

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Electrical installations for aeronautical ground lighting at aerodromes –
Part 1: Fundamental principles**

**Installations électriques pour le balisage aéronautique au sol
dans les aérodromes –
Partie 1: Principes fondamentaux**

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**ELECTRICAL INSTALLATIONS FOR AERONAUTICAL
GROUND LIGHTING AT AERODROMES –****Part 1: Fundamental principles**

FOREWORD

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International Standard IEC 61820-1 has been prepared by IEC technical committee 97: Electrical installations for lighting and beaconing of aerodromes.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
97/198/FDIS	97/200/RVD

Full information on the voting for the approval of this International Standard 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.

A list of all parts in the IEC 61820 series, published under the general title *Electrical installations for aeronautical ground lighting at aerodromes*, can be found on the IEC website.

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

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INTRODUCTION

This document is part of IEC 61820, a series of standards that defines the requirements throughout the lifecycle of an Aeronautical Ground Lighting (AGL) system including design, installation, commissioning, maintenance, decommissioning and disposal.

This document contains fundamental design requirements for AGL systems.

According to ICAO or national standards, the AGL fixtures are subject to specific requirements for photometric output and serviceability level.

The AGL system is provided to support airfield activities. Therefore, the focus of AGL system design is to maintain the lighting against any possible failure. This document pertains to personnel and operational safety.

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ELECTRICAL INSTALLATIONS FOR AERONAUTICAL GROUND LIGHTING AT AERODROMES –

Part 1: Fundamental principles

1 Scope

This part of IEC 61820 covers principles of design and installation requirements for AGL systems including control, monitoring and transformation of energy, the cables and any electrical component utilized to produce the light intended to be used as a visual aid for air and ground navigation.

This document defines in general the fundamental principles to provide safe, reliable and efficient operation of AGL systems independent of the particular system design. Where certain aspects of design are specific to a particular type of system (e.g. series-circuit), these are supplemented in the applicable part.

NOTE Local / national regulations can be different from the provisions of this document.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 60364-4-41, *Low-voltage electrical installations – Part 4-41: Protection for safety – Protection against electric shock*

IEC 60721-3-3, *Classification of environmental conditions – Part 3: Classification of groups of environmental parameters and their severities – Section 3: Stationary use at weatherprotected locations*

IEC 60721-3-4, *Classification of environmental conditions – Part 3: Classification of groups of environmental parameters and their severities – Section 4: Stationary use at non-weatherprotected locations*

IEC 61000-6-2, *Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity standard for industrial environments*

IEC 61000-6-4, *Electromagnetic compatibility (EMC) – Part 6-4: Generic standards – Emission standard for industrial environments*

IEC 62870, *Electrical installations for lighting and beaconing of aerodromes – Safety secondary circuits in series circuits – General safety requirements*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1

AGL

aeronautical ground lighting

any light specially provided as an aid to air navigation, other than a light displayed on an aircraft

Note 1 to entry: This note applies to the French language only.

[SOURCE: ICAO Annex 14 to the Convention on International Civil Aviation:2018.]

3.2

lifecycle

series of identifiable stages through which an item goes, from its conception to disposal

Note 1 to entry: See IEC TS 62143 for AGL systems lifecycle.

3.3

electric insulation

part of an electrotechnical product which separates conducting parts at different electric potentials during operation or insulates such parts from the surroundings

[SOURCE: IEC 60050-212:2010, 212-11-07]

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3.4

insulation resistance

resistance under specified conditions between two conductive elements separated by insulating materials

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[SOURCE: IEC 60050-151:2001, 151-15-43]

3.5

insulation monitoring

continuous determination of the state or condition of the system electrical insulation

3.6

equipotentiality

state when conductive parts are at a substantially equal electric potential

[SOURCE: IEC 60050-195:1998, 195-01-09]

3.7

equipotential bonding

provision of electric connections between conductive parts, intended to achieve equipotentiality

[SOURCE: IEC 60050-195:1998, 195-01-10]

3.8

field circuit isolator

device which provides, in the dedicated position, an isolating distance between the power supply and cables feeding AGL loads

3.9

load, noun

device intended to absorb power supplied by another device or an electric power system

[SOURCE: IEC 60050-151:2001, 151-15-15]

3.10

AGL loads

any load fed by a dedicated AGL power supply

Note 1 to entry: AGL loads can be, but are not limited to: lights, signs, or sensors.

3.11

nominal voltage

value of the voltage by which the electrical installation or part of the electrical installation is designated and identified

[SOURCE: IEC 60050-826:2004, 826-11-01]

3.12

rated insulation voltage

rated value of the rms withstand voltage assigned by the manufacturer to the equipment or to a part of it, characterizing the specified (long-term) withstand capability of its insulation

Note 1 to entry: The rated insulation voltage is not necessarily equal to the rated voltage of equipment which is primarily related to functional performance.

[SOURCE: IEC 60050-312:2001/AMD1:2015, 312-06-02]

3.13

exposed conductive part

conductive part which can readily be touched and which is not normally alive, but which may become alive under fault conditions

Note 1 to entry: Typical exposed conductive parts are walls of enclosures, operating handles, etc.

[SOURCE: IEC 60050-441:2000, 441-11-10]

3.14

field circuit

part of the AGL system that starts from the output terminals of the power source or, if a field circuit isolator is installed, from the output terminals of the field circuit isolator

4 Environmental requirements

4.1 Environmental classes

4.1.1 General

To harmonize the equipment requirements, environmental classes are defined. Equipments are to be selected according to the environmental class of the place of installation.

4.1.2 General environmental requirements

The equipment shall be designed for continuous operation without derating under the defined conditions of the assigned environmental class.

4.1.3 E10: Outdoor installation at or above the surface

Environmental class E10 is applicable to any part of the installation intended to be placed outside in the field.

The equipment is not intended to operate below the surface and cannot be submersed in water and is not suitable for direct burial.

4.1.4 E11: Outdoor installation below the surface

Environmental class E11 is applicable to any part of the installation according to E10 but intended to operate below the surface and can be submersible in fluids and can be suitable for direct burial.

4.1.5 E20: Indoor installation in moderate or controlled climatic environment

Environmental class E20 is applicable to any part of the installation in a building or enclosure that limits the influence from climatic conditions.

4.1.6 E21: Indoor installation in harsh industrial or climatic environment

Environmental class E21 is applicable to any part of the installation in a building or enclosure that protects the parts of the installation against the extremes of climatic influences.

4.2 Environmental conditions

The design of the AGL installation shall take into account the environmental conditions to which it will be subjected, and shall meet the minimum requirements contained in Table 1 and based on IEC 60721-3-3 or IEC 60721-3-4 (as relevant).

Table 1 – Environmental conditions for AGL systems
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Classes	E10	E11	E20	E21
Climatic conditions ^a (K)	4K4 (with minimum temperature 40 °C)	4K4 (with minimum temperature 40 °C)	3K3	3K3
Special condition (Z)	4Z5 4Z7	4Z5 4Z9	3Z12	3Z11 3Z12
Biological conditions ^b (B)	4B1	4B1	3B1	3B1
Chemically active substances (C)	4C3	4C3	3C2	3C2
Mechanically active substances (S)	4S3	4S1 for installation in manholes or ducts	3S1	3S1
Mechanical conditions (M)	4M1 to 4M2	4M1 to 4M2 for areas not intended to be used by aircrafts or vehicles (e.g. taxiways shoulders, runway shoulders); 4M6 for areas intended to be used by aircrafts or vehicles (e.g. taxiways, runways, de-icing pads, aprons)	3M2	3M2