



Certificate no.:
TAP00002UM

TYPE APPROVAL CERTIFICATE

This is to certify:

that the **5 ppm Bilge Alarm**

with type designation(s)
JOWA Seaguard 5 ppm Bilge Alarm

issued to

JOWA AB
Källered, Sweden

is found to comply with

DNV class programme DNV-CP-0485 – Type approval – 5 ppm bilge alarms
IMO Resolution MEPC.107(49) – Revised Guidelines and Specifications for Pollution Prevention Equipment for Machinery Space Bilges of Ships

Application:

This is to certify that the **5 ppm Bilge Alarm** listed above has been examined and tested in accordance with the requirements contained in the DNV programme for type approval, DNV-CP-0485. The Bilge Alarm also complies with IMO Resolution MEPC.107(49). This certificate is valid only for the 5 ppm Bilge Alarm referred to above.

System design limitations / limiting operating conditions imposed are described in this document.

A product approved by this certificate is accepted for installation on all vessels classed by DNV, unless otherwise instructed by relevant Maritime Administration.

5 ppm bilge alarms are required on vessels with DNV class notation CLEAN DESIGN.

Issued at **Høvik** on **2024-03-06**

This Certificate is valid until **2029-03-05**.

for **DNV**

DNV local unit: **Sweden CMC**

Approval Engineer: **Martin Olofsson**

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: 2023-09

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Product description

The JOWA Seaguard 5 ppm Bilge Alarm is designed to monitor the effluent from a bilge water separator. The bilge alarm applies the principle of scattered light recognised by three optical sensors to monitor the oil content of the effluent. There are two alarm signals, which are triggered by an oil content above 5 ppm. Alarm 1 shall be connected to the bilge water separator effluent piping automatic stopping device (three-way-valve) and alarm 2 is for external use. The bilge alarm has a cleaning function, auto flush, designed to keep the measuring cell as clean as possible. Auto flush occurs automatically and will always activate the alarm. The Seaguard 5 ppm Bilge Alarm include a flow switch mounted on the sample inlet pipe to the bilge alarm, which will detect no flow and activate the alarm.

The JOWA Seaguard 5 ppm Bilge Alarm is designed and tested to meet the requirements of DNV class programme for type approval DNV-CP-0485 and the requirements of IMO Resolution MEPC.107(49). This means among other criteria, an accuracy of ± 2 ppm and a response time of less than 5 seconds.

The Seaguard 5 ppm Bilge Alarm hardware is based on the approved Seaguard 15 ppm Bilge Alarm where the software/firmware is modified to achieve accuracy values specified in DNV-CP-0485.

Application/Limitation

The equipment is not permitted to be installed in spaces subject to explosion hazards.

The following shall be verified during installation:

- The alarm is always activated whenever clean water is used for cleaning or zeroing purposes.
- The alarm is always activated whenever no flow of sample through alarm is detected by the flow switch.
- Any alarm will activate the automatic stopping device preventing overboard discharge and lead to recirculation.
- The overall response time (including the response time of the alarm) between the effluent discharge exceeding 5 ppm oil and the operation of the automatic stopping device preventing overboard discharge is less than 20 seconds.
- By-passing the alarm during normal operation shall by no means be possible.
- Every access of the alarm (beyond check on instrument drift, repeatability of the instrument reading, and the ability to re-zero the instrument) requires the breaking of a seal.

Type approval documentation

Dwg. No.	Title	Date/Rev.
86-0000-03-01	P&I Diagram	2011-05-12
86-0000-01-01	GA Drawing	2013-06-24
86-7001-02-01	Component Layout	2013-06-24
86-7001-02-02	Circuit Diagram	2013-06-24
86-7001-02-03	Penetrations	2013-06-24
	Component List	2024-03-06
	Manual - JOWA Seaguard 5 ppm Bilge Alarm	2024-02-26

Tests carried out

The equipment is tested in accordance with the requirements of the DNV programme for type approval DNV-CP-0485 and IMO Resolution MEPC.107(49), which is documented by the following test reports.

- SP; Swedish National Testing and Research Institute, Report No. P703499, Environmental tests of bilge alarm, dated 2007-08-06.
- TEi-Testing Services, LLC; Plumbing Laboratory, USA, Report of Test P00770, JOWA AB, dated 2007-10-01, Testing of 15 ppm Bilge Alarm according IMO Resolution MEPC.107(49), Part 2, and USCG CFR Title 46, Part 162, Subpart 162.050.
- TEi-Testing Services, LLC; Plumbing Laboratory, USA, Summation Certificate TS-P00770, JOWA AB, dated 2007-10-01, Summation Test Data and Results of Test Report TEi-TS-P00700.
- JOWA; Final report for approval DNV-CP-0485 for JOWA Seaguard 5 ppm, dated 2024-03-05.

Software and firmware

The JOWA Seaguard 5 ppm Bilge Alarm is type approved with the software version 86-5-2.xx.yy in the control unit and version 86-NC5-2.xx.yy in the sensor unit (major revision 2, where xx as minor change shall be 0 or larger and yy for patch shall be 0 or larger). Both 5 and NC5 indicate software for the 5 ppm bilge alarm. The software in the sensor unit is shown in the control unit display as v02.xx.yy and with ID BAS5:xxxx, (bilge-alarm-sensor number xxxx) where 5 stands for a 5 ppm sensor unit.

The records of all software changes are to be forwarded periodically to DNV for evaluation. Major changes in the software, which can alter the performance of the system, require approval. Testing of the application functions of the revised software may be required.

Marking of product

For traceability of this Type Approval, each unit is to be marked with:

- Identification of manufacturer
- Equipment type designation and model identification
- Serial number
- Revision information, as applicable, for all firmware or software modules installed per hardware unit
- TA certificate number and revision

Periodical assessment

For retention of the Type Approval, DNV surveyor shall perform periodical assessments to verify that the conditions of the TA are not altered since the certificate was issued. The scope of periodical assessment includes:

- Review of the TA documentation and verification that the documentation is still used as basis for the production.
- Review of possible changes in design, material and performance of the product.
- Verification of the company's production and quality systems ensuring continued consistent production of the type approved products to the required quality.
- Verification that the product marking for identification and traceability to the TA Certificate is not altered.

Copy of type approval certificate

A copy of this Type Approval Certificate shall be carried on board a vessel fitted with this 5 ppm bilge alarm, for inspections on board. A reference to the test protocol and a copy of the test results (Appendix to this certificate) should be available for inspection on board the vessel.

Revision history

Rev.	Date of issuance	Description
0	2024-03-06	Initial certificate based on performance test completed 21 February 2024

APPENDIX – SUMMARY OF TEST DATA AND RESULTS

Test data and results conducted with the 5 ppm bilge alarm in accordance with DNV class programme for type approval DNV-CP-0485, also complying with IMO Resolution MEPC.107(49).

Manufacturer of 5 ppm bilge alarm	JOWA AB
Model name	JOWA Seaguard 5 ppm
Serial number of test unit	control unit: BAC5-0001, sensor: BAS5-0001
Test location	Källered, Sweden
Date of test	
Organization responsible for the test	
Samples sealed and labelled by	
Method of sample analysis	
Samples analysed by (name of laboratory)	
Test fluid “A”	
Density at 15°C	987 kg/m ³
Viscosity at 100°C	36.85 mm ² /s (36.85 centistokes)
Flashpoint	88°C
Ash content	0.059% (mass)
Water content at start of test	0.30% (volume)
Test fluid “B”	
Density at 15°C	870 kg/m ³
Viscosity at 40°C	3.858 mm ² /s (3.858 centistokes)
Flashpoint	81°C
Ash content	<0.001% (mass)
Water content at start of test	pass (Karl Fisher - procedure A)
Test fluid “C”	
Surfactant specification	
Iron oxide specification	
Test water	
Density at 20°C	998.3 kg/m ³
Solid matter present	0.35 g/l
Test temperatures	
Ambient	21°C
Test fluid “A”	80°C
Test fluid “B”	24°C
Test fluid “C”	20°C
Test water	20°C

Diagram of test facility submitted: ☒ Yes ☐ No

Diagram of sampling arrangement submitted: ☒ Yes ☐ No

Display calibration and activation accuracy test

Test fluid "A"	Time	Expected oil content [ppm]	Reading from alarm display [ppm]	Lab analysis oil content in grab sample ⁽¹⁾ [ppm]	Accuracy of reading [ppm]	Alarm activated [Yes/No]
Clean water	09:30	0.0				
2 ppm	09:42	2.0				
Clean water	10:09	0.0				
4 ppm	10:18	4.0				
Clean water	10:42	0.0				
6 ppm	10:50	6.0				
Clean water	11:16	0.0				
Water temperature	18°C					
Re-zero	☐ Yes ☒ No if Yes, when:					
Re-calibrate	☐ Yes ☒ No if Yes, when:					

(1)

Test fluid "B"	Time	Expected oil content [ppm]	Reading from alarm display [ppm]	Lab analysis oil content in grab sample ⁽¹⁾ [ppm]	Accuracy of reading [ppm]	Alarm activated [Yes/No]
Clean water	11:21	0.0				
2 ppm	11:30	2.0				
Clean water	11:53	0.0				
4 ppm	12:01	4.0				
Clean water	12:22	0.0				
6 ppm	12:30	6.0				
Clean water	12:56	0.0				
Water temperature	20°C					
Re-zero	☐ Yes ☒ No if Yes, when:					
Re-calibrate	☐ Yes ☒ No if Yes, when:					

(1)

Contaminant and colour test

Test fluid	Time ⁽¹⁾	Expected oil content [ppm]	Reading from alarm display [ppm]	Calibration shift ⁽²⁾ [ppm]
Clean water	10:06	0.0		
Clean water and 4 ppm test fluid "B"	10:08	4.0		
4 ppm test fluid "B" and iron oxide 4 ppm	10:11	4.0		
4 ppm test fluid "B" and iron oxide 50 ppm	10:12	4.0		
4 ppm test fluid "B" and iron oxide 100 ppm	10:14	4.0		
Clean water and 4 ppm test fluid "B"	11:52	4.0		
4 ppm test fluid "B" and very salt water (6%)	11:55	4.0		

(1) Total testing time >15 minutes.

(2) Calibration shift is defined as temporary movements from the true (expected) value.

Sample pressure or flow test

Test fluid	Pressure [bar] or flow [l/min]	Expected oil content [ppm]	Reading from alarm display [ppm]	Zero shift ⁽¹⁾ [ppm]	Calibration shift ⁽²⁾ [ppm]
Clean water, normal pressure/flow	1,5 l/min	0.0			
4 ppm test fluid "B", normal pressure/flow	1,5 l/min	4.0			
4 ppm test fluid "B", twice of normal pressure/flow	3.0 l/min	4.0			
4 ppm test fluid "B", half of normal pressure/flow	0.7 l/min	4.0			
Clean water, normal pressure/flow	1,5 l/min	0.0			
Deviations and other comments					

(1) Zero shift is defined as temporary movements from an expected zero value.

(2) Calibration shift is defined as temporary movements from the true (expected) value.

Shut-off test

Test fluid	Time ⁽³⁾	Expected oil content [ppm]	Reading from alarm display [ppm]	Zero shift ⁽¹⁾ [ppm]	Calibration shift ⁽²⁾ [ppm]
Clean water	07:31	0.0			
4 ppm test fluid "B" before shut-off	07:36	4.0			
Shut-off, minimum 8 hours					
4 ppm test fluid "B" min. 8 hours after shut-off	15:44	4.0			
Clean water	15:56	0.0			
Deviations or damage to bilge alarm					

(1) Zero shift is defined as temporary movements from an expected zero value.

(2) Calibration shift is defined as temporary movements from the true (expected) value.

(3)

Utilities supply variation test

Test fluid	Expected oil content [ppm]	Reading from alarm display [ppm]	Zero shift ⁽¹⁾ [ppm]	Calibration shift ⁽²⁾ [ppm]
Clean water	0.0			
Clean water and 4 ppm test fluid "B"	4.0			
110% voltage	4.0			
90% voltage	4.0			
90% air pressure	n/a			
110% air pressure	n/a			
90% hydraulic pressure	n/a			
110% hydraulic pressure	n/a			
Clean water	0.0			
Deviations and other comments				

(1) Zero shift is defined as temporary movements from an expected zero value.

(2) Calibration shift is defined as temporary movements from the true (expected) value.

Calibration and zero drift test

Test fluid	Time ⁽⁴⁾	Expected oil content [ppm]	Reading from alarm display [ppm]	Lab analysis oil content in grab sample ⁽⁵⁾ [ppm]	Calibration shift ⁽¹⁾ [ppm]	Calibration drift ⁽²⁾ [ppm]	Zero drift ⁽³⁾ [ppm]
Clean water	06:23	8.0					
4 ppm test fluid "B" after 0 hours	06:30	4.0					
4 ppm test fluid "B" after 2 hours	08:33	4.0					
4 ppm test fluid "B" after 4 hours	10:34	4.0					
4 ppm test fluid "B" after 6 hours	12:37	4.0					
4 ppm test fluid "B" after 8 hours	14:43	4.0					
Clean water	14:59	0.0					

(1) Calibration shift is defined as temporary movements from the true (expected) value. Zero shift is used for temporary movements from an expected zero value.

(2) Calibration drift is defined as slow movements from the true (expected) value, that becomes permanent over time.

(3) Zero drift is defined as slow movements from an expected zero value, that becomes permanent over time.

(4)

(5)

Response time test

Test fluid	Time ⁽¹⁾	Expected oil content [ppm]	Reading from alarm display [ppm]	Response time [s]
Clean water	10:55	0.0		
Test fluid "A"	10:59	8.0		
Clean water	10:33	0.0		
Test fluid "B"	10:36	8.0		
Clean water	11:11	0.0		
Test fluid "C"	11:15	8.0		

(1) Test fluid "B" was done before test fluid "A" for practical reasons.