

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Accumulators**

with type designation(s)

3000psi WP Bladder Type Accumulator 1 Qt. Capacity**3000psi WP Bladder Type Accumulator, 1 Gal. Capacity****3000psi WP Bladder Type Accumulator, 2.5-15 Gal. Capacity****5000psi WP Bladder Type Accumulator, 1 Quart Capacity**

Issued to

Accumulators, Inc.**Houston TX, United States**

is found to comply with

DNVGL-OS-E101 – Drilling plant, Edition July 2015**DNVGL-SI-0166 - Verification for Compliance with Norwegian shelf regulations - Ch.2 Sec.7
DRILL(N), July 2015**

Application :**See Page 2.****This Type Approval Certificate is 5 pages long and replaces D-4746, as issued on 2012-10-17.**Issued at **Houston** on **2017-03-02**This Certificate is valid until **2022-03-01**.for **DNV GL**DNV GL local station: **Houston, Approval CMC**Approval Engineer: **M. Kevin Mandeville Jr.**

Meindert van Mierlo
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.



The following design codes and standards were used as a reference:

EN 14359:2006 +A1:2010, *Gas-loaded Accumulators for Fluid Power Applications*, 2006 Edition with 2010 revisions

ASME Boiler and Pressure Vessel Code, Section VIII, Division 1, 2015 Edition

ASME B1.1, *Unified Inch Screw Threads (UN and UNR Thread Form)*, 2003 Edition

ASME B1.20.1, *Pipe Threads, General Purpose, NPT (Inch)*, 1983 Edition

SAE-J518, "Hydraulic Flanged Tube/Pipe/Hose Connections, 4-Bolt Split Flange Type," June 1993 Edition

Product description

3000 PSI WP BLADDER TYPE ACCUMULATOR

1.0 Quart Capacity Accumulator, Model No. A1QT3100(X)

1.0 Gallon Capacity Accumulator, Model No. A13100(X)

2.5 Gallon Capacity Accumulator, Model Nos. A2.53100(Y), A2.5TR3100(Y)

5.0 Gallon Capacity Accumulator, Model Nos. A53100(Y), A5TR3100(Y)

10.0 Gallon Capacity Accumulator, Model Nos. A103100(Y), A10TR3100(Y)

11.0 Gallon Capacity Accumulator, Model Nos. A113100(Y), A11TR3100(Y)

15.0 Gallon Capacity Accumulator, Model Nos. A153100(Y), A15TR3100(Y)

1.0 Quart Capacity Accumulator, Model No. A1QT5100(X)

Where (Y) varies based on the port types

Application/Limitation

Design Parameter	Value	Equivalent
Max Internal Working Pressure (A1QT5100(X) only)	5,000 psi	345 bar
Max Internal Test Pressure (A1QT5100(X) only)	7,500 psi	517.5 bar
Max Internal Working Pressure	3,000 psi	206.8 bar
Max Internal Test Pressure	4,500 psi	310.3 bar
Max External Pressure †		
1 Qt., 3,000 psi	1,267 psi	87.3 bar
1 Gal., 3,000 psi	1,290 psi	88.9 bar
2.5-15 Gal., 3,000 psi	1,271 psi	87.6 bar
1 Qt., 5,000 psi	1,833 psi	123.4 bar
Min Design Temperature	-40 °F	-40°C
Max Design Temperature	200 °F	93°C
Corrosion Allowance	0in	0mm
Service	Standard	

†These accumulators are not rated for external gage pressure. This statement does not, however, prevent subsea applications.

Applicable Fluid Port Options

For the A1QT3100(X) and A1QT5100(X) models, the value of X indicates the corresponding fluid port:

(X)	Description	(X)	Description
None	¾" NPT	-7	¾" BSPP
-1	1" NPT	-8	1-1/16" SAE w/Bleed
-3	1-1/16" SAE	-9	¾"NPT w/Bleed
-4	¾" Code 61 S.F.	-10	7/8" SAE
-5	¾" Code 62 S.F.		

For the A13100(X) model, the value of X indicates the corresponding fluid port:

(X)	Description	(X)	Description
None	1-1/4" NPT w/Bleed	-4	1-1/2"Code 61 S.F.
-1	¾" NPT	-5	1-1/4" Code 61 S.F.
-2	M40x1.5 w/Bleed	-15	1" Code 61 S.F.
-3	1-5/8" SAE w/Bleed		

Job Id: **262.1-014268-2**
Certificate No: **TAD00000M4**

For the A(X)3100(Y) and A(X)TR3100(Y) models, the value of X indicates the nominal volume, and the value of (Y) indicates the corresponding fluid port:

(Y)	Description	(Y)	Description
None	2" NPT	-14	1-1/2" Code 62 S.F.
-1	1-1/4" NPT	-15	1-1/2" Code 62 S.F. Long
-1.5	1-1/2" NPT	-16	1-5/8" SAE
-2	M50x1.5	-17	1-1/2" Code 61 S.F.
-3	1-7/8" SAE w/ 7/16" SAE Bleed	-18	1" Code 62 S.F.
-4	2" Code 61 S.F.	-20	2" Code 61 S.F. w/ 1/4" NPT Bleed
-6	1" NPT	-24	1-1/4" NPT w/ 1/4" NPT bleed
-7	2" BSPP	-27	1-7/8" SAE w/ 9/16" SAE Bleed
-8	1-7/8" SAE w/ 1/4" NPT Bleed	-98	1.5" Subseal, Long
-9	1-5/16" SAE	-99	1.5" Subseal
-13	1-1/2" Code 61 S.F., Long		

Type Approval documentation

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Tests carried out

Type Testing not required for this TAC renewal.

Marking of product

For traceability, the following marking is to be carried out on each product:

1. Serial No.
2. Manufacturer's Name or Trademark
3. Additional marking at the manufacturer's discretion
4. Markings per ASME BPVC Section VIII, Div. 1, App. 22 on 1 Qt., 5000psi shells

Certificate Retention Survey

For retention of the Type Approval Certificate, DNV GL's surveyor shall perform a survey every second year in accordance with DNV GL's Class Programme for Type Approvals, DNVGL-CP-0338.

Other Conditions/Comments

1. Manufacture and Examination of the integrally forged cylinder to be in accordance with the requirements of ASME BPVC Section VIII, Div. 1, Appendix 22 for the 1Qt., 5000psi shells
2. DNVGL Ref. Project No. PP173743.

END OF CERTIFICATE