These requirements are prepared by embedding related IACS Unified Requirements. In order to have consistency, the numbering of the requirements are kept as the same with related IACS Unified Requirements.

Unless otherwise specified, these Rules apply according to the implementation dates as defined in each requirement. See Rule Change Summary on TL website for revision details.

This latest edition incorporates all rule changes.

"General Terms and Conditions" of the respective latest edition will be applicable (see Rules for Classification and Surveys).

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CONTENTS

TL-R Z3    Periodical survey of the outside of the ship's bottom and related items

TL-R Z7    Hull classification surveys*

TL-R Z7.1  Hull surveys for general dry cargo ships*

TL-R Z7.2  Hull surveys for liquefied gas carriers

TL-R Z8    Corrosion Protection Coating for Salt Water Ballast Spaces

TL-R Z9    Corrosion Protection Coatings for Cargo Hold Spaces on Bulk Carriers

TL-R Z10.1 Hull surveys of oil tankers*

TL-R Z10.2 Hull surveys of bulk carriers*

TL-R Z10.3 Hull surveys of chemical tankers*

TL-R Z10.4 Hull surveys of double hull oil tankers*

TL-R Z10.5 Hull surveys of double skin bulk carriers*

TL-R Z11    Mandatory ship type and enhanced survey programme (ESP) notations*

TL-R Z13    Voyage repairs and maintenance

TL-R Z15    Hull, Structure, Equipment and Machinery Surveys of Mobile Offshore Drilling Units

TL-R Z16    Periodical surveys of cargo installations on ships carrying liquefied gases in bulk

TL-R Z17    Procedural requirements for service suppliers

TL-R Z18    Survey of machinery

TL-R Z19    Calibration of measuring equipment

TL-R Z20    Planned maintenance scheme (PMS) for machinery

TL-R Z21    Surveys of Propeller Shafts and Tube Shafts
<table>
<thead>
<tr>
<th>TL-R Z23</th>
<th>Hull Survey for New Construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>TL-R Z24</td>
<td>Survey requirements for shell and inner doors of ro-ro ships</td>
</tr>
<tr>
<td>TL-R Z25</td>
<td>Periodic Survey of Fuel Installations on Ships ther than Liquefied Gas Carriers utilizing gas or other low flash point fuels</td>
</tr>
<tr>
<td>TL-R Z26</td>
<td>Alternative Certification Scheme (ACS)</td>
</tr>
<tr>
<td>TL-R Z27</td>
<td>Condition Monitoring and Condition Based</td>
</tr>
<tr>
<td>TL-R Z28</td>
<td>Surveys of Watertight Cable Transits</td>
</tr>
<tr>
<td>TL-R Z29</td>
<td>Remote Classification Surveys</td>
</tr>
</tbody>
</table>

* Deleted TL-R Zs were revised by IACS. For revised version of IACS UR Zs please click [here](#).
TL-R Z3 Periodical Survey of the Outside of the Ship’s Bottom and Related Items

Z3.1 General

Z3.1.1 The Owner is to notify the Classification Society whenever the outside of the ship’s bottom and related items can be examined in drydock or on a slipway.

Z3.1.2 There is to be a minimum of two examinations of the outside of the ship’s bottom and related items during each five-year special survey1 period. One such examination is to be carried out in conjunction with the special survey. In all cases the interval between any two such examinations is not to exceed 36 months. An extension of examination of the ship’s bottom of 3 months beyond the due date can be granted in exceptional circumstances2.

Z3.1.3 Examinations of the outside of the ship’s bottom and related items of ships is normally to be carried out with the ship in drydock. However, consideration may be given to alternate examination while the ship is afloat as an In-water Survey, subject to provisions of Z3.3. Special consideration is to be given to ships of 15 years or over before being permitted to have such examinations. For ESP ships of 15 years of age and over, such examinations are to be carried out with the ship in drydock.

Footnotes:

1) Some Member Societies use the term “Special Periodical Survey” others use the term “Class Renewal Survey” instead of the term “Special Survey”.

2) ‘Exceptional circumstances’ means unavailability of dry-docking facilities; unavailability of repair facilities; unavailability of essential materials, equipment or spare parts; or delays incurred by action taken to avoid severe weather conditions.

Notes:

1. This requirement is implemented from 1 July 2020.
Z3.1.4 The interval between examinations of the outside of the ship's bottom and related items for ships operating in fresh water and for certain harbour or non-self-propelled craft may be greater than that given in Z3.1.2.

Z3.1.5 Compliance with TL-R Z3 does not absolve the Owner from compliance with the requirements of SOLAS as amended, especially when shorter intervals between examination of the ship's bottom for certain types of ship are required.

Z3.1.6 For Oil Tankers, Combination Carriers, Bulk Carriers, Chemical Tankers, Double Hull Oil Tankers, Double Side Skin Bulk Carriers, General Dry Cargo Ships and Liquefied Gas Carriers, reference is also made to TL-R Z10.1, Z10.2, Z10.3, Z10.4, Z10.5, Z7.1 and Z7.2 as applicable.

Z3.2 Scope of the survey

Z3.2.1 When a ship is in drydock or on a slipway, it is to be placed on blocks of sufficient height and with the necessary staging to permit the examination of elements such as shell plating including bottom and bow plating, stern frame and rudder, sea chests and valves, propeller, etc.

Z3.2.2 The shell plating is to be examined for excessive corrosion, or deterioration due to chafing or contact with the ground and for any undue unfairness or buckling. Special attention is to be paid to the connection between the bilge strakes and the bilge keels. Important plate unfairness or other deterioration which do not necessitate immediate repairs are to be recorded.

Z3.2.3 Sea chests and their gratings, sea connections and overboard discharge valves and cocks and their fastenings to the hull or sea chests are to be examined. Valves and cocks need not be opened up more than once in a special survey period unless considered necessary by the Surveyor.

Z3.2.4 Visible parts of rudder, rudder pintles, rudder shafts and couplings and stern frame are to be examined. If considered necessary by the Surveyor, the rudder is to be lifted or the inspection plates removed for the examination of pintles. The clearance in the rudder bearings is to be ascertained and recorded. Where applicable, pressure test of the rudder may be required as deemed necessary by the surveyor.

Z3.2.5 Visible parts of propeller and stern bush, are to be examined. The clearance in the stern bush and the efficiency of the oil gland, if fitted, are to be ascertained and recorded. For controllable pitch propellers, the Surveyor is to be satisfied with the fastenings and tightness of hub and blade sealing. Dismantling need not to be carried out unless considered necessary by the Surveyor.

Z3.2.6 Visible parts of side thrusters are to be examined. Other propulsion systems which also have manoeuvring characteristics (such as directional propellers, vertical axis propellers, water jet units) are to be examined externally with focus on the condition of gear housing, propeller blades, bolt locking and other fastening arrangements. Sealing arrangement of propeller blades, propeller shaft and steering column shall be verified.

NOTE: For the survey of propeller shafts, refer to Requirement TL-R Z21.

Z3.2.7 Special consideration may be given in application of relevant sections of this Requirement to commercial vessels owned or chartered by Governments, which are utilized in support of military operations or service.
Z3.3 In-Water Surveys

Z3.3.1 The In-water Survey is to provide the information normally obtained from a docking survey. Special consideration shall be given to ascertaining rudder bearing clearances and stern bush clearances of oil stern bearings based on a review of the operating history, on board testing and stern oil sample reports. These considerations are to be included in the proposals for in-water survey which are to be submitted in advance of the survey so that satisfactory arrangements can be agreed with the Classification Society.

Z3.3.2 The In-water Survey is to be carried out with the ship in sheltered water and preferably with weak tidal streams and currents. The in-water visibility and the cleanliness of the hull below the waterline is to be clear enough to permit a meaningful examination which allows the surveyor and the in-water survey firm to determine the condition of the plating, appendages and the welding. The Classification Society is to be satisfied with the methods of orientation of the divers or Remotely Operated Vehicle (ROV) on the plating, which should make use where necessary of permanent markings on the plating at selected points.

Z3.3.3 The equipment, procedure for observing and reporting the survey are to be discussed with the parties involved prior to the In-water Survey, and suitable time is to be allowed to permit the in-water survey firm to test all equipment beforehand.

Z3.3.4 The In-water Survey is to be carried out under the surveillance of a surveyor by an in-water survey firm approved as a service supplier according to TL-R Z17.

Z3.3.5 The Surveyor is to be satisfied with the method of pictorial representation, and a good two-way communication between the Surveyor and divers is to be provided.

Z3.3.6 If the In-water Survey reveals damage or deterioration that requires early attention, the Surveyor may require that the ship be drydocked in order that a detailed survey can be undertaken and the necessary repairs carried out.
1. General
1.1 Application
1.2 Definitions
1.3 Repairs
1.4 Thickness measurements and close-up surveys
1.5 Remote Inspection Techniques (RIT)

2. Special Survey
2.1 Schedule
2.2 Scope
2.2.1 General
2.2.2 Dry Dock Survey
2.2.3 Tank Protection
2.3 Extent of Overall and Close-up Survey
2.4 Extent of Thickness Measurement
2.5 Extent of Tank Testing

3. Annual Survey
3.1 Schedule
3.2 Scope
3.2.1 General
3.2.2 Examination of the hull
3.2.3 Examination of weather decks
3.2.4 Examination of cargo pump rooms, compressor rooms and pipe tunnels
3.2.5 Suspect Areas
3.2.6 Examination of Ballast Tanks

4. Intermediate Survey
4.1 Schedule
4.2 Scope

5. Preparation for Survey
5.1 Conditions for Survey
5.2 Access to Structures
5.3 Equipment for Survey
5.4 Survey at Sea or at Anchorage

6. Procedures for Thickness Measurements
6.1 General
6.2 Certification of Thickness Measurement Company
6.3 Reporting
ENCLOSURES:

Table I: Minimum requirements for Close-up Surveys at Hull Special Surveys of Liquefied Gas Carriers

Table II: Minimum requirements for Thickness Measurements at Hull Special Surveys of Liquefied Gas Carriers

Table III: Minimum requirements for Close-up Surveys at Hull Intermediate Surveys of Liquefied Gas Carriers

Table IV: Procedures for Certification of Firms Engaged in Thickness Measurement of Hull Structure

Table V: Guidance for Additional Thickness Measurements in Way of Substantial Corrosion

Figure 1: Typical midship sections of Liquefied Gas Carriers.

Note:

1. This requirement is applied for surveys commenced on or after 1 July 2020.
1. GENERAL

1.1 Application

1.1.1 The requirements apply to all self-propelled ships carrying liquefied gases in bulk.

1.1.2 The requirements apply to surveys of hull structure and piping systems, except piping covered by TL-R Z16, in way of pump rooms, compressor rooms, cofferdams, pipe tunnels, void spaces and fuel oil tanks within the cargo area and all ballast tanks.

The requirements are additional to the classification requirements applicable to the remainder of the ship. Refer to TL-R Z7.

Refer to TL-R Z16 for periodical surveys of cargo instalations on ships carrying liquefied gases in bulk.

1.1.3 The requirements contain the minimum extent of examination, thickness measurements and tank testing. The survey is to be extended when Substantial Corrosion and/or structural defects are found and include additional Close-up Survey when necessary.

1.2 Definitions

1.2.1 Ballast Tank

A Ballast Tank is a tank that is being used primarily for salt water ballast.

1.2.2 Overall Survey

An Overall Survey is a survey intended to report on the overall condition of the hull structure and determine the extent of additional Close-up Surveys.

1.2.3 Close-up Survey

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

1.2.4 Transverse Section

A Transverse Section includes all longitudinal members such as plating, longitudinals and girders at the deck, sides, bottom, inner bottom and longitudinal bulkheads.

1.2.5 Representative Tank

Representative Tanks are those which are expected to reflect the condition of other Tanks of similar type and service and with similar corrosion prevention systems. When selecting Representative Tanks account is to be taken of the service and repair history on board and identifiable Critical Structural Areas and/or Suspect Areas.

1.2.6 Critical Structural Areas

Critical Structural Areas are locations which have been identified from calculations to require monitoring or from the service history of the subject ship or from similar ships or sister ships, if applicable, to be sensitive to cracking, buckling or corrosion which would impair the structural integrity of the ship.
1.2.7 Suspect Areas

Suspect Areas are locations showing Substantial Corrosion and/or are considered by the surveyor to be prone to rapid wastage.

1.2.8 Substantial Corrosion

Substantial Corrosion is an extent of corrosion such that assessment of corrosion pattern indicates a wastage in excess of 75% of allowable margins, but within acceptable limits.

1.2.9 Corrosion Prevention System

A Corrosion Prevention System is normally considered a full hard protective coating. Hard Protective Coating is usually to be epoxy coating or equivalent. Other coating systems, which are neither soft nor semi-hard coatings, may be considered acceptable as alternatives provided that they are applied and maintained in compliance with the manufacturer's specifications.

1.2.10 Coating Condition

Coating Condition is defined as follows:

- GOOD: condition with only minor spot rusting.
- FAIR: condition with local breakdown at edges of stiffeners and weld connections and/or light rusting over 20% or more of areas under consideration, but less than as defined for POOR condition.
- POOR: condition with general breakdown of coating over 20% or more of areas or hard scale at 10% or more of areas under consideration.

1.2.11 Cargo Area

Cargo Area is that part of the ship which contains cargo tanks, cargo/ballast pump rooms, compressor rooms, cofferdams, ballast tanks and void spaces adjacent to cargo tanks and also deck areas throughout the entire length and breadth of the part of the ship over the above mentioned spaces.

1.2.12 Special Consideration

Special Consideration or specially considered (in connection with close-up surveys and thickness measurements) means sufficient close-up inspection and thickness measurements are to be taken to confirm the actual average condition of the structure under the coating.

1.2.13 Prompt and Thorough Repair

A Prompt and Through Repair is a permanent repair completed at the time of survey to the satisfaction of the surveyor, therein removing the need for the imposition of any associated condition of classification.

1.2.14 Remote Inspection Techniques (RIT)

Remote Inspection Technique 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 TL-G 42).
1.3 Repairs

1.3.1 Any damage in association with wastage over the allowable limits (including buckling, grooving, detachment or fracture), or extensive areas of wastage over the allowable limits, which affects or, in the opinion of the Surveyor, will affect the vessel's structural, watertight or weathertight integrity, is to be promptly and thoroughly (see 1.2.13) repaired. Areas to be considered include:

- side structure and side plating;
- deck structure and deck plating;
- bottom structure and bottom plating; watertight bulkheads;
- items in 3.2.3.5, 3.2.3.6 and 3.2.3.8 of TL-R Z7.

For locations where adequate repair facilities are not available, consideration may be given to allow the vessel to proceed directly to a repair facility. This may require discharging the cargo and/or temporary repairs for the intended voyage.

1.3.2 Additionally, when a survey results in the identification of structural defects or corrosion, either of which, in the opinion of the surveyor, will impair the vessel's fitness for continued service, remedial measures are to be implemented before the ship continues in service.

1.3.3 Where the damage found on structure mentioned in Para. 1.3.1 is isolated and of a localised nature which does not affect the ship's structural integrity, consideration may be given by the surveyor to allow an appropriate temporary repair to restore watertight or weather tight integrity and impose a condition of class in accordance with TL-PR 35, with a specific time limit.

1.4 Thickness measurements and close-up surveys

1.4.1 In any kind of survey, i.e. special, intermediate, annual or other surveys having the scope of the foregoing ones, thickness measurements, when required by Table II, of structures in areas where close-up surveys are required, shall be carried out simultaneously with close-up surveys.

1.4.2 Consideration may be given by the attending Surveyor to allow use of Remote Inspection Techniques (RIT) as an alternative to close-up survey. Surveys conducted using a RIT are to be completed to the satisfaction of the attending Surveyor. When RIT is used for a close-up survey, temporary means of access for the corresponding thickness measurements as specified in this requirement is to be provided unless such RIT is also able to carry out the required thickness measurements.

1.5 Remote Inspection Techniques (RIT)

1.5.1 The RIT is to provide the information normally obtained from a close-up survey. RIT surveys are to be carried out in accordance with the requirements given here-in and the requirements of TL-G 42 ‘Guidelines for Use of Remote Inspection Techniques for surveys’. These considerations are to be included in the proposals for use of a RIT which are to be submitted in advance of the survey so that satisfactory arrangements can be agreed with TL.

1.5.2 The equipment and procedure for observing and reporting the survey using a RIT are to be discussed and agreed with the parties involved prior to the RIT survey, and suitable time is to be allowed to set-up, calibrate and test all equipment beforehand.
1.5.3 When using a RIT as an alternative to close-up survey, if not carried out by TL itself, it is to be conducted by a firm approved as a service supplier according to TL-R Z17 and is to be witnessed by an attending surveyor of TL.

1.5.4 The structure to be examined using a RIT is to be sufficiently clean to permit meaningful examination. Visibility is to be sufficient to allow for a meaningful examination. TL is to be satisfied with the methods of orientation on the structure.

1.5.5 The Surveyor is to be satisfied with the method of data presentation including pictorial representation, and a good two-way communication between the Surveyor and RIT operator is to be provided.

1.5.6 If the RIT reveals damage or deterioration that requires attention, the Surveyor may require traditional survey to be undertaken without the use of a RIT.
2. SPECIAL SURVEY*

2.1 Schedule

2.1.1 Special Surveys are to be carried out at 5 years intervals to renew the Classification Certificate.

2.1.2 The first Special Survey is to be completed within 5 years from the date of the initial classification survey and thereafter within 5 years from the credited date of the previous Special Survey. However, an extension of class of 3 months maximum beyond the 5th year can be granted in exceptional circumstances. In this case, the next period of class will start from the expiry date of the Special Survey before the extension was granted.

2.1.3 For surveys completed within 3 months before the expiry date of the Special Survey, the next period of class will start from the expiry date of the Special Survey. For surveys completed more than 3 months before the expiry date of the Special Survey, the period of class will start from the survey completion date. In cases where the vessel has been laid up or has been out of service for a considerable period because of a major repair or modification and the owner elects to only carry out the overdue surveys, the next period of class will start from the expiry date of the special survey. If the owner elects to carry out the next due special survey, the period of class will start from the survey completion date.

2.1.4 The Special Survey may be commenced at the 4th Annual Survey and be progressed with a view to completion by the 5th anniversary date. When the Special Survey is commenced prior to the 4th Annual Survey, the entire survey is to be completed within 15 months if such work is to be credited to the Special Survey.

2.1.5 A survey planning meeting is to be held prior to the commencement of the survey.

2.1.6 Concurrent crediting to both Intermediate Survey (IS) and Special Survey (SS) for surveys and thickness measurements of spaces are not acceptable.

2.2 Scope

2.2.1 General

2.2.1.1 The Special Survey is to include, in addition to the requirements of the Annual Surveys, examination, tests and checks of sufficient extent to ensure that the hull and related piping, as required in 2.2.1.3, are in a satisfactory condition and fit for the intended purpose for the new period of class of 5 years to be assigned, subject to proper maintenance and operation and to periodical surveys being carried out at the due dates.

2.2.1.2 Ballast tanks, including double bottom tanks, pump rooms, compressor rooms, pipe tunnels, cofferdams and void spaces bounding cargo tanks, decks and outer hull are to be examined, and this examination is to be supplemented by thickness measurement and testing as required in 2.4 and 2.5, to ensure that the structural integrity remains effective.

The aim of the examination is to discover Substantial Corrosion, significant deformation, fractures, damages or other structural deterioration, that may be present.

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* Some member Societies use the term "Special Periodical Survey" others use the term "Class Renewal Survey" instead of the term "Special Survey".
2.2.1.3 All piping systems within the above spaces, except those covered by TL-R Z16, are to be examined and operationally tested to working pressure to attending Surveyor's satisfaction to ensure that tightness and condition remain satisfactory.

2.2.1.4 The survey extent of ballast tanks converted to void spaces is to be specially considered in relation to the requirements for ballast tanks.

Note: For survey of automatic air pipes refer to 2.2.13 of TL-R Z7.

2.2.2 Dry Dock Survey

2.2.2.1 A survey in dry dock is to be a part of the Special Survey. The overall and close-up surveys and thickness measurements, as applicable, of the lower portions of the ballast tanks are to be carried out in accordance with the applicable requirements for special surveys, if not already performed.

Note: Lower portions of the ballast tanks are considered to be the parts below light ballast water line.

2.2.3 Tank Protection

2.2.3.1 Where provided, the condition of corrosion prevention system of ballast tanks is to be examined. For ballast tanks, excluding double bottom tanks, where a hard protective coating is found in POOR condition and it is not renewed, where soft or semi-hard coating has been applied, or where a hard protective coating was not applied from time of construction, the tanks in question are to be examined at annual intervals. Thickness measurements are to be carried out as deemed necessary by the surveyor.

When such breakdown of hard protective coating is found in double bottom ballast tanks and it is not renewed, where a soft or semi-hard coating has been applied, or where a hard protective coating was not applied from the time of construction, the tanks in question may be examined at annual intervals. When considered necessary by the surveyor, or where extensive corrosion exists, thickness measurements are to be carried out.

2.2.3.2 Where the hard protective coating in ballast tanks is found to be in a GOOD condition, the extent of close-up surveys and thickness measurements may be specially considered.

2.3 Extent of Overall and Close-up Survey

2.3.1 An Overall Survey of all tanks and spaces, excluding fuel oil, lube oil and fresh water tanks, is to be carried out at each Special Survey.

Note: For fuel oil, lube oil and fresh water tanks, reference is to be made to TL-R Z7, Table 3.

2.3.2 The minimum requirements for close-up surveys at special survey are given in Table I.

2.3.3 The Surveyor may extend the close-up survey as deemed necessary taking into account the maintenance of the tanks under survey, the condition of the corrosion prevention system and where tanks have structural arrangements or details which have suffered defects in similar spaces or on similar ships according to available information.

2.3.4 For areas in tanks where hard protective coatings are found to be in a GOOD condition, the extent of close-up surveys according to Table I may be specially considered.
Note: For examination of automatic air pipe heads, reference is to be made to TL-R Z7, Table 4.

2.4 Extent of Thickness Measurement

2.4.1 The minimum requirements for thickness measurements at Special Survey are given in Table II.

2.4.2 The Surveyor may extend the thickness measurements as deemed necessary. When thickness measurements indicate substantial corrosion, the extent of thickness measurements is to be increased to determine the extent of areas of substantial corrosion. Table V may be used as guidance for these additional thickness measurements.

2.4.3 For areas in tanks where hard protective coatings are found to be in a GOOD condition, the extent of thickness measurement according to Table II may be specially considered.

2.4.4 Transverse sections are to be chosen where the largest reductions are suspected to occur or are revealed from deck plating measurements.

2.5 Extent of Tank Testing

2.5.1 All boundaries of ballast tanks and deep tanks used for water ballast within the cargo area are to be pressure tested. For fuel oil tanks, the representative tanks are to be pressure tested.

2.5.2 The Surveyor may extend the tank testing as deemed necessary.

2.5.3 Tank testing of fuel oil tanks is to be carried out with a head of liquid to the highest point that liquid will rise under service conditions. Tank testing of fuel oil tanks may be specially considered based on a satisfactory external examination of the tank boundaries, and a confirmation from the Master stating that the pressure testing has been carried out according to the requirements with satisfactory results.
3. ANNUAL SURVEY

3.1 Schedule

3.1.1 Annual Surveys are to be held within 3 months before or after anniversary date from the date of the initial classification survey or of the date credited for the last Special Survey.

3.2 Scope

3.2.1 General

3.2.1.1 The survey is to consist of an examination for the purpose of ensuring, as far as practicable, that the hull and piping are maintained in a satisfactory condition.

3.2.2 Examination of the hull

3.2.2.1 Examination of the hull plating and its closing appliances as far as can be seen.

3.2.2.2 Examination of watertight penetrations as far as practicable.

3.2.3 Examination of weather decks.

3.2.3.1 Examination of flame screens on vents to all bunker tanks.

3.2.3.2 Examination of bunker and vent piping systems.

3.2.4 Examination of cargo pump rooms and compressor rooms and, as far as practicable, pipe tunnels if fitted.

3.2.4.1 Examination of all pump room and compressor room bulkheads for signs of leakage or fractures and, in particular, the sealing arrangements of all penetrations of pump room and compressor room bulkheads.

3.2.4.2 Examination of the condition of all piping systems, except those covered by TL-R Z16.

Note: For survey of air pipes, flame screens on vents and ventilators refer to 3.2.3.5 to 3.2.3.8 of TL-R Z7.

3.2.5 Suspect Areas

Suspect Areas identified at previous surveys are to be examined. Thickness measurements are to be taken of the areas of substantial corrosion and the extent of thickness measurements is to be increased to determine the extent of areas of substantial corrosion. Table V may be used as guidance for these additional thickness measurements. These extended thickness measurements are to be carried out before the annual survey is credited as completed.

3.2.6 Examination of ballast tanks

3.2.6.1 Examination of ballast tanks when required as a consequence of the results of the Special Survey and Intermediate Survey is to be carried out. When considered necessary by the surveyor, or where extensive corrosion exists, thickness measurement is to be carried out. If the results of these thickness measurements indicate that Substantial Corrosion is found, then the extent of thickness measurements are to be increased to determine the extent of
areas of substantial corrosion. Table V may be used as guidance for these additional measurements. These extended thickness measurements are to be carried out before the annual survey is credited as completed.
4. INTERMEDIATE SURVEY

4.1 Schedule

4.1.1 The Intermediate Survey is to be held at or between either the 2nd or 3rd Annual Survey.

4.1.2 Those items which are additional to the requirements of the Annual Surveys may be surveyed either at or between the 2nd and 3rd Annual Survey.

4.1.3 A survey planning meeting is to be held prior to the commencement of the survey.

4.1.4 Concurrent crediting to both Intermediate Survey (IS) and Special Survey (SS) for surveys and thickness measurements of spaces are not acceptable.

4.2 Scope

4.2.1 The scope of the second or third annual survey is to be extended to include the following:

4.2.2 Ballast tanks

4.2.2.1 For ships between 5 and 10 years of age, an overall survey of representative ballast tanks is to be carried out. If there is no hard protective coating, soft or semi-hard coating or POOR coating condition, the examination is to be extended to other ballast tanks of the same type.

4.2.2.2 For ships over 10 years of age, an overall survey of all ballast tanks is to be carried out.

4.2.2.3 If such examinations reveal no visible structural defects, the examination may be limited to a verification that the corrosion prevention system remains efficient.

4.2.2.4 For ballast tanks, excluding double bottom tanks, if there is no hard protective coating, soft or semi-hard coating, or POOR coating condition and it is not renewed, the tanks in question are to be internally examined at annual intervals.

4.2.2.5 When such conditions are found in double bottom ballast tanks, the tanks in question may be internally examined at annual intervals.

4.2.2.6 The minimum requirements for close-up surveys at intermediate survey are given in Table III.
5. PREPARATION FOR SURVEY

5.1 Conditions of Survey

5.1.1 The Owner is to provide the necessary facilities for a safe execution of the survey.

5.1.2 Tanks and Spaces are to be safe for access, i.e. gas freed, ventilated and illuminated.

5.1.3 In preparation for survey and thickness measurements and to allow for a thorough examination, all spaces are to be cleaned including removal from surfaces of all loose accumulated corrosion scale. Spaces are to be sufficiently clean and free from water, scale, dirt, oil residues etc. to reveal corrosion, deformation, fractures, damages, or other structural deterioration. However, those areas of structure whose renewal has already been decided by the owner need only be cleaned and descaled to the extent necessary to determine the limits of the areas to be renewed.

5.1.4 Sufficient illumination is to be provided to reveal corrosion, deformation, fractures, damages or other structural deterioration.

5.1.5 Where soft or semi-hard coatings have been applied, safe access is to be provided for the surveyor to verify the effectiveness of the coating and to carry out an assessment of the conditions of internal structures which may include spot removal of the coating. When safe access cannot be provided, the soft or semi-hard coating is to be removed.

5.2 Access to Structures

5.2.1 For Overall Survey, means are to be provided to enable the surveyor to examine the hull structure in a safe and practical way.

5.2.2 For Close-up Surveys, one or more of the following means for access, acceptable to the Surveyor, is to be provided:

- permanent staging and passages through structures;
- temporary staging, e.g. ladders, and passages through structures;
- other equivalent means.

5.2.3 For Surveys conducted by use of a remote inspection technique, one or more of the following means for access, acceptable to the Surveyor, is to be provided:

- Unmanned robot arm.
- Remotely Operated Vehicles (ROV).
- Unmanned Aerial Vehicles / Drones.
- Other means acceptable to TL.
5.3 Equipment for Survey

5.3.1 Thickness measurement is normally to be carried out by means of ultrasonic test equipment. The accuracy of the equipment is to be proven to the Surveyor as required.

5.3.2 One or more of the following fracture detection procedures may be required if deemed necessary by the Surveyor:

- radiographic equipment
- ultrasonic equipment
- magnetic particle equipment
- dye penetrant

5.4 Survey at Sea or at Anchorage

5.4.1 Survey at sea or at anchorage may be accepted provided the Surveyor is given the necessary assistance from the personnel on board. Necessary precautions and procedures for carrying out the survey are to be in accordance with 5.1, 5.2, and 5.3.

5.4.2 A communication system is to be arranged between the survey party in the tank and the responsible officer on deck.
6. PROCEDURES FOR THICKNESS MEASUREMENTS

6.1 General

6.1.1 The required thickness measurements, if not carried out by TL itself, are to be witnessed by a Surveyor of TL. The Surveyor is to be on board to the extent necessary to control the process.

6.1.2 The thickness measurement company is to be part of the survey planning meeting to be held prior to commencing the survey.

6.1.3 Thickness measurements of structures in areas where close-up surveys are required shall be carried out simultaneously with close-up surveys.

6.2 Certification of Thickness Measurement Company

6.2.1 The thickness measurements are to be carried out by a company certified by TL according to principles stated in Table IV, except that in respect of measurements of ships less than 500 gross tonnage, the firm need not be so approved.

6.3 Reporting

6.3.1 A thickness measurement report is to be prepared. The report is to give the location of measurements, the thickness measured as well as corresponding original thickness. Furthermore, the report is to give the date when the measurements were carried out, type of measurement equipment, names of personnel and their qualifications and has to be signed by the operator.

6.3.2 The Surveyor is to review the final thickness measurement report and countersign the cover page.
### TABLE I

**TABLE OF THE MINIMUM REQUIREMENTS FOR CLOSE-UP SURVEY AT HULL SPECIAL SURVEYS OF LIQUEFIED GAS CARRIERS**

<table>
<thead>
<tr>
<th>Special Survey No.1</th>
<th>Special Survey No.2</th>
<th>Special Survey No.3 and subsequent</th>
</tr>
</thead>
<tbody>
<tr>
<td>(age ≤ 5)</td>
<td>(5 &lt; age ≤ 10)</td>
<td>(age &gt; 10)</td>
</tr>
<tr>
<td>One web frame in a representative ballast tank of the topside, hopper side and double hull side type (1)</td>
<td>All web frames in a ballast tank, which is to be a double hull side tank or a topside tank. If such tanks are not fitted, another ballast tank is to be selected (1)</td>
<td>All web frames in all ballast tanks (1)</td>
</tr>
<tr>
<td>One transverse bulkhead in a ballast tank (3)</td>
<td>One web frame in each remaining ballast tank (1)</td>
<td>All transverse bulkheads in all ballast tanks (2)</td>
</tr>
<tr>
<td></td>
<td>One transverse bulkhead in each ballast tank (2)</td>
<td></td>
</tr>
</tbody>
</table>

(1) Complete transverse web frame including adjacent structural members.
(2) Transverse bulkhead complete, including girder system and adjacent members, and adjacent longitudinal bulkhead structure.
(3) Transverse bulkhead lower part including girder system and adjacent structural members.

**Note 1:** Ballast tanks include topside, double hull side, double bottom, hopper side, or any combined arrangement of the aforementioned, and peak tanks where fitted.

**Note 2:** For areas in tanks where coatings are found to be in GOOD condition, as defined in 1.2.10, the extent of close-up surveys may be specially considered by TL.

**Note 3:** For ships having independent tanks of type C, with a midship section similar to that of a general cargo ship, the extent of close-up surveys may be specially considered by TL.

**Note 4:** The Surveyor may extend the close-up survey as deemed necessary, taking into account the maintenance of the tanks under survey, the condition of the corrosion prevention system and also in the following cases:

- in particular, in tanks having structural arrangements or details which have suffered defects in similar tanks, or on similar ships according to available information;
- in tanks having structures approved with reduced scantlings.
### TABLE II
**TABLE OF MINIMUM REQUIREMENTS FOR THE THICKNESS MEASUREMENT AT HULL SPECIAL SURVEY OF LIQUEFIED GAS CARRIERS**

<table>
<thead>
<tr>
<th>Special Survey No.1</th>
<th>Special Survey No.2</th>
<th>Special Survey No.3</th>
<th>Special Survey No.4 and subsequent</th>
</tr>
</thead>
<tbody>
<tr>
<td>age ≤ 5</td>
<td>5 &lt; age ≤ 10</td>
<td>10 &lt; age ≤ 15</td>
<td>age &gt; 15</td>
</tr>
</tbody>
</table>

**One section of deck plating for the full beam of the ship within 0.5 L amidships in way of a ballast tank, if any**

- Each deck plate
- One transverse section within 0.5 L amidships in way of a ballast tank, if any

**Within the cargo area:**

- Each deck plate
- Two transverse sections (1)
- All wind and water strakes

**Within the cargo area:**

- Each deck plate
- Three transverse sections (1)
- Each bottom plate
- Duct keel plating and internals

**Selected wind and water strakes outside the cargo area**

**Selected wind and water strakes outside the cargo area**

**All wind and water strakes, full length**

**Measurements, for general assessment and recording of corrosion pattern, of those structural members subject to Close-up Survey according to Table I**

**Measurements, for general assessment and recording of corrosion pattern, of those structural members subject to Close-up Survey according to Table I**

**Measurements, for general assessment and recording of corrosion pattern, of those structural members subject to Close-up Survey according to Table I**

**Measurements, for general assessment and recording of corrosion pattern, of those structural members subject to Close-up Survey according to Table I**

**Suspect areas**

**Suspect areas**

**Suspect areas**

**Suspect areas**

(1) At least one section is to include a ballast tank within 0.5L amidships, if any

**Note 1:** For ships having independent tanks of type C, with a midship section similar to that of a general cargo ship, the extent of thickness measurements may be increased to include the tank top plating at the discretion of the Surveyor.

**Note 2:** For areas in spaces where coatings are found to be in GOOD condition, as defined in 1.2.10, the extent of thickness measurements may be specially considered by TL.

**Note 3:** The Surveyor may extend the thickness measurements as deemed necessary. Where substantial corrosion, as defined in 1.2.8, is found, the extent of thickness measurements is to be increased to the satisfaction of the Surveyor.
<table>
<thead>
<tr>
<th>10 &lt; age ≤ 15</th>
<th>age &gt; 15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Close-up survey of:</td>
<td>Close-up survey of:</td>
</tr>
<tr>
<td>- all web frames and both transverse bulkheads in a representative ballast tank (1) and (2)</td>
<td>- all web frames and both transverse bulkheads in two representative ballast tanks (1) and (2)</td>
</tr>
<tr>
<td>- the upper part of one web frame in another representative ballast tank</td>
<td></td>
</tr>
<tr>
<td>- one transverse bulkhead in another representative ballast tank (2)</td>
<td></td>
</tr>
<tr>
<td>(1) Complete transverse web frame including adjacent structural members</td>
<td></td>
</tr>
<tr>
<td>(2) Transverse bulkhead complete, including girder system and adjacent members, and adjacent longitudinal bulkhead structure</td>
<td></td>
</tr>
</tbody>
</table>

Note 1: Ballast tanks include topside, double hull side, double bottom, hopper side, or any combined arrangement of the aforementioned, and peak tanks where fitted.

Note 2: For areas in tanks where protective coating is found to be in GOOD condition, the extent of close-up survey may be specially considered by TL.

Note 3: For ships having independent tanks of type C, with a midship section similar to that of a general cargo ship, the extent of close-up surveys may be specially considered by TL.

Note 4: The extent of close-up surveys may be extended by the Surveyor as deemed necessary, taking into account the maintenance of the tanks under survey, the condition of the corrosion prevention system and also in the following cases:

- in particular, in tanks having structural arrangements or details which have suffered defects in similar tanks, or on similar ships according to available information;
- in tanks having structures approved with reduced scantlings.
TABLE IV
PROCEDURES FOR CERTIFICATION OF FIRMS ENGAGED IN THICKNESS MEASUREMENT OF HULL STRUCTURES

1. Application

This guidance applies for certification of the firms which intend to engage in the thickness measurement of hull structures of the vessels. TL-R Z17 also applies.

2. Procedures for Certification

(1) Submission of Documents: Following documents are to be submitted to TL for approval:

a) Outline of firm, e.g. organization and management structure.

b) Experience of the firm on thickness measurement inter alia of hull structures of the vessels.

c) Technicians’ careers, i.e. experience of technicians as thickness measurement operators, technical knowledge of hull structure, etc. Operators, are to be qualified according to a recognized industrial NDT Standard.

d) Equipment used for thickness measurement such as ultra-sonic testing machines and its maintenance/calibration procedures.

e) A guide for thickness measurement operators.

f) Training programmes of technicians for thickness measurement.

(2) Auditing of the firms:

Upon reviewing the documents submitted with satisfactory results, the firm is audited in order to ascertain that the firm is duly organised and managed in accordance with the documents submitted, and eventually is capable of conducting thickness measurement of the hull construction of the ships.

(3) Certification is conditional on an onboard demonstration at thickness measurements as well as satisfactory reporting.

3. Certification

(1) Upon satisfactory results of both the audit of the firm in 2(2) and the demonstration tests in 2(3) above, TL will issue a Certificate of Approval as well as a notice to the effect that the thickness measurement operation system of the firm has been certified by TL.

(2) Renewal/endorsement of the Certificate is to be made at intervals not exceeding 3 years by verification that original conditions are maintained.
4. **Information of any alteration to the Certified Thickness Measurement Operation System**

In case where any alteration to the certified thickness measurement operation system of the firm is made, such an alteration is to be immediately informed to TL. Re-audit is made where deemed necessary by TL.

5. **Cancellation of Approval**

Approval may be cancelled in the following cases:

(1) Where the measurements were improperly carried out or the results were improperly reported.

(2) Where TL's surveyor found any deficiencies in the approved thickness measurement operation system of the firm.

(3) Where the firm failed to inform of any alteration in 4 above to TL.
### TABLE V
GUIDANCE FOR ADDITIONAL THICKNESS MEASUREMENTS IN WAY OF SUBSTANTIAL CORROSION

<table>
<thead>
<tr>
<th>Structural member</th>
<th>Extent of Measurement</th>
<th>Pattern of Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plating</td>
<td>Suspect area and adjacent plates</td>
<td>5 point pattern over 1 square metre</td>
</tr>
<tr>
<td>Stiffeners</td>
<td>Suspect area</td>
<td>3 measurements each in line across web and flange</td>
</tr>
</tbody>
</table>
FIGURE 1
TYPICAL MIDSHIP SECTIONS OF LIQUEFIED GAS CARRIERS
Corrosion Protection Coating for Salt Water Ballast Spaces

At the time of new construction, all salt water ballast spaces having boundaries formed by the hull envelope shall have an efficient protective coating, epoxy or equivalent, applied in accordance with the manufacturer's recommendations.
Corrosion Protection Coatings for Cargo Hold Spaces on Bulk Carriers

At the time of new construction, all internal and external surfaces of hatch coamings and hatch covers, and all internal surfaces of the cargo holds, excluding the flat tank top areas and the hopper tanks sloping plating approximately 300 mm below the side shell frame and brackets, are to have an efficient protective coating (epoxy coating or equivalent) applied in accordance with the manufacturer’s recommendation. In the selection of coating due consideration is to be given by the owner to intended cargo conditions expected in service.

For existing bulk carriers, where Owners may elect to coat or recoat cargo holds as noted above, consideration may be given to the extent of the close-up and thickness measurement surveys. Prior to the coating of cargo holds of existing vessels, scantlings are to be ascertained in the presence of a Surveyor.

Note: This requirement is applied to new ships for which the request for class is received on or after 1 July 1998.
Transverse section outline: This diagram may be used for those ships where the diagram on sheet 11 is not suitable.
Close-up Survey and Thickness Measurement Areas

Typical transverse section
Areas A and D

A cargo hold, transverse bulkhead
Area C

Typical areas of deck plating inside line of hatch openings between cargo hold hatches
Area E

Thickness to be reported on TM3-DSBC(CSR), TM4-DSBC(CSR), TM6-DSBC(CSR) as appropriate

Thickness to be reported on TM5-DSBC(CSR)

Thickness to be reported on TM6-DSBC(CSR)
Framing in double-side tanks
Area (B)

<table>
<thead>
<tr>
<th>Ordinary transverse frame in double skin tank</th>
<th>Ordinary longitudinal structure in double skin tank</th>
</tr>
</thead>
</table>

Thickness to be reported on TM4-DSBC(CSR)
ANNEX III
ANNEX IIIA
SURVEY PROGRAMME

Basic information and particulars

Name of ship: ____________________________
IMO number: ____________________________
Flag State: ______________________________
Port of registry: _________________________
Gross tonnage: __________________________
Deadweight (metric tonnes): ______________
Length between perpendiculars (m): ________
Shipbuilder: ____________________________
Hull number: ____________________________
Classification Society: __________________
Class ID: ______________________________
Date of build of the ship: _________________
Owner: _________________________________
Thickness measurement firm: _____________
1 Preamble

1.1 Scope

1.1.1 The present survey programme covers the minimum extent of overall surveys, close-up surveys, thickness measurements and pressure testing within the cargo length area, cargo holds, ballast tanks, including fore and aft peak tanks, required by TL- R Z10.5.

1.1.2 The arrangements and safety aspects of the survey are to be acceptable to the attending surveyor(s).

1.2 Documentation

All documents used in the development of the survey programme are to be available onboard during the survey as required by section 6.

2 Arrangement of cargo holds, tanks and spaces

This section of the survey programme is to provide information (either in the form of plans or text) on the arrangement of cargo holds, tanks and spaces that fall within the scope of the survey.

3 List of cargo holds, tanks and spaces with information on their use, extent of coatings and corrosion prevention system

This section of the survey programme is to indicate any changes relating to (and is to update) the information on the use of the holds and tanks of the ship, the extent of coatings and the corrosion prevention system provided in the Survey Planning Questionnaire.

4 Conditions for survey

This section of the survey programme is to provide information on the conditions for survey, e.g. information regarding cargo hold and tank cleaning, gas freeing, ventilation, lighting, etc.

5 Provisions and method of access to structures

This section of the survey programme is to indicate any changes relating to (and is to update) the information on the provisions and methods of access to structures provided in the Survey Planning Questionnaire.

6 List of equipment for survey

This section of the survey programme is to identify and list the equipment that will be made available for carrying out the survey and the required thickness measurements.

7 Survey requirements

7.1 Overall survey

This section of the survey programme is to identify and list the spaces that should undergo an overall survey for this ship in accordance with 2.3.1.
7.2 Close-up survey

This section of the survey programme is to identify and list the hull structures that are to undergo a close-up survey for this ship in accordance with 2.3.2.

8 Identification of tanks for tank testing

This section of the survey programme is to identify and list the cargo holds and tanks that are to undergo tank testing for this ship in accordance with 2.5.

9 Identification of areas and sections for thickness measurements

This section of the survey programme is to identify and list the areas and sections where thickness measurements are to be taken in accordance with 2.4.1.

10 Minimum thickness of hull structures

This section of the survey programme is to specify the minimum thickness for hull structures of this ship that are subject to TL- R Z10.5 (indicate either (a) or preferably (b), if such information is available):

(a) Determined from the attached wastage allowance table and the original thickness to the hull structure plans of the ship;

(b) Given in the following table(s):

<table>
<thead>
<tr>
<th>Area or location</th>
<th>Original as-built thickness (mm)</th>
<th>Minimum thickness (mm)</th>
<th>Substantial corrosion thickness (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deck Plating</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Longitudinals</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Longitudinal girders</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cross deck plating</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cross deck stiffeners</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bottom Plating</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Longitudinals</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Longitudinal girders</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inner bottom Plating</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Longitudinals</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Longitudinal girders</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Floors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ship side in way of topside tanks Plating</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Longitudinals</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Ship side in way of hopper side tanks Plating</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Longitudinals</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ship side in way of double hull tanks Plating</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Longitudinals or ordinary transverse frames</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Longitudinal stringers</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>------------------------</td>
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<td></td>
</tr>
<tr>
<td><strong>Longitudinal bulkhead (inner side)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plating</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Longitudinals or ordinary transverse frames</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Longitudinal girders (if applicable)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>Transverse bulkheads</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plating</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stiffeners (if applicable)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper stool plating</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper stool stiffeners</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower stool plating</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower stool stiffeners</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>Transverse web frames in topside tanks</strong></td>
<td></td>
<td></td>
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<tr>
<td>Plating</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Flanges</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Stiffeners</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>Transverse web frames in double hull tanks</strong></td>
<td></td>
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<tr>
<td>Plating</td>
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<td>Flanges</td>
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<tr>
<td>Stiffeners</td>
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<tr>
<td><strong>Transverse web frames in hopper tanks</strong></td>
<td></td>
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<td>Plating</td>
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<td>Flanges</td>
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<tr>
<td>Stiffeners</td>
<td></td>
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<tr>
<td><em>Hatch Covers</em></td>
<td></td>
<td></td>
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<tr>
<td>Plating</td>
<td></td>
<td></td>
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<tr>
<td>Stiffeners</td>
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<tr>
<td><em>Hatch Coamings</em></td>
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<tr>
<td>Plating</td>
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<td></td>
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<tr>
<td>Stiffeners</td>
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</tbody>
</table>

Note: The wastage allowance tables are to be attached to the survey programme.
For vessels built under TL Common Structural Rules, the renewal thickness of the hull structure elements is indicated in the appropriate drawings.

11 **Thickness measurement firm**

This section of the survey programme is to identify changes, if any, relating to the information on the thickness measurement firm provided in the Survey Planning Questionnaire.

12 **Damage experience related to the ship**

This section of the survey programme is to, using the tables provided below, provide details of the hull damages for at least the last three years in way of the cargo holds, ballast tanks and void spaces within the cargo length area. These damages are subject to survey.
## Hull damages sorted by location for this ship

<table>
<thead>
<tr>
<th>Cargo hold, tank or space number or area</th>
<th>Possible cause, if known</th>
<th>Description of the damages</th>
<th>Location</th>
<th>Repair</th>
<th>Date of repair</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>

## Hull damages for sister or similar ships (if available) in the case of design related damage

<table>
<thead>
<tr>
<th>Cargo hold, tank or space number or area</th>
<th>Possible cause, if known</th>
<th>Description of the damages</th>
<th>Location</th>
<th>Repair</th>
<th>Date of repair</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

### 13 Areas identified with substantial corrosion from previous surveys

This section of the survey programme is to identify and list the areas of substantial corrosion from previous surveys.

### 14 Critical structural areas and suspect areas

This section of the survey programme is to identify and list the critical structural areas and the suspect areas, when such information is available.

### 15 Other relevant comments and information

This section of the survey programme is to provide any other comments and information relevant to the survey.
Appendices

Appendix 1 - List of plans

Paragraph 5.1.3 requires that main structural plans of cargo holds and ballast tanks (scantling drawings), including information regarding use of high tensile steel (HTS) are to be available. This Appendix of the survey programme is to identify and list the main structural plans which form part of the survey programme.

Appendix 2 - Survey Planning Questionnaire

The Survey Planning Questionnaire (annex IIIB), which has been submitted by the owner, is to be appended to the survey programme.

Appendix 3 - Other documentation

This part of the survey programme is to identify and list any other documentation that forms part of the plan.

Prepared by the owner in co-operation with TL for compliance with 5.1.3:

Date:..............................(name and signature of authorized owner's representative)

Date:..............................(name and signature of authorized representative of TL)
ANNEX IIIB

SURVEY PLANNING QUESTIONNAIRE

1 The following information will enable the owner in co-operation with TL to develop a Survey Programme complying with the requirements of TL- R Z10.5. It is essential that the owner provides, when completing the present questionnaire, up-to-date information. The present questionnaire, when completed, shall provide all information and material required by TL- R Z10.5.

Particulars

Ship’s name:
IMO number:
Flag State:
Port of registry:
Owner:
Classification Society:
Class ID:
Gross tonnage:
Deadweight (metric tonnes):
Date of build:

Information on access provision for close-up surveys and thickness measurement

2 The owner is to indicate, in the table below, the means of access to the structures subject to close-up survey and thickness measurement. A close-up survey is an examination where the details of structural components are within the close visual inspection range of the attending surveyor, i.e. normally within reach of hand.
<table>
<thead>
<tr>
<th>Hold/ Tank No.</th>
<th>Structure</th>
<th>Permanent Means of Access</th>
<th>Temporary staging</th>
<th>Rafts</th>
<th>Ladders</th>
<th>Direct access</th>
<th>Other means (please specify)</th>
</tr>
</thead>
<tbody>
<tr>
<td>F.P.</td>
<td>Fore Peak</td>
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<tr>
<td>A.P.</td>
<td>Aft Peak</td>
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<tr>
<td>CARGO HOLDS</td>
<td>Hatch side coamings</td>
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<td>Topside sloping plate</td>
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<tr>
<td></td>
<td>Upper stool plating</td>
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<td></td>
<td>Cross deck</td>
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<td></td>
<td>Double side tank plating</td>
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<td></td>
<td>Transverse bulkhead</td>
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<td></td>
<td>Hopper tank platting</td>
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<td></td>
<td>Lower stool plating</td>
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<td></td>
<td>Tank top</td>
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<td>TOPSIDE TANKS</td>
<td>Underdeck structure</td>
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<td></td>
<td>Side shell &amp; structure</td>
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<td></td>
<td>Sloping plate &amp; structure</td>
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<td></td>
<td>Webs &amp; bulkheads</td>
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<tr>
<td>HOPPER TANKS</td>
<td>Hopper sloping plate &amp; structure</td>
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<td>Side shell &amp; structure</td>
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<td></td>
<td>Bottom structure</td>
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<td></td>
<td>Webs &amp; bulkheads</td>
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<tr>
<td>DOUBLE SIDE SKIN TANKS</td>
<td>Side shell &amp; structure</td>
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<td></td>
<td>Inner skin &amp; structure</td>
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<td></td>
<td>Webs &amp; bulkheads</td>
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<td>Double bottom structure</td>
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<td></td>
<td>Upper stool internal structure</td>
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<td></td>
<td>Lower stool internal structure</td>
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<tr>
<td>WING TANKS OF ORE CARRIERS</td>
<td>Underdeck &amp; structure</td>
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<td>Side shell &amp; structure</td>
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<td></td>
<td>Side shell vertical web &amp; structure</td>
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<td></td>
<td>Longitudinal bulkhead &amp; structure</td>
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<td>Longitudinal bulkhead web &amp; structure</td>
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<td>Bottom plating &amp; structure</td>
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<td>Cross ties/stringers</td>
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</table>
### History of bulk cargoes of a corrosive nature (e.g. high sulphur content)

### Owner's inspections

3 Using a format similar to that of the table below (which is given as an example), the owner is to provide details of the results of their inspections, for the last 3 years - in accordance with TL- R Z10.5 - on all CARGO holds and BALLAST tanks and VOID spaces within the cargo area.

<table>
<thead>
<tr>
<th>Tank/Hold No.</th>
<th>Corrosion protection (1)</th>
<th>Coating extent (2)</th>
<th>Coating condition (3)</th>
<th>Structural deterioration (4)</th>
<th>Hold and tank history (5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cargo holds</td>
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<td>Topside tanks</td>
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<td>Hopper tanks</td>
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<tr>
<td>Double side skin tanks</td>
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<tr>
<td>Double bottom tanks</td>
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<tr>
<td>Upper stools</td>
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<td>Lower stools</td>
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<tr>
<td>Wing tanks (ore carriers)</td>
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<tr>
<td>Fore peak</td>
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<td>Aft peak</td>
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<tr>
<td>Miscellaneous other spaces:</td>
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</table>

Note: Indicate tanks which are used for oil/ballast

1) HC=hard coating; SC=soft coating; SH=semihard coating; NP=no protection

2) U=upper part; M=middle part; L=lower part; C=complete
3) G=good; F=fair; P=poor; 
   RC=recoated (during the last 3 years)

4) N=no findings recorded; Y=findings recorded, 
description of findings is to be attached to this questionnaire

5) DR=Damage & Repair; L=Leakages; 
   CV= Conversion 
   (Description to be attached to this questionnaire)

Name of owner's representative:

Signature:

Date:
Reports of Port State Control inspections

List the reports of Port State Control inspections containing hull structural related deficiencies, relevant information on rectification of the deficiencies:

Safety Management System

List non-conformities related to hull maintenance, including the associated corrective actions:

Name and address of the approved thickness measurement firm:
Voyage Repairs and Maintenance

Where repairs to hull, machinery or equipment, which affect or may affect classification, are to be carried out by a riding crew during a voyage they are to be planned in advance. A complete repair procedure including the extent of proposed repair and the need for surveyor’s attendance during the voyage is to be submitted to and agreed upon by the Surveyor reasonably in advance. Failure to notify TL in advance of the repairs, may result in suspension of the vessel’s class.

Where in any emergency circumstance, emergency repairs are to be effected immediately, the repairs should be documented in the ship’s log and submitted thereafter to TL for use in determining further survey requirements.

The above is not intended to include maintenance and overhaul to hull, machinery and equipment in accordance with manufacturer’s recommended procedures and established marine practice and which does not require TL’s approval; however, any repair as a result of such maintenance and overhauls which affects or may affect classification is to be noted in the ship’s log and submitted to the attending Surveyor for use in determining further survey requirements.

Note:

Annexed “Guidelines for the Survey of Voyage Repairs” is a recommendation and is not a mandatory requirement under this TL- R Z13.

Notes:

1. This requirement is applied for surveys commenced on or after 1 July 2011.
ANNEX

GUIDELINES FOR THE SURVEY
OF VOYAGE REPAIRS

The purpose of these notes is to provide guidance to the field Surveyors in dealing with voyage hull repairs and is to be considered in addition to the Rules of TL; no part of this guide is intended to conflict with Rules of TL.

A. A meeting is to be held with the owners prior to commencement of hull repairs during a vessel's voyage to discuss and confirm the following:

1. It is the owner’s responsibility to ensure continued effectiveness of the structure, including the longitudinal strength and the watertight/weathertight integrity of the vessel.

2. Extent of intended repairs. All repairs to be based on TL’s recommendations and/or concurrence.

3. Availability of pertinent drawings.

4. Verification of new materials regarding certification, grade and scantlings. Verified mill sheets to remain on board and to be provided to attending Surveyor examining completed repairs.

5. Verification of welding consumables regarding certification and suitability for materials involved. Check on availability of drying ovens, holding containers, etc.

6. Verification of the qualification of welders and supervisory personnel, qualification records to remain on board and to be provided to attending Surveyor examining completed repairs.


8. Review of the intended provisions to facilitate sound weldments, i.e. cleaning, preheating (if applicable) adherence to welding sequence principles.

Further, it might be necessary to restrict welding to certain positions and prohibit welding in more difficult positions when the ship’s motions might influence the quality of the welding.

9. Review of the application of repair coating, as appropriate.

10. Review of intended working conditions, i.e. staging, lighting, ventilation, etc.

11. Review of intended supervision and quality control.

12. Completed repairs are to be examined and tested as required to the satisfaction of the attending Surveyor.

Note:

All details and results of subject meeting to be covered by a memorandum. A copy of this memorandum is to be placed on board and to be provided to the attending Surveyor examining repairs. In addition, a copy is to be sent/faxed to the arrival port where completed repairs will be examined.
B. Any contemplated repairs to primary hull structures, i.e. main longitudinal and transverse members and their attachments, are to be submitted to TL for review prior to commencing voyage repairs.

Riding repairs to primary hull structures should not be permitted except in extreme circumstances.

Any repairs to primary hull structures shall require attendance by a Surveyor riding-ship survey or at regular intervals to confirm fit-up, alignment, general workmanship and compliance with recommendations.

NDT of completed repairs to primary structure to be carried out to attending Surveyor’s satisfaction.

Repairs to other hull structural parts may be accepted based on examination upon completion of repairs.

C. No hull repairs carried out by a riding crew should be accepted unless:

1. The initial meeting had been carried out and conditions found satisfactory.

2. A final satisfactory examination upon completion was carried out.
Hull, Structure, Equipment and Machinery Surveys of Mobile Offshore Drilling Units

1. GENERAL

1.1. Application
1.2. Definition
1.3. Repairs
1.4. Remote Inspection Techniques (RIT)

2. SPECIAL SURVEY

2.1. Schedule
2.2. Scope
2.3. Special Survey No. 1 - Hull, Structure and Equipment
2.4. Special Survey No. 2 and Subsequent Special Surveys - Hull, Structure and Equipment
2.5. Special Surveys - Machinery
2.6. Special Survey - Electrical Equipment
2.7. Special Survey - Shipboard Automatic and Remote Control Systems
2.8. Special Survey - Special Features (All Types)

3. ANNUAL SURVEY

3.1. Schedule
3.2. Scope
3.3. Annual Survey - Hull, Structure and Equipment
3.4. Annual Survey - Machinery
3.5. Annual Survey - Electrical Equipment
3.6. Annual Survey - Shipboard Automatic and Remote Control Systems
3.7. Annual Survey - Special Features

4. SURVEY OF THE OUTSIDE OF THE UNIT'S BOTTOM AND RELATED ITEMS

4.1. Schedule
4.2. Parts to be Examined
4.3. Ballast Spaces

5. PROPULSION SYSTEM SURVEYS

5.1. Schedule
5.2. Propeller Shaft surveys and extension of survey intervals
5.3. Other propulsion systems

6. BOILER SURVEYS

6.1. Schedule
6.2. Scope

7. SURVEY PREPLANNING AND RECORD KEEPING
8. OCCASIONAL SURVEYS

8.1. Damage Survey
8.2. Repairs
8.3. Lay-up and Reactivation Surveys
8.4. Alterations
8.5. Welding and Replacement of Materials

9. PREPARATION FOR SURVEY

9.1. Conditions for Survey
9.2. Access to Structures
9.3. Equipment for Survey
9.4. Survey Offshore or at Anchorage

APPENDIX A

Underwater Inspection in Lieu of Drydocking Survey

APPENDIX B

Minimum Requirements for Thickness Measurements for Special Survey

Note:

1. This requirement is applied for surveys commenced on or after 1 July 2020.
1. GENERAL

1.1. Application

1.1.1. The requirements apply to all Mobile Offshore Drilling Units after their construction.

1.1.2. The requirements apply to surveys of the hull, structure, equipment, and machinery subject to classification.

1.1.3. For Surface-Type Units the survey requirements detailed in this document replace those requirements laid out in TL-Rs Z1, Z3, Z6, Z7, Z18 and Z21, except when noted in the text. The Thickness Measurement requirements of TL-R Z7 have been adapted and incorporated into Appendix B Table I of this document.

1.2. Definition

1.2.1. Ballast Tank
A Ballast Tank is a tank which is used primarily for salt water ballast.

1.2.2. Preload Tank
A Preload Tank is a tank within the hull of a self-elevating unit. These tanks are periodically filled with salt water ballast and used to preload the footings of the unit prior to commencing drilling operations. Preload Tanks are considered equivalent to Ballast Tanks.

1.2.3. Spaces
Spaces are separated compartments.

1.2.4. Coating Condition
Coating Condition is defined as follows:

<table>
<thead>
<tr>
<th>Condition</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>GOOD</td>
<td>condition with only minor spot rusting</td>
</tr>
<tr>
<td>FAIR</td>
<td>condition with local breakdown at edges of stiffeners and weld Connections and/or light rusting over 20% or more of areas under consideration, but less than as defined for POOR condition</td>
</tr>
<tr>
<td>POOR</td>
<td>condition with general breakdown of coating over 20% or more of areas or hard scale at 10% or more of areas under consideration</td>
</tr>
</tbody>
</table>

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

1.2.6. Transverse Section (Girth Belt)
A Transverse Section (Girth Belt) includes all continuous longitudinal members such as plating, longitudinals and girders at a given section of the unit.

1.2.7. Representative Spaces
Representative Spaces are those which are expected to reflect the conditions of other spaces of similar type and service and with similar corrosion prevention systems. When selecting Representative Spaces, account is to be taken of the service and repair history on board and identifiable Critical Structural Areas and/or Suspect Areas.
1.2.8. Critical Structural Area
Critical Structural Areas are locations which have been identified from calculations to require monitoring or from the service history of the subject Unit or from similar Units or sister Units, if applicable, to be sensitive to cracking, buckling or corrosion which would impair the structural integrity of the Unit.

1.2.9. Suspect Area
Suspect Areas are locations showing Substantial Corrosion and/or are considered by the Surveyor to be prone to rapid wastage.

1.2.10. Substantial Corrosion
Substantial Corrosion is an extent of corrosion such that assessment of corrosion pattern indicates a wastage in excess of 75% of allowable margins, but within acceptable limits.

1.2.11. Excessive Diminution
Excessive Diminution is an extent of corrosion beyond allowable limits.

1.2.12. Corrosion Prevention System
A Corrosion Prevention System is normally considered a full hard protective coating. Hard Protective Coating is usually to be epoxy coating or equivalent. Other coating systems, which are neither soft nor semi-hard coatings, may be considered acceptable as alternatives provided that they are applied and maintained in compliance with the manufacturer’s specifications.

1.2.13. Prompt and Thorough Repair
A Prompt and Thorough Repair is a permanent repair completed at the time of survey to the satisfaction of the Surveyor, therein removing the need for the imposition of any associated condition of classification.

1.2.14. Special consideration
Special consideration or specially considered (in connection with close-up surveys and thickness measurements) means sufficient close-up inspection and thickness measurements are to be taken to confirm the actual average condition of the structure under the coating.

1.2.15. Propulsion Assist
Propulsion Assist are non-self-propelled Units fitted with thrusters intended to assist in manoeuvring or propelling while under tow.

1.2.16. Remote Inspection Techniques(RIT)
Remote Inspection Technique 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 TL- G 42).

1.3. Repairs

1.3.1. Any damage in association with wastage over the allowable limits (including buckling, grooving, detachment or fracture), or extensive areas of wastage over the allowable limits, which affects or, in the opinion of the Surveyor, will affect the Unit’s structural, watertight or weathertight integrity, is to be promptly and thoroughly (see 1.2.13.) repaired.

For locations where adequate repair facilities are not available, consideration may be given to allow the unit to proceed directly to a repair facility. This may require temporary repairs for the intended voyage.
1.3.2. Additionally, when a survey results in the identification of structural defects or corrosion, either of which, in the opinion of the Surveyor, will impair the unit’s fitness for continued service, remedial measures are to be implemented before the unit continues in service.

1.3.3. Where the damage mentioned in Para. 1.3.1 is isolated and of a localised nature which does not affect the unit’s structural integrity, consideration may be given by the surveyor to allow an appropriate temporary repair to restore watertight or weather tight integrity and impose a condition of class in accordance with TL- PR 35, with a specific time limit.

1.4. Remote Inspection Techniques (RIT)

1.4.1. The RIT is to provide the information normally obtained from a close-up survey. RIT surveys are to be carried out in accordance with the requirements given here-in and the requirements of TL- G 42 ‘Guidelines for Use of Remote Inspection Techniques for surveys’. These considerations are to be included in the proposals for use of a RIT which are to be submitted in advance of the survey so that satisfactory arrangements can be agreed with TL.

1.4.2. The equipment and procedure for observing and reporting the survey using a RIT are to be discussed and agreed with the parties involved prior to the RIT survey, and suitable time is to be allowed to set-up, calibrate and test all equipment beforehand.

1.4.3. When using a RIT as an alternative to close-up survey, if not carried out by TL itself, it is to be conducted by a firm approved as a service supplier according to TL- R Z17 and is to be witnessed by an attending surveyor of TL.

1.4.4. The structure to be examined using a RIT is to be sufficiently clean to permit meaningful examination. Visibility is to be sufficient to allow for a meaningful examination. TL is to be satisfied with the methods of orientation on the structure.

1.4.5. The Surveyor is to be satisfied with the method of data presentation including pictorial representation, and a good two-way communication between the Surveyor and RIT operator is to be provided.

1.4.6. If the RIT reveals damage or deterioration that requires attention, the Surveyor may require traditional survey to be undertaken without the use of a RIT.
2. SPECIAL SURVEY

2.1. Schedule

2.1.1. Special Surveys (Renewal Surveys) of hull, structure, equipment, and machinery are to be carried out at 5 year intervals to renew the Classification Certificate(s).

2.1.2. The first Special Survey is to be completed within 5 years from the date of the initial classification survey and thereafter within 5 years from the credited date of the previous Special Survey. Extensions of class beyond the 5th year may be granted in exceptional circumstances (for a definition of exceptional circumstances, see TL-PR 1C). In this case the next period of class will start from the expiry date of the Special Survey before the extension was granted.

2.1.3. For survey completed within 3 months before the expiry date of the Special Survey, the next period of class will start from the expiry date of the Special Survey. For Survey completed more than three months before the expiry date of the Special Survey, the period of class will start from the survey completion date.

2.1.4. The Special Survey may be commenced at the 4th Annual Survey and be progressed with a view to completion by the 5th anniversary date. When the Special Survey is commenced prior to the 4th Annual Survey, the entire survey is to be completed within 15 months if such work is to be credited to the Special Survey.

2.1.5. A survey planning meeting is to be held prior to the commencement of the survey.

2.1.6. When considered necessary by TL the interval between Special Surveys may be reduced.

2.1.7. Special Survey requirements of units of unusual design, in lay-up or in unusual circumstances will be determined on individual basis.

2.1.8. At the request of the Owner, and upon TL's approval of the proposed arrangements, a system of Continuous Survey may be undertaken whereby the Special Survey requirements are carried out in regular rotation in accordance with the Rules of TL to complete all the requirements of the particular Special Survey within a five year period. Any defects that may affect classification found during the survey, are to be reported to TL and dealt with to the satisfaction of the Surveyor.

2.2. Scope

2.2.1. The Special Surveys shall include, in addition to Annual Survey requirements per Section 3, the following examinations, tests, and checks of sufficient extent to verify that the hull, structure, equipment, and machinery are in satisfactory condition and that the Mobile Offshore Drilling Unit is in compliance with the applicable Rule requirements for the new period of class of 5 years to be assigned subject to proper maintenance and operation and the Periodical Surveys carried out at the due dates.

2.2.2. The examinations of the hull are to be supplemented by thickness measurements and testing as required, to verify the structural integrity. The aim of the examination is to discover Excessive Diminution, Substantial Corrosion, significant deformation, fractures, damages or other structural deterioration, that may be present.

2.2.3. The Special Survey is to include examination of underwater parts per Section 4.
2.3. Special Survey No. 1 – Hull, Structure and Equipment

2.3.1. All Units

The following parts are to be examined:

- The hull or platform structure including tanks, watertight bulkheads and deck, cofferdams, void spaces, sponsons, chain lockers, duct keels, helicopter deck and its supporting structure, machinery spaces, peak spaces, steering gear spaces, and all other internal spaces are to be examined externally and internally for damage, fractures, or excessive diminution. Thickness gauging of plating and framing may be required where wastage is evident or suspected.

- All tanks, compartments and free-flooding spaces throughout the drilling unit are to be examined externally and internally for excess wastage or damage.

- Internal examinations of spud cans and mats may be specially considered.

- Watertight integrity of tanks, bulkheads, hull, decks and other compartments is to be verified by visual inspection.

- Suspect areas and critical structural areas should be examined and may be required to be tested for tightness, non-destructive tested or thickness gauged.

- All special and primary application structures (as defined in TL- G 11) and identified critical structural areas are to be subjected to Close up survey.

- Tanks and other normally closed compartments are to be ventilated, gas freed and cleaned as necessary to expose damages and allow meaningful examination and thickness gauged in case of excessive diminution.

- Internal examination and testing of void spaces, compartments filled with foam or corrosion inhibitors, and tanks used only for lube oil, light fuel oil, diesel oil, fresh water, drinking water or other non-corrosive products may be waived provided that upon a general examination the Surveyor considers their condition to be satisfactory. External thickness gauging may be required to confirm corrosion control.

- Structures such as derrick substructure and supporting structure, jack-houses, deck houses, superstructures, helicopter landing areas, raw water (sea water intake) towers and their respective attachments to the deck or hull.

- Windlass and attachments of anchor racks and anchor cable fairleads.

- Foundations and supporting headers, brackets, and stiffeners for drilling related apparatus, where attached to hull, deck, superstructure or deck house.

- Thickness gaugings are to be carried out where wastage is evident or suspect.

- Where provided, the condition of corrosion prevention system of ballast tanks is to be examined. Where a hard protective coating is found in POOR condition and it is not renewed, where soft or semi-hard coating has been applied, or where a hard protective coating was not applied from time of construction, the tanks in question are to be examined at a frequency determined by TL. Thickness measurements are to be carried out as deemed necessary by the Surveyor.
• Thickness measurements are to be carried out in accordance with Appendix B, tables 1, 2 or 3 as applicable. The Surveyor may extend the thickness measurements as deemed necessary. When thickness measurements indicate substantial corrosion, the extent of thickness measurements is to be increased to determine areas of substantial corrosion. Table 4 of Appendix B may be used as guidance for these additional thickness measurements. These extended thickness measurements are to be carried out before the survey is credited as completed.

2.3.2. Surface-type Units

In addition to the requirements of 2.3.1 the following items are to be examined:

• Structural appendages and ducts for positioning units.

2.3.3. Self-Elevating Units

In addition to the requirements of 2.3.1 the following items are to be examined:

• All legs, including chords, diagonal and horizontal braces, gussets, racks, joints, together with leg guides. Tubular or similar type legs are to be examined externally and internally, together with internal stiffeners and pinholes as applicable.

• Structure in, around and under jack-house and leg wells. Non-destructive testing of these areas may be required.

• Leg jacking or other elevating systems externally.

• Leg connections to bottom mats or spud cans, including non-destructive testing of leg connections to mats or spud cans.

• Jetting piping systems or other external piping, particularly where penetrating mats or spud cans.

• Spud cans or mats. Where the spud cans or mat are partly or entirely obscured below the mud line where the Special Survey is otherwise being completed, consideration may be given to postponement of the examinations until the next Rig move.

2.3.4. Column-Stabilized Units

In addition to the requirements of 2.3.1 the following items are to be examined:

• Connections of columns and diagonals to upper hull, structure or platform and lower hull, structure or pontoons. Joints of supporting structure including diagonals, braces and horizontals, together with gussets and brackets. Internal continuation or back-up structure for the above. Non-destructive examination may be required of these areas.

2.4. Special Survey No. 2 and Subsequent Special Surveys - Hull, Structure and Equipment

These Surveys are to be at least as comprehensive as Special Survey No. 1, with special attention being given to the condition and thickness of material in high corrosion areas. Representative gaugings will be required as per Appendix B. Special attention should be paid to splash zones on structure, legs or related structure, and in ballast tanks, pre-load tanks, free-flooding spaces, spud cans and mats.
2.5. Special Surveys – Machinery

2.5.1. Non-Self-Propelled Units

In addition to the requirements for Annual Surveys, at each Special Survey, special attention is to be given to the following items as applicable:

• All openings to the sea, including sanitary and other overboard discharges, together with cocks and valves connected therewith are to be examined internally and externally while the Unit is in drydock, or at the time of underwater examination in lieu of drydocking, and the fastenings to the shell plating are to be renewed when considered necessary by the Surveyor.

• Pumps and pumping arrangements, including valves, cocks, pipes and strainers are to be examined. Non-metallic flexible expansion pieces in the main salt water circulating system are to be examined internally and externally. The Surveyor is to be satisfied with the operation of the bilge and ballast systems. Other systems are to be tested as considered necessary.

• The foundations of machinery are to be examined.

• Heat exchangers and other unfired pressure vessels within the scope of classification are to be examined, opened up or thickness gauged and pressure tested as considered necessary, and associated relief valves proved operable. Evaporators that operate with a vacuum on the shell need not be opened, but may be accepted on basis of satisfactory external examination and operational test or review of operating records.

2.5.2. Self-Propelled Units

In addition to the requirements for non-propelled units, the main and auxiliary propulsion machinery, including associated pressure vessels should be surveyed. In addition, examination of the steering machinery is to be carried out, including an operational test and checking or relief-valve settings. The machinery may be required to be opened for further examination as considered necessary by the Surveyor.

2.5.3. Units with Propulsion - Assist or Dynamic Position

Propulsion-assist and dynamic positioning equipment should be surveyed on the basis of Special Survey-Machinery in accordance with the requirements of TL.

2.6. Special Survey - Electrical Equipment

In addition to the requirements for Annual Surveys, at each Special Survey, special attention is to be given to the following items as applicable:

• Fittings and connections on main switchboards and distribution panels are to be examined, and care is to be taken to see that no circuits are overfused.

• Cables are to be examined as far as practicable without undue disturbance of fixtures.

• All generators are to be run under load, either separately or in parallel. Switches and circuit breakers are to be tested.
• All equipment and circuits are to be inspected for possible development of physical changes or deterioration. The insulation resistance of the circuits is to be measured between conductors and between conductors and ground and these values compared with those previously measured.

• Electrical auxiliaries installed for vital purposes, generators and motors are to be examined and their prime movers opened for inspection. The insulation resistance of each generator and motor is to be measured.

• The windings of main propulsion generators and motors are to be thoroughly examined and found or made dry and clean. Particular attention is to be paid to the ends of all windings of stators and rotors.

• Emergency power systems are to be examined and tested.

2.7. Special Survey - Shipboard Automatic and Remote Control Systems

In addition to the requirements of Annual Surveys the following parts are to be examined:

• Control Actuators: All mechanical, hydraulic, and pneumatic control actuators and their power systems are to be examined and tested as considered necessary.

• Electrical equipments: The insulation resistance of the windings of electrical control motors or actuators is to be measured, with all circuits of different voltages above ground being tested separately to the Surveyor’s satisfaction.

• Unattended Plants: Control systems for unattended machinery spaces are to be subjected to dock trials at reduced power on the propulsion engine to verify the proper performance of all automatic functions, alarms, and safety systems.

2.8. Special Survey - Special Features (All Types)

Mobile Offshore Drilling Units may have many items of machinery and electrical equipment not found on conventional vessels. Certain of these items are required for classification even if the unit is without propulsion machinery. Items to be especially examined and reported upon at all Special Surveys are as follows:

2.8.1. Hazardous Areas - Enclosed hazardous areas such as those containing open active mud tanks, shale shakers, degassers and desanders are to be examined and doors and closures in boundary bulkheads verified as effective. Electric lighting, electrical fixtures, and instrumentation are to be examined, proven satisfactory and verified as explosion-proof or intrinsically safe. Ventilating systems including ductwork, fans, intake and exhaust locations for enclosed restricted areas are to be examined, tested and proven satisfactory. Ventilating air alarm systems to be proven satisfactory. Electrical motors are to be examined including closed-loop ventilating systems for large D-C motors. Automatic power disconnect to motors in case of loss of ventilating air is to be proved satisfactory.

2.8.2. Remote Shutdown Arrangements - Remote shutdown for fuel-oil transfer service pumps and ventilating equipment, together with oil tank outlet valves where required to be capable of being remotely closed are to be proved satisfactory. Emergency switch(s) for all electrical equipment including main and emergency generators, except alarm and communication systems and lighting in vital areas such as escape routes and landing platforms, are to be proved satisfactory.
2.8.3. Fire Fighting Systems where included in TL's Rules - A general examination of the fire detection and extinguishing systems is to be made in order that the Surveyor may be satisfied with its efficient state. The following items are to be especially examined:

- Fire hoses, nozzles, and spanners at each fire station.
- Servicing of all portable extinguishers.
- Weighing and re-charging as necessary of all dry chemical and CO₂ extinguishers.
- Fire pumps and piping including operation and capacity.
- Alarm systems including fire and gas detection.

2.8.4. Self Elevating Systems - On self elevating type Mobile Offshore Drilling Units, the elevating systems are to be examined and reported on. Pinions and gears of the climbing pinion gear train of rack and pinion systems are to be examined, as far as practicable, to the Surveyor's satisfaction by an effective crack detection method.

2.8.5. Piping Systems - Piping systems used solely for drilling operations and complying either with the Society's requirements or a recognized standard are to be examined, as far as practical, operationally or hydrostatically tested to working pressure, to the satisfaction of the Surveyor.

2.8.6. Miscellaneous - Bilge alarm systems, if fitted, to be tested.
3. **ANNUAL SURVEY**

3.1. **Schedule**

Annual Surveys are to be held within 3 months before or after each anniversary date from the date of the initial classification survey or the completion for the last Special Survey.

3.2. **Scope**

The survey consists of an examination for the purpose of verifying, as far as practicable, that the hull, structure, equipment, and machinery are maintained in accordance with the applicable Rule requirements.

3.3. **Annual Survey - Hull, Structure and Equipment**

3.3.1. At each Annual Survey the exposed parts of the hull, deck, deck house, structures attached to the deck, derrick substructure, including supporting structure, accessible internal spaces, and the applicable parts listed below are to be generally examined and placed in satisfactory condition as found necessary.

3.3.2. The Surveyors are to be satisfied at each Annual Survey that no material alterations have been made to the unit, its structural arrangements, subdivision, superstructure, fittings, and closing appliances upon which the stability calculations or the load line assignment is based.

3.3.3. Suspect Areas identified at previous surveys are to be examined. Thickness measurements are to be taken of the areas of substantial corrosion and the extent of thickness measurements is to be increased to determine areas of substantial corrosion. Appendix B, Table 4 may be used as guidance for these additional thickness measurements. These extended thickness measurements are to be carried out before the annual survey is credited as completed.

3.3.4. **All Units**

The following items are to be examined:

- Accessible hatchways, manholes and other openings.
- Machinery casings and covers, companionways, and deck houses protecting openings.
- Portlights together with deadcovers, cargo ports and similar openings in hull sides, ends, or in enclosed superstructures.
- Ventilators, tank vent pipes together with flame screens, and overboard discharges from enclosed spaces.
- Watertight bulkheads and end bulkheads of enclosed superstructures.
- Closing appliances for all the above, including hatchcovers, doors, together with their respective securing devices, dogs, sill, coamings and supports.
- Freeing ports together with bars, shutters and hinges.
- Windlass and attachment of anchor racks and anchor cables.
• Protection of the crew, guard rails, lifelines, gangways, and deck houses accommodating crew.

3.3.5. Surface-Type Units

In addition to the requirements of 3.3.4 the following items are to be examined:

The hull and deck structure around the drilling well (moon-pool) and in vicinity of any other structural changes in section, slots, steps, or openings in the deck or hull and the back-up structure in way of structural members or sponsons connecting to the hull.

3.3.6. Self-Elevating Units

In addition to the requirements of 3.3.4 the following items are to be examined:

Jack-house structures and attachments to upper hull or platform. Jacking or other elevating systems and leg guides, externally. Legs as accessible above the waterline, Plating and supporting structure in way of leg wells.

3.3.7. Column-Stabilized Units

In addition to the requirements of 3.3.4 the following items are to be examined:

Columns, diagonal and horizontal braces together with any other parts of the upper hull supporting structure as accessible above the waterline.

Note: At the 1st Annual Survey after construction, Column Stabilized and Self Elevating Units may be subject to examination of major structural components including non-destructive testing, as deemed necessary by TL. If TL deems such survey to be necessary, the extent should be agreed to by TL and the Owner or operator prior to commencement of the Survey.

3.4. Annual Survey - Machinery

3.4.1. Self-Propelled Units

A general examination of main and auxiliary engines, boilers, steering machinery, pumps, pipings, electrical installation including those in hazardous areas, and fire extinguishing systems is to be carried out.

3.4.2. Non-Self Propelled Units

A general examination of items required for classification such as auxiliary machinery, pumps, piping, electrical installation in hazardous areas and fire extinguishing systems is to be carried out.

3.4.3. Units with Propulsion-Assist or Dynamic Positioning

Propulsion-assist and dynamic positioning equipment should be surveyed on the basis of Annual Survey-Machinery in accordance with the requirements of TL.
3.5. **Annual Survey - Electrical Equipment**

A general examination of electrical machinery, the emergency sources of electrical power, the switchgear, and other electrical equipment, including operation of same is to be carried out. The operation of the emergency sources of power, including their automatic operation, is to be confirmed as far as practicable.

3.6. **Annual Survey - Shipboard Automatic and Remote Control Systems**

A general examination of the automatic and remote-control system is to be made to the Surveyor’s satisfaction. The machinery-space fire-detection and bilge water-level alarms are to be tested to confirm satisfactory operation.

3.7. **Annual Survey - Special Features**

A general examination of hazardous areas, remote shutdown arrangements, fire fighting systems where included in TL’s Rules, self-elevating systems, piping systems, and bilge systems is to be made.
4. SURVEY OF THE OUTSIDE OF UNIT’S BOTTOM AND RELATED ITEMS

4.1. Schedule

4.1.1. There is to be a minimum of two examinations of the outside of the unit’s bottom and related items during each five-year special survey period. One such examination is to be carried out in conjunction with the special survey. In all cases the interval between any two such examinations is not to exceed 36 months. For units operating in salt water for less than six (6) months each year, the survey interval may be increased by TL.

4.1.2. Consideration may be given at the discretion of TL, to any special circumstances justifying an extension of the interval.

4.1.3. Proposals for alternative means of examining the unit’s bottom and related items while afloat may be considered, provided they are in general agreement with Appendix A.

4.2. Parts to be Examined

4.2.1. Surface-type Units (ship or barge type units)

• External surfaces of the hull, keel, stem, stern frame, rudder, nozzles, and sea strainers are to be selectively cleaned to the satisfaction of the attending Surveyor and examined together with appendages, the propeller, exposed parts of stern bearing assembly, rudder pintle and gudgeon securing arrangements, sea chest and strainers, and their fastenings.

• Propeller shaft bearing, rudder bearing, and steering nozzle clearances are to be ascertained and recorded.

4.2.2. Self-Elevating Units

• External surfaces of the upper hull or platform, spud cans, mat, underwater areas of legs, together with their connections as applicable, are to be selectively cleaned to the satisfaction of the attending Surveyor and examined.

• At each Drydocking Survey or equivalent, after Special Survey No. 2, the Surveyor is to be satisfied with the condition of the internal structure of the mat or spud cans. Leg connections to mat and spud cans are to be examined at each Drydock Survey or equivalent. Non-destructive testing may be required of areas considered to be critical by TL or found to be suspect by the Surveyor.

4.2.3. Column-Stabilized Units

• External surfaces of the upper hull or platform, footings, pontoons or lower hulls, underwater areas of columns, bracing and their connections, sea chests, and propulsion units as applicable, are to be selectively cleaned and examined to the satisfaction of the attending Surveyor. Non-destructive testing may be required of areas considered to be critical by TL or found to be suspect by the Surveyor.

4.3. Ballast Spaces

In conjunction with Drydocking Surveys (or equivalent) after Special Survey No. 1 and between subsequent Special Surveys, the following ballast spaces are to be internally examined, thickness gauged, placed in satisfactory condition as found necessary, and
reported upon. If such examination reveals no visible structural defects, the examination may be limited to a verification that the corrosion prevention arrangements remain effective.

4.3.1. All Units

Particular attention is to be given to corrosion prevention systems in ballast spaces, free-flooding areas and other locations subjected to sea water from both sides.

4.3.2. Surface type units

One peak tank and at least two other representative ballast tanks between the peak bulkheads used primarily for water ballast.

4.3.3. Self elevating units

Representative ballast tanks or free-flooding compartments in mat or spud cans, if accessible, and at least two representative hull pre-load tanks.

4.3.4. Column stabilized units

Representative ballast tanks in footings, lower hulls, or free-flooding compartments as accessible, and at least two ballast tanks in columns or upper hull, if applicable.
5. PROPULSION SYSTEM SURVEYS

5.1. Schedule

Refer to the schedule in TL- R Z21 for propeller shaft surveys.

5.2. Propeller Shaft surveys and extension of survey intervals

Surveys are to be carried out in accordance with the Rules of TL, except that in the case of Mobile Offshore Drilling unit, due to low running hours on propeller shaft, extended intervals between propeller shaft surveys may be considered based on:

- Satisfactory diver's external examination of stern bearing and outboard seal area including weardown check as far as is possible.
- Internal examination of the shaft area (inboard seals) in propulsion room(s).
- Confirmation of satisfactory lubricating oil records (oil loss rate, contamination).
- Shaft seal elements are examined/replaced in accordance with seal manufacturer's recommendations.

5.3. Other propulsion systems

Other propulsion systems shall be surveyed according to the Society's Rule.
6. BOILERS SURVEYS

6.1. Schedule

Boiler Surveys are to be carried out according to the schedule found in TL- R Z18.2.

6.2. Scope

6.2.1. At each Boiler Survey the boilers, superheaters, and economizers are to be examined internally (water-steam side) and externally (fire side).

6.2.2. Boiler mountings and safety valves are to be examined at each Boiler Survey and opened as considered necessary by the Surveyor.

6.2.3. The proper operation of the safety valves is to be confirmed at each survey.

6.2.4. When considered necessary by the Surveyor, the boilers and superheaters are to be subjected to hydrostatic pressure test.
7. SURVEY PREPLANNING AND RECORD KEEPING

7.1. A specific Survey Program for Special Surveys and Special Continuous Surveys must be worked out in advance of the Special Survey by the Owner in cooperation with TL. The Survey Program shall be in written format.

7.2. Plans and procedures for survey of the outside of the unit’s bottom and related items are to be submitted for review in advance of the survey and made available on board. These should include drawings or forms for identifying the areas to be surveyed, the extent of hull cleaning, non-destructive testing locations (including NDT methods), nomenclature, and for the recording of any damage or deterioration found. Submitted data, after review by TL, will be subject to revision if found to be necessary in light of experience.
8. **OCCASIONAL SURVEYS**

8.1. **Damage Survey**

8.1.1. It is the responsibility of the Owner/operator of the unit to report to TL without delay any damage, defect or breakdown, which could invalidate the conditions for which a classification has been assigned so that it may be examined at the earliest opportunity by TL’s Surveyor(s). All repairs found necessary by the Surveyor are to be carried out to his satisfaction.

8.2. **Repairs**

8.2.1. Where repairs to hull, legs, columns or other structures, machinery or equipment, which affect or may affect classification, are planned in advance to be carried out, a complete repair procedure including the extent of proposed repair and the need for Surveyors attendance is to be submitted to and agreed upon by TL reasonably in advance. Failure to notify TL, in advance of the repairs, may result in suspension of the unit’s classification until such time as the repair is redone or evidence submitted to satisfy the Surveyor that the repair was properly carried out. This applies also to repairs during voyage or on site.

8.2.2. The above is not intended to include maintenance and overhaul to hull, other structures, machinery and equipment in accordance with recommended manufacturers procedures and established marine practice and which does not require TL approval; however, any repair as a result of such maintenance and overhauls which affects or may affect classification is to be noted in the ships log and submitted to the Surveyor.

8.3. **Lay-up and Reactivation Surveys**

8.3.1. When TL is notified by the Owner that a Unit has been laid-up, this status will be noted in the vessel’s survey status and surveys falling due during lay-up may then be held in abeyance until the vessel reactivates, at which time they are to be brought up-to-date.

8.3.2. Units which have been laid up and are returning to active service, regardless of whether TL has been previously informed that the vessel has been in lay-up, a Reactivation Survey is required. The requirements for the Reactivation Survey are to be specially considered in each case, having due regard being given to the status of surveys at the time of the commencement of lay-up, the length of the lay-up period and the conditions under which the vessel has been maintained during that period.

8.4. **Alterations**

No alterations which may affect classification are to be made to the hull or machinery of a classed unit unless plans of proposed alterations are submitted and approved by TL before the work of alterations is commenced. Such work is to be carried out in accordance with approved plans and tested on completion as required by the Rules and to the satisfaction of the Surveyor.

8.5. **Welding and Replacement of Materials**

8.5.1. Welding of steels, including high strength structural steel, is to be to the satisfaction of TL.
8.5.2. Welding or other fabrication performed on steels of special characteristics or repairs or renewals of such steel or in areas adjacent to such steel is to be accomplished with procedures approved by TL considering the special materials involved. Substitution of steels differing from those originally installed is not to be made without approval by TL.

8.5.3. TL may reference TL- G 11 - "Materials Selection Guideline for Mobile Offshore Drilling Units" when considering suitable replacement materials.
9. **PREPARATION FOR SURVEY**

9.1. **Conditions for Survey**

9.1.1. The Owner is to provide the necessary facilities for a safe execution of the survey. For confined space entry, the requirements of TL-PR37 should be followed.

9.1.2. Tanks and spaces are to be safe for access, i.e. gas freed, ventilated and illuminated.

9.1.3. In preparation for survey and thickness measurements and to allow for a thorough examination, all spaces are to be cleaned including removal from surfaces of all loose accumulated corrosion scale. Spaces are to be sufficiently clean and free from water, scale, dirt, oil residues etc. to reveal corrosion, deformation, fractures, damages, or other structural deterioration. However, those areas of structure whose renewal has already been decided by the Owner need only be cleaned and descaled to the extent necessary to determine the limits of the areas to be renewed.

9.1.4. Sufficient illumination is to be provided to reveal corrosion, deformation, fractures, damages or other structural deterioration.

9.1.5. Where soft or semi-hard coatings have been applied, safe access is to be provided for the surveyor to verify the effectiveness of the coating and to carry out an assessment of the conditions of internal structures which may include spot removal of the coating. When safe access cannot be provided, the soft or semi-hard coating is to be removed.

9.2. **Access to Structures**

9.2.1. For survey, means are to be provided to enable the surveyor to examine the hull structure in a safe and practical way.

9.2.2. For survey in void compartments and water ballast tanks, one or more of the following means for access, acceptable to the Surveyor, is to be provided:

- permanent staging and passages through structures;
- temporary staging and passages through structures;
- lifts and movable platforms;
- boats or rafts;
- other equivalent means.

9.2.3. For Surveys conducted by use of a remote inspection technique, one or more of the following means for access, acceptable to the Surveyor, is to be provided:

- Unmanned robot arm
- Remote Operated Vehicles (ROV)
- Unmanned Aerial Vehicles / Drones
- Other means acceptable to TL.
9.3. **Equipment for Survey**

9.3.1. Thickness measurement is normally to be carried out by means of ultrasonic test equipment. The accuracy of the equipment is to be proven to the Surveyor as required. Thickness measurements are to be carried out by a firm approved by TL in accordance with TL- R Z17.

9.3.2. One or more of the following fracture detection procedures may be required if deemed necessary by the Surveyor:

- radiographic equipment;
- ultrasonic equipment;
- magnetic particle equipment;
- dye penetrant.

Other acceptable NDT Techniques.

9.4. **Survey Offshore or at Anchorage**

9.4.1. Survey offshore or at anchorage may be accepted provided the Surveyor is given the necessary assistance from the personnel onboard.

9.4.2. A communication system is to be arranged between the survey party in the tank or space and the responsible officer on deck. This system must also include the personnel in charge of ballast pump handling if boats or rafts are used.

9.4.3. When boats or rafts are used, appropriate life jackets are to be available for all participants. Boats or rafts are to have satisfactory residual buoyancy and stability even if one chamber is ruptured. A safety checklist is to be provided.

9.4.4. Surveys of tanks by means of boats or rafts may only be undertaken at the sole discretion of the Surveyor, who is to take into account the safety arrangements provided, including weather forecasting and ship response in reasonable sea conditions.

See footnote*

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* Reference is made to TL- G 39 – Guidelines for use of Boats or Rafts for Close-up surveys.
Appendix A - Underwater Inspection in Lieu of Drydocking Survey

A1 General

Following are the procedures and conditions under which a properly conducted underwater inspection may be credited as equivalent to a Drydocking Survey.

A2 Conditions

A2.1 Limitations

Underwater Inspection in lieu of Drydocking Survey may not be acceptable where there is record of abnormal deterioration or damage to the underwater structure; or where damage affecting the fitness of the unit is found during the course of the survey.

A2.2 Thickness Gauging and Non-Destructive Testing

Underwater or internal thickness gaugings of suspect areas may be required in conjunction with the underwater inspection. Means for underwater non-destructive testing may also be required for fracture detection.

A2.3 Plans and Data

Plans and procedures for the Drydocking Survey (Underwater Inspection) are to be submitted for review in advance of the survey and made available on board. These should include drawings or forms for identifying the areas to be surveyed, the extent of underwater cleaning, non-destructive testing locations (including NDT methods), nomenclature, and for the recording of any damage or deterioration found.

A2.4 Underwater Conditions

The in-water visibility and the cleanliness of the hull below the waterline is to be clear enough to permit a meaningful examination which allows the surveyor and diver and/or ROV pilot to determine the condition of the plating, appendages and the welding. TL is to be satisfied with the methods of orientation of the divers/ROVs on the plating, which should make use where necessary of permanent markings on the plating at selected points. Overall or spot cleaning may be required.

A3 Physical Features

The following physical features are to be incorporated into the unit's design in order to facilitate the underwater inspection. When verified they will be noted in the unit's classification for reference at subsequent surveys.

A3.1 Stern Bearing

For self-propelled units, means are to be provided for ascertaining that the seal assembly on oil-lubricated bearings is intact and for verifying that the clearance or wear-down of the stern bearing is not excessive. For use of the wear-down gauges, up-to-date records of the base depths are to be maintained on board. Whenever the stainless-steel seal sleeve is renewed or machined, the base readings for the wear-down gauge are to be re-established and noted in the vessel's records and in the survey report.
A3.2 Rudder Bearings

For self-propelled units with rudders, means and access are to be provided for determining the condition and clearance of the rudder bearings, and for verifying that all parts of the pintle and gudgeon assemblies are intact secure. This may require bolted access plates and a measuring arrangement.

A3.3 Sea Suctions

Means are to be provided to enable the diver to confirm that the sea suction openings are clear. Hinged sea suction grids would facilitate this operation.

A3.4 Sea Valves

For the Drydocking Survey (Underwater Inspection) associated with the Special Survey, means must be provided to examine any sea valve.

A4 Procedures

A4.1 Exposed Areas

An examination of the outside of the structure above the waterline is to be carried out by TL’s Surveyor. Means and access are to be provided to enable the Surveyor to accomplish visual inspection and non-destructive testing as necessary.

A4.2 Underwater Areas

An examination of the entire unit below the waterline is to be carried out by an approved firm in accordance with TL- R Z17.

A4.3 Damage Areas

Damage areas are to be photographed. Internal examination, measurements, marking and thickness gauging of such locations may be necessary as determined by the attending Surveyor. Means are to be provided for location, orienting and identifying underwater surfaces in photographs or on video tapes.

A5 Alternatives

TL is prepared to consider alternatives to the above guidelines including remotely operated vehicles, provided means and details for accomplishing results are not less effective.

Information Note:

Appendix A would be applicable to all drilling unit types due to contents of paragraph A2.3 - Plans and Data.
### Appendix B - Minimum Requirements for Thickness Measurements for Special Survey

**TABLE 1**

<table>
<thead>
<tr>
<th>Special Survey No.1</th>
<th>Special Survey No.2</th>
<th>Special Survey No.3</th>
<th>Special Survey No.4 and subsequent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age ≤ 5</td>
<td>&lt; 5 Age ≤ 10</td>
<td>10 &lt; Age ≤ 15</td>
<td>15 &lt; Age</td>
</tr>
<tr>
<td>1) Suspect areas throughout the unit.</td>
<td>1) Suspect areas throughout the unit.</td>
<td>1) Suspect areas throughout the unit.</td>
<td>1) Suspect areas throughout the unit.</td>
</tr>
<tr>
<td>2) One transverse section of deck plating abreast the moon pool opening within the amidships 0.6L, together with internals in way as deemed necessary. Where unit is configured with side ballast tanks, the plating and internals of the tanks are also to be gauged in way of the section chosen.</td>
<td>2) Two Transverse Sections (Girth Belts) of deck, bottom and side plating abreast the moon pool and one hatch opening within the amidships 0.6L together with internals in way as deemed necessary. Where unit is configured with side ballast tanks, the plating and internals of the tanks to be gauged in way of the required belts. Remaining internals in ballast tanks to be gauged as deemed necessary.</td>
<td>2) A minimum of three Transverse Sections (Girth Belts) of deck, bottom, side, and longitudinal-bulkhead plating in way of the moon pool and other areas within the amidships 0.6L, together with internals in way (including in perimeter ballast tanks, where fitted in way of belts).</td>
<td></td>
</tr>
<tr>
<td>3) Moon pool boundary bulkhead plating.</td>
<td>3) Moon pool boundary bulkhead plating.</td>
<td>3) Moon pool boundary bulkhead plating.</td>
<td></td>
</tr>
<tr>
<td>4) Internals in forepeak tank and aft peak tank as deemed necessary.</td>
<td>4) Internals in forepeak and after peak tanks as deemed necessary.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5) Lowest strake of all transverse bulkheads in hold spaces. Remaining bulkhead plating to be gauged as deemed necessary.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6) All plates in two wind and water strakes, port and starboard, full length.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7) All exposed main deck plating full length and all exposed first-tier super-structure deck plating (poop, bridge and forecastle decks).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8) All keel plates full length plus additional bottom plating as deemed necessary by the Surveyor, particularly in way of cofferdams and machinery spaces.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9) Duct keel or pipe tunnel plating or pipe tunnel plating and internals as deemed necessary.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10) Plating of sea chests. Shell plating in way of overboard discharges as considered necessary by the attending surveyor.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**

1. Thickness measurement locations are to be selected to provide the best representative sampling of areas likely to be most exposed to corrosion, considering ballast history and arrangement and condition of protective coatings.
2. Thickness measurements of internals may be specially considered by the Surveyor if the hard protective coating is in GOOD condition.

3. For units less than 100 meters in length, the number of transverse sections required at Special Survey No. 3 may be reduced to one (1), and the number of transverse sections required at subsequent Special Surveys may be reduced to two (2).

4. For units more than 100 meters in length, at Special Survey No. 3, thickness measurements of exposed deck plating within amidship 0.5 L may be required.
**TABLE 2**

Minimum Requirements for Thickness Measurements for Self-Elevating Units at Special Survey

<table>
<thead>
<tr>
<th>Special Survey No.1</th>
<th>Special Survey No.2</th>
<th>Special Survey No.3</th>
<th>Special Survey No.4 and subsequent 15 &lt; Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age ≤ 5</td>
<td>&lt;5 Age ≤ 10</td>
<td>10 &lt; Age ≤ 15</td>
<td>15 &lt; Age</td>
</tr>
<tr>
<td>1) Suspect areas throughout the unit (particular attention to be paid to the legs in way of the Splash Zone).</td>
<td>1) Suspect areas throughout the unit.</td>
<td>1) Suspect areas throughout the unit.</td>
<td>1) Suspect areas throughout the unit.</td>
</tr>
<tr>
<td>2) Legs in way of Splash Zone.</td>
<td>2) Legs in way of Splash Zone.</td>
<td>2) Legs in way of Splash Zone.</td>
<td>2) Legs in way of Splash Zone.</td>
</tr>
<tr>
<td>3) Primary application structures where wastage is evident.</td>
<td>3) Representative gaugings, throughout, of special and primary application structures.</td>
<td>3) Comprehensive gaugings, throughout, of special and primary application structures.</td>
<td>3) Comprehensive gaugings, throughout, of special and primary application structures.</td>
</tr>
<tr>
<td>4) Representative gaugings of upper hull deck and bottom plating and internals of one preload (ballast) tank.</td>
<td>4) Leg well structure.</td>
<td>4) Leg well structure.</td>
<td>4) Leg well structure.</td>
</tr>
<tr>
<td>5) Representative gaugings of deck, bottom, and side shell plating of hull and mat.</td>
<td>5) Representative gaugings of deck, bottom, and side shell plating of hull and mat.</td>
<td>5) Representative gaugings of deck, bottom, and side shell plating of hull and mat.</td>
<td>5) Representative gaugings of deck, bottom, and side shell plating of hull and mat.</td>
</tr>
<tr>
<td>6) Representative gaugings of upper hull deck and bottom plating and internals of at least two preload (ballast) tanks.</td>
<td>6) Substructure of derrick as deemed necessary.</td>
<td>6) Substructure of derrick as deemed necessary.</td>
<td>6) Substructure of derrick as deemed necessary.</td>
</tr>
<tr>
<td>7) Representative gaugings of internals of all preload (ballast) tanks.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note:

Structural application designation (Special, Primary, Secondary) are defined in TL-G 11.
### TABLE 3

**Minimum Requirements for Thickness Measurements for Column-Stabilized Units at Special Survey**

<table>
<thead>
<tr>
<th>Special Survey No.1 Age ≤ 5</th>
<th>Special Survey No.2 &lt;5 Age ≤ 10</th>
<th>Special Survey No.3 10 &lt; Age ≤ 15</th>
<th>Special Survey No.4 and subsequent 15 &lt; Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Suspect areas throughout the unit.</td>
<td>1) Suspect areas throughout the unit.</td>
<td>1) Suspect areas throughout the unit.</td>
<td>1) Suspect areas throughout the unit.</td>
</tr>
<tr>
<td>2) Columns and bracings where wastage is evident in Splash Zone.</td>
<td>2) Representative gaugings of columns and bracings in Splash Zone together with internals in way as deemed necessary.</td>
<td>2) Representative gaugings, throughout, of special and primary application structures.</td>
<td>2) Comprehensive gaugings, throughout, of special and primary application structures.</td>
</tr>
<tr>
<td>3) Special and primary application structure where wastage is evident.</td>
<td>3) One Transverse Section (Girth Belt) of each of 2 columns and 2 bracings in Splash Zone together with internals in way as deemed necessary.</td>
<td>3) One Transverse Section (Girth Belt) of each of one-half of the columns and bracings in Splash Zone and internals in way as deemed necessary (i.e., gauge half of the unit’s columns and bracings in Splash Zone).</td>
<td></td>
</tr>
<tr>
<td>4) Lower hulls in way of mooring lines where wastage is evident.</td>
<td>4) Lower hulls in way of mooring lines where wastage is evident.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5) One Transverse Section (Girth Belt) of each lower hull between one set of columns.</td>
<td>5) One Transverse Section (Girth Belt) of each lower hull between one set of columns.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6) Representative gaugings of substructure of drilling derrick.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:**

Structural application designation (Special, Primary, Secondary) are defined in TL-G 11.
TABLE 4
Guidance for Additional Thickness Measurements in way of Substantial Corrosion

<table>
<thead>
<tr>
<th>STRUCTURAL MEMBER</th>
<th>EXTENT OF MEASUREMENT</th>
<th>PATTERN OF MEASUREMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plating</td>
<td>Suspect area and adjacent plates.</td>
<td>5 point pattern over 1 square meter.</td>
</tr>
<tr>
<td>Stiffeners</td>
<td>Suspect area.</td>
<td>3 measurements each in line across web and flange.</td>
</tr>
</tbody>
</table>
**Periodical surveys of cargo installations on ships carrying liquefied gases in bulk**

**General**

1. **Scope**

Surveys required herein are relevant to ships designed for the carriage of liquefied gases in bulk. These requirements are related to cargo installations and are additional to those already specified in TL- R Z1 and Z7.

2. **Extent and methods**

2.1 The surveys are intended to include all installations and equipment related to the carriage and handling of liquefied gases. These survey requirements do not cover fire protection, fire fighting installation, portable equipment, and personnel protection equipment.

2.2 The annual survey is preferably to be carried out during a loading or discharging operation. Access for cargo tanks or inerted hold spaces, necessitating gas-freeing/aerating will normally not be necessary unless required by the Rules of TL.

2.3 The intermediate survey required in Section Z16.4, intends to supplement the annual survey by testing cargo handling installations with related automatic control, alarm and safety systems for correct functioning. The intermediate survey is preferably to be carried out with the ship in a gas-free condition. The extent of the testing required for the intermediate survey will normally be such that the survey cannot be carried out during a loading or discharging operation.

3. **Survey intervals**

Survey intervals are to be in accordance with TL- R Z1 and Z7.

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**Note:**

1. This requirement is applied for surveys commenced on or after 1 July 2014.
2 Special Survey

2.1 General

The requirements of Section Z16.4 apply with the following additions.

2.2 Cargo containment survey

2.2.1 All cargo tanks are to be examined internally.

2.2.2 Special attention is to be given to the cargo tank and insulation in way of chocks, supports and keys. Removal of insulation may be required in order to verify the condition of the tank or the insulation itself if found necessary by the Surveyor.

Where the arrangement is such that the insulation cannot be examined, the surrounding structures of wing tanks, double bottom tanks and cofferdams are to be examined for cold spots when the cargo tanks are in the cold condition unless voyage records together with the instrumentation give sufficient evidence of the integrity of the insulation system.

2.2.3 Non-destructive testing:

2.2.3.1 Non-destructive testing is to supplement cargo tank inspection with special attention to be given to the integrity of the main structural members, tank shell and highly stressed parts, including welded connections as deemed necessary by the surveyor. However, for type C tanks, this does not mean that non-destructive testing can be dispensed with totally. The following items are, inter alia, considered as highly stressed parts:

- cargo tanks supports and anti-rolling/anti-pitching devices,
- web frames or stiffening rings,
- swash bulkhead boundaries,
- dome and stump connections to tank shell,
- foundations for pumps, towers, ladders, etc.,
- pipe connections.

2.2.3.2 For independent tanks type B, the extent of non-destructive testing shall be as given in a programme specially prepared for the cargo tank design.

2.2.4 The tightness of all cargo tanks is to be verified by an appropriate procedure. Provided that the effectiveness of the ship’s gas detection equipment has been confirmed, it will be acceptable to utilize this equipment for the tightness test of independent tanks below deck.

2.2.5 Where findings of Z16.2.2.1 to Z16.2.2.4 or an examination of the voyage records raises doubts as to the structural integrity of a cargo tank, a hydraulic or hydro-pneumatic test is to be carried out. For integral tanks and for independent tanks type A and B, the test pressure is to be in accordance with TL-R G1.10.5 or G1.10.7 as appropriate. For independent tanks type C, the test pressure is not to be less than 1.25 times the MARVS.

2.2.6 At every other special survey (i.e., 2nd, 4th, 6th, etc.), all independent cargo tanks type C are to be either:

2.2.6.1 Hydraulically or hydro-pneumatically tested to 1.25 times MARVS, followed by non-destructive testing in accordance with Z16.2.2.3.1, or
2.2.6.2 Subjected to a thorough, planned non-destructive testing. This testing is to be carried out in accordance with a programme specially prepared for the tank design. If a special programme does not exist, the following applies:

- cargo tank supports and anti-rolling/anti-pitching devices,
- stiffening rings,
- Y-connections between tank shell and a longitudinal bulkhead of bilobe tanks,
- swash bulkhead boundaries,
- dome and sump connections to the tank shell,
- foundations for pumps, towers, ladders etc.,
- pipe connections.

At least 10% of the length of the welded connections in each of the above mentioned areas is to be tested. This testing is to be carried out internally and externally as applicable.

Insulation is to be removed as necessary for the required non-destructive testing.
(The individual Societies may choose to include any one or both of the above listed two alternatives in their Rules.)

2.2.7 As far as practicable all hold spaces and hull insulation (if provided), secondary barriers and tank supporting structures are to be visually examined. The secondary barrier of all tanks is to be checked for their effectiveness by means of a pressure/vacuum test, a visual examination or another acceptable method.

2.2.8

1) For membrane and semi-membrane tanks systems, inspection and testing are to be carried out in accordance with programmes specially prepared in accordance with an approved method for the actual tank system.

2) For membrane containment systems a tightness test of the primary and secondary barrier shall be carried out in accordance with the system designers’ procedures and acceptance criteria as approved by TL. Low differential pressure tests may be used for monitoring the cargo containment system performance, but are not considered an acceptable test for the tightness of the secondary barrier.

3) For membrane containment systems with glued secondary barriers if the designer’s threshold values are exceeded, an investigation is to be carried out and additional testing such as thermographic or acoustic emissions testing should be carried out.

2.2.9 The pressure/vacuum relief valves, rupture disc and other pressure relief devices for interbarrier spaces and hold spaces are to be opened, examined, tested and readjusted as necessary, depending on their design.

2.2.10 The pressure relief valves for the cargo tanks are to be opened for examination, adjusted, function tested, and sealed. If the cargo tanks are equipped with relief valves with non-metallic membranes in the main or pilot valves, such non-metallic membranes are to be replaced. Where a proper record of continuous overhaul and retesting of individually identifiable relief valves is maintained, consideration will be given to acceptance on the basis of opening, internal examination, and testing of a representative sampling of valves, including each size and type of liquefied gas or vapor relief valve in use, provided there is logbook evidence that the remaining valves have been overhauled and tested since crediting of the previous Special Survey.
2.3 Piping systems

2.3.1 The cargo, liquid nitrogen and process piping systems, including valves, actuators, compensators, etc. are to be opened for examination as deemed necessary. Insulation is to be removed as deemed necessary to ascertain the condition of the pipes. If the visual examination raises doubt as to the integrity of the pipelines, a pressure test at 1.25 times the MARVS for the pipeline is to be carried out. After re-assembly the complete piping systems are to be tested for leaks.

2.3.2 The pressure relief valves are to be function-tested. A random selection of valves is to be opened for examination and adjusted.

2.4 Components

Cargo pumps, compressors, process pressure vessels, liquid nitrogen tanks, heat exchangers and other components, including prime movers, used in connection with cargo handling and methane boil-off burning are to be examined as required in the Rules of TL for periodical survey of machinery.

2.5 Miscellaneous

2.5.1 Systems for removal of water or cargo from interbarrier spaces and holds are to be examined and tested as deemed necessary.

2.5.2 All gas-tight bulkheads are to be inspected. The effectiveness of gas-tight shaft sealing is to be verified.

2.5.3 The following equipment is to be examined: hoses and spool pieces used for segregation of piping systems for cargo, inert gas and bilging.

2.5.4 It is to be verified that all cargo piping systems are electrically bonded to the hull.
3. **Annual Survey**

3.1 **General**

3.1.1 The log books are to be examined with regard to correct functioning of the cargo containment and cargo handling systems. The hours per day of the reliquefaction plants or the boil-off rate is to be considered.

3.1.2 All accessible gas-tight bulkhead penetrations including gas-tight shaft sealings are to be visually examined.

3.1.3 The means for accomplishing gas tightness of the wheelhouse doors and windows is to be examined. All windows and sidescuttles within the area required to be of the fixed type (non-opening) are to be examined for gas tightness. The closing devices for all air intakes and openings into accommodation spaces, service spaces, machinery spaces, control stations and approved openings in superstructures and deckhouses facing the cargo area or bow and stern loading/unloading arrangements, are to be examined.

3.2 **Cargo handling systems**

The cargo handling piping and machinery, e.g. cargo and process piping, cargo heat exchangers, vapourizers, pumps, compressors and cargo hoses are in general to be visually examined, as far as possible, during operation.

3.3 **Cargo containment venting systems**

Venting systems, including protection screens if provided, for the cargo tanks, interbarrrier spaces and hold spaces are to be visually examined externally. It is to be verified that the cargo tank relief valves are sealed and that the certificate for the relief valves opening/closing pressures is onboard.

3.4 **Instrumentation and safety systems**

3.4.1 The instrumentation of the cargo installations with regard to pressure, temperature and liquid level is to be verified in good working order by one or more of the following methods:

- Visual external examination;
- Comparing of read outs from different indicators;
- Consideration of read outs with regard to the actual cargo and/or actual conditions;
- Examination of maintenance records with reference to cargo plant instrumentation maintenance manual;
- Verification of calibration status of the measuring instruments.

3.4.2 The logbooks are to be examined for confirmation that the emergency shutdown system has been tested.

3.5 **Environmental control for cargo containment systems**

1) Inert gas/dry air installations including the means for prevention of backflow of cargo vapour to gas-safe spaces are to be verified as being in satisfactory operating condition.

2) For membrane containment systems normal operation of the nitrogen control system for insulation and interbarrier spaces shall be confirmed to the Surveyor by the Master.
3.6 Miscellaneous

3.6.1 It is to be verified that all accessible cargo piping systems are electrically bonded to the hull.

3.6.2 Arrangements for burning methane boil-off are to be visually examined as far as practicable. The instrumentation and safety systems are to be verified as being in good working order in accordance with Z16.3.4.1.

3.6.3 The relevant instruction and information material such as cargo handling plans, filling limit information, cooling down procedures, etc. are to be verified as being onboard.

3.6.4 Mechanical ventilation fans in gas dangerous spaces and zones are to be visually examined.
4. Intermediate survey

4.1 General

The requirements of Section Z16.3 apply with the following additions:

4.2 Instrumentation and safety systems

4.2.1 The instrumentation of the cargo installation with regard to pressure, temperature and liquid level is to be visually examined and to be tested by changing the pressure, temperature and level as applicable and comparing with test instruments. Simulated testing may be accepted for sensors which are not accessible or for sensors located within cargo tanks or inerted hold spaces. The testing is to include testing of alarm and safety functions.

4.2.2 The piping of the gas detection system is to be visually inspected for corrosion and damage as far as practicable. The integrity of the suction lines between suction points and analyzing units is to be verified as far as possible. Gas Detectors are to be calibrated or verified with sample gases.

4.2.3 The emergency shutdown system is to be tested, without flow in the pipe lines, to verify that the system will cause the cargo pumps and compressors to stop.

4.3 Electrical equipment

Electrical equipment in gas-dangerous spaces and zones is to be examined as far as practicable with particular respect to the following:

- Protective earthing (Spot check).
- Integrity of enclosures.
- Damage of outer sheath of cables.
- Function testing of pressurized equipment and of associated alarms.
- Testing of systems for de-energizing non-certified safe electrical equipment located in spaces protected by air-locks, such as electrical motor-rooms, cargo control rooms, etc.
- Testing of insulation resistance of circuits. Such measurements are only to be made when the ship is in a gas-free or inerted condition. Where proper records of testing are maintained consideration may be given to accepting recent readings by the ship’s crew.

Note: See also TL-G 120 Survey of electrical equipment installed in hazardous areas on tankers.

4.4 Miscellaneous

The instrumentation and safety systems for burning cargo as fuel are to be examined in accordance with the requirements of Z16.4.2.1.
Contents

1. General
2. Objective
3. Definitions
4. Application
5. Procedure for Approval and Certification
6. Certification
7. Information Regarding Alterations to the Certified Service Operating System
8. Cancellation of Approval
9. Existing Approvals

Annex 1 Special Requirements for Various Categories of Service Suppliers

Note:

1. This requirement is implemented from 1 July 2023.
1. General

1.1 To approve firms providing services, such as measurements, tests or maintenance of safety systems and equipment, TL is to apply procedures in this unified requirement and relevant Annex 1.

2. Objective

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

3. Definitions

- Manufacturer: A company that manufactures equipment required to be periodically serviced and/or maintained.

- Service Supplier (A Service Supplier or category of Service Supplier may be referred to hereafter as ‘supplier’): A person or company, not employed by TL, who at the request of an equipment manufacturer, shipyard, vessel’s owner or other 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 in making decisions affecting classification or statutory certification and services.

- Agent: A Person or Company authorised to act for or to represent a Manufacturer or approved/recognized service supplier.

- Subsidiary: A Company partly or wholly owned by a Manufacturer or approved/recognized service supplier.

- Subcontractor: A Person or Company providing services to a Manufacturer or approved/recognized service supplier, with a formal contract defining the assumption of the obligations of the service supplier.

4. Application

4.1 This procedure applies to the approval of the following categories of service suppliers:

4.1.1 Statutory services

- Firms engaged in servicing inflatable liferafts, inflatable lifejackets, hydrostatic release units, marine evacuation systems

- Firms engaged in inspections and testing of radio communication equipment

- Firms engaged in inspections and maintenance of self-contained breathing apparatus

- Firms engaged in annual performance testing of Voyage Data Recorders (VDR) and simplified Voyage Data Recorders (S-VDR)

- Firms engaged in sound pressure level measurements of public address and general alarm systems on board ships
- Firms 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

- Firms engaged in maintenance, thorough examination, operational testing, overhaul and repair of lifeboats and rescue boats, launching appliances and release gear

- Firms engaged in inspection, performance testing and maintenance of Automatic Identification Systems (AIS)

- Firms engaged in Commissioning Testing of Ballast Water Management System (BWMS)

4.1.2 Classification and/or Statutory services:

- Firms engaged in thickness measurements on ships or mobile offshore units except (1) non-ESP ships less than 500 gross tonnage and (2) all fishing vessels.

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

- Firms engaged in inspections and maintenance of fire extinguishing equipment and systems

- Firms engaged in tightness testing of closing appliances such as hatches, doors etc. with ultrasonic equipment

- Firms engaged in measurements of noise level on board ships

- Firms engaged in examination of Ro-Ro ship’s bow, stern, side and inner doors

- Firms engaged in testing of coating systems in accordance with IMO Resolution MSC.215(82), as amended, and TL-I SC223 and/or MSC.288(87), as amended.

- Firms engaged in tightness testing of primary and secondary barriers of gas carriers with membrane cargo containment systems for vessels in service

- Firms 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.

- Firms engaged in Cable Transit Seal Systems inspection on ships and Mobile Offshore Units.

4.1.3 Where TL accepts work of a third party (eg., service supplier) approved by itself, TL shall 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 shall 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 (eg., service supplier) constitutes the work of TL and shall be subject to the requirements incumbent upon TL under the RO Code IMO MSC.349 (92) and MEPC.237(65).
4.2 Where the results of the following service suppliers are used by a Surveyor of **TL** in making decisions affecting classification services then that service supplier must be approved and verified by **TL**.

- Firms engaged in thickness measurements on ships or mobile offshore units except
  (1) non-ESP ships less than 500 gross tonnage and
  (2) all fishing vessels.

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

- Firms engaged in tightness testing of closing appliances such as hatches, doors etc. with ultrasonic equipment

- Firms 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.

4.3 Where such services are used by Surveyors in making decisions affecting statutory certification and service, the firms are subject to approval and verification by **TL** where **TL** is so authorised 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 **TL** may accept approvals done by:

i. the flag Administration itself,

ii. duly authorized organizations acting on behalf of the flag Administration, or

iii. other organizations those are acceptable to the flag Administration (e.g., other governments, etc.).

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

- Firms 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

- Firms engaged in sound pressure level measurements of public address and general alarm systems on board ships

- Firms engaged in measurements of noise level onboard ships

- Firms engaged in testing of coating systems in accordance with IMO Resolution MSC.215(82) as amended and TL-I SC223 and/or MSC.288(87) as amended - Firms engaged in examination of Ro-Ro ships bow, stern, side and inner doors

4.5 Detailed requirements specific to the various categories of suppliers are given in Annex 1. National and/or international requirements may give additional requirements. References to such national and/or international requirements are given in Annex 1.
5. **Procedure for Approval and Certification**

5.1 Submission of documents

5.1.1 The following documents are to be submitted to TL for review. General requirements concerning suppliers are given in 5.2, and specific requirements as relevant, in Annex 1.

- Outline of company, e.g. organisation and management structure, including subsidiaries to be included in the approval/certification
- List of nominated agents, subsidiaries and subcontractors
- Experience of the company in the specific service area
- 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 shall be provided
- List of operators/technicians/inspectors documenting training and experience within the relevant service area, and qualifications according to recognised national, international or industry standards, as relevant
- Description of equipment used for the particular service for which approval is sought
- A guide for operators of such equipment
- Training programmes for operators/technicians/inspectors
- Check lists and record formats for recording results of the services referred to in Annex 1
- Quality Manual and/or documented procedures covering requirements in 5.5
- 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
- Evidence of approval/acceptance by other bodies, if any
- Information on the other activities which may present a conflict of interest
- Record of customer claims and of corrective actions requested by certification bodies
- Operators/technicians/inspectors documentation they have acknowledged the code of conduct

5.2 General requirements:

5.2.1 Extent of Approval – The supplier shall demonstrate, as required by 5.2.2 – 5.2.11, that it has the competence and control needed to perform the services for which approval is sought.
5.2.2 Training of personnel – The supplier is responsible for the qualification and training of its personnel to a recognised national, international or industry standard as applicable. Where such standards do not exist, the supplier is to define standards for the training and qualification of its personnel relevant to the functions each is authorised to perform. The personnel shall also have adequate experience and be familiar with the operation of any necessary equipment. Operators/technicians/inspectors shall 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.

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

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

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

5.2.6 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 shall be documented and confirmed by the service supplier. This shall be undertaken prior to initial use and reconfirmed as necessary.

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

5.2.7 Where several servicing stations are owned by a given company, each station is to be assessed and approved except as specified in 5.5.3

5.2.8 Procedures – The supplier shall have documented work procedures covering all services supplied.

5.2.9 Subcontractors – The supplier shall give information of agreements and arrangements if any parts of the services provided are subcontracted. Particular emphasis shall be given to quality management by the supplier in following-up such subcontracts. Subcontractors providing the services of the approved service supplier shall also meet the requirements of section 5.

5.2.10 Verification – The supplier shall verify that the services provided are carried out in accordance with approved procedures.

5.2.11 Reporting – The report shall be prepared in a form acceptable to TL. The report should detail the results of inspections, measurements, tests, maintenance and/or repairs carried out. Special guidelines may be given in Annex 1. The report shall include a copy of the Certificate of Approval.
5.2.12 Documented procedures and instructions should 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.

5.3 Auditing of the Supplier – Upon reviewing the submitted documents with satisfactory result, the supplier is audited in order to ascertain that the supplier is duly organised and managed in accordance with the submitted documents, and that it is considered capable of conducting the services for which approval/certification is sought.

5.4 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 by other QSCS certified Society according to the provision of this Requirement, 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 QSCS certified Society is acceptable and is sufficient to satisfy this requirement.

5.5 Quality System

5.5.1 The supplier shall 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

5.5.2 A documented Quality system complying with the most current version of ISO 9000 series and including the above items, would be considered acceptable.

5.5.3 If a manufacturer of equipment (and/or its service supplier) applies to TL for inclusion of its nominated agents and/or subsidiaries (excluding any subcontractor), in the approval, then it must have implemented a quality system certified in accordance with the most current version of ISO 9000 series. The quality system must contain effective controls of the manufacturer’s (and/or service supplier’s) agents and/or subsidiaries. The nominated agents/subsidiaries must also have in place an equally effective quality system complying with the most current version of ISO 9000 series. Such approvals shall be based upon an evaluation of the quality system implemented by the parent company against the most current version of ISO 9000 series. TL may require follow-up audits on such agents or subsidiaries against the most current version of ISO 9000 series to confirm adherence to this quality system.
5.6 Service Suppliers Relations with the Equipment Manufacturer

5.6.1 A company which works as a service station for manufacturer(s) of equipment (and as a service supplier in this field), shall be assessed by the manufacturer(s) and nominated as their agent. The manufacturer shall ensure that appropriate instruction manuals, material etc. are available for the agent as well as proper training of the agent’s technicians. Such suppliers shall be approved either on a case by case basis, or in accordance with 5.5.3.

6. Certification

6.1 Upon satisfactory completion of both the audit of the supplier and the demonstration test, as applicable, TL may issue a Certificate of Approval stating that the 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 TL’s Surveyors in making decisions affecting classification or statutory certification, as relevant. The Certificate shall 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 supplier may also be included in the Society’s record of approved service suppliers.

6.2 Renewal or endorsement of the Certificate is to be made at intervals not exceeding five (5) 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, TL is to be informed in due course by the Service Supplier. TL may require renewal or endorsement of the Certificate at intervals shorter than five (5) years and may require intermediate audits. For firms engaged in thickness measurements, renewal/endorsement of the Certificate is to be made at intervals not exceeding 3 years by verification that original conditions are maintained.

7. Information Regarding Alterations to the Certified Service Operating System

7.1 When any alteration to the certified service operating system of the supplier is made, such alteration is to be immediately informed to TL. Re-audit may be required when deemed necessary by TL.

8. Cancellation of Approval

8.1 TL reserves the right to cancel the approval a (For Firms engaged in thickness measurements refer to TL-PR23).

8.2 Approval may be cancelled in the following cases:

8.2.1 Where the service was improperly carried out or the results were improperly reported.

8.2.2 Where a Surveyor finds deficiencies in the approval service operating system of the supplier and appropriate corrective action is not taken.

8.2.3 Where alterations have been made to the Company’s Quality System relevant to the service supplier certificates, without written notification to TL.

8.2.4 Where the intermediate audit, if requested as per 6.2, has not been carried out.

8.2.5 Where wilful acts or omissions are ascertained.

8.2.6 Where any deliberate misrepresentation has been made by the Service Supplier.
8.3 A supplier whose approval was cancelled, may apply for re-approval provided it has corrected the non-conformities which resulted in cancellation, and TL is able to confirm it has effectively implemented the corrective action.

8.4 Expiration or cancellation of the Supplier’s parent company approval automatically invalidates approval of all agents and subsidiaries if these are certified according to 5.5.3.

9. Existing Approvals

Approvals for the categories of service suppliers granted before the date of implementation of TL-R Z17 by TL may remain valid as stated in the respective certificates for a period up to but not exceeding 3 years. Renewals of such certificates must be carried out in accordance with TL-R Z17.
ANNEX 1

Special Requirements for Various Categories of Service Suppliers

1. Firms engaged in thickness measurements on ships or mobile offshore units

1.1 Extent of engagement – Thickness measurement of structural material of ships or mobile offshore units except
   (1) non-ESP ships less than 500 gross tonnage and
   (2) all fishing vessels.

1.2 Supervisor – The responsible supervisor shall be qualified according to a recognised national or international industrial NDT standard (e.g. EN 473 level II as amended or ISO 9712 level II as amended).

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

1.4 Equipment – On coated surfaces, instruments using pulsed echo technique (either with 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 – 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.


1.7 Verification – The supplier must have the Surveyor’s verification of each separate job, documented in the report by the attending Surveyor(s) signature.

2. Firms engaged in tightness testing of closing appliances such as hatches, doors etc. with ultrasonic equipment

2.1 Extent of engagement – Ultrasonic tightness testing of closing appliances such as hatches, doors etc.

2.2 Operators – The operator is to have the following qualifications:
   - Have knowledge of different closing appliances such as hatches, doors etc. including their design, functioning and sealing features
   - Have experience with the operation and maintenance of different closing appliances such as hatches, doors etc.
   - Be able to document theoretical and practical training onboard in using the ultrasonic equipment specified

2.3 It shall be demonstrated to the Surveyor that the ultrasonic equipment is fit for the purpose of detecting leakages in closing appliances.
2.4 Procedures – The supplier shall have documented work procedures which shall include the manual for the ultrasonic equipment specified, its adjustment, its maintenance, its operation and approval criteria.

3. Firms carrying out an in-water survey on ships and mobile offshore units by diver or Remotely Operated Vehicle (ROV).

3.1 Extent of engagement – In-water survey in lieu of a docking survey and/or the internal hull survey of compartments filled with water on ships and mobile offshore units by diver or Remotely Operated Vehicle (ROV).

3.2 Training of personnel – The 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 utilised when carrying out inspection. Knowledge of the following shall be documented:

- Ship’s underwater structure and appendages, propeller shaft, propeller, rudder and its bearings, etc.
- Non-destructive testing in accordance with a recognised 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 firm 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.

3.3 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, the recognition of corrosion damage, buckling and deteriorated coatings, etc. shall be included.

3.4 Supervisor

3.4.1 Diving Supervisor – Diving supervisor shall be qualified according to the supplier’s general requirements and shall have a minimum of two years’ experience as a diver carrying out inspection.

3.4.2 ROV Supervisor – ROV supervisor shall have a minimum of two (2) years of experience conducting inspections with ROVs.

3.5 Diver and Operators

3.5.1 Divers carrying out inspection – The diver carrying out the inspection shall have had at least one year’s experience as an assistant diver carrying out inspections (including participation in a minimum of 10 different assignments).
3.5.2 ROV operators- ROV operators shall have at least one year of experience working with ROVs conducting inspections on vessels.

3.6 Equipment

3.6.1 The following shall be available:

- Closed circuit colour 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

3.6.2 In addition to above 3.6.1, the following shall be available for firms carrying out survey by ROV:

- Remotely Operated Vehicle (ROV)
- Adequate controls or programming for the ROV functions required

3.7 Procedures and guidelines

3.7.1 The supplier shall have documented operational procedures and guidelines for how to carry out the inspection and how to handle the equipment. These shall 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

3.7.2 In addition to above 3.7.1, documented operational procedures and guidelines for firms carrying out in-water survey by ROV shall also include:

- Guidance for the operation and maintenance of the Remotely Operated Vehicle, if applicable
- Methods and equipment to ensure the ROV operator can determine the ROV’s location and orientation in relation to the vessel.

3.8 Verification – The supplier must have the Surveyor’s verification of each separate job, documented in the report by the attending Surveyor(s) signature.
4. Firms engaged in inspection and maintenance of fire extinguishing equipment and systems

4.1 Extent of engagement – 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

- 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

- 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

- For fixed fire-extinguishing systems, Service Suppliers are to demonstrate an understanding of the principles involved with gas, foam, deluge, sprinkler and water-mist systems, as relevant for the approval being sought

4.3 Procedures

- 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 should be appended to the equipment/system)

4.4 Reference Documents - The Service Supplier is to have access to the following documents:

- Manufacturer’s servicing manuals, servicing bulletins, instructions and training manuals, as appropriate

- 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

- 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

4.5 Equipment and Facilities

4.5.1 General Requirements

- If Service Suppliers undertake shore-based inspecting and maintenance, they should 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 onboard are to provide the appropriate facilities to either complete the work onboard or remove the necessary items to their workshops.

4.5.2 Equipment

Sufficient and appropriate spares and tools are to be available as applicable, which should 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 Manufacturer
- Level measuring equipment for bottles
- Recharging facilities for pressurized bottles, extinguishers and cartridges
5. Firms engaged in servicing inflatable liferafts, inflatable lifejackets, hydrostatic release units, marine evacuation systems

5.1 Extent of engagement

- Servicing of inflatable liferafts, inflatable lifejackets, hydrostatic release units

- Servicing of marine evacuation systems

5.2 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 shall be observed as relevant. Where inflatable liferafts are subject to extended service intervals, MSC.1/Circ.1328 should also be followed.

5.3 Procedures and instructions – The supplier shall have documented procedures and instructions for how to carry out service of equipment. 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 should be followed in addition to Resolution A.761(18) as amended by MSC.55(66) and by MSC.388(94).

5.4 The supplier shall provide evidence that it has been authorised or licensed to service the particular makes and models of equipment for which approval is sought by the equipment's manufacturer.

5.5 Reference Documents - 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
6. Firms engaged in inspections and testing of radio communication equipment

6.1 Extent of engagement

- Surveys, inspection, testing, and/or measurement of radio equipment aboard ships or mobile offshore units for compliance with SOLAS regulations

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

- The principles of this section 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

6.2 Reference documents – The supplier shall have access to the following documents:

- SOLAS 1974 as amended


- MSC.1/Circ.1040/Rev.2 – 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

- Relevant parts, if any, of the Society’s Rules and Guidelines

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

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

6.5.1 The supplier shall have the major and auxiliary equipment required for correctly performing the inspection. A record of the equipment used shall be kept. The record shall contain information on manufacturer and type of equipment, and a log of maintenance and calibrations.

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

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

6.6 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)

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

7. Firms engaged in inspections and maintenance of self contained breathing apparatus

7.1 Extent of Engagement - inspections and maintenance of self-contained breathing apparatus, Emergency Escape Breathing Devices (EEBD)

7.2 Extent of Approval

- The supplier shall 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 to identify standards and to make the necessary evaluation of the condition of the equipment

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

- Additionally, Service Suppliers are to demonstrate the necessary safety requirements applicable to such equipment
7.3 Procedures

- 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

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

7.4 Reference Documents - 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

7.5 Equipment and Facilities

7.5.1 General Requirements

- If Service Suppliers undertake shore-based inspecting and maintenance, they should 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 onboard are to provide the appropriate facilities to either complete the work onboard or remove the necessary items to their workshops

7.5.2 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. Firms engaged in examination of Ro-Ro ships bow, stern, side and inner doors

8.1 Extent of engagement - 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.

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

8.3 Supervision - In addition to 5.2.3, the requirement to have had a minimum of two years experience as operator/technician/inspector within the activity, a Supervisor is to have a minimum two years related education from a technical school.

8.4 Training of personnel - Operators carrying out Non-Destructive Test (NDT) are to be qualified to a recognised National or International Standard for the methods used.

8.5 Reference documents - The supplier shall have access 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
- TL-R Z24 - Survey Requirements for Shell and Inner Doors of Ro-Ro ships, or its equivalent, by the relevant class society

8.6 Required Equipment

8.6.1 For 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)

8.6.2 For Tightness Testing:
- Ultrasonic leak detector or equivalent

8.6.3 For Inspection of Hydraulic Operating System:
- Pressure gauges
- Particle counter for analysing the quality of hydraulic fluid

8.6.4 For Inspection of Electric Control System and Indication System:
- Digital multi-meter
- Earth fault detector

8.7 Procedures and Instructions

8.7.1 The supplier shall have access to drawings and documents, including the Operating and Inspection Manual.
8.7.2 The supplier shall have access to the service history of the doors.
8.7.3 The supplier should use, complete and sign a checklist which has been found acceptable by TL.

9. **Firms engaged in annual performance testing of Voyage Data Recorders (VDR) and simplified Voyage Data Recorders (S-VDR)**

9.1 Extent of engagement – 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.

9.2 Extent of Approval

9.2.1 The supplier shall provide evidence that he has been authorised or licensed by the equipment’s manufacturer to service the particular makes and models of equipment for which approval is sought.

9.2.2 Where the Service Supplier is also the Manufacturer of the Voyage Data Recorder (VDR) or 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 apply:

- 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

9.3 Procedures

9.3.1 The Service Supplier shall have documented procedures and instructions.

9.3.2 Where the Service Supplier is also the Manufacturer of the Voyage Data Recorder (VDR) or 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 following is to apply:

- The Manufacturer is to have documented procedures for the assessment and authorisation of Manufacturer’s Authorised Service Stations who carry out annual performance testing
- The Manufacturer is to have documented procedures for the review of Manufacturer’s Authorised Service Stations annual performance test reports, analysis of the Voyage
Data Recorder (VDR) and Simplified Voyage Data Recorder (S-VDR) 12 hour log and the issue of annual performance test certificates to the Owner/Operator

- The Manufacturer is to maintain a list of Manufacturer’s Authorised Service Stations that can be accessed (by any available means, e.g. via a nominated contact point or from the Manufacturer’s website) upon request

9.4 Reference Documents

9.4.1 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) - (11 December 2006)

- IMO - Resolution A.861(20) (adopted on 27 November 1997) as amended by IMO Res. MSC.214(81) and revised by IMO Res. MSC.333(90) - Performance Standards for Shipborne Voyage Data Recorders (VDRs), as amended by MSC.494(104)

- 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) and IMO Resolution MSC.493(104)

9.4.2 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 (S-VDR) – Performance requirements, method of testing and required test results

9.4.3 The Service Supplier is also to have access to any documentation specified in the authorisation or license from the equipment manufacturer.

9.5 Equipment and Facilities - In addition, the Service Supplier shall have equipment as specified in the authorisation or license from the equipment Manufacturer.

9.6 Reporting - Test Report

9.6.1 The Service Supplier shall issue a certificate of compliance as specified in the International Convention on Safety of Life at Sea (SOLAS 1974), as amended, Ch V, Reg 18.8.

9.6.2 Annual Performance Test of VDR and S-VDR should 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.

9.6.3 Where the Service Supplier is also the Manufacturer of the Voyage Data Recorder (VDR) or Simplified Voyage Data Recorder (S-VDR) and has selected to apply IMO -
9.6.4 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’s 12 hour log
- Checking of the master record/database for the recorder

9.6.4. Issue of the annual performance test certificate to the Owner/Operator within 45 days of completion of the annual performance test.

10. Firms 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

10.1 Extent of engagement – Luminance measurements on board ships of low location lighting systems using photo luminescent materials.

10.2 Operators – The operator is to have the following qualifications:
- 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)
- Be able to document theoretical and practical training onboard in using equipment specified

10.3 Equipment – The measuring instrument shall 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/m² to 10 cd/m².

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

10.5 Reporting – The report shall conform to Annex C of ISO 15370-2010.

10.6 Verification – The supplier must have the Surveyor’s verification of each separate job, documented in the report by the attending Surveyor’s signature.

10.7 Reference Documents

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), Ch 11 – Low-location lighting systems
11. Firms engaged in sound pressure level measurements of public address and general alarm systems on board ships

11.1 Extent of engagement – Sound pressure level measurements of public address and general alarm systems on board ships.

11.2 Operators – The operator is to have the following qualifications:

- 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)
- Be able to document theoretical and practical training onboard in using equipment specified

11.3 Equipment – The measuring instrument shall be an integrating sound level meter with frequency analyser capabilities complying with IEC (International Electrotechnical Commission) 60651 and 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 shall be of the random incidence type, complying with IEC 60651.

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

11.5 Reporting – The report shall 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. The report shall conform to any other specific requirement of TL.

11.6 Verification – The supplier must have the Surveyor’s verification of each separate job, documented in the report by his signature.

11.7 Reference documents

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

12. Firms engaged in testing of coating systems in accordance with IMO Resolution MSC.215(82) as amended and TL-I SC223 and/or MSC.288(87) as amended

12.1 Laboratories

12.1.1 Extent of Engagement - Testing of coatings systems according to IMO Resolution MSC.215(82), as corrected by IMO MSC.1/Circ.1381 and amended by IMO Resolution 341(91) and TL-I SC223 and/or MSC.288(87), as corrected by IMO MSC.1/Circ.1381 and amended by IMO Resolution 341(91).

12.1.2 The laboratory is to provide to TL the following information:

- A detailed list of the Laboratory test equipment for the coating approval according to the IMO Resolution MSC.215(82) as amended and/or MSC.288(87) as amended.

- A detailed list of reference documents comprising a minimum those referred to in IMO Resolution MSC.215(82) as amended and/or MSC.288(87) as amended for the coating approval.

- Details of test panel preparation, procedure of test panel identification, coating application, test procedures and a sample test report.

- Details of exposure method and site for weathering primed test panels.

- A sample daily or weekly log/form for recording test conditions and observations including unforeseen interruption of the exposure cycle with corrective actions.

- Details of any sub-contracting agreements (if applicable).

- Comparison test report with an approved coating system or laboratory if available.

12.1.3 Reporting – Reference is made to the following TL-Gs:


- TL-G 102: Model Report for IMO Resolution MSC.215(82) Annex 1 “Test Procedures for Coating Qualification”, Section 1.7 – Crossover Test

12.1.4 Audit of the test laboratory is to be based on this procedure and the standards listed in the IMO Resolution MSC.215(82) as amended and/or MSC.288(87) as amended for the coating approval.
13. Firms engaged in maintenance, thorough examination, operational testing, overhaul and repair of lifeboats and rescue boats, launching appliances and release gear

13.1 Extent of engagement – Maintenance, thorough examination, operational testing, overhaul and repair of:

.1 lifeboats (including free-fall lifeboats), all rescue boats (including inflated rescue boats and fast rescue boats); and

.2 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.

13.2 Extent of Approval

13.2.1 The contents of this procedure apply equally to manufacturers or ship’s operator when they are acting as Service Suppliers.

13.2.2 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 shall 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 shall 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 shall be based on the paragraph 13.3 for each make and type of equipment for which service is to be provided; and,

- compliance with provisions of paragraphs 13.4, 13.5 and 13.6

13.2.3 In cases where an equipment manufacturer is no longer in business or no longer provides technical support, 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 an approved service supplier.

13.3 Certification of Personnel

13.3.1 Personnel for the work specified in 13.1 shall 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.

13.3.2 The education for initial certification of personnel should 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.

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

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

13.3.5 Upon completion of training and competency assessment, a certificate shall 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 shall clearly be written on the certificate and shall be three years from the date of issue. The validity of any certificate shall be suspended in the event of any shortfall in performance and only revalidated after a further competency assessment.

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

13.4 Reference Documents - 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

13.5 Equipment and Facilities - 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

13.6 Reporting - The report shall 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 should be promptly issued by the Service Supplier that conducted the work. A copy of valid documents of certification and authorization as appropriate shall be included with the statement.

14. Firms engaged in measurements of Noise level Onboard Ships

14.1 Extent of engagement

Sound pressure level measurements onboard Ship.

14.2 Supervisor

The supervisor shall have a minimum of 2 years of experience as an operator in sound pressure level measurements.

14.3 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 onboard Ships, as amended.)

- At least 1 year’s 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 onboard Ships

- Be able to document theoretical and practical training onboard in using a sound level meter
14.4 Equipment

14.4.1 Sound level meters

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

14.4.2 Octave filter set

When used alone, or in conjunction with a sound level meter, as appropriate, an octave filter set shall conform to IEC 61260 (1995)\(^3\), as amended, or an equivalent standard acceptable to the Administration.

14.4.3 Sound Calibrator

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

14.4.4 Calibration

Sound Calibrator and sound level meter shall 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. A record with a complete description of the equipment used shall be kept, including a calibration log.

14.4.5 Microphone wind screen

A microphone wind screen shall 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 should not affect the measurement level of similar sounds by more than 0.5 dB(A) in "no wind" conditions.

14.5 Procedures and instructions

14.5.1 The supplier shall 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.

Foot Notes:

1 Recommendation for sound level meters.

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

3 Octave-band and fractional-octave-band filters
14.5.2 The supplier shall 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
- The Society’s Rules and Guidelines

14.6 Reporting

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

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

14.7 Verification

The supplier must have the Surveyor’s verification of each separate job, documented in the report by his signature.

15. Firms engaged in tightness testing of primary and secondary barriers of gas carriers with membrane cargo containment systems for vessels in service

15.1 Extent of engagement

Firms carrying out the following:

- Global Vacuum Testing of Primary and Secondary Barriers
- Acoustic Emission (AE) Testing
- Thermographic Testing

15.2 Requirements for firms engaged in global testing of primary and secondary barriers

15.2.1 Testing Procedures – Testing is to be carried out in accordance with cargo containment system designer’s procedures as approved by TL.

15.2.2 Authorization – The supplier is to be authorized by the system designer to carry out the testing.

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

15.2.4 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

15.3 Requirements for firms engaged in acoustic emission (AE) testing

15.3.1 Testing procedures – The 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: The differential pressure during testing should not exceed the containment system designer’s limitations.

15.3.2 Supervisor – The responsible supervisor shall 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.

15.3.3 Operators – The operators carrying out the acoustic emission (AE) testing shall 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 shall have adequate knowledge of ship structures sufficient to determine sensor placement.

15.3.4 Equipment – Equipment is to be maintained and calibrated in accordance with recognized national or international industrial standards or equipment manufacturer’s recommendations.

15.3.5 Evaluation of acoustic emission (AE) testing – Must 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.

15.3.6 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

15.4 Requirements for firms engaged in thermographic testing

15.4.1 Testing Procedures – Testing is to be carried out in accordance with the cargo containment system designer’s procedures as approved by TL.

15.4.2 Authorization – The supplier is to be authorized by the system designer to carry out the testing.
15.4.3 Supervisor – The responsible supervisor shall be certified to a recognised 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 must provide evidence that training on Level II or above has been administered by an independent training body centrally certified to ASNT or a comparable nationally recognized certification scheme.

15.4.4 Operators – The operators carrying out the imaging shall 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 shall 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 must provide evidence that training on Level I or above has been administered by an independent training body centrally certified to ASNT or a comparable nationally recognized certification scheme.

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

15.4.6 Evaluation of thermographic images – Must 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 must provide evidence that training on Level II or above has been administered by an independent training body centrally certified to ASNT or a comparable nationally recognized certification scheme.

15.4.7 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
16. Firms 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.

16.1 Definitions:

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

- 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 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 TL.

16.2 Extent of engagement – Close-up Survey of ships’ structure and mobile offshore units’ structure by remote inspection techniques. For in-water close-up survey of the internal compartments by Remotely Operated Vehicle (ROV), suppliers are also to hold separate approval as a “Firm carrying out an in-water survey on ships and mobile offshore units by diver or Remotely Operated Vehicle (ROV)” (see Annex 1, Section 3).

16.3 Training and qualification of operators – The 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 TL.

Knowledge of the following shall be documented:

- Marine and/or offshore nomenclatures.

- The structural configuration of relevant ships 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 a UAV.

- Thickness measurement (TM) and non-destructive test (NDT) in accordance with a recognised National or International Industrial NDT Standard when these are part of the service. Suppliers undertaking TMs are to hold separate approval as a ‘Firm engaged in thickness measurements on ships’ (see Annex 1, Section 1).

16.4 Training Plan – the supplier is to maintain a documented training plan for personnel. The plan shall 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.
16.5 Supervisor – The supervisor shall be certified according to the recognized national requirements or an equivalent industrial standard (e.g. XXX Level) and shall have a minimum of two years’ experience in the inspection of ship’s and/or MOU’s structure.

16.6 Operators – The operator carrying out the inspection shall 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 inspections of ship’s and/or MOU’s structure (including participation in a minimum of five different assignments). The operators of those RIT which require, according to the international and national legislations, to be licensed for their use shall hold valid documentation issued by the appropriate Bodies (e.g. UAV Pilots are to be qualified and licensed in accordance with applicable national requirements).

16.7 Equipment – The following shall 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 inspection 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).

16.8 Procedures and guidelines – The supplier shall 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 shall include:

- Requirements for preparation of inspection plans when UAV are part of the equipment flight plans shall 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.

16.9 Documentation and records - The supplier shall 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.

16.10 Verification – The supplier must have the Surveyor's verification of each separate job, documented in the report by the attending Surveyor(s) signature.

17. Firms engaged in Watertight Cable Transit Seal Systems Inspection on Ships and Mobile Offshore Units.

17.1 Extent of engagement

17.1.1 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).

17.2 Extent of Approval

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

17.2.2 Any Service Supplier engaged in the inspections of watertight cable transit seal systems shall 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 shall 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 shall be based on the paragraph 17.3 for each make and type of equipment for which inspection is to be provided, and

- compliance with provisions of paragraphs 17.4, 17.5 and 17.6.

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

17.3 Qualifications and Training of Personnel

17.3.1 Personnel for the work specified in 17.1.1 shall be trained and qualified in the inspection for which they are authorised, for each make and type of equipment for which they provide the inspection.

17.3.2 The education for initial certification of personnel shall 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.

17.3.3 The education and training for the personnel shall 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 shall include disassembly, reassembly and adjustment of the equipment. Classroom training shall be supplemented by field experience in the inspections for which certification is sought, under the supervision of an experienced senior certified person.

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

17.3.5 The Service Supplier shall require refresher training as appropriate to renew the certification.

17.4 Reference Documents - The Service Supplier is to have access to the following documents:

- Manufacturer's servicing manuals, servicing bulletins, instructions and training manuals as appropriate.

- Type Approval certificate showing any conditions that may be appropriate during the installation or maintenance of the watertight cable transit seal system.
17.5 Equipment and Facilities - 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.

17.6 Reporting
- 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.

18. Firms engaged in Commissioning Testing of Ballast Water Management Systems (BWMS)


18.2 Procedure

18.2.1 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

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

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

18.3 Operators – 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, as may be amended - ‘Guidance for the 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 should 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 should 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 shall 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 shall 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.

Foot Notes:

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

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

(3) the points above without symbol are the common qualifications for service supplier.
18.4 Equipment and facilities

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

Testing should be conducted using indicative analysis equipment accepted TL. Information and reference to the acceptance documents for the equipment used should be submitted to TL 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 TL, the following information is to be submitted to TL.

- 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 shall be available. The manuals shall include, at least, clear guidance for the proper storage, handling, operation, maintenance, repair, and calibration.

**Note:** 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 shall 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 should be properly stored or transported to avoid damage and disturbance to calibrations, etc. when transporting from the Service Suppliers facilities to the vessels.

18.5 Sampling and Analysis

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 shall follow the IMO's 'Guidelines for Ballast Water Sampling (G2)'.

The representative samples shall 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 shall 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 shall have equipment certified for use in such spaces.

18.6 Reporting

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 TL. The report, as a minimum, will contain the following:

- Manufacturer's name
- Model name
- BWMS Technology limiting operating conditions and system design limitations
- BWMS treatment mode of operation, e.g., high power, low power, single pass, IMO mode, USCG Mode, 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.
- Type Approval issued by and Certificate No
- Results of Sample analysis
- Pump and ballast tanks used for the commissioning test, including the flow rates and volumes of the ballasting and deballasting operations
- Comments/Options: Filter and other major components, Process measurements.

18.7 Reference Documents

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/Rev.1 - 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)
TL-R Z18 Survey of Machinery

1. General Requirements

1.1 Special Surveys
1.2 Annual Surveys
1.3 Continuous Surveys
1.4 Surveys of Commercial Vessels Supporting Military Use
1.5 Planned Maintenance Scheme
1.6 Condition Monitoring / Condition Based Maintenance

2. Survey of Steam Boilers

3. Propulsion Steam Turbines: Modification of First Special Survey

4. Machinery Verification Runs

5. Survey of towing winch emergency release systems subject to TL-R M79

Note:

1. This requirement is applied on surveys commenced on or after 1 July 2021.
1. General Requirements

1.1 Special Surveys

1.1.1 Special Surveys are to be carried out at 5 years intervals to renew the Class Certificate.

1.1.2 The first Special Survey is to be completed within 5 years from the date of the initial classification survey and thereafter 5 years from the credited date of the previous Special Survey. However, an extension of class of 3 months maximum beyond the 5th year can be granted in exceptional circumstances. In this case, the next period of class will start from the expiry date of the Special Survey before the extension was granted.

1.1.3 For surveys completed within 3 months before the expiry date of the Special Survey, the next period of class will start from the expiry date of the Special Survey. For surveys completed more than 3 months before the expiry date of the Special Survey, the period of class will start from the survey completion date. In cases where the vessel has been laid up or has been out of service for a considerable period because of a major repair or modification and the owner elects to only carry out the overdue surveys, the next period of class will start from the expiry date of the special survey. If the owner elects to carry out the next due special survey, the period of class will start from the survey completion date.

1.1.4 The Special Survey may be commenced at the 4th Annual Survey and be progressed with a view to completion by the 5th anniversary date. When the Special Survey is commenced prior to the 4th Annual Survey, the entire survey is to be completed within 15 months if such work is to be credited to the Special Survey.

1.2 Annual Surveys

Annual Surveys are to be held within 3 months before or after each anniversary date of the date of the initial classification survey or the completion of the last Special Survey. They will normally be performed at the same time as an Annual Hull or Load Line survey.

1.3 Continuous Surveys

Special Surveys of machinery may be carried out on a continuous survey basis. In this case, the interval between consecutive examinations of each item is not to exceed five (5) years.

1.4 Surveys of Commercial Vessels Supporting Military Use

Special consideration may be given in application of relevant sections of this Unified Requirement to commercial vessels owned or chartered by Governments, which are utilized in support of military operations or service.

1.5 Planned Maintenance Scheme (PMS)

Surveys of machinery may be carried out on a PMS basis (Reference to the TL-R Z20).

1.6 Condition Monitoring (CM) and Condition Based Maintenance (CBM)

Surveys of machinery may be carried out on a CM / CBM basis (Reference to the TL-R Z27).

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1 Some Societies use the term “Special Periodical Survey”, others the term “Class Renewal Survey” instead of the terms “Special Survey”.
2. **Survey of Steam Boilers**

2.1 Water tube boilers used for main propulsion, including reheat boilers, all other boilers of essential service, and boilers of non-essential service having working pressure exceeding 0.35 N/mm² (3.5 bar) and a heating surface exceeding 4.5 m², are to be surveyed internally. There is to be a minimum of two internal examinations during each 5-year special survey period. In all cases the interval between any two such examinations is not to exceed 36 months. An extension of examination of the boiler of up to 3 months beyond the due date can be granted in exceptional circumstances². (See 2.3)

At each survey, the boilers, superheaters, and economizers are to be examined internally on water-steam side and fire side. Boiler mountings and safety valves are to be examined at each survey and opened out as considered necessary by TL.

When direct visual internal inspection is not feasible due to the limited size of the internal spaces, such as for small boilers and/or narrow internal spaces, this may be replaced by a hydrostatic pressure test or by alternative verifications as determined by TL.

The adjustment of the safety valves is to be verified during each boiler internal survey. Boiler safety valve and its relieving gear are to be examined and tested to verify satisfactory operation. However, for exhaust gas heated economizers, if steam cannot be raised at port, the safety valves may be set by the Chief Engineer at sea, and the results recorded in the log book for review by TL.

Review of the following records since the last Boiler Survey is to be carried out as part of the survey:

- Operation
- Maintenance
- Repair history
- Feedwater chemistry

2.2 External survey of boilers including test of safety and protective devices, and test of safety valve using its relieving gear, is to be carried out annually, within the window of the Annual Survey of a ship. For exhaust gas heated economizers, the safety valves are to be tested by the Chief Engineer at sea within the annual survey window. This test is to be recorded in the log book for review by the attending Surveyor prior to crediting the Annual Survey of Machinery.

2.3 An extension may be granted by TL, on the basis of Para. 2.1, after the following is satisfactorily carried out:

i) External examination of the boiler

ii) Boiler safety valve relieving gear (easing gear) is to be examined and operationally tested

² "Exceptional circumstances" means unavailability of repair facilities, unavailability of essential materials, equipment or spare parts, or delays incurred by action taken to avoid severe weather conditions.
iii) Boiler protective devices operationally tested

iv) Review of the following records since the last Boiler Survey:
   • Operation
   • Maintenance
   • Repair history
   • Feedwater chemistry

2.4 Exhaust Gas Heated Economizers

In addition to the other requirements of 2.1 (internal examination) in exhaust gas heated economizers of the shell type, all accessible welded joints are to be subjected to a visual examination for cracking. Nondestructive Testing may be required for this purpose.

3. Propulsion Steam Turbines: Modification of First Special Survey

3.1 Where the propulsion steam turbines are of a well known type, and fitted with rotor position indicators and vibration indicators of an approved type, as well as measuring equipment of steam pressure at proper locations along the steam flow, and the arrangements for change over in case of emergency operation of the plant are readily operable, the first Special Survey may be limited to the examination of rotor bearings, thrust bearings and flexible couplings, provided the surveyor has been satisfied from operation service records and power trials subsequent to the survey, that the turbine plant is in good working condition.

3.2 Turbine casings should be opened at the next Special Survey and subsequent Special Surveys.

4. Machinery Verification Runs

4.1 As part of the Special Survey of Machinery, a dock trial is to be carried out to attending Surveyors’ satisfaction to confirm satisfactory operation of main and auxiliary machinery. If significant repairs are carried out to main or auxiliary machinery or steering gear, consideration should be given to a sea trial to attending Surveyors’ satisfaction.

4.2 If the significant repairs as stated in 4.1, is considered by classification society to have any impact on response characteristics of the propulsion systems, then the scope of sea trial shall also include a test plan for astern response characteristics based on those required for such an equipment or systems when fitted to the new ship. Refer to TL-R M25 for astern testing requirements.

The tests are to demonstrate the satisfactory operation of the equipment or system under realistic service conditions at least over the manoeuvring range of the propulsion plant, for both ahead and astern directions.

Depending on the actual extent of the repair, TL may accept a reduction of the test plan.
5. Survey of towing winch emergency release systems subject to TL-R M79

5.1 Annual Survey

5.1.1 Operation of the towing winch emergency release system is to be confirmed with the reference to the documented instructions for surveys provided by the manufacturer. Operation of the winch emergency release system under no load condition is to be verified. Where practical, activation of the emergency release system may be confirmed by observation of the winch brake.

5.1.2 The function of the alarms associated with the emergency release system is to be verified, as far as practicable and reasonable.

5.1.3 The condition of the emergency release system is to be visually examined to confirm it remains in satisfactory condition.

5.1.4 The means of emergency release of the towline in the event of a blackout is to be examined, and where additional sources of energy are arranged for this purpose, the sources of energy are to be visually inspected and operationally tested.

5.1.5 It is to be verified that the performance capabilities and operating instructions of the emergency release system are documented and made available on board the ship on which the winch has been installed.

5.2 Special survey

5.2.1 The Annual Survey requirements are to be carried out, with the additional instructions for special survey provided by the manufacturer, as appropriate, being followed.

5.2.2 The full functionality of the emergency release system is to be tested to the satisfaction of the surveyor. Testing may be conducted either during a bollard pull test or by applying the load against a strong point on the deck of the tug or the shore that is certified to the appropriate load.

5.2.3 The emergency release system is to be tested at a towline load that is equal to the lesser of 30% of the maximum design load or 80% of vessel bollard pull in both a normal power condition and power blackout condition to the satisfaction of the surveyor.
1. **General**

Inspection, measuring and test equipment, which Surveyors rely on to make decisions affecting classification or statutory certification, are to be individually identified and calibrated to a recognized national or international standard.

2. **Simple Measuring Equipment**

The Surveyor may accept simple measuring equipment (e.g. rulers, measuring tapes, weld gauges, micrometers) without individual identification or confirmation of calibration, provided they are of standard commercial design, properly maintained and periodically compared with other similar equipment or test pieces.

3. **Shipboard Equipment**

The Surveyor may accept equipment fitted on board a ship and used in examination of shipboard equipment (e.g. pressure, temperature or rpm gauges and meters) based either on calibration records or comparison of readings with multiple instruments.

4. **Other Equipment**

The Surveyor shall satisfy himself that other equipment (e.g. tensile test machines, ultrasonic thickness measurement equipment, etc) is calibrated to a recognized national or international standard.
Planned Maintenance Scheme (PMS) for Machinery

1 General
1.1 Application
1.2 Maintenance Intervals
1.3 Onboard Responsibility

2 Procedures and conditions for approval of a PMS
2.1 System Requirements
2.2 Documentation and information
2.3 Approval validity

3 Surveys
3.1 Implementation Survey
3.2 Annual Audit
3.3 Damage and repairs

Note:
1. This requirement is applied on surveys commenced on or after 1 July 2020.
1 General

1.1 Application

1.1.1 These requirements apply to an approved Planned Maintenance Scheme for Machinery (PMS) as an alternative to the Continuous Machinery Survey (CMS).

1.1.2 It considers surveys to be carried out on the basis of intervals between overhauls recommended by manufacturers, documented operator’s experience and a condition monitoring system, where fitted.

1.1.3 This scheme is limited to components and systems covered by CMS.

1.1.4 Any items not covered by PMS shall be surveyed and credited in the usual way.

1.2 Maintenance Intervals

1.2.1 In general, the intervals for PMS shall not exceed those specified for CMS. However, for components where the maintenance is based on running hours longer intervals may be accepted as long as the intervals are based on the manufacturer’s recommendations.

1.3 Onboard responsibility

1.3.1 The chief engineer shall be the responsible person on board in charge of the PMS.

1.3.2 Documentation on overhauls of items covered by the PMS shall be reported and signed by the chief engineer.

1.3.3 Access to computerized systems for updating of the maintenance documentation and maintenance program shall only be permitted by the chief engineer or other authorized person.

2 Procedures and conditions for approval of a PMS

2.1 System Requirements

2.1.1 The PMS shall be programmed and maintained by a computerized system. However, this may not be applied to the current already approved schemes.

2.1.2 The system shall be approved in accordance with a procedure of TL.

2.1.3 Computerized systems shall include back-up devices, such as disks/tapes, CDs, which are to be updated at regular intervals.

2.2 Documentation and information

2.2.1 The following documentation shall be submitted for the approval of the scheme:

(i) organization chart identifying areas of responsibility

(ii) documentation filling procedures

(iii) listing of equipment to be considered by classification in PMS
(iv) machinery identification procedure

(v) preventive maintenance sheet(s) for each machine to be considered

(vi) listing and schedule of preventive maintenance procedures

2.2.2 In addition to the above documentation the following information shall be available on board:

(i) all clauses in 2.2.1 in an up-to-date fashion

(ii) maintenance instructions (manufacturer’s and shipyard’s)

(iii) reference documentation (trend investigation procedures etc.)

(iv) records of maintenance including repairs and renewals carried out

2.3 Approval validity

2.3.1 When the PMS is approved a "Certificate of Approval for Planned Maintenance Scheme" is issued. However, other equivalent certification or class notation may be issued according to the procedure in use in TL. In any case, the certification is to be kept on board.

2.3.2 An implementation Survey shall be carried out to confirm the validity of the certificate/class notation (see 3.1).

2.3.3 An annual report covering the year’s service, including the information as required under the clauses iii and v as well as the information on changes to other clauses in 2.2.1, shall be reviewed by TL.

2.3.4 An Annual Audit shall be carried out to maintain the validity of the PMS (see 3.2).

2.3.5 The survey arrangement for machinery under PMS can be cancelled by TL if PMS is not being satisfactorily carried out either from the maintenance records or the general condition of the machinery, or when the agreed intervals between overhauls are exceeded.

2.3.6 The case of sale or change of management of the ship or transfer of class shall cause the approval to be reconsidered.

2.3.7 The shipowner may, at any time, cancel the survey arrangement for machinery under PMS by informing TL in writing and for this case the items which have been inspected under the PMS since the last annual survey can be credited for class at the discretion of the attending surveyor.

3 Surveys

3.1 Implementation Survey

3.1.1 The Implementation Survey shall be carried out by TL’s surveyor within one year from the date of approval of the PMS.

3.1.2 During the implementation survey the following shall be verified by a surveyor to ensure:
(i) the PMS is implemented according to the approval documentation and is adapted to the type and complexity of the components/system on board

(ii) the PMS is producing the documentation required for the Annual Audit and the requirements of surveys and testing for retention of class are complied with

(iii) the onboard personnel is familiar with the PMS

3.1.3 When this survey is carried out and the implementation is found in order, a report describing the PMS shall be submitted to TL and the approved PMS may replace the CMS.

3.2 Annual Audit *

3.2.1 An annual audit of the PMS shall be carried out by TL’s surveyor and preferably concurrently with the annual survey of machinery.

3.2.2 The surveyor shall review the annual report or verify that it has been reviewed by TL.

3.2.3 The purpose of this survey shall be to verify that the scheme is being correctly operated and that the machinery has been functioning satisfactorily since the previous survey. A general examination of the items concerned shall be carried out.

3.2.4 The performance and maintenance records shall be examined to verify that the machinery has functioned satisfactorily since the previous survey or action has been taken in response to machinery operating parameters exceeding acceptable tolerances and the overhaul intervals have been maintained.

3.2.5 Written details of break-down or malfunction shall be made available.

3.2.6 Description of repairs carried out shall be examined. Any machinery part, which has been replaced by a spare one, due to damage, is to be retained on board - where possible - until examined by TL’s Surveyor.

3.2.7 Upon satisfactory completion of the above requirements, TL shall retain the PMS.

3.3 Damage and repairs

3.3.1 The damage of components/machinery shall be reported to TL. The repairs of such damaged components / machinery shall be carried out to the satisfaction of TL’s surveyor.

3.3.2 Any repair and corrective action regarding machinery under PMS system shall be recorded in the PMS logbook and repair verified by TL’s surveyor at the Annual Audit.

3.3.3 In the case of overdue outstanding conditions of class or a record of unrepaired damage which would affect the PMS the relevant items shall be kept out of the PMS until the condition of class is fulfilled or the repair is carried out.

Note: * The term audit, in this context, is not related to ISM audit.
1. General
1.1 Application
1.2 Definitions

2. Oil Lubricated shafts or Closed Loop System Fresh Water Lubricated shafts (closed systems)
2.1 Shaft Survey Methods
2.2 Shaft extension surveys – Extension types
2.3 Oil lubricated shafts
2.4 Closed loop system fresh water lubricated shafts
2.5 TABLE Survey Intervals (closed systems)

3. Water Lubricated shafts (open systems)
3.1 Shaft Survey Methods
3.2 Shaft extension surveys – Extension types
3.3 Shaft Survey Intervals
3.4 TABLE Survey Intervals (open systems)

Note:
1. This requirement is implemented from 1 January 2017.
1. General

1.1 Application

1.1.1 Unless alternative means are provided to assure the condition of the propeller shaft assembly, these requirements apply to all vessels with conventional shafting fitted with a propeller as follows:

1.1.1.1 from 1 January 2016 for ships delivered on or after 1 January 2016;

1.1.1.2 after the first shaft survey scheduled on or after 1 January 2016, for ships delivered before 1 January 2016*.

*Upon the completion of the first shaft survey scheduled on or after 1 January 2016, the designation of dates for the next shaft survey is to be made based upon the requirements of this requirement.

1.2 Definitions

See also Diagram 1.

1.2.1 Shaft

For the purpose of this requirement shaft is a general definition that includes:

- Propeller shaft
- Tube shaft

The definition does not include the intermediate shaft(s) which is(are) considered part of the propulsion shafting inside the vessel.

1.2.2 Propeller Shaft

Propeller shaft is the part of the propulsion shaft to which the propeller is fitted. It may also be called screwshaft or tailshaft.

1.2.3 Tube Shaft

Tube shaft is a shaft placed between the intermediate shaft and propeller shaft, normally arranged within a stern tube or running in open water. It may also be called Stern Tube Shaft.

Diagram 1: Typical Shafting Arrangement
1.2.4 Sterntube

Tube or pipe fitted in the shell of a ship at the stern (or rear part of the ship), below the water-line, through which passes the tube shaft or aftermost section of the propeller-shaft. Sterntube is the housing of the shaft bearings, generally two (one aft and one fore), that sustain the shaft and allows its rotation with less frictional resistance. The stern tube also accommodates the shaft sealing arrangement.

1.2.5 Close Loop (system) Oil Lubricated Bearing

Closed loop oil lubricating systems use oil to lubricate the bearings and are sealed against the environment (seawater) by adequate sealing / gland devices.

1.2.6 Water Lubricated Bearing

Water lubricated bearings are bearings cooled / lubricated by water (fresh or salt).

1.2.7 Closed Loop System Fresh Water Lubricated Bearing

Closed loop water lubricating systems use fresh water to lubricate the bearings and are sealed against the environment (such as seawater) by adequate sealing / gland devices.

1.2.8 Open Systems (water)

Open water lubricating systems use water to lubricate the bearings and are exposed to the environment.

1.2.9 Adequate means for protection against corrosion

An adequate means for protection against corrosion is an approved means for full protection of the core shaft against sea water intrusion and subsequent corrosion attack. Such means are used for the protection of common steel material against corrosion particularly in combination with water lubricated bearings.

Typical means are for example:

- continuous metallic, corrosion resistant liners,
- continuous cladding,
- multiple layer synthetic coating,
- multiple layer of fiberglass,
- combinations of above mentioned,
- rubber / elastomer covering coating.

The means for protection against corrosion are installed / applied according to class approved procedures.

1.2.10 Corrosion Resistant Shaft

Corrosion resistant shaft is made in approved corrosion resistant steel as core material for the shaft.
1.2.11 Sterntube Sealing System

Sterntube Sealing system is the equipment installed on the inboard extremity and, for closed systems, at outboard extremity of the sterntube. Inboard Seal is the device fitted on the fore part of the sterntube that achieve the sealing against the possible leakage of the lubricant media in to the ship internal.

Outboard seal is the device fitted on the aft part of the sterntube that achieve the sealing against the possible sea water ingress and the leakage of the lubricant media.

1.2.12 Service records

Service records are regularly recorded data showing in-service conditions of the shaft(s) and may include, as applicable: lubricating oil temperature, bearing temperature and oil consumption records (for oil lubricated bearings) or water flow, water temperature, salinity, pH, make-up water and water pressure (for closed loop fresh water lubricated bearings depending on design).

1.2.13 Oil sample examination

An oil sample examination is a visual examination of the stern tube lubricating oil taken in presence of the surveyor with a focus on water contamination.

1.2.14 Lubricating oil analysis

Lubricating oil analysis is to be carried out at regular intervals not exceeding six (6) months taking into account TL- G 36.

The documentation on lubricating oil analysis is to be available on board. Oil samples, to be submitted for the analysis, should be taken under service conditions.

1.2.15 Fresh Water sample test

Fresh water sample test should be carried out at regular intervals not exceeding six (6) months

Samples are to be taken under service conditions and are to be representative of the water circulating within the sterntube.

Analysis results are to be retained on board and made available to the surveyor.

At time of survey the sample for the test has to be taken at the presence of the surveyor.

Fresh water sample test shall include the following parameters:

- chlorides content,
- pH value,
- presence of bearing particles or other particles (only for laboratory analysis, not required for tests carried out in presence of the surveyor).
1.2.16 Keyless connection

Keyless connection is the forced coupling Methodology between the shaft and the propeller without a key achieved through interference fit of the propeller boss on the shaft tapered end.

1.2.17 Keyed connection

Keyed connection is the forced coupling Methodology between the shaft and the propeller with a key and keyway achieved through the interference fit of the propeller boss on the shaft tapered end.

1.2.18 Flanged connection

Flanged connection is the coupling Methodology, between the shaft and the propeller, achieved by a flange, built in at the shaft aft end, bolted to propeller boss.

1.2.19 Alternative means

Shafting arrangements such as, but not limited to, an approved Condition Monitoring Scheme and/or other reliable approved means for assessing and monitoring the condition of the tail shaft, bearings, sealing devices and the stern tube lubricant system capable to assure the condition of the propeller shaft assembly with an equivalent level of safety as obtained by survey methods as applicable in TL-R Z21.

2. Oil Lubricated shafts or Closed Loop System Fresh Water Lubricated Shafts (closed system)

2.1 Shaft Survey Methods

2.1.1 METHOD 1

The survey is to consist of:

- Drawing the shaft and examining the entire shaft, seals system and bearings

- For keyed and keyless connections:
  - Removing the propeller to expose the forward end of the taper,
  - Performing a non-destructive examination (NDE) by an approved surface crack-detection method all around the shaft in way of the forward portion of the taper section, including the keyway (if fitted). For shaft provided with liners the NDE shall extended to the after edge of the liner.

- For flanged connection:
  - Whenever the coupling bolts of any type of flange-connected shaft are removed or the flange radius is made accessible in connection with overhaul, repairs or when deemed necessary by the surveyor, the coupling bolts and flange radius are to be examined by means of an approved surface crack detection method.
- Checking and recording the bearing clearances.
- Verification that the propeller is free of damages which may cause the propeller to be out of balance.
- Verification of the satisfactory conditions of inboard and outboard seals during the re-installation of the shaft and propeller.
- Recording the bearing weardown measurements (after re-installation)

2.1.2 METHOD 2

The survey is to consist of:

- For keyed and keyless connections:
  • Removing the propeller to expose the forward end of the taper,
  • Performing a non-destructive examination (NDE) by an approved surface crack-detection Method all around the shaft in way of the forward portion of the taper section, including the keyway (if fitted).

- For flanged connection:
  • Whenever the coupling bolts of any type of flange-connected shaft are removed or the flange radius is made accessible in connection with overhaul, repairs or when deemed necessary by the surveyor, the coupling bolts and flange radius are to be examined by means of an approved surface crack detection Method.

- Checking and recording the bearing weardown measurements.
- Visual Inspection of all accessible parts of the shafting system.
- Verification that the propeller is free of damages which may cause the propeller to be out of balance.
- Seal liner found to be or placed in a satisfactory condition.
- Verification of the satisfactory re-installation of the propeller including verification of satisfactory conditions of inboard and outboard seals.

Pre-requisites to satisfactorily verify in order to apply METHOD 2:

- Review of service records.
- Review of test records of:
  • Lubricating Oil analysis (for oil lubricated shafts), or
  • Fresh Water Sample test (for closed system fresh water lubricated shafts).
- Oil sample Examination (for oil lubricated shafts), or Fresh Water Sample test (for closed system fresh water lubricated).
- Verification of no reported repairs by grinding or welding of shaft and/or propeller.
2.1.3 METHOD 3

The survey is to consist of:

- Checking and recording the bearing weardown measurements.
- Visual Inspection of all accessible parts of the shafting system.
- Verification that the propeller is free of damages which may cause the propeller to be out of balance.
- Seal liner found to be or placed in a satisfactory condition.
- Verification of the satisfactory conditions of inboard and outboard seals.

Pre-requisites to satisfactorily verify in order to apply METHOD 3:

- Review of service records.
- Review of test records of
  - Lubricating Oil analysis (for oil lubricated shafts), or
  - Fresh Water Sample test (for closed system fresh water lubricated shafts).
- Oil sample Examination (for oil lubricated shafts), or Fresh Water Sample test (for closed system fresh water lubricated).
- Verification of no reported repairs by grinding or welding of shaft and/or propeller.

2.2 Shaft extension surveys - Extension types

2.2.1 Extension up to 2.5 years

The survey is to consist of:

- Checking and recording the bearing weardown measurements, as far as practicable.
- Visual Inspection of all accessible parts of the shafting system.
- Verification that the propeller is free of damages which may cause the propeller to be out of balance.
- Verification of the effectiveness of the inboard seal and outboard seals.

Pre-requisites to satisfactorily verify in order to apply EXTENSION UP TO 2.5 YEARS:

- Review of service records.
- Review of test records of
  - Lubricating Oil analysis (for oil lubricated shafts), or
  - Fresh Water Sample test (for closed system fresh water lubricated shafts).
- Oil sample Examination (for oil lubricated shafts), or Fresh Water Sample test (for closed system fresh water lubricated).
- Verification of no reported repairs by grinding or welding of shaft and/or propeller.
- Confirmation from the Chief Engineer that the shafting arrangement is in good working condition.

### 2.2.2 Extension up to 1 year

The survey is to consist of:

- Visual Inspection of all accessible parts of the shafting system.
- Verification that the propeller is free of damages which may cause the propeller to be out of balance.
- Verification of the effectiveness of the inboard seal and outboard seals.

Pre-requisites to satisfactorily verify in order to apply EXTENSION UP TO 1 YEAR:

- Review of the previous weardown and/or clearance recordings.
- Review of service records.
- Review of test records of
  - Lubricating Oil analysis (for oil lubricated shafts), or
  - Fresh Water Sample test (for closed system fresh water lubricated shafts).
- Oil sample Examination (for oil lubricated shafts), or Fresh Water Sample test (for closed system fresh water lubricated).
- Verification of no reported repairs by grinding or welding of shaft and/or propeller.
- Confirmation from the Chief Engineer that the shafting arrangement is in good working condition.

### 2.2.3 Extension up to 3 months

The survey is to consist of:

- Visual Inspection of all accessible parts of the shafting system.
- Verification of the effectiveness of the inboard seal.

Pre-requisites to satisfactorily verify in order to apply EXTENSION UP TO 3 MONTHS:

- Review of the previous weardown and/or clearance recordings.
- Review of service records.
- Review of test records of.
• Lubricating Oil analysis (for oil lubricated shafts), or
• Fresh Water Sample test (for closed system fresh water lubricated shafts).

- Oil sample Examination (for oil lubricated shafts), or Fresh Water Sample test (for closed system fresh water lubricated).
- Verification of no reported repairs by grinding or welding of shaft and/or propeller.
- Confirmation from the Chief Engineer that the shafting arrangement is in good working condition.

2.3 Oil lubricated shafts

2.3.1 Survey intervals

For surveys completed within 3 months before the shaft survey due date, the next period will start from the shaft survey due date.

2.3.1.1 Flanged propeller connection

The following Methods are applicable:

A) Method 1 every 5 years, or

B) Method 2 every 5 years (pre-requisites have to be fulfilled), or

C) Method 3 every 5 years (pre-requisites have to be fulfilled).

2.3.1.2 Keyless propeller connection

The following Methods are applicable:

A) Method 1 every 5 years, or

B) Method 2 every 5 years (pre-requisites have to be fulfilled), or

C) Method 3 every 5 years (pre-requisites have to be fulfilled). The maximum interval between two surveys carried out according to Method 1 or Method 2 shall not exceed 15 years, except in the case when one extension for no more than three months is granted.

2.3.1.3 Keyed propeller connection

The following Methods are applicable:

A) Method 1 every 5 years, or

B) Method 2 every 5 years (pre-requisites have to be fulfilled).
2.3.2 Survey extensions

For all types of propeller connections, the interval between two consecutive surveys may be extended after the execution of extension survey as follows:

A) **Extension up to a maximum of 2.5 years**: no more than one extension can be granted. No further extension, of other type, can be granted.

B) **Extension up to a maximum of 1 year**: no more than two consecutive “one year extensions” can be granted. In the event an additional extension is requested the requirements of the “2.5 year extension” are to be carried out and the shaft survey due date, prior to the previous extension(s), is extended for a maximum of 2.5 years.

C) **Extension up to a maximum of 3 months**: no more than one “three months extension” can be granted. In the event an additional extension is requested the requirements of the “one year extension” or “2.5 years extension” are to be carried out and the shaft survey due date, prior to the previous extension, is extended for a maximum of one year or 2.5 years.

The extension survey should normally be carried out within 1 month of the shaft survey due date and the extension counts from the shaft survey due date.

If the extension survey is carried out more than 1 month prior to the shaft survey due date, then the period of extension counts from the date of the extension survey was completed.

2.4 Closed loop system fresh water lubricated shafts

The maximum interval between two surveys carried out according to Method 1 shall not exceed 15 years. An extension for no more than three months can be granted.

2.4.1 Survey intervals

For surveys completed within 3 months before the shaft survey due date, the next period will start from the shaft survey due date.

2.4.1.1 Flanged propeller connection

The following Methods are applicable:

A) Method 1 every 5 years, or

B) Method 2 every 5 years (pre-requisites have to be fulfilled), or

C) Method 3 every 5 years (pre-requisites have to be fulfilled).

2.4.1.2 Keyless propeller connection

The following Methods are applicable:

A) Method 1 every 5 years, or

B) Method 2 every 5 years (pre-requisites have to be fulfilled), or

C) Method 3 every 5 years (pre-requisites have to be fulfilled).
2.4.1.3 Keyed propeller connection

The following Methods are applicable:

A) Method 1 every 5 years, or

B) Method 2 every 5 years (pre-requisites have to be fulfilled).

2.4.2 Survey extensions

For all types of propeller connections, the interval between two consecutive surveys may be extended after the execution of extension survey as follows:

A) Extension up to a maximum of 2.5 years, no more than one extension can be granted. No further extension, of other type, can be granted.

B) Extension up to a maximum of 1 year, no more than two consecutive extensions can be granted. In the event an additional extension is requested the requirements of the “2.5 year extension” are to be carried out and the shaft survey due date, prior to the previous extension(s), is extended for a maximum of 2.5 years.

C) Extension up to a maximum of 3 months, no more than one “three months extension” can be granted. In the event an additional extension is requested the requirements of the “one year extension” or “2.5 years extension” are to be carried out and the shaft survey due date, prior to the previous extension, is extended for a maximum of one year or 2.5 years.

The extension survey should normally be carried out within 1 month of the shaft survey due date and the extension counts from the shaft survey due date.

If the extension survey is carried out more than 1 month prior to the shaft survey due date, then the period of extension counts from the date of the extension survey was completed.

The maximum interval between two surveys carried out according to Method 1 shall not exceed 15 years, except in the case when one extension for no more than three months is granted.
### 2.5 TABLE of Survey Intervals (closed systems)

<table>
<thead>
<tr>
<th>SURVEY INTERVALS (closed systems)</th>
<th>Oil Lubricated</th>
<th>Closed Loop System Fresh Water Lubricated</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Keyless Propeller Coupling</strong></td>
<td>Method 1 or Method 2 or Method 3</td>
<td>Method 1 or Method 2 or Method 3c</td>
</tr>
<tr>
<td><strong>Every five yearsa</strong></td>
<td>Method 1 or Method 2 or Method 3</td>
<td>Method 1 or Method 2</td>
</tr>
<tr>
<td>Extension 2.5 Y</td>
<td>Yesd</td>
<td>Yesd</td>
</tr>
<tr>
<td>Extension 1 Y</td>
<td>Yese</td>
<td>Yese</td>
</tr>
<tr>
<td>Extension 3 M</td>
<td>Yesf</td>
<td>Yesf</td>
</tr>
</tbody>
</table>

| **Keyed Propeller Coupling**      | Method 1 or Method 2 | Method 1 or Method 2 |
| **Every five yearsa**             | Method 1 or Method 2 | Method 1 or Method 2 |
| Extension 2.5 Y                   | Yesd          | Yesd                                    |
| Extension 1 Y                     | Yese          | Yese                                    |
| Extension 3 M                     | Yesf          | Yesf                                    |

### General notes:
For surveys (Method 1, or Method 2, or Method 3) completed within 3 months before the shaft survey due date, the next period will start from the shaft survey due date. The extension survey should normally be carried out within 1 month of the shaft survey due date and the extension counts from the shaft survey due date. If the extension survey is carried out more than 1 month prior to the shaft survey due date, then the period of extension counts from the date of the extension survey was completed.

### Notes:
- a: unless an Extension type (Extension 2.5 Y, Extension 1 Y, Extension 3 M) is applied in between.
- b: Method 3 not allowed.
- c: The maximum interval between two surveys carried out according to Method 1 or Method 2 shall not exceed 15 years, except in the case when one extension for no more than three months is granted.
- d: no more than one extension can be granted. No further extension of other type can be granted.
- e: no more than two consecutive extensions can be granted. In the event an additional extension is requested the requirements of the “2.5 year extension” are to be carried out and the shaft survey due date, prior to the previous extension(s), is extended for a maximum of 2.5 years.
- f: no more than one three months extension can be granted. In the event an additional extension is requested the requirements of the “one year extension” or “2.5 years extension” are to be carried out and the shaft survey due date, prior to the previous extension, is extended for a maximum of one year or 2.5 years.
- g: The maximum interval between two surveys carried out according to Method 1 shall not be more than 15 years.
3. Water Lubricated shafts (open systems)

3.1 Shaft Survey Methods

3.1.1 METHOD 4

The survey is to consist of:

- Drawing the shaft and examining the entire shaft (including liners, corrosion protection system and stress reducing features, where provided), inboard seal system and bearings.

- For keyed and keyless connections:
  
  • removing the propeller to expose the forward end of the taper,
  
  • performing a non-destructive examination (NDE) by an approved surface crack-detection Method all around the shaft in way of the forward portion of the taper section, including the keyway (if fitted). For shaft provided with liners the NDE shall be extended to the after edge of the liner

- For flanged connection:

  • Whenever the coupling bolts of any type of flange-connected shaft are removed or the flange radius is made accessible in connection with overhaul, repairs or when deemed necessary by the surveyor, the coupling bolts and flange radius are to be examined by means of an approved surface crack detection method.

- Checking and recording the bearing clearances.

- Verification that the propeller is free of damages which may cause the propeller to be out of balance.

- Verification of the satisfactory conditions of inboard seal during re-installation of the shaft and propeller.

3.2 Shaft extension surveys - Extension types

3.2.1 Extension up to 1 year

The survey is to consist of:

- Visual Inspection of all accessible parts of the shafting system.

- Verification that the propeller is free of damages which may cause the propeller to be out of balance.

- Checking and recording the clearances of bearing.

- Verification of the effectiveness of the inboard seal.

Pre-requisites to satisfactorily verify in order to apply EXTENSION UP TO 1 YEAR:

- Review of the previous clearance recordings.
3.2.2 Extension up to 3 months

The survey is to consist of:

- Visual Inspection of all accessible parts of the shafting system.
- Verification that the propeller is free of damages which may cause the propeller to be out of balance.
- Verification of the effectiveness of the inboard seal.

Pre-requisites to satisfactorily verify in order to apply EXTENSION UP TO 3 MONTHS:

- Review of the previous clearance recordings.
- Service records.
- Verification of no reported repairs by grinding or welding of shaft and/or propeller.
- Confirmation from the Chief Engineer that the shafting arrangement is in good working condition.

3.3 Shaft Survey Intervals

3.3.1 Survey Intervals

The following survey intervals between surveys according to Method 4 are applicable to all types of propeller connections.

- For keyless propeller connections the maximum interval between two consecutive dismantling and verifications of the shaft cone by means of non-destructive examination (NDE) shall not exceed 15 years.
- For surveys completed within 3 months before the shaft survey due date, the next period will start from the shaft survey due date.

3.3.1.1 Configurations allowing 5 year intervals

- Single shaft operating exclusively in fresh water.
- Single shaft provided with adequate means of corrosion protection, single corrosion resistant shaft.
- All kinds of multiple shafts arrangements.
3.3.1.2 Other systems

Shaft not belonging in one of the configurations listed in 3.3.1.1 has to be surveyed according to Method 4 every 3 years.

3.3.2 Survey extensions

For all types of propeller connections, the interval between two consecutive surveys may be extended after the execution of extension survey as follows:

A) Extension up to a maximum of 1 year: no more than one extension can be granted. No further extension, of other type, can be granted.

B) Extension up to a maximum of 3 months: no more than one “three months extension” can be granted. In the event an additional extension is requested the requirements of the “one year extension” are to be carried out and the shaft survey due date prior to the previous extension is extended for a maximum of one year.

The extension survey should normally be carried out within 1 month of the shaft survey due date and the extension counts from the shaft survey due date.
If the extension survey is carried out more than 1 month prior to the shaft survey due date, then the period of extension counts from the date of the extension survey was completed.
### 3.4 TABLE of Survey Intervals (open systems)

<table>
<thead>
<tr>
<th>SURVEY INTERVALS (open systems)</th>
<th>Other shaft configuration.</th>
</tr>
</thead>
</table>
| - Single Shaft operating exclusively in Fresh Water.  
- Single Shaft provided with adequate means of corrosion protection, Single corrosion resistant shaft.  
- All kinds of Multiple shafts arrangements. | All kinds of Propeller Coupling\(^d\) |
| All kinds of Propeller Coupling\(^d\) | All kinds of Propeller Coupling\(^d\) |
| Every five years\(^a\) | Every three years\(^a\) |
| Method 4 | Method 4 |
| Extension 1 Y | Extension 1 Y |
| Yes\(^b\) | Yes\(^b\) |
| Extension 3 M | Extension 3 M |
| Yes\(^c\) | Yes\(^c\) |

**General notes:**
For surveys (Method 4) completed within 3 months before the shaft survey due date, the next period will start from the shaft survey due date. The extension survey should normally be carried out within 1 month of the shaft survey due date and the extension counts from the shaft survey due date. If the extension survey is carried out more than 1 month prior to the shaft survey due date, then the period of extension counts from the date of the extension survey was completed.

**Notes:**
a: unless an Extension type (Extension 1 Y, Extension 3 M) is applied in between.  
b: no more than one extension can be granted. No further extension, of other type, can be granted.  
c: no more than one extension can be granted. In the event an additional extension is requested the requirements of the one year extension are to be carried out and the shaft survey due date prior to the previous extension is extended for a maximum of one year.  
d: For keyless propeller connections the maximum interval between two consecutive dismantling and verifications of the shaft cone by means of non-destructive examination (NDE) shall not exceed 15 years
1. **Scope**

The scope of this Requirement includes the following main activities:

1.1 Examination of the parts of the ship covered by classification rules and by applicable statutory regulations for hull construction, to obtain appropriate evidence that they have been built in compliance with the rules and regulations, taking account of the relevant approved drawings.

1.2 Appraisal of the manufacturing, construction, control and qualification procedures, including welding consumables, weld procedures, weld connections and assemblies, with indication of relevant approval tests.

1.3 Witnessing inspections and tests as required in the classification rules used for ship construction including materials, welding and assembling, specifying the items to be examined and/or tested and how (e.g. by hydrostatic, hose or leak testing, non destructive examination, verification of geometry) and by whom.

Note:

1. This Requirement is implemented on ships contracted for construction (as defined in TL-PR 29) from 1 July 2021.
1.4 Appraisal of material and equipment used for ship construction and their inspection at works is not included in this Requirement. Details of requirements for hull and machinery steel forgings and castings and for normal and higher strength hull structural steel are given in W7, W8 and W11 respectively. Acceptance of these items is verified through the survey process carried out at the manufacturer’s works and the issuing of the appropriate certificates.

1.5 In addition to above, for Tankers and Bulk Carriers subject to SOLAS Chapter II-1 Part A-1 Regulation 3-10 (Goal-based ship construction standards for bulk carriers and oil tankers), see also Appendix 2 to this document.

2. Definitions*

2.1 The hull structure is defined as follows:

a) hull envelope including all internal and external structures;

b) superstructures, deckhouses and casings;

c) welded foundations, e.g. main engine seatings;

d) hatch coamings, bulwarks;

e) all penetrations fitted and welded into bulkheads, decks and shell;

f) the fittings of all connections to decks, bulkheads and shell, such as air pipes and ship side valves – all ILLC 1966, as amended, items;

g) welded attachments to shell, decks and primary members, e.g. crane pedestals, bitts and bollards, but only as regards their interaction on the hull structure.

2.2 Reference to documents also includes electronic transmission or storage.

2.3 Definition of survey methods which the surveyor is directly involved in: Patrol, Review, Witness.

2.3.1 Patrol, the act of checking on an independent and unscheduled basis that the applicable processes, activities and associated documentation of the shipbuilding functions identified in Table 1 continue to conform to classification and statutory requirements.

2.3.2 Review, the act of examining documents in order to determine traceability, identification and to confirm that processes continue to conform to classification and statutory requirements.

2.3.3 Witness is the attendance at scheduled inspections in accordance with the agreed Inspection and Test Plans to the extent necessary to check compliance with the survey requirements.

*Footnote: Terminology for hull terms and hull survey terms can be found in Recommendation 82.
3. Applications

3.1 This Requirement covers the survey of all new construction of steel ships intended for classification and for international voyages except for:
   a) those defined in SOLAS I/3;
   b) high speed craft as defined in I/1.3.1 of the 2000 High Speed Craft Code;
   c) Mobile Offshore Drilling Units as defined in I/1.2.1 of the MODU Code.

3.2 This Requirement covers all statutory items, relevant to the hull structure and coating, i.e. Load Line and SOLAS Safety Construction.

3.3 This Requirement does not cover the manufacture of equipment, fittings and appendages regardless whether they are made inside or outside of the shipyard, examples being as follows. Evidence of acceptance shall be provided by accompanying documentation from class surveyor at manufacturer and verified at the shipyard:
   a) hatch covers;
   b) doors and ramps integral with the shell and bulkheads;
   c) rudders and rudder stock;
   d) all forgings and castings integral to the hull.

3.4 This Requirement applies to the installation into the ship, welding and testing of:
   3.4.1 the items listed in 3.3 above;
   3.4.2 equipment forming part of the watertight and weather tight integrity of the ship.

3.5 This Requirement applies to the hull structures and coating constructed at any of the following:
   3.5.1 shipbuilder’s facilities;
   3.5.2 sub-contractors at the shipbuilder’s facilities;
   3.5.3 sub-contractors at their own facilities or at other remote locations.

4. Qualification and monitoring of personnel

4.1 Exclusive surveyors of the classification society, as defined in PR5, are to confirm through patrol, review and witness as defined in para. 2.3, that the ships are built using approved plans in accordance with the relevant rules and statutory requirements. The surveyors are to be qualified to be able to carry out the tasks and procedures are to be in place to ensure that their activities are monitored. Details are specified in PR6 and PR7.

5. Survey of the hull structure

5.1 Table 1 provides a list of surveyable items for the hull structure and coating covered by this Requirement, including:
   5.1.1 description of the shipbuilding functions;
5.1.2 classification and statutory survey requirements;

5.1.3 survey method required for classification;

5.1.4 relevant TL and statutory requirement references;

5.1.5 documentation to be available for the classification surveyor during construction.

5.1.5.1 The shipbuilder is to provide the classification surveyors access to documentation required by classification, this includes documentation retained by the shipbuilder or other third parties.

5.1.5.2 The list of documents approved or reviewed by TL for the specific new construction are as follows:
   a) plans and supporting documents
   b) examination and testing plans
   c) NDE plans
   d) welding consumable details
   e) welding procedure specifications
   f) welding plan or details
   g) welder’s qualification records
   h) NDE operator’s qualification records

5.1.6 Documents to be inserted into the ship construction file. Refer to paragraph 10 for details.

5.1.7 A list of specific activities which are relevant to the shipbuilding functions. This list is not exhaustive and can be modified to reflect the construction facilities or specific ship type.

5.2 Evidence is also to be made available, as required, by the shipbuilder, to the surveyor whilst the construction process proceeds to prove that the material and equipment supplied to the ship has been built or manufactured under survey relevant to the classification rules and statutory requirements.

6. Review of the construction facility*

6.1 The society is to familiarize themselves with the yard's production facilities, management processes, and Safety for consideration in complying with the requirements of Table 1 prior to any steelwork or construction taking place in the following circumstances:

6.1.1 where the society has none or no recent experience of the construction facilities – typically after a one year lapse - or when significant new infrastructure has been added;

6.1.2 where there has been a significant management or personnel re-structuring having an impact on the ship construction process;

6.1.3 or where the shipbuilder contracts to construct a vessel of a different type or substantially different in design.

*Footnote: Reference is made to Appendix 1 “Shipyard review record”, as an example.
7. Newbuilding survey planning

7.1 Prior to commencement of surveys for any newbuilding project, the society is to discuss with the shipbuilder at a kick off meeting the items listed in Table 1. The purpose of the meeting is to review and agree how the list of specific activities shown in Table 1 is to be addressed. The meeting is to take into account the shipbuilder’s construction facilities and ship type including the list of proposed subcontractors. A record of the meeting is to be made, based upon the contents of the Table 1 – the Table can be used as the record with comments made into the appropriate column. If the society has nominated a surveyor for a specific newbuilding project then the surveyor is to attend the kick off meeting.

The builder should agree to undertake ad hoc investigations during construction as may be requested by Class where areas of concern arise and the builder to agree to keep the classification society advised of the progress of any investigation. Whenever an investigation is undertaken, the builder is to be requested, in principle, to agree to suspend relevant construction activities if warranted by the severity of the problem.

7.2 The records are to take note of specific published Administration requirements and interpretations of statutory requirements.

7.3 The shipyard shall be requested to advise of any changes to the activities agreed at the kick off meeting and these are to be documented in the survey plan. E.g. if the shipbuilder chooses to use or change sub-contractors, or to incorporate any modifications necessitated by changes in production or inspection methods, rules and regulations, structural modifications, or in the event where increased inspection requirements are deemed necessary as a result of a substantial non-conformance or otherwise.

7.4 Shipbuilding quality standards for the hull structure during new construction are to be reviewed and agreed during the kick-off meeting. Structural fabrication is to be carried out in accordance with TL-G 47, “Shipbuilding and Repair Quality Standard”, or a Recognized Fabrication Standard (RFS) which has been accepted by the Classification Society prior to the commencement of fabrication/construction. The work is to be carried out in accordance with the Rules and under survey of the classification society.

TL may accept an RFS as an alternative to TL-G 47 provided that 7.4.1 or 7.4.2 is complied with as applicable.

7.4.1 Where a RFS is well established and has well documented history (3 or more years prior to the new vessel contract) of successful application to similar designs as the new vessel and that history is for the same Shipyard as the new vessel. Then the Shipyard is to create a summary document referencing the RFS to be used in construction and highlighting any limitations to usage of the selected RFS. This summary document is to be included with the “record of kick-off meeting” for the vessel.

The summary document is also to be included in the SCF, (for Tankers and Bulk Carriers subject to SOLAS Chapter II-1 Part A-1 Regulation 3-10 per App 2, Table A Tier II Item 11), as applicable.

7.4.2 Where a RFS is new or revised or otherwise not as per 7.4.1 the following steps are to be carried out:

(a) The tolerances and fabrications standards of the RFS are to be compared with those of TL-G 47. Any that are less stringent than those of TL-G 47 are to be identified.
(b) The tolerances and fabrication standards of the RFS identified in 7.4.2 (a) are to be assessed to determine the acceptability for use and/or any restrictions for usage for the subject (or proposed) design. Details of how the acceptability for use and/or restrictions are to be recorded, and,

(c) A summary document including the outcomes of 7.4.2(a) and 7.4.2(b) is to be compiled. This document is to also include a reference to the RFS, details of the tolerance and fabrication standards not analysed as part of 7.4.2(b) and any limitations to the usage of the RFS.

The summary document is to be included with the “record of the kick-off meeting” of the vessel. The summary document is also to be included in the SCF, (for Tankers and Bulk Carriers subject to SOLAS Chapter II-1 Part A-1 Regulation 3-10 per App 2, Table A Tier II Item 11), as applicable.

7.5 The kick-off meeting may be attended by other parties as defined in PR3 (owner, administrations, etc.) subject to agreement by the shipbuilder.

7.6 In the event of series ship production*, the requirement for a kick off meeting in paragraph 7.1 may be waived for the second and subsequent ships provided that no changes to the specific activities agreed in the kick off meeting for the first ship are introduced. If any changes are introduced, these are to be agreed in a new dedicated meeting and documented in a record of such meeting.

*Series Ship Production: vessels in the series subsequent to the first one (prototype), i.e. sister ships built in the same shipyard.

8. Examination and test plan for newbuilding activities

8.1 The shipbuilder is to provide plans of the items which are intended to be examined and tested. These plans need not be submitted for approval and examination at the time of the kick off meeting. They are to include:

8.1.1 proposals for the examination of completed steelwork - generally referred to as the block plan and are to include details of joining blocks together at the pre-erection and erection stages or at other relevant stages;
8.1.2 proposals for fit up examinations where necessary;
8.1.3 proposals for testing of the structure (leak and hydrostatic) as well as for all watertight and weathertight closing appliances;
8.1.4 proposals for non-destructive examination;
8.1.5 any other proposals specific to the ship type or to the statutory requirements.

8.2 The plans and any modifications to them are to be submitted to the surveyors in sufficient time to allow review before the relevant survey activity commences.

8.3 In addition to above, for Tankers and Bulk Carriers subject to SOLAS Chapter II-1 Part A-1 Regulation 3-10 see also Appendix 2 to this Unified Requirement.

9. Proof of the consistency of surveys

9.1 The classification society is to be able to provide evidence, e.g. through records, check lists, inspection and test records, etc. that its surveyors have complied with the
requirements of the newbuilding survey planning and duly participated in the relevant activities shown in the shipbuilder’s examination and test plans.

9.2 In addition, the classification society is to maintain records of deficiencies found during the patrolling activities required in Table 1 and described in paragraph 2.3.1. Records shall include the date when deficiency was found, description of the deficiency and the date the deficiency was cleared.

10. Ship Construction File

The purposes of this paragraph are applicable to all ships except the Tankers and Bulk Carriers subject to SOLAS Chapter II-1 Part A-1 Regulation 3-10 for which the paragraph 3 of Appendix 2 to this Requirement is to be applied.

10.1 The shipbuilder is to deliver documents for the Ship Construction File. In the event that items have been provided by another party such as the shipowner and where separate arrangements have been made for document delivery which excludes the shipbuilder, that party has the responsibility.

The Ship Construction File shall be reviewed for content in accordance with the requirements of para 10.2.

10.2 It is recognised that the purpose of documents held in the Ship Construction File on board the ship, is to facilitate inspection (survey) and repair and maintenance, and, therefore, is to include in addition to documents listed in Table 1, but not be limited to:

10.2.1 as-built structural drawings including scantling details, material details, and, as applicable, wastage allowances, location of butts and seams, cross section details and locations of all partial and full penetration welds, areas identified for close attention and rudders (Z7.1, Z7.2, Z10.1, Z10.2, Z10.3, Z10.4, Z10.5);

10.2.2 manuals required for classification and statutory requirements, e.g. loading and stability, bow doors and inner doors and side shell doors and stern doors – operations and maintenance manuals (S8 and S9);

10.2.3 ship structure access manual, as applicable;

10.2.4 copies of certificates of forgings and castings welded into the hull (W7 and W8);

10.2.5 details of equipment forming part of the watertight and weather tight integrity of the ship;

10.2.5.1 a Cable Transit Seal Systems Register, to be prepared by the shipbuilder for watertight cable transits. The Register can be in either a hard copy or digitized media. For an example of a register see Appendix 3 - Recommendatory Sample - Cable Transit Seal Systems Register. It is to include a marking / identification system, documentation referencing manufacturer manual(s) for each type of cable transit installed, the Type Approval certification for each type of transit system, applicable installation drawings, and a recording of each installed transit documenting the as built condition after final inspection in the shipyard. This is to include sections to record any inspection, modification, repair and maintenance.

10.2.6 tank testing plan including details of the test requirements (S14);

10.2.7 corrosion protection specifications (Z8 and Z9);
10.2.8 details for the in-water survey, if applicable, information for divers, clearances measurements instructions etc., tank and compartment boundaries;

10.2.9 docking plan and details of all penetrations normally examined at drydocking;

10.2.10 Coating Technical File, for ships subject to compliance with the IMO Performance Standard for Protective Coatings (PSPC) as a class requirement under the IACS Common Structural Rules.

Enclosures:
A. Table 1 - Hull Surveyable Items Activities Table
B. Appendix 1 - Shipyard Review Record
C. Appendix 2 - Requirements for Tankers and Bulk Carriers subject to SOLAS Chapter II-1 Part A-1 Regulation 3-10 Goal-based ship construction standards for bulk carriers and oil tankers
D. Appendix 3 - Recommendatory Sample - Cable Transit Seal Systems Register
<table>
<thead>
<tr>
<th>Reference</th>
<th>Shipbuilding function</th>
<th>Survey Requirements for Classification</th>
<th>Survey Method required for Classification</th>
<th>TL reference</th>
<th>statutory requirements and relevant reference</th>
<th>Documentation available to classification surveyor during construction</th>
<th>Documentation for ship construction file</th>
<th>Specific activities</th>
<th>Classification society proposals for the project</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>welding</td>
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<tr>
<td>1.1</td>
<td>welding consumables</td>
<td>Classification approved separately at the manufacturer</td>
<td>review approval status and patrol, verify storage, handling and treatment in accordance with manufacturer's requirements</td>
<td>TL-R W17</td>
<td>consumable specification and approval status</td>
<td>not required</td>
<td>Identify consumables against approved list</td>
<td>verify temporary and permanent storage facilities</td>
<td>e.g. kept dry, covered, where applicable heated</td>
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<tr>
<td>1.2</td>
<td>welder qualification</td>
<td>Qualified welders</td>
<td>review of welder certification and patrol</td>
<td>TL-G 47</td>
<td>shipyards records with individual's identification</td>
<td>not required</td>
<td>verify welder qualification standard, e.g. class or recognised standard approval</td>
<td>verify welder approved for weld position</td>
<td>verify validity of qualification certificate</td>
</tr>
<tr>
<td>Reference</td>
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<tr>
<td>1.3</td>
<td>Welding - mechanical properties (welding procedures)</td>
<td>All weld joint configurations, positions and materials to be covered by weld procedures approved by the classification society or by another IACS member available</td>
<td>review and patrol</td>
<td>TL-R W28</td>
<td>Approved weld procedure specification and welding plan relevant to the ship project or process</td>
<td>not required</td>
<td>verify procedures are available at relevant workstations</td>
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<td></td>
<td></td>
<td>the classification society witnesses all new weld procedure qualification tests carried out in the shipyard whenever the classification society is surveying in the shipyard</td>
<td>witness</td>
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<tr>
<td>1.3a</td>
<td>welding equipment</td>
<td>correctly calibrated and maintained</td>
<td>patrol and review</td>
<td></td>
<td>shipbuilders maintenance and calibration records</td>
<td>not required</td>
<td>verify condition of machinery and equipment. verify machines are calibrated by appropriate staff verify calibration carried out in accordance with manufacturer’s recommendations verify calibration in accordance with maintenance schedule</td>
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<tr>
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<tr>
<td>1.3b</td>
<td>welding environment</td>
<td>satisfactory environment</td>
<td>patrol</td>
<td>TL-G 47</td>
<td>not required</td>
<td>Verify welding areas clean, dry, well lit.</td>
<td>Relevance measures taken for any pre or post heat treatment, drying of surfaces prior to welding</td>
<td>Confirm shielding gases, fluxes protected</td>
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<tr>
<td>1.3c</td>
<td>welding supervision</td>
<td>sufficient number of skilled supervisors</td>
<td>Review and patrol</td>
<td>TL-R W33, TL-G 47</td>
<td>verify supervision is effective</td>
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<tr>
<td>1.4</td>
<td>welding-surface discontinuities</td>
<td>Substantially free from significant indications, satisfactory profile and size</td>
<td>visual examination, surface detection techniques, review of documents and patrol of operator</td>
<td>TL-R W33, TL-G 47</td>
<td>not required</td>
<td>Review NDE records</td>
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<tr>
<td>Reference</td>
<td>Shipbuilding function</td>
<td>Survey Requirements for Classification</td>
<td>Survey Method required for Classification</td>
<td>TL reference * statutory requirements and relevant reference</td>
<td>Documentation available to classification surveyor during construction</td>
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<tr>
<td>1.5</td>
<td>Welding - embedded discontinuities</td>
<td>NDE is to be carried out by qualified operators capable of ensuring that welds are substantially free from significant indications</td>
<td>Radiography and ultrasonic testing, review of documents and patrol of operator, examination of films</td>
<td>TL-R W33, TL-G 47</td>
<td>Shipbuilders and recognised standards and Rules as applicable, welding and NDE plans, NDE reports, operator qualifications</td>
<td>not required</td>
<td>Identify workstations where NDE is carried out, e.g. panel line butt welds, castings into hull structure</td>
<td>Verify NDE carried out in accordance with approved plans where applicable</td>
<td></td>
</tr>
</tbody>
</table>
Verify suitability of NDE methods 
Verify operators suitably qualified particularly where sub-contractors have been employed 
Verify that records have been completed and in accordance with recognised standards, e.g. IQI and sensitivity recorded 
Verify that reports and radiographs have been evaluated correctly by the shipbuilder. Systematic review of radiographs carried out by the surveyor 
Verify equipment calibration satisfactory and in accordance with manufacturers and recognised standards requirements 
Verify NDE is carried out according to the acceptable process |
<table>
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<td>2</td>
<td>Steel preparation and fit up:</td>
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<td>2.1</td>
<td>Surface preparation, marking and cutting</td>
<td>traceability and acceptability of material, check of steel plates &amp; profiles materials type, scantling identification, testing marks</td>
<td>patrol</td>
<td>TL-G 47</td>
<td></td>
<td>material certificates, shipbuilder’s marking/cutting production documents at the workstage - documents retained at the facility</td>
<td>not required</td>
<td>Verify stockyard storage satisfactory</td>
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<td>2.2</td>
<td>straightening</td>
<td>Approval of straightening methods/ procedures against deformation</td>
<td>patrol and review</td>
<td>TL-G 47</td>
<td>recognised standards, approved procedures</td>
<td>not required</td>
<td>Verify that straightening processes are approved for the grade and type of steel, e.g. tmcp, z plate.</td>
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<tr>
<td>2.3</td>
<td>forming</td>
<td>Maintain material properties. Acceptance of forming method against improper deformations</td>
<td>patrol</td>
<td>TL-G 47</td>
<td>Shipbuilders procedure for hot forming</td>
<td>not required</td>
<td>Verify that temperature control is exercised by the operator. Verify that suitable methods of temperature control are available when forming special steels and materials Verify that forming processes are acceptable</td>
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<tr>
<td>2.4</td>
<td>conformity with alignment/fit up/gap criteria</td>
<td>Check alignment/fit up/gap against reference standards</td>
<td>patrol</td>
<td>TL-G 47</td>
<td>Shipbuilders and recognised standards and Rules as applicable,</td>
<td>not required</td>
<td>Verify the processes to ensure satisfactory fit up and alignment at all workstations Verify that edge preparations are re-instated where lost during fitting operations Verify remedial procedures are in place to compensate for wide gaps and alignment deviations</td>
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<td>Reference</td>
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<tr>
<td>2.5</td>
<td>conformity for critical areas, when defined, with alignment/fit up or weld configuration</td>
<td>Check alignment/fit up/gap against approved drawings</td>
<td>witness and review</td>
<td></td>
<td>Shipbuilders and recognised standards and Rules as applicable, approved plan or standard, builder's records</td>
<td>Approved plans of critical areas if applicable</td>
<td>Verify that the information relevant to the latest approved drawings is available at the workstations</td>
<td>Verify the processes to ensure satisfactory fit up and alignment at all workstations</td>
<td>Verify that edge preparations are re-instated where lost during fitting operations</td>
</tr>
<tr>
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<tr>
<td>3</td>
<td>Steelwork process, e.g. sub assembly, block, grand and mega block assembly, pre-erection and erection, closing plates</td>
<td>compliance with approved drawings, visual examination of welding and material, check alignment and deformations</td>
<td>patrol of the process and witness of the completed item</td>
<td>TL-G 47</td>
<td>approved plans, shipbuilders inspection records, Shipbuilders and recognised standards and Rules as applicable, construction plan (steelwork subdivision)</td>
<td></td>
<td>Verify that the information relevant to the latest approved drawings is available at the workstations</td>
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<tr>
<td>4</td>
<td>Remedial work and alteration</td>
<td>welding, check against deformation, alignment</td>
<td>review records and witness</td>
<td>TL-G 47</td>
<td>permanent record of shipyard surveyable item</td>
<td></td>
<td>Verify that records have been maintained of significant deviations from the approved plans, for situations such as mis cut openings, re-routing outfit items</td>
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<tr>
<td>Reference</td>
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<tr>
<td>5</td>
<td>Tightness testing, including leak and hose testing, hydropneumatic testing</td>
<td>Absence of leaks</td>
<td>Review and witness of the test</td>
<td>TL-R S14</td>
<td>Reg. II-1/11 of SOLAS as amended; approved tank testing plan, shipbuilders inspection records</td>
<td>approved tank testing plan</td>
<td>Confirm that tank testing is carried out in accordance with the approved plan</td>
<td>Verify that all deviations brought to the attention of the classification society by the shipbuilder are acceptable</td>
<td></td>
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<tr>
<td>6</td>
<td>Structural testing</td>
<td>structural adequacy of the design</td>
<td>Review and witness of the test</td>
<td>TL-R S14</td>
<td>Reg. II-1/11 of SOLAS as amended; approved tank testing plan, shipbuilders inspection records</td>
<td>approved tank testing plan</td>
<td>Confirm that tank testing is carried out in accordance with the approved plan</td>
<td>Confirm the methods used to carry out leak testing</td>
<td>Confirm that correct test pressures maintained for leak, hose and hydropneumatic testing is satisfactory</td>
</tr>
<tr>
<td>Reference</td>
<td>Shipbuilding function</td>
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<td>7</td>
<td>corrosion protection systems, e.g. coatings, cathodic protection, impressed current except for coating system subject to PSPC</td>
<td>Salt water ballast tanks with boundaries formed by the hull envelope, and also bulk carrier hold internal surfaces, coamings and hatch covers shall have an efficient protective coating. Safety aspects of cathodic systems to be dealt with separately.</td>
<td>Review and report on builder’s &amp; manufacturer’s documentation</td>
<td>TL-R Z 8 and Z 9, TL-I SC122, TL-R F1</td>
<td>Reg. II-1/3-2 of SOLAS as amended; manufacturer’s specification</td>
<td>Verification of applied coatings and review records of application</td>
<td></td>
<td></td>
<td>Verify that adequate records have been maintained and copied to the ship construction file</td>
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<tr>
<td></td>
<td>Application Antifouling Systems</td>
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<tr>
<td>7.1</td>
<td>Application of Protective Coatings for Dedicated Seawater Ballast Tanks in all Types of Ships and Double-Side Skin Spaces of Bulk Carriers subject to PSPC</td>
<td>Monitor implementation of the coating inspection requirements</td>
<td>Patrolling and Review</td>
<td>TL-I SC223</td>
<td>Reg. II-1/3-2 of SOLAS as amended; Signed and Verified Tripartite Agreement</td>
<td>Coating Technical File</td>
<td>Verify that applied coatings are approved and reviewed records of application</td>
<td></td>
<td>Verify that adequate records have been maintained and copied to the ship construction file</td>
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<td>8</td>
<td>Installation, welding and testing of the following:</td>
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<tr>
<td>8.1</td>
<td>hatch covers</td>
<td>Tightness and securing</td>
<td>Witness</td>
<td>TL-R S14, TL-G 14</td>
<td>Reg. 13-14-15 and 16 of ILLC ’66</td>
<td>Details required, structural drawings</td>
<td>Confirm leak test of hatch covers</td>
<td></td>
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</tr>
</tbody>
</table>

*Statutory requirements and relevant reference* for classification surveyor during construction:
- Reg. II-1/3-2 of SOLAS as amended
- Manufacturer’s and builder’s specification

**Specific activities**:
- Verify that applied coatings are approved and reviewed records of application
- Verify that adequate records have been maintained and copied to the ship construction file
- Verify that applied coatings are approved and reviewed records of application in accordance with Chapter 7 of Annex to MSC.215(82)

**Classification society proposals for the project**:
- Proposals for project specific activities
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>8.2</td>
<td>doors and ramps integral with the shell and bulkheads</td>
<td>tightness and securing</td>
<td>witness</td>
<td>TL-R S14</td>
<td>Reg. II-1/18 of SOLAS as amended; Reg. 12 and 21 of ILLC ’66</td>
<td>approved tank testing plan, shipbuilders inspection records</td>
<td>details required</td>
<td>Confirm leak test</td>
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<td>Confirm operation and securing test</td>
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<td>Confirm safety device operation</td>
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<td>Ensure correct maintenance logs/manuals supplied with the ship construction file</td>
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<td>8.3</td>
<td>rudders</td>
<td>fitting</td>
<td>witness</td>
<td>TL-R S14</td>
<td>approved plan, shipbuilders inspection records</td>
<td>details required, structural drawings</td>
<td>Confirm alignment and mounting and fitting up to the connection to the tiller</td>
<td>Confirm function test</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Verify fitting of pintles and all securing bolts</td>
<td></td>
</tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Verify all fit up records including all clearances maintained and placed into ship construction file</td>
<td></td>
</tr>
<tr>
<td>Reference</td>
<td>Shipbuilding function</td>
<td>Survey Requirements for Classification</td>
<td>Survey Method required for Classification</td>
<td>TL reference *</td>
<td>statutory requirements and relevant reference</td>
<td>Documentation available to classification surveyor during construction</td>
<td>Documentation for ship construction file</td>
<td>Specific activities</td>
<td>Classification society proposals for the project</td>
</tr>
<tr>
<td>-----------</td>
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<td>----------------------------------------------</td>
</tr>
<tr>
<td>8.4</td>
<td>forgings and castings</td>
<td>compliance with approved drawings, visual examination of welding and material, check alignment and deformations</td>
<td>patrol of the process and witness of the completed item</td>
<td>TL-R W7 &amp; W8</td>
<td>approved plans, shipbuilders inspection records, Shipbuilders and recognised standards and Rules as applicable, construction plan (steelwork sub-division)</td>
<td>copies of certificates of forgings and castings</td>
<td></td>
<td>Verify casting and forgings against material certificate</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Verify that correct welding and fit up requirements specified in reference 1, 2.4 and 2.5 of this table have been adopted</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>appendages</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Verify that material certificates are included in the ship construction file</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Verify that correct welding and fit up requirements specified in reference 1, 2.4 and 2.5 of this table have been adopted</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reference</td>
<td>Shipbuilding function</td>
<td>Survey Requirements for Classification</td>
<td>Survey Method required for Classification</td>
<td>TL reference</td>
<td>statutory requirements and relevant reference</td>
<td>Documentation available to classification surveyor during construction</td>
<td>Documentation for ship construction file</td>
<td>Specific activities</td>
<td>Classification society proposals for the project</td>
</tr>
<tr>
<td>-----------</td>
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<td>------------------------------------------------</td>
</tr>
<tr>
<td>8.5</td>
<td>equipment forming the watertight and weathertight integrity of the ship, e.g. overboard discharges, air pipes, ventilators</td>
<td>tightness and securing</td>
<td>witness</td>
<td>Reg. II-1/16 and Reg. II-1/16-1 of SOLAS as amended; Reg. 17-18-19-20-22-23 of ILLC '66</td>
<td>approved tank testing plan, shipbuilders inspection records</td>
<td>details required</td>
<td>Verify that correct welding and fit up requirements specified in reference 1, 2.4 and 2.5 of this table have been adopted</td>
<td>Verify Compliance with Load line Convention 1966 as amended - i.e. all fittings in accordance with the record of freeboard assignment</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>TL-R P3</td>
<td></td>
<td></td>
<td>Verify air pipes, vents etc closing device are approved type</td>
<td>Verify material certificates for overboard discharges where applicable</td>
<td>Verify record of freeboard assignment and all material certificates included in the ship construction file</td>
</tr>
<tr>
<td>Freeboard marks and draft marks</td>
<td>within allowable tolerances and in accordance with the freeboard assignment</td>
<td>witness</td>
<td>TL-I LL4</td>
<td>Reg. 4- 5- 6- 7 and 8 of ILLC '66</td>
<td>details required</td>
<td>Verify freeboard marks in accordance with load line assignment</td>
<td>Verify draft marks in accordance with the agreed tolerances specified by the builder unless more onerous flag state requirements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reference</td>
<td>Shipbuilding function</td>
<td>Survey Requirements for Classification</td>
<td>Survey Method required for Classification</td>
<td>TL reference *</td>
<td>statutory requirements and relevant reference</td>
<td>Documentation available to classification surveyor during construction</td>
<td>Documentation for ship construction file</td>
<td>Specific activities</td>
<td>Classification society proposals for the project</td>
</tr>
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<td>-----------------------------------------------</td>
</tr>
<tr>
<td>Principal dimensions</td>
<td>within allowable tolerances</td>
<td>review and witness</td>
<td>TL-G 47</td>
<td>details required</td>
<td>Verify principal dimensions in accordance with recognised standard</td>
<td>Verify dimensions included in ship construction file</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safety Construction certification</td>
<td>no outstanding imperfections or defects</td>
<td>witness</td>
<td>Reg. I/7 or Reg. I/10 of SOLAS as amended, as appropriate</td>
<td>Verify that Administration requirements have been incorporated into the hull structure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.6 watertight cable transit seal systems</td>
<td>compliance with approved drawings, visual examination of fitting, check alignment and securing</td>
<td>patrol of the process and witness of the completed item</td>
<td>Reg. II-1/13 and 13-1 of SOLAS as amended</td>
<td>shipbuilder's inspection records, manufacturer's specification</td>
<td>Cable Transit Seal Systems Register</td>
<td>Verify that correct welding and fit up requirements, including as specified in reference 1, 2.4 and 2.5 of this table have been adopted</td>
<td>Verify watertight cable transit seal systems are type approved</td>
<td>Verify the format and content of the Register</td>
<td></td>
</tr>
</tbody>
</table>

* TL-Gs are not mandatory requirements.
# Shipyard Review Record

<table>
<thead>
<tr>
<th>Name of Shipyard</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## 1. Details of any Management Systems

<table>
<thead>
<tr>
<th>Obtained approval</th>
<th>Certified by</th>
<th>Expiry Date</th>
<th>Remarks (scope, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISO-9001</td>
<td></td>
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<tr>
<td>ISO 14001</td>
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<tr>
<td>ISO 45001</td>
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<td></td>
</tr>
<tr>
<td>Other:</td>
<td></td>
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</tr>
</tbody>
</table>

## 2. Construction Facilities: (Documents such as a brochure of shipyard can be attached in lieu of completing this section.)

### 2.1 Building Berth (B) or Dock (D)

*In case of berth, Depth is not applicable.

<table>
<thead>
<tr>
<th>B / D</th>
<th>Name</th>
<th>Length (m)</th>
<th>Width (m)</th>
<th>Depth* (m)</th>
<th>Building Capacity (Gross Tonnage)</th>
<th>Crane (Ton x No.)</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
</tbody>
</table>

### 2.2 Outfitting Quays

<table>
<thead>
<tr>
<th>Name</th>
<th>Length (m)</th>
<th>Width (m)</th>
<th>Depth (m)</th>
<th>Berthing Capacity (Gross Tonnage)</th>
<th>Crane (Ton x No.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
### 2.3 Main Fabrication and Erection Facilities

<table>
<thead>
<tr>
<th>(1) Marking and cutting of steel plates (including internal members)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Marking method (Manual, Photo x ___, EPM x ___, NC x ___ others _______)</td>
</tr>
<tr>
<td>- NC cutting machine (Gas x ___, Plasma x ___, Laser x ___)</td>
</tr>
<tr>
<td>Control procedure of NC (On-line, other)</td>
</tr>
<tr>
<td>- Cutting equipment (Edge planer x ___, Roll-shear x ____)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(2) Marking and cutting of section bar</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Marking method (Manual, NC) - Marking of reference curved line (Manual, NC)</td>
</tr>
<tr>
<td>- Cutting method (Manual, NC) - In case of NC (Gas x ___, Plasma x ___)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(3) One-side automatic welding machine (Yes, No)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Type of welding machine (Flux Backing x ___, Flux and Copper Backing x ___ other _______)</td>
</tr>
<tr>
<td>- Existence of special surface plate for plate welding (Yes, No)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(4) Fillet welding machine (Gravity, Automatic) Percentage of automatization except gravity: about ___%</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Line Welder (No, Yes: submerged arc x ___ heads, CO₂ x ___ heads)</td>
</tr>
<tr>
<td>- Small automatic fillet welding machine (No, Yes: Name: __________ x ___)</td>
</tr>
<tr>
<td>- Welding robot (No, Yes: Portal x ___, Rectangular x ___, Articulated x ___)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(5) Painting equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Plate shot blasting/primer coating machine (No, Yes: Max. Width ___ m, Length ___ m)</td>
</tr>
<tr>
<td>- Section bar shot blasting/primer coating machine (No, Yes: Max. Length ___ m)</td>
</tr>
<tr>
<td>- Special coating factory (No, Yes: ___ m x ___ m x ___ sections)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(6) Vertical automatic welding machine (No, Yes: EG x ___, SEG x ___, ES x ___)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EG: Electrogas SEG: Simplified Electrogas ES: Electroslag</td>
</tr>
</tbody>
</table>

| (7) Other main fabrication facilities |
3. Shipyard Control of Qualified Welders
(1) Normal steel

<table>
<thead>
<tr>
<th></th>
<th>certification</th>
<th>traceability</th>
<th>supervision</th>
<th>maintenance of qualification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shipyard workers</td>
<td>confirm system in place</td>
<td>Yes / No</td>
<td>Yes / No</td>
<td>Yes / No</td>
</tr>
<tr>
<td>Subcontracted workers</td>
<td>confirm system in place</td>
<td>Yes / No</td>
<td>Yes / No</td>
<td>Yes / No</td>
</tr>
</tbody>
</table>

4. Feature of Construction Procedure

(1) Subcontract of hull blocks (weight)
- Sub members (No, Yes: Ratio of subcontracted works ___ %, No., of subcontractors ___)
- Blocks (No, Yes: Ratio of subcontracted works ___ %, No., of subcontractors ___)

(2) Method of plate block assembly
- Method fitting and welding longitudinals and transverse webs on jointed panels
- Method welding longitudinals on jointed panels prior to fitting and welding transverse webs
- Method fitting and welding a frame consists of longitudinals and transverse webs on jointed panels
- Method jointing panels with pre-assembled longitudinals by welding prior to fitting and welding transverse webs
- Other (please specify in (5) below)

(3) - pre-erection outfitting carried out
- grand block/mega block adopted
- Method of erection at building berth/dock
- Max. weight of loading block: ___ ton
- Construction method in building dock/berth/land construction etc. (1 ship, 1.5 ships: Semi-tandem, dual entrance)
- Block loading process (single starting block, multi starting blocks, inserting block: No, Yes)

(4) Final dock (No, Yes: In-house, Other place of the same company, Use other company)

(5) Other feature of construction procedure
5. **Quality Control System:** (Refer to Quality Manual, if available.)

<table>
<thead>
<tr>
<th>Item and description</th>
<th>Result</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Existence of the organization chart including the departments of design, purchasing, manufacturing and quality assurance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Are the function, responsibility and competence of the organization clear?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2) Quality control organization</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Existence of quality control organization</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Number of employees in this organization</td>
<td>___ persons including the chief</td>
<td></td>
</tr>
<tr>
<td>- Existence of procedures or plans related to tests and inspections</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(3) Pre-inspection system of shipyard</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Is pre-inspection carried out prior to Class inspection?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Are pre-inspectors assigned? (Check the list.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Number of pre-inspectors (related to hull only)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Are inspection results marked on the object and/or recorded in the checklist?</td>
<td>___ persons</td>
<td></td>
</tr>
<tr>
<td>(4) Records of inspections and tests</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Are records made and kept properly?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Does the responsible person verify the records?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Can the adoption of necessary corrective actions against non-conformity happened be checked?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(5) Condition at the time of the surveys in the presence of class surveyors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Is the schedule of the surveys changed often?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Are pre-inspection, shipyard inspection and repairs completed beforehand?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Are the sufficient preparations for surveys such as scaffoldings, lighting, cleaning made?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:**
Above-mentioned (3) and (4) include the acceptance inspection of subcontracted items.
6. Measures for Safety and Health

<table>
<thead>
<tr>
<th>Item and description</th>
<th>Result</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Are conditions of scaffolding, nets, safety belt, lighting and ventilation good?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2) Does sufficient attention paid for radiographic examination and operation of cherry picker?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note:

7. Control System of Non-Destructive Examination (NDE)

<table>
<thead>
<tr>
<th>Item and description</th>
<th>Result</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Number of NDE supervisors in shipyard (including persons responsible for judging results)</td>
<td>______ persons</td>
<td></td>
</tr>
<tr>
<td>(2) Dependence on subcontracted NDE work</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Number of shipyard employees</td>
<td>______ persons</td>
<td></td>
</tr>
<tr>
<td>- Number of sub-contractors</td>
<td>______ persons</td>
<td></td>
</tr>
<tr>
<td>(3) NDE sub-contractor company’s name and official technical qualifications</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Name ___________ (approved by) ___________</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(4) Grade and number of NDE employees with official technical qualifications in shipyard</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specialized in radiography</td>
<td>______ Grade ______ persons</td>
<td></td>
</tr>
<tr>
<td>Specialized in ultrasonic</td>
<td>______ Grade ______ persons</td>
<td></td>
</tr>
<tr>
<td>Specialized in surface detection</td>
<td>______ Grade ______ persons</td>
<td></td>
</tr>
<tr>
<td>(5) If non-destructive examinations are subcontracted, the grade and number of officially qualified persons</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specialized in radiography</td>
<td>______ Grade ______ persons</td>
<td></td>
</tr>
<tr>
<td>Specialized in ultrasonic</td>
<td>______ Grade ______ persons</td>
<td></td>
</tr>
<tr>
<td>Specialized in surface detection</td>
<td>______ Grade ______ persons</td>
<td></td>
</tr>
<tr>
<td>(6) Non-destructive examination equipment (in house)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Number of radiographic equipment</td>
<td>______</td>
<td></td>
</tr>
<tr>
<td>- Number of ultrasonic equipment</td>
<td>______</td>
<td></td>
</tr>
</tbody>
</table>

Note:
Even if all works are subcontracted, it is recommendable to attach the qualified person(s) who can verify the works.
### 8. Quality Control on Production Line

<table>
<thead>
<tr>
<th>Item and description</th>
<th>Result</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>8.1 Preventative measures for misuse of materials</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1) Job title of supervisor and person in charge of collating ordered steel and received steel, and checking of mill sheet</td>
<td>Title of supervisor: ______________________</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Title of person in charge: ______________________</td>
<td></td>
</tr>
<tr>
<td>(2) Are means for checking the material grade in hand prescribed for high-grade steels</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(3) Are regulations prescribed for checking the material grade for high-tensile steel for low-temperature applications?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are there regulations for inscribing high tensile steel on the surface of the high tensile steel and special indication for steel for low temperature applications?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(4) Are procedures for re-using of remaining cut-off mild steel?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(5) Are there procedures for re-using of remaining cut-off high-tensile steel?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(6) In the case of (4) and (5) above, can a collation be made with the mill sheet?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(7) Section of controlling the lists of remaining cut-off steel</td>
<td>Name of section: ______________________</td>
<td></td>
</tr>
<tr>
<td>Note:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- In case of high tensile steel, are means identifying different grades</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- In the case of (3) and (4) above, are the materials approved by other classes controlled similarly?</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>8.2 Shot blasting/Primer coating</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1) Existence of surface preparation standards</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2) Existence of coating thickness control standards</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Existence of thickness measurement records</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Note:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- The standard is to include the description related traceability after shot blasting and primer coating.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>8.3 Marking and cutting (Assembly work)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1) Existence of standards for accuracy and periodical inspection of tape measures, tapes, stencils, etc.</td>
<td></td>
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<tr>
<td>(2) Existence of standards for accuracy of cut dimensions and edge preparation</td>
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<td>(3) Existence of standards for finish of cutting face</td>
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<tr>
<td>(4) What is the frequency and extent of maintenance and inspection carried out for ensuring accuracy of NC cutter and/or flame planer?</td>
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<tr>
<td>Item and description</td>
<td>Result</td>
<td>Remarks</td>
</tr>
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<td>-------------------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>(5) In case of NC, are the disks, tapes etc. maintained in good condition?</td>
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<tr>
<td>(6) What are the measures adopted and guidance given to make the worker fully conversant with cutting work standards for maintaining accuracy?</td>
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</tbody>
</table>

Note:
- In case of (2) and (3) above, check items are to include confirmation of edge preparations free from piercing hole.
- NC for section bars is also to be in accordance with the above.

8.4 Bending and strain free

(1) Existence of standards for maximum heating temperatures during water cooling and at the time of bending and distortion removal of steel by quick heating and cooling

(2) Existence of regulations for plate thickness and bending radius for flange processing

(3) What are the measures adopted and guidance given to make the worker fully conversant with maintaining quality and accuracy during the bending process?

Note:

8.5 Control of welding procedure

(1) Are all welding procedures applied to the ships approved by the Society or other IACS members?

Note:

8.6 Treatment of serious non-conformities

(1) Are repair plans submitted to the Society when serious non-conformities happened?

(2) Were the NDE (RT/UT) plans submitted at appropriate timing?

(3) Was the extent of tests extended considering the results of the test?

Note:

8.7 Hydrostatic and watertight tests

(1) Is the test plan submitted to the Society?

(2) Are vacuum tests applied to?

(3) Are local air injection tests during sub-assembly works applied to?
<table>
<thead>
<tr>
<th>Item and description</th>
<th>Result</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>(4) If (2) or (3) above is applied to, are the test procedures approved by the Society?</td>
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</tr>
</tbody>
</table>

Note:
Appendix 2

Requirements for Tankers and Bulk Carriers subject to
SOLAS Chapter II-1 Part A-1 Regulation 3-10

*Goal-based ship construction standards for bulk carriers and oil tankers*
1. Examination and test plan for newbuilding activities

1.1 The shipbuilder is to provide plans of the items which are intended to be examined and tested in accordance with the Society’s Rules in a document known as the Survey Plan, taking into account the ship type and design. This Survey Plan shall be reviewed at the time of the kick off meeting, and must include:

1.1.1 a set of requirements, including specifying the extent and scope of the construction survey(s) and identifying areas that need special attention during the survey(s), to ensure compliance of construction with mandatory ship construction standards including

.1. Types of surveys (visual, non-destructive examination, etc.) depending on location, materials, welding, casting, coatings, etc.

.2. Establishment of a construction survey schedule for all assembly stages from the kick-off meeting, through all major construction phases, up to delivery.

.3. Inspection/survey plan, including provisions for critical areas identified during design approval.

.4. Inspection criteria for acceptance.

.5. Interaction with shipyard, including notification and documentation of survey results.

.6. Correction procedures to remedy construction defects.

.7. List of items that would require scheduling or formal surveys.

.8. Determination and documentation of areas that need special attention throughout ship’s life, including criteria used in making the determination.

1.1.2 a description of the requirements for all types of testing during survey, including test criteria.

2. Design Transparency

2.1 For ships subject to compliance with IMO Res. MSC.287(87), IMO Res. MSC.290(87), IMO Res. MSC.454(100) and IMO MSC.1/Circ.1343, readily available documentation is to include the main goal-based parameters and all relevant design parameters that may limit the operation of the ship.

3. Ship Construction File (SCF)

3.1 A Ship Construction File (SCF) with specific information on how the functional requirements of the Goal-based Ship Construction Standards for Bulk Carriers and Oil Tankers have been applied in the ship design and construction is to be provided upon delivery of a new ship, and kept on board the ship and/or ashore and updated as appropriate throughout the ship’s service. The contents of the Ship Construction File are to conform to the requirements below.
3.1.1 The following design specific information is to be included in the Ship Construction File (SCF):

.1. Areas requiring special attention throughout the ship’s life. (including critical structural areas).

.2. All design parameters limiting the operation of a ship.

.3. Any alternatives to the rules, including structural details and equivalency calculations.

.4. "As built" drawings and information which are verified to incorporate all alterations approved by the recognized organization or flag State during the construction process including scantling details, material details, location of butts and seams, cross section details and locations of all partial and full penetration welds.

.5. Net (renewal) scantlings for all the structural constituent parts, as built scantlings and voluntary addition thicknesses.

.6. Minimum hull girder section modulus along the length of the ship which has to be maintained throughout the ship’s life, including cross section details such as the value of the area of the deck zone and bottom zone, the renewal value for the neutral axis zone.

.7. A listing of materials used for the construction of the hull structure, and provisions for documenting changes to any of the above during the ship’s service life.

.8. Copies of certificates of forgings and castings welded into the hull (TL-R W7 and TL-R W8).

.9. Details of equipment forming part of the watertight and weather tight integrity of the ship.

.9.1 A Cable Transit Seal Systems Register, to be prepared by the shipbuilder for watertight cable transits. The Register can be in either a hard copy or digitized media. For an example of a register see Appendix 3 - Recommendatory Sample - Cable Transit Seal Systems Register. It is to include a marking / identification system, documentation referencing manufacturer manual(s) for each type of cable transit installed, the Type Approval certification for each type of transit system, applicable installation drawings, and a recording of each installed transit documenting the as built condition after final inspection in the shipyard. This is to include sections to record any inspection, modification, repair and maintenance.

.10. Tank testing plan including details of the test requirements (TL-R S14).

.11. Details for the in-water survey, when applicable, information for divers, clearances measurements instructions etc., tank and compartment boundaries.

.12. Docking plan and details of all penetrations normally examined at drydocking.

.13. Coating Technical File, for ships subject to compliance with the IMO Performance Standard for Protective Coatings (PSPC®).

3.1.2 Refer to Table A of this Appendix for details of information to be further included. This information has to be kept on board the ship and/or ashore and updated as appropriate.
throughout the ship’s life in order to facilitate safe operation, maintenance, survey, repair and emergency measures.

3.1.3 It is to be noted that parts of the content of the SCF may be subject to various degrees of restricted access and that such documentation may be appropriately kept ashore.

3.1.4 The SCF has to include the list of documents constituting the SCF and all information listed in Table A of this Appendix, which is required for a ship’s safe operation, maintenance, survey, repair and in emergency situations. Details of specific information that is not considered to be critical to safety might be included directly or by reference to other documents.

3.1.5 When developing an SCF, all of the columns in Table A of this Appendix have to be reviewed to ensure that all necessary information has been provided.

3.1.6 It may be possible to provide information listed in the annex under more than one Tier II functional requirement as a single item within the SCF, for example, the Coating Technical File required by the PSPC is relevant for both "Coating life" and "Survey during construction".

3.1.7 The SCF has to remain with the ship and, in addition, be available to its classification society and flag State throughout the ship’s life. Where information not considered necessary to be on board is stored ashore, procedures to access this information should be specified in the onboard SCF. The intellectual property provisions within the SCF should be duly complied with.

3.1.8 The SCF should be updated throughout the ship’s life at any major event, including, but not limited to, substantial repair and conversion, or any modification to the ship structure.

3.2 The SCF shall be reviewed, at the time of new building, in accordance with the requirements of paragraphs 3.1.1 and 3.1.2 and the normal storage location shall be distinguished.

3.2.1 For the SCF stored on board ship, the surveyor is to verify that the information is placed on board the ship, upon completion of ship construction.

3.2.2 For the SCF stored on shore archive, the surveyor is to verify that the information is stored on shore archive by examining the list of information included on shore archive, upon completion of ship construction.

---

1 Tier II items means the functional requirements included in the International Goal-based Ship Construction Standards for Bulk Carriers and Oil Tankers (GBS), adopted by IMO Res. MSC 287(87)

2 Performance standard for protective coatings for dedicated seawater ballast tanks in all types of ships and double-side skin spaces of bulk carriers, adopted by IMO Res. MSC 215(82), as amended and Performance standard for protective coatings for cargo oil tanks of crude oil tankers, adopted by IMO Res. MSC 288(87), as amended

3 "Review" means the examination of the SCF that is carried out by the surveyor, at the end of the newbuilding process, in order to confirm that:
   - drawings and documents required under the paragraph 3 of the appendix 2 to the TL-R Z23, plus
   - the possible additional drawings/documents provided by the shipyard, as per the Ship Constructional File (SCF) list of drawings/documents
are present in the copies of the SCF stored on board and in the ashore archive.

The "review" is not to be intended as an assessment of the drawings/documents in order to verify their compliances with the applicable Rules/Regulations.
4. Determination of number of Surveyor(s)

TL will assign adequate number of suitable qualified surveyor(s) for new building projects according to the construction progress of each ship to meet appropriate coverage of the examination and testing activities as agreed in the Survey Plan.
<table>
<thead>
<tr>
<th>Tier II items</th>
<th>Information to be included</th>
<th>Further explanation of the content</th>
<th>Example documents</th>
<th>Normal storage location</th>
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</thead>
<tbody>
<tr>
<td>DESIGN</td>
<td></td>
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<tr>
<td>1 Design life</td>
<td>• assumed design life in years</td>
<td>• statement or note on midship section</td>
<td>• SCF-specific</td>
<td>on board ship</td>
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<td></td>
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<td>• midship section plan</td>
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<tr>
<td>2 Environmental</td>
<td>• assumed environmental conditions</td>
<td>• statement referencing data source or Rule (specific rule and data) or;</td>
<td>• SCF-specific</td>
<td>on board ship</td>
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<tr>
<td>conditions</td>
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<td>• in accordance with Rule (date and revision)</td>
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<tr>
<td>3 Structural strength</td>
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<tr>
<td>3.1 General design</td>
<td>• applied Rule (date and revision)</td>
<td>• applied design method alternative to Rule and subject structure(s)</td>
<td>• SCF-specific</td>
<td>on board ship</td>
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<td>• applied alternative to Rule</td>
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<td>• capacity plan</td>
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<td>• loading manual</td>
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<td>3.2 Deformation and</td>
<td>• calculating conditions and results;</td>
<td>• allowable loading pattern</td>
<td>• trim and stability booklet</td>
<td>on board ship</td>
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<td>failure modes</td>
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<td></td>
<td>• assumed loading conditions</td>
<td>• maximum allowable hull girder bending moment and shear force</td>
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<td>3.3 Ultimate strength</td>
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<tr>
<td>strength</td>
<td>• operational restrictions due to structural strength</td>
<td>• maximum allowable cargo density or storage factor</td>
<td>• loading instrument instruction manual</td>
<td>on board ship</td>
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<td>• operation and maintenance manuals</td>
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<td>• strength calculation</td>
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<tr>
<td>3.4 Safety margins</td>
<td>• strength calculation results</td>
<td>• bulky output of strength calculation</td>
<td>• areas prone to yielding and/or buckling</td>
<td>on board ship</td>
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<td></td>
<td>• gross hull girder section modulus</td>
<td>• plan showing highly stressed areas (e.g. critical structural areas) prone to yielding and/or buckling</td>
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<td>• minimum hull girder section modulus along the length of the ship to be maintained throughout the ship's life, including cross section details such as the value of the area of the deck zone and</td>
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<tr>
<td>Tier II items</td>
<td>Information to be included</td>
<td>Further explanation of the content</td>
<td>Example documents</td>
<td>Normal storage location</td>
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<td></td>
<td>bottom zone, the renewal value for the neutral axis zone</td>
<td>• gross scantlings of structural constituent parts</td>
<td>• key construction plans</td>
<td>on board ship</td>
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<td></td>
<td></td>
<td>• net scantlings of structural constituent parts, as built scantlings and voluntary addition thicknesses</td>
<td>• structural details of typical members</td>
<td>on board ship</td>
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<td>• hull form</td>
<td>• rudder and rudder stock plans</td>
<td>on board ship</td>
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<td>• structural details</td>
<td>on board ship</td>
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<td>• yard plans</td>
<td>on shore archive</td>
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<td>• dangerous area plan</td>
<td>on board ship</td>
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<td>• hull form information indicated in key construction plans</td>
<td>on shore archive</td>
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<td>• hull form data stored within an onboard computer necessary for trim and stability and longitudinal strength calculations</td>
<td>on board ship</td>
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<td>• lines plan</td>
<td>on board ship</td>
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<tr>
<td>4 Fatigue life</td>
<td>• applied Rule (date and revision)</td>
<td>• applied design method alternative to Rule and subject structures</td>
<td>• SCF-specific</td>
<td>on board ship</td>
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<tr>
<td></td>
<td>• applied alternative to Rule</td>
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<td></td>
<td>• calculating conditions and results;</td>
<td>• assumed loading conditions and rates</td>
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<td></td>
<td>• assumed loading conditions</td>
<td>• bulky output of fatigue life calculation</td>
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<td></td>
<td>• fatigue life calculation results</td>
<td>• plan showing areas (e.g. critical structural areas) prone to fatigue</td>
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<td>• areas prone to fatigue</td>
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<td>5 Residual strength</td>
<td>• applied Rule (date and revision)</td>
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<td>• SCF-specific</td>
<td>on board ship</td>
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<tr>
<td>Tier II items</td>
<td>Information to be included</td>
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<td>Example documents</td>
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<td>6 Protection against corrosion</td>
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<td>on board ship</td>
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<tr>
<td>6.1 Coating life</td>
<td>• coated areas and target coating life and other measures for corrosion protection in holds, cargo and ballast tanks, other structure-integrated deep tanks and void spaces</td>
<td>• plans showing areas (e.g. critical structural areas) prone to excessive corrosion • Coating Technical File required by PSPC (Performance standard for protective coatings for dedicated seawater ballast tanks in all types of ships and double-side skin spaces of bulk carriers, adopted by IMO Resolution MSC.215(82), as amended and Performance standard for protective coatings for cargo oil tanks of crude oil tankers, adopted by IMO Resolution MSC.288(87), as amended)</td>
<td>• SCF-specific • areas prone to excessive corrosion • key construction plans</td>
<td>on board ship</td>
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<tr>
<td>6.2 Corrosion addition</td>
<td>• specification for coating and other measures for corrosion protection in holds, cargo and ballast tanks, other structure-integrated deep tanks and void spaces • gross scantlings of structural constituent parts • net scantlings of structural constituent parts, as built scantlings and voluntary addition thicknesses</td>
<td></td>
<td>• specification for coating and other measures for corrosion protection in holds, cargo and ballast tanks, other structure-integrated deep tanks and void spaces • gross scantlings of structural constituent parts • net scantlings of structural constituent parts, as built scantlings and voluntary addition thicknesses</td>
<td>on board ship</td>
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<tr>
<td>7 Structural redundancy</td>
<td>• applied Rule (date and revision)</td>
<td>• SCF-specific</td>
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<td>on board ship</td>
</tr>
<tr>
<td>8 Watertight and weathertight integrity</td>
<td>• applied Rule (date and revision) • key factors for watertight and weathertight integrity</td>
<td>• SCF-specific</td>
<td>• details of equipment forming part of the watertight and weathertight integrity • structural details of hatch covers, doors and other closings integral with the shell and bulkheads</td>
<td>on board ship</td>
</tr>
<tr>
<td>9 Human element considerations</td>
<td>• list of ergonomic design principles applied to ship structure design to enhance safety during operations, inspections and maintenance of ship</td>
<td>• SCF-specific</td>
<td></td>
<td>on board ship</td>
</tr>
<tr>
<td>10 Design transparency</td>
<td>• applied Rule (date and revision) • applicable industry standards for design transparency and IP protection • reference to part of SCF information kept ashore</td>
<td>• intellectual property provisions</td>
<td>• intellectual property provisions • summary, location and access procedure for part of SCF information on shore</td>
<td>on board ship</td>
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</tbody>
</table>

Page 8 of 11
<table>
<thead>
<tr>
<th>Tier II items</th>
<th>Information to be included</th>
<th>Further explanation of the content</th>
<th>Example documents</th>
<th>Normal storage location</th>
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<tbody>
<tr>
<td><strong>CONSTRUCTION</strong></td>
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<tr>
<td>11 Construction quality procedures</td>
<td>• applied construction quality standard</td>
<td>• recognized national or international construction quality standard</td>
<td>• SCF-specific</td>
<td>on board ship</td>
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<td></td>
<td>• survey regime applied during construction (to include all owner and class scheduled inspections during construction)</td>
<td>• applied Rules (date and revision)</td>
<td>• SCF-specific</td>
<td>on board ship on board ship</td>
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<td></td>
<td>• information on non-destructive examination</td>
<td>• copies of certificates of forgings and castings welded into the hull</td>
<td>• non-destructive testing plan</td>
<td>on board ship</td>
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<td>• Coating Technical File required by PSPC</td>
<td>on board ship on board ship</td>
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<tr>
<td><strong>IN-SERVICE CONSIDERATIONS</strong></td>
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<tr>
<td>13 Survey and maintenance</td>
<td>• maintenance plans specific to the structure of the ship where higher attention is called for</td>
<td>• plan showing highly stressed areas (e.g. critical structural areas) prone to yielding, buckling, fatigue and/or excessive corrosion</td>
<td>• SCF-specific</td>
<td>on board ship on board ship</td>
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<td>• operation and maintenance manuals (e.g. hatch covers and doors)</td>
<td>on board ship on board ship</td>
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<td>• preparations for survey</td>
<td>• arrangement and details of all penetrations normally examined at dry-docking</td>
<td>• docking plan</td>
<td>on board ship on board ship</td>
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<td></td>
<td>• gross hull girder section modulus</td>
<td>• details for dry-docking</td>
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<td>• minimum hull girder section modulus along the length of the ship to be maintained throughout the ship’s life, including cross section details such as the value of the area of the deck zone and bottom zone, the renewal value for the neutral axis zone</td>
<td>• details for in-water survey</td>
<td>• dangerous area plan</td>
<td>on board ship on board ship</td>
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<td>• Ship Structure Access Manual</td>
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<td></td>
<td>• gross scantlings of structural constituent parts</td>
<td></td>
<td>• Means of access to other structure-integrated deep tanks</td>
<td>on board ship on board ship</td>
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<td></td>
<td>• net scantlings of structural constituent parts, as built</td>
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<td>• Coating Technical File required by PSPC</td>
<td>on board ship</td>
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<td>• key construction plans</td>
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<td>• rudder and rudder stock</td>
<td>on board ship</td>
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<td>Tier II items</td>
<td>Information to be included</td>
<td>Further explanation of the content</td>
<td>Example documents</td>
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<td>scantlings and voluntary addition thicknesses</td>
<td>• hull form information indicated in key construction plans</td>
<td>• structural details</td>
<td>on board ship</td>
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<td></td>
<td>• hull form</td>
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<td>• yard plans</td>
<td>on shore archive</td>
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<td>• lines plan</td>
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<td>or equivalent</td>
<td>on board ship</td>
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<tr>
<td>14 Structural accessibility</td>
<td>• means of access to holds, cargo and ballast tanks and other structure-integrated deep tanks</td>
<td>• plans showing arrangement and details of means of access</td>
<td>• Ship Structure Access Manual</td>
<td>on board ship</td>
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<td>• means of access to other structure-integrated deep tanks</td>
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</tbody>
</table>

**RECYCLING CONSIDERATIONS**

| 15 Recycling | • identification of all materials that were used in construction and may need special handling due to environmental and safety concerns | • list of materials used for the construction of the hull structure | • SCF-specific | on board ship |

Notes:

1. "SCF-specific" means documents to be developed especially to meet the requirements of these GBS guidelines (MSC.1/Circ.1343).

2. "Key construction plans" means plans such as midship section, main O.T. and W.T. transverse bulkheads, construction profiles/plans, shell expansions, forward and aft sections in cargo tank (or hold) region, engine-room construction, forward construction and stern construction drawings.

3. "Yard plans" means a full set of structural drawings, which include scantling information of all structural members.

4. "Hull form" means a graphical or numerical representation of the geometry of the hull. Examples would include the graphical description provided by a lines plan and the numerical description provided by the hull form data stored within an onboard computer.

5. "Lines plan" means a special drawing which is dedicated to show the entire hull form of a ship.
6 "Equivalent (to Lines plan)" means a set of information of hull form to be indicated in key construction plans for SCF purposes. Sufficient information should be included in the drawings to provide the geometric definition to facilitate the repair of any part of the hull structure.

7 "Normal storage location" means a standard location where each SCF information item should be stored. However, those items listed as being on board in the table above should be on board as a minimum to ensure that they are transferred with the ship on a change of owner.

8 "Shore archive" is to be operated in accordance with applicable international standards.
### Appendix 3 - Recommendatory Sample - Cable Transit Seal System Register

**Name of Ship:** Sample  
**IMO No:** 12345  
**Place:** Hamburg  
**Date:** XX/XX/2017  
**Inspected by:** Smith

<table>
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<tr>
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<th>Condition</th>
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<th>Date</th>
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<td>x</td>
<td>Open, drilled hole not closed</td>
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</table>

**NOTES:**
- C = Compound (not known brand)  
- R = Smith Blocks  
- B = MCT Williams  
- H = Heavy corrosion  
- N = Nelson, Torasaki  
- MB = Mixed brands  
- MM = Mixed module sizes  
- NVD = No Visible Defects  
- CPA = Checkpoints rectangular frames  
- CPB = Checkpoints round frames

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**Page 1 of 1**
Survey Requirements for Shell and Inner Doors of Ro-Ro Ships

CONTENTS

1. Application
2. Definitions
3. Special Survey
4. Annual Survey

TABLE 1

Minimum Requirements for Close-Up Surveys of Doors, Locking, Securing and Supporting Devices and Fittings

Note:

This requirement is implemented for surveys commenced on or after 1 January 2012.
1. **Application**

1.1 These requirements are applicable to the survey of bow, inner, side shell and stern doors of Ro-Ro passenger (Ro-Pax) and Ro-Ro cargo ships, to the extent appropriate to the arrangement and equipment of each ship.

The requirements are additional to the classification requirements applicable to the remainder of the ship. Refer to TL-R Z7.

1.2 Special consideration may be given in application of relevant sections of this Unified Requirement to commercial vessels owned or chartered by Governments, which are utilized in support of military operations or service.

2. **Definitions**

2.1 **Ro-Ro Ship**

Ro-Ro ship - For the purpose of this requirement, a Ro-Ro ship is a ship which utilizes a loading ramp to enable wheeled vehicles to be rolled-on and rolled-off the ship.

2.2 **Ro-Ro passenger ship (Ro-Pax)**

Ro-Ro passenger ship - a passenger ship with Ro-Ro spaces or special category spaces.

2.3 **Ro-Ro spaces**

Ro-Ro spaces - spaces not normally sub-divided in any way and normally extending to either a substantial length or the entire length of the ship, in which motor vehicles with fuel in their tanks for their own propulsion and / or goods (packaged or in bulk, in or on rail or road cars, vehicles (including road or rail tankers), trailers, containers, pallets, demountable tanks or in or on similar stowage units or, other receptacles) can be loaded and unloaded normally in a horizontal direction.

2.4 **Special category spaces**

Special category spaces - those enclosed vehicle spaces above or below the bulkhead deck, into and from which vehicles can be driven and to which passengers have access. Special category spaces may be accommodated on more than one deck provided that the total overall clear height for vehicles does not exceed 10m.

2.5 **Securing device**

Securing device - a device used to keep the door closed by preventing it from rotating about its hinges.

2.6 **Supporting device**

Supporting device - a device used to transmit external or internal loads from the door to a securing device and from the securing device to the ship’s structure, or a device other than a securing device, such as a hinge, stopper or other fixed device, that transmits loads from the door to the ship’s structure.

2.7 **Locking device**

Locking device - a device that locks a securing device in the closed position.

2.8 **Close-Up Survey**

Close-Up Survey - a survey where the details of structural components are within the close visual inspection range of the surveyor, i.e. normally within reach of hand.
3. **Special Survey**

3.1 The Special Survey is to include, in addition to the requirements of the Annual Survey as required in 4.1, examination, tests and checks of sufficient extent to verify that the bow, inner, side shell and stern doors, are in satisfactory condition and considered able to remain in compliance with applicable requirements, subject to proper maintenance and operation in accordance with the Operation and Maintenance Manual (OMM) or manufacturer’s recommendations and the periodical surveys being carried out at the due dates for the five year period until the next Special Survey.

3.2 The examinations of the doors are to be supplemented by thickness measurements and testing to verify compliance with applicable requirements so that the structural and weathertight integrity remain effective. The aim of the examination is to identify corrosion, significant deformation, fractures, damages or other structural deterioration, that may be present.

3.3 The bow, inner, side shell and stern doors are to be surveyed as follows:

3.3.1 A survey of the items listed in 4.4, including close-up survey of securing, supporting and locking devices, together with welding, is to be carried out, refer to Table 1.

3.3.2 Non-destructive testing and thickness measurements are to be carried out on securing, supporting and locking devices, including welding, to the extent considered necessary by the surveyor. Whenever a crack is found, an examination with NDT is to be carried out in the surrounding area and for similar items as considered necessary by the surveyor.

3.3.3 The maximum thickness diminution of hinging arms, securing, supporting and locking devices is to be treated according to the normal procedure for TL for primary structures, but is not to be more than 15% of the as-built thickness or the maximum corrosion allowance of TL, whichever is less. Certain designs may be subject to TL’s special consideration.

3.3.4 Checking the effectiveness of sealing arrangements by hose testing or equivalent is to be carried out.

3.3.5 Clearances of hinges, bearings and thrust bearings are to be taken. Unless otherwise specified in the OMM or by manufacturer’s recommendation, the measurement of clearances on Ro-Ro cargo ships may be limited to representative bearings where dismantling is needed in order to measure the clearances.

If dismantling is carried out, a visual examination of hinge pins and bearings together with NDT of the hinge pin is to be carried out.

3.3.6 The non-return valves of the drainage system are to be dismantled and examined.
4. **Annual Survey**

4.1 The survey is to consist of an examination to verify, as far as is practicable, that the bow, inner, side shell and stern doors are maintained in a satisfactory condition.

4.2 Confirmation is to be obtained that no unapproved changes have been made to the bow, inner, side shell and stern doors since the last survey.

4.3 **Documents**

If an Operating and Maintenance Manual (OMM) is required, it is to be verified that an approved copy is on board and any possible modifications are included. It is to be verified that documented operating procedures for closing and securing doors are kept on board and posted at an appropriate place. The surveyor shall examine the OMM with special attention to the register of inspections and its contents as a basis for the survey.

4.4 **Structural examination**

Bow, inner, side shell and stern doors are to be examined with particular attention paid to:

- Structural arrangement of doors including plating, secondary stiffeners, primary structure, hinging arms and welding;

- Shell structure surrounding the opening of the doors and the securing, supporting and locking devices including shell plating, secondary stiffeners, primary structure, and welding;

- Hinges and bearings, thrust bearings;

- Hull and door side supports for securing, supporting and locking devices;

- Close-up survey of securing, supporting and locking devices including welding, refer to Table 1.

Whenever a crack is found, an examination with NDT is to be carried out in the surrounding area and for similar items as considered necessary by the surveyor.

4.5 **Measurement of clearances**

Clearances of hinges, bearings and thrust bearings are to be taken, where no dismantling is required. Where the function test is not satisfactory, dismantling may be required to measure the clearances. If dismantling is carried out, a visual examination of hinge pins and bearings together with NDT of the hinge pin is to be carried out. Clearances of securing, supporting and locking devices are to be measured, where indicated in the OMM.

4.6 **Sealing arrangement**

An examination of packing material / rubber gaskets and retaining bars or channels, including welding is to be carried out.

4.7 **Drainage arrangement**

An examination of drainage arrangement, including bilge wells and drain pipes is to be carried out, where fitted. A test of the bilge system between the inner and outer doors is to be carried out.

4.8 **Function test of doors**

Checking of the satisfactory operation of the bow, inner, side shell and stern doors during a complete opening and closing operation is to be made, as applicable, including:
- Proper working of the hinging arms and hinges;
- Proper engagement of the thrust bearings;
- Device for locking the door in the open position;
- Securing, supporting and locking devices;
- Proper sequence of the interlock system for the opening / closing system and the securing and locking devices;
- Mechanical lock of the securing devices;
- Proper locking of hydraulic securing devices in the event of a loss of the hydraulic fluid, according to the procedure provided by the OMM;
- Correct indication of open / closed position of doors and securing / locking devices at navigation bridge and other control stations;
- Isolation of the hydraulic securing / locking devices from other hydraulic systems;
- Confirmation that the operating panels are inaccessible to unauthorized persons;
- Verification that a notice plate giving instructions to the effect that all securing devices are to be closed and locked before leaving harbour is placed at each operating panel and supplemented by warning indicator lights;
- Examination of electrical equipment for opening, closing and securing the doors.

4.9 Function test of the indicator system
Checking of the satisfactory operation of the indicator system, where fitted, is to be carried out, as applicable, including:

- Proper visible indication and audible alarm on the navigation bridge panel, according to the selected function "harbour / sea voyage" and on the operating panel;
- Lamp test function on both panels;
- Verification that it is not possible to turn off the indicator light on both panels;
- Verification of fail safe performance, according to the procedure provided by the OMM;
- Confirmation that power supply for indicator system is supplied by the emergency source or other secure power supply and independent of the power supply for operating the doors;
- Proper condition of sensors and protection from water, ice formation and mechanical damage.

4.10 Test of water leakage detection system
Where fitted, the water leakage detection system is to be tested including proper audible alarm on the navigation bridge panel and on the engine control room panel, according to the procedure provided by the OMM.
4.11 Test of television surveillance system
Where fitted, the television surveillance system is to be tested including proper indication on
the navigation bridge monitor and on the engine control room monitor.

4.12 Tightness test
A hose test or equivalent is to be carried out. If the visual examination and function test have
shown satisfactory results, the tightness test of shell doors on Ro-Ro cargo ships need not be
carried out unless considered necessary by the attending surveyor.

4.13 NDT and Thickness Measurements
When considered necessary by the surveyor, NDT and thickness measurements may be
required after visual examination and function test.
Table 1

Minimum Requirements for Close-Up Surveys of Doors, Locking, Securing and Supporting Devices and Fittings

The following is a list of the devices and fittings and associated welding to be subject to close-up survey by the attending Surveyor.

- Cylinder securing pins, supporting brackets, back-up brackets (where fitted) and their welded connections;
- Hinge pins, supporting brackets, back-up brackets (where fitted) and their welded connections;
- Locking hooks, securing pins, supporting brackets, back-up brackets (where fitted) and their welded connections;
- Locking pins, supporting brackets, back-up brackets (where fitted) and their welded connections;
- Locating and stopper devices and their welded connections.
Inner Bow Doors – double leaf side hinged

Illustration by courtesy of MacGREGOR Group

Bow Loading Ramp – stowed position, aft part (inner door) disconnected

Illustration by courtesy of MacGREGOR Group
Bow Loading Ramp – beginning of opening sequence, aft part (inner door) connected by hydraulic hinge pin

Bow Loading Ramp – ramp partly extended to quay
Bow Loading Ramp – ramp fully extended to quay

Illustration by courtesy of MacGregor Group

Inner Bow Door – single leaf top hinged, type 1
Inner Bow Door – single leaf top hinged, type 2

Illustration by courtesy of MacGREGOR Group

Bow Loading Ramp – side opening bow doors

Illustration by courtesy of MacGREGOR Group
Bow side opening door – closed, side view

Illustration by courtesy of MacGREGOR Group

Bow side opening door – closed, top view

Illustration by courtesy of MacGREGOR Group
Bow side opening door – door panel details

Illustration by courtesy of MacGREGOR Group

Bow side opening door – open, top view

Illustration by courtesy of MacGREGOR Group
Bow Loading Ramp – visor type bow doors, general arrangement

Illustration by courtesy of MacGregor Group

Bow Visor Door – general arrangement

Illustration by courtesy of MacGregor Group
Cleating Hook 1

Cleating Hook 2

Cleating Wedge

Illustration by courtesy of MacGREGOR Group
Control Panel – closing door

Illustration by courtesy of MacGREGOR Group

Bunker Door – closed, inside view

Illustration by courtesy of MacGREGOR Group
Bunker Door – Emergency Cleat

Bunker Port – type 1, closed, inside view

Bunker Port – type 2, closed, inside view

Illustration by courtesy of MacGREGOR Group
Cargo Door – closed, inside

Illustration by courtesy of MacGREGOR Group
Cargo Door – open, inside

Illustration by courtesy of NacBREGOR Group
Cargo Door – principle function

Illustration by courtesy of MacREGOR Group
Cargo Door – type side hydraulic securing device disengaged

Cargo Door – top side hydraulic securing device engaged

Illustration by courtesy of MacGREGOR Group

Illustration by courtesy of MacGREGOR Group
Side Shell Door – double leaf, closed, inside view

Illustration by courtesy of MacGREGOR Group
Side Shell Door – double leaf, closed, top view

Illustration by courtesy of MacGREGOR Group

Side Shell Door – double leaf, fully opened, top view

Illustration by courtesy of MacGREGOR Group

Side Shell Door – double leaf, half opened, top view

Illustration by courtesy of MacGREGOR Group
Side Ramp – front view

- Cleating Bolt
- Launch Cylinder
- Cleating Hook
- Cleat Bolt
- Positioning Bolt
- Side Ramp in Deck 6 a Position
- Cleating Bolt
- Side Ramp in Deck 5 Position

Illustration by courtesy of MacGREGOR Group
Side Ramp – side view

- Ramp Level Wires
- Cleating Bolt
- Ramp Angle Wires
- Cleating Hook
- Cleating Bolt
- Bridge Plates fitted on Deck 6
- Positioning Bolt
- Cleating Bolt
- Lifting Plate
- Bridge Plates fitted on Deck 5
- Ramp
- Manrope
- Flap
- Finger Flaps

Illustration by courtesy of MacGregor Group
Side Ramp – top view

Stern Door – single leaf, closed, car carrier type

Illustration by courtesy of MacGREGOR Group

Top Cleat

Locking for Section 2

Cleat Hook

Push Out Cylinder

Cleat Wedge

Illustration by courtesy of MacGREGOR Group
Stern Door – single leaf, open, car carrier type, top view

Illustration by courtesy of MacGREGOR Group

Stern Door – single leaf, open, car carrier type

Illustration by courtesy of MacGREGOR Group
Stern Door – double leaf, open, typical cleating arrangement

Illustration by courtesy of MacGREGOR Group
Stern Door – single leaf, open typical cleating arrangement, type 1

Stern Door – single leaf, open, typical cleating arrangement, type 2
Stern Door – single leaf, closed, inside view, typical cleating arrangement, type 3

Illustration by courtesy of MacGREGOR Group
Stern Door – single leaf, closed, typical cleating arrangement, type 3

Illustration by courtesy of MacGREGOR Group
Stern Door – single leaf, open, push-out cylinder arrangement

Illustration by courtesy of MacGREGOR Group

Stern Door – single leaf, open, typical cleating arrangement, type 3

Illustration by courtesy of MacGREGOR Group

Flap
Cleating Hook
Cleating Wedge
Main Cylindrier
Periodic Survey of Fuel Installations on Ships other than Liquefied Gas Carriers utilizing gas or other low flash point fuels

CONTENTS

1. Application

2. Special Survey
   2.1 Schedule
   2.2 Scope
   2.2.1 General
   2.2.2 Fuel Handling and Piping
   2.2.3 Fuel Valves
   2.2.4 Pressure Relief Valves
   2.2.5 Fuel Handling Equipment
   2.2.6 Electrical Equipment
   2.2.7 Safety Systems
   2.2.8 Fuel Storage Tanks

3. Annual Survey
   3.1 Schedule
   3.2 Scope
   3.2.1 General
   3.2.1.1 Logbooks/Records.
   3.2.1.2 Operating and Maintenance Instruction Manuals.
   3.2.1.3 Control, Monitoring and Safety Systems.
   3.2.1.4 Fuel Handling Piping, Machinery and Equipment
   3.2.1.5 Ventilating System
   3.2.1.6 Drip Trays
   3.2.1.7 Hazardous Areas
   3.2.1.8 Electrical Bonding.
   3.2.2 Fuel Storage, Bunkering and Supply Systems
   3.2.2.1 Fuel Storage
   3.2.2.2 Fuel Bunkering System
   3.2.2.3 Fuel Supply System

4. Intermediate Survey
   4.1 Schedule
   4.2 Scope
   4.2.1 General
   4.2.1.1 Safety Systems.

Note:

1. This requirement is implemented from 1 January 2019.
1. Application

These requirements apply to ships, other than those covered by the TL-R Z16, which utilize gas or other low flash point fuels as a fuel for propulsion prime mover/auxiliary power generation arrangements and associated systems. These requirements are in addition to the requirements of TL-R Z18.

These survey requirements do not cover fire protection, fire-fighting installation, and personnel protection equipment.

2. Special Survey

2.1 Schedule

2.1.1 Special Surveys are to be carried out at 5 years intervals to renew the Classification Certificate.

2.1.2 The first Special Survey is to be completed within 5 years from the date of the initial classification survey and thereafter within 5 years from the credited date of the previous Special Survey. However, an extension of class of 3 months maximum beyond the 5th year can be granted in exceptional circumstances. In this case, the next period of class will start from the expiry date of the Special Survey before the extension was granted.

2.1.3 For surveys completed within 3 months before the expiry date of the Special Survey, the next period of class will start from the expiry date of the Special Survey. For surveys completed more than 3 months before the expiry date of the Special Survey, the period of class will start from the survey completion date. In cases where the vessel has been laid up or has been out of service for a considerable period because of a major repair or modification and the owner elects to only carry out the overdue surveys, the next period of class will start from the expiry date of the Special Survey. If the owner elects to carry out the next due Special Survey, the period of class will start from the survey completion date.

2.1.4 The Special Survey may be commenced at the 4th Annual Survey and be progressed with a view to completion by the 5th anniversary date. When the Special Survey is commenced prior to the 4th Annual Survey, the entire survey is to be completed within 15 months if such work is to be credited to the Special Survey.

2.1.5 Special Surveys may be carried out on a continuous survey basis. In this case, the interval between consecutive examinations of each item is not to exceed five (5) years.

2.2 Scope

2.2.1 General

The Special Survey is to include, in addition to the requirements of the Annual Survey, examination, tests and checks of sufficient extent to ensure that the fuel installations are in a satisfactory condition and is fit for its intended purpose for the new period of class of 5 years to be assigned, subject to proper maintenance and operation and to periodical surveys being carried out at the due dates.

2.2.2 Fuel Handling and Piping

All piping for fuel storage, fuel bunkering, and fuel supply such as venting, compressing, refrigerating, liquefying, heating storing, burning or otherwise handling the fuel and liquid
nitrogen installations are to be examined. Removal of insulation from the piping and opening for examination may be required. Where deemed suspect, a hydrostatic test to 1.25 times the Maximum Allowable Relief Valve Setting (MARVS) for the pipeline is to be carried out. After reassembly, the complete piping is to be tested for leaks. Where water cannot be tolerated and the piping cannot be dried prior to putting the system into service, the Surveyor may accept alternative testing fluids or alternative means of testing.

2.2.3 Fuel Valves

All emergency shut-down valves, check valves, block and bleed valves, master gas valves, remote operating valves, isolating valves for pressure relief valves in the fuel storage, fuel bunkering, and fuel supply piping systems are to be examined and proven operable. A random selection of valves is to be opened for examination.

2.2.4 Pressure Relief Valves

i) Fuel Storage Tank Pressure Relief Valves. The pressure relief valves for the fuel storage tanks are to be opened for examination, adjusted, and function tested. If the tanks are equipped with relief valves with non-metallic membranes in the main or pilot valves, such non-metallic membranes are to be replaced.

ii) Fuel Supply and Bunkering Piping Pressure Relief Valves. Pressure relief valves for the fuel supply and bunkering piping are to be opened for examination, adjusted, and function tested. Where a proper record of continuous overhaul and retesting of individually identifiable relief valves is maintained, consideration will be given to acceptance on the basis of opening, internal examination, and testing of a representative sampling of valves, including each size and type of liquefied gas or vapor relief valve in use, provided there is logbook evidence that the remaining valves have been overhauled and tested since crediting of the previous Special Survey.

iii) Pressure/Vacuum Relief Valves. The pressure/vacuum relief valves, rupture disc and other pressure relief devices for interbarrier spaces and hold spaces are to be opened, examined, tested and readjusted as necessary, depending on their design.

2.2.5 Fuel Handling Equipment

Fuel pumps, compressors, process pressure vessels, inert gas generators, heat exchangers and other components used in connection with fuel handling are to be examined as required in the Rules of each individual Society for periodical survey of machinery.

2.2.6 Electrical Equipment

i) Examination of electrical equipment to include the physical condition of electrical cables and supports, intrinsically safe, explosion proof, or increased safety features of electrical equipment.

ii) Functional testing of pressurized equipment and associated alarms.

iii) Testing of systems for de-energizing electrical equipment which is not certified for use in hazardous areas.

iv) An electrical insulation resistance test of the circuits terminating in, or passing through, the hazardous zones and spaces is to be carried out.
2.2.7 Safety Systems

Gas detectors, temperature sensors, pressure sensors, level indicators, and other equipment providing input to the fuel safety system are to be tested to confirm satisfactory operating condition.

i) Proper response of the fuel safety system upon fault conditions is to be verified.

ii) Pressure, temperature and level indicating equipment are to be calibrated in accordance with the manufacturer’s requirements.

2.2.8 Fuel Storage Tanks

Fuel storage tanks are to be examined in accordance with an approved survey plan. Liquefied gas fuel storage tanks are to be examined based upon Recommendation No. 148.

3. Annual Survey

3.1 Schedule

3.1.1 Annual Surveys are to be held within 3 months before or after each anniversary date of the date of the initial classification survey or of the date credited for the last Special Survey. They will normally be performed at the same time as an Annual Hull survey.

3.2 Scope

3.2.1 General

The following is to be carried out during the survey of the Fuel Storage, Fuel Bunkering System, and Fuel Supply System:

3.2.1.1 Logbooks/Records

The logbooks and operating records are to be examined with regard to correct functioning of the gas detection systems, fuel supply/gas systems, etc. The hours per day of the re-liquefaction plant, gas combustion unit, as applicable, the boil-off rate, and nitrogen consumption (for membrane containment systems) are to be considered together with gas detection records.

3.2.1.2 Operating and Maintenance Instruction Manuals

The manufacturer/builder instructions and manuals covering the operations, safety and maintenance requirements and occupational health hazards relevant to fuel storage, fuel bunkering, and fuel supply and associated systems for the use of the fuel, are to be confirmed as being aboard the vessel.

3.2.1.3 Control, Monitoring and Safety Systems

i) Gas detection and other leakage detection equipment in compartments containing fuel storage, fuel bunkering, and fuel supply equipment or components or associated systems, including indicators and alarms, is to be confirmed in satisfactory operating condition. Recalibration of the gas detection systems should be verified in accordance with the manufacturers’ recommendations.
ii) Verification of the satisfactory operation of the control, monitoring and automatic shut-down systems as far as practicable of the fuel supply and bunkering systems.

iii) Operational test, as far as practicable, of the shutdown of ESD protected machinery spaces.

3.2.1.4 Fuel Handling Piping, Machinery and Equipment

Piping, hoses, emergency shut-down valves, remote operating valves, relief valves, machinery and equipment for fuel storage, fuel bunkering, and fuel supply such as venting, compressing, refrigerating, liquefying, heating, cooling or otherwise handling the fuel is to be examined, as far as practicable. Means for inerting is to be examined. Stopping of pumps and compressors upon emergency shut-down of the system is to be confirmed as far as practicable.

3.2.1.5 Ventilating System

Examination of the ventilation system, including portable ventilating equipment where fitted, is to be made for spaces containing fuel storage, fuel bunkering, and fuel supply units or components or associated systems, including air locks, pump rooms, compressor rooms, fuel preparation rooms, fuel valve rooms, control rooms and spaces containing gas burning equipment. Where alarms, such as differential pressure and loss of pressure alarms, are fitted, these should be operationally tested as far as practicable.

3.2.1.6 Drip Trays

Portable and fixed drip trays and insulation for the protection of the ship’s structure in the event of leakage are to be examined.

3.2.1.7 Hazardous Areas

Electrical equipment and bulkhead/deck penetrations including access openings in hazardous areas are to be examined for continued suitability for their intended service and installation area.

3.2.1.8 Electrical Bonding.

Electrical bonding arrangements in hazardous areas, including bonding straps where fitted, are to be examined.

3.2.2 Fuel Storage, Bunkering and Supply Systems

The following are to be examined, so far as applicable. Insulation need not be removed, but any deterioration or evidence of dampness is to be investigated:

3.2.2.1 Fuel Storage

i) External examination of the storage tanks including secondary barrier if fitted and accessible.

ii) General examination of the fuel storage hold place.

iii) Internal examination of tank connection space.

iv) External examination of tank and relief valves.
v) Verification of satisfactory operation of tank monitoring system.

vi) Examination and testing of installed bilge alarms and means of drainage of the compartment.

vii) Testing of the remote and local closing of the installed main tank valve.

3.2.2.2 Fuel Bunkering System

i) Examination of bunkering stations and the fuel bunkering system.

ii) Verification of satisfactory operation of the fuel bunkering control, monitoring and shut-down systems.

3.2.2.3 Fuel Supply System

Examination of the fuel supply system during working condition as far as practicable.

i) Verification of satisfactory operation of the fuel supply system control, monitoring and shut-down systems.

ii) Testing of the remote and local closing of the master fuel valve for each engine compartment.

4. Intermediate Survey

4.1 Schedule

4.1.1 The Intermediate Survey is to be held at or between either the 2nd or 3rd Annual Survey.

4.1.2 Those items which are additional to the requirements of the Annual Surveys may be surveyed either at or between the 2nd and 3rd Annual Survey.

4.2 Scope

4.2.1 General

In addition to the applicable requirements of the Annual Survey, the Intermediate Survey is also to include:

4.2.1.1 Safety Systems

Gas detectors, temperature sensors, pressure sensors, level indicators, and other equipment providing input to the fuel safety system are to be randomly tested to confirm satisfactory operating condition. Proper response of the fuel safety system upon fault conditions is to be verified.
1. **Definitions**

1.1 ACS is a certification scheme involving a manufacturer (and associated sub-suppliers, if needed) in the inspection, testing and certification of the manufacturer’s products.

1.2 An ACS will clarify:

   - The extent of the required inspection and testing.
   - To which extent and under which conditions the manufacturer may perform all or parts of the required inspection and testing without the presence of a Surveyor from TL when TL Certificate is required.

1.3 The extent to which the manufacturer is given permission to carry out inspections and testing without the presence of a Surveyor is to be agreed on a case by case basis, e.g. for a specific product production line or for specific parts.

2. **Scope**

2.1 An ACS may be arranged with product manufacturers and/or sub-suppliers.

2.2 An ACS with a manufacturer must define the handling of subcontracted parts (those that require TL or work certificates or in any other way are addressed in TL’s Rules). The sub-supplier may be included in the ACS of the manufacturer or have his own ACS or deliver parts that are inspected and certified by TL.

2.3 An ACS that permits the manufacturer to carry out all or parts of required inspection and testing without the presence of a Surveyor may be arranged in two versions with regard to traceability:

   - The ACS describes inspection, testing and certification additional to the manufacturer’s standard quality control in order to meet the Rules. The components are to be stamped with a special stamp supplied by TL or identified as required by TL.
   - The manufacturer has a standard quality control that covers all required inspection, testing and certification in compliance with the Rules. Traceability and the required type of product document for components or products will be defined in the ACS.

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**Notes:**

1. This requirement is implemented on or after 1 July 2016.
3. **Conditions**

3.1 The conditions for the manufacturer to be granted the permission to carry out inspection and testing without the presence of a Surveyor are that:

- The manufacturer has an implemented Quality System according to a national or international standard approved by an accredited certification body or recognised by TL.

- The manufacturer has a quality control system, current drawings, and Rules and standards that cover the product to be certified.

- The inspection and testing required by the Rules are either standard procedures in the Quality System and recognized by TL or specified in detail in the ACS.

- TL initially ascertains the manufacturer’s compliance with the ACS-requirements by verifying the required product and process approvals and performing an initial audit. Follow-up and renewal audits are conducted by TL on a regular basis to verify that conditions of the ACS are continuously maintained by the manufacturer.

- If work certificates (W) or test reports (TR) are found not to fulfil the standards agreed with TL, the component may not be accepted.

- The agreed ACS may be suspended or cancelled when / if found justified by TL.

- TL may carry out unscheduled inspections at the manufacturer and/or subcontractor at its own discretion.

- The manufacturers (and designers, if producing under license) commit themselves to involve TL when changes to the design, manufacturing process or testing are made as well as when any major production problems or any major product delivery problems have occurred.

- The validity of an ACS is to be a maximum of 5 years. The ACS may be renewed subject to an audit. The scope of the renewal audit shall:
  
  - verify the conditions of the ACS are still met
  
  - verify that the current products and processes are appropriately controlled

4. **Information to be submitted**

4.1 For admission to an alternative certification scheme for a product, the manufacturer is to submit an application enclosing the following documentation:

- Product details.

- Existing class approvals of the manufacturer’s products as far as required.

- The procedures relevant to the manufacturing process.

- A list of material suppliers with an indication of their class approval (as far as required by the Rules) and the type of material certification in each case.
- Quality control plans relevant to the products and relevant components to be certified through the alternative certification scheme. Said plans are to detail the inspections and tests required by the Rules with an indication of which inspections and tests are delegated to the manufacturer and which are to be done in the presence of TL representative.

- The procedures relevant to the quality control and inspections, their methods, frequency and certification.

- The list of suppliers of materials and main components of the product, including certificates.

- The quality system details.

- List of nominated personnel for:
  - Marking/stamping of products
  - Tests and Inspection (responsible)
  - Provision of data and information (e.g. declaration of conformity, test reports etc.)

- Any other additional documents that TL may require in order to evaluate the manufacturing processes and product quality control.

5. Audit procedure

5.1 Upon satisfactory examination of the complete documentation for application an initial audit shall be carried out at the manufacturer’s works. This audit is to verify that the manufacture of the product and the relevant controls are performed in accordance with the documents submitted and are in compliance with the requirements laid down in the ACS documentation and TL Rules.

5.2 Upon satisfactory outcome of the audits, the extent, duration and conditions of the ACS are documented.

5.3 At least one intermediate audit during the period of validity of the ACS is to be carried out. Additional audits may be required at the discretion of TL.
TL- R Z27  Condition Monitoring and Condition Based Maintenance

1. General
   1.1 Application
   1.2 Definitions
   1.3 Condition Monitoring (CM)
   1.4 Condition Based Maintenance (CBM)

2. Procedures and Conditions for approval of CM and CBM
   2.1 Onboard Responsibility
   2.2 Equipment and System Requirements
   2.3 Documentation and Information
   2.4 Approval validity

3. Surveys
   3.1 Installation Survey
   3.2 Implementation Survey
   3.3 Annual Audit
   3.4 Damage and repairs

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Note:

1. This requirement is implemented for survey schemes approved on and after 1 July 2019.
1 General

1.1 Application

1.1.1 These requirements apply to the approved Condition Monitoring and Condition Based Maintenance schemes where the condition monitoring results are used to influence the scope and/or frequency of Class survey.

1.1.2 This scheme may be applied to components and systems covered by Continuous Machinery Survey (CMS), and other components and systems as requested by the owner. The extent of Condition Based Maintenance and associated monitoring equipment to be included in the maintenance scheme is decided by the Owner.

1.1.3 These requirements can be applied only to vessels operating on approved PMS survey scheme.

1.1.4 The scheme may be applied to any individual items and systems. Any items not covered by the scheme shall be surveyed and credited in accordance with the requirements of TL- R Z18 and / or TL- R Z20.

1.2 Definitions

1.2.1 The following standard terms are defined in ISO 13372:2012:

- **Condition monitoring**: acquisition and processing of information and data that indicate the state of a machine over time. The machine state deteriorates if faults or failures occur.

- **Diagnostic**: examination of symptoms and syndromes to determine the nature of faults or failures.

- **Condition Based Maintenance**: maintenance performed as governed by condition monitoring programmes.

1.3 Condition Monitoring (CM)

1.3.1 Where an approved condition monitoring system is fitted, credit for survey may be based on acceptable condition monitoring results. The condition monitoring results are to be reviewed during the annual audit.

1.3.2 Limiting parameters are to be based on the Original Equipment Manufacturers guidelines (OEM), or a recognised international standard.

1.3.3 The condition monitoring system is to provide an equivalent or greater degree of confidence in the condition of the machinery to traditional survey techniques.

1.3.4 The condition monitoring system shall be approved in accordance with TL’s procedures.

1.3.5 A condition monitoring system may be used to provide a greater understanding of equipment condition, and a condition based maintenance scheme may be used to obtain maintenance efficiency. Class approval is required where owners wish to change the survey cycle based on CM/CBM.
1.3.6 Software systems can use complex algorithms, machine learning and knowledge of global equipment populations/defect data in order to identify acceptability for continued service or the requirement for maintenance. These systems may be independent of the OEM recommended maintenance and condition monitoring suggested limits. Approval of this type of software is to be based on OEM recommendations, industry standards and TL experience.

1.3.7 TL retains the right to test or open-up the machinery, irrespective of the CM results, if deemed necessary.

1.4 Condition Based Maintenance (CBM)

1.4.1 Where an owner wishes to base their equipment maintenance on a CBM approach, this is to meet the requirements of the ISM Code.

1.4.2 Where an agreed planned maintenance and CBM scheme is in operation, the CMS and other survey intervals may be extended based on OEM maintenance recommendations and acceptable condition monitoring results.

1.4.3 Limiting parameters (alarms and warnings) are to be based on the OEM guidelines, or a recognised international standard.

1.4.4 The CBM scheme is to provide an equivalent or greater degree of confidence in the condition of the machinery to traditional maintenance techniques.

1.4.5 The scheme shall be approved in accordance with each Member Society’s procedures.

1.4.6 Software systems can use complex algorithms, machine learning and knowledge of global equipment populations/defect data in order to identify acceptability for continued service or the requirement for maintenance. These systems may be independent of the OEM recommended maintenance and condition monitoring suggested limits. Approval of this type of software is to be based on OEM recommendations, industry standards and TL experience.

2 Procedures and Conditions for approval of CM and CBM

2.1 Onboard Responsibility

2.1.1 The chief engineer shall be the responsible person on board in charge of the CM and CBM.

2.1.2 Documentation on the overhaul of items covered by CM and CBM schemes shall be reported by the chief engineer.

2.1.3 Access to computerized systems for updating of the maintenance documentation and maintenance program shall only be permitted by the chief engineer or other authorized person.

2.1.4 All personnel involved in CM and CBM shall be appropriately qualified.

Note: CM does not replace routine surveillance or the chief engineer’s responsibility for taking decisions in accordance with his judgement.
2.2 Equipment and System Requirements

2.2.1 CM equipment and systems shall be approved in accordance with a procedure of TL.

2.2.2 The CM/CBM scheme and its extent, are to be approved by TL.

2.2.3 The CBM scheme is to be capable of producing a condition report, and maintenance recommendations.

2.2.4 A system is to be provided to identify where limiting parameters (alarms and warnings) are modified during the operation of the scheme.

2.2.5 Where CM and CBM schemes use remote monitoring and diagnosis (i.e. data is transferred from the vessel and analysed remotely), the system is to meet the applicable standards for Cyber Safety and Security. The system shall be capable of continued onboard operation in the event of loss of the communication function.

2.2.6 CBM schemes are to identify defects and unexpected failures that were not prevented by the CM system.

2.2.7 Systems shall include a method of backing up data at regular intervals.

2.3 Documentation and Information

2.3.1 The following documentation shall be made available to TL for the approval of the scheme:

(i) Procedure for changes to software system and CM parameters

(ii) Listing of equipment to be included in the scheme

(iii) Listing of acceptable condition monitoring parameters

(iv) Description of CBM scheme

(v) Listing, specifications and maintenance procedures for condition monitoring equipment

(vi) Baseline data for equipment with condition monitoring

(vii) Qualification of personnel and company responsible for analysing CM results

2.3.2 In addition to the above documentation the following information shall be available on board:

(i) All clauses in 2.3.1 in an up-to-date fashion

(ii) Maintenance instructions (manufacturer’s and shipyard’s)

(iii) Condition monitoring data including all data since last opening of the machine and the original base line data

(iv) Reference documentation (trend investigation procedures etc.)

(v) Records of maintenance including repairs and renewals carried out
(vi) Records of changes to software systems and parameters

(vii) Sensors calibration records / certification / status

2.4 Approval validity

2.4.1 An Annual Audit shall be carried out to maintain the validity of the CM/CBM scheme.

2.4.2 The survey arrangement for machinery under CM/CBM can be cancelled by TL if the scheme is not being satisfactorily carried out either from the maintenance records or the general condition of the machinery.

2.4.3 The case of sale or change of management of the ship or transfer of class shall cause the approval to be reconsidered.

2.4.4 The ship owner may, at any time, cancel the survey arrangement for machinery under the scheme by informing TL in writing and for this case the items which have been inspected under the scheme since the last annual Audit can be credited for class at the discretion of the attending surveyor.

3 Surveys

3.1 Installation Survey

3.1.1 Condition monitoring equipment is to be installed and surveyed in accordance with TL rules, and a set of base line readings is to be taken.

3.2 Implementation Survey

3.2.1 The Implementation Survey shall be carried out by TL’s surveyor no earlier than 6 months after installation survey and no later than the first Class annual survey.

3.2.2 During the Implementation survey the following shall be verified by a surveyor:

(i) the CM/CBM scheme is implemented according to the approval documentation, including a comparison with baseline data;

(ii) the scheme is producing the documentation required for the Annual Audit and the requirements of surveys and testing for the maintenance of class are complied with;

(iii) the onboard personnel are familiar with operating the scheme.

(iv) records of any limiting parameters (alarms and warnings) that have been modified during the operation of the scheme.

(v) Records of any failures of monitored equipment are to be reviewed to ensure that the condition monitoring scheme is effective / sufficient.

3.2.3 When this survey is carried out and the implementation is found in order, a report describing the scheme shall be submitted to TL and the scheme may be put into service.
3.3  Annual Audit

3.3.1  An annual audit of the CM and CBM scheme shall be carried out by TL’s surveyor concurrently with the Class annual survey.

3.3.2  The purpose of this audit shall be to verify that the scheme is being correctly operated and that the machinery has been functioning satisfactorily since the previous audit. This is to include any limiting parameters (alarms and warnings) that have been modified since the last audit. A general examination of the items concerned shall be carried out.

3.3.3  The performance, condition monitoring and maintenance records shall be examined to verify that the machinery has functioned satisfactorily since the previous survey, or action has been taken in response to machinery operating parameters exceeding acceptable tolerances.

3.3.4  Written details of break-down or malfunction shall be made available.

3.3.5  At the discretion of the surveyor, function tests, confirmatory surveys and random check readings, where Condition Monitoring / Condition Based Maintenance equipment is in use, shall be carried out as far as practicable and reasonable.

3.3.6  The familiarity of the chief engineer and other personnel involved with the CM system shall be verified.

3.3.7  Calibration status of sensors and equipment shall be verified.

3.3.8  Verification that the suitability of the CM/CBM scheme has been reviewed following defects and failures shall be carried out.

3.4  Damage and repairs

3.4.1  Damage to components or items of machinery is to be reported to TL. The repairs of such damaged components or items of machinery are to be carried out to the satisfaction of the Surveyor.

3.4.2  Details of repairs and maintenance carried out shall be examined. Any machinery part, which has been replaced by a spare one, due to damage, is to be retained on board where possible until examined by TL’s Surveyor.

3.4.3  Defect and failure data is to be reviewed in order to ensure the system output is appropriate. Where necessary, following review of the failure data, there is to be a method of amending the CM and CBM scheme.
Surveys of Watertight Cable Transits

1. Application

1.1 These requirements apply to all vessels and Mobile Offshore Units (MOUs) contracted for construction* on or after 1st July 2021 and are in addition to the requirements of TL-Rs Z23, Z7 and Z15.

1.2 Watertight cable transits are to be installed and maintained in accordance with the manufacturer’s requirements and in accordance with the requirements of the relevant Type Approval certification.

1.3 For MOUs, watertight cable transit seal systems should be inspected in accordance with item 8.6, Table 1 of TL-R Z23.

2. Cable Transit Seal Systems Register

2.1 New Construction

2.1.1 A Cable Transit Seal Systems Register (Register) is to be provided by the shipbuilder for all watertight cable transits fitted to the vessel or MOU. For an example of a register see Appendix 3 of TL-R Z23 – “Recommendatory Sample - Cable Transit Seal Systems Register”. The Register can be in either a hard copy or digitized media. It is to include a marking / identification system, documentation referencing manufacturer manual(s) for each type of cable transit installed, the Type Approval certification for each type of transit system, applicable installation drawings, and a recording of each installed transit documenting the as built condition after final inspection in the shipyard. It is to include sections to record any inspection, modification, repair and maintenance.

2.1.2 The Register shall be reviewed by the attending Surveyor to confirm it contains a list of the watertight cable transits, applicable cable transit information and sections to maintain in-service maintenance and survey records.

2.1.3 For manned vessels the Register is to be held onboard of the vessel or MOU. For unmanned vessels, if a suitable storage location does not exist onboard, the Register may be held ashore. The Register is to be readily available for the attending surveyor.

2.2 Vessel and MOU In Service

2.2.1 The owner is to maintain the Register to record any disruption (repair, modification or opening out and closing) to a cable transit or to record the installation of a new cable transit.

Note:

1. This Requirement is to be implemented on or after 1 July 2021.

* The “contracted for construction” date means the date on which the contract to build the vessel is signed between the prospective owner and the shipbuilder. For further details regarding the date of “contract for construction”, refer to TL-PR 29.
3. **Installation and Maintenance of Watertight Cable Transits**

3.1 At new construction and periodic surveys it is to be confirmed that:

- Cable transits have been installed, and where disrupted have been reinstated, in accordance with the manufacturer’s requirements and in accordance with the requirements of Type Approval.

- Where specified, appropriate specialized tools have been used.

4. **Periodical Survey of Watertight Cable Transits**

4.1 **Special Survey**

4.1.1 The requirements for Special Survey may be undertaken by the attending Surveyor or by a firm approved as a service supplier according to TL-R Z17.

4.1.2 All transits are to be examined to confirm their satisfactory condition and the Register is to be reviewed to confirm it is being maintained. The Special Survey is to be recorded in the Register, in which a single record entry will be sufficient to record the survey of all transits.

4.1.3 From review of the Register, where there are records entered since the last special survey of any disruption to the cable transits or installation of new cable transits (except which are reviewed and examined at previous annual surveys), the satisfactory condition of those transits is to be confirmed by the attending Surveyor by review of records and examination of the transits; the results are to be recorded in the Register against each of those cable transits.

4.1.4 In case the cable transits have been examined by an approved service supplier, the attending surveyor is to review the Register in order to ascertain that it has been properly maintained by the owner and correctly endorsed by the service supplier.

4.2 **Annual Survey**

4.2.1 The Register is to be reviewed to confirm it is being maintained and as far as practicable the transits are to be examined to confirm their satisfactory condition.

4.2.2 Where there are records entered since the last annual survey of any disruption to the cable transits or installation of new cable transits, the satisfactory condition of those transits is to be confirmed by review of records and, if deemed necessary, by examination. The results are to be recorded in the Register against the specific cable transit.
1. General

The survey of ships may utilize different methods and concepts. This UR contains principles and minimum requirements for carrying out remote surveys.

Remote survey will only be appropriate provided the level of assurance is not compromised, and the survey is carried out with the same effectiveness as and is equivalent to, a survey carried out with attendance on board by a Surveyor.

1.1 Application

These requirements apply to all vessels, self-propelled or not. These requirements are not mandatory for offshore units.

1.2 Definitions

1.2.1 Remote Survey

A “Remote Survey” is a process of verifying that a ship and its equipment are in compliance with the rules of the Classification Society where the verification is undertaken, or partially undertaken, without attendance on board by a surveyor.

1.2.2 Information and Communication Technology (ICT)

Information and Communication Technology (ICT) are the technologies used in the scope of remote surveys for gathering, storing, retrieving, processing, analysing, and transmitting information which includes both software and hardware.

Notes:

1. ‘Attendance on board by a surveyor’ means physical attendance on board the ship by a surveyor.

2. Remote classification activities not requiring a survey, such as some administrative tasks, are not to be considered as remote surveys.

3. An administrative task is a task where a survey decision is not being made, for example reissue of a certificate or record following a correction, or an update to the ship’s records held by the Classification Society or a document review.

Note:

1. This Requirement is to be applied for remote surveys commenced on or after 01 January 2023.
2. Requirements for equivalency

The requirements for equivalency of a remote survey to a survey attended on board by a Surveyor include:

- eligibility of the remote survey
- qualification of Surveyors
- planning of the remote survey
- performance of the remote survey
- assessment of the remote survey
- reporting

Equivalency is obtained when, with the use of available ICT, a surveyor can perform a survey remotely being able to:

- obtain the supporting and technical evidence required according to the applicable rules,
- verify applicable survey items and relevant tests,

and the results of the remote survey provide the same level of assurance obtained with attendance on board by a Surveyor.

2.1 Eligibility of the remote survey

Eligibility of the remote survey is to be decided based on type and scope of the requested survey, in accordance with 3.1 and, if applicable, flag State Administration acceptance and possible instructions, when the classification survey is also related to a statutory item, and TL is carrying out the statutory survey on behalf of the flag State Administration.

A remote survey is deemed eligible when it provides the same level of assurance, according to the requirements for equivalency, as if it was conducted with attendance on board by a Surveyor.

Remote surveys are generally to be carried out with internet connection allowing a live streaming visual examination, although, at the discretion of the Surveyor, a combination of remote survey methods (see 2.4) may be used. For simple/limited verifications, other types of ICT may be accepted by the Surveyor.

2.2 Qualification and monitoring of Surveyors

2.2.1 Qualification

Surveyors engaged in remote surveys are to be qualified as per standard procedures for the type of ship and type of survey, i.e., in accordance with IMO RO Code (MSC.349(92)), TL-PR 7, and TL’s training and qualification scheme.

Additional training is to be carried out, covering the ICT used for the remote survey, in relation to the applicable remote survey scope and methods, in order to fully qualify the Surveyor engaged in remote surveys.
The additional training required for qualification for remote surveys shall be in accordance with the Society’s procedures and shall provide:

- knowledge of the operation of the Classification Society’s remote survey software, if applicable
- knowledge of the technical and procedural aspects related to remote surveys
- knowledge of the connectivity aspects related to remote surveys

2.2.2 Monitoring
The monitoring of a Surveyor qualified for remote surveys is to be carried out in accordance with TL-PR 6

2.2.3 Surveyor’s Record
Records of Surveyor’s training and qualification for remote surveys shall be maintained and updated as per the Society’s standard procedures.

Notes:

1. Society’s personnel engaged in remote classification activities not requiring a survey (refer to 1.2.1) are to be trained and qualified according to the Society’s standard procedures.

2. On board personnel/Crew:
   - Training and qualification of on board personnel/Crew are regulated by the STCW Convention and is a prerogative of the flag State Administration.
   - The ship’s flag State Administration may require that the Safety Management System of the ship is updated by the Company to include provisions for specific training of the crew engaged in remote surveys.

2.3 Planning of the remote survey
Planning of the remote survey is required to ensure that the remote survey is carried out in accordance with the applicable requirements. The content of the planning shall be based on the scope of the remote survey.

To ensure that the Surveyor can properly plan the remote survey and communicate with personnel/crew, so that the survey is carried out according to the applicable rules, adequate means are to be available enabling the Surveyor and allowing TL to:

- properly interact with personnel/crew involved in the remote survey, before and during the survey process,
- agree on ICT means to be used
- verify that personnel/crew involved in the remote survey are suitably skilled to use the electronic devices and/or software used by TL to perform the remote survey,
- acquire as deemed necessary information on identity and ranking of personnel/crew involved in the remote survey,
- provide the survey item/scope to the personnel/crew involved in facilitating the remote surveys, including the tests that will be performed,

- communicate, during the remote survey, additional actions depending on the evidence to be collected.

One or more of the following means is to be provided for planning the remote survey:

- live-streaming video and audio connection
- exchange of data / electronic documents
- other means acceptable to TL

The owner is to provide the necessary facilities for the safe execution of the survey.

2.4 Performance of the remote survey

To ensure that the Surveyor can properly perform the remote survey according to the applicable rules, the available evidence must allow the attending surveyor to:

- examine and assess a survey item and/or a group of items and/or supporting documents,

- verify and assess applicable tests and/or services.

The evidence provided to the Surveyor is subject to the technical evaluation and final acceptance by the Surveyor with respect to the completeness and accuracy, necessary to perform the requested survey according to the applicable requirements.

One or more of the following evidence is to be provided for performing the remote survey:

- live-streaming video and audio
- recorded videos provided by the Owner’s representative
- photos provided by the Owner’s representative
- other data and/or supporting documents acceptable to TL.

2.5 Assessment of the remote survey

The Surveyor shall evaluate all evidence received and accept them before crediting the remote survey.

The means used for the remote survey must allow the Surveyor to collect the necessary evidence that will be examined according to the Surveyor’s professional judgement in order to satisfactorily complete and credit the relevant survey items.

In case the Surveyor, according to their professional judgement, deems that the remote survey does not provide the same level of assurance as a survey with attendance on board by a Surveyor, the Surveyor may decide not to credit the relevant survey items.

3. Scope and procedures

A remote survey will be only appropriate provided it reaches the same level of assurance as, and is equivalent to, a survey attended on board by a Surveyor.
3.1 Scope - Eligible survey items

A remote survey may be proposed as an alternative to a survey attended on board by a Surveyor for the surveys listed in Table 1.

When the classification survey is also related to a statutory item, and TL is carrying out the statutory survey on behalf of the flag State Administration, then the flag State Administration acceptance is required, and possible additional requirements are to be complied with.

The Surveyor may require to confirm the results of the remote survey, by a survey attended on board by a Surveyor, to credit the relevant survey items, in case the remote survey is not carried out to the Surveyor’s satisfaction or it is required by the Classification Society.

Table 1: Eligible remote survey items:

<table>
<thead>
<tr>
<th>No.</th>
<th>Surveys and related items eligible to remote survey</th>
<th>Live streaming required (See Notes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Postponement, issuance, deletion of Condition of Class</td>
<td>X (1)</td>
</tr>
<tr>
<td>2</td>
<td>Postponement of Class surveys</td>
<td>X (1)</td>
</tr>
<tr>
<td>3</td>
<td>Items of Continuous Survey for Machinery (UR Z18) or Planned Maintenance Scheme (UR Z20, PMS)</td>
<td>X (1)</td>
</tr>
<tr>
<td>4</td>
<td>Occasional survey for change of ship’s name</td>
<td>X (1)</td>
</tr>
<tr>
<td>5</td>
<td>Occasional survey for loss of anchor</td>
<td>X (1)</td>
</tr>
<tr>
<td>6</td>
<td>Occasional survey for minor machinery or equipment damage</td>
<td>X (1)</td>
</tr>
<tr>
<td>7</td>
<td>Occasional survey for minor hull damage</td>
<td>X (1)</td>
</tr>
<tr>
<td>8</td>
<td>Occasional survey for minor deficiencies/defects not subject to a Condition of Class</td>
<td>X (1)</td>
</tr>
<tr>
<td>9</td>
<td>In-water bottom survey</td>
<td>X</td>
</tr>
<tr>
<td>10</td>
<td>Specified items of a class periodical survey (excluding additional specific items of initial or renewal surveys), including completion of remaining items of a part held class periodical survey</td>
<td>X (1)(2)</td>
</tr>
<tr>
<td>11</td>
<td>Non-propelled / un-manned barges/pontoon – annual surveys when no survey of hull compartments is due</td>
<td>X</td>
</tr>
<tr>
<td>12</td>
<td>Minor retrofit / installation/upgrade of equipment</td>
<td>X (1)</td>
</tr>
<tr>
<td>13</td>
<td>Documentary or data based initial / periodical / renewal / occasional verifications and surveys</td>
<td></td>
</tr>
</tbody>
</table>

Notes:

1. "(1)" means that live streaming may not be required for minor survey scope or that a combination remote survey method, as listed in 2.4, may be used at the sole discretion of TL.

2. “(2)” means that pure documentary verifications are eligible in accordance with item 13.

3. Live streaming may be required for surveys not marked X in the Table, depending on the survey scope at the sole discretion of TL.

4. “Minor” in the items 6, 7, 8 and 12 means that the item can be surveyed remotely according to requirements for equivalency given in 2.
3.2 Procedures

3.2.1 Eligibility

Refer to 2.1.

3.2.2 Digital information quality, completeness, and accuracy

Final appraisal of the quality of digital information is at the discretion of the Surveyor, who is to be satisfied with the content and the quality of digital information collected, and the survey carried out, allowing the Surveyor to confirm its completion.

The Owner is responsible for the completeness and accuracy of digital information provided. The digital information submitted by the Owner to the Surveyor is to reflect the real situation of the surveyed item. The date and time, when a photo or video was taken are to be made available to the Surveyor or identifiable from its metadata.

TL is to collect and store digital information as evidence of the survey. It is not necessary to store all of digital information received; the exact digital information stored shall support the survey decision and is to be decided by the Surveyor crediting the survey.

The remote survey is carried out under the supervision and upon instructions of the Surveyor, who is in charge of crediting the remote surveys. A surveyor attendance on board may be required to complete the survey, upon the Surveyor's request and at their discretion.

3.2.3 Requirements for a remote survey when live streaming is not used

When live streaming is not used, communication and digital information collection are to be performed through an ICT channels (such as emails, data streams and clouds), which is to be accepted by the Classification Society prior to the survey.

The Owner’s representative is to confirm the identity of the ship at the commencement of the survey.

3.2.4 Requirements for a remote survey when live streaming is used

The Owner's is to ensure that:

- the Owner’s representative is attending onboard and has access to the areas intended to be surveyed

- the Owner’s representative has at his disposal a 2-ways visual and audible communication means complying with the requirements in 4.

- ICT solution is available on the communication means and meets the requirement described in 4.

In the case these requirements cannot be fulfilled, the remote survey may be rejected. The Surveyor is to verify the identity of the ship at the commencement of the survey by live streaming.

3.3 Hardware and ICT solution

Refer to 4.1.
3.4 Requirements for Connectivity

The Owner’s representative is to ensure that internet connectivity tests are carried out before the survey and that proper connectivity is available and maintained during the survey.

When remote survey by live streaming is being undertaken, a connection that enables live streaming between the Surveyor and the Owner’s representative attending on board is required. The quality of the live streaming connection (audio and video) is to ensure proper communication and to allow the Surveyor to carry out the survey remotely, to the Surveyor's satisfaction. In the case where a live streaming connection with the Surveyor is not possible or is not continuous at the place of the survey (e.g., Engine Room), partly online sequences (where the Owner is able to capture pictures and videos offline of those items not covered by live streaming) may be accepted by the Surveyor.

4. Information and Communication Technology (ICT)

This section outlines the minimum requirements for the use of ICT that can capture images, record video and/or live stream video or other data from a ship as considered acceptable to TL.

4.1 Hardware

The Owner is responsible for ensuring that all hardware installations on board used for the remote survey shall comply with the applicable requirements relevant for use and location on board, including hazardous areas. The ICT shall typically consist of:

- A host computer device, to receive the streaming of images/data/video. This is usually a laptop or desktop computer compatible with the software application used for the remote survey
- On board standalone device which may include digital cameras capable of capturing videos/photos/data
- On board smart device compatible with the applicable software/technology
- Communication accessories like headphones and microphone for the noisy environment as applicable and as deemed necessary

Notes: The smart device may be a smartphone, tablet, computer, wearable device, smart glass, digital camera, or any other device which can be connected to the network and capable of transmitting the necessary data/images to shore.

The communication equipment used for the live streaming shall have the following minimum functionality:

- both ends shall simultaneously see the same image/videos in near real-time (i.e., live streaming)
- two-way direct voice communication
- possibility to take screenshots

When using a portable device on board for live streaming, the movement of the handheld device may affect the stability of the video and the image, leading to lower quality outputs. When necessary, a suitable anti-shake device shall be used to provide proper stability.
Notes:

1. The host computer screen is to be able to present an image quality that is sufficient to enable a survey decision to be made

2. Portable equipment on board shall be equipped with a power capacity suitable for the intended scope and time of the survey

4.2 Internet Connectivity (coverage and speed)

For internet connectivity requirements on board, refer to 3.4.

The on board smart devices shall have the capability of transmitting the images/video/data over a Cellular, Wi-Fi or Satellite Connection to the remote Surveyor.

When live streaming communication is applied, the internet connection shall have sufficient and stable bandwidth capacity to ensure quality (such as resolution and frame rate) of the direct colour image/video and voice communication to the remote survey location to the satisfaction of the Surveyor.

4.3 Software and data security:

The software used for the remote survey is to be acceptable to TL. The overall function and ability of the software used to ensure the security of data shall be evaluated prior to use as per the below requirements.

The Surveyor shall normally control the live video call, providing instructions to the on-site personnel/crew and supervising survey activities for capturing relevant information. The on board device shall have the capability of transmitting the data over a Cellular, Wi-Fi, or Satellite Connection to the Surveyor.

The software used to perform the remote survey may also be provided with technologies that support the Surveyor in the process of making a decision, such as:

- Artificial Intelligence (AI) for the recognition and the classification of defects,

- Internet of things (IoT) for collecting parameters and evaluating acceptability/working condition of machinery and equipment,

- Data driven verification or other means considered acceptable by TL.

The above software and technologies are to be evaluated and accepted by TL in each case.

When considering the use of software/applications and other technologies, data protection shall be considered in accordance with applicable requirements of the Classification Society before the remote survey is commenced. The software/application used to perform the remote survey is to be compatible with the technical requirements detailed in this paragraph; in addition, the software used is to comply with the Classification Society’s applicable requirements for:

- cybersecurity

- data protection and confidentiality for the transmitted data
When not provided by TL itself, the audio/video software or application used to perform the remote survey is to be accepted by TL.

During the survey preparation, it is the Owner’s responsibility to ensure that their data security policies are implemented as per the Company’s Safety Management System.

Notes: The Company’s SMS may take into account IMO resolution MSC.428(98), MSC-FAL.1/Circ.3 and TL-G 166.

5. Recording of evidence and reporting of survey

5.1 Recording of Evidence

5.1.1 Required evidence (refer to 2.4)

In principle, live streaming video and audio shall be applied to remote surveys as a primary means (refer to Table 1 in 3.1).

Additionally, and/or alternatively, one or more of the following evidence may be submitted or verified as requested by the Surveyor during remote survey so that the Surveyor is able to verify conditions of survey items:

- Recorded video and audio
- Photos
- Master's/chief engineer's statement
- Ship's logbook
- Owner's confirmation

5.1.1.1 Live streaming video and audio

Live streaming video and audio using ICT shall be in accordance with the requirements in 4.

5.1.1.2 Recorded videos/photos

For the recorded videos/photos, the following information is to be available:

- confirmation that they were actually taken on the ship by the Owner's representative
- date and time when they were taken
- identity of the personnel/crew responsible for taking evidence

5.1.1.3 Master's/chief engineer's statement

Recorded videos/photos provided by the Owner’s representative may be supplemented with a statement signed by the master and/or the chief engineer confirming the condition of the items shown in the evidence. The final evaluation of the remote survey by the Surveyor is to be based on all of the provided evidence, and it does not delegate the responsibility to the master/chief engineer’s statement only.
5.1.1.4 Ship’s logbook

The Master shall make entries into ship’s logbook on the following occasions and submit copies of the relevant pages when requested by the Surveyor:

- when a remote survey is carried out by the Surveyor
- when videos/photos are taken and submitted to the Surveyor with the master's/chief engineer's statement and additional documents as applicable.

5.1.1.5 Owner’s confirmation

The Owner’s representative or the master is to confirm the correctness and completeness of the provided information and evidence (if any) relevant to the condition of the items requested to be surveyed. This confirmation may be included in the survey application.

5.1.2 Retaining/filing evidence

The evidence submitted by the Owner’s representative or master shall be retained/filed in accordance with TL’s procedures which shall include:

- type of evidence to be retained/filed
- duration/location to be retained/filed

It is not required for TL to record and save live streaming video and audio as evidence unless the Surveyor considers it necessary.

5.1.3 Other supporting documents

The Surveyor may request the Owner’s representative or master to submit supplementary documents such as ship’s maintenance reports and record for the operation of machinery, and equipment and service reports issued by manufacturers, service suppliers or service providers.

While the Surveyor shall verify that the documents are duly prepared and issued to the ship, they may not be required to be retained/filed by TL as evidence.

5.2 Reporting of remote survey

The report of a remote survey shall be issued in accordance with the TL's procedure. The survey report shall also include the following additional information:

- indication that the survey was carried out remotely
- description of the means used during the remote survey
- indication of the provided evidence
- confirmation of the flag State Administration’s authorization, when applicable