DNV·GL

# TYPE APPROVAL CERTIFICATE

Certificate No:
**TAM000013S**

## This is to certify:

**That the Dual Fuel Engine**

with type designation(s)
**X52DF**

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

is found to comply with
**DNV GL Rules for classification, Ships - DNVGL-RU-SHIP-Pt4 Ch3 Sec1**
**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 **8th August, 2024**.

Issued at **Hamburg** on **9th August, 2019**
DNV GL local station: **Augsburg** for **DNV GL**

Approval Engineer: **Sven Neddenien**

**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.

Job Id: **262.1-028912-1**
Certificate No: **TAM000013S**

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

| | |
|---|---|
| Cylinder bore [mm] | 520 |
| Piston stroke [mm] | 2315 |
| No. of cylinders | 5, 6, 7, 8 |

## Additional place of production
not applicable

## Application/Limitation
| | |
|---|---|
| Rated power [kW/cyl.] | 1229 |
| Rated speed [rpm] | 87 |
| Mean effective pressure [bar] | 17.3 |
| Max. firing pressure [bar] | 186 |

## Type Approval documentation

## Tests carried out
Documentation:

| | |
|---|---|
| Test report titel | Type approval test report, WinGD X52DF type engine |
| Place of test | Hyundai Heavy Industries, Ulsan, Korea |
| Date of test | 2019-03-07 until 2019-03-11 |

Test engine:

| | |
|---|---|
| Model | 7X52DF |
| Serial no. | KAA006646 |
| No. of cylinders | 7 |
| Power [kW/cyl.] | 1229 |
| Speed [rpm] | 86.7 |

## 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, cables 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 DNV GL Rule Pt.4 Ch.9 Sec.1.
END OF CERTIFICATE