

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**.for **DNV GL**DNV GL local station: **Kristiansand S**Approval Engineer: **Kristian Hammer**

Torill Grimstad Osberg
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.



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

Type Approval documentation

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.

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