

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Inert Gas Systems Components

with type designation(s)

Marine Nitrogen Generator, Cabinet Model NC1, NC1-1204P---NC1-1816P, NC1-1408S---NC1-2024S, NC1.3-0803--NC.1.3-5896, NC1.3-1814S--2024S, Cabinet Model NC0, NC.0.3-0803

Issued to

Air Products AS
Kristiansand S, Norway

is found to comply with

DNV GL rules for classification – Ships Pt.5 Ch.5 Oil tankers
DNV GL rules for classification – Ships Pt.5 Ch.6 Chemical tankers
DNV GL rules for classification – Ships Pt.5 Ch.7 Liquefied gas tankers
DNV GL rules for classification – Ships Pt.4 Ch.6 Piping systems

Application :

Production of nitrogen for marine and offshore application purposes. Capacity range: Up to 1500 Nm3/hr @95%N2 (See next pages)

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

Issued at **Høvik** on **2018-06-22**

This Certificate is valid until **2023-06-21**.

DNV GL local station: **Kristiansand S**

Approval Engineer: **Kristian Hammer**



for **DNV GL**

Digitally Signed By: Skåra, Øyvind

Location: DNV GL Høvik, Norway

Signing Date: 05.07.2018

Torill Grimstad Osberg
Head of Section

COPY

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.



Job Id: **262.1-027197-1**
Certificate No: **TAP00001E8**

Product description

Marine Nitrogen Generator, Cabinet model NC0/NC1 Marine/Offshore.

The Cabinet model NC0/NC1 comprises of:

- control panel section
- process section
- membrane module section
- Cabinet can be delivered with back-flow protection device/DBB arrangement. The DBB installation is to be approved in each case by New Building surveyor

Compressor, nitrogen buffer tank and piping system outside the cabinet are not included in this certificate.

The control system hardware is type approved, see Type Approval Certificate Nos:

Crewis - FnIO S-Series - Network Remote I/O System: Certificate No. TAA00000G6
Beijer Electronics - X2 Control 7 Marine HMI Panel: Certificate No. TAA00000N8
Alternative, Mitsubishi FX3 and FX5: Certificate no: TAA0000038; TAA00000SE

The following software revisions are included in the Type Approval:
Beijer iX Developer 2.30, CoDeSys v 3.5. Note: Alternative Developer 7.04; GX Works
PLC - X2Control_NA9289Project_60XXX_v1_X2_3_5_10_10.proj
HMI - SoftControl_60XXX_v3_X2Control

Approval conditions for Control System

Doc for approval of control system in each case

- Electrical Wiring diagram xxxxx-0612-002
- System P&ID xxxxx-0605-002
- Reference to this type approval

Product certificate

Whenever certification is required in the application rules each delivery of the application system is to be certified according to Pt.4 Ch.9 Sec.1. The Certification of Application Functions is to be performed at the manufacturer of the application system before the system is shipped to the yard.

Application/Limitation

- The Nitrogen Membrane Generator is intended for production of nitrogen for marine and offshore application purposes.
- Capacity and N2 purity as stated on front page is to be regarded as a nominal range as given by maker and has not been documented as part of this approval. Actual capacity and purity of N2 is to be tested and documented for each delivery.
- This Type Approval is based on examination of drawings and documentation as listed below.
- Correct configuration and set-up for each delivery to be tested during commissioning after installation.
- Drawings of complete system configuration from air intake to end user(s) are to be submitted by the shipyard for approval as relevant for each separate delivery.

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- Design Pressure: 16 barg
- Piping Flange Class: DIN, JIS, ANSI

Type Approval documentation

Drwg. No:	Rev:	Date	Text:
NC1-DNV-608-001	02	14.12.12	Nitrogen Generator-Model NC1.1-xxxx
NC0.3-0803-0608-011	01	17.02.17	General Arrangement Drawing
NC1.3-0803-0608-011	00	09.02.17	General Arrangement Drawing
NC1.3-1612-0608-011	00	10.05.17	General Arrangement Drawing
NC1.3-5078.0608-011	00	26.05.17	General Arrangement Drawing
NC1-DNV-605-001	05	22.08.17	Nitrogen Generator-Mod. NC1, P&ID Standard Drawing
NC1-DNV-0605-004	01	23.08.17	Nitrogen Generator – Cabinet Model NC1.3 P&ID Standard Drawing
NC1-DNV-602-005	01	11.11.04	Nitrogen Generator Model Code
NC1-DNV-605-003	02	23.08.17	N2 Generator – Mod. NC1 w/DBB arr.
NC1-DNV-0820-001	05	13.12.12	Nitrogen Generator Manual
NC1.3-0612-001	00	24.08.17	Electrical wiring Diagram
NC1.3-0612-002	00	24.08.17	Electrical wiring Diagram
NC1.3-0612-003	00	24.08.17	Electrical wiring Diagram
NC1.3-0612-500	00	24.08.17	Ethernet cabling guide
NC1.3-DNV-0616-001	00	24.08.17	Alarm List – Nitrogen Generator
NC1.3-0616-002	01	24.08.17	Control Block & Logic Diagram
12243-0616-003	00	05.09.16	I/O SCHEDULE - IAS/PLC DATA COMMUNICATION
NC1.3-0621-501	00	24.08.17	Layout drawing – Control section 5.1
NC1.3-0621-515	00	24.08.17	Layout drawing / Wiring Diagram – Panel 5.15
NC1.3-0621-519	00	24.08.17	Deck press. transmitter arrangem. – Panel 5.19
NC1.3-0613-001	00	08.06.17	440VAC Power Diagram
NC1.3-0615-001	00	24.08.17	Pneumatic flow Diagram
NC1.3-DNV-0803-A911	01	05.09.17	Component list, certification & information
903-002	00	21.09.17	PLC Approval Test

DNV Periodical assessment survey report dated 2013-01-15 and PLC Approval test Test 903-002 rev.01 signed 2013-09-26

Marking of product

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

- Manufacturers name or mark
- Type designation
- Reference to DNV TA-Certificate
- Additional marking at manufacturers' option.

Periodical Assessment

The scope of the periodical assessment is to verify that the conditions stipulated for the type are complied with, and that no alterations are made to the product design or choice of systems, software versions, components and/or materials.



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The main elements of the assessment are:

- Ensure that type approved documentation is available
- Inspection of factory samples, selected at random from the production line (where practicable)
- Review of production and inspection routines, including test records from product sample tests and control routines
- Ensuring that systems, software versions, components and/or materials used comply with type approved documents and/or referenced system, software, component and material specifications
- Review of possible changes in design of systems, software versions, components, materials and/or performance, and make sure that such changes do not affect the type approval given
- Ensuring traceability between manufacturer's product type marking and the type approval certificate

Periodical assessment is to be performed after 2 years and after 3.5 years. A renewal assessment will be performed at renewal of the certificate.

END OF CERTIFICATE