SOUTH AFRICAN CIVIL AVIATION AUTHORITY

TECHNICAL GUIDANCE MATERIAL on the Assessment of Airport-Related Air Quality

Subject: **GUIDANCE MATERIAL FOR THE ASSESSMENT OF AIRPORT-RELATED AIR QUALITY**

Date: **01 AUGUST 2023**

1. APPLICABILITY

1.1. This Technical Guidance Material (TGM) is applicable to Aerodromes/heliports who intend to deal with issues relating to the impact of aviation on Local Air Quality (LAQ). (The term 'airport' shall be used in the document to mean either aerodromes or heliports).

1.2. It should be noted that the South African Civil Aviation Authority (SACAA) does not regulate the National Environmental Management: Air Quality Act (NEM: AQA) No. 39 of 2004 but only provides air quality management guidance to the aviation industry so that a sustainable future in aviation can be achieved.

2. PURPOSE

To provide guidance to the aviation industry on the best practices concerning the management of airport-related air quality.

3. REFERENCES

i. CAR 34
ii. ICAO Doc 9889 (Airport Air Quality Manual)
iii. National Environmental Management; Air Quality Act 59 of 2004 and the Regulations made thereunder.
iv. The National Framework for Air Quality Management in RSA

4. TERMS AND ABBREVIATIONS:

TERM	DEFINITION
Ambient air quality standards	values that define 'targets for air quality management and establish the permissible amount or concentration of a particular substance in or property of discharges to air, based on what a particular receiving environment can tolerate without significant deterioration'.
Emission standard	A specific limit to the amount of pollutant that can be released to the atmosphere by a specified source.
Greenhouse gases (GHGs)	Gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and re-emit infrared radiation, and includes carbon dioxide, methane and nitrous oxide.

ABBREVIATION	DESCRIPTION
AECS	Aviation Environmental Compliance Specialist
AQMP	Air Quality Management Plan
E: ASI	Executive: Aviation Safety Infrastructure
ECC	Environmental Consultative Committees
EMPRs	Environmental Management Programmes
IAP	Interested and Affected Party
ICAO	The International Civil Aviation Organisation
KPIs	Key Performance Indicators
LAQ	Local Air Quality
MEC	Member of the Executive Council
SARPs	Recommended Practices
SAWS	South African Weather Service
AEPS	Aviation Environmental Protection Specialist:
TGM	Technical Guidance Material
ToR	Terms of Reference

5. INTRODUCTION

The International Civil Aviation Organisation (ICAO) Annex 16 Volume II Standards and Recommended Practices (SARPs) include limits on the amounts of gaseous emissions and smoke allowable in the exhaust of aircraft engine types to reduce the impact of aircraft emissions on LAQ. The goal of these SARPs is to address potential negative effects of air pollutants on Local Air Quality (LAQ), mainly concerning human health and welfare. They also address liquid fuel venting, smoke and the major gaseous exhaust emissions from jet engines viz hydrocarbons (HC), oxides of nitrogen (NOx) and carbon monoxide (CO). Concerns about LAQ in airport surrounding areas also focus on emissions from airport sources e.g. airport traffic and ground service equipment.

5.1. Sources of air pollutants

5.1.1. There are many sources of emissions at an airport and aircraft are one of them. Other sources include:

5.1.1.1. Airport ground service equipment
5.1.1.2. Various ground transport travelling in and around the airport
5.1.1.3. Airport fire training facilities
5.1.1.4. Fuel storage facilities

5.2. Contaminants from aircraft engine emissions

5.2.1. Global focus has been on the reduction of Nitrogen Oxides (NOx) but numerous contaminants are emitted during the different phases of operation:

5.2.1.1. Carbon monoxide (CO)
5.2.1.2. Sulphur oxides e.g. SO2
5.2.1.3. Particulate Matter (PM)- e.g. PM10
5.2.1.4. Volatile Organic Compounds (VOC)- e.g. benzene (C6H6)
5.2.1.5. Ozone (O3)
5.2.1.6. NOx-includes nitrogen oxide (NO) and nitrogen dioxide (NO2)

6. AIR QUALITY REGULATIONS IN RSA

6.1. Roles and responsibilities for Air Quality Management

6.1.1. Government

Section 24 of the RSA Constitution, 1996 places an obligation on all spheres of government to take realistic measures to, among other things, ensure pollution prevention.

> **24. Environment. -** Everyone has the right—
> (a) to an environment that is not harmful to their health or well-being; and
> (b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that—
> (i) prevent pollution and ecological degradation;
> (ii) promote conservation; and
> (iii) secure ecologically sustainable development and use of natural resources while promoting;
> (iv) justifiable economic and social development.

6.1.2. Department of Environmental Affairs (DEA)

This is the National Lead Agent for environmental management, thus air quality management is under their jurisdiction. They provide national norms and standards for air quality governance. Air quality is regulated by the National Environmental Management: Air Quality Act (NEM: AQA) No. 39 of 2004. The management of air quality is influenced by policy and legislation developed at international, national, provincial and municipal levels.

6.1.3. Provincial environmental departments

Each province provides, where necessary, the provincial norms and standards to air quality is governed in the province. Each Member of the Executive Council (MEC) responsible for the environment has various air quality management powers. A few of them are listed below:

a) Prepare the provincial Air Quality Management Plan (AQMP) as part of the Environmental Implementation Plan (EIP) in terms of the National Environmental Management Act (NEMA) 107 of 1998;
b) Report annually on the progress of the implementation of the AQMP;
c) Perform Atmospheric Emission Licensing functions; and
d) Review AQMPs received from Municipalities.

6.1.4. Municipalities

Like the national and provincial departments, municipalities also have numerous responsibilities and exclusive air quality management powers:

a) Develop municipal AQMPs
b) Report annually on the progress of the implementation of the AQMP;
c) May also establish municipal standards for emissions in terms of their by-laws

6.1.5. Other national departments

Some national departments, (other than DEA), within their various jurisdictions, have an impact on air quality. Examples of interest or responsibilities for the Department of Transport (DoT) are:

a) Emissions from various forms of transport (road, rail, aviation and maritime); and
b) Emissions from the construction of transport infrastructure.

NEM: AQA has established regulations on ambient (outdoor) levels of various pollutants. Procedures for achieving compliance with these regulations are defined for each pollutant.

Current legislation, regulations and by-laws are provided by SAAQIS. They also provide broad advice on the roles and responsibilities of the numerous actors and agencies within the various available regulations.

7. AIR QUALITY INFORMATION MANAGEMENT

7.1. The South African Air Quality Information System (SAAQIS)

The National Framework for Air Quality Management facilitates access to air quality information. The Department of Environmental Affairs (DEA), in collaboration with the South African Weather Service (SAWS) established the South African Air Quality Information System (SAAQIS). The SAWS is the custodian of the SAAQIS.

7.2. Duties of the SAAQIS

7.2.1. *Avail air information to stakeholders*

7.2.2. *Offer a common method for managing air quality in the republic*

7.2.3. *Provide consistency in the way data, information and reporting are managed in South Africa*

7.3. Ambient Air Quality Information

7.3.1. SAAQIS will assist with:

a) Information on how to produce and present ambient air quality data;

b) Quality Assurance and Quality Control (QA/QC) systems

c) Data storage and presentation/reporting routines

7.4. Ambient Air Quality Measurement Requirements

Assessment of all ambient pollutant concentrations shall be conducted in terms of Section 5.2.1.3 of the National Framework for Air Quality Management in RSA.

7.5. Location

7.5.1. The following factors should be taken into account in respect to the siting of SO2, NO2, PM10, CO and C6H6 sampling points:

a) Access;

b) Security;

c) Interfering sources disturbing airflow in the locality of the sampler;

d) Safety to the public and operators;

e) Accessibility of electrical power and telephone communication;

f) Planning obligations;

g) Visibility of the site in relation to its surroundings;

h) Educational awareness prospect associated with the siting; and

i) Desirability of co-locating sampling points for different pollutants.

7.6. Criteria for determining the recommended minimum number of sampling sites

Number of sampling sites varies with the class of air quality experienced in a given area (Section 5 of the National Framework for Air Quality Management in RSA provides the framework for the use and application of the standards to air quality management).

7.7. Requirements for meteorological monitoring

Meteorological conditions should be part of air quality management.

8. NATIONAL AMBIENT AIR QUALITY STANDARDS

The national ambient air quality standards to be used shall be in terms of section 9 (1) of the NEM: AQA 59 of 2004 and the regulations made thereunder. The methods for the analysis of the various pollutants (as listed in the NEM: AQA regulations) are summarized in the table below:

Pollutant	**Method for analysis**
Carbon monoxide (CO)	ISO 4224
Sulphur dioxide (SO_2)	ISO 6767
Particulate Matter (PM_{10})	EN 12341

Particulate Matter ($PM_{2.5}$)	EN14907
Benzene (C_6H_6)	EPA compendium method TO-14 A or method TO-17
Ozone (O_3)	SANS 13964
Nitrogen dioxide (NO_2)	ISO 7996

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