

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Power Turbine**

with type designation(s)
PGT25+ / G4

Issued to

NUOVO PIGNONE SRL
Firenze FI, Italy

is found to comply with
DNVGL-OS-E201 – Oil and gas processing systems, Edition January 2017

Application :

Products covered by this Type Approval Certificate are approved for use on top side DNV GL classed FPSOs.

Max. outlet power 33925 kW
Max. speed 6405 rpm

Issued at **Høvik** on **2018-01-17**

This Certificate is valid until **2023-01-16**.

DNV GL local station: **Genoa**

for **DNV GL**

Approval Engineer: **Terje Ingvar Arvidsen**

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Oddvar Deinboll
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

This power turbine is a two stage, high speed, low pressure turbine on a separate shaft.

Application/Limitation

- The power turbine is approved for use as mechanical drive and power generation on offshore topside installation including FPSO's
- The Power Turbine is not approved for powering of propulsion or dynamic positioning systems.

	MCR ISO ¹⁾
Power rating	33925 kW
Power turbine speed	6100rpm
Power Turbine Entry temperature ²⁾	877.2 °C

Application constraints	
Subject	Unit
Max allowable list	+/- 15°C
Max allowable rake	+/- 8°C
Max allowable pitch	+/- 8°C (+/- 10°C using the oil ejector for the floating platform or FPSO)
Max allowable roll	+/- 15°C
Max allowable g-load, vertical downward	2.5
Max allowable g-load, vertical upward	1.5
Max allowable g-load, forward	2.5
Max allowable g-load, aft	2.5
Max allowable g-load, lateral	1.0

* These vertical load cases are relative to 1g load.

Maximum allowable loads Output Shaft:

Bending moment = ± 226 Nm
Shear force = ± 1000 N
Thrust force = ± 30250 N

Conditions

- Control and monitoring system to be separately Type Approved.
- All changes of major nature having effect on the power turbine function, are to be forwarded to DNV for evaluation and approval prior to use.
- The Power Turbine casing along with its enclosure should be capable of completely containing a projectile such as a blade disintegration.

Other Conditions

The following design aspects are application dependent and documentation must be submitted to DNV for each application:

- Vibration analysis of power turbine drive train
- Exhaust systems
- Output Shaft flexible coupling (DNV product certificate is required)

Tests carried out

No load full speed production spin tests as presented in the following DNV Product certificates :

Job Id: **262.1-026902-1**
Certificate No: **TAM00000NV**

DNV Certificate No:	HSPT Serial Number	Test Descriptions
MIL-12-0551-14	G08570	SOM 6676844 Rev. 5
MIL-12-0551-13	G08569	SOM 6676844 Rev.5
MIL-12-0551-12	G08568	SOM 6676844 Rev.5

Marking of product

The product shall be marked with the manufacturer's name or trademark and type number identification.

Periodical assessment

For retention of the Type Approval, a DNV GL surveyor shall perform an assessment after 2 years and after 3.5 years to verify that the conditions of the type approval are complied with. A renewal assessment will be performed at renewal of the certificate.

In cases where the Type Approved product is manufactured at other companies, the Periodical Assessment shall verify that the Type Approval applicant has a quality control system for consistent production at their licensees/subcontractors. Furthermore Periodical Assessment shall be carried out randomly at these companies.