

**Kingdom of Saudi Arabia  
General Authority of Civil Aviation**

# **GACA REGULATION**

## **Section 16**

### **Environmental Protection Volume II - Aircraft Engine Emissions**

**Edition 3.0**



## FOREWORD

The following Regulations governing Environmental Protection related to Aircraft Noise and Engine Emissions are based on Articles; 1, 2, 3, 4, 5, 6, and 38 in addition to the Aircraft Airworthiness Articles; 9, 11, 14, 24, 25, 25, 29, 30, 31,38, 49, 50,51, 52,53, 59,76, 68,69,70,80, 81,82,83,84, 85, 86,87, 91, 92, 93, 94, 97, 175 and 177 of the Civil Aviation Act that has been approved by the Council of Ministers Resolution No. 185 dated 17/07/1426H and issued by the Royal Decree No. M/44 dated 18/07/1426H. (23/08/2005G).

The promulgation of this regulation is based on the authority granted in Article 179 of the Civil Aviation Act, and is issued under the authority of the President, General Authority of Civil Aviation, as a duly delegated representative of the GACA Board of Directors, in accordance with Order No.T-41, dated 30/12/1429H (28/12/2008G).

The General Authority of Civil Aviation is responsible for the preparation and distribution of all regulations in sufficient quantities so that all service providers and aircraft operators based in the Kingdom of Saudi Arabia are able to obtain an authentic copy prior to the effective date of the regulation.

**APPROVED:**

*Original Signed*

Fahad Bin Abdullah M. Al Saud  
President, General Authority of Civil Aviation,

Effective Date: 13 November 2014



## CONTENT RULES

### 1) Organization Structure:

- a) GACA has established an Airworthiness Division (AW) within the Aviation Standards Department (ASD) of the Safety and Economic Regulation Sector (S&AT) with the following responsibilities:
1. Ensure and enforce compliance with the applicable regulations and procedures of GACAR Section 16 Vol II including the identification of conditions and circumstances under which AW are allowed to deal with, and resolve events involving certain deviations internally, within the context of this regulation,
  2. Perform safety oversight functions including audits, inspections, investigations, and data analysis; on pre-established annual audit program and frequent inspections of areas of greater safety concern or need, as identified by the analysis of data, or as instructed by Senior Management,
  3. Certify the airworthiness of aircrafts registered in the Kingdom to include aircraft noise and engine emissions requirements, and maintain current data base for aircraft airworthiness certifications,
  4. Certify major aircrafts alterations and repairs and conduct compliance and conformity inspections to ensure airworthiness,
  5. Review and approve aircraft flight manuals (AFM), structural repair, minimum equipment list (MEL), Configuration Deviation List (CDL), overhaul, fueling/refueling/de-fueling, and ground servicing, manuals
  6. Review and approve registered aircrafts' weight and balance control, reliability, corrosion control, and structural integrity programs,
  7. Ensure the maintenance of registered aircrafts in accordance with all requirements and applicable standards for the particular aircraft design and series through:
    - a) Review and approval of maintenance manuals, programs, and schedules for all registered aircrafts,
    - b) Regular surveillance and inspection of common carriers,
    - c) Inspect and certify in and out of Kingdom stations repairing Saudi-registered aircrafts,
    - d) Inspect and certify mechanics, repairmen and other maintenance personnel working in repair stations handling Saudi-registered aircrafts to ensure their capabilities in maintaining and repairing aircrafts. This includes as well assessing and approving their training program,
    - e) Evaluate application for and appoint Designated Engineering Representatives (DERs),
  8. Participate in incident and accident investigations.



## 2) Rules of Constructions:

- a) To avoid any misunderstanding within this regulation, certain words are to be interpreted as having specific meanings when they are used, unless the context requires otherwise:
1. Words importing the singular include the plural;
  2. Words importing the plural include the singular; and
  3. Words importing the masculine gender include the feminine
- b) In this regulation, the following protocol is used:
1. The words "**Shall**" and "**must**" indicate that compliance is compulsory.
  2. The word "**should**" indicates a recommendation. It does not mean that compliance is optional but rather that, where insurmountable difficulties exist, the GACA-S&AT may accept an alternative means of compliance, provided that an acceptable safety assurance from the authority shows that the safety requirements will not be reduced below that intended by the requirement.
  3. The word "**Can**" or "**May**" is used in a permissive sense to state authority or permission to do the act prescribed, and the words "no person may \* \* \*" or "a person may not \* \* \*" mean that no person is required, authorized, or permitted to do the act prescribed;
  4. The word "**will**" is used to express the future; and
  5. The word "**Includes**" means "**includes but is not limited to**".



### **AMENDMENT PROCEDURE**

The existing General Authority of Civil Aviation Regulations (GACAR) will be periodically reviewed to reflect the latest updates of International Civil Aviation Organization (ICAO) Standards and Recommended Practices (SARP's); it will be also amended to reflect the latest aviation safety provisions issued by GACA and other regional and international civil aviation organizations. A complete revised edition incorporating all amendments will be published every three years from the original effective date of this regulation. The amendment procedure shall be as follows:

1. When the General Authority of Civil Aviation (GACA) receives an amendment to any of the current ICAO Annexes that can affect the provisions of this regulation, it will be forwarded by the Assistant President of International Cooperation to the Assistant Vice President, Safety and Air Transport (S&AT) who in turn will forward it to Aviation Regulation Department to coordinate with the concerned department to study and comments, taking into account the ICAO deadline for the reply.
2. When any GACA department or stakeholder proposes an amendment to this regulation, it will send a letter with the proposed amendment including a clear justification and argument for such amendment. Following the receipt of an amendment proposal, the S&AT will analyze this proposal and forward its comments and any proposed decision action to the S&AT Assistant Vice President.
3. An accepted amendment proposal will be prepared as draft amendment to the GACAR-Section 16 and forwarded to the originator of the amendment proposal and concerned GACA department (s) for further review and comment within a specified timeline.
4. All accepted amendments will be drafted in the form of Notices of Proposed Amendments (NPA) and forwarded to all concerned parties including stakeholders for comment within a two-month reply period. The NPA shall indicate the proposed Amendment's effective date.
5. Following the receipt of NPA replies, the S&AT will analyze the comments received and produce a new draft in consultation with the concerned GACA department. The final draft will be submitted to President of the General Authority of Civil Aviation for formal approval prior to publication.
6. The Amendment's effective date will take into account the comments of all the concerned parties and stakeholders.
7. Any differences between the GACAR Section 16 new amendment and ICAO Annex 16 Standards and Recommended Practices will be forwarded to ICAO as a Difference and published as it is in the Aeronautical Information Publication (AIP).
8. All concerned parties and stakeholders will be provided a copy of the new amendment and will be requested to update their copy of the GACAR Section 16 accordingly.
9. It is the responsibility of all concerned parties to keep their copy of GACAR-Section 16 and other GACA regulation publication up to date.



## **SUPPLEMENTARY REGULATIONS**

From time to time it will be necessary to issue regulations which supplement or augment the GACAR Regulations. The following procedures will apply:

1. Supplementary regulations will be issued in the form of a GACA Regulation Circular (RC).
2. The GACA Regulation Circular will be approved by the President.
3. The process for preparation and publishing of the GACA Regulation Circular will be addressed in the GACA Quality System Manual.





## AMENDMENT RECORD

[illegible]



### LIST OF CURRENT DIFFERENCES TO ICAO SARPS

GACA Regulation Section 16 Volume II is based on ICAO Annex 16 Volume II. The following is a list of differences with the GACA Regulation and the ICAO Standards and Recommended Practices (SARPS). Differences have been notified to ICAO and are also published in the KSA Aeronautical Information Publication (AIP-GEN 1.7).

<b>ICAO Annex 16 Volume II – Environmental Protection - Aircraft Engine Emissions - Amendment 8</b>			
<b>SARP Identifier</b>	<b>SARP</b>	<b>Regulation Reference</b>	<b>Level of implementation of SARP's</b>
Chapter 1 Reference 1.0.4 Definition	<i>Smoke.</i> The carbonaceous materials in exhaust emissions which obscure the transmission of light.	GACA Regulations Section 16: GACAR/FAR 34.1	More Exacting or Exceeds
Chapter 1 Reference Definition	<p style="text-align: center;"><b>INTERNATIONAL STANDARDS AND RECOMMENDED PRACTICES</b></p> <p style="text-align: center;"><b>PART I. DEFINITIONS AND SYMBOLS</b></p> <p style="text-align: center;"><b>CHAPTER 1. DEFINITIONS</b></p> <p>Where the following expressions are used in Volume II of this Annex, they have the meanings ascribed to them below:</p> <p><i>erburning.</i> A mode of engine operation wherein a combustion system fed (in whole or part) by vitiated air is used.</p>	GACA Regulations Section 16: GACAR/FAR Part 34	Less protective or partially implemented or not implemented
Chapter 1 Reference 1.01 Definition	Climb phase. The operating phase defined by the time during which the engine is operated in the climb operating mode.	GACA Regulations Section 16: GACAR/FAR 34.62	Less protective or partially implemented or not implemented
Chapter 1 Reference 1.0.4 Definition	Approach phase. The operating phase defined by the time during which the engine is operated in the approach operating mode.	GACA Regulations Section 16: GACAR/FAR 34.62	Different in Character or Other Means of Compliance
Chapter 1 Reference Definition	Climb phase. The operating phase defined by the time during which the engine is operated in the climb operating mode.	GACA Regulations Section 16: GACAR/FAR 34.62	Different in Character or Other Means of Compliance



**GACA REGULATIONS - SECTION 16 – ENVIRONMENTAL PROTECTION**  
**VOLUME II - AIRCRAFT ENGINE EMISSIONS**

**LIST OF CURRENT DIFFERENCES TO ICAO SARPS**

Chapter 1 Reference Definition	<i><b>Date of manufacture. The date of issue of the document attesting that the individual aircraft or engine as appropriate conforms to the requirements of the type or the date of an analogous document.</b></i>	GACA Regulations Section 16: GACAR/FAR 34.1	Different in Character or Other Means of Compliance
Chapter 1 Reference Definition	Derivative version. An aircraft gas turbine engine of the same generic family as an originally type-certificated engine and having features which retain the basic core engine and combustor design of the original model and for which other factors, as judged by the certifying authority, have not changed. Note.— Attention is drawn to the difference between the definition of “derived version of an aeroplane” in Volume I of Annex 16 and the definition of “derivative version” in this Volume.	GACA Regulations Section 16: GACAR/FAR 34.1	Different in Character or Other Means of Compliance
Chapter 1 Reference Definition	Oxides of nitrogen. The sum of the amounts of the nitric oxide and nitrogen dioxide contained in a gas sample calculated as if the nitric oxide were in the form of nitrogen dioxide.	GACA Regulations Section 16: GACAR/FAR 34.21	Different in Character or Other Means of Compliance
Chapter 1 Reference Definition	Taxi/ground idle. The operating phases involving taxi and idle between the initial starting of the propulsion engine(s) and the initiation of the take-off roll and between the time of runway turn-off and final shutdown of all propulsion engine(s).	GACA Regulations Section 16: GACAR/FAR 34.1, 34.62	Different in Character or Other Means of Compliance
Chapter 1 Reference 1.0.4 Definition	Unburned hydrocarbons. The total of hydrocarbon compounds of all classes and molecular weights contained in a gas sample, calculated as if they were in the form of methane.	GACA Regulations Section 16: GACAR/FAR PART 34, subpart C	Different in Character or Other Means of Compliance
Chapter 1 Reference 1.3 Standard	Contracting States shall recognize as valid a certification relating to fuel venting granted by the certifying authority of another Contracting State provided the requirements under which such certification was granted are not less stringent than the provision of Volume II of this Annex.	GACA Regulations Section 16: GACAR/FAR 34.3(d)	Less protective or partially implemented or not implemented
Chapter 1 Reference 1.4 Standard	Contracting States shall recognize as valid emissions certification granted by the certifying authority of another Contracting State provided that the requirements under which such certification was granted are not less stringent than the provisions of Volume II of this Annex.	GACA Regulations GACAR/FAR 34.3(d)	Less protective or partially implemented or not implemented



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**CHAPTER 1**

**ENVIRONMENTAL PROTECTION REGULATION  
AIRCRAFT ENGINE EMISSIONS**

- 1) The General Authority of Civil Aviation (GACA) adopted the United States of America Environmental Protection Regulations related to Aircraft Engine Emissions through the 14 CFR, and its supporting handbooks, manuals, Advisory Circulars (ACs), Directives, policy, guidance material, Orders, Notices, and specific GACA requirements as amended, to be GACA Regulation Section 16 - Environmental Protection Volume II – Aircraft Engine Emissions.
- 2) The adoption of the United States Environmental Protection Regulations is based on GACA Board of Directors Order No. T- 4-26, dated 28/08/1428H (10/09/2007G). Based on this Order, GACA also adopted the United States Aviation Safety Regulations regarding Personnel Licensing, Operation of Aircraft, and Aircraft Airworthiness to be part of GACA Regulations until GACA develops its own regulations for these areas.
- 3) GACA promulgated civil aviation safety regulations that comprise the following sections:
  - Section 1 - Personnel Licensing (GACAR /FAR)
  - Section 2 - Rules of the Air
  - Section 3 - Meteorological Service for Air Navigation
  - Section 4 - Aeronautical Charts
  - Section 5 - Units of Measurement to be Used in Air and Ground Operations
  - Section 6 - Operation of Aircraft (GACAR /FAR)
  - Section 7 - Aircraft Nationality and Registration Marks
  - Section 8 - Airworthiness of Aircraft (GACAR /FAR)
  - Section 9 - Facilitation (RESERVED)
  - Section 10 - Aeronautical Telecommunications
  - Section 11 - Air Traffic Services
  - Section 12 - Search and Rescue
  - Section 13 - Aircraft Accident and Incident Investigation
  - Section 14 - Aerodromes
  - Section 15 - Aeronautical Information Services
  - Section 16 - Environmental Protection (GACAR /FAR)
  - Section 17 - Aviation Security (RESERVED)
  - Section 18 - The Safe Transportation of Dangerous Goods by Air
  - Section 19 - Safety Management
  - Section 21 - Safety Management System
- 4) Any differences between GACAR Section 16/14 CFR Parts and ICAO Annex 16 Standards and Recommended Practices (SARP's) will be reported to ICAO and reflected in Kingdom of Saudi Arabia (KSA) Aeronautical Information Publications (AIP's).
- 5) GACAR Section 16/14 CFR Parts provisions related to Environmental Protection Volume II – Aircraft Engine Emissions are addressed in 14 CFR Parts, supported by handbooks, manuals, Advisory Circulars (ACs), Directives, policy, guidance materials, Orders and Notices and more specifically through the following 14 CFR Parts:



- a) Part 21 — Certification Procedures for Products and Parts;
  - b) Part 23 — Airworthiness Standards: Normal, Utility, Acrobatic and Commuter Category Airplanes;
  - c) Part 25 — Airworthiness Standards: Transport Category Airplanes;
  - d) Part 26 — Continued Airworthiness and Safety Improvements for Transport Category Airplanes;
  - e) Part 27 — Airworthiness Standards: Normal Category Rotorcraft;
  - f) Part 29 — Airworthiness Standards: Transport Category Rotorcraft;
  - g) Part 31 — Airworthiness Standards: Manned Free Balloons;
  - h) Part 33— Airworthiness Standards: Aircraft Engines;
  - i) Part 34— Fuel Venting and Exhaust Emission Requirements for Turbine Engine Powered Airplanes;
  - j) Part 35 — Airworthiness Standards: Propellers;
  - k) Part 36 — Noise Standards: Aircraft Type and Airworthiness Certification;
  - l) Part 39 — Airworthiness Directives;
  - m) Part 43 — Maintenance, Preventive Maintenance, Rebuilding, and Alteration;
  - n) Part 45 — Identification and Registration Marking;
  - o) Part 47 — Aircraft Registration;
  - p) Part 65 — Certification: Airmen Other than Flight Crewmembers;
  - q) Part 145 — Repair Stations;
  - r) Part 147 — Aviation Maintenance Technician Schools; and
  - s) Part 183 — Representatives of the Administrator (Designees).
- 6) The Presidency of Meteorology and Environment (PME) is the national authority of the Kingdom of Saudi Arabia (KSA) that is responsible for the regulation and the protection of the environment in the Kingdom. GACA will be responsible for the implementation of PME regulations for environmental protection that are not related to aircraft noise and engine emissions which are regulated by GACA Regulation Section 16.

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## CHAPTER 2 - ADDITIONAL GAGA REGULATION

Reserve

