Certificate No:
TAD00001CX

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Pressure Vessels

with type designation(s)
100T Dry bulk cement silo

Issued to
Suretank Ltd
Dunleer, Co. Louth, Ireland

is found to comply with
DNV-OS-E101 – Drilling facilities, Edition July 2021

Application :

See next page:

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

Issued at **Høvik** on **2021-10-05**
This Certificate is valid until **2026-10-04**.
DNV local station: **Oslo Pressure Equipment**

Approval Engineer: **John Poulsson**

for **DNV**

Zeinab Sharifi
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.

Product description
This type approval covers one type of dry bulk cement silo. Pressure vessel with external diameter of 3430 mm and height of approximately 10800 mm including top dish head and coned bottom. Volume of approximate 80m^3.

The dry bulk cement silo is designed to be installed inside a DNV 2.7-3 Offshore container. See application below.

Manufacturer
Probe Oil Tools Ltd., Unit 1 Gawain Road, Beacon Park, Great Yarmouth, UK.

Applied design standard
ASME BPVC VIII div. 1. Ed.: 2019

Application/Limitation

Design pressure	[bar g]	2,5
Test pressure	[bar g]	3,75
Design temperature	[C°]	-20 / +65
Corrosion allowance, pressure vessel/piping	[mm]	1.5 / 0.8
Joint efficiency factor, shell, and cone/head	[-]	0,85 / 1,0
Content/Medium	[-]	Cement
Density	[-]	1.19
Tank capacity	[m^3]	80

Design loads:

Acceleration loads Vert./Horiz.	[m/s2]	1.32/1.78
Peak wind speed	[m/s2]	30
Blast/Snow/Nozzle loads		Not considered

The dry bulk cement silo is designed to be installed inside a DNV 2.7-3 Portable Offshore unit, with reference to type approval certificate TAS000036N issued 2021-09-17. The dry bulk cement silo shall not be supplied as a stand-alone vessel without the DNV 2.7-3 frame.

Lifting and sea transport shall carefully follow the applications/limitations as stated in the abovementioned Type approval certificate TAS000036N.

Other conditions/comments
- The material is to be delivered with material test certificate of level EN 10204-3.1 or equivalent.
- The materials with reference thickness over 6 mm are to be impact tested at minimum design temperature (MDT) according to DNV-OS-E101 Ch.2, Sec.2, 2.6.2. Materials for piping and pressure containing components are, independent of material thickness and MDT, to meet Charpy V-notch energy values of minimum 27 J at MDT, ref. 2.6.2.
- Each vessel is to be surveyed during fabrication in accordance with the requirements of Category I as defined in DNV AS' Offshore Standard DNV-OS-E101 "Drilling Facilities", followed by issuance of DNV Product Certificate. If the intended installation is DNV classed, a DNV Product Certificate is mandatory. Fabrication records are to be maintained in accordance with DNV-OS-E101 Ch.3, Sec.3, 2.1

Type Approval documentation

Tests carried out
Hydrostatic pressure test on prototype has been carried out at 3.75 bar(g) in horizontal position.

Marking of product
For traceability of this type approval certificate, the products are to be marked with serial number and this type approval certificates number, TAD00001CX.

In addition the marking is to show the following particulars:
a) The name and domicile of the manufacture
b) The manufacture's type designation
c) The year of manufacture
e) The maximum/minimum design temperatures in °C
d) The maximum design pressure
f) The hydrostatic test pressure

Periodical assessment

In order to maintain the validity of the type approval certificate, periodical assessments should be carried out according to DNVGL-CP-0338 at 2- and 3.5-year intervals. Periodical assessments will, when possible, be harmonized with other surveys and audits carried out.

This certificate is only valid if required periodical assessments are carried out with satisfactory results. To check the validity of this certificate, please look it up in https://approvalfinder.dnv.com