Certificate No:
**TAM0000198**

# TYPE APPROVAL CERTIFICATE

## This is to certify:

**That the Gas Compressor**

with type designation(s)
**NG21, NG22**

Issued to
**TM.I.C. S.r.l. Termomeccanica Industrial Compressors**
**La Spezia SP**, **Italy**

is found to comply with
**DNV rules for classification – Ships**
**DNV rules for classification – Ships Pt.4 Ch.5 Rotating machinery – driven units**

## Application :

**Products approved by this certificate are accepted for installation on all vessels classed by DNV.**

| Type | Max. working press.: | Operating media: |
|---|---|---|
| NG21 | 20 bar | Boil off Gas (BOG) |
| NG22 | 20 bar | Boil off Gas (BOG) |

Issued at **Hamburg** on **2022-05-10**
This Certificate is valid until **2027-05-09**.
DNV local station: **Italy/Malta CMC**

for **DNV**

Approval Engineer: **Ana Cristina Do Carmo Insfran**

**Olaf Drews**
**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

The gas compressor series: NG21 and NG22 is an oil flooded rotary twin screw gas compressor. It has been equipped with a mechanical shaft seal that minimizes the risk of any possible dangerous leakage into the atmosphere.

They consist of the main component:

- Casing: external gearbox, suction casing, rotor casing, discharge casing, discharge cover.
- Rotor: female and male rotor.

Technical Data:

| **Technical Data** | **Serie NG21** | **Serie NG22** |
|---|---|---|
| **Motor Power (max)** | 210 kW | 250 kW |
| **Flow Rate [1] (max)** | 1320 $m^3/h$ | 1620 $m^3/h$ |
| **Design pressure (max. safety valve setting value)** | 22 bar (g) | 22 bar (g) |
| **Design Temperature (min – max)** | -20°C /120°C | -20°C / 120°C |
| **Shaft speed (max.)** | 4900 rpm | 3900 rpm |
| **Gear ratio (min-max)** | 39/49 - 62/26 | 34/56 - 61/29 |

Note [1]: Compressor capacity will be variated based on gas composition and operative condition.

Operation medium: Gas (methane), boil-off gas (BOG).

Materials: Speciation of material according to the approved drawings.

## Application

The gas compressor may be used within gas systems on board of DNV classed vessels subjected to regulations by the IGF Code and IGC Code and respective subordinated DNV Rules.

For the corresponding applications and the right installation and maintenance, the instructions of the manufacturer are to be observed.

## Limitation

The compressor is approved as a fuel gas compressor. The type approval is valid for compressor only.

The approval does not cover driving member, control system, connected instrumentation and other connected components. Which shall be verified on board at Integration.

## Other conditions

For Compressor installed on liquefied gas tanker the piping shall be in accordance with DNV Rules Pt.5 Ch.7 Sec.5)

After installation on board, the compressor, and the system to which it is connected shall be function tested under working conditions (DNV Rules Pt. 4 Ch.5 Sec.4 [7.1]).

## Type Approval documentation

## Tests carried out

DNV Rules for tests: DNV Rules Pt.4 Ch.5, Section 4 – Compressors, Item [4] – Workshop testing

Function testing comprising:

- Safety functions
- Capacity test
- Hydraulic pressure testing

## Marking of product

For traceability to this type approval, the compressor series NG 21 and NG 22 have the following markings:

- Manufactures Name
- Compressor type
- TM.I.C. serial number
- DNV certificate number
- Maximum suction pressure (specific application)
- Maximum discharge pressure (specific application)
- Gear ratio of the mounted pair (specific application)
- Maximum driver speed for the actual gear ration (specific application)

Note: All above values are inside the type approval ranges (min.-max. values).

## Periodical assessment

For retention of the Type Approval, a DNV Surveyor shall perform periodical assessment after two years (+/- 90 days) and after 3.5 years (+/- 90 days) to verify that the conditions for the Type Approval are complied with.
Refer to DNV-CP-0338, Sec.4.

The 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

**END OF CERTIFICATE**