AMENDMENT No. 6
TO
Doc. No.: MoRTH/CMVR/ TAP-115/116: Issue No.: 4

Administrative and Technical procedure for measurement and monitoring [average] Fuel Consumption in l/100 km of M1 category vehicles with GVW not exceeding 3500 kg

1 INTRODUCTION: -

1.1 The Ministry of Road Transport and Highways (MoRTH)is the nodal authority for implementation of Fuel Consumption standards notified by Ministry of Power vide notification no. S.O. 1072(E) dated 23rd April, 2015. Accordingly, MoRTH has adopted this procedure under CMVR,1989 vide notification no. G.S.R. 954(E), dated the 4th October, 2016.

1.2 The Fuel Consumption standards given in the said notification issued by Ministry of Power are in terms of Fuel Consumption in litre/100km. For the purpose of establishing compliance to these standards as per this procedure, these standards shall be converted into CO_2 g/km. Accordingly, for the purpose of this procedure the equation of the average fuel consumption standard (in litre/100km) given in the said notification issued by Ministry of Power as

a x (W-b) + c

is converted into CO_2 g/km as (a * (W-b) + c) * 23.7135

The values of "a", "b", "c" and "W" shall be as specified in the notification S.O. 1072(E) dated 23rd April, 2015, issued by Ministry of Power.

The compliance to the CO_2 equation mentioned here shall be deemed as compliance to the average fuel consumption standard in petrol equivalent litre/100kmgiven in the said notification issued by Ministry of Power.

1.3 In accordance with the MoRTH notification G.S.R. 954(E), dated the 4th October, 2016, this procedure specifies the technical and administrative details for monitoring the compliance to Fuel Consumption standards for M1 Category vehicles less than 3.5 tons GVW tested on Chassis dynamometer subjected to type approval as CMVR, 1989.

This procedure needs to be read in conjunction with prevalent emission regulation **MoRTH/CMVR/TAP-115 -116** document whichis applicable for Type Approval of motor vehicles for mass emission of pollutants and fuel consumption.

2 SCOPE: -

2.1 This type approval procedure will be applicable to the motor vehicles of M1 category.

2.2 Following vehicles are exempted from applicability of this procedure: -

2.2.1 **"Invalid Carriage"** as defined in The Motor Vehicles Act 1988, Chapter 1, Section 2 (18).

2.2.2 **"Special purpose vehicle (SPV)"** as defined in AIS 053:2005, as amended from time to time.

2.2.3 Vehicles exempted by Government of India from type approval for compliance to CMVR, 1989.

3 DEFINITIONS: -

For the purpose of this procedure, following definitions shall apply-

3.1 **"Manufacturer"** means anorganization who is engaged in the manufacture and/or import of motor vehicles which are subjected to type approval and intended for domestic sale.

3.2 **"Corporate Group"** Manufacturers belonging to the same corporate group under common management control in India may be considered as one "Manufacturer" entity for the purpose of complying with fuel consumption regulation.

3.3 **"Reporting period"** is a twelve month period starting from 1st April to 31st March of the following year, both dates inclusive.

3.4 **"Assessment year"**is the year after reporting period, during which the complied data is verified and reported to MoRTH and Ministry of Power/BEE.

3.5 **"Volume(n_i)"**is the total number of manufactured / importedvehicles of a type approved model 'i', including its variant(s)in a reporting periodas declared by the manufacturer for which excise duty/customs dutyhas been paid.

3.6 **"Designated Agency"** is the agency designated for collection, examination and reporting of data submitted by vehicle manufacturers, ref. notification no. G.S.R. 954(E), dated the 4th October, 2016.As per notification, ICAT, Manesar is the Designated Agency.

3.7 **"Annual Fuel Consumption Report"** is the report to be submitted for every reporting period by the manufacturer to the Designated Agency in the specified format as per Annexure I& Annexure II.

3.8 **"Annual Fuel Consumption Compliance Report"** is the report for every reporting period submitted to MoRTH by the Designated Agency as per the format given in Annexure IV.

3.9 **"Manufacturer Declared CO_2(p_i)"** for a model 'i' and its variant(s) is the specific emission of CO_2 in g/km declared by a manufacturer and verified during type approval.

3.10 **"Petrol Equivalent Fuel Consumption(FC_i)"** for a model 'i' and its variant(s) is the petrol equivalent fuel consumption in litre/100km of a model 'i' and its variants(s).

It is equal to Manufacturer's Declared CO_2value in g/km divided by 23.7135.

3.11 **"Volume derogation factor for super-credits (vi)"**shall be the factor as per clause 6.1

3.12 **"CO_2 reducing technology derogation factor (c_i)"** shall be as per clause 6.2

3.13 **"Rules"** means the Central Motor Vehicles Rules ,1989

3.14 **"Annual Corporate Average CO_2Performance (P)"**, in relation to a manufacturer, means the weighted average CO_2 emissions of all said M1 Category vehicles, manufactured/ imported during a reporting period.

It is expressed in g/km and rounded uptofour decimal places.

3.15 **"Annual Corporate AverageCO_2Target (T)"**, in relation to a manufacturer, means the specific emissions of CO_2 permitted in respect of M1 Category vehicles and is calculated in accordance with the Clause 1.2

It is expressed in g/km and rounded upto four decimal places.

3.16 **"Average Fuel Consumption Standard"**, refer clause 1.2, as specified in the notification S.O. 1072(E) dated 23rd April, 2015, issued by Ministry of Power.

3.17 **"Small Volume Manufacturer"** is a manufacturer as defined in clause 3.1, and whose manufactured / imported volume of all models and their variant(s) is less than 5,000 units in a reporting period (sales year) for M1 category vehicles.

4 CALCULATIONS,REPORTING AND COMPLIANCE VERIFICATION

4.1 Test agencies, as notified under rule 126 of CMVR, 1989 shall provide all Type Approval (TA) and Conformity of Production (COP) emission test reports of M1 category vehicles for each reporting period to the Designated Agency.

4.2 Every manufacturer shall submit an **"Annual Fuel Consumption Report"** for the reporting period as per the format prescribed in Annexure I and "**Manufacturer's Fuel consumption Passbook"** as performat prescribed in Annexure II to the DesignatedAgency on or before 31st May of the Assessment year.

4.3 The Designated Agency shall examine and verify the manufacturer's data as submitted in Annexure I and Annexure II and shall inform any discrepancies observed regarding the details and calculations to the manufacturer on or before 20th June of the Assessment year.

4.4 In case manufacturer receives information about any discrepancies in its Annual Fuel Consumption Report, the manufacturer shall clear all those discrepancies on or before 10th July of the Assessment year.

4.5 The Designated Agency shall issue a "**STATUS OF COMPLIANCE"**to the manufacturer as per the format prescribed in Annexure-III on or before 31st July of the Assessment year along with the copy of **Annual Fuel Consumption Report** (Annexure I) &**Manufacturer's Fuel consumption Passbook**(Annexure II).

4.6 Designated agency shall compile all the information and submit the **"Annual Fuel Consumption Report**" to MoRTH and Ministry of Power/BEE on or before 31stAugust of each Assessment year as per format prescribed inAnnexure IV.

5 CO_2 CREDITS & DEBITS

5.1 The manufacturer's annual corporate average CO_2 performance (P) with respect to the target (T) can be quantified in terms of CO_2 credits / debits in metric tons/km and calculated as follows.

CO_2 Credits = $\{(T - P) \times \Sigma n_i\}/10^6$

CO_2 Debits = $\{(P - T) \times \Sigma n_i\}/10^6$

Where:

'P' is the manufacturer's annual corporate averageCO_2performance expressed in g/km

'T' is the manufacturer's annual corporate averageCO_2target expressed in g/km

n_i is the total number of vehicles manufactured / imported in India of a model i,

including its variant(s) in a Reporting period for sale in India.

These credits and debits shall be recorded in the Manufacturer's fuel consumption passbook and may be used for any management purposes by the nodal agency.

6 SUPER CREDITS AND CO_2 REDUCING TECHNOLOGIES

6.1 SUPER CREDITS

a) For the purpose of calculating the Corporate Average CO_2Performance (P), a manufacturer may consider using the volume derogation factor given below, for each of its models:

S.No.	Vehicle Type	Volume derogation factor for super credit (v_i)
1	Strong Hybrid Electric Vehicles	2.0
2	Plug-in Hybrid Electric Vehicles / Range Extender Hybrid Electric Vehicles	2.5
3	Pure Electric Vehicles	3.0

In case, a vehicle model qualifies for more than one of the volume derogation factors listed above, the highest of those factors shall be applicable.

The effective Volume (N_i) of a model i and its variant(s) shall be calculated as below –

$N_i = v_i \times n_i$

CO_2 emissions of vehicle models i and its variant(s) of Pure Electric Vehicles shall be calculated as per the formula mentioned below :

CO_2 (g/km) = (FC in kWh/100 km) x 0.1028 x 23.7135

The above super credits will be reviewed and finalized by 1st Oct 2018 for 2022-2023 onward norms.

6.2 CO_2 REDUCING TECHNOLOGIES

6.2.1 The vehicle manufacturer, at its option, may use the following factors for the following CO_2 reducing technologies in calculating the Corporate Average CO_2Performance (P).

CO_2 Reducing Technologies	**CO_2 reducing technology derogation factor**on CO_2 emission **(c_i)**
Regenerative braking	0.98
Start-Stop System	0.98
Tyre pressure monitoring system	0.98
6 or more Speed Transmission	0.98

The technology factor for vehicles using multiple technologies shall be the multiplication of individual factors.

For the details of above technology, please refer Annexure V.

The CO_2 performance (P_i) of a model 'i' and its variants shall be calculated as below –

$P_i = c_1 \times c_2 \times \ldots\ldots \times cn \times p_i$

6.2.2 For CO_2 reducing technologies covered in 6.2.1 or any other technology, the CO_2 savings of which cannot be captured significantly on the Type Approval test cycle, a manufacturer may demonstrate the savings to the Type Approval Agency, These CO2 reducing technologies shall not be completely driver dependent.

In demonstrating theCO_2savings, a comparison should be made between the same vehicles with and without the CO_2 reducing technologies. The testing methodology should provide verifiable, repeatable and comparable measurements.

The testing methodology should be based on measurements as agreed by test agency on a chassis dynamometer or on modeling or simulation where such methodologies would provide better and more accurate results.

On satisfactory demonstration of savings using a technology or a combination of technologies, the Type Approval Agency shall certify the savings from the said technology or the combination of technologies.

The CO_2 savings may be certified as a factor ranging from 0 to 1 or in absolute terms i.e. in g/km, as per the discretion of Type Approval Agency.

In case, the CO_2 savings of a technology or a combination of technologies has been already certified elsewhere, the demonstration may be on the basis of appropriate documentation supporting the manufacturer's claim. In such a case, the Type Approval Agency will have the right to decide on the adequacy / appropriateness of the documentation submitted by the manufacturer, or else, may ask for demonstration using suitable test methodology.

Manufacturer may use the certified savings for calculation of its performance (P_i) for each model using the specific technology.

6.2.3 Provided no vehicle model i, including its variant(s) in each reporting period shall reduce more than 9.0 g/km of CO_2 for calculating purposes, for the technologies mentioned in 6.2.1 and 6.2.2 to be used for reducing CO_2 in that model.

7.0 VERIFICATION OF DECLARED VALUE

7.1 Test procedure:

7.1.1 The prototype vehicle shall be tested following the procedure for emission measurement prescribed in Part XI and XIV of Issue IV of the TAP-115/116 or any other standard as may be notified by MoRTH.

7.1.2 The criteria for carrying out tests shall be same as those prescribed for the mass emission tests of the prevalent emission regulations.

For hybrid electric vehicles with a special gear shifting strategy, the gear shifting points prescribed in clause 2.3.1 of chapter 3 in part XIV of TAP115/116 are not applied. For these vehicles the driving cycle specified in clause 2.3.3 of chapter 3 in part XIV of TAP 15/116 shall be used.

Concerning gear shifting points, these vehicles shall be driven according to the manufacturer's instructions, as incorporated in the driver's handbook of production vehicles and indicated by a technical gear shift instrument (for driver's information).

7.2 The CO_2 value (p_i) adopted as the type approval value shall be the value declared by the manufacturer, if the value measured as per 7.1.1, does not exceed the declared

value by more than 4 per cent. The measured value can be lower without any limitations.

7.3 If the measured value of CO_2 exceeds the manufacturer's declared CO_2 by more than 4 per cent, then another test is run on the same vehicle.

7.4 When the average of the two test results does not exceed the manufacturer's declared value by more than four per cent, then the value declared by the manufacturer is considered as the type approval value for the purpose of this regulation.

7.5 If the average still exceeds the declared value by more than 4 per cent, a final test is run on the same vehicle. The average of the three test results is considered as the type approval value for the purpose of this regulation.

7.6 During the process of 7.2 to 7.5 the manufacturer may modify the declared value. If the revised declared value complies with any of the conditions prescribed, additional tests prescribed above need not carried out.

7.7 The test agency shall issue a compliance test report to the manufacturer. The test report shall contain following :

(a) The final type approved value expressed as carbon dioxide emissions in g/km rounded to the second decimal place.
(b) Fuel consumption in L/100km calculated from final type approved value (mentioned in (a) above) using conversion factors provided in said notification, round to the second decimal place.
(c) The actual fuel consumption and Petrol equivalent fuel consumption (FC_i) in L/100km is calculated based on the formulae provided in thesaid notification, rounded to the second decimal place.

8.0 VARIANT (S) MANAGEMENT

8.1 All the model (s) / variant (s) included as one model for the purpose of CO_2 regulation:

(a) Shall have the same declared value.
(b) In case more than one test is required for type approval, all the test results shall be within the permitted tolerance of the declared value.
(c) Manufacturer shall have a system of establishing the production numbers. It is not necessary to account for the variants separately.
(d) One CMVR certificate may have more than one declared values of CO_2. However during reporting number of vehicles manufactured shall be identified separately.
Note: Separate COP for CO_2will be conducted for variants having different manufacturer declared CO_2 values.
(e) In case of inertia class increases, the type approval can be extended to the higher inertia variant / model if the CO_2 emissions, as tested by the test agency, do not exceed the declared type approved value by more than 4 per cent.

8.2 Where different configurations of emission related components, necessitates different type approval test:

8.2.1 They may be treated as one model for CO_2 calculation, by the manufacturer provided conditions 8.1 (a) and (b) are satisfied.

8.2.2 If any such configuration (s) is/are to be treated as different model for CO_2 calculation, by the manufacturer, condition 8.1(c) and (d)needs to be satisfied.\

9.0 CONSEQUENCES OF:

A. NON-SUBMISSION OF DATA
B. NON-COMPLIANCE

A NON-SUBMISSION OF DATA

A.1 From the date of implementation, every manufacturer shall submit the Annual fuel consumption compliance report to the designated agency by 31st May following the reporting period.

A.2 It is the responsibility of every manufacturer to submit the Annual fuel consumption report to the designated agency by 31st May following the reporting period, failing which the designated agency shall report the matter to MoRTH and Ministry of Power/BEE for further suitable action against such manufacturers.

B NON-COMPLIANCE

B.1 From the date of implementation, every manufacturer shall maintain a fuel consumption passbook for continuously monitoring their corporate average fuel consumption including CO2 credits and debits.

B.2 In case manufacturer does not comply with the requirements of MoRTH Fuel consumption Standard in the reporting period, the designated agency shall report such non compliance to MORTH and Ministry of Power/BEE for further suitable action against such manufacturers.

10.0 CONFORMITY OF PRODUCTION

10.1 Vehicles approved to as per the procedure shall be so manufactured as to conform to the type approved vehicle.

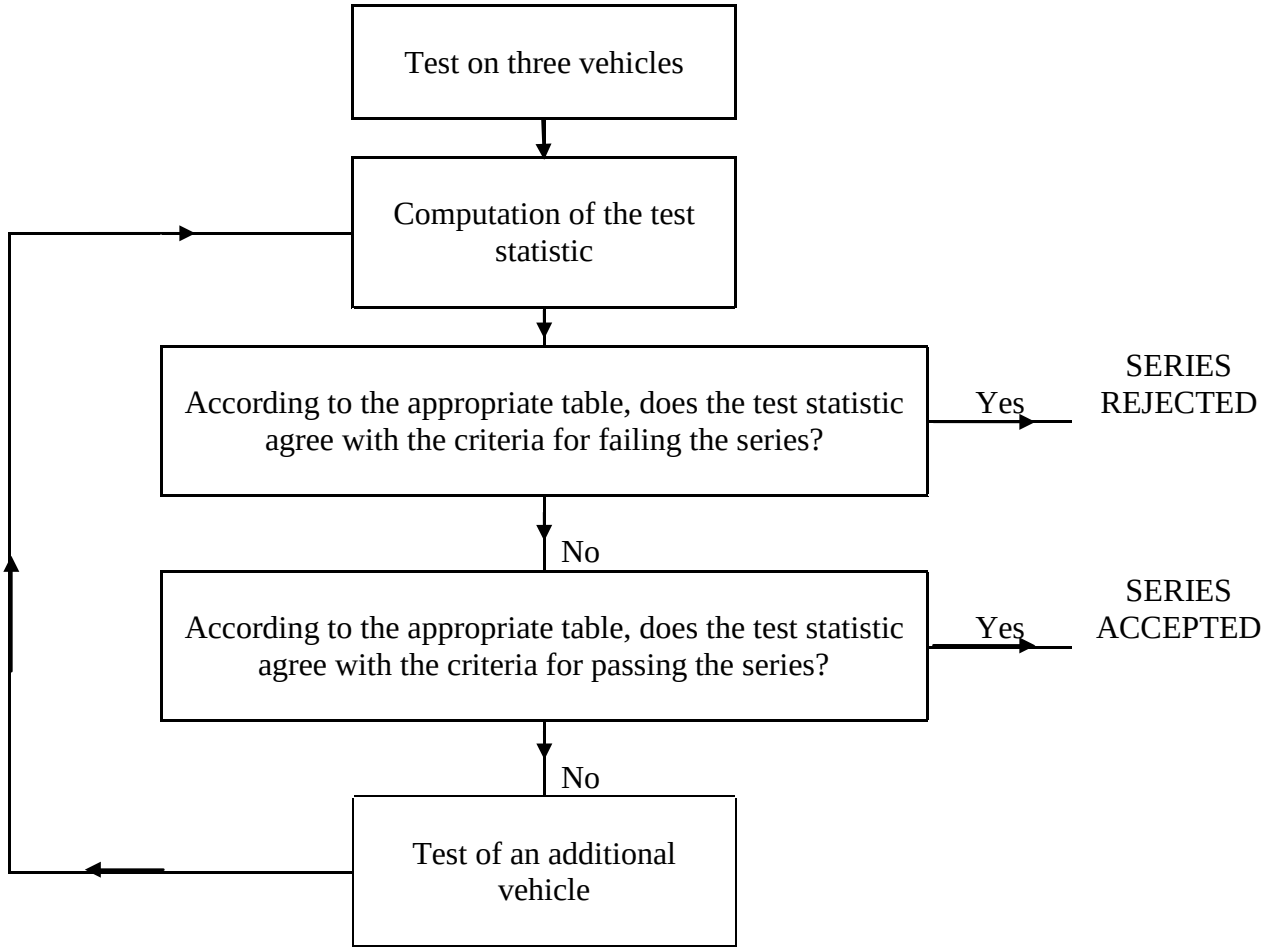
10.1.1 The appropriate production checks shall be carried out to comply with the conditions in10.1
Administrative Procedure for COP shall be applicable as per Part VI of MoRTH/CMVR/TAP-115/116.

10.2 The production of a series is regarded as conforming or non-conforming, on the basis of tests on the three sampled vehicles, once a pass or fail decision is reached for CO_2, according to the test criteria applied in the appropriate table 1. If no pass or fail decision is reached for CO_2, a test is carried out on an additional vehicle (see figure 1).

However, in case of vehicle model and its variants produced less than 250 in the half yearly period as mentioned in Administrative Procedure for COP shall be applicable as per Part VI of MoRTH/CMVR/TAP-115/116, sample size shall be one. The deterioration factors are used in the same way. The limit values shall be CO_2 type approval declared value

10.3 In the case of periodically regenerating systems (e.g. DPF), the results shall be multiplied by the factor Ki obtained by the procedure specified in relevant emission regulation at the time when type approval was granted. At the request of the manufacturer, testing may be carried out immediately after regeneration has been completed.

Figure 1



Note: Vehicle selection for compliance to Emission and Fuel Consumption COP can be same.

10.4 Notwithstanding the requirements of Part XIV, the tests will be carried out on vehicles which have not travelled any distance other than for the purpose of necessary production tests, transportation, preconditioning, running-in, etc.

10.4.1 However, at the request of the manufacturer, the tests will be carried out on vehicles which have been run-in a maximum of 15,000 km.
In this case:,

(a) The run-in procedure will be conducted by the manufacturer who shall undertake not to make any adjustments to those vehicles.

Note: In case COP for CO_2 and other pollutants happens on same set of vehicles, Manufacturer may choose to have evolution coefficient only for CO_2. In case evolution coefficient procedure is followed for CO_2 and other pollutants running specifications may be different for CO_2 and other pollutants.

(b) The test result shall be multiplied by the Evolution Coefficient (EC) determined as follows:
- The emissions of CO_2 will be measured at zero and at 'x' km on the first tested vehicle (which can be the type approval vehicle);
- The evolution coefficient (EC) of the emissions between zero and 'x' km will be calculated as follows:

$$EC = \frac{Emissions\ at\ x\ km}{Emissions\ at\ zero\ km}$$

The value of EC may be less than 1.

The following vehicles will not be subjected to the running-in procedure, but their zero km emissions will be modified by the evolution coefficient, EC.

In this case, the values to be taken will be:

- The value at 'x' km for the first vehicle;
- The values at zero km multiplied by the evolution coefficient for the following vehicles.

10.4.2 As an alternative to this procedure, the manufacturer can use a fixed evolution coefficient, EC, of 0.92 and multiply all values of CO_2 measured at zero km by this factor.

10.5 **Pass-Fail Criteria for COP**

10.5.1 With a minimum sample size of three the sampling procedure is set so that the probability of a lot passing a test with 40 per cent of the production defective is 0.95 (producer's risk = 5 per cent) while the probability of a lot being accepted with 65 per cent of the production defective is 0.1 (consumer's risk = 10 per cent).

10.5.2 The measurement of CO_2 is considered to be log normally distributed and should first be transformed by taking the natural logarithms. Let m_o and **m** denote the minimum and maximum sample sizes respectively (m_o = 3 and m = 32) and let **n** denote the current sample number.

10.5.3 If the natural logarithms of the measurements in the series are x_1, x_2, ..., x_j and L is the natural logarithm of the CO_2 type approval declared value, then define:

$$d_j = x_j - L$$

$$\overline{d}_n = \frac{1}{n}\sum_{j=1}^{n} d_j$$

$$v^2_n = \frac{1}{n}\sum_{j=1}^{n} (d_j - \overline{d}_n)^2$$

10.5.4 Table 1 shows values of the pass (A_n) and fail (B_n) decision numbers against current sample number. The test statistic is the ratio $\overline{d}_n / v_n$ and shall be used to determine whether the series has passed or failed as follows:

for $m_o \leq n \leq m$:

10.5.4.1 pass the series if $\overline{d}_n / v_n \leq A_n$;

10.5.4.2 fail the series if $\overline{d}_n / v_n \geq B_n$;

10.5.4.3 take another measurement if $A_n < \overline{d}_n / v_n < B_n$.

10.6 In case of low volume vehicles with Annual production less than 250 per 6 months, manufacture has to do test as per the procedure prescribed for emission measurement and the CO_2 results to be verified as per Manufacturer declared CO_2 value.

10.7 Consequences of COP Series Rejection

10.7.1 In case of series is rejected as during COP, the manufacturer shall change the "Manufacturers declared value". In such cases for the purpose of verificationof manufactures re-declared CO_2 value,COP test result shall be considered.

10.8 Fuels: Alltests shall be conducted with the reference fuel as specified in the

applicable gazette notification. However, at the manufacturer's request, testsmay be carried out with commercial fuel.

Table 1

Sample Size (cumulative number of vehicles tested), N	**Pass DecisionNo. A_n**	**Fail DecisionNo. B_n**
(a)	(b)	(c)
3	- 0.80380	16.64743
4	- 0.76339	7.68627
5	- 0.72982	4.67136
6	- 0.69962	3.25573
7	- 0.67129	2.45431
8	- 0.64406	1.94369
9	- 0.61750	1.59105
10	- 0.59135	1.33295
11	- 0.56542	1.13566
12	- 0.53960	0.97970
13	- 0.51379	0.85307
14	- 0.48791	0.74801
15	- 0.46191	0.65928
16	- 0.43573	0.58321
17	- 0.40933	0.51718
18	- 0.38266	0.45922
19	- 0.35570	0.40788
20	- 0.32840	0.36203
21	- 0.30072	0.32078
22	- 0.27263	0.28343
23	- 0.24410	0.24943
24	- 0.21509	0.21831
25	- 0.18557	0.18970
26	- 0.15550	0.16328
27	- 0.12483	0.13880
28	- 0.09354	0.11603
29	- 0.06159	0.09480
30	- 0.02892	0.07493
31	0.00449	0.05629
32	0.03876	0.03876

ANNEXURE I

ANNUAL FUEL CONSUMPTION REPORT TO BE SUBMITTED BY MANUFACTURER

Name and Address of the Manufacturer: -

Reporting Period: ----------

Serial No	Model (including Variants and versions)	Type approval certificate number(s)	Unladen Mass (Wi) (kg)	Fuel	Manufacturer declared CO_2 (pi) (g/km)	CO_2 Reducing technology factor (c_i)	CO_2 Performance of Model (including Variants and versions) (P_i)* p_i X c_i	Volume factor for Super Credit (v_i)	Manufactured / imported Volume (n_i)	Effective Volume (N_i) n_i X v_i	N_i X P_i	Wi X n_i
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
									Total			

*** Difference between p_i and $P_i$shall not be more than 9 g/km for a particular model.**

(A) Annualcorporateaverage CO_2emission performance and target

$P = \sum(N_i \text{ X } P_i)/ \sum N_i$ = ------ g/Km

T = (a * (W-b) + c)*23.7135 (applicable as per clause 1.2)
Where :

$W = \sum(n_i X W_i) / \sum n_i$

Note : W_i (i.e. unladen mass in kg of a model **i**) is the heaviest mass of atype approved model and its variant(s) imported or in production for the reporting period.

For small volume manufacturersopting for alternatetarget, the target 'T' shallbecalculated as givenbelow:

Reporting period	Alternate annual corporate average CO_2 in g/km Target (T)
2017-18 onwards	P
2022-23	P * 0.830

Dated:

Authorized Signatory of Vehicle Manufacturer

ANNEXURE II
Manufacturer's Fuel consumptionPassbook

Name and Address of the Manufacturer: -

Reporting period (sales year): ----------

Reporting period	**Corporate average CO_2 target (T) (g/km)**	**Corporate average CO_2 performance (P) (g/km)**	**Manufactured / imported volume for the reporting period (Σn_i)**	**CO_2 Credits earned (T-P)* $\Sigma n_i / 10^6$ (t/km)**	**CO_2 Debits (P-T)* $\Sigma n_i / 10^6$ (t/km)**
(1)	(2)	(3)	(4)	(5)	(6)
2016-2017					
2017- 2018					
2018-2019					
And so on					

Dated: -

Authorized Signatory of Vehicle Manufacturer

ANNEXURE III

Format of Compliance

STATUS OF COMPLIANCE
TO FUEL CONSUMPTION STANDARD

Based on the verification of the Annexure I/ II, submitted by the manufacturer/ importer / corporate group/ importers, M/s----------, it is certified that the status of the Corporate Average Fuel Consumption for the fleet of vehicle models as given in the Annexure I as per the provisions of the Central Motor Vehicle Rules, 1989, under Rule 115 G, clause (2) ,for the reporting period starting from 1st April …… to 31st March …… , is as given below.

Reporting Period	Credits	Debits
FY (n)		
FY (n-1)		
FY (n-2)		
FY (n-3)		

Dated: -

Authorized Signatory ICAT, Manesar

ANNEXURE IV

ANNUAL FUEL CONSUMPTION REPORT

Reporting period

Sr. No.	Manufacturer [(a)]	Annual corporate average CO_2 (in g/km) performance (P)	CAFCS (= P/23.7135)	Manufacturer's annual corporate average CO_2 (in g/km) target (T)	ACAFC (= T/23.7135)	+ veCredit / -veDebit	Manufacturers Corporate Average CO_2 Compliance (Yes/No)	Manufacturers AnnualFuel Consumption Compliance (Yes/No)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1	**Mfr1**							
2	**Mfr2**							
3	**Mfr3**							
4	**Mfr4**							

Dated: -

Authorized Signatory ICAT, Manesar

ANNEXURE V

Definitions for CO2 reduction technologies

CO_2 reduction technology	Definition	Method of verification during type approval
Regenerative braking	A braking system, which during deceleration, provides for the conversion of vehicle kinetic energy into electrical energy.	Verify fitment of regenerative braking system as detailed by manufacture.
Start-Stop System	A system wherein during vehicle idling, the engine stops automatically and again starts automatically when operating conditions as defined by the vehicle manufacturer are met with.	Verify functionality by driving the vehicle. Start stop shall function as per system explanation / description of OEM.
Tyre pressure monitoring system	A system fitted on a vehicle, able to perform a function to evaluate the inflation pressure of the tyres or the variation of this inflation pressure over time and to transmit corresponding information to the user while the vehicle is running.	Verification of functionality that individual tyre pressures of all four service tyres and one spare tyre (If available) are monitored and this information on real time tyre pressure valuesare displayed on the dash board.
6 or more Speed Transmission	A transmission with provision of selecting 6 or more different gear ratios for forward movement of vehicle.	Verify number of gears provided in vehicles (excluding reverse)

ANNEXURE VI
Terms and definitions

Sr.No.	Technology	Definition
1	Hybrid Electric Vehicles (HEV)	means vehicle in which "power train" comprises a combination of two different drive train types: • an internal combustion engine, and • one (or several) electric drive train(s) HEV for the purpose of mechanical propulsion, draws energy from both of the following on-vehicle sources of stored energy/power: • a consumable fuel • an electrical energy/power storage device (e.g.: battery, capacitor, flywheel/generator etc.)"
1a	Strong Hybrid Electric Vehicle **(Strong HEV)**	A 'Hybrid Electric Vehicle (HEV)' which has a 'Stop-start' arrangement, 'Electric Regenerative braking system' and a 'Motor Drive' (motor alone is capable to propel the vehicle from a stationary condition)
1b	Plug-in HEV **(PHEV)/** Range Extended Electric Vehicle **(REEV)**	A 'Strong HEV' vehicle which has a provision for 'Off Vehicle charging' (OVC) of 'Rechargeable Energy storage system (ReESS)'.
2	Battery Electric Vehicle **(BEV)**	A vehicle which is powered exclusively by an electric motor whose traction Energy is supplied exclusively by traction battery installed in the vehicle and has an 'Electric Regenerative Braking system'.
2a	Pure electric vehicle	means vehicle powered by an electric power train only;

***Additional Definitions**

- **Hybrid Electric Vehicle (HEV):** A vehicle that fir the purpose of mechanical propulsion draws energy from both of the following on-vehicle sources of energy/power:
  - ✓ A consumable fuel
  - ✓ Energy / Power storage device (e.g.: battery, capacitor, etc.)
- **Electric Regenerative Braking System:** A system, which during braking, provides for the conversion of vehicle kinetic energy into electrical energy.
- **Off Vehicle Charging (OVC):** ReESS in the vehicle has a provision for external charging.

ANNEXURE- A for CAFÉ- M1 Category

Make	
Name and address of manufacturer with contact persons' name, designation, e-mail, phone nos. etc.	
Provide details of importer, if applicable.	
Name(s) and address (es) of assembly plants	
Name and address of the vehicle importer	
Name and address of manufacturer's authorized representative. if any	
Fuel	Gasoline/ Diesel/ CNG/LPG/BOV/HYBRID

Type Approval Particulars	**Base**	**Variant 1**	**Variant 2**	**Variant 3**	**Variant 4**	**Variant 5**	**Variant 6**
Model Name							
TA certificate no.							
TA Emission Report No.							
TA for CO2, if applicable*							
Unladen mass (kg)							
Declared CO_2 (g/km)							
Measured CO_2 (g/km)							
CAFÉ specific information as per clause 6.0 of TAP 115/116 Part XVIII							
CO_2 Reducing technology	Avaliable (Yes/No)						
Regenerative braking							
Start-Stop System							
Tyre pressure monitoring system							
6 or more Speed Transmission							
Super credit technology	Avaliable (Yes/No)						
Strong Hybrid Electric Vehicles							
Plug-in Hybrid Electric Vehicles / Range Extender Hybrid Electric Vehicles							
Pure Electric Vehicles							
Any Other technology, for CO_2 Savings							

** If TA for CO_2 is other than TA emission*

Note: In case of additional Variants, use attachment

Manufacturer:		Document No:		Test Agency:		Cert No:	
Sign:				Sign:			
				Name:			
Name:		Sheet No:		Desig:			
Desig:		Date:		Date of Issue:		Page no.	