



Certificate No:
TAD00001G4

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Accumulators

with type designation(s)

Accumulator, Piston Style, 5ksi, 1 Gallon Capacity, Model 052A50-8-F095, Stainless Steel Body

Issued to

Tobul Accumulator Incorporated
Houston, TX, USA

is found to comply with

DNV-OS-E101 – Drilling facilities, Edition July 2021

DNV statutory interpretations DNV-SI-0166 – Verification for compliance with Norwegian shelf regulations, Edition July 2021

Application :

Issued at **Houston** on **2022-03-31**

This Certificate is valid until **2027-03-30**.

for **DNV**

DNV local station: **Certification & Inspection Services**

Approval Engineer: **M. Kevin Mandeville Jr.**

.....
Brandon D Caraway
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.



Form code: TA 251

Revision: 2021-03

www.dnv.com

Page 1 of 3

The following design codes/standards were used as references:

ASME Boiler & Pressure Vessel Code, Section VIII, Division 1, 2021 Edition
ASME B1.1, Unified Inch Screw Threads (UN and UNR Thread Form), 2003 Edition
ASME B1.9, Buttress Inch Screw Threads 7°/45° Form with 0.6 Pitch Basic Height of Thread Engagement, 1985 Edition

Product description

Piston Type Accumulator (Subsea Application)
Model No. 052A50-8-F095 (1 Gallon Capacity)

Application/Limitation

Design Parameter	Value	Equivalent
Max Allowable Working Pressure	5000 psi	345 bar
Hydrostatic Test Pressure	7500 psi	517 bar
Max Allowable External Working Pressure †	2434 psi	168 bar
Minimum Design Metal Temperature	-20°F	-29°C
Design Temperature	200°F	93°C
Corrosion Allowance (internal and external)	0in	0mm
ASME Code Stamp "U"	Yes	

†Note: The accumulator is not rated for external gage pressure. This statement does not, however, prevent subsea applications.

Type Approval documentation

Drawings

Drawing No.	Rev.	Description
052A50-8-F095	00	Accumulator Assembly, Piston Style, 5K, 1 Gal.
C42TF33-201-F095	00	Cylinder, 052A50 Series, 1 Gal.
HF33WD19-V-F095	00	End Cap - Fluid
HG33WD19-1-F095	00	End Cap - Gas

Note: Other part numbers or updated revisions may be acceptable under this certificate, provided that critical aspects of the design remain the same. Changes shall be documented and approved (via Engineering Change Order or similar) by the Manufacturer's Engineering and/or Quality Department as appropriate. DNV's local surveyor shall verify the change before issuance of the product certificate.

Materials

Item	Material Specification	Min. Yield Strength	Charpy V-Notch Test Requirements
Cylindrical Shell	ASTM-A487-CA6NM-Class A QF: 90%	80 ksi	0.015in Minimum Lateral Expansion @-20°F
End Cap	ASTM-A479-Type 316	30 ksi	Exempt Expansion @-20°F

Design Calculations:

Design Calculations for 052A50-8-F095, Piston Type Accumulator, Revision 00 (8 pages)
External Pressure Calculation for 052A50-8-F095 (cylinder), Revision 00 (2 pages)

Tests carried out

<<<TYPE TEST REQUIRED>>>

Marking of product

For traceability to this Type Approval Certificate the products are as a minimum to be marked as follows:

1. Serial Number
2. Manufacturer's name and trademark
3. Additional marking at manufacturer's option
4. As required in Paragraph UG-116 of ASME BPVC, Section VIII, Division 1, 2021 Edition

Certificate retention survey

For retention of the Type Approval Certificate, a DNV surveyor shall perform a retention survey after two and three-and-a-half years in accordance with the DNV Class Programme for Type Approval, DNV-CP-0338.

Other Comments and Conditions

1. Cylinder castings are to be processed per ASME BPVC Section VIII, Division 1, Appendix 7 and 8



Job Id: **262.1-037672-1**
Certificate No: **TAD00001G4**

for a quality factor of 90%.
2. DNV Ref. Project A1179038

END OF CERTIFICATE