

# CLASS PROGRAMME

DNVGL-CP-0484

Edition July 2016

## **DNV GL approval of service supplier scheme**

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## FOREWORD

DNV GL class programmes contain procedural and technical requirements including acceptance criteria for obtaining and retaining certificates for objects and organisations related to classification.

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## CHANGES – CURRENT

This document supersedes the February 2016 edition.

Changes in this document are highlighted in red colour. However, if the changes involve a whole chapter, section or sub-section, normally only the title will be in red colour.

### Main changes July 2016

- Appendix A Special requirements for categories of service suppliers listed in IACS UR Z17

The following services have been added with additions and/or clarifications to IACS UR Z17:

- Thickness measurements on ships
- Inspection and maintenance of fire extinguishing equipment and systems
- Service of inflatable liferafts, inflatable lifejackets, hydrostatic release units, inflatable rescue boats, marine evacuation systems
- Inspection and testing of radio communication equipment and Automatic Identification Systems (AIS)
- Inspections and maintenance of self-contained breathing apparatus
- Annual performance testing of Voyage Data Recorders (VDR) and simplified Voyage Data Recorders (S-VDR)
- Inspection of low location lighting systems using photo luminescent materials and evacuation guidance systems used as an alternative to low-location lighting systems
- Sound pressure level measurements of public address and general alarm systems on board ships
- Testing of coating systems in accordance with IMO Resolution MSC.215(82) as amended and IACS UI SC223 and/or MSC.288(87) as amended
- Servicing and maintenance of lifeboats, launching appliances, on-load release gear and davit-launched liferaft automatic release hooks
- Measurements of noise level on board ships
- Tightness testing of primary and secondary barriers of gas carriers with membrane cargo containment systems for vessels in service

- Appendix B Special requirements for categories of service suppliers not listed in IACS UR Z17

The following services have been added:

- Service suppliers engaged in testing of navigational equipment and systems
- Service suppliers engaged in preparation of Inventory of Hazardous Materials (IHM)
- Service suppliers engaged in inspection and testing of centralised gas welding and cutting equipment
- Service suppliers engaged in Non-Destructive Testing (NDT) on classification projects
- Service suppliers firms engaged in condition monitoring of machinery on board ships and mobile offshore units
- Service suppliers engaged in resin casting of chock foundations, stern tubes, etc.
- Service suppliers engaged in testing of ballast water management systems (environmental testing)
- Service suppliers engaged in testing of ballast water management systems (land-based and shipboard testing)
- Laboratories engaged in mechanical and analytical testing
- Laboratories engaged in corrosion testing of corrosion resistant steels

- **New**

- Appendix C Guidelines for the technical inspection of radio installations onboard ships fitted for compliance with GMDSS
- Appendix D Guidelines for the technical inspection of automatic identification system onboard ships fitted for compliance with SOLAS V

## Editorial corrections

In addition to the above stated changes, editorial corrections may have been made.

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## SECTION 1 GENERAL

### 1 Introduction

The approval of service supplier scheme is a procedure by which the Society approves suppliers providing services to the customer, such as measurements, tests or maintenance of safety systems and equipment, the result of which may form the basis for the Society's decisions.

### 2 Objective

The objective of this procedure is to provide minimum requirements for approval and certification of service suppliers and is applicable to both initial and renewal audits.

### 3 Scope

The scope of the Society's approval of service supplier will normally include the following activities:

- review of documentation
- verification of competence and control needed to perform the service
- verification of equipment and facilities for the service
- assessment of the supplier and any servicing stations and subcontractors
- evaluation of how the service will be reported
- witnessing of a practical demonstration of the performance of the service including satisfactory reporting
- issuance of approval of service supplier certificate.

### 4 Definitions

<i>Term</i>	<i>Definition</i>
<i>IACS</i>	International Association of Classification Societies
<i>IACS UR</i>	IACS Unified Requirements

### 5 Requirements

#### 5.1 Services listed in IACS UR Z17

For services listed in IACS UR Z17 the requirements of IACS UR17 apply with any additions and clarifications as given in Appendix A below.

#### 5.2 Services not listed in IACS UR Z17

For services not listed in IACS UR Z17, the general provisions of IACS UR Z17 apply. Amendments/deviations are defined in Appendix B below. If requirements in Appendix B below are in conflict with IACS UR Z17 then the requirements in Appendix B below will prevail.

#### 5.3 Applicable revision of IACS UR Z17

The in force date for revisions shall follow IACS UR Z17 revision notes.



## 6 Validity of the certificate

### 6.1 Renewal

Renewal of the certificate shall be made at intervals not exceeding three (3) years by verification through audits that approved conditions are maintained or, where applicable, on expiry of the supplier's approval received from an equipment manufacturer, whichever comes first. In the latter case, the Society is to be informed in due course by the service supplier.

### 6.2 Periodical audits

The Society may, at its own discretion, require periodical audits in the validity period of the certificate.

## APPENDIX A SPECIAL REQUIREMENTS FOR CATEGORIES OF SERVICE SUPPLIERS LISTED IN IACS UR Z17

### 1 Thickness measurements on ships

IACS UR Z17 Annex 1 [1] applies with the following additions.

#### 1.1 Application

Firms carrying out thickness measurements on board ships and offshore units, the results of which are used by the Society's surveyors in making decisions affecting classification, are subject to approval by the Society in accordance with the mandatory procedures given in this class programme.

All firms shall be certified as one of the following two categories:

- *Category I*: authorised to do measurements onboard all types and sizes of ships
- *Category II*: authorised to do measurements onboard fishing vessels of all sizes, and non-ESP<sup>1)</sup> ships of less than 500 GT<sup>2)</sup>.

ESP ships of all sizes and general cargo ships of more than 500 GT can only be measured by Category I companies.

Category I companies shall be certified according to [Sec.3](#) to [Sec.5](#) of this document. Category II shall be certified according to [Sec.8](#).

<sup>1)</sup> ESP ships: ships subject to enhanced survey programme, i.e. oil tankers, tankers for chemicals and bulk carriers, with the mandatory class notation **ESP**.

<sup>2)</sup> As per the international convention on tonnage measurement of ships, 1969.

#### 1.2 Objective

The objective of this programme is to ensure that measurements and reporting of structural scantlings are correct. This is done by ensuring that firms engaged in thickness measurements have qualified personnel that are able to recognise corroded or pitted areas and understand ship's drawings, implemented written systems for training, control, verification and reporting, in addition to the necessary technical equipment and facilities to render professional assistance.

#### 1.3 Limitation to the size of the company

Where several servicing stations are owned by a given company, each station shall be assessed and approved separately, according to the same requirements as for the main company.

#### 1.4 General requirements

##### 1.4.1 Training and qualification

The operators carrying out the measurements shall be certified in ultrasonic testing at Level 1 and relevant industry sector, according to a recognised international standard for qualification and certification of NDT personnel (i.e. EN ISO 9712 or equivalent). Personnel qualification to an employer based qualification scheme as SNT-TC-1A may be accepted if the employer's written practice is reviewed and found acceptable by the Society. Operators shall have had a minimum of one (1) year tutored on-the-job training.

The operator shall have adequate knowledge of the relevant rules and ship's structures, sufficient to select a representative position for each measurement.

Operators and supervisors shall be able to communicate in English.

The responsible supervisor shall be certified in ultrasonic testing at Level 2 and relevant industry sector, according to a recognized international standard for qualification and certification of NDT personnel (i.e. EN

ISO 9712 or equivalent). Personnel qualification to an employed based qualification scheme as SNT-TC-1A may be accepted if the employer's written practice is reviewed and found acceptable to the Society.

#### 1.4.2 Equipment and facilities

Instruments using pulsed echo technique, either with oscilloscope or digital instruments using multiple echo are required *Single echo instruments are not accepted*. A record of the equipment used shall be kept. The record shall contain information on maintenance and calibration. Confirmation from the manufacturer that the instruments satisfy the requirement above shall be enclosed in the instrument record.

#### 1.4.3 Work procedures

The firm shall have documented work procedures covering planning, execution and reporting including items listed in [1.4.4], [1.4.5], [1.4.6] and [1.4.7].

#### 1.4.4 Preparation

- Practise of verification of readings by attending surveyor to be agreed
- the supplier is responsible for using the latest version of the report form that can be found on [www.dnvgl.com/](http://www.dnvgl.com/), under Maritime, Publications & downloads
- the surveyor's presence shall be recorded in the report
- all data given in the minimum thickness list shall be entered into the template before the job is started, as part of the preliminary preparation
- operators and supervisor shall carry ID cards with photo
- an up-dated list of approved operators and supervisor shall be kept at the approving office so that identification can be verified by the attending surveyor. Readings taken by non-listed operators will be rejected
- the operators shall attend the planning meeting which is held before each job is started. Owner's representative and the attending surveyor will also participate in the meeting
- equipment shall be calibrated with the Society's surveyor present.

#### 1.4.5 Execution

- Each major class job, e.g. main class intermediate / main class renewal (MC.In/MC.R), shall be carried out by at least two qualified operators working together
- thickness measurements of less extent may be carried out by one operator
- measurements that are not carried out in co-operation with the Society will not be accepted. The firm shall inform the owner accordingly
- when onboard the operator/supervisor shall have his/her certificate and identification papers readily available. The operator shall notify the Society's surveyor of any structural deficiencies or abnormal measurements detected. That includes areas with substantial corrosion, which shall be mapped with an increased number of measurements, taken in co-operation with the Society's surveyor
- unless otherwise specified, the measurements shall be taken in line with the Society's guideline for thickness measurements, available at [www.dnvgl.com](http://www.dnvgl.com).

#### 1.4.6 Sub-contractors shall not be used

To hire certified operators from another approved service supplier is not considered sub-contracting. This is, however, to be included in the report. Subcontractors providing anything other than subcontracted personnel or equipment shall also meet the requirements given in this document.

#### 1.4.7 Verification

The firm shall have the Society's surveyor verification of each separate job.

#### 1.4.8 Reporting

The UTM report shall be made in the Society's electronic reporting format, available at [www.dnvgl.com](http://www.dnvgl.com).

Prior to commencing measurements onboard, in addition to the measured values, the original scantlings, the minimum thickness and the substantial corrosion limits shall be stored in the electronic report.

When on board, measured thicknesses shall be continuously recorded in the the Society's Electronic Report Form, based on the operator's working notes, photos and sketches and are regularly to be made available for the attending surveyor's review and verification.

Upon completion of the measurements onboard the operator shall provide the surveyor with a temporary electronic draft of the results presented in the Society's electronic report form, and supplied with the operator's notes, as found necessary. The location of the measurements shall be illustrated by sketches or drawings.

The preliminary report shall include a longitudinal strength evaluation when required, (IMO Res.A.744(18) Annex 12) valid for oil tanker with length above 130 meters and over 10 years of age, e.g. at the third renewal survey and subsequent renewal surveys.

Final reporting in original electronic form or in a non-editable electronic form (e.g. PDF-format) shall be presented to the surveyor within two (2) weeks after the job is terminated. The firm shall have the surveyor's verification of each separate job, documented in the report by his signature and the text "Verified and Evaluated".

The report shall include a copy of the certificate of approval of the firm, containing the names of all approved operators and supervisors.

## 1.5 Certification

### 1.5.1 Information on the certificate

The certificate will list the certified operators and the supervisor.

### 1.5.2 Alterations

In case any alteration to the certified service operation system of the firm is made, including changes related to UTM operators, such alteration shall immediately be reported to the Society.

## 1.6 Category II companies - limited approval of firms locally engaged in ultrasonic thickness measurements of ship's structure

### 1.6.1 Application

Firms carrying out thickness measurements on fishing vessels of all sizes and non-ESP<sup>1)</sup> ships below 500 GT<sup>2)</sup>, may be qualified according to the requirements in this section.

If the company in addition complies with IACS Unified Requirements Z17, it may carry out thickness measurements onboard fishing vessels of all sizes and non-ESP ships with length less than 100 meters, except *General dry cargo ship subject to Extended Hull Survey Requirements (EHSR)* above 500GT, as per the definition set in the *DNV GL rules for classification of ships RU SHIP Pt.7 Ch.1 Sec.1* or IACS Unified Requirements Z7.1.

<sup>1)</sup> ESP ships: ships subject to enhanced survey programme, i.e. oil tankers, tankers for chemicals and bulk carriers, with the mandatory class notation **ESP**.

<sup>2)</sup> As per the *International Convention on Tonnage Measurement of Ships, 1969*.

#### Guidance note:

IACS UR Z17 is available on the Internet at <http://www.iacs.org.uk/> under "Publications", "Unified Requirements".

---e-n-d---o-f---g-u-i-d-a-n-c-e---n-o-t-e---

### 1.6.2 Objective

The objective of this limited approval programme is to ensure that firms engaged in thickness measurements have qualified personnel that are able to measure thicknesses, recognise corroded or pitted areas and understand ship's drawings in addition to having the necessary technical equipment to render professional assistance.

### 1.6.3 Procedure for approval

#### 1.6.3.1 The following documents shall be submitted to the Society for review

- Description of company's management structure and manning
- name of operators and supervisor, documenting training, experience and qualifications
- description of equipment used including routines for maintenance and calibration
- a guide for operators of such equipment.

#### 1.6.3.2 Operator

The operators carrying out the measurements shall be certified in ultrasonic at Level 1 and relevant industry sector, according to a recognised international standard for qualification and certification of NDT personell (i.e. EN ISO 9712 or equivalent). Personnel qualification to an employer based qualification scheme as SNT-TC-1A may be accepted if the employer's written practice is reviewed and found acceptable by Society. Operators shall have had a minimum of one (1) year on-the-job training. The operator shall have adequate knowledge of ship's structure sufficient to select a representative position for each measurement.

An UTM Guideline may be downloaded at [www.dnvgl.com](http://www.dnvgl.com), under "Maritime" -, "Publications & downloads".

#### 1.6.3.3 Equipment

Instruments using pulsed echo technique, either with oscilloscope or digital instruments using multiple echo, single crystal technique are required. Single echo instruments are not accepted. Confirmation from the manufacturer that the instrument satisfies the requirement above shall be enclosed in the instrument record.

#### 1.6.3.4 Work execution

- The firm shall attend the planning meeting that is held before each job is started
- measurements that are not carried out in co-operation with the Society, unless otherwise agreed, will not be accepted. The firm shall inform the owner accordingly
- the operator shall notify the surveyor of any structural deficiencies detected.

### 1.6.4 Reporting

Measured thicknesses shall be continuously recorded and to be made available for the attending Society's surveyor.

The operator shall report in a recognised system and may illustrate the result by sketches or on the drawings.

In addition to the measured values, the original scantlings, the minimum thickness and the substantial corrosion limits, shall be included in the report.

Final reporting shall be presented to the surveyor within two (2) weeks after the job is terminated. The firm must have the surveyor's verification of each separate job, documented in the report by his signature.

The report shall include a copy of the certificate of approval, containing the names of all approved operators.

### 1.6.5 Certification

Any alteration to the certified service operation system shall immediately be reported to the Society.

## 2 Tightness testing of closing appliances such as hatches, doors etc. with ultrasonic equipment

The content of this chapter is under development. The service specific requirements of the legacy rules are to be applied until the new version of this chapter is published.

## 3 In-water survey of ships and mobile offshore units

The content of this chapter is under development. The service specific requirements of the legacy rules are to be applied until the new version of this chapter is published.

## 4 Inspection and maintenance of fire extinguishing equipment and systems

IACS UR Z17 Annex 1 [4] applies with the following additions:

– **[4.3] Procedures:**

CO2 systems - IMO MSC.1/Circ.1318:

- Section valves of fixed gas fire-fighting systems shall be internally inspected every 5 years (ref. IMO MSC.1/Circ.1432 and DNV GL Statutory Interpretations [SI-0364](#)).
- CO2 pipes shall be blown through annually to ensure that they are free from debris and not clogged. Test or record of the test shall be presented to the attending surveyor (ref. DNV GL Statutory Interpretations [SI-0364](#)).

## 5 Service of inflatable liferafts, inflatable lifejackets, hydrostatic release units, inflatable rescue boats, marine evacuation systems

IACS UR Z17 Annex 1 [5] applies.

## 6 Inspection and testing of radio communication equipment and Automatic Identification Systems (AIS)

IACS UR Z17 Annex 1 [6] applies with the additions given below in [6.1] to [6.9]. Guidelines for the technical inspection of radio installations and automatic identification systems are given in [App.C](#) and [App.D](#) respectively.

### 6.1 Extent of engagement

Approval of inspection and testing of radio communication equipment and AIS are independent processes and the applicant may apply for each approval separately or combined. The applicant may apply for inspection and testing of:

- 1) radio communication equipment, or
- 2) AIS, or
- 3) both radio communication equipment and AIS.

The application shall clearly state the type of inspection 1), 2) or 3) applied for.

### 6.2 Reference documents

The Service Supplier shall additionally have access to the following documents:

- DNVGL Statutory Interpretations of SOLAS, as amended
- MODU Code
- HSC Code
- IMO Res. A.1053(27) as amended
- IMO Res. A.789(19)
- MSC.1/Circ.1039
- DNVGL survey report forms: CRC 629a, CRC 630a, MOD CRC 304a and AIS 001a

### 6.3 Supervisors

- Certificate recognized by the ITU shall be understood as First- and Second-class radio electronic certificate, as per ITU Radio Regulations Volume 1 Chapter IX Article 47

- The supervisor for AIS shall document AIS training at the AIS manufacturer(s).

## 6.4 Radio inspector

The inspector shall be different than the installation/commissioning/repair/service technician.

## 6.5 Equipment and facilities

No additions.

## 6.6 Minimum required instruments

Certificates for calibration of the testing equipment shall be submitted.

## 6.7 Procedures and instructions

- If survey of radio installations based on MODU Ch. 11 as amended is included in the application, then the procedures must also cover this area. Descriptions showing understanding of the GMDSS radio requirements in the MODU code shall be submitted.
- The procedures shall conform to the requirements in the applicable IMO Resolutions listed in [App.C Sec.2](#) for radio and [App.D Sec.2](#) for AIS, and shall include:
  - details about what to check, how to check, and testing instrument used for each check item
  - instructions on how to correctly complete the survey reports as listed in [6.8].In addition, procedures and instructions for operating each item of the testing/inspection equipment shall also be kept and be available at all times.
- If [App.C](#) and [App.D](#) are adopted as the service supplier's inspection procedures, then additional information describing the testing instrument/"how to check" and reason for acceptance in some cases shall be provided.

## 6.8 Reporting

The report form used shall be one of the following report forms:

- 1) For Radio equipment:
  - CRC 629a (for ships and HSLC)
  - MOD CRC 304a (for MODU)
  - the form CRC 630a (annual testing of 406 MHz EPIRB) or equivalent to be used for reporting of annual testing of the EPIRB for all vessels.
- 2) For AIS:
  - AIS 001a or Appendix to IMO MSC.1/Circ.1252 (2007).

The name of the Inspector shall be clearly indicated (preferably with upper-case letters) on the reports, stamped and signed by the Inspector.

## 6.9 Communication with DNV GL station

When approached directly by owners or managers of a ship for conducting a radio or AIS survey, before conducting the survey the service supplier shall always notify the appropriate DNVGL station for further instructions.

In addition, a DNVGL surveyor should normally be present during the radio and AIS surveys. Deviation from this shall be clarified with appropriate DNVGL station before conducting the survey.

Failure in complying with the above requirements may result in cancellation of the certificate.

## 7 Inspections and maintenance of self-contained breathing apparatus

IACS UR Z17 Annex 1 [7] applies.

## 8 Examination of Ro-Ro ships bow, stern, side and inner doors

The content of this chapter is under development. The service specific requirements of the legacy rules are to be applied until the new version of this chapter is published.

## 9 Annual performance testing of Voyage Data Recorders (VDR) and simplified Voyage Data Recorders (S-VDR)

IACS UR Z17 Annex 1 [9] applies with the following additions:

### — [9.3] Procedures:

The service supplier shall have documented procedures, instructions and checklists stating how to carry out annual performance testing and examination of the:

- Condition of all protective enclosures, including labelling
- Condition of interfaces and converters
- Condition of the UPS
- Condition of the acoustic beacon
- Condition of the release mechanism
- Condition of microphones
- Condition of the alarm/operating panel
- Availability of all data recorded on the final recording medium.
- Any special items according to the applicable manufacturer's maintenance scheme
- For installations on or after July 1<sup>st</sup> 2014:
  - functions for performance test
  - data recorded on the final recording medium shall also include ECDIS display, AIS, rolling motion, configuration data and electronic logbook (if fitted).

The instructions or checklists shall include pass criteria where relevant. Procedures and instructions for operation of each item of the test equipment shall also be kept and be available during the annual survey.

The person carrying out annual performance testing shall additionally have access to IMO resolution A.861(20), MCS.333(90) and IEC61996 as well as particular documentation from the VDR manufacturer during the annual survey on board.

### — [9.6] Reporting - Test Report:

Successfully passed annual performance test shall be documented in form of a "Certificate of Compliance" (COC) and shall be prepared in a standard form acceptable to the Society. The COC shall as a minimum contain:

- The heading "Certificate of Compliance for Voyage Data Recorder"
- Name and IMO number of the ship
- Date and place of successfully passed testing
- Make, model and serial number of the VDR
- List the reference standards in [4.1]
- Name and address of service supplier
- Name of the technician carrying out the annual performance test



- DNV GL service supplier approval certificate number and the date of expire of the service supplier certificate.

One copy of the COC shall be retained onboard the vessel, and one copy filed at the supplier. The COC shall be traceable to the order reference system.

- **Practical demonstration:**

Certification is conditional on a practical demonstration of an annual VDR performance test (APT) as well as satisfactory reporting being completed. Practical demonstration is required for both initial certification and renewal.

## 10 Inspection of low location lighting systems using photo luminescent materials and evacuation guidance systems used as an alternative to low-location lighting systems

IACS UR Z17 Annex 1 [10] applies.

## 11 Sound pressure level measurements of public address and general alarm systems on board ships

IACS UR Z17 Annex 1 [11] applies with the additions given below.

The service supplier may apply for a combined approval for sound pressure measurements of GA/PA and measurements of noise levels (see [14] below). Both the requirements in [11] and [14] will then be applicable.

- **[11.5] Reporting:**

The sound pressure level of the General Alarm system, the ambient noise level and the arithmetic difference of them shall be stated in the report. Whereas the ambient noise level is in general the noise level measured in the specified space with machinery and equipment under normal operating condition.

The sound level of the Public Address system, the speech interference level (SIL) and the arithmetic difference of them are to be stated in the report. Whereas the SIL is to be determined by measuring the octave band levels 500Hz, 1000Hz, 2000Hz and 4000Hz in the specified space with machinery and equipment under normal operating condition.

The operating condition and the environmental condition shall be reported accordingly.

- **[11.7] Reference documents:**

The supplier shall in addition have access to the following document:

- IEC 60942 - Electroacoustics - Sound calibrators (2003-01).

## 12 Testing of coating systems in accordance with IMO Resolution MSC.215(82) as amended and IACS UI SC223 and/or MSC.288(87) as amended

IACS UR Z17 Annex 1 [12] applies with the following additions.

### 12.1 Application

The test laboratories shall be recognized by the Society and approved in accordance with this class programme. The approval may be given to both a recognized test laboratory independent of the coating manufacturer, and to the coating manufacturer's own laboratory.

In the following, such laboratories are also referred to as the supplier.

## 12.2 Auditing of the supplier

When actual testing, forming basis for test reports used to seek type approval from the Society, is carried out, the Society's local office's surveyor shall be called in for witnessing milestones as given in DNVGL CP 0108 *Non-metallic materials - Protective coating systems - seawater Ballast Tanks and Double-side Skin Spaces* or DNVGL CP 0139 *Non-metallic materials - Protective coating systems - cargo oil tanks*. This is mainly related to testing performed at the coating manufacturer's own laboratory and may typically be:

- witnessing of selection of paint material in the stock if appropriate
- witnessing of sample surface preparation
- witnessing of primer application & weathering
- examination of surface and preparation prior to application of top coat
- witnessing of top coat application
- witnessing during testing
- witnessing evaluation of test.

## 12.3 Documentation

- List and documentation of licences granted by equipment's manufacturer, if any.

## 12.4 Reference documents

The supplier shall have access to:

- IMO Resolution MSC.215(82), Performance Standard for Protective Coatings for Dedicated Seawater Ballast Tanks in all Types of Ships and Double-side Skin Spaces of Bulk Carriers (IMO PSPC-WBT)
- The relevant standards listed in the IMO Resolution MSC.215(82), and which are made mandatory via IACS UI SC 223
- IACS UI SC 223, For Application of SOLAS Regulation II-1/3-2 Performance Standard for Protective Coatings (PSPC) for Dedicated Seawater Ballast Tanks in All Types of Ships and Double-side Skin Spaces of Bulk Carriers, adopted by Resolution MSC.215(82)
- IMO MSC.1/Circ.1465 Unified Interpretations of the Performance Standard for Protective Coatings for Dedicated Seawater Ballast Tanks in all Types of Ships and Double-side Skin Spaces of Bulk Carriers (Resolution MSC.215(82))IMO Resolution MSC.288(87), IMO Performance Standard for Protective Coatings for Cargo Oil Tanks of Crude Oil Tankers (IMO PSPC-COT)
- IACS UI SC 259, For Application of SOLAS Regulation II-1/3-11 Performance Standard for Protective Coatings for Cargo Oil Tanks of Crude Oil Tankers (PSPC-COT), adopted by Resolution MSC.288(87)
- IMO MSC.1/Circ. 1479 ; Unified Interpretation on the application of the performance standard for protective coatings for cargo oil tanks of crude oil tankers (Resolution MSC.288(87))
- The relevant standards listed in the IMO Resolution MSC.288(87), and which are made mandatory via IACS UI SC 259
- IACS Recommendation No. 101, IACS Model Report for IMO Resolution MSC.215(82) App.1 "Test Procedures for Coating Qualification" (REC 101)
- IACS Recommendations No. 102, IACS Model Report for IMO Resolution MSC.215(82) App.1 "Test Procedures for Coating Qualification", Section 1.7 - Crossover Test (REC 102)

## 12.5 Administrative procedures

The supplier shall have an order reference system where each engagement is traceable to when, who and where testing was carried out, including location of test records and reports.

## 12.6 Work procedures and instructions

The supplier shall have documented procedures, instructions and checklists for how to carry out testing and reporting. Procedures and instructions for operating of each item of the testing equipment shall also be kept and be available at all time.

## 12.7 Verification

The supplier shall have a system for verifying that the services provided are carried out in accordance with approved procedures. Performed verification shall be documented.

## 12.8 Reporting

All test records shall be properly documented and retained in such a way that the performed testing can easily be re-traced later. The report shall identify extent and location of testing performed and a conclusive statement as to whether the test results satisfy the acceptance criteria or not.

The test report shall include references to relevant documents, as a minimum as referred to in [2].

In addition, and as a minimum, the following information shall be given:

- name, address and other contact information of the supplier
- contract requirements, e.g. order no., reference documents, specifications, special agreements etc.
- place and date of sample preparation and testing
- test equipment used
- name and signature of the person preparing the test samples
- name and signature of the person performing the tests
- name and signature of the person issuing the test report
- name and signature of the supervisor verifying the report.

The supplier shall file one copy of the test report, and the test report shall be traceable to the order reference system. Also reports for testing of coating systems that have failed shall be reported and filed in accordance with above.

IACS' model reports shall be used as basis for the coating test laboratory's own test report format.

## 12.9 References

- *DNV GL rules for classification of ships* RU SHIP Pt. 6 Ch.1 Sec.9.

## 13 Servicing and maintenance of lifeboats, launching appliances, on-load release gear and davit-launched liferaft automatic release hooks

IACS UR Z17 Annex 1 [13] applies.

## 14 Measurements of noise level on board ships

IACS UR Z17 Annex 1 [14] applies.

The service supplier may apply for a combined approval for measurements of noise levels and sound pressure measurements of GA/PA (see [11] above). Both the requirements in [11] and [14] will then be applicable.



## **15 Tightness testing of primary and secondary barriers of gas carriers with membrane cargo containment systems for vessels in service**

IACS UR Z17 Annex 1 [15] applies.

## APPENDIX B SPECIAL REQUIREMENTS FOR CATEGORIES OF SERVICE SUPPLIERS NOT LISTED IN IACS UR Z17

### 1 Service suppliers engaged in testing of navigational equipment and systems

#### 1.1 Application

##### 1.1.1

This programme is applicable to service suppliers engaged in performing inspection and testing of navigational equipment and systems on board ships for compliance with SOLAS requirements.

##### 1.1.2

Service suppliers should be approved for the 'functional level' and not for the 'manufacturer level'.

Approval of service suppliers by classification societies does not include the ability to service the equipment down to the 'manufacturer level'.

If a service suppliers is not able to cover all groups of navigational equipment the groups of equipment for which the firm is approved should be listed on any certificate issued.

##### 1.1.3

The service supplier engagements are divided into 5 groups of services:

Group 1:

- 1) Heading information systems, including bearing devices
  - 1) Magnetic compass
  - 2) Gyro compass
  - 3) Transmitting heading device (THD)
- 2) Rate-of-turn indicator
- 3) Rudder, propeller, thrust, pitch and operational mode indicators.

Group 2:

- 1) Speed and distance measuring equipment (SDME)
- 2) Echo-sounding equipment.

Group 3:

- 1) Position-fixing systems
  - 1) Loran C / Chayka
  - 2) GPS
  - 3) GLONASS
  - 4) GPS / GLONASS
  - 5) DGPS 7 DGLONASS.

Group 4:

- 1) Bridge navigational watch alarm system (BNWAS)
- 2) Radar system, incl. plotting aids
- 3) Electronic chart display and information system (ECDIS).

Group 5:

- 1) Heading control system (HCS)

- 2) Track control system (TCS)
- 3) Integrated navigational system (INS).

## 1.2 Requirements for supplier

### 1.2.1 Reference documents

The service supplier should have access to the following documents:

- SOLAS 1974 as amended
- IMO Res. A.789(19): Specification on the survey and certification functions of recognized organizations acting on behalf of the administration
- All IMO Performance Standards relevant for each group of services listed in [1.1.3] as well as all IEC cross product standards (IEC 60945 and IEC 61162 series)
- Flag State Administration requirements
- Relevant parts, if any, of the Society's rules and guidelines.

### 1.2.2 Personnel

#### 1.2.2.1

The service supplier should provide evidence that the person carrying out the inspection has education from a technical school (a minimum two years' programme of engineering or physical science) or from a nautical institution with relevant seagoing experience as a certified ship's officer.

#### 1.2.2.2

Personnel should be trained in testing navigational equipment and systems, preferably by the manufacturer of the equipment. Personnel should also have passed training concerning initial, annual, periodical and renewal surveys and have proficiency in the English language commensurate with the work.

#### 1.2.2.3

Personnel testing colour calibration on ECDIS should, in addition, have a documented Ishihara colour vision deficiency test or equivalent and have colour vision not worse than would be required for seagoing service as an officer.

### 1.2.3 Procedures and instructions

The supplier should have documented procedures and instructions for carrying out the testing and examination of navigational equipment and systems. Such procedures and instructions should ensure that the level of performance tests is in compliance with the relevant technical standards.

### 1.2.4 Equipment and facilities

#### 1.2.4.1

The supplier should have the major and auxiliary equipment (e.g. multi meter, earth fault finder, NMEA logger, etc.) required for correctly performing the testing.

#### 1.2.4.2

A record of the test equipment used should be kept. The record should contain information on manufacturer and type of equipment, and a log of maintenance and calibrations.

#### 1.2.4.3

A standard which is relevant to the navigational equipment and systems to be tested is available for the equipment and is cited in the inspection report.

#### 1.2.4.4

For equipment employing software in conjunction with the testing/examination, this software shall be fully described and verified.

### 1.2.5 Reporting

The service supplier should confirm by means of a documented report that the equipment has been tested satisfactorily, using relevant DNV GL forms.

### 1.2.6 Review and verification

#### 1.2.6.1

The surveyor should be on board to the extent necessary to control the process.

#### 1.2.6.2

The surveyor should confirm that no further testing is needed or specify additional testing.

#### 1.2.6.3

The surveyor should verify the report of the service supplier.

## 2 Service suppliers engaged in preparation of Inventory of Hazardous Materials (IHM)

### 2.1 Application

This programme is applicable to service suppliers engaged in the following services:

- Preparation of inventory of hazardous materials (IHM)
- IHM laboratory and testing services.

### 2.2 Specific requirements for hazmat expert companies

#### 2.2.1

The active hazmat experts need to demonstrate practice experience for at least 1 project per year.

#### 2.2.2

At least one employee of the audited company possesses a valid DNV GL fully approved hazmat expert qualification certificate. The training includes a participation in the 3-4 days Seminar "Approved HazMat Expert" as a theoretical and practical introduction to the business and mandatory to pass the exam. Moreover a witnessing of the hazmat expert during his first assignment is required.

#### 2.2.3

An operational manual is provided, which describes the project execution according to the IMO IHM Guidelines.

#### 2.2.4

The reports may be compiled in the following main structure:

- Executive summary
- Scope and method
- Visual and sampling check plan
- Pictorial report
- Lab report
- Findings and conclusions
- References and qualification.

## 2.3 Specific requirements for laboratories (lab)

### 2.3.1

Only ISO/IEC 17025 accredited laboratories should be used.

### 2.3.2

The lab is accredited for the respective test items and test methods stated in the IMO IHM Guidelines.

### 2.3.3

At least one employee of the audited company possesses a valid DNV GL HazMat Expert qualification certificate or an equal qualification issued by a recognized organization.

### 2.3.4

For asbestos the supplier should demonstrate his quality performance through so called proficiency test events organized by independent institutes at least 2 times a year.

### 2.3.5

The reports should content in particular scope, method, detection level and signature.

## 2.4 Relevant documents

- 1) The HKC: The 'Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships, 2009' SR/CONF/45.
- 2) IHM Guidelines: 'Guidelines for the Development of the Inventory of Hazardous Materials' Resolution IMO MEPC.269(68).
- 3) Survey and Certification Guidelines: '2012 Guidelines for the survey and certification of ships under the Hong Kong Convention' Resolution IMO MEPC.222(64).
- 4) EU SRR: Regulation (EU) No 1257/2013 of the European Parliament and of the Council of 20 November 2013 on ship recycling and amending Regulation (EC) No 1013/2006 and Directive 2009/16/EC.
- 5) IACS Recommendation 113 Expert Parties Engaged in Visual and/or Sampling Checks for Preparation of Inventory of Hazardous Materials.
- 6) DNV GL Rules Pt.6 Ch.7 Sec.4 Recycling / Recyclable.
- 7) ISO/IEC 17025 General requirements for the competence of testing and calibration laboratories.

## 3 Service suppliers engaged in inspection and testing of centralised gas welding and cutting equipment

### 3.1 Procedures

#### 3.1.1

Service suppliers are to have documented procedures and instructions on how to carry out the servicing of the equipment and/or system. These are to either contain or make reference to the Manufacturer's servicing manuals, servicing bulletins, instructions and training manuals, as appropriate, and to international requirements.

#### 3.1.2

Additionally they are to make reference to any requirements (e.g. what markings should be appended to the equipment/system).



## 3.2 Administrative procedures

The supplier should have an order reference system where each engagement is traceable to the inspection and testing report.

## 3.3 Training of personnel

The supplier is responsible for the qualification and training of its supervisors and inspectors/operators to a recognised national, international or industry standard as applicable. A plan for training of personnel is included.

## 3.4 Reporting

Every assignment shall be accompanied with a written report. One copy shall be handed to the vessel, and filed at the supplier premises. The report shall be traceable to the order reference systems. The report shall in addition to specify the works carried out give information of any deficiencies found on components, non-conformance detected and any replacements done of components. NMA forms shall be used as applicable. The report shall include a copy of the certificate of approval.

## 3.5 Reference documents

The service supplier is to have access to the following documents:

- Manufacturer's servicing manuals, servicing bulletins, instructions and training manuals, as appropriate
- Approval certificates showing any conditions that may be appropriate during the servicing and/or maintenance of gas welding and cutting equipment.

# 4 Service suppliers engaged in Non-Destructive Testing (NDT) on classification projects

## 4.1 General

### 4.1.1 Scope

This programme is applicable to service suppliers engaged in performing NDT (Non-Destructive Testing) on ship and/or offshore components/structures which have or will have DNV GL classification. These service suppliers shall be approved by DNV GL if required by relevant part of DNV GL Rules. In this programme such service suppliers are referred to as the Supplier.

### 4.1.2 Objective

The objective of this approval programme is to ensure that the Supplier is using appropriate procedures, has qualified and certified personnel and has implemented written procedures for training, performance, application, control, verification and reporting of NDT. In addition, the Supplier shall furnish appropriate equipment and facilities commensurate with providing a professional service.

### 4.1.3 Extent of programme

The approval programme defines the procedures required in obtaining the Society's approval for carrying out NDT of ship and offshore units (components and structures) classed by the Society.

### 4.1.4 Terms and definitions

The following terms and definitions apply for this document and approval programme.

*NDT* = Non-destructive testing

<i>Supplier</i>	= Firm providing NDT services on behalf of a client on ship and/or offshore components/ structures.
	= The classification conducting the approval. For this programme the is DNV GL
<i>Client</i>	= Firm purchasing the services of a Supplier (i.e. NDT services provider).
<i>MT</i>	= Magnetic particle testing
<i>PT</i>	= Penetrant testing
<i>RT</i>	= Radiographic testing
<i>UT</i>	= Ultrasonic testing
<i>ET</i>	= Electromagnetic testing (i.e. eddy current testing and/or alternating current field measurements [ACFM])
<i>Industrial sector</i>	= Particular section of industry or technology where specialised NDT practices are used, requiring specific product-related knowledge, skill, equipment and/or training.
<i>Significant interruption</i>	= Absence or change of activity which prevents the certified/approved individual from practising the duties corresponding to the level in the method and the industrial sector(s) within the certified scope, for either a continuous period in excess of one year or two or more periods for a total time exceeding two years.

**Guidance note:**

Legal holidays or periods of sickness or courses less than 30 days are not taken into account when calculating the interruption.

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<i>shall</i>	= word in a sentence or phrase that indicates a requirement
<i>should</i>	= word in a sentence or phrase that indicates a recommendation (if the recommendation is not complied with, it shall be justified that an alternative approach will satisfy the recommendation).
<i>may</i>	= word in a sentence or phrase that indicates a permission
<i>can</i>	= word in a sentence or phrase that indicates a possibility or a capability

#### 4.1.5 Mandatory references

- EN ISO 9712; Non-destructive testing - Qualification and certification of NDT personnel
- EN ISO/IEC 17020; Conformity assessment - Requirements for the operation of various types of bodies performing inspection
- EN ISO/IEC 17024; Conformity assessment - General requirements for bodies operating certification of persons
- EN ISO 9001; Quality Management Systems - Requirements

## 4.2 Requirements for supplier

A certificate of approval will be awarded and maintained on the basis of compliance with the following.

### 4.2.1 Submission of documents

The following documents shall be submitted for review and approval before any audit is scheduled:

- an outline of supplier's organisation and management structure, including any subsidiaries to be included in the approval
- information on Quality Management System
- quality manual and documented procedures covering the requirements given in [4.2.3]
- for companies with in-house personnel certification scheme; a written practice developed in accordance with a recognised standard or recommended practice (i.e. ASNT's SNT-TC-1A, ANSI/ASNT CP-189 or similar).
- operational work procedures for each NDT method

- training- and follow-up programmes for NDT operators including practical training on various ship and offshore products
- procedure for supervisor's authorisation of NDT operators
- experience of the Supplier in the specific service area,
- a list of NDT operators' documented training and experience within the relevant service area, including qualifications and third party certification according to EN ISO 9712 based certification schemes.
- description of equipment(s) used for the particular service for which approval is sought
- a guide for NDT operators to use such equipment
- record formats for recording results of the services referred to in [4.2.13]
- information on other activities which may present a Conflict of interest
- record of customer claims and corrective actions
- any legal proceedings against the company in the past/currently in the courts of law

#### 4.2.2 Extent of approval

The supplier shall demonstrate, as required in [4.2.4] to [4.2.13], that it has the competence and control needed to perform the specified services.

The extent of the approval shall include and be limited to the NDT methods, NDT techniques and personnel upon which approval will be granted.

#### 4.2.3 Quality management system

The supplier shall have a documented quality management system, covering at least:

- work procedures
- preparation, issuance, maintenance and control of documents
- maintenance and calibration of the equipment
- training programs for the NDT operators and the supervisors
- maintenance of records for NDT operators' and the supervisors' training, qualification and certification
- certification of NDT operators including re-validation and recertification
- procedure for test of operators visual acuity
- supervision and verification of operation to ensure compliance with the approved operational procedures
- quality management of subsidiaries
- job preparation
- recording and reporting of information, including retention time of records
- code of conduct for the Supplier's activities; especially the NDT activities
- periodic review of work process procedures
- corrective and preventive action
- feedback and continuous improvement
- internal audits
- the provision of an engineering library with required codes, standards and procedures to assist NDT operators.

A documented quality system complying with the most current version of EN ISO/IEC 17020 and including the above would be considered acceptable. The Supplier should satisfy the requirements of Type A or Type B inspection body, as described in EN ISO/IEC 17020.

**Guidance note:**

Fulfilling latest version of EN ISO/IEC 17020 will also comprise that latest version of EN ISO 9001 is fulfilled.

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#### 4.2.4 Training and certification of NDT personnel

The supplier is responsible for the training and 3<sup>rd</sup> party certification of its supervisors and operators to a recognised certification scheme based on EN ISO 9712.

Personnel qualification to an employer based qualification scheme as e.g. SNT-TC-1A or ANSI/ASNT CP-189 may be accepted if the supplier's written practice is reviewed and found acceptable by the Society. The supplier's written practice shall as a minimum, except for the impartiality requirements of a certification body and/or authorised body, comply with EN ISO 9712.

The supervisors' and operators' certificates and competence shall comprise all industrial sectors and techniques being applied by the supplier.

Level 3 personnel shall be certified by an accredited certification body.

#### 4.2.5 Supervisor

The Supplier shall have a supervisor or supervisors, responsible for the appropriate execution of NDT operation and for the professional standard of the operators and their equipment, including the professional administration of the working procedures.

The supervisor shall, as a minimum, be certified to Level 3 in the NDT method(s) concerned and as described in [4.2.4]. Please note that Level 3 certification by appointment is not acceptable.

The supervisor shall be directly involved in review and approval of NDT Procedures, NDT reports, Calibration of NDT equipment and tools. The supervisor shall on behalf of the Supplier re-evaluate the training, qualification and experience of the operators annually.

Where such an independently certified Level 3 is not available in-house, the supplier can access such services from external resources under written agreement, as applicable. For Suppliers with ten-10 NDT operators or more in the staff, the Level 3/Supervisor should be permanently employed by the Supplier.

The supervisor's training, qualification, experience and certification shall be re-evaluated at regular intervals for recertification set by the accredited body that originally certified the supervisor (normally every 5 years).

#### 4.2.6 Operators

The operator carrying out the NDT shall, as a minimum, be qualified and certified to Level 2 in the NDT method(s) concerned and as described in [4.2.4]

The operator shall have adequate knowledge of materials, structures or components, NDT equipment and limitations that are sufficient to apply the relevant NDT method for each application appropriately.

#### 4.2.7 Personnel records

The supplier is required to keep records of the approved NDT operators. The supplier shall submit the list of approved operators to the Society.

The records shall contain information on age, formal qualification, training, certification, authorisation/re-validation, recertification and experience in the NDT method(s) concerned.

The approval of the supplier covers the NDT operators at the list of approved operators submitted to the Society.

The company shall maintain these records so that they are easily auditable.

The records will be reviewed by DNV GL during the kick off meeting for each particular job.

#### 4.2.8 Equipment

A record of the equipment used for NDT shall be kept. The records shall contain information on maintenance and calibration. Where the supplier hires equipment from external resources, the equipment shall have calibration records.

Where the equipment is of unique nature, the NDT operators shall be trained in the operation and use of the equipment before carrying out NDT using this equipment.

#### 4.2.9 Work procedures and instructions

The supplier shall have documented work procedures (i.e. NDT and administrative procedures) that complies with DNV GL rules. The work procedures are at least to contain information on NDT methods, calibration checks, inspection procedure and defect evaluation against acceptance criteria in accordance with DNV GL rules. All NDT procedures and instructions shall be properly documented in such a way that the performed testing can be easily retraced and/or repeated at a later stage.

#### 4.2.10 Administrative procedures

The supplier shall have an order reference system where each engagement is traceable to when, who and where the test was carried out including the location of test record and reports. A documented quality system complying with the most current version of EN ISO/IEC 17020 would be considered acceptable for administrative procedures (also see [4.1.6] and [4.2.3]).

#### 4.2.11 Verification

The supplier shall have a system to verify that the service provided is carried out in accordance with approved procedures. Executed verification shall be documented. Verification shall be performed by personnel possessing similar qualifications as the personnel performing the service.

#### 4.2.12 Sub-contractors

The supplier shall give information of agreements and arrangements if any part(s) of the services provided are subcontracted. The supplier, in the following-up of subcontracts shall give particular emphasis to the quality management system of the subcontractor.

Subcontractors shall meet all the requirements of [4.2.1], [4.2.2], [4.2.3], [4.2.4], [4.2.5], [4.2.6], [4.2.7], [4.2.8], [4.2.9], [4.2.10], [4.2.11], [4.2.12] and [4.2.13] of this programme.

#### 4.2.13 Reporting

All NDT shall be properly documented in such a way that the performed examination can be easily retraced and/or repeated at a later stage. The reports shall identify the defects present in the tested area, and a conclusive statement as to whether the material, weld, component or structure satisfies the acceptance criteria or not.

The examination report shall as a minimum have a content covering the same items as listed in [DNVGL-CG-0051](#). Applicable standard, NDT procedure and acceptance criteria shall comply with DNV GL rules.

All reports shall also include the approval number for the supplier.

### 4.3 Approval procedures

#### 4.3.1 Initial audit

The will carry out an audit of the supplier once all documentation and information received from the supplier has been evaluated and approved.

The audit will be carried out by reviewing records submitted by the supplier, a visit to the supplier's facility/ office and interview of personnel including certified Level 3 supervisor.

Approval of the supplier's supervisor(s) and NDT operators shall be done according to [4.8] of this programme.

#### 4.3.2 Intermediate audit

Intermediate audits may be required once a year during the validity of the approval, if found necessary by the Society.

#### 4.3.3 Renewal audit

Renewal of the certificate of approval shall be made at intervals not exceeding three-3 years.

Verification shall be through audits confirming, or otherwise, that approved condition is being maintained.

At least three months before the period from the current expiry date, the Supplier shall apply to the for renewal of the certificate of approval.

#### 4.3.4 Random audit

DNV GL may initiate random audit if deemed necessary, either as part of the approval process or as the result of findings during a project. The audit may be either a review of documentation, a verification of personnel or a verification of processes, using personnel employed by DNV GL and certified Level 3.

Supplier shall provide access to their records, people and facility upon request.

## 4.4 Certificate of approval

### 4.4.1 Approval of the supplier

If the submitted documentation, the surveyor's audit and the practical demonstration are found satisfactory, the supplier will receive a certificate of approval.

### 4.4.2 Scope of the approval

The approval will be specific to the NDT methods and techniques, list of approved operators and to the geographical localisation of the supplier where the audit is implemented.

The approval for NDT methods will depend on availability of supplier's certified supervisor and NDT operators certified in the methods for which the approval is sought.

The approval is not interchangeable across different locations of the supplier. A separate application will be required for a location that is different from the currently approved location.

## 4.5 Information on alteration to the approved service operation system

In cases where any alteration to the approved service operation system or alteration of approved supervisors or NDT operators of the supplier are made, such alteration is to be reported immediately to the Society. A re-audit and/or re-approval of supplier, supervisor and/or NDT operators may be required when deemed necessary by the Society.

## 4.6 Cancellation or suspension of the certificate of approval

### 4.6.1 Right to cancel or suspend

The reserves the right to cancel or suspend the certificate of approval in the following cases:

- where the service was improperly carried out or the results were improperly reported
- where a surveyor finds deficiencies in the approved service operation system of the supplier, and appropriate corrective action is not taken
- if any NDT work are done without following procedures approved by the
- where the supplier fails to give information of any alteration, as given in [4.5]
- where an intermediate audit, if requested as described in [4.3.2], has not been carried out
- where wilful acts or omissions are ascertained
- violation of code of ethics and conduct.

### 4.6.2 Information

The reserves the right to inform interested parties on cancellation or suspension of the certificate of approval.

### 4.6.3 Re-approval

A supplier that has had the certificate of approval cancelled may apply for re-approval after a period of one (1) year.

This possibility is not open, if the cancellation was based on a serious fault, such as a violation of code of conduct.

A supplier that has had the certificate of approval suspended can have the certificate reinstated as soon as issues listed in [4.6.1] are rectified.

## 4.7 Bibliography

- ANSI/ASNT CP-189; ASNT Standard For Qualification and Certification of Nondestructive Testing Personnel
- Recommended Practice No. SNT-TC-1A; Personnel Qualification and Certification in Nondestructive Testing.

## 4.8 Requirements for approval of NDT personnel

### 4.8.1 General

The following approach shall be used in order to approve NDT operators employed or hired by suppliers approved according to this programme or seeking approval according to this programme. One of the following routes shall be applied.

### 4.8.2 Approval of supervisors for service suppliers

The supplier's supervisor or supervisors, responsible for the appropriate execution of NDT operation and for the professional standard of the operators and their equipment, including the professional administration of the working procedures (see [4.2.5]) shall be certified as stated in and approved by the as outlined in this appendix.

When applying approval for supervisors, a qualification on-site audit of the personnel is required. The shall appoint one or more assessors who, between them hold NDT Level 3 certification issued by a third party certification body, covering the relevant sector(s) and NDT method(s) equivalent to those applied by the NDT personnel to be approved.

In particular, the Society's assessor(s) shall ascertain during an audit conducted on site that the individual to be approved:

- has satisfactory vision and colour perception;
- is familiar with and able to satisfactorily interpret standards codes and draft NDT procedures and/or NDT instructions for the testing in the relevant industrial sector(s);
- is familiar with DNV GL's applicable requirements for NDT in the method(s) and sector(s) for which approval as service supplier is sought.
- has acquired suitable industrial experience at typical level corresponding with the certification level in the applicable NDT method and relevant sector(s);
- has been successful in job-specific practical 3<sup>rd</sup> party certification examinations that are relevant to the industrial sector which approval is sought;
- continues to be qualified, without significant interruption, in the industrial sector which approval is sought;

The audit of supervisor(s) can be conducted as an interview or preferably as a questionnaire as outlined in relevant sections for Level 3 examinations in EN ISO 9712. If the supervisor(s) can't document a 3<sup>rd</sup> party practical examination being the basis for their 3<sup>rd</sup> party Level 3 certification, the supervisor(s) need to undergo testing of specimens in each of the NDT methods for which approval is sought. The scope of practical examination and grading of the testing reports shall be as specified in EN ISO 9712 latest revision.

### 4.8.3 Route A for approval of NDT operators

An individual holds at least an EN ISO 9712 Level 2 certificate in a method and relevant sector issued by a certification body which is accredited for certification of persons according to EN ISO/IEC 17024 and EN ISO 9712. Furthermore, the Supplier has active working procedures for follow-up and yearly authorisation of the certified individual.

In this case, the individual is considered to be approved without further action.

See flow diagram in [4.8.6] showing the actual procedure for approving the individual in question.

### 4.8.4 Route B for approval of NDT operators

An individual qualified and certified to at least Level 2 in a method and relevant sector against criteria of a standard that is equivalent to EN ISO 9712, may be approved by the provided it is satisfied that all criteria are equivalent to those of EN ISO 9712.

In this case the individual may be approved by the upon receipt of satisfactory documented evidence of qualification and certification provided by the certification body concerned and that the supplier has active working procedures for follow-up and yearly authorisation of the certified individual.

See flow diagram in [4.8.6] showing the actual procedure for approving the individual in question.

#### 4.8.5 Route C for approval of NDT operators

An individual qualified and certified to at least Level 2 in a method and relevant sector against criteria of a standard or recommended practice that is based on so called in-house certification (e.g. according to ASNT's SNT-TC-1A or ANSI/ASNT CP-189 or similar), may be approved by the provided it is satisfied that all criteria regarding training, theoretical and practical competence are equivalent to those of EN ISO 9712.

When applying approval by route C, a qualification on-site audit of the personnel is required. The shall appoint one or more assessors who, between them hold NDT Level 3 certification issued by a third party certification body, covering the relevant sector(s) and NDT method(s) equivalent to those applied by the NDT personnel to be approved.

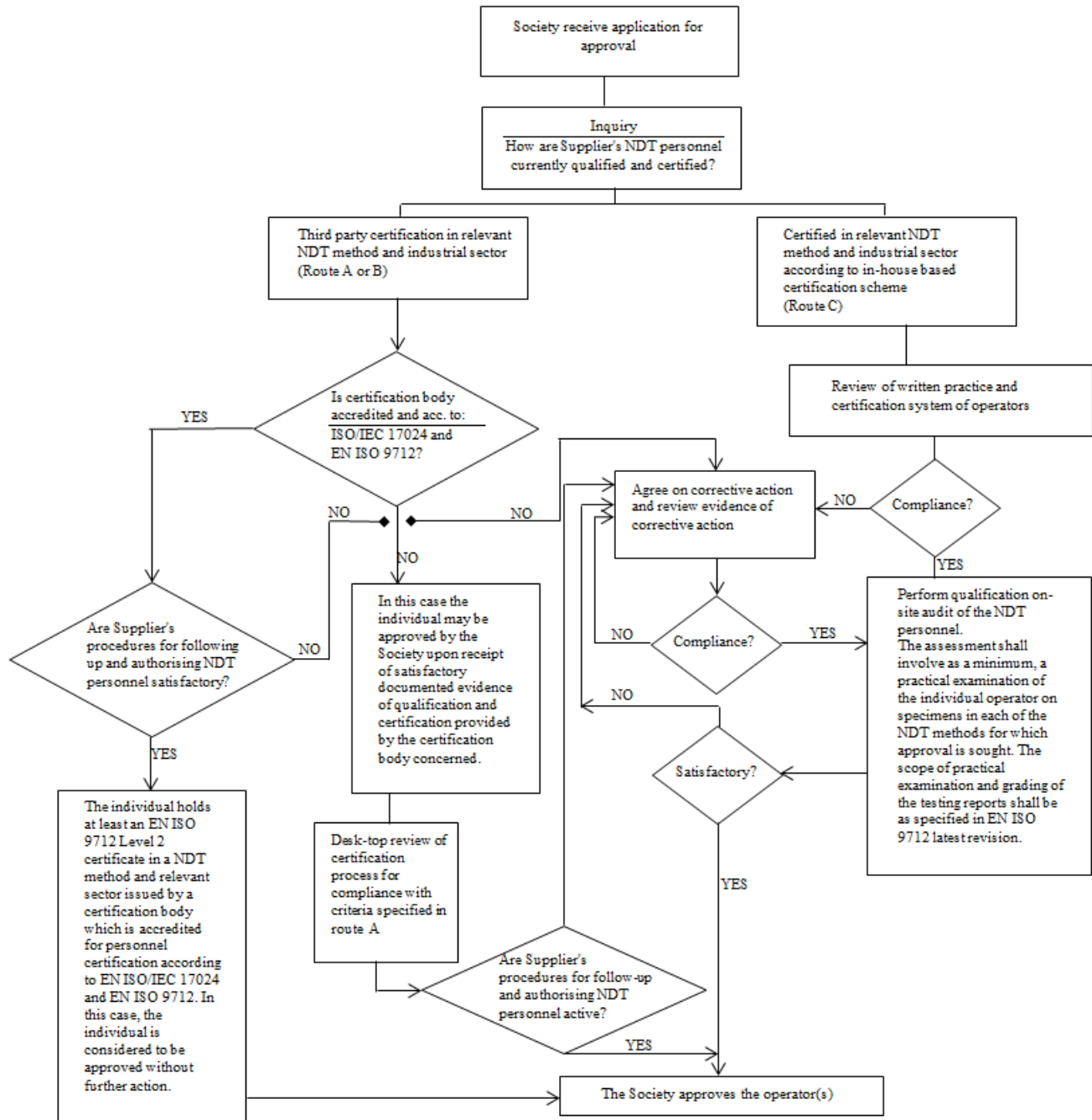
In particular, the Society's assessor(s) shall ascertain during an audit conducted on site that the individual to be approved has:

- satisfactory vision and colour perception;
- completed general and job-specific training prior to examination;
- acquired suitable industrial experience in the applicable NDT method and relevant sector(s);
- been successful in general and relevant specific written qualification examinations;
- been successful in job-specific practical examinations that are relevant to the industrial sector which approval is sought;
- continues to be qualified, without significant interruption, in the industrial sector which approval is sought; and
- is familiar with and able to satisfactorily implement defined NDT procedures and/or NDT instructions for the testing in the relevant industrial sector.

The Society's assessor(s) shall assess each of the NDT personnel applying for approval. The assessment shall involve, as a minimum, a practical examination during which the individual seeking approval shall be observed, satisfactorily testing specimens in each of the NDT methods for which approval is sought. The scope of practical examination and grading of the testing reports shall be as specified in EN ISO 9712 latest revision.



### 4.8.6 Flow diagram for the approval process of NDT operators



## 5 Service suppliers firms engaged in condition monitoring of machinery on board ships and mobile offshore units

### 5.1 General

#### 5.1.1 Scope

Companies providing condition monitoring services of machinery and equipment, in order to offer an alternative to calendar based renewal surveys, shall be approved by the Society. The companies shall be approved in accordance with this programme and applicable DNV GL rules. In the following, such companies are referred to as the supplier.

#### 5.1.2 Objective

The objective of this approval programme is to ensure that the supplier of condition monitoring services is using appropriate procedures, has qualified and certified personnel and has implemented written procedures for training, performance, application, control, verification and reporting.

#### 5.1.3 Extent of approval

The approval programme defines the requirements for obtaining the Society's approval for carrying out condition monitoring of machinery and equipment, normally subject to renewal and annual survey on vessels classed by the Society.

Condition monitoring of machinery and equipment is in this program limited to the following standardised methods:

- vibration condition and diagnostics
- lubricant analysis (oil)

#### 5.1.4 References

<i>DNVGL-RU-OU-0101</i>	= Rules for Classification of Offshore Drilling and Support Units
<i>DNVGL-RU-OU-0102</i>	= Rules for Classification of Floating production, storage and loading units
<i>DNVGL-RU-OU-0103</i>	= Rules for Classification of Floating LNG/LPG production, storage and loading units
<i>DNVGL-RU-SHIP Pt.7</i>	= Rules for Classification of Ships, Part 7
<i>ISO 17359</i>	= <i>Condition monitoring and diagnostics of machines - General guidelines</i>
<i>ISO 13379-1</i>	= <i>Condition Monitoring and diagnostics of machines- Data interpretations and diagnostics techniques</i>
<i>ISO 13372</i>	= <i>Condition Monitoring and diagnostics of machines - Vocabulary</i>
<i>ISO 18436-2</i>	= <i>Condition monitoring and diagnostics of machines - Requirements for training and certification of personnel</i> - Part 2: <i>Vibration condition monitoring and diagnostics.</i>
<i>ISO 18436-4</i>	= <i>Condition monitoring and diagnostics of machines - Requirements for qualification and assessment of personnel - Part 4: Field lubricant analysis</i>
<i>ISO 18436-5</i>	= <i>Condition monitoring and diagnostics of machines - Requirements for qualification and assessment of personnel - Part 5: Lubricant laboratory technician/analyst</i>
<i>ISO 9000 series</i>	= <i>Quality management</i>

## 5.2 Requirements to supplier

The certificate of approval will be awarded and maintained on the basis of compliance with the requirements in this chapter.

### 5.2.1 Submission of documents

In addition to the documents listed in the general requirements provided in this program (DNVGL-CP-0484), the following documents shall be submitted for review:

- 1) information on the implemented Quality Management System, quality manual and/or documented procedures covering the requirements given in [5.2.3]
- 2) written work procedures developed in accordance with the current rules for classification applicable for Ships and Mobile Offshore Units (MOU) and Ships.

**Guidance note:**

A written procedure evaluating type of classed vessel, additional notations and systems applicable for the service offered.

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- 3) written procedures with checklists for applicable processes related to the condition monitoring methods.
- 4) training, competence and certification programmes for condition monitoring operators, ref. [5.2.4]
- 5) list of operators with relevant condition monitoring certification, ref. [5.2.4], [5.2.5] and [5.2.6]

Submission of documents shall comply with the general requirements for documentation given in [RU SHIP Pt.1 Ch.3](#).

### 5.2.2 Extent of approval

In addition to the general requirements given in this program, the supplier shall demonstrate as required in sections [5.2.3] to [5.2.10], that the supplier has the competence and organisation needed to perform the specified services.

### 5.2.3 Quality management system

The supplier shall have a documented quality management system, covering at least:

- 1) work procedures
- 2) internal audits
- 3) training programmes for the condition monitoring operators and the supervisor(s)
- 4) manning requirements needed to ensure continuous operation
- 5) retention time of records
- 6) feed back and continuous improvement

**Guidance note:**

The service supplier shall have an active improvement process including evaluation of monitoring methods and any industry development (Ref. ISO 17359 Ch.11), self-evaluation of relevant services and customer feedback

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### 5.2.4 Training, competence and certification of condition monitoring personnel

The supplier is responsible for the training and 3<sup>rd</sup> party certification of its operators according to requirements given in ISO 18436-2 for vibration diagnostics and for ensuring competence in lubricant analysis applicable to their services. It is the obligation of the supplier to uphold a minimum manning level of qualified personnel in the company to ensure the integrity of the services. Records of qualifications and training shall be maintained on a continuous basis.

**Guidance note:**

The supplier is recommended to apply ISO 18436-4 (or 5) when ensuring sufficient competence with lubrication analysis. A minimum manning level indicates that the supplier shall be able to continue performing all relevant services according to approved procedures and requirements even if relevant personnel for some reason is unavailable to perform their intended function.

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### 5.2.5 Supervisor

The supplier shall have one or more supervisors responsible for the appropriate execution of the condition monitoring. The supervisors shall be responsible for the professional standard of the operators and their equipment, including the professional administration of the working procedures. The supervisor, as a minimum, shall be independently certified to the requirements of Category III, according to ISO 18436-2.

### 5.2.6 Operators

The operator carrying out condition monitoring analysis shall be qualified and certified to the appropriate level for their scope of work, minimum Category I in accordance with ISO 18436-2. The operators shall have adequate knowledge of the systems and components handled, sensors, equipment and the limitations of the relevant condition monitoring methods applied.

**Guidance note:**

The minimum requirements for number of operators are two with ISO 18436-2 certification category II. These will fulfill the analysis and verification function in addition to ensuring continuous operation.

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### 5.2.7 Personnel records

The supplier is required to keep records of approved condition monitoring operators. The records shall contain information on training, certification, revalidation and performing experience in condition monitoring.

### 5.2.8 Work procedures and instructions

The supplier shall have documented work procedures developed in accordance with the requirements in ISO 17359, containing at least information on:

- Monitoring methods
- Data acquisition and analysis
- Determine maintenance actions
- Reporting

**Guidance note:**

It is recommended to apply standard maintenance terminology in all applicable work procedures ref. EN 13372: *Condition Monitoring and diagnostics of machines - Vocabulary*, or equivalent.

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### 5.2.9 Verification

The supplier shall have a system for verifying that the services provided are carried out in accordance with approved procedures. Verification of work shall be executed by personnel with the same or higher certification level as the operator/analyst. Work carried out by the supervisor may be verified by an operator with ISO Category II. Verification shall be documented.

**Guidance note:**

It may be accepted that no verification is carried out if analysis is based upon trends with no fault indications (typical analysis carried out by ISO Category I operator).

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### 5.2.10 Reporting

All condition monitoring records shall be properly documented and retained in such a way that all conclusions can easily be traced later. The reports shall identify extent and location of measurements performed in terms of machine identifying numbers, trends, defects indicated, and a conclusive statement regarding the state of the equipment. In addition, and as a minimum, the following information must be given:

- name of the vessel
- identification number (DNV GL ID or IMO number)
- place and date of examination
- test equipment used

- name and signature of the service supplier representative issuing the report
- name and signature of the service supplier representative verifying the report.

The content of this chapter is under development. The service specific requirements of the legacy rules are to be applied until the new version of this chapter is published.

## 6 Service suppliers engaged in resin casting of chock foundations, stern tubes, etc.

### 6.1 Objective

The objective of this programme is to set the specific requirements for approval of service suppliers (AoSS) engaged in resin casting.

The general requirements for AoSS are given in DNVGL-CP-0484 DNV GL approval of service supplier scheme.

The service supplier has to fulfil both the requirements in DNVGL-CP-0484 in addition to the service specific requirements given below.

Service supplier is hereafter also referred to as 'supplier'.

### 6.2 Application

This programme is applicable to suppliers engaged in resin casting for following applications:

- foundation chocking for machinery installations
- installation of propeller shaft bearings
- installation of rudder stock bearings.

### 6.3 Reference documents

Type approval programme for resin:

- DNVGL CP 0432 Pourable compounds for foundation chocking.

Classification guideline for installation of machinery components:

- DNVGL CG 0372 Foundation and mounting of machinery.

### 6.4 Requirements for service supplier

#### 6.4.1 General

The cast resin used for chocking or installation shall have a Type Approval certificate according DNVGL CP 0432 Pourable compounds for foundation chocking - Non-metallic materials.

#### 6.4.2 Servicing station

The supplier shall appoint supervisory staff responsible for installation. The names will be mentioned on the certificate.

The supplier shall maintain an updated list of qualified personnel.

The evidence of qualification of staff performing the installation shall be available on site at the request of the attending surveyor.

#### 6.4.3 Documents

For each application the installation drawings and calculations shall be prepared by the supplier or an authorized representative.

#### 6.4.4 Reporting

Each application shall be reported with the relevant installation conditions and final acceptance statement by the supplier's person responsible.

As a minimum the following information shall be reported:

- clear identification number of project
- responsible person, operators
- used type of resin with batch number
- environmental conditions (temperature(air, joining parts, resin/hardener), relative humidity) with date and time
- start time and duration of casting process
- amount of resin casted/test samples
- heat treatment / tempering during curing process, if any
- environmental conditions during curing process
- final acceptance test with date and time
- final acceptance statement by the supplier's person responsible.

#### 6.4.5 Verification

The supplier must have the surveyor's verification of each separate job, documented in the report by the attending surveyor's signature.

## 7 Service suppliers engaged in lay-up service of vessels

The content of this chapter is under development. Contact MRRNO332 for further information.

## 8 Service suppliers engaged in testing of ballast water management systems (environmental testing)

### 8.1 Scope

#### 8.1.1 Scope for class approval

Test facilities engaged in testing of ballast water management systems (BWMS) following DNV GL type approval programme CP 0209, the results of which may form the basis for the surveyor's decisions, shall be approved by DNV GL following the criteria established in this programme.

#### 8.1.2 Scope for statutory approval

Test facilities engaged in testing of BWMS following guidelines G8 of the ballast water management convention (BWM Convention), the results of which may form the basis for the surveyor's decisions, shall be approved by DNV GL following the criteria established in this programme, as well as relevant criteria given in guidelines G8 of the BWM convention (hereafter referred to as guidelines G8), where DNV GL is so authorized by the relevant flag administration.

Additional national accreditation, as may be required by the different flag administrations to grant the type approval for the BWMS, shall be complied with and verified by DNV GL. National accreditation or any other accreditation is not considered to be equivalent to the requirements of this programme.

#### 8.1.3 Scope for approval as independent lab for the United States coast guard

This section deals with test facilities engaged in testing of BWMS as sub-contractors to DNV GL acting as independent lab (IL) for the United States coast guard (USCG). In order to be considered as a sub-contractor to DNV GL acting as IL for the USCG, test facilities must comply with the following:

- Tests must be conducted following the USCG 46 CFR 162.060 and/or the US environmental protection Agency's environmental technology verification program document *Generic Protocol for the Verification of Ballast Water Treatment Technologies* November 2010 – hereafter referred to as ETV protocol.

- Be approved by DNV GL following the criteria established in this programme.
- Be approved by the USCG as sub-contractors to DNV GL.

Approval according to this programme is a prerequisite for DNV GL to engage in a frame agreement with test facilities when DNV GL is acting as an IL for the USCG.

## 8.2 Test facility requirements

### 8.2.1 General

A certificate of approval will be awarded and maintained on the basis of compliance with the requirements given in [8.2.3] to [8.2.5]. The test facility must demonstrate that it has the competence and control needed to perform the tests required by:

- Guidelines G8, and
- DNV GL class guideline [CG 0339](#), and/or
- USCG 46 CFR 162.060 and the ETV protocol.

The test facility is responsible for ensuring that the appropriate quality assurance and quality control procedures outlined in the documentation listed in [8.2.2] are implemented.

### 8.2.2 Documentation

The following documents shall be submitted:

- Valid ISO 17025 certificate.

### 8.2.3 Quality assurance system

The test facility shall be accredited to ISO 17025.

The accreditation body shall be a member of IAF/EA, and the scope of accreditation must be relevant and clearly defined.

### 8.2.4 Sub-contractors

The test facility shall give information of agreements and arrangement if any parts of the services provided are sub-contracted. The information must be included in the quality assurance project plan (QAPP) and the quality management plan (QMP) must incorporate all sub-contractors.

The information must include name, address, function and certification of the sub-contractor. The QAPP shall include in details what the sub-contractor will be responsible for and how proper transfer of authority will be assured.

Particular emphasis shall be given to quality management by the test facility in following-up of such subcontracts. Subcontractors providing anything other than subcontracted personnel or equipment shall also meet the requirements of section [8.2.2] to [8.2.5].

### 8.2.5 Reporting

A report shall be written for each test. The report shall be based on standard forms and is in addition to describing the work performed to give information of any deficiencies found on components, non-conformance detected and any replacements done of components.

The report shall also include information regarding the test design, methods of analysis and the results of these analyses.

The report shall be traceable to the order reference system.

## 8.3 Approval procedures

### 8.3.1 Application as sub-contractor to DNV GL acting as IL to the USCG

DNV GL can, based on request by the test facility, apply to the USCG to include the test facility in DNV GL's list of sub-contractors to DNV GL when acting as IL to the USCG.

Upon approval by the USCG, DNV GL and the test facility can sign a frame agreement allowing the test facility to conduct tests as a sub-contractor to DNV GL.

## 8.4 References

The following references are used or referred to in this programme:

- DNV GL rules for classification of ships, [RU SHIP Pt.6 Ch.7 Sec.1](#)
- DNV GL class guideline [CG 0339](#)
- DNV GL type approval programme CP [0209](#)
- IMO Res. MEPC.174(58) *Guidelines G8 of the Ballast Water Management Convention*
- IMO Res. MEPC.169(57) *Guidelines G9 of the Ballast Water Management Convention*
- USCG 46 CFR 162.060 – Ballast water management systems
- US environmental protection agency’s environmental technology verification (ETV) Program document *Generic Protocol for the Verification of Ballast Water Treatment Technologies* november 2010
- ISO 17025:2005 standard.

## 9 Service suppliers engaged in testing of ballast water management systems (land-based and shipboard testing)

### 9.1 Scope

#### 9.1.1 Scope for class approval

Test facilities engaged in testing of ballast water management systems (BWMS) following DNV GL type approval programme CP [0209](#), the results of which may form the basis for the surveyor’s decisions, shall be approved by DNV GL following the criteria established in this programme.

#### 9.1.2 Scope for statutory approval

Test facilities engaged in testing of BWMS following guidelines G8 of the ballast water management convention (BWM Convention), the results of which may form the basis for the surveyor’s decisions, shall be approved by DNV GL following the criteria established in this programme, as well as relevant criteria given in guidelines G8 of the BWM convention (hereafter referred to as guidelines G8), where DNV GL is so authorized by the relevant flag administration.

Additional national accreditation, as may be required by the different flag administrations to grant the type approval for the BWMS, shall be complied with and verified by DNV GL. National accreditation or any other accreditation is not considered to be equivalent to the requirements of this programme.

#### 9.1.3 Scope for approval as independent lab for the United States coast guard

This section deals with test facilities engaged in testing of BWMS as sub-contractors to DNV GL acting as independent lab (IL) for the United States coast guard (USCG). In order to be considered as a sub-contractor to DNV GL acting as IL for the USCG, test facilities must comply with the following:

- Tests must be conducted following the USCG 46 CFR 162.060 and/or the US environmental protection Agency’s environmental technology verification program document *Generic Protocol for the Verification of Ballast Water Treatment Technologies* November 2010 – hereafter referred to as ETV protocol.
- Be approved by DNV GL following the criteria established in this programme.
- Be approved by the USCG as sub-contractors to DNV GL.

Approval according to this programme is a prerequisite for DNV GL to engage in a frame agreement with test facilities when DNV GL is acting as an IL for the USCG.



## 9.2 Test facility requirements

### 9.2.1 General

A certificate of approval will be awarded and maintained on the basis of compliance with the requirements given in [9.2.3] to [9.2.8]. The test facility must demonstrate that it has the competence and control needed to perform the tests required by:

- Guidelines G8, and
- DNV GL type approval programme CP 0209, and/or
- USCG 46 CFR 162.060 and the ETV protocol.

The test facility is responsible for ensuring that the appropriate quality assurance and quality control procedures outlined in the documentation listed in [9.2.2] are implemented.

### 9.2.2 Documentation

The following documents shall be submitted:

- Quality assurance project plan (QAPP) including standard operating procedures (SOP)
- Quality management plan (QMP)
- Environmental safety and health plan (ESH)
- Piping and instrumentation diagram of the test facility set-up
- Detailed sampling facilities and port arrangement and location
- General arrangement plan of the test facility set-up
- Equipment list of pumps, sensors and valves
- Test facility validation plan (see [9.3.3]).

### 9.2.3 Quality assurance system

#### 9.2.3.1 Accreditation

The test facility shall be accredited to ISO 17025. If not available, compliance with the requirements of ISO 17025 must be documented and audited by DNV GL.

#### 9.2.3.2 Quality assurance project plan

The test facility shall have an approved quality assurance project plan (QAPP) for BWMS testing that is regularly reviewed and updated as defined in the facility's quality management plan (QMP).

The QAPP is a written document that provides a comprehensive overview of the test facility management, infrastructure, capabilities, test methodology, measurement and data collection systems, data management systems, and includes all relevant facility standard operating procedures (SOPs, typically included as appendices).

The QAPP shall be developed in accordance with ISO/IEC 17025.

#### 9.2.3.3 Standard operating procedures

Standard operating procedures (SOPs) are work procedures following international standards where applicable and individual procedures containing description for an activity to be performed in exactly the same way independent of involved personnel.

The test facility shall have SOPs that include, as a minimum:

- Challenge water preparation (biological parameters and physical/ chemical parameters)
- Sampling volumes and sample handling
- Analytical procedures
- Handling of results.

#### 9.2.3.4 Quality management plan

The test facility shall have an approved quality management plan (QMP) describing how it structures its quality system, the quality policies and procedures, areas of application, and roles, responsibilities, and authorities.

The QMP addresses the quality control management structure and policies of the test facility (including subcontractors and outside laboratories).

The QMP shall be developed in accordance with ISO/IEC 17025.

#### 9.2.3.5 Environmental safety and health plan

The test facility shall have an environmental safety and health plan (ESH) that is regularly reviewed and updated.

### 9.2.4 Personnel

The test facility is responsible for ensuring that a sufficient number of qualified personnel are available to perform the tests required by the regulations described in [9.2]. The personnel shall all be employed or under contract to the test facility and shall meet, as a minimum the requirements listed in [9.2.4.1] to [9.2.4.3].

#### 9.2.4.1 Positions

The staff responsible for the operations under testing shall consist of the following positions, as a minimum:

- On-site test director
- Operations staff
- 1 QA/QC<sup>1)</sup> person
- 2 analysts for organisms  $\geq 50 \mu\text{m}$  size class
- 2 analysts for organisms  $\geq 10 - 50 \mu\text{m}$  size class
- 1 analyst for the  $< 10 \mu\text{m}$
- 1 sample handling person.

<sup>1)</sup> QA/QC: Quality assurance/quality control.

It is acceptable if one key analyst is identified for multiple size classes, provided the number of qualified analysts during testing is consistent with the QAPP.

#### 9.2.4.2 Qualifications

Personnel involved in testing shall have qualifications in the following disciplines, as a minimum:

- Chemistry
- Engineering
- Biology/microbiology.

#### 9.2.4.3 Training

The test facility is responsible for the qualification and training of its personnel to a recognized national, international or industry standard as applicable.

Records of qualifications and training shall be maintained.

#### 9.2.4.4 Personnel records

The test facility shall keep records of the approved personnel responsible for testing. The record shall contain information on age, formal education, training and experience for the services for which they are approved.

## 9.2.5 Procedures, equipment and premises

### 9.2.5.1 Procedures

The test facility shall maintain a record of:

- Any issues associated in operation or maintenance of the equipment encountered during test operations, including any recorded data or operator observations associated with performance deviations or abnormal/unexpected operations.
- Consumables, spare parts etc. used for the BWMS during testing period.
- The commissioning process, indicating the equipment was correctly installed and safe to operate under its intended operating conditions, and that the designated laboratory representative has received appropriate instruction in operation and maintenance of the equipment.

The test facility shall have a procedure to monitor any potential chemical residuals that result from BWMS operation during testing.

The test facility ensures that the BWMS successfully alerts / alarms if its discharge exceeds prescribed levels as determined by vendor and/or environmental discharge standards and if any safety issues are encountered during operations.

### 9.2.5.2 Equipment

The test facility shall have adequate instrumentation to:

- Log engineering parameters of the operation of the BWMS during testing in order to validate and ensure that the data relevant for the tested BWMS are adequately reported.
- Log power consumption throughout test operations of the BWMS.
- Measure core parameters including temperature, salinity, TSS, POC, DOC, DO, pH and chlorophyll.
- Quantify and analyze samples of organisms in all of the required class sizes.

Calibration certificates and records of all equipment used for monitoring and measuring shall be available on site for inspection.

### 9.2.5.3 Premises

The test facility shall be outfitted with adequate piping, pumps, valves and calibrated gauges to be able to test a BWMS according to the requirements stipulated by the regulations described in [9.2].

The test facility shall be equipped with at least:

- 3 holding tanks, one for feed-water (in case augmentation of the challenge water is necessary) and the other two for holding untreated (control) ballast water and treated ballast water.
- Each of the holding tanks for untreated (control) and treated ballast water shall have a volume  $\geq 200 \text{ m}^3$  and the possibility to hold water for a period of at least 24 hours.
- Sampling facilities and ports designed to be in compliance with guidelines G2 of the BWM convention and the ETV protocol.

## 9.2.6 Challenge water requirements

The test facility shall be able to consistently achieve the water quality conditions (temperature, salinity, organic and mineral matter) and biological conditions required by the regulations described in [9.2].

In the cases where injection of living organisms, sediments, and dissolved organics into challenge water is necessary, appropriate methods and procedures must be described in the QAPP and relevant SOPs.

## 9.2.7 Sub-contractors

The test facility shall give information of agreements and arrangement if any parts of the services provided are sub-contracted. The information must be included in the quality assurance project plan (QAPP) and the quality management plan (QMP) must incorporate all sub-contractors.

The information must include name, address, function and certification of the sub-contractor. The QAPP shall include in details what the sub-contractor will be responsible for and how proper transfer of authority will be assured.

Particular emphasis shall be given to quality management by the test facility in following-up of such subcontracts. Subcontractors providing anything other than subcontracted personnel or equipment shall also meet the requirements of section [9.2.2] to [9.2.8].

### 9.2.8 Reporting

A report shall be written for each test. The report shall be based on standard forms and is in addition to describing the work performed to give information of any deficiencies found on components, non-conformance detected and any replacements done of components.

The report shall also include information regarding the test design, methods of analysis and the results of these analyses.

The report shall be traceable to the order reference system and shall include a copy of the certificate of approval.

## 9.3 Approval procedures

### 9.3.1 Application and approval

The test facility intending to receive a certificate of approval based on this programme must submit an application together with the documentation listed in [9.2.2].

Submitted documentation will be approved or reviewed, as applicable, for compliance with the requirements listed in this programme, guidelines G8 and when applicable the USCG 46 CFR 162.060 and the ETV protocol.

Test facility validation, as detailed in [9.3.3], shall be conducted as part of the initial and renewal audit, or as otherwise required in [9.3.3].

An initial audit as detailed in [9.3.2] can only be conducted after the approval process is finalized.

### 9.3.2 Initial audit

The surveyor will carry out an audit of the test facility once all documentation and information received from the test facility has been evaluated.

Additionally, certification as detailed in [9.3.6] is conditional on a practical demonstration of at least one BWMS test as well as satisfactory reporting being carried out.

### 9.3.3 Test facility validation

As part of the initial audit and the renewal audit, the test facility will conduct validation tests to confirm that the methods, procedures, equipment and personnel conducting the tests can deliver consistent results and that the methods used are fit for their intended purpose.

#### 9.3.3.1 Validation of equipment and test set-up

The intention of this validation test is to document, through experimental data, that there are minimal or no differences between the following measurements for control and treatment samples upon water uptake and discharge, when no treatment system is used:

- Temperature
- Salinity
- Total suspended solids
- Particulate organic matter
- Dissolved organic matter
- Dissolved oxygen
- pH
- Live and dead organisms for the three different sizes:  $\geq 50 \mu\text{m}$ ,  $\geq 10 \mu\text{m}$  and  $< 50 \mu\text{m}$ ,  $< 10 \mu\text{m}$
- The  $< 10 \mu\text{m}$  is only applicable for test facilities intending to work as sub-contractor for DNV GL when acting as IL for the USCG.

Where piping is shared between treatment and control lines, procedures for cleaning the pipes can be demonstrated. Alternatively, test sequence showing that control water is pumped prior to treated water upon uptake, and treated water is pumped prior to control water upon discharge can be accepted by DNV GL.

#### 9.3.3.2 Validation of the sampling and analysis methods

The test facility shall verify that the chosen sampling design, geometry and installation result in representative samples and that organism mortality as a result of sample acquisition is minimized.

If only a sub-sample of the sampling volumes required by guidelines G8 or ETV protocol are analysed, then the test facility shall apply procedures for estimating uncertainty of measurement. Internal data or reference to published data will be accepted as equivalent to the estimation of uncertainty of measurement.

#### 9.3.4 Application as sub-contractor to DNV GL acting as IL to the USCG

After finalization of the process described in [9.3.1] to [9.3.3] and DNV GL has issued a certificate of approval, DNV GL can, based on request by the test facility, apply to the USCG to include the test facility in DNV GL's list of sub-contractors to DNV GL when acting as IL to the USCG.

Upon approval by the USCG, DNV GL and the test facility can sign a frame agreement allowing the test facility to conduct tests as a sub-contractor to DNV.

#### 9.3.5 Renewal audit

Renewal or endorsement of the certificate of approval shall be made at intervals not exceeding 3 years. Verification shall be through audits confirming that approved condition is being maintained. Intermediate audits may be required if found necessary by DNV GL. At least three months before the period of validity expires, the test facility shall apply to DNV GL for renewal of the certificate of approval.

#### 9.3.6 Certification

If the submitted documentation and the surveyor's audit and the practical demonstration are found satisfactory then the test facility will receive a certificate of approval.

### 9.4 Cancellation of the certificate of approval

DNV GL reserves the right to cancel the certificate of approval in the following cases:

- Where the service was improperly carried out or results were improperly reported
- Where a surveyor finds deficiencies on site compared to approved documentation and appropriate corrective action is not taken within the time limit specified by the surveyor
- Where the test facility fails to inform of any alteration
- Where intermediate audit, if requested and as described in [9.3.5], has not been carried out
- Where willful acts or omissions are ascertained
- Where the USCG has withdrawn their approval of the test facility as sub-contractor to DNV GL
- Where a national authority has withdrawn their approval of the test facility.

A test facility who has had the certificate of approval cancelled may apply for re-approval after a period of six (6) months. Re-approval is not allowed if the cancellation was based on a grave fault, such as a violation of ethics.

### 9.5 References

The following references are used or referred to in this programme:

- DNV GL rules for classification of ships, [RU SHIP Pt.6 Ch.7 Sec.1](#)
- DNV GL class guideline [CG 0339](#)
- Guidelines G8 of the Ballast Water Management Convention
- Guidelines G9 of the Ballast Water Management Convention
- USCG 46 CFR 162.060 – Ballast Water Management Systems

- US Environmental protection agency's environmental technology verification (ETV) program document "*Generic Protocol for the Verification of Ballast Water Treatment Technologies*" november 2010.
- ISO/IEC 17025:2005 standard.

## 10 Laboratories engaged in mechanical and analytical testing

### 10.1 Introduction

#### 10.1.1 Objective

The objective of this class programme (CP) is to give a description of the Society's approval scheme for laboratories for mechanical and analytical testing.

In addition to the requirements of this class programme, the general requirements of DNVGL CP 0484 applies and shall be complied with.

Aim of the assessment of testing laboratories is the verification of the personnel competency related to the scope of the certification. Furthermore, it is intend to ensured that an effective and sufficient quality management system exists.

DNV GL acceptance of test laboratories does not preclude witnessing, survey or inspections where this is required by any rules or contract partner.

**Guidance note:**

This class programme is not applicable for obtaining EU marine equipment directive (MED) certificates. Visit [www.dnvgl.com](http://www.dnvgl.com) for information on MED certification.

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#### 10.1.2 Scope

This CP gives a description of the procedures and requirements related to documentation and inspection applicable for approval of *laboratories for mechanical and analytical testing*.

DNV GL acceptance of a testing laboratory is an independent approval system based on assessment of documentation and on-site inspection. Basis for this service is the international standard ISO 17025, the application form AoSS 123 and all supplements provided by the Society.

#### 10.1.3 Application

The procedures and requirements described in this CP are applicable for obtaining approval in accordance with the 's rules and standards.

Note that this is a general program. Wherever specific programs are given for certain laboratories or products, the special programs apply. Examples of other laboratory approval programs are:

- DNVGL CP 0277 Laboratories engaged in testing of protective coating systems
- DNVGL CP 0433 Laboratories engaged in corrosion testing of corrosion resistant steels.

## 10.2 Acceptance procedure

### 10.2.1 Application for acceptance

The application form shall be filled in by the testing laboratory shall be submitted to the together with all documents required in this form.

### 10.2.2 Inspection

The inspection of procedures, premises and equipment, the checking of documents, management and quality systems shall be conducted by the Society's representative with sufficient competency and experience in the field of testing related to the scope of certification.

### 10.2.3 Documentation

All the documents required and necessary for the assessment of documentation (see Form AoM 123) should be submitted to the auditor before the on-site inspection. If any serious divergences are already detected within the assessment of documentation, the laboratory will be informed in advance of appraisal. An appointment for the on-site inspection will be arranged during initial audits, only if the assessment of documentation revealed that no significant differences exist, which are not opposed the Society's acceptance.

### 10.2.4 Audit

The time frame of inspection is based on the extent applied for recognized testing methods and for scope approved employees involved. The minimum duration of on-site inspection is 12 working hours. One-day inspections are only possible in substantiated exceptional cases.

#### 10.2.4.1 Steps of audit

- Introductory discussion
- the introductory discussion involves the following points:
  - a) introduction of participants
  - b) introduction to the structure of the organization according to the currently valid organization chart
  - c) confirmation that the applied scope of acceptance is still up-to-date and has not to be adapted
  - d) confirmation of confidentiality. For this a declaration of independence has to be submitted to the auditor
- verification of the requirements to the organization and management as well as the technical requirements
- final discussion
- during the inspection of the testing laboratory the comparison shall be made with the processes, activities and responsibilities associated with the practical implementation, which are described in the submitted documentation.

#### 10.2.4.2 Audit participants

- Head of laboratory
- quality management representative [QMR] of the testing laboratory
- responsible employees of the testing laboratory
- auditor (the Society's representative).

#### 10.2.4.3 Audit results

A final discussion will be conducted with the head of laboratory at the end of the audit. The final discussion includes:

- information about the overall impression of the testing laboratory
- information about the ascertained defects or deviations
- definition of the corrective actions. The actions have to be confirmed by the head of laboratory and the auditor. Dates until the corrective actions are finished have to be agreed
- resolve open questions/issues.

#### 10.2.4.4 Corrective actions

The testing laboratory shall send the documentation for implementation of corrective actions to the auditor until the agreed due date. If required, a new on-site inspection shall be carried out.

#### 10.2.4.5 Audit report

The auditor will issue an audit report about the area inspected by him, after on-site audit. One copy will be filed by the Society, and the original will be submitted to the testing laboratory.

#### 10.2.4.6 Acceptance as testing laboratory

The auditor makes a recommendation for acceptance or refusal by the in his audit report, and/or with restriction. The acceptance usually applies for a period of three years. In case of acceptance by the , a certificate is issued in the name of the testing laboratory and will be sent to the testing laboratory. Furthermore, part of the certificate is an appendix, containing all the accepted test methods.

#### 10.2.4.7 Maintenance

In order to maintain the acceptance as testing laboratory, a periodic review (hereafter called interim audit) is required and will be carried out by the Society's surveyor. The cycle will be specified during the audit based on the audit results and/or e.g. round robin tests etc. The cycle shall not exceed 18 month.

#### 10.2.4.8 Renewal

A re-certification is possible after expiry of the period of validity. The extent of the renewal process corresponds roughly to the first certification with the task of reviewing compliance with this approval programme. Re-certification is based on the latest issue of the class programme. In the context of the re-certification audit, the cycle of the interim audit is redefined and the testing laboratory will be informed. The procedure for renewed acceptance begins with sending of a written request by the testing laboratory. The re-audit should take place in time and before the validity end date, for ensuring a complete connection to the expired approval.

#### 10.2.4.9 Extension of scope of acceptance

In principle, it is possible to extend or restrict the scope of the certification. In principle, the same requirements apply, which were already specified in the class programme.

#### 10.2.4.10 Non-standardized test methods

The acceptance of testing methods is possible, which has been developed by the testing laboratory and not described in the normative documents. It is also required to validating the procedure adequately and describing in the testing instruction the procedure extensively stating the intended application, the determining parameters and all required information in order to ensure the correct execution.

#### 10.2.4.11 Sub-contractors

The testing laboratory shall give information of agreements and arrangements if any parts of the services provided are subcontracted. Particular emphasis shall be given to quality management by the laboratory in the follow-up of such subcontracts. Subcontractors providing anything other than subcontracted personnel or test equipment shall also meet the requirements of this programme.

## 10.3 Audit of the testing laboratory

### 10.3.1 Review of documentation

All relevant documents and records shall be presented by testing laboratory to the auditor for review.

### 10.3.2 Issues to be handled during the audit

- In general, deviations between actual state of the laboratory and the submitted documentation
- the laboratory shall demonstrate and document that the head of the laboratory and its employees have a sufficient qualifications. A systematic approach shall be in place ensuring that training needs are evaluated and that appropriate measures are taken
- a matrix shall be submitted, indicating the responsibilities and reporting lines of all employees
- proper execution of the testing methods shall be demonstrated
- the suitability of the locations and the equipment for the testing methods. The conformity between submitted documentation of locations and actual locations shall be demonstrated, e.g. with the documents submitted regarding the floor plan and the location laid down therein. The laboratory shall in general be in a clean, tidy and for testing methods appropriate state
- control of documents and records. The laboratory's approval process of the existing documents shall be clearly regulated. All documents shall be labelled with an unique document number and the current



revision status. Systematic approach shall be in place to ensure that all employees in the laboratory is duly and timely informed about changes in documents and procedures, i.e. where they are affected by these changes. For the standards and specifications used a systematic approach shall be in place which ensures that they are current and always up-to-date (latest revision), and that no invalid standards, specifications, inspection/work instructions etc. are in circulation

*Note: More and more frequently, the use of printed documents in testing laboratories is waived and instead uses exclusively electronic documents. For the case where electronic documents are applied exclusively, it should be noted that the electronic documents must be protected against unauthorized modifications, and all printed documents are labelled with an endorsement "uncontrolled copy".*

- demonstration of representative testing methods. The auditor will make a selection of testing methods based on the requested scope of certification, which shall be demonstrated during to the auditor during the audit. The laboratory may request information in advance for which test methods to be demonstrated. The laboratory shall demonstrate that the staff has the ability and competence to perform the test methods professionally and standardised. The laboratory shall ensure that appropriate test specimens are available
- calibration status of the testing equipment and devices shall be valid. Calibration with validity time more than one year will normally not be accepted. The laboratory shall have a systematic approach in place to ensure that calibration will not expire, and that no improperly calibrated testing equipment are used. The laboratory shall have assigned the responsibility of keeping calibrations up to date to one or more employees. The responsibility includes ensuring that all the testing equipment and devices have a unique identification (inventory number) and are equipped with a calibration status tag, if possible. Regular calibration of all the testing equipment and devices shall be recorded by the laboratory. If the testing laboratory performs their own calibration, it shall be ensured that the measurement standards used are connected directly to recognised standards. Furthermore, work instructions must be available for all calibration processes. All calibrations must be documented. If testing equipment and devices are in circulation, which are not calibrated, they must be clearly identified as such and should be exclusively used for subordinate measurements
- the participation in proficiency testing as well as its evaluation and documentation: The testing laboratory should develop a procedure for ensuring test results, which is suitable to monitor the quality of testing methods at regular intervals. This can be achieved e.g. by regular participation in round robin tests. An evaluation with identifying the consequences drawn shall be submitted to the auditor
- existence of clear sample labelling and identification systems: The testing laboratory shall have and demonstrate a procedure, ensuring that each individual test specimen is tagged with an unique identification number for excluding confusion between individual test specimens and ensuring a complete traceability. In cases where the test specimens are too small or otherwise inappropriate for labelling accordingly, an acceptable replacement procedure must be specified
- internal quality assurance measures for the individual testing methods and all other processes, which are necessary for ensuring a smooth processing: Internal audits should be carried out at regular intervals to prove that all the processes still meet the requirements for quality management system. The audit should also be used to ensure, the audit activities correspond with the latest state of standardization and for identifying possibilities for improvement. The planning and conduct of the audits should be the responsibility of QMB. Representative audit reports shall be documented and presented to the surveyor
- existence of test and work instructions: For all testing methods to be recognised by the , a work/job/ inspection instruction shall be available. The instruction shall describe an exact procedure, for example, for calibrations, sample preparation, maintenance and care of testing machines. It shall be demonstrated that inspection and work instructions are always up-to-date, contain an unique document number, are subject to an approval process and are accessible to all relevant employees.
- content and structure of test reports: A test report shall be prepared for all tests to be recognised by the . Each test report should have a cover sheet, which contain the following information:
  - a) Title
  - b) test report number for enabling a clear identification
  - c) name and address of testing laboratory
  - d) name and address of customer
  - e) an indication that the testing laboratory is recognised by DNV GL

Furthermore, a test report should contain the following information:

- f) a pagination with indication of total number of pages
- g) indication of the test report number on each page for allowing an allocation for each test report
- h) indication of the procedures used. Possibly, the hints from the norm text regarding the test report must be observed
- i) deviations from standardized test methods
- j) a detailed description of the tested material or received test specimens. Where possible, a description of the preparation process for test specimens must be specified
- k) testing conditions
- l) the test results, where appropriate and possible, expressing the individual results, average values, standard deviation, measurements of test specimens, number of test specimen verified, graphical presentation of the test results
- m) information required from the customer
- n) date of the test
- o) names and signatures of the persons which create a test report as well as the person which has released the test report
- p) whether additional requirements are fulfilled, for example, official regulations (see page 123 IMO PSPC).

## 10.4 Alteration

In case where any alteration to the certified service operation system of the testing laboratory is made, then such alteration is to be reported immediately to the Society.

In such cases re-audit may be required as and when deemed necessary by the Society.

## 10.5 Cancellation and re-approval

DNV GL reserves the right to cancel the approval of acceptance in the following cases:

- where the service was improperly carried out or results were improperly reported
- where a surveyor finds deficiencies in the approved service operative system of the supplier and appropriate corrective action is not taken
- where the supplier fails to inform the of any alteration made, as given in [1]
- where it as has not been possible to carry out random audit, when requested as described in Sec.3 [3]
- where wilful acts or omissions are ascertained
- or when the Society otherwise finds it justified.

The Society reserves the right to inform interested parties on cancellation of the acceptance of approval.

A testing laboratory who has had the acceptance of approval cancelled may apply for re-approval after a period of six (6) months. Application for re-approval may be refused if the cancellation was based on a grave fault, such as a violation of ethics.

# 11 Laboratories engaged in corrosion testing of corrosion resistant steels

## 11.1 Introduction

### 11.1.1 Objective

The objective of approval according to this approval programme is to ensure that the supplier is using appropriate procedures and test facilities, has qualified and certified personnel and has implemented written procedures for training, performance, testing, control, verification and reporting.

### 11.1.2 Scope

Corrosion resistant steels (CRS) to be applied in cargo oil tanks of crude oil tankers, in accordance with IMO resolution MSC.289(87), shall be pre-qualified by a third party.

As per the following document:

- IACS UI SC 258, for application of SOLAS regulation 3-1, Part A1, Chapter II-1 of the SOLAS convention (corrosion protection of cargo oil tanks of crude oil tankers), adopted by resolution MSC.289(87) The performance standard for alternative means of corrosion protection for cargo oil tanks of crude oil tankers.

The test laboratories shall be recognized by the Society and approved in accordance with this class programme.

**Guidance note:**

- 1) Approval is not needed for the testing laboratory where a surveyor from the Society **is** present at specified stages to witness the approval tests
- 2) approval is needed for the testing laboratory where a surveyor from the Society **is not** present at specified stages to witness the approval tests.

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The approval may be given to both a recognized test laboratory, independent of the steel manufacturer and the steel manufacturer's own laboratory.

In the following, such laboratories are also referred to as the supplier.

### 11.1.3 Extent of engagement

The approval programme defines the procedures required in obtaining the Society's approval carrying out the laboratory tests in accordance with IMO resolution:

- MSC.289(87), Annex 3, Appendix – and further interpreted in IACS UI SC 258.

This approval programme is in agreement with requirements stated in IACS UR Z17, as amended. The specific requirements to laboratories are given in Annex 1, Section 13 of IACS UR Z17.

## 11.2 Requirements to suppliers

The general requirements related to approval of service suppliers as outlined in class programme DNVGL CP 0484 apply to this programme.

A certificate of approval will be awarded and maintained on the basis of compliance with [2] through [11].

### 11.2.1 Submission of documents

The following documents shall be submitted for review:

- an outline of the supplier's organization and management structure, including subsidiaries, if any
- list of operators/technicians/inspectors documenting training and experience within the relevant service area, and qualifications according to recognized national, international or industry standards, as relevant
- list of nominated agents, if any
- quality manual and/or documented procedures covering requirements in the IMO resolution MSC.289(87)
- a detailed list, including description, of the laboratory test equipment for the IMO resolution MSC.289(87)
- a guide for operators of such equipment
- a detailed list of reference documents comprising a minimum those referred to in IMO resolution MSC.289(87) that are available in the laboratory
- details of testing panel preparation, procedure of test panel identification, test procedures and sample test report(s)
- details of exposure method and site for weathering primed test panels
- a sample daily or weekly log/form for recording test condition and observations including unforeseen interruption of the exposure cycle with corrective actions
- experience of the supplier in the specific service area

- details of any sub-contracting agreements, e.g. related to preparation of test samples
- certificates of approval by other bodies, if any
- information on other activities which may present a conflict of interest
- list and documentation of licences granted by equipment's manufacturer, if any
- comparison test report with an approved corrosion resistant steel, if available, or detailed template of test report
- copy of any relevant certificates with their issue number and/or date, such as ISO 17025 and/or ISO 9001 certificates.

#### 11.2.2 Reference documents

The supplier shall have access to:

- IMO resolution MSC.289(87), IMO performance standard for alternative means of corrosion protection for cargo oil tanks of crude oil tankers (IMO PS-COT), adopted on 14yh may 2010.
- IACS UI SC 258, for application of SOLAS Regulation 3-1, Part A1, Chapter II-1 of the SOLAS convention (corrosion protection of cargo oil tanks of crude oil tankers), adopted by resolution MSC.289(87) The performance standard for alternative means of corrosion protection for cargo oil tanks of crude oil tankers.
- IACS UR W30, normal and higher strength corrosion resistant steels for cargo oil tanks, February 2013 and as later amended.

#### 11.2.3 Extent of approval

The supplier shall demonstrate, as required in [12.2.4] to [12.2.10], that it has the competence and control needed to perform the specified services. A practical demonstration may further be required, if deemed to be necessary.

#### 11.2.4 Equipment

The supplier shall have the test equipment and facilities required for correctly performing the tests as per the IMO resolution;

- MSC.289(87), Annex 3, Appendix.

A record of the equipment and software used shall be kept. The record shall contain information on manufacturer and type of equipment, and a log of maintenance and calibrations. Software used in conjunction with the testing shall be fully described and verified.

#### 11.2.5 Administrative procedures

The supplier shall have an order reference system where each engagement is traceable to when, who and where testing was carried out, including location of test records and reports.

#### 11.2.6 Minimum required equipment and instruments

As given in, and/or necessary to carry out the testing specified in, the IMO resolution:

- MSC.289(87), Annex 3, Appendix.

#### 11.2.7 Work procedures and instructions

The supplier shall have documented procedures, instructions and checklists for how to carry out testing and reporting. Procedures and instructions for operating of each item of the testing equipment shall also be kept and be available at all time.

#### 11.2.8 Verification

The supplier shall have a system for verifying that the services provided are carried out in accordance with approved procedures. Performed verification shall be documented.

#### 11.2.9 Sub-contractors

The supplier shall give information of agreements and arrangements if any parts of the services provided are subcontracted. Particular emphasis shall be given to quality management by the supplier in the following-

up of such subcontracts. Subcontractors providing anything other than subcontracted personnel or test equipment shall also meet the requirements of [2] through [11] of this class programme.

#### 11.2.10 Reporting

All test records shall be properly documented and retained in such a way that the performed testing can easily be re-traced later. The report shall identify extent and location of testing performed and a conclusive statement as to whether the test results satisfy the acceptance criteria or not.

The test report shall include references to relevant documents, as a minimum as referred to in [3].

In addition, and as a minimum, the following information must be given:

- Name, address and other contact information of the supplier
- contract requirements, e.g. order no., reference documents, specifications, special agreements etc.
- judgment and conclusion of test results
- place and date of sample preparation and testing
- environmental conditions
- test equipment used
- list of relevant standards
- name and signature of the person preparing the test samples
- name and signature of the person performing the tests
- name and signature of the person issuing the test report
- name and signature of the supervisor verifying the report.

The supplier shall file one copy of the test report, and the test report shall be traceable to the order reference system. Also reports for testing that have failed shall be reported and filed in accordance with above.

## 11.3 Certificate of approval

### 11.3.1 Approval of the supplier

If the submitted documentation and the surveyor's audit and the practical demonstration are all found satisfactory to the Society, the supplier will receive a certificate of approval. The certificate of approval will be published on DNV GL's approval finder (<https://approvalfinder.dnvgl.com/>).

### 11.3.2 Scope of the approval

The approval will be specific as to the types of testing for which approval is sought, i.e. in accordance with IMO resolution:

- MSC.289(87), Annex 3, Appendix.

The approval may be given to both a recognized test laboratory, independent of the steel manufacturer and the steel manufacturer's own laboratory.

When actual testing performed at the steel manufacturer's own laboratory, forming basis for test reports used to seek class approval from DNV GL, is carried out, the DNV GL surveyor shall be called in for witnessing milestones, which may typically be:

- witnessing of steel making process/steel cutting
- witnessing of welding
- witnessing during testing
- witnessing evaluation of test.

### 11.3.3 Change to scope of the approval

In case of changes to the scope of approval, e.g. additions to the applicable welding consumables, the effects of these changes are to be subjected to corrosion resistance tests for the welded joints specified in:

- MSC.289(87), Annex 3, Appendix.

## 11.4 References

- IMO Resolution MSC.289(87), IMO performance standard for alternative means of corrosion protection for cargo oil tanks of crude oil tankers (IMO PS-COT), adopted on 14th may 2010
- IACS UI SC 258, for application of SOLAS regulation 3-1, Part A1, Chapter II-1 of the SOLAS convention (corrosion protection of cargo oil tanks of crude oil tankers), adopted by resolution MSC.289(87) The performance standard for alternative means of corrosion protection for cargo oil tanks of crude oil tankers
- IACS UR W30, normal and higher strength corrosion resistant steels for cargo oil tanks, february 2013 and as later amended
- Current version of ISO 9001 series – quality management systems – requirements
- DNV GL rules for classification of ships, [RU SHIP Pt.2 Ch.2](#) (metallic materials)
- DNV GL rules for classification of ships, [RU SHIP Pt.6 Ch.1 Sec.9](#) (coating).

## 12 Renewal survey examination of mooring chain intended for mobile offshore units

The content of this chapter is under development. The service specific requirements of the legacy rules are to be applied until the new version of this chapter is published.

# APPENDIX C GUIDELINES FOR THE TECHNICAL INSPECTION OF RADIO INSTALLATIONS ONBOARD SHIPS FITTED FOR COMPLIANCE WITH GMDSS

## 1

The guidelines apply to cargo ships above 300 tons gross and to all passenger ships irrespective of size, dynamically supported crafts, and high speed and light craft (DNVGL-RU-HSLC).

### *Terms and definitions*

DSC	Digital selective calling
EPIRB	Emergency position indicating radio beacon
EPIRB testing device	Device designed for monitoring transmitted frequencies and the verification of correct coding of the float-free satellite EPIRBS
GMDSS	Global maritime distress and safety system
MMSI	Maritime mobile service identity
NAVTEX	System for reception of messages to seafarers related to safety at sea using NBDP
NBDP	Narrow band direct printing (radio telex)
NICA	Nickel-cadmium
NIFE	Nickel-ferro
Scanning watch receiver	Receiver continuously scanning dedicated frequencies used solely for safety purposes
SES	Ship earth station

## 2 Introduction

The intention of the guidelines is to enable the radio inspectors contracted by DNV to carry out the radio inspections in a unified and correct manner on ships of any flag.

### 2.1 Performance of radio inspection

The technical radio inspection must always be performed by a qualified radio inspector from an approved local radio inspection service supplier, hereafter referred to as radio inspector.

Radio inspection should be carried out using suitable test equipment capable of performing all the relevant measurements required by these guidelines.

### 2.2 Interpretations

The radio inspector may occasionally observe that compliance with GMDSS requirements are met in different ways. Therefore, in order to avoid any confusion that may arise, IMO has made a set of clarifications. Relevant IMO clarifications are added where appropriate, also referring to relevant regulation of the 1974 SOLAS convention as amended. DNV GL statutory interpretations for SOLAS IV, as amended, contains also useful information.

## 3 Documentation

### 3.1 Initial inspection

For the radio installations of cargo ships the examination of plans and designs should consist of:

- Examining the plans for the provision and positioning of the radio installation including sources of energy and antennas (SOLAS 74/88-II-1/43, IV/6 and 14)
- Examining the plans for the provision and positioning of the radio life-saving appliances (SOLAS 74/88III/6). For the radio installations, including radio life-saving appliances, of cargo ships the inspection during construction and after installation should consist of:
- Examining the position, physical and electromagnetic protection and illumination of each radio installation (SOLAS 74/88-IV/6)

**Guidance note:**

If public correspondence from the communication workstation might cause audible or visual interference to the navigator, such communication shall be performed from another place or room in the ship.

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- Confirming the provision of equipment for the radio installation with due regard to the declared sea areas in which the ship will trade and the declared means of maintaining availability of functional requirements (SOLAS 74/88-III/6, IV/7 to 11, 14 and 15)
- Confirming the ability to initiate the transmission of ship-to-shore distress alerts by at least two separate and independent means, each using a different radio communication service, from the position from which the ship is normally navigated (SOLAS 74/88-IV/4, 7 to 11).

### 3.2 Ships in service

Prior to the technical inspection, it shall be checked that the radio equipment fitted is in accordance with the information stated in Form R – Record of Equipment.

Identification of radio equipment and the result of the inspection shall be recorded in the relevant survey report forms CRC 629a and CRC 630a.

## 4 Antennae

### 4.1 Examining all antennae, including:

- Visually checking all antennae, including INMARSAT antennas, and feeders for satisfactory siting and absence of defects (SOLAS 74/88-IV/14)
- Checking insulation and safety of all antennae.

**Guidance note:**

- 1) Check for protection against inadvertent touching by the ship's staff.
- 2) Check for possible mutual electrical interference
  - Vertical separation and safe distances with respect to transmitting and receiving antennae
  - Free line of sight – INMARSAT antennae.

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## 5 Inspection of the reserve source of energy and automatic battery charger(s)

### 5.1 Reserve source of energy is a battery:

- Checking its siting and installation (SOLAS 74/88-IV/13)

**Guidance note:**

Lead-Acid accumulator batteries and NiCd batteries must not be located in the same battery compartment.

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- Where appropriate, checking its condition by specific gravity measurement or voltage measurement

**Guidance note:**

- For lead accumulators specific gravity readings between 1.24 and 1.30 are acceptable. Readings below 1.24 indicates defective charger/ wrong setting on charger, or that the battery needs to be replaced. Variations in the specific gravity between the battery cells (variation in specific gravity of 0.03 or more) indicates a defective cell, and hence that the battery must be replaced.
- For alkali accumulators, including sealed accumulators, a voltage reading of 1.2 V per cell at maximum discharge current is acceptable.
- If there is doubt as to the condition of accumulators and whether the capacity requirement has been met, the accumulators must be replaced or alternatively undergo capacity testing.

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- With the battery off charge, and the maximum required radio installation load connected to the reserve source of energy, checking the battery voltage and discharge current
- Checking there is sufficient capacity to operate the basic or duplicated equipment for 1 hour or 6 hours, as appropriate (SOLAS 74/88-IV/13), and
- Checking that the charger(s) are capable of re-charging the reserve battery to the required capacity within 10 hours (SOLAS 74/88-IV/13)
- Inspecting mechanical condition of accumulators, connections, cables, fuse circuits etc.
- The battery compartment is to be inspected for mechanical defects and sufficient ventilation. Where outdoors wooden or composite battery compartments are used, the accumulator specifications regarding the ability to withstand extreme temperature variations to be checked.

### 5.2 Automatic chargers

Maintenance voltage for lead accumulators shall be 26.8 V, "boost" 28.8 V. When using NiCd accumulators, 28 V and 32 V, respectively.

### 5.3 General

The following items are to be checked:

- That dedicated AC and DC fuses/circuit breakers for both basic and duplicated GMDSS equipment are provided
- That the main DC supply line from the radio battery is provided with fuses/ circuit breaker – alternatively has been protected by separate and secured pipes
- That the basic and duplicated GMDSS equipment are electrically separated. A 'line by line black-out test' should be carried out.

## 6 Inspection of maritime VHF

### 6.1 The examination should include:

- Checking for operation on channels 6, 13 and 16 (SOLAS 74/88-IV/7 and 14)
- Frequency tolerance, transmission line quality and radio frequency power output (SOLAS 74/88-IV/14)
- For correct operation of all controls including priority of control units in conning positions (SOLAS 74/88IV/14)
- The operation of the VHF control unit(s) or portable VHF equipment provided for navigational safety (SOLAS 74/88-III/6)
- For correct operation by on-air contact with a coast station or other ship
- That the equipment operates from the main, emergency (if provided) and reserve sources of energy (SOLAS 74/88-IV/13).

### 6.2 VHF DSC controller

The examination should include:

- Performing an off-air check confirming the correct maritime mobile service identity is programmed in the equipment (SOLAS 74/88-IV/14)
- Checking for correct transmission/receiving by means of a routine or test call to a coast station, other ship, onboard duplicate equipment or special test equipment
- Checking that the equipment is capable of automatically including the ship's position in the distress alert and that such data is provided from an external/internal GPS receiver (SOLAS Reg. IV/18).

### 6.3 VHF channel 70 DSC watch receiver

Clarification:

The requirement may be met by:

- a separate VHF channel 70 DSC watch receiver; or
- a dedicated VHF channel 70 DSC watch receiver combined with the VHF radiotelephone; or
- a standard VHF radiotelephone permanently locked on channel 70.

### 6.4 Power supply

Checking that the equipment operates from the main, emergency (if provided) and reserve sources of energy (SOLAS 74/88-IV/13). Tick off as appropriate.

### 6.5 Alarm

Checking the audibility of the VHF/DSC alarm.

## 7 MF or MF/HF radiotelephone equipment including DSC and NBDP

### 7.1 The examination should include:

- Checking that the equipment operates from the main, emergency (if provided) and reserve sources of energy (SOLAS 74/88-IV/13)
- Checking the antenna tuning in all appropriate bands
- Checking the equipment is within frequency tolerance on all appropriate bands (SOLAS 74/88-IV/14)

- Checking for correct operation by contact with a coast station and/or measuring transmission line quality and radio frequency output
- Checking receiver performance by monitoring known stations on all appropriate bands.  
If control units are provided outside the navigating bridge, checking the control unit on the bridge has first priority for the purpose of initiating distress alerts (SOLAS 74/88-IV/9, 10, 11 and 14)
- Checking that the equipment is capable of automatically including the ship's position in the distress alert and that such data is provided from an external/internal GPS receiver (SOLAS Reg. IV/18).

## 7.2 Examining the MF or MF/HF DSC controller(s), including:

- Checking that the equipment operates from the main, emergency (if provided) and reserve sources of energy (SOLAS 74/88-IV/13)
- Confirming that the correct maritime mobile service identity is programmed in the equipment
- Checking the off-air self test programme
- Checking operation by means of a test call on MF and/or HF to a coast radio station if the rules of the port permit the use of MF/HF transmissions (SOLAS 74/88-IV/9, 10 and 11).
- Checking that the equipment is capable of automatically including the ship's position in the distress alert and that such data is provided from an external/internal GPS receiver (SOLAS Reg. IV/18).

## 7.3 Examining the MF or MF/HF DSC watch receiver(s), including:

- Confirming that only distress and safety DSC frequencies are being monitored (SOLAS 74/88-IV/9 to 12)
- Checking that a continuous watch is being maintained whilst keying MF/HF radio transmitters (SOLAS 74/88 IV/12)
- Checking for correct operation by means of a test call from a coast station or other ship.

Clarification:

This requirement can be met by:

- A separate MF/HF DSC scanning watch receiver for distress and safety DSC frequencies only; or
- A dedicated MF/HF DSC scanning watch receiver for distress and safety DSC frequencies only combined with the MF/HF radiotelephone.
- If MF mode DSC only is required, a separate MF DSC watch receiver locked on 2187.5 KHz or a dedicated 2187.5 KHz watch receiver combined with the MF radiotelephone installation will suffice.

If DSC operation is desirable on other frequencies, an additional scanning receiver shall be provided.

## 7.4 Examining the MF/HF radiotelex equipment, including:

- Confirming that the correct selective calling number is programmed in the equipment
- Checking correct operation by inspection of recent hard copy or by a test with a coast radio station (SOLAS 74/88 IV/10 and 11).

**Guidance note:**

A test of the telex may be performed by sending the telex message to the vessels INMARSAT-C installation (i.e. through the INMARSAT system).

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## 7.5 Power supply

Checking that the equipment operates from the main, emergency (if provided) and reserve sources of energy (SOLAS 74/88-IV/13). Tick off as appropriate.

## 7.6 MF or MF/HF DSC alarm

Checking the audibility of the MF or MF/HF DSC alarm.

## 8 INMARSAT ship earth station

### 8.1 INMARSAT ship earth station

Examining the INMARSAT ship earth station(s), including:

- Checking that the equipment operates from the main, emergency (if provided) and reserve sources of energy.

### 8.2 Examination of the distress function should include:

- Checking the distress function by means of an approved test procedure where possible (SOLAS 74/88-IV/10, 11, 12 and 14)
- Checking for correct operation by inspection of recent hard copy or by link test.

### 8.3 Automatic position updating support

Checking that the equipment is capable of automatically including the ship's position in the distress alert and that such data is provided from an external/internal GPS receiver (SOLAS Reg. IV/18).

## 9 Float-free satellite EPIRB

### 9.1 Examining the 406 MHz satellite EPIRB (SOLAS 74/88 IV/7 and 14) or 1.6 GHz INMARSAT including:

The items listed in form CRC 630a "Annual testing of 406 MHz EPIRBs" to be attended to, filled in, signed and left onboard for documentation. A copy to be given to DNV GL attending surveyor (follow annexed to the report form CRC 629a).

**Guidance note:**

If the float-free satellite EPIRB is used as the secondary means of alert (see record of equipment, form R) the EPIRB can be accepted if it is installed in the vicinity of the bridge, e.g. in the wings, on top of the wheelhouse, if accessible by stairs, or if its activation is possible by remote control from the position from which the ship is normally navigated.

Where intended for remote activation, the EPIRB should be installed so that it has unobstructed hemispherical line of sight to the satellites.

See also DNV GL statutory interpretations for SOLAS, as amended.

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## 10 Enhanced group call (EGC) receiver

### 10.1 Examining the EGC receiver should include:

- Checking for correct operation and area by monitoring incoming messages or by inspecting recent hard copy
- Running the self-test programme if provided.

## 11 HF MSI with direct-printing (NBDP) receiver

If appropriate, examining the radio equipment for receipt of maritime safety information by HF NBDP (SOLAS 74/88 Rs.IV/7, 12 and 14) including:

- Checking for correct operation by monitoring incoming messages or inspecting recent hard copy
- Running the self-test programme if provided.

**Guidance note:**

The surveyor shall check that the MF/HF/DSC/NBDP equipment is capable of receiving MSI.  
Refer to IMO "GMDSS MASTER PLAN" regarding HF MSI transmitting station's schedules and frequencies.

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## 12 NAVTEX receiver

If appropriate, examining the NAVTEX equipment (SOLAS 74/88-IV/7, 12 and 14) including:

- Checking for correct operation by monitoring incoming messages or inspecting recent hard copy
- Running the self-test programme if provided.

## 13 Two-way VHF radiotelephone apparatus

SOLAS III/6.2.1, IV/4

- 1) Checking for correct operation on channel 16 and one other channel by testing with another fixed or portable VHF.
- 2) Checking the battery charging arrangement where rechargeable batteries are used.

**Guidance note:**

Sealed batteries should normally be provided. If sealed batteries are not provided, documentation should be available so it may be verified that the equipment was installed prior to 1996-11-23. See also guidance note in CRC629a.

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- 3) Checking expiry date of primary battery where used.
- 4) Checking outside markings; ship's name and call sign to be permanently fixed and clearly readable.

## 14 Radar transponders

(SOLAS 74/88, III/6, IV/7 and 14)

- 1) Checking position, mounting and monitoring response on the ship's 9 GHz (x-band) radar. Manufacturer's test procedure to be followed
- 2) Checking battery expiry date
- 3) Checking outside markings; ship's name and call sign to be permanently fixed and clearly readable

**Guidance note:**

One radar transponder shall be mounted in each free-fall life boat, if provided.

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## 15 Methods of maintenance

Check "Flag Info" for special national requirements with regards to carriage of spare parts.

## 15.1 Test equipment

Examining the test equipment and spares carried to ensure carriage is adequate and in accordance with the sea areas in which the ship trades and the declared options for maintaining availability of the functional requirements (SOLAS 74/88-IV/15).

## 16 Handbooks and documentation

### 16.1 Examination of documentation

For the radio installations, including those used in life-saving appliances, the check that documentation, etc., has been placed on board should consist of:

- Checking for a valid radio licence issued by the flag administration (ITU RR Art.18).

#### *OBSERVE*

Flag restrictions regarding the validity of the safety radio certificate in case of outdated radio license, please contact DNV GL surveyor for information and handling.

- Checking the carriage of up-to-date ITU publications (ITU RR App.11).

#### **Guidance note:**

The required publications are:

- List of coast stations
- List of ship stations
- List of radio determination and special services stations
- List of call signs and numerical identities
- Manual for use by the maritime mobile and maritime mobile-satellite services.

Regarding what editions are the latest, please refer to ITU list of coast stations (back cover), which lists the various publication dates.

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- Checking the carriage of operating manuals for all equipment (SOLAS 74/88-IV/15)
- Checking the carriage of service manuals for all equipment when at-sea maintenance is the declared option (SOLAS 74/88-IV/15).

### 16.2 Radio record

Checking the radio record (log) for correct entries (SOLAS 74/88-IV/17 and ITU RR App.11).

### 16.3 Radio operator's certificates

Checking the radio operator's certificates of competence (SOLAS 74/88-IV/16 and ITU RR Art.47).

#### *OBSERVE*

Flag restrictions regarding the validity of the radio certificate in cases where the holder does not possess GOC issued by the flag authorities, please contact DNV GL surveyor for information and handling.

## 17 Signs and labels

Checking that signs/labels indicating the ship's name, call sign, MMSI number and telex identification are permanently posted and is clearly readable for the operator using the relevant GMDSS equipment.

## 18 Special requirements for passenger vessels

This section applies to:

- All passenger ships,
- HSLC; of which keels were laid (or at a similar stage of construction) on or after 2002-07-01.

The following is to be checked by the radio inspector:

- 1) Check that all two-way communication equipment capable of transmitting the ships position is continuously and automatically updated with the ships position from the ships navigation receiver (i.e. GPS).
- 2) Activation of the EPIRB to be possible from the conning position. This will require remote activation of the EPIRB, or alternatively the provision of two EPIRBs (as the EPIRB also shall be located where it may float freely, should the vessel sink).
- 3) If possible, verify that the distress panel and distress alarm panel are operating satisfactory.
- 4) Check that VHF operating on the aeronautical distress frequencies (121.5 MHz and 123.1 MHz FM) are operational and in good working order, and are available on the navigation bridge.
- 5) Verify that one of the officers onboard holding valid GOC is especially assigned to perform radio communication duties only during distress incidents.

# APPENDIX D GUIDELINES FOR THE TECHNICAL INSPECTION OF AUTOMATIC IDENTIFICATION SYSTEM ONBOARD SHIPS FITTED FOR COMPLIANCE WITH SOLAS V

## 1

The guidelines apply to cargo ships above 300 GT engaged on international voyages, cargo ships above 500 GT not engaged on international voyages and all passenger ships irrespective of size, dynamically supported crafts, mobile offshore units and high speed light crafts (DNVGL-RU-HSLC).

Terms and definitions

*AIS* = Automatic identification system

*UPS* = Uninterrupted power supply

## 2 Introduction

The intention of the guidelines is to enable the AIS inspectors contracted by DNV GL to carry out the initial, annual and renewal AIS inspections in a unified and correct manner on ships of any flag.

### 2.1 Performance of AIS inspection

The technical AIS inspection must always be performed by a qualified AIS inspector from an approved AIS inspection firm, hereafter referred to as AIS inspector (A list of DNV GL approved AIS inspection service suppliers can be on the DNV GL web page: <https://approvalfinder.dnvgl.com>), who has adequate knowledge of the current SOLAS conventions and associated performance standard, and the latest radio regulations as appropriate.

AIS inspection should be carried out using suitable test equipment capable of performing all the relevant measurements required by these guidelines.

## 3 Documentation

For the AIS installation the examination of plans and designs should consist of:

- Antenna layout, initial configuration report, interconnection diagrams, provision of the pilot plug and power supply arrangements (SOLAS 74 as amended regulations II-1/4 and V/19; and SN/Circ.227).

## 4 Antennae

### 4.1 General installation requirements in SN/Circ.227

The AIS installation should generally comply with SN/Circ.227. The AIS inspector may occasionally observe that compliance with AIS antennae installation requirements as defined by SN/Circ.227 are difficult to meet (especially for ships in service). Hence:

- 1) For initial inspections: The AIS inspector shall check that the antennae installation is in accordance with the plans approved by DNV GL or flag.
- 2) For periodical and renewal inspections: If the antennae arrangement does not meet the installation requirements in SN/Circ.227 and if no evidence exists that either DNV GL or the flag have accepted/approved the installation then the AIS inspector shall evaluate the arrangement in order to conclude whether or not improvement can be achieved by rearranging the antennae installation and if such rearrangement is practical.



- 3) If, for any technical or practical reasons, it is not possible to comply with all antennae arrangement requirements in SN/Circ.227 then the AIS inspector shall find out which antennae may cause the greatest risk of interference with the AIS operation; and check the AIS performance towards a vessel traffic centre (VTC) or another ship station while those interfering antennae are transmitting. A test towards a VTC would be preferable.

#### 4.2 Examining the AIS-VHF and AIS-GPS antennae, including:

- Visually checking all antennae, and feeders for satisfactory siting and absence of defects
- Checking insulation and safety of all antennae.

#### 4.3 Inspection of the source of power

- Checking that the AIS is supplied by the mains and emergency source of power
- Checking that the AIS is also supplied by an UPS if IMO SN Circ.227 is made mandatory by the flag state.

**Note:**

AIS shall not be supplied by the radio batteries, unless stated otherwise by the flag.

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#### 4.4 Functional testing

- Checking the proper location of the AIS and provision of pilot plug near pilots operating position
- Checking the correct programming of the ships static information (all static information);
- Checking the ability of the AIS to receive ships dynamic information from the appropriate sensors;
- Checking the ability to correctly input the ships voyage related data;
- Carrying out a performance test of the equipment including radio frequency measurements, transmitting output, polling information, read data, send data and AIS response to “virtual vessels”; and
- Carrying out an on-air test that the unit is working correctly using for example an appropriate vessel traffic service (VTS) station or a suitable test equipment.

## CHANGES – HISTORIC

There are currently no historical changes for this document.

**DNV GL**

Driven by our purpose of safeguarding life, property and the environment, DNV GL enables organizations to advance the safety and sustainability of their business. We provide classification and technical assurance along with software and independent expert advisory services to the maritime, oil and gas, and energy industries. We also provide certification services to customers across a wide range of industries. Operating in more than 100 countries, our 16 000 professionals are dedicated to helping our customers make the world safer, smarter and greener.

SAFER, SMARTER, GREENER