DNV·GL

Certificate No:
TAM00000GU

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Refrigerant Compressor

with type designation(s)
2KES; 2JES; 2HES; 2GES; 2FES / CE1 Ecoline

Issued to
Bitzer Kühlmaschinenbau Schkeuditz GmbH
Schkeuditz, Germany

is found to comply with
DNV GL rules for classification – Ships

Application :

Products approved by this certificate are accepted for installation on all vessels classed by DNV GL.

Max. working press.:	**32 bar**
Operating media	**HCFC-refrigerants, HFC-single component refrigerants, HFC-refrigerant blends, HFO-refrigerants, HFO/HFC refrigerant blends, see page 2**

Issued at **Hamburg** on **2017-09-13**
This Certificate is valid until **2022-09-12**.
DNV GL local station: **Magdeburg**

Approval Engineer: **Christian Kaemmer**

for **DNV GL**

Olaf Drews
Head of Section

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid.
The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

© DNV GL 2014. DNV GL and the Horizon Graphic are trademarks of DNV GL AS.

Job Id: **262.1-025382-1**
Certificate No: **TAM00000GU**

Product description

Semi-Hermetic Reciprocating Compressor

CE1 Ecoline:

Type	2KES	2JES	2HES	2GES	2FES
Displacement @ 1450 1/min@ 50 Hz [m3/h]	**4,06**	**5,21**	**6,51**	**7,58**	**9,54**

Casing Material: Cast Iron EN-GJL-250 Lamellar Graphite.

Usable Refrigerants

HCFC-refrigerants of the safety group A1 and Fluid Group 2 PED
HFC-single-component refrigerant of the safety group A1 and Fluid Group 2 PED
HFC-refrigerant blends of the safety group A1 and Fluid Group 2 PED
HFO-refrigerant of safety group A2L and Fluid Group 1 PED
HFO-refrigerant of safety group A2L and Fluid Group 2 PED
HFO/HFC refrigerant blends of safety group A1 and Fluid Group 2 PED

Note: Fluid Groups acc. to PED = Pressure equipment directive 2014/68/EU
Safety Groups acc. to EN DIN 378-1:2017-03

Application
Air Conditioning, Provision Cooling, Cargo Refrigeration.

Tests to be carried out
Compressors are subject to a performance test at the manufacturer´s works under supervision of DNVGL and are to be presented for final inspection.

Type Approval documentation

Marking of product
The product shall be marked with manufacturer´s name, year of construction, effective suction rate [m3/h], discharge pressure [bar], speed [rpm], shaft power [kW], serial number.

Periodical assessment

The scope of the periodical assessment is to verify that the conditions stipulated for the type are complied with, and that no alterations are made to the product design or choice of systems, components and/or materials.
The main elements of the assessment are:

- Ensure that type approved documentation is available
- Inspection of factory samples, selected at random from the production line (where practicable)
- Review of production and inspection routines, including test records from product sample tests and control routines
- Ensuring that systems, components and/or materials used comply with type approved documents and/or referenced system, component and material specifications
- Review of possible changes in design of systems, components, materials and/or performance, and make sure that such changes do not affect the type approval given
- Ensuring traceability between manufacturer's product type marking and the type approval certificate

Periodical assessment is to be performed at least every second year and at renewal of this certificate.

END OF CERTIFICATE