Marine & Offshore

Certificate number: 73473/A0 BV
File number: ACM 101/97/1
Product code: 1403I

This certificate is not valid when presented without the full attached schedule composed of 7 sections

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TYPE APPROVAL CERTIFICATE

This certificate is issued to

KRAL GmbH

Lustenau - AUSTRIA

for the type of product

SCREW PUMPS

types: K, M, C, L, ALP, R, Z and NE
double stations: DL/DS, DLC, DKC, DALP and DKB

Requirements:
BUREAU VERITAS Rules for the Classification of Steel Ships
BUREAU VERITAS Rules for the Classification of Yachts

This certificate is issued to attest that Bureau Veritas Marine & Offshore did undertake the relevant approval procedures for the product identified above which was found to comply with the relevant requirements mentioned above.

This certificate will expire on: 19 Dec 2027

For Bureau Veritas Marine & Offshore,
At BV HAMBURG, on 19 Dec 2022,
Heiko Lange

This certificate was created electronically and is valid without signature

THE SCHEDULE OF APPROVAL

1. PRODUCT DESCRIPTION:

Screw pumps:
series K for low pressure applications
- **sizes: 5 to 2900**
- **design variants KF, KFA, KFN, KFT, KH, KV and KVT**
- **with or without magnetic coupling**

series R for low pressure applications
- **sizes: 15 to 210**
- **design variants RFI, RVI, RFT, RVT**
- **with or without magnetic coupling**

series Z for low pressure applications with high capacity
- **sizes: Z03000; Z05000; Z11000**
- **horizontal or vertical design**
- **including variants with various positions of connection nozzles**

series ALP for low pressure applications
- **sizes: 15 to 280**
- **with or without magnetic coupling**

series L for medium pressure applications
- **sizes: 5 to 85**
- **design variants LFI, LFM, LFT, LFW, LVI, LVM and LVT**
- **with or without magnetic coupling**

series M for medium pressure applications
- **sizes: 105 to 210**
- **with or without magnetic coupling**

series C for high pressure applications
- **sizes: 5 to 3550**
- **design variants CL, CK, CG, CGF, CGV, CGH**
- **with or without magnetic coupling**

series NE for low pressure applications
- **sizes: 5 to 54**
- **with or without magnetic coupling**

Screw pumps may be assembled by pair on a common base frame and connected with each other to double pump stations.

1.1 Technical data:

series	max. working pressure	max. fluid temperature
NE	6 bar	180°C
K	16 bar	250°C
R	16 bar	180°C
Z	Z03000: 16 bar; other sizes: 25 bar	Z03000: 120°C; other sizes: 300°C
ALP	16 bar	250°C
M	40 bar	250°C
L	63 bar	250°C
C	100 bar	300°C

Lower fluid temperature limits might apply depending on material choice of sealing.

1.2 Material specification:

series	material of casing	material of spindles
NE	EN-GJS-400	nitrided steel
K	EN-GJS-400	nitrided steel
R	EN-GJS-400	nitrided steel
ALP	EN-GJS-400	nitrided steel
M	EN-GJS-400	nitrided steel
L	EN-GJS-400	nitrided steel
C	EN-GJS-400; carbon steel; aluminium	nitrided steel

series	material of casing	material of shaft/spindles
Z	EN-GJS-400-18; carbon steel	42CrMo4 or X5CrNiCuNb16-4 / EN-GJS-400-15, X17CrNi16-2

2. DOCUMENTS AND DRAWINGS:

According to following documents:

Designation	Drawing number	Rev.
Catalogue: KRAL Schraubenspindelpumpen - Übersicht	n/a	07/2022
Catalogue: KRAL Baureihe Z	n/a	07/2022
Component Description	9006009-02 V13	01/2020
Component Description	9006010-02 V13	01/2020
Component Description	9008785-02	05/2015
Component Description	LFI- 74.ABAP.00001	29.07.2014
Operating instructions	OIA 07en	01/2019
Operating instructions	OIA 08en	06/2019
Operating instructions	OIC 01en-GB	06/2022
Operating instructions	OIC 02en-GB	06/2022
Operating instructions	OIC 10en-GB	02/2022
Operating instructions	OIC 12en-GB	11/2019
Operating instructions	OIC 13en-GB	06/2022
Operating instructions	OIC 18en-GB	06/2022
Operating instructions	OIC 18en-GB	06/2022
Operating instructions	OID 02en	06/2021
Operating instructions	OID 02en	06/2021
Operating instructions	OID 03en	06/2021
Operating instructions	OID 03en	06/2021
Operating instructions	OID 04de	11/2019
Operating instructions	OID 05en	10/2020
Operating instructions	OID 06en	10/2020
Operating instructions	OID 07en	02/2022
Operating instructions	OIK 07en-GB	07/2021
Operating instructions	OIK 09en-GB	02/2022
Operating instructions	OIK 09en-GB	06/2022
Operating instructions	OIL 01en-GB	06/2022
Operating instructions	OIL 02en-GB	02/2022
Operating instructions	OIM 01en-GB	06/2022
Operating instructions	OIM 05en	08/2015
Operating instructions	OIR 01en-GB	06/2022
Operating instructions	OIR 02en-GB	02/2022
Operating instructions	OIZ 10en-GB	08/2019
Operating instructions	OIZ 11en-GB	08/2019
Part list	ALP-0015-BAA	23.01.2015
Part list	CGF- 951.BAACF.00564	07.04.2014
Part list	CGV- 660.ABBEK.00321	n/a
Part list	CKC- 74.ZCB.001115	30.04.2019
Part list	CKC-275.ZCB.001113	30.04.2019
Part list	CLC-105.AZACP.00098	20.05.2009
Part list	CLC-660.XZXAP.00297	03.01.2018
Part list	CLD- 550.ABB.000014	12.03.2019
Part list	CLE- 160.DAA.500004	25.01.2010
Part list	DKB- 8000.AA.00003	11/2010
Part list	DKC- 5000.AAAA.00341	01/2019
Part list	DLC- 900.BAAA.80210	10/2016
Part list	DS1- 500.CAA.5122	01/2011
Part list	DS3-1100.CAA.5095	01/2011
Part list	KF- 42.ABA.003562	04.06.2009
Part list	KFT- 74.AXA.007077	27.01.2015
Part list	KH- 105.BBA.000020	15.09.2009
Part list	LFM- 20.DBAP.00161	03.09.2013

Designation	Drawing number	Rev.
Part list	M160.03	14.03.2011
Part list	RFI- 55.BAAA.00003	16.08.2022
Screw pump	DLC- 900.BAAA.80210_TSP	004/2012
Screw pump	DS1- 500.CAA.5122	01/2011
Screw pump	DS3-1100.CAA.5095	01/2011
Screw pump / pump station	DALP-C-0075-DBD112	07/2017
Screw pump / pump station	DALP-S-0020-BBBB090	11/2013
Screw pump / pump station	DKC- 5000.AAAA.00341	09/2017
Screw pump arrangement drawing	U000Z_0009	n/a
Screw pump arrangement drawing	U000Z_0014	n/a
Screw pump arrangement drawing	U000Z_0021	n/a
Screw pump arrangement drawing	U001Z_0001	n/a
Screw pump sectional drawing	ALP-0015-BAA	06/2013
Screw pump sectional drawing	CGF- 951.BAACF.00564	n/a
Screw pump sectional drawing	CGV- 660.ABBEK.00321	n/a
Screw pump sectional drawing	CKC- 74.ZCB.001115	n/a
Screw pump sectional drawing	CKC-275.ZCB.001113	n/a
Screw pump sectional drawing	CLC-105.AZACP.00098	n/a
Screw pump sectional drawing	CLC-660.XZXAP.00297_TSP	n/a
Screw pump sectional drawing	CLD- 550.ABB.000014	n/a
Screw pump sectional drawing	CLE- 160.DAA.500004	n/a
Screw pump sectional drawing	KF- 42.ABA.003562	n/a
Screw pump sectional drawing	KFT- 74.AXA.007077_TSP	n/a
Screw pump sectional drawing	KH- 105.BBA.000020	n/a
Screw pump sectional drawing	LFI- 74.ABAP.00001	n/a
Screw pump sectional drawing	LFM- 20.DBAP.00161	n/a
Screw pump sectional drawing	M160.03	n/a
Screw pump sectional drawing	RFI- 55.BAAA.00003	n/a

3. TEST REPORTS:

Not applicable.

4. APPLICATION / LIMITATION:

4.1 May be used on the following services on board: Lube oil, hydraulic oil, thermal oil, fuel oil, cargo oil.

4.2 The pumps body and internal parts should be of a suitable type for use with fluids intended to be carried.

4.3 This certificate covers only the mechanical part of the pump or pump station. The pump or pump station control, monitoring, safety and electrical equipment and in particular the prime mover are to be either type approved or design appraised on a case-by-case basis.

4.4 The pump or pump station is to be installed according to BUREAU VERITAS Rules requirements and manufacturer's instructions.

4.5 The use of cast iron is restricted as per BUREAU VERITAS Rules.

5. PRODUCTION SURVEY REQUIREMENTS:

5.1 The pumps or pump stations are to be supplied by **KRAL GmbH** in compliance with the type and the requirements described in this certificate.

5.2 This type of product is within the category IBV of BUREAU VERITAS Rule Note NR320.

5.3 BUREAU VERITAS product certificate is required.

5.4 For information, **KRAL GmbH** has declared to BUREAU VERITAS the following production site:
KRAL GmbH, Lustenau / AUSTRIA

5.5 The screw pumps and pump stations are to be hydrostatically and performance tested, and delivered with a BUREAU VERITAS certificate when required by the rules.

6. MARKING OF PRODUCT:

Each pump should be marked with:
- Manufacturer's name or logo
- Product code
- Serial number
- Maximum working pressure
- BUREAU VERITAS' marks

7. OTHERS:

7.1 It is **KRAL GmbH**'s responsibility to inform shipbuilders or their sub-contractors of the proper methods of fitting, use and general maintenance of the approved equipment and the conditions of this approval.

***** END OF CERTIFICATE *****