भारतीय मानक **IS 14557 : 2024**

Indian Standard

स्वचल वाहन — कूलिंग प्रदर्शन — मापन पद्धति

(पहला पुनरीक्षण)

Automotive Vehicles — Cooling Performance — Method of Measurement

(First Revision)

ICS 43.020

भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
मानक भवन, 9 बहादुर शाह ज़फर मार्ग, नई दिल्ली - 110002
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI - 110002
www.bis.gov.in www.standardsbis.in

July 2024 **Price Group 4**

Automotive Braking Systems, Vehicle Testing, Steering and Performance Evaluation Sectional Committee, TED 04

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Automotive Braking Systems, Vehicle Testing, Steering and Performance Evaluation Sectional Committee had been approved by the Transport Engineering Division Council.

This standard was first published in 1989. The present revision has been taken up with a view to incorporating the modifications found necessary as a result of experience gained on the use of this standard. Also, in this revision, the standard has been brought into the latest style and format of Indian Standard, and references to Indian Standards, wherever applicable have been updated and amendment no. 1 has also been incorporated.

The composition of the Committee responsible for formulation of this standard is given in Annex A.

In reporting the result of a test or analysis made in accordance with this standard, is to be rounded off, it shall be done in accordance with IS 2 : 2022 ‘Rules for rounding off numerical-values (*second revision*)’.

Indian Standard

AUTOMOTIVE VEHICLES — COOLING PERFORMANCE — METHOD OF MEASUREMENT

(First Revision)

1 SCOPE

This standard outlines the general practice for measurement of cooling performance of automotive vehicles other than two and three wheelers. This is applicable to all road vehicles fitted with coolant cooled engine.

2 VEHICLE PREPARATION

2.1 The vehicle shall be run in as per the practice recommended by the vehicle manufacturer.

2.2 The vehicle shall conform in all its parts, components and systems to the technical specification declared by the manufacturer, especially cooling systems. If any other coolant or additives are used solely or along with water as a coolant; the water to coolant or additives ratio shall be as per the recommendations of the vehicle manufacturer. Prior to testing the coolant system shall be filled to at least 90 percent of its capacity specified by the vehicle manufacturer.

2.3 The adjustment of fuel system, ignition system, adjustment of brakes, clutch, idling speed and grades, quality, quantity of lubricants for various moving parts, etc, shall conform to the recommendations specified by the manufacturer.

2.4 The tyres shall be run-in at the same time as the vehicle and shall have a tread depth not less than 90 percent of tread depth of a new tyre and shall have operated for at least 500 km, or the distance recommended for run in of the vehicle, whichever is lower, on road prior to test.

2.5 The tyre pressure shall be adjusted to the value recommended by the vehicle manufacturer, when cold and shall not exceed the maximum value specified in the relevant Indian Standard for that size of tyre.

2.6 All the fuel enrichening devices other than those required for the normal functioning of the vehicle shall not be operative during the test.

2.7 The test vehicle shall be loaded appropriately to give adequate traction while towing the loaded vehicle/trailed dynamometer to the value recommended by the manufacturer as given in **4.4** below to load the engine to its maximum power capacity.

2.8 Thermostat in the cooling system shall be set to remain in full open condition during the test.

2.9 Appropriate instrumentation shall be provided in the vehicle to measure temperatures mentioned at **4.4** below within an accuracy of ± 2 °C.

2.10 The engine rpm measuring equipment shall be installed and the accuracy of it shall be within ± 1 percent.

2.11 The engine cooling system shall be as per manufacturer's specification and coolant ratio (water and ethylene glycol) shall be as per the recommendations of the vehicle manufacturer.

2.12 The cooling system shall be filled 90 percent of its capacity specified before starting of the test.

2.13 The exhaust back pressure, air intake depression and turbo-boost pressure (in case of turbo charged engine) shall be within the limits specified by the manufacturer for maximum engine power.

3 AMBIENT CONDITIONS

Ambient conditions at test site shall be as given below:

a) Temperature — 303 K to 313 K;
b) Atmospheric pressure — 86 K to 106 kPa;
c) Relative humidity — Not more than 75 percent; and
d) Wind air velocity — Less than 3 m/sec.

4 TEST PROCEDURE

4.1 The test shall be conducted on a test track fairly flat and smooth, the longitudinal gradient being not more than 2 percent. Accessories affecting cooling system (like air conditioning, intercooler, EGR cooling) should be operated.

4.2 Attach a trailer dynamometer or a loaded vehicle or any other suitable loading device to the vehicle so that the engine of the vehicle can be loaded to the maximum power capacity declared by the manufacturer as determined by corresponding engine speed with tolerance specified by the manufacturer. Alternatively it can be carried out by the chassis dynamometer.

4.3 Drive the vehicle in lowest gear (the highest numerical ratio) at full throttle and adjust the load of the towed vehicle such that the engine rpm is maintained within ± 3 percent of the rev/min at which engine develops maximum power.

4.4 In this condition, drive the vehicle continuously. The temperature of engine coolant at the inlet to the radiator, at the outlet of the radiator and engine oil temperature shall be recorded continuously, if possible. If continuous recording is not possible, these shall be noted at a frequency of not more than one minute. Continue to drive the vehicle till any one of the following condition is met:

a) Till the temperature of the coolant stabilizes at the inlet to radiator for five minutes;
b) The temperature of coolant at radiator inlet goes above the safe limit recommended by the manufacturer;
c) The coolant starts boiling; and
d) The engine oil temperature goes above the safe limit recommended by the manufacturer.

4.5 Record the temperatures at radiator inlet, radiator outlet, ambient and oil temperature in the stabilized condition.

4.6 Repeat the operations specified at 4.2 to 4.5 for engine maximum torque and rpm condition.

4.7 Measure the difference between maximum stabilized coolant temperature at radiator inlet and the ambient temperature and record it. Measure the difference between maximum stabilized coolant temperature at inlet and outlet of radiator.

4.8 In case the trial is stopped for any one of the reasons specified in 4.4 (b), (c) or (d); in both maximum power and maximum torque conditions the vehicle is deemed to be unsatisfactory for the purpose of this standard.

ANNEX A

(*Foreword*)

COMMITTEE COMPOSITION

Automotive Braking Systems, Vehicle Testing, Steering and Performance Evaluation Sectional Committee, TED 04

Organization	*Representative(s)*
Automotive Research Association of India, Pune	SHRI A. AKBAR BADUSHA **(*Chairperson*)**
Ashok Leyland Ltd, Chennai	SHRI D. BALAKRISHNAN SHRI VED PRAKASH GAUTAM (*Alternate*)
Association of State Road Transport Undertakings, New Delhi	SHRI R. CHANDRABABU SHRI ULHAS BABU (*Alternate*)
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Automotive Research Association of India, Pune	SHRI P. D. BETGERI SHRI KONAKI RAMU (*Alternate*)
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BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones: 2323 0131, 2323 3375, 2323 9402 *Website*: www.bis.gov.in

Regional Offices:		*Telephones*
Central	: 601/A, Konnectus Tower -1, 6th Floor, DMRC Building, Bhavbhuti Marg, New Delhi 110002	2323 7617
Eastern	: 8th Floor, Plot No 7/7 & 7/8, CP Block, Sector V, Salt Lake, Kolkata, West Bengal 700091	2367 0012 2320 9474
Northern	: Plot No. 4-A, Sector 27-B, Madhya Marg, Chandigarh 160019	265 9930
Southern	: C.I.T. Campus, IV Cross Road, Taramani, Chennai 600113	2254 1442 2254 1216
Western	: Manakalya, 4th Floor, NTH Complex (W Sector), F-10, MIDC, Andheri (East), Mumbai 400093	283 25838

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