NATO OTAN

NATO STANDARDIZATION AGENCY
AGENCE OTAN DE NORMALISATION

NSA

6 June 2013 NSA/0771(2013)ATM/3534

ATMC ATM-CNS Gp

STANAG 3534 (EDITION 7) – AIRFIELD LIGHTING, MARKING AND TONE DOWN SYSTEMS FOR NON-PERMANENT / DEPLOYED OPERATIONS

Reference:

NSA(AIR)1190(2008)AMLI/3534dated 17 November 2008

1. The enclosed NATO Standardization Agreement, which has been ratified by nations as reflected in the NATO Standardization Document Database (NSDD), is promulgated herewith.

2. The reference listed above is to be destroyed in accordance with local document destruction procedures.

ACTION BY NATIONAL STAFFS

3. The ATMC ATM-CNS Gp, considers this an editorial edition of the STANAG, previous ratification and implementation details are deemed to be valid

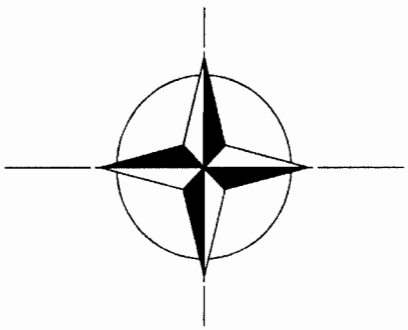
Dr. Cihangir AKSIT, TUR Civ.
Director, NATO Standardization Agency

Enclosure:
STANAG 3534 (Edition 7)

NATO Standardization Agency – Agence OTAN de normalisation
B-1110 Brussels, Belgium Internet site: http://nsa.nato.int
E-mail: nsa@nsa.nato.int – Tel 32.2.707.5556 – Fax 32.2.707.5718

STANAG 3534
(Edition 7)

NORTH ATLANTIC TREATY ORGANIZATION
(NATO)



NATO STANDARDIZATION AGENCY
(NSA)

STANDARDIZATION AGREEMENT
(STANAG)

SUBJECT: AIRFIELD LIGHTING, MARKING AND TONE DOWN SYSTEMS FOR NON-PERMANENT / DEPLOYED OPERATIONS

Promulgated on 6 June 2013

Dr. Cihangir AKSIT, TUR Civ.
Director, NATO Standardization Agency

RECORD OF AMENDMENTS

No.	Reference/date of Amendment	Date entered	Signature

EXPLANATORY NOTES

AGREEMENT

1. This NATO Standardization Agreement (STANAG) is promulgated by the Director NATO Standardization Agency under the authority vested in him by the NATO Standardization Organisation Charter.

2. No departure may be made from the agreement without informing the tasking authority in the form of a reservation. Nations may propose changes at any time to the tasking authority where they will be processed in the same manner as the original agreement.

3. Ratifying nations have agreed that national orders, manuals and instructions implementing this STANAG will include a reference to the STANAG number for purposes of identification.

RATIFICATION, IMPLEMENTATION AND RESERVATIONS

4. Ratification, implementation and reservation details are available on request or through the NSA websites (internet http://nsa.nato.int; NATO Secure WAN http://nsa.hq.nato.int).

RESTRICTIONS TO REPRODUCTION

FEEDBACK

6. Any comments concerning this publication should be directed to NATO/NSA – Bvd Leopold III - 1110 Brussels - BEL.

STANAG 3534
(Edition 7)

STANAG 3534
(Edition 6)

NATO STANDARDIZATION AGREEMENT (STANAG)

AIRFIELD LIGHTING, MARKING AND TONE DOWN SYSTEMS FOR NON-PERMANENT / DEPLOYED OPERATIONS

Annexes:

A. Photometric Characteristics (Omni-directional Lights)
B. Photometric Characteristics (Uni & Bi-directional Lights)
C. Abbreviated Precision Approach Path Indicator System (APAPI)
D. Layout Type 1 System
E. Layout Type 2 System
F. Layout Type 3 System
G. Runway / Landing Strip Marking (Day)
H. Taxiway Marking (Day)
I. Runway and Taxiway Markings
J. Threshold Markings (Runway 45.0M width)
K. Threshold Markings (Runway 30.0M width)
L. Displaced Threshold Markings (Runway 45.0M width)
M. Displaced Threshold Markings (Runway 30.0M width)
N. Taxiway Centreline Curves
O. Summary of Portable Airfield Lighting Types
P. List of Terms used in Aeronautical Ground Lighting

Related Documents:

STANAG 3316	Airfield Lighting
STANAG 2929	Airfield Damage Repair (ADR)
STANAG 3346	AS Marking and Lighting of Airfield Obstructions.
STANAG 3601	TN Criteria for Selection and Marking of Landing Zones for Fixed Wing Transport Aircraft.
STANAG 3158	AS Day Marking of Airfield Lighting and Taxiways.
STANAG 3619	AS Helipad Marking and Lighting.
STANAG 7025	Air Traffic Management and Control of Minimum Operating Strips (MOS) Operations
AAP - 6	NATO Glossary of Terms and Definitions (English and French)
ICAO – Annex 14	Volume I - Aerodrome Design and Operations (Fifth Edition, July 2009)

Related ASCC AIR STDs/ADV PUBs/INFO PUBs.

90/14, 90/20A/90/22, 90/27, and 90/28 (Latest Edition).

AIM

1. To standardise airfield portable lighting, marking and tone-down systems at military airfields and airstrips used by NATO aircraft where permanent arrangements are not available.

AGREEMENT

2. This agreement constitutes a declaration to conform to the provisions expressed herein:

a. No departure will be made by any participant without prior consultation with the other nations, except that if unavoidable circumstances make it essential for any nation to take immediate action without prior consultation, the other NATO nations will be informed as soon as possible.

b. Participating nations accept the standard colours according to the recommendations in ICAO publication, Annex 14, Volume I, Fifth Edition, July 2009.

DEFINITIONS

3. For the purposes of this agreement the definitions given in ICAO Annex 14 Volume 1 are applicable with additional terms as shown in Annex P.

STANDARDS AND RECOMMENDED PRACTICES

4. The requirements for aeronautical ground lighting (AGL) shall be in compliance with the standards and recommended practices of the International Civil Aviation Organisation (ICAO), except as otherwise indicated. These standards and practices are stated in ICAO Annex 14 Fifth Edition – July 2009.

OUTLINE

5. This agreement is divided into three parts as follows:

a. Part A. – Airfield Portable Lighting.

b. Part B – Airfield Portable marking.

c. Part C – Airfield Marking Tone-Down

PART A - AIRFIELD PORTABLE LIGHTING

GENERAL

6. For the purpose of this STANAG, airfield portable lighting is lighting intended for use where it is not operationally practical to provide a permanent installation.

7. The performance of airfield portable lighting is generally inferior to that achieved by the permanent installations detailed in STANAG 3316. The reasons for this are attributable to the need to limit the size and weight of fittings, the limited power available and the requirements of easy and rapid installation under tactical conditions. The general effect of these limitations is to raise operating minima.

8. The equipment shall be capable of being quickly and easily installed and aligned by a small number of trained personnel. It shall also be capable of being removed and re-installed elsewhere. All equipment shall comply with the appropriate military environmental specifications. It shall be lightweight but able to withstand repeated handling and transportation. Complete systems shall be easily transportable by air and military vehicle. The heaviest component shall be capable of being manhandled.

CONCEPTS OF OPERATIONS

9. Circumstances. There are 2 general circumstances where airfield portable lighting is required:

a. On runways, taxiways, and other manoeuvring areas where lighting installations conforming to STANAG 3316 have been damaged.

b. On temporary airfields, reserve airfields, minimum operating strips and other tactical facilities, where there is a requirement to provide lighting aids at short notice or where the infrequency of use does not justify a fixed installation.

COMMONALITY

10. Although portable lighting does not match the highest standards of performance that can be achieved with fixed installations, the permanent and portable systems shall have as much commonality as possible in such aspects as pattern and colour of lighting signals.

OPERATING CRITERIA FOR MINIMUM STRIPS

11.

SYSTEM TYPE	** VISUAL CONDITIONS*	** CALCULATED LIGHT ACQUISITION TIME RANGE*	*OPTIMUM INSTALLATION TIME*	*TYPICAL OPERATIONAL PERIOD*
1	*NIGHT MET VIS>7KM*	*2.2 KM*	*20 MIN*	*8 HRS*
2A (VISUAL APP)	*NIGHT MET VIS>3.7KM*	*2.1 KM(RWY) 4.4 KM (APP)*	*60 MIN*	*8 HRS*
2B (INSTRUMENT APP)	*NIGHT MET VIS>0.8KM*	*0.6 KM(RWY) 1.0 KM (APP)*	*60 MIN*	*8 HRS*
3	*DAY/NIGHT MET VIS>0.4KM*	*0.5 KM*	*8 HRS*	*CONTINUOUS*

* Data provided for guidance only. Operating minima to be established by Operational Field Commander.

NOTES:

The calculated light acquisition ranges is computed at the lowest met visibility given for the system. The visible distance given is from the first light seen in the approach and does not account for any visible segment requirements for system identification or approach alignment purposes.

The decision height/decision altitude to be used with each type of lighting is an operational decision.

Under certain circumstances a Type 2 system may be used in daylight conditions provided the runway is marked in accordance with ANNEX G.

During daytime when the runway is marked in accordance with Part B of this STANAG the visual guidance may be enhanced by using an Abbreviated Precision Approach Path Indicator (APAPI) at full intensity and with Type 2 D approach lights deployed in accordance with the Type 2 system layout.

Installation times are measured from when the operating authority permits entry into a prepared area. Installation times include the time required for the installation of any control systems, which may be necessary.

All systems shall possess an instantaneous blackout capability.

Where runway widths exceed 30 metres the use of a Type 3 system is recommended.

12. The requirements of paragraph 11 shall be met by the following 4 types of light fitting together with a high intensity glideslope indicator, where applicable.

LIGHT	*BEAMSPREAD*	*INTENSITY (CANDELA)*	*LOCATION*
A	*OMNIDIRECTIONAL*	*15*	*RUNWAY EDGE*
B	*OMNIDIRECTIONAL*	*50*	*RUNWAY EDGE*
C	*OMNIDIRECTIONAL*	*250*	*APPROACH*
D	*UNI-BIDIRECTIONAL*	*5000*	*RUNWAY EDGE, AND APPROACH*

13. The photometric characteristics of the light fittings shall be similar to those shown in Annexes A and B.

NOTES:

If area sources such as fluorescent tubes or electroluminescent panels are used without lenses or reflectors for Type A (or possible Type B) systems the equivalent intensity is determined by the relationship I=LxA.

Where I = Intensity (cd)
L = Luminance of source (cd/rn2)
A = Area of source (m2)

Where a glideslope indicator system is required an APAPI system is sufficient - see Annex C.

Brilliancy control is required on the Type D lights and high intensity visual indicators (VGSI) for use at night when visibility conditions are better than 3.7 Km.

LIGHT SYSTEMS SPECIFICATIONS

14.

SYSTEM TYPE	***LIGHT TYPE***
1	***A. (RUNWAY EDGE)***
2	***B. (RUNWAY EDGE)*** ***C. (APPROACH)*** ***HIGH INTENSITY*** ***VGSI***
3	***D. (RUNWAY EDGE, APPROACH)*** ***HIGH INTENSITY*** ***VGSI***

15. The light systems shall be deployed as shown in Annexes D, E and F. The layouts illustrated are the minimum patterns to meet the operating criteria. They may be supplemented to meet operational needs, but the basic patterns and coding shall be maintained.

TAXIWAYS

16. When a taxiway is to be delineated, light types A or B emitting blue light shall be used. The interval between units shall not be greater than 60m (200 ft) with reduced spacing on curves.

NOTE: Where aircraft taxi lights can be used the taxiway may be delineated with retro-reflective markers (blue on the edges or green on the centreline).

OBSTRUCTIONS

17. Obstruction lights shall be red.

ILLUMINATED ARRESTER CABLE MARKERS

18. Portable illuminated arrester cable markers are for temporary deployment with aircraft arrester gear in association with Type 1 and Type 2 Airfield Portable Lighting. Reference should be made to STANAG 3316 for arrester cable marking in association with TYPE 3 Airfield Portable Lighting and Fixed Airfield Lighting.

19. The location of the markers shall be as follows:

a. Markers shall be placed on both sides of the runway in line with the cable and normally equidistant to the centreline of the runway

b. The distance of the markers from the edge of the useable runway shall not be less than 7.5m (25ft) or greater than half the delineated runway width.

c. Marker position adjustments outside the above criteria are permissible, when required, to avoid obscuration of or damage to markers by arrester equipment. Such adjustments must be consistently applied to both boards marking a given cable.

20. Marking

a. The marker shall be a circular annulus of yellow. The outer diameter of the annulus shall be 51cm (20 in) and the inner shall be 43.5 cm (17in).

b. The bottom of the annulus must be a minimum of 30cm (12in) above ground level when installed.

c. The luminance of the yellow surface of the annulus shall be uniform with a minimum average luminance of 60cd/m2

21. The markers Taxiway Marking Dimensions shall be made as light and as frangible as practicable and be designed to function for the fittings they are deployed with.

PART B - AIRFIELD PORTABLE MARKING

General

22. The standards for the day marking of runway and taxiway surfaces at permanent airfields are defined in STANAG 3158 but it may not be possible or operationally desirable to use any of these markings. The decision to use marking, including portable marking is left to the operational authority.

Operating Criteria

23. The markings specified in this STANAG are suitable for daytime operations down to a meteorological visibility of the order of 3.7 km. These markings may be supplemented under any weather conditions by the addition of portable lighting as defined in Part A of this STANAG.

Obstacle Clearances

24. When an airfield or landing strip is marked by portable or paint markings to delineate the manoeuvring surfaces, the areas immediately adjacent to the edges of the runways and taxiways are to be clear of all obstacles other than those deemed operationally essential.

Marking Requirements

25. Where it is decided that a requirement for airfield portable marking exists, the longitudinal and lateral limits of runways/strips, taxiing areas and aircraft dispersal areas shall be delineated. In some circumstances delineation will be achieved solely by the contrast between the manoeuvring area surfaces and surrounding terrain. In other cases a line of lights or other basic markers may be adequate.

26. Where airfield markers are necessary to ensure definition of the manoeuvring surfaces the following general principles are to apply:

a. Materials. Any material suitable for airfield marking may be used provided the markers are:

i. Easily transportable by air, or locally available.

ii. Frangible if they project above ground level.

iii. Conspicuous at operationally effective ranges.

iv. Capable of being secured in order to withstand jet efflux.

Note: Retro-reflective markers are particularly suitable when their use does not conflict with tone-down requirements.

b. Dimensions. Markers are not to project more than 45cm (18in) above ground level, preferably not more than 40 cm (16in).

c. Colour. The colour of markers is to contrast with the surrounding terrain.

d. Size.

i. Runway markers should present the pilot with a minimum rectangular viewing area 0.35 m2 (4 ft2).

ii. Taxiway markers should present the pilot with a minimum rectangular viewing area 0.03 m2 (0.3 ft2).

27. When markers are used the following layout is to be adopted:

a. Runway Marking (Mandatory).

i. Markers are to be placed opposite each other on both sides of the runway at intervals not exceeding 300m (1000 ft) (see Annex G)

ii. The distance of markers from the edge of the runway is not to exceed 4.5m (15 ft) (see Annex G). At minimum operating strips the markers shall be on the edge.

iii. The runway thresholds are to be marked by additional markers on either side of and at right angles to the runway as indicated in Annex G.

iv. The end of the runway is to be indicated by an additional marker on either side of and at right angles to the runway as indicated in Annex G.

b. Taxiway Marking (Mandatory).

i. Markers are placed opposite each other (except on curves) on both sides of the taxiway (see Annex H).

ii. The maximum longitudinal spacing is not to exceed 60m (200ft) on straights. The spacing is to be reduced on curves and is not to exceed 30m (100ft) (see Annex H).

iii. The holding position is to be indicated by double markers located on both sides of the taxiway and at least 30 metres (100ft) from the near edge of the runway.

c. Aircraft Dispersal Area (Permissive). Markers are to define the edges of dispersal areas where necessary. The distance between markers is not to exceed 60m (200ft) (see Annex H).

d. Helicopter Landing Areas (Mandatory). The limits of any area set aside exclusively for the use of helicopters are to be marked in accordance with the standards in STANAG 3619.

PART C - AIRFIELD MARKING TONE-DOWN

GENERAL

28. Airfield marking tone-down measures are to be accepted as an important contribution in order to complete the overall camouflage measures for an airfield. They should preferably be executed in peacetime to enable aircrews to become acquainted with the tone-down marking systems.

29. For flight safety reasons, marking tone-down may not be executed at some airfields. Airfield marking tone-down measures shall form part of national alerting plans.

RUNWAY MARKING

30. The main instrument-runway and subsidiary runways shall be marked as follows:

a. The runway markings shall be aviation surface white in accordance with ICAO colour standards.

b. Centreline Marking

i. The centreline markings shall consist of a broken line of longitudinal stripes of uniform length, uniformly spaced and extending along the whole length of the runway. The length of the stripes shall be 100 ft (30 m). The gap shall be 60 ft (18 m). The width shall be 6 inches (15 cm) (Figure I-1).

ii. Where the landing threshold is displaced from the end of the runway and the area on the approach side is used for ground movement of aircraft (paved overruns which have been prepared to full landing criteria), no centreline marking shall be applied in the area.

c. Runway Designation Marking

i. The threshold markings shall consist of longitudinal stripes symmetrically about the runway centreline (Figures J-1 and K-2).

ii. Where the landing threshold is displaced from the end of the runway and the area on the approach side is used for ground movement of aircraft, the displacement markings shall consist of four chevrons and a transverse bar (Figures L-3 and M-4).

d. Runway Numbering. No markings to number the runway shall be applied.

e. Touchdown Marking. No touchdown marking shall be applied.

f. Runway Sidestripe Markings. No sidestripe markings shall be applied.

g. Deceptive Surface. Deceptive surfaces as defined in STANAG 3158 shall not be marked.

h. Arresting Barrier Warning. The location of the net/pendant cable of an aircraft-arresting barrier shall not be marked on the paved surface but indicated by illuminated arrestor gear markers.

TAXIWAY MARKING

31. Regularly used taxiways shall be marked as outlined below:

a. General. The taxiway markings shall be aviation surface yellow in accordance with ICAO colour standards.

b. Centreline Marking. The centreline of taxiway surfaces shall only be marked in critical sections, such as turns and intersections. The centreline marking in these sections of the taxiways shall be a continuous stripe 6 inches (15 cm) in width. At intersections of taxiways and runways, or taxiways and other taxiways or ramps, the curve of the taxiway centreline marking must be located so that it will retain a clearance from the taxiway or runway edge of no less than one half the width of the taxiway as shown in Figure N-1. When, however, the centreline marking meets the threshold markings, the centreline marking shall be ended at a distance of 5 ft (1.5 m) from the threshold markings (Figure N-1).

c. Holding Position Marking. Holding position markings on taxiways shall be retained.

d. Deceptive Surfaces. Deceptive surfaces as defined in STANAG 3158 on the edge of taxiways shall not be marked.

e. Taxiway Edge Markings. Taxiway edge markings shall not be applied.

TONE-DOWN MATERIALS

32. When airfield marking tone-down measures are executed the following rules on materials to be used shall be followed:

a. No retroreflective paint shall be used for airfield markings.

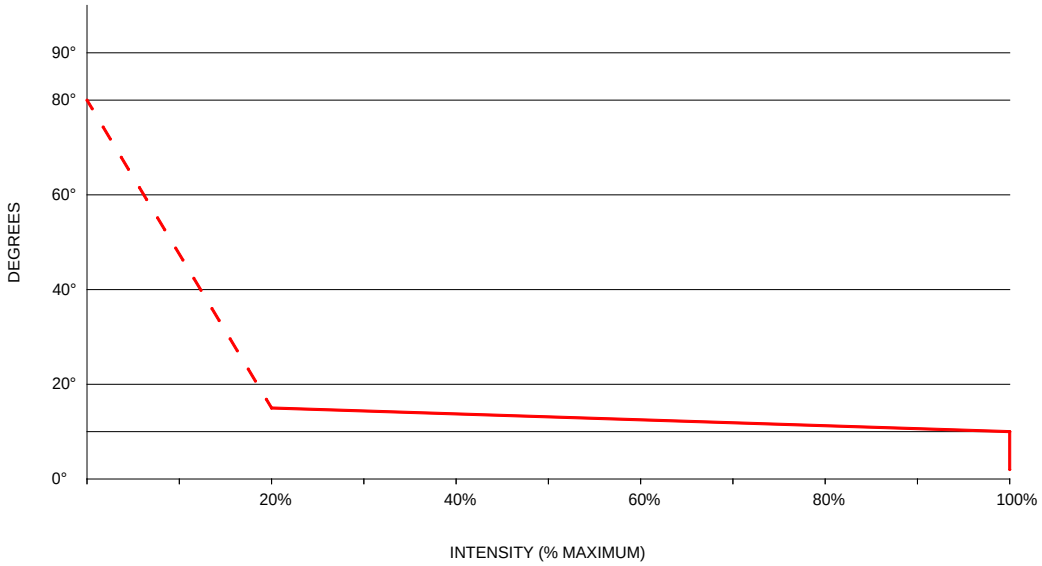
b. In many cases it will be necessary to paint over existing markings. The paint used shall have a colour and reflection characteristics as similar as is possible to the surrounding surfaces.

IMPLEMENTATION OF THE AGREEMENT

33. The STANAG is considered implemented when a nation has issued the necessary orders/ instructions to the forces concerned putting the procedures detailed in this Agreement into effect.

ANNEX A to
STANAG 3534
(Edition 7)

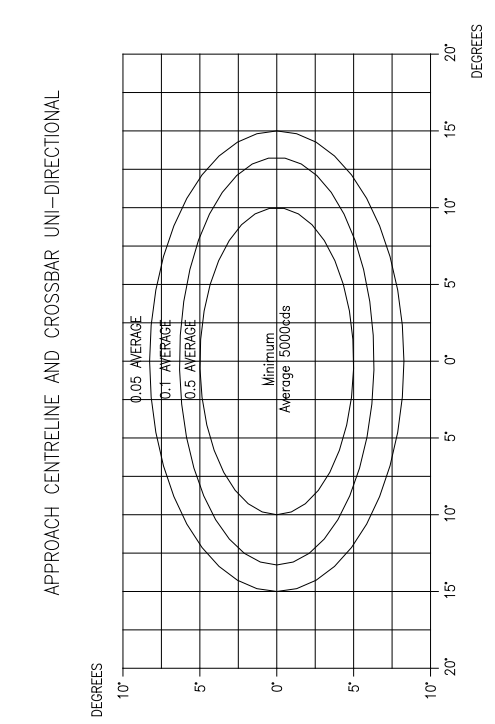
PHOTOMETRIC CHARACTERISTICS (OMNI-DIRECTIONAL LIGHTS)



PHOTOMETRIC CHARACTERISTICS:
OMNI-DIRECTIONAL RUNWAY EDGE (TYPE A AND B)
AND APPROACH LIGHTS (TYPE C)

ANNEX B to
STANAG 3534
(Edition 7)

PHOTOMETRIC CHARACTERISTICS (UNI & BI-DIRECTIONAL LIGHTS)



0.5 Average		0.1 Average		0.05 Average	
horizontal	vertical	horizontal	vertical	horizontal	vertical
±6.5°	±3.5°	±8.5°	±6°	±10°	±8.5°

FIG.1

0.5 Average		0.1 Average		0.05 Average	
horizontal	vertical	horizontal	vertical	horizontal	vertical
±10°	±5°	±13.5°	±6.5°	±15°	±8.75°

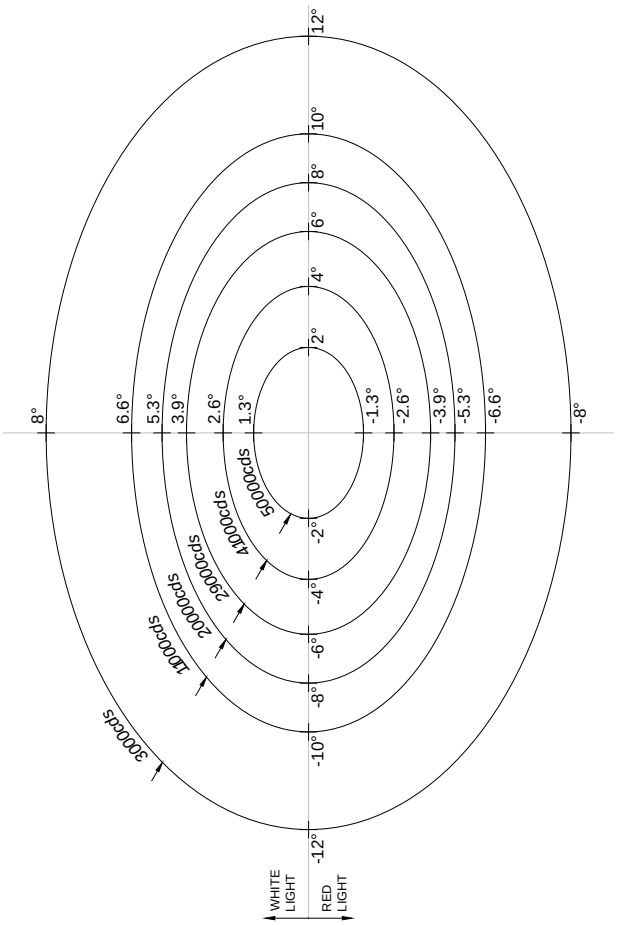
FIG.2

Photometric Characteristics:
Uni/Bi Directional Runway Edge and
Uni Directional Approach Lights (Type D)

Note: Light units conforming to Fig 1. may also be used as approach lights

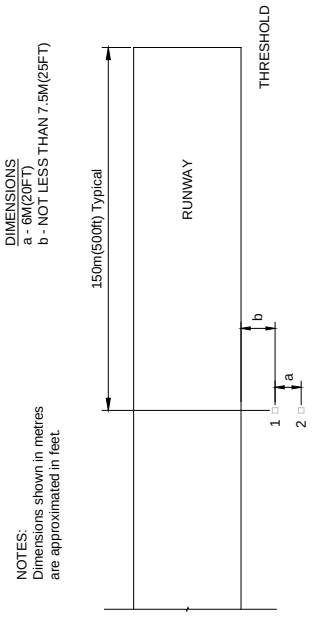
ANNEX C to
STANAG 3534
(Edition 7)

ABBREVIATED PRECISION APPROACH PATH INDICATOR SYSTEM (APAPI)



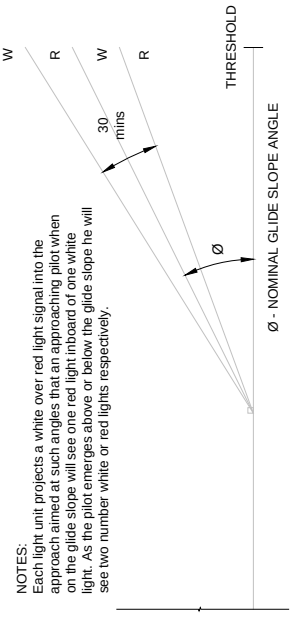
ISOCANDELA DIAGRAM FOR WHITE LIGHT
Transmission Factor for Red Sector not less than 20%

Photometric Characteristics



NOTES:
Dimensions shown in metres are approximated in feet.

APAPI LAYOUT



NOTES:
Each light unit projects a white over red light signal into the approach aimed at such angles that an approaching pilot when on the glide slope will see one red light inboard of one white light. As the pilot emerges above or below the glide slope he will see two number white or red lights respectively.

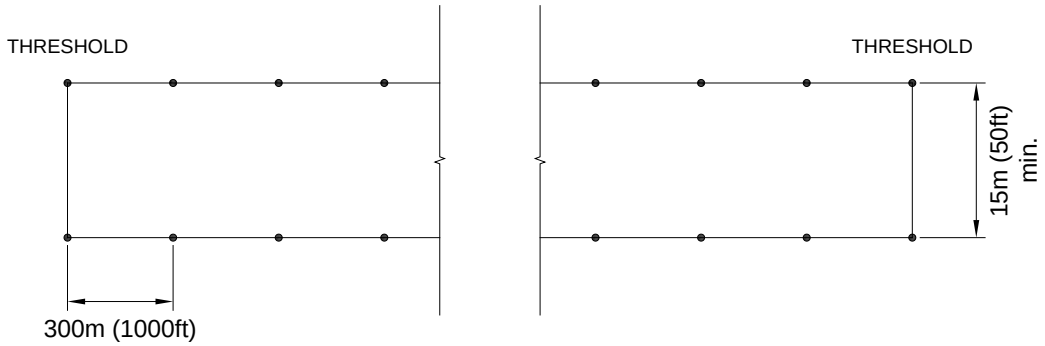
Ø - NOMINAL GLIDE SLOPE ANGLE

SIGNAL FORMAT

ANNEX D to
STANAG 3534
(Edition 7)

LAYOUT TYPE 1 SYSTEM

NOTES:
1. Dimensions shown in metres are approximated in feet.
2. The longitudinal spacings are maximum values. Operational considerations may require closer spacings.



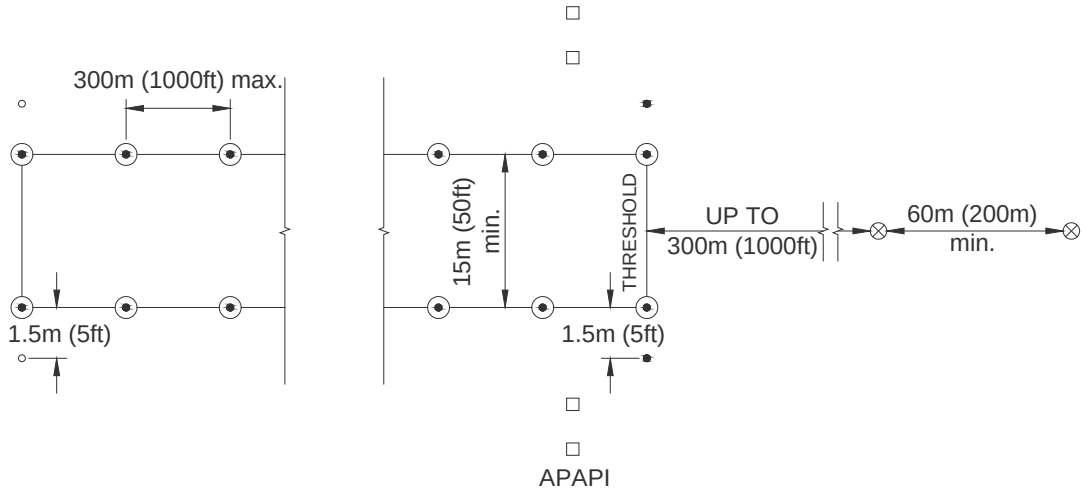
LEGEND

- Omnidirectional Elevated Light White. Lighitng Intensity 15 Candelas.

ANNEX E to
STANAG 3534
(Edition 7)

LAYOUT TYPE 2 SYSTEM

NOTES:
1. Dimensions shown in metres are approximated in feet.
2. The longitudinal spacings are maximum values.
   Operational considerations may require closer spacings.
3. Red / Green lights to masked threshold and runway end are optional.



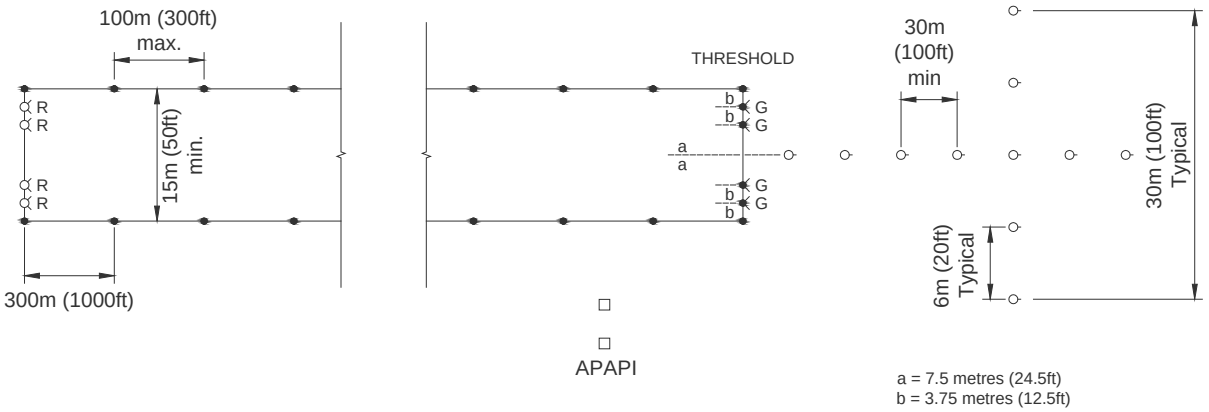
LEGEND

- Omnidirectional Elevated Light, White. Lighting Intensity 50 Candelas.
- Omnidirectional Elevated Light, Red. Lighting Intensity 10 Candelas (filtered).
- Omnidirectional Elevated Light, Green. Lighting Intensity 10 Candelas (filtered).
- Omnidirectional Elevated Light. Lighting Intensity 250 Candelas (filtered).
- APAPI System (See Annex C).

ANNEX F to
STANAG 3534
(Edition 7)

LAYOUT TYPE 3 SYSTEM

NOTES:
1. Dimensions shown in metres are approximated in feet.
2. The longitudinal spacings are maximum values. Operational considerations may require closer spacings.
3. If runway lighting cables cannot be buried or secured then minimum runway width will be of the order of 30m (100ft) to prevent jet efflux damage.
4. It is recomended that when this lighting system is used in visibilites of less than 800m that an additional 5000cd light be sited alongside the runway edge lights 1.5m (5ft) displaced outwards for the first 700m (2000ft) to provide an indication of the extent of the touchdown zone.



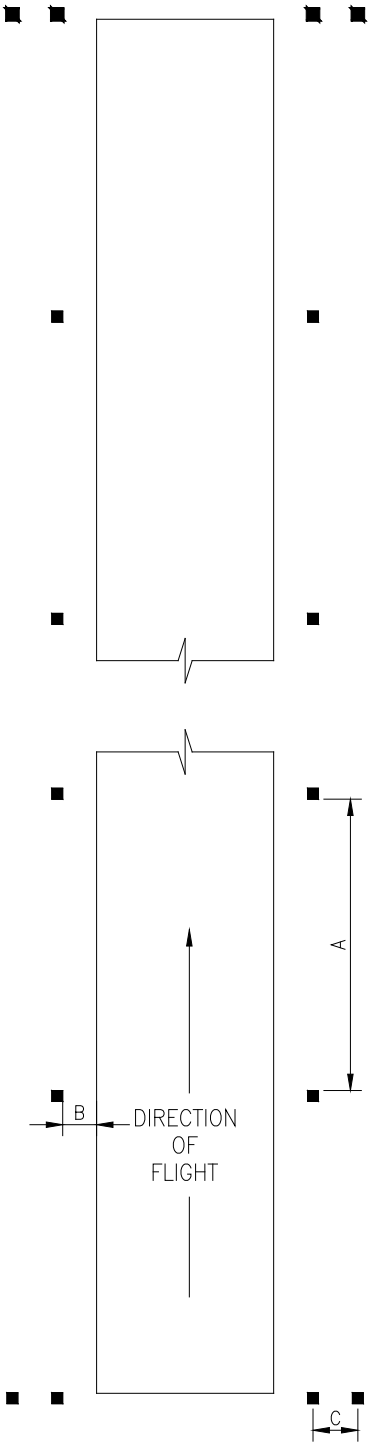
LEGEND

- Uni or Bidirectional Light, White. Lighting Intensity 5000 Candelas.
- Uni-directional Light, Red. Lighting Intensity 1000 Candelas.
- Uni-directional Light, Green. Lighting Intensity 2500 Candelas.
- Uni-directional Approach Light, White. Lighting Intensity 5000 Candelas.
- APAPI System (see Annex C)

Brilliancy Control Required

ANNEX G to
STANAG 3534
(Edition 7)

RUNWAY / LANDING STRIP MARKING (DAY)



DIMENSION (S)		FEET	METRES
A	NOT EXCEEDING	1000	300
B	NOT EXCEEDING	15	4.5
C	NOT EXCEEDING	30	9

NOTE:
The marker dimensions should be such as to present the pilot with a rectangular viewing area of approximately 4ft² (0.35m²)

ANNEX H to
STANAG 3534
(Edition 7)

TAXIWAY MARKING (DAY)

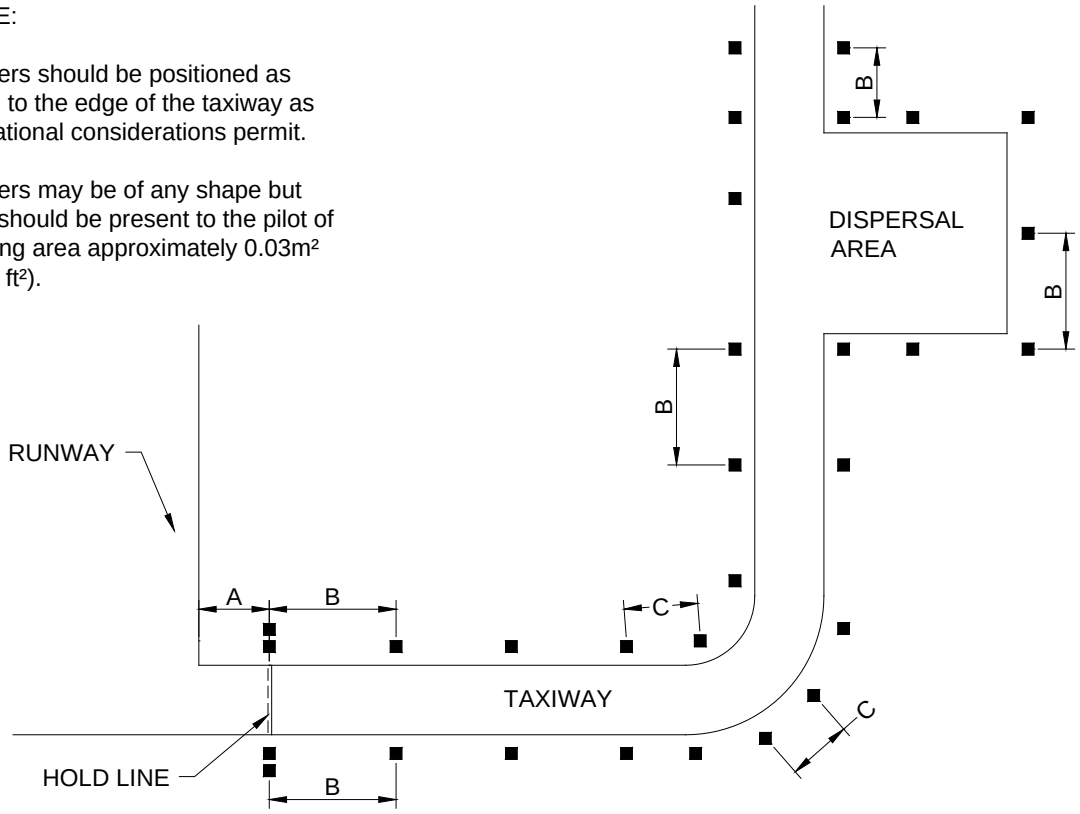
FIGURE H-1 TAXIWAY MARKING (DAY)

DIMENSION (S)		FEET	METRES
A	NOT LESS THAN	100	30
B	NOT EXCEEDING	200	60
C	NOT EXCEEDING	100	30

NOTE:

Markers should be positioned as close to the edge of the taxiway as operational considerations permit.

Markers may be of any shape but they should be present to the pilot of viewing area approximately 0.03m² (0.31 ft²).



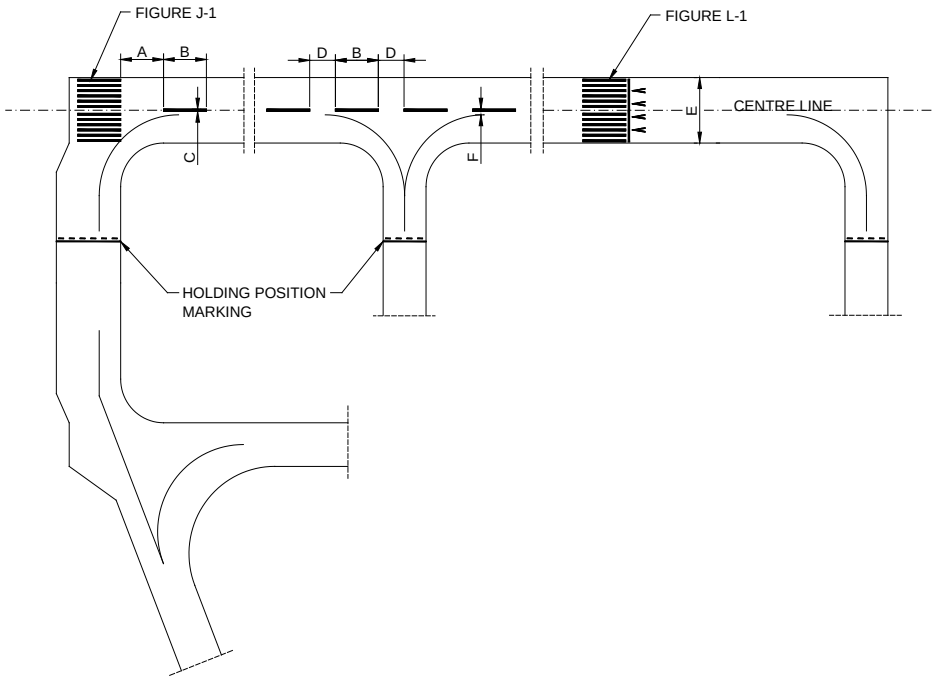


FIGURE I-1: RUNWAY AND TAXIWAY MARKINGS

DIMENSION	METRES	FEET
A	33.00	110
B	30.00	100
C	0.3	1.0
D	20.00	65
E	45.00	150
F	0.90	3

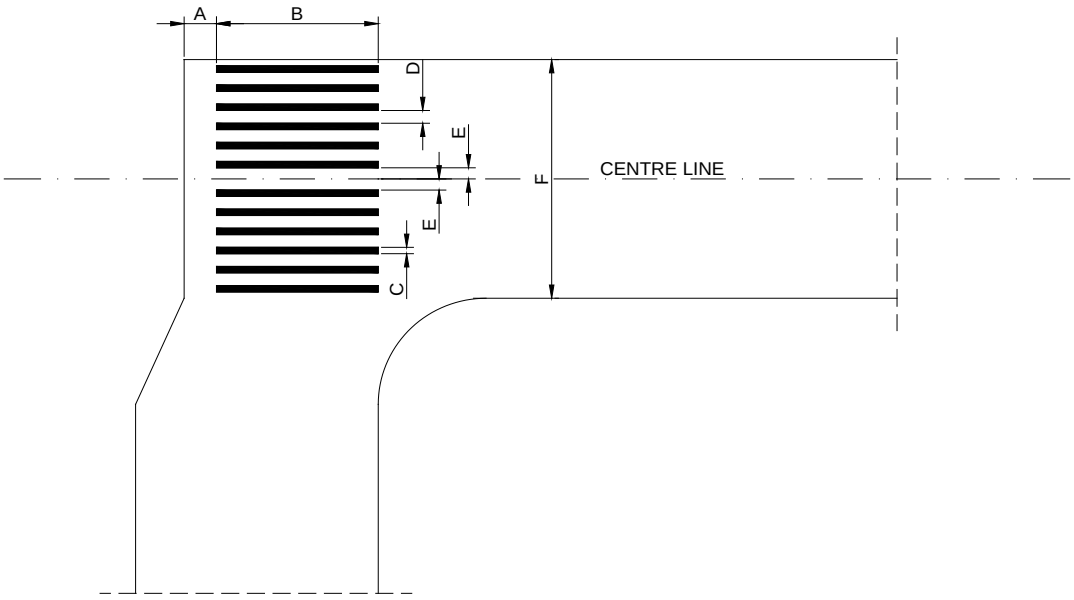


FIGURE J-1: NORMAL THRESHOLD (RUNWAY WIDTH 45.00M OR 150ft)

DIMENSION	METRES	FEET
A	6.00	20
B	30.00	100
C	1.80	6
D	1.80	6
E	1.80	6
F	45.00	150

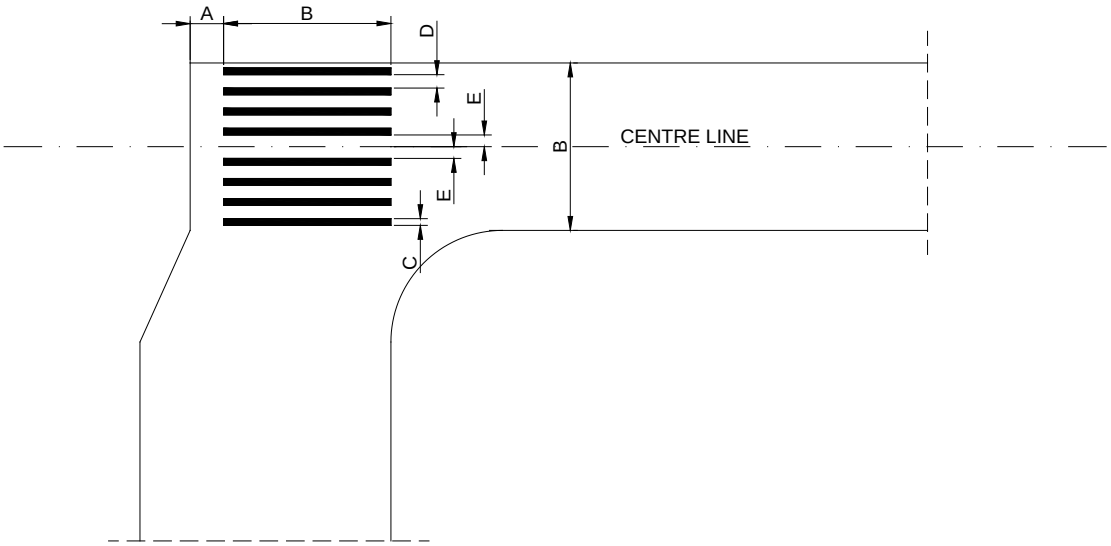


FIGURE K-1: NORMAL THRESHOLD (RUNWAY WIDTH 30.00M OR 100ft)

DIMENSION	METRES	FEET
A	6.00	20
B	30.00	100
C	1.80	6
D	1.80	6
E	1.80	6

ANNEX L to
STANAG 3534
(Edition 7)

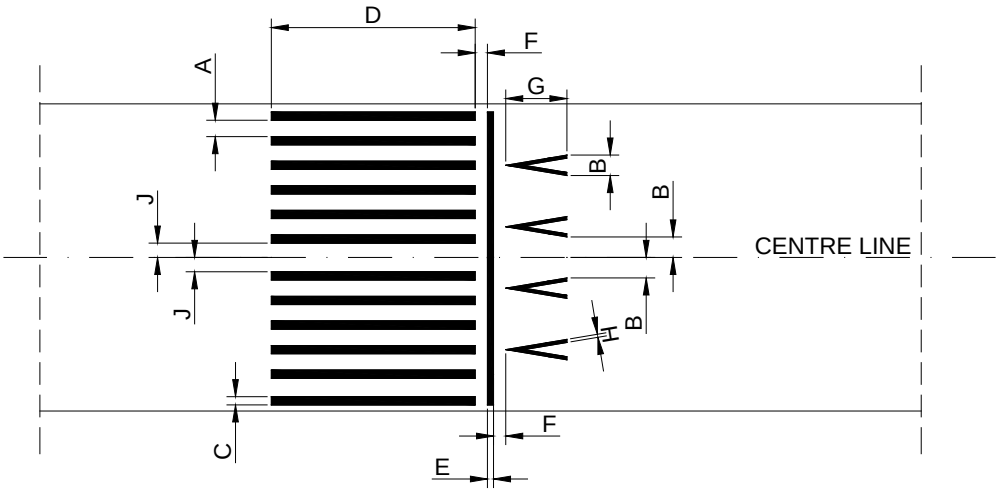


FIGURE L-1: DISPLACED THRESHOLD MARKINGS (RUNWAY WIDTH 45.00M OR 100ft)

DIMENSION	METRES	FEET
A	1.80	6
B	3.30	11
C	1.80	6
D	30.00	100
E	1.20	4
F	2.0	7
G	10.00	33
H	0.85	3
J	1.80	6

ANNEX M to
STANAG 3534
(Edition 7)

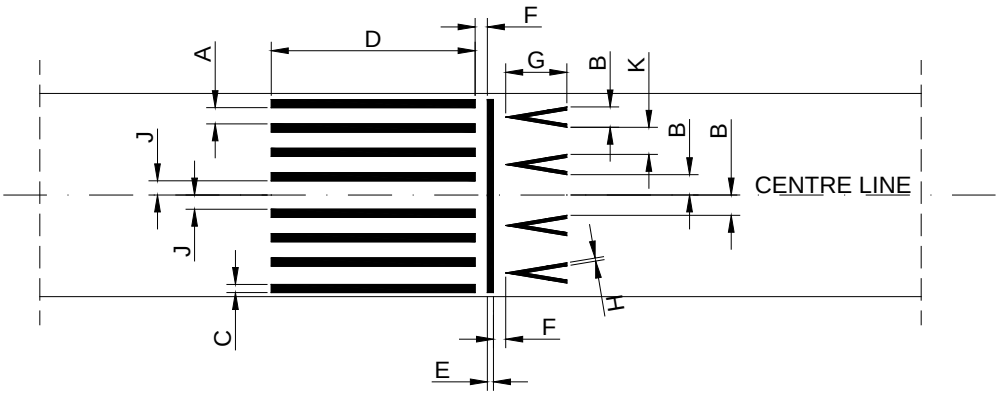


FIGURE M-1: DISPLACED THRESHOLD MARKINGS (RUNWAY WIDTH 30.00M OR 100ft)

DIMENSION	METRES	FEET
A	1.80	6
B	3.30	11
C	1.80	6
D	30.00	100
E	1.20	4
F	2.00	7
G	10.00	33
H	0.85	3
J	1.80	6
K	4.00	13

NOTES:

1. ‘X’ denotes equal angles
2. Other dimensions are based on field conditions.

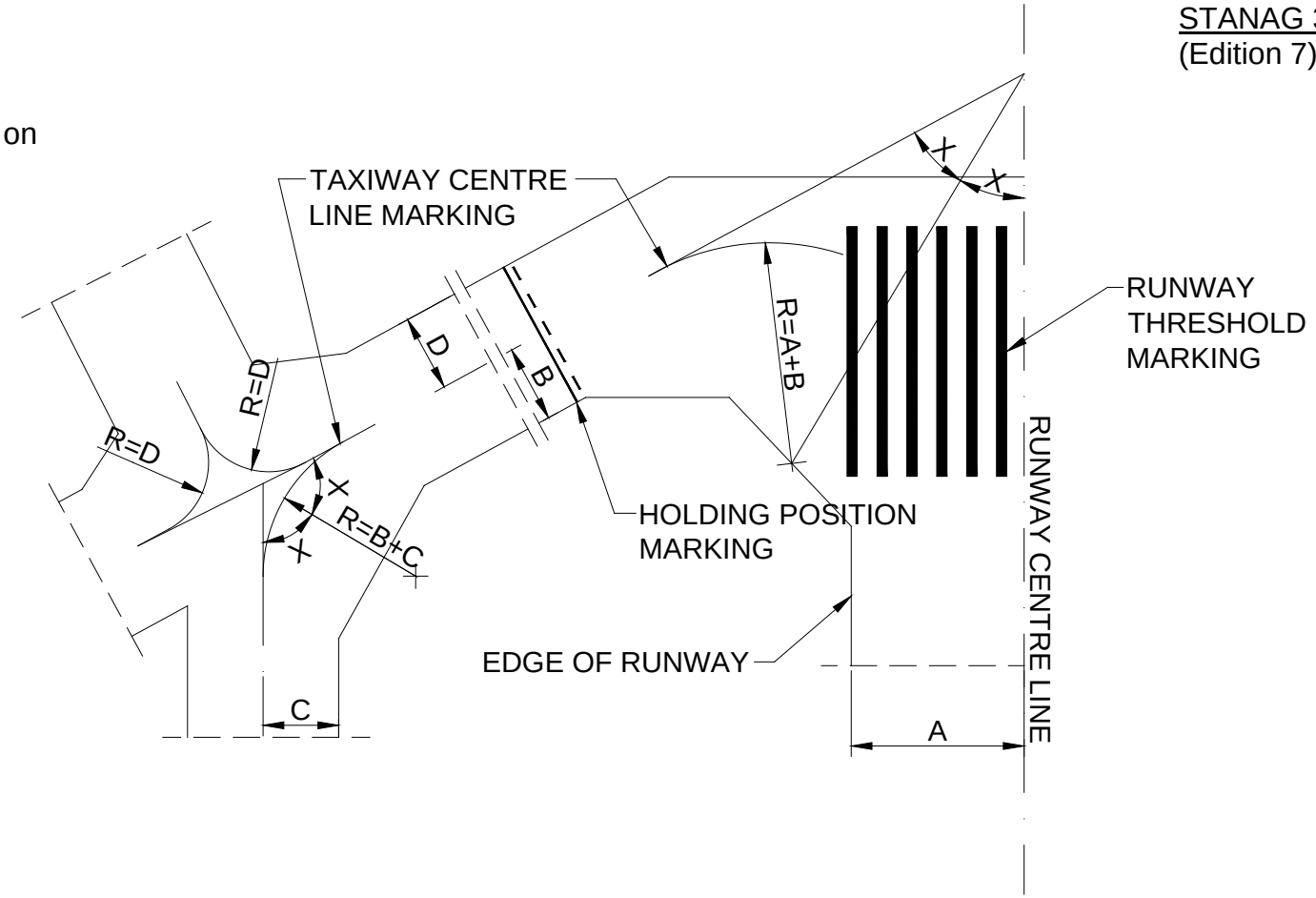


FIGURE N-1: TAXIWAY CENTRELINE CURVES

ANNEX O TO
STANAG 3534
(Edition 7)

Annex O to Stanag 3534 - Summary of Portable Airfield Lighting Types

System Type	System Description (1)	System Equipment	Visual Conditions (2)	Calculated Light Acquisition Range (2)	Optimum Installation Time	Typical Operational Period	Light Type	Beam Spread	Intensity (Candela)	Location	Light Type Application
1	Basic VFR System, Battery Operated, Possibly Solar Powered, VHF Control, NVG Capable	Edge Lighting Only No Approach, No Threshold, Max Spacing 100m	Night MET VIS>7KM	2.2 Km	20 Min	8 Hrs	A	Omnidirectional	15	Runway Edge	A - Runway Edge Ref: Annex D
2A (Visual Approach)	Basic VFR System, Battery Operated, Possibly Solar Powered with auxiliary recharging capability, VHF Control, NVG Capable, Need APU for APAPI	Edge Lighting, Runway End Lighting, Threshold Lighting, Approach Lighting, Visual Guide Slope Indicator	Night MET VIS>3.7KM	2.1 Km (Rwy) 4.4 Km (App)	60 Min	8 Hrs	B	Omnidirectional	50	Runway Edge	B - Runway Edge C - Approach, High Intensity, VGSI Ref: Annex E
2B (Instrument Approach)	As above but IFR capable		Night MET VIS>0.8KM	0.6 Km (Rwy) 1.0 Km (App)	60 Min	8 Hrs	C	Omnidirectional	250	Approach	
3	Cabled IFR System, VHF or Manual Control, NVG Capable preferred, powered from mains or APU supply, Brilliancy control required.	Edge Lighting, Runway End Lighting, Threshold Lighting, Approach Lighting, Visual Guide Slope Indicator	Day/Night MET VIS>0.4KM	0.5 Km	8 Hrs	Continuous	D	Uni/Omni-Directional,	5000	Runway Edge and Approach	D - Runway Edge, Approach, High Intensity, VGSI Ref: Annex C

1. Instantaneous black-out capability required for all systems
2. Data provided for guidance only. Operating minima to be established by Operational Field Commander

ANNEX P to
STANAG 3534
(Edition 7)

GLOSSARY OF TERMS
AERONAUTICAL GROUND LIGHTING (AGL)

Beam Height *
The angle between the two directions in a vertical plane through the axis of the beam in which the main beam is specified.

Beam Spread *
The angle between the two directions in a specified plane through the axis of the beam in which the intensity is 33% of the maximum.

Beam Width *
The angle between the two directions in a horizontal plane through the axis of the beam in which the main beam is specified.

Cross Bar
A line of aeronautical ground lights forming part of an approach light system, being at right angles to and symmetrically disposed about, the line of lights forming the centreline of the system.

Lamp Life
Lamp life is in 3 forms. ‘Objective life’ is the lamp manufacture’s open rack life test. ‘Average life’ is the expected operational life. ‘Rated life’ is the life in specified luminaire test conditions.

Luminaire
Apparatus, which distributes, filters or transfers the light emitted by a lamp or lamps and which includes all the items necessary for fixing and protecting the lamps and for connection to the supply circuit.

Obstacle Lights
Aeronautical ground lights provided to indicate obstacles, which are considered to be an obstruction to aircraft on the ground in the manoeuvring area or in flight.

* These concepts and the use of main beam terminology within them are being superceded in specifications using isocandela diagrams. (Rationale: Isocandela diagrams provide all the information contained in the three System Types in a more meaningful way).