

Mopeds - Methods for setting the running resistance on a chassis dynamometer

ICS 43.140

National foreword

This British Standard is the UK implementation of ISO 28981:2009+A1:2015. It supersedes BS ISO 28981:2009, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee AUE/14, Motor cycles and mopeds.

A list of organizations represented on this committee can be obtained on request to its secretary.

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This British Standard was published under the authority of the Standards Policy and Strategy Committee on 30 November 2009

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ISBN 978 0 580 85222 0

Amendments/corrigenda issued since publication

Date	Comments
31 January 2016	Implementation of ISO amendment 1:2015: Clause 7.2, paragraph 3 updated

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*Cyclomoteurs — Méthodes pour fixer la résistance à l'avancement sur
un banc dynamométrique*



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Published in Switzerland

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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.

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ISO 28981 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 23, *Mopeds*.

Introduction

This International Standard is based on ISO 11486:2006^[6], which specifies the measurement method(s) for determining motorcycle running resistance on the road, but adapted to the different vehicle category of mopeds. The most significant difference between this International Standard and ISO 11486:2006^[6] is that use of chassis dynamometers with a fixed load curve is permitted and a specific verification method is specified.

Mopeds — Methods for setting the running resistance on a chassis dynamometer

1 Scope

This International Standard specifies the measurement method for determining the moped running resistance on the road, and two methods of setting the chassis dynamometer with the moped running resistance. It is applicable to mopeds as defined in ISO 3833.

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 3833, *Road vehicles — Types — Terms and definitions*

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

3 Terms and definitions

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

3.1 running resistance

F

total force resistant to a running moped which, when measured by the coastdown method, includes the friction forces in the drive-train

3.2 reference speed

v_0

moped speed at which the running resistance of the moped is calculated and then used for setting the chassis dynamometer

3.3 specified speed

v

moped speed at which the running resistance on the road is measured to determine the running resistance curve

3.4 moped kerb mass

m_k

moped dry mass to which is added the mass of the following:

— fuel: tank filled at least to 90 % of the capacity specified by the manufacturer;

- oils and coolant: filled as specified by the manufacturer;
- auxiliary equipment usually supplied by the manufacturer in addition to that necessary for normal operation [tool-kit, carrier(s), windscreen(s), protective equipment, etc.]

3.5 moped reference mass

m_{ref}

kerb mass of the moped increased by a uniform figure of 75 kg which represents the mass of a rider

4 Symbols

For the purposes of this document, the symbols in Table 1 apply.

Table 1 — Symbols

Symbols	Definition	Unit
a	The coefficient of polygonal function	—
b	The coefficient of polygonal function	—
c	The coefficient of polygonal function	—
a_T	The rolling resistance force of front wheel	N
b_T	The coefficient of aerodynamic	N/(km/h) ²
d_T	The relative air density under test conditions	—
d_0	The standard ambient relative air density	—
F	The running resistance force	N
F_E	The set running resistance force on the chassis dynamometer	N
$F_E(v_0)$	The set running resistance force at the reference speed on the chassis dynamometer	N
$F_E(v_i)$	The set running resistance force at the specified speed on the chassis dynamometer	N
F_f	The total friction loss	N
$F_f(v_0)$	The total friction loss at the reference speed	N
F_j	The running resistance force	N
$F_j(v_0)$	The running resistance force at the reference speed	N
F_{pau}	The braking force of the power absorbing unit	N
$F_{\text{pau}}(v_j)$	The braking force of the power absorbing unit at the specified speed	N
$F_{\text{pau}}(v_0)$	The braking force of the power absorbing unit at the reference speed	N
F_T	The running resistance force obtained from the running resistance table	N
F^*	The target running resistance force	N
F_j^*	The target running resistance force at the specified speed	N
$F^*(v_0)$	The target running resistance force at the reference speed on the chassis dynamometer	N
$F^*(v_i)$	The target running resistance force at the specified speed on the chassis dynamometer	N
f_0	The rolling resistance	N
f_0^*	The corrected rolling resistance in the standard ambient conditions	N
f_2	The coefficient of aerodynamic drag	N/(km/h) ²
f_2^*	The corrected coefficient of aerodynamic drag in the standard ambient conditions	N/(km/h) ²
K_0	The temperature correction factor for rolling resistance	—

Table 1 (continued)

Symbols	Definition	Unit
m	The test moped mass	kg
m_a	The actual mass of the test moped	kg
m_i	The equivalent inertia mass	kg
m_{fi}	The flywheel equivalent inertia mass	kg
m_k	The moped kerb mass	kg
m_r	The equivalent inertia mass of all the wheels	kg
m_{ref}	The moped reference mass	kg
m_{rid}	The rider mass	kg
m_{rf}	The rotating mass of the front wheel	kg
m_{r1}	The equivalent inertia mass of the rear wheel and the moped parts rotating with the wheel	kg
p_0	The standard ambient pressure	kPa
p_T	The mean ambient pressure during the test	kPa
T_T	The mean ambient temperature during the test	K
T_0	The standard ambient temperature	K
v	The specified speed	km/h
v_j	The specified speeds which are selected for coastdown time measurement	km/h
v_0	The reference speed	km/h
v_1	The speed at which the measurement of the coastdown time begins	km/h
v_2	The speed at which the measurement of the coastdown time ends	km/h
ΔT_E	The corrected coastdown time at the inertia mass ($m_i + m_{r1}$)	s
ΔT_i	The average coastdown time at the specified speed	s
ΔT_j	The average coastdown time of the two tests	s
ΔT_{road}	The target coastdown time	s
Δt	The coastdown time	s
$\overline{\Delta t}$	The mean coastdown time on the chassis dynamometer without absorption	s
Δt_E	The mean coastdown time on the chassis dynamometer at the reference speed	s
Δt_{ai}	The coastdown time measured during the first road test	s
Δt_{bi}	The coastdown time measured during the second road test	s
Δt_i	The coastdown time corresponding to the reference speed	s
Δv	The coastdown speed interval ($2\Delta v = v_1 - v_2$)	km/h
ε	The chassis dynamometer setting error	—
ρ_0	The standard relative ambient air volumetric mass	kg/m ³

5 Test moped, chassis dynamometer and instruments

A full description of the moped shall be provided in accordance with Annex A.

A full description of the chassis dynamometer and instruments shall be provided in accordance with Annex B.