Certificate no.:
TAM00001DW

TYPE APPROVAL CERTIFICATE

This is to certify:

that the Refrigerant Compressor

with type designation(s)
CKHE3M(+)

issued to
BITZER Kühlmaschinenbau Schkeuditz GmbH
Schkeuditz, **Germany**

is found to comply with
DNV rules for classification – Ships Pt.4 Ch.5 Rotating machinery – driven units

Application:

Products approved by this certificate are accepted for installation on all vessels classed by DNV.
Max. working press.: **160 bar / 100 bar**
Operating media: **CO_2 / R744**

Issued at **Hamburg** on **2024-12-18**
This Certificate is valid until **2029-12-17**.
DNV local unit: **Hamburg – CMC North/East**

for **DNV**

Approval Engineer: **Christian Kaemmer**

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.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to USD 300 000.

Product description

Semi-Hermetic Refrigerant Compressor with 4 cylinders, reciprocating.

Compressor series CKHE3M(+) consisting of 4 compressor types 4MTEM(U)-7(L), 4MTEM(U)-10(L), 4KTEM(U)-10(L) and 4KTEM-12 for transcritical CO_2 applications.

CKHE3M(+)		4MTEM(U)-7(L)	4MTEM(U)-10(L)	4KTEM(U)-10(L)	4KTEM-12
Displacement [m³/h] @ 1450 1 /min (@ 1500 1 /min)	50 Hz	6,6 (6,9)	6,6 (6,9)	9,6 (9,9)	9,6
Displacement [m³/h] @ 1750 1 /min (@ 1800 1 /min)	60 Hz	8,0 (8,2)	8,0 (8,2)	11,5 (11,9)	11,5

Casing Material: Cast Iron with Nodular Graphite EN-GJS-600 / EN-GJS-400

Usable Refrigerants

- R744 / CO_2

Production place

- Bitzer Kühlmaschinenbau Schkeuditz GmbH, Industriestr. 48, 04435 Schkeuditz / Germany.

Application

Air Conditioning, Provision Cooling, Cargo Refrigeration, Heatpump.

Tests to be carried out

Compressors for cargo refrigeration are subject to a performance test at the manufacturer´s works under supervision of DNV 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

For retention of the Type Approval, a DNV Surveyor shall perform periodical assessment to verify that the conditions for the Type Approval are complied with. Refer to the Class Programme DNV-CP-0338, Sec.4.

To check the validity of this certificate, please look it up in https://approvalfinder.dnv.com