

Letter of compliance for ECO-design, Process & Comfort chiller

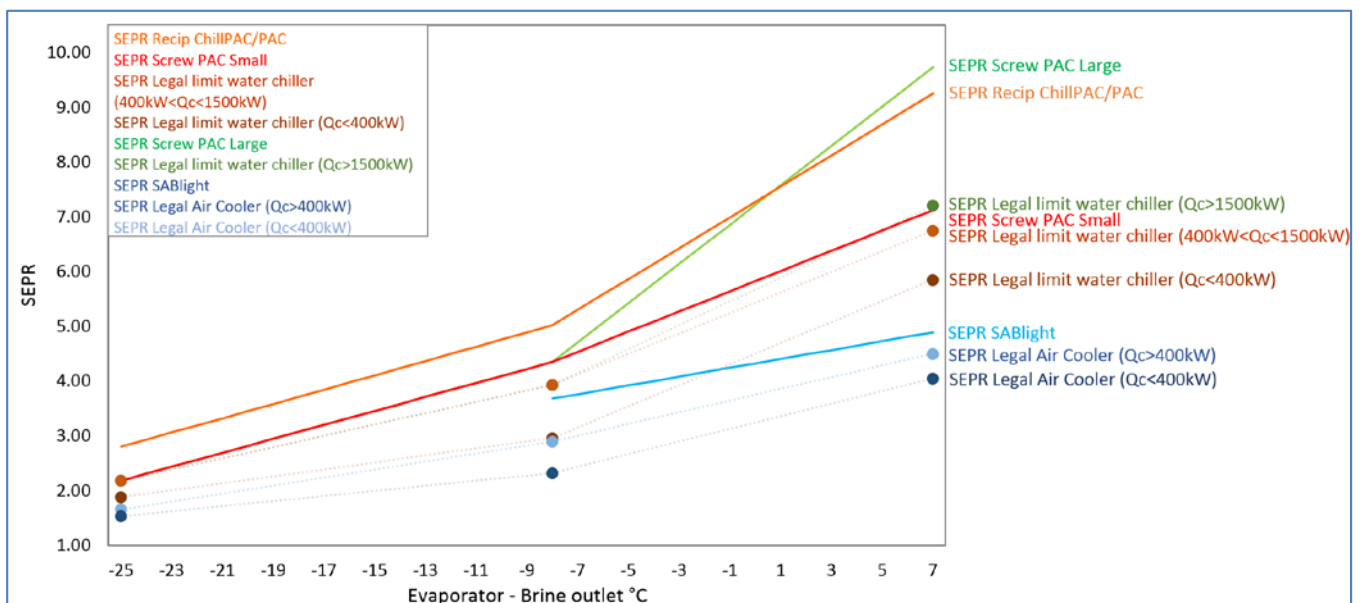
Directive 2009/125/EC

Manufacturer: Johnson Controls Denmark ApS, SABROE Factory
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We hereby declare that our products within the scope of eco-design, implemented according to regulation No 2015/1095 for low (-25°C) and medium (-8°C) temperatures and No 2016/2281 for high temperatures (+7°C), are in compliance. The harmonised standards EN 14511 series and EN 14825 have been used for testing and calculation. Value tolerances for selection tools comply with EN 12900.

Preconditions:

- a EER calculations are defined as COP (Coefficient Of Performance) in our nomenclature for evaporator calculation in COMP1 sales tools. Capacity control is variable.
- b SEPR calculations are made by spreadsheet tool version 1.5.3 date 2013-09-01. Diagram lines drawn as straight lines between legal condition points (2018) and product points. See data and calculation on page 2. Degradation coefficient $C_c = 0.9$. Specific EER and SEPR values are included in the operating manual.
- c Screw compressors without performance-increasing system (economizer).
- d Secondary refrigerant ethylene glycol -25°C and -8°C. Secondary refrigerant water at +7°C.
- e Superheat 0°K and subcooling approx. 1°K.
- f Suction and discharge pressure drop included.
- g Electric power for liquid pumps included according to EN 14511-3, Annex H.3.
- h GWP<150 allows 10% lower value included.
- i Chiller includes evaporator (brine) and condenser (brine or air).
- j Examples of calculations are shown with selected models representing the respective model program. All other conditions or types/models must be calculated.



Højbjerg, Denmark

Place

By written authority

Letter of compliance for ECO-design, Process & Comfort Chiller Directive 2009/125/EC

Data:

Process Chiller, Reciprocating water/brine cooled											
High			Low			High			Low		
>200kW	ChillPAC28V-A	229 kW	>100kW	ChillPAC28V-C	113 kW	>1000kW	ChillPAC 112LV-A	1061 kW	>500kW	ChillPAC 12LV-C	529 kW
SEPR	Sabroe unit	Legal limit	SEPR	Sabroe unit	Legal limit	SEPR	Sabroe unit	Legal limit	SEPR	Sabroe unit	Legal limit
	9,30	5,85		5,05	2,57		9,40	6,75		5,00	3,42
Conditions			Conditions			Conditions			Conditions		
	Condenser Inlet/outlet	Evaporator Inlet/outlet		Condenser Inlet/outlet	Evaporator Inlet/outlet		Condenser Inlet/outlet	Evaporator Inlet/outlet		Condenser Inlet/outlet	Evaporator Inlet/outlet
	30/35	+12/+7		30/35	-2/-8		30/35	+12/+7		30/35	-2/-8

Process Chiller, Screw water/brine cooled											
High			Low			High			Low		
>900kW	ComPAC 151LV-A	932 kW	>500kW	ComPAC 151LV-A	514 kW	>1400kW	ComPAC 193LV-A	1455 kW	>700kW	ComPAC 193LV-C	794 kW
SEPR	Sabroe unit	Legal limit	SEPR	Sabroe unit	Legal limit	SEPR	Sabroe unit	Legal limit	SEPR	Sabroe unit	Legal limit
	8,02	6,75		4,60	3,42		9,77	6,75		4,72	3,42
Conditions			Conditions			Conditions			Conditions		
	Condenser Inlet/outlet	Evaporator Inlet/outlet		Condenser Inlet/outlet	Evaporator Inlet/outlet		Condenser Inlet/outlet	Evaporator Inlet/outlet		Condenser Inlet/outlet	Evaporator Inlet/outlet
	30/35	+12/+7		30/35	-2/-8		30/35	+12/+7		30/35	-2/-8

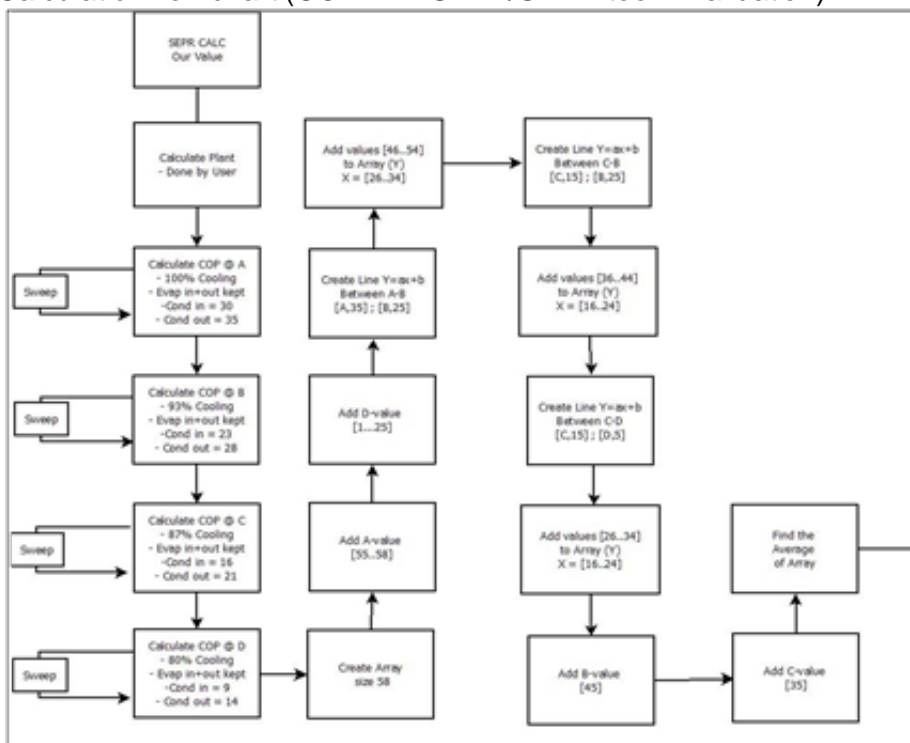
Process Chiller water/brine evaporator, Air Cooled condenser											
High			Low			High			Low		
>400kW	SABlight A400-1	431 kW		A400-1EG	265 kW						
SEPR	Sabroe unit	Legal limit	SEPR	Sabroe unit	Legal limit						
	4,89	4,50		3,68	2,32						
Conditions			Conditions			Conditions			Conditions		
	Condenser Inlet	Evaporator Inlet/outlet		Condenser Inlet	Evaporator Inlet/outlet						
	35	+12/+7		35	-2/-8						

Comfort Chiller, water cooled											
Reciprocating					Screw						
>200kW	ChillPAC 28V-A	229 kW	>1000kW	ChillPAC 112LV-A	1061 kW	>900kW	ComPAC151LV-A	927 kW	>1400kW	ComPAC 193LV-A	1455 kW
Eta s,c	Sabroe unit	Legal limit	Eta s,c	Sabroe unit	Legal limit	Eta s,c	Sabroe unit	Legal limit	Eta s,c	Sabroe unit	Legal limit
	252	196		279	227		242	227		265	227
Conditions			Conditions			Conditions			Conditions		
	Condenser Inlet/outlet	Evaporator Inlet/outlet		Condenser Inlet/outlet	Evaporator Inlet/outlet		Condenser Inlet/outlet	Evaporator Inlet/outlet		Condenser Inlet/outlet	Evaporator Inlet/outlet
	30/35	+12/+7		30/35	+12/+7		30/35	+12/+7		30/35	+12/+7

Comfort Chiller, water evaporator, Air cooled condenser											
Screw, Air Cooled			Screw, Air Cooled			Screw, Air Cooled			Screw, Air Cooled		
<400kW	SABlight A400-1	397 kW									
Eta s,c	Sabroe unit	Legal limit									
	156	149									
Conditions			Conditions			Conditions			Conditions		
	Condenser Inlet	Evaporator Inlet/outlet									
	35	+12/+7									

See COMP1 calculations in the document named 'SEPR-SEER calculations' on www.sabroe.com

Calculation flow chart (COMP1 → SEPR/SEER-tool → Validation)



Regulatory control: www.ens.dk and www.sik.dk