INTERNATIONAL STANDARD

ISO 8709

Second edition
2010-04-15

Mopeds — Brakes and brake systems — Tests and measurement methods

Cyclomoteurs — Freins et systèmes de freinage — Méthodes d'essai et de mesure

Reference number
ISO 8709:2010(E)

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 8709 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 23, *Mopeds*.

This second edition cancels and replaces the first edition (ISO 8709:1995), which has been technically revised. It also incorporates the Technical Corrigendum ISO 8709:1995/Cor.1:1998.

Mopeds — Brakes and brake systems — Tests and measurement methods

1 Scope

This International Standard specifies tests and measurement methods for service brake systems and, where applicable, associated parking brake systems of two-wheeled mopeds (3-1) and three-wheeled mopeds (3-2) which are intended for use on public roads, in order to establish uniform worldwide test procedures for braking systems.

This International Standard does not cover mopeds which:

— have a maximum speed of less than 25 km/h;

— are equipped for disabled riders.

This International Standard sets out the following types of tests:

— dynamic tests:

  — dry stop test (single brake control actuated);

  — wet brake test;

— parking brake system test;

— power-assisted brake system failure test.

NOTE The test methods (application, condition of the moped, test procedure and parameters, measurement of performances) for all the tests defined in this International Standard are equivalent to the corresponding test methods prescribed by UNECE Global Technical Regulation No. 3.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 3779, *Road vehicles — Vehicle identification number (VIN) — Content and structure*

ISO 7116, *Mopeds — Measurement method for determining maximum speed*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1 Vehicle categories

NOTE Vehicle categories as defined in this clause correspond to those given in UNECE Special Resolution No. 1.

3.1.1
category 3 vehicle
power driven vehicle with 2 or 3 wheels designed and constructed for the carriage of persons, of goods, or of persons and goods

3.1.1.1
category 3-1 vehicle
two-wheeled moped
two-wheeled vehicle with an engine cylinder capacity not exceeding 50 cm^3 in the case of a thermic engine and a maximum design speed not exceeding 50 km/h, whatever the means of propulsion

3.1.1.2
category 3-2 vehicle
three-wheeled moped
three-wheeled vehicle of any wheel arrangement with an engine cylinder capacity not exceeding 50 cm^3 in the case of a thermic engine and a maximum design speed not exceeding 50 km/h, whatever the means of propulsion

3.2 Brake system and components

3.2.1
brake system
combination of parts (other than the engine), consisting of the control, the transmission(s) and the brake(s), the function of which is progressively to reduce the speed of a moving moped, bring it to a halt and keep it stationary if it is already halted

3.2.2
control
part actuated directly by the rider to supply to the transmission or control the energy required for braking the moped

3.2.3
transmission
combination of components which provide the functional link between the control and the brake

3.2.4
brake
parts of the brake system in which the forces opposing the movement of the moped are developed

3.3 Types of brake systems

3.3.1
service brake system
brake system which is used for slowing the moped when in motion

3.3.1.1
single brake system
service brake system which acts on only one axle

3.3.1.2
combined brake system
CBS
〈two-wheeled mopeds〉 service brake system whereby at least two brakes on different wheels are actuated by the operation of a single control

3.3.1.3
combined brake system
CBS
⟨three-wheeled mopeds⟩ service brake system whereby the brakes on all the wheels are actuated by the operation of a single control

3.3.1.4
secondary brake system
second service brake system on a vehicle equipped with a combined brake system

3.3.2
power-assisted brake system
brake system in which the energy necessary to produce the braking force is supplied by the physical effort of the rider assisted by one or more energy supplying devices

EXAMPLE Vacuum assisted (with vacuum booster).

3.4 Moped loading

NOTE Vehicle masses as defined in this clause correspond to those given in UNECE Special Resolution No. 1.

3.4.1
laden moped
moped laden so as to reach its gross vehicle mass

3.4.2
lightly loaded moped
moped in the condition of mass in running order to which 15 kg are added, in order to account for the test equipment as described in 5.4

3.4.3
gross vehicle mass
maximum mass of the fully laden solo vehicle, based on its construction and design performances, as declared by the manufacturer

3.4.4
mass in running order
sum of unladen vehicle mass and 75 kg, in order to account for the driver's mass

3.4.5
unladen vehicle mass
mass of the vehicle with bodywork and all factory fitted equipment, electrical and auxiliary equipment for normal operation of vehicle, including liquids (fuel tank filled to at least 90 % of the rated capacity and the other liquid containing systems to 100 % of the capacity specified by the manufacturer), tools, fire extinguisher, standard spare parts, chocks and spare wheel, if fitted

3.5 Test parameters

3.5.1
test speed
V
moped speed measured at the moment the rider begins to actuate the brake control(s)

NOTE For tests where simultaneous actuation of two controls is specified, the moped speed is taken from the moment the first control is actuated.

3.5.2
mean fully developed deceleration
MFDD
d_m
average deceleration calculated from the moment the moped reaches 80 % of the test speed until the moment the moped reaches 10 % of the test speed

3.5.3
stopping distance
S
distance travelled by the moped, measured from the moment the rider begins to actuate the braking system control until the moment the moped comes to a stop

NOTE For tests where simultaneous actuation of two controls is specified, the distance travelled is taken from the moment the first control is actuated.

3.6
baseline test
stop or series of stops carried out in order to confirm the performance of the brake prior to subjecting it to a further test, such as the heating procedure or wet brake stop

3.7
engine disconnected
condition when the engine is no longer connected to the driving wheel(s)

3.8
initial brake temperature
temperature of the hottest brake before any brake application

3.9
maximum speed
V_{max}
speed which the moped can attain when tested in accordance with ISO 7116

3.10
peak braking coefficient
PBC
measure of tyre to road surface friction based on the maximum deceleration of a rolling tyre

3.11
wheel lock
condition that occurs when there is a slip ratio of 1,00

4 Test site conditions

4.1 Test surface

The test surface for dynamic tests shall be clean, dry and substantially level (i.e. it shall not have a gradient in excess of 1 %). The surface shall afford good adhesion, i.e. it shall have a nominal peak braking coefficient (PBC) of 0,9, unless otherwise specified.

The parking brake system test is conducted on a specified gradient. The specified test slope shall have a clean and dry surface that does not deform under the weight of the moped.

4.2 Wind speed

The average wind speed shall not exceed 5 m/s.

4.3 Ambient temperature

The ambient temperature shall be between 4 °C and 45 °C.

4.4 Test lane for dynamic tests

The test area immediately after the point at which the test is to commence shall be marked with a lane of sufficient length for the moped to be brought to a stop.

In the case of two-wheeled mopeds (3-1), this lane shall be 2,5 m wide. In the case of three-wheeled mopeds (3-2), this lane shall have a width of 2,5 m plus the moped width.

5 Moped preparation

5.1 Tyres

The tyres shall be inflated to the moped manufacturer's recommended pressure levels as appropriate to the vehicle loading condition for the test.

5.2 Engine idle speed

The engine idle speed shall be set to the moped manufacturer's specification.

5.3 Mass distribution

The mass distribution on the axles for laden moped tests shall be in accordance with the moped manufacturer's specifications and shall be noted in the test report.

5.4 Instrumentation

The moped shall be prepared for the tests specified in Table 1 by the provision, the calibration, or the provision and calibration of existing instruments, as required.

Optional instruments may be added to provide data, but care shall be taken to ensure that no equipment significantly affects the brake system performance or the dynamic characteristics of the moped.

Table 1 — Test sequence and related instrumentation

Test	Parameter (to measure/calculate)		Example of instrument
	Obligatory	**Optional**	
0. Burnishing procedure[a]	Speed		Calibrated speedometer, photoelectronic measuring systems
	Brake temperature		Rubbing thermocouple, embedded thermocouple
	Moped mass		Load cells, weighbridge
	Deceleration		Motometer, third wheel, recording deceleration meter

Table 1 (*continued*)

Test	Parameter (to measure/calculate)		Example of instrument
	Obligatory	**Optional**	
1. Dry stop test (single brake control actuated)	Speed		Calibrated speedometer, photoelectronic measuring systems
	Brake temperature		Rubbing thermocouple, embedded thermocouple
	Control force		Force meter
	Stopping distance or MFDD (see 6.9.2)		Chalk-pellet gun, third wheel, ink jet marker Motometer, third wheel, recording deceleration meter
	Moped mass		Load cells, weighbridge
		Force in transmission	Hydraulic pressure transducer, cable tension transducer
		Control travel	Linear potentiometer
2. Wet brake test[a]	Speed		Calibrated speedometer, photoelectronic measuring systems
	Brake temperature		Rubbing thermocouple, embedded thermocouple
	Control force		Force meter
	Moped mass		Load cells, weighbridge
	Deceleration throughout braking stop		Motometer, third wheel, recording deceleration meter
	Distance		Third wheel
		Force in transmission	Hydraulic pressure transducer, cable tension transducer
		Control travel	Linear potentiometer
3. Parking brake system test	Time		Stopwatch
	Control force		Force meter
	Moped mass		Load cells, weighbridge
	Brake temperature		Rubbing thermocouple, embedded thermocouple
		Control travel	Linear potentiometer
4. Power-assisted brake system failure test	Speed		Calibrated speedometer, photoelectronic measuring systems
	Brake temperature		Rubbing thermocouple, embedded thermocouple
	Control force		Force meter
	Stopping distance or MFDD (see 6.9.2)		Chalk-pellet gun, third wheel, ink jet marker Motometer, third wheel, recording deceleration meter
	Moped mass		Load cells, weighbridge
		Force in transmission	Hydraulic pressure transducer, cable tension transducer
		Control travel	Linear potentiometer

[a] Where this test result depends on the analysis of a deceleration trace provided by a recording system, the system shall have damping and frequency-response characteristics, such that the behaviour of the moped under braking is faithfully reproduced.

5.5 Burnishing

5.5.1 General

Prior to submitting a moped for tests, the moped brakes shall be burnished. This procedure may be completed by the moped's manufacturer.

5.5.2 Moped condition

The moped condition shall be as follows:

a) moped lightly loaded;

b) engine disconnected.

NOTE If the mass of the lightly loaded moped exceeds the mass of the laden moped, the laden condition is used for the purposes of this subclause.

5.5.3 Procedure

The test procedure shall be as described below.

a) Test speed:

— initial speed: 50 km/h or 0,8 V_{max}, whichever is lower;

— final speed: 5 km/h to 10 km/h.

b) Brake application: each service brake system control actuated separately.

c) Moped deceleration:

— single front brake system only: between 3,0 m/s^2 and 3,5 m/s^2;

— single rear brake system only: between 1,5 m/s^2 and 2,0 m/s^2;

— CBS: between 3,5 m/s^2 and 4,0 m/s^2.

d) Number of decelerations: 100 per brake system.

e) Initial brake temperature before each brake application: $\leqslant$ 100 °C.

f) For the first stop, accelerate the moped to the initial speed and then actuate the brake control under the conditions specified until the final speed is reached. Then, reaccelerate to the initial speed and maintain that speed until the brake temperature falls to the specified initial value. When these conditions are met, reapply the brake as specified. Repeat this procedure for the number of specified decelerations. After burnishing, adjust the brakes in accordance with the moped manufacturer's recommendations.

6 Test requirements

6.1 Brakes

Brakes and brake systems shall not be adjusted at any time during the dynamic tests.

After the tests, the components of the brake system shall be examined for signs of damage, permanent distortion, friction material detachment and brake fluid leakage.

6.2 Brake temperature measurement

The brake temperature shall be measured at approximately the centre of the braking path of the disc or drum using:

a) a rubbing thermocouple that is in contact with the surface of the disc or drum; or

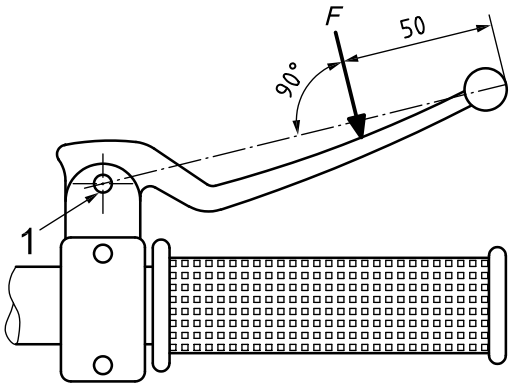
b) a thermocouple that is embedded in the friction material.

6.3 Application of control forces

The control forces shall be applied rapidly, up to the prescribed level, and then maintained constant during the stop.

For a hand control lever, the input force, F, is applied on the control lever's forward surface, perpendicular to the axis between the central axis of the lever fulcrum and its outermost point, on the plane along which the control lever rotates (see Figure 1).

Dimensions in millimetres



Key

1 lever fulcrum

F input force

Figure 1 — Force application for hand control levers

The input force is applied to a point located 50 mm from the outermost point of the control lever, measured along the axis between the central axis of the fulcrum of the lever and its outermost point.

For a foot control pedal, the input force is applied to the centre of the control pedal, at right angles.

6.4 Test sequence

The mopeds may be subjected to either an individual test or a complete series of tests. When the complete series of tests is conducted, the test sequence given in Table 1 should be followed for subsequent tests in order to obtain repeatability.

6.5 Rider

During every dynamic test, the rider shall be seated on the saddle as for normal driving and shall maintain the same position throughout the test run.

6.6 Automatic transmission

Mopeds with automatic transmission shall complete all tests, whether they are for “engine connected” or “engine disconnected”.

If an automatic transmission has a neutral position, the neutral position shall be selected for tests where “engine disconnected” is specified.

6.7 Moped position and wheel lock

The moped shall be positioned in the centre of the test lane for the beginning of each stop.

Stops shall be made without the moped wheels passing outside the applicable test lane and without wheel lock.

6.8 Test speed tolerance

The speeds specified are subject to a tolerance of ± 5 km/h.

6.9 Measurement of dynamic performance

6.9.1 General

The method used to measure performance is as specified in the respective tests in Clause 7. The three different ways in which the service brake system performance may be measured are described in 6.9.2 to 6.9.4.

6.9.2 Mean fully developed deceleration (MFDD)

The mean fully developed deceleration (MFDD), d_m, expressed in m/s^2, shall be calculated using Equation (1):

$$d_m = \frac{v_b^2 - v_e^2}{25{,}92 \cdot (S_e - S_b)} \tag{1}$$

where

v_b is the moped speed at 0,8 V, in km/h;

v_e is the moped speed at 0,1 V, in km/h;

V is the moped speed when the rider actuates the control, in km/h;

S_b is the distance travelled between V and v_b, in m;

S_e is the distance travelled between V and v_e, in m.

6.9.3 Stopping distance

The stopping distance, S, is expressed in metres.

To calculate the corrected stopping distance, S_s, expressed in metres, using the actual moped speed, provided that the test speed tolerance (see 6.8) is not exceeded, Equation (2) shall be used.

$$S_s = 0{,}1 \cdot V_s + (S_a - 0{,}1 \cdot V_a) \cdot \frac{V_s^2}{V_a^2} \tag{2}$$

where

V_s is the specified moped test speed, in km/h;

S_a is the actual stopping distance, in m;

V_a is the actual moped test speed, in km/h.

6.9.4 Continuous deceleration recording

For the burnishing procedure and the wet brake test, there is a continuous recording of the vehicle instantaneous deceleration from the moment a force is applied to the brake control until the end of the stop.

6.10 Test report

The following information shall be recorded in the relevant test report(s) (see Annex A):

a) the test condition details (e.g. speeds, control forces, ambient conditions, vehicle identification, moped loading conditions, relevant tyre information);

b) the results of each test (e.g. mean fully developed deceleration, stopping distance, residual performance);

c) the sequence in which the tests were performed, where applicable;

d) any deviation of the vehicle from its course, any abnormal vibration, noise, behaviour, etc.

7 Test procedures

7.1 Dry stop test (single brake control actuated)

7.1.1 General

The test is applicable to all moped categories.

7.1.2 Moped condition

The moped condition shall be as follows:

a) moped laden;

b) for mopeds fitted with CBS, the moped is tested in the lightly loaded condition in addition to the laden condition;

c) engine disconnected.

NOTE No additional test is needed for mopeds fitted with CBS if the mass of the lightly loaded moped exceeds the mass of the laden moped.

7.1.3 Test conditions and procedure

The test conditions and procedure shall be as described below.

a) Initial brake temperature: $\geqslant$ 55 °C and $\leqslant$ 100 °C.

b) Test speed: 0,9 V_{max}.

c) Brake application: each service brake system control actuated separately.

d) Brake actuation force:

— hand control: $\leqslant$ 200 N;

— foot control: $\leqslant$ 350 N.

e) Number of stops: a maximum of six stops for each control.

f) For each stop, accelerate the moped to the test speed and then actuate the brake control under the conditions specified above.

7.1.4 Performance measurement

For each stop and each control (see 7.1.3) and for each moped loading condition (see 7.1.2), the mean fully developed deceleration or stopping distance shall be measured and recorded.

7.2 Wet brake test

7.2.1 General

The test is comprised of two parts that are carried out consecutively for each brake system:

— a baseline test based on the dry stop test with single brake control actuated (see 7.1);

— a single wet brake stop using the same test parameters as the baseline test, but with the brake(s) being continuously sprayed with water while the test is conducted, in order to measure the brakes' performance in wet conditions.

The test is applicable to all moped categories.

The test is not applicable to the parking brake system unless this acts as the secondary brake system.

Drum brakes or fully enclosed disc brakes are exempt from this test unless ventilation or open inspection ports are present.

This test requires the moped to be fitted with instrumentation that gives a continuous recording of brake control force and vehicle deceleration. The MFDD and the stopping distance measurements are not appropriate in this case.

7.2.2 Moped condition

The moped condition shall be as follows:

a) moped laden;

b) for mopeds fitted with CBS, the moped is tested in the lightly loaded condition in addition to the laden condition;

c) engine disconnected;

d) each brake is fitted with water spray equipment:

— for disc brakes, the water spray equipment is installed as follows (see Figure 2):

i) water is sprayed onto each brake with a flow rate of 15 l/h; the water is equally distributed on each side of the rotor;

ii) if the surface of the rotor has any shielding, the spray is applied 45 ° prior to the shield;

iii) if it is not possible to locate the spray in the position shown in Figure 2, or if the spray coincides with a brake ventilation hole or similar, the spray nozzle may be advanced by an additional 90 ° maximum from the edge of the pad, using the same radius;

— for drum brakes with ventilation and open inspection ports, the water spray equipment is installed as follows:

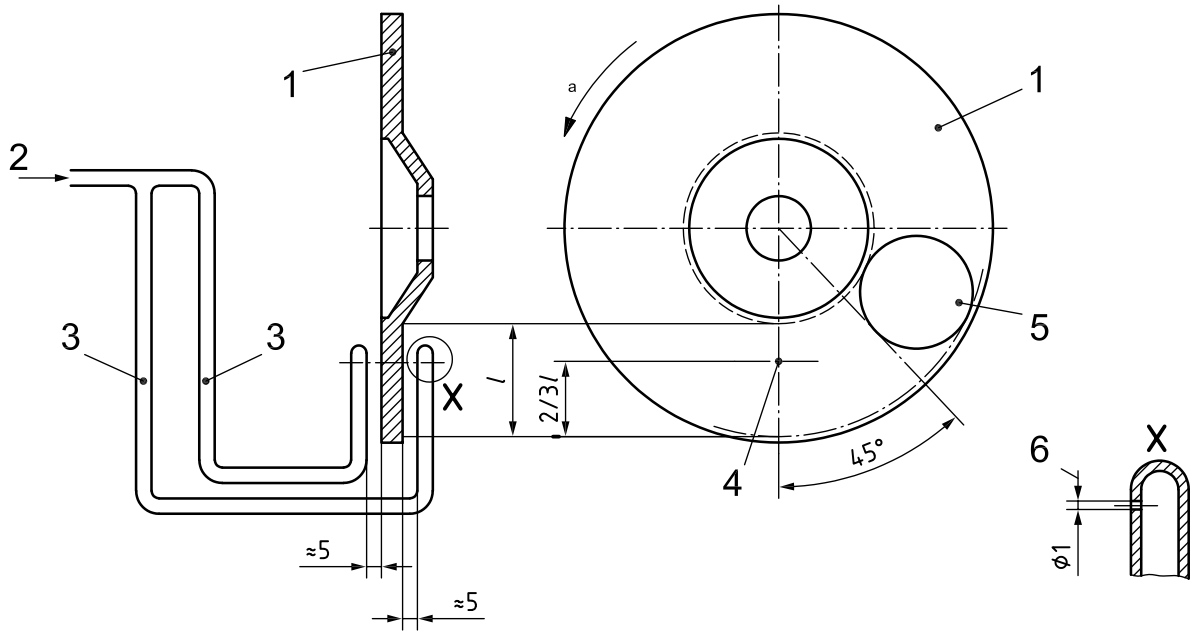
i) water is sprayed equally onto both sides of the drum brake assembly (on the stationary back plate and on the rotating drum) with a flow rate of 15 l/h;

ii) the spray nozzles are positioned two-thirds of the distance from the outer circumference of the rotating drum to the wheel hub centre;

iii) the nozzle position is > 15 ° from the edge of any opening in the drum back plate.

NOTE No additional test is needed for mopeds fitted with CBS if the mass of the lightly loaded moped exceeds the mass of the laden moped.

Dimensions in millimetres



Key

1 disc
2 from water tank
3 spray pipe
4 measurement at spray point (2/3 *l* from outer circumference)
5 pad
6 spray hole
l depth of the friction surface

a Direction of disc rotation.

Figure 2 — Water spray equipment for disc brakes

7.2.3 Test conditions and procedure

7.2.3.1 Baseline test

For the baseline test, the test conditions and procedure shall be as described below.

a) The test specified in 7.1 (dry stop test with single brake control actuated) is carried out for each brake system, but with the brake control force that results in a moped deceleration of between 2,5 m/s^2 and 3,0 m/s^2, and the following is determined:

   — the average brake control force measured when the moped is travelling between 80 % and 10 % of the specified test speed;

   — the average moped deceleration in the period 0,5 s to 1,0 s after the moment of actuation of the brake control;

   — the maximum moped deceleration during the complete stop but excluding the final 0,5 s.

b) Conduct three baseline stops and average the values obtained under bullet a) above.

7.2.3.2 Wet brake stop

For the wet brake stop, the test conditions and procedure shall be as described below.

a) The moped is ridden at the test speed used in the baseline test set out in 7.2.3.1 with the water spray equipment operating on the brake(s) to be tested and with no application of the brake system.

b) After a distance of not less than 500 m, apply the average brake control force determined in the baseline test for the brake system being tested.

c) Measure the average moped deceleration in the period 0,5 s to 1,0 s after the moment of actuation of the brake control.

d) Measure the maximum moped deceleration during the complete stop, but excluding the final 0,5 s.

7.2.4 Performance measurement

The performance of the moped shall be assessed in terms of deceleration achieved in the period of 0,5 s to 1,0 s after control application for both the baseline test and the wet brake stop, recording the average deceleration achieved for each stop and each control (see 7.2.3) and for each moped loading condition (see 7.2.2). In addition, the maximum decelerations achieved during the complete stops, but excluding the final 0,5 s, shall be recorded for each stop and each control (see 7.2.3) and for each moped loading condition (see 7.2.2).

The performance of a moped with one or more wet brakes shall be expressed as a percentage of its performance with one or more dry brakes, using the average decelerations recorded above.

The maximum deceleration of a moped with one or more wet brakes shall be expressed as a percentage of its maximum deceleration with one or more dry brakes, using the maximum decelerations recorded above.

7.3 Parking brake system test

7.3.1 General

The test is applicable to moped category 3-2.

7.3.2 Moped condition

The moped condition shall be as follows:

a) moped laden;

b) engine disconnected.

7.3.3 Test conditions and procedure

The test conditions and procedure shall be as described below.

a) Initial brake temperature: $\leqslant$ 100 °C.

b) Test surface gradient: 18 %.

c) Brake actuation force:

— hand control: $\leqslant$ 400 N;

— foot control: $\leqslant$ 500 N.

d) For the first part of the test, park the moped on the test surface slope facing up the gradient by applying the parking brake system under the conditions specified above. If the moped remains stationary, start the measurement of the test period.

e) On completion of the test with the moped facing up the gradient, repeat the same test procedure with the moped facing down the gradient.

7.3.4 Performance measurement

During the test, observe the behaviour of the moped, both facing up and facing down the gradient (see 7.3.3), and record it in the test report.

The performance of the parking brake system shall be assessed in terms of its ability to hold the moped stationary for 5 min when the moped is both facing up and facing down the gradient.

7.4 Power-assisted brake system failure test

7.4.1 General

The test is applicable to all moped categories.

The test is only applicable to mopeds which are equipped with power-assisted brake systems.

The test is not conducted when the moped is equipped with another separate service brake system.

The test is to confirm the performance of the service brake system in the event of failure of the power assistance.

7.4.2 Test conditions and procedure

Carry out the dry stop test with single brake control actuated, as specified in 7.1, for each service brake system, with the power assistance disabled.

7.4.3 Performance measurement

For each stop (see 7.1.3) and for each moped loading condition (see 7.1.2), the mean fully developed deceleration or stopping distance shall be measured and recorded.

If the power assistance can be activated by more than one control, the above-mentioned performances shall be measured and recorded when each control is actuated separately.

Annex A
(normative)

Specimen format for test result sheet

Report No.: .....

A.1 Test moped

Manufacturer: .....

Model: ..... Year: .....

Category (e.g. 3-1): ..... VIN (see ISO 3779): .....

Submitted by: .....

Engine type: ..... Capacity: ..... cm^3

Power rating: .....

No. of gears and selection means: .....

Maximum speed (ISO 7116): ..... km/h

A.2 Brake details

	Front	**Rear**
Brake type:	.....	.....
Transmission type:	.....	.....
Brake size:	.....	.....
Friction material (make and type):	.....	.....
Disc/drum material:	.....	.....
Disc/drum treatment (holes, slots, plating, etc.):	.....	.....

Brake system layout: .....

Special features: .....

A.3 Tyre details

	Front	**Rear**
Manufacturer:	.....	.....
Size:	.....	.....
Rating:	.....	.....
Type:	.....	.....
Pressure laden:	.....	.....
Pressure lightly loaded:	.....	.....

A.4 Test masses

Test rider: ..... kg

Equipment and instrumentation: ..... kg

Lightly loaded:	Total: ..... kg	Front: ..... kg	Rear: ..... kg
Laden:	Total: ..... kg	Front: ..... kg	Rear: ..... kg

A.5 Test equipment

Test equipment and instrumentation fitted: .....

Odometer reading, where fitted:

— start: .....

— finish: .....

— total: .....

A.6 Test conditions

Test date: .....

Rider's name (optional): .....

Observer's name (optional): .....

Test site: .....

Ambient temperature: ..... °C

Wind speed: ..... m/s

Other weather conditions: .....

Road surface and condition: .....

Name of test organization: .....

Date(s) of tests: .....

Date of report: .....

A.7 Dry stop test results (single brake control actuated)

Test No.: .....

Test date: .....

Odometer reading at start: .....

Moped condition (delete whichever is not applicable)

Loading: laden/lightly loaded

Control used: hand/foot

Braked wheel(s): front wheel(s)/rear wheel(s)/all

Gear selected: ..... (for automatic transmission)

Other conditions: .....

Stop No.	Test speed		Measured performance[a]			Control force	Remarks
	V_s km/h	V_a km/h	d_m m/s^2	S_a m	S_s m	N	

V_s is the specified test speed

V_a is the actual test speed

d_m is the mean fully developed deceleration

S_a is the actual stopping distance

S_s is the corrected stopping distance

[a] Performance is measured in terms of d_m or S_a, S_s.

A.8 Wet brake test results

Test No.: .....

Test date: .....

Odometer reading at start: .....

Moped condition (delete whichever is not applicable)

Loading: laden/lightly loaded

Control used: hand/foot

Braked wheel(s): front wheel(s)/rear wheel(s)/all

Gear selected: ..... (for automatic transmission)

Other conditions: .....

Condition	Stop No.	Test speed		Measured performance	Maximum deceleration	Average brake control force	Remarks
		V_s km/h	V_a km/h	a_m m/s^2	a_{max} m/s^2	N	
Dry brake							Test at between 2,5 m/s^2 and 3,0 m/s^2
Wet brake							Test at same control force as above

V_s is the specified test speed

V_a is the actual test speed

a_m is the average deceleration in the period 0,5 s to 1,0 s after control application

a_{max} is the maximum deceleration during the complete stop but excluding the final 0,5 s

Wet brake performance assessment:

$$\frac{a_{\mathrm{m}}(\mathrm{wet})}{a_{\mathrm{m}}(\mathrm{dry})}$$

and

$$\frac{a_{\mathrm{max}}(\mathrm{wet})}{a_{\mathrm{max}}(\mathrm{dry})}$$

A.9 Parking brake system test results

Test No.: .....

Test date: .....

Odometer reading at start: .....

Moped condition (delete whichever is not applicable)

Loading: laden

Control used: hand/foot

Condition	Control force N	Observed moped behaviour (e.g. elapsed time on the slope)
Moped facing up gradient		
Moped facing down gradient		

Other remarks: .....

.....

.....

A.10 Power-assisted braking system failure test results

Test No.: .....

Test date: .....

Odometer reading at start: .....

Moped condition (delete whichever is not applicable)

Loading: laden/lightly loaded

Control used: hand/foot

Braked wheel(s): front wheel(s)/rear wheel(s)/all

Gear selected: ..... (for automatic transmission)

Other conditions: .....

Stop No.	Test speed		Measured performance[a]			Control force	Remarks
	V_s km/h	V_a km/h	d_m m/s^2	S_a m	S_s m	N	

V_s is the specified test speed

V_a is the actual test speed

d_m is the mean fully developed deceleration

S_a is the actual stopping distance

S_s is the corrected stopping distance

[a] Performance is measured in terms of d_m or S_a, S_s.

Bibliography

[1] UNECE Global Technical Regulation No. 3, *Motorcycle brake systems*

[2] UNECE Special Resolution No. 1 *Concerning the common definitions of vehicle categories, masses and dimensions (S.R. 1)*

ICS 43.140

Price based on 21 pages