AUTOMOTIVE INDUSTRY STANDARD

Testing Procedure and Requirements for Headlamp Beam Testing and Brake Testing at Authorized Testing Stations using Headlight Tester and Roller Brake Tester

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ON BEHALF OF
AUTOMOTIVE INDUSTRY STANDARDS COMMITTEE

UNDER
CENTRAL MOTOR VEHICLE RULES – TECHNICAL STANDING COMMITTEE

SET-UP BY
MINISTRY OF ROAD TRANSPORT & HIGHWAYS
(DEPARTMENT OF ROAD TRANSPORT & HIGHWAYS)
GOVERNMENT OF INDIA

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Status chart of the standard to be used by the purchaser for updating the record

Sr. No.	Corrigenda.	Amendment	Revision	Date	Remark	Misc.
General remarks :						

INTRODUCTION

The Government of India felt the need for a permanent agency to expedite the publication of standards and development of test facilities in parallel when the work on the preparation of the standards is going on, as the development of improved safety critical parts can be undertaken only after the publication of the standard and commissioning of test facilities. To this end, the erstwhile Ministry of Surface Transport (MoST) has constituted a permanent Automotive Industry Standards Committee (AISC) vide order No. RT-11028/11/97-MVL dated September 15, 1997. The standards prepared by AISC will be approved by the permanent CMVR Technical Standing Committee (CTSC). After approval, the Automotive Research Association of India (ARAI), Pune, being the secretariat of the AIS Committee, has published this standard. For better dissemination of this information ARAI has published this document on their Web site.

Ministry of Road Transport & Highways (MoRTH), Government of India has initiated establishment of 10 automated Inspection & Certification (I&C) Test Centers where verification of vehicle fitness is carried out using test lane equipment. In these centers, several instruments are used to verify the road worthiness of in-use vehicles. The tests carried out at minimum are as per regulations defined in CMVR 62. Such centers will be useful to introduce further rules for improving our road worthiness requirements. The subject of formulation of test procedures and requirements for vehicle systems in Inspection & Certification (I&C) Test Centers was discussed in CMVR-TSC and AISC. Accordingly this standard is formulated to cover test procedures and requirements for headlamp beam testing and brake testing at authorized testing station using headlight tester and roller brake tester.

The Automotive Industry Standards Committee (AISC) responsible for preparation of this standard are given in Annex I.

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Testing Procedure and Requirements for Headlamp Beam Testing and Brake Testing at Authorized Testing Stations using Headlight Tester and Roller Brake Tester

1.0 SCOPE

This standard lays down the testing procedure and requirements for headlamp beam testing and brake testing for fitness check of vehicles at authorized testing stations using headlight tester and roller brake tester.

2.0 HEADLAMP BEAM TESTING PROCEDURE (USING MANUAL / SEMI-AUTOMATIC / AUTOMATIC HEADLIGHT TESTER)

2.1 The procedure below describes the testing of headlamp beam using headlight tester (manual / semi-automatic / automatic).

2.2 Test Overview

The headlight tester (manual / semi-automatic / automatic) is capable of measuring the horizontal cut-off of the passing beam (low beam) when measured at a distance specified by instrument manufacturer. It shall simulate the condition of testing of passing beam when tested at 10m as specified in Annexure VII of CMVR. Brief description of headlight tester is given in clause 4.1.

2.3 Test Procedure

i) Position the vehicle at a distance as specified in clause 2.2 from headlight tester and perpendicular to the headlight tester track.
ii) Turn on the headlamp low beam.
iii) The headlight tester is to be positioned in front of the headlamp position and begin testing of headlamp.
iv) The headlight tester will measure the headlamp's low beam pattern with respect to center line in terms of a unit termed % deviation.
v) The headlight tester is now to be positioned in front of the other headlamp, if any.
vi) The headlight tester then tests the headlamp's low beam on other side of the vehicle repeating steps iii) and iv).
vii) The recorded test data will be stored.
viii) After the test gets completed, the headlight tester will be moved to its rest position.
ix) The vehicle shall be moved to next station.

2.4 Passing Criteria

Horizontal cut off of passing beam shall always be below headlamp centerline and the deviation shall be within 0.5% to 2.5%.

3.0 BRAKE TESTING USING ROLLER BRAKE TESTER

3.1 The procedure below describes the process of conducting the vehicle brake testing using a roller brake tester.

3.2 **Test Overview**

Roller brake tester measures the braking force required to stop the vehicle. Braking efficiency shall be established for service and parking brakes. Roller brake tester shall also measure the brake imbalance. Brief description of roller brake tester is given in clause 4.2.

3.3 **Test Procedure**

i) Position the front axle of the vehicle on the roller brake tester
ii) Shift the vehicle to neutral and then release the vehicle brake pedal.
iii) Start the engine and keep the engine running at idling.
iv) In the case of power assisted brakes (air brakes, air assisted, vacuum assisted etc.) press the accelerator pedal and keep the engine running till the air/vacuum reservoirs are charged fully.
v) Run both sets of rollers together in a forward direction to align the vehicle
vi) Then the rollers will rotate wheels at the preset speed (approx. 5 km/h for 3 and 4 wheeled vehicles having GVW not exceeding 3500 kg and approx. 2.5 km/h for 4 wheeled vehicles having GVW exceeding 3500 kg).
vii) Apply the service brake firmly to stop the brake tester rollers.
viii) The maximum brake force required to stop each wheel on the axle shall be recorded by the roller brake tester.
ix) Release the service brake and drive the vehicle forward until the rear axle wheels are on the rollers.
x) Repeat the same steps from ii) to viii) for rear axle also.
xi) Release the service brake.
xii) Total braking efficiency of vehicle is calculated from the sum of all braking forces of all wheels and total weight of vehicle. Also the difference between the braking efficiency of two wheels on the same axle will be calculated.
xiii) As the parking brake is installed on the rear axle itself, repeat the steps from ii) to viii) for calculating the braking efficiency of the parking brake.
xiv) Release the parking brake.
xv) Drive the vehicle off the roller brake tester.

The vehicle shall be considered as meeting the requirement only if the total braking efficiency of service brake is as per the pre-defined values.

3.4 **Pass/ Fail Criteria**

Breaking efficiency when measured on roller brake tester should be more than 27.23%.

4.0 BRIEF DRESCRIPTION AND FEATURES OF HEADLIGHT TESTER AND ROLLER BRAKE TESTER

4.1 Requirements for Headlight Tester

4.1.1 Brief description

Headlamp testing apparatus shall consist mainly of a collimating lens and a marked screen. With this system it is possible to project the light distribution (light/dark limit) from the headlamps and to check the inclination of the beam.

The apparatus shall be capable of vertical adjustment to test headlamps of various heights. The instrument output shall be in terms of percentage inclination of headlamp beam.

4.1.2 Required features

i) Height: The adjustment range of the headlight tester must be capable of measuring headlamps with their centres 500 mm to 1200 mm above ground level.
ii) Inclination (vertical orientation) maximum deviation: The maximum deviation of inclination for vertical orientation shall not be more than ±0.1%.
iii) Alignment with the longitudinal axis of the vehicle: The apparatus shall be capable of being accurately aligned with the longitudinal axis of the vehicle.

4.2 Requirements for Roller Brake Testers

4.2.1 Brief description

Roller brake testers are required on test lanes where Light and Heavy Vehicles are inspected. Roller brake testing machine consist of two pairs of rollers on which the wheels of an axle are placed during test. The braking force produced by the wheels is converted directly into an indication of braking efficiency.

4.2.2 Required features

i) Set of rollers of adequate diameter with suitable surface finish, connected via suitable drive configuration to a motor of adequate capacity in order to carry out testing at desired testing speed

ii) The braking torque applied by the motor measured by suitable sensor at point of slipping.

iii) A suitable arrangement may be provided for positioning the vehicle on the test rig and taking it off the test rig after the testing is over.

iv) Measurement Display: The console should display individual brake force for each of the wheels on the axle and braking efficiency. The display shall be readily visible to the inspector when seated in the driving seat of the vehicle being inspected.

ANNEX I

(See introduction)

COMMITTEE COMPOSITION *
Automotive Industry Standards Committee

Chairman	
Shri Shrikant R. Marathe	Director, The Automotive Research Association of India, Pune
Members	**Representing**
Representative from	Ministry of Road Transport & Highways (Dept. of Road Transport & Highways), New Delhi
Representative from	Ministry of Heavy Industries & Public Enterprises (Department of Heavy Industry), New Delhi
Shri S. M. Ahuja	Office of the Development Commissioner, MSME, Ministry of Micro, Small & Medium Enterprises, New Delhi
Shri P. C. Joshi	Bureau of Indian Standards, New Delhi
Director/ Shri D. P. Saste (Alternate)	Director , Central Institute of Road Transport, Pune
Dr. M. O. Garg	Indian Institute of Petroleum, Dehra Dun
Director	Vehicles Research & Development Establishment, Ahmednagar
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Shri T. C. Gopalan	Tractor Manufacturers Association, New Delhi
Shri U. S. Harite	Automotive Components Manufacturers Association of India, New Delhi

Member Secretary
Mrs. Rashmi Urdhwareshe
Sr. Deputy Director
The Automotive Research Association of India, Pune

* At the time of approval of this Automotive Industry Standard (AIS)