AIS-146

AUTOMOTIVE INDUSTRY STANDARD

Requirements applying to Stands fitted in two wheeled motor vehicles

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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

September 2018

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 Ministry of Surface Transport (MOST) has constituted a permanent Automotive Industry Standard 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 may publish this document on their Web site.

This standard prescribes the requirements applying to stands.

Considerable assistance has been taken from European Regulation No. 44/2014 of 21st November 2013, titled "Applicable for vehicle construction and general requirements for the approval of two- or three- wheel vehicles and Quadricycles".

The AISC panel and the Automotive Industry Standards Committee (AISC) responsible for preparation of this standard are given in Annex C and D respectively.

Requirements applying to Stands fitted in two wheeled motor vehicles

Requirements Applying to Stands fitted in two wheeled motor vehicles

1.0 SCOPE

This standard specifies the requirements of stands for L1 and L2 categories of vehicles as defined in AIS-053.

2.0 REFERENCES

2.1 AIS-053: Automotive Vehicles – Types – Terminology

2.2 IS 11422:2001-Terms and Definitions of Weights of Two Wheeled Motor Vehicles

3.0 DEFINITIONS

For the purpose of this document, the following definitions shall apply.

3.1 **'Stand'** means a device firmly attached to the vehicle and able to maintain the fully unattended vehicle in its intended parking position.

3.2 **'Prop stand'** means a stand which, when extended or swung into the position of use, supports the vehicle on one side only, leaving both wheels in contact with the ground.

3.3 **'Centre stand'** means a stand which, when swung into the position of use, supports the vehicle by providing one or more areas of contact between the vehicle and the ground on both sides of the longitudinal median plane of the vehicle.

3.4 **'Transverse tilt'** means the sideways gradient, expressed as a percentage, of the actual supporting surface where the line formed by the intersection of the longitudinal median plane of the vehicle and the supporting surface is perpendicular to the line of maximum gradient.

3.5 **'Longitudinal tilt'** means the fore and aft gradient, expressed as a percentage, of the actual supporting surface where the longitudinal median plane of the vehicle is parallel to, and thus in line with, the line of maximum gradient.

3.6 **'in-use position'** of a stand refers to a stand being extended or opened and put in the intended position for parking**.**

3.7 **'not-in-use position'** of a stand refers to a stand being retracted or closed and kept in the position for travelling**.**

3.8 **'Longitudinal Median Plane'** of vehicle is vertical plane passing through centre of gravity of vehicle along longitudinal axis (along the wheelbase).

3.9 **'Lateral Median Plane'** of vehicle is vertical plane passing through centre of gravity of vehicle and perpendicular to the longitudinal plane of vehicle.

4.0 APPLICATION FOR TYPE APPROVAL

4.1 The application for type approval of a vehicle type with regard to Stands shall be submitted by the vehicle manufacturer along with at least the details given in Annex A.

Note: If the above details are covered in application for complete vehicle type approval, it is not necessary to submit them separately.

4.2 Every modification in technical specifications affecting type approval declared in accordance with 4.1, shall be intimated to the testing agency.

4.3 Testing agency may then consider, whether;

4.3.1 The Stands with modifications complies with specified requirements, or,

4.3.2 Any further document verification is required.

4.3.3 In case of 4.3.2, checks for those parameters which are affected by the modification only needs to be carried out

4.3.4 In the event of 4.3.1 or in the case of 4.3.2 after successful compliance to requirements, the certificate of compliance shall be validated for the modified version.

4.4 For deciding whether any further verification is required, guidelines given in Annex B shall be followed.

5.0 REQUIREMENTS APPLYING TO TWO-WHEEL MOPEDS AND TWO-WHEEL MOTORCYCLES OF CATEGORY L1 AND L2 WITH OR WITHOUT SIDE CAR

5.1 General requirements

5.1.1 Vehicles of categories L1and L2 shall be fitted with at least one stand.

5.1.1.1 Each stand fitted to the vehicle shall enable the vehicle to meet the performance requirements in 5.2 to 5.2.5.2 without being held or supported by a person or any other external means.

5.1.1.2 Vehicles fitted with twinned wheels may not need to be fitted with a stand provided that the performance requirements in 5.3 to 5.3.2.5 and 5.3.4 to 5.3.4.3.4 are met.

5.1.1.3 Prop stands fitted to vehicles of category L1 with a mass in running order of less than 35 kg are exempted from the requirements in 5.2.3.3, to 5.2.3.4 and 5.2.5.2.

5.1.2 Vehicles of category L2 fitted with side car shall be fitted with at least one stand under the following conditions:

5.1.2.1 If the side-car is detachable from the motorcycle so that the motorcycle be used without it, the motorcycle shall fulfill the requirements for solo motorcycles in 5.1.1. to 5.1.1.2.

5.2 **Specific requirements**

5.2.1 A stand shall be either a prop stand or centre stand.

5.2.2 Where the stand swivels below or about the lower part of the vehicle, its free end shall swing to the rear of the vehicle to reach the not-in-use position.

5.2.3 Specific requirements for prop stands

5.2.3.1 A prop stand shall be able to support the vehicle in such a way as to provide its lateral stability whether the vehicle is on a horizontal supporting surface or on a slope. It shall also prevent the stationary vehicle leaning more deeply or being moved too easily into an upright position to such an extent that it becomes unstable and may fall or tip over.

Note: this condition is deemed to be satisfied if the requirement specified in 5.3 to 5.3.2.5 and 5.3.4 to 5.3.4.3.4 are complied with.

5.2.3.2 A prop stand shall be able to support the vehicle in such a way as to maintain full stability when the vehicle is parked on a slope. This requirement is checked in accordance with the procedures and performance requirements in 5.3 to 5.3.2.5 and 5.3.4 to 5.3.4.3.4.

5.2.3.3 A prop stand shall be able to swing back Automatically into the not-in-use position under the following conditions:

- When the vehicle is returned to its normal upright riding position, or
- When the vehicle starts to move forward as a result of deliberate action by the rider, while in its normal upright riding position.

5.2.3.4 The requirements in point 5.2.3.3 are not applicable if the vehicle is designed in such a way that

- it cannot be propelled when the prop stand is in the in-use position;

Note: This can be achieved by any suitable method as per the choice of manufacturer and deemed to be compliant on satisfactory demonstration to the test agency.

5.2.3.5 A prop stand shall be so designed and constructed that it does not swing back automatically if the vehicle is being leaned down in order to bring the free end of the prop stand into contact with the ground surface.

5.2.3.6 A prop stand shall be so designed and constructed that it does not swing back automatically if the angle of lean is altered unexpectedly or unintentionally (e.g. if the vehicle is pushed lightly by a third party or if the vehicle is subjected to a gust of wind arising from the passage of a large vehicle) under the following conditions:

- when the vehicle is left unattended in its parked position, and
- when the prop stand is in the in-use position.

Compliance with this requirement shall be checked in accordance with the procedure in 5.3.3, 5.3.3.1 and 5.3.3.2.

5.2.4 **Specific requirements for centre stands**

5.2.4.1 A centre stand shall be able to support the vehicle, whether or not one or both wheels are in contact with the ground surface, so as to provide its lateral stability when the vehicle is on a horizontal supporting surface or on a slope.

5.2.4.2 A centre stand shall be able to support the vehicle so as to maintain full stability when the vehicle is parked on a slope. This requirement is checked in accordance with the procedures and performance requirements in 5.3 to 5.3.2.5 and 5.3.4 to 5.3.4.3.4.

5.2.4.3 A centre stand shall be able to swing back automatically into the not-in-use position when the vehicle is moved forward purposely so as to raise the centre stand from the ground surface.

5.2.4.4 The requirement in 5.2.4.3 is not applicable if the vehicle is so designed that it cannot be propelled when the centre stand is in the in-use position.

5.2.5 **Stand retention systems**

5.2.5.1 Stands shall be provided with a retention system which holds them in the not-in-use position.

5.2.5.2 A retention system shall consist of:

5.2.5.2.1 Two independent devices such as two separate springs or one spring and one other retaining device, or

5.2.5.2.2 A single device which shall be able to operate without failing for at least 10,000 normal-use cycles (i.e., travel between “not-in-use position” to “in-use-position”) if the vehicle has been fitted with two stands; or 15,000 normal-use cycles (i.e., travel between “not-in-use position” to “in-use-position”) if the vehicle is fitted with only one stand.

5.3 **Test procedure**

5.3.1 Test surface specifications

5.3.1.1 A testing platform shall be used for carrying out the tests and shall be so designed that it assumes a position simulating the longitudinal and transverse tilts.

5.3.1.2 The testing platform shall be flat, rectangular and of sufficient dimensions to fully support the vehicle in the parked position while simulating the longitudinal and transverse tilts. It shall not exhibit any perceptible flexing or deformation during the tests.

5.3.1.3 The surface of the testing platform shall be clean and dry and of sufficient roughness and friction to prevent the vehicle's tyres from sliding on the surface during the tests.

5.3.2 Vehicle preparation (valid for all tests)

5.3.2.1. The vehicle's mass shall be adjusted to that of the manufacturer's declared mass in running order, without the rider, plus the mass of any propulsion batteries.

5.3.2.2. The vehicle's tyre pressures shall be adjusted to the manufacturer's specified values correspond to test load conditions.

5.3.2.3. The vehicle's transmission shall be put in the 'park' position, if available, in the case of an automatic transmission, or the 'neutral' position in all other cases.

5.3.2.4. If the vehicle is fitted with a parking brake, this shall be engaged.

5.3.2.5. The vehicle's steering system shall be put in the locked position. If there is more than one position in which the steering can be locked, the vehicle shall undergo the following tests with the steering system locked in each available position:

5.3.3. Test of stability of a vehicle fitted with a prop stand on a horizontal ground surface

5.3.3.1. The vehicle is parked on the horizontal testing platform with the prop stand in the in-use position.

5.3.3.2 The vehicle shall be manipulated in such a way as to increase by 3.0° the angle between the displaced longitudinal median plane of the vehicle (i.e. as the vehicle is parked and leaning the longitudinal median plane is displaced and thus no longer vertical) and the horizontal surface by pushing and moving the vehicle into a more vertical position

5.3.4 **Test of stability of a vehicle parked on an inclined surface**

5.3.4.1 The vehicle is parked on the horizontal testing platform.

5.3.4.1.1 The vehicle's stand shall be in the in-use position. If the vehicle is fitted with more than one stand, each stand shall be assessed separately by repeating all prescribed tests.

5.3.4.1.2 If the vehicle is fitted with twinned wheels and not fitted with a stand, compliance with 5.1.2.2 may be demonstrated by performing the tests without the presence of a stand in the in-use position.

5.3.4.2 The testing platform shall be shifted or rotated to achieve the minimum prescribed inclination in relation to the transverse tilt towards the left and the right of the vehicle, and the longitudinal tilt to the front and the back of the vehicle. These four tilt orientations shall be carried out separately, always starting from a horizontal position. The vehicle shall remain stable when the testing platform is being brought into the inclined position or may be moved into position after the platform has been set in the inclined position.

5.3.4.3 **Table 3-1**

Tilt requirements for prop and centre stands

(see also Figures 5-1 to 5-3)

Tilt	**Prop stand**		**Centre Stand**	
	L1 Category	**L2 Category**	**L1 Category**	**L2 Category**
Transverse tilt (to the left)	5 %	6 %	6 %	8 %
Transverse tilt (to the right)	5 %	6 %	6 %	8 %
Longitudinal tilt (downstream)	5 %	6 %	6 %	8 %
Longitudinal tilt (upstream)	6 %	8 %	12 %	14 %

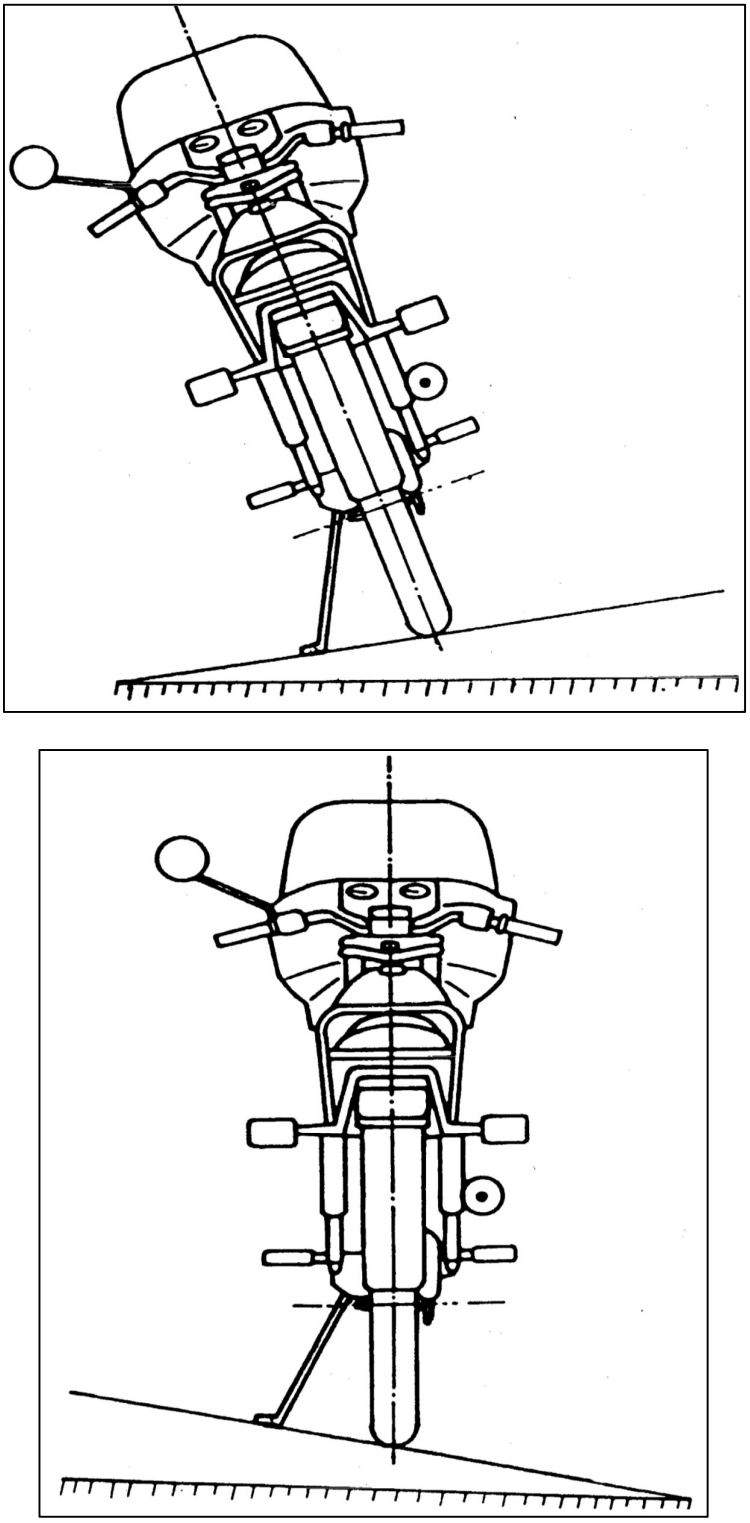
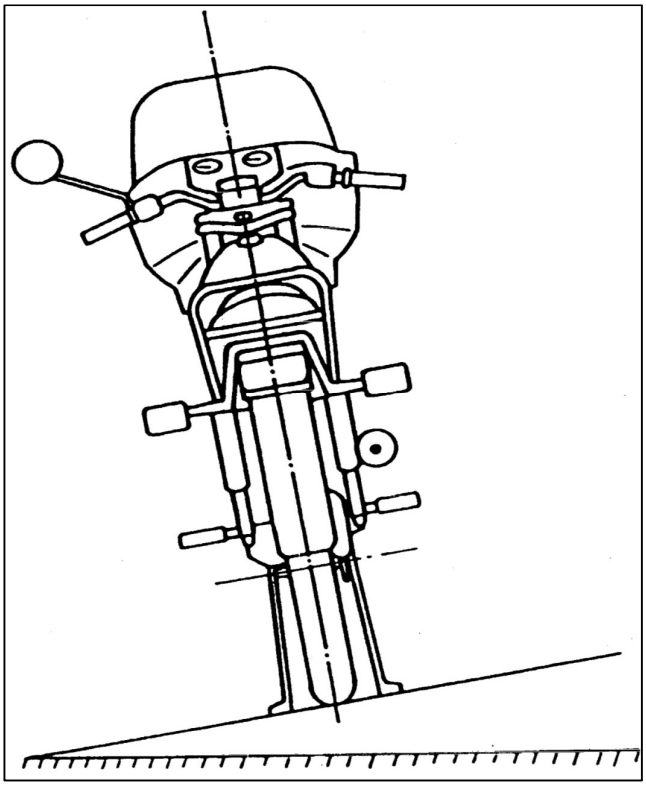


Figure 5-1

Transverse tilt to the left and right (prop stand)



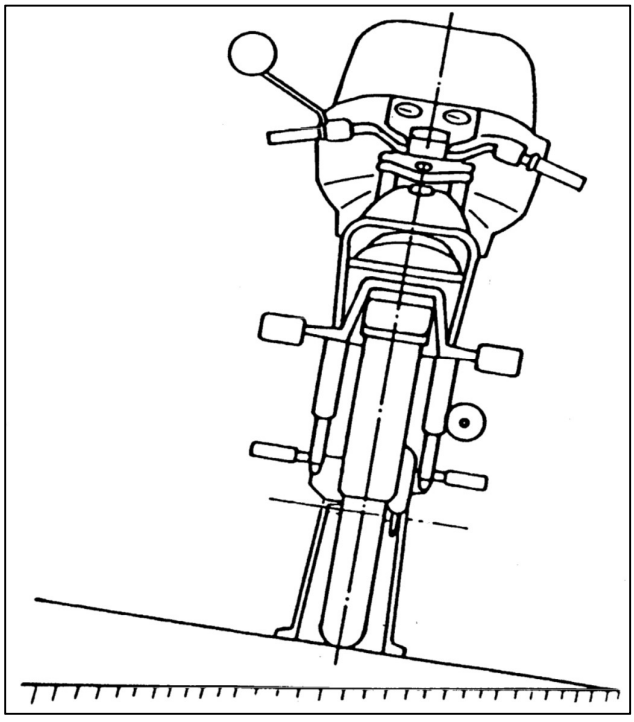


Figure 5-2

Transverse tilt to the left and right (centre stand)

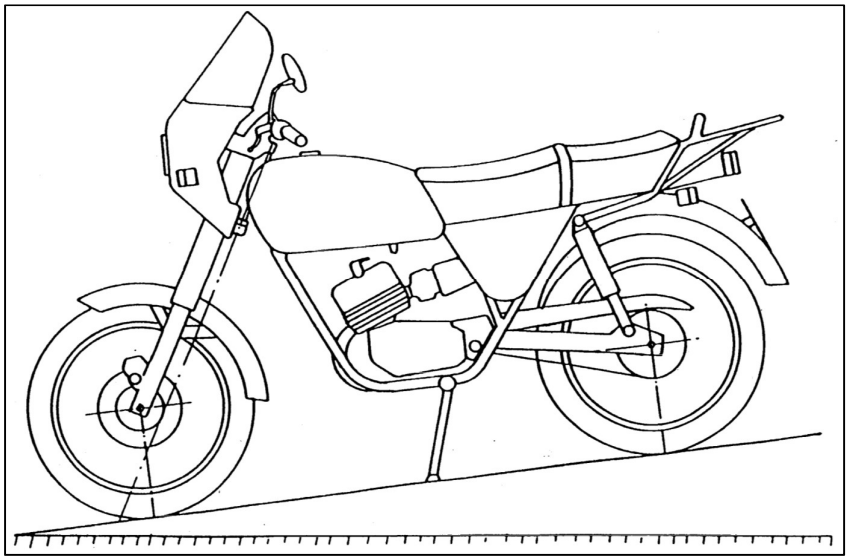


Figure 5-3
Longitudinal tilt downstream

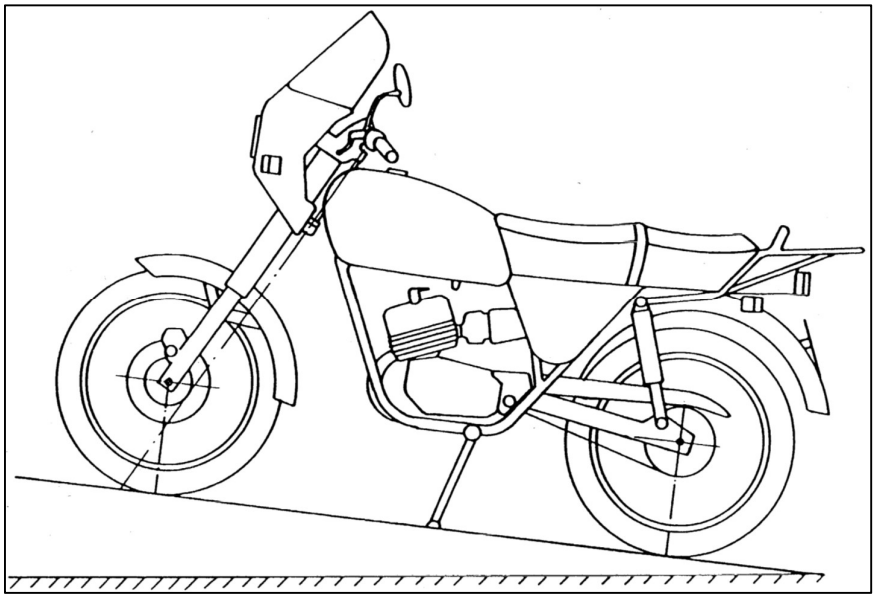


Figure 5-4
Longitudinal tilt upstream

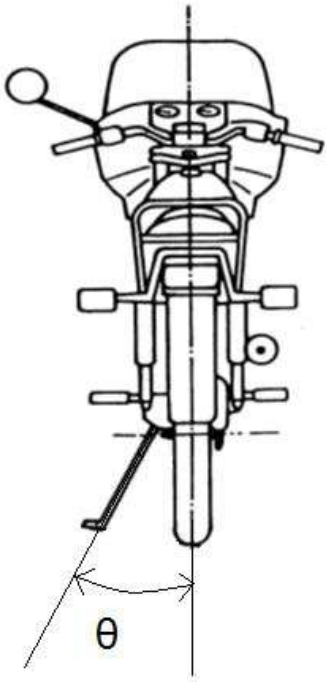


Figure 5-5

Angle between prop stand and longitudinal median plane

5.3.4.4. Where a vehicle on a tilted testing platform is resting on its centre stand and just one wheel and when this vehicle may be maintained in a position with either the centre stand and the front wheel in contact with the testing platform or the centre stand and the rear wheel in contact with the testing platform, the tests as described in 5.3.4.2 to 5.3.4.3.3 shall be conducted solely with the vehicle resting on the centre stand and its rear wheel in contact with the testing platform.

ANNEX A
(Clause 4)

Information to be submitted by the manufacturer

A-1	**General**
A-1.1	Make
A-1.2	Type (state any possible variants and versions: each variant and each version shall be identified by a code consisting of numbers or a combination of letters and numbers):
A-1.3	Vehicle category as per AIS-053:
A-1.4	Name and address of manufacturer
A-1.5	Name and address of manufacturer's authorized representative, if any:
A-2.0	**Masses (in kg)**
A-2.1	Mass of vehicle in running order :
A-2.1.1	Distribution of that mass between the axles:
A-3.0	**Type of stand (Centre/Prop/both)**
A-3.1	Number of Stands
A-3.2	Retention Mechanism (one spring/two spring/ one spring with separate retention system)
A-3.3	In the case of spring used in 5.2.5.2.2,
A-3.3.1	Wire Diameter (mm)
A-3.3.2	Free length of the spring (mm)
A-3.3.3	Outer Coil diameter (mm)
A-3.3.4	Assembled length in “in-use position” (mm)
A-3.3.5	Assembled length in “not-in-use position” (mm)
A-3.3.6	Spring Material
A-4.0	Photographs and/or drawings showing the location and the construction

ANNEX B

Guideline for selection of representative vehicle and Criteria for Extension of Type Approval

B-1 This Annex gives factors to be considered while selecting a vehicle to represent a range or variants for testing the vehicle for type approval as per this standard. This is also used for the extension of type approval of one model to changes in technical specifications, or to its variant(s).

B-2 In general, when changes in technical specifications of vehicle do not affect the requirements of stand adversely, and is still within the stipulated limits, the type approval can shall be extended. The changes in parameters that affect the external stands requirements are listed in B-3 of this Annexure.

B-3 In the cases of following changes, with respect to the vehicle tested, in the details submitted as per Annex A. Type Approval can shall be extended, if changes are within the prescribed limits, else tests are necessary for establishing compliance:

B-4 Calculate the lateral median plane based on front and rear axle weights by locating the plane of centre of gravity.

Distance from front wheel axle = (Rear axle weight*wheelbase) / (total weight of vehicle)

S. No.	Aggregate and Specification	Additional verification required if any
1	Change in location of installation of prop stand	
1.1	If the location of installation of prop stand is shifted away from median lateral plane calculated as per B-4	All Tests to be conducted
1.2	If the location of installation of prop stand is shifted towards median lateral plane calculated as per B-4	No Test is required
1.3	If the angle between vehicle longitudinal median plane and prop stand in-use position increases (Angle θ as shown in 5-5).	No Test is required

1.4	If the angle between vehicle longitudinal median plane and prop stand in-use position decreases (Angle θ as shown in 5-5).	Test as per 5.3.3.2
2	Vehicle category as per AIS-053:	
2.1	L1 to L2	Stability test as per 5.3.4 to be repeated if original test results does not meet the requirements of L2
2.2	L2 to L1	No test required
3	Change in Mass of vehicle in running order	
3.1	If increase by more than 10%.	All Test required except test in 5.2.5.2.2
3.2	For decrease in mass or increase not exceeding 10% in mass.	No Test required.
4	Distribution of that mass between the axles:	No Test required.
5	Type of stand (Centre/Prop/both)	
5.1	If change from centre stand to prop stand or vice versa, all applicable tests to be done.	All applicable Tests to be conducted.
5.2	If vehicle has been tested with both the stands and one is deleted no additional test is required.	No Test required.
5.3	If vehicle has been tested with prop stand and if centre stand is added.	Tests for applicable only centre stand.
5.4	If vehicle has been tested with centre stand and if prop stand is added.	Tests for applicable only prop stand.
6	**Stand Material**	
6.1	Material of stand from metallic to non-metallic.	All Tests to be conducted
6.2	Material of stand non-metallic to metallic.	No Test required

7	Retention Mechanism (one spring/two spring/ one spring with separate retention system)	Retention mechanism defined in 5.2.5.2.1 to 5.2.5.2.2, test as per 5.2.5.2.2 to be done Retention mechanism defined in 5.2.5.2.2 to 5.2.5.2.1 no test to be done Changes in requirements 5.2.5.2.1, no test required
8	Spring Characteristics in the case of The spring used for 5.2.5.2.2	Test as per 5.2.5.2.2 to be repeated.
Changes other than those listed above, are considered to be having no adverse effect requirements of stands.		

ANNEX C

PANEL COMPOSITION*

(See Introduction)

Chairman	
Mr. S. Arun	SIAM (Hero Moto. Corp. Ltd.)
Members	**Representing**
Mr. P. D. Betgeri	ARAI
Mr. V. P. Rawal	ARAI
Mr. Ramu Konanki	ARAI
Mr. Tagad Nilesh	CIRT
Ms. Vijayanta Ahuja	ICAT
Mr. Gurukaran	ICAT
Mr. Arvind Kumbhar	SIAM (Bajaj Auto Ltd.)
Mr. T. M. Balaraman	SIAM (Hero Moto. Corp. Ltd.)
Mr. Danish Gazali	SIAM (Hero Moto. Corp. Ltd.)
Mr. Suraj Agarwal	SIAM (Honda Motorcycle & Scooter India)
Mr. Vipin Sharma	SIAM (Honda Motorcycle & Scooter India)
Mr. Sandeep Miskeen	SIAM (Honda Motorcycle & Scooter India)
Mr. Piyush Chowdhry	SIAM (Hero Moto. Corp. Ltd.)
Mr. Vivek	SIAM (Piaggio Vehicles Pvt. Ltd.)
Mr. Anantkumar	SIAM (TVS Motor Company Ltd.)
Mr. Venusuresh	SIAM (Yamaha Motor)
Mr. Gaurav	SIAM (Suzuki Motorcycle Ind. Pvt. Ltd.)
Mr. Rakesh Sharma	H. D. Motor
Mr. Uday Harite	ACMA

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

ANNEX D
(See Introduction)
COMMITTEE COMPOSITION *

Automotive Industry Standards Committee

Chairperson	
Mrs. Rashmi Urdhwareshe	Director The Automotive Research Association of India, Pune
Members	**Representing**
Representative from	Ministry of Road Transport and Highways (Dept. of Road Transport and Highways), New Delhi
Representative from	Ministry of Heavy Industries and Public Enterprises (Department of Heavy Industry), New Delhi
Shri S. M. Ahuja	Office of the Development Commissioner, MSME, Ministry of Micro, Small and Medium Enterprises, New Delhi
Shri Shrikant R. Marathe	Former Chairman, AISC
Shri R.R. Singh	Bureau of Indian Standards, New Delhi
Director	Central Institute of Road Transport, Pune
Director	Global Automotive Research Centre
Director	International Centre for Automotive Technology, Manesar
Director	Indian Institute of Petroleum, Dehra Dun
Director	Indian Rubber Manufacturers Research Association
Director	Vehicles Research and Development Establishment, Ahmednagar
Representatives from	Society of Indian Automobile Manufacturers
Shri R. P. Vasudevan	Tractor Manufacturers Association, New Delhi
Shri Uday Harite	Automotive Components Manufacturers Association of India, New Delhi

Member Secretary
Shri Vikram Tandon
Dy. General Manager
The Automotive Research Association of India, Pune

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