BRITISH STANDARD

BS 7961:2004

Specification for a device for measuring the static vertical mass (noseweight) at the coupling point of a towed vehicle

ICS 17.060; 43.040.70; 43.100

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Committees responsible for this British Standard

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Camping and Caravanning Club Limited

Caravan Club

Consumer Policy Committee of BSI

DfT — Central Transport Group

National Caravan Council Limited

National Trailer and Towing Association Limited

Society of Motor Manufacturers and Traders Limited

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Foreword

This British Standard has been prepared by AUE/8, Undergear for caravans and light trailers.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 7 and a back cover.

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1 Scope

This British Standard specifies requirements for devices intended to measure the static vertical mass of towed vehicles. Such devices are commonly known as "noseweight gauges".

This British Standard only applies to all towed vehicles up to 3 500 kg maximum technical permissible laden mass.

NOTE Normally such towed vehicles are fitted with a 50 mm ball coupling device but the manufacturer of a noseweight gauge may also specify its suitability for use with other coupling devices.

2 Terms and definitions

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

2.1
ball coupling system
mechanical coupling system designed to connect towing vehicles and towed vehicles by means of a coupling ball

2.2
coupling head
mechanical device on the drawbar or overrun device of towed vehicles for connection to a coupling ball

2.3
noseweight
static vertical mass ("*S*" value in kg) exerted on the towing vehicle by the towed vehicle at the coupling point

NOTE Static vertical mass is commonly referred to as the *S* value in the UK and Europe. See Directive 94/20/EEC [1] and UNECE Regulation No. 55 [2] for further information.

2.4
towing vehicle
mechanically propelled vehicle used for towing a towed vehicle

2.5
towed vehicle
vehicle without any means of self-propulsion to be towed by a towing vehicle (e.g. caravan, horse-box, etc.)

3 The noseweight gauge

3.1 Range

The noseweight gauge shall be capable of measuring from 20 kg to at least 100 kg.

The noseweight gauge shall be capable of measuring in increments not greater than 5 kg and in the case of an analogue device the minimum scale separation for a 5 kg increment shall not be less than 5 mm.

NOTE The scale and marked numerical values should be clear and easy to read.

3.2 Performance

NOTE The same noseweight gauge should be used in performing each of the following three tests. If the noseweight gauge fails at any stage, then no further testing should be carried out.

3.2.1 *Durability*

When tested in accordance with Clause **4**, the noseweight gauge shall be able to complete 1 000 test cycles and continue to meet the accuracy requirements of **3.2.3**.

3.2.2 *Overload testing*

After being tested in accordance with Clause **4**, the noseweight gauge shall be able to withstand twice the maximum load specified by the device manufacturer, for a period of 30 s, without permanent damage when tested in accordance with Clause **5**. After removal of the load, the noseweight gauge shall show no deformation.

3.2.3 *Accuracy*

Having undergone the tests described in Clause **4** and Clause **5**, the noseweight gauge shall be accurate to within ±5 kg or ±10 % of the specified mass, whichever is least.

3.3 Operating height range

The operating height range of the noseweight gauge shall be as specified in the manufacturer's user instructions.

3.4 Finish

All surfaces of the noseweight gauge shall be smooth and free from any burrs or sharp edges that could cause injury.

3.5 Markings

All noseweight gauges shall be permanently and legibly marked with the following information:

a) the weight range, … kg to … kg;

b) the operating height range … mm to … mm to the centre of rotation of the coupling device in relation to the ground [see Figure 1a) and Figure 1b)];

c) the number and date of this British Standard, i.e. BS 7961:2004;

d) the manufacturer's name or trade mark;

e) reference to the user instructions (see **3.6**).

3.6 User instructions

Each noseweight gauge shall be supplied with user instructions that shall contain at least the following information:

a) detailed instructions for use;

b) recommendations for safe operation of the device;

c) recommendations for maintenance, storage and re-calibration.

The instructions shall include the following statement:

"When assessing/adjusting the noseweight of the towed vehicle, the limiting noseweights that individual components are able to sustain should be taken into account as well as those that the towed vehicle can sustain. The following components should all have limits of noseweight specified by the manufacturer, and any other limiting factors should also be considered in the assessment/adjustment of the noseweight of the towed vehicle:

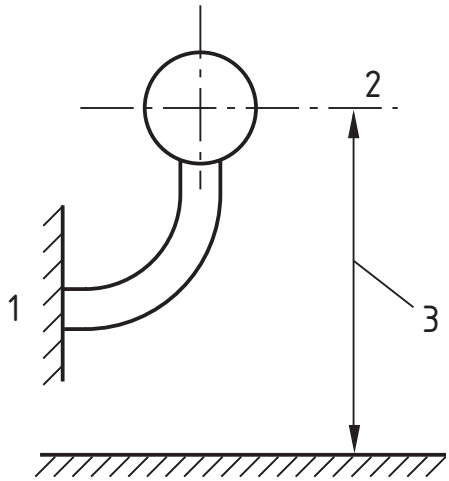
a) towing vehicle;

b) vehicle mounted towing device (tow bar);

c) towed vehicle mounted towing device (coupling assembly);

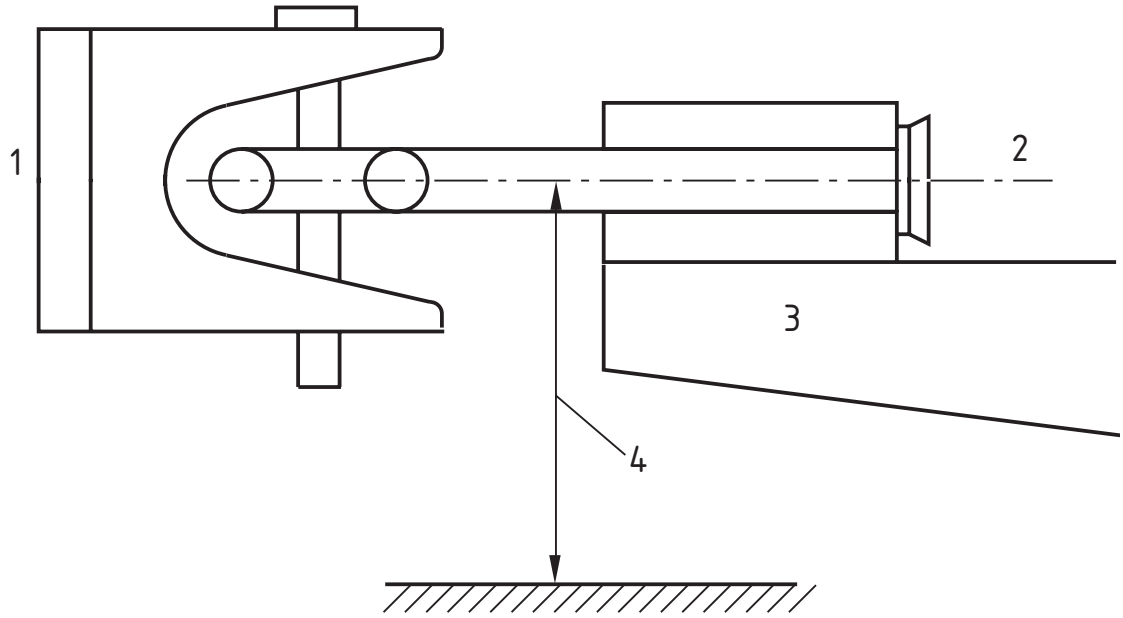
d) towed vehicle drawbar assembly;

e) towed vehicle."



Key
1 is the vehicle
2 is the center of rotation
3 is the range of operating height from the centre of rotation to the ground

a) Coupling ball



Key
1 is the vehicle
2 is the center of rotation
3 is the towed vehicle drawbar
4 is the range of operating height from the centre of rotation to the ground

b) Coupling jaw and eye

Figure 1 — Coupling

4 Test for the determination of durability

4.1 Principle

The noseweight is operated in cycles from an *S* value of zero to the maximum specified for the noseweight gauge under test and back again to an *S* value of zero. The gauge's ability to successfully complete a given number of test cycles is taken as a measure of its durability.

4.2 Apparatus

4.2.1 *test rig*, with a suitable means of force application so that it is not subjected to any additional forces or moments apart from an *S* value commensurate with the maximum specified for the noseweight gauge under test.

4.2.2 *noseweight gauge*.

4.3 Initial inspection of the noseweight gauge

Prior to the start of the test check the noseweight gauge for any deformation.

4.4 Procedure

Set up the test rig to apply the specified test forces to the noseweight gauge. Perform the load/unload cycle from an *S* value of zero to the maximum specified for the noseweight gauge under test and back again to an *S* value of zero. Repeat the load/unload cycle at a frequency of not greater than 1 Hz until a minimum of 1 000 cycles have been completed.

4.5 Final inspection of the noseweight gauge

Check the noseweight for any deformation. If there is no obvious deformation, undertake the overload test described in Clause **5**.

4.6 Expression of results

Record the number of test cycles completed without failure. If 1 000 or more test cycles have been successfully completed, record a "PASS". If less than 1 000 test cycles have been completed, record a "FAIL".

4.7 Test report

The test report shall include the following:

a) reference to this British standard, i.e. BS 7961:2004;

b) the test result recorded in accordance with **4.6**;

c) the date of the test;

d) where the test took place.

5 Test for the determination of overload

5.1 Principle

Following testing in accordance with Clause **4**, the noseweight gauge is loaded to twice the maximum specified *S* value for the noseweight under test for a measured time and inspected for signs of deformation and damage. The gauge's ability to successfully complete a given number of test cycles without deformation is taken as a measure of its durability.

5.2 Apparatus

5.2.1 *test rig*, with a suitable means of force application so that it is not subjected to any additional forces or moments apart from an *S* value commensurate with the maximum specified for the noseweight gauge under test.

5.2.2 *noseweight gauge*.

5.3 Initial inspection of the noseweight gauge

Prior to the start of the test, check the noseweight gauge for any deformation. If there is any deformation, do not proceed with the test.

5.4 Procedure

Set up the test rig to apply the test force to the noseweight gauge. Maintain twice the maximum specified *S* value for the noseweight under test for a period of 30 s and then release.

5.5 Final inspection of the noseweight gauge

Check the noseweight for any deformation. If there is no obvious deformation, undertake the accuracy test described in Clause **6**.

5.6 Expression of results

Record any visible changes shown between the initial and final inspections of the noseweight gauge. If there is no obvious deformation, record a "PASS". If there is obvious deformation, record a "FAIL".

5.7 Test report

The test report shall include:

a) reference to this British Standard, i.e. BS 7961:2004;

b) the result of the test in accordance with **5.6**;

c) the date of the test;

d) where the test took place.

6 Test for the determination of accuracy

6.1 Principle

After the noseweight gauge has been successfully tested in accordance with the tests described in Clause **4** and Clause **5**, test forces of one-third, two-thirds and the maximum specified *S* value for the noseweight gauge under test are applied and the results indicated by the noseweight gauge are analysed for conformance with **3.2.3**.

6.2 Apparatus

6.2.1 *test rig*, with a suitable means of force application so that it is not subjected to any additional forces or moments apart from an *S* value commensurate with the maximum specified for the noseweight gauge under test.

6.2.2 *noseweight gauge*.

6.3 Initial inspection of the noseweight gauge

Prior to the start of the test, check the noseweight gauge for any deformation. If there is any deformation, do not proceed with the test.

6.4 Procedure

Apply each force to the noseweight gauge. Note the reading of each force.

6.5 Final inspection of the noseweight gauge

Check the noseweight for any deformation.

6.6 Expression of results

Record the weight of each test force and the reading taken from the noseweight gauge. Calculate the variance between each applied force and the indicated reading taken from the noseweight gauge.

6.7 Test report

The test report shall include:

a) reference to this British Standard, i.e. BS 7961:2004;

b) the result of the test in accordance with **6.4**;

c) the date of the test;

d) where the test took place.

Bibliography

[1] Directive 94/20/EC of the European Parliament and of the Council of 30 May 1994 relating to the mechanical coupling devices of motor vehicles and their trailers and their attachment to those vehicles. Official Journal L 195, 29/07/1994, p. 0001–0060.

[2] UNECE (Economic Commission for Europe of the United Nations) Regulation No. 55, Agreement Concerning the Adoption of Uniform Conditions of Approval and Reciprocal Recognition of Approval for Motor Vehicle Equipment and Parts. Geneva, 20 March 1958.

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