Certificate No:
TAP00002JU

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Hydraulic Accumulator

with type designation(s)
HPS10/101-350 T1/T3, HPS10/101-415 T1/T3, HPS10/101-500 T1/T3

Issued to
Hydroll Oy
LAPUA, **Finland**

is found to comply with
DNV rules for classification – Ships Pt.4 Ch.7 Pressure equipment
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:	Temperature range:	Operating media:	Design pressure:	Sizes:
HPS10/101-350 T1/T3	T1: -25 °C to 100 °C, T3: -45 °C to 80°C	Hydraulic oil/Nitrogen gas	350 bar	ID: 100 mm or 140 mm, L: 3*OD to 2200 mm
HPS10/101-415 T1/T3	T1: -25 °C to 100 °C, T3: -45 °C to 80°C	Hydraulic oil/Nitrogen gas	415 bar	ID: 140 mm or 200 mm, L: 3*OD to 2200 mm
HPS10/101-500 T1/T3	T1: -25 °C to 100 °C, T3: -45 °C to 80°C	Hydraulic oil/Nitrogen gas	500 bar	ID: 100 mm, L: 3*OD to 2200 mm

Issued at **Høvik** on **2022-09-06**

This Certificate is valid until **2027-09-05**.

for **DNV**

DNV local station: **Finland CMC**

Approval Engineer: **Vegard Skauge Hjelmeland**

Sinisa Sedlan
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

Hydraulic piston accumulator designed according to EN 14359.

	Temperature range	Design pressure	Inside diameter	Length
HPS10-350-100-T1	-25 °C to 100 °C	350 bar	100 mm	3*OD to 2200 mm
HPS101-350-100-T1	-25 °C to 100 °C	350 bar	100 mm	3*OD to 2200 mm
HPS10-350-100-T3	-45 °C to 80 °C	350 bar	100 mm	3*OD to 2200 mm
HPS101-350-100-T3	-45 °C to 80 °C	350 bar	100 mm	3*OD to 2200 mm
HPS10-350-140-T1	-25 °C to 100 °C	350 bar	140 mm	3*OD to 2200 mm
HPS101-350-140-T1	-25 °C to 100 °C	350 bar	140 mm	3*OD to 2200 mm
HPS10-350-140-T3	-45 °C to 80 °C	350 bar	140 mm	3*OD to 2200 mm
HPS101-350-140-T3	-45 °C to 80 °C	350 bar	140 mm	3*OD to 2200 mm
HPS10-415-140-T1	-25 °C to 100 °C	415 bar	140 mm	3*OD to 2200 mm
HPS101-415-140-T1	-25 °C to 100 °C	415 bar	140 mm	3*OD to 2200 mm
HPS10-415-140-T3	-45 °C to 80 °C	415 bar	140 mm	3*OD to 2200 mm
HPS101-415-140-T3	-45 °C to 80 °C	415 bar	140 mm	3*OD to 2200 mm
HPS10-415-200-T1	-25 °C to 100 °C	415 bar	200 mm	3*OD to 2200 mm
HPS101-415-200-T1	-25 °C to 100 °C	415 bar	200 mm	3*OD to 2200 mm
HPS10-415-200-T3	-45 °C to 80 °C	415 bar	200 mm	3*OD to 2200 mm
HPS101-415-200-T3	-45 °C to 80 °C	415 bar	200 mm	3*OD to 2200 mm
HPS10-500-100-T1	-25 °C to 100 °C	500 bar	100 mm	3*OD to 2200 mm
HPS101-500-100-T1	-25 °C to 100 °C	500 bar	100 mm	3*OD to 2200 mm
HPS10-500-100-T3	-45 °C to 80 °C	500 bar	100 mm	3*OD to 2200 mm
HPS101-500-100-T3	-45 °C to 80 °C	500 bar	100 mm	3*OD to 2200 mm

Materials:

Cylinder tube	Fluid flange	Gas flange
E355+SR (EN10305-1)*	S355J2 (EN 10025-2)*	S355J2 (EN 10025-2)*

*Material shall be according to Particular Material Appraisal (PMA).

Application/Limitation

The accumulators covered by this certificate are limited to a pressure fluctuation (maximum working pressure minus minimum working pressure) ΔP, specified in the below table.

Accumulator type	HPS10/101-350-100	HPS10/101-350-140	HPS101-415-140	HPS101-415-200	HPS101-500-100
ΔP	70 bar	70 bar	83 bar	83 bar	100 bar

Each accumulator shall be protected on both gas and hydraulic fluid side by a safety device such as relief valve, fuse plug or rupture disc to prevent excess pressure if overheated. When the accumulator is an integral part of a system with such a safety device, the accumulator itself need not be supplied with a safety device.

All manufacturing, workmanship and testing shall be done in accordance with EN 14359.

Production testing and Certification

Production Testing and Certification for the actual intended application shall follow EN 14359 and the latest applicable edition of the Rules (as mentioned on the front page of this certificate).

Type Approval documentation

Marking of product

Each hydraulic accumulator is to be permanently and legibly marked with following information:

- Date of manufacture, (month/year)
- Manufacturer's serial number
- Manufacturer's name/symbol
- Gas volume in litres
- Allowable temperature range in degrees Celsius
- Maximum allowable pressure
- Test pressure

The location and process of stamping of the accumulators shall not be detrimental to its strength.

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.