

New generation of CS.3 compact screws

Appropriate choice of refrigerant
Why R134a ?

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New generation of CS.3 screw compressors



Why R134a ?

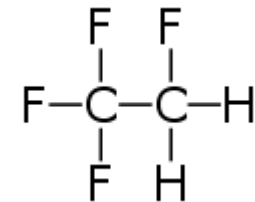
From all refrigerants available on the market at present, R134a is offering the most efficient combination of:

- / Safety
- / Environmental friendliness
- / Low operating costs
- / Technical & legal feasibility
- / Global availability

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R134a is a single substance refrigerant in the group of fluorine hydrocarbons (CFC) chemically: **Tetrafluorethan (CF₃CH₂F)**



Formula of structure

Classification as per the European standard for refrigeration systems and heat pumps EN-378-1:

- / **Safety refrigerants**
 - **Lowest safety group A1**

- / Non-flammable
- / Low toxic

- / It is allowed to install parts or systems containing refrigerants in personal or outdoor areas!

- / No limitation of charge for machine rooms or outdoor installation

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Environmental friendliness

Refrigerant	Configuration (formula)	ODP ¹⁾ [R11=1,0]	GWP _{100a} ²⁾ [CO ₂ =1,0]	Safety class ⁴⁾	Applied safety value ⁴⁾ [kg/m ³]	Rel. COP ⁵⁾ +5/+50 °C [R134a=100%]	Pressure +5/+50 °C [bar/bar]
R134a	CF ₃ CH ₂ F	0	1300	A1	0,25	100%	3,5/13,2
R22	CHClF	0,055	1700	A1	0,3	95%	5,8/19,4
R407C _{TAU}	R32/125/134a	0	1650	A1	0,31	92%	5,5/19,9
R410A _{TAU}	R32/125	0	1980	A1	0,44	90%	9,3/30,5
R290	C ₃ H ₈	0	3	A3	0,008	103%	5,5/17,1

1) Ozon reduction potential

2) Global warming potential as per IPCC III (2001)

3) As per EN 378-1 and ASHRAE34

4) As per EN-378-1, enclosure E:
Limited time, which persons may be exposed to acute toxicity or lack of oxygen

5) Relative Coefficient of Performance

The global warming potential **GWP_{100a} = 1300** is not yet the target value we aim for, *however it is the lowest value among the presently available non-flammable and only low toxic safety refrigerants*

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Low operating costs

The low pressure level of R134a offers:

- / low required compression activity
- / small power consumption
- / high performance data

Depending on plant size, operating time and - conditions and the electricity tariff which has to be paid, the **choice of refrigerant** may cause a difference of **several hundreds or thousands of Euro** in the **yearly operating costs** – following the capacity of the liquid chillers operated with compact screws!

In **China**, where a phaseout of R22 is planned up to the year 2030, already **60%** of the **big air-conditioned liquid chillers** which are equipped with screw or centrifugal compressors **are operated with R134a!**

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Refrigerants for operation with CS.3 compact screws

Refrigerant	R134a	R407C	R22	R404A	R507A
CSW.3	✓	✓	✓	--	--
CSH.3	✓	✓	✓	✓ *	✓ *

* Upon request – if necessary additional measures have to be taken

BITZER recommends R134a for the operation with CS compact screws!



THE HEART OF FRESHNESS