

Edition 1.0 2019-02

TECHNICAL SPECIFICATION

Electric energy supply networks – General aspects and methods for the maintenance of installations and equipment

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ICS 29.240.01 ISBN 978-2-8322-6562-8

Warning! Make sure that you obtained this publication from an authorized distributor.

CONTENTS

FO	REWO	RD	4
INT	RODU	CTION	6
1	Scop	e	7
2	Norm	ative references	7
3	Term	s and definitions	7
4		eral aspects of maintenance and maintenance management	
5		agement of maintenance	
	5.1	Structure of maintenance management	
	5.2	Principles and roles	
	5.3 5.4	Maintenance concept	
		Maintenance plan	
6		ucting maintenance tasks	
	3.1	General	
	5.2	Planning of maintenance activities	
	3.3	Instructions of maintenance activities	
7		mentation and analysis	
	7.1	Documentation	
	7.2	Statistics	
	7.3	Additional analysis	
8	Asse	ssment and improvement of maintenance concepts	18
Anr	nex A (informative) Notes on types of maintenance	19
1	٩.1	Types of maintenance	19
1	٩.2	Corrective maintenance	19
	A.2.1	General	19
	A.2.2	Maintenance after the occurrence of a malfunction	19
	A.2.3	Repair after failure	19
1	٩.3	Preventive maintenance	19
	A.3.1	General	19
	A.3.2	Condition-based maintenance	20
	A.3.3	Periodic maintenance	20
	A.3.4	Maintenance after extraordinary operating conditions	20
1	٩.4	Reliability-centred maintenance	20
1	٩.5	Risk-based maintenance	21
Anr	nex B (informative) Condition assessment of equipment and installations	22
I	3.1	Information for use	22
I	3.2	Selection catalogue for activities to determine the actual condition of	00
	D 0 4	equipment/installations of electrical supply systems	
	B.2.1		
	B.2.2	3	
	B.2.3		
	B.2.4		
	B.2.5	9	
	B.2.6		
	B.2.7	- 7 71	
	B.2.8	, , , , ,	
	B.2.9	Telecontrol systems and network technology	35

Bibliography	. 36
Figure 1 – Influence of maintenance actions with different strategies on the availability of equipment	.12
Table 1 – Structure of maintenance management	.13

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTRIC ENERGY SUPPLY NETWORKS – GENERAL ASPECTS AND METHODS FOR THE MAINTENANCE OF INSTALLATIONS AND EQUIPMENT

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of 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, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). 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. 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 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 IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

The main task of IEC technical committees is to prepare International Standards. In exceptional circumstances, a technical committee may propose the publication of a Technical Specification when

- the required support cannot be obtained for the publication of an International Standard, despite repeated efforts, or
- the subject is still under technical development or where, for any other reason, there is the future but no immediate possibility of an agreement on an International Standard.

Technical Specifications are subject to review within three years of publication to decide whether they can be transformed into International Standards.

IEC TS 63060, which is a Technical Specification, has been prepared by IEC technical committee 8: System aspects of electrical energy supply.

The text of this Technical Specification is based on the following documents:

Enquiry draft	Report on voting
8/1470/DTS	8/1488/RVDTS

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

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

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

- transformed into an International Standard,
- reconfirmed,
- · withdrawn,
- replaced by a revised edition, or
- amended.

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

INTRODUCTION

Maintenance (MA) and maintenance support provide an important contribution to ensure the reliability of components and electric installations throughout their operating life cycle. The correct functionality, performance, and reliability will be achieved by providing the necessary maintenance in conjunction with adequate design, construction, maintainability and installation quality, and by their proper usage. Other parameters besides maintenance affect the safe, secure, and reliable operation of electricity networks. For example: network topology, spare parts, new investment, technology, network conditions, know-how, staff, etc. The option(s) used is/are the responsibility of the company.

The extent and type of maintenance and maintenance support correspond to the type of equipment and installations, their constitution and required availability, as well as other factors such as operational and environmental condition, and operating experience.

Inappropriate, irregular or missing maintenance could lead to premature functional failures which reduce the availability of equipment and installations, could lead to consequential damage, and shorter asset life cycles. Functional failures can lead to operational consequences and need to be assessed accordingly. Safety aspects have to be considered at all times.

The purpose of this document is to describe, in general terms, the management methods, processes, and techniques with regard to the maintenance of installations and equipment, which are necessary to achieve public safety, reliable operation, and acceptable reliability for installations and equipment.

In this document, the term "network operator" and "system operator" are used for the network owner, asset manager, and maintenance provider.

ELECTRIC ENERGY SUPPLY NETWORKS – GENERAL ASPECTS AND METHODS FOR THE MAINTENANCE OF INSTALLATIONS AND EQUIPMENT

1 Scope

This document provides guidance to develop maintenance requirements of installations and equipment in electric power networks. It is primarily meant for the operators of electric power networks, particularly those of public power supplies, including High-Voltage DC transmission (HVDC). This scope does not include:

- railway networks,
- installations of end consumer networks,
- installations for electric power generation.

Crises handling, e.g. in emergency situations, is not within the scope of this document.

NOTE Consumer networks (e.g. networks of chemical companies, traffic lights and street lighting) are installations which are not used to distribute electric energy to further consumers. The main scope covers public networks, but the general recommendations can be applied to other networks.

2 Normative references

There are no normative references in this document.