

TYPE APPROVAL CERTIFICATE

This is to certify:

That the **Hydraulic Cylinders**

with type designation(s)
40/28, 63/45

Issued to

Winel B.V.
Assen, Netherlands

is found to comply with

DNV standard DNV-ST-0194 – Hydraulic cylinders
DNV rules for classification – Ships Pt.4 Ch.6 Piping systems
DNV-OS-D101 – Marine and machinery systems and equipment, Edition July 2021

Application :

Product(s) approved by this certificate is/are accepted for installation on vessels classed by DNV.

Type	Design pressure (push)	Design pressure (pull)	Cylinder sizes
40/28	See page 2	175 bar	40/28-1300
63/45	90 bar	175 bar	63/45-1300

Issued at **Høvik** on **2023-12-20**

This Certificate is valid until **2028-12-19**.

for **DNV**

DNV local station: **Netherlands VMC**

Approval Engineer: **Jane Lozanov**

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Zeinab Sharifi
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

2 types of double acting hydraulic cylinders for watertight sliding doors designed according to DNV-ST-0194.

Dimensional data:

Type	Tube		Rod		Maximum stroke
	Outside diameter	Inside diameter	Outside diameter	Inside diameter	
40/28	50 mm	40 mm	28 mm	-	1300 mm
63/45	75 mm	63 mm	45 mm	30 mm	1300 mm

Materials:

Type	Cylinder tube	Piston rod	Piston	End cap	Stuffing box	End eye
40/28	E355+SR EN 10305-1	AISI 431 / 1.4057	S355J2 EN 10025-2	S355J2 EN 10025-2	S355J2 EN 10025-2	S355J2 En 10025-2
63/45	E355+SR EN 10305-1	E355+SR EN 10305-1	S355J2 EN 10025-2	S355J2 EN 10025-2	S355J2 En 10025-2	S355J2 En 10025-2

Materials for these hydraulic cylinders shall be according to DNV-ST-0194 section 2.

Manufacturer: KBM Machinefabriek BV.

Application/Limitation

Hydraulic cylinders covered by this certificate are intended for operating watertight doors in below working conditions:

- 40/28 cylinders: push pressure in first 50 mm stroke equal to 175 bar then drops to 30 bar
- design temperature range is 0°C to +50°C
- the cylinders are limited to 15 000 full load cycles over the life span

Mounting of cylinders is according to Type approval certificate TAS000019W for watertight sliding doors.

All welding is to be carried out by qualified welders and according to approved welding procedures. Non-destructive testing of all welds is to be performed according to DNV-ST-0194 [2.3].

Cylinder tube, piston rod, end covers, and end connections shall be Charpy-V impacted tested at minimum design temperature. Minimum specified average energy value shall be according to DNV-ST-0194 [2.1.1].

Production test and Certification

Each hydraulic cylinder is to be hydraulically pressure tested to 1.5 times design pressure before paint or any coating is applied on the cylinders and be delivered with a DNV product certificate. The test pressure is to be applied on both sides of the piston in sequence. Testing is to be in accordance with DNV-ST-0194 in presence of DNV surveyor.

Materials for cylinder tube, piston rod, end cover, stuffing box and end connections shall be delivered with 3.1 material certificates (according to EN 10204 or equivalent).

Type Approval documentation

Marking of product

Hydraulic cylinders shall be permanently marked in order to enable unique traceability to a product certificate or a type approval certificate. The marking shall at least consist of the following:

- manufacturer's name or trade mark
- design pressure
- type designation
- DNV product certificate number, if applicable
- charge number for the materials used in the cylinder tube and the piston rod.

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 approval are complied with. Reference is made to DNV-CP-0338.