

CALCULO DE CARGAS TERMICAS CAMARAS

Table 17 Typical insulation thickness for chill and cold stores utilising different insulation materials

Insulation	Calculated thermal conductivity (kcal/m h °C)	Thickness (mm)
Polystyrene	0.033	220
Styrofoam FR	0.030	200
Polyurethane	0.025	170

Table 66 Average number of air changes/24 h for storage rooms due to door opening and infiltration

Room volume (m³)	Air change per 24 h	Room volume (m³)	Air change per 24 h	Room volume (m³)	Air change per 24 h	Room volume (m³)	Air change per 24 h
2.5	70	20	22	100	9	600	3.2
3.0	63	25	19.5	150	7	600	2.8
4.0	53	30	17.5	200	6	1 000	2.4
5.0	47	40	15.0	250	5.3	1 500	1.95
7.5	38	50	13.0	300	4.8	2 000	1.65
10.0	32	60	12.0	400	4.1	2 500	1.45
15.0	26	80	10.0	500	3.6	3 000	1.3

2400 m³
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Table 67 Heat removed in cooling air to storage room conditions (kcal/m³)

Cold Store Temp (°C)	Outside air condition		
	+20°C & 60% RH	+30°C & 60% RH	+40°C & 60% RH
-18	20.5	29.5	43.0
-25	23.5	33.0	46.5
-30	26.0	35.5	49.5
-50	36.5	47.5	62.5

Table 68 Heat equivalent of occupancy

Cold Store Temp. (°C)	Heat Equivalent per Person (kcal/h)
-18	328
-25	365
-30	391
-50	494

Table 62 Evaporator-fan data *Ventiladores -*

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Evaporator capacity (kcal/h)	No. of fans	Type of fan	Dia. (mm)	RPM	Fan motor output (kW)	Air throw (M)	
						Blow through	Draw through
3 024	1	Propeller	457	1 450	0.3	7.6	9.1
6 048	2	"	457	1 450	0.3	8.5	9.1
9 072	2	"	610	960	0.45	9.8	12.2
12 096	2	"	610	960	0.45	9.8	12.2
16 128	2	"	762	900	0.67	12.2	13.7
18 144	3	"	610	960	0.67	12.2	12.2
21 168	3	"	762	900	0.67	13.7	13.7
24 696	3	"	762	900	0.67	14.6	13.7
28 224	3	"	800	920	1.3	15.8	15.2
32 760	3	"	800	920	1.3	16.8	15.2

Power

1 hp (U.K. or U. S.)	= 0.746 kW	= 0.746 Joules/second (J/s)
1 hp (metric)	= 0.736 kW	= 0.736 kJ / seg.
1 Watt (W)	= 1 J/s	

DIMENSIONAMIENTO DE CAMARAS FRIGORIFICAS

Table 48 Density of stowage rates - Fillets blocks

Wt of block (kg)	Dimension of block (mm)	Density (t/m ³)	No of blocks per pallet	Total wt per pallet (kg)	Stowage rate with pallet (m ³ /t)
5.7	505 x 263 x 38	1.13	176	1003	1.3
6.1	508 x 295 x 41	1.0	168	1025	1.2
6.4	629 x 264 x 38	1.01	160	1024	1.2
7.5	483 x 252 x 58	1.06	128	975	1.4
8.4	484 x 288 x 56	1.08	120	1008	1.2
12	798 x 249 x 60	1.01	84	1008	1.7 a/
25	530 x 525 x 102	0.88	40	1000	1.3
29	802 x 533 x 65	1.04	34	986	1.3
50	1 060 x 530 x 102	0.88	20	1000	1.3

Table 44 Density and stowage rates Fillets IQF -polystyrene trays with stretch wrap

Wt of pack (kg)	Total wt in master carton (kg)	Dimensions of pack (mm)	No of packs in master carton	Dimension of master carton (mm)	Density in master carton (t/m ³)	No of master cartons per pallet	Total wt per pallet (kg)	Stowage rate with pallet (m ³ /t)
0.284	1.7	188 x 135 x 30	6	305 x 190 x 140	0.21	200	340	5.9
0.227 to 0.298	2.3	220 x 130 x 30	10	270 x 235 x 195	0.19	119	274	7.4
0.255 to 0.369	2.3	270 x 138 x 18	9	400 x 300 x 100	0.19	150	345	5.8
0.255 to 0.369	4.6	270 x 138 x 18	18	400 x 280 x 194	0.21	70	322	6.3
0.173 to 0.355	4.6	215 x 130 x 30	18	260 x 220 x 335	0.24	68	313	6.4

0.184 to 0.340	7.25	264 x 131 x 25	35	400 x 297 x 260	0.23	50	360	5.6
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Table 58 Recommended minimum thickness for cold store insulation (mm)

Material and conductivity	Ambient Temp. (°C)	Storage Temperature (°C)					
		-10	-18	-20	-25	-30	-50
Cork 0.037 Kcal/hr m°C	20	150	175	200	225	250	325
	30	200	225	250	250	275	375
	40	250	275	275	300	325	425
Polystyrene 0.030 Kcal/hr m°C	20	125	150	175	200	225	275
	30	175	200	225	225	225	325
	40	225	225	225	250	275	350
Polyurethane 0.0198 Kcal/hr m°C	20	100	100	125	125	150	175
	30	125	125	150	150	150	200
	40	150	150	150	175	175	225

Table 59 Details of pallet loads used in layouts in Figures 51-61

Product No.	Description	Average weight/pallet (kg)	Net storage volume/pallet (m³)	Storage rate (m³/t)	Storage density (t/m³)
1	Fish fingers	770	2.02	2.6	0.38
2	Fish steaks	730	2.02	2.8	0.36
3	IQF fillets in polytrays	326	2.02	6.2	0.16
4	IQF fillets in bulk catering pack	559	2.02	3.6	0.28
5	IQF fillets in polybags	546	2.02	3.7	0.27
6	Blocks of whole fish	990	1.6	1.6	0.62