INTERNATIONAL STANDARD

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Ships and marine technology — Service personnel for the maintenance, thorough examination, operational testing, overhaul and repair of lifeboats and rescue boats, launching appliances and release gear —

Part 4: Level 2 in-field competence

Navires et technologie maritime — Personnel de maintenance pour l'entretien, l'examen approfondi, la mise à l'essai en cours d'exploitation, la révision et la réparation des embarcations de sauvetage et des canots de secours, des engins de mise à l'eau et des dispositifs de largage —

Partie 4: Compétences de niveau 2 sur le terrain

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 8, *Ships and marine technology*, SC 1, *Maritime safety.*

This first edition cancels and replaces ISO/PAS 23678-4:2020, which has been technically revised.

The main changes are as follows:

— text has been editorially revised in accordance with the ISO/IEC Directives, Part 2, 2021.

A list of all parts in the ISO 23678 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

A major objective of the maritime industry is to prevent accidents and incidents from occurring. A global network of competent personnel employed by authorized service providers is vital for lifesaving appliances to remain fit for purpose, sustaining crew confidence and contributing to the prevention of incidents and accidents.

The need to develop an International Standard for this objective is evident from the new requirements in IMO Resolution MSC.402 (96)[3], entitled "requirements for maintenance, thorough examination, operational testing, overhaul and repair of lifeboats and rescue boats, launching appliances, and release gear" (henceforth referred to as "the IMO Requirements") adopted 19 May 2016 and entering into force 1 January 2020, as per paragraph 7.1.1.

This document and the associated documents ISO 23678-1, ISO 23678-2 and ISO 23678-3 have been developed to achieve three key objectives:

— develop training documents that would support the IMO Requirements, section 7, paragraph 7.1.1.

— provide a consistent, reliable, and standardized approach to training and provide a clear auditable trail for interested parties to grant authorization supporting the IMO Requirements, section 3, to approved service providers.

— establish a competency framework that would enable personnel certified by authorized service providers to develop and maintain competencies identified by industry experts to a level that enables them to competently work unsupervised on equipment covered by this document.

This document has been developed by identifying common design features in relation to survival craft, davits, winches and release gear makes and types for which service is to be provided. This has been achieved by conducting professional discussions with disciplined experts, to obtain the appropriate information to develop a training programme that is fit for purpose. Successfully completing ISO 23678-1, ISO 23678-2 and ISO 23678-3 enables personnel certified by an authorized service provider to meet the IMO Requirements, section 7, paragraph 7.1.1, and section 8.

Ships and marine technology — Service personnel for the maintenance, thorough examination, operational testing, overhaul and repair of lifeboats and rescue boats, launching appliances and release gear —

Part 4: Level 2 in-field competence

1 Scope

This document establishes a uniform, safe and consistent approach to the in-field competence assessment of personnel for the maintenance, thorough examination, operational testing, overhaul and repair of lifeboats and rescue boats, launching appliances and release gear.

It also provides the necessary information for interested parties to grant authorization, effectively evaluate and audit training, supporting the IMO Requirements[3], section 3.

It specifies the level 2 in-field initial and ongoing competence assessment for personnel certified by a manufacturer or an authorized service provider to carry out maintenance, thorough examination, operational testing, overhaul and repair of lifeboats (including free-fall lifeboats) and rescue boats (including fast rescue boats), launching appliances and release gear.

The training an individual receives while following a development process is covered in ISO 23678-2 and ISO 23678-3.

The competence requirements contained in this document provide a clear description of performance in-field in respect to:

a) what practitioners are expected to do;

b) the underpinning knowledge and skills they require to enable them to do what is expected;

c) how they can demonstrate what is expected of them;

d) how their performance can be assessed.

This document is intended to be used in conjunction with ISO 23678-1, ISO 23678-2 and ISO 23678-3.

This document is applicable to the following types of lifeboats (including free-fall lifeboats), rescue boats (including fast rescue boats), launching appliances and release gear.

Survival craft types:

a) single fall totally enclosed lifeboats with sprinkler and air systems;

b) twin fall totally enclosed lifeboats with sprinkler and air systems;

c) partially enclosed lifeboats;

d) tender lifeboats;

e) freefall lifeboats;

f) open lifeboat;

g) inflatable rescue boats;

h) rigid rescue boats;

i) semi-ridged inflatable rescue boats;

j) rigid fast rescue boats;

k) rigid inflatable fast rescue boats.

Survival craft propulsion system types:

a) inboard diesel engines;

b) outboard engines;

c) propeller drives;

d) jet drives.

Davit types:

a) gravity single and twin fall outrigger;

b) hydraulic single pivoting/luffing;

c) hydraulic multi pivot/luffing;

d) telescopic;

e) gravity roller track;

f) gravity free fall primary;

g) free fall hydraulic secondary;

h) A-frame hydraulic;

i) single arm slewing (manual, electric);

j) davits with stored power systems.

Winch types:

a) twin drum;

b) single drum;

c) gravity-lowering, electric hoisting;

d) gravity-lowering hydraulic hoisting;

e) hydraulic hoisting and lowering.

Hook release system types:

a) on-load/off load (load not over centre);

b) on-load/offload (load over centre);

c) off load;

d) freefall hydraulic;

e) automatic.

2 Normative references

The following documents are indispensable for the application of this document. For dated references, only the edition cited applies. For updated reference, the latest edition of the referenced document (including any amendments) applies.

ISO 23678-1, *Service personnel for the maintenance, thorough examination, operational testing, overhaul and repair of lifeboats and rescue boats, launching appliances and release gear — General requirements for training providers*

ISO 23678-2, *Service personnel for the maintenance, thorough examination, operational testing, overhaul and repair of lifeboats and rescue boats, launching appliances and release gear — Service personnel initial training*

ISO 23678-3, *Service personnel for the maintenance, thorough examination, operational testing, overhaul and repair of lifeboats and rescue boats, launching appliances and release gear — Level 1 technical training*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 23678-1 apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

4 Level 2 in-field competence

4.1 General

This competence document is designed to meet the in-field and ongoing competence assessment for level 2 service technicians.

Any inspection, maintenance, thorough examination, operational testing, overhaul, and repair shall be carried out according to the maintenance service manuals and associated technical documentation developed by the manufacturer.

See Figure B.1 for an example of a certificate.

See Tables C.1 to C.3 for checklists to assess level 2 service personnel competence.

4.2 Candidate pre-requisites for level 2 service technician in-field assessment

To be assessed against the competence statements, candidates shall either have completed the Initial Refresher training in accordance with ISO 23678-2 and have appropriate evidence of experience in-field, or be deemed competent in accordance with the requirements of ISO 23678-2 and ISO 23678-3. They shall either:

a) have successfully completed Initial and Level 1 Service Technician controlled environment technical education and training; or

b) provide evidence to verify a satisfactory level of previous experience (see ISO 23678-1:2022, 4.7.6, for acceptable evidence requirements).

4.3 Competence unit/element titles

4.3.1 Unit 1 — Work, health, and safety issues while conduction activities on board

a) element 1.1: the people who should be informed and consulted, prior to and during the scope of work;

b) element 1.2: the documentation that shall be raised, checked, verified interpreted and completed prior to and during interventions;

c) element 1.3: safety checks that shall be carried out prior to commencing work;

d) element 1.4: the equipment that shall be examined and attached to safely carry out the work scope.

4.3.2 Unit 2 — Annual inspection, maintenance, thorough examination, repair and operational test for lifeboats, rescue boats fast rescue boats their launching appliances and release gear

a) element 2.1: davit annual thorough examination;

b) element 2.2: davit annual maintenance;

c) element 2.3: winch thorough examination;

d) element 2.4: winch annual maintenance;

e) element 2.5: launching appliance annual operational test;

e) element 2.6: lifeboat annual thorough examination;

f) element 2.7: rescue boat (including fast rescue boat) annual thorough examination, additional competence requirements;

g) element 2.8: lifeboat, rescue boat (including fast rescue boats) annual maintenance;

h) element 2.9: release gear annual thorough examination;

i) element 2.10: release gear annual maintenance;

j) element 2.11: release gear annual operational function test.

4.3.3 Unit 3 — Five-year thorough examination overhaul and operational overload test for lifeboats, rescue boats fast rescue boats their launching appliances and release gear

a) element 3.1: launching appliance overhaul;

b) element 3.2: lifeboat, rescue boat (including fast rescue boat) overhaul;

c) element 3.3: release gear overhaul;

d) element 3.4: launching appliance and release gear five-year operational overload test.

5 Level 2 service technician in-field competence units

5.1 Unit 1 — Work, health and safety issues while conducting activities on-board

5.1.1 General

Upon satisfactory completion of this unit, candidates shall have demonstrated they can interface effectively with the applicable personnel involved with the intervention; review, complete and evaluate

the relevant documentation required for the work scope; implement safety and operating procedures to ensure the intervention is carried out in a safe and responsible manner.

5.1.2 Element 1.1 — The people who should be informed and consulted, prior to and during the scope of work

5.1.2.1 Scope: this element is about being able to interface effectively with relevant personnel to ensure the scope of the intervention is understood and carried out in an effective and safe manner.

5.1.2.2 To achieve this element, candidates shall meet the following competence requirements:

a) inform the person in charge of the scope of the intervention;

b) conduct a tool box talk with all personnel involved;

c) ensure there are no conflicting work scopes;

d) supply valid and reliable information relevant to the nature and scope of the intervention at appropriate times to applicable personnel [person in charge (PIC), superintendent, recognized organization (RO), safety officer];

e) liaise with applicable personnel in a professional manner at appropriate times to resolve problems which may occur (PIC, superintendent, RO, safety officer, company operations manager); and

f) carry out comprehensive debrief with applicable personnel to identify the outcomes of the intervention.

5.1.2.3 The underpinning knowledge requirements are to:

a) understand and convey the scope of the intervention to relevant personnel;

b) know the information required to conduct a tool box talk;

c) understand maintenance routines and plans;

d) be familiar with workplace reporting procedures;

e) understand statutory health and safety requirements.

5.1.3 Element 1.2 — The documentation that shall be raised, checked, verified, interpreted and completed prior to and during interventions

5.1.3.1 Scope: this element is about ensuring the correct documentation has been raised, checked and verified before commencing work; interpreting the appropriate documents for the scope of work; and completing the documentation so a statement of fitness can be issued.

5.1.3.2 To achieve this element, candidates shall meet the following competence requirements:

a) complete the appropriate documentation prior to commencing the work scope; permits to work, toolbox talks, risk assessments, method statements;

b) identify situations relating to the work scope that requires a risk assessment to be undertaken;

c) review and verify that all items listed in checklists for the weekly/monthly inspections supporting SOLAS regulations III/20.6 and III/20.7[5] have been completed;

d) check and verify that records of inspections and routine on-board maintenance have been carried out by the ship's crew;

e) ensure that relevant technical documentation is available for the work scope;

f) identify which items of equipment require certification and ensure it is current and corresponds to the applicable equipment;

g) interpret and apply the relevant technical information in relation to the work scope, manufacturer's manuals and associated technical documentation, job specific procedures; and

h) complete reports and checklists that accurately identify the outcome of the intervention, remedial work scope and replacement parts, if required.

5.1.3.3 The underpinning knowledge requirements for this element are to:

a) interpret and apply risk assessments applicable to the scope of work;

b) understand the technical documentation requirements for the work scopes;

c) identify equipment that requires certification;

d) identify, interpret and verify the requirements of SOLAS regulations III/20.6 and III/20.7[5];

e) identify and interpret the requirements of SOLAS Regulation III/20.4[5];

f) identify and understand the information required to complete reports and check lists;

g) understand maintenance routines and plans;

h) understand statutory health and safety requirements;

i) be familiar with workplace reporting procedures.

5.1.4 Element 1.3 — Safety checks that shall be carried out prior to commencing work

5.1.4.1 Scope: this element is about implementing safety and operating procedures prior to commencing work to ensure accidents and incidents do not occur.

5.1.4.2 To achieve this element, candidates shall meet the following competence requirements:

a) select and don appropriate personal protective equipment;

b) undertake the required exterior visual safety checks to confirm decks, gratings and handrails are secure and free from excessive corrosion, slip and trip hazards;

c) undertake the required visual safety checks of launching appliances for lifeboats (including freefall lifeboats), rescue boats (including fast rescue boats), mechanical restraints, winch brake status, davit structure, sheaves, fall wires, foundations;

d) undertake the checks to confirm the release gear is locked and safe prior to turning out;

e) undertake the checks and confirmed by visual inspection that the launching appliance is operating correctly while the survival craft is being turned out.

5.1.4.3 Underpinning knowledge requirements for this element are as follows:

a) understand application, care and limitations of distinct types of personal protective clothing and equipment;

b) interpret and apply risk assessments applicable to the scope of work;

c) understand company and customer policies and operational procedures related to health and safety;

d) understand statutory health and safety requirements;

e) interpret and apply manufacturer documentation, company and customer operational procedures in relation to the work scope;

f) evaluate the condition of wire ropes;

g) evaluate corrosion levels;

h) evaluate alignment and deformation;

i) understand, interpret and apply IMO Resolution MSC.48 (66)[6], paragraph 4.4.7.6.14 as amended.

5.1.5 Element 1.4 — The equipment that shall be examined and attached to safely carry out the work scope

5.1.5.1 Scope: this element is about thorough examination and evaluation of the condition of mechanical restraints and the actions required to safely attach them to lifeboats (including freefall lifeboats) and rescue boats (including fast rescue boats).

5.1.5.2 Competence requirements for this element are as follows:

a) carry out a thorough visual examination of mechanical restraints to confirm they are safe to use, gripe wires, bowsing in tackle, tricing pendants, hanging off/maintenance pendants;

b) carry out a thorough visual examination to evaluate the condition of the load path pad eyes, maintenance hangar beams, release gear hanging off attachment point, hook assembly legs, keel pins, keel shoes and bolts;

c) identify, interpret and apply manufacturers, customer and company procedures in relation to fitting mechanical restraints, maintenance pendants, secondary safety devices, bowsing in tackle; and

d) confirm the survival craft is safe to board.

5.1.5.3 Underpinning knowledge requirements for this element are as follows:

a) understand uses, care and limitations of distinct types of personal protective clothing and equipment;

b) interpret and apply risk assessments applicable to the scope of work;

c) understand company and customer policies and operational procedures related to health and safety;

d) understand statutory health and safety requirements;

e) interpret and apply manufacturer documentation, company and customer operational procedures in relation to the work scope;

f) evaluate the condition of wire ropes;

g) evaluate corrosion levels;

h) evaluate alignment and deformation;

i) understand, interpret and apply IMO Resolution MSC.48 (66)[6], paragraph 4.4.7.6.14.

5.2 Unit 2 — Annual maintenance, thorough examination, and operational test for lifeboats (including free fall lifeboats) rescue boats (including fast rescue), launching appliances and release gear

5.2.1 General

Upon satisfactory completion of this unit, candidates shall have demonstrated they can carry out the annual maintenance through examination and operational tests effectively supporting the IMO Requirements[3], section 6, and manufacturer's technical documentation, in a responsible and safe manner.

5.2.2 Element 2.1 — Davit annual thorough examination

5.2.2.1 Scope: this element is about carrying out the annual thorough examination supporting the IMO Requirements[3], paragraphs 6.2.9.1 to 6.2.9.4, in accordance with manufacturer's service manuals and associated technical information for specific types of davits (see Table A.1) to confirm they operate correctly and are in a satisfactory condition.

5.2.2.2 To achieve this element, candidates shall meet the following competence requirements:

a) undertake a thorough visual and where applicable physical examination of the davit foundation to evaluate corrosion; welds, bolts;

b) undertake a thorough visual examination of the davit structure to evaluate, corrosion, alignment, deformation; frames, pedestals, columns, tracks, ramps;

c) undertake a thorough visual examination of davit arms to evaluate, corrosion, alignment, deformation, freedom of movement, excessive free play;

d) undertake a thorough visual and physical examination of rollers and sheaves to evaluate freedom of movement, excessive free play and lubrication;

e) carry out a thorough visual inspection of the fall wire to evaluate damage, corrosion, lubrication;

f) carry out a thorough visual inspection of floating blocks, master links, shackles, turnbuckles or other connections to evaluate corrosion, freedom of movement, excessive free play, deformation;

g) undertake a thorough visual and where applicable intrusive examination of slewing and worm gearing to evaluate freedom of movement, excessive free play, damage, lubrication levels;

h) undertake a thorough visual examination of hydraulic system components; reservoirs, filters, hoses, ferrules, valves, gauges, rams to evaluate corrosion, damage, fluid levels;

i) undertake a thorough visual examination of stored power system components; accumulators, pipework, hose, connections gauges, to evaluate corrosion, damage, pre-charge and final pressures; and;

j) undertake the required checks to confirm electrical systems, starter box, limit switches, wiring and motors operate correctly and are in a satisfactory condition.

5.2.2.3 Underpinning knowledge requirements for this element are as follows:

a) understand application, care and limitation of distinct types of personal protective clothing and equipment;

b) interpret and apply risk assessments applicable to the scope of work;

c) understand company and customer policies and operational procedures related to health and safety;

d) understand the hazards of working with high voltage systems;

e) understand statutory health and safety requirements;

f) understand safety protocols in relation to pressure systems;

g) have a basic understanding of hydraulic systems;

h) understand basic electrical circuitry;

i) evaluate levels of corrosion;

j) understand wire rope construction, inspection and discard criteria;

k) evaluate acceptable levels of free play in relation to davit components;

l) evaluate alignment and deformation;

m) understand the design and construction characteristics of specific designs of davits;

n) interpret and apply manufacturer information to safely operate specific designs of davits;

o) interpret and apply manufacturer's manuals and associated technical documentation, company and customer operational procedures in relation to the work scope;

p) select and use tools and equipment safely.

5.2.3 Element 2.2 — Davit annual maintenance

5.2.3.1 Scope: this element is about carrying out the annual thorough maintenance in accordance with the manufacturer's service manuals and associated technical information for specific types of davits (see Table A.1) to confirm they operate correctly and are in a satisfactory condition.

5.2.3.2 To achieve this element, candidates shall meet the following competence requirements:

a) apply the correct lubricants to greasing points, bearings, internal worm gear, sheave bearings, luffing cylinders;

b) apply the correct lubricants to wire ropes;

c) change gearing oil in; external slewing gear, reduction gearing;

d) change oil in hydraulic reservoir; and

e) test stored power accumulator pre-charge pressures and replenish where required.

5.2.3.3 Underpinning knowledge requirements for this element are as follows:

a) understand application, care and limitation of different types of personal protective clothing and equipment;

b) interpret and apply risk assessments applicable to the scope of work;

c) understand company and customer policies and operational procedures related to health and safety;

d) understand statutory health and safety requirements;

e) understand safety protocols in relation to pressure systems;

f) have a basic understanding of hydraulic systems;

g) understand the various type of lubricants and suitability for use on specific components;

h) understand the design and construction characteristics of specific designs of davits;

i) interpret and apply manufacturer's manuals and associated technical documentation, company and customer operational procedures in relation to the work scope;

j) select and use tools and equipment safely.

5.2.4 Element 2.3 — Winch thorough examination

5.2.4.1 Scope: this element is about carrying out the annual thorough examination supporting the IMO Requirements[3], paragraph 6.2.9.5, in accordance with manufacturer's service manuals and associated technical information for specific types of winches (see Table A.1) to ensure they operate correctly and remain in a satisfactory condition.

5.2.4.2 To achieve this element, candidates shall meet the following competence requirements:

a) undertake a thorough visual and, where applicable, physical examination of the winch foundation, bolts or welds to evaluate corrosion and torque settings where applicable;

b) undertake a thorough visual examination of the winch assembly to evaluate corrosion, leaks, damage;

c) dismantle the brake assembly to undertake a thorough examination of a static brake with friction pads to evaluate wear using a measuring device;

d) dismantle the brake assembly to undertake a thorough examination of a static brake that is mechanically operated and has multiple disks with friction pads, to evaluate wear using a measuring device;

e) dismantle the brake assembly (if required), to undertake a thorough examination of a static brake that is hydraulically operated and has multiple disks with friction pads, to evaluate wear using a measuring device;

f) dismantle the brake assembly to undertake a thorough examination of a centrifugal brake with friction pads to evaluate wear using a measuring device;

g) undertake a thorough examination of a lowering brake with a hydraulic pump to evaluate corrosion, satisfactory operation;

h) ensure the static brake arm lever is adjusted to the correct position;

i) undertake the checks to establish the hand crank is operating correctly;

j) undertake a thorough visual examination of remote-control systems and confirm they operate correctly;

k) undertake a thorough examination of a clutch to evaluate condition, operation, lubrication;

l) undertake the checks required to confirm gearing operates correctly and is in a satisfactory condition; pinions, spur gears, reduction gearing, chains, planetary gearing;

m) undertake a thorough examination of hydraulic system components; operating levers, hand pumps, reservoirs, filters, hoses, connections, valves, gauges, accumulators to evaluate corrosion, damage, fluid levels, pressures;

n) carry out the checks required to establish the electrical system is in a satisfactory condition;

o) carry out the checks required to establish the electric motor operates correctly and is in a satisfactory condition; and

p) operate distinct types of winches (see Table A.1) to ensure they are operating correctly.

5.2.4.3 Underpinning knowledge requirements for this element are as follows:

a) understand application, care and limitation of distinct types of personal protective clothing and equipment;

b) interpret and apply risk assessments applicable to the scope of work;

c) understand company and customer policies and operational procedures related to health and safety;

d) understand hazards of working with high voltage systems;

e) understand statutory health and safety requirements;

f) understand safety protocols in relation to pressure systems;

g) have a basic understanding of hydraulic systems;

h) have a basic understanding of electrical systems;

i) evaluate levels of corrosion;

j) evaluate wear of brake components and acceptable levels of free play in relation to winch components;

k) evaluate alignment and deformation;

l) understand the design and construction characteristics of specific designs of winch;

m) interpret and apply manufacturer information to safely operate specific designs of winch;

n) interpret and apply manufacturer's manuals and associated technical documentation, company and customer operational procedures in relation to the work scope;

o) select and use tools and equipment safely.

5.2.5 Element 2.4 — Winch annual maintenance

5.2.5.1 Scope: this element is about carrying out the annual maintenance in accordance with the manufacturer's service manuals and associated technical information for specific types of winches (see Table A.1) to confirm they operate correctly and are in a satisfactory condition.

5.2.5.2 To achieve this element, candidates shall meet the following competence requirements:

a) change oil in primary and secondary gearing;

b) apply the correct lubricants to greasing points, bearings, shafts, bearings;

c) carry out the action required to change oil for distinct types of clutch;

d) carry out the actions to test stored power accumulator pressures and replenish;

e) carry out the actions required to adjust gear chains to stay within specific tolerances.

5.2.5.3 Underpinning knowledge requirements for this element are as follows:

a) understand application, care and limitation of different types of personal protective clothing and equipment;

b) interpret and apply risk assessments applicable to the scope of work;

c) understand company and customer policies and operational procedures related to health and safety;

d) understand statutory health and safety requirements;

e) understand safety protocols in relation to pressure systems;

f) have a basic understanding of hydraulic systems;

g) understand the various types of lubricants and suitability for use on specific components;

h) understand the design and construction characteristics of specific designs of winch;

i) interpret and apply manufacturer's manuals and associated technical documentation, company and customer operational procedures in relation to the work scope;

j) select and use tools and equipment safely.

5.2.6 Element 2.5 — Winch of launching appliance annual operational test

5.2.6.1 Scope: this element is about carrying out the annual operational test supporting the IMO Requirements[3], in accordance with manufacturer's service manuals and associated technical information for specific types of winches (see Table A.1) to confirm they operate correctly.

5.2.6.2 To achieve this element, candidates shall meet the following competence requirements:

a) undertake the actions required to carry out a dynamic load test of the winch by lowering the boat or equivalent load until it reaches its maximum lowering speed and before it hits the water apply the brake;

b) after completion of the operational test, reinspect and test the stressed structural parts applicable to the type of winch where the structure permits the re-inspection.

5.2.6.3 Underpinning knowledge requirements for this element are as follows:

a) understand application, care and limitation of different types of personal protective clothing and equipment;

b) interpret and apply risk assessments applicable to the scope of work;

c) understand company and customer policies and operational procedures related to health and safety;

d) understand statutory health and safety requirements;

e) understand the design and construction characteristics of specific designs of launching appliance;

f) interpret and apply manufacturer's manuals and associated technical documentation, company and customer operational procedures in relation to the work scope;

g) select and use tools and equipment safely;

h) understand the IMO Requirements[3], paragraph 6.2.10;

i) understand how to carry out load test calculation;

j) understand how to operational test of a winch using a simulated survival craft load.

5.2.7 Element 2.6 — Lifeboat annual thorough examination

5.2.7.1 Scope: this element is about carrying out the annual thorough examination in accordance with the manufacturer's service manuals and associated technical information for specific types of lifeboats (see Table A.1) to confirm they operate correctly and are in a satisfactory condition.

5.2.7.2 To achieve this element, candidates shall have undertaken the following competence requirements:

a) thorough visual examination of the boats structure to confirm it is free from damage, cracks, osmosis;

b) the required checks regarding the loose equipment to confirm the requirements of the Life Saving Appliance Code (LSA) are being met;

c) a thorough visual examination of access hatches to confirm they operate correctly and in satisfactory condition; to include hinges and seals;

d) a thorough visual examination of non-access hatches to confirm they operate correctly and are in a satisfactory condition; to include windows, seals and vents;

e) a thorough visual examination of external fittings to confirm they operate in a satisfactory condition; to include handrails, lifelines, skates and lashings;

f) a thorough visual examination of the external boundaries as far as practicable of the void spaces to evaluate their condition;

g) a visual examination of the bilge drain plug and hull fitting to confirm it operates correctly and is in a satisfactory condition;

h) a thorough visual examination of the engine to confirm it is in satisfactory condition and running correctly; to include throttle/gear box controls and cables, gauges, primary and secondary starting systems;

i) the required checks to evaluate the engine and gear box lubrication levels;

j) the required checks to confirm the engine coolant system is in a satisfactory condition and operating correctly; to include belts, pipes, pumps, keel cooler, expansion tanks, cap seals and coolant levels;

k) the required checks of the fuel system to confirm it is in a satisfactory condition and operating correctly; to include tanks, lines, valves and filters;

l) a thorough visual examination of the exhaust system to confirm it is free of corrosion and leaks (drain valves if fitted are operating correctly);

m) a thorough visual examination of the engine bed to confirm it is in a satisfactory condition; to include mounts and fixings;

n) the required checks of the electrical system to confirm the components are operating correctly and are in a satisfactory condition; to include alternator, belts, external charging systems, battery, isolators, wiring loom, internal and external lights;

o) the required checks of the propulsion system to confirm it operates correctly and is in a satisfactory condition; to include stern tube, stuffing box, shafts, couplings, propeller and bearings;

p) the required checks of the manoeuvring system to confirm it operates correctly and is in a satisfactory condition; to include control cables, rudder, pintles, skeg, emergency tiller and hydraulics;

q) the required checks of the bailing system to confirm it operates correctly and is in a satisfactory condition; to include pumps, seals, pipework and diaphragms;

r) the required checks of the sprinkler system to confirm it operates correctly and is in a satisfactory condition; to include pumps, belts, valves, pipework and nozzles;

s) the required checks of the air system to confirm it operates correctly and is in a satisfactory condition; to include cylinders, hoses, connection, valves and gauges;

t) the required checks to confirm the self-righting/anti-entrapments system to confirm it operates correctly and is in a satisfactory condition; to include cylinders, gauges, valves, hoses and bag;

u) a thorough examination of the internal fittings to confirm they operate correctly and are in a satisfactory condition; to include seatbelts and lighting;

v) a thorough examination of all operating instructions to confirm they are in a satisfactory condition.

5.2.7.3 Underpinning knowledge requirements for this element are as follows:

a) understand application, care and limitation of different types of personal protective clothing and equipment;

b) interpret and apply risk assessments applicable to the scope of work;

c) understand company and customer policies and operational procedures related to health and safety;

d) understand statutory health and safety requirements;

e) understand the design and construction characteristics of specific designs lifeboats;

f) have a basic understanding of hydraulic systems;

g) have a basic understanding of electrical systems;

h) have an awareness of the risks related to working with pressure systems;

i) understand marine diesel engine maintenance;

j) interpret and apply the manufacturer's manuals and associated technical documentation, company and customer operational procedures in relation to the work scope;

k) select and use tools and equipment safely;

l) understand the IMO Requirements[3], paragraph 6.2.3;

m) understand the requirements of IMO Resolution MSC.48 (66)[6], paragraph 4.4.8.

5.2.8 Element 2.7 — Rescue boats (including fast rescue boats) annual thorough examination, additional competence requirements

5.2.8.1 Scope: this element is about carrying out the annual thorough examination in accordance with the manufacturers service manuals and associated technical information for specific types of rescue boats and fast rescue boats (see Table A.1) to confirm they operate correctly and are in a satisfactory condition.

5.2.8.2 To achieve this element, candidates shall meet the following competence requirements:

a) carry out a thorough visual examination of lifting equipment and attachment points to confirm they are in a satisfactory condition and their certification is current;

b) undertake a thorough examination of a lifting yoke including foundation bolts to confirm it is in a satisfactory condition;

c) carry out a thorough visual examination of fenders/inflatable sponson to confirm they operate correctly and are in a satisfactory condition; non-return valves, air pressure;

d) carry out a thorough visual examination of an outboard engine to confirm it is in a satisfactory condition and running correctly; spark plugs, throttle/gear box controls and cables, primary and secondary starting systems;

e) undertake the required checks to confirm an outboard engine coolant system is in a satisfactory condition and operating correctly; intake, outlet, impellor;

f) undertake the required checks to evaluate the engine and gear box lubrication levels;

e) undertake the required checks of a jet drive propulsion system to confirm it operates correctly and is in a satisfactory condition; housing, bucket, impellor;

f) undertake the required checks to confirm the self-righting system operates correctly and is in a satisfactory condition; frame foundation, cylinders, activating mechanisms, hoses, connections, bag;

g) undertake the required checks to confirm the self-bailing system operates correctly and is in a satisfactory condition;

h) carry out the actions required to verify the mass of the craft.

5.2.8.3 Underpinning knowledge requirements for this element are as follows:

a) understand application, care and limitation of different types of personal protective clothing and equipment;

b) interpret and apply risk assessments applicable to the scope of work;

c) understand company and customer policies and operational procedures related to health and safety;

d) understand statutory health and safety requirements;

e) understand the design and construction characteristics of specific designs lifeboats;

f) have a basic understanding of hydraulic systems;

g) have a basic understanding of electrical systems;

h) have an awareness of the risks related to working with pressure systems;

i) understand outboard engine maintenance;

j) interpret and apply manufacturer's manuals and associated technical documentation, company and customer operational procedures in relation to the work scope;

k) select and use tools and equipment safely;

l) calculate loads;

m) understand IMO Requirements[3], paragraph 6.2.3;

n) understand IMO Resolution MSC.48 (66)[6], paragraphs 5.1.2 and 5.1.3 as amended.

5.2.9 Element 2.8 — Lifeboat, rescue boat (including fast rescue boats) annual maintenance

5.2.9.1 Scope: this element is about carrying out the annual maintenance in accordance with the manufacturers service manuals and associated technical information for specific types of lifeboats, rescue boat (including fast rescue boat) (see Table A.1) to confirm they operate correctly and are in a satisfactory condition.

5.2.9.2 To achieve this element, candidates shall meet the following competence requirements:

a) replace the engine oil and filter for an inboard diesel engine in accordance with specific specifications;

b) replace the engine oil and filter for an outboard engine in accordance with specific specifications;

c) replace the gearbox oil an inboard diesel engine in accordance with specific specifications;

d) replace the gearbox oil for an outboard engine in accordance with specific specifications;

e) carry out the actions required to replace the fuel filter and ensure any air is removed from the fuel system;

f) remove and replace a fuel lift pump for an inboard diesel engine;

g) carry out the actions required to replace spark plugs including setting the gap to specific specifications;

h) replenish hydraulic starting and steering system fluid in accordance with specifications;

i) carry out the actions required to remove and replace an impellor for a coolant pump, replace cooling water in accordance with the requirements to ensure the cooling system is working effectively and free from air;

j) carry out the actions to replenish breathing air in cylinders in accordance with specifications;

k) apply specified lubricants to specific greasing points.

5.2.9.3 Underpinning knowledge requirements for this element are as follows:

a) understand application, care and limitation of distinct types of personal protective clothing and equipment;

b) interpret and apply risk assessments applicable to the scope of work;

c) understand company and customer policies and operational procedures related to health and safety;

d) understand statutory health and safety requirements;

e) understand safety protocols in relation to pressure systems;

f) have a basic understanding of hydraulic systems;

g) have a basic understanding of electrical systems;

h) understand the various types of lubricants and suitability for use on specific components;

i) understand the design and construction characteristics of specific designs of davits;

j) interpret and apply manufacturer's manuals and associated technical documentation, company and customer operational procedures in relation to the work scope;

k) selection and safe use of tools and equipment;

l) reasons for replacement of impellor as a result of failure.

5.2.10 Element 2.9 — Release gear annual thorough examination

5.2.10.1 Scope: this element is about carrying out the annual thorough examination supporting the IMO Requirements[3], paragraph 6.2.4, in accordance with manufacturer's service manuals and associated technical information for specific types of release gears (see Table A.1) to confirm they operate correctly and are in a satisfactory condition.

5.2.10.2 To achieve this element, candidates shall have completed the following competence requirements:

a) offload/on-load lift not over centre: undertaken a thorough visual and where required intrusive examination to evaluate corrosion, deformation, alignment, free play and verify tolerances of hook assembly components (excluding the locking device) to confirm it is in a satisfactory condition and operates correctly; to include moveable hook, fulcrum pins, bushes, hook body, hook locking indicators, mousing plate, retainers, safety latches, legs, keel shoes and keel pins;

b) offload/on-load lift over centre: undertaken a thorough visual and where required intrusive examination to evaluate corrosion, deformation, alignment, free play and verify tolerances of hook assembly components to confirm it is in a satisfactory condition and operates correctly; to include moveable hook, fulcrum pins, bushes, hook body, mousing plate, retainers, safety latches, legs, keel shoes and keel pins;

c) free fall hydraulic: undertaken a thorough visual and where required intrusive examination to evaluate corrosion, deformation, alignment, free play and verify tolerances of hook assembly components to confirm it is in a satisfactory condition and operates correctly; to include hook foundation, securing bolts, stop pawl/release hook contact, securing bolt, moveable hook, fulcrum pins, bushes, washers, hook body, mousing plate, retainers and safety latches;

d) automatic release: undertaken a thorough visual examination to evaluate corrosion, deformation, alignment, free play and verify tolerances of hook assembly components to confirm it is in a satisfactory condition and operates correctly; to include securing bolts, moveable hook, fulcrum pins, hook body, operating/resetting levers and safety latches;

e) off load: undertaken a thorough visual examination to evaluate corrosion, deformation, alignment, free play and verify tolerances of hook assembly components to confirm it is in a satisfactory condition and operates correctly; to include securing bolts, moveable hook, fulcrum pins, hook body, operating/resetting levers and safety latches;

f) undertaken a thorough visual and where required intrusive examination to evaluate, deformation, alignment, free play and verify tolerances of locking device components to confirm they are in a satisfactory condition and operate correctly; to include rotating cams flat to flat and amplification arms;

g) undertaken a thorough visual and where required intrusive examination to evaluate deformation, alignment, free play and verify tolerances of locking device components to confirm they are in a satisfactory condition and operate correctly; to include rotating cams curve to curve and torsion springs;

h) undertaken a thorough visual and where required intrusive examination to evaluate corrosion, deformation, alignment, free play and verify tolerances of locking device components to confirm they are in a satisfactory condition and operate correctly; to include rotating cams curve to flat, intermediary hooks amplification arms, arresting levers and torsion springs;

i) undertaken a thorough visual and where required intrusive examination to evaluate deformation, alignment, free play and verify tolerances of locking device components to confirm they are in a satisfactory condition and operate correctly; to include up and down pins and locking collars;

j) undertaken a thorough visual and where required intrusive examination to evaluate deformation, alignment, free play and verify tolerances of a mechanically operated central release unit to confirm its components are in a satisfactory condition and operate correctly; to include release handles, hydrostatic locking levers, locking lever indicators, locking pins, hydrostatic overrides and cables for control and release;

k) undertaken a thorough visual and where required intrusive examination to evaluate corrosion, deformation and alignment of a hydraulically operated release system to confirm its components are in a satisfactory condition and operate correctly; to include pipework, connections, electrical system, handpumps and secondary means of emergency release;

l) undertaken a thorough visual and where required intrusive examination to evaluate corrosion, deformation, alignment and free play of a hydrostatic unit with a diaphragm to confirm it is in a satisfactory condition and operates correctly; to include operating cables, piston plates, piston plate fixings, housing and vent hose;

m) undertaken a thorough visual and where required intrusive examination to evaluate corrosion, deformation, alignment and free play of a hydrostatic unit with a float to confirm it is in a satisfactory condition and operates correctly; to include operating rods, housing and vents;

n) undertaken a function test of the hydrostatic release unit with electronic sensors to confirm it is in a satisfactory condition and operates correctly; and

o) operated specific types of release gear to ensure they release and reset correctly.

5.2.10.3 Underpinning knowledge requirements for this element are as follows:

a) understand application, care and limitations of distinct types of personal protective clothing and equipment;

b) interpret and apply risk assessments applicable to the scope of work;

c) understand company and customer policies and operational procedures related to health and safety;

d) understand statutory health and safety requirements;

e) understand design and construction characteristics of specific designs release gear;

f) have a basic understanding of hydraulic systems;

g) have a basic understanding of electrical systems;

h) have an awareness of the risks related to working with on-load release gear;

i) evaluate corrosion deformation, alignment and free play;

j) evaluate wear of internal and external diameters using appropriate measuring equipment;

k) evaluate wear of internal and external radius using appropriate measuring equipment;

l) measure air gaps using appropriate measuring equipment;

m) understand the design and construction of the various types of cable used for control and release;

n) interpret and apply manufacturer's manuals and associated technical documentation, company and customer operational procedures in relation to the work scope;

o) select and use tools and equipment safely;

p) understand IMO Requirements[3], paragraph 6.2.4;

q) understand IMO Resolution MSC.48 (66)[6], paragraph 4.4.7, as amended.

5.2.11 Element 2.10 — Release gear annual maintenance

5.2.11.1 Scope: this element is about carrying out the annual maintenance in accordance with the requirements of manufacturers service manuals and associated technical information for specific types of release gear (see Table A.1) to confirm they operate correctly and are in a satisfactory condition.

5.2.11.2 To achieve this element, candidates shall have completed the following competence requirements:

a) replaced specified components as required for distinct types of release gear hook assemblies;

b) replaced specified components as required for distinct types of central release units;

c) replaced specified components as required for distinct types of hydrostatic units;

d) replaced hydraulic systems with the specified oil;

e) cleaned and applied the specified lubricants to specific components as required; and

f) adjusted cables used for control and release to ensure a simulation release for twin fall release gear is obtained.

5.2.11.3 Underpinning knowledge requirements for this element are as follows:

a) understand uses, care and limitations of distinct types of personal protective clothing and equipment;

b) interpret and apply risk assessments applicable to the scope of work;

c) understand company and customer policies and operational procedures related to health and safety;

d) understand statutory health and safety requirements;

e) understand safety protocols in relation to pressure systems;

f) have a basic understanding of hydraulic systems;

g) understand the various types of lubricants and suitability for use on specific components;

h) understand the design and construction characteristics of specific designs of release gear;

i) interpret and apply manufacturer's manuals and associated technical documentation, company and customer operational procedures in relation to the work scope;

j) select and use tools and equipment safely.

5.2.12 Element 2.11 — Release gear annual operational function test

5.2.12.1 Scope: this element is about carrying out the annual operational function test of release supporting the IMO Requirements[3], paragraphs 6.2.4 to 6.2.8, in accordance with manufacturer's service manuals and associated technical information for specific types of release gears (see Table A.1) to confirm they operate correctly.

NOTE To address specific flag administration technical documentation issued in regard to IMO requirements which permit the use of hydraulic testing devices to carry out the annual operational function test of on-load release gear instead of lowering the survival craft to the water to carry out a “real” release, a hydraulic tool can be used to simulate the load of an empty boat and its equipment.

5.2.12.2 To achieve this element, candidates shall have completed the following competence requirements:

a) on-load lift not over centre: undertaken the actions required to carry out the operational test of release gear function supporting the IMO Requirements[3], paragraph 6.2.5;

b) on-load lift over centre: undertaken the actions required to carry out the operational test of release gear function supporting the IMO Requirements, paragraph 6.2.5;

c) offload lift over centre: undertaken the actions required to carry out the operational test of release gear function supporting the IMO Requirements, paragraph 6.2.6;

d) free fall hydraulic: undertaken the actions required to carry out the operational test of release gear function supporting the IMO Requirements, paragraph 6.2.7;

e) automatic lift over centre: undertaken the actions required to carry out the operational test of release gear function supporting the IMO Requirements, paragraph 6.2.8;

f) carried out the actions required to measure the trip and closing force of automatic release hooks;

g) carried out the actions required to set up a hydraulic test tool; and

h) carried out the calculations necessary for establishing the required pressure to apply to a hydraulic test tool to simulate the weight of a survival craft and its equipment.

5.2.12.3 Underpinning knowledge requirements for this element are as follows:

a) understand the application, care and limitations of distinct types of personal protective clothing and equipment;

b) interpret and apply risk assessments applicable to the scope of work;

c) understand company and customer policies and operational procedures related to health and safety;

d) understand statutory health and safety requirements;

e) understand the design and construction characteristics of specific designs of release gear;

f) interpret and apply manufacturer's manuals and associated technical documentation, company and customer operational procedures in relation to the work scope;

g) select and use tools and equipment safely;

h) understand IMO Requirements[3], paragraph 6.2.10;

i) carry out the mathematics required to calculate various loads;

j) set up of a hydraulic test tool.

5.3 Unit 3 — Five-year, overhaul and operational overload test for lifeboats, rescue boats (including fast rescue boats), their launching appliances and release gear

5.3.1 General

Upon satisfactory completion of this unit, candidates shall have demonstrated they can carry out the five-year overhaul and operational overhaul tests effectively supporting the IMO Requirements[3], paragraph 6.3, and in accordance with manufacturer's service technical documentation, in a responsible and safe manner.

NOTE The five-year overhaul requirements are carried out in addition to the annual thorough examination and maintenance requirements.

5.3.2 Element 3.1 — Launching appliance overhaul

5.3.2.1 Scope: this element is about carrying out the five-year overhaul requirements supporting the IMO Requirements[3], in accordance with manufacturer's service manuals and associated technical information for specific types of launching appliance (see Table A.1) to ensure they remain fit for purpose.

5.3.2.2 To achieve the competence required for this element, candidates shall have carried out the actions required to:

a) replace a stored power accumulator;

b) change a wire rope for a single fall winch;

c) change a wire rope for a twin fall winch;

d) replace winch clutches;

e) replace a davit sheave; and

f) replace hydraulic hoses/pipes.

5.3.2.3 Underpinning knowledge requirements for this element are as follows:

a) understand application, care and limitations of distinct types of personal protective clothing and equipment;

b) interpret and apply risk assessments applicable to the scope of work;

c) understand company and customer policies and operational procedures related to health and safety;

d) understand statutory health and safety requirements;

e) understand design and construction characteristics of specific designs of launching appliance;

f) understand safety protocols in relation to pressure systems;

g) have a basic understanding of hydraulic systems;

h) understand the various type of lubricants and suitability for use on specific components;

i) interpret and apply manufacturer's manuals and associated technical documentation, company and customer operational procedures in relation to the work scope;

j) select and use tools and equipment safely;

k) understand IMO Requirements[3], paragraph 6.3.1;

l) understand SOLAS Regulation III/20.4[5].

5.3.3 Element 3.2 — Lifeboat, rescue boat (including fast rescue boat) overhaul

5.3.3.1 Scope: this element is about carrying out the five-year overhaul requirements supporting the IMO Requirements[3], in accordance with manufacturer's service manuals and associated technical information for specific types of survival craft (see Table A.1) to ensure they remain fit for purpose.

5.3.3.2 To achieve the competence required for this element, candidates shall have carried out the actions required to:

a) carry out the actions required to replace breathing air cylinders and function test;

b) carry out the actions required to replace entrance hatch door seals and function test.

5.3.3.3 Underpinning knowledge requirements for this element are as follows:

a) understand application, care and limitations of distinct types of personal protective clothing and equipment;

b) interpret and apply risk assessments applicable to the scope of work;

c) understand company and customer policies and operational procedures related to health and safety;

d) understand statutory health and safety requirements;

e) understand safety protocols in relation to pressure systems;

f) have a basic understanding of hydraulic systems;

g) interpret and apply manufacturer's manuals and associated technical documentation, company and customer operational procedures in relation to the work scope;

h) select and use tools and equipment safely.

5.3.4 Element 3.3 — Release gear overhaul

5.3.4.1 Scope: this element is about carrying out the five-year overhaul supporting the IMO Requirements[3], paragraph 6.3.3, in accordance with manufacturer's service manuals and associated technical information for specific types of release gears (see Table A.1) to ensure they remain fit for purpose.

5.3.4.2 To achieve the competence required for this element, candidates shall have carried out the actions required to:

a) offload/on-load lift not over centre: dismantle specified hook assembly components to carry out a thorough visual and intrusive examination to evaluate corrosion, deformation, alignment, free play and verify tolerance to confirm they are in a satisfactory condition and operate correctly; to include moveable hook, fulcrum pins, bushes, hook body, hook locking indicators, mousing plate, retainers, safety latches, legs, keel shoes and keel pins;

b) offload/on-load lift over centre: dismantle and reassemble specified hook assembly components to evaluate corrosion, deformation, alignment, free play and verify tolerances, to confirm they are in a satisfactory condition and operate correctly; to include moveable hook, fulcrum pins, bushes, hook body, mousing plate, retainers, safety latches, legs, keel shoes and keel pins;

c) free fall hydraulic: dismantle and reassemble specified hook assembly components to evaluate corrosion, deformation, alignment, free play and verify tolerances, to confirm they are in a satisfactory condition and operate correctly; to include hook foundation, securing bolts, stop pawl/release hook contact, securing bolt, moveable hook, fulcrum pins, bushes, washers, hook body, mousing plate, retainers and safety latches;

d) automatic release: carry out a service exchange;

e) off load: dismantle and reassemble specified hook assembly components to evaluate corrosion, deformation, alignment, free play and verify tolerances of hook assembly components to confirm they are in a satisfactory condition and operate correctly; to include securing bolts, moveable hook, fulcrum pins, hook body, operating/resetting levers and safety latches;

f) dismantle and reassemble specified locking device components to evaluate deformation, alignment, free play and verify tolerances where required to confirm they are in a satisfactory condition and operate correctly; to include rotating cams flat to flat and amplification arms;

g) dismantle and reassemble specified locking device components to evaluate deformation, alignment, free play and verify tolerances of locking device components to confirm they are in a satisfactory condition and operate correctly; to include rotating cams curve to curve and torsion springs;

h) dismantle and reassemble specified locking device components to evaluate corrosion, deformation, alignment, free play and verify tolerances to confirm they are in a satisfactory condition and operate correctly; to include rotating cams curve to flat, intermediary hooks amplification arms, arresting levers and torsion springs;

i) dismantle and reassemble specified locking device components to evaluate, deformation, alignment, free play and verify tolerances of locking device components to confirm they are in a satisfactory condition and operate correctly; to include up and down pins;

j) dismantle and reassemble specified components to evaluate deformation, alignment, free play and verify tolerances of a mechanically operated central release unit to confirm components are in a satisfactory condition and operate correctly; to include release handles, hydrostatic locking levers, locking lever indicators, locking pins, hydrostatic overrides and cables for control and release;

k) undertake a thorough visual and where required intrusive examination to evaluate corrosion, deformation and alignment of a hydraulically operated release system to confirm its components are in a satisfactory condition and operate correctly; to include pipework, connections, electrical system, handpumps and secondary means of emergency release;

l) dismantle and reassemble specified components to evaluate corrosion, deformation, alignment and free play of a hydrostatic unit with a diaphragm to confirm it is in a satisfactory condition and operates correctly; to include operating cables, piston plates, piston plate fixings, housing and vent hose;

m) dismantle and reassemble specified components to evaluate corrosion, deformation, alignment and free play of a hydrostatic unit with a float, floats to confirm it is in a satisfactory condition and operates correctly; to include operating rods, housing and vents;

n) undertake a function test of the hydrostatic release unit with electronic sensors to confirm it is in a satisfactory condition and operates correctly;

o) replace specific parts in accordance with requirements.

5.3.4.3 Underpinning knowledge requirements for this element are as follows:

a) understand application, care and limitations of distinct types of personal protective clothing and equipment;

b) interpret and apply risk assessments applicable to the scope of work;

c) understand company and customer policies and operational procedures related to health and safety;

d) understand statutory health and safety requirements;

e) understand design and construction characteristics of specific designs release gear;

f) have a basic understanding of hydraulic systems;

g) have a basic understanding of electrical systems;

h) have an awareness of the risks related to working with on-load release gear;

i) evaluate corrosion deformation, alignment and free play;

j) evaluate wear of internal and external diameters using appropriate measuring equipment;

k) evaluate wear of internal and external radius using appropriate measuring equipment;

l) measure air gaps using appropriate measuring equipment;

m) understand the design, construction of the various types of cable used for control and release;

n) interpret and apply manufacturer's manuals and associated technical documentation, company and customer operational procedures in relation to the work scope;

o) select and use tools and equipment safely;

p) understand IMO Requirements[3], paragraph 6.2.4.

5.3.5 Element 3.4 — Launching appliance and release gear five-year operational overload test

5.3.5.1 Scope: this element is about carrying out the five-year operational overload test supporting the IMO Requirements[3], paragraph 6.3, in accordance with manufacturers service manuals and associated technical information for specific types of launching appliance and release gear (see Table A.1) to confirm they operate correctly.

NOTE To address specific flag administration technical documentation issued in regard to IMO requirements which permit the use of hydraulic testing devices to carry out the five-year overload operational function test of on-load release gear instead of lowering the survival craft to the water to carry out a "real" release, a hydraulic tool can be used to simulate the load of a lifeboat, rescue boat (including fast rescue boat) with a load of 1,1 times the weight of the craft with its full complement of persons and equipment.

5.3.5.2 Competence required: in achieving this element, candidates shall have completed the following:

a) on-load lift not over centre: undertaken the actions required to carry out the operational overload test of release gear supporting the IMO Requirements[3], paragraphs 6.2.5, 6.3.3.5;

b) on-load lift over centre: undertaken the actions required to carry out the operational test of release gear function supporting the IMO Requirements, paragraphs 6.2.5, 6.3.3.5;

c) offload lift over centre: undertaken the actions required to carry out the operational test of release gear function supporting the IMO Requirements, paragraph 6.2.6;

d) free fall hydraulic: undertaken the actions required to carry out the operational test of release gear function supporting the IMO Requirements, paragraph 6.2.7;

e) automatic lift over centre: undertaken the actions required to carry out the operational test of release gear function supporting the IMO Requirements, paragraph 6.2.8;

f) carried out the actions required to measure the trip and closing force of automatic release hooks;

g) carried out the actions required to set up a hydraulic test tool;

h) carried out the calculations necessary for establishing the required pressure to apply to a hydraulic test tool to simulate 1,1 times the weight of distinct various types of survival craft with their full complement of persons and equipment;

i) performed the procedures required to examine vital parts with regard to cracks and defects;

j) undertaken the actions required to carry out five-year operational overload test of the winch supporting the IMO Requirements, paragraph 6.3.1; and

k) following the test, reinspected the stressed structural parts applicable to the type of winch, where the structure permits the reinspection.

5.3.5.3 Underpinning knowledge requirements for this element are as follows:

a) understand the application, care and limitations of distinct types of personal protective clothing and equipment;

b) interpret and apply risk assessments applicable to the scope of work;

c) understand company and customer policies and operational procedures related to health and safety;

d) understand statutory health and safety requirements;

e) understand the design and construction characteristics of specific designs of release gear;

f) interpret and apply manufacturer's manuals and associated technical documentation, company and customer operational procedures in relation to the work scope;

g) select and use tools and equipment safely;

h) understand IMO Requirements, paragraph 6.2.10;

i) carry out the mathematics required to calculate various loads;

j) set up of a hydraulic test tool;

k) carry out a non-destructive examination.

Annex A
(informative)

Equipment covered by the training

Table A.1 — Exercise assessment system type breakdown

Survival craft types	Davits types	Winch types	Release gear types
Lifeboat a) with sprinkler and air system **Lifeboat** a) Single fall or b) Twin fall or c) Free fall **Lifeboat** a) Open or b) Partially enclosed **Rescue boats** a) Single fall rescue boat or b) Fast rescue boat	a) Fixed outrigger b) Free fall ramp c) Free fall A-frame d) Roller track gravity e) Hydraulic/luffing gravity-lowering f) Single arm slewing	**Twin drum** a) Gravity-lowering/ electric hoisting 1) Holding/static brakes with friction pads 2) Holding/static brakes with mechanically operated multiple disks. 3) Holding/static brakes, multiple disks, hydraulically operated 4) Hydraulic pump lowering brake 5) Centrifugal brakes with friction pads b) Gravity-lowering hydraulic hoisting **Single drum** a) Gravity-lowering/ Electric hoisting 1) Holding/Static brakes with friction pads 2) Centrifugal brakes with friction pads b) Hydraulic lowering and hoisting	**Hook assemblies** a) Off load/On-load – lift not over centre release gear 1) Flat to flat rotating cams 2) Forward or reverse curve to curve rotating cams 3) Curve to flat rotating cams 4) Up and down pins b) On-load/Off load – lift over centre release gear c) Free fall hydraulic d) Automatic – lift over centre e) Off load – lift over centre **Devices for activating release** a) Central release units. b) Hydrostatic interlock with diaphragm c) Hydrostatic interlock with float d) Electronic sensors

Annex B
(informative)

Example of certificate

Candidate Photograph

This is to certify that

«FirstName» «LastName»

Has successfully completed

Level 2 Infield Competent Service Technician

The candidate was assessed competent in relation to ISO 23678
Approved by…..
«Training establishment name»

«Certificate Number»

Course Date:

Training establishment signatory……..

Training establishment Stamp

Expiry Date:……..

a) Front of certificate

The holder of this certificate has successfully completed the following infield competence assessment in relation to; Resolution MSC 402(96) Section 8: Paragraph 8.2.3; and is certified to carry out work as specified in paragraphs 4.2 and 4.3;

Unit summary;
Unit 1: Work, health and safety issues while conducting activities on board
Unit 2: Annual thorough examination and operational test for lifeboats, rescue boats fast rescue boats their launching appliances and release gear
Unit 3: 5 yearly thorough examination and operational, overhaul and operational overload test for lifeboats, rescue boats fast rescue boats their launching appliances and release gear

This certificate is applicable to the following make, types, and series of equipment

Survival Craft Types
Lifeboat:
- a) Without sprinkler and air systems
  Make; xxx, model; xxx series
- b) with air systems;
  Make; xxx, model; xxx series;
- c) with sprinkler and air systems.
  Make; xxx, model; xxx series;

Lifeboat:
- d) Single fall;
- e) Twin fall
- f) Free Fall

Lifeboat:
- g) Open
- h) Totally Enclosed

Rescue Boats:
- i) Single Fall Rescue Boat
- j) Fast Rescue Boat

Survival Craft Propulsion systems
- k) Inboard diesel engines
- l) Outboard Engines
- m) Propeller drives
- n) Jet drives

Davit Types
- o) Gravity Single and Twin Fall Outrigger
- p) Hydraulic Pivoting and Luffing
- q) Gravity Roller Track
- r) Gravity Free Fall Primary
- s) Free Fall Hydraulic Secondary
- t) A frame Hydraulic
- u) Single Arm Slewing (manual, electric)

Winch Type:
- a) Twin drum
- b) Single drum
- c) Gravity lowering, electric hoisting
- d) Gravity lowering hydraulic hoisting
- e) Hydraulic Hoisting and lowering

Brake system; static brake:
- f) Cone
- g) Disk
- h) Shoe
- i) Band
- j) Eccentric cam
- k) Mechanical, multiple disks
- l) Hydraulic, multiple disks

Brake system; decent brake:
- m) Centrifugal with pads
- n) Hydraulic pump

Release Gear
Hook Assemblies
- a) Off load/On load – lift not over centre release gear
  - i) Flat to flat rotating cams
  - ii) Forward or reverse curve to curve rotating cams
  - iii) Curve to flat rotating cams
  - iv) Up and down pins
- b) Off-load release (load over centre)
- c) Freefall hydraulic
- d) Rescue boats including Fast Rescue Boat Offload
- e) Rescue boats including Fast Rescue Boat Automatic
- f) Davit Launched Liferaft Automatic

Devices for activating release
- g) Davit Launched Liferaft Automatic
- h) Central release units.
- i) Hydrostatic interlock with diaphragm
- j) Hydrostatic interlock with float
- k) electronic sensors

b) Rear of certificate

Figure B.1 — Example of certificate

Annex C
(informative)

Assessors checklists — Level 2 service personnel competence

Table C.1 — Checklist for assessors — Unit 1 (1 of 4)

Unit 1 – Work, health and safety issues while conduction activities on board		Assessment results	
1.1	**The people who should be informed and consulted prior to and during the scope of work**		
Ref	**Competency requirements**	Check mark initials	Evidence source[a]
1.1.1	Inform the person in charge the scope of the intervention.		
1.1.2	Conduct a tool box talk with all personnel involved.		
1.1.3	Ensure there are no conflicting work scopes.		
1.1.4	Supply valid and reliable information relevant to the nature and scope of the intervention at appropriate times to applicable personnel.		
1.1.5	Liaise with applicable personnel in a professional manner at appropriate times to resolve problems which may occur.		
1.1.6	Carry out comprehensive debrief with applicable personnel to identify the outcomes of the intervention.		
Range/scope 1.1.1/1.1.4; PIC, superintendent, classification society, safety officer. **Underpinning knowledge** — Understand and convey the scope of the intervention to relevant personnel. — Know the information required to conduct a toolbox talk. — Understand maintenance routines and plans. — Familiarity with workplace reporting procedures. — Understand statutory health and safety requirements.			

Table C.1 — Checklist for assessors — Unit 1 (2 of 4)

1.2 – The documentation that shall be raised, checked, verified, interpreted and completed prior to and during interventions.		Assessment results	
Ref	**Competency requirements**	Check mark initials	Evidence source[a]
1.2.1	Complete the appropriate documentation prior to commencing the work scope.		
1.2.2	Identify situations relating to the work scope that require a risk assessment to be undertaken.		
1.2.3	Review and verify that all items listed in checklists for the weekly/monthly inspections supporting SOLAS regulations III/20.6 and III/20.7 have been completed.		
1.2.4	Check and verify records of inspections and routine on-board maintenance carried out by the ship's crew have been completed correctly.		
1.2.5	Ensure that relevant technical documentation is available for the work scope.		
1.2.6	Identify which items of equipment require certification and ensure it is current and corresponds to the applicable equipment.		
1.2.7	Interpret and apply the relevant technical information in relation to the work scope.		
1.2.8	Complete reports and checklists that accurately identify the outcome of the intervention, remedial work scope and replacement parts, where necessary.		

Range/Scope

1.2.1 Permits to work, tool box talks, risk assessments, method statements.

1.2.5 Fall wires, lifting equipment, overload tests.

1.2.7 Manufactures manuals and associated technical information.

Underpinning knowledge

— Understand how to interpret and apply risk assessments applicable to the scope of work.

— Understand the technical documentation requirements for the work scopes.

— Understand the items of equipment that should be certified.

— Identify, interpret and verify the requirements of SOLAS regulations III/20.6 and III/20.7.

— Identify and interpret the requirements of SOLAS regulations III/20.4.

— Identify and to understand the information required to complete reports and check lists.

— Understand maintenance routines and plans.

— Understand statutory health and safety requirements.

— Familiarity with workplace reporting procedures.

Table C.1 — Checklist for assessors — Unit 1 (3 of 4)

1.3 – Safety checks that shall be carried out prior to commencing work.		Assessment results	
Ref	**Competency requirements**	Check mark initials	Evidence source[a]
1.3.1	Select and don appropriate personal protective equipment.		
1.3.2	Undertake the required exterior visual safety checks to confirm the lifesaving appliance is safe to approach.		
1.3.3	Undertake the required visual safety checks of launching appliances for lifeboats (including freefall lifeboats), rescue boats and fast rescue boats.		
1.3.4	Confirm the release gear is locked and safe prior to turning out.		
1.3.5	Check and confirm by visual inspection that the launching appliance is operating correctly while the survival craft is being turned out.		
Range/Scope 1.3.2 Decks, gratings handrails, security corrosion levels, slip and trip hazards. 1.3.3 Harbour pins, gripe wires, tricing pendants, hanging off pendants, bowsing in tackle, winch brake, status, davit structure, sheaves, fall wires foundations. **Underpinning knowledge** — Application, care and limitations of different types of personal protective clothing and equipment. — Understand how to interpret and apply risk assessments applicable to the scope of work. — Understand company and customer policies and operational procedures related to health and safety. — Understand statutory health and safety requirements. — Understand how to interpret and apply the manufacturer's documentation, company and customer operational procedures in relation to the work scope. — Understand how to evaluate the condition of wire ropes. — Understand how to evaluate corrosion levels. — Understand how to evaluate alignment, deformation. — Understand, interpret and apply IMO Resolution MSC.48 (66) 4.4.7.6.14.			

Table C.1 — Checklist for assessors — Unit 1 (4 of 4)

1.4 – The equipment that shall be examined and attached to safely carry out the work scope.		Assessment results	
Ref	**Competency requirements**	Check mark initials	Evidence source[a]
1.4.1	Carry out a thorough visual examination of mechanical restraints and confirm they are safe to use.		
1.4.2	Carry out a thorough visual examination to evaluate satisfactory condition of the load path to which the mechanical restraint is intended to be attached.		
1.4.3	Identify, interpret and apply manufacturers, customer and company procedures in relation to fitting mechanical restraints.		
1.4.4	Confirm the survival craft is safe to board.		
Range/scope 1.4.1 Gripe wires, bowsing in tackle, tricing pendants, fall prevention devices, hanging off/maintenance pendants. 1.4.2 Pad eyes, maintenance hangar beams, release gear hanging off attachment point, hook assembly legs, keel pins, keel shoes and bolts. 1.4.3 Maintenance pendants, secondary safety devices, fall prevention devices, bowsing in tackle. **Underpinning knowledge** — Application, care and limitations of different types of personal protective clothing and equipment. — Understand how to interpret and apply risk assessments applicable to the scope of work. — Understand company and customer policies and operational procedures related to health and safety. — Understand statutory health and safety requirements. — Understand how to interpret and apply the manufacturer's documentation, company and customer operational procedures in relation to the work scope. — Understand how to evaluate the condition of wire ropes. — Understand how to evaluate corrosion levels. — Understand how to evaluate alignment, deformation. — Understand, interpret and be able to apply IMO Resolution MSC.48 (66) 4.4.7.6.14.			
[a] Source of evidence: O = observation; S = simulation; VQ = verbal questioning; WT = written questions; P = photographic; V = video; W = witness statement			
√ = COMPETENT IN RELEVANT CRITERIA **O = NOT YET COMPETENT IN RELEVANT CRITERIA**. This may be overwritten with a √ if the candidate/s, following additional training, subsequently become competent in those particular criteria.			
Unit 1 **INSTRUCTOR/ASSESSOR COMMENTS**			
The above-named person was assessed against the competence statements indicated in accordance with the assessment criteria and is considered **competent/not yet competent** in relation to Unit 1.			
Assessor name:	Assessor signature:	Date:	
Candidates name:	Candidates signature:	Date:	

Table C.2 — Checklist for assessors — Unit 2 (1 of 11)

Unit 2 - Annual maintenance thorough examination, and operational test for lifeboats (including free fall lifeboats) rescue boats (including fast rescue), launching appliances and release gear.			
2.1	**Davit through examination**	Assessment results	
Ref	**Competency requirements**	Check mark Initials	Evidence source[a]
2.1.1	Undertake a thorough visual and where applicable physical examination of the davit foundation to evaluate corrosion; welds, bolts.		
2.1.2	Undertake a thorough visual examination of the davits structure to evaluate, corrosion, alignment, deformation; frames, pedestals, tracks, ramps.		
2.1.3	Undertake a thorough visual examination of the davit arms to evaluate, corrosion, alignment, deformation, freedom of movement, excessive, free play.		
2.1.4	Undertake a thorough visual and physical examination of rollers, and sheaves to evaluate freedom of movement, excessive free play and lubrication.		
2.1.5	Carry out a through visual inspection of the fall wire to evaluate, damage, corrosion, lubrication.		
2.1.6	Carry out a thorough visual inspection of floating blocks, master links, shackles, turnbuckles or other connections to evaluate corrosion, freedom of movement, deformation.		
2.1.7	Undertake a thorough visual and where applicable intrusive examination of slewing a worm gearing to evaluate freedom of movement, excessive free play, damage, lubrication.		
2.1.8	Undertake a thorough visual and where applicable intrusive examination of hydraulic system components; reservoirs, filters, hoses, connections, valves, gauges, rams to evaluate corrosion, damage, fluid levels.		
2.1.9	Undertake a thorough visual and where applicable intrusive examination of stored power system components; accumulators, pipework, hose, connections gauges, to evaluate corrosion, damage, pre-charge and final pressures.		
2.1.10	Undertake the required checks to confirm electrical systems, starter box, limit switches, wiring, motors operate correctly and are in a satisfactory condition.		

Table C.2 — (*continued*)

Underpinning knowledge — Application, care and limitations of different types of personal protective clothing and equipment. — Understand how to interpret and apply risk assessments applicable to the scope of work. — Understand company and customer policies and operational procedures related to health and safety. — Understand the hazards of working with high voltage systems. — Understand statutory health and safety requirements. — Understand safety protocols in relation to pressure systems. — Understand hydraulic systems. — Understand basic electrical circuitry. — Understand how to evaluate levels of corrosion. — Understand wire rope construction, inspection and discard criteria. — Understand how to evaluate acceptable levels of free play in relation to davit components. — Understand how to evaluate alignment, deformation. — Understand the design and construction characteristics of specific designs of davits. — Understand how to interpret and apply manufacturers information to safely operate specific designs of davits. — Understand how to interpret and apply the manufacturer's manuals and associated technical documentation, company and customer operational procedures in relation to the work scope. — Understand which tools and equipment to use and how to use them safely.
[a]Source of evidence: O = observation; S = simulation; VQ = verbal questioning; WT = written questions; P = photographic; V = video; W = witness statement
√ = COMPETENT IN RELEVANT CRITERIA **O = NOT YET COMPETENT IN RELEVANT CRITERIA**. This may be overwritten with a √ if the delegate/s, following additional training, subsequently become competent in that particular criteria.
Element 2.1 **ASSESSOR COMMENTS** Survival Craft Types Lifeboat: a) Without sprinkler and air systems Make; xxx, model; xxx series b) with air systems; Make; xxx, model; xxx series; c) with sprinkler and air systems. Make; xxx, model; xxx series;
The above-named person was assessed against the competence statements indicated in accordance with the assessment criteria and is considered **competent / not yet competent** in relation to element 2.1 davit thorough examination.

Assessor name:	Assessor signature:	Date:

Table C.2 *(continued)*

Delegates name:	Delegates signature:	Date:

Table C.2 — Checklist for assessors — Unit 2 (2 of 11)

2.2	**Davit maintenance**	Assessment results	
Ref	**Competency requirements**	Check mark initials	Evidence source[a]
2.2.1	Apply the correct lubricants to greasing points, bearings, internal worm gear, sheave bearings, luffing cylinders.		
2.2.2	Apply the correct lubricants to wire ropes.		
2.2.3	Change gearing oil in; external slewing gear, reduction gearing.		
2.2.4	Change oil in hydraulic reservoir.		
2.2.5	Test stored power accumulator pressures and replenish where required.		

Underpinning knowledge

— Application, care and limitations of different types of personal protective clothing and equipment.

— Understand how to interpret and apply risk assessments applicable to the scope of work.

— Understand company and customer policies and operational procedures related to health and safety.

— Understand statutory health and safety requirements.

— Understand safety protocols in relation to pressure systems.

— Understand hydraulic systems.

— Understand the various type of lubricants and suitability for use on specific components.

— Understand the design and construction characteristics of specific designs of davits.

— Understand how to interpret and apply the manufacturer's manuals and associated technical documentation, company and customer operational procedures in relation to the work scope.

— Understand which tools and equipment to use and how to use them safely.

[a] Source of evidence: O = observation; S = simulation; VQ = verbal questioning; WT = written questions; P = photographic; V = video; W = witness statement

√ = COMPETENT IN RELEVANT CRITERIA

O = NOT YET COMPETENT IN RELEVANT CRITERIA. This may be overwritten with a √ if the candidate/s, following additional training, subsequently become competent in those particular criteria.

Element 2.2

ASSESSOR COMMENTS

The above-named person was assessed against the competence statements indicated in accordance with the assessment criteria and is considered **competent/not yet competent** in relation to element 2.2 davit maintenance.

Assessor name:	Assessor signature:	Date:
Candidates name:	Candidates signature:	Date:

Table C.2 — Checklist for assessors — Unit 2 (3 of 11)

Unit 2 – Annual maintenance thorough examination, and operational test for lifeboats (including free fall lifeboats) rescue boats (including fast rescue), launching appliances and release gear.			
2.3	**Winch thorough examination**	Assessment results	
Ref	**Competency requirements**	Check mark initials	Evidence source[a]
2.3.1	Undertake a thorough visual and where applicable physical examination of the winch foundation bolts or welds to evaluate corrosion and torque settings where applicable.		
2.3.2	Undertake a thorough visual examination of the winch assembly to evaluate corrosion, leaks, damage.		
2.3.3	Dismantle the brake assembly to undertake a thorough examination of a static brake with friction pads to evaluate wear using a measuring device.		
2.3.4	Dismantle the brake assembly to undertake a thorough examination of a static brake that is mechanically operated and has multiple disks with friction pads, to evaluate wear using a measuring device.		
2.3.5	Dismantle the brake assembly (if required), to undertake a thorough examination of a static brake that is hydraulically operated and has multiple disks with friction pads, to evaluate wear using a measuring device.		
2.3.6	Dismantle the brake assembly to undertake a thorough examination of a centrifugal brake with friction pads. to evaluate wear using a measuring device.		
2.3.7	Undertake a thorough examination of a lowering brake with a hydraulic pump to evaluate corrosion, satisfactory operation.		
2.3.8	Ensure the static brake arm lever is adjusted to the correct position.		
2.3.9	Undertake the checks to establish the hand crank / pay-out is operating correctly.		
2.3.10	Undertake a thorough visual examination of remote-control systems and confirm they operate correctly.		
2.3.11	Undertake a thorough examination of a clutch; to evaluate condition, operation, lubrication.		
2.3.12	Undertake the checks required to confirm gearing operates correctly and is in a satisfactory condition; pinions, spur gears, reduction gearing, chains, planetary gearing.		
2.3.13	Undertake a thorough examination of hydraulic system components; operating levers, hand pumps, reservoirs, filters, hoses, connections, valves, gauges, accumulators to evaluate corrosion, damage, fluid levels, and pressures.		
2.3.14	Carry out the checks required to establish the electrical system is in a satisfactory condition.		
2.3.15	Carry out the checks required to establish the electric motor operates correctly and is in a satisfactory condition.		
2.3.16	Operate distinct types of winch (See Table A.1) to ensure they are operating correctly.		

Table C.2 — (*continued*)

Underpinning knowledge — Application, care and limitations of different types of personal protective clothing and equipment. — Understand how to interpret and apply risk assessments applicable to the scope of work. — Understand company and customer policies and operational procedures related to health and safety. — Understand the hazards of working with high voltage systems. — Understand statutory health and safety requirements. — Understand safety protocols in relation to pressure systems. — Understand hydraulic systems. — Understand basic electrical circuitry. — Understand how to evaluate levels of corrosion. — Understand wire rope construction, inspection and discard criteria. — Understand how to evaluate wear of brake components and acceptable levels of free play in relation to winch components. — Understand how to evaluate alignment, deformation. — Understand the design and construction characteristics of specific designs of winch. — Understand how interpret and apply manufacturers information to safely operate specific designs of winch. — Understand how to interpret and apply the manufacturer's manuals and associated technical documentation, company and customer operational procedures in relation to the work scope. — Understand which tools and equipment to use and how to use them safely.
[a] Source of evidence: O = observation; S = simulation; VQ = verbal questioning; WT = written questions; P = photographic; V = video; W = witness statement
√ = COMPETENT IN RELEVANT CRITERIA **O = NOT YET COMPETENT IN RELEVANT CRITERIA**. This may be overwritten with a √ if the candidate/s, following additional training, subsequently become competent in those particular criteria.
Element 2.3 **ASSESSOR COMMENTS**
The above-named person was assessed against the competence statements indicated in accordance with the assessment criteria and is considered **competent/not yet competent** in relation to element 2.3 winch thorough examination.

Assessor name:	Assessor signature:	Date:
Candidates name:	Candidates signature:	Date:

Table C.2 — Checklist for assessors — Unit 2 (4 of 11)

2.4	**Winch maintenance**	Assessment results	
Ref	**Competency requirements**	Check mark initials	Evidence source[a]
2.4.1	Change oil in primary or secondary gearing.		
2.4.2	Apply the correct lubricants to greasing points, bearings, shafts, bearings.		
2.4.3	Replenish or change oil for distinct types of clutch.		
2.4.4	Test stored power accumulator pressures and replenish.		
2.4.5	Replace brake pads.		
2.4.6	Adjust gear chains.		

Underpinning knowledge

— Application, care and limitations of different types of personal protective clothing and equipment.

— Understand how to interpret and apply risk assessments applicable to the scope of work.

— Understand company and customer policies and operational procedures related to health and safety.

— Understand statutory health and safety requirements.

— Understand safety protocols in relation to pressure systems.

— Understand hydraulic systems.

— Understand the various type of lubricants and suitability for use on specific components.

— Understand the design and construction characteristics of specific designs of davits.

— Understand how to interpret and apply the manufacturer's manuals and associated technical documentation, company and customer operational procedures in relation to the work scope.

— Understand which tools and equipment to use and how to use them safely.

[a] Source of evidence: O = observation; S = simulation; VQ = verbal questioning; WT = written questions; P = photographic; V = video; W = witness statement

√ = COMPETENT IN RELEVANT CRITERIA

O = NOT YET COMPETENT IN RELEVANT CRITERIA. This may be overwritten with a √ if the candidate/s, following additional training, subsequently become competent in those particular criteria.

Element 2.4

ASSESSOR COMMENTS

The above-named person was assessed against the competence statements indicated in accordance with the assessment criteria and is considered **competent/not yet competent** in relation to element 2.4 winch maintenance.

Assessor name:	Assessor signature:	Date:
Candidates name:	Candidates signature:	Date:

Table C.2 — Checklist for assessors — Unit 2 (5 of 11)

2.5	**Launching appliance annual operational test**	Assessment results	
Ref	**Competency requirements**	Check mark initials	Evidence source[a]
2.5.1	Undertake the actions required to carry out a dynamic load test of the winch by lowering the boat or equivalent load until it reaches its maximum lowering speed and before it hits the water apply the brake.		
2.5.2	Following the test, reinspect the stressed structural parts applicable to the type of winch, where the structure permits the reinspection.		

Underpinning knowledge

— Application, care and limitations of different types of personal protective clothing and equipment.

— Understand how to interpret and apply risk assessments applicable to the scope of work.

— Understand company and customer policies and operational procedures related to health and safety.

— Understand statutory health and safety requirements.

— Understand the design and construction characteristics of specific designs of launching appliance.

— Understand how to interpret and apply the manufacturer's manuals and associated technical documentation, company and customer operational procedures in relation to the work scope.

— Understand which tools and equipment to use and how to use them safely.

— Understand Resolution M.S.C.402(96) 6.2.10.

— Understand how to carry out load test calculations.

— Understand how to carry out the operational test of a winch using a simulated survival craft load.

[a] Source of evidence: O = observation; S = simulation; VQ = verbal questioning; WT = written questions; P = photographic; V = video; W = witness statement.

√ = COMPETENT IN RELEVANT CRITERIA

O = NOT YET COMPETENT IN RELEVANT CRITERIA. This may be overwritten with a √ if the candidate/s, following additional training, subsequently become competent in those particular criteria.

Element 2.5

ASSESSOR COMMENTS

The above-named person was assessed against the competence statements indicated in accordance with the assessment criteria and is considered **competent/not yet competent** in relation to element 2.5.

Assessor name:	Assessor signature:	Date:
Candidates name:	Candidates signature:	Date:

Table C.2 — Checklist for assessors — Unit 2 (6 of 11)

2.6	**Lifeboat annual thorough examination**	Assessment results	
Ref	**Competency requirements**	Check mark initials	Evidence source[a]
2.6.1	Undertake a thorough visual examination of the boats structure to confirm it is free from damage; cracks, osmosis.		
2.6.2	Undertake the required checks regarding the loose equipment to confirm the requirements of the L.S.A code are being met.		
2.6.3	Undertake a thorough visual examination of access hatches to confirm they operate correctly and in satisfactory condition; hinges, seals.		
2.6.4	Undertake a thorough visual examination of non-access hatches to confirm they operate correctly and in a satisfactory condition; windows, seals, vents.		
2.6.5	Undertake a thorough visual examination of external fittings to confirm they are in a satisfactory condition; handrails, lifelines, skates, lashings.		
2.6.6	Carry out a thorough visual examination of the external boundaries as far as practicable of the void spaces to evaluate their condition.		
2.6.7	Carry out a visual examination of the bilge drain plug and hull fitting to confirm it operates correctly and is in a satisfactory condition.		
2.6.8	Carry out a thorough visual examination of the engine to confirm it is in satisfactory condition and running correctly; throttle /gear box controls and cables, gauges, primary and secondary starting systems.		
2.6.9	Undertake the required checks to evaluate the engine and gear box lubrication levels.		
2.6.10	Undertake the required checks to confirm the engine coolant system is in a satisfactory condition and operating correctly, belts, pipes, pumps, keel cooler, expansion tanks, cap seals, coolant levels.		
2.6.11	Undertake the required checks of the fuel system to confirm it is in a satisfactory condition and operating correctly; tanks, lines, valves, filters.		
2.6.12	Undertake a thorough visual examination of the exhaust system to confirm it is free of corrosion and leaks, (drain valves if fitted are operating correctly).		
2.6.13	Undertake a thorough visual examination of the engine bed to confirm it is in a satisfactory condition; mounts, fixings.		
2.6.14	Undertake the required checks of the electrical system to confirm the components are operating correctly and are in a satisfactory condition; alternator, belts, external charging systems, battery, isolators, wiring loom, internal and external lights.		
2.6.15	Undertake the required checks of the propulsion system to confirm it operates correctly and is in a satisfactory condition; stern tube, stuffing box, shafts, couplings, propeller, bearings.		
2.6.16	Undertake the required checks of the manoeuvring system to confirm it operate correctly and is in a satisfactory condition; control cables, rudder, pintles, skeg, emergency tiller, hydraulics.		

Table C.2 *(continued)*

2.6	**Lifeboat annual thorough examination**	Assessment results	
Ref	**Competency requirements**	Check mark initials	Evidence source[a]
2.6.17	Undertake the required checks of the bailing system to confirm it operates correctly and is in a satisfactory condition; pumps, seals, pipework, diaphragms.		
2.6.18	Undertake the required checks of the sprinkler system to confirm it operates correctly and is in a satisfactory condition; pumps, belts, valves, pipework, nozzles.		
2.6.19	Undertake the required checks of the air system to confirm it operates correctly and is in a satisfactory condition; cylinders, hoses, connection, valves, gauges.		
2.6.20	Undertake the required checks to confirm the self-righting/ anti-entrapments system to confirm it operates correctly and is in a satisfactory condition; cylinders, gauges, valves, hoses, bag.		
2.6.21	Undertake a thorough examination of the internal fittings to confirm they operate correctly and in a satisfactory condition; seatbelts, lighting.		
2.6.22	Undertake a thorough examination of all operating instructions to confirm they are in a satisfactory condition.		
Underpinning knowledge — Application, care and limitations of different types of personal protective clothing and equipment. — Understand how to interpret and apply risk assessments applicable to the scope of work. — Understand company and customer policies and operational procedures related to health and safety. — Understand statutory health and safety requirements. — Understand the design and construction characteristics of specific designs lifeboats. — Have a basic of understanding of hydraulic systems. — Have a basic of understanding of electrical systems. — Have an awareness of the risks related to working with pressure systems. — Understand marine diesel engine maintenance. — Understand how to interpret and apply the manufacturer's manuals and associated technical documentation, company and customer operational procedures in relation to the work scope. — Understand which tools and equipment to use and how to use them safely. — Understand Resolution M.S.C.402(96) 6.2.3. — Understand Resolution M.S.C.48 (66) 4.4.8.			
[a] Source of evidence: O = observation; S = simulation; VQ = verbal questioning; WT = written questions; P = photographic; V = video; W = witness statement			
√ = COMPETENT IN RELEVANT CRITERIA **O = NOT YET COMPETENT IN RELEVANT CRITERIA**. This may be overwritten with a √ if the candidate/s, following additional training, subsequently become competent in those particular criteria.			
Element 2.6 **ASSESSOR COMMENTS**			
The above-named person was assessed against the competence statements indicated in accordance with the assessment criteria and is considered **competent/not yet competent** in relation to element 2.6.			
Assessor name:	Assessor signature:	Date:	

Table C.2 *(continued)*

2.6	**Lifeboat annual thorough examination**		Assessment results	
Ref	**Competency requirements**		Check mark initials	Evidence source[a]
Candidates name:	Candidates signature:	Date:		

Table C.2 — Checklist for assessors — Unit 2 (7 of 11)

2.7	**Rescue boats (including fast rescue boats) annual thorough examination, additional competence requirements**	Assessment results	
Ref	**Competency requirements**	Check mark initials	Evidence source[a]
2.7.1	Carry out a thorough visual examination of lifting equipment and attachment points, to confirm they are in a satisfactory condition and their certification is current.		
2.7.2	Undertake a thorough examination of a lifting yoke including foundation bolts to confirm it is in a satisfactory condition.		
2.7.3	Carry out a thorough visual examination of fenders / inflatable sponson to confirm they operate correctly and in a satisfactory condition; non-return valves, air pressure.		
2.7.4	Carry out a thorough visual examination of an onboard engine to confirm it is in satisfactory condition and running correctly; spark plugs, throttle /gearbox controls and cables, primary and secondary starting systems.		
2.7.5	Undertake the required checks to confirm an outboard engine coolant system is in a satisfactory condition and operating correctly, intake, outlet, impellor.		
2.7.6	Undertake the required checks to evaluate the engine and gear box lubrication levels.		
2.7.7	Undertake the required checks of a jet drive propulsion system to confirm it operates correctly and is in a satisfactory condition; housing, bucket, impellor.		
2.7.8	Undertake the required checks to confirm the self-righting system operates correctly and is in a satisfactory condition; frame foundation, cylinders, activating mechanisms, hoses, connections, bag.		
2.7.9	Undertake the required checks to confirm the self-bailing system operates correctly and is in a satisfactory condition.		
2.7.10	Carry out the actions required to verify the weight of the craft.		

Underpinning knowledge

Requirements for this element are as follows:

— Application, care and limitations of different types of personal protective clothing and equipment.

— Understand how to interpret and apply risk assessments applicable to the scope of work.

— Understand company and customer policies and operational procedures related to health and safety.

— Understand statutory health and safety requirements.

— Understand the design and construction characteristics of specific designs lifeboats

— Have a basic to understanding of hydraulic systems.

— Have a basic to understanding of electrical systems.

— Have an awareness of the risks related to working with pressure systems.

— Understand outboard engine maintenance.

— Understand how to interpret and apply the manufacturer's manuals and associated technical documentation, company and customer operational procedures in relation to the work scope.

— Understand which tools and equipment to use and how to use them safely.

Table C.2 *(continued)*

2.7	**Rescue boats (including fast rescue boats) annual thorough examination, additional competence requirements**	Assessment results	
Ref	**Competency requirements**	Check mark initials	Evidence source[a]
— Understand how to calculate loads. — Understand IMO Resolution MSC.402 (96) 6.2.3. — Understand IMO Resolution MSC.48 (66), paragraphs 5.1.2 and 5.1.3.			
[a] Source of evidence: O = observation; S = simulation; VQ = verbal questioning; WT = written questions; P = photographic; V = video; W = witness statement			
√ = COMPETENT IN RELEVANT CRITERIA **O = NOT YET COMPETENT IN RELEVANT CRITERIA**. This may be overwritten with a √ if the candidate/s, following additional training, subsequently become competent in those particular criteria.			
Element 2.7 **ASSESSOR COMMENTS**			
The above-named person was assessed against the competence statements indicated in accordance with the assessment criteria and is considered **competent/not yet competent** in relation to element 2.7.			
Assessor name:	Assessor signature:	Date:	
Candidates name:	Candidates signature:	Date:	

Table C.2 — Checklist for assessors — Unit 2 (8 of 11)

2.8	**Lifeboat, rescue boat (including fast rescue boats) annual maintenance**	Assessment results	
Ref	**Competency requirements**	Check mark initials	Evidence source[a]
2.8.1	Replace the engine oil and filter for an inboard diesel engine in accordance with specific specifications.		
2.8.2	Replace the engine oil and filter for an outboard engine in accordance with specific specifications.		
2.8.3	Replace the gearbox oil an inboard diesel engine in accordance with specific specifications.		
2.8.4	Replace the gearbox oil for an outboard engine in accordance with specific specifications.		
2.8.5	Carry out the actions required to replace the fuel filter and ensure any air is removed from the fuel system.		
2.8.6	Remove and replace a fuel lift pump for an inboard diesel engine.		
2.8.7	Carry out the actions required to replace spark plugs including setting the gap to specific specifications.		
2.8.8	Replenish hydraulic starting and steering system fluid in accordance with specifications.		
2.8.9	Carry out the action required to remove and replace an impellor for a coolant pump. Replace cooling water in accordance with the requirements to ensure the cooling system is working effectively and free from air.		
2.8.10	Carry out the actions to replenish breathing air in cylinders in accordance with specifications.		
2.8.11	Apply specified lubricants to specific greasing points.		

Underpinning knowledge

— Application, care and limitations of distinct types of personal protective clothing and equipment.

— Understand how to interpret and apply risk assessments applicable to the scope of work.

— Understand company and customer policies and operational procedures related to health and safety.

— Understand statutory health and safety requirements.

— Understand safety protocols in relation to pressure systems.

— Have a basic to understanding of hydraulic systems.

— Have a basic to understanding of electrical systems.

— Understand the various type of lubricants and suitability for use on specific components.

— Understand the design and construction characteristics of specific designs of davits.

— Understand how to interpret and apply the manufacturer's manuals and associated technical documentation, company and customer operational procedures in relation to the work scope.

— Understand which tools and equipment to use and how to use them safely.

— Understand the reasons for replacement of impellor as a result of failure.

[a] Source of evidence: O = observation; S = simulation; VQ = verbal questioning; WT = written questions; P = photographic; V = video; W = witness statement

Table C.2 *(continued)*

2.8	**Lifeboat, rescue boat (including fast rescue boats) annual maintenance**	Assessment results	
Ref	**Competency requirements**	Check mark initials	Evidence source[a]
√ = COMPETENT IN RELEVANT CRITERIA **O = NOT YET COMPETENT IN RELEVANT CRITERIA**. This may be overwritten with a √ if the candidate/s, following additional training, subsequently become competent in those particular criteria.			
Element 2.8 **ASSESSOR COMMENTS**			
The above-named person was assessed against the competence statements indicated in accordance with the assessment criteria and is considered **competent/not yet competent** in relation to element 2.8.			
Assessor name:	Assessor signature:	Date:	
Candidates name:	Candidates signature:	Date:	

Table C.2 — Checklist for assessors — Unit 2 (9 of 11)

2.9	**Release gear annual thorough examination**	Assessment results	
Ref	**Competency requirements**	Check mark initials	Evidence source[a]
2.9.1	Offload/on-load lift not over centre: undertake a thorough visual and where required intrusive examination to evaluate corrosion, deformation, alignment, free play and verify tolerances of hook assembly components (excluding the locking device) to confirm it is in a satisfactory condition and operates correctly; moveable hook, fulcrum pins, bushes, hook body, hook locking indicators, mousing plate, retainers, safety latches, legs, keel shoes, keel pins.		
2.9.2	Offload/on-load lift over centre: undertake a thorough visual and where required intrusive examination to evaluate corrosion, deformation, alignment, free play and verify tolerances of hook assembly components, to confirm it is in a satisfactory condition and operates correctly; moveable hook, fulcrum pins, bushes, hook body, mousing plate, retainers, safety latches, legs, keel shoes, keel pins.		
2.9.3	Free fall hydraulic: undertake a thorough visual and where required intrusive examination to evaluate corrosion, deformation, alignment, free play and verify tolerances of hook assembly components to confirm it is in a satisfactory condition and operates correctly; hook foundation, securing bolts, stop pawl/release hook contact, securing bolt, moveable hook, fulcrum pins, bushes, washers, hook body, mousing plate, retainers, safety latches.		
2.9.4	Automatic release: undertake a thorough visual examination to evaluate corrosion, deformation, alignment, free play and verify tolerances of hook assembly components to confirm it is in a satisfactory condition and operates correctly; securing bolts, moveable hook, fulcrum pins, hook body, operating/resetting levers, safety latches.		
2.9.5	Off load: undertake a thorough visual examination to evaluate corrosion, deformation, alignment, free play and verify tolerances of hook assembly components to confirm it is in a satisfactory condition and operates correctly; securing bolts, moveable hook, fulcrum pins, hook body, operating/resetting levers, safety latches.		
2.9.6	Undertake a thorough visual and where required intrusive examination to evaluate, deformation, alignment, free play and verify tolerances of locking device components, to confirm it is in a satisfactory condition and operates correctly; rotating cams flat to flat, amplification arms.		
2.9.7	Undertake a thorough visual and where required intrusive examination to evaluate, deformation, alignment, free play and verify tolerances of locking device components, to confirm it is in a satisfactory condition and operates correctly; rotating cams curve to curve, torsion springs.		
2.9.8	Undertake a thorough visual and where required intrusive examination to evaluate corrosion, deformation, alignment, free play and verify tolerances of locking device components, to confirm it is in a satisfactory condition and operates correctly; rotating cams curve to flat, intermediary hooks amplification arms, arresting levers, torsion springs.		