



TYPE APPROVAL CERTIFICATE

Certificate No:
TAP00000D7
Revision No:
3

This is to certify:

That the Flowmeter

with type designation(s)
OMP

Issued to

KRAL GmbH
Lustenau, Vorarlberg, Austria

is found to comply with
DNV rules for classification – Ships Pt.4 Ch.6 Piping systems

Application :

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

Temperature range: -20° C to 200°C
Max. working press.: 40 bar
Sizes: OMP-013; OMP-020; OMP-032; OMP-052

Issued at **Hamburg** on **2023-03-22**

for **DNV**

This Certificate is valid until **2028-03-21**.

DNV local unit: **Augsburg**

Approval Engineer: **Ana Cristina Do Carmo Insfran**

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Sven Klinger
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.

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 300,000 USD.



Product description

The KRAL universal flowmeters OMP type may be used for versatile flow measurement of liquids, lubricative fluids and non abrasive and non corrosive media.

The Kral volume flow meters are designed and fabricated in different sizes.

The OMP flow meter design provides a volume flow measurement done by two geared screw spindles integrated in a compact housing. Each full rotation of the two geared screw spindles causes an amount of liquid flow volume to be measured in a unique integrated flow chamber of the OMP housing. An electronic sensor converts the specific measured flow chamber volume to an electronic signal corresponding to an industrial standard.

Application/Limitation

OMP universal flow meters to be used e.g. for the following applications:

Shipping / Marine-Fuel consumption measurement

Fuel oil measurement, e.g. HFO, MDO, MGO

Flow rate:	0,1 to 350 litres /minute; maximum 525 litres /minute
Maximum operating pressure:	40 bar
Operating temperature range:	-20°C to +200°C
Viscosity range:	1 to $1 \cdot 10^6$ mm ² /s
Precision:	± 0,1% of measured flow measurement value

Type Approval documentation

Type Approval Application dated on 2023-01-23

Type Approval Assessment Report dated on 2023-03-13

Design drawings:

OMP-013; OMP-020; OMP-032; OMP-052

Parts Lists with material specifications

Operating instructions:

OMP-013; OMP-020; OMP-032; OMP-052

Data sheets electrical sensors

Test documentation

Calibration protocols: OMP 13.43; OMP 20.43; OMP 32.43; OMP 52.43

Tests carried out

The OMP flow meters have been tested and calibrated in presence of a DNV Surveyor

Standard test of volume flow meter performed on KRAL Master test facility VPP08.

Flow rate measurement carried out with test fluid Exxsol D120 at a test temperature between 20 °C and 30 °C at a viscosity range between 5,29 and 4,11 mm²/s.

The following technical parameters and units apply:

Flow rate (Q – l/min); temperature (T - °C); viscosity (v – mm²/s); max. pressure (p – bar);

test pressure (pp – bar); measured volume (V – l); Puls (P); K-Factor (P/l);

measurement error (% of measured value).

The K-Factor adjusts any uncertainty of volume flow measurement of OMP type to be tested compared to a reference volume flow meter corresponding to the same OMP type size and calibrated at an independent test institute.

Calibration of flow rate can be carried out acc. to ISO / IEC 17025.

The calibration of volume flow meters are to be performed and controlled within two linearity classes.

All flow meters for calibration have to comply as minimum with Linearity class II.

Tests carried out – continuation

The following table shows an overview about optional flow ranges available for OMP size 13 to OMP size 52 within linearity class I and linearity class II.

Size	Linearity class I			Linearity class II		
	Flow range [l/min]		max. allow. Linearity [%]	Flow range [l/min]		max. allow. Linearity [%]
	from	to		from	to	
OM 13	0,2	10,0	± 2,0	0,4	10,0	± 2
	1,0	10,0	± 0,6	1,0	10,0	± 2
OM 20	0,6	30,0	± 1,0	1,2	30,0	± 2,0
	3,0	30,0	± 0,3	3,0	30,0	± 2,0
OM 32	2,0	100,0	± 1,0	4,0	100,0	± 2,0
	10,0	100,0	± 0,3	10,0	100,0	± 2,0
OM 52	7,0	350,0	± 1,0	14,0	350,0	± 2,0
	35,0	350,0	± 0,3	35,0	350,0	± 1,0

Marking of product

Each OMP flow meter is labelled with a KRAL rating plate showing a specific KRAL manufacturer's type code. The OMP type code consists of the specific OMP size which corresponds to the diameter of the measurement screw spindle. Further labelling comprises numbers for KRAL's internal version indexes, end connection and code for electronic signal. The OMP rating plate provides the OMP type, serial number, year of construction, K-Factor, preferred flow direction, maximum temperature, maximum pressure.

Periodical assessment

For retention of the Type Approval, a DNV Surveyor shall perform periodical assessment after two years (+/- 90 days) and after 3.5 years (+/- 90 days) to verify that the conditions for the Type Approval are complied with. Refer to DNV CP-0338, Sec.4.

The certificate is only valid if required periodical assessments are carried out with satisfactory results. To check the validity of this certificate, please look it up in <https://approvalfinder.dnv.com>

END OF CERTIFICATE