

Amendment No. 5 (12/2017)
To
AIS-018:2001
Automotive Vehicles - Speed Limitation Devices - Specifications

1.0 Page 3, Clause No 4.11,

Add following text at the end of existing text:

4.11 The Speed Limitation Device (SLD) shall conform to the performance requirement of EMC as per AIS: 004 (Part 3), as amended from time to time.

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THE AUTOMOTIVE RESEARCH ASSOCIATION OF INDIA
P. B. NO. 832, PUNE 411 004

ON BEHALF OF
AUTOMOTIVE INDUSTRY STANDARDS COMMITTEE

UNDER
CENTRAL MOTOR VEHICLES RULES - TECHNICAL STANDING COMMITTEE

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

19th December 2017

Amendment No. 4 16 May 2014
To
AIS-018:2001
Automotive Vehicles - Speed Limitation Devices - Specifications

1.0 Page 10, after clause 5, add new clause 6 as follows:

“6.0 TYPE APPROVAL (TA) AND CONFORMITY OF PRODUCTION (COP)

The manufacturer /applicant shall take all appropriate steps to ensure that the components continue to comply with the requirements of the AIS-037:2004, as amended from time to time.

With regards to approval of Speed Limitation Device (SLD) and Speed Limiting Function (SLF), Type Approval Certificate / Conformity of Production / test reports / extension reports shall be issued by same agency who has issued Type Approval.”

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

16 May 2014

Amendment No. 3 August 2013
To
AIS-018:2001: Automotive Vehicles - Speed Limitation Devices – Specifications

1. Page No. 2 , Clause 3.7:

Substitute the following text for the existing text

“3.7 Following are the general guidelines to be used by test agency for extending type approval issued to the speed limiting device as installed on the vehicle (SLD) or speed limiting function as the case may be for considering extension to another vehicle under consideration-

Vehicle Type means vehicle, which do not differ in such essential respect as:

- i) Make and type of the SLD / SLF fitted
- ii) Maximum Engine Power to unladen weight ratio less than or equal to the tested vehicle
- iii) Set speed /speeds
- iv) Highest ratio of the engine to vehicle speed in top gear less than or equal to that of the tested vehicle
- v) Method used to control the fuel feed of the system
- vi) Fuel of the vehicle
- vii) Vehicle model and vehicle category

Every modification of the vehicle type shall be notified to the test agency which approved the vehicle type. The test agency may then either –

- a) Consider that the modification made are unlikely to have an appreciable adverse effect and that in any case the vehicle still complies with the requirements or,
- b) Require a further report from the technical service.”

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SET-UP BY

MINISTRY OF ROAD TRANSPORT & HIGHWAYS
(DEPARTMENT OF ROAD TRANSPORT & HIGHWAYS)
GOVERNMENT OF INDIA

August 2013

AMENDMENT NO. 2

To

AIS 018/2001

Automotive Vehicles -Speed Limitation Devices – Specifications

1. Page No. 1, clause No. 1, 1st sentence:

Substitute following text for existing text.

“This standard specifies the requirements, methods of test and procedure for type approval for the Speed Limitation Device (SLD) and Speed Limiting Function (SLF). These may be a separate unit to be installed on the vehicle and an add-on or on-board system built in the vehicle.”

2. Page No.1, clause No. 3:

Add following definition after 3.3 and renumber subsequent clauses.

“3.4 Speed limitation function (SLF), means a function to control the fuel feed of the vehicle or engine management in order to limit the vehicle speed to a fixed maximum value.”

3. Page No. 2, clause No. 3.6, 2nd sentence:

Delete entire 2nd sentence.

4. Page No. 2, clause No.3.7, 3rd bullet point:

Substitute following text for existing text.

“ - ratio of maximum engine power / unladen mass is less than or equal.”

5. Page No. 2, clause No. 3.7, 4th bullet point:

Substitute following text for existing text.

“The highest ratio of engine speed to vehicle speed in top gear, less than or equal to that of the tested vehicle.”

6. Page No. 2, clause No. 4.1:

Substitute following text for existing text.

“The speed limitation must be such that the vehicle in normal use must comply with the provisions of this standard. It shall be so designed, constructed, that it will perform satisfactorily, despite the vibrations to which it may be subjected”

7. Page No. 3, clause No. 4.5:

Substitute following text for existing text.

“The speed limitation function shall not actuate the vehicle’s service braking system. A permanent brake (e.g. retarded) may be incorporated only if it operates after the speed limitation function has restricted the fuel feed to the minimum fuel position”

8. Page No. 3, clause No. 4.13:

Delete entire clause No. 4.13 and renumber subsequent clauses.

9. Page No. 4, clause No. 5.3.3, Title:

Substitute following text for existing title.

“**Functional Test and Power Consumption** (This is not applicable to Speed Limitation Function (SLF))”

10. Page No. 4, clause No. 5.3.4, Title:

Substitute following text for existing title.

“**Operating Voltage Range** (This is not applicable to Speed Limitation Function (SLF))”

11. Page No. 4, clause No. 5.3.4, Table:

“Delete text in last row containing 6V rated voltage.”

12. Page No. 4, clause No. 5.4.1:

Substitute following text for existing text.

“Endurance tests on SLD should be carried out as per the following procedure and conditions specified. The device should work satisfactorily during the tests and would meet the performance requirements as given in cl. No. 5.3.3 after the test. However, if any breaking down of the device occurs during one of the endurance tests, a second device can be submitted to the considered endurance tests at the manufacturer's request. The SLD should be mounted on a test bench simulating the attitude and movement to simulate the vehicle conditions

Note : “For speed limiting function as inbuilt feature in the engine ECU shall be submitted to the endurance test prescribed below. However, this may be omitted if the applicant demonstrates resistance to those effects.

Here “demonstration” means – Declaration by manufacturer in a format (Annexure 1) or Submission of relevant test reports”

13. Page No. 5, clause No.5.4.2:

Substitute following text for existing text.

“**Endurance Test at Ambient Temperature**

The component should be tested for 50,000 cycles as described in Fig.3 at an ambient temperature of $30^{\circ}\text{C} \pm 5^{\circ}\text{C}$.”

14. Page No. 5, clause No.5.4.3:

Substitute following text for existing text.

“Endurance Test at High Temperature

Electronic components:

the components shall be cycled in a climatic chamber. A temperature of $65^{\circ}\text{C} \pm 5^{\circ}\text{C}$ is maintained during the whole functioning. Number of cycles: 12,500.

Mechanical components:

The components shall be cycled in a climatic chamber. A temperature of $100^{\circ}\text{C} \pm 5^{\circ}\text{C}$ is maintained during the whole functioning. Number of cycles: 12,500.”

15. Page No. 5, clause No.5.4.4:

Substitute following text for existing text.

“Endurance Test at Low Temperature

SLD components shall be cycled In the climatic chamber-used for conditioning 2, a temperature of $-20^{\circ}\text{C} \pm 5^{\circ}\text{C}$ is maintained during the whole functioning. Number of cycles: 12,500.”

16. Page No.5, clause No.5.4.5, Title:

Substitute following text for the existing title:

“Endurance Test with Damp Heat Cycling (This test is not applicable to speed limitation function (SLF))”.

17. Page No.5, clause No.5.4.6:

Delete entire clause No. 5.4.6 and renumber subsequent clauses.

18. Page No.5, clause No.5.4.7:

Substitute following text for existing text.

“Endurance Test under Vibration

The SLD is mounted in a similar way to its mounting on the vehicle. Sinusoidal vibrations shall be applied in all three planes. Logarithmic sweep shall be 1 octave per minute; First test: frequency range 10-24 Hz, amplitude ± 2 mm; Second test : frequency range 24-1,000 Hz For chassis and cab-mounted components, input 2.5 g. For engine-mounted components, input 5 g. Test duration: 1 hour in each axis

19. Page No. 5, clause No.5.4.8:

Substitute following text for existing text:

“Endurance Test - Salt Spray

The components, exposed to ambient road environment, shall be kept in a salt spray chamber with 5% concentration of sodium chloride and internal temperature of $35^{\circ}\text{C} \pm 2^{\circ}\text{C}$ for 12500 cycles.”

20. Page No.6, clause No.5.5, Title:

Substitute following text for the existing title:

“ Conditioning Tests (These tests are not applicable to speed limitation function (SLF))”.

21. Page No. 8, clause No.5.7.3.5.2, 2nd bullet point:

Substitute following text for existing text:

“The difference between the stabilization speeds obtained during each test run shall be equal to or less than 3 km/h.”

22. Page No. 11:

Add following Annexure 1 after figure 3.

Annexure 1
(See 5.4.1)

Declaration of compliance to the test according clause 5.4.1
Speed limiting function of Engine Management System

Speed limitation of the vehicle is a software part of Engine Management System (EMS). EMS has undergone test according to or beyond the endurance test requirements specified for the speed limiting function.

This declaration is based on tests conducted for our internal approvals.

Model name:
Identification:

Conditioning 1:

Test at ambient temperature. $T = 30^{\circ}\text{C} \pm 5^{\circ}\text{C}$, 50000 cycles
Test conducted (actual parameters if different than above)
Test results: Test performed. No failures. [t1]

Conditioning 2:

Test at high temperature.: T =65°C ± 5°C : for electronic components,
100°C±5°C : for mechanical components; 12500 cycles.
Test conducted (actual parameters if different than above)
Test results: Test performed. No failures. [t2]

Conditioning 3:

Test at low temperature; T = -20°C ± 5°C, 12500 cycles.
Test conducted (actual parameters if different than above)
Test results: Test performed. No failures. [t3]

Conditioning 4:

Test in salted atmosphere. 5 % sodium chloride,
T =35°C ± 2°C, 12500 cycles.
Test conducted (actual parameters if different than above)
Test results: Test performed. No failures. [t4]

Conditioning 5:

Vibration test. Test 1 : 10 - 24 Hz, amplitude ± 2mm.
Test 2 : 24-1000 Hz for 2.5/5 g.
Test conducted (actual parameters if different than above)
Test results: Test performed. No failures. [t5]

Note:

The declaration must be issued by authorized signatory of the manufacturer

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UNDER
CENTRAL MOTOR VEHICLE RULES – TECHNICAL STANDING
COMMITTEE
SET-UP BY
MINISTRY OF SHIPPING, ROAD TRANSPORT & HIGHWAYS
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GOVERNMENT OF INDIA

August 2008

AMENDMENT NO. 1 / JUNE 2002

TO

AIS-018/2001

Automotive Vehicles - Speed Limitation Devices - Specifications

1. Delete Clause No. "3.7"
2. Renumber Clause No. "3.8" as Cl. No. "3.7"

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UNDER
CENTRAL MOTOR VEHICLE RULES - TECHNICAL STANDING COMMITTEE

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

June 2002

AUTOMOTIVE INDUSTRY STANDARD

**Automotive Vehicles -
Speed Limitation Devices -
Specifications**

PRINTED BY:

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ON BEHALF OF :
AUTOMOTIVE INDUSTRY STANDARD COMMITTEE
UNDER
CENTRAL MOTOR VEHICLE RULES - TECHNICAL STANDING COMMITTEE
SET-UP BY
MINISTRY OF ROAD TRANSPORT & HIGHWAYS
GOVERNMENT OF INDIA

July 2001

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

Sr. No.	Corr- igenda.	Amend- ment	Revision	Date	Remark	Misc.

General remarks :

Introduction

According to CMVR - 118, the transport vehicles as notified by the Central Government shall be fitted by the operator of the vehicle with a speed governor conforming to the specifications of Bureau of Indian Standard. There are two Indian standards on the subject viz.:

IS : 10144 - 1982 : Specifications for Electronic Speed Limiters for Diesel Vehicles.

IS : 14382 - 1996 : Automotive Vehicles - Speed - Limiters specifications for installed requirements.

In order to update the standards and also to keep them aligned with EC, Automotive Industry Standards Committee (AISC) has formulated a procedure to evaluate the performance of speed limiting devices. It was considered that it will be better to merge both IS.

This standard covers the speed limitation devices both as :

- a) Separate unit to be installed on a vehicle.
- b) As an add-on or on-board system built in the vehicle.

The requirements cover the tests in the laboratory as well as on the road as installed on the vehicle.

The members of AISC responsible for preparation of the standard is given in Annexure - I.

Automotive Vehicles -Speed Limitation Devices - Specifications

1. SCOPE

This standard specifies the requirements and methods of test of the Speed Limitation Device, both as (1) separate unit to be installed on the vehicle and (2) an add-on or on-board system built in the vehicle. The requirements cover the tests in the lab as well as on the road as installed on the vehicle.

2. REFERENCES

- 2.1 IS:10250-1982 "Specifications for Severities for Environmental Tests for Automotive Electrical Equipment"
- 2.2 IS:9000 (Part V/Sec. 1 and 2) - 1981 "Basic Environmental Testing Procedures for Electronic and Electrical Items Damp Heat (Cyclic) Test"

3. DEFINITIONS

For the purpose of this standard :

- 3.1 Maximum Speed (V_{max}) means the maximum speed reached by the vehicle on the first half period of the transient response curve, if any (refer Fig.1), if not, the cases as given in the Fig.2, $V_{set} = V_{max}$.
- 3.2 Set Speed (V_{set}) means the intended mean vehicle speed when operating in a stabilized condition. It shall be marked on the vehicle.
- 3.3 Speed Limitation Device (Speed Limiter), hereinafter referred as SLD, means a device whose primary function is to control the fuel feed to the engine in order to limit the vehicle speed to the specified value. The purpose of the SLD is to limit the maximum road speed for vehicles to a specified value without affecting the other performance parameters of the vehicle in any manner.
- 3.4 Stabilized Speed (V_{stab}), means the stabilized vehicle speed - average speed calculated over a minimum period of 20 s beginning 10 s after the set speed is achieved (refer Fig.1) and meeting the requirements specified in Cl. No. 5.7.3.4.2.
- 3.5 Type of SLD means SLDs which do not differ with respect to the essential characteristics such as:
- make and type of the device.
 - range of speed values at which the speed limitation device may be set.
 - method used to control the fuel feed of the engine.

- 3.6 Unladen Mass means the mass of the vehicle in running order, including coolant, oils, fuel, tools and spare wheel on board, where applicable. In case of drive away chassis, the kerb weight of the drive away chassis will be considered in place of Unladen mass.
- 3.7 Vehicle means any motor vehicle of category M3 with a maximum authorized mass exceeding 100 kN (10 tons) intended for use on the road having at least four wheels and a maximum design speed exceeding 25 km/h.
- 3.8 Vehicle Type means vehicles, which do not differ in such essential respects as :
- make and type of the speed limitation system or speed limitation device , if any.
 - range of speeds at which the limitation may be set, is within the ranges established for the tested vehicle.
 - ratio of maximum engine power in unladen mass (kerb weight in the case of drive away chassis) is less than or equal.
 - Calculated ratio of engine to vehicle speed in top gear at a given engine speed is less than that of the tested vehicle at the same engine speed in top gear.

4. GENERAL REQUIREMENTS

- 4.1 The speed limitation must be such that the vehicle in normal use must comply with the provisions of this standard. The SLD shall be so designed, constructed, assembled and fitted to the vehicle that it will perform satisfactorily, despite the vibrations to which it may be subjected.
- 4.2 The SLD of the vehicle must be so designed, constructed and assembled as to resist corrosion and aging phenomena to which it may be exposed.
- 4.3 The device should be so designed, constructed and assembled and fitted to the vehicle to make it maximum tamper proof and fail safe, against various factors such as disconnection / failure of various components e.g. power supply, speed sensor, mechanical actuator system, linkages etc. or any unauthorized modification and adjustment to the system. The limitation threshold must not, in any case, be capable of being increased or removed temporarily or permanently on vehicles in use. The inviolability shall be demonstrated to the testing agency with documentation analyzing the failure mode in which the system will be globally examined. The analysis shall show, taking into account the different states taken by the system, the consequences of a

modification of the input or output states on the functioning, the possibilities of obtaining these modifications by failures or by tampering and possibility of their occurrence. The analysis level will be always to the first failure.

- 4.4 The speed limitation function or the SLD and the connections necessary for its operation except those essential for the running of the vehicle shall be protected from any unauthorized adjustments or the interruption of its energy supply by use of proper sealing devices and/or special tools.
- 4.5 The speed limitation function or the SLD should work without causing interference with any other safety system of the vehicle.
- 4.6 The speed limitation function or the SLD must be such that it does not affect the vehicle's road speed if a positive action on the accelerator is applied when the vehicle is running at its set speed.
- 4.7 The speed limitation function or the SLD must allow normal accelerator control for the purpose of gear changing.
- 4.8 No malfunction or tampering shall result in an increase in engine power above that demanded by the position of the driver's accelerator.
- 4.9 The speed limitation function shall be obtained regardless of the accelerator control used if there is more than one such control, which may be reached from the driver's seating position.
- 4.10 The actuation force of the controls should not have a detrimental effect on the driver's efficiency or impose fatigue on the driver.
- 4.11 The speed limiter function or the SLD shall operate satisfactorily in its electromagnetic environment without unacceptable electromagnetic disturbance for any other device in the environment.
- 4.12 All components necessary for full function of the speed limitation or the SLD shall be energized whenever the vehicle is being driven.
- 4.13 The device shall be fail safe and so designed that in the event of a failure of the speed limiter, the speed shall not be enhanced beyond the set speed limit and if there is any failure, there should be a positive indication to the driver. Further, the vehicle shall be capable of continuing to move at a reduced speed, even in the case of total failure/tampering of the speed limiter.
- 4.14 The set speed shall be indicated on a plate in a conspicuous position in the driver's compartment of the vehicle.
- 4.15 The device should provide functional check facility by which the set speed and functioning can be checked by the field and other concerned authorities.

5. TESTS OF SPEED LIMITATION DEVICE

5.1 The SLD may be approved as a device alone when it meets the requirements of para 5.3 and 5.4 below. When it is intended for a specific vehicle model, it should meet the requirements of para 5.7 also.

5.2 Five samples of SLD shall be provided - four samples for the performance and endurance test described in para 5.3 and 5.4 below and one sample as fitted on the vehicle for carrying out the tests prescribed in para 5.7 below. In the case of add-on or on-board system built in the vehicle, the involved system and its components should be provided separately for the performance and endurance tests.

5.3 Performance Tests

5.3.1 All the four samples shall be tested for performance as given below.

5.3.2 Visual Examination

The speed limiter shall be visually examined for workmanship, finish, marking and general requirements mentioned in para 4.0, pertaining to the components alone.

5.3.3 Functional Test and Power Consumption

The speed limiter shall be connected to the rated voltage. The SLD shall be coupled to a suitable test rig and tested for its function viz. limiting the speed at the set value. The maximum current consumption is noted. The maximum current of each type of SLD shall not exceed the values specified by the manufacturer.

5.3.4 Operating Voltage Range

The speed limiter shall operate satisfactorily over the following voltage:

Rated Voltage of Speed Limiter	Performance Limit of Voltage	
	Maximum	Minimum
24	32	22
12	16	11
6	8	5.5

5.4 Endurance Tests

5.4.1 Endurance tests on SLD should be carried out as per the following procedure and conditions specified. The device should work satisfactorily during the tests and would meet the performance requirements as given in Cl. No. 5.3.3 after the test.

5.4.2 Endurance Test at Ambient Temperature

The SLD should be mounted on a test bench simulating the attitude and movement to simulate the vehicle conditions. The component should be tested for one lac cycles as described in Fig.3 at an ambient temperature of $30^{\circ}\text{C} \pm 5^{\circ}\text{C}$.

5.4.3 Endurance Test at High Temperature

The component shall be mounted and tested as described in para 5.4.2 except that the component should be mounted in a chamber whose temperature is maintained at $55^{\circ}\text{C} \pm 2^{\circ}\text{C}$ as per Clause 4.2 of IS : 10250- 1982 for 16 h.

5.4.4 Endurance Test at Low Temperature

The component shall be mounted and tested as described in para 5.4.2 except that the component should be mounted in a chamber whose temperature is maintained at $-10^{\circ}\text{C} \pm 3^{\circ}\text{C}$ as per Clause 4.4 of IS:10250-1982 for 16 h.

5.4.5 Endurance Test with Damp Heat Cycling

The component shall be mounted and tested as described in para 5.4.2 except that the component should be mounted in a chamber, whose environment is varied according to Damp Heat Cycle Test as per 1A Test Cycle of Variant 1 with upper temperature of 55°C of IS: 9000 (Part V/Sec. 2)-1981 (Fig.2), for 6 damp heat cycles.

5.4.6 Endurance Test with Rapid Change of Temperature

The component shall be mounted and tested as described in para 5.4.2 except that the component should be mounted in a chamber whose temperature is varied between -10°C and 55°C as per Group 2 Clause 4.5 of IS : 10250-1982, for 5 cycles of rapid change of temperature.

5.4.7 Endurance Test under Vibration

The component shall be mounted on a table as per Clause 4.1 of IS : 10250-1982, with the following conditions :

- for engine mounted components, vibration should be provided in the frequency range of 10 Hz to 250 Hz with constant displacement of 0.75 mm upto a frequency of 57/62 Hz and a constant acceleration of 10 g above that frequency, for 1 h in each axis.
- for cabin mounted components, the test frequency is 10-55 Hz, constant displacement of 0.35 mm for 1 h in each axis.

5.4.8 Endurance Test – Salt Spray

The components, exposed to the ambient road environment, shall be kept in a salt spray chamber with 5% concentration of sodium chloride and internal temperature of $35^{\circ}\text{C} \pm 2^{\circ}\text{C}$. The system should be tested as per Clause 4.8 of IS : 10250-1982 for 50 h.

5.5 Conditioning Tests :

5.5.1 The device should be subjected to the following conditions and meet the performance requirements as given in the Cl. No.5.3.3 after the test.

5.5.2 Conditioning with Dust

The unit should be conditioned as per Clause 4.6 of IS : 10250-1982.

5.5.3 Conditioning with Contaminants

The unit should be conditioned as per Clause 4.9 of IS : 10250-1982.

5.5.4 Conditioning with Water Spray

The unit should be conditioned as per Clause 4.13 of IS : 10250-1982.

5.5.5 Drop and Topple Test

The complete device should be subjected to drop and topple test as per Clause 4.10 of IS : 10250-1982 with a drop height of 200 mm and number of drops 6.

5.5.6 Bump Test

The complete device should be subjected to bump test as per Clause 4.11 of IS : 10250-1982.

5.6 The distribution of the samples for the various tests are shown below:

Sr. No.	Test	Sample No.			
		1	2	3	4
	Endurance Tests				
1	Ambient Temperature	*			
2	High Temperature		*		
3	Low Temperature		*		
4	Damp Heat Cycles		*		
5	Rapid Change of Temperature		*		
6	Vibration				*
7	Salt Spray			*	
	Conditioning Tests				
8	Dust			*	
9	Contamination			*	
10	Water Spray			*	
11	Bump				*
12	Drop and Topple				*

5.7 Performance Tests on the Device as Fitted on the Vehicle

5.7.1 SLD as installed on specified vehicle type can be approved as per choice of supplier by either of the following methods; mentioned in Cl. No. 5.7.3 or 5.7.4.

5.7.2 The general requirements mentioned in Cl. No. 4 pertaining as fitted on the vehicle should be examined during the test.

5.7.3 Measurement on Test Track

5.7.3.1 Preparation of the Vehicle

The device should be fitted on the vehicle to be approved. The settings of the engine of the test vehicle, particularly the fuel feed (carburetor or injection system) shall conform to the specification of the vehicle manufacturer. The tyres shall be bedded and the pressure shall be as specified by the vehicle manufacturer. The vehicle mass shall be unladen mass as declared by the manufacturer.

5.7.3.2 Characteristics of Test Track

The test surface shall be suitable to enable stabilized speed to be maintained and free from uneven patches. Gradients shall not exceed 2% and vary by more than 1% excluding camber effects.

5.7.3.3 Wind Conditions

The mean wind speed measured at a height at least 1 m above ground shall be less than 6 m/s with gusts not exceeding 10 m/s.

5.7.3.4 Acceleration Test Method

5.7.3.4.1 The vehicle running at a speed, which is 10 km/h below the set speed, shall be accelerated as much as possible using a fully positive action on the accelerator controls. The action shall be maintained at least 30 s after the vehicle speed has been stabilized. The instantaneous vehicle speed shall be recorded during the test in order to establish the curve of the speed versus the time and during the operation of the speed limiting function or of the SLD as appropriate. The accuracy of speed measurements shall be $\pm 1\%$ and that of time measurements within 0.1s.

5.7.3.4.2 Acceptance Criteria for Acceleration Test

The test shall be satisfactory if following conditions are met.

The stabilized speed reached by the vehicle shall not exceed the set speed ($V_{\text{stab}} \leq V_{\text{set}}$). However, a tolerance of 5% of the V_{set} value, or 5 km/h, whichever is higher is acceptable.

Transient Response (Fig.1)

After the set speed is reached first time,

- The maximum speed shall not exceed the set speed , V_{set} by more than 5%.
- The rate of change of speed shall not exceed 0.5 m/s^2 when measured on a period greater than 0.1 s.
- The stabilized speed conditions specified in para 3.4 shall be attained within 10 s of first reaching of the set speed V_{set} .

Stabilized Speed (Fig.1)

V_{stab} is the average speed calculated for a minimum time interval of 20s beginning 10s after first reaching V_{set} .

When stable speed control has been achieved,

- Speed shall not vary by more than 4% of the set speed V_{set} or 2 km/h whichever is higher
- The rate of change of speed shall not exceed 0.2 m/s^2 when measured on a period greater than 0.1 s.

Acceleration tests shall be carried out and the acceptable criteria verified for each reduction ratio of gear allowing the speed to be exceeded.

5.7.3.5 Test Method at Steady Speed

5.7.3.5.1 The vehicle shall be driven at full acceleration till a steady speed is achieved, then shall be maintained at this speed for atleast 400 m. The test shall then be repeated in the opposite direction. The stabilized speed for the whole test is the mean of the two average speeds measured on both directions. The whole test including the calculation of the stabilization speed shall be carried out five times. The speed measurement shall be carried out with an accuracy of $\pm 1\%$, the time measurement with an accuracy of 0.1 s.

5.7.3.5.2 Acceptance Criteria for Steady Speed Test

Tests are judged satisfactory if following conditions are fulfilled,

- None of the stabilization speeds V_{stab} obtained shall exceed set speed V_{set} . However, a tolerance of 5% of the V_{set} value or 5 km/h whichever is greater is acceptable.
- The gap between the extreme stabilization speeds obtained during the tests shall not exceed 3 km/h.
- Tests in steady speed shall be carried out and the acceptance criteria verified for each reduction gear ratio allowing, in theory, the speed limit to be exceeded.

5.7.4 Tests on Chassis Dynamometer

5.7.4.1 Characteristics of Chassis Dynamometer

The equivalent inertia of the vehicle mass shall be reproduced on the chassis dynamometer with an accuracy of $\pm 10\%$. The speed of the vehicle shall be measured with an accuracy of $\pm 1\%$. The time shall be measured with an accuracy of 0.1s.

5.7.4.2 Acceleration Test Method

5.7.4.2.1 The power absorbed by the brake of the chassis dynamometer during the test shall be set to correspond with the vehicle's resistance to progressive movement at the tested speed(s). This power may be established by calculation and shall be set to an accuracy of $\pm 10\%$. At the request of the manufacturers, the power absorbed may alternatively be set at $0.4 P_{\max}$. (P_{\max} is the maximum power of the engine). The vehicle running at a speed which is 10 km/h below its set speed shall be accelerated to the maximum possible engine speeds by a fully positive action on the acceleration control. The action shall be maintained for at least 20 s, after the vehicle speed has been stabilized. The instantaneous vehicle speed shall be recorded during the test in order to establish the curve of the speed versus the time and during the operation of the speed limitation device.

5.7.4.2.2 Acceptance Criteria for the Acceleration Test

The test shall be satisfactory if conditions of para 5.7.3.4.2 are met.

5.7.4.3 Test Method for Steady Speed Test

5.7.4.3.1 The vehicle shall be installed on the chassis dynamometer. The following acceptance criteria should be met for power absorbed by the chassis dynamometer varying progressively from the maximum power P_{\max} to a value equal to $0.2 P_{\max}$. The speed of the vehicle shall be recorded in the full range of power defined above. The maximum speed of the vehicle shall be determined on this range. Test and record defined above shall be made five times.

5.7.4.3.2 Acceptance criteria for steady speed tests are judged satisfactory if the conditions of para 5.7.3.5.2 are fulfilled.

NOTE : This standard is based on :

- 1 IS: 10144 - 1982: Specifications for Electronic speed limiters for diesel vehicles.
- 2 IS: 14382 - 1996: Automotive Vehicles - Speed limiters - specification for installed requirements.

- 3 92/24/EEC : Council directive relating to speed limitation on-board systems of certain categories of vehicles.
- 4 ECE R-89 "Uniform Provisions Concerning the Approval of :
 - 1) Vehicle with regard to limitation of their maximum speed
 - 2) Vehicle with regard to the installation of a speed limitation device of an approved type
 - 3) Speed limitation device

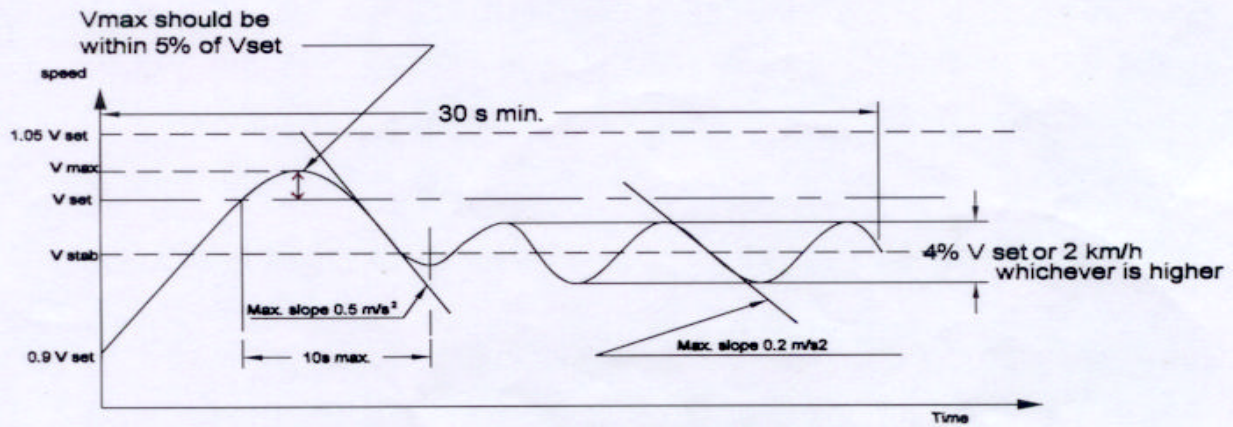


Figure 1 (Refer Para 3.1,3.4 & 5.7.3.4.2)

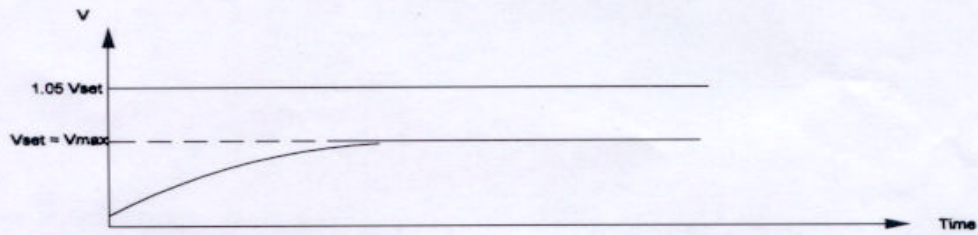


Figure 2 (Refer Para 3.1)

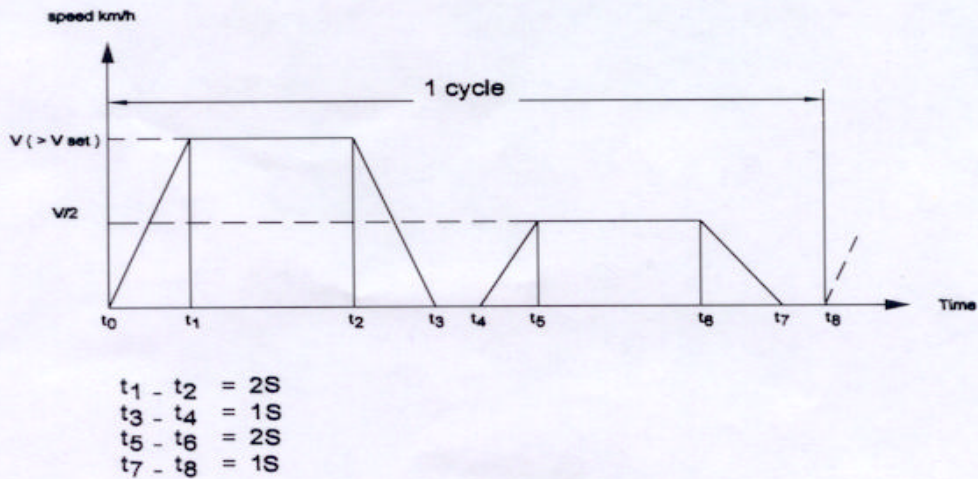


Figure 3 (Refer Para 5.4.2)

