

TESTING OF SMOKE METERS AND GAS ANALYSERS

INTRODUCTION

The Central Motor Vehicle Rule (CMVR) 116 requires that the field testing of vehicles as per CMVR-115(2) (a & b) shall be carried out with a meter which is type approved by the specified agencies provided that such a testing agency shall follow ISO or ECE Standards and Procedure for approval of measuring meters. As there were some problems in following the ISO and ECE Standards, MOST had constituted a Committee to formulate a uniform test procedure and specifications for measuring meters. The finalised test procedures and specifications approved by the MOST and amended from time to time, which are being used for the type testing of meters from 31st Oct 95 are given in chapter I, II and III. MOST has also introduced the conformity of production (COP) testing of these meters from 1st Jan 1997 and the test procedure for the same is given in chapter IV, V and VI.

ADMINISTRATIVE PROCEDURE FOR COP TESTING

- 1.0 The Ministry of Surface Transport, New Delhi (MOST) is the Nodal Agency for implementation of Emission Legislation.
- 2.0 The MOST had constituted a Committee under the Chairmanship of Joint Secretary (Transport) to formulate a standard uniform procedure for testing of smoke meters, etc. This Committee has finalised the test specifications and procedure for type testing of smoke meters and Gas analysers (henceforth referred to as instrument).
- 3.0 This Committee has also decided to introduce conformity of production (COP) testing for the instrument manufactured / supplied in India to keep a check on the production quality of the instrument.
- 4.0 There is a Standing Committee on implementation of emission legislation constituted by MOST to advise the Nodal Agency in such implementation.

At present this Standing Committee is looking into the aspects of vehicle testing. It is proposed that the same Committee can function for the testing of the instruments. If found necessary, the instrument manufacturer's / suppliers representative may be invited for the Committee meeting.

COP TEST AGENCIES

- 1.0 The test agencies carrying out the type testing will be responsible for carrying out the COP test.

- 2.0 Initially, the instrument manufacturer / supplier has the option of choosing the test agency for type approval of its specific model. On completion of first COP by the same test agency, the manufacturer can change the test agency if so desired.
- 3.0 In case the instrument manufacturer / supplier desires to change the COP test agency, a formal request shall be made to the new test agency under intimation to the previous test agency and nodal agency. This request shall be made atleast one month before the next COP is due along with all relevant documents concerning type approval / previous COP.
- 4.0 On receipt of intimation of request for a change, the previous COP test agency will authenticate all the relevant documents of that model and forward to the New test agency. The new test agency will carry out the process of selection And testing of the instruments for COP as per the procedure and will consult the previous test agency if required about the test findings and results before issuing the final COP certificate.

COP PERIOD

- 1.0 The COP period for an instrument model will be 2.5 years from the date of type approval certification or supply of 200 units of the type approved instrument model or resumption of supply of the model or end of last COP period for that model whichever is earlier. If the production and supply of an instrument model is discontinued, it should either coincide with COP test or COP test should be performed before the instrument model is discontinued even though COP criteria is not applicable. The instrument manufacturer / supplier may request the Nodal Agency for relaxation of the above period with justification. The Nodal Agency will take a decision based on the merit of the case.
- 2.0 An instrument is considered to be supplied when the instrument has been dispatched from the instrument manufacturer / supplier's premises.
- 3.0 The instrument manufacturer / supplier shall inform the Nodal Agency and concerned test agency as soon as 180 units have been supplied, and/or, after twenty eight months have passed from the date of type approval certificate. The concerned test agency keeps the track regarding this and in case the information is not received from the manufacturer / supplier, informs the Nodal Agency accordingly.
- 4.0 Test agency will ask for an instrument model type approved for COP testing before the COP period. The instrument manufacturer / supplier will submit the first available unit after the receipt of this request. The instrument manufacturer / supplier shall provide sufficient documents along with the instrument to support the fact that this is the first available unit after the receipt of request. The documents could be production final check documents showing the instrument serial number, bill of entry / purchase order in case of imported equipments, etc.

COP TESTING

The COP testing procedure for smoke meter and Gas analyser are given in Chapter IV,V and VI.

MODEL CHANGE AND VARIANCE

- 1.0 Generally, whenever there is a change in sensor, detector, electronic circuits, software, it shall be treated as new model and separate model number shall be given by the manufacturer / supplier. If any part is indigenised or there is any minor modification subsequent to the type approval testing, which will not affect the function of the instrument, the instrument manufacturer / supplier shall inform the details to test agency and test agency will decide whether the retesting is to be carried out.

COP CERTIFICATE

- 1.0 If the instrument meets the requirements of COP testing, the test agency will issue a COP Certificate to the manufacturer / supplier for the particular instrument model. The test agency will also send the copies of the COP certificate to other testing agencies and Nodal Agency.

CONSEQUENCE OF COP FAILURE

- 1.0 If the instrument fails to meet the requirements of COP, the testing agency shall send the copies of the test report to the Nodal Agency and the manufacturer / supplier. The Nodal Agency will take a decision and convey the same to the manufacturer / supplier and test agencies within 4 weeks of the receipt of The failure report of COP. The Nodal Agency may decide to call a meeting of the Standing Committee to discuss and advise the Nodal Agency. The instrument manufacturer / supplier may be given an opportunity to present his case to the Committee before advising the Nodal Agency. Upon reaching the decision the Nodal Agency will issue the order for withdrawal of Type Approval Certificate and stop dispatch of the instruments by the manufacturer / supplier from his works.
- 2.0 In case the type approval certificate has been withdrawn, as per point 1 above, the manufacturer / supplier can subsequently identify the reasons for not meeting the COP and necessary corrective measures. Then they shall inform the same to the Nodal Agency and concerned test agency and offer the rectified instrument for testing. The test agency carry out a complete test as per the Type approval procedure on the rectified instrument passes the relevant norms, the manufacturer / supplier will write to the Nodal Agency and concerned test agency which has carried out the test, the modifications which are to be finally carried out on the instruments to be supplied in future and the instruments which require retrofitting rectifications.

Type approval will be restored by the Nodal Agency subject to the point 3.0 below. Further a special COP will be carried out after 10 number of units have been supplied, using standard COP procedure.

3.0 It is responsibility of the instrument manufacturer / supplier to ensure at his cost that the modifications / modified components are carried out / retrofitted within a period, specified by the Nodal Agency on all instruments supplied during the period between the dates test agency has sent the test report and restoration of the type approval by the Nodal Agency as per point 2 above.

CODE OF PRACTICE FOR PUC EQUIPMENT MANUFACTURER / SUPPLIER

Based on the decision adopted in the Standing Committee on Emissions (SCOE) meeting held on 28th March 2003, every PUC equipment manufacturer / supplier shall comply with the following Code of Practice and submit an affidavit for the same along with the instrument model submitted for type approval to the respective Test Agency.

1. PUC equipment manufacturer/supplier shall include the description of the test procedure described in Part I or Part II, whichever is applicable, amended from time to time of the document MOST/CMVR/TAP 115/116 shall be included in the user's manual of the PUC equipment.
2. PUC equipment manufacturer/ supplier shall supply copy of type- approval certificate with date of validity along with the PUC equipment.
3. The validity of the type approval certificate of the PUC equipment shall be 5 years, after the expiry of which the PUC equipment manufacturer/ supplier shall get it re-validated from the test agency.
4. PUC equipment manufacturer / supplier shall provide the status of production/ supply of PUC equipment at a regular interval of 1 year to the test agency from where the equipment has been certified.
5. PUC equipment manufacturer / supplier shall submit the equipment for COP as per procedure mentioned above.
6. PUC equipment manufacturer/ supplier shall enter into AMC for a period of 5 years with the authorised PUC test agency based on agreed charges. The AMC shall be comprehensive (including spare parts) but does not include maintenance of PC/PC peripherals of the computerized PUC equipment. This AMC contract shall include 3 visits and equipment calibration as per field calibration procedure given in Annexure-1. PUC equipment manufacturer/ supplier shall provide calibration certificate as per format given in the Annexure-2.
7. PUC equipment manufacturer / supplier shall train minimum 3 operators of PUC test agency and shall provide training certificate as per format given in Annexure 3.

STANDARD FORMAT FOR TYPE APPROVAL TEST CERTIFICATE FOR PUC EQUIPMENT

Based on the decision adopted in the Standing Committee on Emissions (SCOE) meeting held on 28th March 2003, every test agency shall issue Type Approval Certificate for PUC Equipment as per format in Annexure- 4.

Annexure - 1
FIELD CALIBRATION PROCEDURE FOR TESTING OF
GAS ANALYSERS

1.0 INTRODUCTION

This procedure has to be carried out on gas analysers after they are commissioned in the field and for the subsequent calibration.

2.0 TESTING

The test procedure for gas analysers is as follows :

- i) Check that the power supply is as per specifications of the manufacturer and electrical earthing is proper.
- ii) Check that all the accessories as per manufacturer are available and are functioning properly.
- iii) Check the span and zero calibration using sample gas of suitable value for CO as well as HC.
- iv) Check the electrical calibration.
- v) Check that the sampling system is leakproof.
- vi) The printer is working correctly and the print out details are correct.
- vii) Checking of 1 no. of vehicle for idling emission measurement using this analyzer.

FIELD CALIBRATION PROCEDURE FOR TESTING OF SMOKE METERS

3.0 INTRODUCTION

This procedure has to be carried out on meters after they are commissioned in the field and for the subsequent calibration.

4.0 TESTING

The test procedure for smoke meters is as follows :

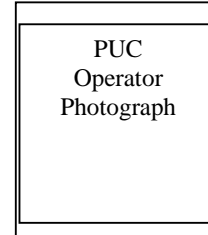
- i) After the warm-up of the meter, the calibration of the meter has to be checked at zero and midscale point with the neutral density filter available. The value must lie within 0.1 m^{-1} .
- ii) The meter shall have the standard accessories as specified by the manufacturer. It shall be checked that the sample hose, internal pipes etc are not deteriorated or damaged to ensure that there is no leakage.
- iii) The functionality of oil temperature and RPM sensor.
- iv) The heating system for the optical chamber is functioning.
- v) The purge air system is working correctly.
- vi) Visual displays are functioning correctly.
- vii) The printer is working correctly and the print out details are correct.
- viii) The instrument casing is proper and has proper electrical earthing.
- ix) Free acceleration test is carried out using a vehicle and the print out details are checked.

Annexure – 2
CALIBRATION CERTIFICATE FORMAT

1.0	Component:	
2.0	PUC Center Registration No. :	
3.0	Objective of the test : To carry out Physical check and calibration of gas Analyser / Smoke meters as per the test procedure specified in Annexure 1 of CMVR / TAP 115-116 Part-8.	
4.0	Detailed Observations	
4.1	Checking of supply/ earthing	
4.2	Checking of accessories :	Details of accessories checked.
4.3	Span Calibration 2. Details of span gas concentration_____ % 3. Calibration gas cylinder No.: _____ 4. Calibration gas cylinder make: _____ 5. Calibration gas validity date: _____ OR 1. Details of Natural Density filters used for mid point calibration	
4.4	Electrical Calibration OK/ Not OK	
4.5	Leak test :	Passed/ Failed
5.0	One no of petrol / diesel vehicle checked for idling Emission / Free acceleration, measurement	
6.0	Conclusion :	
7.0	Next Calibration Due Date:	

Signature & Seal of manufacturer/ Supplier

Annexure -3
TRAINING CERTIFICATE



It is to certify that Mr. / Mrs. _____ has attended the training and knows all required operation of the smoke meter / Gas Analyser model _____ to perform PUC tests.

Training is given in the following areas :

Understanding of procedure for testing of Idling emission/ free acceleration smoke as CMVR/ TAP/ 115/116 procedure.

1. Normal thermal condition of the vehicle
2. Actual testing procedure
3. Procedural understanding of issue of PUC certificate

Operation of smoke meter / Gas analyzer

- | | |
|---------------------------|----------------------|
| 1. Vehicle testing mode | <input type="text"/> |
| 2. Zero Calibration | <input type="text"/> |
| 3. Span calibration | <input type="text"/> |
| 4. Electronic calibration | <input type="text"/> |
| 5. Leak test | <input type="text"/> |

Maintenance

- | | | |
|---|------------------------|----------------------|
| 1 | Replacement of filters | <input type="text"/> |
| 2 | General maintenance | <input type="text"/> |

Authorized Signature &
seal of manufacturer /
supplier

Annexure - 4

Certificate No: _____

Dated : *Certificate date*

CERTIFICATE

FOR

COMPLIANCE TO THE CENTRAL MOTOR VEHICLES RULES

Exhaust gas analyzer/ Opacimeter Model _____, bearing Sr. No. _____ from
(*Supplier*) _____ was examined and tested as per the test procedure
finalized for *exhaust gas analyzer / Opacimeter* given in CMVR / TAP 115-116, Part 8.

Based on the above, it is certified that the *exhaust gas analyzer/ Opacimeter* Model
_____ manufactured by (*Manufacturer*) _____ (and
marketed _____) meets the requirements of the provisions of Rule 116(3)
of the Central Motor Vehicles Rules 1989, as amended up-to-date, for the *exhaust gas
analyzer/ free acceleration test / free acceleration and full load test*.

The first Conformity of Production testing will be due after 2 years or production of 100
exhaust gas analyzers / Opacimeter from the date of this Certificate, whichever is earlier.

This Type Approval certificate is valid for the period of 5 years from the date of
this Certificate subject to compliance to attached Code of Practice.

Authorised signatory