



Beijer Ref India – Bitzer Reciprocating Compressor Training (2022)

Scheme of Presentation

- Bitzer Profile
- Refrigerant
- Types of reciprocating compressor
- Application – Ecoline
- Nomenclature
- Scope of supply
- New Developments
- How to select a compressor

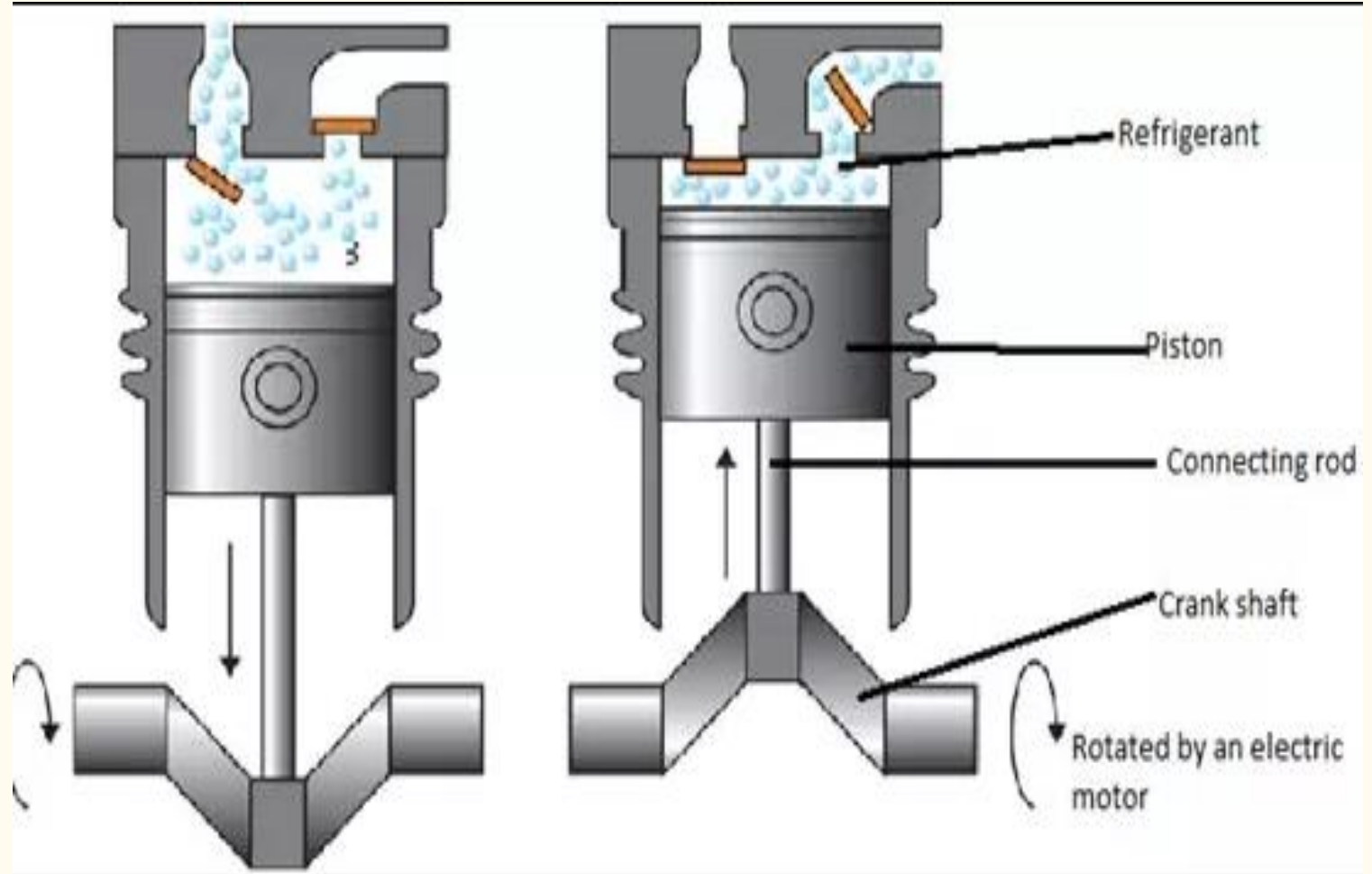


Bitzer Profile

- Bitzer SE is a manufacturer of refrigeration and air conditioning technology.
- **Revenue:** 74 crores EUR (2017)
- **Headquarters:** Sindelfingen, Germany
- **Founded:** 1934
- **Number of employees:** 3,500

Compatible Refrigerants

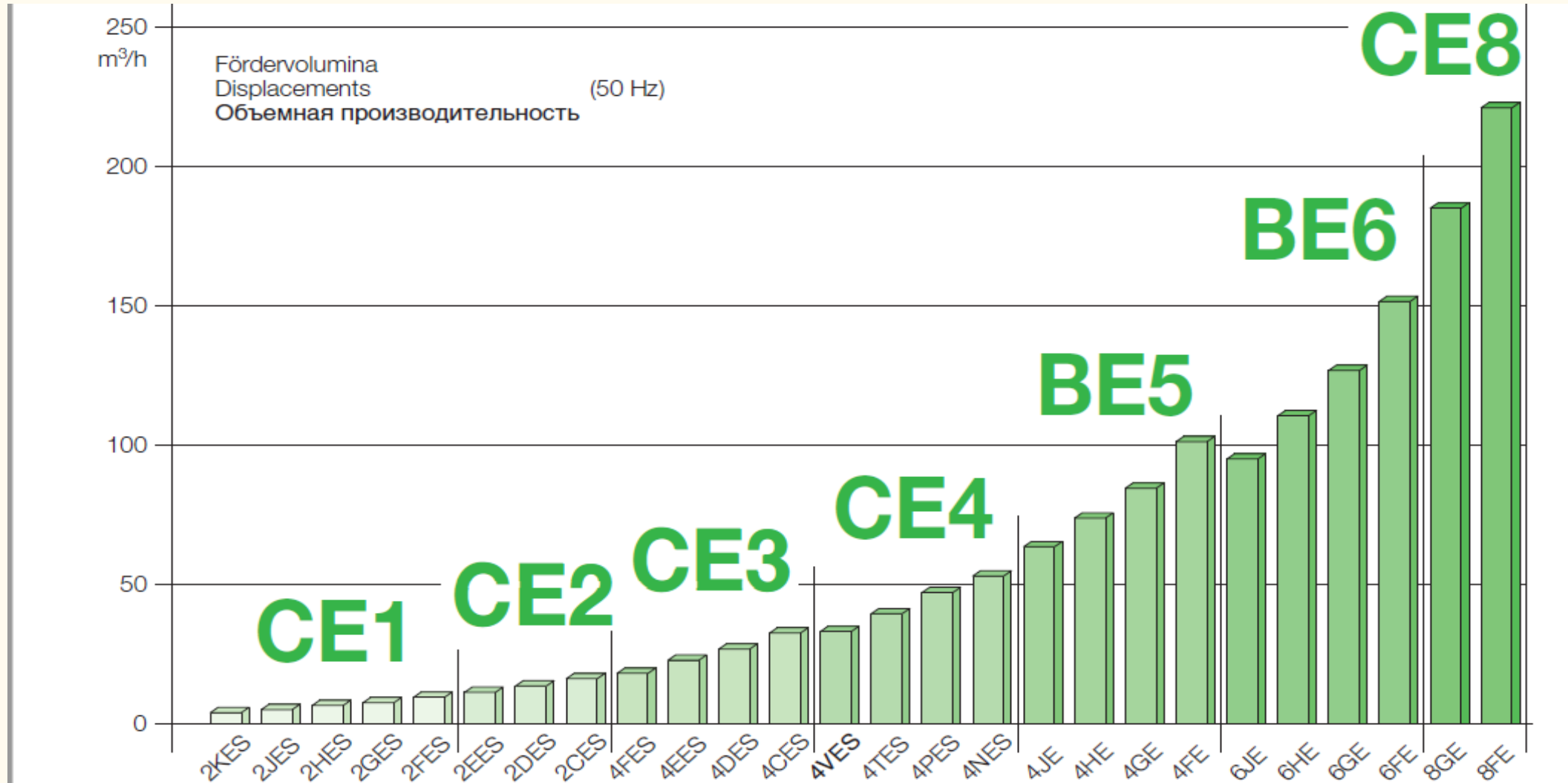
- R22
- R134a
- R407C
- R404a
- R407a
- R407F
- R448a
- R449a
- R450a
- R507a
- R513a
- R1234yf
- R1234ze



Types of Reciprocating Compressors

1. Semi Hermetic Ecoline
2. Semi Hermetic Tandem Ecoline
3. Semi Hermetic 2 stage
4. Semi Hermetic 2 stage tandem
5. Open Type reciprocating compressor

Range of Semi Hermetic Ecoline



Ecoline Application Envelope – R134a

Einsatzgrenzen

bezogen auf 20°C Sauggastemperatur

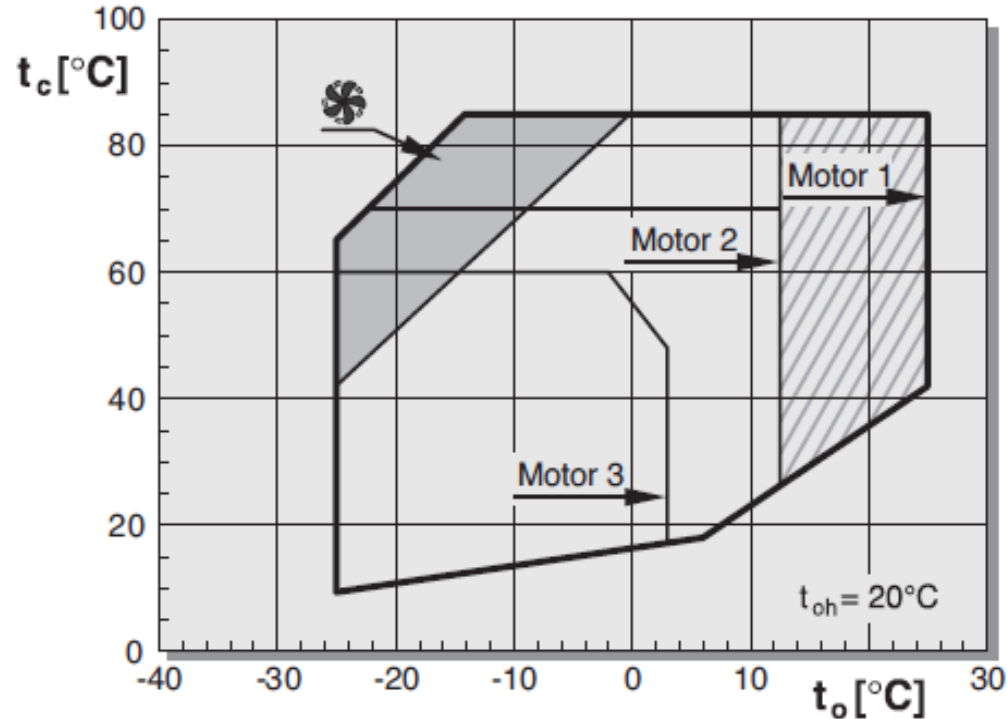
Application limits

relating to 20°C suction gas temperature

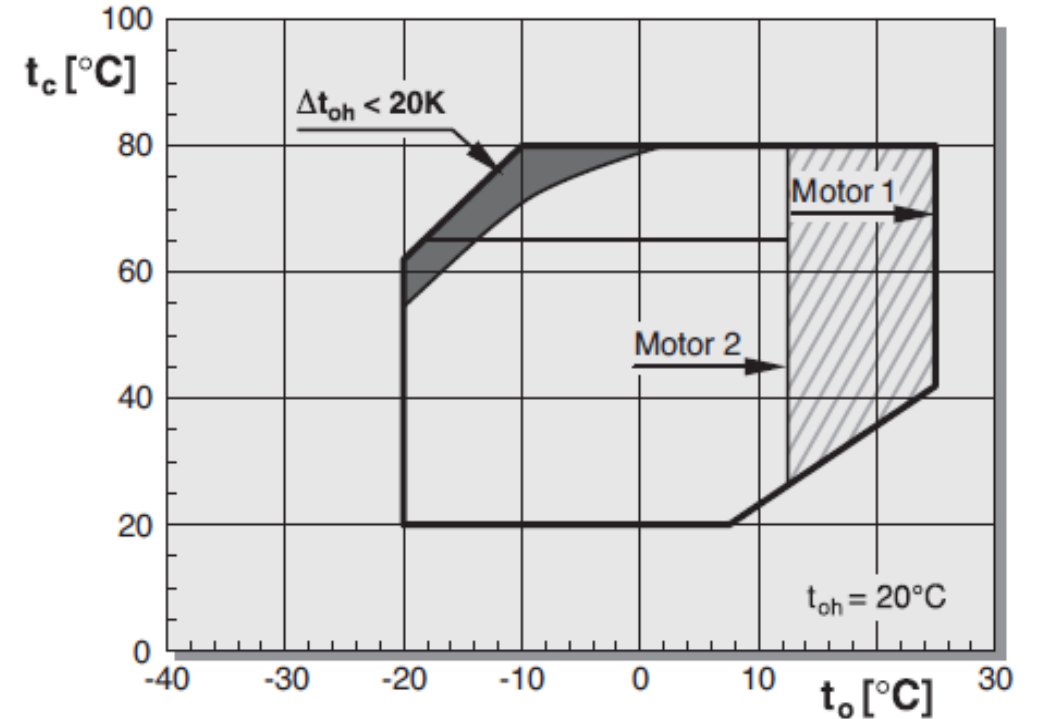
Области применения

при температуре всасываемого пара 20°C

R134a, R1234yf, R450A, R513A ① 2KES-05Y .. 6FE-50Y



R134a, R1234yf, R450A, R513A ① 8GE-50Y .. 8FE-70Y



Ecoline Application Envelope – R22

Einsatzgrenzen

bezogen auf 20°C Sauggastemperatur

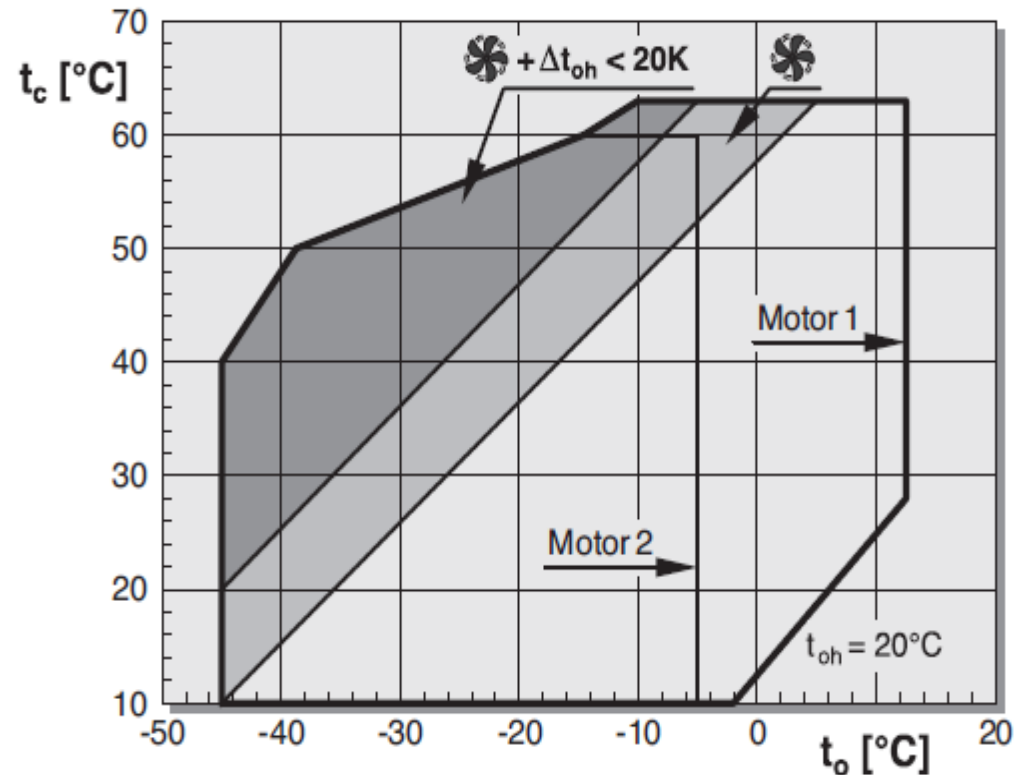
Application limits

relating to 20°C suction gas temperature

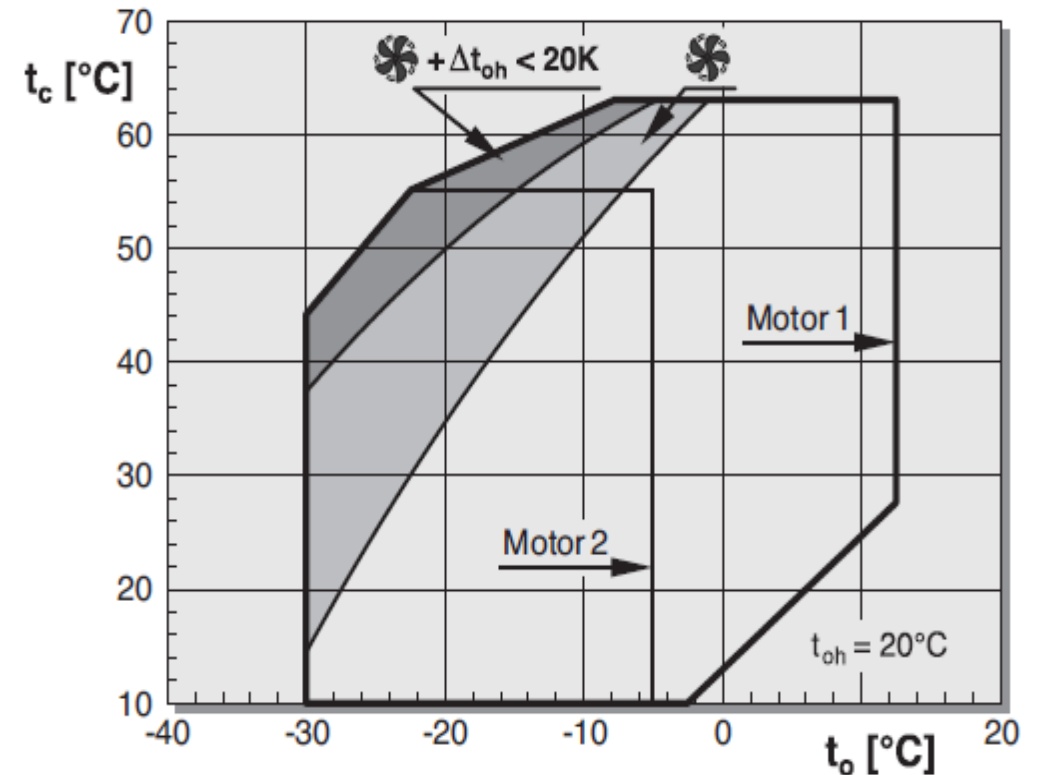
Области применения

при температуре всасываемого пара 20°C

R22 2KES-05 .. 4CES-9

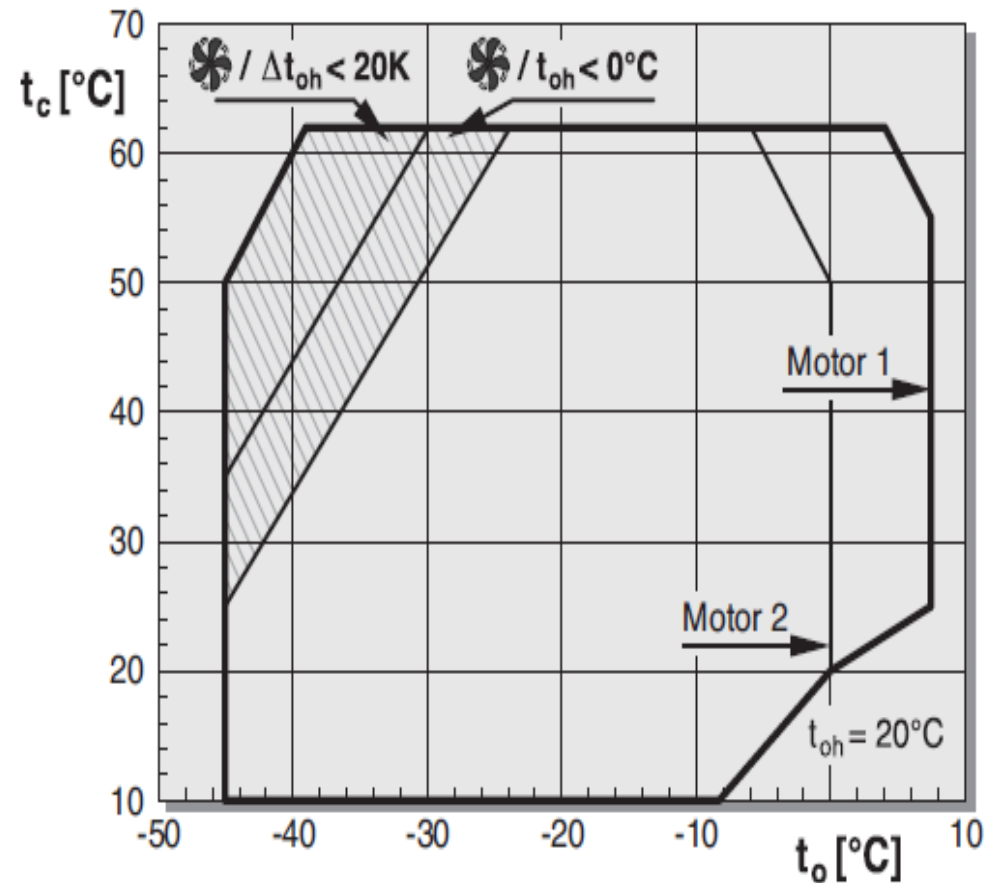


R22 4VES-7 .. 6FE-50

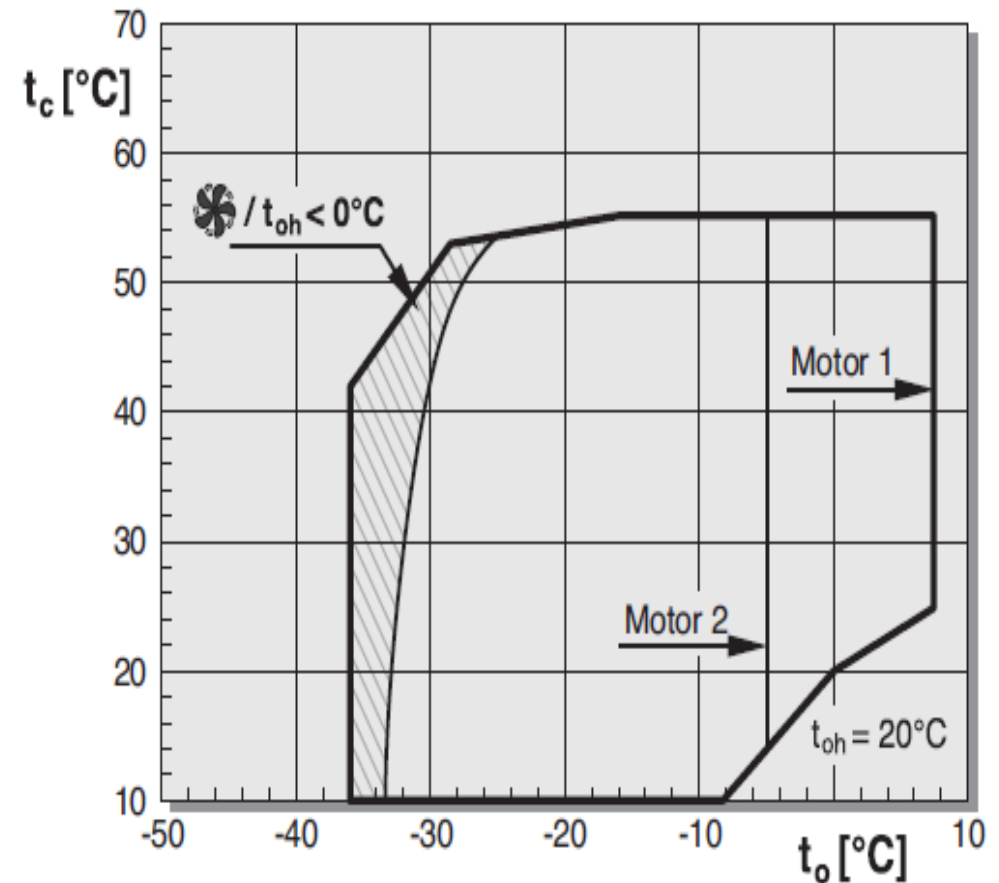


Ecoline Application Envelope – R404a

R404A ■ R507A 2KES-05Y .. 6FE-50Y



R404A ■ R507A 8GE-50Y .. 8FE-70Y



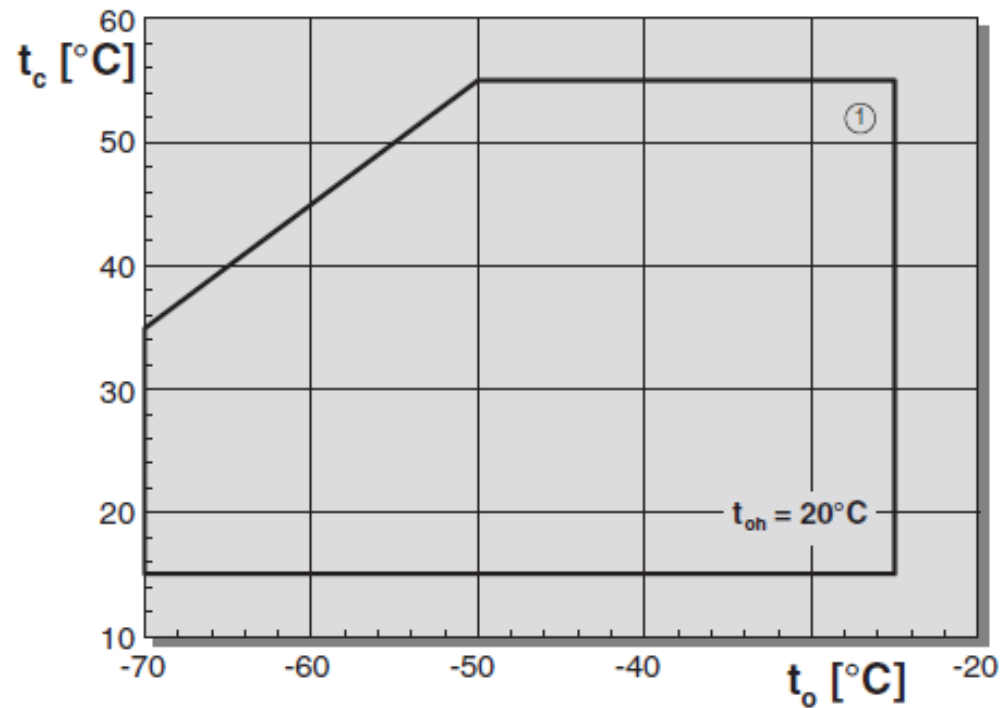
2 Stage Application Envelope – R404a/ R507a

Einsatzgrenzen

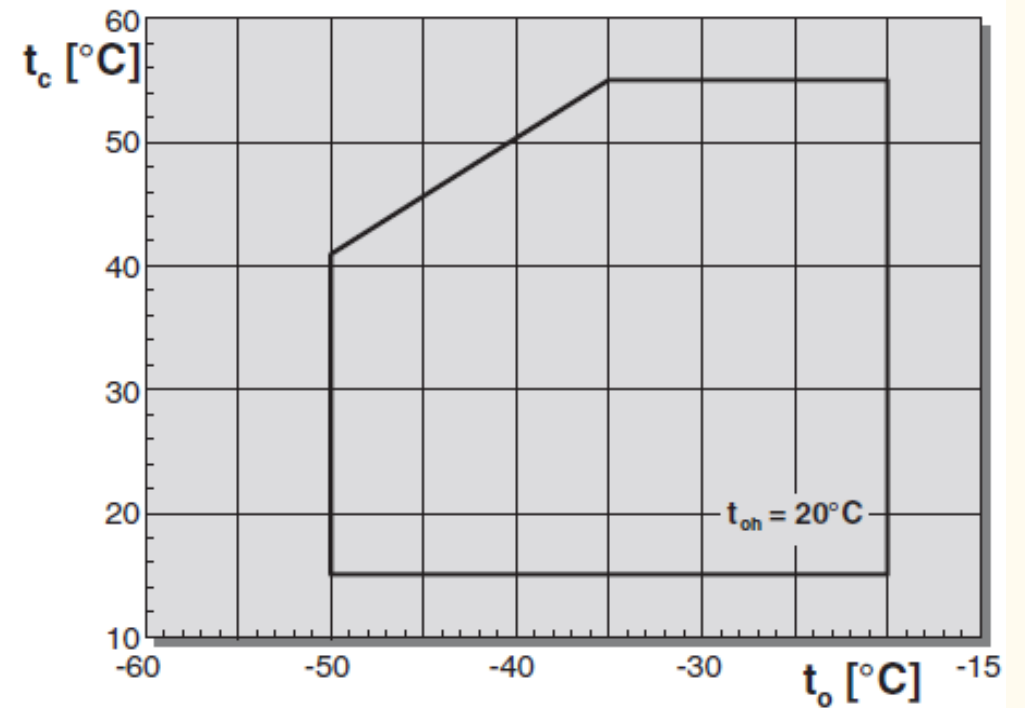
Application limits

Limites d'application

R404A ■ R507A

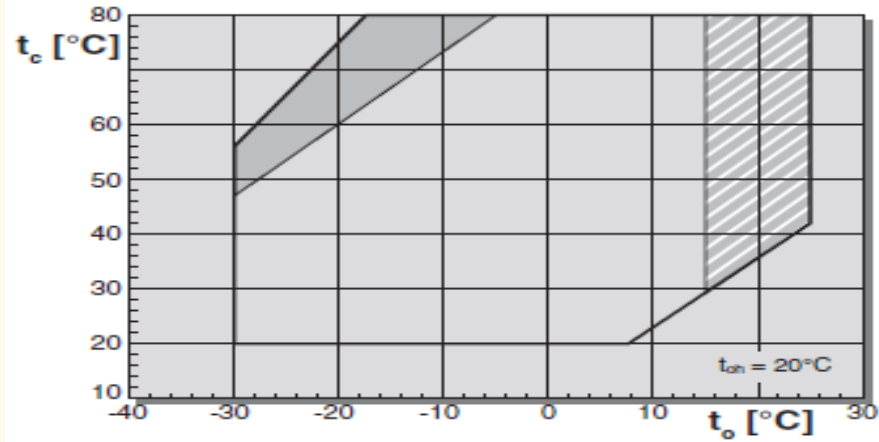


R22

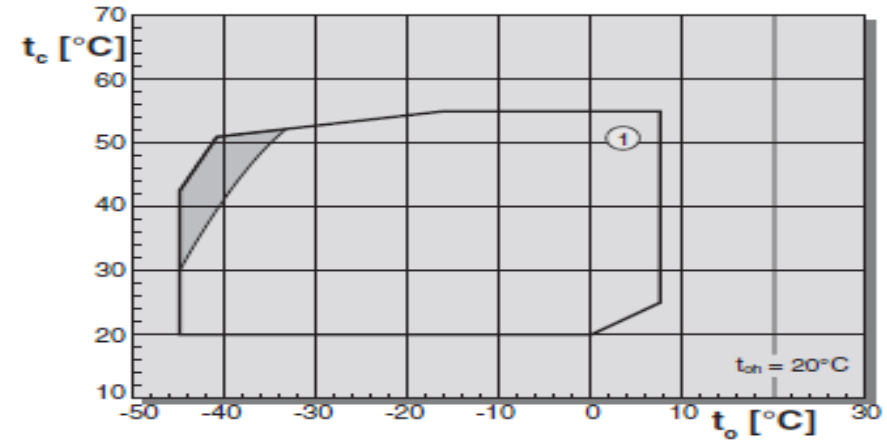


Open Type Application Envelope – R22/R134a/R404a/ R507a/NH3

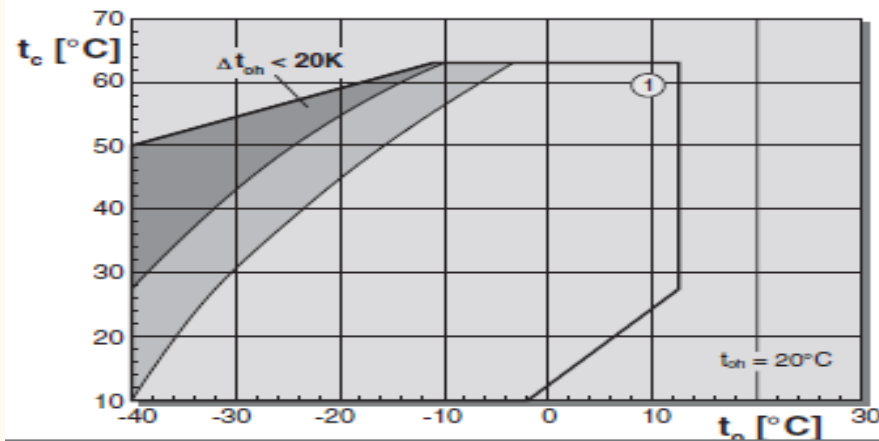
R134a (2)



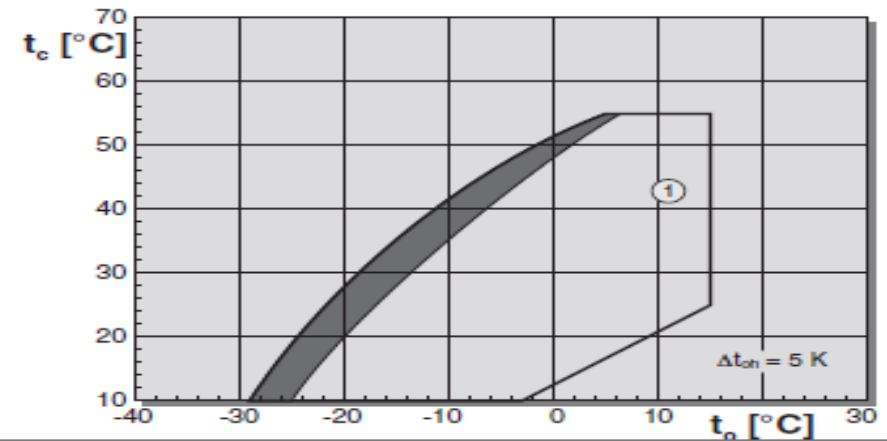
R404A ■ R507A



R22



NH₃



Nomenclature

- 4EES-4Y-40S
- 4FE-35-40P
- S6F-30.2Y
- S66F-60.2Y
- 4H.2
- 4P.2Y
- VIW
- VIIWY

Explanation of model designation

Example

4 N E S – 20 Y – 40P

Index for number of cylinders
(double with tandem compressor)

4 **N** E S – 20 Y – 40P

Identification letter for bore x stroke

4 N **E** S – 20 Y – 40P

Identification letter for BITZER ECOLINE
series

4 N E **S** – 20 Y – 40P

Identification letter for centrifugal
lubrication

4 N E S – **20** Y – 40P

Code for motor size

4 N E S – 20 **Y** – 40P

Identification letter for ester oil charge

4 N E S – 20 Y – **40P**

Motor code

Nomenclature

- 4EES-4Y-40S
- 4FE-35-40P
- S6F-30.2Y
- S66F-60.2Y
- 4H.2
- 4P.2Y
- VIW
- VIIWY

Explanation of type designation

Example

W 4 N .2 Y – S 230

Only in case of water cooled cylinder heads as standard (NH₃)

W **4** N .2 Y – S 230

Index for number of cylinders

W 4 **N** .2 Y – S 230

Identification letter for bore x stroke

W 4 N **.2** Y – S 230

.2 Series code

A R717/NH₃ - design

W 4 N .2 **Y** – S 230

Identification letter for ester oil charge

W 4 N .2 Y – **S** 230

S Belt drive

K Direct drive

W 4 N .2 Y – S **230**

Only in case of belt drive
(ø motor pulley)

Nomenclature

- 4EES-4Y-40S
- 4FE-35-40P
- S6F-30.2Y
- S66F-60.2Y
- 4H.2
- 4P.2Y
- VIW
- VIIWY

Explanation of type designation

Example

S 6 G - 25 . 2 Y - 40P

Identification letter for 2-stage construction

S **6** G - 25 . 2 Y - 40P

Index for number of cylinders (twice for tandem compressor)

S 6 **G** - 25 . 2 Y - 40P

Identification letter for bore x stroke

S 6 G - **25** . 2 Y - 40P

Code for motor size

S 6 G - 25 . **2** Y - 40P

Index for series

S 6 G - 25 . 2 **Y** - 40P

Identification letter for ester oil charge (HFC refrigerants: R404A/R507A etc.)

S 6 G - 25 . 2 Y - **40P**

Motor code

Further information see Technical Information KT-410

Scope of Supply

2-stage Compressors for Low Temperature Applications			BS4	BS5	BS6	Specification
			S4T, S4N	S4G	S6J .. S6F S66J .. S66F	
1	Motor with PTC sensors	- part winding type - motor code 40P	S	S	S	380-420 V-3-50 Hz 440-480 V-3-60 Hz
2	Connection suction line	shut-off valve	S	S	S	-
3	Connection discharge line	shut-off valve	S	S	S	2x for tandem types
4	Oil charge	BSE32 (ester oil)	S	S	S	-
5	Sight glass	-	S	S	S	-
6	Motor protection device	SE-B2	S	S	S	230 V-1-50/60 Hz
7	Terminal box - aluminium	enclosure class IP54	S	S	S	-
8	Pressure relief valve	-			S	-
9	Vibration dampers	spring dampers	S	S	S	tandem with elastomer dampers
10	Components for interstage cooling	- liquid injection valve - sight glass - filter drier - solenoid valve - coil for 230 V-1-50/60 Hz	S	S	S	Information about refrigerant and application range required for order processing

Scope of Supply

ECOLINE - Single Compressors ECOLINE - Tandem Compressors			Single Compressors						Tandem Compressors					Specification	
			CE1S	CE2S	CE3S	CE4S	BE5	BE6	CE8	CE2S	CE3S	CE4S	BE5		BE6
			2KES .. 2FES	2EES .. 2CES	4FES .. 4BES	4VES .. 4NES	4JE .. 4FE	6JE .. 6FE	8GE .. 8FE	22EES .. 22CES	44FES .. 44CES	44VES .. 44NES	44JE .. 44FE		66JE .. 66FE
1	Motor with PTC sensors	- star-delta type Y/Δ - motor code 40S	S	S	S					S	S				220-240 V-3-50 Hz-Δ 380-420 V-3-50 Hz-Y 440-480 V-3-60 Hz-Y
2		- part winding type - motor code 40P				S	S	S	S			S	S	S	380-420 (400") V-3-50 Hz 440-480 (480") V-3-60 Hz * for 6FE-50, 66FE-100
3	Connection suction line	shut-off valve	S	S	S	S	S	S	S	S	S	S	S	S	-
4	Connection discharge line	shut-off valve	S	S	S	S	S	S	S	S	S	S	S	S	2x for tandem types
5	Oil charge	BSE32 (ester oil)	S	S	S	S	S	S	S	S	S	S	S	S	-
6	Sight glass	-	S	S	S	S	S	S	S	S	S	S	S	S	-
7	Motor protection device	SE-B1	S	S	S	S				S	S	S			230 V-1-50/60 Hz
8		SE-B2					S	S	S				S	S	
9	Bearing cover with bore	prepared for OLC-K1 retrofit		S	S	S				S	S	S			-
10	Terminal box - plastic	enclosure class IP66	S	S	S	S				S	S	S			-
11	Terminal box - aluminium or sheet steel	enclosure class IP54					S	S	S				S	S	-
12	Pressure relief valve	-					S	S	S				S	S	-
13		elastomer dampers	S	S	S					S	S	S	S	S	-

Scope of Supply

[illegible]

How to Select a Compressor

The following inputs are required for selection.

- Refrigerant
- Cooling Capacity
- Evaporating Temperature
- Condensing Temperature

How to Select a Compressor

Semi-hermetic Reciprocating Compressors

Mode: Refrigeration and Air con

Refrigerant: R134a

Reference temperature: Dew point temp.

Compressor type: Single Compressor

Series: Standard

Motor version: all

Compressor selection

☒ Cooling capacity: 16 kW

☐ Compressor model

☐ Incl. former types

Operating point

Evaporating SST: 0 °C

Condensing SDT: 45 °C

Operating conditions

Liq. subc. (in condenser): 0 K

Suct. gas superheat: 10 K

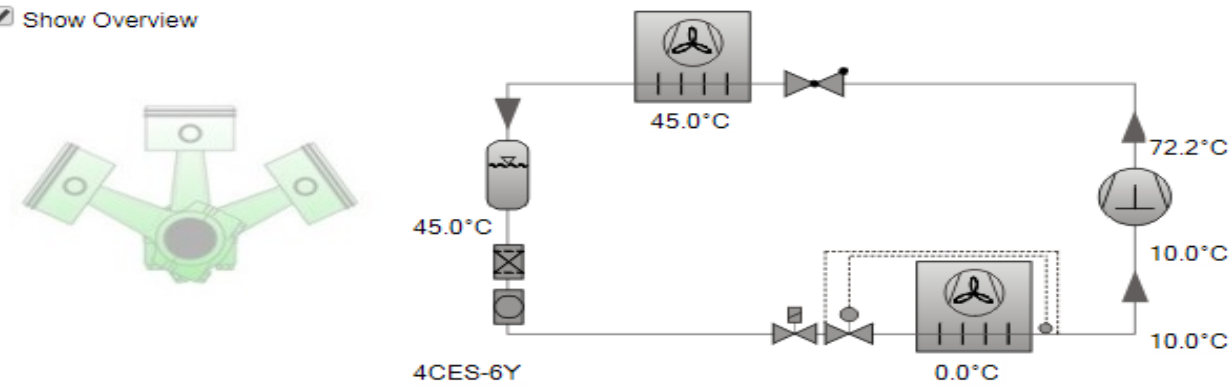
☐ Useful superheat: 100 %

Operating mode: Auto

Capacity control

☒ without

☒ Show Overview



4CES-6Y

0.0°C

45.0°C

72.2°C

10.0°C

Result | Limits | Technical Data | Dimensions | Information | Documentation | Trainings

*According to EN12900 (20°C suction gas temp., 0K liquid subcooling)

Compressor	4CES-6Y-40S	4VES-6Y-40P
Capacity steps	100%	100%
Cooling capacity	15.18 kW	16.10 kW
Cooling capacity *	15.43 kW	16.36 kW
Evaporator capacity	15.18 kW	16.10 kW
Power input	4.84 kW	4.94 kW
Current (400V)	9.33 A	8.98 A
Voltage range	380-420V	380-420V
Condenser capacity	20.0 kW	21.0 kW
COP/EER	3.14	3.26
COP/EER *	3.19	3.31
Mass flow	383 kg/h	406 kg/h
Operating mode	Standard	Standard
Discharge gas temp. w/o cooling	72.2 °C	70.7 °C

Thank you