WP 109
Version 7 June 2007

GASR
WORKING GROUP

GAR
Subpart H - Obstacle Marking and Lighting

SECTION 1

SUBPART H – OBSTACLE MARKING AND LIGHTING

GAR 1.H001 Objects to be marked and/or lighted
See ACJ-GAR (IEM) 1.H001

(a) Arrangements shall be made to enable the appropriate authority to be consulted concerning proposed construction within the horizontal limits of the obstacle limitation surfaces, in order to permit an aeronautical study of the effect of such construction on the operation of aeroplanes and take necessary measures.

(b) All obstacles penetrating the obstacle limitation surfaces of an aerodrome shall be marked and/or lighted unless such marking or lighting can be omitted when an aeronautical study shows that marking and/or lighting is not required from a safety view-point.

GAR 1.H005 Obstacles that extend above a take-off climb surface, an approach or transitional surface

A fixed object that extends above a take-off climb surface, the approach surface or the transitional surface shall be considered as an obstacle and marked and, if the runway is used at night, lighted, except that:

(a) such marking and lighting may be omitted when the obstacle is shielded by another fixed obstacle;
(b) the marking may be omitted when the obstacle is lighted by medium-intensity obstacle lights, Type A, by day and its height above the level of the surrounding ground does not exceed 150 m;
(c) the marking may be omitted when the obstacle is lighted by high-intensity obstacle lights by day; and
(d) the lighting may be omitted where the obstacle is a lighthouse and an aeronautical study indicates the lighthouse light to be sufficient.

GAR 1.H010 Obstacles that extend above a horizontal and conical surface

A fixed object above a horizontal and conical surface shall be considered as an obstacle and marked and, if the aerodrome is used at night, lighted except that:

(a) such marking and lighting may be omitted:
1) when the obstacle is shielded by another fixed obstacle; or
2) for a circuit extensively obstructed by immovable objects or terrain, when procedures have been established to ensure safe vertical clearance below prescribed flight paths; or
3) when an aeronautical study shows the obstacle not to be of operational significance;

(b) the marking may be omitted when the obstacle is lighted by medium-intensity obstacle lights, Type A, by day and its height above the level of the surrounding ground does not exceed 150 m;

(c) the marking may be omitted when the obstacle is lighted by high-intensity obstacle lights by day; and

(d) the lighting may be omitted where the obstacle is a lighthouse and an aeronautical study indicates the lighthouse light to be sufficient.

GAR 1.H015 Obstacles that extend above a protection surface

A fixed obstacle that extends above an obstacle protection surface shall be marked and, if the runway is used at night, lighted.

Comment [g1]: Stránka: 1
See Subpart J for the definition of a protection surface

Comment [g2]: Annex 14 - 6.1.5

GAR 1.H020 Other objects on or near aerodrome

See ACJ-GAR 1.H020 and GAR 1.G030 Limitations of other objects

(a) Other objects below the obstacle limitation surfaces limits or protection surfaces limits that could affect aerodrome operation safety, shall be considered as

obstacles and marked, and if the aerodrome is used at night, lighted.

(b) Supporting towers of overhead wires and cables considered as obstacles shall, whenever practicable, be marked, except that:

(1) such marking may be omitted when the obstacle is shielded by another fixed obstacle,
(2) obstacles that are sufficiently conspicuous by their shape, size or colour need not be otherwise marked,
(3) the marking may be omitted when the obstacle is lighted by high-intensity obstacle lights by day, or
(4) the marking may be omitted when there is an obstacle collision avoidance system installed.

(c) Overhead wires and cables considered as obstacles shall, whenever practicable, be marked, except that:

(1) such marking may be omitted when the obstacle is shielded by another fixed obstacle,
(2) marking may be omitted when the obstacle is shielded by adjacent wire or cable,
(3) high-intensity obstacle lights, are provided on their supporting towers, or
(4) the marking may be omitted when there is an obstacle collision avoidance system installed.

GAR 1.H025 Marking of obstacles

See ACJ-GAR 1.H025

(a) All fixed obstacles shall, whenever practicable, be coloured; if this is not practicable, markers or flags shall be displayed on or above them, except that objects that are sufficiently conspicuous by their shape, size or colour need not be otherwise marked.

(b) All mobile objects to be marked shall be coloured or display flags.

GAR 1.H030 Use of colours

(See Figure GAR 1.H030 (a), Figure GAR 1.H030 (b), Table GAR 1.H030 and ACJ-GAR 1.H030)

(a) The chromaticity factors of ordinary colours used for marking obstacles shall be within specifications given in Figure GAR 1.H030 (b) and the following boundaries determined under standard conditions:

Red
Purple boundary y = 0.345 – 0.051x
White boundary y = 0.910 – x
Orange boundary y = 0.314 + 0.047x
Luminance factor ß = 0.07 (mnm)

Orange
Red boundary y = 0.285 + 0.100x
White boundary y = 0.940 – x
Yellow boundary y = 0.250 + 0.220x
Luminance factor ß = 0.20 (mnm)

White
Purple boundary y = 0.010 + x
Blue boundary y = 0.610 – x
Green boundary y = 0.030 + x
Yellow boundary y = 0.710 – x
Luminance factor ß = 0.75 (mnm)

Black
Purple boundary y = x – 0.030
Blue boundary y = 0.570 – x
Green boundary y = 0.050 + x
Yellow boundary y = 0.740 – x
Luminance factor ß = 0.03 (max)

(b) An obstacle shall be coloured to show a chequered pattern if it has essentially unbroken surfaces and its projection on any vertical plane equals or exceeds 4.5 m in both dimensions. The pattern shall consist of rectangles of not less than 1.5 m and not more than 3 m on a side, the corners being of the darker colour. The colours of the pattern shall contrast each with the other and with the background against which they will be seen. Orange and white or alternatively red and white shall be used, except where such colours merge with the background.

(See Figure GAR 1.H030 (a))

(c) An obstacle shall be coloured to show alternating contrasting bands if:

(1) it has essentially unbroken surfaces and has one dimension, horizontal or vertical, greater than 1.5 m, and the other dimension, horizontal or vertical, greater than 4.5 m; or

(2) it is of skeletal type with either a vertical or a horizontal dimension greater than 1.5 m.

The bands shall be perpendicular to the longest dimension and have a width approximately 1/7 of the longest dimension or 30 m, whichever is less. The colours of the bands shall contrast with the background against which they will be seen. Orange and white or alternatively red and white shall be used, except where such colours are not conspicuous when viewed against the background. The bands on the extremities of the object shall be of the darker colour.

(See Table GAR 1.H030 and ACJ-GAR 1.H030 (c))

(d) Wind turbines, which are considered as obstacles, shall be marked. The pattern and/or colours of the pattern shall contrast with the background against which they will be seen.
(See ACJ-GAR 1.H030 (d))

(e) An obstacle shall be coloured in a single conspicuous colour if its projection on any vertical plane has both dimensions less than 1.5 m. Orange or red shall be used, except where such colours merge with the background.

GAR 1.H035 Use of markers

(a) Markers displayed on, or adjacent to, an obstacle shall be:

(1) located in conspicuous positions so as to retain the general definition of the object;

(2) and recognizable in clear weather from a distance of at least :

(i) 1 000 m for an object to be viewed from the air

(ii) and 300 m for an object to be viewed from the ground

in all directions in which an aircraft is likely to approach the object.

(b) The shape of markers shall be distinctive to the extent necessary to ensure that they are not mistaken for markers employed to convey other information.

(c) Markers shall be such that the hazard presented by the object they mark is not increased.

(d) A marker displayed on an overhead wire and/or cable shall be spherical and have a diameter of not less than 60 cm.

(e) The spacing between two consecutive markers or between a marker and a supporting tower shall be appropriate to the diameter of the marker, but in no case shall the spacing exceed:

(1) 30 m where the marker diameter is 60 cm progressively increasing with the diameter of the marker to

(2) 35 m where the marker diameter is 80 cm and further progressively increasing to a maximum of

(3) 40 m where the marker diameter is of at least 130 cm.

(f) Where multiple overhead wires and/or cables are involved, a marker shall be located not lower than the level of the highest wire at the point marked.

(g) A marker shall be of one colour. When installed, single white and red, or single white and orange markers shall be displayed alternately. The colour selected shall contrast with the background against which it will be seen.

GAR 1.H040 Use of flags

(a) Flags used to mark obstacle shall be displayed around, on top of, or around the highest edge of the object. When flags are used to mark extensive obstacle or groups of closely spaced obstacles, they shall be displayed at least every 15 m. Flags shall not increase the hazard presented by the object they mark.

(b) Flags used to mark fixed obstacles shall not be less than 0.6 m square and flags used to mark mobile objects, not less than 0.9 m square.

(c) Flags used to mark fixed obstacles shall be orange in colour or a combination of two triangular sections, one orange and the other white, or one red and the other white, except that where such colours merge with the background, other conspicuous colours shall be used.

(d) Flags used to mark mobile objects shall consist of a chequered pattern, each square having sides of not less than 0.3 m. The colours of the pattern shall contrast each with the other and with the background against which they will be seen. Orange and white or alternatively red and white shall be used, except where such colours merge with the background.

GAR 1.H045 Lighting of obstacles
See AMC GAR 1.H045

(a) The presence of obstacles, which must be lighted, shall be indicated by low-, medium- or high-intensity obstacle lights, or a combination of such lights.

(b) The chromaticity of aeronautical ground lights shall be within specifications given in Figure GAR 1.H045 and the following boundaries:

Red
Purple boundary y = 0.980 – x
Yellow boundary y = 0.335

Yellow
Red boundary y = 0.382
White boundary y = 0.790 – 0.667x
Green boundary y = x – 0.120

White
Yellow boundary x = 0.500
Blue boundary x = 0.285
Green boundary y = 0.440
and y = 0.150 + 0.640x
Purple boundary y = 0.050 + 0.750x
and y = 0.382

Blue
Green boundary y = 0.805x + 0.065
White boundary y = 0.400 – x
Purple boundary x = 0.600y + 0.133

GAR 1.H050 Use of obstacle lights
See ACJ-GAR 1.H050

(a) Low-intensity obstacle lights, Type A or B, shall be used where the obstacle is a less extensive one and its height above the surrounding ground is less than 45 m.

(b) When an early special warning is required and the use of low-intensity obstacle lights, Type A or B, is inadequate, then medium or high-intensity obstacle lights shall be used.

(c) Low-intensity obstacle lights, Type C, shall be displayed on vehicles and other mobile objects excluding aircraft.

(d) Low-intensity obstacle lights, Type D, shall be displayed on follow-me vehicles.

(e) Low-intensity obstacle lights, Type B, shall be used either alone or when the obstacle height above the level of the surrounding ground is greater than 45, the lights shall be in combination with medium-intensity obstacle lights, Type B in accordance with (f).

(f) Medium-intensity obstacle lights, Type A, B or C, shall be used when the obstacle is an extensive one or its height above the level of the surrounding ground is greater than 45 m. Medium-intensity obstacle lights, Types A and C, shall be used alone, whereas medium intensity obstacle lights, Type B, shall be used

either alone or in combination with low-intensity obstacle lights, Type B.

(g) High-intensity obstacle lights, Type A, shall be used to indicate the presence of an obstacle if its height above the level of the surrounding ground exceeds 150 m and an aeronautical study indicates such lights to be essential for the recognition of the obstacle by day.

(h) High-intensity obstacle lights, Type B, shall be used to indicate the presence of a tower supporting overhead wires and/or cables when:

(1) an aeronautical study indicates such lights to be essential for the recognition of the presence of wires and/or cables or
(2) it has not been found practicable to install markers on the wires and/or cables.

(i) Where aeronautical study indicates that the use of high-intensity obstacle lights, Type A or B, or medium-intensity obstacle lights, Type A, at night may dazzle pilots in the vicinity of an aerodrome (within approximately 10 000 m radius) or cause significant environmental concerns, a dual obstacle lighting system shall be provided. The system shall be composed of high-intensity obstacle lights, Type A or B, or medium intensity obstacle lights, Type A, as appropriate, for daytime and twilight use and medium-intensity obstacle lights, Type B or C, for night-time use.

GAR 1.H055 Location of obstacle lights
See Table GAR 1.H055, ACJ-GAR 1.H055 and Figure AMC 1.H030 (a))

(a) One or more low-, medium- or high-intensity obstacle lights shall be located as close as practicable to the fixed top of the obstacle. The top lights shall be so arranged as to at least indicate the highest points or edges of the obstacle in relation to the obstacle limitation surface.

(b) In the case of chimney or other structure of like function, the top lights shall be placed sufficiently below the top so as to minimize contamination by dust, smoke or condensation.

(See Figure AMC 1.H030 (a))

(c) In the case of a tower or antenna structure indicated by high-intensity obstacle lights by day with an appurtenance, such as a rod or an antenna, greater than 12 m where it is not practicable to locate a high-intensity obstacle light on the top of the appurtenance, such a light shall be located at the highest practicable point and, if practicable, a medium-intensity obstacle light, Type A, mounted on the top.

(d) In the case of an extensive obstacle or of a group of closely spaced obstacles, top lights shall be displayed at least on the points or edges of the obstacles highest in relation to the obstacle limitation surface, so as to indicate the general definition and the extent of the obstacles. If two or more edges are of the same height, the edge nearest the landing area shall be marked. Where low-intensity lights are used, they shall be spaced at longitudinal intervals not exceeding 45 m. Where medium-intensity lights are used, they shall be spaced at longitudinal intervals not exceeding 900 m.

(e) When the obstacle limitation surface concerned is sloping and the highest point above the obstacle limitation surface is not the highest point of the obstacle, additional obstacle lights shall be placed on the highest point of the obstacle.

(f) When an obstacle is indicated by medium-intensity obstacle lights, Type A, and the top of the obstacle is more than 105 m above the level of the surrounding ground or the elevation of tops of nearby buildings, additional lights shall be provided at intermediate levels. These additional intermediate lights shall be spaced as equally as practicable, between the top lights and ground level or the level of tops of nearby

buildings, as appropriate, with the spacing not exceeding 105 m.

(g) When an obstacle is indicated by medium-intensity obstacle lights, Type B, and the top of the obstacle is more than 45 m above the level of the surrounding ground or the elevation of tops of nearby buildings (when the obstacle to be marked is surrounded by buildings), additional lights shall be provided at intermediate levels. These additional intermediate lights shall be alternately low-intensity obstacle lights, Type B, and medium-intensity obstacle lights, Type B, and shall be spaced as equally as practicable between the top lights and ground level or the level of tops of nearby buildings, as appropriate, with the spacing not exceeding 52 m.

(h) When an obstacle is indicated by medium-intensity obstacle lights, Type C, and the top of the obstacle is more than 45 m above the level of the surrounding ground or the elevation of tops of nearby buildings (when the obstacle to be marked is surrounded by buildings), additional lights shall be provided at intermediate levels. These additional intermediate lights shall be spaced as equally as practicable, between the top lights and ground level or the level of tops of nearby buildings, as appropriate, with the spacing not exceeding 52 m.

(i) When high-intensity obstacle lights, Type A, are used, they shall be spaced at uniform intervals not exceeding 105 m between the ground level and the top light(s) specified in GAR 1.H055 (a), except where an obstacle to be marked is surrounded by buildings, the elevation of the tops of the buildings may be used as the equivalent of the ground level when determining the number of light levels.

See ACJ-GAR 1.H055 (i)

(j) Where high-intensity obstacle lights, Type B, are used, they shall be located at three levels:

(1) at the top of the tower;

(2) at the lowest level of the catenary of the wires or cables; and

(3) at approximately midway between these two levels.

(k) The installation setting angles for high-intensity obstacle lights, Types A and B, shall be in accordance with Table GAR 1.H055.

(See Table GAR 1.H055)

(l) The number and arrangement of low-, medium- or high-intensity obstacle lights at each level to be marked shall be such that the obstacle is indicated from every angle in azimuth. Where a light is shielded in any direction by another part of the obstacle, or by an adjacent object, additional lights shall be provided on that object in such a way as to retain the general definition of the object to be lighted. If the shielded light does not contribute to the definition of the obstacle, it may be omitted.

GAR 1.H060 Characteristics of low-intensity obstacle lights

(See Table GAR 1.H060)

(a) Low-intensity obstacle lights on fixed obstacles, Types A and B, shall be fixed-red lights.

(b) Low-intensity obstacle lights, Types A and B, shall be in accordance with the specifications in Table GAR 1.H060.

(c) Low-intensity obstacle lights, Type C, displayed on vehicles associated with emergency or security shall be flashing-blue and those displayed on other vehicles shall be flashing-yellow.

(d) Low-intensity obstacle lights, Type D, displayed on follow-me vehicles shall be flashing-yellow.

(e) Low-intensity obstacle lights, Types C and D, shall be in accordance with the specifications in Table GAR 1.H060.

(f) Low-intensity obstacle lights on objects with limited mobility such as aerobridges shall be fixed-red. The intensity of the lights shall be sufficient to ensure conspicuity considering the intensity of the adjacent lights and the general levels of illumination against which they would normally be viewed.

(g) Low-intensity obstacle lights on obstacles with limited mobility shall as a minimum be in accordance with the specifications for low-intensity obstacle lights, Type A, in Table GAR 1.H060.

GAR 1.H065 Characteristics of medium-intensity obstacle lights

(a) Medium-intensity obstacle lights, Type A, shall be flashing-white lights, Type B shall be flashing-red lights and Type C shall be fixed-red lights.

(b) Medium-intensity obstacle lights, Types A, B and C, shall be in accordance with the specifications in Table GAR 1.H060.

(c) Medium-intensity obstacle lights, Types A and B, located on an object shall flash simultaneously.

GAR 1.H070 Characteristics of high-intensity obstacle lights

(a) High-intensity obstacle lights, Types A and B, shall be flashing-white lights.

(b) High-intensity obstacle lights, Types A and B, shall be in accordance with the specifications in Table GAR 1.H060.

(c) High-intensity obstacle lights, Type A, located on an object shall flash simultaneously.

(d) High-intensity obstacle lights, Type B, indicating the presence of a tower supporting overhead wires and/or cables shall flash sequentially; first the middle light, second the top light and last, the bottom light. The intervals between flashes of the lights shall be in the following ratios:

Flash interval between	***Ratio of cycle time***
middle and top light	*1/13*
top and bottom light	*2/13*
bottom and middle light	*10/13*

Attachment 1 to Subpart H

Use of colours
See GAR 1.H030 Use of colours

Figure GAR 1.H030 (a) Basic marking patterns

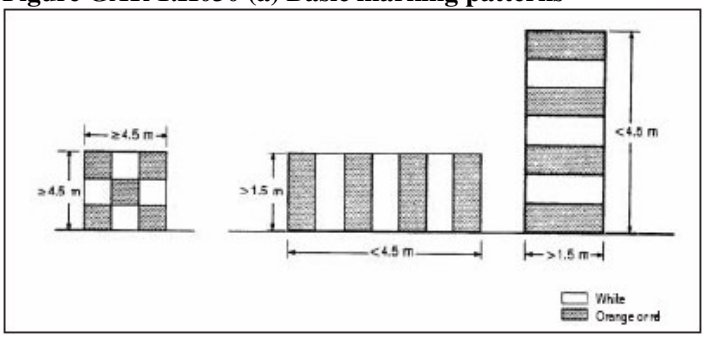


Table GAR 1.H030 Marking band widths

Longest dimension		
Greater than	Not exceeding	Band width
1.5 m	210 m	1/7 of longest dimension
210 m	270 m	1/9 " " "
270 m	330 m	1/11 " " "
330 m	390 m	1/13 " " "
390 m	450 m	1/15 " " "
450 m	510 m	1/17 " " "
510 m	570 m	1/19 " " "
570 m	630 m	1/21 " " "

Figure GAR 1.H030 (b) Ordinary colours for marking

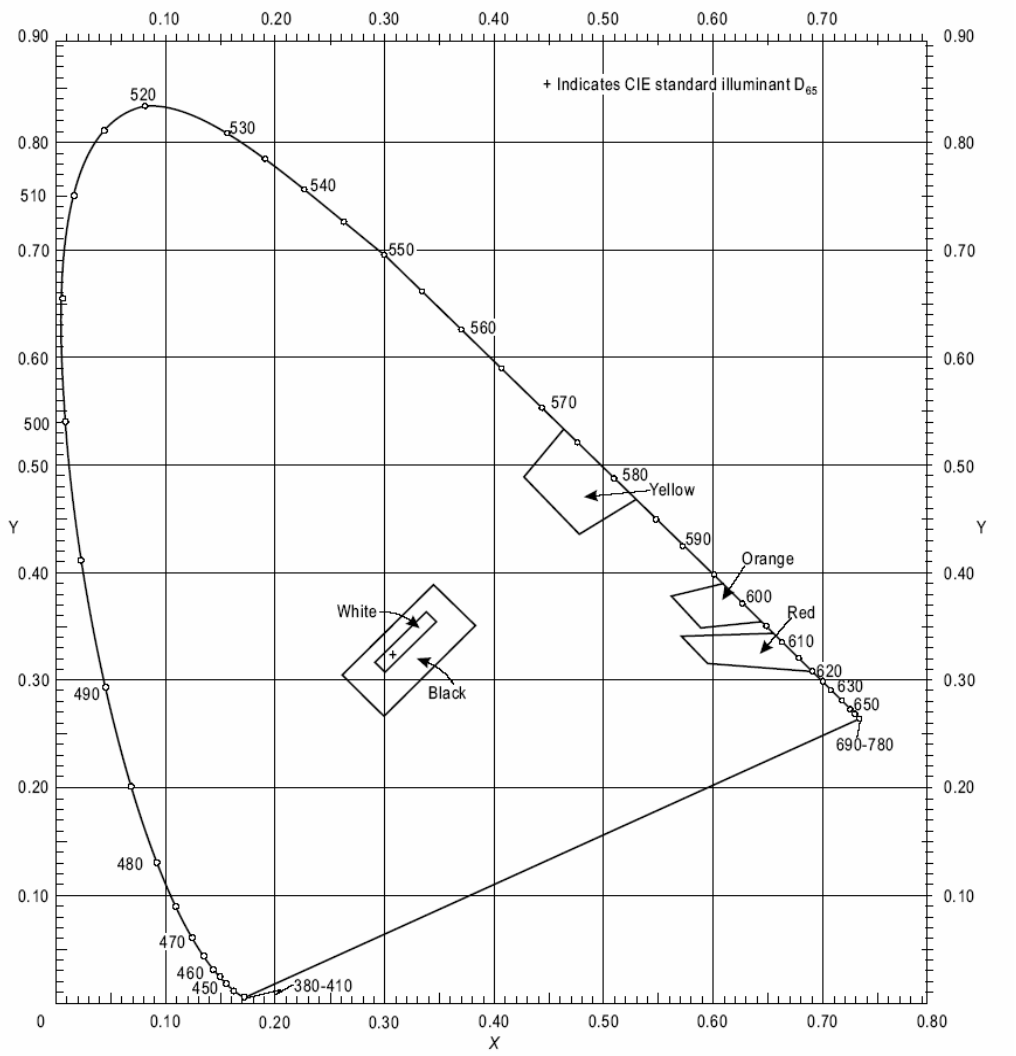


Table GAR 1.H055 Installation setting angles for high-intensity obstacle lights
(See GAR 1.H055 Location of obstacle lights)

Height of light unit above terrain	*Angle of the peak of the beam above the horizontal*
greater than 151 m AGL	0°
122 m to 151 m AGL	1°
92 m to 122 m AGL	2°
less than 92 m AGL	3°

Table GAR 1.H060 Characteristics of obstacle lights

(See GAR 1.H060, GAR 1.H065 and GAR 1.H070)

1	2	3	4	5	6	7	8	9	10	11	12
Light Type	Colour	Signal type/ (flash rate)	Peak intensity (cd) at given Background Luminance			Vertical Beam Spread (c)	Intensity (cd) at given Elevation Angles when the light unit is levelled (d)				
			Above 500 cd/m^2	50-500 cd/m^2	Below 50 cd/m^2		–10° (e)	–1° (f)	±0° (f)	+6°	+10°
Low-intensity, Type A (fixed obstacle)	Red	Fixed	N/A	10 mnm	10 mnm	10°	—	—	—	10 mnm (g)	10 mnm (g)
Low-intensity, Type B (fixed obstacle)	Red	Fixed	N/A	32 mnm	32 mnm	10°	—	—	—	32 mnm (g)	32 mnm (g)
Low-intensity, Type C (mobile obstacle)	Yellow/Blue (a)	Flashing (60-90 fpm)	N/A	40 mnm (b) 400 max	40 mnm (b) 400 max	12° (h)	—	—	—	—	—
Low-intensity, Type D Follow-me Vehicle	Yellow	Flashing (60-90 fpm)	N/A	200 mnm (b) 400 max	200 mnm (b) 400 max	12° (i)	—	—	—	—	—
Medium-intensity, Type A	White	Flashing (20-60 fpm)	20 000 (b) ± 25%	20 000 (b) ± 25%	2 000 (b) ± 25%	3° mnm	3% max	50% mnm 75% max	100% mnm	—	—
Medium-intensity, Type B	Red	Flashing (20-60 fpm)	N/A	N/A	2 000 (b) ± 25%	3° mnm	—	50% mnm 75% max	100% mnm	—	—
Medium-intensity, Type C	Red	Fixed	N/A	N/A	2 000 (b) ± 25%	3° mnm	—	50% mnm 75% max	100% mnm	—	—
High-intensity, Type A	White	Flashing (40-60 fpm)	200 000 (b) ± 25%	20 000 (b) ± 25%	2 000 (b) ± 25%	3°-7°	3% max	50% mnm 75% max	100% mnm	—	—
High-intensity, Type B	White	Flashing (40-60 fpm)	100 000 (b) ± 25%	20 000 (b) ± 25%	2 000 (b) ± 25%	3°-7°	3% max	50% mnm 75% max	100% mnm	—	—

Note.— This table does not include recommended horizontal beam spreads. 6.3.22 requires 360° coverage around an obstacle. Therefore, the number of lights needed to meet this requirement will depend on the horizontal beam spreads of each light as well as the shape of the obstacle. Thus, with narrower beam spreads, more lights will be required.

a) See 6.3.25

b) Effective intensity, as determined in accordance with the *Aerodrome Design Manual*, Part 4.

c) Beam spread is defined as the angle between two directions in a plane for which the intensity is equal to 50% of the lower tolerance value of the intensity shown in columns 4, 5 and 6. The beam pattern is not necessarily symmetrical about the elevation angle at which the peak intensity occurs.

d) Elevation (vertical) angles are referenced to the horizontal.

e) Intensity at any specified horizontal radial as a percentage of the actual peak intensity at the same radial when operated at each of the intensities shown in columns 4, 5 and 6.

f) Intensity at any specified horizontal radial as a percentage of the lower tolerance value of the intensity shown in columns 4, 5 and 6.

g) In addition to specified values, lights shall have sufficient intensity to ensure conspicuity at elevation angles between ± 0° and 50°.

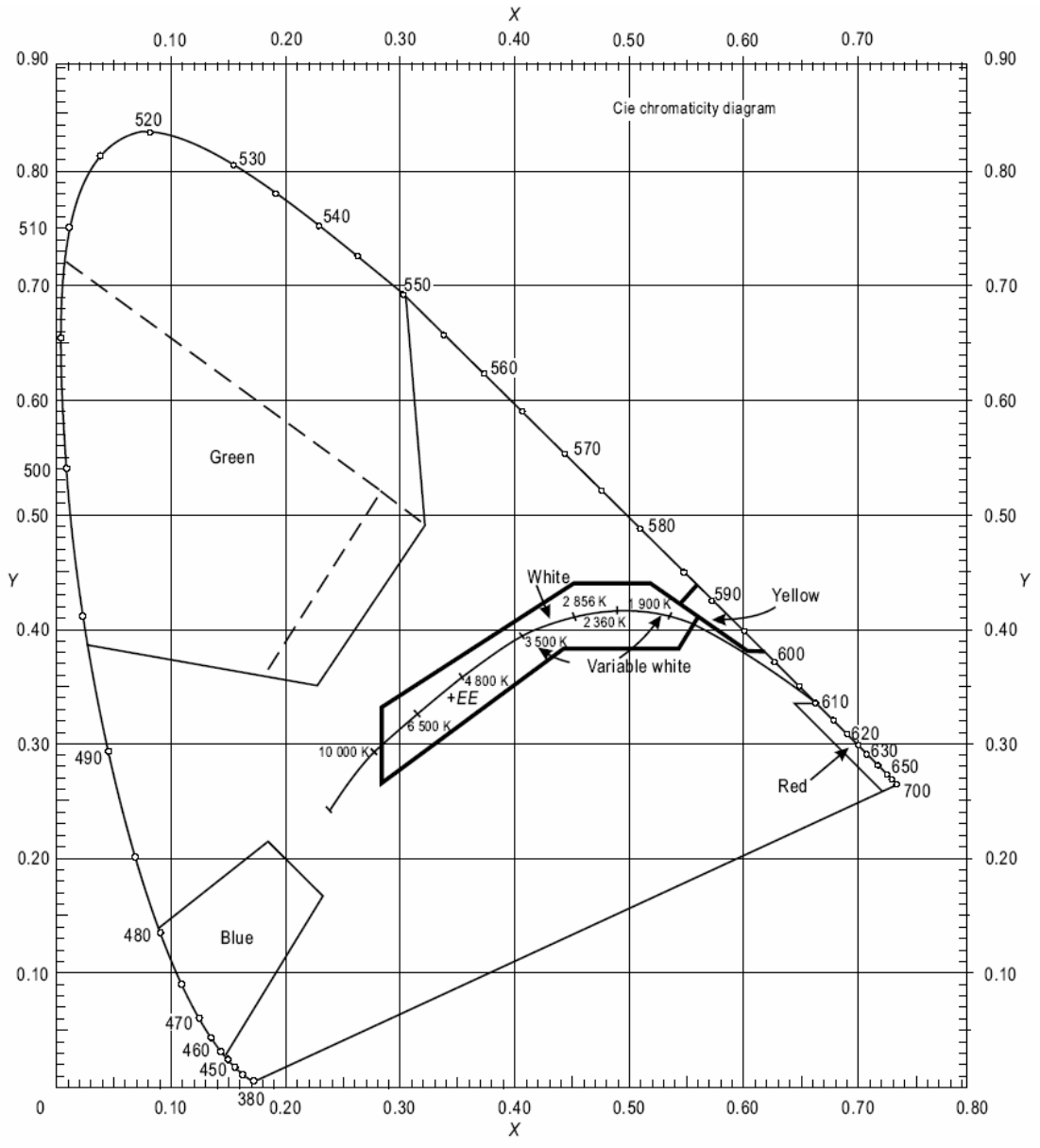
h) Peak intensity should be located at approximately 2.5° vertical.

i) Peak intensity should be located at approximately 17° vertical.

fpm — flashes per minute; N/A — not applicable

Comment [g3]: Change text in Table Annex 14 par. 6.3.22 to GAR 1.H070 (l) and par. Annex 14 6.3.25 to GAR 1.H060 (c)

Figure GAR 1.H045 Colours for aeronautical ground lights



SECTION 2

SUBPART H –OBSTACLE MARKING AND LIGHTING

ACJ-GAR (IEM) 1.H001, 1.H005, 1.H010 and1.H015
Purpose of marking and/or lighting obstacles
See GAR 1.H001, GAR 1.H005, GAR 1.H010 and GAR 1.H015

The marking and/or lighting of obstacles are intended to reduce hazards to aircraft by indicating the presence of the obstacles. It does not necessarily reduce operating limitations, which may be imposed by an obstacle.

ACJ-GAR (AMC) 1.H020
Other objects on or near aerodrome
See GAR 1.H020 Other objects on or near aerodrome

In certain circumstances, objects that do not project above any of the surfaces enumerated in Subpart G-may constitute a hazard to aeroplanes as, for example, where there are one or more isolated objects in the vicinity of an aerodrome.

1 Objects below take-off climb surface
A fixed object, other than an obstacle, adjacent to a take-off climb surface should be marked and, if the runway is used at night, lighted if such marking and lighting is considered necessary to ensure its avoidance, except in the following cases:

1.1 the marking may be omitted when the object is lighted by medium-intensity obstacle lights, Type A, by day and its height above the level of the surrounding ground does not exceed 150 m; or
1.2 the marking may be omitted when the object is lighted by high-intensity obstacle lights by day.

2 Vehicles and mobile objects
Vehicles and other mobile objects, excluding aircraft, on the movement area of an aerodrome are obstacles and should be marked and, if the vehicles and aerodrome are used at night or in conditions of low visibility, lighted, except that aircraft servicing equipment and vehicles used only on aprons may be exempt.

3 Elevated aeronautical ground lights
Elevated aeronautical ground lights within the movement area should be marked so as to be conspicuous by day. Obstacle lights should not be installed on elevated ground lights or signs in the movement area.

4 Obstacles near taxiways
All obstacles within the distance specified in the following table from the centre line of a taxiway, an apron taxiway or aircraft stand taxilane should be marked and, if the taxiway, apron taxiway or aircraft stand taxilane is used at night, lighted.

Code letter	Taxiway, other than aircraft stand taxilane, centre line to object (metres)	Aircraft stand taxilane centre line to object (metres)
A	**16,25**	**12**
B	**21,5**	**16,5**
C	**26**	**24,5**
D	**40,5**	**36**
E	**47,5**	**42,5**
F	**57,5**	**50,5**

ACJ-GAR (AMC) 1.H025
Obstacle that exceeds an overall height of 100 m above ground level
See GAR 1.H025 Marking of obstacles

Any temporary or permanent obstacle that exceeds an overall height of 100 m above ground level, wind turbines and all skeletal structures should preferably be lighted with medium intensity or high intensity lights.

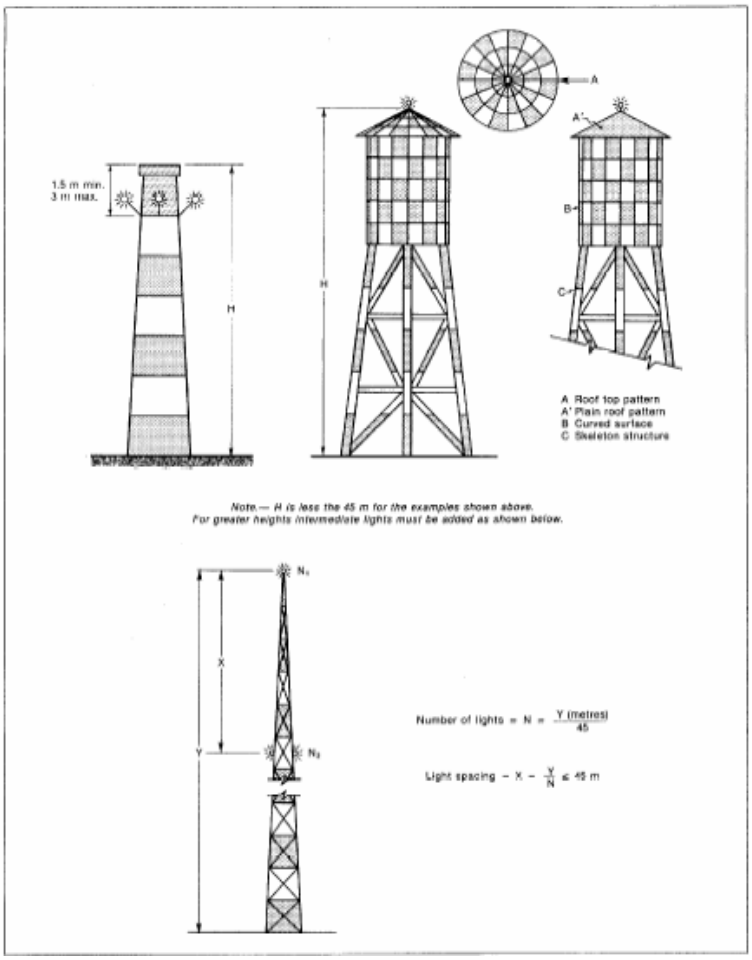
ACJ-GAR (AMC) 1.H030
Use of colours
See GAR 1.H030 Use of colours

1. Against some backgrounds, it may be found necessary to use a different colour from orange or red to obtain sufficient contrast.

2. When mobile objects are marked by colour, a single conspicuous colour, preferably red or yellowish green for emergency vehicles and yellow for service vehicles, should be used.

ACJ-GAR (AMC) 1.H030 (c)
Marking and lighting of tall obstacles
See GAR 1.H030 (c)

Figure AMC 1.H030 (a) Examples of marking and lighting of tall structures



Groups of bands on obstacles

Bands on the obstacles with the main vertical axes can create groups. Each group should have at least 5 bands with the total width not less than 20 m. Obstacle with the height of 120 m or less should be marked with one group of bands. Obstacle higher than 120 m but less than 180 m should be marked with 2 groups. Obstacles 180 m high or higher should have one group on each 60 m of the total height.

(See Figures AMC 1.H030 (b), (c) and (d))

Figure AMC 1.H030 (b)

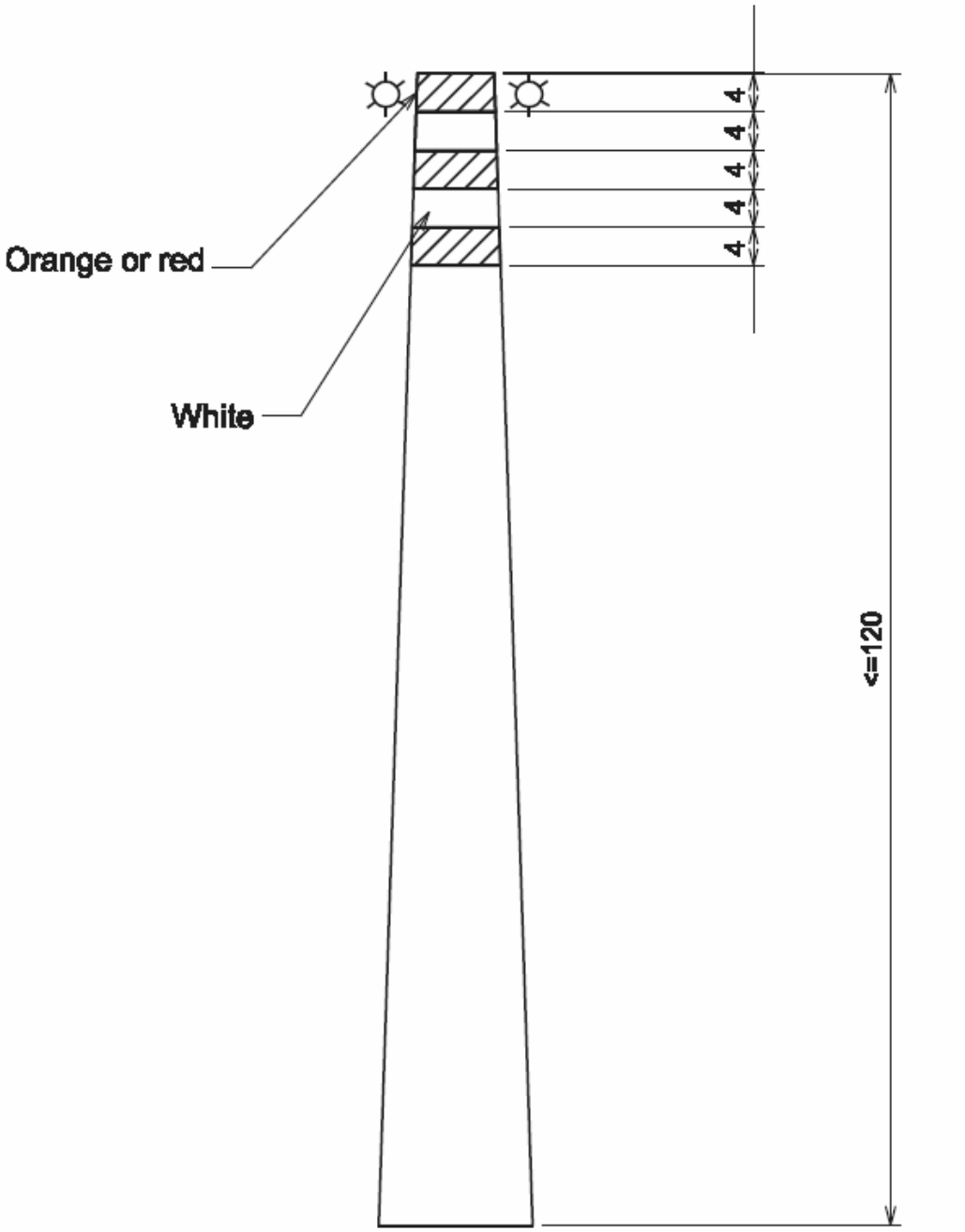


Figure AMC 1.H030 (c)

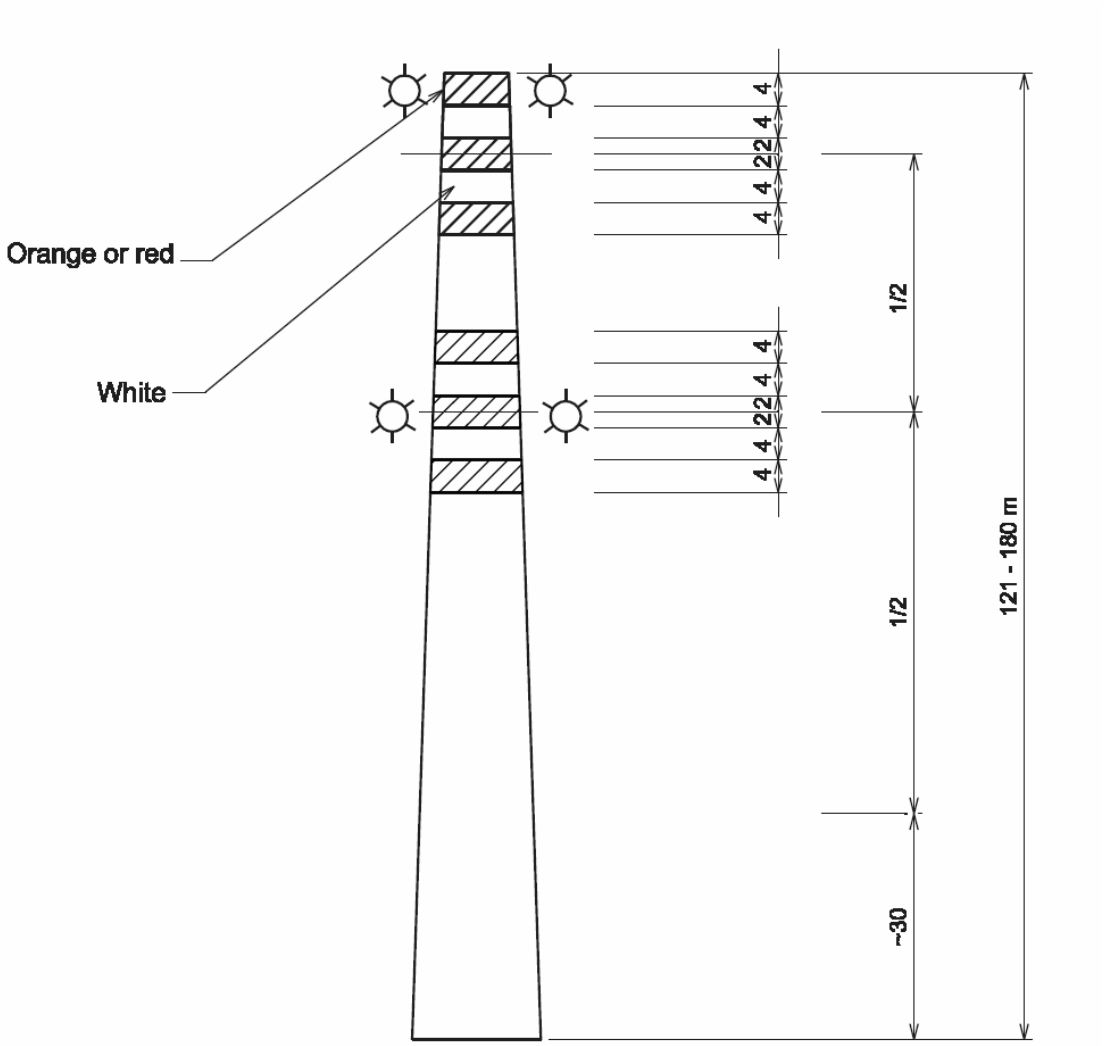
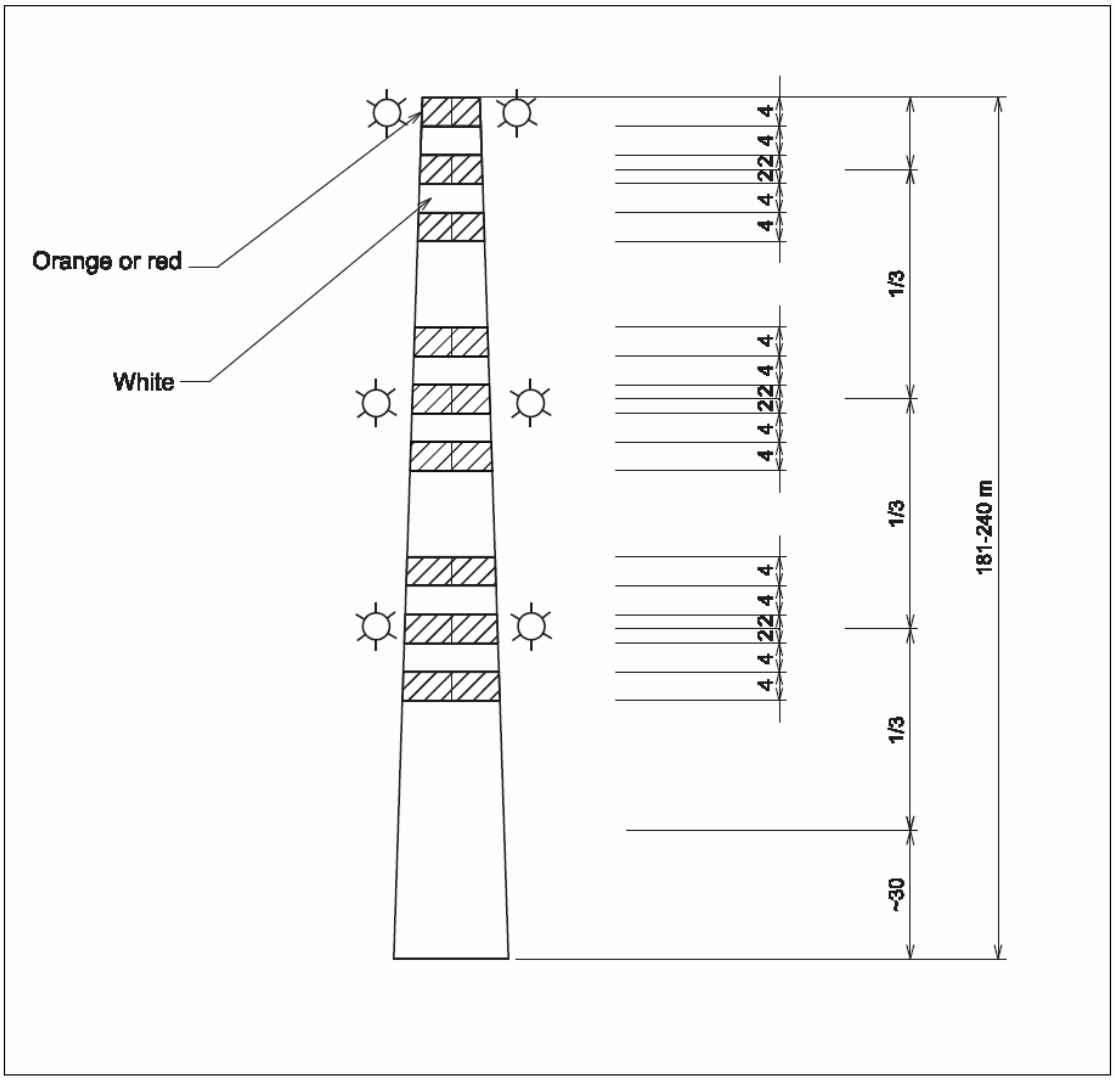


Figure AMC 1.H030 (d)



ACJ-GAR (AMC) 1.H030 (d)
Marking of wind turbines
See GAR 1.H030 (d)

Marking of wind turbines may vary from situation to situation. Final decision about pattern and used colours can be influenced by different factors such as:

- total height of wind turbine,
- location,
- colour of background,
- air operation in the area,
- number of wind turbines within wind farm and
- environmental restrictions.

ACJ-GAR (IEM) 1.H045
High intensity lights
See GAR 1.H045 Lighting of objects

High-intensity obstacle lights are intended for day use as well as night use. Care is needed to ensure that these lights do not create disconcerting dazzle. Guidance on the design, location and operation of high-intensity obstacle lights is given in the Aerodrome Design Manual, Part 4.

ACJ-GAR (IEM) 1.H050
Extensive obstacle
See GAR 1.H050 Use of obstacle lights

A group of trees or buildings is regarded as an extensive obstacle.

ACJ-GAR (IEM) 1.055
Combination of low, medium and/or high intensity lights
See GAR 1.H055 Location of obstacle lights

Recommendations on how a combination of low-, medium-, and/or high-intensity lights on obstacles should be displayed are given in Appendix 6 of ICAO Annex 14.

ACJ-GAR (IEM) 1.055 (i)
Combination of low, medium and/or high intensity lights
See GAR 1.H055 (i) Location of obstacle lights

The elevation of the tops of the buildings may be used as the equivalent of the ground level when determining the number of light levels.