BUREAU VERITAS MARINE & OFFSHORE

RULE NOTE

APPROVAL OF
SERVICE SUPPLIERS

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These rules are provided within the scope of the Bureau Veritas Marine & Offshore General Conditions, enclosed at the end of Part A of NR467, Rules for the Classification of Steel Ships. The latest version of these General Conditions is available on the Bureau Veritas Marine & Offshore website.

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Rule Note
NR533

APPROVAL OF SERVICE SUPPLIERS

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Section 1 General

1 General

1.1 Introduction

1.1.1 To approve companies providing services such as measurements, tests or maintenance of safety systems and equipment, the Society is to apply the procedure described in this document.

1.2 Objective

1.2.1 The objective of this Rule Note is to set requirements for approval and certification of service suppliers and is applicable to both initial and renewal audits.

1.3 Definitions

1.3.1 The Society

"The Society" means Bureau Veritas Marine & Offshore SAS.

1.3.2 Service supplier

"Service supplier" (a service supplier or a category of service supplier may be referred to hereafter simply as "supplier") means a person or a company not employed by the Society who, at the request of an equipment manufacturer, a shipyard, a Shipowner or another client, acts in connection with inspection work and provides services for a ship or a mobile offshore unit such as measurements, tests or maintenance of safety systems and equipment, the results of which are used by surveyors, taking decisions affecting classification or statutory certifications and services.

1.3.3 Manufacturer

"Manufacturer" means a company that manufactures equipment required to be periodically serviced and/or maintained.

1.3.4 Agent

"Agent" means a person or a company authorised to act for, or to represent, a manufacturer or approved/recognized service supplier.

1.3.5 Subsidiary

"Subsidiary" means a company partly or wholly owned by a manufacturer or approved/recognized service supplier.

1.3.6 Subcontractor

"Subcontractor" means a person or a company providing services to a manufacturer or approved/recognized service supplier, with a formal contract defining the assumption of the obligations from the service supplier.

1.3.7 Personnel

"Personnel" means an operator, a technician, an inspector or a supervisor employed by the service supplier.

1.3.8 Certificate

"Certificate" means a Certificate of Approval delivered to the service supplier.

1.4 Procedures for approval and certification

1.4.1 The procedure of approval of a service suppliers is defined in Sec 2.

1.4.2 The issuance, renewal and cancellation of the certificate of approval is defined in Sec 3.

Section 2 Procedure for Approval

1 Application

1.1 Class and statutory services

1.1.1 Service suppliers involved in class and/or statutory services

- service suppliers engaged in thickness measurements on ships or mobile offshore units, except non-ESP ships of less than 500 gross tonnage and all fishing vessels
- service suppliers carrying out an in-water survey on ships and mobile offshore units by diver or remotely operated vehicle (ROV)
- service suppliers engaged in inspections and maintenance of fire-extinguishing equipment and systems
- service suppliers engaged in measurements of noise level on board ships
- service suppliers engaged in the examination of bow, stern, side and inner doors of Ro-Ro ships
- service suppliers engaged in tightness testing of primary and secondary barriers of gas carriers with membrane cargo containment systems for ships in service
- service suppliers engaged in survey using remote inspection techniques (RIT) as an alternative means for close-up survey of the structure of ships and mobile offshore units
- service suppliers engaged in visual and/or sampling checks and preparation of Inventory of Hazardous Materials (IHM)
- service suppliers engaged in noise and vibrations measurements within the scope of **COMF** class notation
- service suppliers engaged in underwater radiated noise measurements related to **URN** class notation
- service supplier engaged in watertight Cable Transit Seal Systems inspection on ships and Mobile Offshore Units
- service supplier engaged in condition monitoring and condition based maintenance
- service supplier engaged in activities within the scope of **SMART()** class notation
- service supplier engaged in data-centric evaluation.

1.1.2 Service suppliers involved in statutory services

- service suppliers engaged in servicing on inflatable life-rafts, inflatable lifejackets, hydrostatic release units, marine evacuation systems
- service suppliers engaged in the inspections and testing of radio communication equipment
- service suppliers engaged in inspections and maintenance of self-contained breathing apparatus
- service suppliers engaged in annual performance testing of Voyage Data Recorders (VDR) and simplified Voyage Data Recorders (S-VDR)
- service suppliers engaged in sound pressure level measurements of public address and general alarm systems
- service suppliers engaged in inspections of low-location lighting systems using photo luminescent materials and evacuation guidance systems used as an alternative to low-location lighting systems
- service suppliers engaged in maintenance, thorough examination, operational testing, overhaul and repair of lifeboats and rescue boats, launching appliances and release gear
- service suppliers engaged in inspection, performance testing and maintenance of Automatic Identification Systems (AIS)
- service suppliers engaged in commissioning testing of Ballast Water Management System (BWMS).

Note 1: National and/or international requirements may give requirements supplementing the procedure given in Article [2].

1.1.3 Where the Society accepts work of a third party (e.g. a service supplier) approved by itself, the Society is to verify the performance of such services. For statutory service, the flag State may increase the scope of verification to be applied to these services. The process is to be defined within the Society's quality management system. For the purpose of accountability to the flag State, the work performed by the third party (e.g. service supplier) constitutes the work of the Society and is to be subject to the requirements incumbent upon the Society under the RO Code IMO MSC.349 (92) and MEPC.237(65).

1.1.4 Where the results of the following service suppliers are used by a Surveyor in making decisions affecting classification services, then these service suppliers are to be approved and verified by the Society:

- service suppliers engaged in thickness measurements on ships or mobile offshore units, except:
  - non-ESP ships of less than 500 gross tonnage, and
  - all fishing vessels.
- service suppliers carrying out an in-water survey on ships and mobile offshore units by diver or remotely operated vehicle (ROV)
- service suppliers engaged in survey using remote inspection techniques (RIT) as an alternative means for close-up survey of the structure of ships and mobile offshore units
- service suppliers engaged in noise and vibrations measurements within the scope of **COMF** class notation
- service suppliers engaged in underwater radiated noise measurements related to **URN** class notation
- service suppliers engaged in condition monitoring and condition based maintenance
- service suppliers engaged in activities within the scope of **SMART()** class notation
- service suppliers engaged in data-centric evaluation.

1.1.5 Where such services are used by Surveyors in making decisions affecting statutory certification and service, the service suppliers are subject to approval and verification by the Society, where the Society is so authorized by the relevant flag Administration (i.e. the flag of the ship on which the servicing is to be done or the service equipment is to be used).

For such services, the Society may accept approvals done by:

- the flag Administration itself
- duly authorized organizations acting on behalf of the flag Administration, or
- other organizations recognized by the flag Administration (e.g. other governments, etc.).

1.1.6 Use of approved service suppliers is not mandatory for the following services, unless otherwise instructed by the flag Administration with respect to the statutory certification:

- service suppliers engaged in inspections of low-location lighting systems using photo luminescent materials and evacuation guidance systems used as an alternative to low-location lighting systems
- service suppliers engaged in sound pressure level measurements of public address and general alarm systems on board ships
- service suppliers engaged in measurements of noise level on board ships
- service suppliers engaged in the examination of bow, stern, side and inner doors of Ro-Ro ships.

2 Procedure

2.1 Documents to be submitted

2.1.1 Application file

The following documents are to be submitted to the Society for review:

a) outline of the company, e.g. organization and management structure, including subsidiaries to be included in the approval/certification

b) list of the nominated agents, subsidiaries and subcontractors

c) experience of the company in the specific service area

d) for categories of service suppliers that require certification from manufacturers: manufacturer's documentary evidence that the service supplier has been certified or licensed to service the particular makes and models of equipment for which approval is sought is to be provided

e) list of documenting training and experience of operators/technicians/inspectors within the relevant service area, and qualifications according to recognized national, international or industry standards, as relevant

f) description of equipment used for the particular service for which approval is sought

g) a guide for operators of such equipment

h) training programmes for operators/technicians/inspectors

i) check lists and record formats for recording results of the services referred to in Article [1]

j) quality manual and/or documented procedures covering requirements in [2.2]

k) documented procedures for communication with the crew prior to commencing work, so that it is safe to decommission the equipment being maintained, and to provide a safe system of work in place

l) evidence of approval/acceptance by other bodies, if any

m) information on the other activities which may present a conflict of interest

n) record of customer claims and of corrective actions requested by certification bodies

o) operators/technicians/inspectors documentation they have acknowledged the code of conduct.

Requirements concerning service suppliers are given in:

- [2.3] for general requirements
- App 1 for specific requirements, where necessary.

2.2 Quality system

2.2.1 Documented system

The service supplier is to have a documented system covering at least the following:

- code of conduct for the relevant activity
- maintenance and calibration of equipment
- training programmes for operators/technicians/inspectors
- supervision and verification to ensure compliance with operational procedures
- recording and reporting of information
- quality management of subsidiaries, agents and subcontractors
- job preparation
- periodic review of work process procedures, complaints, corrective actions, and issuance, maintenance and control of documents.

2.2.2 A documented quality system complying with the most current version of ISO 9000 series or equivalent and including the above items, would be considered acceptable.

2.2.3 If a manufacturer of equipment (and/or its service supplier) applies to the Society for inclusion of its nominated agents and/or subsidiaries (excluding any subcontractor), in the approval, then it is to have implemented a quality system certified in accordance with the most current version of ISO 9000 series. The quality system is to contain effective controls of the manufacturer's (and/or service supplier's) agents and/or subsidiaries. The nominated agents and/or subsidiaries are also to have in place an equally effective quality system complying with the most current version of ISO 9000 series. Such approvals are to be based upon an evaluation of the quality system implemented by the parent company against the most current version of ISO 9000 series.

The Society may require follow-up audits on such agents and/or subsidiaries against the most current version of ISO 9000 series to confirm adherence to this quality system.

2.3 General requirements

2.3.1 Extent of approval

The service supplier is to demonstrate, as required by [2.3.2] to [2.3.13], that it has the competence and control needed to perform the services for which the approval is sought.

2.3.2 Training of personnel

The service supplier is responsible for the qualification and training of its personnel to a recognized national, international or industry standard, as applicable. Where such standards do not exist, the service supplier is to define standards for the training and qualification of its personnel relevant to the functions each is authorized to perform. The personnel is also to have an adequate experience and be familiar with the operation of any necessary equipment. Operators/technicians/inspectors are to have had a minimum of one year tutored on-the-job training. Where it is not possible to perform internal training, a program of external training may be considered as acceptable.

2.3.3 Supervision

The service supplier is to provide supervision for all services provided. The responsible supervisor is to have had a minimum of two years of experience as operator/technician/ inspector within the activity for which the service supplier is approved. For a service supplier consisting of one person, that person is to meet the requirements of a supervisor.

2.3.4 Personnel records

The service supplier is to keep records of the approved operators/technicians/inspectors. The record is to contain information on age, formal education, training and experience for the services for which they are approved.

2.3.5 Subcontractors

The service supplier is to give information of agreements and arrangements if any parts of the provided services are subcontracted. Particular emphasis is to be given to quality management by the service supplier in following-up of such subcontracts. Subcontractors providing the services of the approved service supplier are also to meet the requirements of Article [2].

2.3.6 Equipment and facilities

The service supplier is to have the necessary equipment and facilities for the service to be supplied. A record of the equipment used is to be kept and available. The record is to contain information on maintenance and results of calibration and verifications. The Society is to assess and record the validity of previous measuring results when the equipment is found not to conform to requirements. The Society is to take appropriate action on the equipment affected.

2.3.7 Control of data

When computers are used for the acquisition, processing, recording, reporting, storage, measurement assessment and monitoring of data, the ability of computer software to satisfy the intended application is to be documented and confirmed by the service supplier. This is to be undertaken prior to initial use and reconfirmed as necessary.

Note 1: Commercial off-the-shelf software (e.g. wordprocessing, database and statistical programmes) in general used within their designed application range may be considered to be sufficiently validated and do not require any subsequent confirmation.

2.3.8 Where several servicing stations are owned by a given company, each station is to be assessed and approved except as specified in [2.2.3].

2.3.9 Procedures and instructions

The service supplier is to have documented work procedures and instructions covering all the services supplied.

2.3.10 Documented procedures and instructions are to be available for the recording of damages and defects found during inspection, servicing and repair work. This documentation is to be made available upon request.

2.3.11 Verification

The service supplier is to verify that the services provided are carried out in accordance with approved procedures.

2.3.12 Reporting

The report is to be prepared in a form acceptable to the Society. The report is to detail the results of inspections, measurements, tests, maintenance and/or repairs carried out. Special guidelines may be given in App 1. The report is to include a copy of the Certificate of Approval. The report is to be made available to the Surveyor.

2.3.13 Documentation

The service supplier is responsible for ensuring the provision and updating of:

- reporting forms in use
- other documents such as user equipment manuals, Rules or Guidance Notes.

2.4 Auditing of the service supplier

2.4.1 Upon reviewing the submitted documents with satisfactory result, the service supplier is audited in order to ascertain that he is duly organized and managed in accordance with the submitted documents, and that he is considered capable of conducting the services for which approval or certification is sought.

2.5 Witnessing

2.5.1 Certification is conditional on a practical demonstration of the performance of the specific service as well as satisfactory reporting being carried out. At initial audits, when the service supplier is already certified in accordance with IACS UR Z17 by other Classification Society subject to verification of compliance with QSCS in accordance with Section 5 of Annex 1 to the QSCS, this may be verified through documentary review that a practical demonstration has already been carried out.

At renewal audits, verification by documentary review of jobs undertaken since the previous audit and that have been accepted by a Classification Society subject to verification of compliance with QSCS in accordance with Section 5 of Annex 1 to the QSCS is acceptable and is sufficient to satisfy this requirement.

2.6 Service supplier’s relations with the equipment manufacturer

2.6.1 Service suppliers working as a service station

A service supplier working as a service station for manufacturer(s) of equipment (and as a service supplier in this field), is to be assessed by the manufacturer(s) and nominated as his (their) agent. The manufacturer is to ensure that appropriate instruction manuals, material etc. are available for the agent as well as of proper training of the agent's technicians. Such service suppliers are to be approved, either on a case-by-case basis or in accordance with [2.2.3].

2.7 Additional requirements

2.7.1 The service supplier is to fulfil the general requirements outlined in [2.1] to [2.6]and depending on the area to be assessed, the additional requirement referred to in Tab 1.

3 Alteration to the certified service operating system

3.1 Notification

3.1.1 Where any alteration to the certified service operating system of the service supplier is made, such alteration is to be immediately notified to the Society. Re-audit may be required when deemed necessary by the Society.

Table 1 : Additional Requirements

Topic	Reference
Thickness measurements	App 1, [1]
In-water surveys	App 1, [2]
Examination of ro-ro ships bow, stern, side and inner doors	App 1, [3]
Tightness testing of closing appliances such as hatches or doors	App 1, [3]
Noise and vibration measurements (**COMF** notation)	App 1, [16]
Underwater radiated noise measurements (**URN** notation)	App 1, [17]
Tightness testing of primary and secondary barriers of gas carriers	App 1, [13]
Remote inspection technique (RIT)	App 1, [14]
Cable transit seal systems inspection	App 1, [18]
Condition based monitoring	App 1, [20]
SMART notation	App 1, [21]
Data-centric evaluation	App 1, [22]
Fire extinguishing and fire detection equipment and systems	App 1, [4]
Inflatable liferafts, inflatable lifejackets, hydrostatic release units, marine evacuation systems	App 1, [5]
Radio communication equipment	App 1, [6]
Automatic identification system (AIS)	App 1, [6]
Voyage data recorder (VDR) and simplified voyage data recorder (S-VDR)	App 1, [10]
Self contained breathing apparatus	App 1, [7]
Low location lighting systems using photo luminescent materials and evacuation guidance systems used as an alternative to low location lighting systems	App 1, [8]
Sound pressure level measurements of public address and general alarm systems	App 1, [9]
Noise level onboard ships	App 1, [12]
Visual and/or sampling checks and preparation of inventory of hazardous materials (IHM)	App 1, [15]
Commissioning testing of ballast water management system (BWMS)	App 1, [19]
Lifeboats and rescue boats, launching appliances, and release gear	App 1, [11]

Section 3 Certification

1 General process

1.1 Issuance of the Certificate of Approval

1.1.1 Upon satisfactory review of the application file and the completion of both the audit of the service supplier and the demonstration test, as applicable, the Society may issue a Certificate of Approval stating that the service supplier's service operation system has been found to be satisfactory and that the results of services performed in accordance with that system may be accepted and utilised by the Surveyors taking decisions affecting classification or statutory certification, as relevant. The Certificate is to clearly state the type and scope of services and any limitations or restrictions imposed, including type of equipment and/or names of manufacturers of equipment where this is a limiting restraint. The service supplier may also be included in the Society's records of approved service suppliers.

1.2 Renewal of the Certificate of Approval

1.2.1 Renewal or endorsement of the Certificate is to be made at intervals not exceeding three 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.

Intermediate audits may be requested, if deemed necessary by the Society. It is the responsibility of the service supplier to request the renewal of its agreement.

2 Cancellation of approval

2.1 Condition for cancellation

2.1.1 The Society reserves the right to cancel the approval and to inform the IACS Members accordingly (for service suppliers engaged in thickness measurements, refer to IACS PR23).

2.1.2 Approval may be cancelled 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 operating system of the service supplier and appropriate corrective actions are not taken
- where alterations have been made to the company's quality system relevant to the service supplier certificates, without written notification to the Society
- where the intermediate audit, if prescribed, has not been carried out
- were willful acts or omissions or grossly negligent act or omission are ascertained
- where any deliberate misrepresentation has been made by the service supplier.

2.1.3 Expiration or cancellation of the supplier's parent company approval automatically invalidates approval of all agents and subsidiaries if these ones are certified according to Sec 2, [2.2.3].

2.1.4 Re-approval

A service supplier whose approval has been cancelled may apply for re-approval, provided it has corrected the non-conformities which resulted in cancellation, and the Society is able to confirm it has effectively implemented the corrective action.

Appendix 1 Specific Requirements

1 Service suppliers engaged in thickness measurements on ships or mobile offshore units

1.1 Extent of engagement

1.1.1 Thickness measurements of structural material of ships or mobile offshore units, except:

- non-ESP ships less than 500 gross tonnage, and
- all fishing vessels.

1.2 Reference document

1.2.1 The service supplier is to have access to the relevant parts of the Society's Rules and Guidelines.

1.3 Qualification

1.3.1 Supervisor

The responsible supervisor is to be qualified according to a recognized national or international industrial NDT standard (e.g. EN 473 level II as amended, or ISO 9712 level II as amended).

1.3.2 Operators

The operators carrying out the measurements are to be certified to a recognized national or international industrial standard (e.g. EN 473 level I as amended, or ISO 9712 level I as amended) and are to have adequate knowledge of ship structures sufficient to elect a representative position for each measurements.

1.4 Equipment

1.4.1 On coated surfaces, instruments using pulsed echo technique (with either oscilloscope or digital instruments using multiple echoes, single crystal technique) are required. Single echo instruments may be used on uncoated surfaces, which have been cleaned and ground.

1.5 Procedures

1.5.1 Documented work procedures are at least to contain information on inspection preparation, selection and identification of test locations, surface preparation, protective coating preservation, calibration checks, and report preparation and content.

1.6 Verification

1.6.1 The service supplier is to have the Surveyor's verification of each separate job, documented in the report by the attending Surveyor(s) signature.

2 Service suppliers carrying out an in-water survey on ships and mobile offshore units by diver or Remotely Operated Vehicle (ROV)

2.1 Extent of engagement

2.1.1 In-water survey in lieu of a docking survey and/or internal hull survey of compartment filled with water on ships and mobile offshore units by diver or remotely operated vehicle (ROV).

2.2 Reference document

2.2.1 The service supplier is to have access to the relevant parts of the Society's Rules and Guidelines.

2.3 Qualification

2.3.1 Training of personnel

The service supplier is responsible for the qualification of its divers, remotely operated vehicle (ROV) operators and supervisors and for their training in the use of the equipment utilized when carrying out inspection. Knowledge of the following is to be documented:

- ship's underwater structure and appendages, propeller shaft, propeller, rudder and its bearings, etc
- non-destructive testing in accordance with a recognized national or international industrial NDT standard. This requirement only applies if an in-water survey company performs non-destructive testing
- certification as a thickness measurement service supplier when conducting thickness measurements under water
- bearing clearance measurements on rudders and propeller shaft
- under-water video monitoring with TV-monitors on deck, as well as still picture work
- operation of under-water communication system
- any special equipment necessary for the work carried out.

2.3.2 Training plan

A plan for training of personnel in the reporting system, minimum rule requirements for relevant ship or unit types, ship's or unit's underwater structure, measuring of bearing clearances, recognition of corrosion damage, buckling and deteriorated coatings, etc. is to be included.

2.3.3 Supervisor

a) Diving supervisor: diving supervisor is to be qualified according to the service supplier's general requirements and is to have a minimum of two years' experience as a diver carrying out inspection.

b) ROV supervisor: ROV supervisor is to have a minimum of two (2) years of experience conducting inspections with ROVs.

2.3.4 Diver and operator

a) Divers carrying out inspection: the diver carrying out the inspection is to have had at least one year's experience as an assistant diver carrying out inspections (including participation in a minimum of 10 different assignments).

b) ROV operators: ROV operators are to have at least one year working with ROVs conducting inspections on vessels.

2.4 Equipment

2.4.1 The following is to be available:

- closed circuit color television with sufficient illumination equipment
- two-way communication between diver and surface staff
- video recording device connected to the closed circuit television
- still photography camera
- equipment for carrying out thickness gauging, non-destructive testing and measurements, e.g. clearances, indents, etc., as relevant to the work to be performed
- equipment for cleaning of the hull.

2.4.2 In addition to above [2.4.1], the following is to be available for service suppliers carrying out survey by ROV:

- remotely operated vehicle
- adequate controls or programming for the ROV functions required.

2.5 Procedures and guidelines

2.5.1 The service supplier is to have documented operational procedures and guidelines for how to carry out the inspection and how to handle the equipment. These are to include:

- two-way communication between diver and surface
- video recording and closed circuit television operation
- guidance of the diver along the hull to provide complete coverage of the parts to be inspected.

2.5.2 In addition to above [2.5.1], documented operational procedures and guidelines for firms carrying out in-water survey by ROV are also to include:

- guidance for the operation and maintenance of the remotely operated vehicle (ROV), if applicable
- methods and equipment to ensure the ROV operator can determine the ROV's location and orientation in relation to the vessel.

2.6 Verification

2.6.1 The service supplier is to have the Surveyor's verification of each separate job, documented in the report by the attending Surveyor(s) signature.

3 Service suppliers engaged in examination of bow, stern, side and inner doors of ro-ro ships

3.1 Extent of engagement

3.1.1 Inspection of securing and locking devices, hydraulic operating system, electric control system for the hydraulics, electric indicator systems, and supporting, securing and locking devices and tightness testing.

3.2 Reference documents

3.2.1 The service supplier is to have access to the relevant parts of the Society's Rules and Guidelines and to the following reference documents:

- IMO - International Convention on the Safety of Life at Sea (SOLAS) 74/78, as amended
- ISO 9002:1994 - Quality systems - Model for quality assurance in production, installation and servicing
- UR Z24 - Survey Requirements for Shell and Inner Doors of Ro-Ro ships, or its equivalent, by the Society.

3.3 Quality certification

3.3.1 The service supplier is to be certified to the most current version of ISO 9000 series.

3.4 Qualification

3.4.1 Supervision

In addition to Sec 2, [2.3.3], the supervisor is to have a minimum of two years of related education from a technical school.

3.4.2 Training of personnel

Operators carrying out non-destructive test (NDT) are to be qualified to a recognized national or international standard for the methods used.

3.5 Required equipment

3.5.1 Inspection of supporting securing and locking devices, hinges and bearings

- equipment for measuring clearances (i.e. feeler gauges, vernier calipers, micrometers)
- non-destructive test (i.e. dye penetrant, magnetic particle inspection).

3.5.2 Tightness testing

- ultrasonic leak detector or equivalent.

3.5.3 Inspection of hydraulic operating system

- pressure gauges
- particle counter for analyzing the quality of hydraulic fluid.

3.5.4 Inspection of electric control system and indication system

- digital multi-meter
- earth fault detector.

3.6 Procedures and instructions

3.6.1 The service supplier is to have access to drawings and documents, including the operating and inspection manual.

3.6.2 The service supplier is to have access to the service history of the doors.

3.6.3 The service supplier is to use, complete and sign a checklist which has been found acceptable by the Society.

3.7 Verification

3.7.1 The service supplier is to have the Surveyor's verification of each separate job, documented in the report by the attending Surveyor(s) signature.

4 Service suppliers engaged in inspections and maintenance of fire-extinguishing equipment and systems

4.1 Extent of engagement

4.1.1 Inspections and maintenance of fire-extinguishing equipment and systems such as fixed fire-extinguishing systems, portable fire extinguishers and fire detection and alarm systems.

4.2 Extent of approval

4.2.1 As prerequisite to the Society's approval, the servicing station, where involved in servicing of fire detection systems, is to be approved by the equipment Manufacturer(s) as per a dedicated list of equipment.

4.2.2 The service supplier is to provide evidence of any such license granted by the equipment Manufacturer(s).

4.2.3 Service suppliers are to have professional knowledge of fire theory, fire-fighting and fire-extinguishing appliances sufficient to carry out the maintenance and/or inspections, and to make the necessary evaluations of the condition of the equipment.

4.2.4 In demonstrating professional knowledge, service suppliers are to have an understanding of the various types of fires and the extinguishing media to be used on them.

4.2.5 For fixed fire-extinguishing systems, service suppliers are to demonstrate an understanding of the principles involved with gas, foam, deluge, sprinkler and watermist systems, as relevant for the approval being sought.

4.3 Reference document

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

- Manufacturer's servicing manuals, servicing bulletins, instructions and training manuals, as appropriate
- Type approval certificates showing any conditions that may be appropriate during the servicing and/or maintenance of fire-extinguishing equipment and systems
- SOLAS, MSC.1/Circular.1318/Rev.1 (Revised Guidelines for the Maintenance and Inspections of Fixed Carbon Dioxide Fire-Extinguishing Systems), International Code for Fire Safety Systems (FSS Code), ISO 6406 (periodic inspection and testing of seamless steel gas cylinders), and any documentation specified in the authorisation or license from the equipment Manufacturer(s)
- MSC/Circ.670 (Guidelines for the Performance and Testing Criteria and Surveys of High Expansion Foam Concentrates for Fixed Fire-Extinguishing Systems)
- MSC/Circ.798 (Guidelines for the Performance and Testing Criteria and Surveys of Medium Expansion Foam Concentrates for Fixed Fire-Extinguishing Systems)
- MSC.1/Circ.1312 (Revised Guidelines for the Performance and Testing Criteria and Surveys of Foam Concentrates for Fixed Fire-Extinguishing Systems as corrected by MSC/Circ.1312/Corr.1)
- MSC.1/Circ.1432 (Revised Guidelines for the Maintenance and Inspection of Fire Protection Systems and Appliances), as amended by MSC.1/Circ.1516
- IMO Res. A. 951(23) - Improved guidelines for marine portable fire extinguishers
- MSC.1/Circ.1370 - Guidelines for the design, construction and testing of fixed hydrocarbon gas detection systems
- Guidelines adopted by IMO for fire-extinguishing equipment and systems specifically intended for service by service suppliers
- the relevant parts of the Society's Rules and Guidelines.

4.4 Equipment and facilities

4.4.1 General requirements

If service suppliers undertake shore-based inspecting and maintenance, they are to maintain and implement procedures for workshop cleanliness, ventilation and arrangement, with due cognisance of the spares and extinguishing media being stored, to ensure safe and effective working procedures.

Service suppliers undertaking inspecting and maintenance of equipment and systems on board are to provide the appropriate facilities to either complete the work on board or remove the necessary items to their workshops.

4.4.2 Equipment

Sufficient and appropriate spares and tools are to be available as applicable, which are to include:

- various scales to weigh items
- means to hydrostatically pressure test components/systems/storage bottles
- liquid/gas, flow meters, as appropriate
- pressure gauges or manometers
- in the cases of foam concentrates and portable fire extinguishers, chemical analysis equipment and a testing bay, respectively, and
- specific equipment/spares as may be specified by the Manufacturer(s)
- level measuring equipment for bottles
- recharging facilities for pressurized bottles, extinguishers and cartridges.

4.5 Procedures

4.5.1 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.

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

5 Service suppliers engaged in servicing of inflatable liferafts, inflatable lifejackets, hydrostatic release units, marine evacuation systems

5.1 Extent of engagement

5.1.1 Servicing of inflatable liferafts, inflatable lifejackets and/or hydrostatic release units.

5.1.2 Servicing of marine evacuation systems.

5.2 Extent of approval

5.2.1 As a prerequisite to the Society's recognition, the servicing station is to be approved by the equipment Manufacturer(s) as per dedicated list of equipment.

5.2.2 The service supplier is to provide evidence that it has been authorized or licensed to service the particular makes and models of equipment for which approval is sought by the equipment Manufacturer(s).

5.3 Reference documents

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

- IMO - Resolution A.761(18) - Recommendation on Conditions for the Approval of Servicing Stations for Inflatable Liferafts - (adopted on 4 November 1993), amended by Resolution MSC.55(66) and by MSC.388(94)
- IMO - Resolution MSC.55(66)
- IMO - Resolution MSC.388(94)
- IMO - MSC.1/Circ.1328 - Guidelines for the Approval of Inflatable Liferafts Subject to Extended Service Intervals Not Exceeding 30 Months
- Manufacturer's servicing manuals, servicing bulletins, instructions and training manuals, as appropriate
- Type approval certificates, showing any conditions that may be appropriate during the servicing and/or maintenance of inflatable liferafts, inflatable lifejackets, and hydrostatic release units
- LSA code/Chap.IV, 1995 SOLAS Conference Resolution 4 regarding marine evacuation systems
- the relevant parts of the Society's Rules and Guidelines.

5.4 Equipment and facilities

IMO Res. A.761 (18) as amended by MSC.55(66) and by MSC.388(94) gives recommendations on conditions for the approval of servicing stations for inflatable liferafts which is to be observed as relevant. Where inflatable liferafts are subject to extended service intervals, MSC.1/Circ.1328 is also to be followed.

5.5 Procedures and instructions

5.5.1 The service supplier is to have documented procedures and instructions for how to carry out service of equipment.

5.5.2 Where inflatable liferafts are subject to extended service intervals in accordance with the requirements of SOLAS Regulation III/20.8.3, MSC.1/Circ.1328 is to be followed in addition to Resolution A.761(18) as amended by MSC.55(66) and by MSC.388(94).

6 Service suppliers engaged in inspections and testing of radio communication equipment

6.1 Extent of engagement

6.1.1 Inspection, testing, and/or measurement of radio equipment aboard ships or mobile offshore units for compliance with SOLAS regulations.

6.1.2 Annual testing of 406 MHz satellite EPIRBs for compliance with SOLAS Regulation IV/15.9.

6.1.3 The principles of this Article also apply to service suppliers involved in inspection, performance testing and maintenance of Automatic Identification Systems (AIS). The service supplier is to be familiar with the equipment with which it will be involved, such as being a service agent for the equipment Manufacturer(s).

6.2 Reference documents

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

- SOLAS 1974 as amended
- IMO Res. MSC.349(92): Code for Recognized Organizations (RO Code)
- MSC/Circ.1040/Rev.1 - Guidelines on Annual Testing of 406 MHZ Satellite EPIRBs
- MSC.1/Circ.1252 - Guidelines on Annual Testing of the Automatic Identification System (AIS)
- SN/Circ.227, SN/Circ.227/Corr.1 and 245 - Guidelines for the Installation of a Shipborne Automatic Identification System (AIS) and amendments thereto
- ITU Radio Regulations
- IMO Performance Standards for the Equipment for which the Service Supplier is Approved
- Flag State Administration requirements
- the relevant parts, if any, of the Society's Rules and Guidelines.

6.3 Qualification

6.3.1 Supervisor

The supervisor is to have a minimum of two years of education from a technical school and experience as an inspector, and is preferably to hold a General Operator's Certificate (GOC) or a GMDSS Radio Electronic Certificate (REC), recognised by the ITU, to operate or test radio transmitters. He is to be aware of any local conditions for radio signal propagation, of regional radio stations and their facilities, and of the GMDSS infrastructure.

6.3.2 Radio inspector

The inspector carrying out the inspection is to have passed the internal training of the service supplier in radiotelephony, GMDSS, and initial and renewal surveys, as applicable. The inspector is to also have at least one year of technical school training or, as alternative, hold evidence that he followed a technical course approved by the relevant Administration, at least one year of experience as an assistant radio inspector and is preferably to hold an appropriate National Radio Operators Certificate, recognised by the ITU, such as a GMDSS General Operator's Certificate (GOC) or a GMDSS Radio Electronic Certificate (REC). He is to be aware of any local conditions for radio signal propagation, of regional radio stations and their facilities, and of the GMDSS infrastructure.

6.4 Equipment and facilities

6.4.1 The service supplier is to have the major and auxiliary equipment required for correctly performing the inspection. A record of the equipment used is to be kept. The record is to contain information on the Manufacturer and type of equipment, and a log of maintenance and calibrations.

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

6.4.3 Software

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

6.4.4 Minimum required instruments

Equipment for measuring frequency, voltage, current and resistance.

Equipment for measuring output and reflect effect on VHF and MF/HF.

Equipment for measuring modulation on MF/HF and VHF (AM, FM, PM).

Acid tester for checking specific gravity of lead batteries.

Tester for checking of correct output from Free-Float Satellite EPIRB.

Equipment for testing the performance of Automatic Identification Systems (AIS).

6.5 Procedures and instructions

6.5.1 The service supplier is to have documented procedures and instructions for how to carry out testing and examination of radio equipment. Procedures and instructions for operating of each item of the testing/inspection equipment are also to be kept and be available at all times.

6.6 Reporting

6.6.1 The service supplier is to use, complete and sign a report which has been found acceptable by the Society.

7 Service suppliers engaged in inspections and maintenance of self-contained breathing apparatus

7.1 Extent of engagement

7.1.1 Inspections and maintenance of self-contained breathing apparatus, emergency escape breathing devices (EEBD).

7.2 Extent of approval

7.2.1 The service supplier is to document and demonstrate that it has knowledge of the equipment and systems sufficient to carry out the inspections and testing of self-contained breathing apparatus according to identified standards and to make the necessary evaluation of the condition of the equipment.

7.2.2 In demonstrating professional knowledge, the service suppliers are to have an understanding of the operational requirements involved with self-contained breathing apparatus and how these are to be maintained.

7.2.3 Additionally, the service suppliers are to demonstrate the necessary safety requirements applicable to such equipment.

7.3 Reference documents

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

- manufacturers' servicing manuals, servicing bulletins, instructions and training manuals, as appropriate
- type approval certificates showing any conditions which may be appropriate during the servicing and/or maintenance of self-contained breathing apparatus
- the relevant parts of the Society's Rules and Guidelines.

7.4 Equipment and facilities

7.4.1 General requirements

If service suppliers undertake shore-based inspecting and maintenance, they are to maintain and implement procedures for workshop cleanliness, ventilation and arrangement, with due cognisance of the spares and pressurised bottles being stored, to ensure safe and effective working procedures.

Service suppliers undertaking inspecting and maintenance of equipment and systems on board are to provide the appropriate facilities to either complete the work on board or remove the necessary items to their workshops.

7.4.2 Equipment

Sufficient and appropriate spares and tools are to be available for repair, maintenance and servicing of self-contained breathing apparatus in accordance with the requirements of the Manufacturers.

These are to include, as required by the self-contained breathing apparatus equipment and/or systems:

- various scales to weigh items
- means to hydrostatically pressure test components/systems/storage bottles
- flow meters, and
- pressure gauges or manometers
- equipment for checking air quality
- recharging facilities for breathing apparatus.

8 Service suppliers engaged in inspections of low location lighting systems using photo luminescent materials and evacuation guidance systems used as an alternative to low location lighting systems

8.1 Extent of engagement

8.1.1 Luminance measurements on board ships of low location lighting systems using photo luminescent materials.

8.2 Reference documents

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

- IMO - International Convention on the Safety of Life at Sea (SOLAS), 74/78 Ch II-2, Pt D, Reg 13.3.2.5 - Marking of escape routes
- IMO - Fire Safety Systems (FSS Code), Chapter 11 - Low-location lighting systems
- IMO - Resolution A.752(18) - Guidelines for the Evaluation, Testing and Application of Low-Location Lighting on Passenger Ships (adopted on 4 November 1993)
- ISO 15370:2010 - Ships and marine technology - Low-location lighting on passenger ships - Arrangement

- MSC/Circ.1168 - Interim guidelines for the testing, approval and maintenance of evacuation guidance systems used as an alternative to low-location lighting systems
- the relevant parts of the Society's Rules and Guidelines.

8.3 Qualification

8.3.1 The operator is to have the following qualifications:

- to have adequate knowledge of the applicable international requirements (namely SOLAS, reg. II-2/13.3.2.5, IMO Res. A.752(18) -Guidelines for the Evaluation, Testing and Application of Low-Location Lighting on Passenger Ships-, ISO 15370-2010, FSS Code Chapter 11)
- to be able to document a theoretical and practical training on board, using equipment specified.

8.4 Equipment

8.4.1 The service supplier is to have the equipment required for correctly performing the testing and measurement of LLL (PL) systems. A record of the equipment used is to be kept. It is to contain information on the Manufacturer and type of equipment, log of maintenance and calibration.

8.4.2 The measuring instrument is to incorporate a fast-response photometer head with CIE (International Commission on Illumination) photopic correction and have a measurement range of at least 10^{-4} cd/m^2 to 10 cd/m^2.

8.5 Procedures and instructions

8.5.1 Documented work procedures are at least to contain information on inspection preparation, selection and identification of test locations.

8.6 Reporting

8.6.1 The report is to conform to Annex C of ISO 15370-2010.

8.7 Verification

8.7.1 The service supplier is to have the Surveyor's verification of each separate job, documented in the report by the attending Surveyor’s signature.

9 Service suppliers engaged in sound pressure level measurements of public address and general alarm systems on board ships

9.1 Extent of engagement

9.1.1 Sound pressure level measurements of public address and general alarm systems on board ships.

9.2 Reference documents

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

- SOLAS 74/78, Ch III, Pt A, Reg 4 - Evaluation, testing and approval of life-saving appliances and arrangements
- SOLAS 74/78, Ch III, Pt B, Reg 6 - Communications
- International Life-Saving Appliance (LSA) Code, Ch VII, Reg 7.2 - General alarm and public address system
- IMO - Code on Alarms and Indicators, 1995 as amended
- IEC 60651 (2001-10) - Sound level meters
- IEC 61672 - Electroacoustics - Sound level meters
- IEC 61260 - Electroacoustics - Octave-band and fractional-octave-band filters
- the relevant parts of the Society's Rules and Guidelines.

9.3 Qualification

9.3.1 The operator is to have the following qualifications:

- to have adequate knowledge of the applicable international requirements (SOLAS Reg. III/4 and III/6, LSA CODE Chapter VII/ 7.2, IMO Code on alarms and indicators, 1995)
- to be able to document a theoretical and practical training on board, using equipment specified.

9.4 Equipment

9.4.1 The measuring instrument is to be an integrating sound level meter with frequency analyzer capabilities complying with IEC (International Electrotechnical Commission) 60651and IEC 61672, type 1 precision class with, at least an A-weighting frequency response curve and 1/3 octave and 1 octave band filters, complying to IEC 61260, as appropriate for the measurements to be carried out. In addition, microphones are to be of the random incidence type, complying with IEC 60651.

9.5 Procedures

9.5.1 Documented work procedures are at least to contain information on inspection preparation, calibration, selection and identification of test locations.

9.6 Reporting

9.6.1 The report is to describe, as a minimum, the environmental conditions of the tests and, for each test location, the ambient noise level or the speech interference level, as appropriate for the measurements to be carried out.

9.7 Verification

9.7.1 The service supplier is to have the Surveyor's verification of each separate job, documented in the report by the attending Surveyor’s signature.

10 Service suppliers engaged in annual performance testing of Voyage Data Recorders (VDR) and Simplified Voyage Data Recorders (S-VDR)

10.1 Extent of engagement

10.1.1 Testing and servicing of voyage data recorders (VDR) and simplified voyage data recorders (S-VDR) in accordance with SOLAS Chapter V Regulation 18.8 and IMO - MSC.1/Circular.1222/Rev.1 - Guidelines on Annual Testing of Voyage Data Recorders (VDR) and Simplified Voyage Data Recorders (S-VDR), as applicable.

10.2 Extent of approval

10.2.1 The service supplier is to provide evidence that he has been authorised or licensed by the equipment Manufacturer to service the particular makes and models of equipment for which approval is sought.

10.2.2 Where the service supplier is also the Manufacturer of the voyage data recorder (VDR) or the simplified voyage data recorder (S-VDR) and has elected to apply IMO - MSC.1/Circular.1222/Rev.1 - Guidelines on Annual Testing of Voyage Data Recorders (VDR) and Simplified Voyage Data Recorders (S-VDR) in its entirety for the purpose of acting as a service supplier engaged in annual performance testing, the following is to be applied:

- the Manufacturer is responsible for appointing Manufacturer's authorised service stations to carry out annual performance testing.
- the Manufacturer is required to be an approved service supplier and is to satisfy the requirements for service suppliers engaged in annual performance testing of voyage data recorders (VDR) and simplified voyage data recorders (S-VDR), as applicable.
- the Manufacturer's authorised service station is not required to be an approved service supplier.
- the Manufacturer is to demonstrate that IMO - MSC.1/Circular.1222/Rev.1 - Guidelines on Annual Testing of Voyage Data Recorders (VDR) and Simplified Voyage Data Recorders (S-VDR) is applied in its entirety.

10.3 Reference documents

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

- IMO - International Convention on the Safety of Life at Sea (SOLAS), 74/78, Ch V, Reg 18.8. - Approval, surveys and performance standards of navigational systems and equipment and voyage data recorder
- IMO - MSC.1/Circular.1222/Rev.1 - Guidelines on Annual Testing of Voyage Data Recorders (VDR) and Simplified Voyage Data Recorders (S-VDR) - (14 June 2019)
- IMO - Resolution A.861(20) (adopted on 27 November 1997) as amended by IMO Resolution MSC.214(81) and revised by IMO Resolution MSC.333(90) - Performance Standards for Shipborne Voyage Data Recorders (VDRs) -
- IMO - Resolution MSC.163(78) - Performance Standards for Shipborne Simplified Voyage Data Recorders (S-VDRs) - (adopted on 17 May 2004), as amended by IMO Resolution 214(81).

10.3.2 The service supplier is to have access to applicable industry performance standards, e.g.:

- IEC 61996 - Maritime navigation and radiocommunication equipment and systems - Shipborne voyage data recorder (VDR)
- IEC 61996-2 - Maritime navigation and radio communication equipment and systems - Shipborne voyage data recorder (VDR) - Part 2: Simplified voyage data recorded (SVDR) - Performance requirements, method of testing and required test results.

10.3.3 The service supplier is also to have access to any documentation specified in the authorisation or license from the equipment Manufacturer.

10.4 Equipment and facilities

10.4.1 The service supplier is to have equipment as specified in the authorisation or license from the equipment Manufacturer.

10.5 Procedures

10.5.1 The service supplier is to have documented procedures and instructions.

10.5.2 Where the service supplier is also the Manufacturer of the voyage data recorder (VDR) or the simplified voyage data recorder (S-VDR) and has selected to apply IMO - MSC.1/Circular.1222/Rev.1 - Guidelines on Annual Testing of Voyage Data Recorders (VDR) and Simplified Voyage Data Recorders (S-VDR) in its entirety for the purpose of acting as a service supplier engaged in annual performance testing, the Manufacturer is to:

- have documented procedures for the assessment and authorisation of the Manufacturer's authorised service stations who carry out annual performance testing
- have documented procedures for the review of the Manufacturer's authorised service stations annual performance test reports, analysis of the voyage data recorder (VDR) and the simplified voyage data recorder (S-VDR) 12-hour log, and the issue of annual performance test certificates to the Owner/operator, and
- maintain a list of the Manufacturer's authorised service stations that can be accessed upon request (by any available means, e.g. via a nominated contact point or from the Manufacturer's website).

10.6 Reporting

10.6.1 The service supplier is to issue a certificate of compliance as specified in the International Convention on the Safety of Life at Sea (SOLAS 1974), as amended, Ch V, Reg 18.8.

10.6.2 Annual performance test of VDR and S-VDR are to be recorded in the form of the model test report given in the Appendix to MSC.1/Circular.1222/Rev.1, signed and stamped by the service supplier and attached to the annual performance test certificate.

10.6.3 Where the service supplier is also the Manufacturer of the voyage data recorder (VDR) or the simplified voyage data recorder (S-VDR) and has selected to apply IMO - MSC.1/Circular.1222/Rev.1 - Guidelines on Annual Testing of Voyage Data Recorders (VDR) and Simplified Voyage Data Recorders (S-VDR) in its entirety for the purpose of acting as a service supplier engaged in annual performance testing, the Manufacturer is to make arrangements for the following:

- review of the Manufacturer's authorised service station annual performance test report
- analysis of the recorder 12-hour log
- checking of the master record/database for the recorder.

10.6.4 Issue of the annual performance test certificate to the Owner/operator within 45 days of completion of the annual performance test.

11 Service suppliers engaged in maintenance, thorough examination, operational testing, overhaul and repair of lifeboats and rescue boats, launching appliances and release gear

11.1 Extent of engagement

11.1.1 Maintenance, thorough examination, operational testing, overhaul and repair of:

- lifeboats (including free-fall lifeboats), all rescue boats (including inflated rescue boats and fast rescue boats); and
- launching appliances and on-load and off-load release gear for lifeboats (including primary and secondary means of launching appliances for free-fall lifeboats), rescue boats, fast rescue boats and davit-launched liferafts.

11.2 Extent of approval

11.2.1 The content of this procedure applies equally to manufacturers or ship's operator when they are acting as service suppliers.

11.2.2 Any service supplier engaged in maintenance, thorough examination, operational testing, overhaul and repair of lifeboats and rescue boats, launching appliances and release gear carried out in accordance with SOLAS regulation III/20 is to be approved for these operations for each make and type of equipment for which they provide the service in accordance with IMO Resolution MSC.402(96)/Corr.1 (annex, section 7).

Such approval is to include, as a minimum:

- employment and documentation of personnel certified in accordance with a recognized national, international or industry standard as applicable, or an equipment manufacturer's established certification program. In either case, the certification program is to be based on [11.3] for each make and type of equipment for which service is to be provided; and
- compliance with provisions (see [11.4], [11.5] and [11.6]).

11.2.3 In cases where an equipment Manufacturer is no longer in business or no longer provides technical support, the service suppliers may be approved for the equipment, on the basis of prior approval for the equipment and/or long term experience and demonstrated expertise as authorized service providers.

11.3 Certification of personnel

11.3.1

a) Personnel for the work specified in [11.1.1] are to be certified by the manufacturer or the Service Supplier for each make and type of the equipment to be worked on. Approved Service Supplier is allowed to certify its own personnel (i.e. employed by the same service supplier) only.

b) The education for initial certification of personnel is to be documented and address, as a minimum:
   - causes of lifeboat and rescue boat accidents
   - relevant rules and regulations, including International Conventions
   - design and construction of lifeboats (including free-fall lifeboats), rescue boats and fast rescue boats including on load release gear and launching appliances
   - education and practical training in the procedures specified in section 6 of the annex to IMO Resolution MSC.402(96)/Corr.1 for which certification is sought
   - detailed procedures for thorough examination, operational testing, repair and overhaul of lifeboats (including free-fall lifeboats), rescue boats and fast rescue boats, launching appliances and on load release gear, as applicable
   - procedures for issuing a report of service and statement of fitness for purpose based on IMO Resolution MSC.402(96)/Corr.1 (annex, paragraph 5.3); and
   - work, health and safety issues while conducting activities on board.

c) The training for the personnel is to include practical technical training on thorough examination, operational testing, maintenance, repair and overhaul using the equipment for which the personnel are to be certified. The technical training is to include disassembly, reassembly, correct operation and adjustment of the equipment. Classroom training is to be supplemented by field experience in the operations for which certification is sought, under the supervision of a certified person.

d) Prior to issuance of personnel certification, a competency assessment is be satisfactorily completed, using the equipment for which the personnel are to be certified.

e) Upon completion of training and competency assessment, a certificate is to be issued defining the level of qualification and the scope of the certification (i.e. makes and types of equipment and specifically state which activities (annual thorough examination and operational tests; 5-year thorough examination, overhaul; overload operational tests; repairs) are covered by the certification). The expiry date is to clearly be written on the certificate and is to be three years from the date of issue. The validity of any certificate is to be suspended in the event of any shortfall in performance and only revalidated after a further competency assessment.

f) A competency assessment is to be conducted to renew the certification. In cases where refresher training is found necessary a further assessment is to be carried out after completion.

11.4 Reference documents

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

- IMO - Resolution MSC.402(96) /Corr.1, Requirements for Maintenance, Thorough Examination, Operational Testing, Overhaul and Repair of Lifeboats and Rescue Boats, Launching Appliances and Release Gear
- IMO - Resolution A.689(17), Recommendation on testing of life-saving appliances and, for life-saving appliances installed on board on or after 1 July 1999
- IMO - Resolution MSC.81(70), as amended, revised recommendation on testing of life-saving appliances
- Manufacturer's instructions (including updates, amendments and safety notices) for repair work involving disassembly or adjustment of on-load release mechanisms and davit winches
- Type approval certificate showing any conditions that may be appropriate during the servicing and/or maintenance of lifeboats, launching appliances and on-load release gear.

11.5 Equipment and facilities

11.5.1 The service supplier is to have the following:

- sufficient tools, and in particular any specialized tools specified in the equipment Manufacturer's instructions, including portable tools as needed for work to be carried out on board ship
- access to appropriate parts and accessories as specified by the equipment Manufacturer for maintenance and repair
- for servicing and repair work involving disassembly or adjustment of on-load release mechanisms, availability of genuine replacement parts as specified or supplied by the equipment Manufacturer.

11.6 Reporting

11.6.1 The report is to conform to the requirements of IMO Resolution MSC.402(96) /Corr.1 (annex, paragraph 5.3). When repairs, thorough examinations and annual servicing are completed, a statement confirming that the lifeboat arrangements remain fit for purpose, is to be promptly issued by the service supplier that conducted the work. A copy of valid documents of certification and authorization as appropriate are to be included with the statement.

12 Service suppliers engaged in measurements of noise level on board ships

12.1 Extent of engagement

12.1.1 Sound pressure level measurements on board ships.

12.2 Qualification

12.2.1 Supervisor

The supervisor is to have a minimum of two years of experience as an operator in sound pressure level measurements.

12.2.2 Operators

The operator is to have the following qualifications:

- knowledge in the field of noise, sound measurements and handling of measurement equipment
- adequate knowledge of the applicable international requirements (SOLAS Regulation II-1/3-12, as amended, and IMO Code on Noise Levels on Board Ships, as amended)
- at least one-year experience, including participation in a minimum of 5 measurement campaigns as an assistant operator
- training concerning the procedures specified in IMO Code on Noise Levels on Board Ships
- to be able to document theoretical and practical training on board, using a sound level meter.

12.3 Procedures and instructions

12.3.1 The service supplier is to have documented procedures and instructions to carry out service of the equipment. Documented work procedures are at least to contain information on inspection preparation, selection and identification of sound level measurement locations, calibration checks and report preparation.

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

- SOLAS 1988, as amended (Reg.II-1/3-12)
- Resolution A.468(XII) and IMO Resolution MSC.337(91) Code on Noise Levels on Board Ships
- Resolution A.343(IX) Recommendation on methods of measuring noise levels at listening posts
- IMO MSC.1/Circ.1509 Unified Interpretations of the Code on Noise Levels on Board Ships (Resolution MSC.337(91))
- the Society's Rules and Guidelines.

12.4 Equipment

12.4.1 Sound level meters

Measurement of sound pressure levels are to be carried out using precision integrating sound level meters. Such meters are to be manufactured to IEC 61672-1(2002-05) (see Note 1), as amended, type/class 1 standard as applicable, or to an equivalent standard acceptable to the Administration (see Note 2).

Note 1: Recommendation for sound level meters.

Note 2: Sound level meters class/type 1 manufactured according to IEC 651/IEC 804 may be used until 1 July 2016.

12.4.2 Octave filter set

When used alone, or in conjunction with a sound level meter, as appropriate, an octave filter set is to conform to IEC 61260 (1995) (see Note 1), as amended, or an equivalent standard acceptable to the Administration.

Note 1: Octave-band and fractional-octave-band filters.

12.4.3 Sound calibrator

Sound calibrators are to comply with the standard IEC 60942 (2003-01), as amended, and are to be approved by the Manufacturer of the sound level meter used.

12.4.4 Calibration

The edition of the calibration standard is to correspond with the edition of the manufacturing standard of the instruments. Sound calibrator and sound level meter are to be verified at least every two years by a national standard laboratory or a competent laboratory accredited according to ISO/IEC 17025:2017, as amended. The calibration of sound calibrators is to be carried out in accordance with IEC 60942 Appendix B, whilst the calibration of sound level meters is to be in accordance with IEC 61672-3. A record with a complete description of the equipment used shall be kept, including a calibration log.

12.4.5 Microphone wind screen

A microphone wind screen is to be used when taking readings outside, e.g. on navigating bridge wings or on deck, and below deck where there is any substantial air movement. The wind screen is not to affect the measurement level of similar sounds by more than 0,5 dB(A) in “no wind” conditions.

12.5 Reporting

12.5.1 A noise inspection report is to be made for each ship. The report is to comprise information on the noise levels in the various spaces on board. The report is to show the reading at each specified measuring point. The points are to be marked on a general arrangement plan, or on accommodation drawings attached to the report, or to be otherwise identified.

The format for noise inspection reports is set out in appendix 1 of IMO Code on Noise Levels on Board Ships and may conform to any other specific requirement of the Society (refer to IMO circular MSC.337(91)).

12.6 Verification

12.6.1 The service supplier is to have the Surveyor's verification of each separate job, documented in the report by the attending Surveyor’s signature.

13 Service suppliers engaged in tightness testing of primary and secondary barriers of gas carriers with membrane cargo containment systems for ships in service

13.1 Extent of engagement

13.1.1 Firms carrying out the following:

- global vacuum testing of primary and secondary barriers
- acoustic emission (AE) testing
- thermographic testing.

13.2 Requirements for service suppliers engaged in global testing of primary and secondary barriers

13.2.1 Testing procedures

Testing is to be carried out in accordance with cargo containment system designer's procedures as approved by the Society.

13.2.2 Authorization

The service supplier is to be authorized by the system designer to carry out the testing.

13.2.3 Equipment

Equipment is to be maintained and calibrated in accordance with recognized national or international industrial standards.

13.2.4 Reporting

The report is to contain the following:

- date of testing
- identity of test personnel
- vacuum decay data for each tank
- summary of test results.

13.3 Requirements for service suppliers engaged in acoustic emission (AE) testing

13.3.1 Testing procedures

The service supplier is to have documented procedures based upon recognized national or international industrial standards to perform ultrasonic leak test using AE sensors for the secondary barrier of membrane cargo containment systems. The procedures are to include details of personnel responsibilities and qualification, instrumentation, test preparation, test method, signal processing, evaluation and reporting.

Note 1: The differential pressure during testing is not to exceed the containment system designer's limitations.

13.3.2 Qualification

a) Supervisor

The responsible supervisor is to be certified to a recognized national or international industrial standard (e.g. level II, ISO-9712 as amended or SNT-TC-1A as amended) and have one-year experience at level II.

b) Operators

The operators carrying out the acoustic emission (AE) testing are to be certified to a recognized national or international industrial standard (e.g. level I, ISO-9712 as amended or SNT-TC-1A as amended) and are to have adequate knowledge of ship structures sufficient to determine sensor placement.

c) Evaluation of acoustic emission (AE) testing is to be carried out by the supervisor or individuals certified to a recognized national or international industrial standard (e.g. level II, ISO-9712 as amended or SNT-TC-1A as amended) and have one-year experience at level II.

13.3.3 Equipment

Equipment is to be maintained and calibrated in accordance with recognized national or international industrial standards or equipment Manufacturer's recommendations.

13.3.4 Reporting

The report is to contain the following:

- date of testing
- supervisor and operator(s) certifications
- description of time and pressure of each cycle of test
- list and sketch detailing location of possible defects.

13.4 Requirements for service suppliers engaged in thermographic testing

13.4.1 Testing procedures

Testing is to be carried out in accordance with the cargo containment system designer's procedures as approved by the Society.

13.4.2 Authorization

The service supplier is to be authorized by the system designer to carry out the testing.

13.4.3 Qualification

a) Supervisor

The responsible supervisor is to be certified to a recognized national or international industrial standard (e.g. level II, ISO-9712 as amended or SNT-TC-1A as amended) with additional certification in infrared/thermal testing. SNT-TC-1A certified personnel is to provide evidence that training on Level II or above has been administered by independent training body centrally certified to ASNT or a comparable nationally recognized certification scheme.

b) Operators

The operators carrying out the imaging are to be certified to a recognized national or international industrial standard (e.g. level I, ISO-9712 as amended or SNT-TC- 1A as amended) with additional certification in infrared/thermal testing and are to have adequate knowledge of ship structures sufficient to determine position for each identified image, and of the containment system to understand the basis of the testing. SNT-TC-1A certified personnel is to provide evidence that training on Level I or above has been administered by independent training body centrally certified to ASNT or a comparable nationally recognized certification scheme.

c) Evaluation of thermographic images is to be carried out by the supervisor or individuals certified to a recognized national or international industrial standard (e.g. level II, ISO-9712 as amended or SNT-TC-1A as amended) with additional certification in infrared/thermal testing. SNT-TC-1A certified personnel is to provide evidence that training on Level II or above has been administered by independent training body centrally certified to ASNT or a comparable nationally recognized certification scheme.

13.4.4 Equipment

Thermal cameras and sensors are to be in accordance with the system designer's procedures with regard to sensitivity, accuracy and resolution. Equipment are to be in accordance with recognized standard (IEC, etc.) with regard to their safety characteristics for the use in hazardous areas (in gas explosive atmosphere), maintained and calibrated in accordance with the maker's recommendations.

13.4.5 Reporting

The report is to contain the following:

- date of testing
- supervisor and operator(s) certifications
- differential pressures of all phases
- list and sketch detailing location of thermal indications
- thermographic images of all phases of testing for thermal indications
- evaluation of thermal images indicating possible leaks.

14 Service suppliers engaged in survey using Remote Inspection Techniques (RIT) as an alternative means for close-up survey of the structure of ships and mobile offshore units

14.1 Definitions

14.1.1 Close-up survey

A close-up survey is a survey where details of structural components are within the close visual inspection range of the surveyor i.e. normally within the reach of hand.

14.1.2 Remote Inspection Techniques (RIT)

RIT is a means of survey that enables examination of any part of the structure without the need for direct physical access of the surveyor (refer to IACS REC.42). Remote inspection techniques may include the use of:

- unmanned Aerial Vehicles (UAV)
- drones
- unmanned robot arm
- Remotely Operated Vehicles (ROV)
- climbers
- other means acceptable to the Society.

14.2 Extent of engagement

14.2.1 Close-up survey of ship's structure and mobile offshore unit's structure by remote inspection techniques. For in-water close-up survey of the internal compartments by Remotely Operated Vehicles (ROV), service suppliers are also to hold separate approval as a “Service suppliers carrying out an in-water survey on ships and mobile offshore units by diver or Remotely Operated Vehicle (ROV)” (see Article [2]).

14.3 Training and qualification of operators

14.3.1 The service supplier is responsible for the training and qualification of its operators to undertake the remote inspections. UAV Pilots are to be qualified and licensed in accordance with applicable national requirements or an equivalent industrial standard acceptable to the Society.

14.3.2 Knowledge of the following is to be documented:

- marine and/or offshore nomenclatures
- the structural configuration of relevant ship types and MOUs, including internal structure
- the remote inspection equipment and its operation
- survey plans for examination of hull spaces of various configurations, including appropriate flight plans if using an UAV
- thickness measurement (TM) and non-destructive test (NDT) in accordance with a recognized National or International Industrial NDT Standard when these are part of the service. Service suppliers undertaking TMs are to hold separate approval as a “Service supplier engaged in thickness measurements on ships or mobile offshore units” (see Article [1]).

14.4 Training plan

14.4.1 The service supplier is to maintain a documented training plan for personnel. The plan is to include requirements for training in the minimum Rule requirements for the structure of relevant ships types and MOUs, the recognition of structural deterioration (including corrosion, buckling, cracking and deteriorated coatings) and use of the reporting system.

14.5 Supervisor

14.5.1 The supervisor is to be certified according to the recognized national requirements or an equivalent industrial standard (e.g. XXX Level) and is to have a minimum of two years' experience in the inspection of ship's and/or MOU's structure.

14.6 Operators

14.6.1 The operator carrying out the inspection is to be certified according to the recognized national requirements or an equivalent industrial standard (e.g. YYY Level) and have had at least one year's experience as an assistant carrying out inspection of ship's and/or MOU's structure (including participation in a minimum of five different assignments). The operator of those RIT which require, according to the international and national legislations, to be licensed for their use, is to hold valid documentation issued by the appropriate Bodies (e.g. UAV Pilots are to be qualified and licensed in accordance with applicable national requirements).

14.7 Equipment

14.7.1 The following is to be available:

- remotely operated platform with data capture devices capable of operation within an enclosed space
- means of powering the platforms with sufficient capacity to complete the required inspections, including spare batteries if applicable
- data collection devices which may include cameras capable of capturing in high definition both video images and still images
- illumination equipment
- high definition display screen with live high definition feed from inspections cameras
- (when this is part of the RIT)
- means of communication
- data recording devices, as applicable
- equipment for carrying out thickness gauging and/or non-destructive testing, as relevant to the work to be performed (when this is part of the service).

14.8 Procedures and guidelines

14.8.1 The service supplier is to have documented operational procedures and guidelines for how to plan, carry out and report inspections; how to handle/operate the equipment; collection and storage of data. These is to include:

- requirements for preparation of inspection plans (when UAV are part of the equipment, flight plans are to be included)
- operation of the remotely operated platforms
- operation of lighting
- calibration of the data collection equipment
- operation of the data collection equipment
- two-way communication between the operator, platform, Surveyor, other personnel such as support staff and ships officers and crew
- guidance of the operator to provide complete coverage of the structure to be inspected
- guidance for the maintenance of the remotely operated platforms, data capture and storage devices and display screens, as applicable
- requirements for the collection and validation of data
- if data is to be stored, then requirements for location attribution (geo-tagging), validation and storage of data
- requirements for the reporting of inspections, including the recording of damages and defects found during inspection and repair work.

14.9 Documentation and records

14.9.1 The service supplier is to maintain the following:

- records of training
- operator statutory and regulatory certificates and licenses
- equipment register for UAVs, robots, data collection devices, data analysis devices and any associated equipment necessary to perform inspections
- equipment maintenance manuals and records / logbook
- records of calibration
- UAV / robot operation logbook.

14.10 Verification

14.10.1 The service supplier is to have the Surveyor's verification of each separate job, documented in the report by the attending Surveyor(s) signature.

15 Service suppliers engaged in visual and/or sampling checks and preparation of Inventory of Hazardous Materials (IHM)

15.1 Extent of engagement

15.1.1 Visual and/or sampling checks (targeted and/or random sampling) onboard ships, use appropriate laboratories engaged in the testing of samples, development of IHM.

15.2 Extent of approval

15.2.1 Service Suppliers engaged in visual and/or sampling checks are to have professional knowledge of hazardous materials licensed as required and, are trained and equipped experts, in particular with regards to the evaluation and sampling of hazardous materials and materials containing hazardous materials as:

a) Appendix 1 of the Annex of Hong Kong Convention & Annex I of REGULATION (EU) No 1257/2013:
   - asbestos
   - polychlorinated biphenyls (PCB)
   - ozone depleting substances (ODS)
   - anti-fouling compounds and systems
   - perfluorooctane sulfonic acid (PFOS).

b) Appendix 2 of the Annex of Hong Kong Convention & Annex II of REGULATION (EU) No 1257/2013:
   - cadmium and cadmium compounds,
   - hexavalent chromium and hexavalent chromium compounds
   - lead and lead compounds
   - mercury and mercury compounds
   - polybrominated biphenyl (PBBs)
   - polybrominated diphenyl ethers (PBDEs)
   - polychlorinated naphthalenes (more than 3 chlorine atoms)
   - radioactive substances
   - certain shortchain chlorinated paraffins (alkanes, C10-C13, chloro)
   - brominated flame retardant (HBCDD).

Service Suppliers are to use appropriate laboratories engaged in the testing of samples which are to be accredited or certified according to recognized standards (ISO/IEC 17025 or equivalent).

15.3 Procedures

15.3.1 Service suppliers are to have a documented work and safety procedures that contain at least the following:

- information on survey preparation
- safety procedures relevant to the hazards
- selection and identification of visual and/or sampling check locations
- material preparation
- sample removal
- reinstatement of safe conditions for the material once the sample is taken
- sample storage, identification and transport requirements, and
- report preparation and content.

Service suppliers are to implement quality processes and procedures preferably in accordance with ISO 17020 or any equivalent standard covering all the relevant activities of the company.

15.4 Qualification and training of personnel

15.4.1 Personnel carrying out visual and/or sampling checks of relevant hazardous materials is to have professional knowledge of ship structures, equipment, hazardous materials and materials used for ship structures and equipment, taking of samples handling of such materials.

Such personnel is to provide evidence of all the necessary training, qualifications, licenses or equivalent thereto and the work and safety procedures for visual and/or sampling checks and the handling of specified hazardous material(s), in accordance with recognized national or international standards or the equivalent thereto, and other associated work practices as applicable.

15.5 Equipment and facilities

15.5.1 Specific equipment used on-board the ship for the purpose of sampling checks, is to be duly calibrated and/or certified according to recognized standards.

Laboratory to carry out specific tests are to be accredited in accordance with ISO/IEC 17025 or an equivalent standard for the purpose of conducting specific tests for Hazardous Materials included in the Hong Kong Convention and REGULATION (EU) No 1257/2013.

15.6 Reference documents

15.6.1 The Service Supplier is to have access to the following documents:

- Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships, 2009 as set out in final Act of the Conference SR/CONF/46
- Regulation (EU) No 1257/2013 of the European Parliament and of the Council on ship recycling
- EMSA's Best Practice Guidance on the Inventory of Hazardous Materials
- 2015 Guidelines for the development of the Inventory of Hazardous Materials as set out in the annex to resolution MEPC.269(68)
- 2012 Guidelines for the survey and certification of ships under the Hong Kong Convention, as set out in the annex to the resolution MEPC.222(64)
- ISO/IEC 17025 General requirements for the competence of testing and calibration laboratories
- ISO/IEC 17020 Conformity assessment – Requirements for the operation of various types of bodies performing inspection
- IACS Rec. 113 (Rev.1 Oct 2012) - Expert Parties Engaged in Visual and/or Sampling Checks for Preparation of Inventory of Hazardous Materials.

15.7 Development of Inventory and reporting

15.7.1 Development and reporting are to be based on the 2015 IMO Guidelines for the development of the Inventory of Hazardous Materials, as amended and EMSA's Best Practice Guidance on the Inventory of Hazardous Materials.

Development process and assessment report for Part I of the Inventory is to be annexed as appropriate to the inventory.

Inventory is to be developed on the basis of the standard format set out in appendix 2 the 2015 IMO Guidelines for the development of the Inventory of Hazardous Materials, as amended and is to make reference to Regulation (EU) No 1257/2013, as applicable.

Expert parties engaged in visual and/or sampling checks are to document each job by including the signatures of operator's designated responsible person in the final report for verification purposes.

16 Service suppliers engaged in noise and vibrations measurements related to COMF notation

16.1 Extent of engagement

16.1.1 Noise and vibrations measurement and reporting within the scope of the additional class notation **COMF**.

16.2 Reference document

16.2.1 The service supplier is to have access to the relevant parts of the Society's Rules and Guidelines.

16.3 Qualification

16.3.1 Operator

The technician carrying out the measurements is to have at least two years experience and have knowledge about the equipment used.

16.4 Equipment

16.4.1 The service supplier is to have the major and auxiliary equipment required for correctly performing the inspection. A record of the equipment used is to be kept. The record is to contain information on the Manufacturer and type of equipment, and a log of maintenance and calibrations.

Measurement and calibration equipment are to meet the requirements of:

- ISO 2923, IEC 61672-1, IEC 61260 and IEC 60942 for noise, and
- ISO 20283-5 or ISO 6954:1984 and ISO 8041 for vibration.

16.5 Procedures

16.5.1 The service supplier is to have documented operational procedures and guidelines for how to carry out the inspection and how to handle the equipment.

16.5.2 Prior to starting any measurement, the service supplier has to prepare and send dedicated measurements procedures to the Society, for approval.

16.6 Conflict of interest

16.6.1 If the service supplier was involved in the design/technical assistance within the scope of the additional class notation **COMF** of the ship surveyed, the measurements are witnessed by the Society.

16.7 Verification

16.7.1 The service supplier is to have the Society's validation of each separate procedure, documented by a stamp.

16.8 Reporting

16.8.1 The service supplier is to use the Society’s report framework in order to prepare the measurements report and to submit it to the Society for final approval.

17 Service suppliers engaged in underwater radiated noise measurements related to URN notation

17.1 Extent of engagement

17.1.1 Noise and vibrations measurement and reporting within the scope of the additional class notation **URN**.

17.2 Reference document

17.2.1 The service supplier is to have access to the relevant parts of the Society's Rules and Guidelines.

17.3 Qualification

17.3.1 Operator

The technician carrying out the measurements is to have at least two years experience and have knowledge about the equipment used.

17.4 Equipment

17.4.1 The service supplier is to have the major and auxiliary equipment required for correctly performing the inspection. A record of the equipment used is to be kept. The record is to contain information on the Manufacturer and type of equipment, and a log of maintenance and calibrations.

17.5 Procedures

17.5.1 The service supplier is to have documented operational procedures and guidelines for how to carry out the inspection and how to handle the equipment.

17.5.2 Prior to starting any measurement, the service supplier has to prepare and send dedicated measurements procedures to the Society, for approval.

17.6 Conflict of interest

17.6.1 If the service supplier was involved in the design/technical assistance within the scope of the additional class notation **URN** of the ship surveyed, the measurements are witnessed by the Society.

17.7 Verification

17.7.1 The service supplier is to have the Society's validation of each separate procedure, documented by a stamp.

17.8 Reporting

17.8.1 The service supplier is to use the Society’s report framework in order to prepare the measurements report and to submit it to the Society for final approval.

18 Service suppliers engaged in watertight cable transit seal systems inspection on ships and mobile offshore units

18.1 Extent of engagement

18.1.1 Inspection of the watertight Cable Transit Seal Systems for compliance with the relevant approval certificates and product installation manuals, (types of penetrating cables, dimensions, fill ratio and insulation details, as applicable).

18.2 Extent of approval

18.2.1 The contents of this procedure apply equally to manufacturers or shipyards when they are acting as Service Suppliers.

18.2.2 Any Service Supplier engaged in the inspections of watertight cable transit seal systems is to be qualified in these inspections for each make and type of equipment for which they provide the inspection, and provide manufacturers documentary evidence that they have been so authorized or they are certified in accordance with an established system for training and authorization. Such qualification is to include, as a minimum:

- employment and documentation of personnel certified in accordance with a recognized national, international or industry standard as applicable, or an equipment manufacturer's established certification program. In either case, the certification program is be based on [18.3] for each make and type of equipment for which inspection is to be provided, and
- compliance with provisions of paragraphs [18.4], [18.5] and [18.6].

18.2.3 In cases where an equipment manufacturer is no longer in business or no longer provides technical support, Service Suppliers may be authorized for the equipment on the basis of prior authorization for the equipment and/or long term experience and demonstrated expertise as an authorized service provider.

18.3 Qualifications and training of personnel

18.3.1 Personnel for the work specified in [18.1.1] are to be trained and qualified in the inspection for which they are authorized, for each make and type of equipment for which they provide the inspection.

18.3.2 The education for initial certification of personnel is to be documented and addressed, as a minimum:

- Procedures and instructions for the inspection of the watertight cable transit seal systems
- Common problems found with the initial installation and in-service inspections of watertight cable transit seal systems
- Relevant rules and regulations, including International Conventions
- Procedures for reporting on initial installation and in-service inspections of watertight cable transit seal systems in the Cable Transit Seal Systems Register.

18.3.3 The education and training for the personnel are to include practical technical training on actual inspection using the watertight cable transit seal systems for which the personnel are to be certified. The technical training is to include disassembly, reassembly and adjustment of the equipment. Classroom training is to be supplemented by field experience in the inspections for which certification is sought, under the supervision of an experienced senior certified person.

18.3.4 At the time of initial certification and at each renewal of certification, the service supplier is to provide documentation to verify personnel's satisfactory completion of a competency assessment using the equipment for which the personnel are certified.

18.3.5 The Service Supplier is to require refresher training as appropriate to renew the certification.

18.4 Reference documents

18.4.1 The Service Supplier is to have access to the following documents:

- Manufacturer's servicing manuals, servicing bulletins, instructions and training manuals as appropriate.
- Type Approval certificate showing any conditions that may be appropriate during the installation or maintenance of the watertight cable transit seal system.

18.5 Equipment and facilities

18.5.1 The Service Supplier is to have access to the following:

- sufficient tools, and in particular any specialized tools specified in the equipment manufacturer's instructions, including portable tools as needed for work to be carried out on board ship.

18.6 Reporting

18.6.1 On completion of inspection, the Service Supplier will issue a report confirming the condition of the watertight Cable Transit Seal System. They will also record the results of their inspection in the Cable Transit Seal System Register.

19 Service suppliers engaged in commissioning testing of Ballast Water Management Systems (BWMS)

19.1 Extent of engagement

19.1.1 Sampling and Analysis of ballast water and Verification of the self-monitoring equipment during Commissioning Testing of Ballast Water Management Systems (BWMS), for Statutory purposes.

19.2 Procedure

19.2.1 Service suppliers are to have documented procedures including:

- procedures for sampling collection and handling, analysis, assessment of BWMS correct operations and documenting and reporting. The procedures are to outline how the ballast water sampling and analysis is conducted with respect to each size class of organisms.
- operating procedures for the ballast water test equipment specified including calibration, adjustment and maintenance.

19.2.2 Service Suppliers are to be familiar with the BWMS operation including features and limits of each treatment technology, and self-monitoring parameters.

19.2.3 Service Suppliers are to be accredited to relevant standards such as ISO/IEC 17025 or equivalent, as applicable.

19.2.4 Service Suppliers are to be independent of the BWMS manufacturer or supplier including shipyards.

19.3 Qualifications

19.3.1 Service Suppliers are expected to be able to perform both the biological sampling and assessment of self-monitoring parameters and has responsibility for document that the requirements to the operator are satisfied. Therefore, operators who conduct commissioning testing are to:

- demonstrate knowledge in the use of different ballast water testing equipment for the purpose of assessing biological efficacy
- have documented evidence of sufficient engineering and biological knowledge to conduct the commissioning testing
- have knowledge of IMO BWM.2/Circ.70/Rev.1 - 'Guidance for the Commissioning Testing of Ballast Water Management Systems', IACS Recommendation 180 - 'Recommendation for conducting commissioning testing of Ballast Water Management Systems' and IMO BWM.2/Circ.42/Rev.2 - 'Guidance on Ballast Water Sampling and Analysis for Trial Use in accordance with the BWM Convention and Guidelines (G2)' as may be amended
- (*) be trained in the proper use of portable indicative analysis equipment. Review of training records and/or interviews is to be conducted to confirm the equipment will be properly used during testing
- (*) be trained in the proper use of detailed analysis methods and equipment in case the Service Supplier offers detailed analysis. Review of training records and/or interviews is to be conducted to confirm the equipment will be properly used during testing
- (*) be familiar with and understand the design concepts of the Guidelines G2 sampling devices installed on the vessel's water ballast system. Personnel is to understand the need to maintain the G2 sampling devices clean and free of contaminants and the importance of controlling the ballast water sample flow rates from the G2 device (to avoid organism mortality in the sample)
- (*) be familiar with the technologies utilized by the indicative sampling equipment and understand water quality issues that are both conducive to successful use of the equipment and circumstances that could challenge the use of the equipment
- (*) be trained in the proper disposal procedures for water samples following testing
- (Δ) have knowledge of the system design limitations of the BWMS (as stated in the BWMS type approval certificate) and knowledge of the BWMS self-monitoring parameters, such as flow rate, pressure, TRO concentration, UV transmittance/ intensity, etc, and how the BWMS notifies the operator in case he operates BWMS outside its system design limitations. This knowledge is relevant for evaluating whether the self-monitoring equipment of the BWMS indicates correct operation of the BWMS. In case Service Supplier are not present during ballasting operations, the Service Supplier is to have knowledge of how to access the BWMS log to evaluate that the BWMS operated correctly during ballasting operations
- (Δ) have the procedures and knowledge to be able to assess the applicable self-monitoring parameters (e.g., flow rate, pressure, TRO, UV intensity, etc.) of the BWMS, taking into account the System Design Limitations of the BWMS

Note 1: The points marked with (*) are qualifications for operators performing sampling and analysis of ballast water.

Note 2: The points marked with (Δ) are the qualifications for operators performing verification of the self-monitoring equipment.

Note 3: The points above without symbol are the common qualifications for service supplier.

19.4 Equipment and facilities

19.4.1 Equipment, procedures and methods for detailed analysis, where applicable, are to be in accordance with relevant International standard and/or accepted Industry standards.

Laboratories conducting sample enumeration are to be certified to ISO/IEC 17025 standard, or equivalent.

Testing is to be conducted using indicative analysis equipment accepted by Society.

Information and reference to the acceptance documents for the equipment used is to be submitted to the Society in the report which includes the results from the commissioning test as per IMO BWM.2/Circ.70/Rev.1, as may be amended. In case the indicative analysis equipment used has not been previously accepted by the Society, the following information is to be submitted to the Society:

- equipment information - type, model, technology used, evidence of calibration, detection range, Organism type/size classes that can be analyzed
- test results conduct for the verification of accuracy, detection range and repeatability
- certificate of standards, if available.

For indicative analysis equipment planned to be used, the equipment OEM instruction manuals is to be available. The manuals is to include, at least, clear guidance for the proper storage, handling, operation, maintenance, repair, and calibration.

Note 1: Each Service Supplier applicant will present the Surveyor their confidential internal procedures for conducting the indicative testing. Not all the equipment listed in the references will be used. For all equipment planned to be used, the instruction manuals are to be available.

The Service Supplier will need to use specialty devices (e.g., sieves, screens, etc.) to separate the different organism sizes classes (i.e., ≥ 10 µm to < 50 µm, and ≥ 50 µm, and indicator microbes) to support analysis of each size class.

Equipment used for the analysis of other physical-chemical water parameters is to be suitable for the intended use.

Indicative analysis equipment is to be properly stored or transported to avoid damage and disturbance to calibrations, etc. when transporting from the Service Suppliers facilities to the vessels.

19.5 Sampling and Analysis

19.5.1 Service Suppliers are to follow relevant guidelines on sampling of ballast water. A standard operating procedure is to be defined for sampling of uptake water. Discharge sampling is to follow the IMO's 'Guidelines for Ballast Water Sampling (G2)'.

The representative samples are to be analyzed as a minimum for the two size classes of organisms, namely ≥ 50 µm and ≥ 10 µm to < 50 µm, specified in IMO Circular BWM.2/Circ.70/Rev.1 - Guidance for the Commissioning Testing of Ballast Water Management Systems using indicative analysis methods. Detailed analysis of all organism type/size classes or combination of detail and indicative analysis can also be performed.

Service Suppliers are to maintain a record of:

- operation of the BWMS during test period, including any recorded data or operator observations associated with the performance deviations, alarms or abnormal/unexpected operations.
- applicable self-monitoring parameters.

In case the commissioning testing requires the Service Supplier's personnel to work in hazardous areas (e.g., pump room for tankers, etc.), the Service Supplier is to have equipment certified for use in such spaces.

19.6 Reporting

19.6.1 Service Suppliers are to provide reports detailing the results of sampling and analysis of ballast water and assessment of self-monitoring parameters during commissioning testing. The format is to be acceptable to Society. The report, as a minimum, will contain the following:

- manufacturer's name
- model name
- BWMS Technology limiting operating conditions and system design limitations
- operation required, e.g., ballasting, de-ballast, circulation, one pass, in tank, etc
- treatment rated capacity (TRC) in m3/h
- relevant performance parameters (e.g. TRO, UV dose, UVI, flow rate or other relevant performance parameter)
- alarms developed during operation
- installation location
- type Approval issued by and Certificate No
- date installed
- results of Sample analysis
- pump flow rate, ballast tanks and volume
- comments/options: Filter and other major components, Process measurements.

19.7 Reference Documents

19.7.1 The Service Supplier is to have access to the following documents, as may be amended:

- IMO Resolution MEPC.300(72) - Code for Approval of Ballast Water Management Systems (BWMS Code)
- IMO Resolution MEPC.173(58) - Guidelines for Ballast Water Sampling (G2)
- IMO Circular BWM.2/Circ.42/Rev. 2 - Guidance on Ballast Water Sampling and Analysis for Trial Use in accordance with the BWM Convention and Guidelines (G2)
- IMO Circular BWM.2/Circ.70/Rev.1 - Guidance for the Commissioning Testing of Ballast Water Management Systems
- IMO Circular BWM.2/Circ.61 - Guidance on Methodologies that may be used for Enumerating Viable Organisms for Type Approval of Ballast Water Management Systems
- IMO Circular BWM.2/Circ.69 - Guidance on System Design Limitations of Ballast Water Management Systems and their Monitoring
- IMO Resolution A.1156(32) - Survey Guidelines under the Harmonized System of Survey and Certifications (HSSC), as amended (for BWMS that were Type Approved to the 2016 G8)
- IACS Recommendation 180 - Recommendation for conducting commissioning testing of Ballast Water Management Systems.

20 Service suppliers engaged in Condition Monitoring and Condition Based Maintenance

20.1 Extent of engagement

20.1.1 Condition Monitoring System (CMS) operation or Condition Based Maintenance (CBM) activities for CMS of type A, B or C as defined in NR674 for ships under CBM survey scheme.

20.1.2 The service supplier may be involved in data collection, data processing and analysis (e.g. diagnostic, prognostic), or any other related part of CMS operations or CBM activities.

20.1.3 A given service supplier may be approved for different condition monitoring techniques (vibration analysis, oil analysis…).

20.1.4 The service supplier involved in operation of predictive CMS is generally to be the Original Equipment Manufacturer (OEM) - or to be delegated by the OEM - for the maintenance of their own equipment. When the service supplier is not the Original Equipment Manufacturer, a written agreement from the OEM is to be provided to the Society.

The scope of service supplier approval is the following:

- a service supplier applies for a given predictive CMS. The predictive CMS is to be approved by the Society
- specification of roles and responsibilities of people involved, see [20.3.1]
- specifications of procedures related to the operation of the predictive CMS (e.g. data processing, data analysis, diagnostic, prognostic), see [20.5.2]
- specifications of procedures related to data quality management and continuous improvement process, see [20.5.2]
- when applicable, specification of risk mitigation procedures as specified during the predictive CMS design assessment, see [20.5.2].

20.2 Reference documents

20.2.1 The service supplier is to have access to the relevant parts of the Society's Rules and to the following reference documents:

- NI684 - Guideline for Condition Based Maintenance
- NR467, Pt A, Ch 2, App 4 - Condition monitoring and Condition Based Maintenance
- NR674 - Condition Monitoring Systems
- ISO 18436 - Condition monitoring and diagnostics of machines - Requirements for qualification and assessment of personnel.

20.3 Qualification and training

20.3.1 General

Service suppliers are to be appropriately qualified with regards to the CMS operation or CBM activities they are contracted or engaged in.

For predictive CMS operations, an organization chart representing roles and competences are to be provided, focusing on:

- predictive CMS model development, support and maintenance
- predictive CMS operation.

20.3.2 Monitoring operator

The operator carrying out the measurements is to be certified in accordance with a recognized national or international industrial standard (e.g. Category I or above, ISO 18436) for the given condition monitoring technique and is to have adequate knowledge of machinery.

Measurements may also be carried out by a non certified operator under supervision of a certified monitoring operator.

20.3.3 Data analysis operator

The operator carrying out the analysis of data is to be certified in accordance with a recognized national or international industrial standard (e.g. Category II or above, ISO 18436) for the given condition monitoring technique and is to have adequate knowledge of machinery, and sufficient experience to carry out reliable analysis (e.g. knowledge of sensor, condition monitoring technique limitation…).

Analysis may also be carried out by a certified monitoring operator under supervision of a certified data analysis operator.

20.3.4 Supervisor

The responsible supervisor is to be certified in accordance with a recognized national or international industrial standard (e.g. Category III or above, ISO 18436) for the given condition monitoring technique and is to have adequate knowledge of machinery and sufficient experience to supervise operations and direct condition monitoring programs.

Program supervision may also be carried out by a certified data analysis operator with a minimum of 30 months experience as a data analysis operator.

20.3.5 Training

For personnel engaged in predictive CBM, as far as possible, training is to be documented in accordance with requirements of recognized international standards. When such standards are not available or deemed irrelevant, the approved service supplier is to propose its own process for qualification and training of personnel. Especially, for personnel involved in complex activities such as data analysis, algorithm or model development and health recommendation, the relevant knowledge is to be documented (education, past projects, experience).

20.4 Equipment

20.4.1 Portable equipment supplied by the service supplier is to be maintained and calibrated in accordance with recognized national or international industrial standards. For vibration analysis, system are to be capable of frequency analysis.

Records of calibration are to be readily available upon request of the Society.

20.5 Documentation and Procedures

20.5.1 The service supplier is to submit the following documentation to the Society for review:

- procedures and instructions of carrying out condition monitoring task.

Note 1: Reference is made to NI684, Sec 2 CMS Inventory and CBM Handbook.

- process for information reporting and data sharing with the Owner.

20.5.2 For service suppliers engaged in predictive CBM, in addition to [20.5.1], the service supplier is to show procedures and instructions related to:

- predictive CMS operation and corresponding CBM activities
- process related to model development
- procedures related to risk mitigation, when applicable
- procedures related to data quality framework and continuous improvement process
- process for information reporting and data sharing with the Owner. When remote data center is supplied, this is to be specified.

20.6 Reporting

20.6.1 Subject to Owner's agreement, records of analysis reports delivered to the Owner are to be archived for a minimum period of 5 years.

21 Service suppliers engaged in activities within the scope of SMART() class notation

21.1 Extent of engagement

21.1.1 The additional class notation **SMART( )** addresses smart systems designed to achieve sustainable, efficient and safe ship operations by processing ship's data and providing decision support information.

With reference to NR675, Sec 2, the smart group **3** may be assigned to augmented system which requires expert-in-the-loop services to produce conclusive results. The service supplier providing the expert-in-the-loop services is to be certified as a smart service supplier.

21.1.2 The **SMART( )** class notations and the smart functions supported by the smart service supplier are to be indicated in the Certificate of Approval.

21.2 Reference documents

21.2.1 The service supplier is to have knowledge of the relevant parts of the Society's Rules and Guidelines and the following reference documents:

- NR675 - Ships equipped with SMART systems.

21.3 Qualification and training of personnel

21.3.1 Experts in charge of delivering expert-in-the-loop services as defined in NR675, Sec 1, are to be qualified taking into account the following:

- engineering degree and minimum one year of the relevant experience, including, but not limited to, service on board in ranks corresponding to STCW Code certification as per Tables II/2, III/2, III/6, or experience as a technical service engineer for the equipment in the scope of the decision support provided
- computer science degree or a demonstrated one year experience as a system administrator, software engineer or on an equivalent position which included network, server or software maintenance duties.

Experts are to be trained for appropriate use of the smart system.

21.4 Procedures

21.4.1 The smart service supplier is to have documented procedures including:

- documented procedures and instructions for the recording of faults and anomalies found during the provision of services
- scalability plan, including the maximum workload per operator/technician relevant to the allocated vessels, maximum number of vessels to be supported remotely
- check lists for establishing a remote connection to a vessel, if applicable
- system and data recovery plan for potential incidents involving a loss of database, servers and network segments
- documented procedures and instructions on how to carry out the servicing of the smart system, including references to Manufacturer's manuals, maintenance bulletins, instruction and training manuals, as appropriate, and to the national and international regulations, as relevant.

21.4.2 The smart service supplier is to:

- keep records of work allocation between the operators/technicians with the respect to the number of vessels serviced
- maintain an incident notification procedure to inform the vessel and the Owner in the event of a major service disruption, for each vessel serviced
- provide a list of the smart service centres ashore, including the centres selected for approval. The smart service supplier is to provide a procedure for transferring the service duty between the approved smart service centres, if applicable.

This documentation is to be made available upon request.

21.5 Equipment and facilities

21.5.1 The smart service supplier is to have the necessary digital solutions for the service to be supplied. The inventory of the digital assets available in the smart service centre is to be kept available.

21.5.2 The smart service supplier is to maintain the physics-based and data-driven models, if they form a part of the digital solution employed to deliver the services. Procedures are to be available for model development, validation and commissioning as adapted to a particular vessel. Procedures are to include the algorithm description and a methodology for robustness and model error evaluation.

21.5.3 The smart service supplier is to provide a description of the hardware equipment used for the particular service for which approval is sought: shore data infrastructure including, but not limited to, workstations, servers, network devices. Redundant design features and any other measures to improve the technical availability of the services are to be listed.

21.5.4 If cloud infrastructure is used, the smart service supplier is to provide a cloud's inventory of assets.

21.5.5 The smart service supplier is to provide a server capacity to store the data exchanged within the scope of the service with a backup. If the shore storage durations are prescribed in the requirements for the smart functions in NR675, the smart service supplier is to provide the storage capacity sufficient to accommodate the corresponding data. Cloud and local area network (LAN) servers can be used if redundant cloud storage and redundant array of independent memory (RAIM) are provided respectively.

22 Service suppliers engaged in Data-centric Evaluation

22.1 Extent of engagement

22.1.1 Provision of services which support Data-centric Evaluation (DE) according to NR690, Sec 1, [1.5] and [5], such as remote:

- decision support, and
- operational monitoring.

22.2 Reference documents

22.2.1 The service supplier is to have knowledge of the relevant parts of the Society's Rules and the following reference document:

- NR690 Data-centric Evaluation.

22.3 Qualification and training

22.3.1 The minimum qualification and training requirements for a DE (Data-centric Evaluation) service centre are given below:

- at least one person with an engineering degree and minimum one year of relevant experience, including, but not limited to, service on board in ranks corresponding to STCW Code certification as per Tables II/2, III/2, III/6, or experience as a technical service engineer for the equipment in the scope of remote monitoring and decision support
- at least one person with a computer science degree or a demonstrated one year experience as a system administrator or on an equivalent position which included network, server or software maintenance duties
- at least one person is to receive a training from the manufacturer of the DE SDS (Data-centric Evaluation Shore Digital Solution) for the use of this DE SDS by the DE service centre.

A DE service centre may have a single person compliant with all requirements.

Note 1: It is recommended for the DE service centre's personnel to receive a training about the EUT (Equipment Under Test) from the manufacturer of the EUT or about the automation system supported by the EUT, if the training is available.

22.4 Procedures

22.4.1 The Data-centric Evaluation Service Supplier (DESS) is to have documented procedures, including:

- instructions for the recording of faults and anomalies found during the provision of services
- scalability plan, including the maximum workload per operator/technician relevant to the allocated vessels and the maximum number of vessels which may be supported remotely
- check lists for establishing a remote connection to a vessel, if applicable
- system and data recovery plan for potential incidents involving a loss of database, servers and network segments
- documented procedures and instructions on how to carry out the servicing of the DE Onboard Digital Solution (DE ODS) and DE Shore Digital Solution (DE SDS)
- documented procedures and instructions on how to interact with the Equipment Under Test (EUT) including Manufacturer's user - installation - and maintenance manuals, maintenance bulletins and fault-finding instructions, as appropriate, and references to the national and international regulations, as relevant
- documented procedures and instructions on how to deliver the service in either:
  - fully automatic mode for Automatic Data-centric Evaluation (ADE) supervised by an operator in a DESS centre, or
  - human-in-the-loop mode for Semi-automatic Data-centric Evaluation (SADE) where an action of a shore operator is needed for the DE SDS to produce conclusive results.

  The procedures are to describe the operational limits and result validity limits for the digital solution employed for the service. For the ADE, the intervention criteria are to be specified for the operators. For the SATC modes, the procedures are to define the maximum permitted delay for the acknowledgment of the alerts for the anomalies observed in the onboard process by the operator in the DESS centre
- transfer of the service duty between the approved DE centres, if applicable.

22.4.2 The DESS is to:

- keep records of work allocation between the operators/technicians with respect to the number of vessels serviced
- maintain a record of technical availability metrics for the DE Shore Digital Solution (DE SDS) functions which are required for the provision of the DE services
- maintain an incident notification procedure to inform the vessel, the Owner and the Society in the event of a major service disruption
- provide a list of the DE centres ashore, including the centres selected for approval.

This documentation is to be made available upon request.

22.5 Equipment and facilities

22.5.1 The DESS is to have the necessary digital solutions for the service to be supplied. The following is to be kept available:

- inventory of the digital assets available in the service centre
- DE SDS manufacturer's documentary evidence that the DESS has been certified or licensed to use the DE SDS to provide the services for which approval is sought.

22.5.2 The DESS is to maintain the physics-based and data-driven models, if they form a part of the digital solution employed to deliver the services. Procedures are to be available for model development, validation and commissioning as adapted to a particular vessel. Procedures are to include the algorithm description and a methodology for robustness and model error evaluation.

22.5.3 The DESS is to provide a description of the hardware equipment used for the particular service for which approval is sought: shore data infrastructure including, but not limited to, workstations, servers, network devices. Redundant design features and any other measures to improve the technical availability of the services are to be listed.

22.5.4 If cloud infrastructure is used, the DESS is to provide a cloud's inventory of assets.

22.5.5 The DESS is to provide a server capacity to store the data exchanged within the scope of the service with a backup. Where the shore storage durations are prescribed for the DE, the DESS is to provide the storage capacity sufficient to accommodate the corresponding data. Cloud and local area network (LAN) servers can be used if redundant cloud storage and redundant array of independent memory (RAIM) are provided respectively.

22.5.6 DESS is to store all data associated with any NC-A report for at least 3 years from the date of the report’s creation.

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