Federal Aviation Administration, DOT

§ 34.21 Standards for exhaust emissions.

(a) Exhaust emissions of smoke from each new aircraft gas turbine engine of class T8 manufactured on or after February 1, 1974, shall not exceed a smoke number (SN) of 30.

(b) Exhaust emissions of smoke from each new aircraft gas turbine engine of class TF and of rated output of 129 kN (29,000 lb) thrust or greater, manufactured on or after January 1, 1976, shall not exceed

\[ SN = 83.6 \left( rO \right) ^{-0.274} \]

\( rO \) is in kN.

(c) Exhaust emission of smoke from each new aircraft gas turbine engine of class T3 manufactured on or after January 1, 1978, shall not exceed a smoke number (SN) of 25.

(d) Gaseous exhaust emissions from each new aircraft gas turbine engine shall not exceed:

(1) For Classes TF, T3, T8 engines greater than 26.7 kN (6,000 lb) rated output:

(i) Engines manufactured on or after January 1, 1984:

Hydrocarbons: 19.6 g/kN rO.

(ii) Engines manufactured on or after July 7, 1997:

Carbon Monoxide: 118 g/kN rO.

(2) Engines manufactured on or after January 1, 1984:

(i) Oxides of Nitrogen: \((40+2(rPR))\) g/kN rO.

(iii) Engines of a type or model of which the date of manufacture of the first individual production model was on or before December 31, 1995, and for which the date of manufacture of the individual engine was on or before December 31, 1999 (Tier 2):

Oxides of Nitrogen: \((40+2(rPR))\) g/kN rO.

(iv) Engines of a type or model of which the date of manufacture of the first individual production model was after December 31, 1995, or for which
§ 34.23 Exhaust Emission Standards for Engines Manufactured on and after July 18, 2012.

The standards of this section apply to aircraft engines manufactured on and after July 18, 2012, unless otherwise exempted or excepted. Where a gaseous emission standard is specified by a formula, calculate and round the standard to the nearest 0.1 g/kN. Where a smoke standard is specified by a formula, calculate and round the standard to the nearest 0.1 SN.

SN = 83.6(\text{rO})^{-0.274} (\text{rO is in kN}) not to exceed a maximum of SN = 50.

1. For Classes T3, T8, TSS, and TF of rated output equal to or greater than 26.7 kN (6,000 lb) manufactured on or after January 1, 1984:

SN = 83.6(\text{rO})^{-0.274} (\text{rO is in kN}) not to exceed a maximum of SN = 50.

2. For Class TP of rated output equal to or greater than 1,000 kW manufactured on or after January 1, 1984:

SN = 187(\text{rO})^{-0.168} (\text{rO is in kW}).

The standards set forth in paragraphs (a), (b), (c), (d), and (e) of this section refer to a composite gaseous emission sample representing the operation cycles and exhaust smoke emission emitted during operation of the engine as specified in the applicable sections of subpart G of this part, and measured and calculated in accordance with the procedures set forth in subpart G.

Where a gaseous emission standard is specified by a formula, calculate and round the standard to three significant figures or to the nearest 0.1 g/kN (for standards at or above 100 g/kN). Where a smoke standard is specified by a formula, calculate and round the standard to the nearest 0.1 SN. Engines comply with an applicable standard if the testing results show that the engine type certificate family’s characteristic level does not exceed the numerical level of that standard, as described in §34.60.

§34.23 Exhaust Emission Standards for Engines Manufactured on and after July 18, 2012.

The standards of this section apply to aircraft engines manufactured on and after July 18, 2012, unless otherwise exempted or excepted. Where a gaseous emission standard is specified by a formula, calculate and round the standard to the nearest 0.1 g/kN. Where a smoke standard is specified by a formula, calculate and round the standard to the nearest 0.1 SN.

SN = 83.6(\text{rO})^{-0.274} (\text{rO is in kN}) not to exceed a maximum of SN = 50.

1. For Classes T3, T8, TSS, and TF of rated output equal to or greater than 26.7 kN (6,000 lb) manufactured on or after January 1, 1984:

SN = 83.6(\text{rO})^{-0.274} (\text{rO is in kN}) not to exceed a maximum of SN = 50.

2. For Class TP of rated output equal to or greater than 1,000 kW manufactured on or after January 1, 1984:

SN = 187(\text{rO})^{-0.168} (\text{rO is in kW}).

The standards set forth in paragraphs (a), (b), (c), (d), and (e) of this section refer to a composite gaseous emission sample representing the operation cycles and exhaust smoke emission emitted during operation of the engine as specified in the applicable sections of subpart G of this part, and measured and calculated in accordance with the procedures set forth in subpart G.

Where a gaseous emission standard is specified by a formula, calculate and round the standard to three significant figures or to the nearest 0.1 g/kN (for standards at or above 100 g/kN). Where a smoke standard is specified by a formula, calculate and round the standard to the nearest 0.1 SN. Engines comply with an applicable standard if the testing results show that the engine type certificate family’s characteristic level does not exceed the numerical level of that standard, as described in §34.60.

§34.23 Exhaust Emission Standards for Engines Manufactured on and after July 18, 2012.

The standards of this section apply to aircraft engines manufactured on and after July 18, 2012, unless otherwise exempted or excepted. Where a gaseous emission standard is specified by a formula, calculate and round the standard to the nearest 0.1 g/kN. Where a smoke standard is specified by a formula, calculate and round the standard to the nearest 0.1 SN.

SN = 83.6(\text{rO})^{-0.274} (\text{rO is in kN}) not to exceed a maximum of SN = 50.

1. For Classes T3, T8, TSS, and TF of rated output equal to or greater than 26.7 kN (6,000 lb) manufactured on or after January 1, 1984:

SN = 83.6(\text{rO})^{-0.274} (\text{rO is in kN}) not to exceed a maximum of SN = 50.

2. For Class TP of rated output equal to or greater than 1,000 kW manufactured on or after January 1, 1984:

SN = 187(\text{rO})^{-0.168} (\text{rO is in kW}).

The standards set forth in paragraphs (a), (b), (c), (d), and (e) of this section refer to a composite gaseous emission sample representing the operation cycles and exhaust smoke emission emitted during operation of the engine as specified in the applicable sections of subpart G of this part, and measured and calculated in accordance with the procedures set forth in subpart G.

Where a gaseous emission standard is specified by a formula, calculate and round the standard to three significant figures or to the nearest 0.1 g/kN (for standards at or above 100 g/kN). Where a smoke standard is specified by a formula, calculate and round the standard to the nearest 0.1 SN. Engines comply with an applicable standard if the testing results show that the engine type certificate family’s characteristic level does not exceed the numerical level of that standard, as described in §34.60.