

LAMPIRAN

Lampiran A. Data Perhitungan Cooling Load

1. Nilai Koefisien dinding (U)

TABLE 6.3 WALL CONSTRUCTION GROUP DESCRIPTION

Group No.	Description of Construction	Weight (lb/ft ²)	U-Value (BTU/h·ft ² ·°F)
4-in. Face brick + (brick)			
C	Air space + 4-in. face brick	83	0.358
D	4-in. common brick	90	0.415
C	1-in. insulation or air space + 4-in. common brick	90	0.174–0.301
B	2-in. insulation + 4-in. common brick	88	0.111
B	8-in. common brick	130	0.302
A	Insulation or air space + 8-in. common brick	130	0.154–0.243
4-in. Face brick + (heavyweight concrete)			
C	Air space + 2-in. concrete	94	0.350
B	2-in. insulation + 4-in. concrete	97	0.116
A	Air space or insulation + 8-in. or more concrete	143–190	0.110–0.112
4-in. Face brick + (light or heavyweight concrete block)			
E	4-in. block	62	0.319
D	Air space or insulation + 4-in. block	62	0.153–0.246
D	8-in. block	70	0.274
C	Air space or 1-in. insulation + 6-in. or 8-in. block	73–89	0.221–0.275
B	2-in. insulation + 8-in. block	89	0.096–0.107
4-in. Face brick + (clay tile)			
D	4-in. tile	71	0.381
D	Air space + 4-in. tile	71	0.281
C	Insulation + 4-in. tile	71	0.169
C	8-in. tile	96	0.275
B	Air space or 1-in. insulation + 8-in. tile	96	0.142–0.221
A	2-in. insulation + 8-in. tile	97	0.097
Heavyweight concrete wall + (finish)			
E	4-in. concrete	63	0.585
D	4-in. concrete + 1-in. or 2-in. insulation	63	0.119–0.200
C	2-in. insulation + 4-in. concrete	63	0.119
C	8-in. concrete	109	0.490
B	8-in. concrete + 1-in. or 2-in. insulation	110	0.115–0.187
A	2-in. insulation + 8-in. concrete	110	0.115
B	12-in. concrete	156	0.421
A	12-in. concrete + insulation	156	0.113
Light and heavyweight concrete block + (finish)			
F	4-in. block + air space/insulation	29	0.161–0.263
E	2-in. insulation + 4-in. block	29–37	0.105–0.114
E	8-in. block	47–51	0.294–0.402
D	8-in. block + air space/insulation	41–57	0.149–0.173
Clay tile + (finish)			
F	4-in. tile	39	0.419
F	4-in. tile + air space	39	0.303
E	4-in. tile + 1-in. insulation	39	0.175
D	2-in. insulation + 4-in. tile	40	0.110
D	8-in. tile	63	0.296
C	8-in. tile + air space/1-in. insulation	63	0.151–0.231
B	2-in. insulation + 8-in. tile	63	0.099
Metal curtain wall			
G	With/without air space + 1- to 3-in. insulation	5–6	0.091–0.230
Frame wall			
G	1-in. to 3-in. insulation	16	0.081–0.178

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2. Data CLTD Dinding

Group D Walls																												
N	15	13	12	10	9	7	6	6	6	6	6	7	8	10	12	13	15	17	18	19	19	19	18	16	21	6	19	13
NE	17	15	13	11	10	8	7	8	10	14	17	20	22	23	23	24	24	25	25	24	23	22	20	18	19	7	25	18
E	19	17	15	13	11	9	8	9	12	17	22	27	30	32	33	33	32	31	30	28	26	24	22	16	8	33	25	
SE	20	17	15	13	11	10	8	8	10	13	17	22	26	29	31	32	32	31	30	28	26	24	22	17	8	32	24	
S	19	17	15	13	11	9	8	7	6	6	7	9	12	16	20	24	27	29	29	27	26	24	22	19	6	29	23	
SW	28	25	22	19	16	14	12	10	9	8	8	8	10	12	16	21	27	32	36	38	38	37	34	31	21	8	38	30
W	31	27	24	21	18	15	13	11	10	9	9	9	10	11	14	18	24	30	36	40	41	40	38	34	21	9	41	32
NW	25	22	19	17	14	12	10	9	8	7	7	8	9	10	12	14	18	22	27	31	32	32	30	27	22	7	32	25
Group E Walls																												
N	12	10	8	7	5	4	3	4	5	6	7	9	11	13	15	17	19	20	21	23	20	18	16	14	20	3	22	19
NE	13	11	9	7	6	4	5	9	13	20	24	25	25	26	26	26	26	26	25	24	22	19	17	15	16	4	26	22
E	14	12	10	8	6	5	6	11	18	26	33	36	38	37	36	34	33	32	30	28	25	22	20	17	13	5	38	33
SE	15	12	10	8	7	5	5	8	12	19	25	31	35	37	37	36	34	33	31	28	26	23	20	17	15	5	37	32
S	15	12	10	8	7	5	4	3	4	5	9	13	10	24	29	32	34	33	31	29	26	23	20	17	17	3	34	31
SW	22	18	15	12	10	8	6	5	5	6	7	9	12	18	24	32	38	43	45	44	40	35	30	26	19	5	45	40
W	25	21	17	14	11	9	7	6	6	6	7	9	11	14	20	27	36	43	49	49	45	40	34	29	20	6	49	43
NW	20	17	14	11	9	7	6	5	5	5	6	8	10	13	16	20	26	32	37	38	36	32	28	24	20	5	38	33

3. Nilai Koreksi pada garis bujur (LM)

Lat.	Month	N	NNE NNW	NE NW	ENE WNW	E W	ESE WSW	SE SW	SSE SSW	S
0	Dec	-3	-5	-5	-5	-2	0	3	6	9
	Jan/Nov	-3	-5	-4	-4	-1	0	2	4	7
	Feb/Oct	-3	-2	-2	-2	-1	-1	0	-1	0
	Mar/Sept	-3	0	1	-1	-1	-3	-3	-5	-8
	Apr/Aug	5	4	3	0	-2	-5	-6	-8	-8
	May/Jul	10	7	5	0	-3	-7	-8	-9	-8
	Jun	12	9	5	0	-3	-7	-9	-10	-8
8	Dec	-4	-6	-6	-6	-3	0	4	8	12
	Jan/Nov	-3	-5	-6	-5	-2	0	3	6	10
	Feb/Oct	-3	-4	-3	-3	-1	-1	1	2	4
	Mar/Sept	-3	-2	-1	-1	-1	-2	-2	-3	-4
	Apr/Aug	2	2	2	0	-1	-4	-5	-7	-7
	May/Jul	7	5	4	0	-2	-5	-7	-9	-7
	Jun	9	6	4	0	-2	-6	-8	-9	-7

4. Data Beban Panas pada Manusia Berdasarkan Fungsi Bangunan

TABLE 6.13 RATES OF HEAT GAIN FROM OCCUPANTS OF CONDITIONED SPACES

Degree of Activity		Total Heat Adults		Sensible Heat, Btu/h	Latent Heat, Btu/h
		Adult Male	Adjusted M/F ^a		
Seated at theater	Theater—matinee	390	330	225	105
Seated at theater, night	Theater—night	390	350	245	105
Seated, very light work	Offices, hotels, apartments	450	400	245	155
Moderately active office work	Offices, hotels, apartments	475	450	250	200
Standing, light work; walking	Department store, retail store	550	450	250	200
Walking; standing	Drug store, bank	550	500	250	250
Sedentary work	Restaurant ^b	490	550	275	275
Light bench work	Factory	800	750	275	475
Moderate dancing	Dance hall	900	850	305	545
Walking 3 mph; light machine work	Factory	1000	1000	375	625
Bowling ^c	Bowling alley	1500	1450	580	870
Heavy work	Factory	1500	1450	580	870
Heavy machine work; lifting	Factory	1600	1600	635	965
Athletics	Gymnasium	2000	1800	710	1090

5. Data CLF Manusia (Cooling Load Factor)

TABLE 6.14 SENSIBLE HEAT COOLING LOAD FACTORS FOR PEOPLE

Total hours in space	Hours After Each Entry Into Space																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
2	0.49	0.58	0.17	0.13	0.10	0.08	0.07	0.06	0.05	0.04	0.04	0.03	0.03	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	
4	0.49	0.59	0.66	0.71	0.27	0.21	0.16	0.14	0.11	0.10	0.08	0.07	0.06	0.06	0.05	0.04	0.04	0.03	0.03	0.03	0.02	0.02	0.02	0.01	
6	0.50	0.60	0.67	0.72	0.76	0.79	0.34	0.26	0.21	0.18	0.15	0.13	0.11	0.10	0.08	0.07	0.06	0.06	0.05	0.04	0.04	0.03	0.03	0.03	
8	0.51	0.61	0.67	0.72	0.76	0.80	0.82	0.84	0.38	0.30	0.25	0.21	0.18	0.15	0.13	0.12	0.10	0.09	0.08	0.07	0.06	0.05	0.03	0.04	
10	0.53	0.62	0.69	0.74	0.77	0.80	0.83	0.85	0.87	0.89	0.42	0.34	0.28	0.23	0.20	0.17	0.15	0.13	0.11	0.10	0.09	0.08	0.07	0.06	
12	0.55	0.64	0.70	0.75	0.79	0.81	0.84	0.86	0.88	0.89	0.91	0.92	0.45	0.36	0.30	0.25	0.21	0.19	0.16	0.14	0.12	0.11	0.09	0.08	
14	0.58	0.66	0.72	0.77	0.80	0.83	0.85	0.87	0.89	0.90	0.91	0.92	0.93	0.94	0.47	0.38	0.31	0.26	0.23	0.20	0.17	0.15	0.13	0.11	
16	0.62	0.70	0.75	0.79	0.82	0.85	0.87	0.88	0.90	0.91	0.92	0.93	0.94	0.95	0.95	0.96	0.49	0.39	0.33	0.28	0.24	0.20	0.18	0.16	
18	0.66	0.74	0.79	0.82	0.85	0.87	0.89	0.90	0.92	0.93	0.94	0.94	0.95	0.96	0.96	0.97	0.97	0.97	0.97	0.50	0.40	0.33	0.28	0.24	0.21

CLF = 1.0 for systems shut down at night and for high occupant densities such as in theaters and auditoriums.
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6. Nilai BF pada Lampu

Lighting

The factor BF accounts for heat losses in the ballast in fluorescent lamps, or other special losses. A typical value of BF is 1.25 for fluorescent lighting. For incandescent lighting, there is no extra loss, and BF = 1.0.

For these reasons, the CLF tables for lighting are not presented here. For those cases where they are applicable, they may be found in the ASHRAE *Fundamentals Volume*. Otherwise use a value of CLF = 1.0.

7. Nilai Beban Pendinginan pada *Equipment*

Table 6 Recommended Heat Gain from Typical Medical Equipment

Equipment	Nameplate, W	Peak, W	Average, W
Anesthesia system	250	177	166
Blanket warmer	500	504	221
Blood pressure meter	180	33	29
Blood warmer	360	204	114
ECG/RESP	1440	54	50
Electrosurgery	1000	147	109
Endoscope	1688	605	596
Harmonical scalpel	230	60	59
Hysteroscopic pump	180	35	34
Laser sonics	1200	256	229
Optical microscope	330	65	63
Pulse oximeter	72	21	20
Stress treadmill	N/A	198	173
Ultrasound system	1800	1063	1050
Vacuum suction	621	337	302
X-ray system	968		82
X-ray system	1725	534	480
X-ray system	2070		18

Source: Hosni et al. (1999)

Table 5 Recommended Rates of Heat Gain From Typical Commercial Cooking Appliances

Appliance	Size	Energy Rate, W		Recommended Rate of Heat Gain, ^a W			
		Rated	Standby	Without Hood			With Hood
				Sensible	Latent	Total	Sensible
Electric, No Hood Required							
Barbeque (pit), per kilogram of food capacity	36 to 136 kg	88	—	57	31	88	27
Barbeque (pressurized) per kilogram of food capacity	20 kg	210	—	71	35	106	33
Blender, per litre of capacity	1.0 to 3.8 L	480	—	310	160	470	150
Braising pan, per litre of capacity	102 to 133 L	110	—	55	29	84	40
Cabinet (large hot holding)	0.46 to 0.49 m ³	2080	—	180	100	280	85
Cabinet (large hot serving)	1.06 to 1.15 m ³	2000	—	180	90	270	82
Cabinet (large proofing)	0.45 to 0.48 m ³	2030	—	180	90	270	82
Cabinet (small hot holding)	0.09 to 0.18 m ³	900	—	80	40	120	37
Cabinet (very hot holding)	0.49 m ³	6150	—	550	280	830	250
Can opener		170	—	170	—	170	0
Coffee brewer	12 cup/2 brnrs	1660	—	1100	560	1660	530
Coffee heater, per boiling burner	1 to 2 brnrs	670	—	440	230	670	210
Coffee heater, per warming burner	1 to 2 brnrs	100	—	66	34	100	32
Coffee/hot water boiling urn, per litre of capacity	11 L	120	—	79	41	120	38
Coffee brewing urn (large), per litre of capacity	22 to 38 L	660	—	440	220	660	210
Coffee brewing urn (small), per litre of capacity	10 L	420	—	280	140	420	130
Cutter (large)	460 mm bowl	750	—	750	—	750	0
Cutter (small)	360 mm bowl	370	—	370	—	370	0
Cutter and mixer (large)	28 to 45 L	3730	—	3730	—	3730	0
Dishwasher (hood type, chemical sanitizing), per 100 dishes/h	950 to 2000 dishes/h	380	—	50	110	160	50
Dishwasher (hood type, water sanitizing), per 100 dishes/h	950 to 2000 dishes/h	380	—	56	123	179	56
Dishwasher (conveyor type, chemical sanitizing), per 100 dishes/h	5000 to 9000 dishes/h	340	—	41	97	138	44
Dishwasher (conveyor type, water sanitizing), per 100 dishes/h	5000 to 9000 dishes/h	340	—	44	108	152	50
Display case (refrigerated), per cubic metre of interior	0.17 to 1.9 m ³	1590	—	640	0	640	0
Dough roller (large)	2 rollers	1610	—	1610	—	1610	0
Dough roller (small)	1 roller	460	—	460	—	460	0
Egg cooker	12 eggs	1800	—	850	570	1420	460
Food processor	2.3 L	520	—	520	—	520	0
Food warmer (infrared bulb), per lamp	1 to 6 bulbs	250	—	250	—	250	250
Food warmer (shelf type), per square metre of surface	0.28 to 0.84 m ²	2930	—	2330	600	2930	820
Food warmer (infrared tube), per metre of length	1.0 to 2.1 m	950	—	950	—	950	950
Food warmer (well type), per cubic metre of well	20 to 70 L	37400	—	12400	6360	18760	6000
Freezer (large)	2.07 m ³	1340	—	540	—	540	0
Freezer (small)	0.51 m ³	810	—	320	—	320	0
Griddle/grill (large), per square metre of cooking surface	0.43 to 1.1 m ²	29000	—	1940	1080	3020	1080
Griddle/grill (small), per square metre of cooking surface	0.20 to 0.42 m ²	26200	—	1720	970	2690	940
Hot dog broiler	48 to 56 hot dogs	1160	—	100	50	150	48
Hot plate (double burner, high speed)		4900	—	2290	1590	3880	1830
Hot plate (double burner stockpot)		4000	—	1870	1300	3170	1490
Hot plate (single burner, high speed)		2800	—	1310	910	2220	1040
Hot water urn (large), per litre of capacity	53 L	130	—	50	16	66	21
Hot water urn (small), per litre of capacity	7.6 L	230	—	87	30	117	37
Ice maker (large)	100 kg/day	1090	—	2730	—	2730	0
Ice maker (small)	50 kg/day	750	—	1880	—	1880	0
Microwave oven (heavy duty, commercial)	20 L	2630	—	2630	—	2630	0
Microwave oven (residential type)	30 L	600 to 1400	—	600 to 1400	—	600 to 1400	0
Mixer (large), per litre of capacity	77 L	29	—	29	—	29	0
Mixer (small), per litre of capacity	11 to 72 L	15	—	15	—	15	0
Press cooker (hamburger)	300 patties/h	2200	—	1450	750	2200	700
Refrigerator (large), per cubic metre of interior space	0.71 to 2.1 m ³	780	—	310	—	310	0
Refrigerator (small) per cubic metre of interior space	0.17 to 0.71 m ³	1730	—	690	—	690	0
Rotisserie	300 hamburgers/h	3200	—	2110	1090	3200	1020
Serving cart (hot), per cubic metre of well	50 to 90 L	21200	—	7060	3530	10590	3390
Serving drawer (large)	252 to 336 dinner rolls	1100	—	140	10	150	45
Serving drawer (small)	84 to 168 dinner rolls	800	—	100	10	110	33
Skillet (tilting), per litre of capacity	45 to 125 L	180	—	90	50	140	66
Slicer, per square metre of slicing carriage	0.06 to 0.09 m ²	2150	—	2150	—	2150	680
Soup cooker, per litre of well	7 to 11 L	130	—	45	24	69	21
Steam cooker, per cubic metre of compartment	30 to 60 L	214000	—	17000	10900	27900	8120
Steam kettle (large), per litre of capacity	76 to 300 L	95	—	7	5	12	4
Steam kettle (small), per litre of capacity	23 to 45 L	260	—	21	14	35	10
Syrup warmer, per litre of capacity	11 L	87	—	29	16	45	14

Table 5 Recommended Rates of Heat Gain From Typical Commercial Cooking Appliances (Concluded)

Appliance	Size	Energy Rate, W		Recommended Rate of Heat Gain, ^a W			
		Rated	Standby	Without Hood		With Hood	
				Sensible	Latent	Total	Sensible
Toaster (bun toasts on one side only)	1400 buns/h	1500	—	800	710	1510	480
Toaster (large conveyor)	720 slices/h	3200	—	850	750	1600	510
Toaster (small conveyor)	360 slices/h	2100	—	560	490	1050	340
Toaster (large pop-up)	10 slice	5300	—	2810	2490	5300	1700
Toaster (small pop-up)	4 slice	2470	—	1310	1160	2470	790
Waffle iron	0.05 m ²	1640	—	700	940	1640	520
Electric, Exhaust Hood Required							
Broiler (conveyor infrared), per square metre of cooking area	0.19 to 9.5 m ²	60800	—	—	—	—	12100
Broiler (single deck infrared), per square metre of broiling area	0.24 to 0.91 m ²	34200	—	—	—	—	6780
Charbroiler, per linear metre of cooking surface	0.6 to 2.4 m	10600	8900	—	—	—	2700
Fryer (deep fat)	15 to 23 kg oil	14000	850	—	—	—	350
Fryer (pressurized), per kilogram of fat capacity	6 to 15 kg	1010	—	—	—	—	38
Griddle, per linear metre of cooking surface	0.6 to 2.4 m	18800	3000	—	—	—	1350
Oven (full-size convection)	—	12000	5000	—	—	—	850
Oven (large deck baking with 15.2 m ³ decks), per cubic metre of oven spacer	0.43 to 1.3 m ³	17300	—	—	—	—	710
Oven (roasting), per cubic metre of oven space	0.22 to 0.66 m ³	28300	—	—	—	—	1170
Oven (small convection), per cubic metre of oven space	0.04 to 0.15 m ³	107000	—	—	—	—	1520
Oven (small deck baking with 7.7 m ³ decks), per cubic metre of oven space	0.22 to 0.66 m ³	28700	—	—	—	—	1170
Open range (top), per 2 element section	2 to 10 elements	4100	1350	—	—	—	620
Range (hot top/fry top), per square metre of cooking surface	0.36 to 0.74 m ²	22900	—	—	—	—	8500
Range (oven section), per cubic metre of oven space	0.12 to 0.32 m ³	40600	—	—	—	—	1660
Gas, No Hood Required							
Broiler, per square metre of broiling area	0.25	46600	190 ^b	16800	9030	25830	3840
Cheese melter, per square metre of cooking surface	0.23 to 0.47	32500	190 ^b	11600	3400	15000	2680
Dishwasher (hood type, chemical sanitizing), per 100 dishes/h	950 to 2000 dishes/h	510	190 ^b	150	59	209	67
Dishwasher (hood type, water sanitizing), per 100 dishes/h	950 to 2000 dishes/h	510	190 ^b	170	64	234	73
Dishwasher (conveyor type, chemical sanitizing), per 100 dishes/h	5000 to 9000 dishes/h	400	190 ^b	97	21	118	38
Dishwasher (conveyor type, water sanitizing), per 100 dishes/h	5000 to 9000 dishes/h	400	190 ^b	110	23	133	41
Griddle/grill (large), per square metre of cooking surface	0.43 to 1.1 m ²	53600	1040	3600	1930	5530	1450
Griddle/grill (small), per square metre of cooking surface	0.23 to 0.42 m ²	45400	1040	3050	1610	4660	1260
Hot plate	2 burners	5630	390 ^b	3430	1020	4450	1000
Oven (pizza), per square metre of hearth	0.59 to 1.2 m ²	14900	190 ^b	1970	690	2660	270
Gas, Exhaust Hood Required							
Braising pan, per litre of capacity	102 to 133 L	3050	190 ^b	—	—	—	750
Broiler, per square metre of broiling area	0.34 to 0.36 m ³	68900	1660	—	—	—	5690
Broiler (large conveyor, infrared), per square metre of cooking area/minute	0.19 to 9.5 m ²	162000	6270	—	—	—	16900
Broiler (standard infrared), per square metre of broiling area	0.22 to 0.87 m ²	61300	1660	—	—	—	5040
Charbroiler (large), per linear metre of cooking area	0.6 to 2.4 m	34600	21000	—	—	—	3650
Fryer (deep fat)	15 to 23 kg	23500	1640	—	—	—	560
Oven (bake deck), per cubic metre of oven space	0.15 to 0.46 m ³	79400	190 ^b	—	—	—	1450
Griddle, per linear metre of cooling surface	0.6 to 2.4 m	24000	6060	—	—	—	1540
Oven (full-size convection)	—	20500	8600	—	—	—	1670
Oven (pizza), per square metre of oven hearth	0.86 to 2.4 m ²	22800	190 ^b	—	—	—	410
Oven (roasting), per cubic metre of oven space	0.26 to 0.79 m ³	44500	190 ^b	—	—	—	800
Oven (twin bake deck), per cubic metre of oven space	0.31 to 0.61 m ³	45400	190 ^b	—	—	—	810
Range (burners), per 2 burner section	2 to 10 burners	9840	390	—	—	—	1930
Range (hot top or fry top), per square metre of cooking surface	0.26 to 0.74 m ²	37200	1040	—	—	—	10700
Range (large stock pot)	3 burners	29300	580	—	—	—	5740
Range (small stock pot)	2 burners	11700	390	—	—	—	2290
Range top, open burner (per 2 element section)	2 to 6 elements	11700	4000	—	—	—	640
Steam							
Compartment steamer, per kilogram of food capacity/h	21 to 204 kg	180	—	14	9	23	7
Dishwasher (hood type, chemical sanitizing), per 100 dishes/h	950 to 2000 dishes/h	920	—	260	110	370	120
Dishwasher (hood type, water sanitizing), per 100 dishes/h	950 to 2000 dishes/h	920	—	290	120	410	130
Dishwasher (conveyor, chemical sanitizing), per 100 dishes/h	5000 to 9000 dishes/h	350	—	41	97	138	44
Dishwasher (conveyor, water sanitizing), per 100 dishes/h	5000 to 9000 dishes/h	350	—	44	108	152	50
Steam kettle, per litre of capacity	12 to 30 L	160	—	12	8	20	6

Sources: Alereza and Breen (1984), Fisher (1998).

^aIn some cases, heat gain data are given per unit of capacity. In those cases, the heat gain is calculated by: $q = (\text{recommended heat gain per unit of capacity}) \times (\text{capacity})$ ^bStandby input rating is given for entire appliance regardless of size.

**Table 7 Recommended Heat Gain from
Typical Laboratory Equipment**

Equipment	Nameplate, W	Peak, W	Average, W
Analytical balance	7	7	7
Centrifuge	138	89	87
Centrifuge	288	136	132
Centrifuge	5500	1176	730
Electrochemical analyzer	50	45	44
Electrochemical analyzer	100	85	84
Flame photometer	180	107	105
Fluorescent microscope	150	144	143
Fluorescent microscope	200	205	178
Function generator	58	29	29
Incubator	515	461	451
Incubator	600	479	264
Incubator	3125	1335	1222
Orbital shaker	100	16	16
Oscilloscope	72	38	38
Oscilloscope	345	99	97
Rotary evaporator	75	74	73
Rotary evaporator	94	29	28
Spectronics	36	31	31
Spectrophotometer	575	106	104
Spectrophotometer	200	122	121
Spectrophotometer	N/A	127	125
Spectro fluorometer	340	405	395
Thermocycler	1840	965	641
Thermocycler	N/A	233	198
Tissue culture	475	132	46
Tissue culture	2346	1178	1146

**Table 8 Recommended Heat Gain from
Typical Computer Equipment**

	Continuous, W	Energy Saver Mode, W
Computers^a		
Average value	55	20
Conservative value	65	25
Highly conservative value	75	30
Monitors^b		
Small monitor (330 to 380 mm)	55	0
Medium monitor (400 to 460 mm)	70	0
Large monitor (480 to 510 mm)	80	0

Sources: Hosni et al. (1999), Wilkins and McGaffin (1994).

^aBased on 386, 486, and Pentium grade.

^bTypical values for monitors displaying Windows environment.

**Table 9 Recommended Heat Gain from
Typical Laser Printers and Copiers**

	Continuous, W	1 page per min., W	Idle, W
Laser Printers			
Small desktop	130	75	10
Desktop	215	100	35
Small office	320	160	70
Large office	550	275	125
Copiers			
Desktop copier	400	85	20
Office copier	1,100	400	300

Source: Hosni et al. (1999).

**Table 10 Recommended Heat Gain from
Miscellaneous Office Equipment**

Appliance	Maximum Input Rating, W	Recommended Rate of Heat Gain, W
Mail-processing equipment		
Folding machine	125	80
Inserting machine, 3,600 to 6,800 pieces/h	600 to 3300	390 to 2150
Labeling machine, 1,500 to 30,000 pieces/h	600 to 6600	390 to 4300
Postage meter	230	150
Vending machines		
Cigarette	72	72
Cold food/beverage	1150 to 1920	575 to 960
Hot beverage	1725	862
Snack	240 to 275	240 to 275
Other		
Bar code printer	440	370
Cash registers	60	48
Check processing workstation, 12 pockets	4800	2470
Coffee maker, 10 cups	1500	1050 sens., 450 latent
Microfiche reader	85	85
Microfilm reader	520	520
Microfilm reader/printer	1150	1150
Microwave oven, 28 L	600	400
Paper shredder	250 to 3000	200 to 2420
Water cooler, 30 L/h	700	350

8. Data Solar Heat Gain Factor (SHGF) Glass

	4 Deg										8 Deg									
	N	NNE/NNW	NE/NW	ENE/WNW	E/W	ESE/WSW	SE/SW	SSE/SSW	S	HOR	N	NNE/NNW	NE/NW	ENE/WNW	E/W	ESE/WSW	SE/SW	SSE/SSW	S	HOR
Jan.	33	33	79	170	229	252	237	193	141	286	32	32	71	163	224	250	242	203	162	275
Feb.	35	35	123	199	242	248	215	152	88	301	34	34	114	193	239	248	219	165	110	294
Mar.	38	77	163	219	242	227	177	96	43	302	37	67	156	215	241	230	184	110	55	300
Apr.	55	125	189	223	223	190	126	43	38	287	44	117	184	221	225	195	134	53	39	289
May	93	154	200	220	206	161	89	38	38	272	74	146	198	220	209	167	97	39	38	277
June	110	164	202	215	196	147	73	38	38	263	90	155	200	217	200	141	82	39	39	269
July	96	154	197	215	200	156	85	39	38	267	77	145	195	215	204	162	93	40	39	272
Aug.	59	124	184	215	214	181	120	42	40	279	47	117	179	214	216	186	128	51	41	282
Sep.	39	75	156	209	231	216	170	93	44	293	38	66	149	205	230	219	176	107	56	290
Oct.	36	36	120	193	234	239	207	148	86	294	35	35	112	187	231	239	211	160	108	288
Nov.	34	34	79	168	226	248	232	190	139	284	33	33	71	161	220	245	233	200	160	273
Dec.	33	33	62	157	221	250	242	206	160	277	31	31	55	149	215	246	247	215	179	265

9. Data Shading Coefficient (SC) Glass

TABLE 6.7 SHADING COEFFICIENTS FOR GLASS WITHOUT OR WITH INTERIOR SHADING DEVICES

Type of Glazing	Nominal Thickness, in (Each light)	Without Shading	With Interior Shading					
			Venetian Blinds		Roller Shades			
			Medium	Light	Dark	Light	Light	
Single glass								
Clear	¼	0.94	0.74	0.67	0.81	0.39	0.44	
Heat absorbing	¼	0.69	0.57	0.53	0.45	0.30	0.36	
Double glass								
Clear	¼	0.81	0.62	0.58	0.71	0.35	0.40	
Heat absorbing	¼	0.55	0.39	0.36	0.40	0.22	0.30	

Note: Venetian blinds are assumed set at a 45° position. Adapted with permission from the 1993 ASHRAE Handbook—Fundamentals.

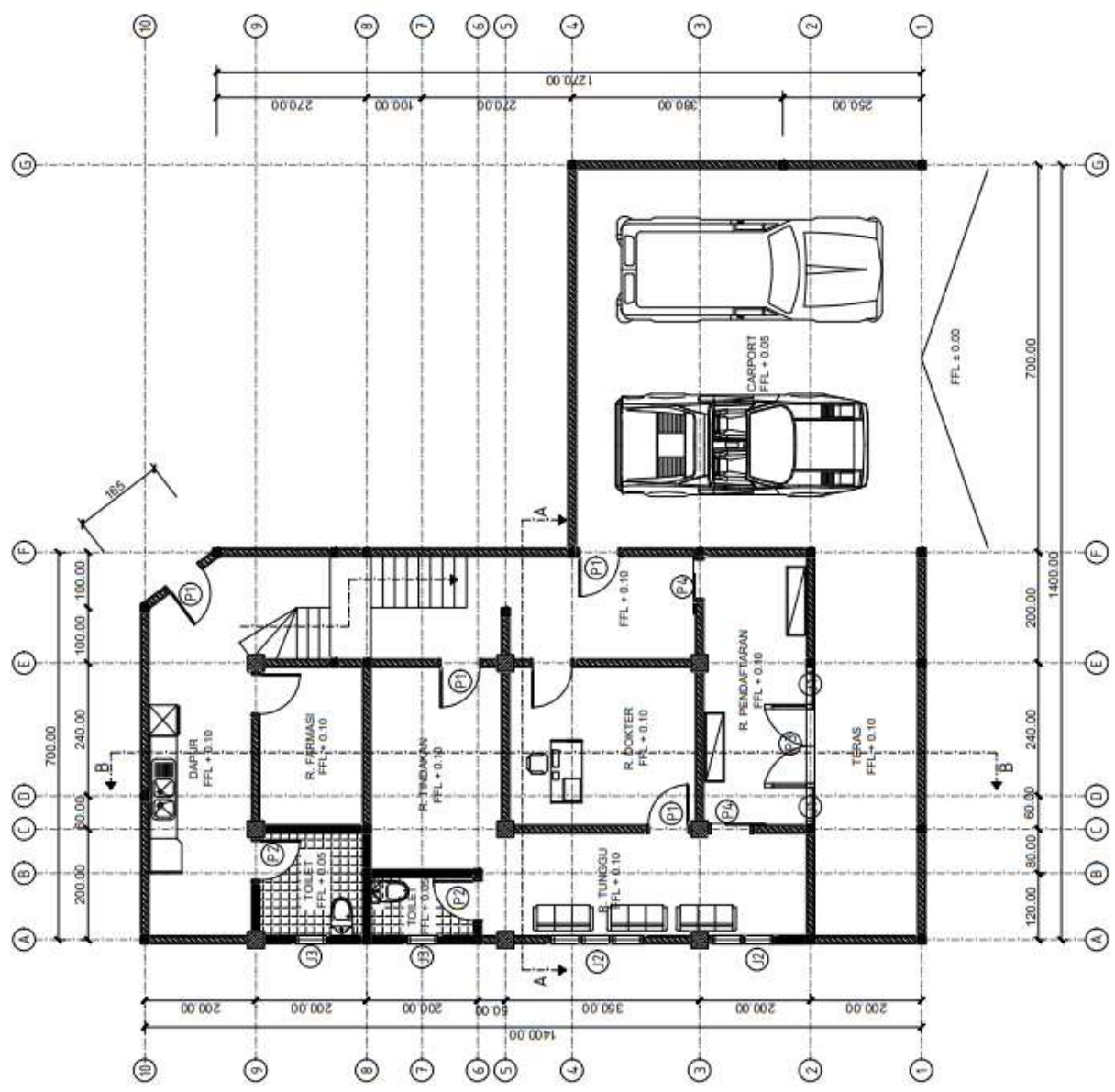
10. Cooling Load Factor (CLF) Glass

TABLE 6.8 COOLING LOAD FACTORS (CLF) FOR GLASS WITHOUT INTERIOR SHADING, IN NORTH LATITUDE SPACES HAVING CARPETED FLOORS

Room	Dir.	Mass	Solar Time																							
			0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400
N	L	.00	.00	.00	.00	.01	.64	.73	.74	.81	.88	.95	.98	.98	.94	.88	.79	.79	.55	.31	.12	.04	.02	.01	.00	
	M	.03	.02	.02	.02	.02	.64	.69	.69	.77	.84	.91	.94	.95	.91	.86	.79	.79	.56	.32	.16	.10	.07	.05	.04	
	H	.10	.09	.08	.07	.07	.62	.64	.64	.71	.77	.83	.87	.88	.85	.81	.75	.76	.55	.34	.22	.17	.15	.13	.11	
NE	L	.00	.00	.00	.00	.01	.51	.83	.88	.72	.47	.33	.27	.24	.23	.20	.18	.14	.09	.03	.01	.00	.00	.00	.00	
	M	.01	.01	.00	.00	.01	.50	.78	.82	.67	.44	.32	.28	.26	.24	.22	.19	.15	.11	.05	.03	.02	.02	.01	.01	
	H	.03	.03	.03	.02	.03	.47	.71	.72	.59	.40	.30	.27	.26	.25	.23	.20	.17	.13	.08	.06	.05	.05	.04	.04	
E	L	.00	.00	.00	.00	.00	.42	.76	.91	.90	.75	.51	.30	.22	.18	.16	.13	.11	.07	.02	.01	.00	.00	.00	.00	
	M	.01	.01	.00	.00	.01	.41	.72	.86	.84	.71	.48	.30	.24	.21	.18	.16	.13	.09	.04	.03	.02	.01	.01	.01	
	H	.03	.03	.03	.02	.02	.39	.66	.76	.74	.63	.43	.29	.24	.22	.20	.18	.15	.12	.08	.06	.05	.05	.04	.04	
SE	L	.00	.00	.00	.00	.00	.27	.58	.81	.93	.93	.81	.59	.37	.27	.21	.18	.14	.09	.03	.01	.00	.00	.00	.00	
	M	.01	.01	.01	.00	.01	.26	.55	.77	.88	.87	.76	.56	.37	.29	.24	.20	.16	.11	.05	.04	.03	.02	.02	.01	
	H	.04	.04	.03	.03	.03	.26	.51	.69	.78	.78	.68	.51	.35	.29	.25	.22	.19	.15	.09	.08	.07	.06	.05	.05	
S	L	.00	.00	.00	.00	.00	.07	.15	.23	.39	.62	.82	.94	.93	.80	.59	.38	.26	.16	.06	.02	.01	.00	.00	.00	
	M	.01	.01	.01	.01	.01	.07	.14	.22	.38	.59	.78	.88	.88	.76	.57	.38	.28	.18	.09	.06	.04	.03	.02	.02	
	H	.05	.05	.04	.04	.03	.09	.15	.21	.35	.54	.70	.79	.79	.69	.52	.37	.29	.21	.13	.10	.09	.08	.07	.06	
SW	L	.00	.00	.00	.00	.04	.09	.13	.16	.19	.23	.39	.62	.82	.94	.94	.81	.54	.19	.07	.03	.01	.00	.00	.00	
	M	.02	.02	.01	.01	.01	.05	.09	.13	.16	.19	.22	.38	.60	.78	.89	.89	.77	.52	.20	.10	.07	.05	.04	.03	
	H	.07	.06	.05	.05	.04	.07	.11	.14	.16	.18	.21	.35	.55	.71	.80	.79	.69	.48	.20	.14	.11	.10	.08	.07	
W	L	.00	.00	.00	.00	.00	.03	.07	.10	.13	.15	.16	.18	.31	.55	.78	.92	.93	.73	.25	.10	.04	.01	.01	.00	
	M	.02	.02	.01	.01	.01	.04	.07	.10	.13	.14	.16	.17	.30	.53	.74	.87	.88	.69	.24	.12	.07	.05	.04	.03	
	H	.06	.06	.05	.04	.04	.06	.09	.11	.13	.15	.16	.17	.28	.49	.67	.78	.79	.62	.23	.14	.11	.09	.08	.07	
NW	L	.00	.00	.00	.00	.00	.04	.09	.14	.17	.20	.22	.23	.24	.31	.53	.78	.92	.81	.28	.10	.04	.02	.01	.00	
	M	.02	.02	.01	.01	.01	.05	.10	.13	.17	.19	.21	.22	.23	.30	.52	.75	.88	.77	.26	.12	.07	.05	.04	.03	
	H	.06	.05	.05	.04	.04	.07	.11	.14	.17	.19	.20	.21	.22	.28	.48	.68	.79	.69	.23	.14	.10	.09	.08	.07	
Hor.	L	.00	.00	.00	.00	.00	.08	.25	.45	.64	.80	.91	.97	.97	.91	.80	.64	.44	.23	.08	.03	.01	.00	.00	.00	
	M	.02	.02	.01	.01	.01	.08	.24	.43	.60	.75	.86	.92	.92	.87	.77	.63	.45	.26	.12	.07	.05	.04	.03	.02	
	H	.07	.06	.05	.05	.04	.11	.25	.41	.56	.68	.77	.83	.83	.80	.71	.59	.44	.28	.17	.13	.11	.10	.09	.08	

Values for nominal 15 ft by 15 ft by 10 ft high space, with ceiling, and 50% or less glass in exposed surface at listed orientation.
 L = Lightweight construction, such as 1 in. wood floor, Group G wall.
 M = Mediumweight construction, such as 2 to 4 in. concrete floor, Group E wall.
 H = Heavyweight construction, such as 6 to 8 in. concrete floor, Group C wall.
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MEI 2023	
KAB. SERANG - PROV. BANTEN	
PROJECT	
PERSetujuan BANGUNAN GEDUNG Klinik dr. Rifa	
DIPERIKSA	PARAF
H. ABD MANA'AF OWNER	
INDOSONYENI SELLER Dir PT. Griya Nawasena	
DISETUJUI	PARAF
H. ABD MANA'AF OWNER	
INDOSONYENI SELLER Dir PT. Griya Nawasena	
GAMBAR	SKALA
AS-SHOWED	1:100
DIGAMBAR	PARAF
YUSRIL HADI R	
UKURAN KERTAS	KODE
A4	
	HAL

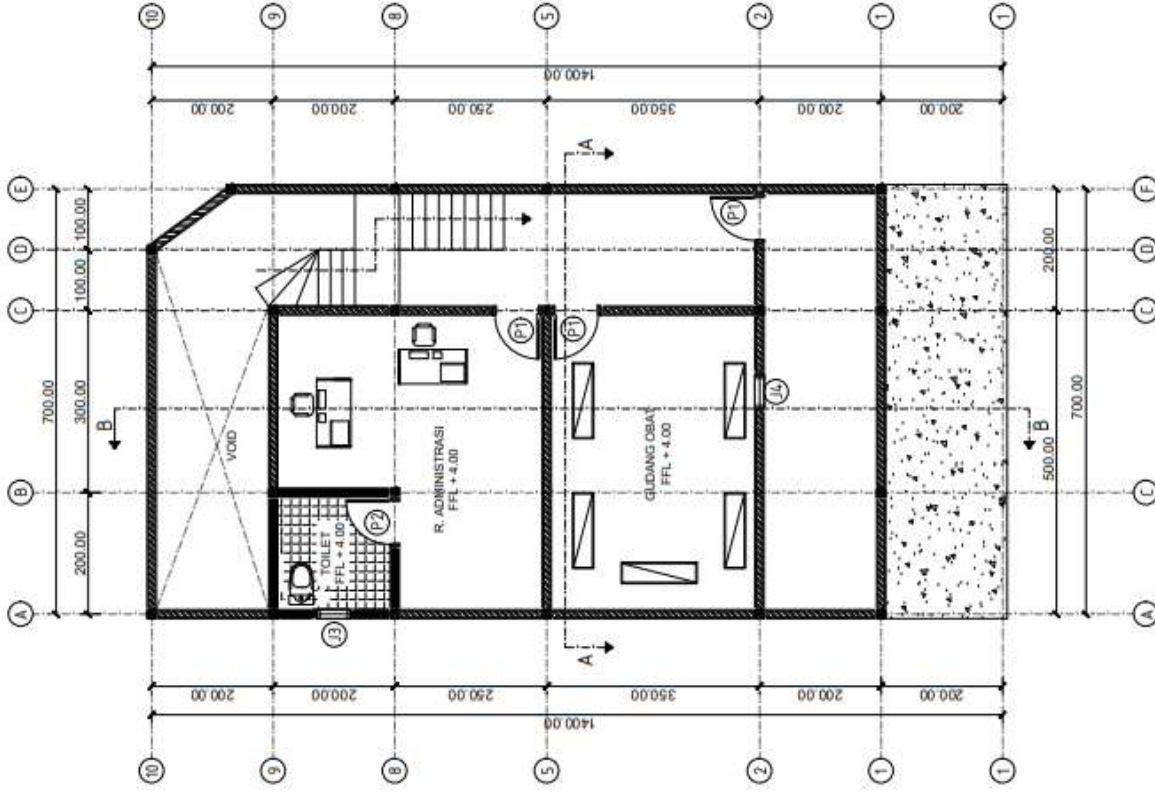


- NOTASI :**
- FFL = FINISHED FLOOR LEVEL
 - P1 = PINTU TYPE (82x200)
 - P2 = PINTU TYPE (82x200)
 - P3 = PINTU TYPE (135x214)
 - J1 = JENDELA TYPE (75x214)
 - J2 = JENDELA TYPE (185x40)
 - J3 = JENDELA TYPE (55x40)

- LEGENDA :**
- [Pattern] : ARSIRAN KOLOM
 - [Pattern] : ARSIRAN DINDING
 - [Pattern] : ARSIRAN TRASRAM
 - [Pattern] : ARSIRAN KERAMIK
 - [Pattern] : ARSIRAN POTONG
 - [Pattern] : GARIS GRID
 - [Pattern] : GARIS UKURAN



DENAH KUSEN PINTU JENDELA LANTAI DASAR
 Skala 1 : 100



- NOTASI :
- FFL : FINISHED FLOOR LEVEL
 - P1 : PINTU TYPE (82x200)
 - P2 : PINTU TYPE (82x200)
 - J3 : JENDELA TYPE (55x40)
 - J4 : JENDELA TYPE (75x120)

- LEGENDA :
- ARSIRAN KOLOM
 - ARSIRAN DINDING
 - ARSIRAN TRASRAM
 - ARSIRAN KERAMIK
 - GARIS POTONG
 - GARIS GRID
 - GARIS UKURAN



DENAH KUSEN PINTU JENDELA LANTAI DUA
 Skala 1 : 100