−)		(−)
			Sub Total			
Safety Factor			%			
Room Sensible Heat Sub Total				9858	8632	9555
Supply Duct Heat Gain	Supply Duct +Leak Loss	Fan +HP	=16%	986	864	956
Bypass Outside Air	150 CMH × 16.5 deg × 0.1 BF × 0.29			72	80	64
Effective Room Sensible Heat				10916	9576	10575
ROOM LATENT HEAT						
Infiltration	CMH ×	g/kg ×	0.72			
People	6 People × 49			294		
Steam		kg/h ×	540			
Appliances etc.						
Vapor Trans.						
			Sub Total			
Safety Factor			%			
Room Latent Heat Sub Total				294	294	294
Supply Duct Leakage Loss			10%	30	30	30
Bypass Outside Air	150 CMH × 9.5 g/kg × 0.1 BF × 0.72			103	104	102
Effective Room Latent Heat				427	428	426
Effective Room Total Heat				11343	10004	11001
OUTSIDE AIR HEAT				(189)		
Sensible:	CMH ×	deg × (1 − BF) × 0.29				
Latent:	CMH ×	g/kg × (1 − BF) × 0.72				
Grand Total Heat Sub Total						
Return Duct Heat Gain + Return Duct Leak Gain + Pump H.P + Pipe Gain			= %			
(U.S.R.T) GRAND TOTAL HEAT						

Estimate For.	AM	PM	Peak Load	AM	PM 5
Hours of Operation	Hour (		~	)	

Outside Design Conditions	DB °C	WB °C	%RH	DP °C	g/kg
Outside	40.5	28.2	39		18.9
Room	24.0	17.1	50		9.4
Difference	16.5	×××	×××	×××	9.5

Blind	(Non-existence/Outside, Inside)	L. M. D
Glass	Ordinary, Thick. Absorbent.	% Double
Color	Light. Medium. Dark.	
Weight	kg/m²(Floor)	kg/m²(Wall)
Internal Heat	W/m²	m²/People

Infiltration

Swinging			
Revolving Doors	People ×	CMH/Per.	
Open Doors	Doors ×	CMH/Door	
Exhaust Air			
Crack	m ×	CMH/m	
Infiltration	CMH ■		

Ventilation

6 People ×	25	CMH/Per.	150
m² ×		CMH/m²	
Ventilation	CMH ■		150

Sensible Heat Factor

E.S.H.F = 10916 (ERSH) / 11343 (ERTH) = 0.96 (12.6°C)

Dehumidified Air

Apparatus Dewpoint 12.5 °C

10916 (ERSH) / (24 RM − 12 > ADP)(1 − 0.BF) × 0.29 = 3,640 CMH

NOTES

SR = 10.5 × 6.5 − 2.0 × 4.0 = 60.25

GLASS (NW): 1.5 × 1.8 + 1.5 × 2.8 = 6.9
(SW): 1.5 × 1.8 × 3 = 8.1

WALL (NW): 6.5 × 4.0 − 6.9 = 19.1
(SW): 10.5 × 4.0 − 8.1 = 33.9

ROOF (1): 4.0 × 4.5 = 18.0
(2): 6.5 × 6.5 = 42.25

PARTITION: 4.0 × 2.5 + 2.0 × 3.8 = 17.6

VR: 4.0 × 4.5 × 2.5 + 6.5 × 6.5 × 3.8
= 205.55

FORM E-201

COOLING AND DEHUMIDIFYING ESTIMATE (METRIC)

Inquiring No. | Inquired By | Sheet No. 31
Job Name | Address | Date Original
Space Used For CONFERENCE Room (F03) | PAC-2 SYSTEM | Revision
Size 13.0 m × 6.5 m = 84.5 m² × 3.0 m(H) = 253.5 m³ | Person in Charge

Item	Area or Quantity	Sun Gain or Temp. Diff.	Factor	Kcal/h MAX	2:00	3:00	4:00
SOLAR GAIN — GLASS							
(SE)	12.3 m²	× 252 × 0.79/0.85 × 0.94 × 0.65			647	535	468
	m²	×	×				
	m²	×	×				
	m²	×	×				
	m²	×	×				
SOLAR & TRANS GAIN—WALLS & ROOF							
Wall (SE)	39.7 m²	× 13.9	× 2.1		1159	1076	777
	m²	×	×				
	m²	×	×				
	m²	×	×				
	m²	×	×				
Roof—Sun	m²	×	×				
Roof—Shaded	m²	×	×				
TRANS. GAIN—EXCEPT WALLS & ROOF							
Glass	12.78 m²	× 17.7	× 5.1		1154	1187	1154
Ceiling	m²	×	×				
Floor	84.5 m²	× 12.7	× 2.5		2683	2789	2683
Partition(1)	12.6 m²	× 8.85	× 1.8		201	207	201
(2)	12.0 m²	× 8.85	× 2.5		266	273	266
Infiltration	CMH	× deg	× 0.29				
INTERNAL HEAT							
People	16 People	× 41			656	656	656
Kw	Kw	×	× 860				
Lights	84.5	× 20 W	× 1.08		1826	1826	1826
Appliances etc.							
Credit for Thermal Storage	m²	× deg	×	(-)		(-)	
			Sub Total				
Safety Factor			%				
Room Sensible Heat Sub Total					8592	8549	8031
Supply Duct Heat Gain	Supply Duct +Leak Loss	Fan +HP	=10%		860	855	804
Bypass Outside Air	400 CMH	× 19.7 deg	× 0.1 B.F × 0.29		206	212	212
Effective Room Sensible Heat					9658	9616	9047
ROOM LATENT HEAT							
Infiltration	CMH	× g/kg	× 0.72				
People	16 People	× 49			784	784	784
Steam		kg/h	× 540				
Appliances etc.							
Vapor Trans.							
			Sub Total				
Safety Factor			%				
Room Latent Heat Sub Total					784	784	
Supply Duct Leakage Loss			10 %		79	79	
Bypass Outside Air	400 CMH	× 9.4 g/kg	× 0.1 BF × 0.72		271	277	274
Effective Room Latent Heat					1134	1136	1133
Effective Room Total Heat					10792	10752	10180
OUTSIDE AIR HEAT					(128)		
Sensible:	CMH	× deg	× (1 − BF) × 0.29				
Latent:	CMH	× g/kg	× (1 − BF) × 0.72				
Grand Total Heat Sub Total							
Return Duct Heat Gain + Return Duct Leak Gain + Pump H.P + Pipe Gain			= %				
(U.S.R.T) Grand Total Heat							

Estimate For.	AM / PM	Peak Load	AM / PM 2
Hours of Operation	Hour (	–	)
Outside Design Conditions		°CDB	°CWB	%RH
Conditions:	DB °C	WB °C	%RH	DP °C	g/kg
Outside	41.7	28.4	38		18.8
Room	24.0	19.1	50		9.4
Difference	17.7	×××	×××	×××	9.4
Blind	Non-existence (outside, inside) L.M.D				
Glass	Ordinary, thick, absorbent.			% Double	
Color	Light, medium, dark.				
Weight	kg/m²(floor)			kg/m²(wall)	
Internal Heat	W/m²			m²/people	

Infiltration

Swinging			
Revolving Doors	People ×	CMH/per	
Open Doors	Doors ×	CMH/door	
Exhaust Air			
Crack	m ×	CMH/m	
Infiltration	CMH	■	

Ventilation

16 People ×	25	CMH/per	400
1 m² ×		CMH/m²	
Ventilation	CMH	■	400

Sensible Heat Factor

$$E.S.H.F = \frac{9,658\ (ERSH)}{10,792\ (ERTH)} = 0.91\ (12.1°C)$$

Dehumidified Air

Apparatus Dewpoint 12.5 °C

$$\frac{9,658\ (ERSH)}{(24\ RM - 12.5\ ADP)(1 - 0.1\ BF) \times 0.29} = 3,220\ CMH$$

NOTES

- GLASS (SE) : 1.5×1.8×3 + 1.5×2.8 = 12.3
- WALL (SE) : 13.°×4.0 − 12.3 = 39.7
- PARTITION
  - (1) : 4.2×3.0 = 12.6
  - (2) : 4.0×3.0 = 12.0
- FLOOR : SR

FORM E-20E

COOLING AND DEHUMIDIFYING ESTIMATE (METRIC)

INQUIRING NO. | INQUIRED BY | SHEET NO. 32
JOB NAME | ADDRESS | DATE ORIGINAL
SPACE USED FOR CORRIDOR (F09) PAC-2 SYSTEM | REVISION
SIZE mX m = 87.25 m² × 2.5 m(H) = 218.13 m³ | PERSON IN CHARGE

ITEM	AREA OR QUANTITY	SUN GAIN OR TEMP DIFF.	FACTOR	Kcal/h MAX 3:00	CORRECTION 2:00	CORRECTION 4:00
SOLAR GAIN — GLASS						
	m²×		×			
	m²×		×			
	m²×		×			
	m²×		×			
	m²×		×			
SOLAR & TRANS GAIN—WALLS & ROOF						
WALL	m²×		×			
	m²×		×			
	m²×		×			
	m²×		×			
ROOF—SUN	m²×		×			
ROOF—SHADED	m²×		×			
TRANS. GAIN—EXCEPT WALLS & ROOF						
GLASS	m²×		×			
CEILING	m²×		×			
FLOOR	56.25 m²×	13.2	× 2.5	1857	1786	
PARTITION (1)	81.85 m²×	9.1	× 1.8	1336	1299	
(2)	30.15 m²×	9.1	× 2.5	686	667	
DOOR	11.34 m²×	9.1	× 1.6	166	161	
INFILTRATION	CMH×	deg×	0.29			
INTERNAL HEAT						
PEOPLE	PEOPLE×		× 860			
KW	KW×					
LIGHTS	87.25 × 20 W×		1.08	1885	1885	
APPLIANCES ETC.						
CREDIT FOR THERMAL STORAGE	m²×	deg×	(−)		(−)	
			SUB TOTAL			
SAFETY FACTOR			%			
ROOM SENSIBLE HEAT SUB TOTAL				5930	5798	
SUPPLY DUCT HEAT GAIN	SUPPLY DUCT +LEAK LOSS	FAN +HP	=10%	593	580	
BYPASS OUTSIDE AIR	CMH×	deg×	BF×0.29			
EFFECTIVE ROOM SENSIBLE HEAT			■	6523	6378	6378
ROOM LATENT HEAT						
INFILTRATION	CMH×	g/kg×	0.72			
PEOPLE	PEOPLE×					
STEAM	kg/h×		540			
APPLIANCES ETC.						
VAPOR TRANS.						
			SUB TOTAL			
SAFETY FACTOR			%			
ROOM LATENT HEAT SUB TOTAL						
SUPPLY DUCT LEAKAGE LOSS			%			
BYPASS OUTSIDE AIR	CMH×	g/kg×	BF×0.72			
EFFECTIVE ROOM LATENT HEAT			■			
EFFECTIVE ROOM TOTAL HEAT			◙	6523	6378	6378
OUTSIDE AIR HEAT						
SENSIBLE:	CMH×	deg×(1− BF)×0.29				
LATENT:	CMH×	g/kg×(1− BF)×0.72				
GRAND TOTAL HEAT SUB TOTAL						
RETURN DUCT HEAT GAIN + RETURN DUCT LEAK GAIN + PUMP H.P + PIPE GAIN			= %			
(U.S.R.T) GRAND TOTAL HEAT			◙			

ESTIMATE FOR: AM / PM — PEAK LOAD — AM / PM 3

HOURS OF OPERATION Hour (~)

OUTSIDE DESIGN CONDITIONS	DB °C	WB °C	%RH	DP °C	g/kg
OUTSIDE	42.2	28.6	37		19.0
ROOM	24.0	17.1	50		9.4
DIFFERENCE	18.2	×××	×××	×××	9.6

BLIND: NON-EXISTENCE (OUTSIDE, INSIDE) L M D
GLASS: ORDINARY. THICK. ABSORBENT. ½. DOUBLE
COLOR: LIGHT. MEDIUM. DARK.
WEIGHT: kg/m²(FLOOR) kg/m²(WALL)
INTERNAL HEAT: W/m² m²/PEOPLE

INFILTRATION
SWINGING
REVOLVING DOORS PEOPLE× CMH/PER.
OPEN DOORS DOORS× CMH/DOOR
EXHAUST AIR
CRACK m× CMH/m
INFILTRATION CMH ■

VENTILATION
PEOPLE× CMH/PER.
m²× CMH/m²
VENTILATION CMH ■

SENSIBLE HEAT FACTOR
E.S.H.F = 6523 (ERSH) / 6623 (ERTH) = 1.0 (13.2°C)

DEHUMIDIFIED AIR
APPARATUS DEWPOINT 12.5 °C
6523 (ERSH) / (24 RM − 12.5 ADP)(1 − .1 BF)×0.29 = 2180 CMH

NOTES
SR = 26.0×2.5 + 2.0×2.0 + 6.5×2.5 + 2.0
= 87.25

PARTITION
(1) 35.5×2.5 − 0.9×2.0×4 = 81.65
(2) 13.5×2.5 − 0.9×2.0×2 = 30.15

DOOR: 0.9×2.0×6 = 10.8

FLOOR: 2.5 × 22.5 = 56.25

1029

FORM E-20

COOLING AND DEHUMIDIFYING ESTIMATE (METRIC)

Inquiring No. | Inquired By | Sheet No. 23
Job Name | Address | Date Original
Space Used For EXCUTIVE ENGINEER Room (505 d) PAC-2 SYSTEM | Revision
Size 3.75 m × 6.5 m = 21.13 m² × 3.8 m (H) = 80.29 m³ | Person in Charge

Item	Area or Quantity	Sun Gain or Temp. Diff	Factor	Kcal/h MAX: 12:00	Correction 3:00	Correction 4:00
SOLAR GAIN — GLASS						
(SE) 4.2	m² × 252 × 1.57/6.85 ×		0.94 × 0.65	434	183	160
	m² ×		×			
	m² ×		×			(221)
	m² ×		×			
	m² ×		×			
SOLAR & TRANS GAIN—WALLS & ROOF						
Wall (SE) 8.8	m² ×	13.6	× 2.1	252	239	230
	m² ×		×			
	m² ×		×			(25)
	m² ×		×			
Roof—Sun	m² ×		×			
Roof—Shaded	m² ×		×			
TRANS. GAIN—EXCEPT WALLS & ROOF						
Glass 4.2	m² ×	14.4	× 5.1	309	393	354
Ceiling	m² ×		×			(354)
Floor	m² ×		×			
Partition 15.2	m² ×	7.2	× 1.8	197	249	243
						(243)
Infiltration	CMH ×	deg ×	0.29			
INTERNAL HEAT						
People	2 People ×	41		82	82	82
Kw	Kw ×	×	860			
Lights	21.13 × 20	W ×	1.08	457	457	457
Appliances Etc.						
Credit for Thermal Storage	m² ×	deg ×		(−)	(−)	
		Sub Total				
Safety Factor		%				(1614)
Room Sensible Heat Sub Total				1731	1663	1526
Supply Duct Heat Gain	Supply Duct +Leak Loss	Fan +HP	=10%	174	161	(162) 153
Bypass outside air	50 CMH × 14.9 deg × 0.1 B.F × 0.29			21	27	24
Effective Room Sensible Heat				1926	1791	1703
ROOM LATENT HEAT						(1800)
Infiltration	CMH ×	g/kg ×	0.72			
People	2 People ×	49		98		
Steam	kg/h ×		540			
Appliances etc.						
Vapor trans.						
		Sub Total				
Safety Factor		%				
Room Latent Heat Sub Total				98	98	98
Supply Duct Leakage Loss			10 %	10	10	10
Bypass Outside Air	50 CMH × 9.5 g/kg × 0.1 BF × 0.72			35	35	34
Effective Room Latent Heat				143	143	142
Effective Room Total Heat				2069	1934	1845
OUTSIDE AIR HEAT				(98)		
Sensible:	CMH ×	deg × (1 − BF) × 0.29				
Latent:	CMH ×	g/kg × (1 − BF) × 0.72				
Grand Total Heat Sub Total						
Return Duct Heat Gain + Return Duct Leak Gain − Pump H.P + Pipe Gain = %						
(U.S.R.T) Grand Total Heat						

Estimate For | AM / PM | Peak Load | AM / PM 12

Hours of Operation Hour (~)

Outside Design Conditions	DB °C	WB °C	%RH	DP °C	g/kg
Outside	38.4	27.6	43		18.9
Room	24.0	17.1	50		9.4
Difference	14.4	×××	×××	×××	9.5

Blind (Non-existence / Outside / Inside) L. M. D
Glass Ordinary. Thick. Absorbent. %. Double
Color Light. Medium. Dark.
Weight kg/m² (Floor) kg/m² (Wall)
Internal Heat W/m² m²/People

Infiltration
Swinging
Revolving Doors People × CMH/Per.
Open Doors Doors × CMH/Door
Exhaust Air
Crack m × CMH/m
Infiltration CMH ■

Ventilation
2 People × 25 CMH/Per. 50
m² × CMH/m²
Ventilation CMH ■ 50

Sensible Heat Factor
E.S.H.F = 1.926 (ERSH) / 2.069 (ERTH) = 0.93 (12.3°C)

Dehumidified Air
Apparatus Dewpoint 12.5 °C

$$\frac{1926\ (ERSH)}{(24RM - 12.5ADP)(1 - 0.1\ BF) \times 0.29} = 620\ CMH$$

NOTES
- GLASS (SE) : 1.5 × 2.8 = 4.2
- WALL (SE) : 3.75 × 4.0 − 4.2 = 8.8
- PARTITION : 4.0 × 3.8 = 15.2

(2:00) : 1942

FORM E-20E

COOLING AND DEHUMIDIFYING ESTIMATE (METRIC)

Inquiring No. | Inquired By | Sheet No. 34
Job Name | Address | Date Original
Space Used For EXECUTIVE ENGINEER ROOM (505b, 505c) PAC-2 SYSTEM | Revision
Size 6.5 m × 4.25 m = 27.13 m² × 3.8 m(H) = 80.29 m³ | Person in Charge

Item	Area or Quantity	Sun Gain or Temp. Diff.	Factor	Kcal/h MAX 12:00	3:00	Correction 4:00
SOLAR GAIN — GLASS						
(SE) 4.2	m² × 252	× 0.57/0.85	× 0.94 × 0.65		434	183	160
	m² ×		×				
	m² ×		×				(221)
	m² ×		×				
	m² ×		×				
SOLAR & TRANS GAIN—WALLS & ROOF							
WALL (SE) 8.8	m² ×	13.6	× 2.1		252	239	230
	m² ×		×				
	m² ×		×				(259)
	m² ×		×				
Roof—Sun	m² ×		×				
Roof—Shaded	m² ×		×				
TRANS. GAIN—EXCEPT WALLS & ROOF							
Glass 4.2	m² ×	14.4	× 5.1		309	393	354
Ceiling	m² ×		×				
Floor	m² ×		×				(354)
Partition	m² ×		×				
Infiltration	CMH ×	deg ×	0.29				
INTERNAL HEAT							
People	2 People ×	41			82	82	82
Kw	Kw ×		× 860				
Lights	21.13 × 2.0	W ×	1.08		457	457	457
Appliances Etc.							
Credit for Thermal Storage	m² ×	deg ×		(—)		(—)	
			Sub Total				(1371)
Safety Factor			%				
Room Sensible Heat Sub Total					1534	1354	1283
Supply Duct Heat Gain	Supply Duct +Leak Loss	Fan +HP	=10%		154	136	(138) 129
Bypass Outside Air	50 CMH × (49 deg − 0.1 B.F) × 0.29				21	27	26
Effective Room Sensible Heat ■					1709	1517	1438
ROOM LATENT HEAT							(1673)
Infiltration	CMH ×	g/kg ×	0.72				
People	2 People ×	49			98		
Steam		kg/h ×	540				
Appliances Etc.							
Vapor Trans.							
			Sub Total				
Safety Factor			%				
Room Latent Heat Sub Total					98	98	98
Supply Duct Leakage Loss			10 %		10	10	10
Bypass Outside Air	50 CMH × 9.5 g/kg × 0.1 BF × 0.72				35	35	34
Effective Room Latent Heat ■					143	143	142
Effective Room Total Heat ▣					1852	1660	1580 (2:00) 1815
OUTSIDE AIR HEAT					(88)		
Sensible:	CMH ×	deg × (1 − BF) × 0.29					
Latent:	CMH ×	g/kg × (1 − BF) × 0.72					
Grand Total Heat Sub Total							
Return Duct Heat Gain + Return Duct Leak Gain		− Pump H.P	+ Pipe Gain = %				
(U.S.R.T) GRAND TOTAL HEAT ▣							

Estimate For	AM / PM	Peak Load	AM / PM 12
Hours of Operation	Hour (	~	)

Outside Design Conditions	DB °C	WB °C	%RH	DP °C	g/kg
Outside	38.4	29.6	43		18.9
Room	24.0	17.1	50		9.4
Difference	14.4	×××	×××	×××	9.5

Blind	Non-existence (outside, inside)	L. M. D
Glass	Ordinary. Thick. Absorbent.	%. Double
Color	Light. Medium. Dark.	
Weight	kg/m² (Floor)	kg/m² (Wall)
Internal Heat	W/m²	m²/People

Infiltration

Swinging		
Revolving Doors	People × CMH/Per.	
Open Doors	Doors × CMH/Door	
Exhaust Air		
Crack	m × CMH/m	
Infiltration	CMH ■	

Ventilation

2 People ×	25 CMH/Per.	50
m² ×	CMH/m²	
Ventilation	CMH ■	50

Sensible Heat Factor

E.S.H.F = 1.709 (ERSH) / 1.852 (ERTH) = 0.92 (12.3°C)

Dehumidified Air

Apparatus Dewpoint 12.5 °C

1.709 (ERSH) / (24 RM − 12.5 ADP)(1 − 0.1 BF) × 0.29 = 550 CMH

NOTES
GLASS (SE) : 4.2
WALL (SE) : 8.8

Return Duct Heat Gain + Return Duct Leak Gain − Pump H.P + Pipe Gain = %

1031

FORM E-20E

COOLING AND DEHUMIDIFYING ESTIMATE (METRIC)

Inquiring No. | Inquired By | Sheet No. 35
Job Name | Address | Date Original
Space Used For EXCUTIVE ENGINER ROOM (505 a) PAC-2 SYSTEM | Revision
Size 3.25 m × 6.5 m = 21.13 m² × 3.8 m(H) = 80.29 m³ | Person in Charge

Item	Area or Quantity	Sun Gain or Temp. Diff.	Factor	Kcal/h MAX 12:00	3:00	4:00
SOLAR GAIN — GLASS						
(SE)	4.2 m²	× 252 × 0.57/0.85	× 0.94 × 0.65	434	183	160
	m²	×	×			
	m²	×	×			(221)
	m²	×	×			
	m²	×	×			
SOLAR & TRANS GAIN—WALLS & ROOF						
Wall (SE)	8.8 m²	× 13.6	× 2.1	252	239	230
	m²	×	×			
	m²	×	×			(259)
	m²	×	×			
Roof—Sun	m²	×	×			
Roof—Shaded	m²	×	×			
TRANS. GAIN—EXCEPT WALLS & ROOF						
Glass	4.2 m²	× 14.4	× 5.1	309	393	354
Ceiling	m²	×	×			(354)
Floor	m²	×	×			
Partition	15.2 m²	× 7.2	× 2.5	274	346	339
						(339)
Infiltration	CMH ×	deg ×	0.29			
INTERNAL HEAT						
People	2 People × 41			82	82	82
Kw	Kw ×	×	860			
Lights	21.13 × 20	W ×	1.08	457	457	457
Appliances etc.						
Credit for Thermal Storage	m² ×	deg ×		(-)		(-)
			Sub Total			
Safety Factor			%			(1708)
Room Sensible Heat Sub Total				1808	1700	1620
Supply Duct Heat Gain	Supply Duct +Leak Loss	Fan +HP	=10%	181	170	(171) 162
Bypass Outside Air	50 CMH × 44 deg × 0.1 BF × 0.29			21	27	26
Effective Room Sensible Heat				2010	1897	1808
ROOM LATENT HEAT						(1905)
Infiltration	CMH ×	g/kg ×	0.72			
People	2 People × 49			98		
Steam	kg/h ×		540			
Appliances etc.						
Vapor Trans.						
			Sub Total			
Safety Factor			%			
Room Latent Heat Sub Total				98		
Supply Duct Leakage Loss			10 %	10		
Bypass Outside Air	CMH × 9.5 g/kg × 0.1 BF × 0.72			35	35	34
Effective Room Latent Heat				143	143	142
Effective Room Total Heat				2153	2040	1950 (2:00) : 2049
OUTSIDE AIR HEAT						
Sensible:	CMH ×	deg × (1 − BF) × 0.29				
Latent:	CMH ×	g/kg × (1 − BF) × 0.72				
Grand Total Heat Sub Total						
Return Duct Heat Gain + Return Duct Leak Gain		Pump H.P + Pipe Gain	= %			
(U.S.R.T) Grand Total Heat						

Estimate For.	AM / PM	Peak Load	AM / PM 12
Hours of Operation	Hour (	~	)

Outside Design Conditions	°CDB	°CWB	%RH

Conditions	DB °C	WB °C	%RH	DP °C	g/kg
Outside	38.4	27.6	43		18.9
Room	24.0	17.1	50		9.4
Difference	14.4	×××	×××	×××	9.5

Blind	Non-Existence (Outside, Inside)	L. M. D
Glass	Ordinary, Thick, Absorbent,	%, Double
Color	Light, Medium, Dark.	
Weight	kg/m²(Floor)	kg/m²(Wall)
Internal Heat	W/m²	m²/People

Infiltration		
Swinging		
Revolving Doors	People × CMH/Per.	
Open Doors	Doors × CMH/Door	
Exhaust Air		
Crack	m × CMH/m	
Infiltration	CMH	
Ventilation		
2 People ×	25 CMH/Per.	50
m² ×	CMH/m²	
Ventilation	CMH	50

Sensible Heat Factor

E.S.H.F = 2010 (ERSH) / 2153 (ERTH) = 0.93 (12.3°C)

Dehumidified Air

Apparatus Dewpoint 12.5 °C

2010 (ERSH) / (24 RM · 12.5 (ADP) (1 − 0.1 BF) × 0.29) = ____ CMH

NOTES

GLASS (SE): 1.5 × 2.8 = 4.2

WALL (SE): 3.25 × 4 − 4.2 = 8.8

PARTITION: 4.0 × 3.8 = 15.2

FORM E-20E

COOLING AND DEHUMIDIFYING ESTIMATE (METRIC)

Inquiring No. | Inquired By | Sheet No. 36
Job Name | Address | Date Original
Space Used For PRAY Room (504) | PAC-2 System | Revision
Size 6.5 m × 6.5 m = 42.25 m² × 3.8 m(H) = 160.55 m³ | Person in Charge

Item	Area or Quantity	Sun Gain or Temp. Diff.	Factor	Kcal/h MAX 3:00	Correction 2:00	Correction 4:00
SOLAR GAIN — GLASS						
(SE)	6.9 m²	× 252 × 0.24/0.85 × 0.94 × 0.65		300	363	263
(SW)	5.4 m²	× 252 × 0.7/0.85 × 0.94 × 0.65		685	646	627
	m²	×	×			
	m²	×	×			
	m²	×	×			
SOLAR & TRANS GAIN—WALLS & ROOF						
Wall (SE)	19.1 m²	× 12.9	× 2.1	518	558	498
(SW)	20.6 m²	× 15.8	× 2.1	684	524	805
	m²	×	×			
	m²	×	×			
Roof—Sun	m²	×	×			
Roof—Shaded	m²	×	×			
TRANS. GAIN—EXCEPT WALLS & ROOF						
Glass	6.9 m²	× 18.2	× 5.1	641	623	623
Ceiling	m²	×	×			
Floor	42.25 m²	× 9.1	× 1.7	654	636	636
Partition	15.2 m²	× 9.1	× 1.8	249	243	243
Infiltration	CMH	× deg	× 0.29			
INTERNAL HEAT						
People	12 People	× 41		492	492	492
Kw	Kw	×	× 860			
Lights	42.25 × 20 W	×	1.08	913	913	913
Appliances Etc.						
Credit for Thermal Storage	m²	× deg	×	(−)	(−)	
			Sub Total			
Safety Factor			%	5136	4998	5100
Room Sensible Heat Sub Total						
Supply Duct Heat Gain	Supply Duct +Leak Loss	Fan +HP	=10%	514	500	510
Bypass Outside Air	300 CMH	× 18.2 deg	× 0.1 B.F × 0.29	159	154	154
Effective Room Sensible Heat				5809	5652	5764
ROOM LATENT HEAT						
Infiltration	CMH	× g/kg	× 0.72			
People	12 People	× 49		588		
Steam	kg/h	×	540			
Appliances etc.						
Vapor Trans.						
			Sub Total			
Safety Factor			%			
Room Latent Heat Sub Total				588	588	588
Supply Duct Leakage Loss			10 %	59	59	59
Bypass Outside Air	300 CMH	× 9.6 g/kg × 0.1 BF	× 0.72	208	203	203
Effective Room Latent Heat				855	850	850
Effective Room Total Heat				6664	6502	6614
OUTSIDE AIR HEAT						
Sensible:	CMH	× deg × (1 − BF)	× 0.29			
Latent:	CMH	× g/kg × (1 − BF)	× 0.72			
Grand Total Heat Sub Total						
Return Duct Heat Gain + Return Duct Leak Gain		− Pump H.P + Pipe Gain	= %			
(U.S.R.T) GRAND TOTAL HEAT						

Estimate For.	AM / PM	Peak Load	AM / PM 3
Hours of Operation	Hour (	~	)

Outside Design Conditions	°CDB	°CWB	%RH

Conditions	DB °C	WB °C	% RH	DP °C	g/kg
Outside	42.2	28.6	37		19.0
Room	24.0	17.1	50		9.4
Difference	18.2	×××	×××	×××	9.6

Blind	Non-existence (outside, inside)	L. M. D
Glass	Ordinary. Thick. Absorbent.	%. Double
Color	Light. Medium. Dark.	
Weight	kg/m² (floor)	kg/m² (wall)
Internal Heat	W/m²	m²/People

Infiltration		
Swinging		
Revolving Doors	People × CMH/per.	
Open Doors	Doors × CMH/door	
Exhaust Air		
Crack	m × CMH/m	
Infiltration	CMH ■	

Ventilation		
12 People ×	25 CMH/per.	300
m² ×	CMH/m²	
Ventilation	CMH ■	300

Sensible Heat Factor

E.S.H.F = 5809 (ERSH) / 6.664 (ERTH) = 0.87 (11.8°C)

Dehumidified Air

Apparatus Dewpoint 12.5 °C

5.809 (ERSH) / (24 RM − 12.5 ADP)(1 − 21 BF) × 0.29 = 1,940 CMH

NOTES

GLASS (SE): 1.5 × 1.8 + 1.5 × 2.8 = 6.9
WALL (SE): 6.5 × 4.0 − 6.9 = 19.1
PARTITION: 4.0 × 3.8 = 15.2
GLASS (SW): 1.5 × 1.8 × 2 = 5.4
WALL (SW): 6.5 × 4.0 − 5.4 = 20.6

FORM E-20

1033

COOLING AND DEHUMIDIFYING ESTIMATE (METRIC)

INQUIRING NO. | INQUIRED BY | SHEET NO. 37
JOB NAME | ADDRESS | DATE ORIGINAL
SPACE USED FOR CORRIDOR (S06) | AC-2 SYSTEM | REVISION
SIZE 1 m× m= 101.5 m² × 2.5 m(H)= 253.75 m³ | PERSON IN CHARGE

ITEM	AREA OR QUANTITY	SUN GAIN OR TEMP DIFF.	FACTOR	Kcal/h MAX 3:00	CORRECTION 2:00	CORRECTION 4:00
SOLAR GAIN — GLASS						
(SW). 4.2 m²×252×0.17/1.85×0.94×0.65				533	503	487
m²×		×				
m²×		×				
m²×		×				
m²×		×				
SOLAR & TRANS GAIN—WALLS & ROOF						
WALL (SW) 5.8 m²×	15.8	×	2.1	193	148	227
m²×		×				
m²×		×				
m²×		×				
m²×		×				
ROOF—SUN m²×		×				
ROOF—SHADED m²×		×				
TRANS. GAIN—EXCEPT WALLS & ROOF						
GLASS 4.2 m²×	18.2	×	5.1	390	380	380
CEILING m²×		×				
FLOOR m²×		×				
PARTITION (1) 30.15 m²×	9.1	×	1.8	494	481	481
(2) 33.2 m²×	9.1	×	2.5	756	735	735
DOOR 5.4 m²×	9.1	×	1.6	79	77	77
INFILTRATION CMH×		deg×	0.29			
INTERNAL HEAT						
PEOPLE PEOPLE×						
KW KW×		×	860			
LIGHTS 101.5×20 W×			1.08	2193	2193	2193
APPLIANCES ETC.						
CREDIT FOR THERMAL STORAGE m²×		deg×		(—)		(—)
SUB TOTAL						
SAFETY FACTOR %						
ROOM SENSIBLE HEAT SUB TOTAL				4638	4571	4580
SUPPLY DUCT HEAT GAIN	SUPPLY DUCT +LEAK LOSS	FAN +HP	=10%	464	457	458
BYPASS OUTSIDE AIR	CMH×	deg×	BF×0.29			
EFFECTIVE ROOM SENSIBLE HEAT ■				5102	4969	5038
ROOM LATENT HEAT						
INFILTRATION CMH×		g/kg×	0.72			
PEOPLE	PEOPLE×					
STEAM	kg/h×		540			
APPLIANCES ETC.						
VAPOR TRANS.						
SUB TOTAL						
SAFETY FACTOR %						
ROOM LATENT HEAT SUB TOTAL						
SUPPLY DUCT LEAKAGE LOSS %						
BYPASS OUTSIDE AIR CMH×	g/kg×	BF×0.72				
EFFECTIVE ROOM LATENT HEAT ■						
EFFECTIVE ROOM TOTAL HEAT ▣				5102	4969	5038
OUTSIDE AIR HEAT						
SENSIBLE: CMH×	deg×(1− BF)×0.29					
LATENT: CMH×	g/kg×(1− BF)×0.72					
GRAND TOTAL HEAT SUB TOTAL						
RETURN DUCT HEAT GAIN + RETURN DUCT LEAK GAIN − PUMP H.P + PIPE GAIN = %						
(U.S.R.T) GRAND TOTAL HEAT ▣						

ESTIMATE FOR: AM / PM — PEAK LOAD: AM / PM 3

HOURS OF OPERATION	HOUR (	–	)		
OUTSIDE DESIGN CONDITIONS	°CDB	°CWB	%RH		
CONDITIONS	DB °C	WB °C	%RH	DP °C	g/kg
OUTSIDE	42.2	28.6	37		19.0
ROOM	24.0	17.1	50		9.4
DIFFERENCE	18.2	×××	×××	×××	9.6

BLIND	NON-EXISTENCE(OUTSIDE, INSIDE)	L. M. D
GLASS	ORDINARY. THICK. ABSORBENT.	%. DOUBLE
COLOR	LIGHT. MEDIUM. DARK.	
WEIGHT	kg/m²(FLOOR)	kg/m²(WALL)
INTERNAL HEAT	W/m²	m²/PEOPLE

INFILTRATION
SWINGING
REVOLVING DOORS PEOPLE× CMH/PER.
OPEN DOORS DOORS× CMH/DOOR
EXHAUST AIR
CRACK m× CMH/m
INFILTRATION CMH ■

VENTILATION
PEOPLE× CMH/PER.
m²× CMH/m²
VENTILATION CMH ■

SENSIBLE HEAT FACTOR
E.S.H.F. = 5102 (ERSH) / 5102 (ERTH) = 1.0 (13.2)

DEHUMIDIFIED AIR
APPARATUS DEWPOINT 12.5 °C
5102 (ERSH) / (24 RM−12.5 ADP)(1−BF)×0.29 = 1680 CMH

NOTES

SR = 32.5×2.5 + 2.0×2.0 + 6.5×2.5 = 101.5

GLASS (SW): 1.5×2.8 = 4.2

WALL (SW): 2.5×4.0 − 4.2 = 5.8

PARTITION
(1): 13.5×2.5 − 3.6 = 30.15
(2): 14.0×2.5 − 1.8 = 33.2

DOOR: 0.9×2.0×3 = 5.4

FORM E-20E

COOLING AND DEHUMIDIFYING ESTIMATE (METRIC)

Inquiring No. | Inquired By | Sheet No. 38
Job Name | Address | Date Original
Space Used For EXCUTIVE ENGINEER ROOM (T03d) PAC-2 System | | Revision
Size 3.25 m × 6.5 m = 21.13 m² × 3.8 m(H) = 80.29 m³ | | Person in Charge

Item	Area or Quantity	Sun Gain or Temp. Diff.	Factor	Kcal/h MAX 4:00	Correction 2:00	Correction 3:00
SOLAR GAIN — GLASS						
(SE)	4.2 m²	× 252 × 0.21/0.85 × 0.94 × 0.65		160	221	183
	m²	×	×			
	m²	×	×			
	m²	×	×			
	m²	×	×			
SOLAR & TRANS GAIN—WALLS & ROOF						
Wall (SE)	8.8 m²	× 12.4	× 2.1	230	257	239
	m²	×	×			
	m²	×	×			
	m²	×	×			
Roof—Sun	21.13 m²	× 26.2	× 1.7	947	962	863
Roof—Shaded	m²	×	×			
TRANS. GAIN—EXCEPT WALLS & ROOF						
Glass	4.2 m²	× 17.7	× 5.1	380	380	390
Ceiling	m²	×	×			
Floor	m²	×	×			
Partition	15.2 m²	× 885	× 1.8	243	243	249
Infiltration	CMH	× deg	× 0.29			
INTERNAL HEAT						
People	2 People	× 41		82	82	82
Kw	Kw	×	× 860			
Lights	21.13 × 20	W	× 1.08	457	457	457
Appliances etc.						
Credit for Thermal Storage	m²	× deg	×	(–)	(–)	
			Sub Total			
Safety Factor			%			
Room Sensible Heat Sub Total				2 494	2402	2463
Supply Duct Heat Gain	Supply Duct +Leak Loss	Fan +HP	=10%	250	241	247
Bypass Outside Air	50 CMH	× 17.7 deg	× 0.1 BF × 0.29	26	26	27
Effective Room Sensible Heat				2 770	2669	2737
ROOM LATENT HEAT						
Infiltration	CMH	× g/kg	× 0.72			
People	2 People	× 49		98		
Steam	kg/h	×	540			
Appliances etc.						
Vapor Trans.						
			Sub Total			
Safety Factor			%			
Room Latent Heat Sub Total				98	98	98
Supply Duct Leakage Loss			10 %	10	10	10
Bypass Outside Air	50 CMH	× 9.4 g/kg	× 0.1 BF × 0.72	34	34	35
Effective Room Latent Heat				142	142	143
Effective Room Total Heat				2 912	2811	2880
OUTSIDE AIR HEAT				(138)		
Sensible:	CMH	× deg	× (1 – BF) × 0.29			
Latent:	CMH	× g/kg	× (1 – BF) × 0.72			
Grand Total Heat Sub Total						
Return Duct Heat Gain	+ Return Duct Leak Gain	– Pump H.P	+ Pipe Gain = %			
(U.S.R.T) Grand Total Heat						

Estimate For.	AM / PM	Peak Load	AM / PM 4
Hours of Operation	Hour (–)		

Outside Design Conditions	DB °C	WB °C	%RH	DP °C	CDB CWB %RH g/kg
Outside	41.7	28.4	38		18.8
Room	24.0	17.1	50		9.9
Difference	17.7	×××	×××	×××	9.4

Blind	Non-existence (Outside, Inside) L. M. D
Glass	Ordinary. Thick. Absorbent. % Double
Color	Light. Medium. Dark.
Weight	kg/m²(Floor) kg/m²(Wall)
Internal Heat	W/m² m²/People

Infiltration

Swinging		
Revolving Doors	People × CMH/Per.	
Open Doors	Doors × CMH/Door	
Exhaust Air		
Crack	m × CMH/m	
Infiltration	CMH ■	

Ventilation

2 People ×	25 CMH/Per.	50
m² ×	CMH/m²	
Ventilation	CMH ■	50

Sensible Heat Factor

E.S.H.F = 2.770 (ERSH) / 2.912 (ERTH) = 0.95 (12.5°C)

Dehumidified Air

Apparatus Dewpoint 12.5 °C

2.770 (ERSH) / (24RM - 12.5ADP)(1 – BF) × 0.29 = 920 CMH

Notes

GLASS (SE) : 1.5 × 2.8 = 4.2
WALL (SE) : 3.75 × 4.0 – 4.2 = 8.8
PARTITION : 4.0 × 3.8 = 15.2
ROOF : SR

FORM E-20E

COOLING AND DEHUMIDIFYING ESTIMATE (METRIC)

Inquiring No. | Inquired By | Sheet No. 39
Job Name | Address | Date Original
Space Used For EXCUTIVE ENGINEER ROOM (T03C, T03A) PAC-2 SYSTEM | Revision
Size 13.25 m × 6.5 m = 21.13 m² × 3.8 m(H) = 80.29 m³ | Person in Charge

Item	Area or Quantity	Sun Gain or Temp. Diff.	Factor	Kcal/h MAX 4:00	2:00	3:00
SOLAR GAIN — GLASS						
(SE) 4.2	m² × 23 × 0.2 / 0.85 × 0.94 × 0.65			160	221	183
	m² ×		×			
	m² ×		×			
	m² ×		×			
	m² ×		×			
SOLAR & TRANS GAIN—WALLS & ROOF						
Wall (SE) 8.8	m² × 12.4		× 2.1	230	257	239
	m² ×		×			
	m² ×		×			
	m² ×		×			
Roof—Sun 21.13	m² × 26.2		× 1.7	942	762	863
Roof—Shaded	m² ×		×			
TRANS. GAIN—EXCEPT WALLS & ROOF						
Glass 4.2	m² × 17.7		× 5.1	380	380	390
Ceiling	m² ×		×			
Floor	m² ×		×			
Partition	m² ×		×			
Infiltration	CMH ×	deg ×	0.29			
INTERNAL HEAT						
People	2 People × 41			82	82	82
Kw	Kw ×		× 860			
Lights	21.13 × 20 W ×		1.08	457	457	457
Appliances Etc.						
Credit for Thermal Storage	m² ×	deg ×		(−)		(−)
			Sub Total			
Safety Factor			%			
Room Sensible Heat Sub Total				2251	2159	2214
Supply Duct Heat Gain	Supply Duct +Leak Loss	FAN +HP	=11%	226	216	222
Bypass Outside Air	50 CMH × 17.7 deg × 0.1 BF × 0.29			26	26	27
Effective Room Sensible Heat ■				2503	2401	2463
ROOM LATENT HEAT						
Infiltration	CMH ×	g/kg ×	0.72			
People	2 People × 49			98		
Steam		kg/h ×	540			
Appliances etc.						
Vapor trans.						
			Sub Total			
Safety Factor			%			
Room Latent Heat Sub Total				98	98	98
Supply Duct Leakage Loss			10 %	10	10	10
Bypass Outside Air	50 CMH × 9.4 g/kg × 0.1 BF × 0.72			34	34	35
Effective Room Latent Heat ■				143	142	143
Effective Room Total Heat ▣				2646	2543	2606
OUTSIDE AIR HEAT						
Sensible:	CMH ×	deg × (1 − BF) × 0.29				
Latent:	CMH ×	g/kg × (1 − BF) × 0.72				
Grand Total Heat Sub Total						
Return Duct Heat Gain + Return Duct Leak Gain	− Pump H.P	− Pipe Gain	= %			
(U.S.R.T) GRAND TOTAL HEAT ▣						

Estimate For.	AM / PM	Peak Load	AM / PM 4
Hours of Operation	Hour (~)		
Outside Design Conditions	°CDB	°CWB	%RH

Conditions	DB °C	WB °C	%RH	DP °C	g/kg
Outside	41.7	28.4	38		18.8
Room	24.0	17.1	50		9.4
Difference	17.7	×××	×××	×××	9.4

Blind	NON-EXISTENCE (OUTSIDE, INSIDE)	L. M. D
Glass	ORDINARY. THICK. ABSORBENT.	%. DOUBLE
Color	LIGHT. MEDIUM. DARK.	
Weight	kg/m²(FLOOR)	kg/m²(WALL)
Internal Heat	W/m²	m³/PEOPLE

INFILTRATION

Swinging		
Revolving Doors	People × CMH/PER.	
Open Doors	Doors × CMH/DOOR	
Exhaust Air		
Crack	m × CMH/m	
Infiltration	CMH ■	

VENTILATION

2 People ×	25 CMH/PER.	50
m² ×	CMH/m²	
Ventilation	CMH ■	50

SENSIBLE HEAT FACTOR

E.S.H.F = 2503 (ERSH) / 2646 (ERTH) = 0.95 (12.6°C)

DEHUMIDIFIED AIR

Apparatus Dewpoint 12.5 °C

2503 (ERSH) / [24 RM − 12.5 ADP)(1 − BF) × 0.29] = 830 CMH

NOTES

GLASS (SE) : 1.5 × 2.8 = 4.2

WALL (SE) : 3.25 × 4.0 − 4.2 = 8.8

ROOF : SR

FORM E-20E

COOLING AND DEHUMIDIFYING ESTIMATE (METRIC)

Inquiring No. | Inquired By | Sheet No. 40
Job Name | Address | Date Original
Space Used For EXEUTIVE ENGINEER ROOM (T03A) PAC-2 SYSTEM | Revision
Size 3.25 m × 6.5 m = 21.13 m² × 3.8 m(H) = 80.29 m³ | Person in Charge

Item	Area or Quantity	Sun Gain or Temp. Diff.	Factor	Kcal/h MAX	4:00	Correction 2:00	3:00
SOLAR GAIN — GLASS							
(SE)	4.2 m²	× 252 × 0.3	× 0.85 × 0.94 × 0.65		160	221	183
	m²	×	×				
	m²	×	×				
	m²	×	×				
	m²	×	×				
SOLAR & TRANS GAIN—WALLS & ROOF							
Wall (SE)	8.8 m²	× 12.4	× 2.1		230	257	239
	m²	×	×				
	m²	×	×				
	m²	×	×				
Roof—Sun	21.13 m²	× 26.2	× 1.7		942	767	863
Roof—Shaded	m²	×	×				
TRANS. GAIN—EXCEPT WALLS & ROOF							
Glass	4.2 m²	× 17.7	× 5.1		380	380	390
Ceiling	m²	×	×				
Floor	m²	×	×				
Partition	15.2 m²	× 8.85	× 2.5		337	337	346
Infiltration	CMH ×	deg ×	0.29				
INTERNAL HEAT							
People	2 People ×		× 41		82	82	82
Kw	Kw ×		× 860				
Lights	21.13 × 20 W ×		1.08		457	457	457
Appliances etc.							
Credit for Thermal Storage	m² ×	deg ×		(-)		(-)	
			Sub Total				
Safety Factor			%				
Room Sensible Heat Sub Total					2588	2496	2560
Supply Duct Heat Gain	Supply Duct +Leak Loss		+ FAN HP = 10%		259	250	256
Bypass Outside Air	50 CMH × 17.7 deg × 0.1 BF × 0.29				26	26	27
Effective Room Sensible Heat					2873	2772	2843
ROOM LATENT HEAT							
Infiltration	CMH ×	g/kg ×	0.72				
People	2 People × 49				98		
Steam		kg/h ×	540				
Appliances etc.							
Vapor trans.							
			Sub Total				
Safety Factor			%				
Room Latent Heat Sub Total					98	98	98
Supply Duct Leakage Loss			10 %		10	10	10
Bypass Outside Air	CMH × 9.4 g/kg × 0.1 BF × 0.72				34	34	35
Effective Room Latent Heat					142	142	143
Effective Room Total Heat					3015	2914	2986
OUTSIDE AIR HEAT					(143)		
Sensible:	CMH ×	deg × (1 − BF) × 0.29					
Latent:	CMH ×	g/kg × (1 − BF) × 0.72					
Grand Total Heat Sub Total							
Return Duct Heat Gain + Return Duct Leak Gain		+ Pump H.P + Pipe Gain	= %				
(U.S.R.T) GRAND TOTAL HEAT							

Estimate For.	AM / PM	Peak Load	AM / PM 4
Hours of Operation	Hour (~)		

Outside Design Conditions	°CDB	°CWB	%RH	
Conditions	DB °C	WB °C	%RH	DP °C	g/kg
Outside	41.7	28.4	38		18.8
Room	24.0	17.1	50		9.0
Difference	17.7	×××	×××	×××	9.4

Blind	Non-existence (outside, inside)	L. M. D.
Glass	Ordinary. Thick. Absorbent.	%. Double
Color	Light. Medium. Dark.	
Weight	kg/m² (Floor)	kg/m² (Wall)
Internal Heat	W/m²	m²/People

INFILTRATION

Swinging			
Revolving Doors	People ×	CMH/Per.	
Open Doors	Doors ×	CMH/Door	
Exhaust Air			
Crack	m ×	CMH/m	
Infiltration	CMH ■		

VENTILATION

2 People ×	25	CMH/Per.	50
m² ×		CMH/m²	
Ventilation	CMH ■		50

SENSIBLE HEAT FACTOR

E.S.H.F = 2.873 (ERSH) / 3.015 (ERTH) = 0.95 (12.5°C)

DEHUMIDIFIED AIR

Apparatus Dewpoint 12.5 °C

2873 (ERSH) / (24RM − 12.5ADP)(1 − 0.1 BF) × 0.29 = 960 CMH

NOTES

GLASS (SE): 1.5 × 2.8 = 4.2

WALL (SE): 3.25 × 4.0 − 4.2 = 8.8

PARTITION: 4.0 × 3.8 = 15.2

ROOF: SR

FORM E-20E

COOLING AND DEHUMIDIFYING ESTIMATE (METRIC)

Inquiring No. | Inquired By | Sheet No. 41
Job Name | Address | Date Original | Revision | Person in Charge
Space Used For LIBRARY & STRAGE ROOM (TO2) PAC-2 SYSTEM
Size 6.5 m × 6.5 m = 42.25 m² × 3.8 m(H) = 160.55 m³

Item	Area or Quantity	Sun Gain or Temp. Diff.	Factor	Kcal/h MAX 4:00	2:00	3:00
SOLAR GAIN — GLASS						
(SW)	5.4 m²	× 252 × 0.64 / 0.85 × 0.94 × 0.65		627	646	685
(SE)	6.9 m²	× 252 × 0.21 / 0.85 × 0.94 × 0.65		263	363	700
	m²	×	×			
	m²	×	×			
	m²	×	×			
SOLAR & TRANS GAIN—WALLS & ROOF						
Wall (SW)	21.6 m²	× 18.6	× 2.1	805	524	684
(SE)	19.1 m²	× 12.4	× 2.1	498	558	518
	m²	×	×			
	m²	×	×			
Roof—Sun	36.25 m²	× 26.2	× 1.7	1625	1307	1479
Roof—Shaded	m²	×	×			
TRANS. GAIN—EXCEPT WALLS & ROOF						
Glass	12.3 m²	× 17.7	× 5.1	1111	1111	1142
Ceiling	6.0 m²	× 8.85	× 1.4	75	75	77
Floor	m²	×	×			
Partition	15.2 m²	× 8.85	× 1.8	243	243	249
Infiltration	CMH ×	deg ×	0.29			
INTERNAL HEAT						
People	4 People ×	41		164	164	164
Kw	Kw ×	×	860			
Lights	42.25 × 20 W ×		1.08	913	913	913
Appliances etc.						
Credit for Thermal Storage	m² ×	deg ×	(−)		(−)	
			Sub Total			
Safety Factor			%			
Room Sensible Heat Sub Total				6324	4904	6211
Supply Duct Heat Gain	Supply Duct +Leak Loss	Fan +HP	=10%	633	491	622
Bypass Outside Air	100 CMH × 19.7 deg × 0.1 BF × 0.29			52	52	53
Effective Room Sensible Heat				7009	5447	6886
ROOM LATENT HEAT						
Infiltration	CMH ×	g/kg ×	0.72			
People	4 People ×	49		196		
Steam	kg/h ×		540			
Appliances etc.						
Vapor Trans.						
			Sub Total			
Safety Factor			%			
Room Latent Heat Sub Total				196	196	196
Supply Duct Leakage Loss			10 %	20	20	20
Bypass Outside Air	100 CMH × 9.4 g/kg × 0.1 BF × 0.72			68	68	70
Effective Room Latent Heat				284	284	286
Effective Room Total Heat				7293	5731	7172
OUTSIDE AIR HEAT				(173)		
Sensible:	CMH ×	deg × (1 − BF) × 0.29				
Latent:	CMH ×	g/kg × (1 − BF) × 0.72				
Grand Total Heat Sub Total						
Return Duct Heat Gain + Return Duct Leak Gain		Pump H.P + Pipe Gain	= %			
(U.S.R.T) Grand Total Heat						

Estimate For	AM / PM	Peak Load	AM / PM 4
Hours of Operation	Hour (	–	)

Outside Design Conditions	DB °C	WB °C	%RH	DP °C	g/kg
Outside	41.7	28.4	38		18.8
Room	24.0	17.1	50		9.4
Difference	17.7	×××	×××	×××	9.4

Blind	Non-existence (outside, inside)	L. M. D
Glass	Ordinary, Thick, Absorbent,	%, Double
Color	Light, Medium, Dark,	
Weight	kg/m² (floor)	kg/m² (wall)
Internal Heat	W/m²	m²/People

Infiltration		
Swinging		
Revolving Doors	Peoplex CMH/per.	
Open Doors	Doorsx CMH/door	
Exhaust Air		
Crack	m × CMH/m	
Infiltration	CMH ■	
Ventilation		
4 People ×	25 CMH/per.	100
m² ×	CMH/m²	
Ventilation	CMH ■	100

Sensible Heat Factor

E.S.H.F = 7009 (ERSH) / 7293 (ERTH) = 0.96 (12.6°C)

Dehumidified Air

Apparatus Dewpoint 12.5 °C

7009 (ERSH) / (24 RM − 12.5 ADP)(1 − 0.1 BF) × 0.29 = 2,340 CMH

NOTES

GLASS (SW) : 1.5 × 1.8 × 2 = 5.4
(SE) : 1.5 × 1.8 + 1.5 × 2.8 = 6.9

WALL (SW) : 6.5 × 4.0 − 5.4 = 20.6
(SE) : 6.5 × 4.0 − 6.9 = 19.1

PARTITION ; 4.0 × 3.8 = 15.2

ROOF : SR − 6.0 = 36.25

CEILING : 3.0 × 2.0 = 6.0

FORM E-20E

COOLING AND DEHUMIDIFYING ESTIMATE (METRIC)

Sheet No. 42

Inquiring No. | Inquired By
Job Name | Address
Space Used For CORRIDOR (T04) | PAC-2 System
Size m × m = 101.5 m² × 2.5 m (H) = 253.75 m³

Date Original
Revision
Person in Charge

Item	Area or Quantity	Sun Gain or Temp. Diff.	Factor	Kcal/h MAX 4:00	Correction 2:00	Correction 3:00
SOLAR GAIN — GLASS						
(SW)	4.2 m²	× 253 × 0.14/0.85	× 0.94 × 0.65	487	503	533
	m²	×	×			
	m²	×	×			
	m²	×	×			
	m²	×	×			
SOLAR & TRANS GAIN—WALLS & ROOF						
Wall (SW)	5.8 m²	× 18.6	× 2.1	227	148	193
	m²	×	×			
	m²	×	×			
	m²	×	×			
Roof—Sun	85.25 m²	× 26.2	× 1.1	2457	1988	2251
Roof—Shaded	m²	×	×			
TRANS. GAIN—EXCEPT WALLS & ROOF						
Glass	4.2 m²	× 17.7	× 5.1	380	380	390
Ceiling	16.25 m²	× 8.85	× 1.4	202	202	207
Floor	m²	×	×			
Partition (1)	30.15 m²	× 8.85	× 1.8	481	481	494
(2)	37.2 m²	× 8.85	× 2.5	735	735	756
Door	5.4 m²	× 8.85	× 1.6	77	77	79
Infiltration	CMH	× deg	× 0.29			
INTERNAL HEAT						
People	People	×	× 860			
Kw	Kw	×				
Lights	101.5 × 20	W	× 1.08	2193	2193	2193
Appliances Etc.						
Credit for Thermal Storage	m²	× deg	×	(−)	(−)	
			Sub Total			
Safety Factor			%			
Room Sensible Heat Sub Total				7239	6707	7096
Supply Duct Heat Gain	Supply Duct +Leak Loss	FAN +HP	=10%	724	671	710
Bypass Outside Air	CMH	deg	× B.F × 0.29			
Effective Room Sensible Heat				7963	7378	7806
ROOM LATENT HEAT						
Infiltration	CMH	g/kg	× 0.72			
People	People		×			
Steam	kg/h		× 540			
Appliances etc.						
Vapor Trans.						
			Sub Total			
Safety Factor			%			
Room Latent Heat Sub Total						
Supply Duct Leakage Loss			%			
Bypass Outside Air	CMH	g/kg	× BF × 0.72			
Effective Room Latent Heat						
Effective Room Total Heat				7963	7378	7806
OUTSIDE AIR HEAT						
Sensible:	CMH	deg	× (1 − BF) × 0.29			
Latent:	CMH	g/kg	× (1 − BF) × 0.72			
Grand Total Heat Sub Total						
Return Duct Heat Gain + Return Duct Leak Gain		Pump H.P + Pipe Gain	= %			
(U.S.R.T) GRAND TOTAL HEAT						

Estimate For	AM	PM	Peak Load	AM	PM4
Hours of Operation	Hour (		–	)	

Outside Design Conditions	DB °C	WB °C	%RH	DP °C	g/kg
Conditions					
Outside	41.7	28.6	38		18.8
Room	24.0	17.1	50		9.4
Difference	17.7	×××	×××	×××	9.4

Blind	(NON-EXISTENCE (OUTSIDE. INSIDE)	L. M. D
Glass	ORDINARY. THICK. ABSORBENT.	%. DOUBLE
Color	LIGHT. MEDIUM. DARK.	
Weight	kg/m² (FLOOR)	kg/m² (WALL)
Internal Heat	W/m²	m²/PEOPLE

INFILTRATION

Swinging		
Revolving Doors	People ×	CMH/PER.
Open Doors	Doors ×	CMH/DOOR
Exhaust Air		
Crack	m ×	CMH/m
Infiltration	CMH	■

VENTILATION

People ×		CMH/PER.
m² ×		CMH/m²
Ventilation	CMH	■

SENSIBLE HEAT FACTOR

E.S.H.F = 7966 (ERSH) / 7966 (ERTH) = 1.0

DEHUMIDIFIED AIR

Apparatus Dewpoint 12.5 °C

7966 (ERSH) / (24.RM − 12.5ADP)(1 − BF/0.1) × 0.29 = CMH

NOTES

SR = 2.5 × 32.5 + 2.0 × 2.0 + 6.5 × 2.5 = 101.5

GLASS (SW) : 1.5 × 2.8 = 4.2

WALL (SW) : 2.5 × 4.0 − 4.2 = 5.8

PARTITION

(1) : 13.5 × 2.5 − 3.6 = 30.15

(2) : 14.0 × 2.5 − 1.8 = 33.2

DOOR : 0.9 × 2.0 × 3 = 5.4

ROOF : SR − 2.5 × 6.5 = 85.25

CEILING : 2.5 × 6.5 = 16.25

FORM E-20E

8.5 設備負荷

5. EQUIPMENT LOAD

5-1 PAC-1

(1) CONDITIONS

		D.B	W.B	ENTHALPY
ROOM	:	24.0°C	17.1°C	11.5 Kcal/kg
OUTSIDE	:	42.2°C	28.6°C	22.0 Kcal/kg
R S.H	:	119.476 Kcal/H		
S.H.F	:	0.94		
DEHUMIDIFIED AIR		: 39.900 m^3/H		
OUT AIR		: 4.230 m^3/H		
RETURN AIR		: 35670 m^3/H		

(2) REQUIRED COOLING CAPACITY

$$\text{MIX POINT} = \frac{4230\ m^3/H \times 22.0\ Kcal/kg + 35670\ m^3/H \times 11.5\ Kcal/kg}{39.900\ m^3/H}$$

$$= 12.6\ Kcal/kg$$

$$\therefore [\ 39.900\ m^3/H \times 1.2\ kg/m^3 \times (12.6 - 8.5)\ Kcal/kg \times (1 - 0.1) \times 1.05\ BF$$

$$= 185.000\ Kcal/H.$$

① PEAK LOAD (PM. 5:00)

E.R.T.H : 125.721 Kcal/H ....①

OUT SIDE AIR HEAT : $4.230\ m^3/H \times 16.5 \times (1-0.1) \times 0.29 = 18.217$ Kcal/H ②

$4.230 \times 9.5 \times (1-0.1) \times 0.72 = 26040$ Kcal/H ③

TOTAL ① + ② + ③ $= (125.721 + 18217 + 26040) \times 1.05 = 179.000$ Kcal/h

PSYCHROMETRIC CHART

ZONE NAME :

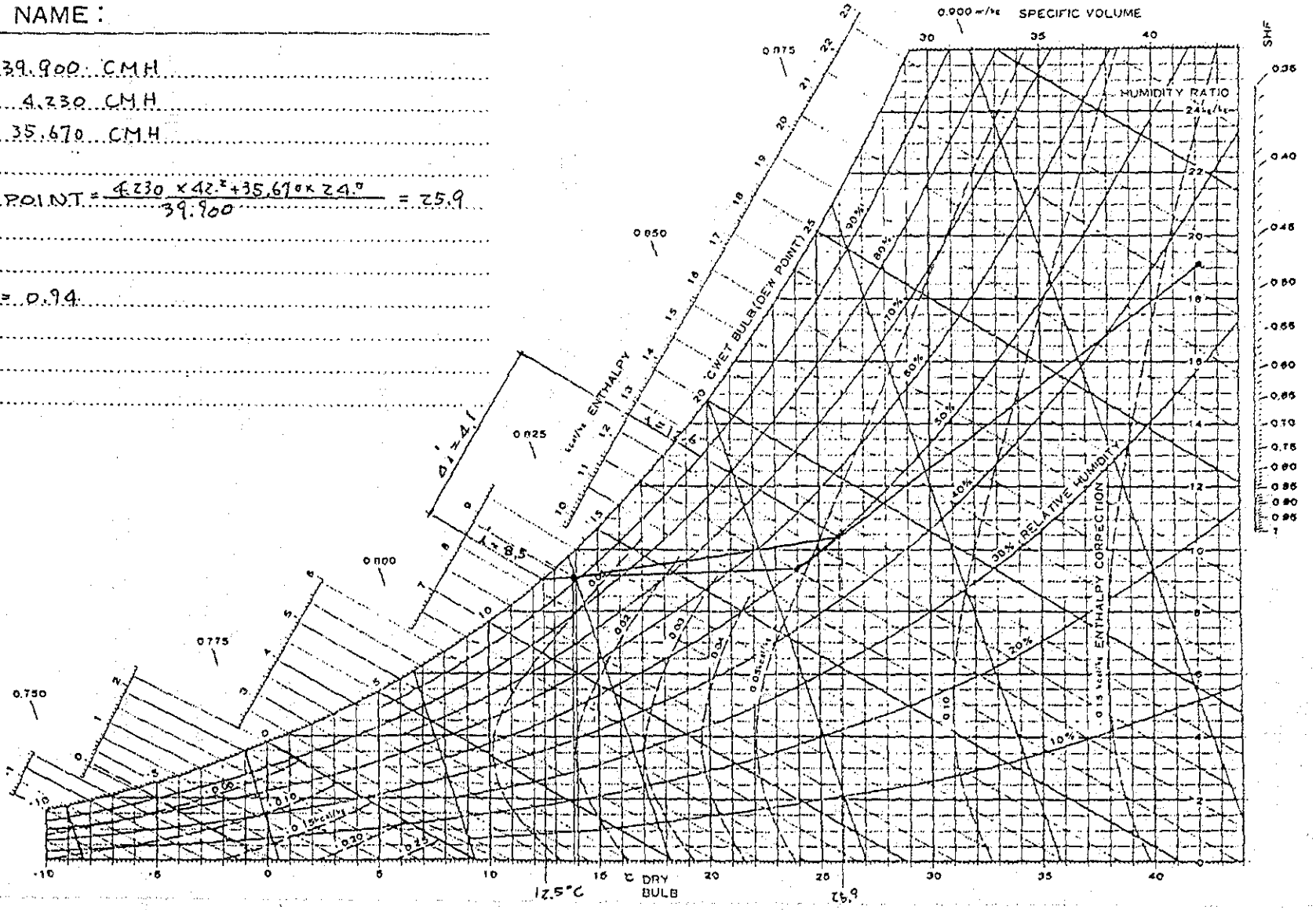
SA = 39.900 CMH

OA = 4,230 CMH

RA = 35,670 CMH

MIX POINT = $\frac{4230 \times 42.2 + 35,670 \times 24.0}{39.900} = 25.9$

SHF = 0.94



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5 - 2 PAC - 2

(1) CONDITIONS

		D.B	W.B	ENTHALPY
ROOM	:	24.0 °C	17.1 °C	11.5 kcal/kg
OUTSIDE	:	42.2 °C	28.6 °C	22.0 kcal/kg
R S.H	:	60.067 kcal/H		
S.H.F	:	0.95		
DEHUMIDIFIED AIR	:	20.050 m^3/H		
OUT AIR	:	1.200 m^3/H		
RETURN AIR	:	18.850 m^3/H		

(2) REQUIRED COOLING CAPACITY

$$\text{MIX POINT} = \frac{1200\ m^3/H \times 22.0\ kcal/kg + 18.850\ m^3/H \times 11.5\ kcal/kg}{20.050\ m^3/H}$$

$$= 12.1\ kcal/kg$$

$$\therefore [\ 20050\ m^3/H \times 1.2\ kg/m^3 \times (12.1 - 8.5)\ kcal/kg \times (1 - 0.1)\ BF \times 1.05$$

$$= 82.000\ kcal/H$$

⊙ PEAK LOAD CPM

E.R.T.H : 62.391 kcal/H ... ①

OUT SIDE AIR HEAT : $1200\ m^3/H \times 18.2 \times (1-0.1) \times 0.29 = 5.701$ kcal/H ... ②

: $1200 \times 9.6 \times (1-0.1) \times 0.72 = 7.465$ kcal/H ... ③

TOTAL = ① + ② + ③ = $(62391 + 5701 + 7465) \times 1.05 = 80.000$ kcal/H

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PSYCHROMETRIC CHART

ZONE NAME :

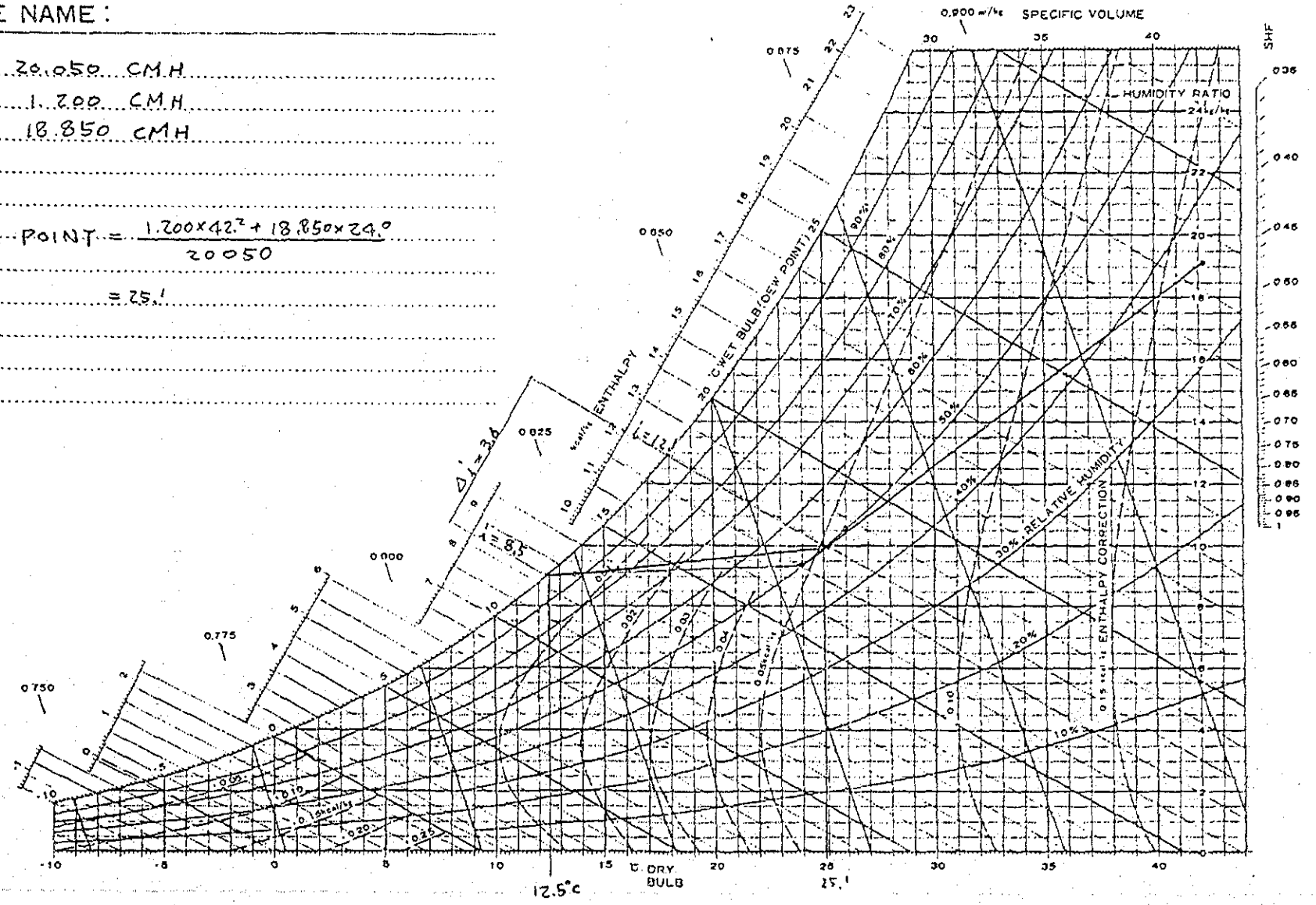
SA = 20,050 CMH

OA = 1,200 CMH

RA = 18,850 CMH

MIX POINT = $\frac{1,200 \times 42.2 + 18,850 \times 24.0}{20050}$

= 25.1



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6. SELECTION OF COOING EQUIPMENT

6-1 EQUIPMENT PAC-1 x 1 eq

AIR-COOLED PACKAGED AIR CONDITIONER

AIR FLOW RATE : 39.900 m3/H (665 m3/min)
COOLING LOAD (T.H.R) : 179.000 KCAL/H
(SHC) : 119.476
EXTERNAL STATIC PRES. : 70 mmAq
AIR INLET : 25.9 °C DB , 18.4 °C WB , 12.6 Kcal/Kg
OUTLET 13.8 °C DB , 13.2 °C WB , 8.9 Kcal/Kg

CONDENSING TEMPERATURE : 50° DB
TEMPERATURE DIFFERENCE : 15° C

TYPE	:	FLOOR (DUCT TYPE)
AIR FLOW RATE	:	39.900 m³/H
COMPRESSOR (3eq)	:	83.5 Kw (INPUT)
FAN MOTOR	:	18.5 Kw (IN), 0.75 Kw x 3 x 3 (OUT)
POWER	:	Ø3-380 V, 50Hz
TAPPING SIZE	:	(1-3/8" + 7/8") x 3 ., DRAIN 40 A
DIMENSION (INDOOR)	:	3.700 x 1.600 x 2130 H (mm)
(OUTDOOR)		2.922 x 1.204 x 1126 H x 3
WEIGHT	:	(IN) 2.660 Kg (OUT) 410 Kg x 3

MODEL INDOOR UNIT : 50 BM 100 x 1 eq (CARRIER)
OUT DOOR UNIT : 09 DC 024 x 3 eq

SHC' = 151.000 + 665 x 17.4 x (1 - 0.17) x (24 - 27) = 122.000 kal/H

6-2 EQUIPMENT PAC-2 x 1 eq

AIR-COOLED PACKAGED AIR CONDITIONER

AIR FLOW RATE : 20050 m3/H (345 m3/min)

COOLING LOAD (T.H.R) : 80.000 KCAL/H

(S.H.C) : 60.067 Kcal/H

EXTERNAL STATIC PRES. : 65 mmAq

AIR INLET : 25.1 °C DB , 18.1 °C WB , 12.1 Kcal/Kg

OUTLET : 13.8 °C DB , 13.2 °C WB , 8.9 Kcal/Kg

CONDENSING TEMPERATURE : 50° DB

TEMPERATURE DIFFERENCE : 15° C.

TYPE	:	FLOOR (DUCT TYPE)
AIR FLOW RATE	:	20.050 m3/H
COMPRESSOR (2 eq)	:	45.0 Kw (INPUT)
FAN MOTOR	:	7.5 Kw (IN) , 0.3 kw x 2 x 2 (OUT)
POWER	:	Ø3-380 V, 50Hz
TAPPING SIZE	:	(1-1/8" + 1-3/8") x 2 . DRAIN 40 A
DIMENSION (INDOOR)	:	2.600 x 1.600 x 1.900 H (mm)
(OUTDOOR)		1.900 x 1.118 x 1.028 H x 2.
WEIGHT	:	(IN) 1.650 Kg (OUT) 180 Kg x 2

MODEL INDOOR UNIT : 50BM 054 x 1 eq (CARRIER)

OUTDOOR UNIT : 09DE012 x 2 eq.

$SHC' = 79.000 + 345 \times 17.4 \times (1 - 0.2) \times (24 - 27) = 64.600$ Kcal/H

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7. VENTILATION SYSTEM

7-1 ESTIMATE OF VENTILATION AIR VOLUME

ADMINISTRATION BUILDING (1)

FLOOR	ROOM NAME	AREA (m^2)	VOL. (m^3)	AIR CHANGE (T/Hr)	AIR FLOW (m^3/Hr)	EXHAUST AIR (m^3/Hr)	SUPPLY AIR (m^3/Hr)	
GROUND FLOOR	(G04) MACHINE SHOP	310.	1.488	10	14.880	15.000	15.000	OF-1×4 (I) PF-1×4
	(G05) WELDING ROOM	22.8	109.4	5	547	550	550	OF-3 (I) PF-5
	(G06) TOOL & SPARE PARTS STORAGE ROOM	35.0	168.0	5	840	840	DG: 840	(III) PF-4
	(G07) AIR CONDITIONING MACHINE ROOM	84.5	405.6	5	2028	2100	2100	OF-2 (I) PF-2
	(G08) ELECTRIC ROOM	21.1	101.3	20	2026	2100	2100	OF-2 (I) PF-2
	(G09) LAVATORY	18.4	46	10	460	460 *	—	(III) VF-4
	SUB TOTAL.					21.050	20590	SA: 1660 RA: 1200 OA: 460
FIRST FLOOR	(F15) LAVATORY (MALE)	27.0	67.5	10	675	680 *	2670 —	(III) VF-2
	(F16) LAVATORY (FEMALE)	9.0	22.5	10	225	230 *	—	(II) VF-6
	(F18b) LAVATORY	6.8	17.0	10	170	170 *	—	(III) VF-9
	(F14b) SHOWER BOOTH	3.2	8	10	80	80	—	(III) VF-11
	(F14a) SHOWER BOOTH	3.0	7.5	10	75	80	—	(III) VF-11
	(F12) DRESSING RM.	7.0	17.5	10	175	180 *	—	(III) VF-8
	(F18a) LAVATORY	3.0	7.5	10	75	80 *	—	(III) VF-11
	(F13) KITCHENETTE	6.0	15.0	10	150	150	—	(III) VF-10
	(F17) LAVATORY	7.0	17.5	10	175	180 *	—	(III) VF-8
	(F06) PANTRY	9.0	22.5	10	225	250 *	—	(III) PF-6
	(F08) BATTERY ROOM	16.0	60.8	10	608	610	610	OF-4 (I) VF-3
	(F05) KITCHEN	33.3	83.25	10	833	900 *	700 200 —	RF-1 (III) VF-7
								(13380+8400)
	SUB TOTAL.					3.590		SA: 18.780 RA: 16.110 OA: 2670 (2270+400)

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ESTIMATE OF VENTILATION AIR VOLUME

ADMINISTRATION BUILDING (2)

FLOOR	ROOM NAME	AREA (m^2)	VOL. (m^3)	AIR CHANGE (T/Hr)	AIR FLOW (m^3/Hr)	EXHAUST AIR (m^3/Hr)	SUPPLY AIR (m^3/Hr)	
SECOND FLOOR	(509) LAVATORY (MALE)	27.0	67.5	10	675	680 *	1250 –	(III) VF-2
	(510) LAVATORY (FEMALE)	9.0	22.5	10	225	230 *	–	(III) VF-6
	(511b) LAVATORY	6.8	17.0	10	170	170 *	–	(III) VF-9
	(512b) SHOWER BOOTH	3.2	8	10	80	80	–	(III) VF-11
	(511a) LAVATORY	6.8	17.0	10	170	170 *	–	(III) VF-9
	(512a) SHOWER BOOTH	3.2	8	10	80	80	–	(III) VF-11
	SUB TOTAL					1.410	–	SA = 16.030 RA = 14.780 OA = 1.250
THIRD FLOOR	(T07) LAVATORY (MALE)	27.0	67.5	10	675	⇒ 750 *	1050 –	(III) VF-1
	(T08) LAVATORY (FEMALE)	9.0	22.5	10	225	⇒ 300 *	–	(III) VF-5
	SUB TOTAL					1050		SA = 23.480 RA = 22.430 OA = 1050
								TSA : 59.950 TRA : 54.520 ~~TEA/~~OA : 5430
ROOF	(R01) ELEVATOR MACHINE ROOM	27.7	85.9	20	1.718	1800		(III) PF-3
	G. TOTAL							

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7-2. SERECTION OF VENTILATION EQUIPMENT

V - 1. MACHINE SHOP (GROUND FLOOR)

MACHINE NO PF-1 (=OF-1 x 4 ea)		
TYPE OF VENTILATOR	:	PROPELLER x 4 ea
AIR FLOW RATE	:	3750 m^3/Hr ϕ500 x 5mmAq
FAN MOTOR	:	0.4 KW or W
POWER	:	~~1φ 220v~~ / 3φ 380 v (50/~~60~~ Hz)
SIZE	:	620 x 620 x 337 (mm)
ACCESSORY	:	SUS WEATHER COVER, SHUTTER

V - 2 ELECTRIC ROOM. (GROUND FLOOR)

MACHINE NO PF-2 (=OF-2 x 1 ea)		
TYPE OF VENTILATOR	:	PROPELLER x 1 ea
AIR FLOW RATE	:	2.100 m^3/Hr ϕ400 x 5mmAq
FAN MOTOR	:	0.1 KW or W
POWER	:	~~1φ 220v~~ / 3φ 380v (50/~~60~~ Hz)
SIZE	:	520 x 520 x 268 (mm)
ACCESSORY	:	SUS. WEATHER COVER, SHUTTER

V - 3 AIR CONDITONING MACHINE ROOM (GROUND FLOOR)

MACHINE NO PF-2, (=OF-2 x 1 ea)		
TYPE OF VENTILATOR	:	PROPELLER x 1 ea
AIR FLOW RATE	:	2.100 m^3/Hr ϕ400 x 5mmAq
FAN MOTOR	:	0.1 KW or W
POWER	:	~~1φ 220v~~ / 3φ 380v (50/~~60~~ Hz)
SIZE	:	520 x 520 x 268 (mm)
ACCESSORY	:	SUS WEATHER COVER, SHUTTER

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V - 4 WELDING ROOM (GROUND FLOOR)

MACHINE NO		PF-5 (=OF-3 x 1 ea) V
TYPE OF VENTILATOR	:	PROPELLER x 1 ea
AIR FLOW RATE	:	550 m^3/Hr 250$^{\phi}$ x 5 mmAq
FAN MOTOR	:	0.025 KW or W
POWER	:	~~1φ 220v~~ / 3φ 380 v (50/~~60~~ Hz)
SIZE	:	370 x 370 x 214 (mm)
ACCESSORY	:	SUS WEATHER COVER, SHUTTER

V - 5. TOOL & SPARE PARTS STORAGE ROOM (GROUND FLOOR)

MACHINE NO		PF-4
TYPE OF VENTILATOR	:	PROPELLER x 1 ea
AIR FLOW RATE	:	840 m^3/Hr 300$^{\phi}$ x 5 mmAq
FAN MOTOR	:	0.050 KW or W
POWER	:	~~1φ 220v~~ / 3φ 380 v (50/~~60~~ Hz)
SIZE	:	420 x 420 x 247 (mm)
ACCESSORY	:	SUS WEATHER COVER, SHUTTER

V - 6. LAVATORY (GROUND FLOOR)

MACHINE NO		VF - 4
TYPE OF VENTILATOR	:	CEILING x 1 ea
AIR FLOW RATE	:	460 m^3/Hr x 6 mmAq
FAN MOTOR	:	~~KW~~ or 62 W
POWER	:	1φ 220v / ~~3φ 460v~~ (50/~~60~~ Hz)
SIZE	:	345 x 345 x 243^{H} (mm)
ACCESSORY	:	150$^{\phi}$ VENT CAP

V - 7 LAVATORY (MALE) (FIRST, SECOND FLOOR)

MACHINE NO		VF - 2
TYPE OF VENTILATOR	:	AXIAL FAN x 2 ea
AIR FLOW RATE	:	680 m^3/Hr x 8 mmAq
FAN MOTOR	:	~~KW~~ or 40 W
POWER	:	1φ 220v / ~~3φ 460v~~ (50/~~60~~ Hz)
SIZE	:	375φ x (224φ) x 320L (mm)
ACCESSORY	:	

V - 8 LAVATORY (MALE). (THIRD FLOOR)

MACHINE NO		VF - 1
TYPE OF VENTILATOR	:	AXIAL FAN x 1 ea
AIR FLOW RATE	:	750 m^3/Hr x 8 mmAq
FAN MOTOR	:	~~KW~~ or 40 W
POWER	:	1φ 220v / ~~3φ 460v~~ (50/~~60~~ Hz)
SIZE	:	375φ x (224φ) x 320L (mm)
ACCESSORY	:	

V - 9 BATTERY ROOM (FIRST FLOOR)

MACHINE NO		VF - 3 (OF-4 x 1ea)
TYPE OF VENTILATOR	:	AXIAL FAN x 1 ea
AIR FLOW RATE	:	610 m^3/Hr x 8 mmAq
FAN MOTOR	:	KW or 40 W
POWER	:	1φ 220v / ~~3φ 460v~~ (50/~~60~~ Hz)
SIZE	:	375φ x (224φ) x 320L (mm)
ACCESSORY	:	

0501

V - 10 LAVATORY (FEMALE) (FIRST, SECOND FLOOR)

MACHINE NO		VF-6
TYPE OF VENTILATOR	:	CEILING x 2 ea
AIR FLOW RATE	:	230 m^3/Hr x 7 mmAq
FAN MOTOR	:	~~KW~~ or 35 W
POWER	:	1φ 220v / ~~3φ 460v~~ (50/~~60~~ Hz)
SIZE	:	308 x 308 x 243 H (mm)
ACCESSORY	:	150φ VENT CAP

V - 11 LAVATORY (FEMALE) (THERD FLOOR)

MACHINE NO		VF-5
TYPE OF VENTILATOR	:	CEILING x 1 ea
AIR FLOW RATE	:	300 m^3/Hr x 8 mmAq
FAN MOTOR	:	~~KW~~ or 46 W
POWER	:	1φ 220v / ~~3φ 460v~~ (50/~~60~~ Hz)
SIZE	:	345 x 345 x 243 H (mm)
ACCESSORY	:	150φ VENT CAP

V - 12 LAVATORY (FIRST, SECOND FLOOR) <F18b> · <S11b,a>

MACHINE NO		VF-9
TYPE OF VENTILATOR	:	CEILING x 3 ea
AIR FLOW RATE	:	170 m^3/Hr x 8 mmAq
FAN MOTOR	:	~~KW~~ or 35 W
POWER	:	1φ 220v / ~~3φ 460v~~ (50/~~60~~ Hz)
SIZE	:	308 x 308 x 243 H (mm)
ACCESSORY	:	150φ VENT CAP

1251

V - 13

SHOWER BOOTH (FIRST, SECOND FLOOR) <F14a, b, S12a, b>

MACHINE NO		VF - 11
TYPE OF VENTILATOR	:	CEILING x 4 ea
AIR FLOW RATE	:	80 m^3/Hr x 8 mm/Aq
FAN MOTOR	:	~~KW~~ or 13 w
POWER	:	1φ 220v / ~~3φ 460v~~ (50/~~60~~ Hz)
SIZE	:	303 x 303 x 204H (mm)
ACCESSORY	:	100φ VENT CAP

V - 14

PRESSING ROOM (FIRST FLOOR)

MACHINE NO		VF - 8
TYPE OF VENTILATOR	:	CEILING x 1 ea
AIR FLOW RATE	:	180 m^3/Hr x 8 mm/Aq
FAN MOTOR	:	~~KW~~ or 35 w
POWER	:	1φ 220v / ~~3φ 460v~~ (50/~~60~~ Hz)
SIZE	:	308 x 308 x 243H (mm)
ACCESSORY	:	150φ VENT CAP

V - 15.

LAVATORY (FIRST FLOOR) <F18a>

MACHINE NO		VF - 11
TYPE OF VENTILATOR	:	CEILING x 1 ea
AIR FLOW RATE	:	80 m^3/Hr x 8 mm/Aq
FAN MOTOR	:	KW or 13 w
POWER	:	1φ 220v / ~~3φ 460v~~ (50/60 Hz)
SIZE	:	303 x 303 x 204H (mm)
ACCESSORY	:	100φ VENT CAP

1052

V - 16

KITCHENETE

MACHINE NO		VF-10
TYPE OF VENTILATOR	:	CEILING x 1 ea
AIR FLOW RATE	:	150 m^3/Hr x 6 mmAq
FAN MOTOR	:	~~KW~~ or 25 W
POWER	:	1φ 220v / ~~3φ 460v~~ (50/~~60~~ Hz)
SIZE	:	303 x 303 x 204H (mm)
ACCESSORY	:	100φ VENT CAP

V - 17

LAVATORY (FIRST FLOOR) <F 17>

MACHINE NO		VF-8
TYPE OF VENTILATOR	:	CEILING x 1 ea
AIR FLOW RATE	:	180 m^3/Hr x 5 mmAq
FAN MOTOR	:	~~KW~~ or 35 W
POWER	:	1φ 220v / ~~3φ 460v~~ (50/60 Hz)
SIZE	:	308 x 308 x 243H (mm)
ACCESSORY	:	150φ VENT CAP

V - 18

PANTRY (FIRST FLOOR)

MACHINE NO		PF-6
TYPE OF VENTILATOR	:	PROPELLER x 1 ea.
AIR FLOW RATE	:	250 m^3/Hr 200φ
FAN MOTOR	:	~~KW~~ or 18 W
POWER	:	1φ 220v / ~~3φ 460v~~ (50/~~60~~ Hz)
SIZE	:	280 x 280 x 152D (mm)
ACCESSORY	:	SUS. WEATHER COVER, SHUTTER

1053

V - 19

KITCHEN

MACHINE NO		RF-1
TYPE OF VENTILATOR	:	RANGE HOOD FAN x 1 ea
AIR FLOW RATE	:	700 m^3/Hr x 3 mmAq
FAN MOTOR	:	~~KW~~ or 70 w
POWER	:	1φ 220v / ~~3φ 460v~~ (50/~~60~~ Hz)
SIZE	:	600 x x 580H (mm)
ACCESSORY	:	SUS WEATHER COVER

V - 20

KITCHEN

MACHINE NO		VF-7
TYPE OF VENTILATOR	:	CEILING x 1 ea
AIR FLOW RATE	:	200 m^3/Hr x 8 mmAq
FAN MOTOR	:	~~KW~~ or 35 w
POWER	:	1φ 220v / ~~3φ 460v~~ (50/~~60~~ Hz)
SIZE	:	308 x 308 x 243H (mm)
ACCESSORY	:	150φ VENT CAP

V - 21

ELEVATOR MACHINE ROOM

MACHINE NO		PF-3
TYPE OF VENTILATOR	:	PROPELLER x 1 ea
AIR FLOW RATE	:	1800 m^3/Hr φ400 x 5 mmAq
FAN MOTOR	:	0.1 KW or w
POWER	:	~~1φ 220v /~~ 3φ 380v (50/60 Hz)
SIZE	:	520 x 520 x 268 (mm)
ACCESSORY	:	SUS WEATHER COVER, SHUTTER

10FR

V - 22

RETURN FAN (G. FLOOR AIR CONDITIONING MACHINE RM.)

MACHINE NO		RAF - 1 SS#7
TYPE OF VENTILATOR	:	CENTIFUGAL MULTI-BANE x 1 ea
AIR FLOW RATE	:	54.520 m^3/Hr x 25 mm-AQ
FAN MOTOR	:	15 KW or w
POWER	:	~~1φ 220v~~ / 3φ 380v (50/~~60~~ Hz)
SIZE	:	2500L x 900W x 2070H (mm)
ACCESSORY	:	

V -

MACHINE NO		
TYPE OF VENTILATOR	:	x ea
AIR FLOW RATE	:	m^3/Hr
FAN MOTOR	:	KW or w
POWER	:	1φ 220v / 3φ v (50/60 Hz)
SIZE	:	x x (mm)
ACCESSORY	:	

V -

MACHINE NO		
TYPE OF VENTILATOR	:	x ea
AIR FLOW RATE	:	m^3/Hr
FAN MOTOR	:	KW or w
POWER	:	1φ 220v / 3φ v (50/60 Hz)
SIZE	:	x x (mm)
ACCESSORY	:	