

INTERNATIONAL STANDARD

IEC 60092-502

Fifth edition
1999-02

Electrical installations in ships – Part 502: Tankers – Special features

*Installations électriques à bord des navires –
Partie 502:
Navires-citernes –
Caractéristiques spéciales*

© IEC 1999 — Copyright - all rights reserved

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

International Electrotechnical Commission 3, rue de Varembé Geneva, Switzerland
Telefax: +41 22 919 0300 e-mail: inmail@iec.ch IEC web site <http://www.iec.ch>



Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

PRICE CODE

X

For price, see current catalogue

CONTENTS

	Page
FOREWORD	4
INTRODUCTION	5
Clause	
1 Scope	6
2 Normative references	6
3 Definitions	7
4 Area classification	11
4.1 General	11
4.2 Tankers carrying flammable liquids other than liquefied gases having a flashpoint not exceeding 60 °C, for example crude oil, oil products, chemical products	15
4.3 Tankers carrying flammable liquids having a flashpoint exceeding 60 °C	17
4.4 Tankers carrying flammable liquefied gases	17
4.5 Tankers carrying cargoes (for example acids) reacting with other products/materials to evolve flammable gases	18
5 Electrical systems	18
5.1 Sources of electrical power	18
5.2 Distribution systems	18
5.3 Electrical protection	18
5.4 Equipotential bonding	19
5.5 Static electricity	19
5.6 Lightning protection	20
5.7 Cathodically protected metallic parts	20
5.8 Electromagnetic radiation	20
6 Electrical equipment	20
6.1 General	20
6.2 Selection of electrical equipment	20
6.3 Certified safe type equipment	22
6.4 Electrical equipment of the type “n” and that which ensures the absence of sparks and arcs and of “hot spots” during its normal operation.	22
6.5 Electrical equipment in hazardous areas	23
6.6 Movable equipment	24
7 Installation	24
7.1 General	24
7.2 Selection of apparatus	25
7.3 Wiring system – general	25
7.4 Cable wiring systems	25

7.5	Connection of cables	25
7.6	Cable joints	25
8	Ventilation and pressurisation	26
8.1	General	26
8.2	Design principles	27
8.3	Ventilation related to area classification	27
8.4	Protection by over-pressure	27
9	Inspection and maintenance.....	29
9.1	General	29
9.2	Inspection and testing.....	29
9.3	Isolation of apparatus	29
9.4	Maintenance.....	29
9.5	Qualifications of personnel.....	29
10	Documentation	29
10.1	Area classification	29
10.2	Equipment	30
10.3	Installation.....	31
10.4	Maintenance.....	32
10.5	Administration of the documentation	32
 Annexes		
A (informative)	Examples of hazardous area classification – Basic principles	33
B (informative)	Examples of hazardous area classification – Tankers carrying flammable liquids other than liquefied gases having a flashpoint not exceeding 60 °C, for example, crude oil, oil products, chemical products.....	37
C (informative)	Examples of hazardous area classification – Tankers carrying flammable liquids having a flashpoint exceeding 60 °C – Unheated cargoes and cargoes heated to temperature (TH) below, and not within 15 °C of, their flashpoint (FP).....	40
D (informative)	Examples of hazardous area classification – Tankers carrying flammable liquefied gases	41
E (informative)	Examples of hazardous area classification – Tanker carrying cargoes (for example acids) reacting with other products/materials to evolve flammable gases	43

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTRICAL INSTALLATIONS IN SHIPS –

Part 502: Tankers – Special features

FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of the IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested National Committees.
- 3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical reports or guides and they are accepted by the National Committees in that sense.
- 4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.
- 5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.
- 6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60092-502 has been prepared by IEC technical committee 18: Electrical installations of ships and of mobile and fixed offshore units.

This fifth edition cancels and replaces the fourth edition published in 1994.

The text of this standard is based on the following documents:

FDIS	Report on voting
18/853/FDIS	18/862/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

Annexes A, B, C, D and E are for information only.

A bilingual version of this standard may be issued at a later date.

INTRODUCTION

This standard introduces the zonal concept for hazardous area classification and permits the use of earthed distribution systems.

It should be noted, however, that it is not in full concurrence with the requirements for electrical installations in hazardous areas given in Clause 10.2 of the IBC Code¹⁾ and Clause 10.2 of the IGC Code²⁾ and the system earthing requirements of Regulations II-1/45.4.1 and 45.4.3 of SOLAS³⁾.

Until the International Maritime Organization has decided upon corresponding amendments to the Codes and to SOLAS, users of this standard are advised to ask the appropriate authority to consider equivalence in accordance with the “Equivalents” provisions of Clause 1.4 of the IBC Code and Clause 1.4 of the IGC Code and Regulation I/5 of SOLAS.

1) International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (1994 edition).

2) International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (1993 edition).

3) SOLAS – the International Convention for the Safety of Life at Sea, 1974, and its Protocol of 1978 (Consolidated edition, 1997).

ELECTRICAL INSTALLATIONS IN SHIPS –

Part 502: Tankers – Special features

1 Scope

This part of IEC 60092 deals with the electrical installations in tankers carrying liquids which are flammable, either inherently, or due to their reaction with other substances, or flammable liquefied gases.

The requirements in other parts of IEC 60092 also apply to tankers, unless otherwise mentioned in this standard.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 60092. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this part of IEC 60092 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 60050(426):1990, *International Electrotechnical Vocabulary (IEV) – Chapter 426: Electrical apparatus for explosive atmospheres*

IEC 60079-0:1983, *Electrical apparatus for explosive gas atmospheres – Part 0: General requirements*

IEC 60079-1:1990, *Electrical apparatus for explosive gas atmospheres – Part 1: Construction and verification test of flameproof enclosures of electrical apparatus*

IEC 60079-2:1983, *Electrical apparatus for explosive gas atmospheres – Part 2: Electrical apparatus, type of protection ‘p’*

IEC 60079-4:1975, *Electrical apparatus for explosive gas atmospheres – Part 4: Method of test for ignition temperature*

IEC 60079-5:1997, *Electrical apparatus for explosive gas atmospheres – Part 5: Powder filling ‘q’*

IEC 60079-6:1995, *Electrical apparatus for explosive gas atmospheres – Part 6: Oil-immersion ‘o’*

IEC 60079-7:1990, *Electrical apparatus for explosive gas atmospheres – Part 7: Increased safety ‘e’*

IEC 60079-10:1968, *Electrical apparatus for explosive gas atmospheres – Part 10: Classification of hazardous areas*

IEC 60079-11:1991, *Electrical apparatus for explosive gas atmospheres – Part 11: Intrinsic safety ‘i’*

IEC 60079-12:1978, *Electrical apparatus for explosive gas atmospheres – Part 12: Classification of mixtures of gases or vapours with air according to their maximum experimental safe gaps and minimum igniting currents*

IEC 60079-14:1996, *Electrical apparatus for explosive gas atmospheres – Part 14: Electrical installation in hazardous areas (other than mines)*

IEC 60079-15:1987, *Electrical apparatus for explosive gas atmospheres – Part 15: Electrical apparatus with type of protection 'n'*

IEC 60079-17:1990, *Electrical apparatus for explosive gas atmospheres – Part 17: Inspection and maintenance of electrical installations in hazardous areas (other than mines)*

IEC 60079-18:1992, *Electrical apparatus for explosive gas atmospheres – Part 18: Encapsulation 'm'*

IEC 60079-19:1993, *Electrical apparatus for explosive gas atmospheres – Part 19: Repair and overhaul for apparatus used in explosive atmospheres (other than mines or explosives)*

IEC 60092-101:1994, *Electrical installations in ships – Part 101: Definitions and general requirements*

IEC 60092-201:1994, *Electrical installations in ships – Part 201: System design – General*

IEC 60092-202:1994, *Electrical installations in ships – Part 202: System design – Protection*

IEC 60092-350:1988, *Electrical installations in ships – Part 350: Low-voltage shipboard power cables – General construction and test requirements*

IEC 60092-401:1980, *Electrical installations in ships – Part 401: Installation and test of completed installation*