Certificate no.:
TAA00003NN

TYPE APPROVAL CERTIFICATE

This is to certify:

that the Engine Control System

with type designation(s)
VCR (Variable Compression Ratio Control System)

issued to
WinGD Ltd.
Winterthur, ZH, **Switzerland**

is found to comply with

DNV rules for classification – Ships

Application:

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

Issued at **Hamburg** on **2025-09-03**
This Certificate is valid until **2027-09-02**.
DNV local unit: **Augsburg**

Approval Engineer: **Jens Dietrich**

for **DNV**

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 USD 300 000.

Product description
The Variable Compression Ratio (VCR) system adjusts the compression ratio (CR) continuously by a hydraulic cylinder located in the crosshead pin, by moving the piston rod in vertical direction. The CR can be adjusted during the normal engine running according to the fuel mode and operational conditions. Reference is made to TAM00001EG.

The control system is a sub system of the engine control system WiCE (TAA00002U2) and the VCR signals are processed by the following control cabinets:

-E95.nn utilizing CCUnn for VCR valve control (nn=cylinder no.)
-E27.1 utilizing MCU
-E27.3 utilizing MCU
CCU and MCU hardware are covered by TAA00002U2.

WiCE software including VCR functions: Version 3.8.x.

Application/Limitation
WinGD DF 2-stroke engines

Approval conditions
The documentation listed in TAA00002U2 including the VCR function is to be submitted for approval in each case. Reference to this or other relevant Type Approval Certificates shall be made.

The Type Approval covers hardware and software listed under Product description.

Product certificate
As described in TAA00002U2.

Software control
All changes in software are to be recorded as long as the system is in use on board. Documentation of major changes is to be forwarded to DNV for evaluation and approval before implemented on board. Certification of modified functionality may be required for the particular vessel.

Type Approval documentation
WinGD List of Drawings for Design Approval VCR Control, CL-24-005, Rev. no.0, 2024-10-03;
Type Approval Test Report WinGD VCR CL-24-167-1 (8th to 10th of January 2025) with annex (Techdoc. No.23).
TA assessment report issued by DNV Augsburg 2024-10-15.

Tests carried out
Witnessed Initial type approval test at Mitsui E&S DU Co. Ltd., Aioi Plant, Japan, including the functional performance test. Carried out on test engine DU WinGD 6X62DF-2.1.

Marking of product
See TAA00002U2 with SW Version Info on HMI “WiCE Software Information 3.8.x”.

Periodical assessment
The scope of the periodical assessment is to verify that the conditions stipulated for the type are complied with, and that no alterations are made to the product design or choice of systems, software versions, components and/or materials.

The main elements of the assessment are:
- Ensure that type approved documentation is available
- Inspection of factory samples, selected at random from the production line (where practicable)
- Review of production and inspection routines, including test records from product sample tests and control routines
- Ensuring that systems, software versions, components and/or materials used comply with type approved documents and/or referenced system, software, component and material specifications
- Review of possible changes in design of systems, software versions, components, materials and/or performance, and make sure that such changes do not affect the type approval given
- Ensuring traceability between manufacturer’s product type marking and the type approval certificate

A renewal assessment will be performed at renewal of the certificate.

END OF CERTIFICATE