

BRITISH STANDARD

Strength and stability of furniture –

Part 7: Domestic and contract storage furniture – Performance requirements

ICS 97.140

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Contents

Foreword *iii*

- 1** Scope *1*
- 2** Normative references *1*
- 3** Principle of the performance tests *1*
- 4** Requirements *2*
- 5** Tests *2*
- 6** Test report *6*

Annexes

Annex A (informative) Test levels in relation to application *7*

Bibliography *8*

List of tables

Table 1 – Tests *4*

Table 2 – Loads in storage components during testing *6*

Table 3 – Steel impact plates *6*

Table A.1 – Relationship of test levels to use of furniture *7*

Table A.2 – Test levels for typical applications *7*

Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 8, an inside back cover and a back cover.

Foreword

Publishing information

This part of BS 4875 was published by BSI and came into effect on 31 October 2006. It was prepared by Panel 2, *Domestic and contract furniture*, under the authority of Technical Committee FW/0, *Furniture*. A list of organizations represented on this committee can be obtained on request to its secretary.

Supersession

This part of BS 4875 supersedes BS 4875-7:1998, which is withdrawn.

Information about this document

This revision of BS 4875-7 has been prompted, in part, by the publication of ISO 7170:2005, which contains the test methods previously included in BS 4875-7:1998. BS 4875-7:1998 was written as a test method standard, this revision of BS 4875-7 has been written as a performance specification and cross-refers to the test methods given in ISO 7170:2005.

This revision of BS 4875-7 does not include safety requirements for domestic storage furniture. These are specified in BS EN 14749:2005, which has replaced BS EN 1727:1998. This revision of BS 4875-7 was also prompted, in part, by the need to remove material covered by BS EN 14749:2005.

The performance requirements are verified by tests which reproduce normal use and common misuse to which storage furniture can be subjected. They apply to a wide range of storage furniture. Five test levels are given, corresponding to the variations in severity of end-use to be expected for various types of storage furniture, e.g. delicate styles, short-life furniture, robust serviceable types. Whilst the tests reproduce normal use and common misuse, they do not reproduce any abuse to which the article might be subjected.

Annex A explains the test levels used in this standard.

The requirements apply only to the durability of the structure. The tests are designed to be applied to an article that is fully assembled and ready for use. The tests do not reproduce the effects of degradation of structural materials by sunlight or chemical attack.

Use of this document

It has been assumed in the preparation of this British Standard that the execution of its provisions will be entrusted to appropriately qualified and experienced people, for whose use it has been produced.

Hazard warnings

WARNING. This British Standard calls for the use of substances and/or procedures that can be injurious to health if adequate precautions are not taken. It refers only to technical suitability and does not absolve the user from legal obligations relating to health and safety at any stage.

Presentational conventions

The provisions of this standard are presented in roman (i.e. upright) type. Its requirements are expressed in sentences in which the principal auxiliary verb is “shall”.

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Contractual and legal considerations

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

Compliance with a British Standard cannot confer immunity from legal obligations.

1 Scope

This part of BS 4875 specifies performance requirements for the strength and durability of the structure of domestic and contract storage furniture. It is applicable to entire articles of furniture, fully assembled and ready for use.

This part of BS 4875 is not applicable to the safety of domestic storage furniture.

NOTE Safety requirements and test methods for domestic and kitchen storage units are specified in BS EN 14749:2005.

This standard is not applicable to kitchen storage furniture, office storage furniture or storage furniture intended for educational use.

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 7170: 2005, *Furniture – Storage units – Determination of strength and durability*

3 Principle of the performance tests

3.1 General

Conformity to the requirements specified in Clause 4 for the strength and durability of the structure of an article of furniture is verified by applying to various parts, loads or forces simulating normal functional use, as well as acceptable misuse, according to a graded scale of severity (see Annex A).

The test sequence as a whole determines the following:

- a) static strength and initial damage;
- b) fatigue strength and damage propagation;
- c) ability to withstand acceptable misuse; and
- d) demonstration of residual strength.

The magnitude of the forces applied or the number of applications varies according to the test level to which conformity is tested.

3.2 Static tests

Static tests assess the static strength of the article under the highest levels of loading that can reasonably be expected to occur.

3.3 Fatigue tests

The strength of the component parts of the article is tested by simulating the repeated application of loads and movement of components that occur during long-term use.

3.4 Impact tests

Impact tests assess the impact strength of the article under the rapid rates of loading that occur only occasionally.

4 Requirements

After the item of furniture has been tested in accordance with Clause 5, at the selected test level, none of the following shall have occurred:

- a) any fracture of any member, joint or component, including castors;
- b) any loosening, shown to be permanent by hand pressure applied to suitable members, of joints intended to be rigid;
- c) any deformation or wear of any component that will affect its function;
- d) any loosening of any means of fixing components to the article;
- e) any changes that prevent movable parts opening or closing freely or that cause movable parts, other than drawers, to require application of a force in excess of 100 N for operation;
- f) any deflection of shelves or tops greater than span/200 for particle board, span/50 for wood or span/100 for other materials;
- g) any deflection of clothes rails greater than span/100;
- h) any force required to move drawers in excess of 70 N and any force required to maintain movement in excess of 45 N.

5 Tests

5.1 Samples

Samples shall each comprise a complete item of storage furniture, as supplied by the manufacturer, fully assembled and ready for use. When testing a complete item of storage furniture all the strength tests (including strength of runners and strength of pivoted doors) shall be carried out on the same sample. If required, to reduce testing time, it shall be permissible for wear and fatigue tests to be carried out on components fitted in an additional identical sample. For this purpose the door or drawer under test shall be subjected to the specific tests in the order specified in Table 1, i.e. static strength, followed by durability.

NOTE 1 For an item fitted with a number of flaps, drawers or doors that are identical in every respect (apart from the direction of opening and closing), it is necessary to test only one of the relevant flaps, drawers or doors.

Components that have a dual function shall be subjected to the relevant tests for each function, for example, a shelf that can be pulled out on runners shall be subjected to the tests for shelves and additionally to the durability tests for drawers and runners.

NOTE 2 The test results are valid only for the article tested. When the test results are intended to cover other similar articles, the test specimen should be representative of the production model. Information on the scale of sampling to be employed can be obtained from BS 6001.

5.2 Moisture content of timber components

Before testing, parts made of timber products shall be checked with an electric moisture meter to determine whether the moisture content is between 8% and 12%. If the moisture is outside this range the sample shall be allowed to stand in a warm ventilated room until the moisture content is between 8% and 12%.

5.3 Inspection before testing

Immediately before testing, the sample shall be thoroughly inspected. Any defects in the members, joints or attachments of components such as flaps and extensions shall be noted so that they are not attributed to the tests. A complete dimensional check shall be carried out on all articles likely to suffer permanent deformation as a result of testing. The dimensions shall be recorded.

Any minor defects detected as a result of this inspection shall be recorded in the test report. If the sample is found to have a major defect as described in Clause 4 the sample shall be rejected.

5.4 Procedure

The sample shall be tested in accordance with ISO 7170:2005, as specified in Table 1. All tests on the sample shall be carried out at the same test level (see Table 1) and in the sequence given in Table 1.

Unless otherwise specified for a particular test, all storage components other than those undergoing testing shall be loaded in accordance with Table 2.

5.5 Inspection after testing

Immediately after completion of the tests, the sample shall again be thoroughly inspected. Any defects as detailed in Clause 4 shall be recorded, together with any other changes that have taken place since the initial inspection.

Table 1 Tests

Test (Clause in ISO 7170:2005)	Test description	Loading	Test level				
			1	2	3	4	5
6.2.2	Static load test for tops and bottoms	Force, N; 10 times	—	600	750	1 000	1 250
6.2.1	Sustained load test for tops and bottoms	Mass, kg/dm ²	1.0	1.0	1.5	2.0	2.5
6.1.4	Strength of shelf supports	Mass, kg/dm ² (plus steel impact plate, see Table 3)	10	10	10	10	10
6.1.3	Deflection of shelves	Mass, kg/dm ²	1.0	1.0	1.5	2.0	2.5
6.3.1	Strength of clothes rail supports	Mass, kg/dm; 1 h	4.0	4.0	4.0	4.0	4.0
6.3.2	Dislodgement of clothes rails	Mass, kg/dm	4.0	4.0	4.0	4.0	4.0
7.1.2.1	Vertical load on pivoted doors	Mass, kg; 10 cycles	10	15	25	30	45
7.1.2.2	Horizontal load on pivoted doors	Force, N; 10 times	—	50	60	70	80
7.2.3	Durability of sliding doors and horizontal roll fronts	Cycles	10 000	20 000	40 000	80 000	160 000
7.1.3	Slam shut test of pivoted doors	Mass, m_2 , kg; 10 times	2	2	3	4	6
7.1.4	Durability of pivoted doors	Cycles	10 000	20 000	40 000	80 000	160 000
7.2.2	Slam shut/open of sliding doors and horizontal roll fronts	Mass, m_2 , kg; 10 times	2	2	3	4	6
7.3.1	Strength of bottom-hinged flaps	Force, N; 10 times	50	100	200	300	500
7.3.2	Durability of flaps	Cycles	5 000	10 000	20 000	40 000	80 000
7.3.3	Drop test for top-hinged flaps	Cycles	—	100	150	200	250
7.4.2	Durability of vertical roll fronts	Cycles	2 500	5 000	10 000	20 000	40 000
7.4.1	Slam shut/open of vertical roll fronts	Mass, m_2 , kg; 10 times	2	2	3	4	6
7.5.2	Strength of extension elements	Force, N; 10 times	100	150	250	300	450
7.5.3	Durability of extension elements	Cycles	10 000	20 000	40 000	80 000	160 000
7.5.4	Slam open/shut test of extension elements	Velocity, m/s, at calibration points Slam open 5 kg Slam shut 35 kg	1.25 0.80	1.45 0.95	1.65 1.10	1.85 1.25	2.05 1.40
7.5.5	Displacement of extension element bottoms	Force, N; 10 times	30	40	60	70	80
7.5.6	Interlock test	Force, N; 10 times	200	200	200	200	200
7.6.2	Strength test for locking and latching mechanisms for extension elements	Force, N; 10 times	200	200	200	200	200

Table 1 Tests (continued)

Test (Clause in ISO 7170:2005)	Test description	Loading	Test level				
			1	2	3	4	5
7.6.3	Strength test for locking and latching mechanisms for doors, flaps and roll fronts	Force, N; 10 times	200	200	200	200	200
6.4.1	Test for structure and underframe	Force, N; 10 times	150	250	300	450	600
6.4.3	Test for units with castors or wheels	Cycles	—	500	500	1 000	2 000
8.1.3	Sustained load test	Mass, kg/dm ²	1.0	1.0	1.5	2.0	2.5
8.1.4	Dislodgement test	Force, N	200	200	200	200	200

Table 2 Loads in storage components during testing

Component	Load	Test level				
		1	2	3	4	5
Door baskets	kg/dm ²	1.0	1.0	1.5	2.0	2.5
Extension elements ^{A)}	kg/dm ³	0.25	0.25	0.33	0.65	0.8
Suspended pocket files	kg/dm	2.5	2.5	2.5	2.5	2.5

^{A)} The volume of extension elements is calculated from the internal depth × internal width × internal clear height.

Table 3 Steel impact plates

Test level	Mass	Approximate width	Approximate thickness	Length	Impact energy
	kg	mm	mm	mm	J
1	0.5	32	10	200	0.49
2	0.75	48	10	200	0.74
3	1.1	70	10	200	1.08
4	1.7	109	10	200	1.66
5	2.5	160	10	200	2.45

6 Test report

The test report shall contain the following:

- a) the number and date of this British Standard, i.e. BS 4875-7:2006¹⁾;
- b) details of the article tested, e.g. specification and photographs;
- c) the test level at which the article has been tested;
- d) details of any defects observed before the tests;
- e) details of any defects and damage observed after the tests;
- f) the test result;
- g) details of any deviation from the test procedures.

¹⁾ Marking BS 4875-7:2006 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 the standard. The accuracy of the claim is solely the claimant's responsibility. Such a declaration is not to be confused with third-party certification of conformity.

Annex A (informative) Test levels in relation to application

Table A.1 shows the type of use that might be expected from furniture in relation to the five test levels.

Table A.1 Relationship of test levels to use of furniture

Test level	Performance category		Example of use
1	Delicate	—	Cabinets of delicate appearance
2	Careful domestic	—	Domestic bedroom
3	General domestic	Careful contract	Domestic living/dining room or hotel bedroom
4	Severe domestic	General contract	Cabinets where rough treatment and careless handling occur e.g. college study, hotel reception
5	—	Severe contract	Cabinets intended for exceptionally severe use e.g. transport terminus, student common room and barrack room

Table A.2 shows the test levels appropriate to some typical applications.

Table A.2 Test levels for typical applications

Type of use	Test level				
	1	2	3	4	5
Domestic	X	X	X	X	—
Institutional	—	—	—	—	X
Hotel	—	—	X	X	—
Non-specialized hospital	—	—	X	X	X
Military	—	—	—	—	X
Bar	—	—	—	X	X
Church	—	—	X	—	—
Police station	—	—	—	X	X
Recreation room	—	—	—	—	X
Common room	—	—	—	—	X
Public hall	—	—	—	X	X

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BS 5873-4:1998, *Educational furniture – Part 4: Specification for strength and stability of storage furniture for educational institutions*

BS 6001 (all parts), *Sampling procedures for inspection by attributes*

BS 6222-2:1997, *Domestic kitchen equipment – Part 2: Specification for structural performance requirements and methods of test for fitted kitchen units*

BS EN 14073-2:2004, *Office furniture – Storage furniture – Part 2: Safety requirements*

BS EN 14073-3:2004, *Office furniture – Storage furniture – Part 3: Test methods for the determination of stability and strength of the structure*

BS EN 14074:2004, *Office furniture – Tables and desks and storage furniture – Test methods for the determination of strength and durability of moving parts*

BS EN 14749:2005, *Domestic and kitchen storage units and worktops*

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