

CELLA FRIGORIFERA

Cold Room - Step 2 of 5: Review Cold Room Load



The inputs below are necessary to calculate the required cooling capacity of the Cold Room:

Length: 6.00 m
Width: 5.00 m
Height: 3.60 m

☒ Inner dimensions

☐ Outer dimensions

Room conditions:

Temperature: 5.0 °C

Relative humidity: 80 %

Operating hours: 17.3 h

Goods:

Meat, frozen

Quantity per day: 4000 kg

Inlet temperature: -13.0 °C

Respiration heat load:

Total mass in room: 20000 kg

Air exchange (infiltration):

Temperature: 28.0 °C

Relative humidity: 55 %

☒ Door openings:

Regular

☐ Air exchange rate: 4.81

(times room volume per 24 hours)

Heat transfer:

☒ Standard panels

☐ Custom panels

Type:

Polyurethane

Thickness:

100.0 mm

Temperature of surroundings:

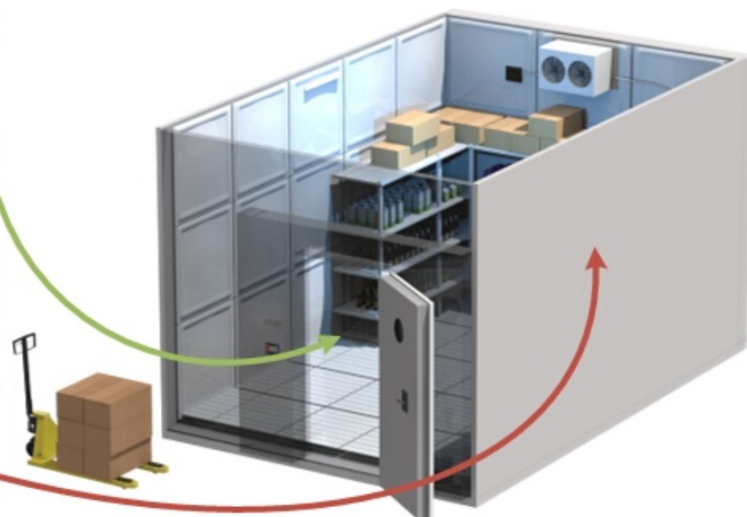
28.0 °C

Temperature below floor:

10.0 °C



☒ Floor is insulated



Additional loads

Lights: 240 W

Fans: 68.79 W

People: 2 h/day

Other: 0 W

☒ Defrost

☐ Electric

☒ Natural

Power: 569.5 W

Defrosts per day: 4

Defrost time: 30 min

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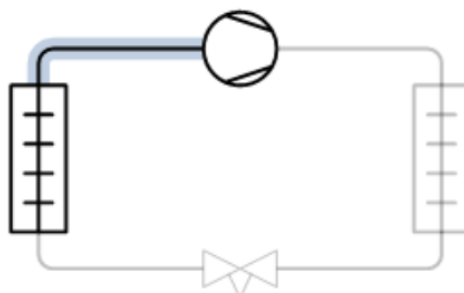
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Operating conditions (synchronized across application)

Refrigerant:	R134a	Cooling capacity:	1.778 kW
Mass flow in line:	44.37 kg/h	Heating capacity:	2.305 kW
Evaporating temperature:	-3.3 °C	Condensing temperature:	43.0 °C
Evaporating pressure:	2.596 bar	Condensing pressure:	10.99 bar
Useful superheat:	5.4 K	Subcooling:	3.0 K
Additional superheat:	0 K	Additional subcooling:	0 K
Discharge temperature:	63.2 °C		

System and line: Dry - Suction line

Selection criteria: 0.02. 0 day. Efficiency, internal HX: 0.3

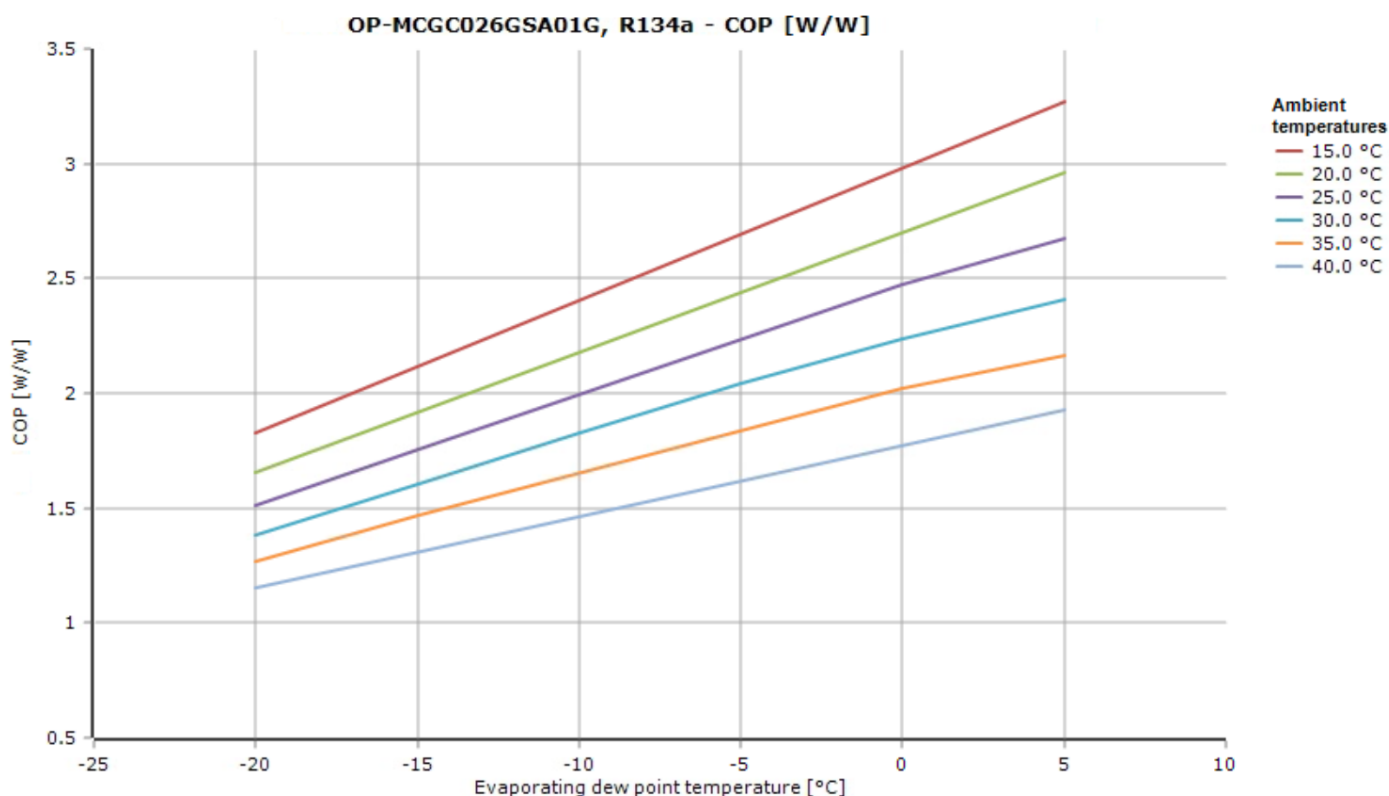


Operating conditions (synchronized across application)

Refrigerant:	R134a		
Evaporating dew point temperature:	-3.3 °C	Ambient temperature:	32.0 °C
Evaporating pressure:	2.594 bar	Subcooling:	3.0 K
Useful superheat:	5.4 K	Additional subcooling:	0 K
Additional superheat:	0 K	Altitude:	0 m
Return gas temperature:	2.1 °C		
Rating conditions:	Custom		
Required cooling capacity:	1.434 kW		

Evaporator conditions

Cooling capacity:	1.777 kW
Dew point temperature:	-3.3 °C
Air inlet temperature:	5.0 °C
Mean temperature difference:	8.3 K
Estimated fan power:	68.79 W
Estimated defrost power:	569.5 W

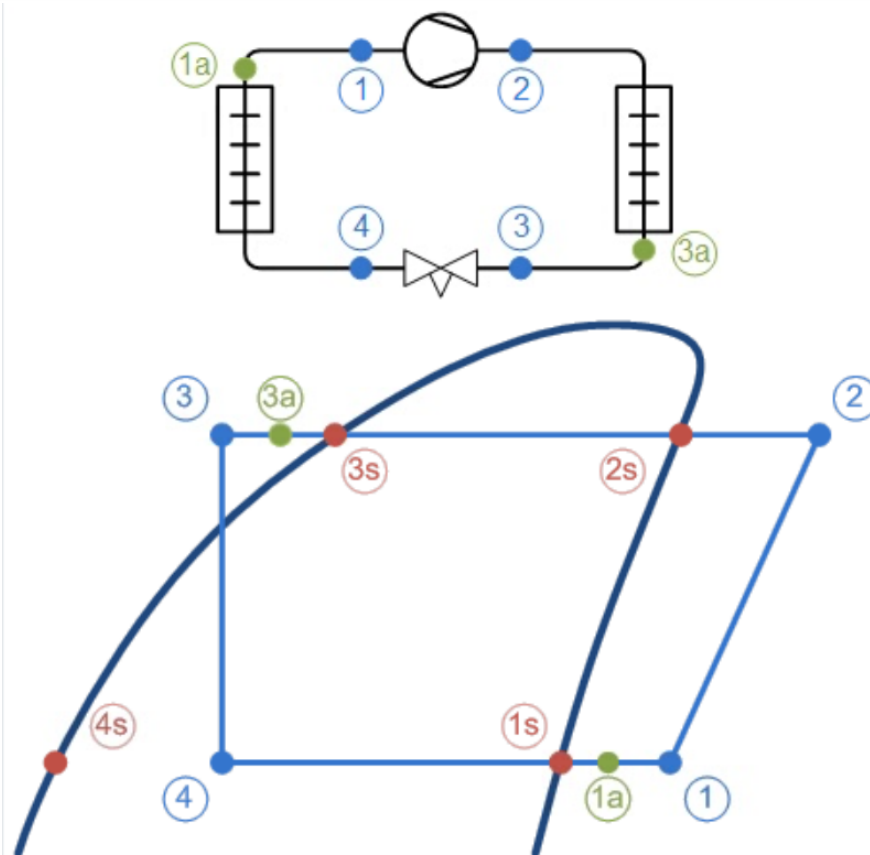


All values are calculated based on the given operating conditions.

The selected compressor or condensing unit capacity is used to calculate mass flows.

Mass flow in compressor: 44.34 kg/h

Point	Description	Temperature [°C]	Pressure (a) [bar]	Density [kg/m ³]	Enthalpy [kJ/kg]	Entropy [kJ/(kg·K)]
1	Compressor suction	2.1	2.594	12.5	401.4	1.746
2	Compressor discharge (estimated)	71.0	10.99	45.89	452.7	1.807
2s	Condensation dew point	43.0	10.99	54.41	421.4	1.713
3s	Condensation bubble point	43.0	10.99	1135	261.6	1.207
3a	Condenser out	40.0	10.99	1148	257.1	1.193
3	Including additional subcooling	40.0	10.99	1148	257.1	1.193
4	After expansion valve	-3.3	2.594	41.03	257.1	1.212
4s	Evaporation bubble point	-3.3	2.594	1306	195.5	0.9836
1s	Evaporation dew point	-3.3	2.594	12.84	396.6	1.729
1a	Evaporator out	2.1	2.594	12.5	401.4	1.746



R134a ASEREP v5.2.3.0

