BSI Standards Publication

Service personnel for the 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

Part 3: Level 1 technician training

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National foreword

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Part 3:
Level 1 technician training

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Contents

Page

Foreword ... **v**

Introduction ... **vi**

1 Scope ... **1**

2 Normative references ... **3**

3 Terms and definitions ... **3**

4 Level 1 Service Technician Stage 1 technical training ... **3**
4.1 General ... 3
4.2 Candidate pre-requisites for Level 1 Service Technician Stage 1 technical training ... 3
4.3 Aims and objectives of Level 1 Service Technician Stage 1 technical training ... 3
4.3.1 Aim ... 3
4.3.2 Key objectives ... 3

5 Learning outcomes of Level 1 Service Technician Stage 1 technical training ... **4**
5.1 General ... 4
5.2 Theory learning outcomes ... 4
5.2.1 Module 1 — Work, health and safety issues while conducting activities on board 4
5.2.2 Module 2 — Survival craft ... 4
5.2.3 Module 3 — Release gear ... 4
5.2.4 Module 4 — Davits ... 5
5.2.5 Module 5 — Winches ... 5
5.3 Practical learning outcomes ... 6
5.3.1 Module 1 — Work, health and safety issues while conducting activities on-board ... 6
5.3.2 Module 2 — Survival craft ... 6
5.3.3 Module 3 — Release gear ... 7
5.3.4 Module 4 — Davits ... 8
5.3.5 Module 5 — Winches ... 8

6 Candidate performance assessment Level 1 Service Technician Stage 1 technical training — Candidate performance assessment ... **9**
6.1 General ... 9
6.2 Continuous assessment ... 9
6.3 Final assessment ... 9

7 Duration and timing of Level 1 Service Technician Stage 1 technical training ... **10**
7.1 General ... 10
7.2 Contact time ... 10

8 Level 1 Service Technician Stage 1 technical training programme ... **10**
8.1 General ... 10
8.2 Overview of training modules ... 11
8.2.1 Module 1 — Work, health and safety issues while conducting activities on board ... 11
8.2.2 Module 2 — Survival craft ... 11
8.2.3 Module 3 — Release gear ... 11
8.2.4 Module 4 — Davits ... 11
8.2.5 Module 5 — Winches ... 12
8.3 Module 1 — Work, health and safety issues while conducting activities on board ... 12
8.3.1 Element 1. – Intervention communications and documentation ... 12
8.3.2 Element 1.2 – On-board safety ... 13
8.4 Module 2 — Survival craft ... 13
8.4.1 Element 2.1 – Annual general inspection, examination and maintenance requirements for lifeboats (including free-fall lifeboat), rescue boat (including fast rescue boats) with inboard engines ... 13

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8.4.2 Element 2.2 – Additional specific inspection examination, maintenance and overhaul requirements for totally enclosed lifeboats ... 15
8.4.3 Element 2.3 – Additional specific inspection examination maintenance and overhaul requirements for rescue boats (including fast rescue boats) ... 15
8.5 Module 3 — Release gear ... 16
8.5.1 Element 3.1 – Specific rules and regulations requirements relating to release gear ... 16
8.5.2 Element 3.2 – Release gear specialised tooling and lubricant requirements ... 16
8.5.3 Element 3.4 – Cables for control and release ... 16
8.5.4 Element 3.5 – Design and construction of release gear ... 17
8.5.5 Element 3.6 – Annual thorough examination and operational test of release gear ... 17
8.5.6 Element 3.7 – Five-year thorough examination, overhaul and overload operational test of release gear in accordance with manufacturer's service technical documentation ... 19
8.6 Module 4 — Davits ... 20
8.6.1 Element 4.1 – Specific rules and regulations requirements relating to davits ... 20
8.6.2 Element 4.2 – Design and construction of davits ... 20
8.6.3 Element 4.3 – Annual thorough examination and operational test of davits ... 20
8.7 Module 5 — Winches ... 22
8.7.1 Element 5.1 – Specific rules and regulations requirements relating to winches ... 22
8.7.2 Element 5.2 – Design and construction of winches ... 22
8.7.3 Element 5.3 – Annual thorough examination and operational test of winches ... 22
8.7.4 Element 5.4 – Five-year thorough examination, overhaul and overload operational test of winches ... 24

9 Level 1 Service Technician Stage 2 controlled environment experience and assessment ... 25
9.1 General ... 25
9.2 Candidate pre-requisites for Level 1 service technician Stage 2 controlled environment experience and assessment ... 25
9.3 Aims and objectives of Level 1 Service Technician Stage 2 controlled environment experience and assessment ... 25
9.3.1 Aim ... 25
9.3.2 Objectives ... 25

10 Learning outcomes of Level 1 Service Technician Stage 2 controlled environment experience and assessment ... 26
10.1 General ... 26
10.2 Practical learning outcomes ... 26

11 Duration and timing of Level 1 Service Technician Stage 2 controlled environment experience and assessment ... 26

Annex A (informative) **Equipment covered by the training ... 27**

Annex B (informative) **Assessment checklist — Level 1 Service Technician Stage 1 technical training ... 28**

Annex C (informative) **Assessment checklist — Level 1 Service Technician Stage 2 controlled environment experience and assessment ... 45**

Bibliography ... 47

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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.*

A list of all parts in the ISO/PAS 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

The industry recognises that a major objective 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.

It has been recognized from the new requirements in IMO Resolution MSC.402 (96) for 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 (henceforth referred to as "the IMO Requirements") adopted 19th May 2016 and entering into force 1st January 2020, that it is necessary to develop an International Standard. This necessity is based on the IMO Requirement in paragraph 7.1.1:

"Employment and documentation of personnel certified in accordance with a recognized national, international or industry standard as applicable, or a manufacturer's established certification programme. In either case, the certification programme shall comply with section 8 for each make and type of equipment for which service is to be provided;"

This document and the associated ISO/PAS 23678-1, ISO/PAS 23678-2 and ISO/PAS 23678-4 have been developed to achieve three key objectives.

1. The first objective was to develop training documents that would support the IMO Requirements, section 7, paragraph 7.1.1.

2. The second objective was to develop training documents that would provide a consistent, reliable, and standardised approach to training and provide a clear auditable trail for interested parties to grant authorisation supporting the IMO Requirements, section 3, to approved service providers.

3. The third objective was to develop training documents 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 the service technician training in ISO/PAS 23678-2, ISO/PAS 23678-3 and ISO/PAS 23678-4 enables personnel certified by an authorized service provider to meet the IMO Requirements, section 7, paragraph 7.1.1, and section 8.

The ISO/PAS 23678-series on service technician training consists of:

— Part 1 Guidance to training providers; describes the competence route of the candidate and the resources that the training provider needs to deliver the training.

— Part 2 Initial training; describes the training programme for initial familiarisation and induction training that is classroom education. The training programme focuses on introducing individuals to the complex terminology, rules and regulations, organisations, health and safety which a service technician needs to understand in order to carry out their role.

— Part 3 Level 1 training; describes the controlled environment education and training delivered at a training school. The training programme focuses on the technical training for type specific lifesaving appliances.

— Part 4 Level 2 in-field competence; describes the requirements for initial in-field and ongoing competence assessments.

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NOTE ISO/PAS 23678-1, ISO/PAS 23678-2 and ISO/PAS 23678-3 are referencing typical in-house/training school training programmes. ISO/PAS 23678-4 is typical in-field performance of the personnel trained and recording of their competence.

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Service personnel for the 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 —

Part 3: Level 1 technician 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 (including free-fall lifeboats) and rescue boats (including fast 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.

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 part of the IMO Requirements, paragraphs 8.1, 8.2.1.1-8.2.1.6, 8.2.2, and 8.2.3.

— Stage 2, Service Technician technical controlled environment experience and assessment, where candidates 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/PAS 23678-1, ISO/PAS 23678-2 and ISO/PAS 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;

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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;

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d) freefall hydraulic;

e) automatic.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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

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

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

— IEC Electropedia: available at http://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 for Level 1 Service Technician Stage 1 technical training

a) hold or be working towards a nationally recognised 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 of Level 1 Service Technician Stage 1 technical training

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 are:

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

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

c) ensure candidates have the required technical underpinning knowledge and practical skills to carry out maintenance thorough examination, operational testing, repair and overhaul of lifeboats

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(including free-fall lifeboats), rescue boats (including fast rescue boats), launching appliances and on-load release gear, as applicable;

d) ensure candidates can write reports and complete associated documentation;

e) ensure candidates 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

The learning outcomes for Level 1 Service Technician training are specified in 5.2 and 5.3. 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) explain the people that needs to 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 specialised equipment requirements including PPE; and

d) explain the documents that 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); and

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, paragraph 6.2.3.

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; and

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; and

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 liferafts;

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; and

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; and

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 specific makes and types of survival craft (see Table A.1), supporting the IMO Requirements, paragraph 6.2.3, and the manufacturer's technical documentation. To include:

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) maneuvering 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 liferafts; and

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 specific makes and types of release systems (see Table A.1), supporting the IMO requirements, paragraphs 6.2.4 to 6.2.8, and the manufacturer's technical documentation. To include:

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 specific makes and types of release systems (see Table A.1), supporting the IMO Requirements, paragraph 6.3.3, and the manufacturer's technical documentation. To include:

a) how to 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) how to dismantle and re-assemble specific makes and types of central release units;

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

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

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

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

g) how to replace service exchange release gear;

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

i) how to carry out the 5-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 specific makes and types of davits (see Table A.1), supporting the IMO Requirements, paragraphs 6.2.9.1 to 6.2.9.4, and the manufacturer's technical documentation. To include:

a) how to 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 specific makes and types of winches (see Table A.1), supporting the IMO requirements, paragraphs 6.2.9. and 6.3, and the manufacturer's technical documentation. To include:

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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