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Title 40 —Protection of Environment
Chapter I —Environmental Protection Agency
Subchapter U —Air Pollution Controls

Part 1030 Control of Greenhouse Gas Emissions from Engines Installed on Airplanes

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PART 1030—CONTROL OF GREENHOUSE GAS EMISSIONS FROM ENGINES INSTALLED ON AIRPLANES

Authority: 42 U.S.C. 7401-7671q.

Source: 86 FR 2171, Jan. 11, 2021, unless otherwise noted.

SCOPE AND APPLICABILITY

§ 1030.1 Applicability.

- (a) Except as provided in paragraph (c) of this section, when an aircraft engine subject to 40 CFR part 1031 is installed on an airplane that is described in this section and subject to 14 CFR chapter I, the airplane may not exceed the Greenhouse Gas (GHG) standards of this part when original civil certification under 14 CFR chapter I is sought.
 - (1) A subsonic jet airplane that has —
 - (i) Either—

- (A) A type-certificated maximum passenger seating capacity of 20 seats or more,
 - (B) A maximum takeoff mass (MTOM) greater than 5,700 kg, and
 - (C) An application for original type certification that is submitted on or after January 11, 2021;
- (ii) Or—
 - (A) A type-certificated maximum passenger seating capacity of 19 seats or fewer,
 - (B) A MTOM greater than 60,000 kg, and
 - (C) An application for original type certification that is submitted on or after December 23, 2022.
- (2) A subsonic jet airplane that has—
 - (i) A type certificated maximum passenger seating capacity of 19 seats or fewer;
 - (ii) A MTOM greater than 5,700 kg, but not greater than 60,000 kg; and
 - (iii) An application for original type certification that is submitted on or after January 1, 2023.
- (3) A propeller-driven airplane that has—
 - (i) A MTOM greater than 8,618 kg; and
 - (ii) An application for original type certification that is submitted on or after January 11, 2021.
- (4) A subsonic jet airplane—
 - (i) That is a modified version of an airplane whose original type certificated version was not required to have GHG emissions certification under this part;
 - (ii) That has a MTOM greater than 5,700 kg;
 - (iii) For which an application for the modification in type design is submitted on or after January 1, 2023; and
 - (iv) For which the first certificate of airworthiness is issued for an airplane built with the modified design.
- (5) A propeller-driven airplane—
 - (i) That is a modified version of an airplane whose original type certificated version was not required to have GHG emissions certification under this part;
 - (ii) That has a MTOM greater than 8,618 kg;
 - (iii) For which an application for certification that is submitted on or after January 1, 2023; and
 - (iv) For which the first certificate of airworthiness is issued for an airplane built with the modified design.
- (6) A subsonic jet airplane that has—
 - (i) A MTOM greater than 5,700 kg; and
 - (ii) Its first certificate of airworthiness issued on or after January 1, 2028.

- (7) A propeller-driven airplane that has—
 - (i) A MTOM greater than 8,618 kg; and
 - (ii) Its first certificate of airworthiness issued on or after January 1, 2028.
- (b) An airplane that incorporates modifications that change the fuel efficiency metric value of a prior version of airplane may not exceed the GHG standards of this part when certification under 14 CFR is sought. The criteria for modified airplanes are described in § 1030.35. A modified airplane may not exceed the metric value limit of the prior version under § 1030.30.
- (c) The requirements of this part do not apply to:
 - (1) Subsonic jet airplanes having a MTOM at or below 5,700 kg.
 - (2) Propeller-driven airplanes having a MTOM at or below 8,618 kg.
 - (3) Amphibious airplanes.
 - (4) Airplanes initially designed, or modified and used, for specialized operations. These airplane designs may include characteristics or configurations necessary to conduct specialized operations that the EPA and the FAA have determined may cause a significant increase in the fuel efficiency metric value.
 - (5) Airplanes designed with a reference geometric factor of zero.
 - (6) Airplanes designed for, or modified and used for, firefighting.
 - (7) Airplanes powered by reciprocating engines.

[86 FR 2171, Jan. 11, 2021, as amended at 87 FR 72351, Nov. 23, 2022]

§ 1030.5 State standards and controls.

No State or political subdivision of a State may adopt or attempt to enforce any airplane or aircraft engine standard with respect to emissions unless the standard is identical to a standard that applies to airplanes under this part.

§ 1030.10 Exemptions.

Each person seeking relief from compliance with this part at the time of certification must submit an application for exemption to the FAA in accordance with the regulations of 14 CFR parts 11 and 38. The FAA will consult with the EPA on each exemption application request before the FAA takes action.

SUBSONIC AIRPLANE EMISSION STANDARDS AND MEASUREMENT PROCEDURES

§ 1030.20 Fuel efficiency metric.

For each airplane subject to this part, including an airplane subject to the change criteria of § 1030.35, a fuel efficiency metric value must be calculated in units of kilograms of fuel consumed per kilometer using the following equation, rounded to three decimal places:

$$\text{Fuel Efficiency metric value} = \frac{\left(\frac{1}{SAR}\right)_{avg}}{RGF^{0.24}}$$

Where:

SAR = specific air range, determined in accordance with § 1030.23.

RGF = reference geometric factor, determined in accordance with § 1030.25.

§ 1030.23 Specific air range (SAR).

- (a) For each airplane subject to this part the SAR of an airplane must be determined by either:
 - (1) Direct flight test measurements; or
 - (2) Using a performance model that is:
 - (i) Validated by actual SAR flight test data; and
 - (ii) Approved by the FAA before any SAR calculations are made.
- (b) For each airplane model, establish a 1/SAR value at each of the following reference airplane masses:
 - (1) High gross mass: 92 percent maximum takeoff mass (MTOM).
 - (2) Low gross mass: $(0.45 * MTOM) + (0.63 * (MTOM^{0.924}))$.
 - (3) Mid gross mass: Simple arithmetic average of high gross mass and low gross mass.
- (c) Calculate the average of the three 1/SAR values described in paragraph (b) of this section to calculate the fuel efficiency metric value in § 1030.20. Do not include auxiliary power units in any 1/SAR calculation.
- (d) All determinations under this section must be made according to the procedures applicable to SAR in Paragraphs 2.5 and 2.6 of ICAO Annex 16, Volume III and Appendix 1 of ICAO Annex 16, Volume III (incorporated by reference in § 1030.110).

[86 FR 2172, Jan. 11, 2021; 86 FR 52416, Sept. 21, 2021]

§ 1030.25 Reference geometric factor (RGF).

For each airplane subject to this part, determine the airplane's nondimensional reference geometric factor (RGF) for the fuselage size of each airplane model, calculated as follows:

- (a) For an airplane with a single deck, determine the area of a surface (expressed in m²) bounded by the maximum width of the fuselage outer mold line projected to a flat plane parallel with the main deck floor and the forward and aft pressure bulkheads except for the crew cockpit zone.
- (b) For an airplane with more than one deck, determine the sum of the areas (expressed in m²) as follows:
 - (1) The maximum width of the fuselage outer mold line, projected to a flat plane parallel with the main deck floor by the forward and aft pressure bulkheads except for any crew cockpit zone.

- (2) The maximum width of the fuselage outer mold line at or above each other deck floor, projected to a flat plane parallel with the additional deck floor by the forward and aft pressure bulkheads except for any crew cockpit zone.
- (c) Determine the non-dimensional RGF by dividing the area defined in paragraph (a) or (b) of this section by m^2 .
- (d) All measurements and calculations used to determine the RGF of an airplane must be made according to the procedures for determining RGF in Appendix 2 of ICAO Annex 16, Volume III (incorporated by reference in § 1030.110).

§ 1030.30 GHG emission standards.

- (a) The greenhouse gas emission standards in this section are expressed as maximum permitted values fuel efficiency metric values, as calculated under § 1030.20.
- (b) The fuel efficiency metric value may not exceed the following, rounded to three decimal places:

For airplanes defined in . . .	with MTOM . . .	the standard is . . .
(1) Section 1030.1(a)(1) and (2)	5,700 < MTOM < 60,000 kg	$10^{(-2.73780 + (0.681310 * \log_{10}(MTOM)) + (-0.0277861 * (\log_{10}(MTOM))^2))}$
(2) Section 1030.1(a)(3)	8,618 < MTOM < 60,000 kg	$10^{(-2.73780 + (0.681310 * \log_{10}(MTOM)) + (-0.0277861 * (\log_{10}(MTOM))^2))}$
(3) Section 1030.1(a)(1) and (3)	60,000 < MTOM < 70,395 kg	0.764
(4) Section 1030.1(a)(1) and (3)	MTOM > 70,395 kg	$10^{(-1.412742 + (-0.020517 * \log_{10}(MTOM)) + (0.0593831 * (\log_{10}(MTOM))^2))}$
(5) Section 1030.1(a)(4) and (6)	5,700 < MTOM < 60,000 kg	$10^{(-2.57535 + (0.609766 * \log_{10}(MTOM)) + (-0.0191302 * (\log_{10}(MTOM))^2))}$
(6) Section 1030.1(a)(5) and (7)	8,618 < MTOM < 60,000 kg	$10^{(-2.57535 + (0.609766 * \log_{10}(MTOM)) + (-0.0191302 * (\log_{10}(MTOM))^2))}$
(7) Section 1030.1(a)(4) through (7)	60,000 < MTOM < 70,107 kg	0.797
(8) Section 1030.1(a)(4) through (7)	MTOM > 70,107 kg	$10^{(-1.39353 + (-0.020517 * \log_{10}(MTOM)) + (0.0593831 * (\log_{10}(MTOM))^2))}$

§ 1030.35 Change criteria.

- (a) For an airplane that has demonstrated compliance with § 1030.30, any subsequent version of that airplane must demonstrate compliance with § 1030.30 if the subsequent version incorporates a modification that either increases—
 - (1) The maximum takeoff mass; or
 - (2) The fuel efficiency metric value by more than:

- (i) For airplanes with a MTOM greater than or equal to 5,700 kg, the value decreases linearly from 1.35 to 0.75 percent for an airplane with a MTOM of 60,000 kg.
- (ii) For airplanes with a MTOM greater than or equal to 60,000 kg, the value decreases linearly from 0.75 to 0.70 percent for airplanes with a MTOM of 600,000 kg.
- (iii) For airplanes with a MTOM greater than or equal to 600,000 kg, the value is 0.70 percent.
- (b) For an airplane that has demonstrated compliance with § 1030.30, any subsequent version of that airplane that incorporates modifications that do not increase the MTOM or the fuel efficiency metric value in excess of the levels shown in paragraph (a) of this section, the fuel efficiency metric value of the modified airplane may be reported to be the same as the value of the prior version.
- (c) For an airplane that meets the criteria of § 1030.1(a)(4) or (5), after January 1, 2023 and until January 1, 2028, the airplane must demonstrate compliance with § 1030.30 if it incorporates any modification that increases the fuel efficiency metric value by more than 1.5 per cent from the prior version of the airplane.

§ 1030.98 Confidential information.

The provisions of 40 CFR 1068.10 and 1068.11 apply for information you submit under this part.

[88 FR 4484, Jan. 24, 2023]

REFERENCE INFORMATION

§ 1030.100 Abbreviations.

The abbreviations used in this part have the following meanings:

TABLE 1 TO § 1030.100

EPA	U.S. Environmental Protection Agency.
FAA	U.S. Federal Aviation Administration.
GHG	greenhouse gas.
IBR	incorporation by reference.
ICAO	International Civil Aviation Organization.
MTOM	maximum takeoff mass.
RGF	reference geometric factor.
SAR	specific air range.

§ 1030.105 Definitions.

The following definitions in this section apply to this part. Any terms not defined in this section have the meaning given in the Clean Air Act. The definitions follow:

Aircraft has the meaning given in 14 CFR 1.1, a device that is used or intended to be used for flight in the air.

Aircraft engine means a propulsion engine that is installed on or that is manufactured for installation on an airplane for which certification under 14 CFR is sought.

Airplane has the meaning given in 14 CFR 1.1, an engine-driven fixed-wing aircraft heavier than air, that is supported in flight by the dynamic reaction of the air against its wings.

Exempt means to allow, through a formal case-by-case process, an airplane to be certificated and operated that does not meet the applicable standards of this part.

Greenhouse Gas (GHG) means an air pollutant that is the aggregate group of six greenhouse gases: carbon dioxide, nitrous oxide, methane, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride.

ICAO Annex 16, Volume III means Volume III of Annex 16 to the Convention on International Civil Aviation (see § 1030.110).

Maximum takeoff mass (MTOM) is the maximum allowable takeoff mass as stated in the approved certification basis for an airplane type design. Maximum takeoff mass is expressed in kilograms.

Performance model is an analytical tool (or a method) validated using corrected flight test data that can be used to determine the specific air range values for calculating the fuel efficiency metric value.

Reference geometric factor is a non-dimensional number derived from a two-dimensional projection of the fuselage.

Round has the meaning given in 40 CFR 1065.1001.

Specific air range is the distance an airplane travels per unit of fuel consumed. Specific air range is expressed in kilometers per kilogram of fuel.

Subsonic means an airplane that has not been certificated under 14 CFR to exceed Mach 1 in normal operation.

Type certificated maximum passenger seating capacity means the maximum number of passenger seats that may be installed on an airplane as listed on its type certificate data sheet, regardless of the actual number of seats installed on an individual airplane.

§ 1030.110 Incorporation by reference.

- (a) Certain material is incorporated by reference into this part with the approval of the Director of the Federal Register under 5 U.S.C. 552(a) and 1 CFR part 51. To enforce any edition other than that specified in this section, the Environmental Protection Agency must publish a document in the FEDERAL REGISTER and the material must be available to the public. All approved material is available for inspection at EPA Docket Center, WJC West Building, Room 3334, 1301 Constitution Ave. NW, Washington, DC 20004, www.epa.gov/dockets, (202) 202-1744, and is available from the sources listed in this section. It is also available for inspection at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, email fedreg.legal@nara.gov or go to: www.archives.gov/federal-register/cfr/ibr-locations.html.
- (b) International Civil Aviation Organization, Document Sales Unit, 999 University Street, Montreal, Quebec, Canada H3C 5H7, (514) 954-8022, www.icao.int, or sales@icao.int.
 - (1) ICAO Annex 16, Volume III, Annex 16 to the Convention on International Civil Aviation, Environmental Protection, Volume III—Aeroplane CO₂ Emissions, as follows:
 - (i) First Edition, July 2017. IBR approved for §§ 1030.23(d) and 1030.25(d).
 - (ii) Amendment 1, July 20, 2020. IBR approved for §§ 1030.23(d) and 1030.25(d).

(2) [Reserved]