DNV·GL

Certificate No:
TAP00001G1

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Gas Loaded Accumulator

with type designation(s)
SBO210-2,8E, SBO210-0,75E, SBO210-0,16E, SBO100-0,7E

Issued to
HYDAC Technology GmbH
Sulzbach, Saarland, Germany

is found to comply with
DNV GL rules for classification – Ships Pt.4 Ch.7 Pressure equipment
DNV GL standard DNVGL-ST-0358 – Certification of offshore gangways for personnel transfer
DNV GL standard DNVGL-ST-0378 – Standard for offshore and platform lifting appliances

Application :

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

Type:	Temperature range:	Operating media:	Design pressure:	Sizes:
SBO210-2,8E	-40°C to +100°C	Mineral oil, nitrogen	210 bar	2,8L
SBO210-0,75E	-40°C to +100°C	Mineral oil, nitrogen	185 bar	0,75L
SBO210-0,16E	-40°C to +100°C	Mineral oil, nitrogen	145 bar	0,16L
SBO100-0,7E	-40°C to +100°C	Mineral oil, nitrogen	70 bar	0,7L

Issued at **Hamburg** on **2018-08-30**

This Certificate is valid until **2023-08-29**.

for **DNV GL**

DNV GL local station: **Essen**

Approval Engineer: **Stefan Wiemer**

Harald Pauli
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.

Product description

Diaphragm type hydraulic accumulator, the seamless upper and bottom part as well as the fluid port and gas valve are connected by welding.

Dimensions of the accumulators:

Type	Shell external diameter (mm)	Length overall (mm)	Volume (Liter)	Min. shell thickness (mm)
SBO210-2,8E	167	283	2,8	8,2
SBO210-0,75E	121	182,5	0,75	5,7
SBO210-0,16E	74	124,5	0,16	4
SBO100-0,7E	108	189	0,7	3,7

For details of the accumulators (e. g. design data, materials or detailed dimensions) see Approved Drawings (listed below in "Type Approval documentation").

Application/Limitation

The accumulators are approved according to DNV GL Rules Ship Pt.4 Ch.7 'Pressure Equipment' (Edition January 2018), designed according to EN 14359 `Gas-loaded accumulators for fluid power applications´ (Edition April 2011) , and graded as pressure equipment class I (Pt.4 Ch.7 Sec.1 table 2). The joint efficiency is v=0,85 for the circumferential welds, the corrosion allowance 1 mm (carbon steel).

For the material QStE380TM the requirements of Hydac specification 00374241 shall be observed additionally.

For each batch of the upper and bottom part (material cast and heat treatment lot, but max. 600 pieces) a burst pressure test according to Hydac specification 03398159 'Berstversuch' shall be performed in the presence of our surveyor.

Cyclic loading has not been specified by the manufacturer. Maximum number of fatigue cycles during life time is therefore limited to 500 cycles (EN 14359 [5.4.1]). The use of accumulators outside these cyclic load ranges shall be subject to special consideration by DNV GL in each individual case.

Each accumulator manufactured to this type approval is to be:

- Constructionally checked and hydraulic pressure tested to minimum 1.5 x design pressure,
- Certified by DNV GL and delivered with a product certificate.

Type Approval documentation

Marking of product

For traceability to this type approval the products are at least to be marked with:

- the name and domicile of the manufacturer,
- the manufacturer's type designation and serial number,
- the year of manufacture,
- the design pressure,
- the design temperature in °C,
- the hydraulic test pressure, and
- DNV GL's identifying mark.

Periodical assessment

The objective of the periodical assessment is to verify that the conditions for the type approval (TA) have not been altered.

The main scope of the periodical assessment will normally include:

- verification of the TA applicant's production and quality system w.r.t. ensuring continued consistent production of the TA products at the TA applicant's own premises and at other companies that are given the responsibility for manufacturing of the products,
- review of TA documentation and that this is still used as basis for the production,
- review of possible changes in the design, the materials and the performance of the product, and
- verification of the product marking.

For retention of the TA certificate in its validity period the periodical assessments will be carried out bi-yearly.

Unscheduled assessments for retention of the certificate may be carried out when there is reason to believe that the type approval applicant has not adhered to the obligations stipulated in the type approval certificate.

End of Certificate