



# TYPE APPROVAL CERTIFICATE

Certificate no.:  
**TAP00000CC**  
Revision No:  
**3**

## This is to certify:

that the **Hydraulic Accumulator**

with type designation(s)  
**AK...210-18, AK...350-25, AK...350-36**

issued to

**Roth Hydraulics GmbH**  
**Biedenkopf, Hessen, Germany**

is found to comply with

**DNV rules for classification – Ships Pt.4 Ch.7 Pressure equipment**

## Application:

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

Type:	Temperature range:	Operating media:	Design pressure:	Sizes:
AK...210-18	-40°C/+80°C	Nitrogen/Hydraulic fluid	210 bar	2L to 95L
AK...350-25	-40°C/+80°C	Nitrogen/Hydraulic fluid	350 bar	5L to 300L
AK...350-36	-40°C/+80°C	Nitrogen/Hydraulic fluid	350 bar	40L to 950L

Issued at **Hamburg** on **2025-10-02**

for **DNV**

This Certificate is valid until **2026-12-22**.

DNV local unit: **Essen**

Approval Engineer: **Le Loi Nguyen**

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 USD 300 000.

## Product description

A series of piston accumulators with threaded covers designed according to EN 14359:2017. The drawing approval was conducted according to DNV-RU-SHIP Pt.4 Ch.7 'Pressure Equipment' (Edition July 2021).

Type	210-18	350-25	350-36
Inside diameter (mm)	180	250	360
Outside diameter (mm)	210	290	435
Shell Material	P355N / P355NL1 P460NL1 / P460NL2 (acc. to EN 10216-3)	P460NL2 (acc. EN10216-3)	P355NH (acc. to EN 10216-3)
End Cover & Ring Material	P355NH / P355QH1 (acc. to EN 10222-4)		
Medium	Nitrogen / Hydraulic Fluid		
Length (mm)	390 to 4045	505 to 6515	1035 to 9975
Volume (Liter)	2 to 95	5 to 300	40 to 950

## Place of production

ROTH Hydraulics GmbH  
 Lahnstraße 34  
 D-35216 Biedenkopf-Eckelshausen  
 Germany

## Application/Limitation

Design Data:

Type	210-18	350-25	350-36
Design Pressure (bar)	210	350	350
Test Pressure (bar)	315	525	525
Design Temperature (°C)	-40 ~ +80		
Load cycles	110-190 bar : n>2.000.000 or 0 – 190 bar: 14000	225 – 318 bar : n>2.000.000 or 0 – 318 bar : n=4000	

The products are graded as pressure equipment class I acc. to DNV-RU-SHIP Pt.4 Ch.7 Sec.1 Table 2.

All used material shall fulfil requirements in EN 14359 clauses 4.1 & 4.2. The corrosion allowance includes 1mm. Used Material shall be provided with certificates acc. to DNV-RU-SHIP Pt.4 Ch.7 Sec.1 Table 5.

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

**Seamless tubes manufactured from P355NH (for AK 210-18 type) and P355N must meet a Charpy V-notch impact energy of at least 27 J at -40°C. If this requirement is not fulfilled, the minimum design temperature must be raised to -20°C.**

**The tube material P355NL1 will be substituted with either P355N, P460NL1, or P460NL2.**

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.

Each accumulator is to be:

- Hydraulic pressure tested to minimum 1.5 x design pressure,
- Certified by DNV and delivered with a product certificate.

## Type Approval documentation

- Drawings:
  - 3\_10x1821-01, Rev.3, dated 10-Jul-2025
  - 3\_10x2535-57, Rev.0, dated 24-Feb-2014
  - 3\_10x3635-53, Rev.1, dated 08-May-2014
- Initial Survey report dated: 2007-12-04 for AK 210-18
- Calculation AK-210-18\_3\_10x1821-01 dated 15-Jul-2025 / Calculation-AK-350-25\_3\_10x2535-57 dated 24-Feb/10-Mar-2014 / Calculation-AK-350-36\_3\_10x3635-53 dated 11-Mar-2014
- Load cycle calculation 3\_10x2535-57 dated 15-Jul-2025 / Load cycle calculation 3\_10x3635-53 dated 11-Mar-2014 / / Load cycle calculation 3\_10x1821-01 dated 08-05-2014

## Marking of product

For traceability to this type approval the starting air receivers are at least to be marked with:

- a. Name and domicile of the manufacturer
- b. Manufacturer's type designation and serial number
- c. Year of manufacture
- d. Maximum allowable working pressure
- e. Design temperature in °C
- f. Hydrostatic test pressure
- g. DNV'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 with relation to ensuring continue consistent production of the type approved products at the TA applicant's own premisses and at other companies that are given the responsibility for manufacturing of the products,
- review of the TA documentation and that this is still used as basis for the production,
- review of possible changes to the design, the material and the performance of the product,
- verification of the product marking.

Periodical assessments for type approvals with a validity period of five years will be required after two years (+/- 90 days) and after 3.5 years (+/- 90 days).

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

**END OF CERTIFICATE**