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TECHNICAL REPORT

Electrical installations in ships – Electromagnetic compatibility – Optimising of cable installations on ships – Testing method of routing distance

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTRICAL INSTALLATIONS IN SHIPS – ELECTROMAGNETIC COMPATIBILITY – OPTIMISING OF CABLE INSTALLATIONS ON SHIPS – TESTING METHOD OF ROUTING DISTANCE

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IEC 62482/TR, which is a technical report, has been prepared by IEC technical committee 18: Electrical installations of ships and of mobile and fixed offshore units.

The text of this technical report is based on the following documents:

Enquiry draft	Report on voting
18/1030/DTR	18/1041A/RVC

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

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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

INTRODUCTION

In accordance with IMO-Resolution A.694/6.1: "*All reasonable and practicable steps shall be taken to ensure electromagnetic compatibility between the equipment concerned and other radio communication and navigational equipment carried on board in compliance with the relevant requirements of chapters III, IV and V of the SOLAS Convention*."

To fulfil this requirement it is necessary to survey the chosen cables and cable installation with regard to EMC.

Basic rules for cabling in international shipbuilding are presently specified in the series of standards given in IEC 60092 [1][1], requirements on dimensions of routing distances in cable systems are given in IEC 60533 and basic requirements on cable routing in IEC 60092-352. As the requirements differ between the relevant documents, the question of validity has been discussed internationally. This applies particularly in regard to parallel routing of power electronics cables on the one hand and measuring and control equipment cables on the other hand.

General Information about routing distances is mainly based on the German standard VG 95375-3 [4]. This standard is based on tests performed in 1982 [2].

In those days tests were performed mainly with sinusoidal signals in the frequency range of 0.1 MHz up to > 40 MHz and even today there is no reason to doubt these test results. However, the question has often been raised whether these results are also adequate for unacceptable crosstalk into cables for integrated digital circuits. In no case fast transients may affect the function inadmissibly where interference thresholds should be a maximum. The measurements were accomplished to investigate this issue.

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1 Numbers in square brackets refer to the Bibliography.

ELECTRICAL INSTALLATIONS IN SHIPS – ELECTROMAGNETIC COMPATIBILITY – OPTIMISING OF CABLE INSTALLATIONS ON SHIPS – TESTING METHOD OF ROUTING DISTANCE

1 Scope

This Technical Report describes tests methods carried out to determine minimum routing distances in order to avoid crosstalk of fast transients (bursts). The test results may be applied to cable installations according to IEC 60092-352.

2 Normative references

The following referenced documents are indispensable for the application 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.

IEC 60092-352, *Electrical installations in ships – Part 352: Choice and installation of electrical cables*

IEC 60092-353, *Electrical installations in ships – Part 353: Single and multicore non-radial field power cables with extruded solid insulation for rated voltages 1kV and 3 kV*

IEC 60092-374, *Electrical installations in ships – Part 374: Shipboard telecommunication cables and radio-frequency cables – Telephone cables for non-essential communication services*

IEC 60092-375, *Electrical installations in ships – Part 375: Shipboard telecommunication cables and radio-frequency cables – General instrumentation, control and communication cables*

IEC 60092-376, *Electrical installations in ships – Part 376: Cables for control and instrumentation circuits 150/250 V (300 V)*

IEC 60092-504, *Electrical installations in ships – Part 504: Special features – Control and instrumentation*

IEC 60533:1999, *Electrical and electronic installations in ships – Electromagnetic compatibility*

IEC 61000-4-4, *Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test*

IEC 61196-1, *Coaxial communication cables – Part 1: Generic specification – General, definitions and requirements*