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Specification for

Draughtstrips for the draught control of existing doors and windows in housing (including test methods)

ICS 91.120.10

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by Technical Committee B/540, Energy performance of materials components and buildings, to Subcommittee B/540/5, Draught control of installed doors and windows, upon which the following bodies were represented:

Association for the Conservation of Energy
Association of Metropolitan Authorities
British Plastics Federation
Department of the Environment (Construction Sponsorship Directorate)
Department of the Environment (Housing and Urban Monitoring and Analysis Directorate)
Draught Proofing Advisory Association Ltd.
Energy Action Grants Agency
Neighbourhood Energy Action

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Contents

National foreword

This British Standard has been prepared by Subcommittee B/540/5. It is a revision of BS 7386 : 1990 which is superseded and withdrawn. It principally covers draughtstrip products for the high proportion of existing doors and windows in housing which were not originally designed to take draughtstripping. These doors and windows vary in age and the variations in detail design and manufacture over a long period, combined with wear and tear in service, pose more difficult dimensional requirements than those for products engineered into new doorsets and windows at the production stage, even after allowing for prior repair of the most ill-fitting of existing doors and windows. Products used in new doorsets and windows at the production stage and therefore not included.

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 and ii, pages 1 to 18, an inside back cover and a back cover.

Specification

Introduction

National surveys on housing (see Building Research Establishment Digest 319) have shown that, when considered by broad door or window type, four categories cover 95 % of the existing doors and windows which were not originally designed for draughtstripping. These are hinged doors in wood, sliding windows in wood and hinged windows in wood and steel.

Amongst any one category, experience has shown that only a small minority of doorsets and windows are of poor fit. The poor fit is usually confined to a minor part of the opening perimeter and, if a draughtstrip does not seal completely at the worst points, its overall effectiveness is unlikely to be markedly impaired.

It is impractical to seek to seal the poor fit of a small minority of a door or window category, or to deal with all the manifold varieties amongst a rare type like a sliding wood door. These are situations where special measures may be needed.

Hence it has been deemed reasonable to base this standard on products to fill the gaps around 90 % of the four categories, without making them hard to close. Products to fill gaps between doorset or window frames and walls, or to fill gaps at any glazing, for which appropriate sealant products should be used, are not included.

Doorsets and windows identical to those in the four common categories can be found in building applications other than housing. Draughtstrip products conforming to this standard could also be suitable for them, given that the conditions in service are comparable with domestic occupation.

It does not follow that draughtstrip products conforming to this standard are unsuitable for other categories of door and window, or for use elsewhere in housing such as at loft hatches. It is also necessary in these categories to consider their ability both to fill the air leakage gaps and to retain an ease of component closing.

Test methods and evaluation are given in annex A. Advisory notes on the seasonal movement of external doors made of wood and on materials specification are given in annex B and annex C respectively.

1 Scope

This British Standard specifies requirements for draughtstrip products to fit the common types of installed doors and windows in housing that were not originally designed to incorporate draughtstripping, and applies to hinged doors in wood, sliding windows in wood, hinged windows in wood and steel and domestic loft hatches.

NOTE. Unless specifically designed as such, draughtstrips conforming to this standard should not be fitted as smoke control seals without the approval of the fire authority, nor should they be fitted to doors with intumescent seals without the prior approval of the manufacturer of the door or consultation with the fire authority.

Gap filling and in-situ gaskets, applied like sealants, are not dynamic products and are excluded from this standard. Letter box seals are excluded from this standard because they do not generally function in the manner of a draughtstrip. Draughtstrip materials specifically designed for use on the bottom of doors are also excluded from this standard.

2 References

2.1 Normative references

This British Standard incorporates, by dated or undated reference, provisions from other publications. These normative references are made at the appropriate places in the text and the cited publications are listed on the inside back cover. For dated references, only the edition cited applies; any subsequent amendments to or revisions of the cited publication apply to this British Standard only when incorporated in the reference by amendment or revision. For undated references, the latest edition of the cited publication applies, together with any amendments.

2.2 Informative references

This British Standard refers to other publications that provide information or guidance. Editions of these publications current at the time of issue of this standard are listed on the inside back cover, but reference should be made to the latest editions.

3 Definitions

For the purposes of this British Standard, the definitions given in BS 6100 : Subsection 1.3.5 apply together with the following:

3.1 perimeter gap

Air leakage gap remaining between a door leaf or window sash and its frame when the leaf/sash is shut.

3.2 draughtstrip

Product with dynamic characteristics for closing perimeter gaps in particular for retrospective fitting to existing doors and windows that were not originally designed to receive such products.

NOTE. The draughtstrips have to be attached either to the frame or door leaf/window sash and may consist entirely of a working section or the working section may be attached to a carrier.

3.3 size and dynamic characteristics

Attributes of draughtstrip products which enable them to fill a range of gap sizes without undue resistance and follow seasonal changes in gap size. These embrace cross-sectional dimensions and the ability to deflect, compress and recover. Where relevant, they also include an ease of sliding against opposing surfaces.

3.4 code of action

Manner in which a draughtstrip forms a seal, characterized by three basic modes; compression, wiping and sliding.

NOTE. In practice, products are likely to operate in more than one mode of action. For example, a product working in compression on the hinge side of a door may experience some wiping action.

3.5 compression mode

Reduction of working section height by an openable member of a doorset or window, broadly in the direction of local final closure for the member, in order to match the size of the working section to the perimeter gap.

3.6 wiping mode

Reduction of working section height, broadly in a direction perpendicular to that of the local closure motion of an openable member, with the working section (eventually) slipping against the member or doorset or window frame at a size which matches the perimeter gap.

3.7 sliding mode

Similar to wiping mode but with closure (and opening) motion parallel to the axis of a draughtstrip, such that some or all of the working section may remain deflected at a size which matches the perimeter gap.

3.8 working section

Part of the draughtstrip which exhibits the dynamic characteristics.

3.9 carrier

Part of the draughtstrip designed to hold and fix the working section in its operating position.

3.10 test piece

Section of softwood, steel, plastic or other material used to simulate that part of a doorset or window to which a draughtstrip is intended to be attached.

3.11 test surface

Planed softwood surface brush painted with one coat of undercoat paint followed by two coats of gloss finish topcoat paint.

3.12 measurement datum

Any convenient line or plane on the test equipment relative to which the height of a draughtstrip in a mounting block is measured.

4 Classification

Products conforming to this standard shall be classified as follows.

a) *Class 1*. Products intended for use on poorly fitting external hinged wood doors which have maximum perimeter gaps greater than 2 mm and/or have large seasonal movements (see annex B).

NOTE. An indication of large seasonal movement might be, for example, particular difficulty in operating locks and bolts at the door head and door bottom at certain times of the year.

b) *Class 2*. Products intended for use on domestic loft hatches and internal or well fitting external hinged wood doors which have maximum perimeter gaps less than 2 mm and have small seasonal movements (see annex B).

NOTE. An indication of small seasonal movement might be, for example, slight difficulty in operating locks and bolts at the door head and door bottom at certain times of the year.

c) *Class 3*. Products intended for use on hinged wood and steel windows and sliding wood windows.

5 Test procedures

The test procedures and evaluation shall be as described in annex A and the draughtstrip products shall conform to clauses **5** to **10**.

6 Product size and dynamic characteristics

NOTE. This requirement is intended to ensure that, when installed as recommended, the draughtstrip products will not make the opening or closing of draughtstripped doorsets and windows unduly difficult.

When tested by the method described in **A.2** the load required to compress/deflect the draughtstrip by any amount up to 6 mm or 3 mm as appropriate shall not exceed the maximum resistance shown in table 1.

In addition, products which are designed to operate in a wiping or sliding mode shall be tested by the method described in **A.4** and shall have a sliding friction force of no greater than 20 N/m length when compressed by a minimum of 6 mm or 3 mm as appropriate (see table 1).

Table 1. Dynamic characteristics of working sections, related to type of doorset or window (see **A.2**)

Application	**Minimum deflection range** mm	**Maximum resistance anywhere in specified height or deflection range** N/m
Hinged external doors: class 1 draughtstrips	6	60
Hinged external or internal doors; domestic loft hatches: class 2 draughtstrips	3	60
Windows (all types): class 3 draughtstrips	3	80

7 Set in product under sustained compression/deflection

NOTE. This requirement is intended to ensure suitable resistance of draughtstrip products to a permanent loss in functional height or change of shape arising from sustained pressure.

When tested by the method described in **A.3** and subjected to sustained compression/deflection, in the mode in which the product is installed in practice, the mean value of the compression/deflection recovery, i.e. the recovery of functional height from the compressed/deflected state, for each set of 10 specimens tested shall be not less than 55 % of the applied compression/deflection.

8 Integrity of working section and carrier of draughtstrip

NOTE. This requirement is intended to ensure that the working section and carrier of a draughtstrip will neither become detached from each other, nor from the doorset or window when installed as recommended.

When tested and subjected to the sliding and pulling forces described in **A.5**, the working section of a draughtstrip shall neither become detached from the carrier, nor shall the working section or carrier become detached from the test piece.

9 Adhesion of draughtstrips secured by an adhesive only

NOTE. This requirement is intended to ensure that draughtstrip products without a carrier which are fixed by means of an adhesive only, will resist becoming detached from a doorset or window.

When tested by the method described in **A.6**, the draughtstrip shall not become totally detached from the test piece during the period in which the weight is applied.

10 Air leakage through product

When tested by the method described in **A.7** and when installed in the maximum gap size specified, and compressed/deflected in accordance with the product information, products designed to fit a maximum gap size of 10 mm shall conform to item a); those designed to fit a maximum gap size greater than 10 mm shall conform to item b).

a) The air leakage through the product over a range of applied differential pressures across the specimen from 10 Pa to 100 Pa shall not, at any point, exceed the values shown in graph 1 of figure A.8. The equation of the line in graph 1 of figure A.8 is:

$$Q = 0.13(\Delta p)^{0.88}$$

where

Q is the air leakage rate per metre run of draughtstrip (in m^3/h per metre);

Δp is the applied differential pressure across the specimen (in Pa).

b) The air leakage through the product over a range of applied differential pressures across the specimen from 10 Pa to 100 Pa shall not, at any point, exceed the values shown in graph 2 of figure A.8. The equation of the line in graph 2 of figure A.8 is:

$$Q = 0.65(\Delta p)^{0.74}$$

11 Resistance to wear

When tested by the method described in **A.8**, products designed to operate in a compression mode only shall conform to item a); those designed to operate in a wiping or sliding mode shall to conform to item b); those designed to operate in both modes shall conform to items a) and b); products intended for use on the hinge side of a door or window and which will, in service, experience a combination of compression and wiping modes of action shall in addition conform to item c). Any limitations on operating mode shall be stated in the product information, as specified in **12.2**. All products shall conform to item d).

a) When subjected to repeated compression and release, the reduction in height shall be not greater than 1 mm for class 1 draughtstrips or 0.5 mm for class 2 or class 3 draughtstrips.

b) When subjected to repeated wiping or sliding action, the reduction in height of the working section shall be not greater than 1 mm for class 1 draughtstrips or 0.5 mm for class 2 or class 3 draughtstrips.

c) When subjected to repeated combined compression and wiping action, the reduction in height of the working section shall be not greater than 1 mm for class 1 draughtstrips or 0.5 mm for class 2 or class 3 draughtstrips.

d) When subjected to repeated wear, products shall remain intact.

12 Marking and product information

12.1 Marking

Draughtstrips shall be marked in relation to the product, e.g. on the product itself, on the packaging or other container, the manufacturer's certificate, the delivery note or the invoice, with the following particulars:

a) the name, trademark or other means of identification of the manufacturer;

b) the number and date of this British Standard[1)];

c) the class, i.e. class 1, 2 or 3;

d) the manufacturer's batch or lot number.

12.2 Product information

The following information, presented in a clear and concise manner, shall be included with each retail sale and made available to bulk purchasers.

a) *Storage*. Any limitations on storage conditions to keep the product in good usable condition.

b) *Shelf life*. Maximum shelf life, assuming storage as recommended, by way of a use by date in the case of self-adhesive products and separate adhesives.

c) *Suitability*. Advice on the type of door or window for which the particular class and type of draughtstrip is suitable and the type of gap and minimum and maximum gap size the draughtstrip is designed to bridge after compression by a minimum of 3 mm for class 1 draughtstrips or 1.5 mm for class 2 or class 3 draughtstrips.

d) *Installation*. Any preparatory work required and installation instructions appropriate to the particular class of product including the recommended compression/deflection (minimum of 3 mm for class 1 draughtstrips or 1.5 mm for class 2 or class 3 draughtstrips), the mode(s) of action and methods and types of fixing.

e) *Maintenance and use*. Cleaning and any procedures or usages to keep the product in good working condition.

f) *Painting*. Any precautions required for newly decorated doorset or window surfaces, whether or not the product can be painted or stained, and whether or how adventitious paint or stain can be removed. A statement that draughtstrips should not be painted or stained because a working section of a draughtstrip which has been painted or stained is unlikely to continue to meet the performance achieved under this standard.

g) *Safety warning*. A warning to the effect that before fitting draughtproofing in rooms fitted with fuel burning appliances, any existing ventilators shall be checked for proper operation.

[1)] Marking BS 7386 : 1997 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 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.

Annexes

Annex A (normative)
Test methods and evaluation

A.1 General

A.1.1 *Test sequence*

Where applicable, the tests shall be performed in the sequence listed in table A.1.

Table A.1 Sequence of test methods

Reference	Related figure	Related clause
A.2 Product size and dynamic characteristics	A.1	**6** and table 1
A.3 Set in product under sustained compression/deflection	A.2 and A.3	**7**
A.4 Sliding friction force	A.4	**6** and table 1
A.5 Integrity of working section and carrier of draughtstrip	A.5	**8**
A.6 Adhesion of draughtships secured by an adhesive only	A.6	**9**
A.7 Air leakage through product	A.7 and A.8	**10**
A.8 Resistance to wear	A.9	**11**

A.1.2 *Selection of specimens*

Each of the tests in **A.2** to **A.8** shall be carried out on a new set of specimens. Specimens shall be stored at all times in accordance with the manufacturer's product information.

A.1.3 *Test conditions*

Before testing, all specimens shall be conditioned for 24 h at an ambient room temperature of (20 ± 5) °C and a relative humidity in the range 30 % r.h. to 70 % r.h.

A.2 Product size and dynamic characteristics

NOTE. A typical form of equipment is shown in figure A.1.

A.2.1 *Apparatus*

A.2.1.1 *Equipment to provide a means of compressing/deflecting a draughtstrip specimen, at a rate of (1.0 ± 0.2) mm/s*, and measuring both the peak force required and displacement.

NOTE. Electronic force measuring devices should have minimum internal sampling and display update rates of 20 times/s. Instruments are available which automatically record the peak force applied.

A.2.2 *Procedure*

NOTE. Products designed to operate in a wiping mode should be tested in that mode, if necessary sweeping the working section to one side before applying the force.

Test specimens in the following way.

a) Take a specimen of draughtstrip (50 ± 0.5) mm in length.

b) Mount the specimen in the loading equipment, in accordance with the manufacturer's instructions, so as to simulate its action on a door or window such that the force is applied along a 50 mm section of the specimen. Apply a small force of 0.1 N to ensure that any slack between the working section and carrier is taken up. Zero the force gauge. Measure the height of the specimen under zero force, to an accuracy of ± 0.1 mm.

c) Apply an increasing force to compress/deflect the specimen at a rate of (1.0 ± 0.2) mm/s until a compression/deflection of 3 mm or 6 mm as appropriate (see table A.1) has been achieved. Measure the maximum applied force during the compression to an accuracy of ± 0.05 N.

NOTE. The method described in **A.2.2**c may be carried out using a tensiometer machine capable of the required accuracy.

d) In the case of products designed to fit inside the leakage gap, with fit obtained by compression/deflection of the draughtstrip, continue to apply the force until the draughtstrip is compressed to the minimum gap size specified in the product information. Measure the maximum applied force.

A.2.3 *Expression of results*

Convert the forces applied to the 50 mm specimen of draughtstrip into units of force per metre, by multiplying by 20. Determine the force in newtons per metre against the height of the specimen.

A.3 Set in product under sustained compression/deflection

NOTE. Products designed to operate in a wiping mode should be tested in that mode, if necessary sweeping the working section to one side before applying the load.

A.3.1 *Apparatus*

A.3.1.1 *Compression block*, see figure A.2.

A.3.1.2 *Means of keeping the block containing sets of specimens at specified temperatures.*

A.3.1.3 *Equipment to measure the height of the specimen before and after compression/deflection*, consisting of a balance beam and non-contact position measuring device, see figure A.3.

NOTE. A travelling microscope, a shadowgraph, or a laser light beam based device may be suitable types of non-contact measuring devices.

A.3.2 *Procedure*

Test specimens in the following way.

a) Take three sets, each comprising 10 specimens of draughtstrip (100 ± 0.5) mm in length.

b) Label each specimen and secure in a suitable mounting block as shown in figure A.2. Place the mounting block in the balance beam equipment. Position the balance beam contact plate over the central 50 mm of the working section (within ± 2 mm) and with a weight of 5 g applied after balancing. Measure and record the height of the specimen perpendicular to the compressing surface relative to a convenient datum to an accuracy of ± 0.1 mm. In order to maintain the measurement datum, do not remove the specimens from or disturb them in the mounting block until all stages of this procedure have been completed.

c) Compress/deflect each specimen by either a minimum of 6 mm or 3 mm as appropriate (see table A.1) using a suitable compression plate.

d) Leave one set of specimens at (55 ± 2) °C for 14 days. Leave a further set at (−10 ± 2) °C for 24 h. Leave the final set at an ambient room temperature of (20 ± 5) °C and relative humidity in the range 30 % r.h. to 70 % r.h. for 24 h.

e) Remove the compression plates without disturbing the specimens in their mounting blocks.

f) After no more than seven days recovery with the specimens lying horizontal and with the working section uppermost, measure and record the height of the specimen using the same equipment and method as item b) above.

A.3.3 *Expression of results*

Calculate the compression/deflection recovery of the working section, i.e. the recovery of functional height from the compressed/deflected state, for each specimen, as a percentage of the applied compression/deflection.

A.4 Sliding friction force

NOTE 1. This test applies to draughtstrip materials designed to operate in a wiping or sliding mode only.

NOTE 2. A typical form of equipment is shown in figure A.4.

A.4.1 *Apparatus*

A.4.1.1 *Suitable mounting carriage*, of minimum mass 3 kg, supported on free rolling wheels (total rolling resistance less than 0.05 N) with an adjustable carrier plate.

A.4.1.2 *Means of drawing the mounting carriage along the test surface.*

A.4.1.3 *Force gauge*, capable of measuring to an accuracy of ± 0.05 N.

A.4.1.4 *Spirit level.*

A.4.1.5 *Lint free cloth and cleaning agent.*

A.4.2 *Procedure*

Test specimens in the following way.

a) Mount two specimens of draughtstrip each (250 ± 0.5) mm long in parallel at a distance of 250 mm apart on the mounting carriage.

b) Using the spirit level ensure that the test surface is truly horizontal, inserting thin wedges below it if necessary.

c) Clean the test surface with the lint free cloth and a suitable cleaning agent.

d) Place the test assembly on the test surface with the working sections of the draughtstrip specimens in contact/engaged with the test surface and compressed by a minimum of 6 mm or 3 mm as appropriate (see table A.1).

e) Apply a horizontal force, F (in N), to maintain the test assembly at a constant velocity for a distance of at least 100 mm so as to simulate the usual mode(s) of action of the draughtstrip, i.e. in a direction either along or perpendicular to the action of the draughtstrip according to the product information, and measure the applied force to an accuracy of ± 0.05 N.

NOTE. For products that can be used in both modes the pulling force should be applied in order to simulate each mode of action separately.

f) Repeat item e), reversing the direction of motion. Calculate the mean value of F for motion in both directions.

g) Repeat items e) and f) to obtain two values of F.

A.4.3 *Expression of results*

Add the two values of F together to give the value of the friction force per metre.

A.5 Integrity of working section and carrier of draughtstrip

NOTE. A typical form of equipment is shown in figure A.5.

A.5.1 *Apparatus*

A.5.1.1 *Vice.*

A.5.1.2 *Clamp*, of length (200 ± 1) mm (for attachment to the working section of the draughtstrip).

A.5.1.3 *Means of applying a gradually increasing force to the clamp.*

A.5.1.4 *Force gauge*, capable of measuring to an accuracy of ± 0.05 N.

A.5.2 Procedure

Test specimens in the following way.

a) Mount a specimen of draughtstrip (200 ± 0.5) mm in length on a test piece in accordance with the manufacturer's fitting instructions. Place the test piece horizontally in the vice and attach a clamp of length (200 ± 1) mm to the working section.

b) Apply a gradually increasing force of up to 20 N in a horizontal direction, in an attempt to slide the working section out of the carrier/mounting.

c) Apply a gradually increasing force of up to 100 N in a vertical direction, in an attempt to pull the working section out of the carrier/mounting.

A.6 Adhesion of draughtstrips secured by an adhesive only

NOTE. A typical form of equipment is shown in figure A.6.

A.6.1 *Apparatus*

A.6.1.1 *Glass test piece*, of minimum length 200 mm.

A.6.1.2 *Weight*, of (250 ± 10) g including clamp.

A.6.1.3 *Lint free cloth and cleaning agent.*

A.6.2 *Procedure*

Test specimens in the following way.

a) Clean the surfaces of the glass test piece with the lint free cloth and a suitable cleaning agent.

b) Apply the specimen of draughtstrip, in accordance with the manufacturer's fitting instructions, such that 150 mm of its length is adhered to the glass test piece (see figure A.6).

c) Leave the specimen attached to the test piece for either a maximum of 1 h, or the time specified in the manufacturer's fitting instructions where this is longer.

d) Hang the weight (mass of (250 ± 10) g) on the unbonded end of the specimen. This weight shall act in a direction parallel to the axis of the specimen and such that the specimen is bent back on itself through 180° away from the test piece (see figure A.6).

e) Leave the specimen with the force applied for a minimum of 1 h.

A.7 Air leakage

NOTE. A typical form of equipment and product arrangement is shown in figure A.7.

A.7.1 *Apparatus*

A.7.1.1 *Equipment to provide a means of mounting a draughtstrip specimen to a pressure box*, providing a controllable flow of air and measuring leakage rates at given pressure differences. (Typical air flow required up to 10 m^3/h.)

A.7.2 *Procedure*

NOTE. Products which have an asymmetrical working section should be tested facing both directions.

Test specimens in the following way.

a) Mount the specimen of draughtstrip, of length (500 ± 0.5) mm, in accordance with the manufacturer's fitting instructions compressed by a minimum of 6 mm or 3 mm as appropriate (see table 1), and in a gap equal to the maximum gap size specified in the product information. Fix the specimen and its mounting to the pressure box, sealing the ends.

b) Blank off the exit slot so that no air can pass through the specimen. Supply air to the box at rates sufficient to maintain pressures up to 100 Pa above atmospheric pressure, in steps of (10 ± 1) Pa. At each step, when readings have stabilized, record the air flow rates and the pressure difference to obtain the blank leakage. If the blank leakage is more than 10 % of the maximum allowable air leakage through the product given in figure A.8, repeat the test with improved blanking of the exit slot until this condition is satisfied.

c) Remove the blank from the exit slot without disturbing the specimen. Supply air to the box at rates sufficient to maintain a pressure up to 100 Pa above atmospheric pressure, in steps of (10 ± 1) Pa. At each step, when readings have stabilized record the air flow rates and the pressure difference to obtain the gross leakage.

NOTE. The typical air flow required is up to 10 m^3/h measured to an accuracy of ± 5 % .

A.7.3 *Expression of results*

Determine the net air leakage rate through the draughtstrip alone, at each step of pressure differential, as follows:

Net leakage = gross leakage – blank leakage

Calculate the air leakage per metre run of product by doubling each of the air leakage values obtained in the test. Plot the results on a graph of the form shown in figure A.8.

A.8 Resistance to wear

NOTE. Typical forms of equipment are shown in figure A.9.

A.8.1 *Apparatus*

A.8.1.1 *Equipment to provide a means of measuring resistance to wear*, by the application of repeated opening and closing actions in various modes.

A.8.1.2 *Equipment to measure the height of the specimen before and after compression/deflection*, as described in **A.3.1.3** and figure A.3.

A.8.2 ***Procedure***

Test specimens in the following way.

a) Take two specimens of draughtstrip, each (200 ± 0.5) mm in length.

b) Label each specimen and secure in a suitable mounting block. Place the mounting block in the balance beam equipment. Position the balance beam contact plate over the central 50 mm of the working section (within ± 2 mm) and with a weight of 5 g applied after balancing. Measure and record the height of the specimen perpendicular to the compressing surface relative to a convenient datum to an accuracy of ± 0.1 mm. In order to maintain the measurement datum, do not remove the specimens or disturb them in the mounting block until all stages of this procedure have been completed.

c) Without disturbing the specimens in their mounting blocks, mount them in the test equipment in the relevant mode. Ensure that the test surface is clean and free from any cleanser or other residues.

d) Adjust the equipment to compress the working section of the draughtstrip by 3 mm for class 1 draughtstrips or 1.5 mm for class 2 and class 3 draughtstrips.

e) Run the equipment for 20 000 cycles in one or more of the modes listed as follows as necessary to cover the applications given in the manufacturer's fitting instructions.

NOTE. A new specimen is required for each test.

1) Apply a repeated compression and release action to the draughtstrip, at a rate of (30 ± 5) cycles/min.

2) For products that can be used in both modes the pulling force should be applied in order to simulate each mode of action separately.

3) Apply a repeated combined compression and wiping action to the draughtstrip, at a rate of (30 ± 5) cycles/min.

4) Apply a repeated sliding action to the draughtstrip, at a rate of at least 6 cycles/min and with a stroke of (150 ± 5) mm.

f) Remove the mounting blocks from the equipment without disturbing the specimens. Measure and record the height of the specimens using the same equipment and method as used in item b) above.

g) Inspect each specimen for visible damage.

A.8.3 ***Expression of results***

Calculate the loss in height of the working section of each specimen. Describe any visible damage observed.

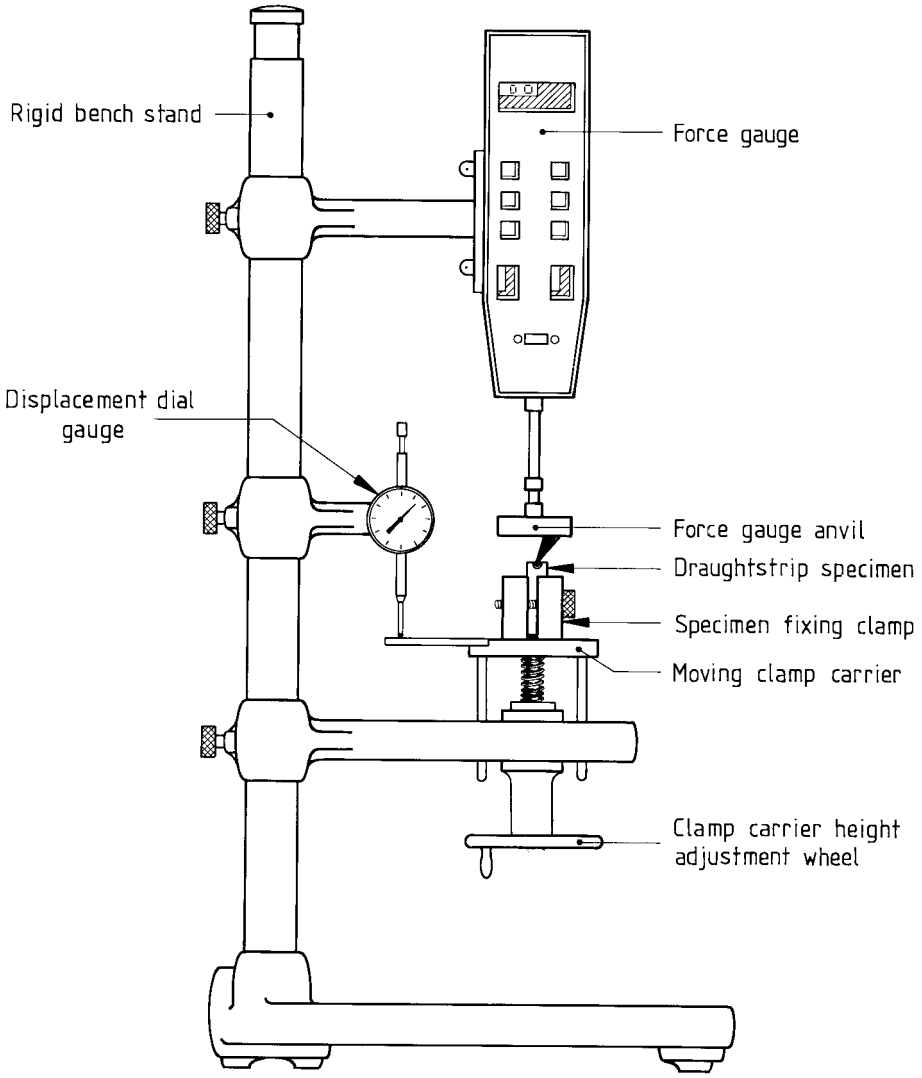


Figure A.1 Product size and dynamic characteristics: compression/deflection force test (typical arrangement of equipment)

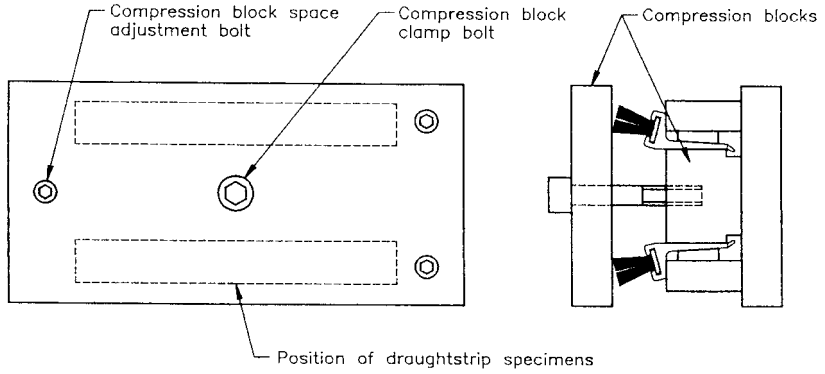


Figure A.2 Mounting block for set in product under sustained compression/deflection test (typical arrangement of equipment)

A Balance beam
B Fulcrum (to allow contact plate to swivel)
C Balance adjusting weight
D Contact plate (to be half the nominal sample length and to pivot freely from side to side)
E Weight (dropped over height measurement post)
F Height measurement post (on contact plate)
G Suggested measurement datum
H Draughtstrip specimen
J Mounting block (height to be such that arm angle is restricted to ± 2.5°)

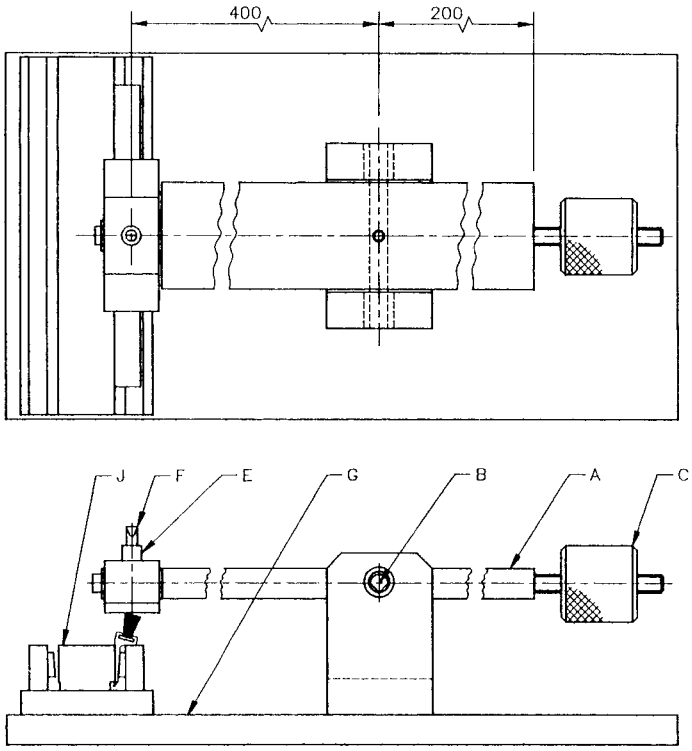


Figure A.3 Method of measuring height of working section (typical arrangement of equipment)

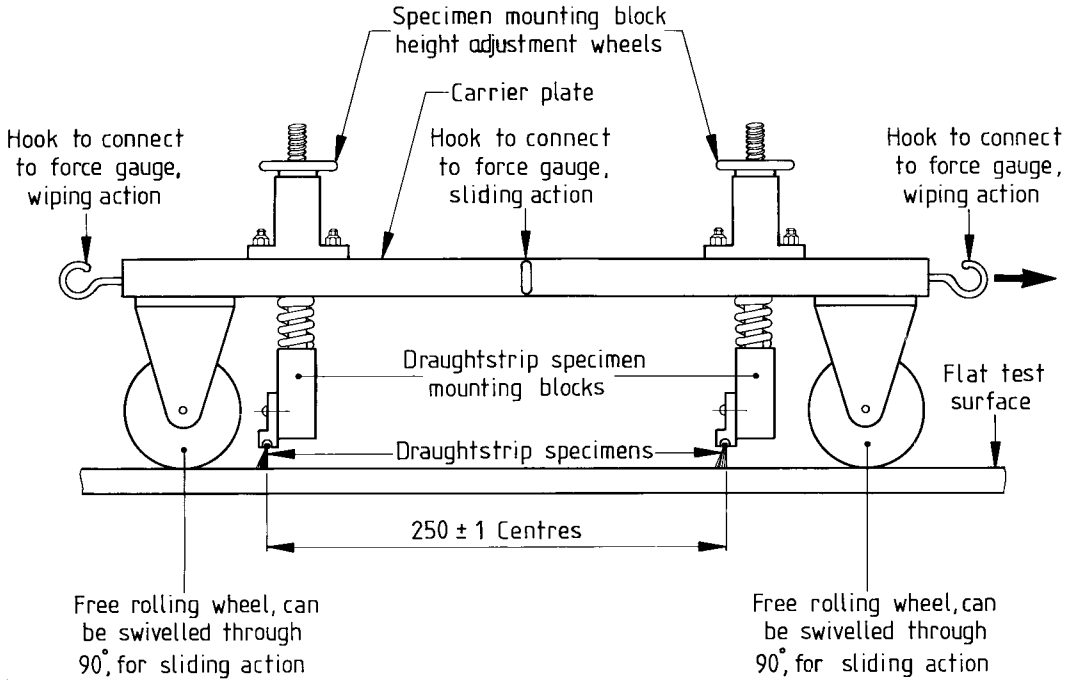


Figure A.4 Sliding friction force test (typical arrangement of equipment)

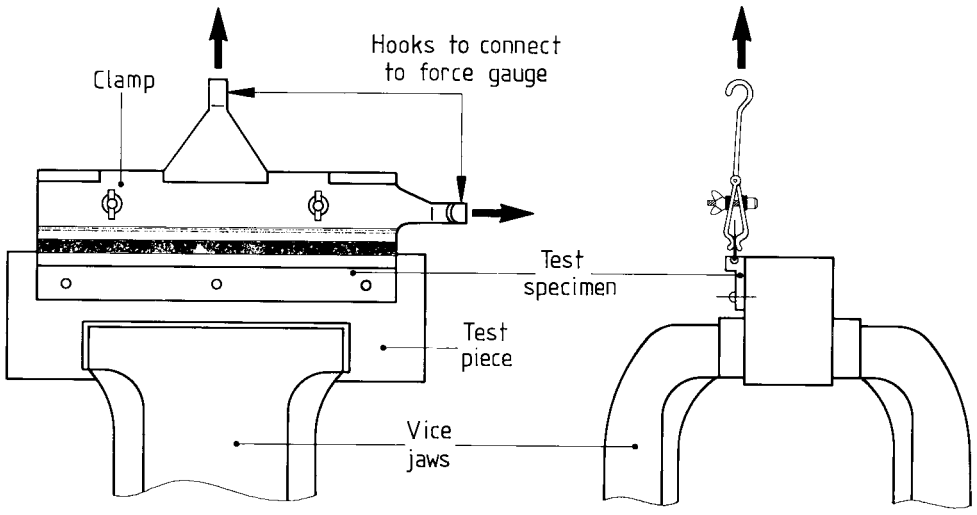


Figure A.5 Integrity of working section and carrier test (typical arrangement of equipment)

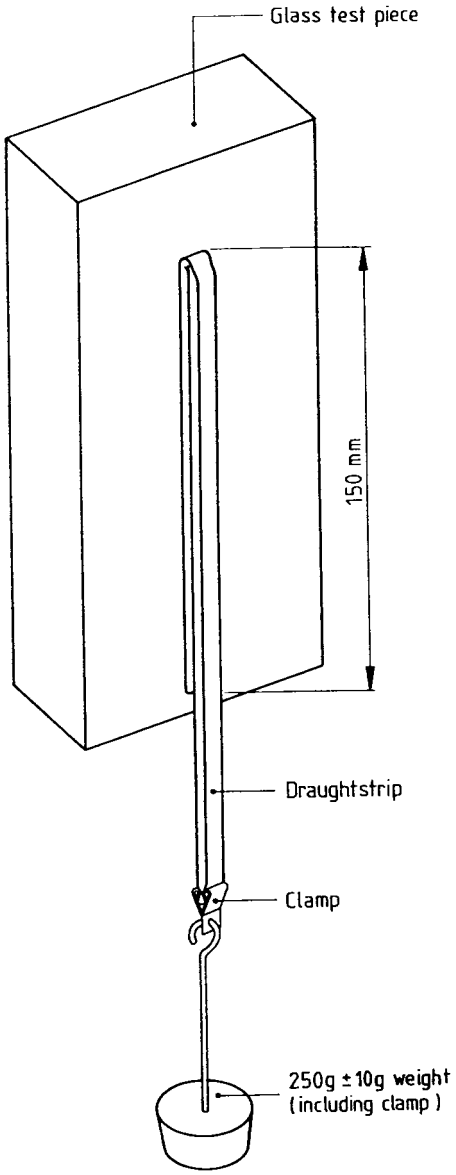


Figure A.6 Test for adhesion of draughtstrips secured by an adhesive only (typical arrangement of equipment)

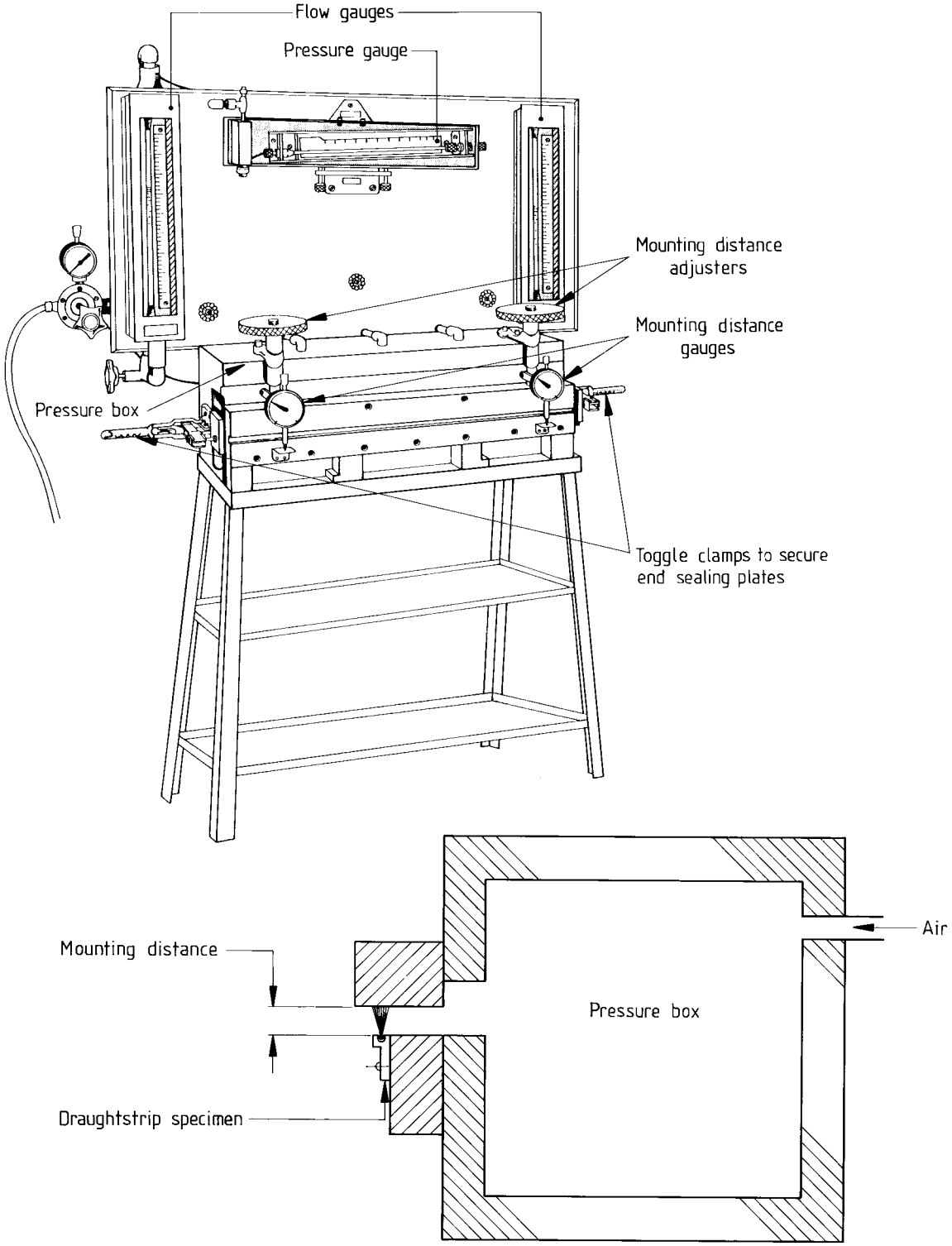
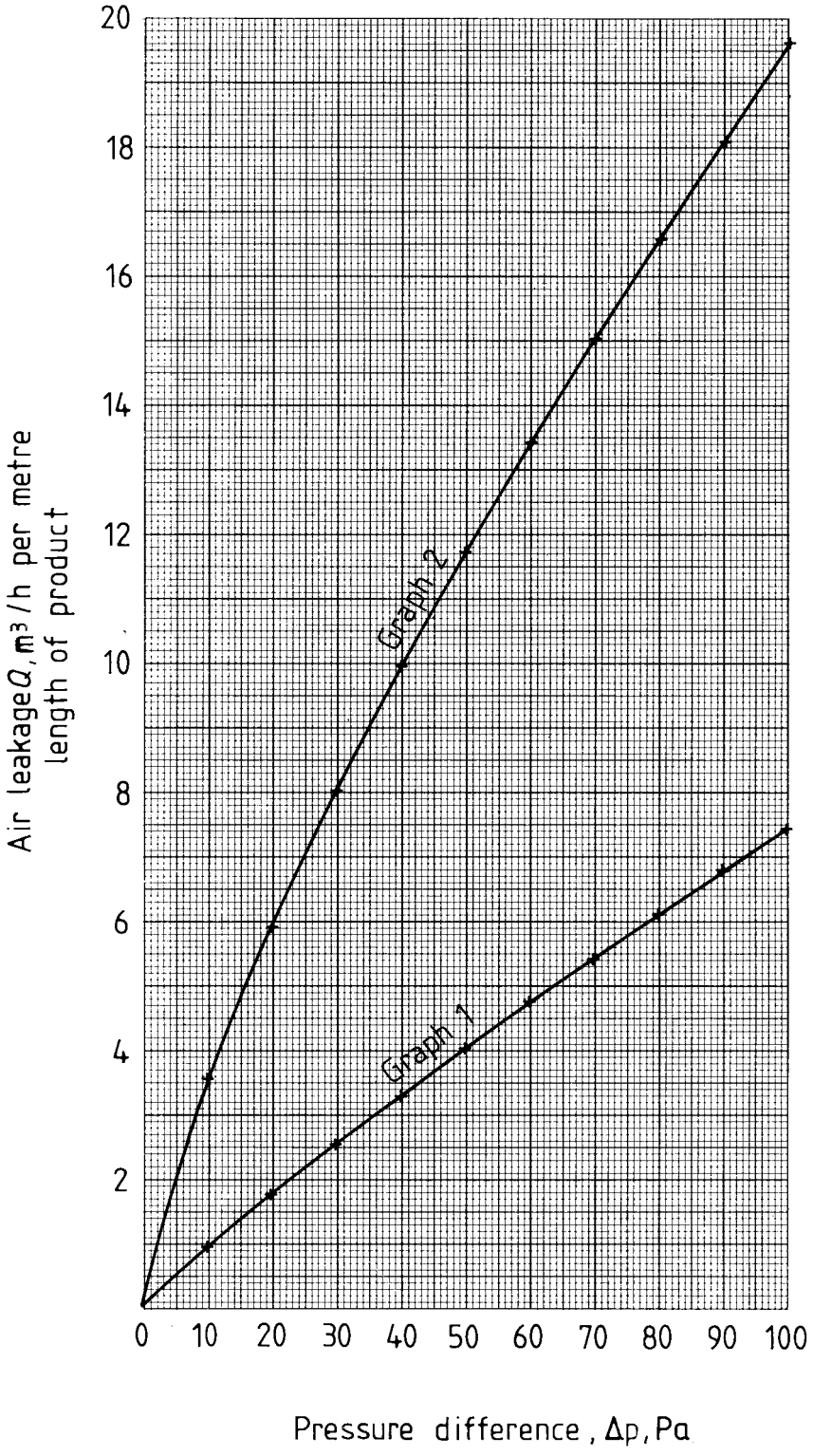
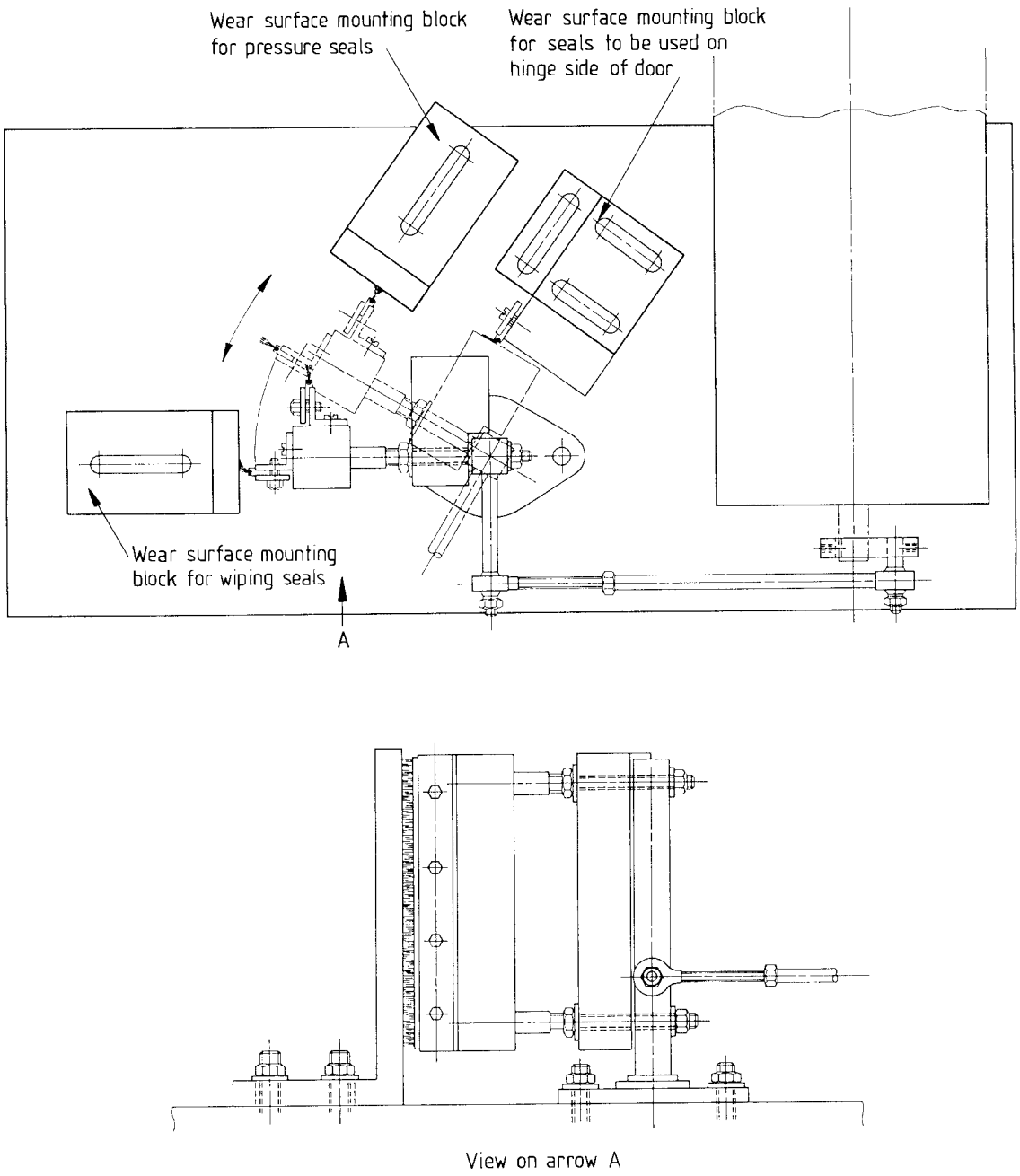


Figure A.7 Air leakage test (typical arrangement of equipment)



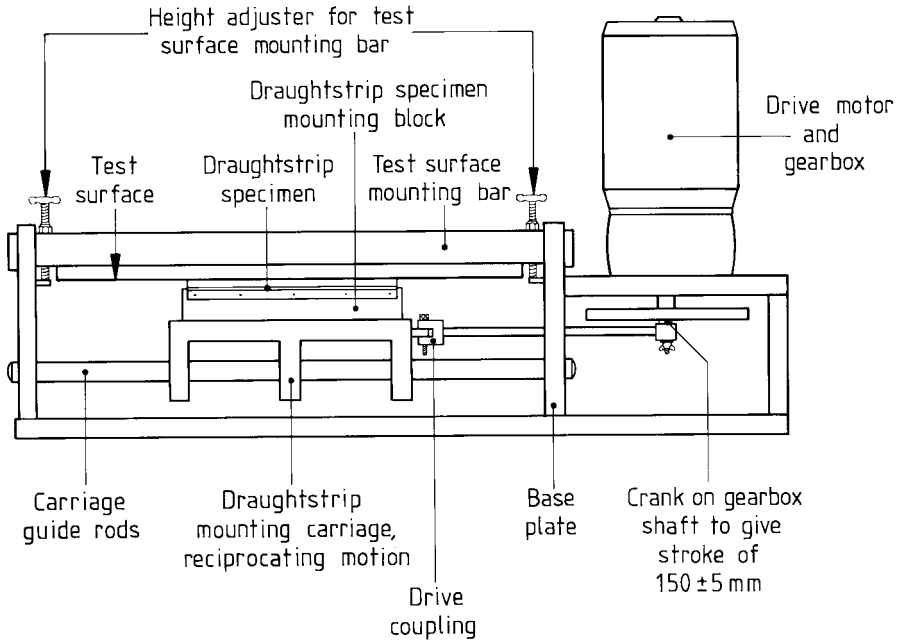
NOTE. Graph 1: products designed to fit a maximum gap size of 10 mm or less.
Graph 2: products designed to fit a maximum gap size greater than 10 mm.

Figure A.8 Maximum air leakage through product plotted against applied pressure difference



a) Equipment for modes 1), 2) and 3) (see **A.8.2**e)

Figure A.9 Resistance to wear test (typical arrangement of equipment)



b) Equipment for mode 4) (see **A.8.2**e)

Figure A.9 Resistance to wear test (typical arrangement of equipment) *(continued)*

Annex B (informative)

Advisory notes on the seasonal movement of external doors made of wood

The moisture content of wood components such as windows and doors varies with the seasonal changes in climate, and this can result in seasonal changes of shape and size. Thus, the gaps around an external door, for example, may vary in broadly regular cycles from summer to winter and back again the following summer. This movement is relevant to two aspects of draughtstrip performance: one is a possible loss of seal due to increases in gap which the seal might not be able to follow; the other is that reductions in gap might lead to an increase in door closing force (but no loss of seal) because the draughtstrip needs to be more compressed before the latch can be engaged.

Unpublished Building Research Establishment surveys, carried out for the Department of Energy and the Department of the Environment, of gaps around openable windows and doors have included measurements, made in July and again the following January, on 260 external doors of timber construction. Measurements of edge gaps and face gaps made at 10 positions around each door revealed that the changes in gap size along the lock stiles of doors tend to be greater than those along the hinge stiles and the changes at the bottom of doors tend to be greater than at the head. The seasonal change may increase or decrease the size of the gap.

Annex C (informative)

Advisory notes on materials specification and resistance to weather

It is apparent that some of the materials used in the manufacture of draughtstrips suffer degradation when exposed to sunlight and the weather. In particular, ultraviolet (UV), rain and ozone are known to have significant effects. Ozone mainly affects rubber type materials for which adequate material specification and ozone testing standards already exist. An ozone test specifically for draughtstrips is not therefore appropriate; however, rubber type raw materials should conform to procedure A of BS 903 : Part A43 : 1990.

The Building Research Establishment commissioned research in the late 1980s which was intended to establish the most appropriate type of artificial weathering test for this British Standard. The results of that research were inconclusive in that there was little visible degradation in a sample of draughtstrip specimens after what were considered to be relatively severe exposures and physical tests on specimens did not show consistent or significant changes in draughtstrip properties relative to those measured before exposure. An artificial weathering test using exposure to UV was not therefore included in BS 7386 : 1990.

The matter of artificial weathering was investigated again in 1996. The possibility of adopting test methods used for plastics window frames and glazing gaskets was rejected as impractical and not appropriate to draughtstrips. Furthermore committees responsible for plastics windows and glazing gaskets had been working for some time on artificial weathering tests for similar materials, with inconclusive results and there was concern over the duration and cost of the tests required. Therefore, regrettably there is still no suitable artificial weathering test available for draughtstrips.

The possibility of requiring plastics raw materials used in draughtstrip manufacture to conform to specifications for UV resistance was investigated but, surprisingly, no suitable British or European Standard could be found. Nevertheless it is absolutely essential that plastics raw materials used in the manufacture of draughtstrips are specified to contain suitable quantities of appropriate UV stabilizing additives. It is suggested that a North American specification ASTM 53 may be a practical means of specifying UV stabilized raw materials sourced in the United Kingdom.

blank

List of references (see clause 2)

Normative references

BSI publications

BRITISH STANDARDS INSTITUTION, London

BS 6100 :	*Glossary of building and civil engineering terms*
BS 6100 : Subsection : 1.3.5 : 1988	*Doors, windows and openings*

Informative references

BSI publications

BRITISH STANDARDS INSTITUTION, London

BS 903 :	*Physical testing of rubber*
BS 903 : Part A43 : 1990	*Method for determination of resistance to ozone cracking (static strain test)*

Other publications

Domestic draughtproofing: materials, costs and benefits. Building Research Establishment Digest 319, March 1987

Operating light- and water-exposure apparatus (fluorescent UV condensation type) for exposure of non-metallic material. ASTM-G53, 1996

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