



# PRODUCT PERFORMANCE INFORMATION

SINDELFINGEN // 29.06.2016

## **BITZER Condensing Units complying with the EU Ecodesign Regulation 2015/1095**

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#### **1 Initial situation**

The EU Regulation 2015/1095 became effective in July 2015 and will be applied in the entire EU as of July 1, 2016. The Regulation defines the "Setting of Ecodesign requirements for professional refrigerated storage cabinets, blast cabinets, condensing units and process chillers".

Accordingly, any product of the listed categories that does not comply with the requirements must not be placed on the market after July 1, 2016. These primarily concern the minimum criteria for energy efficiency.

BITZER, one of the leading manufacturers of condensing units, has already implemented the necessary measures at an early stage in order to comply with or even exceed the efficiency criteria. For deliveries from the effective date, the (CE) Declaration of Conformity as well as supplementary documents for all product series will be available for download – see section 3.

#### **2 Core elements of the Regulation**

For bringing condensing units onto the market, certain minimum efficiency values (so-called MEPS → Minimum Energy Performance Standards) must be complied with and declared by the manufacturer in the Declaration of Conformity. Depending on the capacity segment and the application range, the following conditions apply:

- Condensing units with a refrigerating capacity of up to 5 kW (medium temperature application) and 2 kW (low temperature application):  
→ Declaration according to the coefficient of performance (COP) at one reference point
- Condensing units with a refrigerating capacity of more than 5 kW / 2 kW:  
→ Declaration according to the seasonal performance ratio (SEPR = Seasonal Energy Performance Ratio) based on a corresponding ambient temperature and load profile.



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Condensing Units	COP	SEPR
Medium temp (to -10°C) – Refrigerating capacity	0.2... ≤ 5 kW	5... 50 kW
Low temp (to -35°C) – Refrigerating capacity	0.1... ≤ 2 kW	2... 20 kW
t <sub>amb</sub> – Criteria for COP <b>MEPS*</b>	32°C	
t <sub>amb</sub> (A) 32°C t <sub>amb</sub> (B) 25°C t <sub>amb</sub> (C) 15°C t <sub>amb</sub> (D) 5°C – Criteria for <b>MEPS*</b>	25°C to be published	full load part load part load part load

The minimum requirements for COP and SEPR are listed in the following table. There are two stages (Tier-1 / Tier-2) for their application: The requirements according to Tier-1 will apply from 1/7/2016 and those according to Tier-2 (with higher efficiency values) from 1/7/2018.

## MEPS – COP Analysis

	Refrigerating capacity	MEPS Tier-1	MEPS Tier-2
Medium Temperature	0,2 kW... ≤ 1 kW	1,2	1,4
	1 kW... ≤ 5 kW	1,4	1,6
Low Temperature	0,1 kW... ≤ 0,4 kW	0,75	0,8
	0,4 kW... ≤ 2 kW	0,85	0,95

## MEPS – SEPR Analysis

	Refrigerating capacity	MEPS Tier-1	MEPS Tier-2
Medium Temperature	5 kW... ≤ 20 kW	2,25	2,55
	20 kW... ≤ 50 kW	2,35	2,65
Low Temperature	2 kW... ≤ 8 kW	1,5	1,6
	8 kW... ≤ 20 kW	1,6	1,7

Bonus GWP < 150 ⇔ Tier-1: 15% // Tier-2: 10%

### Special note:

The above mentioned minimum requirements (MEPS) have to be fulfilled with the corresponding refrigerant. Any possible restrictions must be observed.

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## 3 CE Declaration of Conformity and supplementary documents according to Regulation 2015/1095

For series “Standard (LHE)”, “High ambient temperature (LHE)” and “Condensing units with 2-stage compressors” one common Declaration of Conformity is provided and a separate document for ECOSTAR. Both Declarations can be downloaded from the BITZER website at:

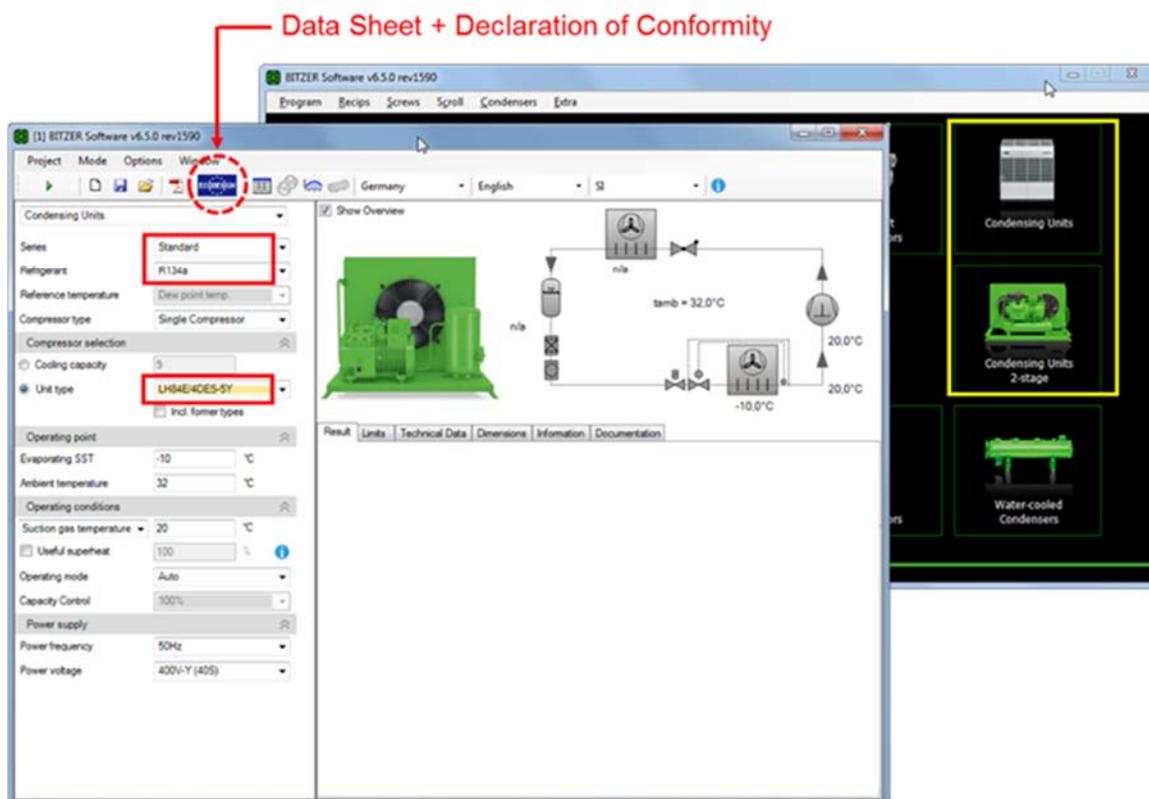
<https://www.bitzer.de/de/de/service/documentation/documentation/>

Likewise, the Declarations of Conformity and the supplementary Performance Data Sheets according to Annex V of the Regulation, table 4 (COP Declaration) and table 5 (SEPR Declaration) can be created in just a few steps using the BITZER Software:

<https://www.bitzer.de/websoftware/>

After starting the Software activate the button **Condensing Units** or, if required, **Condensing Units 2-stage** to open the calculation mode. Then select the Series, the Refrigerant and the Unit type (rectangular red frames in the following figure) in the input menu. The preset operating conditions may be maintained.

By clicking the **Ecodesign** button in the tool bar (dashed red circle) the Performance Data Sheet (“Information Requirements”) is generated under consideration of the selected condensing unit type and refrigerant. In a first step the Explorer opens for saving the Data Sheet (PDF). After saving the document will open automatically.





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Via Link on the Performance Data Sheet (red frame in following figure) the Declaration of Conformity (PDF) for the selected product configuration can be opened and saved or printed in usual manner.

	BITZER Kühlmaschinenbau GmbH Eschenbrunnlestraße 15 71065 Sindelfingen
BITZER Software v6.5.0 rev1596	23.06.2016 / All data subject to change. <span style="float: right;">1 / 1</span>

## Performance Data Sheet according to EU Regulation 2015/1095

Modell: LH135E/4NES-20Y

Kältemittel: R4...

Item	Symbol*	Value		Unit
Evaporating temperature	t	-10	-35	°C
Annual electricity consumption	Q	51732 kWh	31901 kWh	kWh/a
Seasonal Energy Performance Ratio	SEPR	3,27	1,84	

### Point A: Parameters at full load and ambient temperature 32°C

Rated cooling capacity	P <sub>A</sub>	27,5	7,88	kW
Rated power input	D <sub>A</sub>	11,61	5,47	kW
Rated COP	COP <sub>A</sub>	2,37	1,44	



### Other items

Capacity Control	—		
Reference temperature	Dew point temp.		
Suction gas temperature	toh	20°C	
Power voltage	Net	400V/50Hz	
Coefficient of degradation for units w/o capacity control**	Cdc	0.25	

Additional document: [Declaration of Conformity AC-500](#)

Particular information on the Declaration of Conformity and Performance Data Sheet must be observed!

Besides, the Declaration of Conformity as well as supplementary documents can also be downloaded using the QR code specified on the name plate of the condensing unit. The additional data saved in the QR code is used to check in parallel whether the condensing unit is an original BITZER product.





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## 4 Calculation of the SEPR using the BITZER Software

The BITZER Software also allows for individual calculation of the SEPR and to display all relevant data that may also be exported to an Excel file.

After opening the normal input menu select the Series, Refrigerant and Unit type. First, a single-point calculation is done by clicking the Calculate button (red dashed circle in the following figure). The preset reference conditions may be maintained.

Single point calculation

Parameter	Value
Unit type	LH84E/4DES-5Y-40S
Capacity steps	100%
Cooling capacity	8.48 kW
Evaporator capacity	8.48 kW
Power input	3.49 kW
Current (400V)	6.52 A
Voltage range	380-420V
Mass flow	186.9 kg/h
Condensing SDT	41.7 °C
Liquid subcooling	3.00 K
Operating mode	Standard

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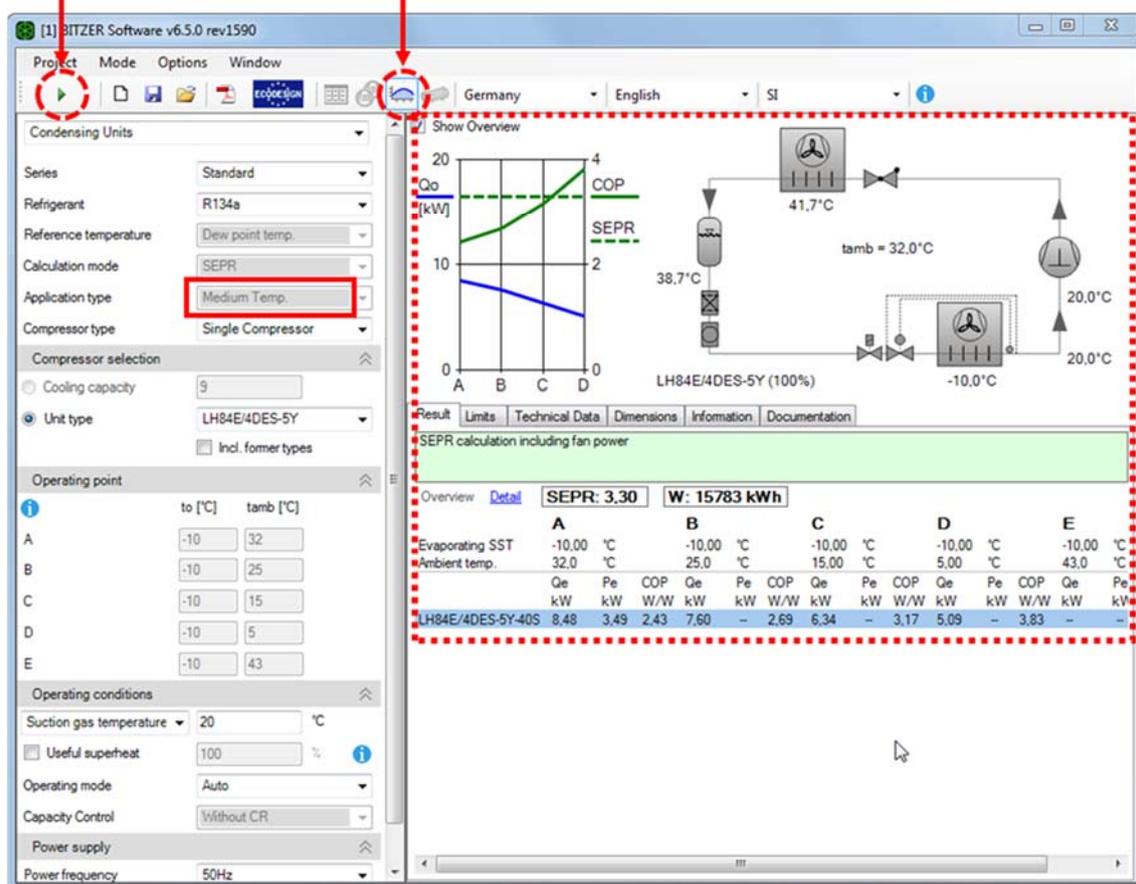
Click the **Seasonal calculation** button shown in the following figure (dashed red circle to the right) to open the menu for entering additional data and for SEPR calculation. The Application type **Medium temp.** is preset, for calculating the SEPR for **Low temp.** the default setting (red frame) may be changed. If necessary, input values may be adjusted. For data output, click the **Calculate** button (dashed red circle to the left). The data is displayed in the output menu (dotted red frame to the right).

For the output data either **Overview** or **Detail** may be selected. When selecting **Detail** an Excel logo will be displayed for saving the data.

If the condensing unit can be used at an ambient temperature of up to 43°C the COP value will also be shown (reference point E). This value is used for information only and has no effect on the SEPR value.

**SEPR Calculation**

**SEPR Menu**



**Operating point**

	to [°C]	tamb [°C]
A	-10	32
B	-10	25
C	-10	15
D	-10	5
E	-10	43

**Operating conditions**

Suction gas temperature: 20 °C  
 Useful superheat: 100 %  
 Operating mode: Auto  
 Capacity Control: Without CR  
 Power supply: 50Hz

**Result** SEPR calculation including fan power

Overview	Detail	SEPR: 3.30	W: 15783 kWh											
A	B	C	D	E										
Evaporating SST	-10,00 °C	-10,00 °C	-10,00 °C	-10,00 °C	-10,00 °C									
Ambient temp.	32,0 °C	25,0 °C	15,00 °C	5,00 °C	43,0 °C									
	Qe	Pe	COP	Qe	Pe	COP	Qe	Pe	COP	Qe	Pe	COP	Qe	Pe
	kW	kW	W/W	kW	kW	W/W	kW	kW	W/W	kW	kW	W/W	kW	kW
LH84E/4DES-5Y-40S	8,48	3,49	2,43	7,60	-	2,69	6,34	-	3,17	5,09	-	3,83	-	-

The Ecodesign Regulation 2015/1095 can be downloaded from the following website:  
<http://eur-lex.europa.eu>