

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Hydraulic Accumulator**

with type designation(s)

HBS 10 - 57L - 330, HBS 4 - 15L - 350

Issued to

HENNLICH - HCT GmbH
St. Ingbert, Germany

is found to comply with

DNV GL rules for classification – Ships Pt.4 Ch.7 Pressure equipment**Application :****Hydraulic Accumulators approved by this certificate are accepted for installation on all vessels classed by DNV GL.**

Type:	Temperature range:	Operating media:	Design pressure:	Sizes:
HBS 10 - 57L - 330	-40°C to 80°C	Hydr. Oil or H2O/ N2	330 bar	10 - 57 L
HBS 4 - 15L - 350	-40°C to 80°C	Hydr. Oil or H2O/ N2	350 bar	4 - 15 L

This Certificate is valid until **2021-08-17**.Issued at **Hamburg** on **2016-08-18**for **DNV GL**DNV GL local station: **Essen**Approval Engineer: **Astrid Caschube**

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

Bladder Hydraulic Accumulator, designed as assembly according to DNVGL Rules Pt.4 Ch.7 (October 2015) and graded as Pressure Equipment Class I.

Technical details according to approved drawings. See type approval documentation as stated below.

Application/Limitation

All materials, forming, heat treatment, prototype testing and product testing shall meet with the requirements of EN 14359.

Cyclic loads are stated as mentioned in the corresponding drawings considering the corrosion allowance of 1 mm on the basis of customer calculation which has been taken for information.

The materials used shall meet the certificate requirements of DNV Rules Pt.4 Ch.7 Sec. 2 Table 1 and the requirements as specified in the drawings. Comparable materials have to be submitted for approval.

The materials used shall conform DNVGL Rules Pt.2 Ch.2 (steel for low temperature services). The test temperature for the impact test of the pressure bearing parts is -45°C.

The manufacturer of the shell (accumulator body) has to be approved by DNVGL.

The manufacturer of the accumulator assembly has to be approved by the Society for pressure equipment class I.

Each accumulator assembly is to be:

- Hydraulic pressure tested to the test pressure (1.5 x design pressure) in presence of our local Surveyor,
- Certified by DNVGL and to be delivered with a product certificate.

In case that the accumulator assemblies are mounted in an exposed position, the gas valve shall be protected from mechanical damage by suitable means, i.e. a metallic protection shield.

Type Approval documentation

General:

EPU_100100_A_DNV_GL, Rev. A	Speicherkörper/ Accumulator Shell HBS 10 bis/to 57 L – 330bar_DNV_GL
EPU_100101_A_DNV_GL, Rev. A	Baugruppe/ Assembly Group Blasenspeicher/ Bladder Accumulator 10-57L. – 330 bar Berechnung nach EN 14359 + GL
EPU_200100_A_DNV_GL, Rev. B	Speicherkörper/ Accumulator Shell HBS 4 bis/to 15 L – Ø168,3/61 – 350 bar_DNV_GL
EPU_200101_A_DNV_GL, Rev. A	Baugruppe/ Assembly Group Blasenspeicher HBS 4 bis 15L Ø168,3 – 350 bar Berechnung n. EN 14359 + DNV_GL_rules
HOV-R-200-xxx-01	Geteilter Ring für Ölventil 2" zu 10 - 50 L / Ø 221mm HBS - HOV-R

For carbon steel valves:

HGV-K-A-001	Gasanschlußkörper für Blase Standard ø22 mit M10 HBS - HGV-K
HOV-K-200-A-002	HBS Ölventil Standard Körper G2" für HBS 10-50 HBS - HOV-K
HOV-K-114-A-002	HBS Ölventil - Standard Körper G 1-1/4" für HBS 4-10l HBS - HOV
HOV-R-200-A-01	HBS - geteilter Ring Metallteil für geteilter Ting 2" (Rohr Ø 219,1) HBS - HOV-R
HOV-R-114-A-01	HBS - geteilter Ring Metallteil geteilter Ring - 1-1/4" (Ø 114 + Ø 168) HBS - HOV-R

For stainless steel valves:

HGV-K-R-001	Gasanschlusskörper für Blase doppelzert. Edelstahl Ø 22 mit M10 HBS – HGV-K
HOV-K-200-R-002	Ölventil HBS - Edelstahl Körper G2" für HBS 10-50 HBS - HOV-K
HOV-K-114-R-002	Ölventil HOV – Edelstahl Körper G1-1/4" für HBS 4-10l HBS - HOV
HOV-R-200-R-01	HOV-R doppelzert. Material Metallteil für geteilter Ring – 2" (Rohr Ø 219,1) HBS – HOV-R
HOV-R-0114-R-01	HBS – geteilter Ring Metallteil geteilter Ring – 1-1/4" (Ø 114 + Ø 168) HBS – HOV-R

Marking of product

Each bladder 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
- Total shell volume in liters
- Allowable temperature range in degrees Celsius
- Maximum allowable pressure in bar
- Test pressure in bar
- DNV GL's identifying mark

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

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
- 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