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BSI Standards Publication

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 3: Level 1 technical training

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National foreword

This British Standard is the UK implementation of ISO 23678-3:2022. It supersedes PD ISO/PAS 23678-3:2020, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee SME/32, Ships and marine technology - Steering committee.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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Part 3: Level 1 technical training

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 3: Formation technique de niveau 1

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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).

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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*, Subcommittee SC 1, *Maritime safety.*

This first edition cancels and replaces ISO/PAS 23678-3:2020, 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.

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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)[5], 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 23678-4 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 service providers;

— establish a competency framework that would enable personnel certified by 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 training objectives 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 the service technician training in ISO 23678-1, ISO 23678-2 and ISO 23678-4 enables personnel certified by an authorized service provider to meet the IMO Requirements, section 7, paragraph 7.1.1, and section 8.

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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 3: Level 1 technical training

1 Scope

This document establishes a uniform, safe and consistent approach to the technical training 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, section 3[5].

It specifies the training requirements for the level 1 controlled environment education and technical training 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 level 1 training is split into two stages, both covered in this document:

— stage 1 service technician technical controlled environment education and training has five modules that consist of classroom-based theory followed by practical sessions. The five modules encompass the scope and range of technical knowledge and skills required to assume type-specific design coverage of survival craft, release systems, davits and winches. The modules focus on supporting the requirements in the IMO Requirements, section 8, paragraphs 8.1, 8.2.1.1 to 8.2.1.6, 8.2.2, and 8.2.3.

— stage 2 service technician technical controlled environment experience and assessment requires candidates to undertake a minimum of four supervised scenarios-based practical exercises assessments covering the range of type specific complete systems for which they will be certified.

This document is intended to be used in conjunction with ISO 23678-1, ISO 23678-2 and ISO 23678-4.

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;

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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 off load.

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2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, 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*

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 1 service technician stage 1 technical training

4.1 General

This programme is designed to meet the technical controlled environment training and assessment requirements for all prospective service technicians. The level 1 service technician training document explains how competence shall be assessed and certified.

4.2 Candidate pre-requisites

Candidates shall:

a) hold or be working towards a nationally recognized qualification in engineering or mechanics, but not unduly excluding similar qualifications; and

b) hold a valid initial service technician certificate.

4.3 Aims and objectives

4.3.1 Aim

This programme is designed for individuals who have completed the initial service technician training and need to gain the technical theoretical and practical knowledge to enable them to carry out maintenance thorough examination, operational testing, repair and overhaul of lifeboats (including free-fall lifeboats), rescue boats (including fast rescue boats), launching appliances and on-load release gear under supervision.

4.3.2 Key objectives

The key objectives of the training programme are to ensure candidates:

a) can interpret technical documentation developed by the manufacturers and apply the information to their role;

b) can identify, interpret and apply to their role key legislation, industry guidelines, rules, regulations and conventions;

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c) have the required technical underpinning knowledge and practical skills to carry out maintenance thorough examination, operational testing, repair and overhaul of lifeboats (including free-fall lifeboats), rescue boats (including fast rescue boats), launching appliances and on-load release gear, as applicable;

d) can write reports and complete associated documentation;

e) can demonstrate in their working environment basic safety and awareness.

5 Learning outcomes of level 1 service technician stage 1 technical training

5.1 General

During the training programme, candidates shall be required to demonstrate they have the skills and understanding required to be deemed competent in relation to the training outcomes.

5.2 Theory learning outcomes

5.2.1 Module 1 — Work, health and safety issues while conducting activities on board

To successfully complete the service technician level 1 stage 1 training programme, candidates shall be able to:

a) identify the people who shall be informed and the documentation that needs to be checked, verified and completed before commencing work;

b) explain the safety checks that need to be considered before commencing work on lifeboats (including free fall lifeboats), rescue boats (including fast rescue boats), launching appliances and release gear;

c) explain specialized equipment requirements including personal protective equipment (PPE);

d) explain which documents need to be consulted, interpreted, applied and completed to inspect, maintain, thoroughly examine, operationally test, overhaul and repair lifeboats (including free fall lifeboats), rescue boats (including fast rescue boats), launching appliances and release gear.

5.2.2 Module 2 — Survival craft

To successfully complete the level 1 training programme, candidates shall be able to:

a) identify and explain the function of the individual components related to lifeboats (including free fall lifeboats), rescue boats (including fast rescue boats);

b) identify and explain the specific lubricant requirements for lifeboats (including free fall lifeboats) and rescue boats (including fast rescue boats);

c) explain the specific procedures that apply to the inspection, maintenance, thorough examination, operational testing, overhaul and repair of lifeboats (including free fall lifeboats), rescue boats (including fast rescue boat), supporting the IMO Requirements, section 6, paragraph 6.2.3[5].

5.2.3 Module 3 — Release gear

To successfully complete the level 1 training programme, candidates shall be able to:

a) explain the specific design and construction features of distinct various makes and types of release gears;

b) identify and explain the function of the individual components that make up the distinct designs associated with specific makes and types of release gears;

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c) explain the common faults that can occur and potential solutions to resolve them in relation to the distinct designs associated with specific makes and types of release gears;

d) identify and explain the generic maintenance and examination criteria in relation to release gears;

e) identify and explain the specific procedures to carry out maintenance thorough examination, operational testing, repair and overhaul, in relation to the distinct designs associated with specific makes and types of release gears found in lifeboats (including free-fall lifeboats) and rescue boats (including fast rescue boats).

5.2.4 Module 4 — Davits

To successfully complete the level 1 training programme, candidates shall be able to:

a) explain the various design and construction features of davits;

b) explain the common faults that can occur and potential solutions to resolve them in relation to the specific designs of davits;

c) explain how to carry out non-destructive tests on davit components to check for cracks and the integrity of welds;

d) identify and explain the function of the individual davit components used for launching lifeboats (including free-fall lifeboats), rescue boats (including fast rescue boats) and davit-launched liferafts;

e) identify and explain the specific procedures to carry out maintenance thorough examination, operational testing, repair and overhaul of specific makes and types of davits used to launch lifeboats (including free-fall lifeboats) and rescue boats (including fast rescue boats).

5.2.5 Module 5 — Winches

To successfully complete the level 1 training programme, candidates shall be able to:

a) explain the specific design and construction features of the various specific makes and types of winches;

b) explain the common faults that can occur and potential solutions to resolve them in relation to the specific designs of winches;

c) identify and explain the function of specific individual components associated with specific makes and types of winches used to launch lifeboats (including free-fall lifeboats), rescue boats (including fast rescue boats) and davit-launched life rafts;

d) identify and explain the specific procedures to carry out maintenance thorough examination, operational testing, repair and overhaul, in relation to the distinct designs associated with specific makes and types of winches used to launch lifeboats (including free-fall lifeboats) and rescue boats (including fast rescue boats);

e) explain the construction of wire ropes;

f) explain the specific procedures that apply to the inspection, maintenance, thorough examination, exchange and discard of wire ropes.

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5.3 Practical learning outcomes

5.3.1 Module 1 — Work, health and safety issues while conducting activities on-board

To successfully complete the level 1 training programme, candidates shall be able demonstrate:

a) safety checks that need be completed prior to commencing work on lifeboats (including free fall lifeboats) rescue boats (including fast rescue boats), launching appliances and release gear;

b) how to interpret and apply the relevant documentation for the maintenance, thorough examination, operational testing, overhaul and repair of lifeboats (including freefall lifeboats), rescue boats (including fast rescue boats), launching appliances and release gear;

c) how to complete checklists and compile reports;

d) how to carry out the required safety checks and attach maintenance/hanging off pendants and secondary safety devices.

5.3.2 Module 2 — Survival craft

To successfully complete the level 1 training programme, candidates shall be able demonstrate how to maintain, thoroughly examine and check for satisfactory condition and operation of specific makes and types of survival craft (see Table A.1), supporting the IMO Requirements, section 6, paragraph 6.2.3[5], and the manufacturer's technical documentation, including:

a) structure of the boat, including fixed and loose equipment;

b) the external boundaries of the internal void spaces as far as practicable;

c) inboard engines and gearbox;

d) outboard engines;

e) engine bed and mounts;

f) primary and secondary start systems;

g) exhaust system;

h) propulsion system, stern tubes, stern glands;

i) lifeboats sprinkler system;

j) lifeboats air supply;

k) manoeuvring system;

l) power supply;

m) bailing system;

n) fender and skate arrangements;

o) lifeboat inflatable righting/anti-entrapment equipment;

p) rescue boat (including fast) righting system.

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5.3.3 Module 3 — Release gear

5.3.3.1 Operation and tooling

To successfully complete the level 1 training programme, candidates shall be able to demonstrate:

a) how to correctly operate release gear for lifeboats (including free-fall lifeboats), rescue boats (including fast rescue boats) and davit-launched life rafts;

b) the ability to use specialized tooling and apply the correct lubricants to the applicable components.

5.3.3.2 Annual thorough examination and operational test

To successfully complete the level 1 training programme, candidates shall be able to demonstrate how to thoroughly examine and check for satisfactory condition and operation of specific makes and types of release systems (see Table A.1), supporting the IMO requirements, section 6, paragraphs 6.2.4 to 6.2.8[5], and the manufacturer's technical documentation including:

a) central release units;

b) hydrostatic interlock systems with diaphragms;

c) hydrostatic interlock systems with floats;

d) cables for control and release;

e) hook assemblies with fastening/locking devices with flat to flat cams;

f) hook assemblies with fastening/locking devices with curve to curve cams;

g) hook assemblies with fastenings/locking devices with curve to flat cams;

h) hook assemblies with fastenings/locking devices with up and down pins;

i) hook assemblies with fastenings/locking devices with amplification arms, intermediary hooks, arresting levers;

j) free fall hydraulic hook assemblies;

k) automatic hook assemblies;

l) how to check excessive free play and tolerances of release gear against the specifications of the manufacturer's technical documentation;

m) how to carry out the annual operational tests of davit-launched lifeboats and rescue boats on-load release function with a simulated load;

n) how to carry out the operational test of the davit-launched liferaft automatic release function.

5.3.3.3 Five-year thorough examination, overhaul and overload operational test

To successfully complete the level 1 training programme, candidates shall be able to demonstrate how to overhaul, thoroughly examine and check for satisfactory condition and operation of specific makes and types of release systems (see Table A.1), supporting the IMO Requirements, section 6, paragraph 6.3.3, and the manufacturer's technical documentation. This includes how to:

a) dismantle and re-assemble specific makes and types of hook assemblies with fastening/locking devices with flat to flat cams, curve to curve cams, curve to flat cams, up and down pins, amplification arms, intermediary hooks and arresting levers;

b) dismantle and re-assemble specific makes and types of central release units;

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c) dismantle and re-assemble specific makes and types of hydrostatic units;

d) carry out examinations with regards to tolerances and design requirements of specific makes and types of release gear as specified by the manufacturer;

e) adjust specific makes and types of release gear systems after assembly to operate correctly;

f) identify and rectify the faults that can occur related to specific makes and types of release gear;

g) replace service exchange release gear;

h) examine vital parts with regards to defects and cracks; and

i) carry out the five-yearly overload operational test of davit-launched lifeboats and rescue boats using a simulated load.

5.3.4 Module 4 — Davits

To successfully complete the level 1 training programme, candidates shall be able to demonstrate how to overhaul, thoroughly examine and check for satisfactory condition and operation of specific makes and types of davits (see Table A.1), supporting the IMO Requirements, section 6, paragraphs 6.2.9.1 to 6.2.9.4[5], and the manufacturer's technical documentation, including:

a) carry out the necessary safety checks prior to approaching davits;

b) safely operate specific makes and types of davits;

c) davit or other launching structures, with regards to corrosion, misalignments, deformation and excessive free play;

d) sheaves, rollers, floating blocks for wear, corrosion and excessive free play;

e) fall wires for kinks, damage, corrosion and lubrication;

f) the function of limit switches;

g) mechanical restraints;

h) hydraulic systems;

i) stored power systems; and

j) electrical systems.

5.3.5 Module 5 — Winches

To successfully complete the level 1 training programme, candidates shall be able to demonstrate how to overhaul, thoroughly examine and check for satisfactory condition and operation of specific makes and types of winches (see Table A.1), supporting the IMO Requirements, section 6, paragraphs 6.2.9. and 6.3[5], and the manufacturer's technical documentation, including:

a) winch foundations;

b) remote-control systems, electrical, operating cables, pulleys;

c) power supply systems;

d) lubricants;

e) multiple disc holding/static brake;

f) holding/static brakes with brake bands;

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