

Heliport & Helipad Lighting in Saudi Arabia (GACA / ICAO)

Educational Reference for the Aviation Sector



Alrouf Lighting Technology (AlroufLED)

Version 1.0 — Last updated: 2025-12-12

Purpose: This "web book" explains *how heliport lighting is specified, evaluated, and accepted in Saudi Arabia* under **GACA (GACAR)** requirements, and how those requirements relate to **ICAO** guidance and common market requests like **FAA** type approvals.

- **Key idea:** In Saudi projects, acceptance is typically driven by **system compliance** (heliport design + installation + lighting performance) under **GACAR**, supported by **independent laboratory test reports** and **project approvals**—not by a single "GACA product certificate."

How to Use This Reference



If you are an owner / operator

Start with Chapters 1–2, then the "Owner Checklist".



If you are a consultant / engineer

Go to Chapter 3 (GACAR requirements) and Chapter 6 (documentation package).



If you are a contractor

Read Chapter 7 (installation & commissioning) and the "Submittal checklist".



If you are procurement

Read Chapter 4 (documents & certificates) and Chapter 8 (acceptance tests).



If you are AlroufLED team

Use Chapter 9 (sales & communication scripts) as the standard response kit.

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Chapter 1: Aviation Lighting Fundamentals

1.1 What heliport lighting must achieve



A heliport lighting system must help a pilot:



Find

the heliport from a safe distance (identification).



Align

with the approach direction (guidance).



Recognize

the landing/touchdown area boundaries and geometry (perimeter cues).



Avoid

obstacles and visual confusion (glare control, color integrity).



Operate reliably

in **harsh environments** (heat, dust, humidity, salt fog near coast, electrical surges).

1.2 Core heliport terms (quick reference)

- **Heliport / Helipad:** A landing area for helicopters, onshore or offshore.
- **FATO (Final Approach and Take-Off Area):** Area used for final approach and takeoff.
- **TLOF (Touchdown and Lift-Off Area):** Actual touchdown/lift-off surface.
- **Beacon (Heliport Beacon):** Long-range identification light, typically white flashes.
- **Approach lighting:** Lights defining a preferred approach direction.
- **Floodlighting:** General illumination of an area (must avoid glare).

Chapter 2: Who Regulates What — ICAO vs GACA vs FAA

2.1 ICAO (International Civil Aviation Organization)

ICAO publishes *standards and recommended practices* (SARPs). For heliports, the global baseline is **ICAO Annex 14, Volume II (Heliports)**.

ICAO does not issue product certificates. It defines the technical performance requirements (photometry, chromaticity, geometry, etc.).

2.2 GACA (Saudi Arabia) and GACAR

In Saudi Arabia, heliports are governed by **GACAR Part 138 – Certification, Authorization and Operation of Heliports**.^[REF-1]

GACAR includes detailed lighting requirements (applications, locations, and performance). In §138.505, GACA explicitly notes that the design and chromaticity guidance for certain lights in **GACAR Part 139** is equally applicable to heliports.

❏ **Important:** The GACAR document you use may be labeled as "uncontrolled when downloaded"; always confirm the latest version through official channels.

2.3 FAA / EASA (and why they appear in specifications)

Some owners/consultants request **FAA** type approvals (or EASA equivalents) because:

- They follow US/European airport standards across global assets.
- They want *pre-approved* equipment lists as a risk control.
- They have internal standards in Oil & Gas / airports / defense.

However:

- **FAA type approval is not automatically a legal requirement in Saudi heliport regulation.**
- It can be a *contractual requirement* in a project spec.

Action: Treat FAA requests as a **commercial/spec issue**, not as a baseline regulatory assumption.

Chapter 3: Saudi Requirements — GACAR Part 138 (Heliports)

This chapter summarizes lighting requirements from **GACAR Part 138 §138.505 Lights**.^[REF-1]

3.1 General notes (what they mean in practice)

GACA indicates:

- Design characteristics and chromaticity guidance in **GACAR Part 139** is applicable to heliports.
- Obstacle lighting/marking guidance in Part 139 is also applicable.
- For heliports near navigable waters, avoid confusing mariners with aeronautical ground lights.
- NVIS operations require compatibility assessment by the helicopter operator.

📌 **Practical takeaway:** It's not only "does the light work"; it's "does the whole visual environment remain unambiguous and safe".

3.2 Heliport Beacon (Identification beacon)

GACAR specifies that a heliport beacon must:^[REF-1]

- Emit **repeated series of equispaced short duration white flashes** (Figure H-10).
- Be visible at **all angles of azimuth** (360°).
- Have an **effective intensity distribution** as shown in Figure H-11 (Illustration 1).

It also notes that where brilliancy control is desired, 10% and 3% settings can be satisfactory and shielding may be needed to prevent dazzling during final approach.

3.3 Approach lighting systems

GACAR provides configuration guidance for approach lighting (including spacing, crossbar geometry, and optional sequencing).^[REF-1]

3.4 FATO and TLOF lighting

GACAR provides:^[REF-1]

- Application, location, spacing, height limits, color requirements.
- Light distribution references (Figure H-11 illustrations).

These are system-level requirements: you must design the layout and choose products that

Chapter 4: Documents That Matter — Test Reports, Certificates, Approvals

This chapter prevents the #1 cause of confusion: *"What certificate should we show?"*



What is a "Test Report"?

A test report is evidence from an independent lab that a product sample met a referenced standard at the time of testing.

Example: A lab verification indicating compliance with **ICAO Annex 14, Volume II** for photometry and chromaticity.[REF-3]



What is "CE / EMC / LVD" compliance?

These relate to electrical safety and electromagnetic compatibility (EMC). They are often requested because heliport lighting is installed in environments with:

- Radios and navigation aids,
- medical facilities,
- sensitive electronics,
- and surge-prone power networks.

Example: EMC test report for a heliport beacon against EN 55015 / EN 61547 / EN 61000-3-2 / EN 61000-3-3.[REF-4]



What is a "Project Material Approval"?

This is a formal acceptance (often by the Engineer / Consultant) that a product can be used in a specific project.

Example: A material submittal for **AIUIa Helipad Upgrade** listing "Heliport Identification Beacon ... (HP/B)" supplied by Alrouf, with engineer approval.[REF-2]



What is a "GACA approval" in practice?

GACA's heliport oversight is focused on authorization/certification of the **heliport as a system**, not issuing a separate "product certificate" for each light. The lighting products must be supported by adequate evidence (test reports, data sheets, compliance statements) to demonstrate system compliance under GACAR requirements.

Chapter 5: Design Workflow — From Requirements to a Compliant System

5.1 Step-by-step workflow (recommended)

01	02	03
<hr/> Classify the heliport type surface-level, elevated, helideck/shipboard.	<hr/> Define the operating mode day-only, night operations, NVIS.	<hr/> Identify required visual aids under GACAR (beacon, FATO/TLOF, approach, floodlighting).
04	05	06
<hr/> Translate requirements into technical criteria Color, flash, distribution, spacing, mounting height, glare control.	<hr/> Select luminaires supported by credible test evidence (photometry/chromaticity + EMC/safety as applicable).	<hr/> Design the layout (drawings, placement, control systems).
07	08	09
<hr/> Build the documentation package (Compliance Dossier).	<hr/> Install & commission using checklists and acceptance tests.	<hr/> Handover & maintenance plan.

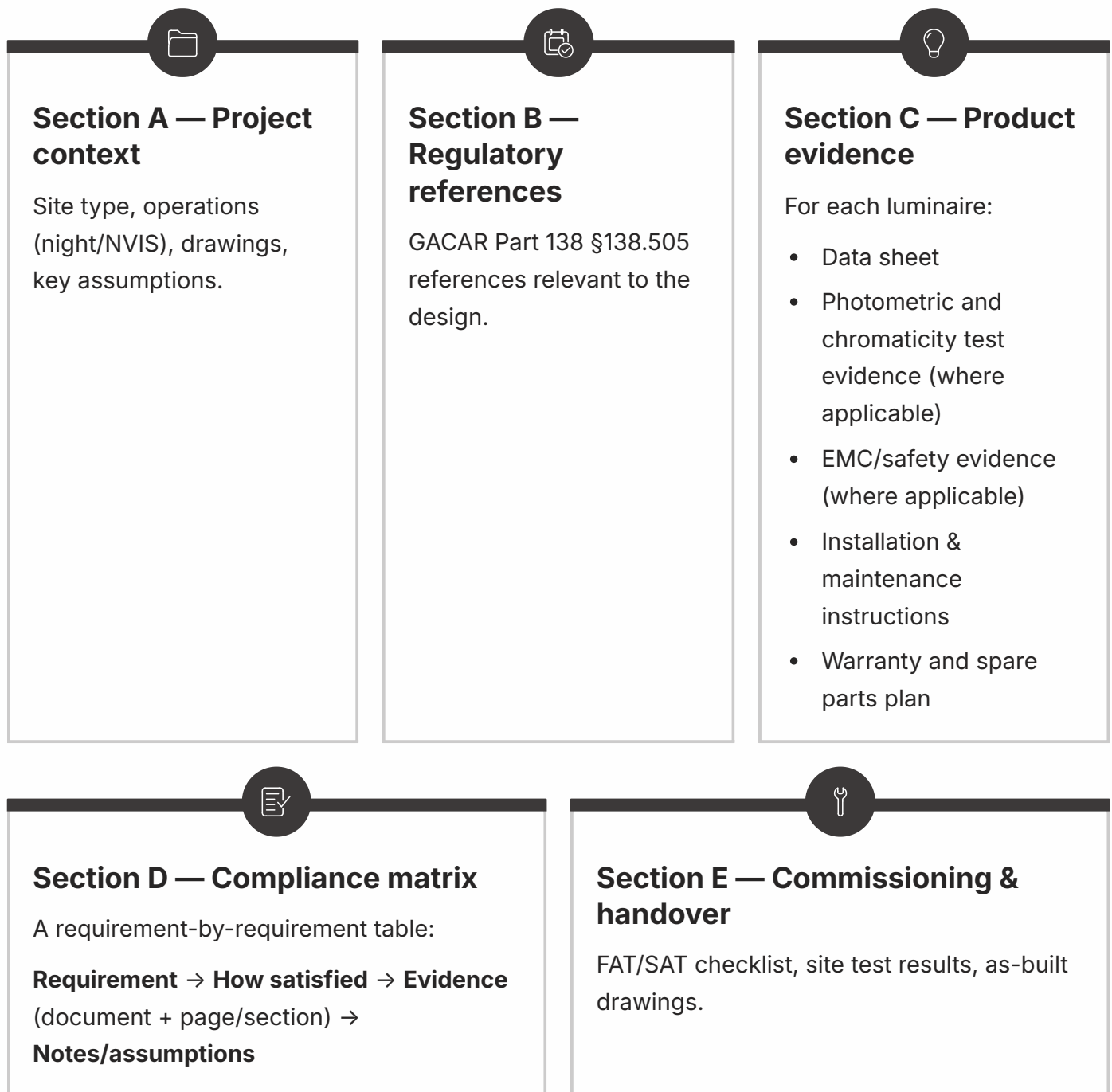
5.2 Common design mistakes (and how to avoid them)

- Treating the beacon as the "only required light".
- Ignoring glare/dazzle (especially for elevated heliports).
- Selecting lights without photometric evidence (risk of rejection).
- Mixing colors and creating visual confusion.
- No change-control: suppliers change LEDs/optics and invalidate test evidence.

Chapter 6: The Compliance Dossier — What to Submit and How to Structure It

A good dossier speeds approvals and reduces rework.

6.1 Recommended dossier structure



6.2 Minimum acceptable evidence (practical)

For a heliport identification beacon, strong evidence includes:

- Independent lab verification against ICAO Annex 14 Vol II for photometry/chromaticity.
- EMC/safety compliance test report(s).

Chapter 7: Installation & Commissioning



7.1 Installation principles

- Follow manufacturer installation notices (voltage range, sealing, tightening, maintenance access).
- Ensure 360° visibility for beacons (avoid parapets / screens / signage blocking sightlines).
- Provide surge protection and correct grounding.
- Avoid light spill that can dazzle pilots; use shielding or brilliancy control settings where necessary (per GACAR note).

7.2 Commissioning checklist (site acceptance)

Mechanical

Mounting integrity, correct fasteners, vibration resistance.

Electrical

Voltage/frequency confirmation, grounding continuity, surge devices installed.

Functional

Correct flash pattern for beacon, correct colors for perimeter lights.

Chapter 8: Quality, Traceability, Change Control

8.1 Why aviation lighting needs stricter change control

A minor component change (LED bin, optics, driver) can change:

- intensity distribution,
- chromaticity,
- EMI behavior,

and may invalidate prior test evidence (because test results apply to the tested sample).

8.2 Recommended controls



Product identification

model code + configuration code.



BOM lock

documented revision and controlled changes.



Supplier declaration

no changes without written notice.



Incoming inspection

key components (driver, LED board, optics).



Periodic re-testing

when changes occur or per annual/biannual schedule for critical assets.

Chapter 9: FAQ & Customer Communications (Including FAA Requests)

9.1 "Do you have a GACA certificate for the product?"

Recommended answer (short):

GACA's heliport regulation focuses on **system compliance** under GACAR. Product acceptance is typically supported through **independent test reports** and compliance documentation, and the heliport is authorized as a complete facility.

9.2 "Is FAA approval mandatory in Saudi Arabia?"

Under GACAR Part 138, lighting requirements are specified by performance/characteristics (flash, distribution, etc.). FAA approval may be required only if it is written as a contractual requirement in a particular project specification.

9.3 "What do you show instead of FAA?"

A best-practice evidence pack includes:

- ICAO-related photometry/chromaticity verification by an independent lab.
- EMC and safety test reports.
- Compliance matrix mapped to GACAR requirements.
- Local project references (where available).

Chapter 10: Case Study — Alrouf Heliport Identification Beacon (HP/B)

This case study uses evidence included in Alrouf submittals and lab documents.

10.1 Product identity (example project use)

A material submittal for **AIU1a Helipad Upgrade** lists:

- "Heliport Identification Beacon ... (HP/B)"
- supplied by **Alrouf Lighting Technology**, origin China.

10.2 Independent ICAO-related verification (Intertek)

An Intertek "Test Verification of Conformity" for a **Heliport Beacon, White, flashing** (model GS-HP/B) references ICAO Annex 14 Volume II (Seventh Edition, July 2016) and includes photometry and chromaticity requirements.

❏ **Important:** The Intertek verification states that results are relevant to the sample tested and do not imply the product is in an Intertek certification program.

10.3 EMC evidence (HTT)

An EMC test report for heliport beacon GS-HP/B covers EN 55015 / EN 61547 / EN 61000-3-2 / EN 61000-3-3 with pass results stated in the summary.

10.4 Why this matters for Saudi projects

Combined, these documents provide:

- **Performance evidence** aligned with ICAO heliport lighting requirements (used as baseline by GACA).
- **EMC/safety confidence** for installations around sensitive equipment.
- **Local reference acceptance** through project material approval.

Chapter 11: Templates — Letters, Checklists, and Matrices

11.1 Template — Compliance Letter (Consultant / Owner)

Subject: Heliport Lighting Compliance Package (GACAR Part 138 / ICAO Evidence)

Dear [Name],

We hereby submit the compliance package for the proposed heliport lighting equipment. The submission is prepared with reference to **GACAR Part 138 §138.505 (Lights)** and related requirements.

The package includes:

1. Product data sheets
2. Photometric/chromaticity evidence (ICAO-related) from independent laboratory documents (where applicable)
3. EMC and safety evidence from independent test reports (where applicable)
4. Compliance Matrix mapping requirements to evidence
5. Installation, commissioning, and maintenance instructions

Sincerely,

[Name]

[Title] — Alrouf Lighting Technology

Template — Compliance Matrix (Structure)

Requirement (GACAR)	Design Decision / Product Feature	Evidence (Doc/Report)	Notes
Example: Beacon flash pattern	Beacon configured to required flashing format	Datasheet + commissioning record	Confirm final settings on site
Example: 360° azimuth	Unobstructed installation location	Layout drawings + photos	Avoid parapet blocking

11.3 Template — Contractor Handover Checklist

- As-built drawings (layout + SLD)
- Device list with model numbers and serial numbers
- Commissioning results and photos
- Maintenance schedule and spare parts list

Glossary

Azimuth

Horizontal angle around the horizon (0–360°).

Chromaticity

Color specification in a defined color space; ensures "aviation green" or "white" matches standards.

Photometry

Measurement of light intensity/distribution.

EMC

Electromagnetic compatibility; emission and immunity performance.

FATO

Final Approach and Take-Off Area.

TLOF

Touchdown and Lift-Off Area.

References

REF-1 — GACAR Part 138 (Heliports)

- Document: *GACAR Part 138 – Certification, Authorization and Operation of Heliports* (downloaded copy; may be labeled as "UNCONTROLLED DOCUMENT WHEN DOWNLOADED — Consult the GACA website for current version").
- Relevant section: §138.505 "Lights" (Heliport beacon, approach lighting, FATO/TLOF lighting, floodlighting, obstacle and taxiway lighting notes).

REF-2 — Saudi Project Reference (Material Approval)

- Material Submittal: **CW14852-HHG-MAB-MS-EL-001** — *AIUla Helipad Upgrade* (Royal Commission for AIUla).
- Content: Heliport Identification Beacon (HP/B) listed as supplied by Alrouf Lighting Technology with engineer approval in the submittal package.

References (Continued)

REF-3 — Photometry & Chromaticity Evidence (ICAO-Referenced)

- Document: **Intertek Test Verification of Conformity**, Verification No. **10346479CRT-002TVOC**, Test Report No. **10346479CRT-002**.
- Product: Heliport Beacon (Model **GS-HP/B**).
- Standard referenced: **ICAO Annex 14, Volume II – Heliports**, Seventh Edition (July 2016); photometry and chromaticity requirements.

REF-4 — EMC Evidence

- Document: **EMC Test Report**, Report No. **HTT180910177ER** (HTT).
- Product: Heliport Beacon (Model **GS-HP/B**).
- Standards: EN 55015, EN 61547, EN 61000-3-2, EN 61000-3-3 (pass results stated in the report summary).

Key Takeaways for Aviation Professionals

System-Level Compliance

In Saudi Arabia, heliport lighting acceptance is driven by **system compliance** under GACAR, not individual product certificates. Focus on the complete installation and its performance.

Independent Verification

Support your submissions with **independent laboratory test reports** that reference ICAO standards for photometry, chromaticity, and EMC/safety compliance.

Documentation Excellence

Build a comprehensive **Compliance Dossier** that maps every requirement to evidence, includes project context, and provides clear traceability.

Change Control

Maintain strict **change control** over components. Even minor changes to LEDs, optics, or drivers can invalidate test evidence and compromise compliance.

Contact & Support

Alrouf Lighting Technology (AlroufLED)

For technical inquiries, project support, or compliance documentation assistance, please contact our aviation lighting specialists.

This reference document is maintained by the Alrouf technical team and updated regularly to reflect the latest regulatory requirements and industry best practices.

Document Version: 1.0

Last Updated: 2025-12-12

- Always verify the latest version of GACAR and ICAO standards through official channels before beginning a new project.

