COPY

DET NORSKE VERITAS

TYPE APPROVAL CERTIFICATE

CERTIFICATE NO. **P-14482**

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

Manufactured by
Air Products AS
KRISTIANSAND, Norway

is found to comply with
Det Norske Veritas' Rules for Classification of Ships Pt.5, Ch.3 "Oil Carriers"
Det Norske Veritas' Rules for Classification of Ships Pt.5, Ch.4 "Chemical Carriers"
Det Norske Veritas' Rules for Classification of Ships Pt.5, Ch.5 "Liquefied Gas Carriers"
Det Norske Veritas' Rules for Classification of Ships Pt.4, Ch.6 "Piping Systems"

Application
Production of nitrogen for marine and offshore application purposes. Capacity range: Up to 420Nm3/hr @95%N2 (See next pages)

This Certificate is valid until **2017-12-31**.

Issued at **Høvik** on **2013-10-16**

DNV local station: **Kristiansand S**

Approval Engineer: **Liliana Castro**

for **Det Norske Veritas AS**
Digitally Signed By: Sæle-Nilsen, Dag
Location: DNV Oslo, Norway
Signing Date: 2013-10-17

Dag Sæle-Nilsen
Head of Section

Product description

Marine Nitrogen Generator, Cabinet model NC1 Marine/Offshore.

The Cabinet model 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:

Mitsubishi PLC FX3U Series: A-13453
Bejer Operating Panel E1060: A-13037

The following software revisions are included in the Type Approval:

- Control basis no 12243 FX3 ver.4 dated 02.01.13
- HMI E1060 ver.5 dated 02.01.13

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

Drwg. No:	Rev:	Date	Text:
NC1-DNV-608-001	02	19.12.12	Nitrogen Generator-Model NC1.2, General Arrangement Drawing.
NC1-DNV-605-001	04	12.12.12	Nitrogen Generator-Mod. NC1, P&ID Standard Drawing
NC1-DNV-602-005	01	11.11.04	Nitrogen Generator Model Code
NC1-DNV-616-001	01	11.11.04	Alarm List – Nitrogen Generator
NC1-DNV-803-A911	01	20.12.12	Component list, certification & Information
NC1-DNV-605-003	01	12.12.12	N2 Generator – Mod. NC1 w/DBB arr.
NC1-DNV-0820-001	05	13.12.12	Nitrogen Generator Manual
12243-0612-001/002/003	0	21.01.12	Wiring Diagrams
12243.0616-001	00	14.12.12	Alarm List – Control System
12243-0616-002		14.12.12	Control Block & Logic Diagram
12243-0616-003	00	14.12.12	I/O schedule
12243-0621-501	00	14.12.12	Layout drawing and wiring diagram
12243-0621-515A	00	14.12.12	Panel Layout drawing
903-002	01	07.01.05	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

For retention of the Type Approval, DNV Surveyor shall perform periodical assessments to verify that the conditions of the TA are not altered since the certificate was issued.

The periodical assessment scope includes:
- Review of the TA documentation and verification that the documentation is still used as basis for the production
- Review of possible changes in design, material and performance of the product
- Verification of the conpanys production and quality systems ensuring continued consistent production of the type approved products to the required quality
- Verification that the product marking for identification and traceability to the TA Certificate is not altered.

Periodical assessments shall be carried out every second year - and before the expiry date of this certificate.