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INTERNATIONAL STANDARD

colour inside

Protection against lightning – Thunderstorm warning systems

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CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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PROTECTION AGAINST LIGHTNING – THUNDERSTORM WARNING SYSTEMS

FOREWORD

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International Standard IEC 62793 has been prepared by IEC technical committee 81: Lightning protection.

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

FDIS	Report on voting
81/508/FDIS	81/519/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.

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 stability date indicated on the IEC website 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- withdrawn,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.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

Natural atmospheric electric activity and, in particular, cloud-to-ground lightning poses a serious threat to living beings and property. Every year severe injuries and even deaths of humans are caused as a result of direct or indirect lightning strikes.

Lightning:

- may affect sport, cultural and political events attracting large concentrations of people; events may have to be suspended and people evacuated in the case of a risk of thunderstorm;
- may affect industrial activities by creating power outages and unplanned interruptions of production processes;
- may interrupt all kinds of traffic (people, energy, information, etc.);
- has led to a steady increase in the number of accidents per year due to the wider use of electric components that are sensitive to the effects of lightning (in industry, transportation and communication);
- may be a hazard for activities with an environmental risk, for example handling of sensitive, inflammable, explosive or chemical products;
- may be a cause of fire.

During the last decades, technical systems including systems devoted to real-time monitoring of natural atmospheric electric activity and lightning, have experienced an extraordinary development. These systems can provide high quality and valuable information in real-time of the thunderstorm occurrence, making it possible to achieve information which can be extremely valuable if coordinated with a detailed plan of action.

Although this information allows the user to adopt anticipated temporary preventive measures, it should be noted that all the measures to be taken based on monitoring information are the responsibility of the system user according to the relevant regulations. The effectiveness will depend largely on the risk involved and the planned decisions to be taken. This International Standard gives an informative list of possible actions.

Lightning and thunderstorms, as with many natural phenomena, are subject to statistical uncertainty. It is not possible therefore to achieve precise information on when and where lightning will strike.

Other lightning protection standards do not cover the use of thunderstorm warning systems.

PROTECTION AGAINST LIGHTNING – THUNDERSTORM WARNING SYSTEMS

1 Scope

This International Standard describes the characteristics of thunderstorm warning systems and evaluation of the usefulness of lightning real time data and/or storm electrification data in order to implement lightning hazard preventive measures.

This standard provides the basic requirements for sensors and networks collecting accurate data of the relevant parameters, giving real-time information of lightning tracks and range. It describes the application of the data collected by these sensors and networks in the form of warnings and historical data.

This standard applies to the use of information from thunderstorm warning systems (systems or equipment providing real-time information) on atmospheric electric activity in order to monitor preventive measures.

This standard includes:

- a general description of available lightning and storm electrification hazard warning systems;
- a classification of thunderstorm detection devices and properties;
- guidelines for alarming methods;
- a procedure to determine the usefulness of thunderstorm information;
- some informative examples of possible preventive actions.

The following aspects are outside the scope of this standard:

a) lightning protection systems; such systems are covered by the IEC 62305 series;
b) other thunderstorm related phenomena such as rain, hail, wind;
c) satellite and radar thunderstorm detection techniques.

A non-exhaustive list of situations to which this standard could be applicable is given below:

- people in open areas involved in activities such as maintenance, labour, sports, competitions, agriculture and fisheries or situations where large crowds gather;
- wind farms, large solar power systems, power lines;
- occupational health and safety prevention;
- sensitive equipment such as computer systems, emergency systems, alarms and safety equipment;
- operational and industrial processes;
- storage, processing and transportation of hazardous substances (e.g. flammable, radioactive, toxic and explosive substances);
- determined environments or activities with special danger of electrostatic discharges (e.g. space and flight vehicle operations);
- operations in which the continuity of the basic services is very important (e.g. telecommunications, the generation, transport and distribution of energy, sanitary services and emergency services);
- infrastructures: ports, airports, railroads, motorways and cableways;

- civil defense of the environment: forest fires, land slide and floods;
- wide networks (e.g. power lines, telecommunication lines) may also benefit from having early detection of thunderstorms.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 62305 (all parts), *Protection against lightning*

3 Terms, definitions and abbreviations

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1.1
alarm
information indicating that the target or the surrounding area is likely to be affected by thunderstorms and the accompanying lightning related events

3.1.2
cloud-to-ground lightning
CG
electric discharge of atmospheric origin that is comprised of one or more cloud-to-ground lightning strokes that propagate from cloud to ground or vice versa and lead to a net transfer of charge between cloud and ground

3.1.3
coverage area
CA
area where a given warning equipment has a sufficient detection efficiency and/or accuracy to give a warning

3.1.4
detection efficiency
DE
percentage of cloud-to-ground discharges (flashes or strokes) that are detected and located by a sensor or a network

Note 1 to entry: As cloud-to-ground flashes are often composed of several strokes, there is a difference between flash detection efficiency and stroke detection efficiency. A flash is reported (detected) if at least one stroke (first or subsequent) is detected and therefore flash detection efficiency is always equal or higher than stroke detection efficiency.

3.1.5
dwell time
DT
time that an alarm is sustained after all warning criteria are no longer met

3.1.6
effective alarm
EA
alarm where a lightning related event occurs in the surrounding area during the total alarm duration