

INTERNATIONAL STANDARD

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First edition
2002-12

Electrical installations for lighting and beaconing of aerodromes – AGL series transformers

*Installations électriques pour le balisage
et l'éclairage des aérodromes –
Transformateurs séries AGL*

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**ELECTRICAL INSTALLATIONS FOR LIGHTING
AND BEACONING OF AERODROMES –
AGL SERIES TRANSFORMERS**

FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the 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, the IEC publishes International Standards. 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. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard IEC 61823 has been prepared by IEC technical committee 97: Electrical installations for lighting and beaconing of aerodromes.

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

FDIS	Report on voting
97/94/FDIS	97/95/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 2006. At this date, the publication will be

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- withdrawn;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

ELECTRICAL INSTALLATIONS FOR LIGHTING AND BEACONING OF AERODROMES – AGL SERIES TRANSFORMERS

1 Scope

This standard specifies the characteristics of aeronautical ground lighting series transformers (AGLST) used in aeronautical ground lighting for 6,6 A series circuits, at a service voltage of up to 5 kV, supplied by constant current regulators up to 30 kVA in rating.

AGL series transformers provide power to airport lighting luminaires or other loads (resistive) from their secondary circuits. The AGL series transformers provide continuity of the series circuit in the event of a loss of the load on the transformer, and electrical isolation between the primary circuit supplied by a constant current regulator, and the secondary circuit connected to the load under conditions defined in this standard.

An AGL series transformer is to be able to withstand a permanent short or open-circuit secondary series circuit.

Specifications for similar series transformers intended for any primary or secondary currents other than 6,6 A, or to supply alternative voltages, constant power, reactive loads, etc., are not included in this standard.

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 60085, *Thermal evaluation and classification of electrical insulation*

IEC 61822, *Electrical installations for lighting and beaconing of aerodromes – Constant current regulators*

ISO 48, *Rubber, vulcanised or thermoplastic – Determination of hardness (hardness between 10 IRHD and 100 IRHD)*

3 Definitions and abbreviated terms

3.1 Definitions

For the purposes of this standard the following definitions apply.

Where the terms voltage and current are used, they shall be r.m.s. values unless otherwise stated.

3.1.1

AGL series transformer

aeronautical ground lighting series transformer, as specified in this standard

3.1.2

ambient temperature

the temperature of the air or other medium surrounding the AGL series transformer; for testing purposes, a temperature of $(20 \pm 5) ^\circ\text{C}$

3.1.3**nominal power**

arbitrarily selected values of power used in this standard for convenience to refer to AGL series transformers with different characteristics

3.1.4**rated frequency**

the frequency or frequency range for which the AGL series transformer is designed to operate

3.1.5**rated power**

the range of powers for which each AGL series transformer is suitable.

NOTE The low and high values of these ranges are given in Table 1.

3.1.6**rated primary current**

the current at which the primary of the AGL series transformer is designed to operate

3.1.7**rated secondary current**

the current at which the secondary of the AGL series transformer is designed to operate

3.1.8**routine test**

test for the purpose of checking manufactured products for compliance with this standard

3.1.9**service voltage**

the maximum primary or secondary voltage at which the AGL series transformer is designed to operate

3.1.10**type test**

a test to confirm that the product design and production processes are capable of providing products that meet the requirements of this standard

3.1.11**type test sample**

a sample consisting of one or more similar samples used for a type test

3.2 Abbreviated terms

AC1	Source of mains power
AC2	High voltage a.c. source
AGLST	AGL series transformer
DC1	Source of d.c. power
CCR	Constant current regulator as specified in IEC 61822
I_1, I_2	Primary and secondary currents respectively, as measured by ammeters or equivalent devices
U_1, U_2	Primary and secondary voltages respectively, as measured by voltmeters or equivalent devices
P_1, P_2	Active power measurements or calculations of respectively the primary and secondary circuits of an AGL series transformer

4 General requirements

4.1 Classification

There are seven types of AGL series transformers specified in this standard, defined by their nominal power, namely 30 W, 45 W, 65 W, 100 W, 150 W, 200 W and 300 W. See Table 1 for the required characteristics.

4.2 Rated current

The rated primary and secondary currents shall be 6,6 A.

4.3 Earthing

AGL series transformers may be provided with or without an earthing connection.

4.4 AGL construction

The AGL series transformers shall have two electrically and physically separate windings, one primary and one secondary, wound on a magnetic core. The polarity of the windings shall be such that the primary plug corresponds to the large socket of the secondary receptacle.

All internal electrical connections shall be permanent, e.g. by compression high-pressure crimping, high-temperature soldering, welding, etc.

The shapes of the transformers are optional provided they meet all the requirements of this standard. Sharp edges shall be avoided.

The AGL series transformer including all connector leads shall be able to be inserted through the open end of a cylinder 20 cm in diameter by 25 cm long, and shall easily and totally fit inside such a cylinder.

The transformers shall be designed so that they may be installed and will perform to the requirements of this standard in any orientation.

The AGL series transformers shall be provided with two single-conductor primary leads and a two-conductor secondary lead.

4.4.1 Primary connection leads

The AGL series transformers shall be connected to the AGL primary series circuit cable by two insulated, multi-stranded, copper conductors, with at least a 6 mm² cross section, and a length measured from the transformer housing to the face of the connector of 60⁺¹⁰₀ cm. The service voltage for the leads shall be 5 kV. One lead shall have a style 2 male plug at its end. The other lead shall have a style 9 female receptacle at its end. Unless otherwise agreed between the manufacturer and supplier, the connectors shall be provided with disposable shipping caps.

4.4.2 Secondary connection lead

The secondary lead shall consist of two insulated, multi-stranded, copper conductors with an overall jacket, each core of minimum cross section 2,5 mm², minimum service voltage 600 V, and a length measured from the transformer housing to the face of the connector of 120⁺¹⁰₀ cm. The lead shall have a type 2, class A, style 7 or style 8 female receptacle at its end. Unless otherwise agreed between the manufacturer and supplier, the connector shall be provided with a disposable shipping cap.

4.5 Encapsulation

The AGL series transformer body, the connectors and the connection lead's sheaths, shall be made of compatible materials. The case shall be composed of material formed directly on the core and coil assembly, or by compound filling a container. The transformer shall be permanently encapsulated without cracks, holes, or internal voids as far as practical. The encapsulation of the transformer must form a watertight casing, and must bond with its connection leads so as to provide a completely waterproof assembly.

The encapsulation material shall have a durometer hardness IRHD (Shore A) of not less than 55 as measured in accordance with the test method of ISO 48.

The minimum thickness of the encapsulation over the internal components shall be 6,5 mm at all points of the surface, for any type of encapsulant.

The encapsulation materials shall be capable of withstanding acid and alkaline soils, as well as limited exposure to chemicals typically present on the aerodrome, including but not limited to oil, gasoline, and de-icing fluids. The encapsulating materials must resist limited UV exposure. These characteristics may be confirmed by testing material samples (only). The characteristics may be confirmed by tests sponsored by the transformer manufacturer, or by test results supplied by the materials manufacturer. These results may be applied to all AGL series transformers using the encapsulation material. If a transformer manufacturer uses more than one material for encapsulation, each such material shall meet these requirements.

4.6 Earthing

The magnetic core shall not be connected to earth or to either of the primary or secondary electrical circuits.

AGL series transformers may be provided with or without an earthing connection. If an earthing connection is provided, it shall be connected to that side of the secondary winding of the transformer which is connected to the larger socket of the secondary connector. The earthing connection must have a water barrier within the transformer body.

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4.7 Service conditions

The ambient temperature range shall be –40 °C to +55 °C.

AGL series transformers shall be suitable for continuous outdoor service when installed within enclosures or by direct earth burial.

AGL series transformers shall be capable of operation when completely submerged in water for the life of the transformer.

4.8 Electrical characteristics

4.8.1 Secondary current

With the primary current I_1 at 6,6 A, the secondary current I_2 shall be within ± 1 % of the primary current in the range between the low and high load in ohms given in Table 1.

4.8.2 Power factor

With the primary current I_1 at 6,6 A, and the nominal load in ohms (see Table 1) connected to the secondary, the power factor shall be not less than 95 %.