

115. Emission of smoke, vapour, etc. from motor vehicles.—¹[(1) Every motor vehicle other than motor cycles of engine capacity not exceeding 70 cc, manufactured prior to the first day of March 1990, shall be maintained in such condition and shall be so driven so as to comply with the standards prescribed in these rules.]

⁴[(2) On and from the commencement of the Central Motor Vehicles (7th Amendment) Rules, 2001, every motor vehicle shall comply with the following standards, namely:—

⁵[(a) Idling CO (Carbon Monoxide) emission limit for all vehicles other than two wheelers and three wheelers operating on—

(i) Liquefied Petroleum Gas (LPG), Petrol; or

(ii) Compressed Natural Gas (CNG), Petrol,

shall not exceed 3.0 per cent by volume;

(b) Idling CO (Carbon Monoxide) emission limit for all two wheeler and three wheeler vehicles operating on—

1. Subs. by G.S.R. 338 (E), dated 26th March, 1993 (w.e.f. 26-3-1993).

2. Ins. by G.S.R. 642 (E), dated 28th July, 2000 (w.e.f. 28-7-2000).

3. Subs. by G.S.R. 116 (E), dated 27th February, 2002 (w.e.f. 27-8-2002).

4. Subs. by G.S.R. 853 (E), dated 19th November, 2001 (w.e.f. 19-5-2002).

5. Subs. by G.S.R. 400 (E), dated 31st May, 2002 (w.e.f. 31-5-2002).

(i) Liquefied Petroleum Gas (LPG), Petrol; or

(ii) Compressed Natural Gas (CNG), Petrol

shall not exceed 4.5 per cent by volume;]

(c) Smoke density for all diesel-driven vehicles shall be as follows:—

TABLE

| Method of Test | Maximum Smoke Density | | |
|--|-------------------------------------|-------------|----------------|
| | Light Absorption Co-efficient (1/m) | Bosch Units | Hartidge Units |
| (1) | (2) | (3) | (4) |
| (a) For vehicles other than agricultural tractors: Full load at 60 to 70% of maximum engine-rated rpm declared by the manufacturer. or Free acceleration for turbo charged engine. or Free acceleration for naturally aspirated engine. | 3.25 | 5.2 | 75 |
| (b) For agricultural tractors 80% load corresponding to maximum power developed in PTO Performance Tests. | 2.45 | — | 65 |
| | 3.25 | 5.2 | 75] |

(3) On and from the date of commencement of this sub-rule¹, all petrol-driven vehicles shall be so manufactured that they comply with the mass emission standards as specified at Annexure I. The breakdown of the operating cycle used for the test shall be as specified at Annexure II, and the reference fuel for all such tests shall be specified in Annexure III to these rules.

(4) On and from the date² of commencement of this sub-rule, all diesel-driven vehicles shall be so manufactured that they comply with the following based on exhaust gas capacity as specified at Annexure IV to these rules.

(5) On and from the date³ of commencement of this sub-rule, all petrol-driven vehicles shall be so manufactured that they comply with the following levels of emissions³ [when tested as per test cycle specified in Annexure V]:—

1. 1st day of April, 1991 vide S.O. 869 (E), dated 27th October, 1989.

2. 1st day of April, 1992 vide S.O. 869 (E), dated 27th October, 1989.

3. Subs. by G.S.R. 338 (E), dated 26th March, 1993 (w.e.f. 26-3-1993).

| Mass of Carbon Monoxide (CO) | Mass of Hydrocarbons (HC) | Mass of Nitrogen Oxides (NO) |
|---------------------------------|------------------------------|---------------------------------|
| Max. grams per KWH | Max. grams per KWH | Max. grams per KWH |
| 14% | 3.5 | 18 |

¹[Provided the standards for exhaust gas emissions applicable to agricultural tractors shall be notified separately.]

(6) Each motor vehicle manufactured on and after the dates specified in sub-rules (2), (3), (4) or (5), shall be certified by the manufacturers to be conforming to the standards specified in the said sub-sections, and further certify that the components liable to effect the emission of gaseous pollutants are so designed, constructed and assembled as to enable the vehicle, in normal use, despite the vibration to which it may be subjected, to comply with the provisions of the said sub-rule.

²(7) After the expiry of a period of one year from the date on which the motor vehicle was first registered, every such vehicle shall carry a valid 'Pollution under control' certificate issued by an agency authorised for this purpose by the State Government. The validity of the certificate shall be for six months or any lesser period as may be specified by the State Government from time to time and the certificate shall always be carried in the vehicle and produced on demand by the officers referred to in sub-rule (1) of rule 116.

(8) The certificate issued under sub-rule (7) shall, while it remains effective be valid throughout India.]

³(9) MASS EMISSION STANDARD FOR DIESEL VEHICLES.

TYPE APPROVAL TESTS

| Vehicle Category | HC* (g/KWH) | CO* (g/KWH) | NO _x (g/KWH) | Smoke |
|---------------------------------|----------------|----------------|----------------------------|-------|
| Medium & Heavy over 3.5 Ton/GVW | 2.4 | 11.2 | 14.4 | *** |
| Light diesel upto 3.5 Ton/GVW | 2.4 | 11.2 | 14.4 | *** |
| or | | | | |
| Reference mass R(Kg) R (Kg) | g/Km | CO** g/Km | HC+NO _x ** | |
| R<1020 | 5.0 | 2.0 | | |
| 1020<R<1250 | 5.7 | 2.2 | | |
| 1250<R<1470 | 6.4 | 2.5 | | |
| 1470<R<1700 | 7.0 | 2.7 | | |
| 1700<R<1930 | 7.7 | 2.9 | | |
| 1930<R<2150 | 8.2 | 3.5 | | |
| R<2150 | 9.0 | 4.0 | | |

1. Ins. by G.S.R. 338 (E), dated 26th March, 1993 (w.e.f. 26-3-1993).

2. Added by G.S.R. 338 (E), dated 26th March, 1993 (w.e.f. 26-3-1993).

3. Subs. by G.S.R. 163 (E), dated 29th March, 1996.

Note.—

- * The test cycle is as per 13 mode cycle on dynamometer.
- ** The test should be as per Indian driving cycle with cold start.
- *** The emissions of visible pollutants (smoke) shall not exceed the limit value to smoke density. When expressed as light absorption coefficient given below for various nominal flows when tested at constant speeds over full load. (As indicated at Annexure 1).

COP STANDARDS

- * 10% relaxation in the standards for HC, CO and NO_x would be given.
- ** 10% relaxation in the standards for CO and combined HC+NO_x would be given.

MASS EMISSION STANDARD FOR PETROL DRIVEN VEHICLES**TYPE APPROVAL TEST****(i) Passenger Cars**

| Cubic Capacity (cm ³) | Carbon Monoxide (gm/Km) | HC+NO _x (gm/Km) |
|--------------------------------------|----------------------------|-------------------------------|
| C>† 1400 | 8.68 | 3.00 |
| C> 1400>† 2000 | 11.20 | 3.84 |
| C> 2000 | 12.40 | 4.36 |

- Note.—** 1. The tests will be as per Indian driving cycle with warm start. However, with effect from 1st April, 1998, the test will be as per Indian driving cycle with cold start.
2. There should be no crankcase emission.
 3. Evaporative emission should not be more than 2.0 gms per test.
 4. COP standards:— 20% relaxation in the standards for Carbon Monoxide and combined HC+NO_x would be given.

(ii) Three wheelers (for all categories)—

| | |
|-----------------------------|------|
| CO gms/Km | 6.75 |
| HC + NO _x gms/Km | 5.40 |

- Note.—** 1. The test will be as per Indian driving cycle with warm start. However, with effect from 1st April, 1998, the test will be as per Indian driving cycle with cold start.
2. COP standards: 20% relaxation in the standards for Carbon Monoxide and combined HC+NO_x would be given.

(iii) Two Wheelers (for all categories)

| | |
|----------------------------|------|
| CO gms/Km | 4.50 |
| HC+ NO _x gms/Km | 3.60 |

- Note.—** 1. The test will be as per Indian driving cycle with warm start. However, with effect from 1st April, 1998, the test will be as per Indian driving cycle with cold start.

†. This should read (less than or equal to) since the next category is greater than this figure.

2. COP standards: 20% relaxation in the standards for Carbon Monoxide and combined HC+NO_x would be given.

ANNEXURE 1

| Nominal Flow G(1/2) | Light Absorption (K(1/m)) |
|------------------------|------------------------------|
| 42 | 2.26 |
| 45 | 2.19 |
| 50 | 2.08 |
| 55 | 1.985 |
| 60 | 1.90 |
| 65 | 1.84 |
| 70 | 1.775 |
| 75 | 1.72 |
| 80 | 1.665 |
| 85 | 1.62 |
| 90 | 1.575 |
| 95 | 1.535 |
| 100 | 1.495 |
| 105 | 1.465 |
| 110 | 1.425 |
| 115 | 1.395 |
| 120 | 1.37 |
| 125 | 1.345 |
| 130 | 1.32 |
| 135 | 1.30 |
| 140 | 1.27 |
| 145 | 1.25 |
| 150 | 1.205 |
| 160 | 1.19 |
| 165 | 1.17 |
| 170 | 1.155 |
| 175 | 1.14 |
| 180 | 1.125 |
| 185 | 1.11 |
| 190 | 1.095 |
| 195 | 1.08 |
| 200 | 1.065] |

[(10) MASS EMISSION STANDARDS FOR VEHICLES MANUFACTURED ON AND AFTER 1ST JUNE, 1999 IN CASE OF NATIONAL CAPITAL REGION OF DELHI AND IN OTHER CASES ON AND AFTER 1ST APRIL, 2000]

A. FOR PETROL DRIVEN VEHICLES

| (1) PASSENGER CARS | CO (g/km) | HC+NO _x (g/km) |
|--------------------------|-----------|---------------------------|
| Type Approval | 2.72 | 0.97 |
| Conformity of Production | 3.16 | 1.13 |

Notes.—

1. The test shall be as per the modified Indian Driving Cycle, with cold start, as specified in Annexure IV B, on chassis Dynamometer.
2. There should be no crankcase emission.
3. Evaporative emission should not be more than 2.0g/test.
4. For vehicles fitted with Catalytic Converter, a deterioration factor of 1.2 on Type Approval Limits will be applicable for durability.
5. Commercial fuel shall be as notified by the Ministry of Environment and Forests *vide* Notification No. G.S.R. 176 (E), dated the 2nd April, 1996.
6. Reference test fuel shall be as specified in Annexure IV C.

| 2-Wheelers and 3-Wheelers | CO (g/km) | | HC+NO _x (g/km) | |
|---------------------------|-----------|-----------|---------------------------|-----------|
| | 2-Wheeler | 3-Wheeler | 2-Wheeler | 3-Wheeler |
| Type Approval | 2.0 | 4.0 | 2.0 | 2.0 |
| Conformity of Production | 2.4 | 4.8 | 2.4 | 2.4 |

Notes.—

The test shall be as per the Indian Driving Cycle, with cold start on Chassis Dynamometer as specified in Annexure IV B to the principal rules.

Commercial fuel shall be as notified by Ministry of Environment and Forests *vide* Notification No. G.S.R. 176 (E), dated 2nd April, 1996.

Reference test fuel shall be as specified in Annexure IV C.

³[For 2-wheelers and 3-wheelers fitted with catalytic converter, a deterioration factor of 1.2 on Type Approval limits, will be applicable for durability:

Provided that the vehicle manufacturers may opt for an ageing test of 30,000 kms for evaluating deterioration factor, as per procedure that may be laid down by the Central Government.]

1. Ins. by G.S.R. 493 (E), dated 28th August, 1997 (w.e.f. 1-4-2000).
2. Subs. by G.S.R. 399 (E), dated 1st June, 1999 (w.e.f. 1-6-1999).
3. Ins. by G.S.R. 400 (E), dated 31st May, 2002 (w.e.f. 31-5-2002).

B. FOR DIESEL VEHICLES (INCLUDING TWO AND THREE WHEELERS)**I. Vehicles with GVW exceeding 3.5 ton**

| Pollutants | Limits for | |
|---|---------------|--------------------------|
| | Type Approval | Conformity of Production |
| CO(g/kWh) | 4.5 | 4.9 |
| HC(g/kWh) | 1.1 | 1.23 |
| NO _x (g/kWh) | 8.0 | 9.0 |
| PM (g/kWh) for engines with power exceeding 85kW | 0.36 | 0.4 |
| PM (g/kWh) for engines with power not exceeding 85 kW | 0.36 | 0.4 |

II. Vehicles with GVW equal to or less than 3.5 ton

| Pollutants | Limits for | |
|---|---------------|--------------------------|
| | Type Approval | Conformity of Production |
| CO(g/kWh) | 4.5 | 4.9 |
| HC(g/kWh) | 1.1 | 1.23 |
| NO _x (g/kWh) | 8.0 | 9.0 |
| PM (g/kWh) for engines with power exceeding 85kW | 0.36 | 0.4 |
| PM (g/kWh) for engines with power equal to or less than 85 kW | 0.61 | 0.68 |

Or Chassis Dynamometer Test

| Reference Mass (kg) | Limits for Type Approval gm/km | | | Limits for conformity of Production gm/km | | |
|---------------------|--------------------------------|--------------------|------|---|--------------------|------|
| | CO | HC+NO _x | PM | CO | HC+NO _x | PM |
| R ≤ 1250 | 2.72 | 0.97 | 0.14 | 3.16 | 1.13 | 0.18 |
| 1250 ≤ R < 1700 | 5.17 | 1.40 | 0.19 | 6.0 | 1.60 | 0.22 |
| 1700 ≤ R | 6.90 | 1.70 | 0.25 | 8.0 | 2.0 | 0.29 |

Notes.—

The test for vehicles with GVW equal to or less than 3.5 ton shall be as per the 13 mode cycle on engine dynamometer specified in Annexure IV A to the principal rules.

The test shall be as per the Indian Driving Cycle, for 2 Wheelers and 3 Wheelers and modified Indian Driving Cycle for 4 Wheelers with cold start, as specified in Annexure IV B on Chassis Dynamometer.

For vehicles fitted with catalytic converters a deterioration factor 1.1 of CO; 1.0 for HC+NO_x and 1.2 for PM on type approval limits will be applicable for durability.

The emission of visible pollutants (smoke) shall not exceed the limit value to smoke density, when expressed as light absorption co-efficient for various nominal flows as in Annexure-I to rule 115 (9) (Notification No. G.S.R. 163 (E), dated 29th March, 1996), when tested at constant speeds over full load. These smoke limits are without correction factor and engines are to be tested with conditioned air supplied to the engine to maintain atmospheric factor of 0.98 to 1.02.

Commercial fuel shall be as notified by Ministry of Environment and Forest vide Notification No. G.S.R. 176 (E), dated 2nd April, 1996.

Reference test fuel shall be as specified in Annexure IVD]

[For 2-wheelers and 3-wheelers fitted with catalytic converter, the deterioration factor shall be as follows:—

CO = 1.1; HC + NO_x = 1.0; PM = 1.2:

Provided that the Vehicle manufacturers may opt for an ageing test of 30,000 kms for evaluating deterioration factor, as per procedure that may be laid down by the Central Government:

Provided further that the above provisions shall come into force after six months from the publication of the notification.]

[(11) MASS EMISSION STANDARDS (BHARAT STAGE-II):]

(A) Motor Cars with seating capacity of and upto 6 persons (including driver) and Gross Vehicle Mass (GVM) not exceeding 2500 kg.

| Vehicles with | Standards (Type Approval =COP)(g/km) | | |
|-----------------|--------------------------------------|-----------------------|------|
| | CO | (HC+NO _x) | PM |
| Gasoline engine | 2.2 | 0.5 | — |
| Diesel engine | 1.0 | 0.7 | 0.08 |

(B) Four-wheeler Passenger Vehicles with GVW equal to or less than 3500 kg and designed to carry more than 6 persons (including driver) or maximum mass of which exceeds 2500 kg.

| | | Limit Values for Type Approval (TA) as well as COP | | | | |
|-------|------------------|--|--------|-----------------------------------|--------|------------------|
| Class | Ref. Mass(rw) Kg | Mass of CO(g/km) | | Mass of HC+NO _x (g/km) | | Mass of PM(g/km) |
| | | Gasoline | Diesel | Gasoline | Diesel | Diesel |
| I | rw<1250 | 2.2 | 1.0 | 0.5 | 0.7 | 0.08 |
| II | 1250<rw<1700 | 4.0 | 1.25 | 0.6 | 1.0 | 0.12 |
| III | 1700<rw | 5.0 | 1.5 | 0.7 | 1.2 | 0.17 |

1. Ins. by G.S.R. 400 (E), dated 31st May, 2002 (w.e.f. 31-5-2002).

2. Ins. by G.S.R. 77 (E), dated 31st January, 2000 (w.e.f.1-4-2000) in the National Capital Region.

Notes.—

- The test including driving cycle shall be as per sub-rule (10), with the modifications that—
 - there shall be no relaxation of norms for COP purposes;
 - the tests shall be in Chassis dynamometer;
 - the driving cycle shall be at a maximum speed of 90 kmph; and
 - the reference fuel shall be of a maximum of 0.05% sulphur content;
- Commercial fuel for meeting above norms shall be upto 0.05% mass maximum sulphur content.
- There shall be no crankcase emissions for petrol driven vehicles.
- Evaporative emission shall not be more than 2.0g/test from petrol driven vehicles.
- For the above vehicles when fitted with catalytic converter deterioration factor shall be as follows:—

Gasoline engines: CO=1.2;(HC+NO_x)=1.2;

Diesel engines: CO=1.1;(HC+NO_x)=1.0;PM=1.2

Provided that the vehicle manufacturers may opt for an aging test of 80,000 kms. for evaluating deterioration factor, as per procedure that may be laid down by the Central Government.

- For diesel engine vehicles, the emission of visible pollutants (smoke) shall not exceed the limit value to smoke density, when expressed as light absorption coefficient for various nominal flows as in Annexure-I to rule 115(9) when tested at constant speeds over full load".]

[(C) Four Wheeled Vehicles (other than passenger vehicles) with GVW equal to or less than 3500 kg shall conform the following norms:—

ENGINE DYNAMOMETER TEST

Limit Values for Type Approval (TA) as well as (COP)

| CO(g/k Wh.) | HC(g/k Wh.) | NO _x (g/k Wh.) | PM(g/k Wh.) |
|-------------|-------------|---------------------------|-------------|
| 4.0 | 1.1 | 7.0 | 0.15 |

Or Chassis Dynamometer Test

| Class Ref. Mass (RM) kg | Mass of CO (g/km) | | Mass HC+NO _x (g/km) | | Mass of PM (g/km) |
|----------------------------|----------------------|--------|-----------------------------------|--------|----------------------|
| | Gasoline | Diesel | Gasoline | Diesel | |
| I RM<1250 | 2.2 | 1.0 | 0.5 | 0.7 | 0.08 |
| II 1250<RM<1700 | 4.0 | 1.25 | 0.6 | 1.0 | 0.12 |
| III 1700<RM | 5.0 | 1.5 | 0.7 | 1.2 | 0.17 |

- Ins. by G.S.R. 286 (E), dated 24th April, 2001 (w.e.f. (a) in the National Capital Territory of Delhi in respect of vehicles manufactured on or after six months from 24th April, 2001; and (b) in respect of the 'Four Wheeled transport vehicles' which are plying on Inter-State Permits or on National Permits or on All India Tourist Permits within the jurisdiction of National Capital Territory of Delhi; and in respect of any vehicles in other areas of the country, from such date as the Central Government may by notification appoint in the Official Gazette; and different dates may be appointed for different areas).

Notes.—1. (a) There shall be no relaxation for COP purposes.

(b) The tests shall be carried out on the engine dynamometer operation as specified in Annexure IV A of the rules. The tests on chassis dynamometer shall be as per the driving cycle given in Note of clause (B) of sub-rule 11 of rule 115.

(c) The reference fuel for meeting above norms shall be up to 0.05% maximum mass sulphur content.

2. Commercial fuel for meeting above norms shall be up to 0.05 maximum mass sulphur content.

3. For Diesel engined vehicles the emission of visible pollutants (smoke) shall not exceed the limit value to smoke density, when expressed as light absorption coefficient for various nominal flows as in Annexure I to sub-rule (9) of rule 115 when tested at constant speeds over full load. These smoke limits are without correction factor and engines are to be tested with conditioned air supplied to the engine to maintain atmospheric factor of 0.98 to 1.02.

4. For Diesel engined vehicles, the free acceleration smoke for naturally aspirated and turbo-charged engines shall not exceed the smoke density limit value as in clause (c) of sub-rule (2) of rule 115.

5. There shall be no crankcase emissions for Petrol engined vehicles.

6. Evaporative emission shall not be more than 2.0/g test from Petrol engined vehicles.

(D) Vehicles with GVW exceeding 3500 kg shall conform the following norms:—

Limit Values for Type Approval (TA) as well as (COP)

| CO(g/k Wh.) | HC(g/k Wh.) | NOx(g/k Wh.) | PM(g/k Wh.) |
|-------------|-------------|--------------|-------------|
| 4.0 | 1.1 | 7.0 | 0.15 |

Notes.—1.(a) There shall be no relaxation for COP purposes.

(b) The tests shall be carried out on the engine dynamometer operation as specified in Annexure IV A of the rules.

(c) The reference fuel shall be of a maximum of 0.05% mass sulphur content.

2. Commercial fuel for meeting above norms shall be up to 0.05% mass maximum sulphur content.

3. For Diesel engined vehicles, the emission of visible pollutants (smoke) shall not exceed the limit value to smoke density, when expressed as light absorption coefficient for various nominal flow as in Annexure I to sub-rule (9) of rule 115 when tested at constant speeds over full load. These smoke limits are without correction factor and engines are to be tested with conditioned air supplied to the engine to maintain atmospheric factor of 0.98 to 1.02.

4. For Diesel engined vehicles, the free acceleration smoke for naturally aspirated and turbo-engines shall not exceed the smoke density limit value as in clause (c) of sub-rule (2) of rule 115.]