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 **ATMO**  
**sphere**

solutions for europe  
**natural refrigerants**

19 & 20 April, 2016 – Barcelona







## CO<sub>2</sub> Plug-in cabinets for supermarket

The ISA experience



ISA







Made in Italy



67% export



ISO 9000  
ISO 14000  
ISO 14064



4 plants



100 mio €



750 employees

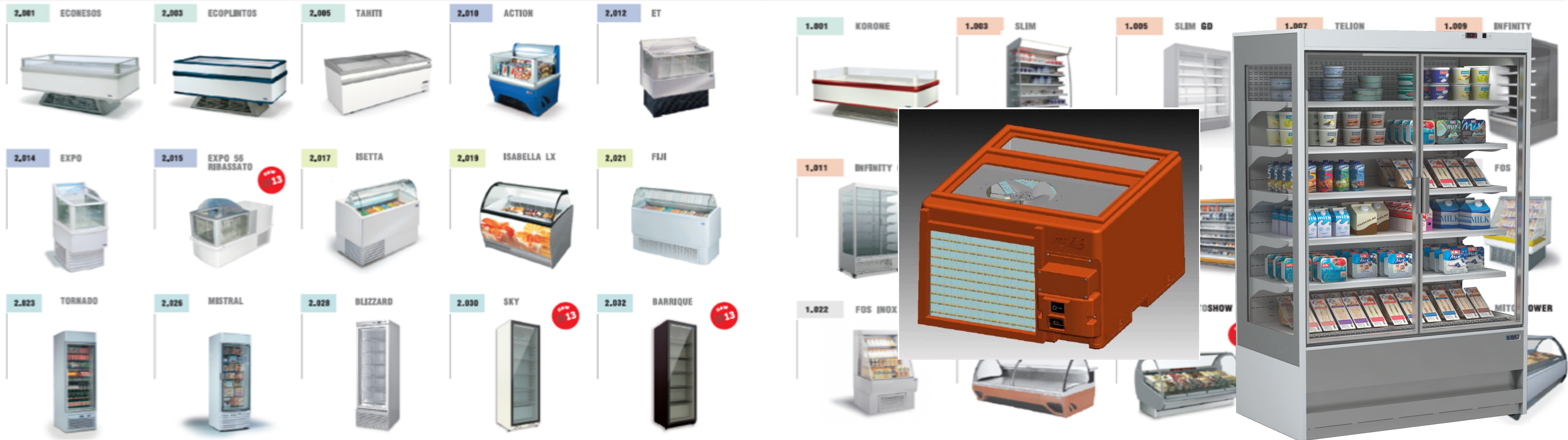


60% Isa cabinet range is now operating natural refrigerant

15% of it using CO<sub>2</sub>

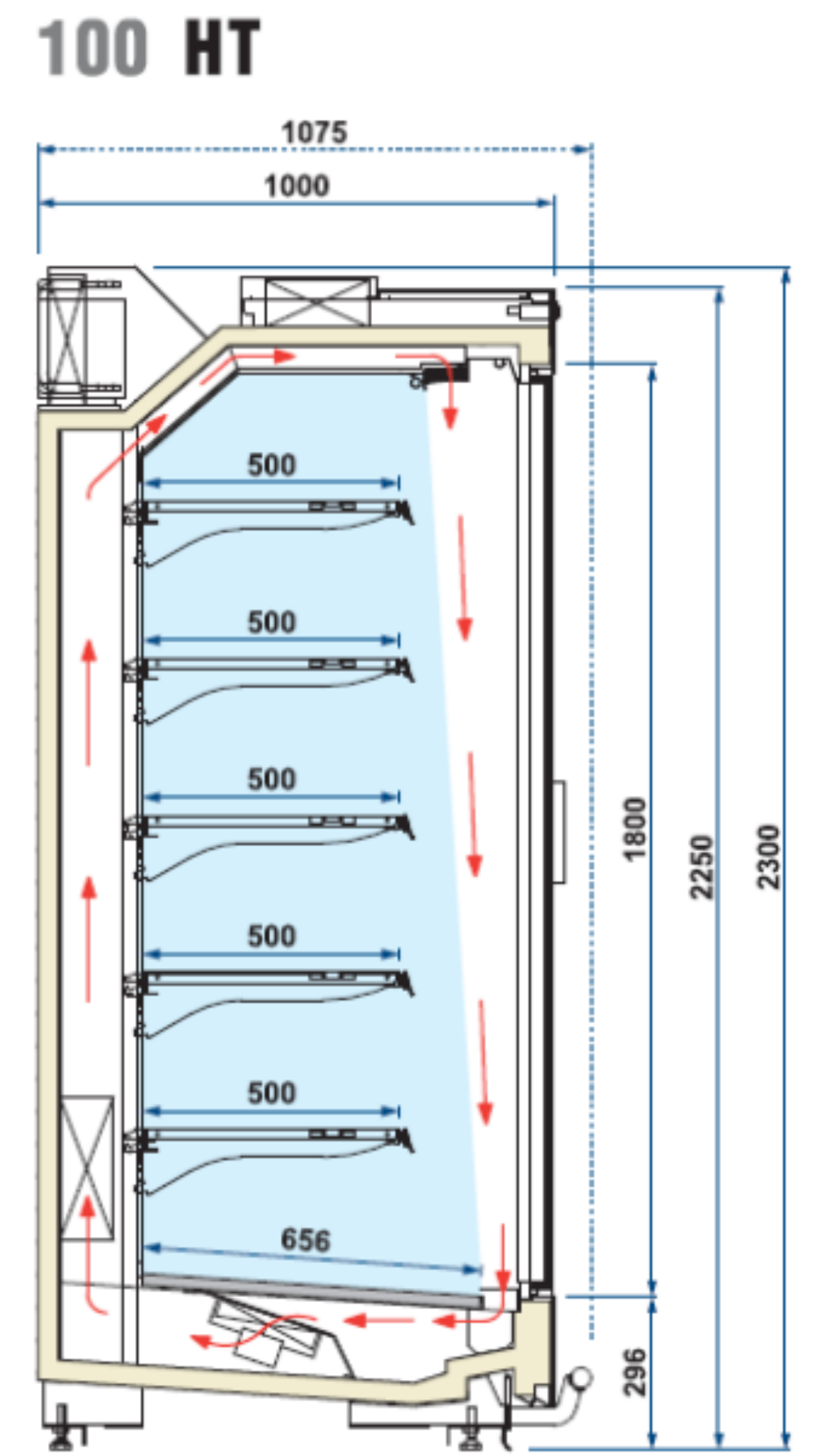
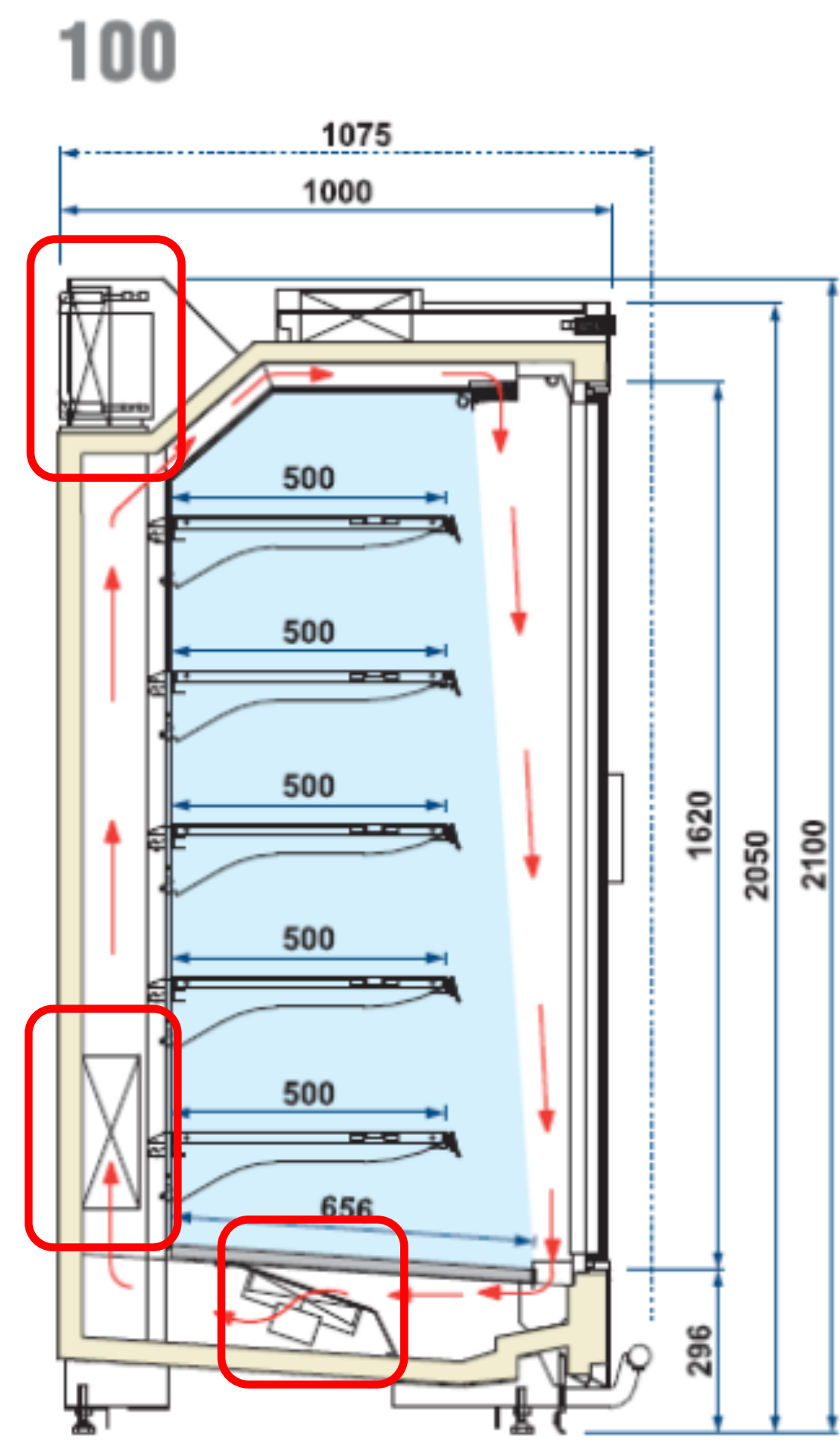
HydroCarbon

CO<sub>2</sub>





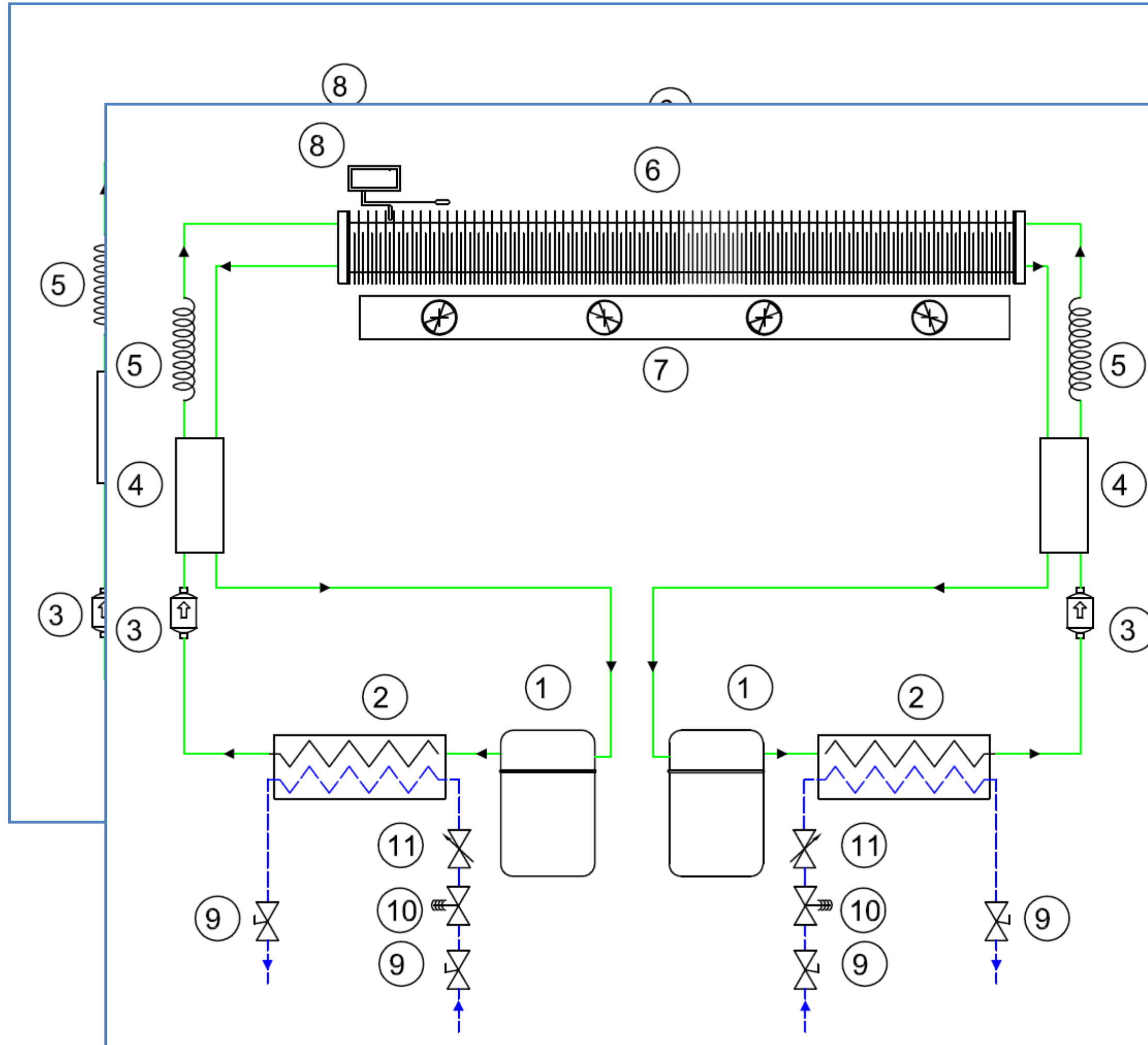
## glass door multideck cabinet: chilled product





## glass door multideck cabinet: chilled product

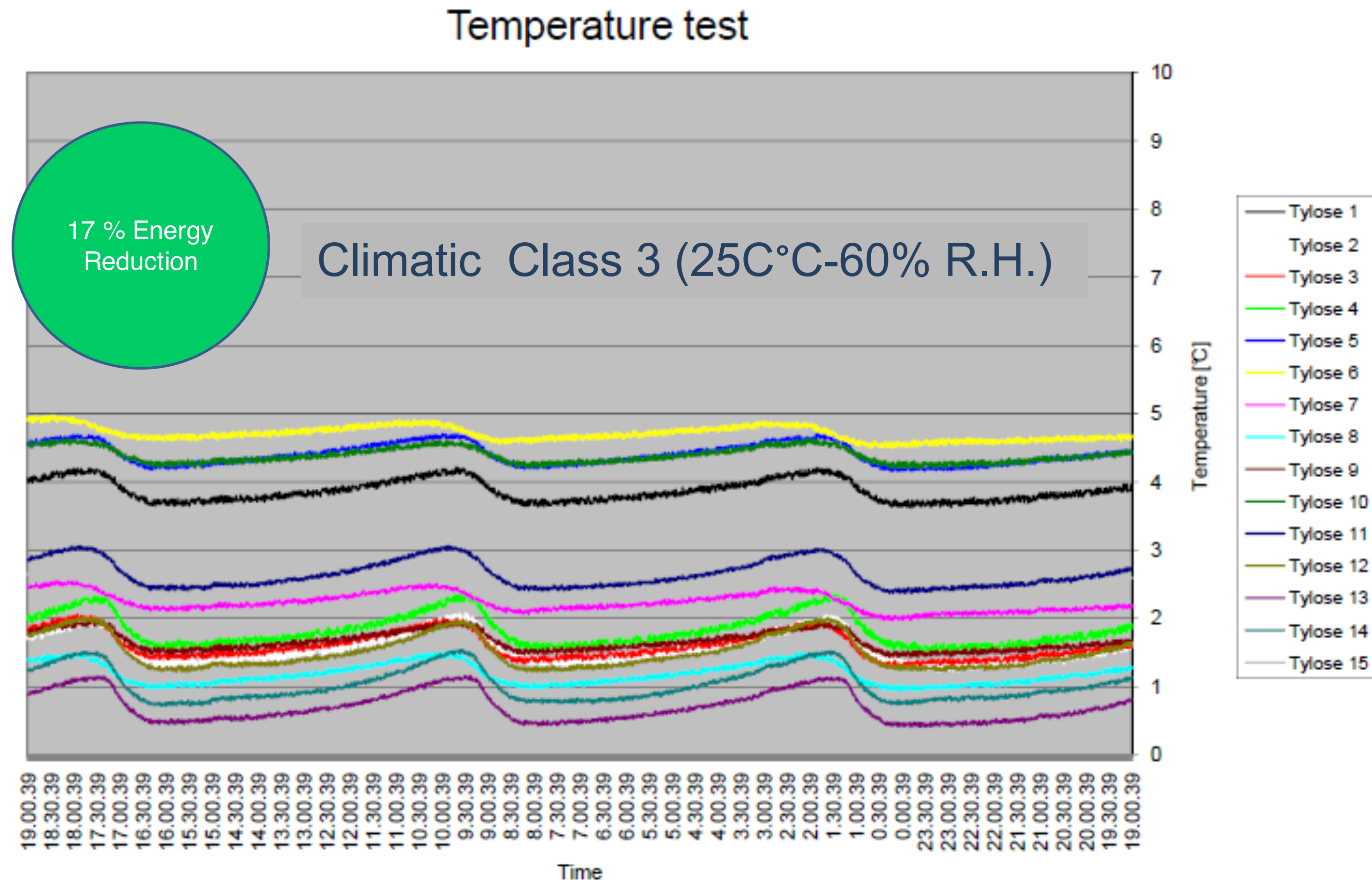
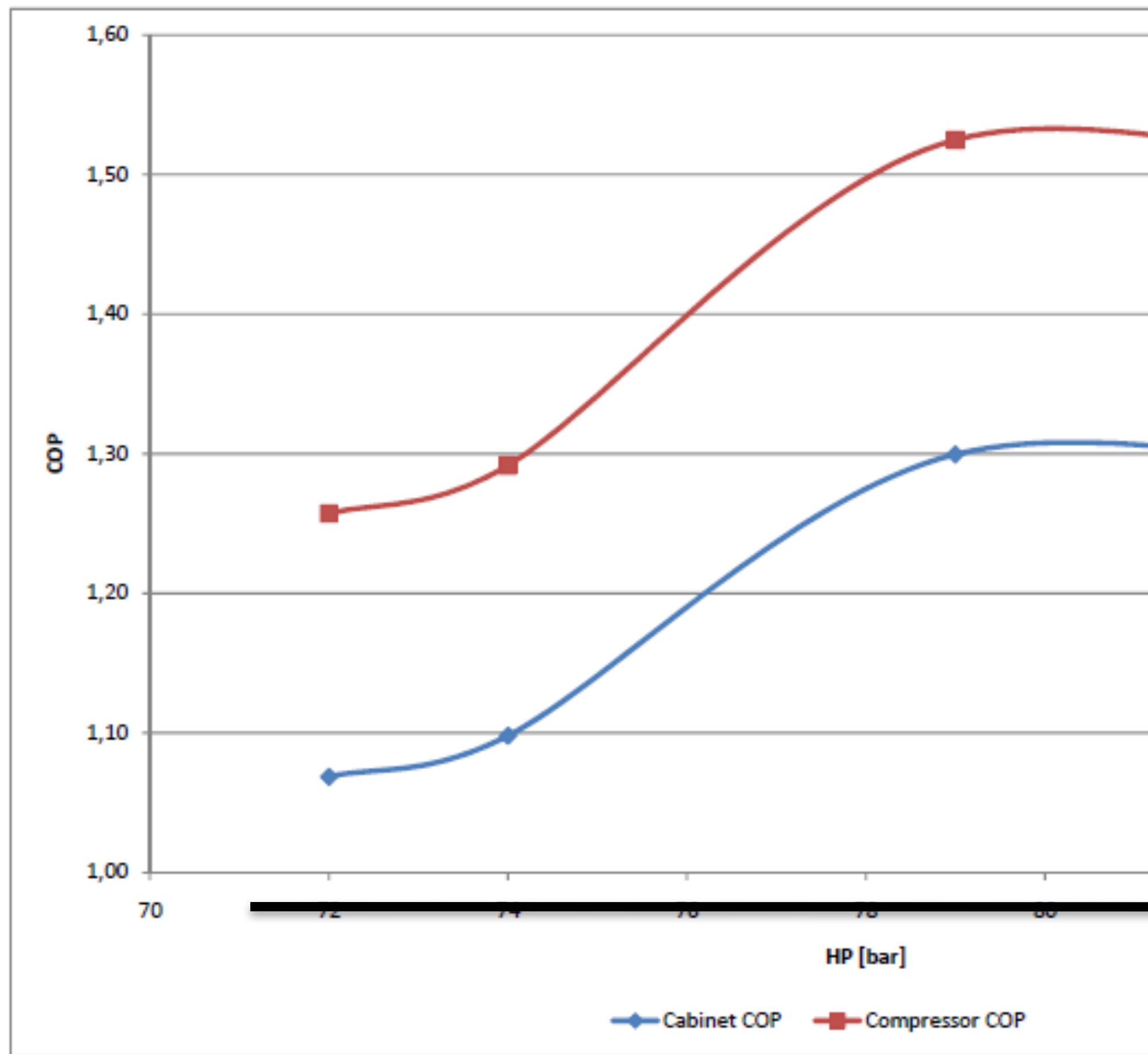
cabinet class 3M1 EN 23953 test result



		Description	Value
1	CC		
2	W/	evaporator air inlet temperature [°C]	2,0
3	FIL		
4	SL	evaporating temperature [°C]	-10,0
5	CA	Low pressure [bar]	26,0
6	EV		
7	FA	High pressure [bar]	75/85
8	EL		
9	W/	Ambient temperature [°C]	25
10	W/	Electrical Power [W]	1380
11	W/	Refrigerated capacity [W]	1793,0
		Cabinet COP	1,30
		Compressor COP	1,52



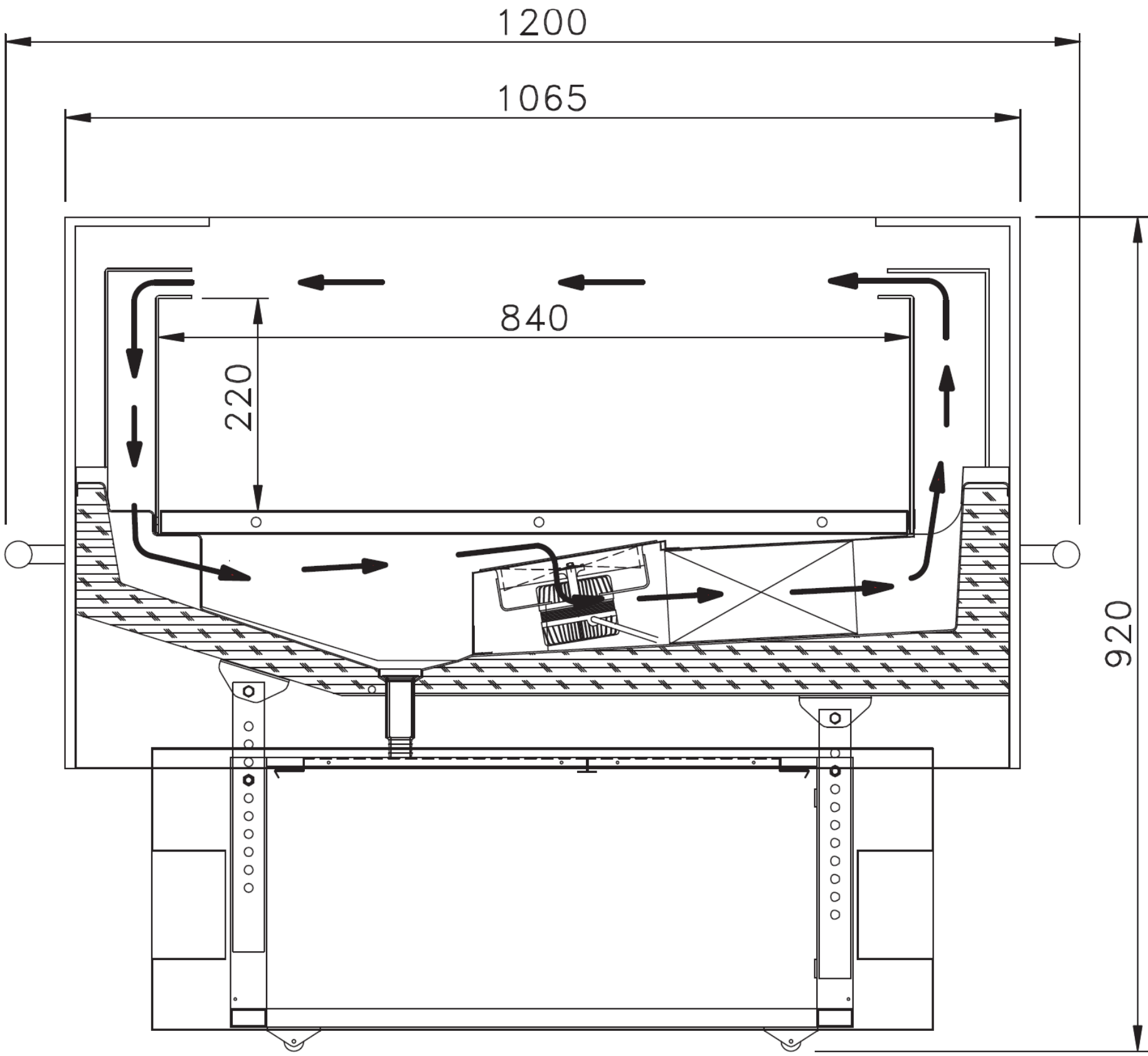
## glass door multideck cabinet: chilled product



Refrigerated capacity    Electrical power

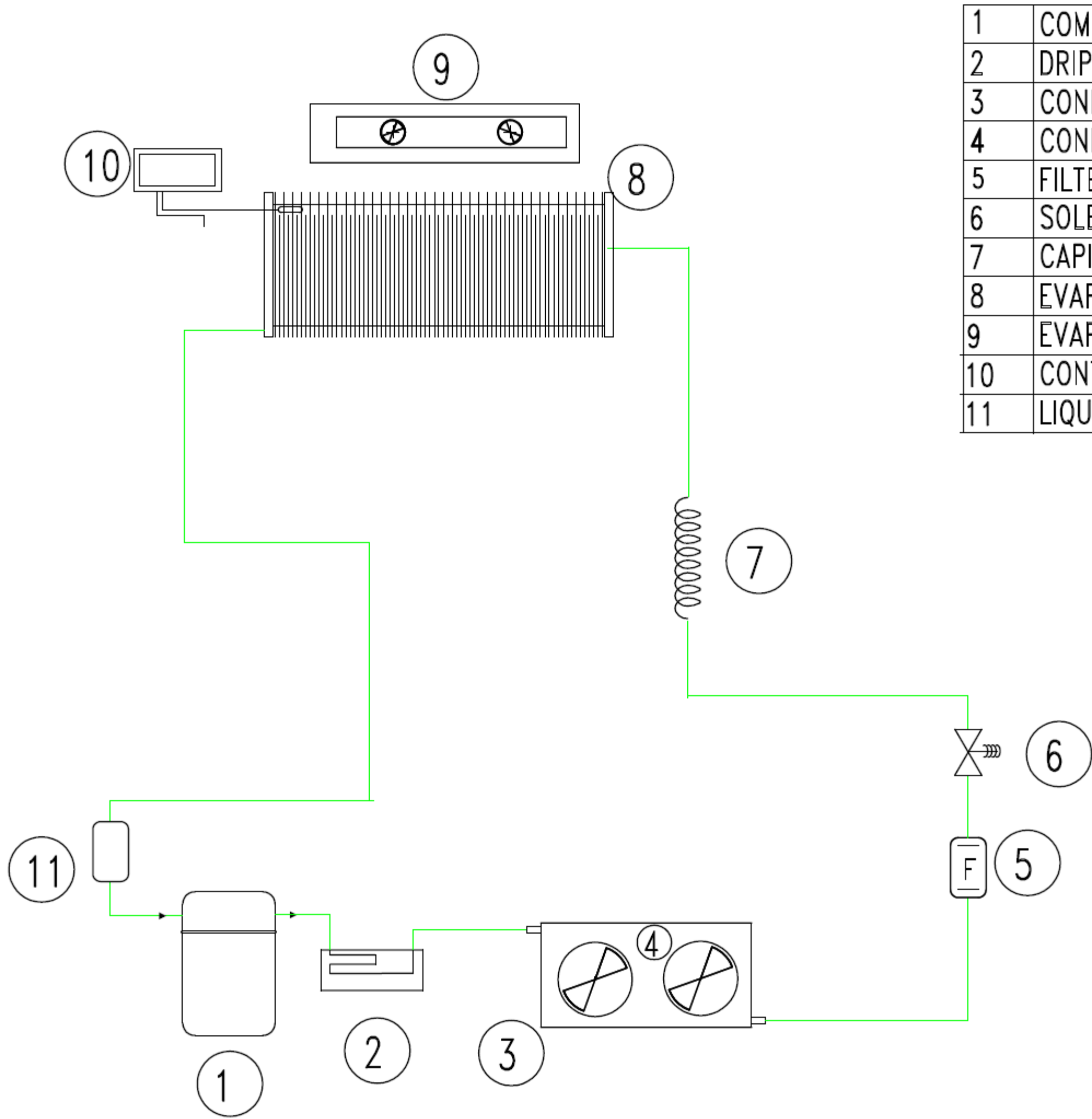


## spot merchandiser cabinet: comparative test





## spot merchandiser cabinet: R404A



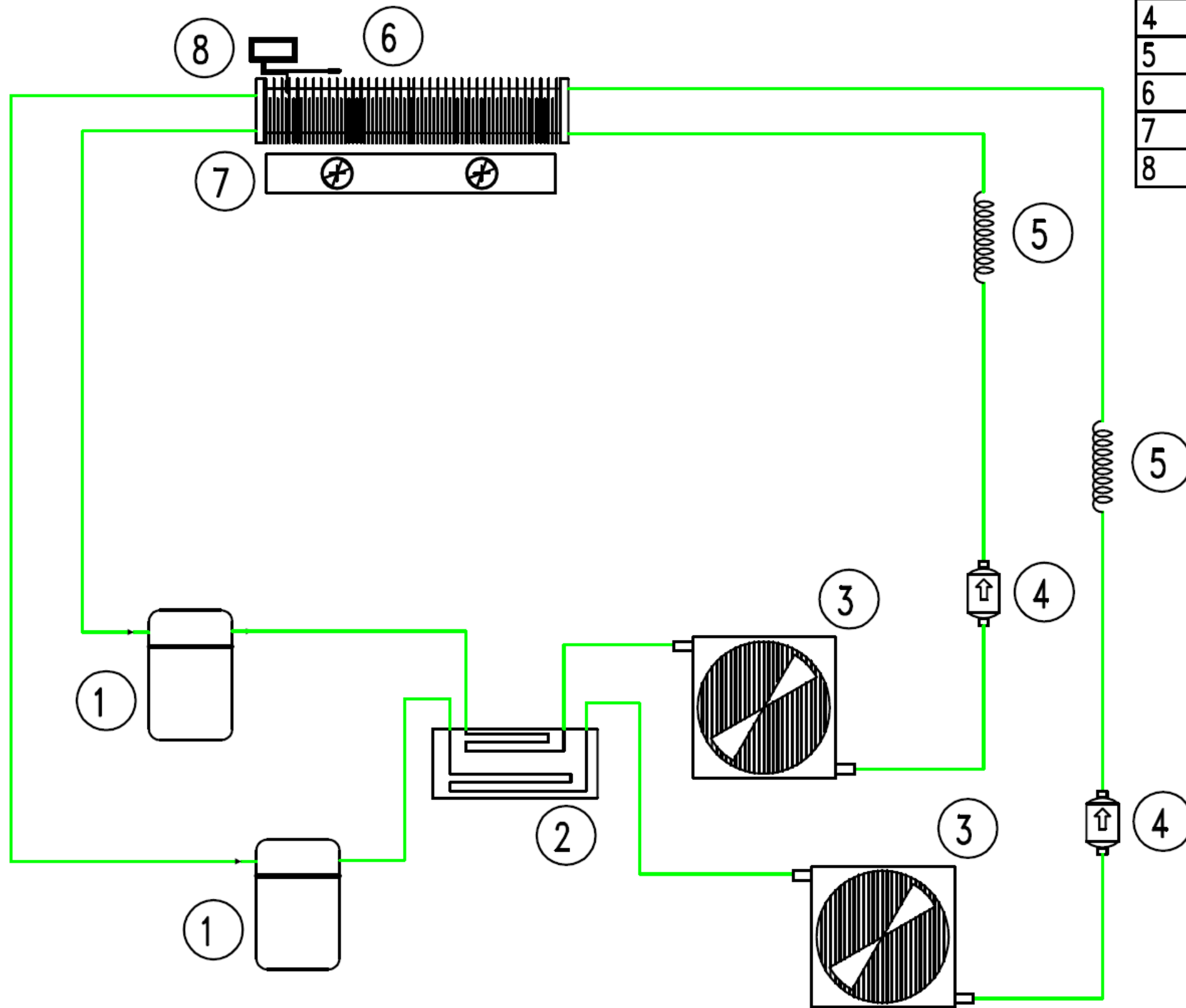
1	COMPRESSOR
2	DRIP TRAY
3	CONDENSER
4	CONDENSER FANS
5	FILTER
6	SOLENOID VALVE
7	CAPILLARY PIPE
8	EVAPORATOR
9	EVAPORATOR FANS
10	CONTROLLER
11	LIQUID TRAP

cabinet class 3M0 EN 23953

spot merchandiser R404A			
component	quantity	type	technical details
Compressor	1	Hermetic	18 cc
Evaporator	1	Tubes and fins	
Evaporator fan	2	EC	low energy consumption
Condenser	1	Tubes and fins	
Condenser fan	2	EC	low energy consumption
SLHex	1	Suction/cap. tube	
Drip tray heater	1	hot pipe	
Refrigerant Charge	850	R404A	



## spot merchandiser cabinet: R290



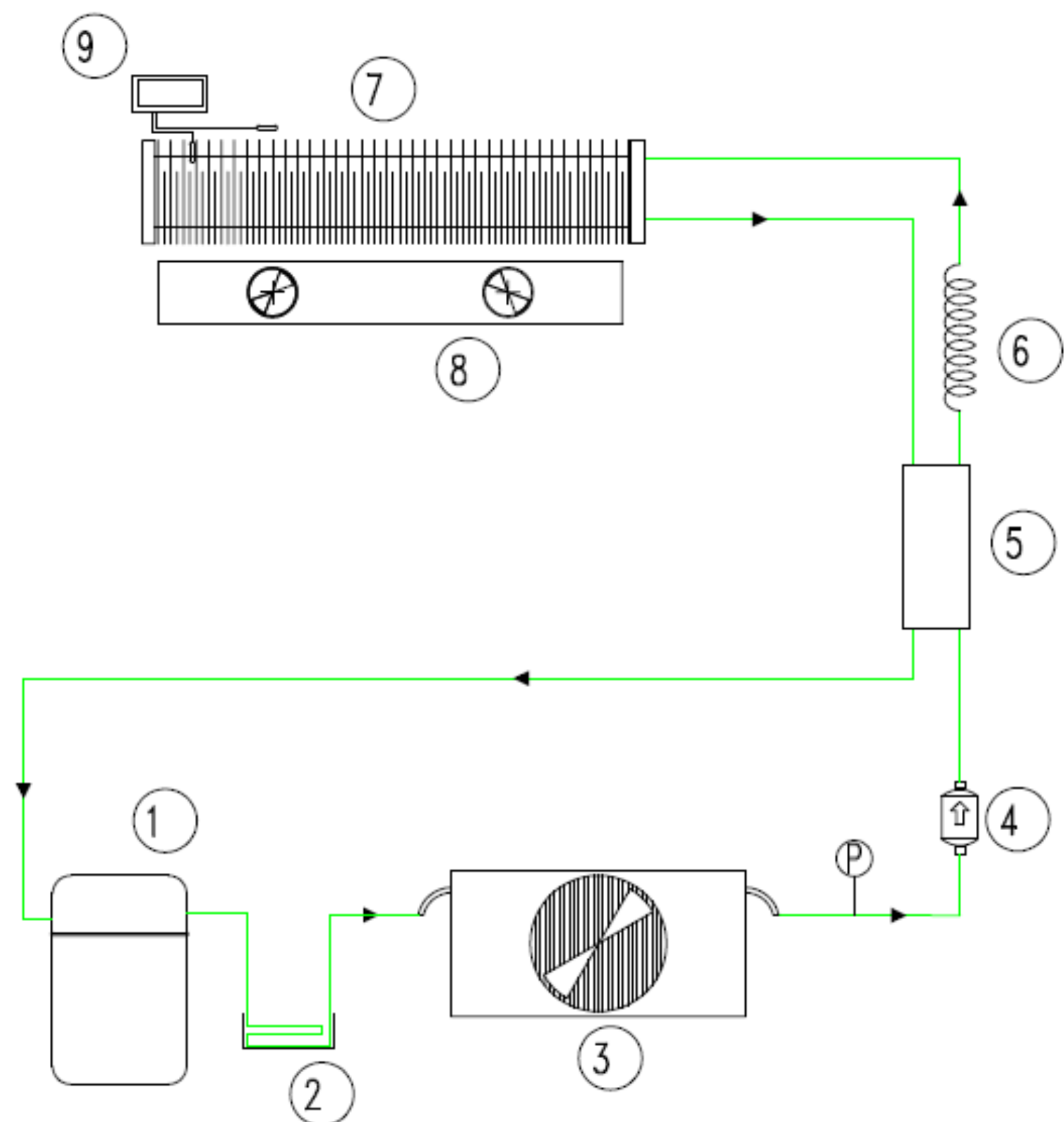
1	COMPRESSORE \ COMPRESSOR
2	VASCHETTA ASCIUGA CONDENSA \ DRY PAN
3	CONDENSATORE \ CONDENSER
4	FILTRO \ FILTER DRYER
5	CAPILLARE \ CAPILLARY
6	EVAPORATORE \ EVAPORATOR
7	VENTILATORI \ FANS
8	CENTRALINA ELETTRONICA \ ELECTRONIC BOARD

cabinet class 3M0 EN 23953

spot merchandiser R290			
component	quantity	type	technical details
Compressor	2	Hermetic	2 x 10 cc
Evaporator	1	Tubes and fins	
Evaporator fan	2	EC	low energy consumption
Condenser	2	Tubes and fins	
Condenser fan	2	EC	low energy consumption
SLHEX	2	Suction/cap. tube	
Drip tray heater	2	hot pipe	
Refrigerant Charge	2 x 135	R290	
Energy consumption			14% less of R404A



## spot merchandiser cabinet: R744 (CO<sub>2</sub>)



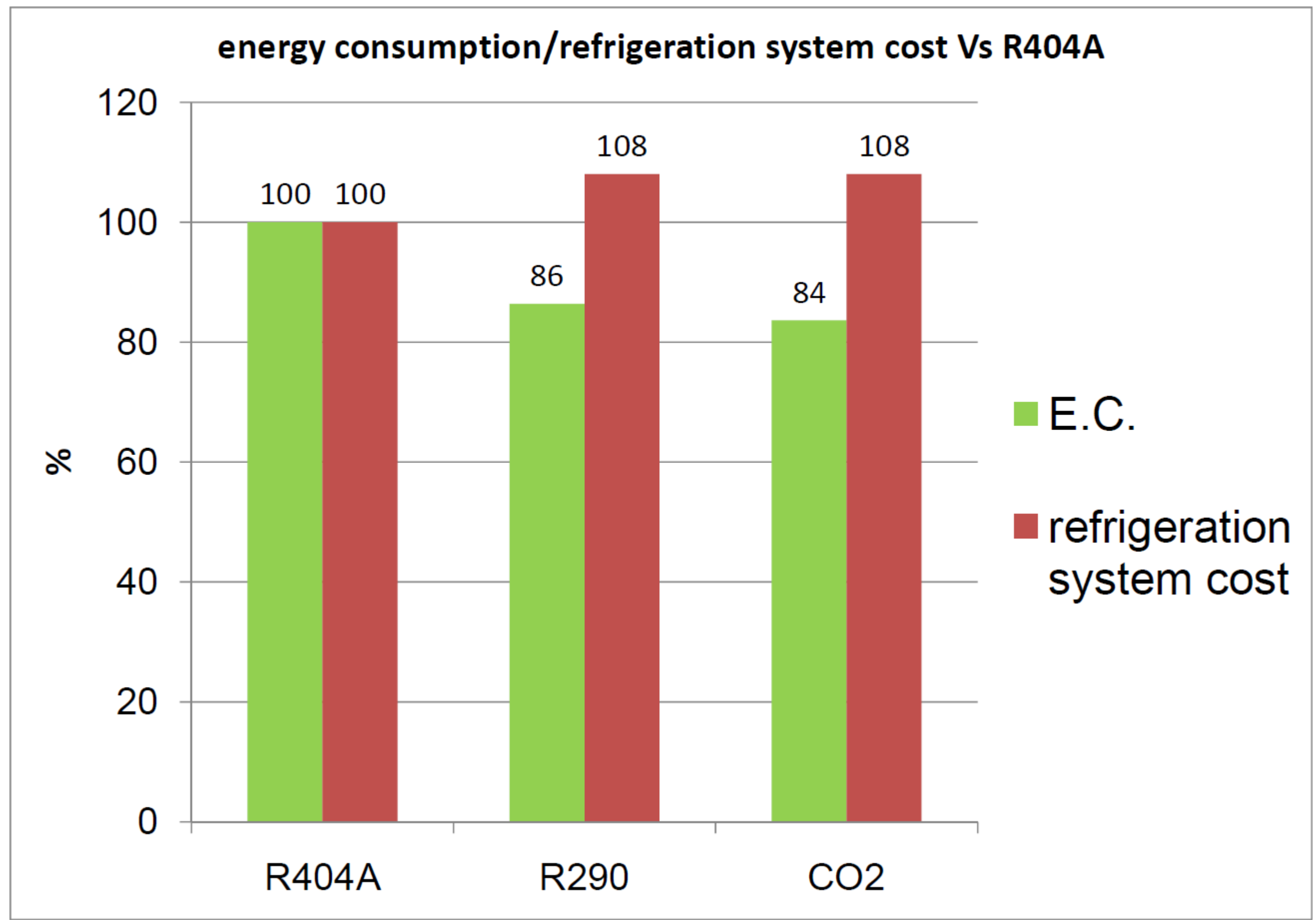
1	COMPRESSOR
2	DRIP TRY
3	GASCOOLER
4	DRYER FILTER
5	SLHEX
6	CAPILLARY PIPE
7	EVAPORATOR
8	FANS
9	ELECTRONIC DEVICE
P	PRESSURE SWITCH

cabinet class 3M0 EN 23953

spot merchandiser R744 (CO <sub>2</sub> )			
component	quantity	type	technical details
Compressor	<b>1</b>	Hermetic	2,5 cc
Evaporator	1	Tubes and fins	
Evaporator fan	2	EC	low energy consumption
Condenser	<b>1</b>	Tubes and fins	
Condenser fan	<b>1</b>	EC	low energy consumption
SLHEX	1	Suction/cap. tube	
Drip tray heater	1	hot pipe	
Refrigerant Charge	<b>650 gr</b>	R744	
Energy consumption		<b>16% less of R404A</b>	



## spot merchandiser cabinet: the final selection



Why different cost compare to R404A?

R290 → Because of the double compressor

CO<sub>2</sub> → Because of the heat exchanger





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Thank you very much!