DNV·GL

Certificate No:
**TAM0000085**

# TYPE APPROVAL CERTIFICATE

## This is to certify:

**That the Dual Fuel Engine**

with type designations(s)
**RT-flex50DF**

Issued to
**Winterthur Gas & Diesel Ltd.**
**Winterthur, Switzerland**

is found to comply with
**DNV GL Rules for classification, Ships - DNVGL-RU-SHIP-Pt4Ch3Sec1, Reciprocating Internal Combustion Engines**

## Application:

**propulsion**

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

This Certificate is valid until **9th May, 2021**
Issued at **Hamburg** on **10th May, 2016**

DNV GL local station: Augsburg

for **DNV GL**

Approval Engineer: Sven Neddenien

**Frank Lutz**
**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

two stroke, in-line engine, reversible, crosshead, with supercharging, with charge air cooling, constant-pressure charging system, direct injection, indirect injection, injection operation electronically controlled, valve operation electronically controlled, dual fuel

Cylinder bore: 500 mm
Piston stroke: 2050 mm

## Additional place of production

not applicable

## Application / Limitation

| | | |
|---|---|---|
| Rated power [kW/cyl.] | 1440 | 1440 |
| Rated speed [rpm] | 124 | 124 |
| Mean effective pressure [bar] | 17.3 | 17.3 |
| Max. firing pressure [bar] | 150 | 200 |
| Definition | Diesel Mode | Gas Mode |

## Type Approval documentation

13-006958, 14-051585, 14-065860, 14-101101, 15-023047, 15-049280, 262.1-017488-2

## Tests carried out

Documentation:

| | |
|---|---|
| Test report titel | Type Approval Test Report, Wärtsilä RT-flex50DF Type Engine |
| Test report reference | 262.1-017488-2, 2016-05-10 |
| Place of test | Yuchai Marine Power Co., Ltd., Zhuhai, China |
| Date of test | 2015-12-07 until 2015-12-11 |

Test engine:

| | |
|---|---|
| Model | 5RT-flex50DF |
| Serial no. | W550003 |
| No. of cylinders | 5 |
| Power [kW/cyl.] | 1440 |
| Speed [rpm] | 124 |

## Marking of product

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

## Periodical assessment

Meetings on regularly basis and at least every second year with the Type Approval applicant (hereof: the Engine Designer) shall be arranged with the objective to verify that the conditions for the Type Approval are not altered since the Type Approval Certificate was issued, and to keep DNV GL updated with regard to:

- The latest development status and design as covered by the Type Approval certificate.
- Damages and failures of products certified by DNV GL leading to break down or other malfunctions in service. The causes and reasons for the failure and results from investigations are to be made available to DNV GL upon request. Failure to inform DNV GL may lead to suspension of this Type Approval certificate.

In cases where the Type Approved design is manufactured at other companies, DNV GL shall verify that the Type Approval applicant has a quality control system for consistent production at their licensees/subcontractors.

## Other conditions

Engine safety, control and monitoring systems, including sensors and actuators are not covered by this Type Approval certificate. Documentation for engine safety, control (including speed governing) and monitoring systems shall be submitted for approval according to the Rules Pt.4 Ch.9 Sec.1 Table 5 - "Documentation resquirements" and/or as listed in relevant Type Approval certificates.

END OF CERTIFICATE