

AMENDMENT No. 7 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	<u>INTRODUCTION:</u> -
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 23 rd April, 2015. Accordingly, MoRTH has adopted this procedure under CMVR, 1989 vide notification no. G.S.R. 954(E) dated the 4 th October, 2016, further amended by G.S.R 1461(E) dated 27 th November, 2017.
1.2	<p>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 CO₂ 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</p> $a \times (W-b) + c$ <p>is converted into CO₂ g/km as $(a * (W-b) + c) * 23.7135$</p> <p>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.</p> <p>The compliance to the CO₂ equation mentioned here shall be deemed as compliance to the average fuel consumption standard in petrol equivalent litre/100km given in the said notification issued by Ministry of Power.</p>
1.3	<p>In accordance with the MoRTH notification G.S.R. 954(E), dated the 4th October, 2016, further amended by G.S.R 1461(E) dated 27th November, 2017, this procedure specifies the technical and administrative details for monitoring the compliance to Fuel Consumption standards for M1 Category vehicles not exceeding 3.5 tons GVW tested on Chassis dynamometer subjected to type approval as per CMVR, 1989.</p> <p>This procedure needs to be read in conjunction with prevalent emission regulation MoRTH/CMVR/TAP-115/116 document which is applicable for Type Approval and Conformity of production of motor vehicles for mass emission of pollutants and fuel consumption.</p>
1.4	Approvals provided by Test Agencies for Amendment 6 to Doc. No.: MoRTH/CMVR/ TAP-115/116: Issue No.: 4 shall be deemed to be compliant to this procedure, subject to satisfactory compliance of the clauses 8.1 and 10.4.
2	<u>SCOPE:</u>
2.1	This procedure will be applicable to M1 Category vehicles not exceeding 3.5 tons GVW.
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	<u>DEFINITIONS:</u>
	For the purpose of this procedure, following definitions shall apply :
3.1	“ Manufacturer ” means an organization 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 ” would mean and include manufacturers belonging to the same corporate group, as defined by minimum 51% direct shareholding in each manufacturing company by the corporate group, may be considered as one “Manufacturer” for the purpose of complying with fuel consumption standard.
3.3	“ Reporting period ” is a twelve month period starting from 1 st April to 31 st 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 / imported vehicles of a type approved model ‘i’, including its variant(s) in a reporting period as declared by the manufacturer for which excise duty or GST /customs duty has 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 4 th October, 2016, further amended by G.S.R 1461(E) dated 27 th November, 2017. 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 CO₂ (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 ₂ value in g/km divided by 23.7135.
3.11	“ Volume derogation factor for super-credits (v_i) ” shall be the factor as per clause 6.1
3.12	“ CO₂ 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 CO₂ Performance (P) ”, in relation to a manufacturer, means the weighted average CO ₂ emissions of all said M1 Category vehicles not exceeding 3.5 tons GVW, manufactured/ imported during a reporting period. It is expressed in g/km and rounded up to three decimal places.

3.15	<p>“Annual Corporate Average CO₂ Target (T)”, in relation to a manufacturer, means the specific emissions of CO₂ permitted in respect of M1 Category vehicles not exceeding 3.5 tons GVW and is calculated in accordance with the Clause 1.2</p> <p>It is expressed in g/km and rounded up to three decimal places.</p>
3.16	<p>“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 not exceeding 3.5 tons GVW.</p>
3.17	<p>“Zero (0) km vehicle” means a vehicle that has covered the distance of less than or equal to 100 km before the start of preconditioning.</p>
3.18	<p>“Hybrid Electric Vehicles (HEV)” means a vehicle in which "power train" comprises a combination of two different drive train types:</p> <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • a consumable fuel • an electrical energy/power storage device (e.g.: battery, capacitor, flywheel/generator etc.)”
3.19	<p>“Strong Hybrid Electric Vehicle (Strong HEV)” means 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)</p>
3.20	<p>“Plug-in HEV (PHEV)/ Range Extended Electric Vehicle (REEV)” means a ‘Strong HEV’ vehicle which has a provision for ‘Off Vehicle charging’ (OVC) of ‘Rechargeable Energy storage system (ReESS)’.</p>
3.21	<p>"Pure electric vehicle" means vehicle powered by an electric power train only.</p>
3.22	<p>“Bi Fuel” means a vehicle that can run part-time on petrol and also part-time on either LPG or NG</p>
4	<p><u>CALCULATIONS, REPORTING AND COMPLIANCE VERIFICATION:</u></p>
4.1	<p>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.</p>
4.2	<p>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 per format prescribed in Annexure II to the Designated Agency on or before 31st May of the Assessment year.</p>
4.3	<p>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.</p>
4.4	<p>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.</p>
4.5	<p>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).</p>
4.6	<p>Designated agency shall compile all the information and submit the “Annual Fuel Consumption Compliance Report” to MoRTH and Ministry of Power/BEE on or before 31st August of each Assessment year as per format prescribed in Annexure IV.</p>

5	<u>CO₂ CREDITS & DEBITS :</u>												
5.1	<p>The manufacturer's annual corporate average CO₂ performance (P) with respect to the target (T) can be quantified in terms of CO₂ credits / debits in metric tons/km and calculated as follows.</p> $\text{CO}_2 \text{ Credits} = \{(T - P) \times \sum n_i\} / 10^6$ $\text{CO}_2 \text{ Debits} = \{(P - T) \times \sum n_i\} / 10^6$ <p>Where:</p> <p>'P' is the manufacturer's annual corporate average CO₂ performance expressed in g/km</p> <p>'T' is the manufacturer's annual corporate average CO₂ target expressed in g/km</p> <p>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.</p> <p>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.</p>												
6	<u>SUPER CREDITS AND CO₂ REDUCING TECHNOLOGIES:</u>												
6.1	<u>SUPER CREDITS:</u>												
	<p>a) For the purpose of calculating the Corporate Average CO₂ Performance (P), a manufacturer may consider using the volume derogation factor given below, for each of its models:</p> <table border="1" data-bbox="407 940 1414 1283"> <thead> <tr> <th data-bbox="407 940 500 1094">S.No.</th> <th data-bbox="500 940 1149 1094">Vehicle Type</th> <th data-bbox="1149 940 1414 1094">Volume derogation factor for super credit (v_i)</th> </tr> </thead> <tbody> <tr> <td data-bbox="407 1094 500 1142">1</td> <td data-bbox="500 1094 1149 1142">Strong Hybrid Electric Vehicles</td> <td data-bbox="1149 1094 1414 1142">2.0</td> </tr> <tr> <td data-bbox="407 1142 500 1230">2</td> <td data-bbox="500 1142 1149 1230">Plug-in Hybrid Electric Vehicles / Range Extender Hybrid Electric Vehicles</td> <td data-bbox="1149 1142 1414 1230">2.5</td> </tr> <tr> <td data-bbox="407 1230 500 1283">3</td> <td data-bbox="500 1230 1149 1283">Pure Electric Vehicles</td> <td data-bbox="1149 1230 1414 1283">3.0</td> </tr> </tbody> </table> <p>The effective Volume (N_i) of a model 'i' and its variant(s) shall be calculated as below :</p> $N_i = v_i \times n_i$	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
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											
	<p>CO₂ emissions of vehicle models 'i' and its variant(s) of Pure Electric Vehicles shall be calculated as per the formula mentioned below :</p> $\text{CO}_2 \text{ (g/km)} = (\text{FC in kWh/100 km}) \times 0.1028 \times 23.7135$ <p>The above super credits will be reviewed and finalized by 1st Oct 2018 for 2022-2023 onward norms.</p>												
6.2	<u>CO₂ REDUCING TECHNOLOGIES</u>												
6.2.1	<p>The vehicle manufacturer, may use the following factors for the following CO₂ reducing technologies in calculating the Corporate Average CO₂ Performance (P).</p> <p>These technologies shall be verified as per Annexure V and captured in technical specification AIS 007 / and test report issued by the Type approval test agency during the type approval process.</p>												

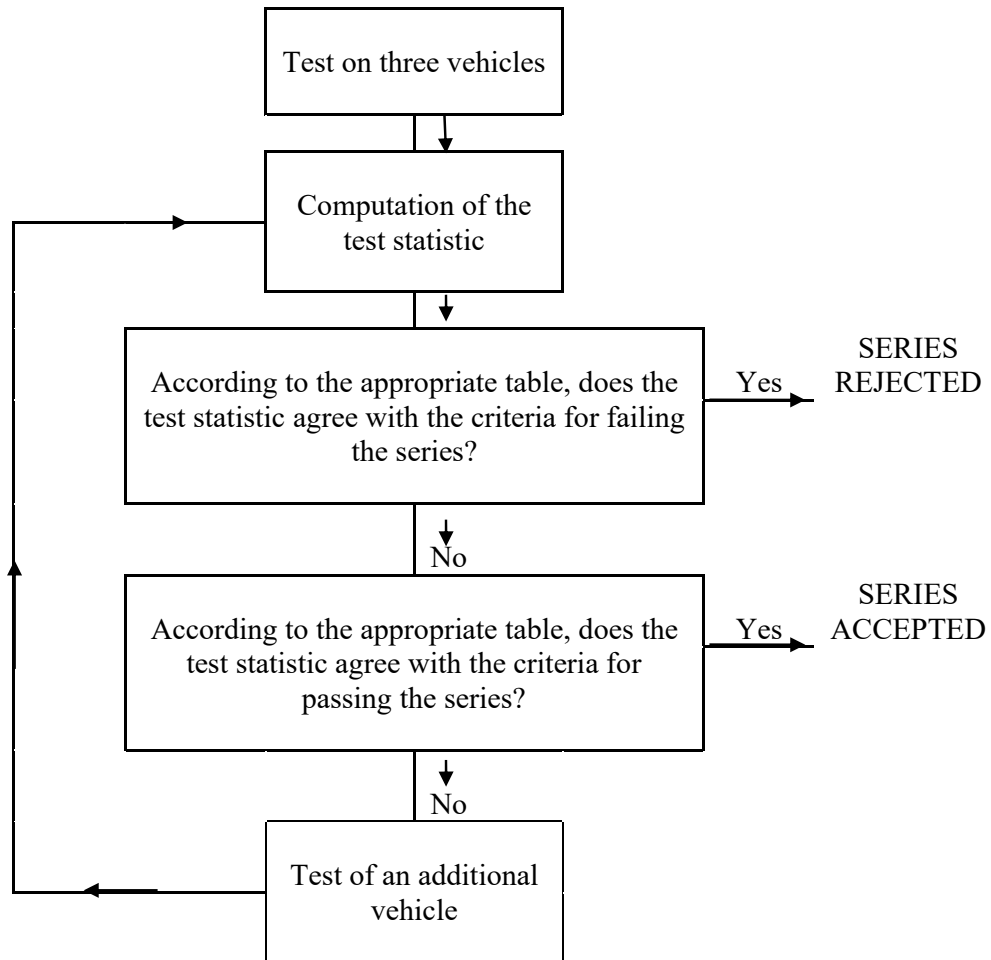
	CO ₂ Reducing Technologies	CO₂ reducing technology derogation factor on CO₂ emission (c_i)
	Regenerative braking	0.98
	Start-Stop System*	0.98
	Tyre pressure monitoring system	0.98
	6 or more Speed Transmission	0.98
	<p>The technology factor for vehicles using multiple technologies shall be the multiplication of individual factors.</p> <p>The CO₂ performance (P_i) of a model ‘i’ and its variants shall be calculated as below –</p> $P_i = c_1 \times c_2 \times \dots \times c_n \times p_i$ <p>*For reporting FY 17-18: Start – Stop system with manual intervention will be considered for fuel consumption computation.</p>	
6.2.2	<p>For CO₂ reducing technologies other than those covered in 6.2.1, the manufacturer shall demonstrate the savings to the Type Approval Agency. These CO₂ reducing technologies shall not be completely driver dependent and must achieve minimum reduction of 1 gm CO₂/ km.</p> <p>While demonstrating the CO₂ savings on chassis dynamometer, a comparison should be made between the same vehicles with and without the CO₂ reducing technologies. The testing methodology should provide verifiable, repeatable and comparable measurements.</p> <p>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.</p> <p>The CO₂ 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.</p> <p>In case, the CO₂ 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.</p> <p>Manufacturer may use the certified savings for calculation of its performance (P_i) for each model using the specific technology.</p>	
6.2.3	<p>Provided no vehicle model ‘i’, including its variant(s) in each reporting period shall reduce more than 9.0 g/km of CO₂ for calculating purposes, for the technologies mentioned in 6.2.1 and 6.2.2 to be used for reducing CO₂ in that model.</p>	
7.0	<u>VERIFICATION OF DECLARED VALUE:</u>	
7.1	Test procedure:	
7.1.1	<p>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.</p>	

7.1.2	<p>The criteria for carrying out tests shall be same as those prescribed for the mass emission tests of the prevalent emission regulations.</p> <p>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 115/116 shall be used.</p> <p>Concerning gear shifting points, these vehicles shall be driven according to the manufacturer's instructions, as incorporated in the Owner's Manual and service/workshop manual of vehicles and indicated by a technical gear shift instrument.</p>
7.1.3	For bi-fuel vehicles, CO ₂ value of gaseous mode test shall be considered for calculation purpose.
7.1.4	In case of multiple modes, where default mode is -
7.1.4.1	available, tests shall be carried out in default mode.
7.1.4.2	not available, tests shall be carried out in all the modes. The maximum CO ₂ value will be considered for the purpose of fuel consumption computation.
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 four 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, additional test shall be 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 four 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	<p>The test agency shall issue a compliance test report to the manufacturer. The test report shall contain following :</p> <p>(a) The final type approved value expressed as carbon dioxide emissions in g/km rounded to the third decimal place.</p> <p>(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 third decimal place.</p> <p>(c) The actual fuel consumption and Petrol equivalent fuel consumption (FC_i) in l/100km is calculated based on the formulae provided in the said notification, rounded to the third decimal place.</p>
8.0	VARIANT (S) MANAGEMENT:
8.1	<p>All the model (s) / variant (s) included as one model for the purpose of CO₂ regulation:</p> <p>(a) Shall have the same declared value.</p> <p>(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.</p> <p>(c) Manufacturer shall have a system of establishing the production numbers. It is not necessary to account for the variants separately.</p>

	<p>(d) One CMVR certificate may have more than one declared values of CO₂. However during reporting period, number of vehicles manufactured shall be identified separately. Note: Separate COP for CO₂ will be conducted for variants having different manufacturer declared CO₂ values.</p> <p>(e) In case of inertia class increases, the type approval can be extended to the higher inertia variant / model if the CO₂ emissions, as tested by the test agency, do not exceed the declared type approved value by more than four per cent.</p> <p>(f) In case of 4x2 & 4x4 vehicles as variants, if declared CO₂ is</p> <ul style="list-style-type: none"> • same for both 4x4 & 4x2, test will be carried out in 4X4 variant. • is different for 4x4 & 4x2 variants, test will be carried out on both variants. <p>However, for vehicle model having a selectable option for 4x2 & 4x4 modes, test will be carried out in 4x2 mode unless opted otherwise by the vehicle manufacturer.</p> <p>The vehicle manufacturer shall comply to the following conditions w.e.f reporting period FY 19-20, in case test is carried out in 4x2 mode:</p> <ol style="list-style-type: none"> 1. To adequately cover the adverse effects such as excessive noise, abnormal tyre wear, adverse fuel economy etc of the usage of 4x4 mode while normal driving on dry hard surface in the owner's manual and it is also recommended to educate the customer at the point of sale. 2. To provide a tell-tale symbol in the instrument cluster indicating the engagement of 4x4 mode.
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	<u>CONSEQUENCES OF:</u>
	A. NON-SUBMISSION OF DATA
	B. NON-COMPLIANCE
A	<u>NON-SUBMISSION OF DATA</u>
A.1	From the date of implementation, every manufacturer shall submit the Annual fuel consumption compliance report to the designated agency by 31 st 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 31 st 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	<u>NON-COMPLIANCE</u>
B.1	From the date of implementation, every manufacturer shall maintain a fuel consumption passbook for continuously monitoring their corporate average fuel consumption including CO ₂ 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	<u>CONFORMITY OF PRODUCTION</u>
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 in 10.1. 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 including its variants manufactured/ imported is less than 250 in the reporting period, COP shall be applicable for that vehicle model and the test procedure as per MoRTH/CMVR/TAP-115/116.
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.
10.4	In case of multiple modes, where default mode is not available, COP shall be carried out on all the modes on one (01) sample.

Figure 1



Note: Vehicle selection for compliance to Emission and Fuel Consumption COP shall be common, unless opted otherwise by the vehicle manufacturer, in which case, the compliance of both emission and CO₂ needs to be carried out simultaneously.

10.4	Notwithstanding the requirements of Part XIV, the tests will be carried out on zero km vehicles. However, during COP, the vehicle manufacturer has an option to select the method as per clause 10.4.1 or 10.4.2. The compliance of both emission and CO ₂ needs to be carried out simultaneously.
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 7 ;,
(a)	The run-in procedure will be conducted by the manufacturer who shall undertake not to make any adjustments to those vehicles.
(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);

	<p>- The evolution coefficient (EC) of the emissions between zero and 'x' km will be calculated as follows:</p> $EC = \frac{\text{Emissions at } x \text{ km}}{\text{Emissions at zero km}}$ <p>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.</p> <p>In this case, the values to be taken will be:</p> <ul style="list-style-type: none"> • 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	<u>Pass-Fail Criteria for COP :</u>
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 ₀ and m denote the minimum and maximum sample sizes respectively (m ₀ = 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: $d_j = x_j - L$ $\bar{d}_n = \frac{1}{n} \sum_{j=1}^n d_j$ $v_n^2 = \frac{1}{n} \sum_{j=1}^n (d_j - \bar{d}_n)^2$
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 \bar{d}_n / v_n and shall be used to determine whether the series has passed or failed as follows: for m ₀ ≤ n ≤ m:
10.5.4.1	pass the series if $\bar{d}_n / v_n \leq A_n$;
10.5.4.2	fail the series if $\bar{d}_n / v_n \geq B_n$;
10.5.4.3	take another measurement if $A_n < \bar{d}_n / v_n < B_n$.
10.6	In case of low volume vehicles, if the number of a specific vehicle model and its variants produced/ Imported are less than 250 in any consecutive period of six months in a year, CO ₂ COP should be carried out as per clause 10.4 “Provided that in case the number of vehicles sold in India for a given base model and its variants (manufactured in India or imported to India) are less than 250 in any consecutive period of six months in a year, then such base model and its variants need not be subjected to the above test, if at least one model or its variants manufactured

	<p>or imported by that manufacturer or importer, as the case may be, is subjected to such tests at least once in a year;</p> <p>Provided further that, in case the number of base models and its variants manufactured / imported is more than one and if the individual base model and its variants are less than 250 in any consecutive period of six months in a year, then the testing agencies can pick up one of the vehicles out of such models and their variants for respective fuel type once in a year for carrying out such test”.</p> <p>Note: The CO2 values of such low volume vehicle models and their variants, when exempted from CO2 COP, shall be taken from declared CO2 value at the time of type approval for the purpose of Fuel consumption computations.</p>																																																																																							
10.7	<u>Consequences of COP Series Rejection</u>																																																																																							
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 verification of manufactures re-declared CO ₂ value, COP test result shall be considered.																																																																																							
10.8	Fuels: All tests shall be conducted with the reference fuel as specified in the applicable gazette notification. However, at the manufacturer’s request, tests may be carried out with commercial fuel.																																																																																							
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	30	- 0.02892	0.07493	
	31	0.00449	0.05629	
	32	0.03876	0.03876	
Table 1				

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 (ci)	CO ₂ Performance of Model (including Variants and versions) (Pi)* pi X ci	Volume factor for Super Credit (vi)	Manufactured / imported Volume (ni)	Effective Volume (Ni) ni X vi	Ni X Pi	Wi X ni
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Total												

* Difference between pi and Pi shall not be more than 9 g/km for a particular model.

(A) Annual corporate average CO₂ emission performance and target

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

$$T = (a * (W-b) + c) * 23.7135 \text{ (applicable as per clause 1.2)}$$

Where :

$$W = \frac{\sum(n_i X W_i)}{\sum n_i}$$

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

For small volume manufacturers opting for alternate target, the target 'T' shall be calculated as given below:

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 consumption Passbook

Name and Address of the Manufacturer: -

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

Reporting period	Corporate average CO₂ target (T) (g/km)	Corporate average CO₂ performance (P) (g/km)	Manufactured / imported volume for the reporting period (Σn_i)	CO₂ Credits earned (T-P)* $\Sigma n_i / 10^6$ (t/km)	CO₂ Debits (P-T)* $\Sigma n_i / 10^6$ (t/km)
(1)	(2)	(3)	(4)	(5)	(6)
2017-2018					
2018- 2019					
2019-2020					
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 COMPLIANCE REPORT

Reporting period

Sr. No .	Manufacturer ^(a)	Annual corporate average CO₂ (in g/km) performance (P)	CAFCS (= P/23.7135)	Manufacturer's annual corporate average CO₂ (in g/km) target (T)	ACAFC (= T/23.7135)	+ ve Credit / -ve Debit	Manufacturers Corporate Average CO₂ Compliance (Yes/No)
(1)	(2)	(3)	(4)	(5)	(6)		(8)
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 wheels <u>in-service</u> , including the spare wheel (If regular in size), when in-service, are monitored and low pressure information is displayed on the dash board. This requirement does <u>not apply to temporary spare wheel</u> .
6 or more Speed Transmission	A transmission with provision of selecting 6 or more different gear ratios, which includes MT, AT, AMT, CVT types of transmission's, for the forward movement of vehicle.	Verify number of forward speed gears provided in vehicles (excluding reverse).