
Road vehicles — Braking threshold pressures for heavy commercial vehicle combinations with fully pneumatic braking systems — Test with roller brake tester

Véhicules routiers — Seuil de pressions de freinage pour les ensembles routiers lourds à systèmes de freinage uniquement pneumatiques — Essais sur banc d'essai à rouleaux



PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

STANDARDSISO.COM : Click to view the full PDF of ISO 20918:2007



COPYRIGHT PROTECTED DOCUMENT

© ISO 2007

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 either ISO at the address below or ISO's member body in the country of the requester.

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	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 System threshold pressure recommendation	2
5 Apparatus	2
6 Procedure	3
6.1 General	3
6.2 Vehicle test for truck and semi-trailer tractor	3
6.3 Vehicle test for trailer	4
Annex A (informative) Report form for the roller brake test if printouts not available	5
Annex B (informative) Examples of roller brake test printouts for the measurement of system threshold pressure	6
Bibliography	8

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 20918 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 2, *Braking systems and equipment*.

STANDARDSISO.COM : Click to view the full PDF of ISO 20918:2007

Introduction

The braking performance compatibility between motor vehicles and trailers is governed by the compatibility bands contained in ECE Council Directive 71/320/EEC, Annex II (including ECE Commission Directive 75/524/EEC) and ECE Regulation No.13, Annex 10, and by brake force development requirements contained in ECE Regulation No.13, Annex 10. The purpose of these compatibility bands is to maintain the stability of a vehicle combination in all braking conditions, while the brake force development requirements are to provide a minimum standard regarding wear balance at low braking pressure.

The compatibility between motor vehicles and trailers relates not only to stability, but also to wear balance, or rather, to wear optimization.

Wear optimization and low adhesion utilization requires good braking balance between axles in the pressure range up to 200 kPa¹⁾. This improvement in balance is achieved by minimizing the variation in pressure when all brakes start to develop a braking force.

This International Standard provides a best practice for determining the threshold pressure at which a brake starts to develop a braking force. It is applicable to all vehicles equipped with a conventional braking system and to trailers equipped with an electronic braking system (EBS) when used in conjunction with conventional equipped vehicles, the connector being connected in accordance with ISO 7638.

For EBS equipped motor vehicles, it is intended that the default values for the threshold pressure values of the EBS system comply with this International Standard as a minimum requirement. For EBS equipped vehicles, it is advisable that the vehicle/system manufacturer's manual be followed in order to obtain the appropriate threshold values.

1) 100 kPa = 1 bar.

STANDARDSISO.COM : Click to view the full PDF of ISO 20918:2007

Road vehicles — Braking threshold pressures for heavy commercial vehicle combinations with fully pneumatic braking systems — Test with roller brake tester

1 Scope

This International Standard describes a method to evaluate the braking threshold of heavy commercial vehicle combinations with pneumatic braking systems, by means of a roller brake tester.

This International Standard describes procedures for workshops and garages and provides

- a recommended pressure range of the system threshold pressure for motor vehicles and trailers, and
- a recommended practice for determining the system threshold pressure.

NOTE Motor vehicles and trailer combinations with conventional braking systems are covered by the procedures given in this International Standard. Motor vehicles with a conventional braking system coupled to an EBS equipped trailer can also be tested using the procedure given in this International Standard, as the pneumatic control line is used.

This International Standard covers neither high-pressure compatibility, including the control of the coefficient of friction between lining/pad and drum/disc, nor dynamic influences. This International Standard is not for use at Type Approval.

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 611, *Road vehicles — Braking of automotive vehicles and their trailers — Vocabulary*

ISO 21069-1, *Road vehicles — Test of braking systems on vehicles with a maximum authorized total mass of over 3,5 t using a roller brake tester — Part 1: Pneumatic braking systems*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 611 and the following apply.

3.1

rolling resistance

A

resistance force generated by rolling causing a braking force or torque

3.2

trailer pressure

p_m

pressure at the coupling head of the control line to the trailer

3.3

brake actuator pressure

p_c

pneumatic pressure in a brake chamber of a braking system

3.4

system threshold pressure

p_t

pressure at which the braking force or torque starts to increase above the rolling resistance measured as trailer pressure

NOTE Pressure is only to be measured with increasing pressure.

4 System threshold pressure recommendation

The recommended system threshold pressure, p_t , in kPa, measured as trailer pressure, p_m , is as follows:

$$p_t = \left(70^{+10}_{-20}\right) \text{ kPa} \quad (1)$$

In the case of unladen vehicles (trailers) equipped with small size actuators (16"), it may not be possible to achieve the above recommended value.

The following value may be accepted for N2 vehicles and O3 trailers:

$$p_t = \left(70^{+20}_{-20}\right) \text{ kPa} \quad (2)$$

For EBS equipped motor vehicles, the default values for the threshold pressure values of the EBS system should comply with this International Standard as a minimum requirement. For EBS equipped vehicles, the vehicle/system manufacturer's manual should be followed in order to obtain the appropriate threshold values.

5 Apparatus

For automatic recording of measurements of any of the following test equipment a minimum sampling rate of 5 Hz is recommended.

5.1 Pressure gauges, in accordance with ISO 21069-1 or equivalent, with an accuracy of ± 10 kPa below 500 kPa, and of ± 2 % of the measured value above 500 kPa.

NOTE It is also possible to use digital diagnostic scan tools capable of measuring the necessary pressure values, providing that accuracy is similar to that obtained with conventional equipment.

5.2 Adapter to measure control line pressure (at the motor vehicle or trailer), capable of fully opening the self-sealing valve in the coupling head.

5.3 Roller brake tester, with a braking force resolution of 100 N or better in the range up to 5 000 N, and of 500 N or better above that limit.

The accuracy of the braking force measurement shall be within ± 100 N below 5 000 N, and within ± 2 % of the measured value above 5 000 N.

5.4 Compressed air source with a continuous pressure regulator, capable of delivering a maximum pressure of 1000 kPa, and of adjusting the pressure within 10 kPa in the range up to 200 kPa.

NOTE The source can be the motor vehicle.

5.5 Device for operating the brakes gradually on the motor vehicle and/or trailer is recommended.

NOTE However, with practice, a well-briefed operator who has a clear view of the control line pressure gauge can achieve comparable results by carefully applying the brake in the normal manner.

6 Procedure

6.1 General

This procedure sets out a method for measuring the brake system pressure threshold relative to the coupling head pressure of a vehicle with the laden condition simulated. Whilst the procedure is based on measuring the system threshold pressures of a laden vehicle or a vehicle in the simulated laden condition, the procedure could also be applied to vehicles in the unladen condition.

It is recommended that when load sensing valves are used, they shall have a characteristic such that pressure reduction starts at a brake pressure above the level needed to overcome the resistance of return springs.

6.2 Vehicle test for truck and semi-trailer tractor

The instructions for the roller brake tester to be used shall be checked before applying the following procedure:

- a) charge the air system to the cut-out pressure and fully apply and release the brakes five times;
- b) either
 - 1) install the adapter and gauge in the trailer control line (yellow), or
 - 2) connect the digital diagnostic scan tool (if available) to the diagnostic interface of the braking system to measure pressure values on different points on the system;
- c) charge the air system to cut-out pressure and set any load sensing valve (if applicable) to the laden condition;
- d) drive the vehicle so that the foremost axle is on the roller brake tester;
- e) gradually increase the pressure by operating the service brake;
- f) note the minimum pressure at the coupling head when the braking force on one wheel starts to increase above the force generated by the rolling resistance, A ;
- g) if the minimum pressure is overshoot, do not try to find it by slowly releasing the pedal: instead, fully release the pedal and start again;
- h) repeat the procedure three times, fully releasing the pressure after each measurement, and record the average result;

NOTE It is not necessary to record the result if a printout is available. Annex A provides an example of a report form for the roller brake test if printouts are not available.

- i) repeat the procedure from 6.2 d) to 6.2 h) for the other wheel on the same axle, and record the average result (if necessary);
- j) recharge the air system, if necessary, and repeat for the remaining axles;
- k) return the load sensing valve(s) to the appropriate laden condition, if applicable [see 6.2 c) above].

6.3 Vehicle test for trailer

The instructions for the roller brake tester to be used shall be checked before applying the following procedure:

- a) either
 - 1) connect supply (red) and control (yellow) lines between truck and trailer, or
 - 2) use an independent supply (minimum capacity of 750 kPa) and adjustable control line pressure;
 - b) charge the air system to the cut-out pressure or to a minimum of 650 kPa $\pm$ 50 kPa (as applicable) and fully apply and release the brakes five times;
 - c) either
 - 1) install the adapter and gauge in the trailer control line (yellow), or
 - 2) connect the digital diagnostic scan tool with the communication interface to measure different pressure values;
 - d) recharge the system, if necessary, to the cut-out pressure or to a minimum of 650 kPa $\pm$ 50 kPa (as applicable); set any load sensing valve (if applicable) to the laden condition;
 - e) drive the trailer so that the foremost axle is on the roller brake tester;
 - f) gradually increase the control line pressure;
 - g) note the minimum pressure at the coupling head when braking force on one wheel starts to increase above the force generated by the rolling resistance, A_1 ;
 - h) if the minimum pressure is overshoot, do not try to find it by slowly releasing the pedal: instead, fully release the pressure and start again;
 - i) repeat the procedure three times, fully releasing the pressure after each measurement, and record the average result;
- NOTE It is not necessary to record the result if a printout is available. Annex A provides an example of a report form for the roller brake test if printouts are not available.
- j) repeat the procedure from 6.3 e) to 6.3 i) for the other wheel on the same axle, and record the average result (if necessary);
 - k) recharge the air system, if necessary, and repeat for the remaining axles;
 - l) return the load sensing valve(s) to the appropriate laden condition if applicable [see 6.3 d) above].

Annex A (informative)

Report form for the roller brake test if printouts not available

A.1 Vehicle identification

Vehicle type: Manufacturer:

Reg. no: Chassis no:

Motor vehicle ☐ Trailer ☐ EBS system ☐

A.2 System threshold pressure

Axle 1

Left Average

Right Average

Axle 2

Left Average

Right Average

Axle 3

Left Average

Right Average

Axle 4

Left Average

Right Average

Annex B
(informative)

Examples of roller brake test printouts
for the measurement of system threshold pressure

This annex shows how the system threshold pressure is determined by means of a roller brake tester. A graph can be produced if a brake tester with printout function is available.

Figure B.1 shows the deceleration curve calculated to maximum vehicle mass from the measured brake force as a function of pressure in the trailer control line. The system threshold pressure, p_t , can be read as the pressure where the curve indicates brake force being added to the rolling resistance, A .

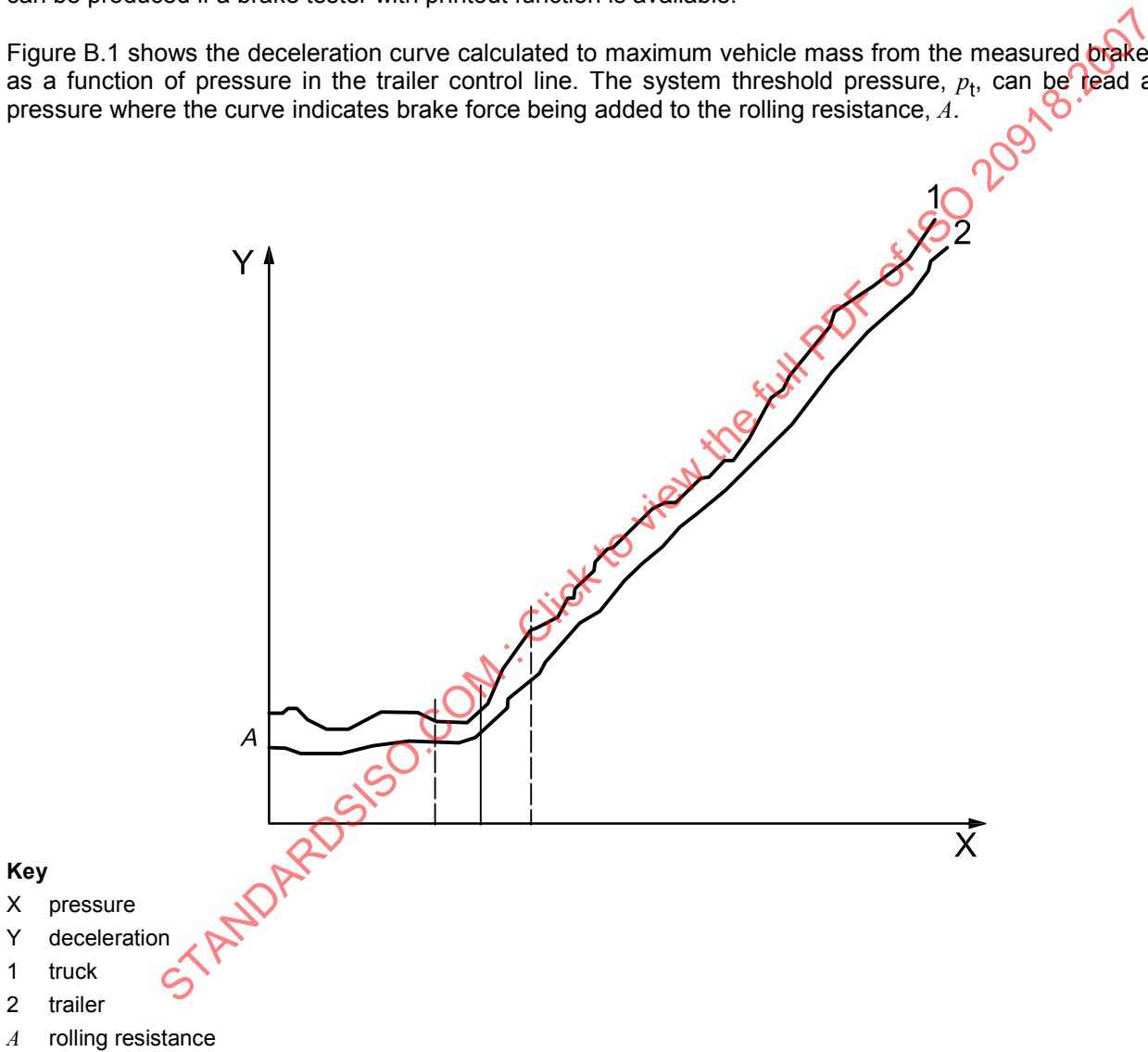


Figure B.1 — Pressure diagram for the control line showing deceleration curve

If the point where the curve shows that brake force begins to be generated is not clear or distinctive, it may be necessary to examine each axle and wheel separately.

Figure B.2 shows the brake force measured for each axle as a function of the trailer pressure, p_m , measured at the coupling head of the trailer control line. Two different threshold pressures for left and right wheel respectively are shown. Table B.1 shows the relation between trailer pressure and the brake forces for the left and right wheels.