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**GASR  
WORKING GROUP**

**GAR  
Subpart K – Equipment and installations**

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**SECTION 1**  
**SUBPART K – EQUIPMENT AND INSTALLATIONS**

**GAR 1.K001. Electrical power supply systems for air navigation facilities**

(a) Adequate power supply shall be available at aerodromes for the safe functioning of air navigation facilities.

(b) An alternate power supply shall be provided at a runway intended to be used at night.

(c) The design and provision of electrical power systems for aerodrome visual and radio navigation aids shall be such that an equipment failure will not leave the pilot with inadequate visual and/or non-visual guidance or misleading information.

(d) Where a runway forming part of a standard taxi route is provided with runway lighting and taxiway lighting, the power supply systems shall be interlocked to preclude the possibility of simultaneous operation of both forms of lighting.

(e) There shall be provided an alternative power supply, capable of supplying the power requirements of at least following aerodrome facilities:

- (1) The signalling lamp and the minimum lighting necessary to enable air traffic services personnel to carry out their duties;
- (2) All obstacle lights, which, in the opinion of the appropriate authority, are essential to ensure the safe operation of aircraft;
- (3) Approach, runway and taxiway lighting;
- (4) Meteorological equipment;
- (5) Essential equipment and facilities for the aerodrome responding emergency agencies; and
- (6) Floodlighting on a designated isolated aircraft parking position.

(f) Electric power supply connections to those facilities for which alternative power is required shall be so arranged that the facilities are automatically connected to the alternative power supply on failure of the normal source of power.

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(g) The time interval between failure of the normal source of power and the complete restoration of the services shall not exceed the requirements in Table GAR 1.K001

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(h) An alternative power supply for the appropriate category of precision approach runway shall be provided.  
Electric power supply connections to those facilities, for which alternative power is required, shall be so arranged that the facilities are automatically connected to the alternative power supply on failure of the normal source of power.

(i) An alternative power supply shall be provided for a runway meant for take-off in runway visual range conditions less than a value of 800 m.

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I think this should go into section 2, as the requirement is not a part of "the safe operation of aircrafts"

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Table GAR 1.K001

<b>Alternative <u>power supply requirements</u></b>		
<b><u>Runway</u></b>	<b><u>Lighting aids requiring power</u></b>	<b><u>Maximum switch-over time</u></b>
<u>Non-instrument</u>	<u>Visual approach slope indicators<sup>a</sup></u>	1 minute
	<u>Runway edge<sup>b</sup></u>	1 minute
	<u>Runway threshold<sup>b</sup></u>	1 minute
	<u>Runway end<sup>b</sup></u>	1 minute
	<u>Obstacle<sup>a</sup></u>	1 minute
<u>Non-precision approach</u>	<u>Approach lighting system</u>	15 seconds
	<u>Visual approach slope indicators<sup>a,d</sup></u>	15 seconds
	<u>Runway edge<sup>d</sup></u>	15 seconds
	<u>Runway threshold<sup>d</sup></u>	15 seconds
	<u>Runway end</u>	15 seconds
	<u>Obstacle<sup>a</sup></u>	15 seconds
<u>Precision approach category I</u>	<u>Approach lighting system</u>	15 seconds
	<u>Runway edge<sup>d</sup></u>	15 seconds
	<u>Visual approach slope indicators<sup>a,d</sup></u>	15 seconds
	<u>Runway threshold<sup>d</sup></u>	15 seconds
	<u>Runway end</u>	15 seconds
	<u>Essential taxiway<sup>a</sup></u>	15 seconds
	<u>Obstacle<sup>a</sup></u>	15 seconds
<u>Precision approach category II/III</u>	<u>Inner 300 m of the approach lighting system</u>	1 second
	<u>Other parts of the approach lighting system</u>	15 seconds
	<u>Obstacle<sup>a</sup>:</u>	15 seconds
	<u>Runway edge</u>	15 seconds
	<u>Runway threshold</u>	1 second
	<u>Runway end</u>	1 second
	<u>Runway center line</u>	1 second
	<u>Runway touchdown zone</u>	1 second
	<u>All stop bars</u>	1 second
	<u>Essential taxiway</u>	15 seconds
	<u>Runway meant for take-off in runway visual range conditions less than a value of 800 m</u>	<u>Runway edge</u>
<u>Runway end</u>		1 second
<u>Runway center line</u>		1 second
<u>All stop bars</u>		1 second
<u>Essential taxiway<sup>a</sup></u>		15 seconds
<u>Obstacle<sup>a</sup></u>		15 seconds

a. Supplied with secondary power when their operation is essential to the safety of flight operations.

b. See GAR 1.001(d) regarding the use of emergency lighting.

c. One second where no runway center line lights are provided.

d. One second where approaches are over hazardous or precipitous terrain.

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## GAR 1.K010 Design of the electrical systems

For a runway meant for use in runway visual range conditions less than a value of 550 m, the electrical systems for the power supply, lighting and control of the lighting systems shall be so designed that an equipment failure will not leave the pilot with inadequate visual guidance or give misleading information.

## GAR 1.K015 Monitoring

(a) A system of monitoring visual aids shall be employed to ensure lighting system reliability.

(b) Where lighting systems are used for aircraft control purposes, such systems shall be monitored automatically so as to provide an immediate indication of any fault, which may affect the control functions. This information shall be automatically relayed to the air traffic service unit.

(c) For a runway meant for use in runway visual range conditions less than a value of 550 m, the lighting systems detailed in Table GAR 1.K001 shall be monitored so as to provide an immediate indication when the serviceability level of any element falls below the minimum serviceability level, as appropriate. This information shall be immediately relayed to the maintenance crew.

(d) For a runway meant for use in runway visual range conditions less than a value of 550 m, the lighting systems shall be monitored automatically to provide an immediate indication when the serviceability level of any element falls below the minimum level specified by the appropriate authority below which operations shall not continue. This information shall be automatically relayed

to the air traffic services unit and displayed in a prominent position.

(e) Where a change in the operational status of lights has occurred, an indication should be provided within two seconds for a stop bar at a runway holding position and within five seconds for all other types of visual aids.

## GAR 1.K020 Fencing

(a) A fence or other suitable barrier shall be provided on an aerodrome to prevent the entrance to the movement area of animals large enough to be a hazard to aircraft.

(b) A fence or other suitable barrier shall be provided on an aerodrome to deter the inadvertent or premeditated access of an unauthorized person onto a non-public area of the aerodrome.

(c) Where facilities provided for the navigation of aircraft are not located on the aerodrome, a suitable means of exclusion shall be provided to prevent the inadvertent entry to the facility.

(d) The fence or barrier shall be located so as to separate the movement area and the other facilities or zones on the aerodrome vital to the safe operation of aircraft from areas open to public access.

## GAR 1.K025 Siting of equipment and installations on operational areas

(a) Unless its function requires it to be there for air navigation purposes, no equipment or installation shall be:

(1) On a runway strip, a runway end safety area, a taxiway strip, or within the distances specified in Table 1.F035 column 11.

(2) On a clearway if it would endanger an aircraft in the air.

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Other possible useful references:¶  
ICAO Doc 9157-AN/901, Part 5, Electrical Systems¶  
CAA CAP 168 Licensing of Aerodromes, Ch. 6, Sections 10 and 12¶  
ICAO Doc 9137-AN/898, Part 9, Airport Maintenance Practices, Ch.3

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(b) Any equipment or installation required for air navigation purposes which must be located:

- (1) On that portion of a runway strip within:
  - (i) 75 m of the runway center line where the code number is 3 or 4; or
  - (ii) 45 m of the runway center line where the code number is 1 or 2; or
- (2) On a runway end safety area, a taxiway strip or within the distances that would cause any danger to aircraft; or
- (3) On a clearway and which would endanger an aircraft in the air;  
Shall be frangible and mounted as low as possible.

(c) Any equipment or installation required for air navigation purposes which must be located on the non-graded portion of a runway strip, shall be regarded as an obstacle and shall be frangible and mounted as low as possible.

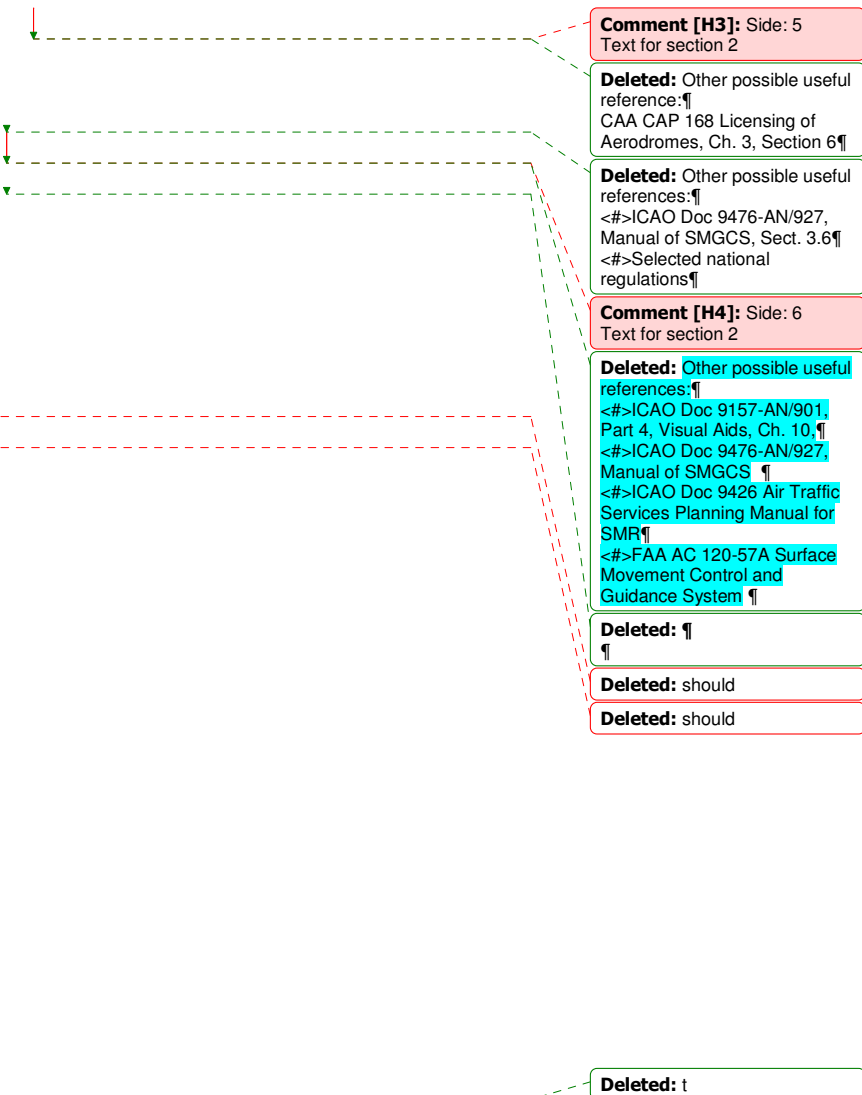
(d) Unless its function requires it to be there for air navigation purposes, no equipment or installation shall be located within 300 m from the end of the runway or stopway end and within:

- (1) 60 m of the extended center line where the code number is 3 or 4; or
- (2) 45 m of the extended center line where the code number is 1 or 2.

(e) Any equipment or installation required for air navigation purposes which must be located on or near a strip of a precision approach runway category I, II or III and which:

- (1) Is situated on that portion of the strip within 77.5 m of the runway center line where the code number is 4 and the code letter is F; or
- (2) Is situated within 300 m from the end of the runway or stopway end:
  - (i) 60 m of the extended runway centerline where the code number 3 or 4;
  - (ii) 45 m of the extended runway centerline where the code number is 1 or 2; or

(3) Penetrates the inner approach surface the inner transitional surface or the balked landing surface;  
Shall be frangible and mounted as low as possible.



## SECTION 2

### SUBPART K – EQUIPMENT AND INSTALLATIONS

#### GAR (IEM)1.K001

#### Electrical power supply systems for air navigation facilities

1 Safety of operations at aerodromes depends on the properly supplied electric power. The electrical power supply system may include connections to one or more external sources of electric power supply, one or more generating facilities and a distribution network including transformers and switchgear. The main aerodrome facility to be supplied with electric power is the aerodrome lighting system, navigation- and ANS-facilities essential for the safe operation of an aerodrome. Other aerodrome facilities supplied from the same system need to be taken into account.

Design and installation of the electrical systems need to take into consideration factors that can lead to malfunctions, such as electromagnetic disturbances, line losses, power quality, etc.

2 Minimum lighting requirement may be met by other than electrical means.

#### ACJ-GAR (IEM) 1.K010

#### Electrical systems sources of power

1 Aerodrome lighting and radio-navigation aids should be provided with alternative electrical power supply for the aids required as a minimum for operation. The circuits and facilities to be provided with alternative power supplies vary with type of flight operations.

2 An alternative power supply should be met by either of the following:

2.1 Independent public power, which is a source of power supplying the aerodrome

service from a substation other than the normal substation, through a transmission line following a route different from the normal power supply route, and such that the possibility of a simultaneous failure of the normal and independent public power supplies is extremely remote; or  
2.2 Alternate power unit(s), which are engine generators, batteries, etc. from which electric power can be obtained.

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IEM-AGA-1 2.200 . Electrical systems