Annex Reference	ENVIRONMENTAL PROTECTION Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 1 Reference **Definition**	**INTERNATIONAL STANDARDS AND RECOMMENDED PRACTICES** **PART I. DEFINITIONS AND SYMBOLS** **CHAPTER 1. DEFINITIONS** Where the following expressions are used in Volume II of this Annex, they have the meanings ascribed to them below: ***Afterburning.*** A mode of engine operation wherein a combustion system fed (in whole or part) by vitiated air is used.	Civil Aviation Rule (CAR) 91.807; Civil Aviation Rules (CAR) Part 21 Appendix C.	No Difference		The Standards of Annex 16 Volume II are incorporated by reference in both CAR 91.807 and Part 21 Appendix C.
Chapter 1 Reference **Definition**	***Approach phase.*** The operating phase defined by the time during which the engine is operated in the approach operating mode.	CAR 91.807; CAR Part 21 Appendix C.	No Difference		
Chapter 1 Reference **Definition**	***Climb phase.*** The operating phase defined by the time during which the engine is operated in the climb operating mode.	CAR 91.807; CAR Part 21 Appendix C.	No Difference		

Report on entire Annex

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Chapter 1 Reference **Definition**	***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.	CAR 91.807; CAR Part 21 Appendix C.	No Difference		
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 certificating 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.*	CAR 91.807; CAR Part 21 Appendix C.	No Difference		
Chapter 1 Reference **Definition**	***Exhaust nozzle.*** In the exhaust emissions sampling of gas turbine engines where the jet effluxes are not mixed (as in some turbofan engines for example) the nozzle considered is that for the gas generator (core) flow only. Where, however, the jet efflux is mixed the nozzle considered is the total exit nozzle.	CAR 91.807; CAR Part 21 Appendix C.	No Difference		
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.	CAR 91.807; CAR Part 21 Appendix C.	No Difference		Common usage.

Report on entire Annex

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Chapter 1 Reference **Definition**	***Rated thrust.*** For engine emissions purposes, the maximum take-off thrust approved by the certificating authority for use under normal operating conditions at ISA sea level static conditions, and without the use of water injection. Thrust is expressed in kilonewtons.	CAR 91.807; CAR Part 21 Appendix C.	No Difference		
Chapter 1 Reference **Definition**	***Reference pressure ratio.*** The ratio of the mean total pressure at the last compressor discharge plane of the compressor to the mean total pressure at the compressor entry plane when the engine is developing take-off thrust rating in ISA sea level static conditions. *Note.— Methods of measuring reference pressure ratio are given in Appendix 1.*	CAR 91.807; CAR Part 21 Appendix C.	No Difference		
Chapter 1 Reference **Definition**	***Smoke Number.*** The dimensionless term quantifying smoke emissions (*see* 3 of Appendix 2).	CAR 91.807; CAR Part 21 Appendix C.	No Difference		
Chapter 1 Reference **Definition**	***Smoke.*** The carbonaceous materials in exhaust emissions which obscure the transmission of light.	CAR 91.807; CAR Part 21 Appendix C.	No Difference		

Report on entire Annex

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Chapter 1 Reference **Definition**	***Take-off phase.*** The operating phase defined by the time during which the engine is operated at the rated thrust.	CAR 91.807; CAR Part 21 Appendix C.	No Difference		
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).	CAR 91.807; CAR Part 21 Appendix C.	No Difference		
Chapter 1 Reference **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.	CAR 91.807; CAR Part 21 Appendix C.	No Difference		

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Chapter 2 Reference **2.0** **Standard**	**CHAPTER 2. SYMBOLS** Where the following symbols are used in Volume II of this Annex, they have the meanings ascribed to them below: CO Carbon monoxide *Dp* The mass of any gaseous pollutant emitted during the reference emissions landing and take-off cycle F_n Thrust in International Standard Atmosphere (ISA), sea level conditions, for the given operating mode F_{oo} Rated thrust F^*_{oo} Rated thrust with afterburning applied HC Unburned hydrocarbons (*see* definition) NO Nitric oxide NO_2 Nitrogen dioxide NO_x Oxides of nitrogen (*see* definition) SN Smoke Number (*see* definition) π_{oo} Reference pressure ratio (*see* definition)	CAR 91.807; CAR Part 21 Appendix C.	No Difference		The Standards of Annex 16 Volume II are incorporated by reference in both CAR 91.807 and Part 21 Appendix C.

Report on entire Annex

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Chapter 1 Reference **1.0.1** **Standard**	**PART II. VENTED FUEL** **CHAPTER 1. ADMINISTRATION** The provision of this Part shall apply to all turbine engine powered aircraft intended for operation in international air navigation manufactured after 18 February 1982.	CAR 91.807; CAR Part 21 Appendix C.	No Difference		The Standards of Annex 16 Volume II are incorporated by reference in both CAR 91.807 and Part 21 Appendix C.
Chapter 1 Reference **1.2** **Standard**	Certification related to the prevention of intentional fuel venting shall be granted by the certificating authority on the basis of satisfactory evidence that either the aircraft or the aircraft engines comply with requirements of Chapter 2. *Note.— The document attesting certification relating to fuel venting may take the form of a separate fuel venting certificate or a suitable statement contained in another document approved by the certificating authority.*	CAR 91.807; CAR Part 21 Appendix C.	No Difference		
Chapter 1 Reference **1.3** **Standard**	Contracting States shall recognize as valid a certification relating to fuel venting granted by the certificating 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.	CAR 91.807; CAR Part 21 Appendix C.	No Difference		
Chapter 2 Reference **2.0** **Standard**	**CHAPTER 2. PREVENTION OF INTENTIONAL FUEL VENTING** Aircraft shall be so designed and constructed as to prevent the intentional discharge into the atmosphere of liquid fuel from the fuel nozzle manifolds resulting from the process of engine shutdown following normal flight or ground operations.	CAR 91.807; CARs, Part 21 Appendix C.	No Difference		The Standards of Annex 16 Volume II are incorporated by reference in both CAR 91.807 and Part 21 Appendix C.

Report on entire Annex

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Chapter 1 Reference **1.0.1** **Standard**	**PART III. EMISSIONS CERTIFICATION** **CHAPTER 1. ADMINISTRATION** The provision of 1.2 to 1.4 shall apply to all engines included in the classifications defined for emission certification purposes in Chapters 2 and 3 where such engines are fitted to aircraft engaged in international air navigation.	CAR 91.807; CAR Part 21 Appendix C.	No Difference		The Standards of Annex 16 Volume II are incorporated by reference in both CAR 91.807 and Part 21 Appendix C.
Chapter 1 Reference **1.2** **Standard**	Emissions certification shall be granted by the certificating authority on the basis of satisfactory evidence that the engine complies with requirements which are at least equal to the stringency of the provisions of Volume II of this Annex. Compliance with the emissions levels of Chapters 2 and 3 shall be demonstrated using the procedure described in Appendix 6. *Note.— The document attesting emissions certification may take the form of a separate emissions certificate or a suitable statement contained in another document approved by the certificating authority.*	CAR 91.807; CAR Part 21 Appendix C.	No Difference		

Report on entire Annex

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Chapter 1 Reference **1.3** **Standard**	The document attesting emissions certification for each individual engine shall include at least the following information which is applicable to the engine type: a) name of certificating authority; b) manufacturer's type and model designation; c) statement of any additional modifications incorporated for the purpose of compliance with the applicable emissions certification requirements; d) rated thrust; e) reference pressure ratio; f) a statement indicating compliance with Smoke Number requirements; g) a statement indicating compliance with gaseous pollutant requirements.	CAR 91.807; CAR Part 21 Appendix C.	No Difference		
Chapter 1 Reference **1.4** **Standard**	Contracting States shall recognize as valid emissions certification granted by the certificating 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.	CAR 91.807; CAR Part 21 Appendix C.	No Difference		
Chapter 1 Reference **1.5** **Standard**	Contracting States shall recognize as valid engine exemptions for an engine production cut-off requirement granted by a certificating authority of another Contracting State provided that the exemptions are granted in accordance with the process and criteria defined in the *Environmental Technical Manual* (Doc 9501), Volume II — *Procedures for the Emissions Certification of Aircraft Engines*.	CAR 91.807; CAR Part 21 Appendix C.	No Difference		

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Chapter 2 Reference **2.1.1.1** **Standard**	**CHAPTER 2. TURBOJET AND TURBOFAN ENGINES INTENDED FOR PROPULSION ONLY AT SUBSONIC SPEEDS** **2.1 General** 2.1.1 Applicability The provisions of this chapter shall apply to all turbojet and turbofan engines, as further specified in 2.2 and 2.3, intended for propulsion only at subsonic speeds, except when certificating authorities make exemptions for: a) specific engine types and derivative versions of such engines for which the type certificate of the first basic type was issued or other equivalent prescribed procedure was carried out before 1 January 1965; and b) a limited number of engines over a specific period of time beyond the dates of applicability specified in 2.2 and 2.3 for the manufacture of the individual engine.	CAR 91.807; CAR Part 21 Appendix C.	No Difference		The Standards of Annex 16 Volume II are incorporated by reference in both CAR 91.807 and Part 21 Appendix C.
Chapter 2 Reference **2.1.1.2** **Standard**	In such cases, an exemption document shall be issued by the certificating authority, the identification plates on the engines shall be marked “EXEMPT NEW,” or “EXEMPT SPARE” and the grant of exemption shall be noted in the permanent engine record. Exemptions shall be reported by engine serial number and made available via an official public register.	CAR 91.807; CAR Part 21 Appendix C.	No Difference		

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Chapter 2 Reference **2.1.1.3** **Standard**	The provisions of this chapter shall also apply to engines designed for applications that otherwise would have been fulfilled by turbojet and turbofan engines. *Note.— In considering exemptions, certificating authorities should take into account the probable numbers of such engines that will be produced and their impact on the environment. When such an exemption is granted, the certificating authority should consider imposing a time limit on the production of such engines for installation on new aircraft. Further guidance on issuing exemptions is provided in the* Environmental Technical Manual *(Doc 9501), Volume II* — Procedures for the Emissions Certification of Aircraft Engines.	CAR 91.807; CAR Part 21 Appendix C.	No Difference		
Chapter 2 Reference **2.1.2** **Standard**	Emissions involved The following emissions shall be controlled for certification of aircraft engines: Smoke Gaseous emissions Unburned hydrocarbons (HC); Carbon monoxide (CO); and Oxides of nitrogen (NO_x).	CAR 91.807; CAR Part 21 Appendix C.	No Difference		
Chapter 2 Reference **2.1.3.1** **Standard**	2.1.3 Units of measurement The smoke emission shall be measured and reported in terms of Smoke Number (SN).	CAR 91.807; CAR Part 21 Appendix C.	No Difference		

Report on entire Annex

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Chapter 2 Reference **2.1.3.2** **Standard**	The mass (D_p) of the gaseous pollutant HC, CO, or NO_x emitted during the reference emissions landing and take-off (LTO) cycle, defined in 2.1.4.2 and 2.1.4.3, shall be measured and reported in grams.	CAR 91.807; CAR Part 21 Appendix C.	No Difference		
Chapter 2 Reference **2.1.4.1** **Standard**	2.1.4 Reference conditions *Atmospheric conditions* The reference atmospheric conditions shall be ISA at sea level except that the reference absolute humidity shall be 0.00634 kg water/kg dry air.	CAR 91.807; CAR Part 21 Appendix C.	No Difference		

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Chapter 2 Reference **2.1.4.2** **Standard**	*Thrust settings* The engine shall be tested at sufficient thrust settings to define the gaseous and smoke emissions of the engine so that mass emission rates and Smoke Numbers can be determined at the following specific percentages of rated thrust as agreed by the certificating authority: *LTO operating mode* / *Thrust setting* Take-off 100 per cent F_{oo} Climb 85 per cent F_{oo} Approach 30 per cent F_{oo} Taxi/ground idle 7 per cent F_{oo}	CAR 91.807; CAR Part 21 Appendix C.	No Difference		

Report on entire Annex

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Chapter 2 Reference **2.1.4.3** **Standard**	*Reference emissions landing and take-off (LTO) cycle* The reference emissions LTO cycle for the calculation and reporting of gaseous emissions shall be represented by the following time in each operating mode. *Phase* — *Time in operating mode, minutes* Take-off — 0.7 Climb — 2.2 Approach — 4.0 Taxi/ground idle — 26.0	CAR 91.807; CAR Part 21 Appendix C.	No Difference		
Chapter 2 Reference **2.1.4.4** **Standard**	*Fuel specifications* The fuel used during tests shall meet the specifications of Appendix 4.	CAR 91.807; CAR Part 21 Appendix C.	No Difference		
Chapter 2 Reference **2.1.5.1** **Standard**	*2.1.5* Test conditions The tests shall be made with the engine on its test bed.	CAR 91.807; CAR Part 21 Appendix C.	No Difference		
Chapter 2 Reference **2.1.5.2** **Standard**	The engine shall be representative of the certificated configuration (*see* Appendix 6); off-take bleeds and accessory loads other than those necessary for the engine's basic operation shall not be simulated.	CAR 91.807; CAR Part 21 Appendix C.	No Difference		

Report on entire Annex

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Chapter 2 Reference **2.1.5.3** **Standard**	When test conditions differ from the reference atmospheric conditions in 2.1.4.1, the gaseous emissions test results shall be corrected to the reference atmospheric conditions by the methods given in Appendix 3.	CAR 91.807; CAR Part 21 Appendix C.	No Difference		
Chapter 2 Reference **2.2.1** **Standard**	**2.2 Smoke** Applicability The provisions of 2.2.2 shall apply to engines whose date of manufacture is on or after 1 January 1983.	CAR 91.807; CAR Part 21 Appendix C.	No Difference		
Chapter 2 Reference **2.2.2** **Standard**	Regulatory Smoke Number The Smoke Number at any of the four LTO operating mode thrust settings when measured and computed in accordance with the procedures of Appendix 2, or equivalent procedures as agreed by the certificating authority, and converted to a characteristic level by the procedures of Appendix 6 shall not exceed the level determined from the following formula: Regulatory Smoke Number = 83.6 $(F_{oo})^{-0.274}$ or a value of 50, whichever is lower *Note.— Guidance material on the definition and the use of equivalent procedures is provided in the* Environmental Technical Manual *(Doc 9501), Volume II* — Procedures for the Emissions Certification of Aircraft Engines.	CAR 91.807; CAR Part 21 Appendix C.	No Difference		

Report on entire Annex

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Chapter 2 Reference **2.3.1** **Standard**	**2.3 Gaseous emissions** Applicability The provisions of 2.3.2 shall apply to engines whose rated thrust is greater than 26.7 kN and whose date of manufacture is on or after 1 January 1986 and as further specified for oxides of nitrogen.	CAR 91.807; CAR Part 21 Appendix C.	No Difference		

Report on entire Annex

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Chapter 2 Reference **2.3.2** **Standard**	Regulatory levels Gaseous emission levels when measured and computed in accordance with the procedures of Appendix 3 and converted to characteristic levels by the procedures of Appendix 6, or equivalent procedures as agreed by the certificating authority, shall not exceed the regulatory levels determined from the following formulas: Hydrocarbons (HC): $D_p/F_{oo} = 19.6$ Carbon monoxide (CO): $D_p/F_{oo} = 118$ Oxides of nitrogen (NO_x): a) for engines of a type or model for which the date of manufacture of the first individual production model was before 1 January 1996 and for which the date of manufacture of the individual engine was before 1 January 2000. $D_p/F_{oo} = 40 + 2\pi_{oo}$ b) for engines of a type or model for which the date of manufacture of the first individual production model was on or after 1 January 1996 or for which the date of manufacture of the individual engine was on or after 1 January 2000. $D_p/F_{oo} = 32 + 1.6\pi_{oo}$ c) for engines of a type or model for which the date of manufacture of the first individual production model was on or after 1 January 2004: 1) for engines with a pressure ratio of 30 or less: i) for engines with a maximum rated thrust of more than 89.0 kN: $D_p/F_{oo} = 19 + 1.6\pi_{oo}$ ii) for engines with a maximum rated thrust of more than 26.7 kN but not more than 89.0 kN:	CAR 91.807; CAR Part 21 Appendix C.	No Difference		

Annex Reference	ENVIRONMENTAL PROTECTION Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
	$D_p/F_{oo} = 37.572 + 1.6\pi_{oo} - 0.2087F_{oo}$ 2) for engines with a pressure ratio of more than 30 but less than 62.5: iii) for engines with a maximum rated thrust of more than 89.0 kN: $D_p/F_{oo} = 7 + 2.0\pi_{oo}$ iv) for engines with a maximum rated thrust of more than 26.7 kN but not more than 89.0 kN: $D_p/F_{oo} = 42.71 + 1.4286\pi_{oo} - 0.4013F_{oo} + 0.00642\pi_{oo} \times F_{oo}$ 3) for engines with a pressure ratio of 62.5 or more: $D_p/F_{oo} = 32 + 1.6\pi_{oo}$ d) for engines of a type or model for which the date of manufacture of the first individual production model was on or after 1 January 2008 or for which the date of manufacture of the individual engine was on or after 1 January 2013: 4) for engines with a pressure ratio of 30 or less: v) for engines with a maximum rated thrust of more than 89.0 kN: $D_p/F_{oo} = 16.72 + 1.4080\pi_{oo}$ vi) for engine with a maximum rated thrust of more than 26.7 kN but not more than 89.0 kN: $D_p/F_{oo} = 38.5486 + 1.6823\pi_{oo} - 0.2453F_{oo} - 0.00308\pi_{oo}F_{oo}$				

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	5) for engines with a pressure ratio of more than 30 but less than 82.6: vii) for engines with a maximum rated thrust of more than 89.0 kN: $D_p/F_{oo} = -1.04 + 2.0\pi_{oo}$ viii) for engines with a maximum rated thrust of more than 26.7 kN but not more than 89.0 kN: $D_p/F_{oo} = 46.1600 + 1.4286\pi_{oo} - 0.5303F_{oo} + 0.00642\pi_{oo}F_{oo}$ 6) for engines with a pressure ratio of 82.6 or more: $D_p/F_{oo} = 32 + 1.6\pi_{oo}$ e) for engines of a type or model for which the date of manufacture of the first individual production model was on or after 1 January 2014: 7) for engines with a pressure ratio of 30 or less: ix) for engines with a maximum rated thrust of more than 89.0 kN: $D_p/F_{00} = 7.88 + 1.4080\pi_{00}$ x) for engines with a maximum rated thrust of more than 26.7 kN but not more than 89.0 kN: $D_p/F_{00} = 40.052 + 1.5681\pi_{00} - 0.3615F_{00} - 0.0018\pi_{00}F_{00}$ 8) for engines with a pressure ratio of more than 30 but less than 104.7: xi) for engines with a maximum rated thrust of more than 89.0 kN: $D_p/F_{00} = -9.88 + 2.0\pi_{00}$				

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	xii) for engines with a maximum rated thrust of more than 26.7 kN but not more than 89.0 kN: $D_p/F_{00} = 41.9435 + 1.505\pi_{00} - 0.5823F_{00} + 0.005562\pi_{00}F_{00}$ 9) for engines with a pressure ratio of 104.7 or more: $D_p/F_{00} = 32 + 1.6\pi_{00}$ *Note.— Guidance material on the definition and the use of equivalent procedures is provided in the* Environmental Technical Manual *(Doc 9501), Volume II* — Procedures for the Emissions Certification of Aircraft Engines.				

Report on entire Annex

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Chapter 2 Reference **2.4.1** **Standard**	**2.4 Information required** *Note.— The information required is divided into three groups: 1) general information to identify the engine characteristics, the fuel used and the method of data analysis; 2) the data obtained from the engine test(s); and 3) the results derived from the test data.* General information The following information shall be provided for each engine type for which emissions certification is sought: a) engine identification; b) rated thrust (in kilonewtons); c) reference pressure ratio; d) fuel specification reference; e) fuel hydrogen/carbon ratio; f) the methods of data acquisition; g) the method of making corrections for ambient conditions; and h) the method of data analysis.	CAR 91.807; CAR Part 21 Appendix C.	No Difference		
Chapter 2 Reference **2.4.2** **Standard**	Test information The following information shall be provided for each engine tested for certification purposes at each of the thrust settings specified in 2.1.4.2. The information shall be provided after correction to the reference ambient conditions where applicable: a) fuel flow (kilograms/second); b) emission index (grams/kilogram) for each gaseous pollutant; and c) measured Smoke Number.	CAR 91.807; CAR Part 21 Appendix C.	No Difference		

Report on entire Annex

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Chapter 2 Reference **2.4.3.1** **Standard**	2.4.3 Derived information The following derived information shall be provided for each engine tested for certification purposes: a) emission rate, i.e. emission index × fuel flow, (grams/second) for each gaseous pollutant; b) total gross emission of each gaseous pollutant measured over the LTO cycle (grams); c) values of D_p/F_{oo} for each gaseous pollutant (grams/kilonewton); and d) maximum Smoke Number.	CAR 91.807; CAR Part 21 Appendix C.	No Difference		
Chapter 2 Reference **2.4.3.2** **Standard**	The characteristic Smoke Number and gaseous pollutant emission levels shall be provided for each engine type for which emissions certification is sought.	CAR 91.807; CAR Part 21 Appendix C.	No Difference		
Chapter 3 Reference **3.1.1** **Standard**	**CHAPTER 3. TURBOJET AND TURBOFAN ENGINES INTENDED FOR PROPULSION AT SUPERSONIC SPEEDS** **3.1 General** Applicability The provisions of this chapter shall apply to all turbojet and turbofan engines intended for propulsion at supersonic speeds whose date of manufacture is on or after 18 February 1982.	CAR 91.807; CAR Part 21 Appendix C.	No Difference		The Standards of Annex 16 Volume II are incorporated by reference in both CAR 91.807 and Part 21 Appendix C, and apply to all engines, wheter subsonic or supersonic.

Report on entire Annex

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Chapter 3 Reference **3.1.2** **Standard**	Emissions involved The following emissions shall be controlled for certification of aircraft engines: Smoke Gaseous emissions Unburned hydrocarbons (HC); Carbon monoxide (CO); and Oxides of nitrogen (NO_x).	CAR 91.807; CAR Part 21 Appendix C.	No Difference		
Chapter 3 Reference **3.1.3.1** **Standard**	3.1.3 Units of measurement The smoke emission shall be measured and reported in terms of Smoke Number (SN).	CAR 91.807; CAR Part 21 Appendix C.	No Difference		
Chapter 3 Reference **3.1.3.2** **Standard**	The mass (D_p) of the gaseous pollutants HC, CO, or NO_x emitted during the reference emissions landing and take-off (LTO) cycle, defined in 3.1.5.2 and 3.1.5.3 shall be measured and reported in grams.	CAR 91.807; CAR Part 21 Appendix C.	No Difference		
Chapter 3 Reference **3.1.4** **Standard**	Nomenclature Throughout this chapter, where the expression F^*_{oo} is used, it shall be replaced by F_{oo} for engines which do not employ afterburning. For taxi/ground idle thrust setting, F_{oo} shall be used in all cases.	CAR 91.807; CAR Part 21 Appendix C.	No Difference		

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Chapter 3 Reference **3.1.5.1** **Standard**	3.1.5 Reference conditions *Atmospheric conditions* The reference atmospheric conditions shall be ISA at sea level except that the reference absolute humidity shall be 0.00634 kg water/kg dry air.	CAR 91.807; CAR Part 21 Appendix C.	No Difference		
Chapter 3 Reference **3.1.5.2** **Standard**	*Thrust settings* The engine shall be tested at sufficient power settings to define the gaseous and smoke emissions of the engine so that mass emission rates and Smoke Numbers corrected to the reference ambient conditions can be determined at the following specific percentages of rated output as agreed by the certificating authority. *Operating mode* — *Thrust setting* Take-off — 100 per cent F^*_{oo} Climb — 65 per cent F^*_{oo} Descent — 15 per cent F^*_{oo} Approach — 34 per cent F^*_{oo} Taxi/ground idle — 5.8 per cent F_{oo}	CAR 91.807; CAR Part 21 Appendix C.	No Difference		

Report on entire Annex

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Chapter 3 Reference **3.1.5.3** **Standard**	*Reference emissions landing and take-off (LTO) cycle* The reference emissions LTO cycle for the calculation and reporting of gaseous emissions shall be represented by the following time in each operating mode. *Phase* — *Time in operating mode, minutes* Take-off — 1.2 Climb — 2.0 Descent — 1.2 Approach — 2.3 Taxi/ground idle — 26.0	CAR 91.807; CAR Part 21 Appendix C.	No Difference		
Chapter 3 Reference **3.1.5.4** **Standard**	*Fuel specifications* The fuel used during tests shall meet the specifications of Appendix 4. Additives used for the purpose of smoke suppression (such as organo-metallic compounds) shall not be present.	CAR 91.807; CAR Part 21 Appendix C.	No Difference		
Chapter 3 Reference **3.1.6.1** **Standard**	*3.1.6* Test conditions The tests shall be made with the engine on its test bed.	CAR 91.807; CAR Part 21 Appendix C.	No Difference		

Report on entire Annex

Annex Reference	ENVIRONMENTAL PROTECTION Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.1.6.2** **Standard**	The engine shall be representative of the certificated configuration (*see* Appendix 6); off-take bleeds and accessory loads other than those necessary for the engine's basic operation shall not be simulated.	CAR 91.807; CAR Part 21 Appendix C.	No Difference		
Chapter 3 Reference **3.1.6.3** **Standard**	Measurements made for determination of emission levels at the thrusts specified in 3.1.5.2 shall be made with the afterburner operating at the level normally used, as applicable.	CAR 91.807; CAR Part 21 Appendix C.	No Difference		
Chapter 3 Reference **3.1.7** **Standard**	When test conditions differ from the reference conditions in 3.1.5, the test results shall be corrected to the reference conditions by the methods given in Appendix 5.	CAR 91.807; CAR Part 21 Appendix C.	No Difference		

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Chapter 3 Reference **3.2.1** **Standard**	**3.2 Smoke** Regulatory Smoke Number The Smoke Number at any thrust setting when measured and computed in accordance with the procedures of Appendix 2 and converted to a characteristic level by the procedures of Appendix 6 shall not exceed the regulatory level determined from the following formula: Regulatory Snoke Number = 83.6 $(F^*_{oo})^{-0.274}$ or a value of 50, whichever is lower *Note.— Certificating authorities may alternatively accept values determined using afterburning provided that the validty of these data is adequately demonstrated.*	CAR 91.807; CAR Part 21 Appendix C.	No Difference		
Chapter 3 Reference **3.3.1** **Standard**	**3.3 Gaseous emissions** Regulatory levels Gaseous emission levels when measured and computed in accordance with the procedures of Appendix 3 or Appendix 5, as applicable, and converted to characteristic levels by the procedures of Appendix 6 shall not exceed the regulatory levels determined from the following formulas: Hydrocarbons (HC): $D_p/F^*_{oo} = 140(0.92)^{\pi_{oo}}$ Carbon monoxide (CO): $D_p/F^*_{oo} = 4\,550(\pi_{oo})^{-1.03}$ Oxides of nitrogen (NO_x): $D_p/F^*_{oo} = 36 + 2.42\pi_{oo}$ *Note.— The characteristic level of the Smoke Number or gaseous pollutant emissions is the mean of the values of all the engines tested, measured and corrected to the reference standard engine and reference ambient conditions, divided by the coefficient corresponding to the number of engines tested, as shown in Appendix 6.*	CAR 91.807; CAR Part 21 Appendix C.	No Difference		

Report on entire Annex

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Chapter 3 Reference **3.4.1** **Standard**	**3.4 Information required** *Note.— The information required is divided into three groups: 1) general information to identify the engine characteristics, the fuel used and the method of data analysis; 2) the data obtained from the engine tests(s); and 3) the results derived from the test data.* The following information shall be provided for each engine type for which emissions certification is sought: a) engine identification; b) rated output (in kilonewtons); c) rated output with afterburning applied, if applicable (in kilonewtons); d) reference pressure ratio; e) fuel specification reference; f) fuel hydrogen/carbon ratio; g) the methods of data acquisition; h) the method of making corrections for ambient conditions; and i) the method of data analysis.	CAR 91.807; CAR Part 21 Appendix C.	No Difference		
Chapter 3 Reference **3.4.2** **Standard**	Test information The following information shall be provided for each engine tested for certification purposes at each of the thrust settings specified in 3.1.5.2. The information shall be provided after correction to the reference ambient conditions where applicable: a) fuel flow (kilograms/second); b) emission index (grams/kilogram) for each gaseous pollutant; c) percentage of thrust contributed by afterburning; and d) measured Smoke Number.	CAR 91.807; CAR Part 21 Appendix C.	No Difference		

Report on entire Annex

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Chapter 3 Reference **3.4.3.1** **Standard**	3.4.3 Derived information The following derived information shall be provided for each engine tested for certification purposes: a) emission rate, i.e. emission index × fuel flow, (grams/second), for each gaseous pollutant; b) total gross emission of each gaseous pollutant measured over the LTO cycle (grams); c) values of D_p /F*$_{oo}$ for each gaseous pollutant (grams/kilonewton); and d) maximum Smoke Number.	CAR 91.807; CAR Part 21 Appendix C.	No Difference		
Chapter 3 Reference **3.4.3.2** **Standard**	The characteristic Smoke Number and gaseous pollutant emission levels shall be provided for each engine type for which emissions certification is sought. *Note.— The characteristic level of the Smoke Number or gaseous pollutant emissions is the mean of the values of all the engines tested, measured and corrected to the reference standard engine and reference ambient conditions, divided by the coefficient corresponding to the number of engines tested, as shown in Appendix 6.*	CAR 91.807; CAR Part 21 Appendix C.	No Difference		

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