

# Letter of compliance for ECO-design, Process Chiller

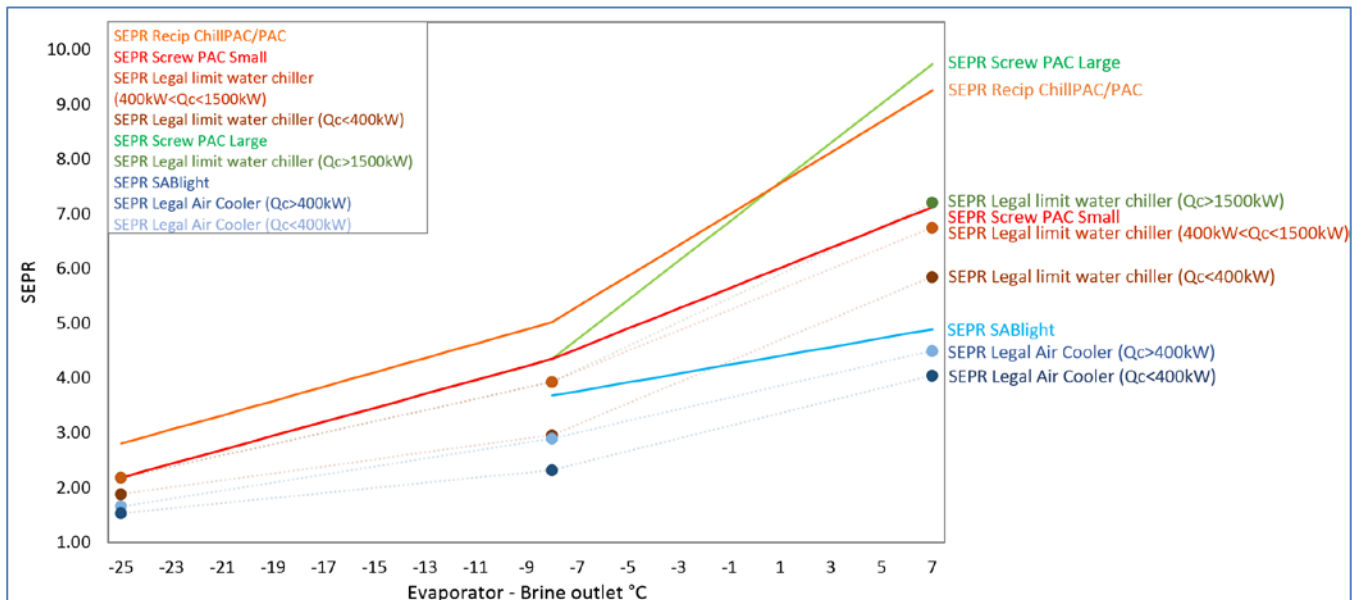
## Directive 2009/125/EC

Manufacturer: Johnson Controls Denmark ApS, SABROE Factory  
 Christian X's Vej 201 · 8270 Højbjerg · Denmark  
 Phone +45 87 36 70 00

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 (-8°C) and (-25°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).



Højbjerg, Denmark  
 \_\_\_\_\_  
 Place

*Torben Pilsgaard Hansen*  
 \_\_\_\_\_  
 By written authority

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Data:

Reciprocating																			
High				High				Medium				Low							
>400kW	ChillPAC 106S-A	423 kW		>1500kW	ChillPAC 116E-A	1423 kW		>300kW	ChillPAC 108L-C	355 kW		>200kW	TSMC116S	232 kW					
SEPR	Sabroe unit	Limit (<400/>400)		SEPR	Sabroe unit	Limit (<1500/>1500)		SEPR	Sabroe unit	Limit (<300/>300)		SEPR	Sabroe unit	Limit (<200/>200)					
	9.25	5.85/6.75			8.73	6.75/7.20			5.02	2.96/3.93			2.80	1.88/2.18					
Conditions				Conditions				Conditions				Conditions							
Load	Condenser Inlet/outlet	Evaporator Inlet/outlet	EER	Load	Condenser Inlet/outlet	Evaporator Inlet/outlet	EER	Load	Condenser Inlet/outlet	Evaporator Inlet/outlet	EER	Load	Condenser Inlet/outlet	Evaporator Inlet/outlet	EER				
A	100%	30/35	12/7	4.98	A	100%	30/35	12/7	4.80	A	100%	30/35	-2/-8	3.09	A	100%	30/35	-19/-25	2.12
B	93%	23/28	12/7	6.33	B	93%	23/28	12/7	6.00	B	93%	23/28	-2/-8	3.75	B	93%	23/28	-19/-25	2.38
C	87%	16/21	12/7	8.15	C	87%	16/21	12/7	7.99	C	87%	16/21	-2/-8	4.68	C	87%	16/21	-19/-25	2.69
D	80%	9/14	12/7	12.44	D	80%	9/14	12/7	11.24	D	80%	9/14	-2/-8	6.09	D	80%	9/14	-19/-25	3.11

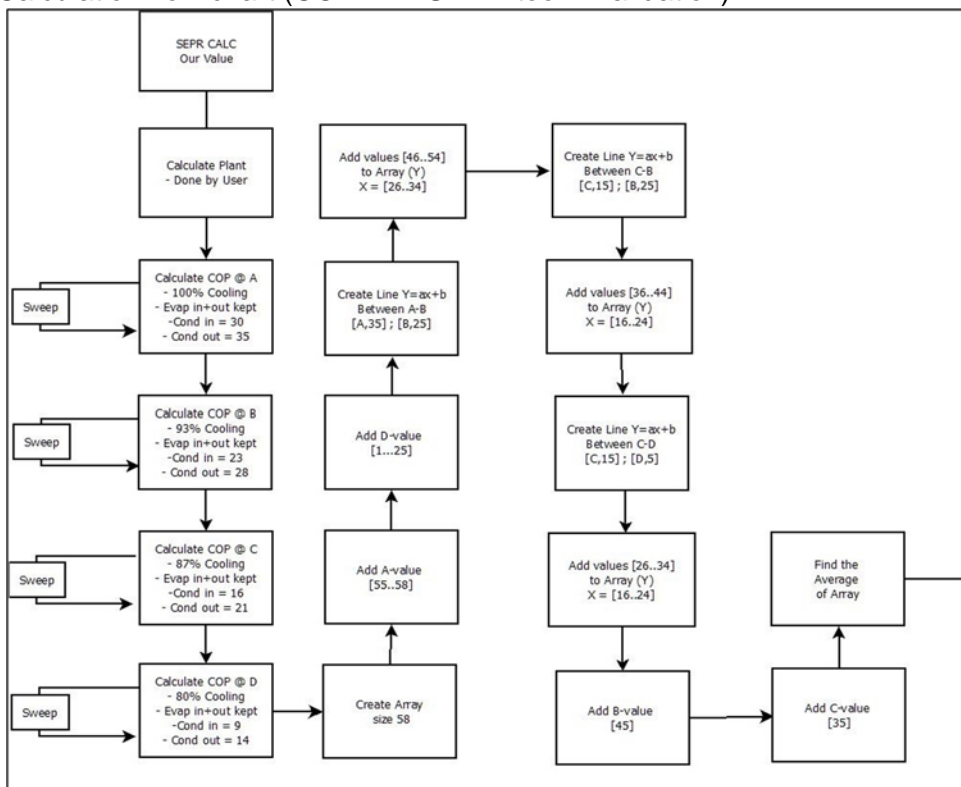
  

Screw																			
High				High				Medium				Low							
>400kW	ComPAC 120L-A	402 kW		>1500kW	ComPAC 193L-A	1455 kW		>300kW	CompAC 120E-C	298 kW		>200kW	SAB193S	205 kW					
SEPR	Sabroe unit	Limit (<400/>400)		SEPR	Sabroe unit	Limit (<1500/>1500)		SEPR	Sabroe unit	Limit (<300/>300)		SEPR	Sabroe unit	Limit (<200/>200)					
	7.12	5.85/6.75			9.73	6.75/7.20			4.35	2.96/3.93			2.18	1.88/2.18					
Conditions				Conditions				Conditions				Conditions							
Load	Condenser Inlet/outlet	Evaporator Inlet/outlet	EER	Load	Condenser Inlet/outlet	Evaporator Inlet/outlet	EER	Load	Condenser Inlet/outlet	Evaporator Inlet/outlet	EER	Load	Condenser Inlet/outlet	Evaporator Inlet/outlet	EER				
A	100%	30/35	12/7	4.40	A	100%	30/35	12/7	4.99	A	100%	30/35	-2/-8	2.70	A	100%	30/35	-19/-25	1.40
B	93%	23/28	12/7	5.42	B	93%	23/28	12/7	6.29	B	93%	23/28	-2/-8	3.31	B	93%	23/28	-19/-25	1.72
C	87%	16/21	12/7	6.80	C	87%	16/21	12/7	8.74	C	87%	16/21	-2/-8	4.16	C	87%	16/21	-19/-25	2.07
D	80%	9/14	12/7	8.36	D	80%	9/14	12/7	13.22	D	80%	9/14	-2/-8	5.09	D	80%	9/14	-19/-25	2.50

Air															
High				Medium				Low (No compressor applicable)							
>400kW	SABlight A400-1	431 kW			A400-1EG	265									
SEPR	Sabroe unit	Limit (<400/>400)		SEPR	Sabroe unit	Limit (<300/>300)		SEPR	Sabroe unit	Limit (<200/>200)		SEPR	Sabroe unit	Limit (<200/>200)	
	4.89	4.05/4.50			3.68	2.32/2.90				1.53/1.66					
Conditions				Conditions				Conditions							
Load	Condenser Inlet	Evaporator Inlet/outlet	EER	Load	Condenser Inlet	Evaporator Inlet/outlet	EER	Load	Condenser Inlet	Evaporator Inlet/outlet	EER	Load	Condenser Inlet	Evaporator Inlet/outlet	EER
A	100%	35	12/7	2.66	A	100%	35	-2/-8	2.02	A	100%	35	-19/-25		
B	93%	25	12/7	3.95	B	93%	25	-2/-8	3.12	B	93%	25	-19/-25		
C	87%	15	12/7	5.10	C	87%	15	-2/-8	3.81	C	87%	15	-19/-25		
D	80%	5	12/7	5.19	D	80%	5	-2/-8	3.86	D	80%	5	-19/-25		

### Calculation flow chart (COMP1→SEPR-tool→Validation)



Regulatory control: <http://www.ens.dk>