INTERNATIONAL ELECTROTECHNICAL COMMISSION

(affiliated to the International Organization for Standardization - ISO)

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RECOMMENDATIONS FOR ELECTRICAL INSTALLATIONS IN SHIPS

Central Office of the International Electrotechnical Commission

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FOREWORD

(1) The formal decisions or agreements of the IEC on technical matters, prepared by Technical Committees on which all the National Committees having a special interest therein are represented, express, as nearly as possible, an international consensus of opinion on the subjects dealt with.

(2) They have the form of recommendations for international use and they are accepted by the National Committees in that sense.

(3) In order to promote this international unification, the IEC expresses the wish that all National Committees having as yet no national rules, when preparing such rules, should use the IEC recommendations as the fundamental basis for these rules in so far as national conditions will permit.

(4) The desirability is recognized of extending international agreement on these matters through an endeavour to harmonize national standardization rules with these recommendations in so far as national conditions will permit. The National Committees pledge their influence towards that end.

PREFACE

Delegates from twelve nations with interests in marine applications met at The Hague in June 1935 and decided that an international set of regulations relating to electrical installations in ships would be an advantage to the many interests involved. They fixed on the order of importance of the subjects to be dealt with as :-

(a) Safety

(b) Reliability

(c) Simplicity

(d) Ease of maintenance

The United Kingdom was asked to appoint the Chairman of Technical Committee No. 18 and the Netherlands was entrusted with the Secretariat.

Eight sub-committees were appointed and a further meeting was held in London in June 1936. Some progress had been made in the preparation of draft regulations when the work was interrupted by the Second World War.

At a meeting held in London in July 1948 immediately following the 1948 Convention on Safety of Life at Sea, it was resolved to make a fresh start and ten sub-committees, each based on a National Committee, were appointed to prepare preliminary drafts. These were subsequently combined by a Co-ordinating and Editing Committee into a first comprehensive draft of 25 chapters. Thus no further plenary session was held until the Jubilee IEC meeting at Philadelphia in September 1954, when comments which had been submitted by National Committees on the first comprehensive draft were considered.

It was then resolved that the decisions then taken should be embodied in a second draft and that in view of the length of time which had elapsed it was highly desirable to publish a 1st edition and to continue in the meantime with the consideration of matters still unresolved with a view to a 2nd edition.

The second draft was accordingly circulated to National Committees in August 1955 for approval under the Six Months' Rule. The following 16 countries voted in favour of publication but in every case, except one, comments were submitted.

Australia	Italy	Union of South Africa
Austria	Japan	Union of Soviet Socialist Republics
Belgium	Netherlands	United Kingdom
Denmark	Norway	United States of America
France	Sweden	Yugoslavia
German Federal Republic		

Against approval : Nil

The comments were submitted to the Chairman who recommended the acceptance of those which dealt with technical errors and inconsistencies. In the meantime the Committee had met at The Hague in December 1955 and had agreed certain amendments and had recommended that these be embodied in the 1st edition.

These matters were accordingly submitted to National Committees under the Two Months' Procedure and the following countries voted explicitly in favour of publication.

Austria	German Federal Republic	Sweden
Belgium	Italy	Union of South Africa
Denmark	Netherlands	Union of Soviet Socialist Republics
Finland	Norway	United Kingdom
France	Poland	United States of America
		Yugoslavia

Against approval : Nil

The comments of a purely editorial nature which were submitted with the votes have been accepted. The remainder have, on the Authority of the Chairman of Technical Committee No. 18, been withheld for consideration for the second edition.

INTRODUCTION

The operating conditions in ships sailing the seven seas as far as they affect electrical appliances are the same regardless of where the ship is built. Except for variations in quality the materials used in the construction of electrical appliances are similar and are subject to the same natural laws. The characteristics of electric circuits and the behaviour of appliances are likewise predeterminable and follow the same fundamental laws irrespective of the country of origin. It is accordingly feasible to establish international standards to secure that degree of performance, reliability and safety which are essential for the well-being of crews and passengers alike and for the safe carriage of valuable cargoes.

It is for the fulfilment of these ends that the present recommendations have been formulated. Shipbuilders, electrical contractors and manufacturers engaged in the building of ships for the international market are faced at present with several codes of rules and regulations with which to comply although as already stated the conditions of service are identical. It is recognized that apparatus manufactured in various countries will inevitably differ in appearance and conception but for the same duties similar apparatus and materials will necessarily have to meet the same service conditions. This code has therefore been drafted in the form of "recommendations" thus allowing the fullest possible scope for the manufacturer to use his initiative in the design and development of his product and to use existing tools and patterns so far as they are suitable.

The preparatory work was divided between subcommittees on a National basis with instructions to prepare their drafts as far as practicable on the basis of existing National Standards and the published requirements of Classification Societies.

Complete and progressive cooperation between the naval architect, the shipbuilder, the owner and the designer and installer of the electrical installation are essential from the earliest stages right through to completion to ensure not only that all services required of the electrical appliances are met but that proper and suitable space and accommodation is provided for electric cables and appliances.

It is not intended to exclude new materials, appliances or methods or to discourage invention.

It cannot be too strongly emphasized that good technical design, the correct choice of apparatus, good and suitable materials and, above all, good workmanship are essential for a sound installation. The recommendations are not intended to take the place of a detailed specification or to instruct untrained persons.

NOTE 1:- As some problems could not be resolved satisfactorily without involving considerable delay this first edition has been published embodying the matters on which agreement has been reached.
It is intended to proceed immediately with outstanding items which will be embodied in due course in the second edition.

NOTE 2:- All dimensions in these Recommendations are, in the first place, given in metric units; figures in brackets in British and American units are not exact numerical equivalents of the metric quantities, but are the nearest dimensions in practical use in the respective countries.

CHAPTER 1

DEFINITIONS

NOTE: The following definitions indicate the sense in which the expressions defined are used in this International Code. All other expressions are used in the sense defined in IEC Publication No.50 "International Electrotechnical Vocabulary"

GENERAL

1.01 - Accommodation spaces. Accommodation spaces are those used for public spaces, corridors, lavatories, cabins, offices, crew quarters, barber shops, isolated pantries and lockers, and similar spaces.

1.02 - Appropriate authority. A governmental body or a classification society with whose rules a ship is required to comply.

1.03 - Bond. To connect together non-current-carrying parts such as the armour or lead sheath of consecutive or adjacent lengths of cable or the metal plates, for example, comprising the walls etc. of a radio-receiving room in order to ensure continuity of electrical connection or to equalize the potential between the parts concerned.

1.04 - Cargo spaces. Cargo spaces are all spaces used for cargo (including cargo oil-tanks) and trunks to such spaces.

1.05 - Dangerous spaces in tankers. Dangerous spaces in a tanker are all those where inflammable or explosive vapour or gas may normally be expected to accumulate, such as :-

- cargo oil tanks
- cofferdams
- cargo pump-rooms
- spaces immediately above tank crowns (e.g. between decks)
- spaces adjacent to a tank not extended from a side to the other side of the ship
- zones within 3m (or 10 ft.) of any oil tank outlet or vapour outlet.

1.06 - Degree, electrical. 1/360 of a complete electrical cycle.

NOTE: If P = number of poles of an alternator, the number of electrical cycles in a revolution is P/2, so that 360 mechanical degrees correspond to P/2 x 360 electrical degrees, or one mechanical degree = P/2 electrical degrees.

1.07 - Diversity factor (Demand factor). The ratio of the estimated consumption of a group of power-consuming appliances under their normal working conditions to the sum of their normal ratings.

1.08 - Insulation, double. A portable appliance which is partially or wholly metal-clad is said to have double insulation when every live part, besides being mounted upon or surrounded by a suitable insulation support with adequate creepage path, is so separated from the external casing by means of insulating material or adequate spacing that no live part can be touched, no accessible metal part can become live in the event of failure of the said insulating support.

1.09 - Live conductor or circuit. A conductor or circuit electrically connected to a source of potential difference between it and earth.

1.10 - Machinery spaces. Machinery spaces include all spaces used for propelling, auxiliary or refrigeration machinery, boilers, pumps, workshops, generators, ventilating and air-conditioning machinery, oil-filling stations and similar spaces, and trunks to such spaces.

1.11 - Prospective current. The r.m.s. value of the alternating component of an alternating current, or the value of the direct current which would flow in a circuit, on the occurrence of a short-circuit immediately on the supply side of the fuse or other protective device, under given voltage conditions and supply network conditions.

1.12 - Public spaces. Public spaces are those portions of the accommodation which are used for halls, dining-rooms, lounges, and similar permanently enclosed spaces.

1.13 - Sea-going ship. Any ship not exclusively employed in the navigation of rivers or inland waters.

1.14 - Service spaces. Service spaces are those used for galleys, main pantries, stores (except isolated pantries and lockers), mail and specie rooms, and similar spaces and trunks to such spaces.

1.15 - Services, essential. Services essential to the safety of life, and to the navigation and propulsion of a ship.

1.16 - Tanker. A cargo ship constructed (or adapted) and intended for the carriage in bulk of liquid cargoes having a flash-point (closed test) of 65 °C or less.

1.17 - Voltage, extra low. Applies to systems in which the voltage does not normally exceed 30 volts r.m.s., a.c. or 50 volts d.c.