BS EN 16139:2013
Incorporating corrigendum July 2013

BSI Standards Publication

Furniture — Strength, durability and safety — Requirements for non-domestic seating

National foreword

This British Standard is the UK implementation of EN 16139:2013, incorporating corrigendum July 2013. It supersedes BS EN 13761:2002 and BS EN 15373:2007, which are withdrawn.

BSI, as a member of CEN, is obliged to publish EN 16139 as a British Standard. However, attention is drawn to the fact that during the development of this European Standard, the UK voted against its approval as a European Standard.

The reason for this vote is due to concerns that the rolling resistance test defined in Clause 4.4 does not simulate safety incidents experienced in the UK.

The UK participation in its preparation was entrusted by Technical Committee FW/0, Furniture, to Subcommittee FW/0/3, Office Furniture.

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

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English Version

Furniture - Strength, durability and safety - Requirements for non-domestic seating

Mobilier - Résistance, durabilité et sécurité - Exigences applicables aux sièges à usage collectif

Möbel - Festigkeit, Dauerhaltbarkeit und Sicherheit - Anforderungen an Sitzmöbel für den Nicht-Wohnbereich

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Foreword

This document (EN 16139:2013) has been prepared by Technical Committee CEN/TC 207 “Furniture”, the secretariat of which is held by UNI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by September 2013, and conflicting national standards shall be withdrawn at the latest by September 2013.

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Introduction

This European Standard has been developed as a merging project out of the following European Standards:

— EN 15373:2007, *Furniture – Strength, durability and safety – Requirements for non-domestic seating*

— EN 13761:2002, *Office furniture – Visitors chairs*

All requirements in EN 16139 are taken from these two standards, where the new test level 2 reflects test level 3 of EN 15373 and the new test level 1 reflects test level 2 of EN 15373 and the former EN 13761.

The correspondent test method standard for this document, EN 1728, was also under revision in the same time period. In order to avoid a further revision of EN 16139 for the alignment with EN 1728, this project was slowed down until the final draft of EN 1728 was available.

1 Scope

This European Standard specifies requirements for the safety, strength and durability of all types of non-domestic seating intended to be used by adults with a weight of not more than 110 kg, including office visitor chairs.

This European Standard does not apply to ranked seating, office work chairs, chairs for educational institutions, outdoor seating and to links for linked seating for which European Standards or drafts exist. It does also not apply to work chairs for industrial use.

This European Standard does not include requirements for the durability of upholstery materials, castors, reclining and tilting mechanisms and seat height adjustment mechanisms.

This European Standard does not include requirements for the resistance to ageing, degradation and flammability.

Annex A contains additional tests.

Annex B contains information on the level of test severity in relation to applications.

Annex C contains dimensional requirements for office visitor chairs.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 1022, *Domestic furniture – Seating – Determination of stability*

EN 1335-2:2009, *Office furniture – Office work chair – Part 2: Safety requirements*

EN 1335-3:2009, *Office furniture – Office work chair – Part 3: Test methods*

EN 1728:2012*, Furniture – Seating – Test methods for the determination of strength and durability*

3 Terms and definitions

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

3.1
accessible part
part to which access can easily be gained by the user when the seating is in its intended configuration of use and for which the probability of unintentional user contact is high

3.2
part accessible during setting up and folding
part to which access can only be gained when setting up and folding the furniture

3.3
shear and squeeze points
shear and squeeze points exist if the distance between two accessible parts moving relatively to each other is less than 25 mm and more than 8 mm for adults and children older than 3 years in any position during movement

3.4
castors
castors assembly comprising a housing, one or more wheels, an axle and, if required, accessories

3.5
leg rest
extension of the seat area intended to support the legs of the sitter

Note 1 to entry: A leg rest may or may not be permanently attached to the seat.

3.6
foot rail
component intended as an occasional support for the feet or to assist getting on and off a high chair or stool

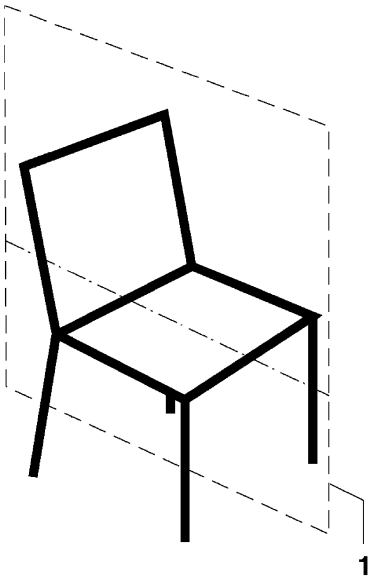
Note 1 to entry: A foot rail may be a part of the structure of the underframe of a chair or stool.

3.7
visitor chair
seating for one person used in the office environment additional to the office work chair

Note 1 to entry: It is used for meetings or consultations as well as for reading, writing, listening and waiting.

3.8
median plane
vertical plane passing through the geometric centre of the seat, dividing the seat from side to side into two equal parts

Note 1 to entry: See Figure 1.



Key

1 median plane

Figure 1 — Median plane

4 Safety

4.1 General

The seating shall be so designed as to minimise the risk of injury to the user.

All accessible parts (3.1) shall be so designed that physical injury and damage are avoided.

This requirement is met when:

a) accessible corners are rounded or chamfered;

b) the edges of the seat, back rest and arm rests which are in contact with the user when sitting in the chair are rounded or chamfered;

c) the edges of handles are rounded or chamfered in the direction of the force applied;

d) all other edges are free from burrs and rounded or chamfered;

e) the ends of hollow components are closed or capped.

Movable and adjustable parts shall be designed so that injuries and inadvertent operation are avoided.

It shall not be possible for any load bearing part of the seating to come loose unintentionally.

All parts which are lubricated to assist sliding shall be designed to protect users from lubricant stains when in normal use.

4.2 Shear and squeeze points

4.2.1 Shear and squeeze points when setting up and folding

Unless 4.2.2 or 4.2.3 are applicable, shear and squeeze points that are created only during setting up and folding, including tipping seat actions, are acceptable, because the user can be assumed to be in control of his/her movements and to be able to cease applying the force immediately upon experiencing pain.

The edges of parts moving relative to each other and creating shear and squeeze points shall be as specified in 4.1.

4.2.2 Shear and squeeze points under influence of powered mechanism

With the exception of tipping seats there shall be no shear and squeeze points created by parts of the seating operated by powered mechanisms, e.g. springs and gas lifts.

4.2.3 Shear and squeeze points during use

There shall be no shear and squeeze points created by forces applied during normal use as well as during normal movements and actions, see Table 1.

4.3 Stability

4.3.1 General

The seating shall not overturn under the following conditions:

a) by pressing down on the front edge of the seat surface in the median plane (3.8);

b) by applying a load on the seat surface via the front corner;

c) by leaning sideways on an item of seating with or without arm rests;

d) by leaning against the back rest;

e) by sitting on the front edge of the seat;

f) by loading the foot rest.

4.3.2 Swivelling chairs

Requirements a) to e) are considered to be met if the seating complies with the relevant requirements of EN 1335-2.

The requirement f) is considered to be met if the seating complies with EN 1022:2005, 6.3.

4.3.3 Non swivelling chairs

Requirements a) to f) are considered to be met if the seating complies with EN 1022:2005.

4.4 Rolling resistance of the unloaded chair

This subclause is only applicable to single seating units fitted with castors or wheels.

The unloaded seating shall not roll unintentionally.

This requirement is met when:

— the rolling resistance is ≥ 12 N when tested in accordance with EN 1335-3:2009, 7.4; and

— all castors are of the same type.

4.5 Safety of the construction

The following tests described in Clause 6, Table 1 are considered to be relevant to safety:

Test No.: 1, 2, 4, 6, 7, 8, 9, 10, 12, 13, 14.

Seating is considered to satisfy the safety requirements if, on completion of the relevant tests, the chair satisfies all requirements of Clause 5.

5 Safety, strength and durability requirements

The chair shall be constructed to ensure that it does not create a risk of injury to the user of the chair under the following conditions:

— sitting on the seat, both centrally and off-centre;

— moving forward, backwards, and sideways while sitting in the chair;

— leaning over the arm rests;

— pressing down on the arm rests while getting up from the chair.

These safety, strength and durability requirements are fulfilled when during and after testing in accordance with Table 1:

a) there are no fractures of any member, joint or component;

b) there are no loosening of joints intended to be rigid;

c) no major structural element is significantly deformed;

d) the chair fulfils its functions after removal of the test loads.

The stability requirements are fulfilled when after testing in accordance with Table 1 the seating does not overturn.

6 Test methods

Seating shall be tested on the same sample for safety, strength and durability according to Table 1 and following the order listed in Table 1.

The guidance for selecting level L1 or L2 with due respect for the end use of the product is given in Annex B.

Table 1 — Safety, strength and durability tests *(1 of 2)*

Test	Reference	Loading [a]	Level	
			L1	L2
1. Seat and back static load test	EN 1728:2012, 6.4	Seat: force, N Back: force, N 10 times	1 600 560 (min. force, 410)	2 000 700 (min. force, 410)
2. Seat front edge static load test	EN 1728:2012, 6.5	Force, N 10 times	1 300	1 600
3. Vertical static load on back [b]	EN 1728:2012, 6.6	Force, N Seat load, N 10 times	600 1 300	900 1 800
4. Foot rest and leg rest static load test	EN 1728:2012, 6.8, 6.9	Force, N 10 times	1 300	1 600
5. Arm sideways static load test	EN 1728:2012, 6.10	Force, N 10 times	400	900
6. Arm downwards static load test	EN 1728:2012, 6.11	Force, N 5 times	750	900
7. Vertical upwards static load on arm rests	EN 1728:2012, 6.13.1, 6.13.2	Seat load, N Lift 10 times, during ≥ 10 s	250 or lift stack with max. 8 chairs of max. 25 kg	1 200
8. Seat and back durability test	EN 1728:2012, 6.17	Cycles Seat: 1 000 N Back [c]: 300 N	100 000	200 000
9. Seat front edge durability test	EN 1728:2012, 6.18	Cycles Force: 800 N	50 000	100 000

Table 1 *(2 of 2)*

Test	Reference	Loading	Level	
			L1	L2
10. Arm durability test	EN 1728:2012, 6.20	Cycles Force: 400 N	30 000	60 000
11. Foot rest durability test	EN 1728:2012, 6.21	Cycles Force: 1 000 N	50 000	100 000
12. Leg forward static load test	EN 1728:2012, 6.15	Force, N Seat load, N 10 times	500 1 000	620 1 800
13. Leg sideways static load test	EN 1728:2012, 6.16	Force, N Seat load, N 10 times	400 1 000	760 1 800
14. Seat impact test	EN 1728:2012, 6.24	Drop height, mm 10 times	240	300
15. Back impact test	EN 1728:2012, 6.25	Height of fall, mm/° 10 times	210/38	330/48
16. Arm impact test	EN 1728:2012, 6.26	Height of fall, mm/° 10 times	210/38	330/48
17. Drop test (multiple seating)	EN 1728:2012, 6.27.1	Drop height, mm 2 × 5 times	not applicable	450
18. Auxiliary writing surface static load test	EN 1728:2012, 6.14	Force, N 10 times	300	300
19. Auxiliary writing surface durability test	EN 1728:2012, 6.22	Cycles Force: 150 N	10 000	20 000

[a] Seat load on parts not undergoing test: 750 N.

[b] The test is only applicable for chairs without head/neck rest and for chairs with a height of the backrest < 1 000 mm above ground.

[c] No minimum force defined.

7 Information for use

Information for use shall be available in the language of the country in which it will be delivered to the end user. It shall contain at least the following details:

a) information regarding the intended use (see Annex B);

b) if the chair is fitted with adjusting mechanisms: instruction for operating the adjusting mechanisms;

c) assembly instructions, where applicable;

d) instruction for the care and maintenance of the chair;

e) if the seating is fitted with castors: information on the choice of castors in relation to the floor surface;

f) if the seating is fitted with adjustment mechanisms comprising an energy accumulator, an additional note is required pointing out that only instructed personnel may replace and maintain adjustment mechanisms containing energy accumulators.

8 Test report

The test report shall include at least the following information:

a) reference to this European Standard;

b) details of the tested seating;

c) details of defects observed before testing;

d) any variation from the specified temperature range;

e) test results;

f) name and address of the test facility;

g) date of test.

Annex A
(informative)

Additional tests

Annex A contains additional tests that may be considered for specific applications.

For requirements on additional tests, see Table A.1.

Table A.1 — Additional tests

Test	Reference	Loading	Level	
			L1	L2
1. Drop test for stacking seating	EN 1728:2012, 6.27.2	Drop height, mm 10 times	150	200
2. Backward fall test	EN 1728:2012, 6.28	Cycles	5	5
3. Drop test from the height of a table	EN 1728:2012, 6.27.3	Drop height, mm 10 times (5 times on one front leg and 5 times on one rear leg)	600	600

Annex B
(informative)

Test severity in relation to applications

Table B.1 shows the type of use that might be expected from furniture in relation to the two levels of test severity contained in Table 1.

Table B.1 — Level of test severity in relation to applications

Level	Type of use	Range of application
L1	general use	Areas in which seating is usually intended for mixed use (short-time and for a period of several hours, light to heavy load). Examples of end-use: all kind of applications in office buildings, showrooms, public halls, function rooms, cafés, restaurants, canteens, banks, bars.
L2	extreme use	Areas in which seating is occasionally or repeatedly subject to extremely high loads due to their specific types of use or due to improper use. Examples of end-use: night-clubs, police stations, transport terminals, sport changing rooms, prisons, barracks (non-controlled areas).

It should be noted that some end uses may be covered by more than one requirement depending on the severity of the expected use.

This applies particularly to furniture in nursing homes and public areas in hospitals. These types of furniture are subject to test severity L1. But for seating fulfilling the requirements “Seating which may be moved when occupied”, the test “Vertical upwards static load on arm rests” in accordance with Table 1 (Test 7) should be carried out with test severity L2.

Annex C
(informative)

Dimensional requirements for office visitor chairs

C.1 General

The dimensions in this standard are based on the conflicting requirements of anthropometric measurements, mechanical design, subjective preference and other factors.

C.2 Dimensional requirements

C.2.1 Seat height [a]

Fixed seat height: between 400 mm and 500 mm.

Adjustable seat height: minimum range from 420 mm to 480 mm.

C.2.2 Seat depth [b]

Seat depth: between 380 mm and 470 mm.

C.2.3 Seat width [d]

Seat width: minimum 400 mm.

C.2.4 Distance between arm rests [r]

Distance between arm rests: minimum 460 mm.

C.3 Determination of reference points

C.3.1 Point “A”

For swivelling chairs, point “A” should be determined in accordance with EN 1335-1:2000, 5.1.

For all other types, point “A” is the seat loading point determined in accordance with EN 1022.

C.3.2 Back supporting point “S”

The back supporting point “S” should be determined in accordance with EN 1335-1:2000, 5.2.

C.4 Determination of dimensions

C.4.1 Seat height [a]

The seat height [a] should be determined in accordance with EN 1335-1:2000, 6.1.

C.4.2 Seat depth [b]

The seat depth [b] should be determined in accordance with EN 1335-1:2000, 6.2.

C.4.3 Seat width [d]

The seat width [d] should be determined in accordance with EN 1335-1:2000, 6.4.

C.4.4 Distance between arm rests [r]

The distance between armrests [r] should be determined in accordance with EN 1335-1:2000, 6.16.

Bibliography

[1] EN 1335-1:2000, *Office furniture – Office work chair – Part 1: Dimensions – Determination of dimensions*

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