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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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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

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Contents

Page

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;