

590  
No. MIT/38778/TC/02

12  
2) Direct MM-III to Insp  
testing centres and report  
Transport Commissionerate  
Kerala, Thiruvananthapuram

Date: 20.1.2007

Circular No.02/2007

Sub: Motor Vehicles Dept. - Control of Pollution norms - Up gradation of pollution under control norms - amendment issued to CMVR, 1989 - implementation by the State Reg:-

Ref: GSR 111 (E) dated 10-02-2004.

Central Government vide Gazette notification number GSR 111(E) dated 10-02-2004 made amendments to CMVR 115 revising the procedure for testing automotive emission for issue of pollution under control certificate as follows.

**A) DIESEL VEHICLE TESTING**

Oil temperature and average RPM of six flushing cycle also to be measured before measuring actual smoke density. Maximum permitted smoke density remains same.

**Test Limits**

Method of Test	Maximum Smoke Density	
	Light absorption co-efficient (I/M)	Hatridge Units
Free acceleration test for turbo charged engine and naturally aspirated engine.	2.45	65

The free acceleration test shall be carried out after attaining the oil temperature of minimum 60 degree Celsius. During each free acceleration, Maximum no load speed shall be within band width of  $\pm 500$  RPM of the average value in respect of 3-wheelers vehicles and  $\pm 300$  RPM of the average value for all other category of vehicles.

The free acceleration test shall be repeated till the peak smoke density values recorded in four successive acceleration meeting above maximum no load RPM criteria are suitable within a bandwidth of 25% of the arithmetic mean (in  $m^{-1}$  unit) of these values or within a bandwidth 0.25 k, whichever is higher and do not form a decreasing sequence. The smoke density to be recorded shall be arithmetic mean of these four readings. In case the valid readings are not obtained within the limits, the testing shall be discontinued and the vehicle owner shall be advised to resubmit the vehicle after repair service.

All other related details and certificates and report formats are explained in ANNEXURE (TAP documents) ANNEXURE 2 and ANNEXURE 3 respectively. Smoke density testing equipment can be upgraded by providing oil pressure gauge and gauge to marking to the RPM to the existing unit.



## B) PETROL/CNG/LPG VEHICLE TESTING

Maximum emission limits from petrol/CNG/LPG vehicle are categorized to 5 and is as follows:

Sl..No.	Vehicle type	CO%	*HC (n-hexane equivalent) PPM
1.	2 & 3 - Wheelers (2/4 stroke) Manufactured on and before 31 <sup>st</sup> March 2000)	4.5	9000
2.	2 & 3 - Wheelers (2-stroke) Manufactured after 31 <sup>st</sup> March 2000	3.5	6000
3.	2 & 3 - Wheelers (4-stroke) Manufactured after 31 <sup>st</sup> March 2000	3.5	4500
4.	Bharath stage II Complaint 4 - Wheelers	0.5	750
5.	4 Wheelers other than Bharath stage - II compliant	3.0	1500

Emission test for Petrol/CNG/LPG vehicles before Bharath Stage II can be tested after upgrading existing two Gas Analyzer. Bharat Stage III and above vehicles require four Gas Analyser to conduct the test.

- 1) Testing Centers with existing equipments will be permitted to test all manufacture before the introduction of Bharath stag II, ie except Bharath II and above four wheelers, using two gas analyzer after necessary up gradation and calibration of the equipment.
- 2) In view of the limitation of two gas analyzer for testing Bharat 2 and above four wheelers, the testing center has to install the four gas analyzer for the permission of testing Bharath II and above compliant four wheelers.
- 3) The testing centers, whoever has installed four gas analyzer, will be given a special licence number and will be permitted to use green color certificate for differentiating from other PUC Centers.

All other related details and certificate and report formats are explained in Annexure IV (TAP documents), ANNEXURE 5 and ANNEXURE 6 respectively.

### Procedure for License renewal.

- 1) After upgrading/procuring the instruments the manufacturer will issue a compliance certificates to the respective PUC centers based on which the concerned transport authorities will permit the PUC testing center to conduct tests as per the revised norms.
- 2) The PUC center will have to enter in to annual maintenance contract with manufacturer and to service and calibrate their equipment and to adhere the following code of practice



- A) The type approval certificates supplied by PUC equipment manufacturer shall be displayed in the testing center.
- B) The operator training certificates issued by PUC Equipment manufacturer will also to be displayed in the testing center.
- C) PUC center shall submit the monthly report of all tested in use vehicle along with test print out in original to the transport department.

#### Cancellation of licence

- 1) Testing centers will be permitted to use the original software supplied by the manufacturer only. Manufacturers emblem or Factory address is also to be displayed on computer screen. The PUC Centers licence will be cancelled, if identified any other software in PUC format is installed in the computer.
- 2) The licence may be suspended or terminated or cancelled at any time, if the authority finds the testing centers and equipment installed therein not working as per the terms and condition or the occupier is found to have adopted any unfair means in issuing of PUC certificates.
- 3) Maintenance of the SI.No. and model – legible condition shall be inspected for inspection purpose.
- 4) Now licence may be issued only to these who provide equipments capable of testing Barath Stage II & III standards.

The auto emission testing center may be inspected occasionally by the Motor vehicle inspector or officer from the transport department.

Sd/-  
Transport Commissioner.

To

All Deputy Transport Commissioners,  
All Regional Transport Officers &  
All Joint Regional Transport Officers

Copy to:

- 1) CA to TC, Senior DTC & Secretary, Senior DTC (Taxation), Senior AO, FO, LO, SO.
- 2) C-DIT for adding to Website.
- 3) S/F and Spare.

Approved for issue,

5/11/07  
Senior Superintendent.

5/12

ANNEXURE 1	- TAP Documents – Diesel
ANNEXURE 2	- Certificate - Diesel
ANNEXURE 3	- Report – Diesel
ANNEXURE 4	- TAP Document – Petrol
ANNEXURE 5	- Certificate – Petrol
ANNEXURE 6	- Report - Diesel
ANNEXURE 7	- RUC inspection formats
ANNEXURE 8	- List of Approved equipments – 2 gas analyzer
ANNEXURE 9	- List of Approved equipments – 4 gas analyzer
ANNEXURE 10	- List of Approved equipments – smoke meter
ANNEXURE 11	- Revised testing fees
ANNEXURE 12	- Gazette notification

10740  
 780  
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 11350  
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 11910  
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 12463





MOST/CMVR/ TAP-115/116	STANDARDS AND TEST PROCEDURES FOR FREE ACCELERATION	
ISSUE NO. 1		PART II

## **PART II : DETAILS OF STANDARDS AND TEST PROCEDURES FOR MEASUREMENT OF SMOKE LEVELS BY FREE ACCELERATION FOR IN-SERVICE VEHICLES FITTED WITH DIESEL ENGINES**

### **1. Scope and Field of Application**

- 1.1 This part applies to the emissions of visible pollutants from in-service compression ignition (diesel) engine vehicles, when subjected to a free acceleration test as referred in CMVR-115 (2)(b) and for issue of "Pollution under control certificate" to be issued by the authorised agencies under CMVR-115 (7).
- 1.2 This part specifies standard and test procedure for the determination of smoke levels by free acceleration from road vehicles equipped with compression ignition engines.

### **2. Definitions**

- 2.1 Compression Ignition Engine: means an Internal Combustion Engine that operates on compression ignition principle (Diesel Engines).
- 2.2 Smoke Density: means the light absorption coefficient of the exhaust gases emitted by the vehicle expressed in terms of  $m^{-1}$  or in other units such as Bosch, Hartidge, % opacity etc.
- 2.3 Opacity Meter: means an Instrument for continuous measurement of the light absorption coefficient of the exhaust gases emitted by vehicles.
- 2.4 Maximum Rated Speed: means the maximum speed permitted by governor at full load.
- 2.5 Free Acceleration Test: means the test conducted by abruptly but not violently, accelerating the vehicle from idle to full speed with the vehicle stationary in neutral gear.

### **3.0 Test Procedure**

#### **3.1 Test Instrument**

- 3.1.1 The opacimeter, the Instrument used for the measurement of smoke should be a type approved instrument as given in CMVR -116(3) and meeting the requirements specified in Part-VIII.
- 3.1.2 The Instrument should be prepared, used and maintained following the directions given in the instrument manufacturer's operation manual and it should be serviced and calibrated at such intervals as to ensure accuracy.

#### **3.2 Sampling Opacimeter**

##### **3.2.1 Installation for tests under Free Acceleration**

- 3.2.1.1 The ratio of cross sectional area of the probe to that of the exhaust pipe shall not be less than 0.05.

- 3.2.1.2 The probe shall be a tube with an open end facing forward in the axis of exhaust pipe or of the extension pipe, if one is required. It shall be situated in a section where the distribution of smoke is approximately uniform. To achieve this, the probe shall be placed as far downstream in the exhaust pipe as possible or if necessary in an extension pipe so that, if  $D$  is the diameter of exhaust pipe at the opening, the end of probe is situated in a straight portion at least  $6 D$  in length upstream of the sampling point and  $3 D$  in length downstream. If an extension pipe is used, no air shall be allowed to enter the joint.
- 3.2.1.3 The sampling system shall be such that at all engine speeds, pressure of the sample at the opacimeter is within the limits specified. This may be checked by noting the sample pressure at engine idling and maximum no load speeds. Depending on the characteristics of the opacimeter, control of sample pressure can be achieved by a fixed restriction or butterfly valve in the exhaust pipe or extension pipe. Whichever method is used, the backpressure measured in the exhaust pipe at the opening of the probe shall not exceed 75 mm (water gauge).
- 3.2.1.3 The pipes connecting the opacimeter shall also be as short as possible. The pipe shall be inclined upwards from the sampling point to the opacimeter and sharp bends where soot might accumulate shall be avoided. A bypass valve may be provided upstream of opacimeter to isolate it from the exhaust gas flow when no measurement is being made.
- 3.2.1.4 The temperature probe for the measurement of oil temperature shall be inserted in place of oil dipstick.
- 3.2.1.5 The engine speed measurement sensor shall be appropriately installed on to the engine of the vehicle.

### 3.3 Full Flow Opacimeter

The only general precautions to be observed in free acceleration tests are the following:

- 3.3.1 Joints in the connecting pipes, if any, between the exhaust pipe and the opacimeter shall not allow air to enter from outside.
- 3.3.2 The pipes connecting the opacimeter shall be as short as possible, as prescribed in the case of sampling opacimeter. The pipe system shall be inclined upwards from the exhaust pipe to the opacimeter, and sharp bends where soot might accumulate shall be avoided. A by-pass valve may be provided upstream of the opacimeter to isolate it from the exhaust gas flow when no measurement is being made.
- 3.3.3 A cooling system may also be required upstream of the opacimeter.

### 3.4 Vehicle Inspection

- 3.4.1 The Exhaust device shall not have any orifice through which the gases emitted by the engine might be diluted.
- 3.4.2 In cases where an engine has several exhaust outlets; these shall be connected to a single outlet in which opacity measurement shall be made. If it is not possible, to combine all exhaust outlets in one, the smoke shall be measured in each and an arithmetical mean of the values shall be recorded at each outlet. The test shall be taken as valid only if the extreme values measured do not differ by more than  $0.15\text{m}^{-1}$ .
- 4.4.3 The engine shall be in normal working condition prescribed by the manufacturer.



#### 4.5 Measurement Procedure

##### 4.5.1 Free Acceleration Test

4.5.1.1 The test shall be carried out on a vehicle.

4.5.1.2 The engine of the vehicle shall be warmed-up to attain oil temperature of 60 °C. The test shall be carried out as soon as this engine condition is reached.

4.5.1.3 The combustion chamber shall not have been cooled or fouled by a prolonged period of idling preceding the test.

4.5.1.4 The vehicle gear change control shall be set in the neutral position and the drive between engine and gearbox engaged. With the engine idling, the accelerator control shall be operated quickly, but not violently, so as to obtain maximum delivery from the injection pump. This position shall be maintained until maximum engine speed is reached and the governor comes into action. As soon as this speed is reached the accelerator shall be released until the engine resumes its idling speed and the opacimeter reverts to the corresponding conditions. Typically the maximum time for acceleration shall be 5s and for the stabilization at maximum no load speed shall be 2s. The time duration between the two free accelerations shall be between 5-20s.

4.5.1.5 The operation described in 4.5.1.4 above shall be repeated not less than six times in order to clear the exhaust system and to allow for any necessary adjustments of the apparatus. During this operation the sample probe shall not be inserted in to the vehicle exhaust system.

4.5.1.6 The free acceleration smoke test as per operation in 4.5.1.4 shall be carried out with sample probe inserted in to the vehicle exhaust system. The maximum no load rpm reached during this operation shall be within  $\pm 500$  rpm in respect of 3 wheeler vehicles and  $\pm 300$  rpm for all other categories of vehicles, of the average value obtained in 4.5.1.5. If for any reason the speed is not within the specified tolerance band the particular smoke reading shall be considered as invalid and shall be discarded. The above operation shall be repeated till the peak smoke values recorded in four successive accelerations are valid and are situated within a bandwidth of 25 % of the arithmetic mean (in m-1 unit) of these values or within a bandwidth of 0.25 K, whichever is higher and do not form a decreasing sequence.

The absorption coefficient to be recorded shall be the arithmetic mean of these four valid readings. The vehicle should be considered meeting the requirement if the absorption coefficient thus recorded is less than the prescribed limits.

In case the valid readings are not obtained within the 10 free-accelerations, the testing shall be discontinued and the vehicle owner shall be advised to re-submit the vehicle after the same is repaired / serviced.

4.5.1.7 For the purpose of PUC certification if the smoke is not within limits as per 5.0 below, the testing shall be discontinued and the vehicle owner shall be advised to re-submit the vehicle after the same is repaired / serviced.

5 Test Limits :

Method of Test	Maximum Smoke Density	
	Light absorption co-efficient (1/m)	Hartidge units
Free acceleration test for turbo charged engine and naturally aspirated engine	2.45	65

- 6.0 Code of Practice for Authorised PUC Test Agencies :  
The PUC test agencies authorised for issue of "Pollution Under Control Certificate" as per CMVR-115(7) shall comply with following Code of Practice.
- 6.1 The Type Approval certificate supplied by PUC equipment manufacturer / supplier shall be displayed in the PUC center.
- 6.2 The operator training certificate issued by PUC equipment manufacturer / supplier shall be displayed in the PUC center.
- 6.3 PUC operator shall submit the monthly report of all tested in-use vehicles along with test printout in original to the Transport Department.

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**Report to Regional Transport Officer (Pass Report – Diesel)**  
**From** \_\_\_\_\_ **to** \_\_\_\_\_

Name and address of testing centre

## License number

Sl.No.	Reg. no.	Class of vehicle	Result	HSU – Result	RPM - Result	Oil temperature	Cert. No.	Date of testing
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MOST/CMVR/ TAP-115/116	STANDARDS AND TEST PROCEDURES FOR IDLING	
ISSUE NO. 1		PART I

**PART I : DETAILS OF STANDARDS AND TEST PROCEDURES FOR MEASUREMENT OF CARBON MONOXIDE AND HYDRO CARBON EMISSIONS AT IDLING FOR IN-SERVICE VEHICLES FITTED WITH SI ENGINES**

**1. Scope & Field of application:**

1.1 This Part applies to the emissions of carbon monoxide and hydro carbon at idling from in-service vehicles fitted with spark ignition engines, as referred in CMVR-115 (2)(a) and for issue of "Pollution under control certificate" to be issued by authorised agencies under CMVR-115 (7).

1.2 This part specifies standard and test procedure for the determination of the volumetric concentration of exhaust carbon monoxide (CO) and hydrocarbon (HC) emissions from road vehicles equipped with spark ignition engines running at idle speed.

**2. Definitions:**

2.1 Spark Ignition Engine: Means an internal combustion engine in which the combustion of the air/fuel mixture is initiated at given instants by a hot spot, usually an electric spark.

2.2 Idle Speed: Means the engine rate, in revolution per minute, with fuel system controls (accelerator and choke) in the rest position, transmission in neutral and clutch engaged in the case of vehicles with manual or semi-automatic transmission or with selector in park or neutral position when an automatic transmission is installed, as recommended by the manufacturer.

2.3 Normal Thermal Conditions: Means the thermal conditions attained by an engine and its drive line after a run of at least 15 min. on a variable course, under normal traffic conditions.

**3.0 Test Procedure:**

**3.1 Instrument**

3.1.1 The Instrument used for the measurement of CO and HC shall be a type approved instrument as given in CMVR-116 (3) and meeting the requirements specified in Part-VIII. The tachometer to measure engine idling speed shall have an accuracy of  $\pm 50$  rpm.

3.1.2 The Instrument shall be prepared, used and maintained following the directions given in the instrument manufacturer's operation manual, and it shall be serviced and calibrated at such intervals as to ensure accuracy.

3.1.3 The electronic calibration shall be carried out at least once after switching on the instrument and thereafter a maximum time period of four hours. The span calibration using gas bottle shall be carried out at least once in four months and whenever instrument is moved to a different place. The total record of calibration shall be maintained and if it is observed during calibration that the calibration is shifted more than the accuracy, the calibration period shall be suitably reduced.



The calibration shall be performed well away from the exhaust of motor vehicles whose engines are running.

- 3.1.4 If the sample handling system is not integral with the analyser, the effectiveness of the condensate traps and all connections of the gas sampling system shall be checked. It shall be checked that filters are clean; that filter holders are fitted with their gaskets and that these are in good conditions.
- 3.1.5 If the Instrument is not self-compensated for non-standard conditions of altitude and ambient temperature or not equipped within a manually controlled system of compensation, the span calibration shall be performed with calibration gas.
- 3.1.6 It shall be ensured that the sample handling line and probe are free from contaminants and condensates.
- 3.2 Vehicle Preparation
  - 3.2.1 It shall be checked that the road vehicle exhaust system is leak proof and that the manual choke control has been returned to the rest position.
  - 3.2.2 It shall be checked that the gas sampling probe can be inserted into the exhaust pipe to a depth of at least 300 mm. If this proves impossible owing to the exhaust pipe configuration, a suitable extension to the exhaust pipe(s), making sure that the connection is leak proof, shall be provided.
  - 3.2.3 The vehicle shall have attained normal thermal conditions as defined in 2.3, immediately prior to the measurement.
  - 3.2.4 The vehicle idling speed shall be checked and set as per 2.2, as prescribed by the manufacturer, with all the accessories switched off.
- 3.3 Measurement
  - 3.3.1 Immediately preceding the measurement, the engine is to be accelerated to a moderate speed with no load, maintained for at least 15 seconds, then returned to idle speed as set in 3.2.4.
  - 3.3.2 While the engine idles, the sampling probe shall be inserted into the exhaust pipe to a depth not less than 300 mm.
  - 3.3.3 After the engine speed stabilises, the reading shall be taken.
  - 3.3.4 The value of CO and HC concentration reading shall be recorded.
  - 3.3.5 In cases where gadgets or devices are incorporated in the exhaust system, for dilution of the exhaust, both CO and CO<sub>2</sub> shall be measured using an instrument having facility to measure both CO and CO<sub>2</sub>. If the total of the measured values of CO and CO<sub>2</sub> (T. CO and T. CO<sub>2</sub>) concentration exceed 15% for four stroke engines and 10% for two stroke engines, the measured value of CO shall be taken as carbon monoxide emissions from the vehicle.

If it does not, the corrected value (T corrected) shall be taken, as given below: -

$$\begin{aligned} T \text{ corrected} &= T \text{ CO} \times 15 / (T \text{ CO} + T \text{ CO}_2) \\ &\quad \text{For 4-stroke engines} \\ &= T \text{ CO} \times 10 / (T \text{ CO} + T \text{ CO}_2) \\ &\quad \text{For 2-stroke engines} \end{aligned}$$

3.3.6 Multiple exhaust outlets shall be connected to a manifold arrangement terminating in a single outlet. If a suitable adopter is not available, the arithmetic average of the concentrations from the multiple pipes may be used.

3.3.7 If the measurement is to be repeated, the entire procedure of para 3.0 shall be repeated.

3.3.8 For the purpose of PUC (Pollution Under Control) certification, if the idling CO and/or HC are not within limits as per 4.0 below, the testing shall be discontinued and the vehicle owner shall be advised to resubmit the vehicle after repair / service.

#### 4.0 Test Limits :

4.1 The vehicle when tested as per 3.0 above shall meet the following limits.

Sr. No.	Vehicle Type (Petrol)	CO %	*HC (n – hexane equivalent) ppm
1.	2&3—Wheeler (2/4-stroke) (Manufactured on and before 31 <sup>st</sup> March 2000)	4.5	9000
2.	2&3—Wheeler (2-stroke) (Manufactured after 31 <sup>st</sup> March 2000)	3.5	6000
3.	2&3 – Wheeler (4-stroke) (Manufactured after 31 <sup>st</sup> March 2000)	3.5	4500
4.	Bharat Stage-II compliant 4-Wheelers	0.5	750
5.	4-Wheelers other than Bharat Stage – II compliant	3.0	1500

#### \*NOTES :

(i) Idling emission standards for vehicles when operating on CNG shall replace Hydrocarbon (HC) by Non Methane Hydrocarbon (NMHC). NMHC may be estimated by the following formula:

$$\text{NMHC} = 0.3 \times \text{HC}$$

Where HC = Hydrocarbon measured (n – hexane equivalent)

(ii) Idling emission standards for vehicles when operating on LPG shall replace Hydrocarbon (HC) by Reactive Hydrocarbon (RHC). RHC may be estimated by the following formula:

$$\text{RHC} = 0.5 \times \text{HC}$$

Where HC = Hydrocarbon measured (n – hexane equivalent)

#### 5.0 Code of Practice for Authorised PUC Test Agencies :

The PUC test agencies authorised for issue of "Pollution Under Control Certificate" as per CMVR-115(7) shall comply with following Code of Practice.

5.1 The Type Approval certificate supplied by PUC equipment manufacturer / supplier shall be displayed in the PUC center.

5.2 The operator training certificate issued by PUC equipment manufacturer / supplier shall be displayed in the PUC center.

5.3 PUC operator shall submit the monthly report of all tested in-use vehicles along with test printout in original to the Transport Department.

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**POLLUTION UNDER CONTROL CERTIFICATE**  
Under rule 115(7) of CMV Rules 1989

**Registration No.**  
**Date of Testing**  
**Engine No.**  
**Make**  
**Class of Vehicle**

**Serial No**  
**Time**  
**Year of Manufacture**  
**Speedometer Reading**  
**Fuel**

Reading table

photo

Certified that this CO Emission Level conforms to the standards prescribed under Rule 115(2) of CMV Rules 1989. this certificate is valid up to

Name of the testing station and address  
LIC. NO. XXX (This license is not valid to test bharath 2 and above 4 wheelers / valid for all

(Signature)

(Seal) (Name of the authorized signatory)

**POLLUTION UNDER CONTROL CERTIFICATE**  
Under rule 115(7) of CMV Rules 1989

**Registration No.**  
**Date of Testing**  
**Engine No.**  
**Make**  
**Class of Vehicle**

**Serial No**  
**Time**  
**Year of Manufacture**  
**Speedometer Reading**  
**Fuel**

**BS II Complaint :**

	Regulation	Actual reading	
<b>CO</b>			<b>% Vol</b>
<b>HC</b>			<b>PPM</b>

VEHICLE PHOTO

Certified That this CO Emission Level conforms to the standards prescribed under Rule 115(2) of CMV Rules 1989.this certificate is valid up to

Name of the testing station and address  
LIC. NO. XXX(This license is not valid to test bharath 2 and above 4 wheelers / valid for all vehicle )

(Signature)

(Seal) (Name of the authorized signatory)



**Report to Regional Transport Officer (Pass Report – Petrol)**  
**From** \_\_\_\_\_ **to** \_\_\_\_\_

**Name and address of testing centre**

## License number

Sl. No.	Reg. no.	Class of vehicle	Result CO %	Result HC PPM	Cert. No.	Date of testing
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### 1.0 PUC Center

Name

Address

Name of the Center Owner / Representative

RTO License Number

License Validity

AMC Details and Validity

Is Copy of Type Approval Certificate Displayed

Yes	No
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Are copies Training Certificates of Operators displayed

Yes	No
-----	----

Is the Mask and Ear Plug available for the test operator ?

Yes	No
-----	----

Is sufficient space available for testing all types of vehicles ?

Yes	No
-----	----

### 2.0 PUC Test Operator

Name

Qualification

Training Details

Is the understanding of Measurement Test Procedure Correct

Yes	No
-----	----

Is Mask and Ear Plug used by Test Operator

Yes	No
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### 3.0 PUC Equipment (Gas analyser)

Model Name of the Instrument

Manufacturer / Supplier

Whether Type Approved ?

Yes	No
-----	----

Is Instrument Calibrated ?

Yes	No
-----	----

Calibration Report No. and Date

Is Sample Handling Leak Proof ?

Yes	No
-----	----

Are Extension Pipes available ?

Yes	No
-----	----

Is the Probe length sufficient (> 30 cm)

Yes	No
-----	----

Is the Instrument Pump working ?

Yes	No
-----	----



Sr. NO: DL0001

Are the filters cleaned and working condition ?

Yes

No

Test software logic as per type approval specifications ?

a. Leak Check (Always on Power ON)

Yes

No

b. HC Residue

(Always on Power ON and Before every measurement)

Yes

No

c. Low Flow

Yes

No

Is the RPM Measurement facility provided ?

Yes

No

### 4.0 Test Results

	RPM	CO%	HC ppm	CO2 %	O2 %	Lambda	
						Indicated	Calculated
Idle							
High Idle							

### 5.0 PUC Equipment (Smoke meter)

Model Name of the Instrument

Manufacturer / Supplier

Whether Type Approved ?

Yes

No

Is Instrument Calibrated ?

Yes

No

Calibration Report No. and Date

Is RPM sensor provided ?

Yes

No

Is Oil temperature sensor available ?

Yes

No

Is the GO / NOGO guage provided for fuel injection pipe dia measurement?

Yes

No

Test software logic as per type approval specifications ?

a. Requirement of 60°C oil temperature Cut-off

Yes

No

b. RPM measurement during the flushing cycles

Yes

No

c. Smoke results are varified for validity

Yes

No

### 6.0 Test Results

	Min RPM	Max. RPM	Oil Tem.	SMOKE
1				
2				
3				
4				
5				
6				

Flushing Cycles

1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

Actual Measurement

AVG				
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### 7.0 Remarks

### 8.0 Points to be verified in next Audit

### 9.0 Photographs

Yes	No
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Signature of PUC test Center  
Owner / Representative

Signature of Inspection Engineer



### **Revised testing fees for testing and issuing PUC Certificates**

1	Two/ Three Wheelers	- Rs. 50
2	LMV	- Rs. 70
3	Four wheelers (Petrol)	- Rs. 70
4	Four wheelers ( Bharath 2 and above)	- Rs. 100
5	HMV (Diesel)	- Rs. 90

Status of PUC Equipment Approval As On 1<sup>st</sup> July 2006

## 2 Gas Analyser

## List of Models for which Testing is Complete and Certificate Issued

Sr. No.	Manufacturer	Model	Certificate No.
1.	AVL India Pvt. Ltd.	DiGas-422 (I)	ARAI/TA(HC)/AVL/DiGas 422 (I)/2004-05 Dt.27.8.2004 AMENDMENT NO.1 Dt.29.11.2004
2.	Netel (India) Ltd.	NPM-CH-1	ARAI/TA(HC)/NETEL/NPM-CH-1/2004-10 Dt.27.8.2004 AMENDMENT NO.1 Dt.29.11.2004
3.	Indus Scientific Pvt. Ltd.	PEA 202	ARAI/TA(HC)/INDUS/PEA 202/2004-09 Dt.27.8.2004 AMENDMENT NO.1 Dt.29.11.2004
4.	Gen-Maint	EXOSCAN II	ARAI/TA(HC)/Gen-Maint/Excscan ii/2004-11 Dt.27.8.2004 AMENDMENT NO.1 Dt.29.11.2004
5.	Madhus Garage Equipments	HGA 200	ARAI/TA(HC)/MADHUS/HGA 200/2004-08 Dt.27.8.2004 AMENDMENT NO.1 Dt.29.11.2004
6.	Indus Scientific Pvt. Ltd.	PEA 201	ARAI/TA(HC)/INDUS/PEA 201/ 2004-20 Dt. 3.9. 2004 AMENDMENT NO.1 Dt.29.11.2004 (This certificate is valid for the equipment supplied in the field on or before 17 <sup>th</sup> Nov 2001)
7.	Elgi Equipment Ltd.	INFRAGAS 196	ARAI/TA(HC)/ELGI/INFRAGAS 196/ 2004-18 Dt. 3.9.2004 AMENDMENT NO.1 Dt.29.11.2004
8.	Elgi Equipment Ltd.	INFRAGAS 196.2	ARAI/TA(HC)/ELGI/INFRAGAS 196.2/ 2004-19 Dt. 3.9.2004 AMENDMENT NO.1 Dt.29.11.2004
9.	Modi Measurement Systems Pvt. Ltd.	MEXA 324 JA	TE/2004/112/TA/EMN/CD/141 Dt.16.9.2004
10.	Neptune Equipment Pvt. Ltd.	TD 2040 / EGA 200	TE/2004/243/TA/EMN/CD/145 Dt.16.9.2004
11.	Manatec Electronics	ECOGAS-2	ARAI/TA(2G)/MANATEC/ECOGAS-2/2004-24 Dt. 29.9.2004
12.	Madhus Garage Equipments	IPEX-2	ARAI/TA(2G)/MADHUS/IPEX-2/2004-32 Dt. 3.12. 2004
13.	T V Sundaram Iyengar & Sons Ltd.	BEAR EUROGAS IV 50-01X	ARAI/TA(HC)/BEAR EUROGAS IV 50-01X/2004-35 Dt.23.12.2004 (This certificate is valid for the equipment supplied in the field on or before 31 <sup>st</sup> July 2002)
14.	Hariwill Electronics	V-2001	ARAI/TA(HC)/HARIWILL/V-2001/2005-21 Dt.26.4.2005
15.	Sarvesh Analytics Pvt. Ltd.	ZFE-1 REV.2	ARAI/TA(HC)/SARVESH/ZFE-1 REV.2/2005-35 Dt.20.12.2005 (This certificate is valid for the equipment supplied in the field on or before 30 <sup>th</sup> Jun 2000)
16.	Manatec	EGA 1000/2	ARAI/TA(HC)/MANATEC/EGA 1000-



**4 Gas Analyser**

**List of Models for which Testing is Complete and Certificate Issued**

Sr. No.	Manufacturer	Model	Certificate No.
1.	AVL India Pvt. Ltd.	DiGas-444	ARAI/TA(4G)/AVL/DiGas 444/ 2004-14 Dt.27.8.2004 & ARAI/TA(4G EMC)/AVL/DiGas 444/ 2005-16 Dt.6.4.2005
2.	Netel (India) Ltd.	NPM-MGA-1	ARAI/TA(4G)/NETEL/NPM-MGA-1/2004-15 Dt.27.8.2004 & ARAI/TA(4G EMC)/NETEL/NPM-MGA-1/2005-15 Dt.6.4.2005
3.	Indus Scientific Pvt. Ltd.	PEA 205	ARAI/TA(4G)/INDUS/PEA205/ 2004-21 Dt. 10.9.2004 & ARAI/TA(4G EMC)/INDUS/PEA205/ 2005-29 Dt.7.10.2005
4.	Ace Cartech Pvt. Ltd.	AIR ULTRA TEC	ARAI/TA(4G)/ ACE CARTECH/ AIR ULTRA TEC/2004-23 Dt. 27.9.2004 & ARAI/TA(4G EMC)/ ACE CARTECH/ AIR ULTRA TEC/2005-17 Dt. 6 <sup>th</sup> Apr 2005
5.	Modi Measurement Systems Pvt. Ltd.	MEXA 554JA	ARAI/TA(4G)/MODI/MEXA 554JA/2004-25 Dt.11.10.2004 & ARAI/TA(4G EMC)/MODI/MEXA 554JA/2005-30 Dt.7.10.2005
6.	SMS Autoline Equipments Pvt. Ltd.	Crypton 290 EN2	ARAI/TA(4G)/SMS/Crypton 290 EN2/2004-26 Dt.25.10.2004 & ARAI/TA(4G EMC)/SMS/Crypton 290 EN2/2005-14 Dt.6.4.2005
7.	Madhus Garage Equipments	IPEX-D	ARAI/TA(4G)/MADHUS/IPEX-D/2004-31 Dt. 3.12.2004 & ARAI/TA(4G EMC)/MADHUS/IPEX-D/2005-27 Dt. 7.10.2005
8.	Precision Testing Machines Pvt. Ltd.	PEA 0786	ARAI/TA(4G)/PRECISION/PEA-0786/2004-34 Dt.13.12.2004 & ARAI/TA(4G EMC)/PRECISION/PEA-0786/2005-13 Dt.6.4.2005
9.	ARO Equipments Pvt. Ltd.	GA 4040	ARAI/TA(4G)/CORAL/GA 4040/2005-05 Dt.3.3.2005 ARAI/TA(4G)/ARO/GA4040/2006-10 Dt. 10.3. 2006
10.	Hariwill Electronics India Pvt. Ltd.	P-10	ARAI/TA(4G)/HARIWILL/P-10/ 2005-08 Dt.16.3.2005
11.	Manatec Electronics	ECO GAS-4	ARAI/TA(4G)/MANATEC/ECOGAS-4/ 2005-09 Dt.16.3.2005
12.	Elgi Equipments Ltd.	ECOMATE	ARAI/TA(4G)/ELGI/ECOMATE/2005-10 Dt.22.3.2005
13.	Addisplay Equipment Pvt. Ltd.	HG 540	ARAI/TA(4G)/TTC/TTC HG 540/ 2005-06 Dt.23.3.2005 ARAI/TA(4G)/ADDISPLAY/HG 540/ 2006-02 Dt.3.2.2006
14.	Neptune Equipment Pvt. Ltd.	Multigas 4005	ARAI/TA(4G)/NEPTUNE/MULTIGAS-4005/2005-01 Dt.24.3.2005
15.	SmartCaps	SCT-G-05	ARAI/TA(4G)/SMARTCAPS/SCT-G-

	Electronics	2/2005-37 Dt. 22.12.2005 (This certificate is valid for the equipment supplied in the field on or before 30 <sup>th</sup> Jan 2004)
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List of Models for which Testing is Under Progress

Sr. No.	Manufacturer	Model	Test Agency	Remarks
NIL				

7x9  
9447438600

	Technologies		05/2005-32 Dt.10.11.2005
16.	T V Sundaram Iyengar & Sons Ltd.	Stargas 898	ARAI/TA(4G)/TVS/STARGAS 898/2005-33 Dt.11.11.2005
17.	DeWorth Equipments Pvt. Ltd.	OTC 805	ARAI/TA(4G)/DEWORTH/OTC 805/2006-03 Dt.20.2.2006
18.	Sarveshwari Technologies Ltd.	AGS-200	ARAI/TA(4G)/SARVESHWARI/AGS-200/2006-16 Dt.25.5.2006

**List of Models for which Testing is Under Progress**

Sr. No.	Manufacturer	Model	Test Agency	Remarks
1.	Ace Cartech Pvt. Ltd.	V-GAS	ARAI	Testing in progress
2.	Netel (India) Ltd.	NPM-MGA-2	ARAI	Testing in progress

**Equipment Submitted for Type Approval  
But Testing Held-up Due to Non-Compliance to  
Initial Verification Requirements / Rectifications Awaited from Manufacturer**

Sr. No.	Manufacturer	Model	Test Agency	Remarks
1.	AVL India Pvt. Ltd.	AVL DiGas 4000 Light	ARAI	Problem in analyzer accuracy test. Awaiting rectification by the manufacturer



Status of PUC Equipment Approval As On 1<sup>st</sup> July 2006

## Smoke Meter

## List of Models for which Testing is Complete and Certificate Issued

Sr. No.	Manufacturer	Model	Certificate No.
1.	AVL India Pvt. Ltd.	AVL 437C	ARAI/TA(MOD-SM)/AVL/437C/ 2004-16 Dt.27.8.2004 & ARAI/TA(MOD-SM)/AVL/437C DISPEED490/2005-22 Dt.26.7.2005
2.	Netel (India) Ltd.	NPM-SM-111B	ARAI/TA(SM_MOD)/NETEL/NPM-SM-111B/2004-13 Dt.27.8.2004 ARAI/TA(SM_ALTRPM)/NETEL/NPM-SM-111B/2006-24 Dt.29.6.2006
3.	AVL India Pvt. Ltd.	AVL 437	ARAI/TA(MOD-SM)/AVL/437/ 2004-17 Dt. 27.8.2004 & ARAI/TA(MOD-SM)/AVL/437 DISPEED490/2005-24 Dt.13.9.2005
4.	AVL India Pvt. Ltd.	AVL 437S	ARAI/TA(SM_MOD)/AVL/437S/2004-22 Dt. 16.9.2004 & ARAI/TA(MOD-SM)/AVL/437S DISPEED490/2005-25 Dt.13.9.2005 (This certificate is valid only for the smoke meter units already present in the field and supplied before 31 <sup>st</sup> July 2001)
5.	Manatec Electronics	ECO SMOKE	ARAI/TA(SM)/Manatec/ECO SMOKE/2004-27 Dt. 25.10.2004 ARAI/TA(SM_ALTRPM)/MANATEC/ECO SMOKE/2006-18 Dt.26.5.2006
6.	Manatec Electronics	DSM 2000	ARAI/TA (SM_MOD)/MANATEC/DSM2000/2005-03 Dt.7.2.2005
7.	Madhus Garage Equipments	OPAX 2005	ARAI/TA(SM)/MADHUS/OPAX 2005/2005-02 Dt. 17.2.2005 ARAI/TA (SM_ALTRPM)/MADHUS/OPAX2005/2006-14 Dt.16.5.2006
8.	Indus Scientific Pvt. Ltd.	OMS 101	ARAI/TA(MOD_SM)/INDUS/OMS 101/2005-07 Dt. 4.3.2005
9.	Gen-Maint	SMOKESCAN MASTER SCANNER MS (A) 99/MS(D)99	ARAI/TA(MOD_SM)/GEN-MAINT/SMOKESCAN/2005-19 Dt. 7.4.2005
10.	Manatec Electronics	DSM 2000L	ARAI/TA(MOD_SM)MANATEC/DSM 2000L/ 2005-23 Dt. 6.6.2005
11.	Aro Equipments Pvt. Ltd.	DSM 5050	ARAI/TA(SM)/ARO/DSM 5050/2005-28 Dt.7.10.2005 ARAI/TA(SM_ALTRPM)/ARO/DSM 5050/2006-17 Dt.25.5.2006
12.	Precision Testing Machines Pvt. Ltd.	PSM-0786	ARAI/TA(SM)/PRECISION/PSM-0786/2005-31 Dt.10.11.2005
13.	Elgi Equipments Ltd.	OPA 391/HD	ARAI/TA (MOD_SM)/ELGI/OPA391HD/2006-13 Dt.29.3.2006 (This certificate is valid only for the smoke meter units already present in the field and supplied before 30 <sup>th</sup> Sep 2004)
14.	Hariwill Electronics	V-2005	Included in the approved list as per

India Pvt. Ltd.	Interim Order No.F.A.F.O. No.389 of 2006 Dt.23.5.2006 of The Hon'ble High Court of Judicature at Allahabad, Lucknow Bench, Lucknow. The said smoke meter model has not been submitted for upgradation approval requirements as per GSR111(E) dated 10.2.2004 issued by Ministry of Shipping, Road Transport & Highways, Government of India.
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## List of Models for which Testing is Under Progress

Sr. No.	Manufacturer	Model	Test Agency	Remarks
1.	Madhus Garage Equipments	DO 285	ARAI	Testing completed and report preparation in progress.
2.	Ace Cartech Pvt. Ltd.	V-SMOKE	ARAI	Testing in progress
3.	Sarveshwari Technologies Pvt. Ltd.	OPA-100	ARAI	Testing in progress
4.	Elgi Equipments Ltd.	ENVIRO	ARAI	Testing in progress

Equipment Submitted for Type Approval  
But Testing Held-up Due to Clarifications/Rectifications Awaited from Manufacturer

Sr. No.	Manufacturer	Model	Test Agency	Remarks
NIL				

## List of Models not Submitted for Approval

Sr. No.	Manufacturer	Model
NIL		