§ 531.4   Definitions.

(a) *Statutory terms.* (1) The terms *average fuel economy*, *manufacture*, *manufacturer*, and *model year* are used as defined in section 501 of the Act.

(2) The terms *automobile* and *passenger automobile* are used as defined in section 501 of the Act and in accordance with the determination in part 523 of this chapter.

(b) *Other terms.* As used in this part, unless otherwise required by the context—

(1) *Act* means the Motor Vehicle Information and Cost Savings Act, as amended by Pub. L. 94–163.

§ 531.5   Fuel economy standards.

(a) Except as provided in paragraph (e) of this section, each manufacturer of passenger automobiles shall comply with the average fuel economy standards in Table I, expressed in miles per gallon, in the model year specified as applicable:

TABLE I

Model year	Standard
1978..	18.0
1979..	19.0
1980..	20.0
1981..	22.0
1982..	24.0
1983..	26.0
1984..	27.0
1985..	27.5
1986..	26.0
1987..	26.0
1988..	26.0
1989..	26.5
1990-2010....................................	27.5

(b) For model year 2011, a manufacturer's passenger automobile fleet shall comply with the fuel economy level calculated for that model year according to Figure 1 and the appropriate values in Table II.

Figure 1:

$$Required\_Fuel\_Economy\_Level = \frac{N}{\sum_i \frac{N_i}{T_i}}$$

Where:

N is the total number (sum) of passenger automobiles produced by a manufacturer,

N_i is the number (sum) of the *ith* model passenger automobile produced by the manufacturer, and

T_i is fuel economy target of the *ith* model passenger automobile, which is determined according to the following formula, rounded to the nearest hundredth:

$$T = \frac{1}{\dfrac{1}{a} + \left(\dfrac{1}{b} - \dfrac{1}{a}\right)\dfrac{e^{(x-c)/d}}{1+e^{(x-c)/d}}}$$

Where:

Parameters *a*, *b*, *c*, and *d* are defined in Table II;

e = 2.718; and

x = footprint (in square feet, rounded to the nearest tenth) of the vehicle model

TABLE II—PARAMETERS FOR THE PASSENGER AUTOMOBILE FUEL ECONOMY TARGETS

Model year	Parameters			
	A	b	c	d
2011................................	31.20	24.00	51.41	1.91

(c) For model years 2012–2016, a manufacturer's passenger automobile fleet shall comply with the fuel economy level calculated for that model year according to Figure 2 and the appropriate values in Table III.

Figure 2: $CAFE_{required} = \dfrac{\sum_i Production_i}{\sum_i \dfrac{Production_i}{TARGET_i}}$

Where:

$CAFE_{required}$ is the required level for a given fleet (domestic passenger automobiles or import passenger automobiles),

Subscript i is a designation of multiple groups of automobiles, where each group's designation, *i.e.*, i = 1, 2, 3, etc., represents automobiles that share a unique model type and footprint within the applicable fleet, either domestic passenger automobiles or import passenger automobiles.

$Production_i$ is the number of passenger automobiles produced for sale in the United States within each ith designation, *i.e.*, which shares the same model type and footprint.

$TARGET_i$ is the fuel economy target in miles per gallon (mpg) applicable to the footprint of passenger automobiles within each ith designation, *i.e.*, which shares the same model type and footprint, calculated according to Figure 3 and rounded to the nearest hundredth of a mpg, *i.e.*, 35.455 = 35.46 mpg, and the summations in the numerator and denominator are both performed over all models in the fleet in question.

$$\textbf{Figure 3}: \quad TARGET = \frac{1}{MIN\left[MAX\left(c \times FOOTPRINT + d, \frac{1}{a}\right), \frac{1}{b}\right]}$$

Where:

TARGET is the fuel economy target (in mpg) applicable to vehicles of a given footprint (*FOOTPRINT*, in square feet),

Parameters *a, b, c,* and *d* are defined in Table III, and

The *MIN* and *MAX* functions take the minimum and maximum, respectively, of the included values.

TABLE III—PARAMETERS FOR THE PASSENGER AUTOMOBILE FUEL ECONOMY TARGETS

Model year	Parameters			
	a	b	c	d
2012	35.95	27.95	0.0005308	0.006057
2013	36.80	28.46	0.0005308	0.005410
2014	37.75	29.03	0.0005308	0.004725
2015	39.24	29.90	0.0005308	0.003719
2016	41.09	30.96	0.0005308	0.002573

(d) In addition to the requirement of paragraphs (b) and (c) of this section, each manufacturer shall also meet the minimum standard for domestically manufactured passenger automobiles expressed in Table IV:

TABLE IV

Model year	Minimum standard
2011	27.8
2012	30.7
2013	31.4
2014	32.1
2015	33.3
2016	34.7

(e) The following manufacturers shall comply with the standards indicated below for the specified model years:

(1) Avanti Motor Corporation.

AVERAGE FUEL ECONOMY STANDARD

Model year	Miles per gallon
1978	16.1
1979	14.5
1980	15.8
1981	18.2
1982	18.2
1983	16.9
1984	16.9
1985	16.9

(2) Rolls-Royce Motors, Inc.

Model year	Average fuel economy standard (miles per gallon)
1978	10.7
1979	10.8
1980	11.1
1981	10.7
1982	10.6
1983	9.9
1984	10.0
1985	10.0
1986	11.0
1987	11.2
1988	11.2
1989	11.2
1990	12.7
1991	12.7
1992	13.8
1993	13.8
1994	13.8
1995	14.6
1996	14.6
1997	15.1
1998	16.3
1999	16.3

(3) Checker Motors Corporation.

AVERAGE FUEL ECONOMY STANDARD

Model year	Miles per gallon
1978	17.6
1979	16.5
1980	18.5
1981	18.3
1982	18.4

(4) Aston Martin Lagonda, Inc.

AVERAGE FUEL ECONOMY STANDARD

Model year	Miles per gallon
1979	11.5
1980	12.1
1981	12.2
1982	12.2
1983	11.3
1984	11.3
1985	11.4

(5) Excalibur Automobile Corporation.

AVERAGE FUEL ECONOMY STANDARD

Model year	Miles per gallon
1978	11.5
1979	11.5
1980	16.2
1981	17.9
1982	17.9
1983	16.6
1984	16.6
1985	16.6

(6) Lotus Cars Ltd.

Model year	Average fuel economy standard (miles per gallon)
1994	24.2
1995	23.3

(7) Officine Alfieri Maserati, S.p.A.

AVERAGE FUEL ECONOMY STANDARD

Model year	Miles per gallon
1978	12.5
1979	12.5
1980	9.5
1984	17.9
1985	16.8

(8) Lamborghini of North America.

AVERAGE FUEL ECONOMY STANDARD

Model year	Miles per gallon
1983	13.7
1984	13.7

(9) LondonCoach Co., Inc.

AVERAGE FUEL ECONOMY STANDARD

Model year	Miles per gallon
1985	21.0
1986	21.0

AVERAGE FUEL ECONOMY STANDARD—
Continued

Model year	Miles per gallon
1987	21.0

(10) Automobili Lamborghini S.p.A./ Vector Aeromotive Corporation.

Model year	Average fuel economy standard (miles per gallon)
1995	12.8
1996	12.6
1997	12.5

(11) Dutcher Motors, Inc.

Model year	Average fuel economy standard (miles per gallon)
1986	16.0
1987	16.0
1988	16.0
1992	17.0
1993	17.0
1994	17.0
1995	17.0

(12) MedNet, Inc.

Model year	Average fuel economy standard (miles per gallon)
1996	17.0
1997	17.0
1998	17.0

(13) Vector Aeromotive Corporation.

Model year	Average fuel economy standard (miles per gallon)
1998	12.1

(14) Qvale Automotive Group Srl.

Model year	Average fuel economy standard (miles per gallon)
2000	22.0
2001	22.0

(15) Spyker Automobielen B.V.

AVERAGE FUEL ECONOMY STANDARD

Model year	Miles per gallon
2006	18.9
2007	18.9

[43 FR 28204, June 29, 1978]

EDITORIAL NOTE: For FEDERAL REGISTER citations affecting §531.5 see the List of CFR Sections Affected which appears in the Finding Aids section of the printed volume and on GPO Access.

§531.6 Measurement and calculation procedures.

(a) The average fuel economy of all passenger automobiles that are manufactured by a manufacturer in a model year shall be determined in accordance with procedures established by the Administrator of the Environmental Protection Agency under section 502(a)(1) of the Act and set forth in 40 CFR part 600.

(b) A manufacturer that is eligible to elect a model year in which to include value added in Mexico as domestic value, under subparagraphs (B)(i) and (B)(iii) of 49 U.S.C. 32904(b)(3), shall notify the Administrators of the Environmental Protection Agency and the National Highway Traffic Safety Administration of its election not later than 60 days before it begins production of automobiles for the model year. If an eligible manufacturer does not elect a model year before January 1, 2004, any value added in Mexico will be considered domestic value for automobiles manufactured in the next model year beginning after January 1, 2004, and in subsequent model years.

[42 FR 33552, June 30, 1977, as amended at 64 FR 27203, May 19, 1999]

APPENDIX A TO PART 531—EXAMPLE OF CALCULATING COMPLIANCE UNDER §531.5(C)

Assume a hypothetical manufacturer (Manufacturer X) produces a fleet of domestic passenger automobiles in MY 2012 as follows:

APPENDIX A, TABLE 1

Model type				Description	Actual measured fuel economy (mpg)	Volume
Group	Carline name	Basic engine (L)	Transmission class			
1	PC A FWD	1.8	A5	2-door sedan	34.0	1,500
2	PC A FWD	1.8	M6	2-door sedan	34.6	2,000
3	PC A FWD	2.5	A6	4-door wagon	33.8	2,000
4	PC A AWD	1.8	A6	4-door wagon	34.4	1,000
5	PC A AWD	2.5	M6	2-door hatchback ..	32.9	3,000
6	PC B RWD	2.5	A6	4-door wagon	32.2	8,000
7	PC B RWD	2.5	A7	4-door sedan	33.1	2,000
8	PC C AWD	3.2	A7	4-door sedan	30.6	5,000
9	PC C FWD	3.2	M6	2-door coupe	28.5	3,000
Total						27,500

NOTE TO APPENDIX A, TABLE 1. Manufacturer X's required corporate average fuel economy level standard under §531.5(c) would first be calculated by determining the fuel economy targets applicable to each unique model type and footprint combination for model type groups 1–9 as illustrated in Appendix A, Table 2:

APPENDIX A, TABLE 2

Manufacturer X calculates a fuel economy target standard for each unique model type and footprint combination.