

CERTIFICATE OF CONFORMITY - EC (MODULE G)

Certificate No:
MEDG0000047

Application of: Directive 2014/90/EU of 23 July 2014 on marine equipment (MED), issued as "Forskrift om Skipsutstyr" by the Norwegian Maritime Authority. This Certificate is issued by DNV GL AS under the authority of the Government of Norway.

This is to certify:

That the On board exhaust gas cleaning systems

with type designation and serial number

Exhaust Gas Seawater Scrubber - Inline Open-Loop Scrubber - CROWN-01, CROWN-02, CROWN-03, CROWN-04

Issued to

**DFDS A/S
COPENHAGEN Ø, Denmark**

is, by design assessment and product verification, found to comply with
Regulation **(EU) 2017/306,**
item No. MED/2.10. Marpol 73/78 as amended, Annex VI Regulation 4 and IMO Res.
MEPC.259(68)

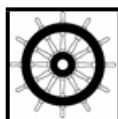
USCG Approval No: **N/A**

Further details of the equipment and conditions for certification are given overleaf.

Issued at **Høvik** on **2017-09-19**

DNV GL local station:
Høvik Machinery

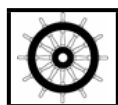
Approval Engineer:
Tin Nguyen



Notified Body
No.: **0575**

for **DNV GL AS**

Vidar Dolonen
Head of Notified Body



0575/yyyy

0575: Notified Body number undertaking quality surveillance
yyyy: The year in which the mark is affixed



The product liability tests with the manufacturer or his representative in accordance with Directive 2014/90/EU. This certificate remains valid unless suspended, withdrawn, recalled or cancelled, provided this equipment is not modified without the acceptance of the notified body named herein.

This certificate authorises the manufacturer to affix the "Mark of Conformity" (wheelmark) to the product described herein.



Product description

The EGC system consists of 4 open loop wet-scrubbing EGC units cleaning the exhaust gas from the main engines. There are two operation settings possible:

- Open loop, seawater is continuously added and discharged from the scrubber unit with the possibility of boosting the alkalinity by adding caustic e.g. sodium hydroxide.
- Dry mode, when operating on compliant fuel or operating outside ECA areas.

The EGC units are designed to operate in dry mode with temperatures up to 300°C. Materials used in the scrubber casing is 316L. The piping system for the washwater from inlet to overboard is constructed in glass-reinforced epoxy piping (GRE), PE100 and 316L.

The EGC units are installed inline and replaces a part of the existing exhaust gas pipeline. The exhaust gas will at all-time pass through the EGC units. When an EGC unit is activated, the exhaust gas is washed with seawater in the scrubber tower. The exhaust gas is cooled, and velocity reduced within the scrubber, enabling the washwater to efficiently absorb the SO_x from the exhaust gas. The cleaned exhaust gas continues upwards through a demister, which are mounted after the scrubber tower securing remaining water droplets to be captured before the exhaust gas is leaving the funnel.

The load of the combustion engine as well as the emissions and seawater monitoring systems regulate the wash water flow, to ensure minimal power consumption of the EGC unit.

The seawater inlet is monitored prior to the scrubbing process, to ensure that the supplied amount of seawater is adjusted to match the actual level of alkalinity in the seawater. Additionally, it is possible to boost the alkalinity by adding caustic e.g. sodium hydroxide. The wash water is monitored prior to discharge, to meet the requirements of MEPC.259(68).

EGC system layout

- Four fully welded complete scrubber casings.
- One exhaust gas monitoring system for SO_x and CO₂
- One washwater monitoring system for inlet seawater
- One washwater monitoring system for discharge wash water
- Four pumps for water supply to the scrubber towers
- One control system

Application/Limitation

Exhaust Gas Cleaning Systems (EGCS) are intended for reducing the SO_x emissions to a level below the current and upcoming requirements in worldwide and ECA areas. In scheme B, compliance with emission requirements are demonstrated by continuous exhaust gas and washwater discharge monitoring. The monitoring system is to be approved by the Administration.

The monitoring equipment is to have yearly surveys according to MEPC.259(68)

Type Examination documentation

Tests carried out

16956- 23301479/DNV DNV GL MARPOL Verification Survey checklist EGCS

Marking of product

The product is to be indelibly marked with name and address of manufacturer, type designation, dimensions and date of manufacture. In addition, the manufacturer shall affix the Mark of Conformity followed by the DNV GL Notified Body No. 0575 and the production year (4 digits).



Job Id: **344.1-005490-1**
Certificate No: **MEDG0000047**

END OF CERTIFICATE