

Specification for

Performance requirements and tests for office furniture —

Part 2: Office seating

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Committees responsible for this British Standard

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- British Educational Equipment Association
- British Furniture Manufacturers' Federation
- British Office Systems and Stationery Federation
- British Telecommunications plc
- Department of the Environment (Property Services Agency)
- Electrical Installation Equipment Manufacturers' Association (BEAMA Ltd.)
- Electricity Supply Industry in England and Wales
- Electronics and Business Equipment Association
- Furniture Industry Research Association
- Health and Safety Executive
- International Wool Secretariat
- LAMSAC
- Manchester Testing House
- Post Office

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Foreword

This Part of BS 5459 has been prepared under the direction of the Furniture and Household Equipment Standards Policy Committee and is a revision of BS 5459-2:1977. It has been prepared in recognition of the need for a wider range of requirements to cover the increased complexity of office seating designs in addition to providing assurance that seats made in compliance with this standard will be sound and reasonably durable. This Part of BS 5459 seeks to ensure that the seating will not become a danger or cause injury to office users when used as office seating in a manner which is foreseeable. It should be understood that the tests specified in this standard do not ensure that structural failure will not eventually occur as a result of habitual misuse or after an excessively long period of service but an attempt has been made to ensure that as far as can be foreseen such service failures as may occur will not be a serious hazard to health.

This Part of BS 5459 is mainly concerned with the specification of performance requirements for the strength, stability, and structural safety of office seating.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 24, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

Section 1. General

1.1 Scope

This Part of BS 5459 specifies performance requirements and describes tests for the strength, stability and structural safety of office seating.

This Part of BS 5459 applies to adjustable chairs, rotatable chairs, four-legged cantilever and sled chairs, multiple seating and bench seats.

NOTE The titles of the publications referred to in this standard are listed on the inside back cover.

1.2 Definitions

For the purposes of this Part of BS 5459 the following definitions apply.

1.2.1

self-supporting gas spring seat height adjustment component

a height adjustment component in which the pressurized outer tube of the device directly carries the applied bending moments

1.2.2

footring

a structure integral with a chair intended as a foot support whether used when sitting or when mounting the chair

1.2.3

components

all items of the seating which may be separately manufactured

1.3 Performance

When tested in accordance with 2.5 for single seating and 7.1 and 7.4 of BS 4875-3:1985 to test level 4 for multiple and beam seating, the following shall not occur:

- a) fracture of any member, joint or component (including seat suspension and castors);
- b) loosening of joints intended to be rigid which is shown to be permanent by applying hand pressure;
- c) deformation affecting the appearance or function of the seating;
- d) any increase of the free movement of any part of the structure;
- e) impairment of the operation of any mechanical part.

When tested in accordance with 2.5.1.2 the flexibility quotient shall not exceed $0.0008H_s$, where H_s is the actual force applied to the back and H_s shall be not less than 410 N.

1.4 Safety of pedestal chairs

When tested in accordance with 2.6 the chair shall fail safely, i.e. the failure shall be such that the sitter would immediately notice that the chair was impaired but would not be at risk of injury. Permanent tilting of the seat or structural insecurity shall be acceptable so long as:

- a) the chair and its occupant would not overturn at the moment of failure;
- b) expulsion of internal parts under pressure is not possible;
- c) the seat cannot be detached except by deliberately lifting it.

Critical parts of the structure such as the top of the gas spring seat height adjustment component and the chair base shall show no significant damage.

NOTE The following are examples of safe failure: arm bending, fracture of part of an arm (though not the sudden loss of an arm), damage to the tilt mechanism or seat structure (providing the seat is not suddenly detached from the pedestal) including bending of the base or pedestal and loss or damage of castors.

1.5 Stability

When tested in accordance with 2.7 for single seating, and in accordance with BS 4875-4, to test level 4 for multiple seating, the seating shall not overturn.

1.6 Operation

When tested in accordance with 2.8.2 to 2.8.4 the damage listed in items a) to e) of 1.3 shall not occur.

When tested in accordance with 2.8.3 there shall be no significant change in the seat height. When tested in accordance with 2.8.5 control levers and knobs shall show no deformation or damage.

1.7 Seat height adjustment components

1.7.1 Seat height adjustment components other than self-supporting gas spring seat height adjustment components

When tested in accordance with 2.9 critical parts of the seat height adjustment components, such as the top of the gas cylinder, shall show no significant damage or the seat height adjustment component shall fail safely.

NOTE A seat height adjustment component of a type which suffered structural failure when tested in accordance with 2.9 may be fitted to chairs complying with this Part of BS 5459 provided that all 20 seat height adjustment components tested in accordance with 2.9 failed in a consistent and acceptable manner.

1.7.2 Self-supporting gas spring seat height adjustment components

When tested in accordance with **2.9** self-supporting gas spring seat height adjustment components shall show no damage. Self-supporting gas spring seat height adjustment components which do not comply with **2.9** shall not be fitted.

1.8 Marking

1.8.1 Seating

Each item of seating shall be marked with the following or shall be accompanied by the following information:

- a) the name, registered trade name, registered trade mark or other means of identifying the manufacturer;
- b) the number and date of this British Standard, i.e. BS 5459-2:1990¹⁾;
- c) a description of the performance of the seating indicated by the appropriate test level (see **2.1.9**);
- d) the date of manufacture of the item.

1.8.2 Seat height adjustment components

Seat height adjustment components which have been tested in accordance with **2.9** and found to comply with **1.7** shall be marked with the following:

- a) the name, registered trade name, registered trade mark or other means of identifying the manufacturer;
- b) the model number;
- c) the date of manufacture;
- d) the level the component was tested to, i.e. G, H or S.

The marking shall be located so that it is visible on the outside of the gas spring seat height adjustment component.

¹⁾ Marking BS 5459-2:1990 on or in relation to a product represents a manufacturer's declaration of conformity, i.e. a claim by or on behalf of the manufacturer that the product meets the requirements of this standard. The accuracy of the claim is therefore solely the responsibility of the person making the claim. Such a declaration is not to be confused with third party certification of conformity, which may also be desirable.

Section 2. Test methods

2.1 General

NOTE A summary of tests is given in Table 1.

2.1.1 Test loading

The apparatus used to apply seat loading shall not restrain the chair from overturning, nor hinder horizontal movement of the chair when the back force is applied.

NOTE The tests may, in certain cases, be carried out by means of loads or forces. For practical purposes, a force of 10 N may be taken to be equal to the downwards force due to a mass of 1 kg.

2.1.2 Moisture content and conditioning

Before the tests are commenced the chair shall be of a sufficient age to ensure that all component materials have developed their full strength. At least 4 weeks shall elapse from manufacture in the case of glued joints in timber, plastics moulded parts, etc.

Parts made of timber products shall be checked with an electric moisture meter to ensure that the moisture content is between 8 % and 12 %. If the moisture content is greater than 12 % the chair shall be allowed to dry out in a warm ventilated room until the moisture content is between 8 % and 12 %.

2.1.3 Rate of carrying out the tests

Fatigue cycles shall be carried out at a sufficiently slow rate to ensure that negligible dynamic load is applied and also to ensure that kinetic heating does not occur.

NOTE In general it is recommended that the tests are carried out at a maximum rate of six cycles per minute.

2.1.4 Assembly

The seating shall be assembled in accordance with the manufacturer's instructions when supplied. If the seating can be assembled in different ways the most adverse condition shall be used for each test.

Fastenings shall be checked for tightness before the first test and not retightened thereafter. The chair seat height shall be set at 440 mm or as close to that as the seat height adjustment will allow, unless otherwise specified in the test method.

2.1.5 Inspection

Before testing each chair shall be thoroughly inspected. Any defects in the members, joints or attachments shall be noted so that they are not attributed to the effects of the tests when the tests have been completed. In order to detect any permanent deformation the critical dimensions of the chair shall be measured and recorded.

After completion of each test the chair shall be thoroughly inspected. Any apparent defects shall be noted and a determination shall be made of any changes that have taken place since the initial inspection.

2.1.6 Sequence of tests

All tests shall be carried out to the same test level (see 2.1.9). The performance tests (see 2.5) shall be carried the sequence given in 2.5.

In the case of the fore and aft safety test (see 2.6.2), if the chair completes the number of test cycles specified as follows, the requirements for seat and back fatigue (test 4) will have been exceeded and therefore test 4 need not be carried out.

Therefore provided that tests 1a, 1b, 2 and 3 are carried out before test 9b and that tests 5 to 8 are carried out after the completion of the number of test 4 need not be carried out.

The performance tests (see 2.5) shall all be carried out on the same chair.

NOTE 1 This is the preferred sequence because static and load impact tests are included in the safety assessments.

NOTE 2 Additional chairs may be used for tests 9 to 17.

NOTE 3 A chair tested in the safety tests (see 2.6) is likely to fail during the test and so two samples may be required for testing.

2.1.7 Ranges of chairs

Chairs from ranges of chairs with basically similar construction can be considered likely to comply with this Part of BS 5459 if examples of chairs, from the range, most likely to be adversely affected by the tests have been tested and found to comply with this Part of BS 5459.

This would normally mean subjecting:

- a) the chair with the largest back and no arms to all tests not covered by tests on another chair and test 9a and test 9b; and
- b) the armchair with the highest back to test 2, test 3, test 7 and test 8.

NOTE 1 Chairs of basically similar construction have similar geometries and are constructed from the same materials and components. From the structural point of view differences in the outer upholstery cover in terms of fabric or sewing detail are considered immaterial.

NOTE 2 The test results are valid only for the chair tested. When the test results are intended to be applied to other similar chairs, the test specimen has to be truly representative of them. Information on the scale of sampling to be employed can be obtained from BS 6001.

2.1.8 Components

Components fitted to a chair that has been tested and found to comply with this Part of BS 5459 can be considered capable of complying with **1.3** at the same test level, when fitted on chairs commensurate with the tested chair or a chair of such dimensions and construction as to generate loads on the specific component that are less than or equal to the loads generated by the tested chair. Components on a chair that has been tested and found to comply with **1.4** cannot be assumed to have any significance in relation to the performance during test 9 (see **2.6**) of another chair incorporating the same components.

2.1.9 Test levels

In the tests the seating can be tested to one of three test levels. The test levels are appropriate to the following office applications.

General (G), i.e. approximately 8 h of use per day (equivalent to test level 4 of BS 4875) by persons weighing up to 100 kg.

Heavy (H), i.e. 24 h per day use (equivalent to test level 5 of BS 4875) by persons weighing up to 100 kg. Severe (S), i.e. 24 h per day use by persons weighing up to 120 kg with an additional allowance for some abusive use.