

New generation of CS.3 compact screws

Application range, systems and efficiency

BITZER Kühlmaschinenbau GmbH



New generation of CS.3 compact screws



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/ Application limits

/ Basic systems of liquid chillers

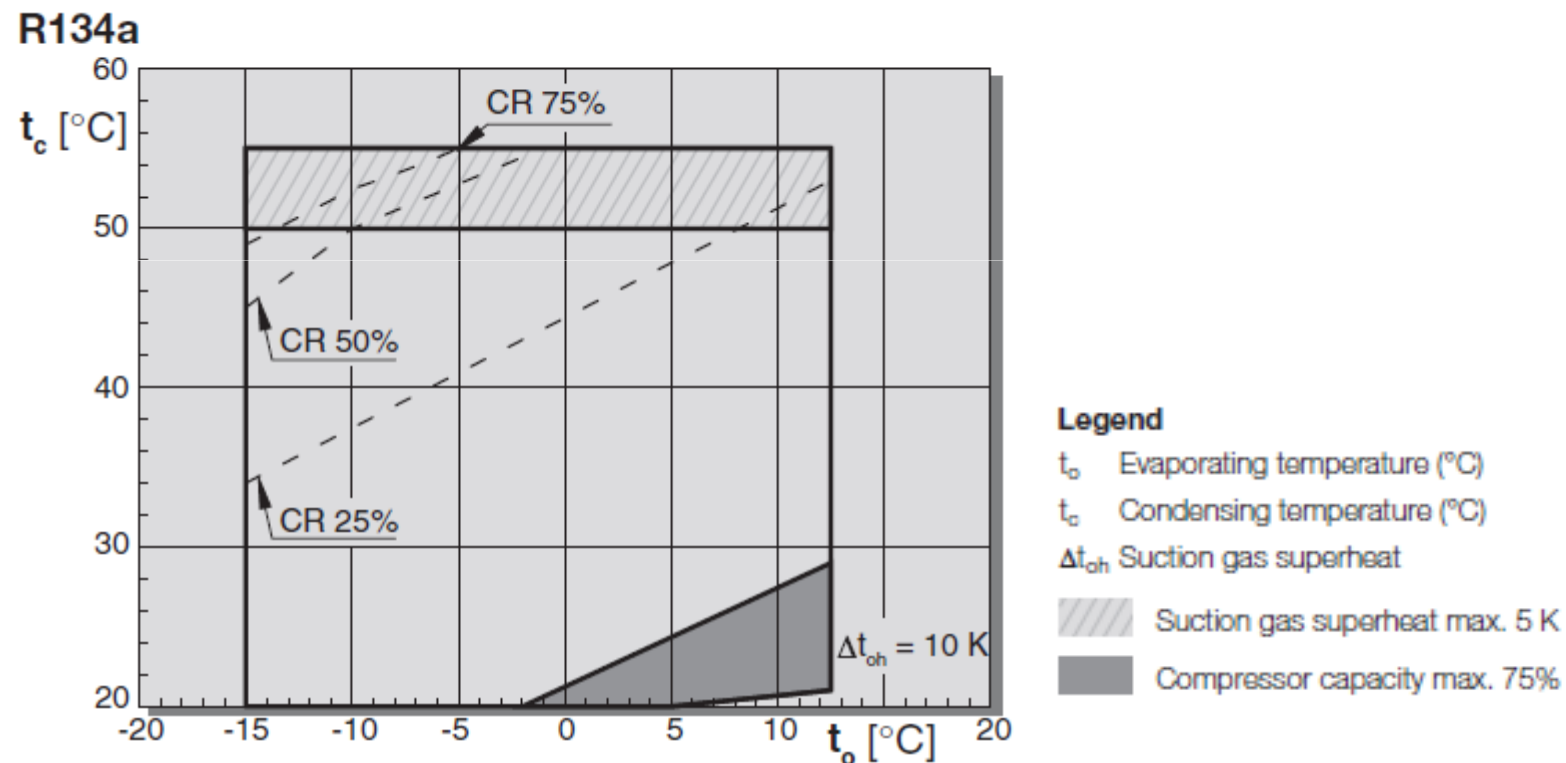
/ Efficiency evaluation of CS.3 compact screws in different systems



New generation of CS.3 compact screws

Application range CSW.3 series

/ Highest efficiency at low condensing temperatures

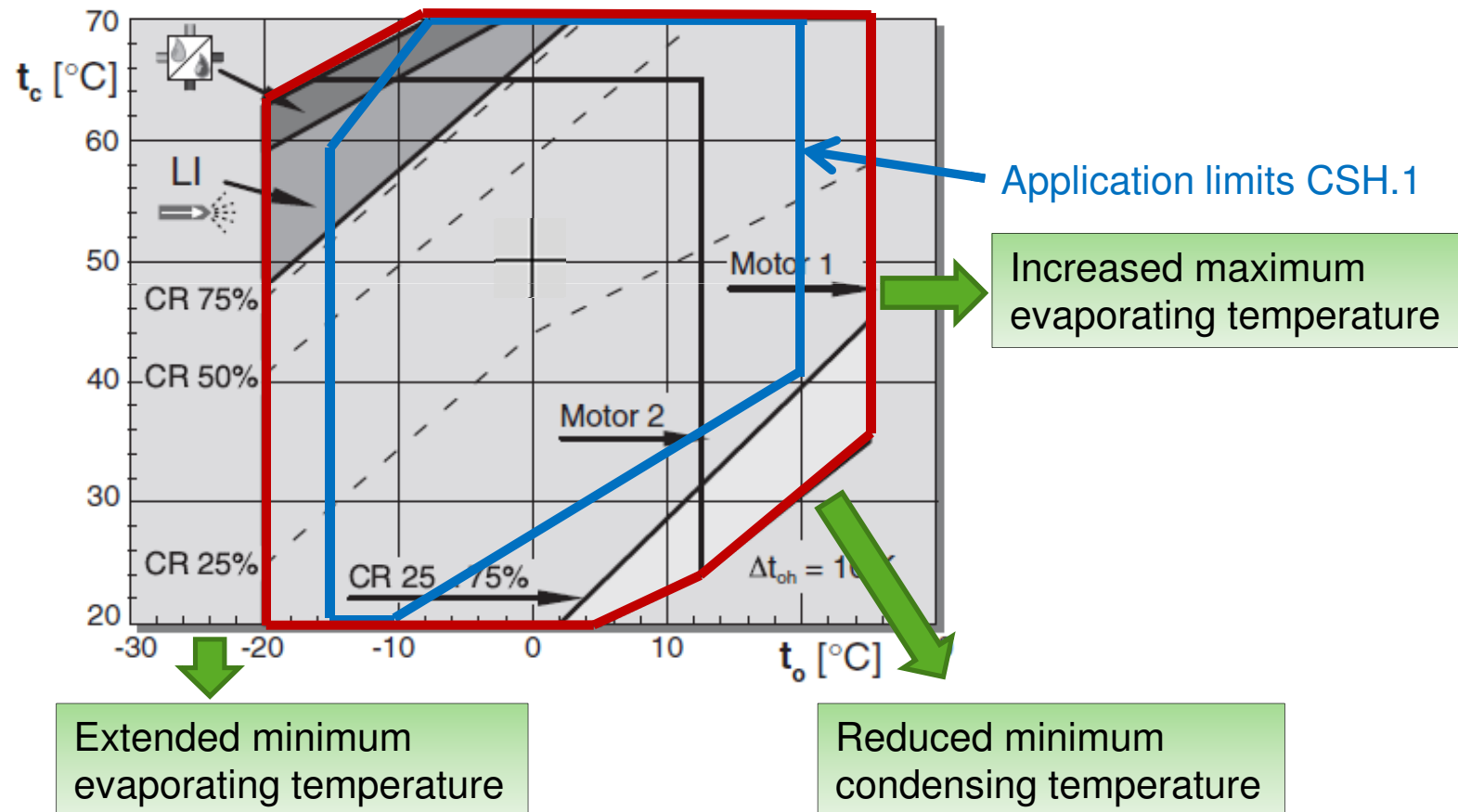




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Extended application range new CSH.3

/ Improved efficiency and a large application range



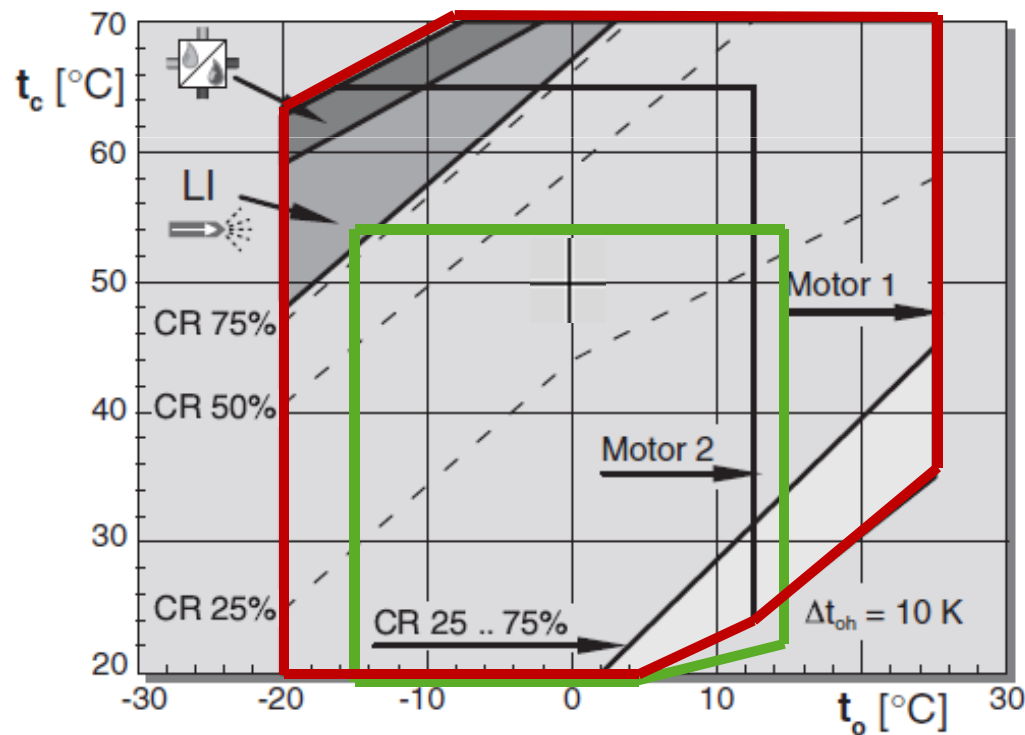


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Application range CSH.3 and CSW.3

CSH.3 \Rightarrow **Extended application range, improved efficiency** (in full- and part load)

CSW.3 \Rightarrow **Application range limited, highest efficiency** (in full- and part load)



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Basic systems of liquid chillers with CS.3 compact screws

/ DX evaporator and air-cooled condenser

/ DX evaporator with economiser and air-cooled condenser

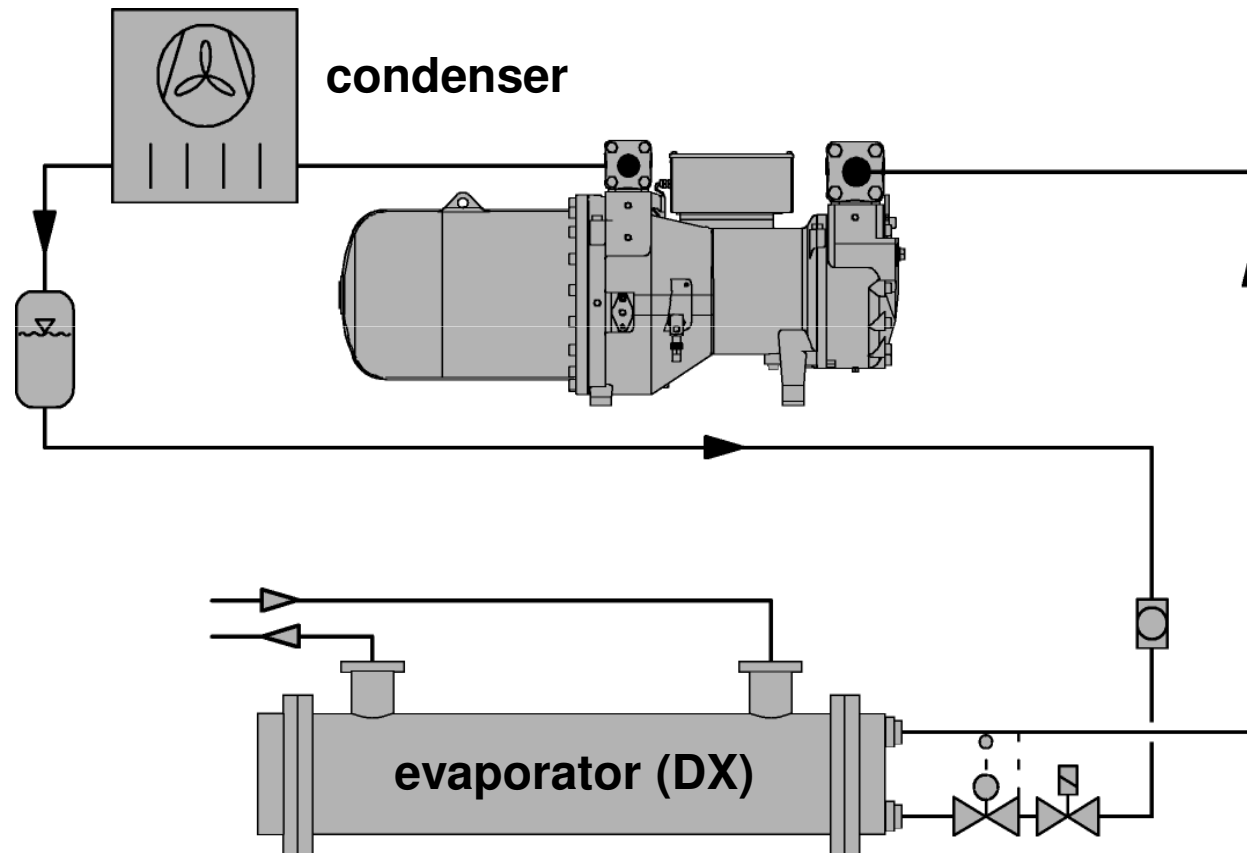
/ DX evaporator with economiser and water-cooled condenser

/ Flooded evaporator with open intermediate pressure receiver and water-cooled condenser

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1. Liquid chiller with CS compact screw compressor
Direct evaporation (DX) and air-cooled condenser

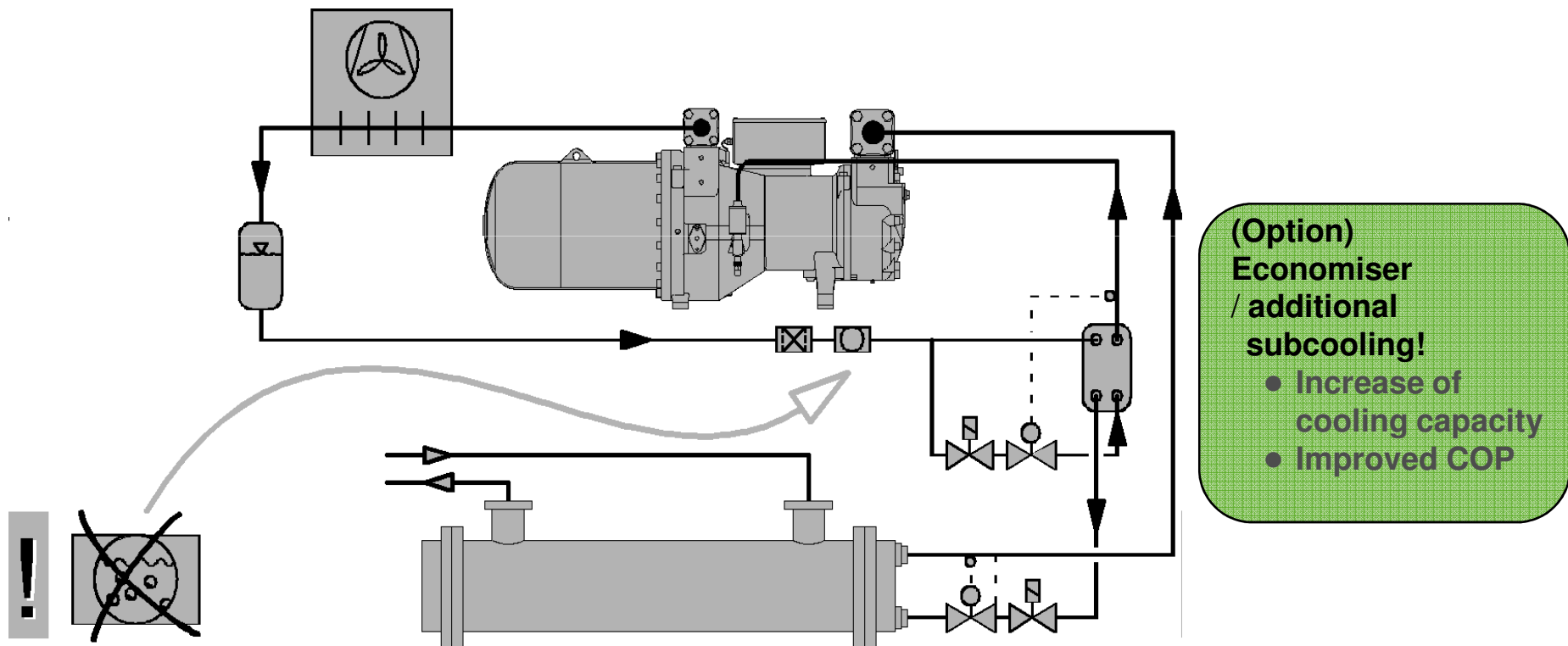


Simplified diagram

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2. Liquid chiller with CS compact screw compressor
Direct evaporation (DX) and air-cooled condenser
Option Economiser

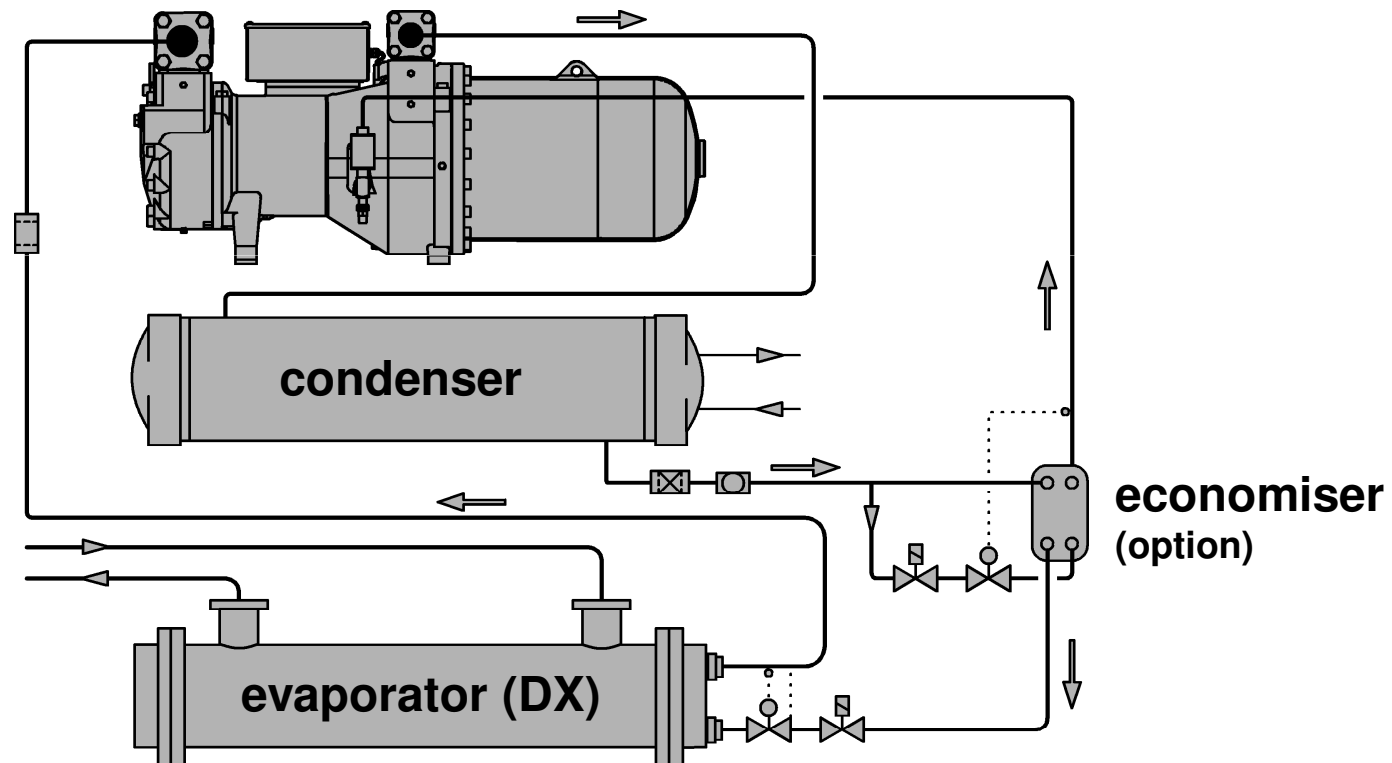


Simplified diagram



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3. Liquid chiller with CS compact screw compressor
Direct evaporation (DX) and water-cooled condenser
Option economiser



Simplified diagram

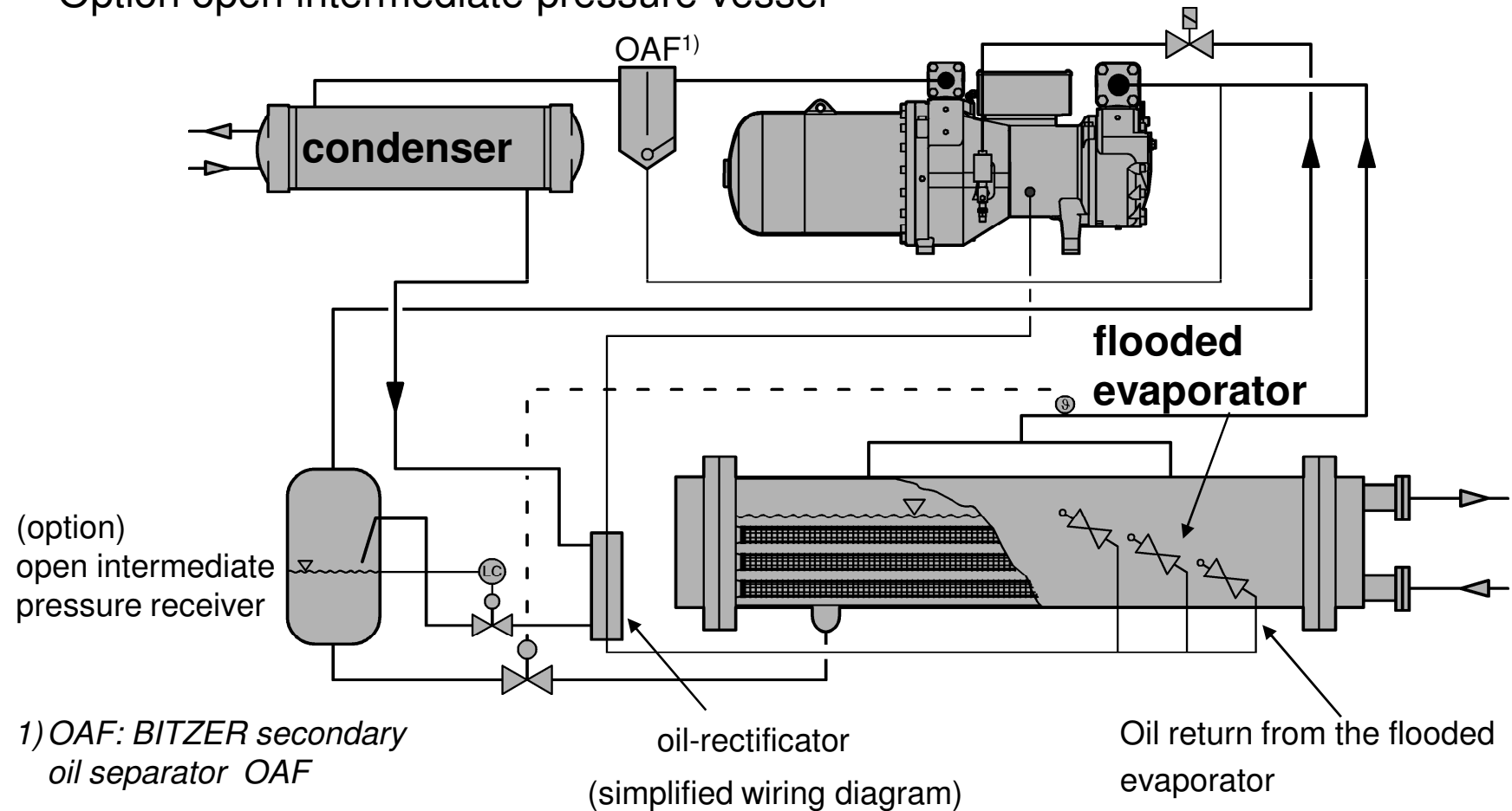
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4. Liquid chiller with CS compact screw compressor

Flooded evaporator and water-cooled condenser

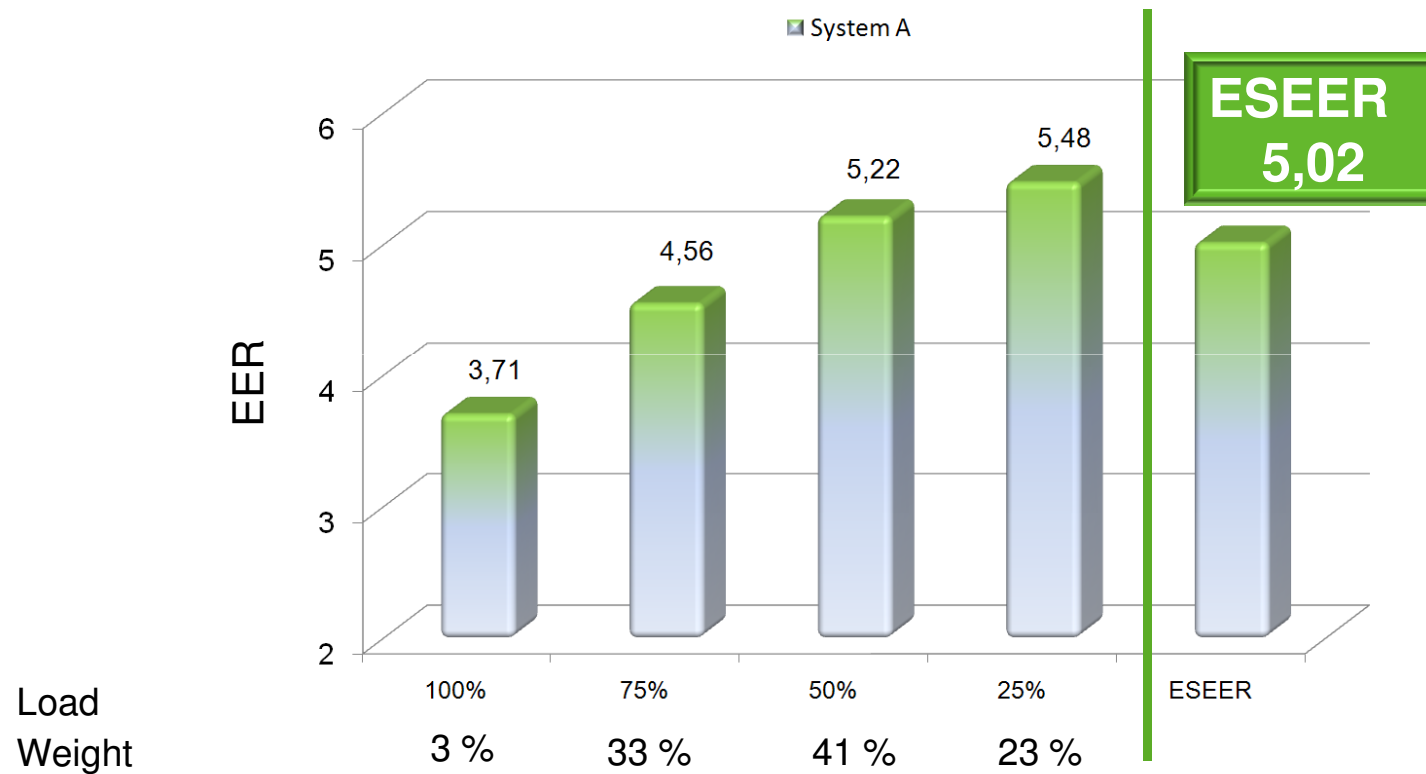
Option open intermediate pressure vessel



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Typical EER values for **aircooled liquid chillers** in full- and partload, following ESEER conditions. 2-circuit system with **2 pcs. CSH9573-180Y-40D**



BITZER Software 5.3

**R134a, Refrigeration capacity 927 kW @ 100% load, Direct evaporation (DX),
ECO-Operation, Air-cooled condensation with $\Delta t_{condenser} = 15K$ at 100% load**



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System A: CSH.3 – Weighted performance data following ESEER conditions
 Conditions at direct evaporation (DX), ECO Operation and air-cooled condensation
 with $\Delta t_{\text{condenser}} = 15\text{K}$ at 100% load

scenario		100%	75%	50%	25%
DX evaporator & air-cooled condenser	Air temperature at condenser inlet ¹⁾ in °C	35	30	25	20
	Evaporating temperature ²⁾ in °C	3,5	4,5	4,5	4,0
	Condensing temperature ²⁾ in K	50	42	37	27
	Subcooling ²⁾ in K	4	4	2	2
	Overheat ²⁾ in K	5	5	5	5
	Loading ¹⁾ in %	0,03	0,33	0,41	0,23

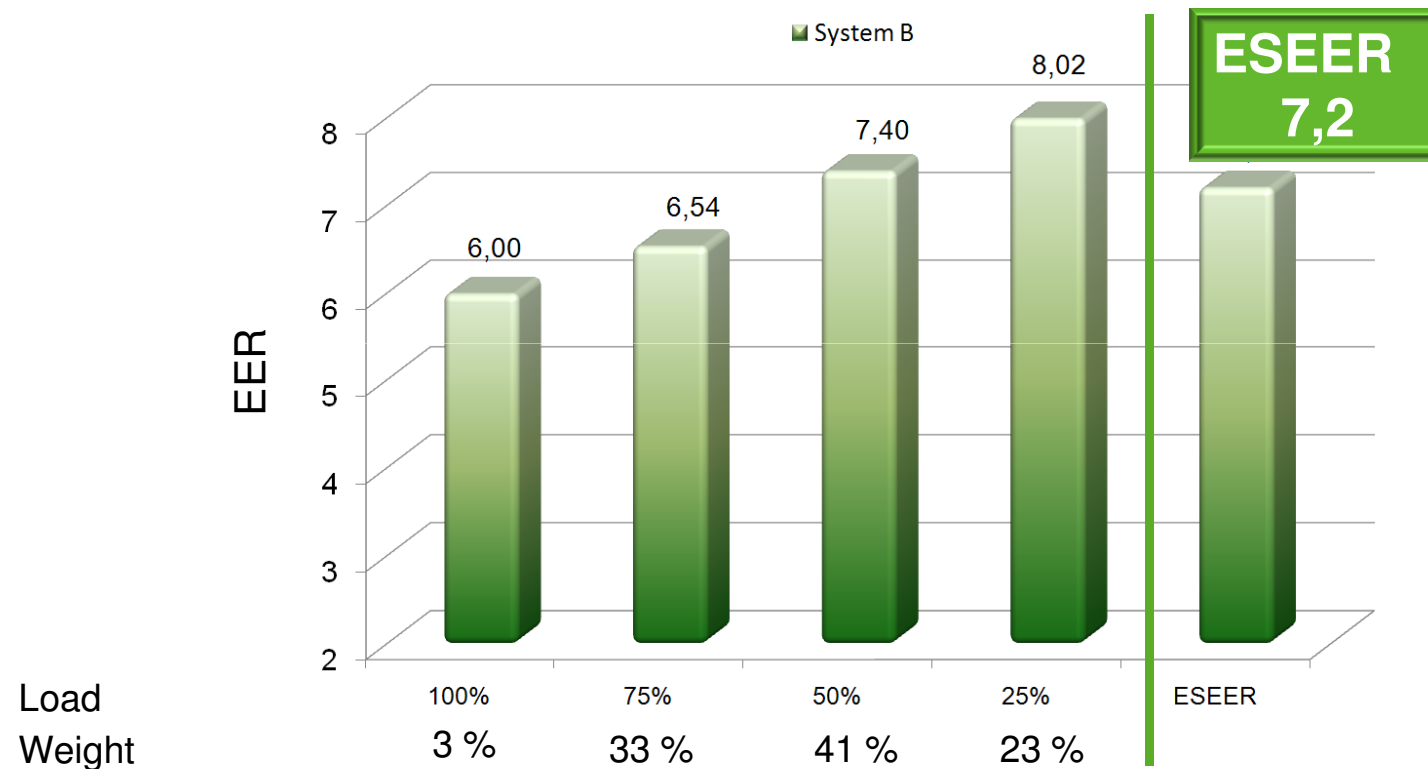
1) Conditions as per ESEER

2) Supposition: ESEER is a rating system for the assessment of complete, functional air-conditioned liquid chillers for creating cold water temperatures $t_{\text{on}}/t_{\text{off}}$ 7/12°C. Therefore only an assessment according to ESEER conditions can be made for a compressor inspection. Additionally reasonable suppositions have to be made! For similar basic conditions an assessment according to ESEER is also a reasonable image tool for compressors.



New generation of CS.3 compact screws

Typical EER values for **watercooled liquid chillers** in full- and partload, following ESEER conditions. 2-circuit system with **2 pcs. CSW9563-140Y-40D**



BITZER Software 5.3

*R134a, Refrigeration capacity 919 kW, Flooded evaporation, ECO-Operation,
Water-cooled condensation with $\Delta t_{\text{condenser}} = 5K$ at 100% charge*

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System B: CSW.3 - Weighted performance data following ESEER conditions
 Conditions for flooded evaporator, ECO Operation and water-cooled condensation
 with $\Delta t_{\text{condenser}} = 5\text{K}$ at 100% load

Scenario		100%	75%	50%	25%
Flooded evaporator & water-cooled condenser	Water temperature at condenser inlet ¹⁾ in °C	30	26	22	18
	Evaporating temperature ²⁾ in °C	5,0	5,5	6,0	6,0
	Condensing temperature ²⁾ in K	35	30	25	21
	Subcooling ²⁾ in K	4	4	2	2
	Overheat ²⁾ in K	5	5	5	5
	Loading ¹⁾ in %	0,03	0,33	0,41	0,23

1) Conditions as per ESEER

2) Supposition: ESEER is a rating system for the assessment of complete, functional air-conditioned liquid chillers for creating cold water temperatures $t_{\text{on}}/t_{\text{off}}$ 7/12°C. Therefore only an assessment according to ESEER conditions can be made for a compressor inspection. Additionally reasonable suppositions have to be made! For similar basic conditions an assessment according to ESEER is also a reasonable image tool for compressors.



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