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NATO ARMY ARMAMENTS GROUP (NAAG)

**Ratification Draft STANAG 4381 EDITION 2 and AEP-4381 Edition A Version 1 on
BLACKOUT LIGHTING SYSTEMS FOR TACTICAL LAND VEHICLES**

Note by the International Staff

LAMP Reference: LE-005

1. In accordance with procedures outlined in AAP-03, draft versions of Standardization Documents (STANAG, STANREC, Allied Publication) must be endorsed/approved by the Tasking Authority/Delegated Tasking Authority prior to distribution to national standardization entities by the NATO Standardization Office (NSO) for entrance into the ratification/approval process.
2. You will find at enclosure the draft STANAG 4381 EDITION 2 and its AEP-4381 on BLACKOUT LIGHTING SYSTEMS FOR TACTICAL LAND VEHICLES, produced by the Land Capability Group on Land Engagement (NAAG/LCGLE).
3. The draft STANAG has been sent out to translation and the translated version will be submitted to NSO in due time.
4. These documents are hereby forwarded to the NAAG under a silence approval ending on COB 2 December 2022. If the Action Officer doesn't hear to the contrary by any NATO Nation, STANAG 4381 EDITION 2 and its AEP-4381 on BLACKOUT LIGHTING SYSTEMS FOR TACTICAL LAND VEHICLES will be sent to the NSO for processing.

(Signed) Esther Savvidis Toledo

Encl.: 1

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Original: English

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STANDARDIZATION
AGREEMENT

ACCORD DE
NORMALISATION

STANAG 4381

BLACKOUT LIGHTING
SYSTEMS FOR TACTICAL
LAND VEHICLES

TITRE FRANÇAIS

EDITION/ÉDITION 2
DRAFT

October/date2022



NORTH ATLANTIC
TREATY ORGANIZATION

ORGANISATION DU TRAITÉ
DE L'ATLANTIQUE NORD

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Date

NSO REFERENCE/RÉFÉRENCE NSO

LETTER OF PROMULGATION

LETTRE DE PROMULGATION

STATEMENT

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

DÉCLARATION

L'accord de normalisation OTAN (STANAG) ci-joint, qui a été ratifié par les pays membres dans les conditions figurant dans la Base de données des documents de normalisation OTAN (NSDD), est promulgué par la présente.

ENACTMENT

This STANAG is effective upon receipt use by the participating nations and NATO bodies.

ENTRÉE EN VIGUEUR

Ce STANAG entre en vigueur dès réception aux fins d'application par les pays et les organismes OTAN participants.

ACTIONS BY NATIONS

Nations are invited to examine their ratification of the STANAG and, if they have not already done so, advise the NSO of their intention regarding its ratification and implementation.

MESURES À PRENDRE PAR LES PAYS

Les pays sont invités à examiner l'état d'avancement de la ratification du STANAG et à informer, s'ils ne l'ont pas encore fait, le NSO de leur intention concernant sa ratification et sa mise en application.

Once implemented, Allies shall provide implementation details through the electronic reporting tool.

Dès que le STANAG est mis en application, les Alliés doivent fournir les informations y afférentes via l'outil de notification électronique.

SECURITY CLASSIFICATION

[This STANAG is a NATO [non-classified]/[UNCLASSIFIED] document to be handled in accordance with C-M(2002)60.]

CLASSIFICATION DE SÉCURITÉ

[Ce STANAG est un document OTAN [non classifié]/[SANS CLASSIFICATION] qui doit être traité conformément au C-M(2002)60.]

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ADDITIONAL INFORMATION

This document supersedes the following document:

INFORMATIONS SUPPLÉMENTAIRES

Si le STANAG ou la norme interalliée qu'il couvre ont été modifiés, veuillez préciser les

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STANAG 4381 Edition 1, dated 20 January 1993. changements faits par rapport aux documents de normalisation antérieurs.

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normalisation

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STANAG 4381 Edition/Édition 2

**BLACKOUT LIGHTING SYSTEMS FOR
TACTICAL LAND VEHICLES**

TITRE FRANÇAIS

AIM

The aim of this NATO standardization agreement (STANAG) is to respond to the following interoperability requirements.

BUT

Le présent accord de normalisation OTAN (STANAG) a pour but de répondre aux exigences d'interopérabilité suivantes.

INTEROPERABILITY REQUIREMENTS

[To provide guidance for member nations in the design and application of blackout lighting systems on tactical land vehicles.]

EXIGENCES D'INTEROPÉRABILITÉ

[Résumé des exigences d'interopérabilité et de leurs liens avec les capacités interalliées concernées — commencez par un verbe à l'infinitif.]

AGREEMENT

Participating nations agree to implement the following standard(s).

ACCORD

Les pays participants conviennent de mettre en application la/les norme(s) suivante(s).

STANDARD(S)

[STANAG 4381 Edition 2 – Blackout Lighting Systems for Tactical Land Vehicles.]

NORME(S)

[Insérez les titres abrégés et complets des normes interalliées ou non OTAN couvertes.]

OTHER RELATED DOCUMENTS

[AEP 4381 Edition A Version 1 - Blackout Lighting Systems for Tactical Land Vehicles

STANAG 2154 – Regulations for Military Motor Vehicle Movement by Road

STANAG 4007 – Electrical Connectors Between Tractors and Trailers

MIL-STD-1179 – Lamps, Reflectors and Associated Signalling Equipment for Military Vehicles]

AUTRES DOCUMENTS CONNEXES

[Insérez les titres abrégés et complets des documents de normalisation OTAN ou extérieurs connexes.]

SUPERSEDED DOCUMENTS

This STANAG supersedes the following document(s):

[STANAG 4381 Edition 1, dated 20 January 1993.]

DOCUMENTS ANNULÉS ET REMPLACÉS

Le présent STANAG annule et remplace le(s) document(s) suivant(s):

[Énumérez le(s) document(s) : titre abrégé (par exemple STANAG xxxx), édition et date.]

NATIONAL RATIFICATION RESPONSE

National responses are recorded in the NATO Standardization Document Database (NSDD). Allies shall provide ratification details through the electronic reporting tool (e-Reporting).

RÉPONSES NATIONALES AUX DEMANDES DE RATIFICATION

Les réponses nationales sont consignées dans la Base de données des documents de normalisation OTAN (NSDD). Les Alliés doivent rendre compte de leurs ratifications via de l'outil de notification électronique (e-Reporting).

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IMPLEMENTATION OF THE AGREEMENT

[This STANAG is implemented when the necessary orders/instructions to adopt the techniques and procedures described in the covered standard regarding design and application of blackout lighting systems on tactical land vehicles have been issued to the forces concerned]

[Allies and NATO Bodies shall provide implementation details through the electronic reporting tool (e-Reporting).]

Partner nations are invited to provide their implementation details through the electronic reporting tool (e-Reporting)

[]

NATO EFFECTIVE DATE (NED)

[N/A.]

REVIEW

This STANAG is to be reviewed at least once every five years. The result of the review is to be recorded within the NSDD.

TASKING AUTHORITY

This STANAG is supervised under the authority of:

NAAG/LCGLE

FEEDBACK

Any comments concerning this STANAG shall be directed to:

**NATO Standardization Office
(NSO)**

MISE EN APPLICATION DE L'ACCORD

[Donnez des directives qui guideront les pays et les organismes OTAN dans la mise en application des normes interalliées couvertes. Celles-ci devraient comprendre une liste de mesures spécifiques, y compris, si nécessaire, dans le domaine de la qualification, à prendre pour assurer une mise en application complète des normes interalliées couvertes.]

[Indiquez les références normatives à mettre en application parallèlement aux normes interalliées couvertes.]

Les Alliés et les organismes OTAN doivent rendre compte de leur mise en application via l'outil de notification électronique (e-Reporting).

FACULTATIF :

[Les pays partenaires sont invités à rendre compte de leur mise en application via l'outil de notification électronique (e-Reporting).]

DATE D'ENTRÉE EN VIGUEUR OTAN (NED)

[Insérez la date d'entrée en vigueur OTAN (le cas échéant).]

RÉEXAMEN

Le présent STANAG doit être réexaminé au moins une fois tous les cinq ans. Le résultat de ce réexamen doit être consigné dans la NSDD.

AUTORITÉ DE TUTELLE

Le présent STANAG est sous la responsabilité de :

INFORMATIONS EN RETOUR

Tous les commentaires concernant le présent STANAG doivent être adressés au :

**Bureau OTAN de normalisation
(NSO)**

**Boulevard Léopold III
1110 BRUXELLES – Belgique**

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NATO STANDARD

AEP-4381

**BLACKOUT LIGHTING SYSTEMS FOR
TACTICAL LAND VEHICLES**

Edition A, Version 1

DRAFT

October 2022



NORTH ATLANTIC TREATY ORGANIZATION

ALLIED ENGINEERING PUBLICATION

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NORTH ATLANTIC TREATY ORGANIZATION (NATO)

NATO STANDARDIZATION OFFICE (NSO)

NATO LETTER OF PROMULGATION

[Date]

1. The enclosed Allied Engineering Publication AEP-4381, Edition A, Version 1, BLACKOUT LIGHTING SYSTEMS FOR TACTICAL LAND VEHICLES, which has been approved by the nations in the NATO ARMY ARMAMENTS GROUP (NAAG), is promulgated herewith. The agreement of nations to use this publication is recorded in STANAG 4381.
2. AEP-4381, Edition A, Version 1, is effective upon receipt.
3. This NATO standardization document is issued by NATO. In case of reproduction, NATO is to be acknowledged. NATO does not charge any fee for its standardization documents at any stage, which are not intended to be sold. They can be retrieved from the NATO Standardization Document Database (<https://nso.nato.int/nso/>) or through your national standardization authorities.
4. This publication shall be handled in accordance with C-M(2002)60.

Dimitrios SIGOULAKIS
Major General, GRC (A)
Director, NATO Standardization Office

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CHAPTER 1 INTRODUCTION

The aim of this agreement is to provide guidance for member nations in the design and application of blackout lighting systems on tactical land vehicles.

CHAPTER 2 AGREEMENT

Participating nations agree to adopt the Tactical land Vehicle Blackout Lighting Principles described in the following paragraphs. It is intended that this lighting will be incorporated into new fleets of tactical land vehicles taken into service by countries signing this agreement. Blackout lighting is not mandatory for administrative or civilian pattern vehicles. This agreement does not apply to the interior lights in tracked or wheeled tactical land vehicles.

CHAPTER 3 DEFINITION

The following terms and definitions are used for the purpose of this agreement:

- a. Blackout conditions - When applied to lighting it means reduced lighting to comply with regulations governing vehicle movement under blackout conditions. When applied to rear lights, stoplights, front corner markers (or their equivalents), etc, it means special purpose lights or lamps, capable only of suitably reduced emissions, solely for use under blackout conditions.
- b. Blackout lamps - Blackout lamps are lamps designed to maintain vehicle/trailer blackout lighting security during blackout conditions by limiting horizontal and vertical illumination as well as providing ample light for safe vehicle operation. Blackout lamps may use light from either normal lamp filaments or infra-red secure emitters.
- c. Convoy lamp - A light used by certain nations to mark the rear of a vehicle when operating under blackout conditions by means of the reflection on a white surface of an emission from a cowled lamp. It may be used as an alternative to blackout rearlights.
- d. Convoy driving lamp - A single light in front of the vehicle, shaded to prevent detection from above and used to provide roadway illumination for the driver during blackout driving conditions.
- e. Blackout marker lamps - Blackout marker lamps are lamps used on tactical land vehicles to indicate their width. Width is indicated by using either front marker lamps or tail marker lamps.
- f. Infra-red secure lamps - Infra-red secure lamps use emitters which primarily emit radiation in the visible portion of the electromagnetic spectrum.
- g. Non infra-red secure lamps - Non infra-red secure lamps are lamps which emit radiation in both the visible and infra-red portion of the electromagnetic spectrum.
- h. Tactical land vehicle - A military vehicle, whether designed primarily for military use or adapted from a commercial vehicle, which has specialized military characteristics to fit it for use by forces in the field in direct connection with, or in support of, combat operations or the training of troops for such operations.

- j. Normal conditions - With regard to lighting and signaling this term implies operating under conditions of normality and not under blackout or tactical conditions.
- k. Curb weight - The weight of the vehicle/trailer fully equipped and serviced for operation, including fuel, lubricants, coolant, vehicle tools and equipment, but without crew, personal equipment or payload. It is also known as net or tare weight.

CHAPTER 4 DETAILS OF AGREEMENT
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4.1 Conditions and Movement at Night

The conditions under which military traffic will move at night will be determined by the Command Headquarters in relation to the enemy threat and, insofar as possible, with due regard to regulations in force in the host country. Such conditions may be directly imposed on operations by this threat. These conditions are as follows:

- (a) normal lighting conditions; and
- (b) blackout lighting conditions

4.2 Blackout conditions

Blackout conditions implies:

- (a) total blackout in which all vehicle lighting (both normal vehicle and blackout lighting is extinguished;
- (b) partial blackout in which blackout lamps are used in such a way as to reduce the possibility of enemy detection and collisions by other road users

4.3 Vehicle Lighting Capabilities

The overall commander must be able to control vehicle lighting on the battlefield. Tactical land vehicle lighting systems shall have the following capabilities:

- (a) normal lighting;
- (b) complete lack of lighting or total blackout conditions;
- (c) reduce lighting - guidance for member nations in the design and application of blackout lighting systems on tactical vehicles is set out in Annex A;
- (d) the design of the vehicle electrical system must be such that it will prevent inadvertent switching from reduced lighting to normal lighting

CHAPTER 5 IMPLEMENTATION OF THE AGREEMENT

This AEP will be considered to have been implemented when the necessary orders/instructions bringing into use the principles mentioned in this Agreement have been issued to the forces concerned.

ANNEX A	REDUCED LIGHTING DESIGN PARAMETERS
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- Appendices:
1. Methods used to measure blackout lamp design parameters and sketches of blackout lamps.
 2. Tactical Land Vehicle/Trailer blackout lighting equipment requirements and their locations.

GENERAL

1. The design parameters and the locations on tactical land vehicles of the three types of blackout lamps contained in this AEP are based on the lamps referred to and manufactured to meet the specifications/drawings in MIL-STD-1179. Figures 1, 2 and 3 in Appendix 1 show sketches of the Blackout Driving Lamp; Blackout Composite Lamp - Front, turn, Park and Marker; and the blackout Composite Lamp - Tail, Stop, Turn and Marker respectively.

VEHICLE/TRAILER BLACKOUT LAMPS AND LOCATIONS

2. The minimum number of blackout lamps and their locations on tactical land vehicles/trailers shall be as specified in Appendix 2.

DESIGN PARAMETERS FOR BLACKOUT LAMPS

3. General. Blackout lamps may use light sources which emit radiation in both the visible and infra-red or only the visible portion of the electromagnetic spectrum. Blackout lamps which use light sources which emit radiation in both the visible and infra-red portion of the electromagnetic spectrum are referred to as non infra-red secure blackout lamps while lamps which use light sources which primarily emit radiation only in the visible portion of the electromagnetic spectrum are known as infra-red secure blackout lamps. Parameters for both non infra-red secure and infra-red secure lamps are listed in the following paragraphs.

4. Non infra-red secure blackout driving lamps. The following photometric specification may be used as a guide for the design of these lamps:

PHOTOMETRIC SPECIFICATION

<u>POSITION (Angular Degrees)</u>	<u>Candle power (candela)</u>	
	minimum	maximum
Line H (see Appendix 1, para 2)	0	10
Line 1° Down -6° Right to 6° Left	5	50
Line 2° Down -9° Right to 6° Left	5	55
Line 3° Down -12° Right to 12° Left	5	55
Line 4° Down -15° Right to 15° Left	5	60
Line 5° Down -18° Right to 18° Left	5	55
Line 6° Down -21° Right to 24° Left	5	50
Line 7° Down -24° Right to 24° Left	5	30
Line 8° Down -27° Right to 27° Left	5	10

5. Infra-red secure blackout driving lamps. The following photometric specification may be used as a guide for the design of these lamps:

PHOTOMETRIC SPECIFICATION

<u>POSITION (Angular Degrees)</u>	<u>Candle power (candela)</u>	
	mean	maximum
Line H (see Appendix 1, para 1)	0	0
Line 1° Down -6° Right to 6° Left	3	5
Line 2° Down -9° Right to 6° Left	5	15
Line 3° Down -12° Right to 12° Left	8	20
Line 4° Down -15° Right to 15° Left	7	25
Line 5° Down -18° Right to 18° Left	7	20
Line 6° Down -21° Right to 24° Left	7	20
Line 7° Down -24° Right to 24° Left	3	15
Line 8° Down -27° Right to 27° Left	2	10

6. Non infra-red secure blackout front marker lamps. The following parameters may be used as a guide for the design of these lamps:

<u>LAMP TYPE AND AREA</u>	<u>LUMINANCE (Foot-lamberts)</u>			
	<u>MEAN VALUE</u>	<u>MAXIMUM VALUE</u>	<u>MINIMUM VALUE</u>	
FRONT MARKER LAMP	110.0	190.0	50.0	
	<u>CIE CHROMATICITY COORDINATE VALUES</u>			
	<u>MEAN VALUE</u>		<u>MAXIMUM TOLERANCE</u>	
FRONT MARKER LAMP	\bar{x}	\bar{y}	\bar{x}	\bar{y}
	0.445	0.396	+/- 0.013	0.008

7. Infra-red secure blackout front marker lamps. The following parameters may be used as a guide for the design of these lamps:

<u>LAMP TYPE AND AREA</u>	<u>LUMINANCE (Foot-lamberts)</u>		
	<u>MEAN VALUE</u>	<u>MAXIMUM VALUE</u>	<u>MINIMUM VALUE</u>
FRONT MARKER LAMP			
Brightest Zone	10	15	5
Least Bright Area	2.5	4	1

NOTE: An explanation of the “brightest zone,” “least bright area,” etc, is contained in Appendix 1, Paragraph 2.

	<u>CIE CHROMATICITY COORDINATE VALUES</u>			
	<u>MEAN VALUE</u>		<u>MAXIMUM TOLERANCE</u>	
FRONT MARKER LAMP	\bar{x}	\bar{y}	\bar{x}	\bar{y}

0.596 0.406 +/- 0.008 0.008

8. Non infra-red secure blackout tail and stop lamps. The following parameters may be used as a guide for the design of tail and stop lamps (in Europe tail lamps are referred to as rear lamps):

<u>LAMP TYPE AND AREA</u>	<u>LUMINANCE (Foot-Lamberts)</u>		
	<u>MEAN VALUE</u>	<u>MAXIMUM VALUE</u>	<u>MINIMUM VALUE</u>
TAIL LAMP	17	26	11
STOP LAMP	35	50	25

<u>LAMP TYPE AND AREA</u>	<u>CIE CHROMATICITY COORDINATE VALUES</u>				
	<u>MEAN VALUE</u>			<u>MAXIMUM TOLERANCE</u>	
	<u>x</u>	<u>y</u>		<u>x</u>	<u>y</u>
TAIL LAMP	0.698	0.290	+/-	0.006	0.005
STOP LAMP	<u>x</u>	<u>y</u>		<u>x</u>	<u>y</u>
	0.570	0.408	+/-	0.003	0.002

9. Infra-red secure blackout tail and stop lamps. The following parameters may be used as a guide for the design of secure tail and stop lamps:

<u>LAMP TYPE AND AREA</u>	<u>LUMINANCE (Foot-Lamberts)</u>		
	<u>MEAN VALUE</u>	<u>MAXIMUM VALUE</u>	<u>MINIMUM VALUE</u>

TAIL LAMP

Brightest Zone	10	14	5
Least Bright Area	2	7	1

STOP LAMP

Brightest Zone	6	8	5
Least Bright Area	2	3	1

<u>LAMP TYPE AND AREA</u>	<u>CIE CHROMATICITY COORDINATE VALUES</u>			
	<u>MEAN VALUE</u>		<u>MAXIMUM TOLERANCE</u>	

TAIL LAMP

\bar{x}	\bar{y}		\bar{x}	\bar{y}
0.712	0.288	+/-	0.009	0.007

STOP LAMP

\bar{x}	\bar{y}		\bar{x}	\bar{y}
0.599	0.401	+/-	0.007	0.007

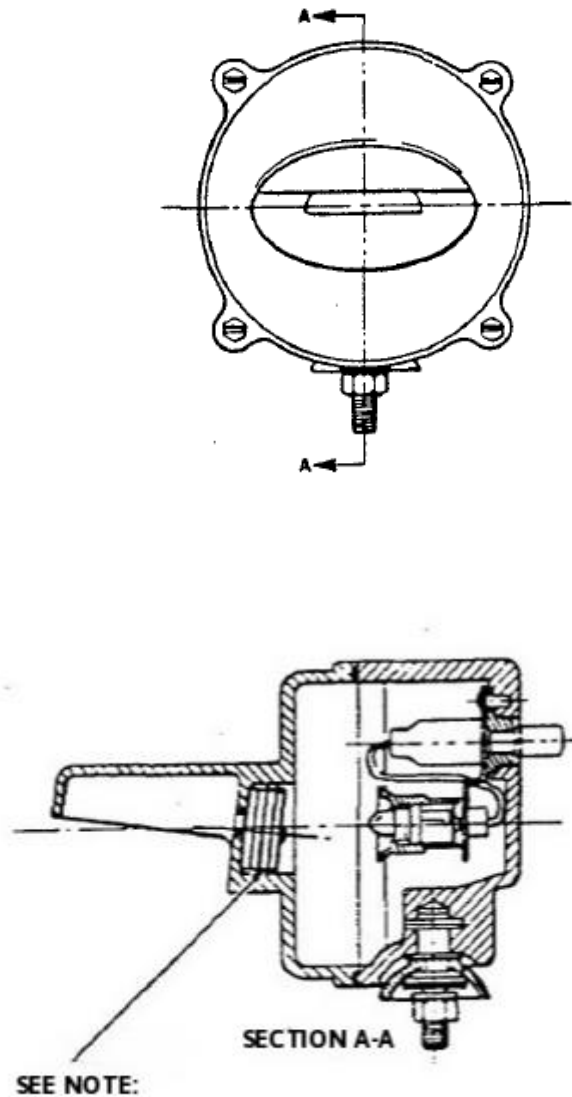
APPENDIX 1	METHODS USED TO MEASURE BLACKOUT LAMP DESIGN PARAMETERS AND SKETCHES OF THE BLACKOUT LAMPS
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BLACKOUT DRIVING LAMP

1. The following method can be used to measure the design parameters of this lamp:
 - a. Measure the beam candlepower of the Blackout Driving lamp using an automated goniometer measuring system. Select horizontal scan measuring positions, both right and left of the center position, every three degrees to a maximum of thirty degrees. Select vertical scan measuring positions every one degree downward from zero degrees to eight degrees.
 - b. To establish a central reference location from which horizontal and vertical angles of measurement for the beam pattern can be determined use the following procedure:
 - (1) Align the photo detector at a distance of 305 cms normal to the surface plane of the goniometer and at a location such that the center of the detector is located on a line extended from a point on the goniometer surface coinciding with the center point of the bottom of the hood of the blackout drive lamps.
 - (2) Mount the lamps so that the front surface of the lamp assembly is in contact with the plate on the goniometer and the bottom of the hood and the horizontal center of the lamp are as close to the rotation of the two axes of the goniometer as possible.
 - (3) With the lamp mounted and powered at 28.00 Vdc, rotate the goniometer head in the vertical axis until the shadow from the hood (visual cutoff) and brightest horizontal area are aligned at the center of the photo detector. This is the center, or zero aiming point from which all test angles are referenced.

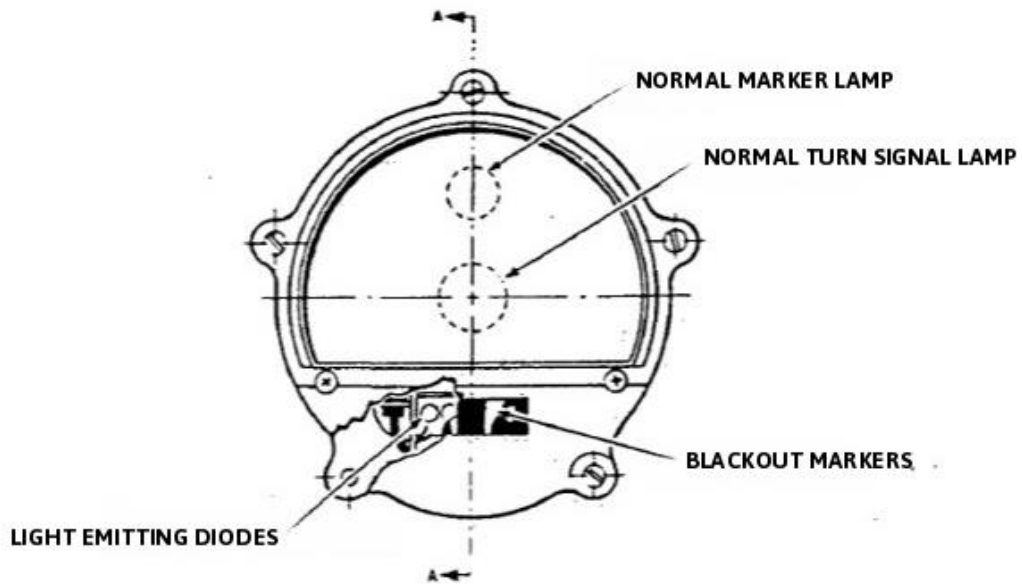
2. Treat the Blackout Composite Lamp-Tail, Stop, Turn and Marker and the Blackout Composite Lamp-Front, Park and Marker as luminance sources rather than illuminance projection sources. With this in mind the design parameters can be established in the following manner:

- (a) Measure brightness with a luminance spotmeter over an area with a diameter of approximately one millimeter.
- (b) On the composite Lamp-Tail measure and report on all four blackout elements (four openings which emit light) separately, on the Stop Lamp measure the single element and on the Front Marker Lamp measure and report on the two blackout elements separately.
- (c) Infra-red secure lamps use light emitting diodes as a source of illumination instead of light bulbs which results in an unevenly illuminated area with bright spots and a darker surround. Consequently, measure both the nominal brightest zone (area) and the least bright area within the region of greatest concern for each lamp.
- (d) For non infra-red source lamps measure the brightest area.
- (e) For both infra-red and non infra-red secure blackout lamps color in units of CIE Chromaticity Coordinates are measured with the spotmeter from the brightest area only.
- (f) Supply the lamps with 28.00 Vdc for the tests.



Note: Infra-Red Secure Capability is achieved by using special construction techniques which restrict radiation emission to the visible portion of the electromagnetic spectrum.

Figure 1: Infra-Red Secure Blackout Driving Lamp



NOTE:
NON INFRA-RED SECURE LAMPS USE
INCANDESCENT SOURCES OF RADIATION
INSTEAD OF LIGHT EMITTING DIODES

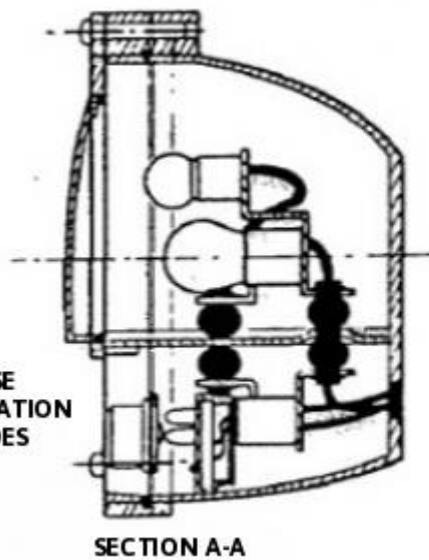
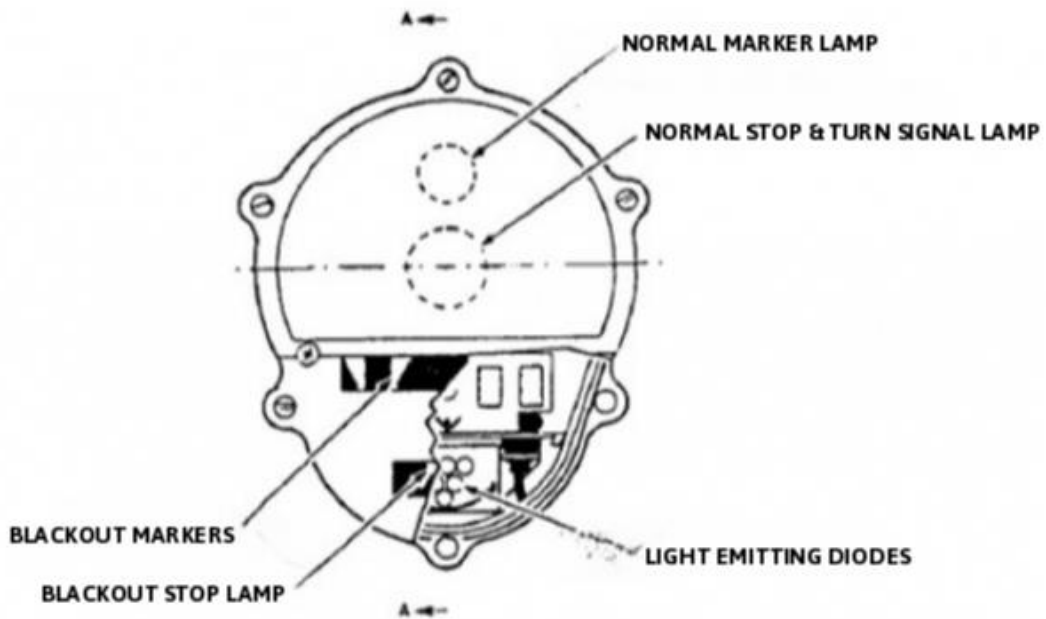


Figure 2: Infra-Red Blackout Composite Lamp - Front, Turn, Park and Marker



NOTE:
NON INFRA-RED SECURE LAMPS USE
INCANDESCENT SOURCES OF RADIATION
INSTEAD OF LIGHT EMITTING DIODES

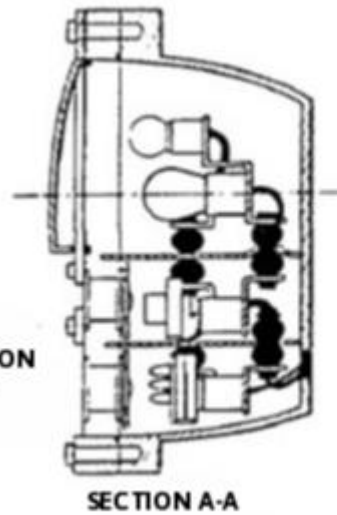


Figure 3: Infra-Red Secure Blackout Composite Lamp – Tail, Stop, Turn and Marker

APPENDIX 2	TACTICAL LAND VEHICLE/TRAILER BLACKOUT LIGHTING EQUIPMENT REQUIREMENTS AND THEIR LOCATION
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Item	Quantity And Color		Location	Recommended height above road surface measured from center of lamp on vehicle/trailer at curb weight
	Wheeled Vehicle/Trailer	Tracked		
Blackout driving lamp <u>1/</u>	one blue	one blue	The light source shall be mounted between the center and left-hand side of the vehicle, as far forward and as near the line of the driver's vision as practicable.	Approximately 1067 mm
Blackout front marker lamp <u>1/</u>	two yellow/white		On the front - one on each side of the vertical centerline, at the same level and as far apart as practicable	Not less than 381 mm nor more than 1829 mm
Blackout tail & stop lamp	two tail red/orange two stop amber		On the rear - one on each side of the vertical centerline, at the same level and as far apart as practicable	Not less than 381 mm nor more than 1829 mm
		one tail red-orange one stop amber	On rear right side of the vertical centerline at the same level as the rear left side and as far apart as practicable.	Not less than 381 mm nor more than 1829 mm

1/ These lamps are not fitted to trailers.

ANNEX B	RELATED DOCUMENTS
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STANAG 2454 and AMovP-01 - Road Movements and Movement Control

STANAG 4007 - Electrical Connectors Between Prime Movers,
Trailers and Towed Artillery

MIL-STD-1179 - Lamps, Reflectors and Associated Signaling
Equipment for Military Vehicles

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