

INTERNATIONAL STANDARD

**ISO
6970**

First edition
1994-10-15

Motorcycles and mopeds — Pollution tests — Chassis dynamometer bench

*Motocycles et cyclomoteurs — Essais concernant la pollution — Banc
d'essai dynamométrique*



Reference number
ISO 6970:1994(E)



Documents
Document Sharing Hub

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.

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.

International Standard ISO 6970 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 23, *Mopeds*.

This first edition of ISO 6970 cancels and replaces ISO/TR 6970:1981, of which it constitutes a revision.

Annex A forms an integral part of this International Standard.

© ISO 1994

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

International Organization for Standardization
Case Postale 56 • CH-1211 Genève 20 • Switzerland

Printed in Switzerland

Motorcycles and mopeds — Pollution tests — Chassis dynamometer bench

1 Scope

This International Standard specifies the performance of a universal chassis dynamometer bench and a simplified bench, with a single roller, for laboratory tests on mopeds and motorcycles. It also gives the design characteristics of a bench.

The bench is used to check exhaust gas emissions from mopeds and motorcycles, as defined in ISO 3833, by tests carried out in accordance with ISO 6460 and ISO 6855.

NOTE 1 In this International Standard, to simulate the vehicle mass on the road, the moment of inertia of the masses added on the test bench is equivalent to the vehicle inertia on the road.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 3833:1977, *Road vehicles — Types — Terms and definitions*.

ISO 6460:1981, *Road vehicles — Measurement method of gaseous pollutants emitted by motorcycles equipped with a controlled ignition engine*.

ISO 6855:1983, *Road vehicles — Measurement methods for gaseous pollutants emitted by mopeds equipped with a controlled ignition engine*.

3 General characteristics

The bench shall permit the operation of a vehicle on a level road to be simulated at speeds between 0 and 100 km/h. It consists essentially of the following.

3.1 Inertia simulation system which permits the effects of the mass of the vehicle being tested to be reproduced.

3.2 Device for power absorption (brake) which reproduces the aerodynamic resistance which the vehicle meets on the road.

3.3 Cooling system situated in front of the vehicle, which directs a cooling air stream onto the engine to cool it, in a manner similar to normal road usage.

4 Bench performance

4.1 General

The power absorbed by the bench shall be approximately equal to the power necessary to propel the vehicle at a steady speed on a level road.

4.2 Power absorption curves

The power P required to propel the vehicle on the road may be represented by the equation:

$$P = Av^3 + Bv + mv \frac{dv}{dt}$$

where

v is the speed of the vehicle;

A and B are the dimensional constants which are functions of the characteristics of the vehicle and its rider;

m	is the reference mass of the vehicle;
$\frac{dv}{dt}$	is the acceleration of the vehicle;
Av^3	corresponds to the power absorbed by the aerodynamic resistance;
Bv	corresponds to the power absorbed by the rolling resistance;
$mv \frac{dv}{dt}$	corresponds to the power absorbed by the resistance due to the mass of the vehicle.

4.2.1 Simulation of aerodynamic resistance, Av^3

The power absorbed by the brake shall be equal to the power necessary to overcome the aerodynamic resistance which the vehicle meets on the road. It may be assumed that this condition is satisfied when the power P_a absorbed by the brake, including the internal friction of the bench, is as follows:

— for speeds up to and including 12 km/h:

$$0 \leq P_a \leq kv_{12}^3 + 0,05kv_{12}^3 + 0,05P_{v_{50}}$$

— for speeds exceeding 12 km/h (where the result cannot be negative):

$$P_a = kv^3 \pm 0,05kv^3 \pm 0,05P_{v_{50}}$$

4.2.2 Simulation of rolling resistance, Bv

With a roller of suitable diameter, the power lost by contact between the tyre and roller shall be equal to the power lost by the contact between the tyres and road. It may be assumed that this condition is satisfied by the use of a bench incorporating a roller with a diameter of 400 mm $^{+20}_0$ mm with a smooth metallic surface.

A roller with a different diameter may be used on condition that it can be shown that the results obtained are equivalent to those obtained with the roller defined above.

4.2.3 Simulation of mass, $mv \frac{dv}{dt}$

To simulate the mass of the vehicle on the road during the acceleration and deceleration phases, the rotating parts of the bench shall have an inertia equivalent to that of the vehicle in the conditions prescribed for the test.

The equivalent inertia is the mass which, bearing on the periphery of the roller, produces a moment of in-

ertia in relation to the axis of rotation of the roller equal to the rotation inertia masses of the bench.

This result shall be obtained by adding the basic inertia of the bench to the additional masses of inertia.

The basic inertia of the bench shall be equal to 100 kg.

With the additional masses, the inertia may be varied between 100 kg and 410 kg, in steps of 10 kg.

These inertias shall be measured and recorded within ± 3 kg.

Other devices may be used on condition that it can be shown that the results obtained are equivalent.

4.3 Measurement of distance covered

The bench shall be equipped with a device to measure the distance covered by the vehicle driven wheel during the test. This measurement shall be made within the limits of ± 2 m.

4.4 Measurement of speed

The linear speed of the roller shall be measured within ± 1 km/h for speeds above 10 km/h.

5 Performance of cooling system

5.1 Linear speed of cooling air stream

The linear speed of the cooling air stream produced by the system, measured at the centre of the air stream, at 20 cm from the outlet of the cooling system, shall be in accordance with table 1.

Table 1 — Speed of air stream

Type of bench	Roller speed v_R km/h	Air speed v_a km/h
Universal bench	$v_R \leq 10$	$0 \leq v_a \leq 15$
	$v_R > 10$	$v_R \pm 5$
Simplified bench	for every speed	25 ± 5

5.2 Dimension of cooling system outlet

The outlet air stream shall have a section at least 0,4 m².