



Certificate No:
TAM000018X

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Engine Subsystem

with type designation(s)

MAN ES Water in Fuel (WIF)

Issued to

**MAN Energy Solutions, branch of MAN Energy Solutions SE, Germany
København SV, Denmark**

is found to comply with

DNV rules for classification – Ships Pt.4 Ch.6 Piping systems

Application :

Ships with MAN Energy Solution ME engines for production of emulsified fuel.

Product approved by this certificate is accepted for installation on all vessels classed by DNV.

Issued at **Høvik** on **2022-03-29**

This Certificate is valid until **2027-03-28**.

for **DNV**

DNV local station: **Denmark CMC**

Approval Engineer: **Dag Harald Williksen**

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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.

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.



Form code: TA 251

Revision: 2021-03

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Page 1 of 3

Product description

The WIF mixing unit is an electronically controlled unit that mixes marine diesel and water for the purpose of reducing NOx emission. The WIF mixing unit controls the water to diesel ratio (water fraction) and mixing of diesel, water and emulsifier. The WIF mixing unit is controlled by the ME engine control system.

The WIF mixing unit may add an emulsifier to the mixture for stabilizing purpose.

Place of production

ENH Engineering A/S, Jellingvej 15, DK-9230 Svenstrup

Application/Limitation

The WIF unit is designed to supply emulsified water and fuel oil to a WIF supply system.

Fuel type: Ultra low sulphur marine fuel oil

Type Approval documentation

The approval is based on the following documents:

Drawing No.	Rev. No.	Document Title
6101854-1	1	General System Information, WIF, with the following documents included:
6086421-4	1	WIF description
6073299-0	4	WIF – P&ID
6097212-7	0	Alarm list
6091530-5	1	List of components for Water in fuel emulsion
6098800-4	0	HAZOP WIF
6091697-1	0	Worst-case simulation
6142060-6	0	Technical plant, WUF
6103851-5	0	Inspection of system, WIF
6097781-7	1	Commissioning and function test / sea trial
6099729-6	0	Hydrostatik test report
Armofuel 161	-	Safety data sheet
6118991-2	0	Component Specification of fuel plant

Tests carried out

The WIF mixing unit was successfully pressure tested at ENH Engineering A/S, Jellingvej 15, DK-9230 Svenstrup, on the 8th of April 2021.

Marking of product

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

Product, material and type approval certificates

The WIF unit is to be assembled by specified components listed in document: 6091530-5, "List of Components for Water in fuel emulsion".

The following shall be delivered with a product declaration issued by manufacturer:

- Valves

The following shall be delivered with a material declaration issued by the manufacturer.

- Fuel oil inlet pipes
- Water inlet pipes

The following shall be delivered with a material test report issued by the manufacturer.

- Emulsion outlet pipes
- Flanges, elbows and T-pieces
- Pump housings
- Valve housings
- Filter housings
- Flow meter housings

The following components to be delivered with a DNV type approval certificate:

- Flexible hose assemblies
- Field instrumentation, sensors and actuators

All welds applicable for fabrication of WIF mixing unit shall be carried out in DNV approved welding facilities according to requirements specified in our DNV GL Rules Pt.2 Ch.1 to Ch.4 - Materials and welding. This covers approved welding procedure specifications (WPS) and procedure qualification records (PQR) including certified welders prior to start of fabrication.

WIF mixing unit field instrumentation is accepted based on document 6091530-5, rev.1. No additional documentation is necessary.

Electric cables and installation of this is not covered by this approval and must be verified to comply with the requirement of the Rules Pt.4 Ch.8 - Electrical Installation.

The WIF mixing unit to be pressure tested according to 6103851-5.0 at the manufacturer.

A product certificate can be issued to the WIF mixing unit if it is built and tested according to this type approval certificate.

Periodical assessment

Periodical assessments are to be performed after 2 years and after 3.5 years. A renewal assessment will be performed at renewal of the certificate.

In case 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.

Onboard installation approval conditions

The following are to be submitted for each WIF mixing unit to be installed in DNV Classed vessels:

- Reference to this Type Approval Certificate.
- Piping and instrumentation diagram (P&ID) for the actual installation showing the complete fuel oil supply system onboard the vessel including the WIF mixing unit.
- Pipe sizes and routing sketch of the actual installation

END OF CERTIFICATE