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British Standard Methods of test for

Buttons

Méthodes d'essai des boutons

Verfahren zur Prüfung von Knopfwaren

British Standards Institution

Contents

Foreword

This British Standard is a revision of the standard first published in 1967 and amended in 1969 and 1974, and has been prepared under the direction of the Textile Products and Leather Standards Committee. BS 4162 : 1967 is now withdrawn.

This British Standard was prepared at the request of the British Button Manufacturers' Association and others interested in ascertaining and establishing the ability of buttons to meet user specifications, particularly with regard to various methods of cleaning the garments to which they are attached.

The principal changes introduced by this revision are as follows:

(a) units and quantities are now based on the metric system of measurement;

(b) new tests are described for resistance to wash liquors; resistance to dry-cleaning solvents; resistance to free steam pressing and resistance to hot head pressing;

(c) the test for strength of buttons has been extended to include an impact test;

(d) additional tests are given for resistance to abrasive action, resistance to atmospheric corrosion and resistance to water, sea-water (sodium chloride solution) and chlorine water.

The methods of test are, in appropriate cases, based on the corresponding methods of test in BS 1006.

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

British Standard Methods of test for

Buttons

1. Scope

This British Standard describes methods of test for all types of buttons for the fastening and ornamentation of wearing apparel.

NOTE 1. The tests cannot be directly related to laundering and dry-cleaning occurring in practice because other factors such as mechanical effects cannot be reproduced satisfactorily on a small scale, but they can be used to indicate the suitability of buttons for general and specific uses.

NOTE 2. The titles of the publications referred to in this standard are listed on page 9.

2. Sampling

Batch sampling for each test, except for the strength test, shall be as follows:

up to 1000 buttons	five buttons taken at random
1001 to 10 000 buttons	five buttons plus one for each additional 1000 or part thereof taken at random
10 001 to 100 000 buttons	15 buttons plus one for each additional 10 000 or part thereof taken at random
100 001 buttons upwards	25 buttons plus one for each additional 25 000 or part thereof taken at random.

When duplicate test samples are required each test sample shall be taken as near as possible from the same source.

For the strength test (clause 4) the above sampling procedure shall be followed, except that the minimum size of sample shall be 10 buttons.

3. Determination of abrasion resistance

3.1 General. This test determines the resistance of all types of buttons to normal 'wear and tear' such as may be encountered during the lifetime of garments.

3.2 Principle. The buttons, together with a specified quantity of a designated grade of pumice powder are tumbled in a small cylindrical barrel which is rotated at a specified number of revolutions per minute over a specified period of time. The buttons are examined for any change in appearance.

3.3 Apparatus

3.3.1 *Cylindrical PVC barrel*, inside diameter 105 mm, length 70 mm having a removable lid. The barrel is mounted horizontally and rotated by a fractional horsepower motor at a constant speed of 60 r/min.

3.3.2 *Pumice powder*, dry, commercial grade, i.e. mean particle diameter less than 425 μm.

3.3.3 *Balance*, capable of weighing to an accuracy of 0.1 g.

3.3.4 *Small sieve*, aperture size approximately 6.7 mm.

3.3.5 *Soft brush or duster.*

3.4 Procedure. Weigh out 50 g of pumice powder, and place in the barrel with:

(a) for 11 mm to 25 mm buttons, 5 test buttons;

(b) for 26 mm to 38 mm buttons, 3 test buttons.

Replace the lid and rotate the barrel at 60 r/min for 30 min. Remove the lid and empty the contents of the barrel on the sieve. Separate the buttons from the pumice powder by gently shaking the sieve. Remove all traces of pumice powder from the buttons by means of a soft brush or duster. Repeat until all the test buttons have been tested.

Examine carefully the tested buttons and compare with untested buttons in a north sky light.

The buttons shall be considered to have passed the test if there is no visible change in their appearance.

NOTE 1. The surfaces to be compared are illuminated by north sky light in the Northern hemisphere (or south sky light in the Southern hemisphere) or an equivalent source of light giving an illuminance of 600 lx or more. The light is incident upon the surfaces at an angle of approximately 45°, and the direction of viewing is approximately along the perpendicular to the plane of the surfaces.

NOTE 2. Fresh pumice powder should be used for each batch sample of buttons tested.

3.5 Test report. The test report shall include the following particulars:

(a) the test result, pass or fail;

(b) reference to this standard;

(c) details of any deviation from the test method.

4. Determination of strength

4.1 General. This test determines the resistance of all types of buttons (10 mm diameter and over) to strain imposed during clothing manufacture or normal use (tension) and/or to violent blows encountered during clothing manufacture or normal use (impact).

4.2 Principle. The buttons are subjected (a) to tension whereby the load is steadily increased until the point of breakage occurs and/or (b) to impact by a pendulum of a specified mass released from a specified height.

4.3 Apparatus

4.3.1 *Tension*

4.3.1.1 *Mechanically driven tensometer* giving a rate of separation of the grips of 6.35 mm/min.

4.3.1.2 *Jig to hold the button evenly round its outer edge* (see figure 1).

4.3.1.3 1.6 mm *welding rod* pieces bent as shown in figure 1, so as to pass easily through the holes in the button or hole in the shank and attached to the clamp. For certain types of buttons* a different means of attaching the button to the clamp will be required to apply a horizontal tensile force.

4.3.1.4 *Clamp* to hold the ends of the welding rod during the test.

4.3.2 *Impact*

4.3.2.1 *An Izod-type impact machine* (see figure 2).

4.3.2.2 *Button holders* of suitable size for the buttons to be tested (see figure 2).

4.4 **Test specimens.** Take ten buttons at random for each test.

4.5 **Procedures**

4.5.1 *Tension.* Pass the looped welding rod through the holes in a test button (through two holes diagonally opposite each other for a four hole button or through the hole in the shank of the button). Assemble the button and rod in the tensometer. Apply a gradually increasing load until the button or shank breaks and note the reading obtained in newtons. Repeat the procedure on the remaining test buttons.

Calculate the average and record the highest and lowest results.

NOTE. The highest and lowest values are normally expected to deviate by up to 25 % of the average strength, e.g. for an average strength of 100 N the values of 75 N minimum and 125 N maximum are regarded as on the borderline of normal deviation.

4.5.2 *Impact.* Place a test button into the half round cavity of the appropriate sized clamp with the face towards the swing of the pendulum weight such that for a four hole button, two holes are exposed and for a two hole button, one hole is exposed. Close the clamp with the button in position and load the assembly on the base of the impact machine by means of the screw provided. Raise and secure the pendulum at position 2 (see figure 2) for a button up to 15 mm diameter, or at position 1 for a larger button by means of the spring loaded catch. Release the catch and allow the pendulum to swing down, striking the button. Record whether the button breaks, fractures or distorts. Repeat the procedure on the remaining test buttons.

4.6 **Conditions for pass or fail.** When tested by the tension and/or impact tests the buttons shall meet the following criteria:

(a) if submitted to the tension test the buttons shall be classified as 'light duty' or 'heavy duty', depending on their average tension strength and diameter as specified in table 1;

(b) if submitted to the impact test the buttons shall not break, fracture or distort.

Table 1. Average tension strength values

Button diameter	Average tension strength (min)	
	Light duty	Heavy duty
mm	N	N
Up to 13	65	130
13 and below 16	90	155
16 and below 23	110	180
23 and below 30	130	200

4.7 **Test report.** The test report shall include the following particulars:

(a) the strength of the buttons (see 4.6);

(b) reference to this standard;

(c) details of any deviation from the test method.

5. Resistance to wash liquors

5.1 **General.** This test determines the resistance of all types of buttons to wash liquors at temperatures of 40 °C, 50 °C, 60 °C or 95 °C, as required. These temperatures cover the range of washing procedures from mild to severe.

5.2 **Principle.** The buttons are placed in contact with standard multi-fibre adjacent fabric and then mechanically agitated under specified conditions of time and temperature in a soap or detergent solution, rinsed and dried. The change in colour of the buttons and the staining of adjacent fabrics are assessed with the grey scales.

5.3 **Apparatus and reagents**

5.3.1 *Rotary mechanical washing device,* as described in appendix A.

5.3.2 *Beaker, or similar container,* 750 mL capacity, suitable for boiling water and of a size sufficient to cover the test specimen.

5.3.3 *Means of heating the beaker.*

5.3.4 *Thermometer,* 0 °C to 110 °C.

5.3.5 *Bags containing non-corrodible steel balls.* Squares of undyed, unfinished cotton twill, each measuring approximately 100 mm x 100 mm, sewn together in pairs along all four sides containing 10 non-corrodible 6 mm diameter steel balls.

5.3.6 *Grey scales,* complying with BS 1006, sections A02 and A03.

5.3.7 *Pieces of standard multi-fibre adjacent fabric*†, 100 mm width.

5.3.8 *Soap solution,* containing 5 g of soap complying with BS 1006, section C03 and 2 g of anhydrous sodium carbonate per litre of deionized water. The solution shall be freshly prepared.

NOTE. Soap complying with BS 1912 is suitable.

*For example: screw type, serrated wires, spike with sherlock-type washers, draw strings and loops, etc.

†For information on the availability of standard multi-fibre fabric, apply to Central Enquiries Section, BSI, 2 Part Street, London W1A 2BS, enclosing a stamped addressed envelope for reply.

5.3.9 *Detergent solution*, containing 4 g of detergent complying with BS 1006, section C06 and 1 g of sodium perborate per litre of deionized water. The solution shall be freshly prepared.

5.4 Composite specimens. Sew up to five of the test buttons equally spaced along the centre of the first piece of fabric of suitable length. Cover with the second piece of fabric of similar length and sew along all four sides and between the buttons. Prepare composite specimens from the remainder of the test buttons in the same way.

NOTE 1. For large buttons it may be necessary to prepare a greater number of composite specimens. Each composite specimen should be tested separately.

NOTE 2. The buttons should be sewn as close as possible together so that they do not touch, but so that all fabric types are touched if the multi-fibre adjacent fabric strip is used.

5.5 Procedure. Test each composite specimen in turn as follows.

Pour a quantity of the soap solution (**5.3.8**) or the detergent solution (**5.3.9**) equal to half the capacity of a container of the rotary mechanical washing device unit into the beaker and raise its temperature to 40 °C, 50 °C, 60 °C or 95 °C, as required.

Immerse the composite specimen and two bags of steel balls. Raise the temperature of the contents of the beaker to the test temperature plus 2 °C within 2 min and transfer the contents of the beaker to a container of the mechanical washing device. When the temperature has fallen to the test temperature, seal the container and rotate it at 35 ± 2 r/min for 30 min.

Remove the composite specimen from the solution, thoroughly rinse in water and hang up until completely dry. Both the rinsing and the drying shall be carried out at room temperature (approximately 20 °C).

Separate the two pieces of fabric and examine each piece and the buttons. It is permitted to rub the surface of the buttons with a piece of dry fabric to remove any sediment that may have adhered.

Assess the change in colour of the buttons and the staining of the adjacent fabric with the grey scales.

Examine the buttons for distortion or other defects, i.e. softening, swelling, blistering, cracking, breaking, or loss of lustre.

5.6 Conditions for pass or fail. The buttons shall be deemed to have passed the test if the following conditions are met:

(a) the colour fastness of the buttons is not less than 4 when assessed against the grey scale for assessing change in colour;

(b) the staining of the adjacent fabrics is not less than 5 when assessed against the grey scale for assessing staining of the adjacent fabric;

(c) there is no distortion or other defect.

5.7 Test report. The test report shall include the following particulars:

(a) the test result, pass or fail;

(b) the test temperature;

(c) reference to this standard;

(d) details of any deviation from the test method.

6. Resistance to dry-cleaning solvents

6.1 General. This test determines the resistance of all types of buttons to dry-cleaning solvents.

6.2 Principle. The buttons are placed in contact with multi-fibre adjacent fabric and subjected to agitation in a dry-cleaning solvent at a specified temperature, over a fixed period of time, after which they are removed and dried. The change in colour of the buttons, and the staining of adjacent fabrics, are assessed with the grey scales.

6.3 Apparatus and reagents

6.3.1 *The apparatus described in* **5.3.1** *to* **5.3.7.**

6.3.2 *Dry-cleaning solvent.* For buttons intended for industrial garments, use trichloroethylene complying with type 1 of BS 580; for buttons intended for domestic garments, use tetrachloroethylene complying with BS 1593.

Warning note 1. Careful handling of these solvents is essential as they are volatile and the fumes given off are objectionable and in some instances can be harmful. In the presence of a naked flame they can be decomposed into poisonous gases.

Warning note 2. Dry-cleaning fluids should never be disposed of into public sewers.

6.4 Composite specimens. Prepare composite specimens from the test buttons as described in **5.4.**

6.5 Procedure. Test each composite specimen in turn as follows.

Place the composite specimen and two bags of steel balls in one container of the mechanical washing device. Pour a quantity of the appropriate dry-cleaning solvent, equal to half the capacity of the container, into the beaker and heat to a temperature between 35 °C and 36 °C.

Transfer the heated solvent to a container of the mechanical washing device and immediately check the temperature to ensure that it is between 32 °C and 34 °C. Close the container and rotate the unit at 35 ± 2 r/min for 30 min.

Remove the composite specimen from the solvent and hang it up to dry at room temperature (approximately 20 °C).

Separate the two pieces of fabric and examine each piece and the buttons. It is permitted to rub the surface of the buttons with a piece of dry fabric to remove any sediment that may have adhered.

Assess the change in colour of the buttons and the staining of the adjacent fabric with the grey scales.

Examine the buttons for distortion or other defects, i.e. softening, swelling, blistering, cracking, breaking, or loss of lustre.

NOTE. Drying should preferably be carried out in a fume cupboard.

6.6 Conditions for pass or fail. The buttons shall be deemed to have passed the test if the following conditions are met:

(a) the colour fastness of the buttons is not less than 4 when assessed against the grey scale for assessing change in colour;

(b) the staining of the adjacent fabric is not less than 5 when assessed against the grey scale for assessing staining of the adjacent fabric;

(c) there is no distortion or other defect.

6.7 Test report. The test report shall include the following particulars:

(a) the test result, pass or fail;

(b) reference to this standard;

(c) details of any deviation from the test method.

7. Resistance to free steam pressing

7.1 General. This test determines the resistance of all types of buttons to free steam pressing. Where necessary tests shall be made:

(a) on new buttons; and

(b) when the buttons are to be used on garments suitable for dry-cleaning, the test in addition shall be carried out on the composite specimens previously used for the solvent test (see clause 6). Similarly, when the buttons are to be used on garments suitable for laundering, the test in addition shall be carried out on the composite specimens previously used for the wash liquor test (see clause 5).

7.2 Principle. The buttons are placed in contact with standard multi-fibre adjacent fabric and subjected to free steam pressing at a specified pressure, over a fixed period of time, removed and dried. The change in colour of the buttons and the staining of the adjacent fabric are assessed with the grey scales.

7.3 Apparatus

7.3.1 *A free steam press clothed as follows:*

head: fabric safe plate;

buck: copper gauze (next to casting),
2 knitted cotton pads (in new state),
1 wool flannel,
1 outer cover.

7.3.2 *Grey scales* complying with BS 1006, sections A02 and A03.

7.3.3 *Pieces of standard multi-fibre fabric*,* width 100 mm.

7.4 Composite specimens. Prepare composite specimens from the test buttons as described in 5.4.

7.5 Procedure. Ensure that the steam press has attained the normal working temperature with a steam pressure of 0.34 MPa to 0.41 MPa. Test each composite specimen in turn as follows.

Place the composite specimen on the centre of the buck, close and lock the press and allow steam to issue from both the head and the buck for 4 s continuously. The locking pressure exerted between head and buck shall be approximately 50 kPa.

Release the pressure, apply vacuum for 4 s and open the press.

Remove the composite specimen from the press. Separate the two pieces of fabric and hang up to dry at room temperature (approximately 20 °C). Examine each piece of fabric and the buttons.

Assess the change in colour of the buttons and the staining of the adjacent fabric with the grey scales. Examine the buttons for distortion or other defects, i.e. softening, swelling, blistering, cracking, breaking, or loss of lustre.

7.6 Conditions for pass or fail. The buttons shall be deemed to have passed the test if the following conditions are met:

(a) the colour fastness of the buttons is not less than 4 when assessed against the grey scale for assessing change in colour;

(b) the staining of the adjacent fabric is not less than 5 when assessed against the grey scale for assessing staining of the adjacent fabric;

(c) there is no distortion or other defect.

7.7 Test report. The test report shall include the following particulars:

(a) the test result, pass or fail;

(b) reference to this standard;

(c) details of any deviation from the test method.

8. Resistance to ironing

8.1 General. This test determines the resistance of all types of buttons to ironing on dry or damp fabrics at specified temperatures.

8.2 Principle. The buttons are placed on layers of dry or damp cotton twill which are spread over a specified surface. The buttons are pressed with an aluminium block heated to a specified temperature. The block is withdrawn and the pieces of fabric and the buttons removed. The change in colour of the buttons and the staining of the adjacent fabric are assessed with the grey scales.

8.3 Apparatus

8.3.1 *Aluminium block,* 100 mm diameter, 50 mm deep, with a central hole 6 mm in diameter, 40 mm deep, perpendicular to the upper flat surface. The block is fitted with a carrying handle. The total mass of the block and handle shall be 1150 ± 50 g. The base shall be turned and finished, and shall not be polished.

8.3.2 *Means for heating the aluminium block,* other than a naked flame, e.g. electrical hot plate.

8.3.3 *Thermometer,* 0° C to 360° C.

8.3.4 *Silicone grease or other fixative,* for ensuring good thermal contact.

8.3.5 *Insulating sheet.*

8.3.6 *Horizontal ironing board,* prepared by covering a suitable surface with one layer of 6 mm felt and two layers of undyed cotton twill (8.3.8).

8.3.7 *Grey scales,* complying with BS 1006, sections A02 and A03.

8.3.8 *Pieces of undyed, unfinished cotton twill,* of mass per unit area approximately 200 g/m^2.

8.4 Procedure. Place the test buttons on a piece of cotton twill (dry or damp) that has previously been placed on the prepared ironing board.

*For information on the availability of standard multi-fibre fabric, apply to Central Enquiries Section, BSI, 2 Park Street, London W1A 2BS, enclosing a stamped addressed envelope for reply.

NOTE. Damp pieces of cotton twill are those soaked in water and dried so that the mass per unit area is approximately 10 % above that of the same fabric in equilibrium with the ambient atmosphere. To check that 10 % water has been absorbed, weigh the fabric, soak in water, wring out and re-weigh.

Place the thermometer in the central hole of the aluminium block together with some silicone grease (8.3.4). Heat the block to a temperature of at least 5 °C above that required for the test and transfer to the insulating sheet.

The temperatures for this test shall be as follows:

(a) 150 °C
(b) 180 °C
(c) 210 °C.

When the correct temperature is recorded place the aluminium block on each button for 4 s and withdraw.

Remove the pieces of cotton twill and the buttons.

Assess the change in colour of the buttons and the staining of the adjacent fabric with the grey scales. Examine the buttons for distortion or other defects, i.e. softening, swelling, blistering, cracking, breaking, or loss of lustre.

8.5 Conditions for pass or fail. The buttons shall be deemed to have passed the test if the following conditions are met:

(a) the colour fastness of the buttons is not less than 4 when assessed against the grey scale for assessing change in colour;

(b) the staining of the adjacent fabric is not less than 5 when assessed against the grey scale for assessing staining of the adjacent fabric;

(c) there is no distortion or other defect.

8.6 Test report. The test report shall include the following particulars:

(a) the test result, pass or fail;
(b) the ironing temperature used;
(c) whether the test has been carried out with dry or damp fabrics;
(d) reference to this standard;
(e) details of any deviation from the test method.

9. Resistance to hot head pressing

9.1 General. This test determines the resistance of all types of buttons to hot head pressing, both pre-cured and post-cured techniques.

9.2 Principle. The buttons are placed in contact with standard multi-fibre adjacent fabric and subjected to hot head pressing at a specified pressure over a fixed period of time. The change in colour of the buttons, and the staining of the adjacent fabric are assessed with the grey scales.

9.3 Apparatus

9.3.1 *Hot head press* having a padded buck comprising:

1 piece of 9 mm silicone rubber with perforations;
1 piece of aramid flannel;
1 aramid outer cover.

9.3.2 *Pieces of standard multi-fibre adjacent fabric**, width 100 mm.

9.3.3 *Grey scales* complying with BS 1006, sections A02 and A03.

9.4 Composite specimens. Sew up to five of the test buttons equally spaced along the centre of a piece of multi-fibre fabric (9.3.2). Cover with a similar piece of fabric.

Prepare composite specimens from the remainder of the test buttons.

NOTE. For large buttons it may be necessary to prepare a greater number of composite specimens. Each composite specimen should be tested separately.

9.5 Procedure. Ensure that the hot head press has attained the normal working temperature of 175 °C. Test each composite specimen in turn as follows.

Place the composite specimen in position on the press. Close the press with a locking pressure of 70 kPa over the pressing area. Lock for 10 s continuously. Release the pressure. Apply vacuum for 5 s and open the press.

Remove the composite specimen from the press. Separate the two pieces of fabric. Examine the two pieces of fabric and the buttons.

Assess the change in colour of the buttons and the staining of the adjacent fabric with the grey scales. Examine the buttons for distortion or other defects, i.e. softening, swelling, blistering, cracking, breaking, or loss of lustre.

9.6 Conditions for pass or fail. The buttons shall be deemed to have passed the test if the following conditions are met:

(a) the colour fastness of the buttons is not less than 4 when assessed against the grey scale for assessing change in colour;

(b) the staining of the adjacent fabric is not less than 5 when assessed against the grey scale for assessing staining of the adjacent fabric;

(c) there is no distortion or other defect.

9.7 Test report. The test report shall include the following particulars:

(a) the test result, pass or fail;
(b) reference to this standard;
(c) details of any deviation from the test method.

10. Resistance to atmospheric corrosion

10.1 General. This test determines the resistance of all types of metal and metallized plastics buttons to corrosion when exposed to harmful atmospheres (a) with and (b) without the presence of water.

10.2 Principle. The buttons are placed in contact with specified adjacent fabric and subjected to a corrosive atmosphere created by a specified quantity of ammonium sulphide solution for a specified period of time, after which they are removed and dried. The change in colour of the buttons, and the staining of the adjacent fabric, are assessed with the grey scales.

*For information on the availability of standard multi-fibre fabric, apply to Central Enquiries Section, BSI, 2 Park Street, London W1A 2BS, enclosing a stamped addressed envelope for reply.

10.3 Apparatus and reagents

10.3.1 *Ammonium sulphide,* 0.5 % (*V/V*) solution made by diluting 2.5 mL of analytical reagent quality ammonium sulphide to 500 mL with deionized water.

10.3.2 *Desiccator,* at least 200 mm internal diameter at the top fitted with an approximately 200 mm diameter perforated porcelain disc.

10.3.3 *Measuring cylinder,* 10 mL capacity.

10.3.4 *Glass funnel,* long stemmed.

10.3.5 *Grey scales* complying with BS 1006, sections A02 and A03.

10.3.6 *Pieces of standard multi-fibre adjacent fabric*,* width 100 mm.

10.4 **Composite specimens.** Prepare composite specimens as described in **5.4** but in duplicate (two sets of composite specimens from duplicate test samples).

10.5 **Procedure.** Place 10 mL of ammonium sulphide solution (**10.3.1**) in the well of the desiccator using the long stemmed funnel. Place a composite specimen on the porcelain disc, close the desiccator and leave for 1 h at room temperature (approximately 20 °C).

Remove the specimen, separate the fabrics and examine the fabrics and buttons.

Immerse a second composite specimen in deionized water; thoroughly wet the fabrics; remove, squeeze out excess moisture, and treat as for the first specimen.

Assess the change in colour of the buttons and the staining of the adjacent fabric with the grey scales. Examine the buttons for distortion or other defects, i.e. softening, swelling, blistering, cracking, breaking, or loss of lustre.

Repeat the above procedure on the remaining composite specimens.

10.6 **Conditions for pass or fail.** The buttons shall be deemed to have passed the test if the following conditions are met:

(a) the colour fastness of the buttons is not less than 4 when assessed against the grey scale for assessing change in colour;

(b) the staining of the adjacent fabric is not less than 5 when assessed against the grey scale for assessing staining of the adjacent fabric;

(c) there is no distortion or other defect.

10.7 **Test report.** The test report shall include the following particulars:

(a) the test result, pass or fail;

(b) reference to this standard;

(c) details of any deviation from the test method.

11. Resistance to the action of water, sea-water, or chlorine water

11.1 **General.** This test determines the resistance of all types of buttons to the action of water, sea-water (sodium chloride solution) or chlorine water.

11.2 **Principle.** The buttons are placed in contact with specified adjacent fabric and are immersed in water, sodium chloride solution or chlorine water, drained, separated and examined.

The buttons are examined for any change in appearance. The change in colour of the buttons, and the staining of the adjacent fabrics are assessed with the grey scales.

11.3 Apparatus and reagents

11.3.1 *Oven* that can be maintained at 37 ± 2 °C.

11.3.2 *Petri dish.*

11.3.3 *Pieces of standard multi-fibre adjacent fabric*,* width 100 mm, and, for the chlorine water test, pieces of undyed cotton and polyamide fabric, width 100 mm, free from finish, or any of the fabric combinations given in BS 1006, section UK-TF.

NOTE. It is not recommended that multi-fibre fabric be used for the chlorine water test since there is a danger that the hypochlorite will be absorbed and deactivated by the wool content of the fabric.

11.3.4 *Deionized water.*

11.3.5 *Sodium chloride solution,* 35 g/L in deionized water.

11.3.6 *Sodium hypochlorite solution* of the following composition:

active chlorine	140 g/L to 160 g/L
sodium chloride (NaC1)	120 g/L to 170 g/L
sodium hydroxide (NaOH)	20 g/L max.
sodium carbonate (Na_2CO_3)	20 g/L max.
iron (Fe)	0.01 g/L max.

To prepare chlorine water dilute one part of the above solution with 100 parts of deionized water immediately before use.

11.3.7 *Glass or acrylic resin plates,* 115 mm x 60 mm.

11.3.8 *Grey scales* complying with BS 1006, sections A02 and A03.

11.4 **Composite specimens.** Prepare composite specimens as described in **5.4.**

11.5 **Procedure.** Test each composite specimen in turn as follows.

Place the composite specimen in a petri dish filled with either water, or sodium chloride solution, or chlorine water so that it is totally covered. Leave the composite specimen to soak for 15 min at room temperature (approximately 20 °C). Lay the composite specimen on a glass or acrylic resin plate and place in the oven at 37 ± 2 °C, for 4 h.

Remove the composite specimen and thoroughly rinse it in water, then hang it up until completely dry. Carry out rinsing and drying at room temperature (approximately 20 °C).

Separate the two pieces of fabric and examine each piece and the buttons. It is permitted to rub the surface of the buttons with a piece of dry fabric to remove any sediment that may have adhered.

Assess the change in colour of the buttons and the staining of the adjacent fabric with the grey scales. Examine the buttons for distortion or other defects, i.e. softening, swelling, blistering, cracking, breaking, or loss of lustre.

* For information on the availability of standard multi-fibre adjacent fabric, apply to Central Enquiries Section, BSI, 2 Park Street, London W1A 2BS, enclosing a stamped addressed envelope for reply.

11.6 Conditions for pass or fail. The buttons shall be deemed to have passed the test if the following conditions are met:

(a) the colour fastness of the buttons is not less than 4 when assessed against the grey scale for assessing change in colour;

(b) the staining of the adjacent fabric is not less than 5 when assessed against the grey scale for assessing staining of the adjacent fabric;

(c) there is no distortion or other defect.

11.7 Test report. The test report shall include the following particulars:

(a) the test result, pass or fail;

(b) the solvent(s) used, i.e. water, sodium chloride solution, or chlorine water;

(c) reference to this standard;

(d) details of any deviation from the test method.

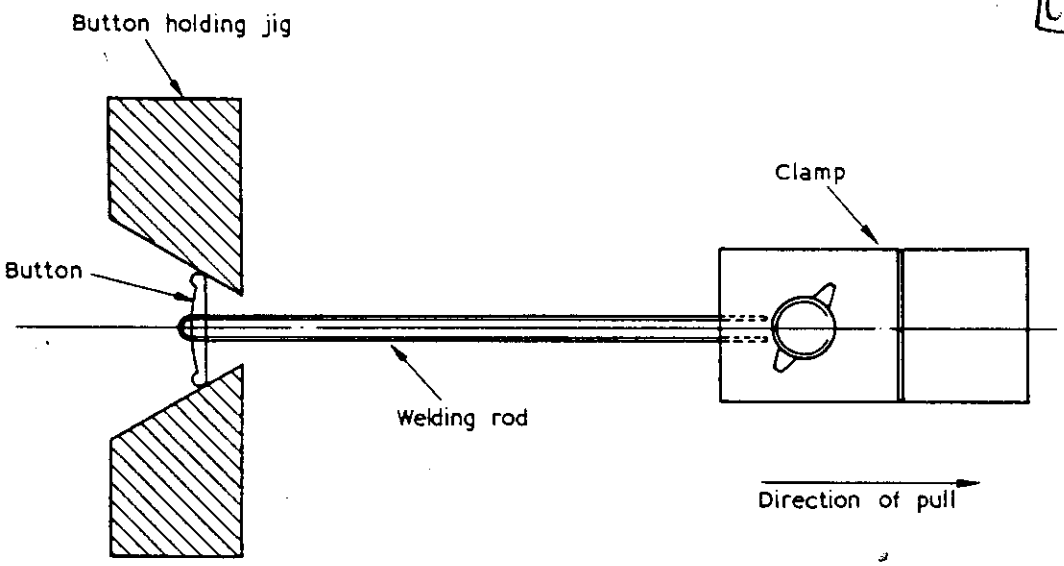
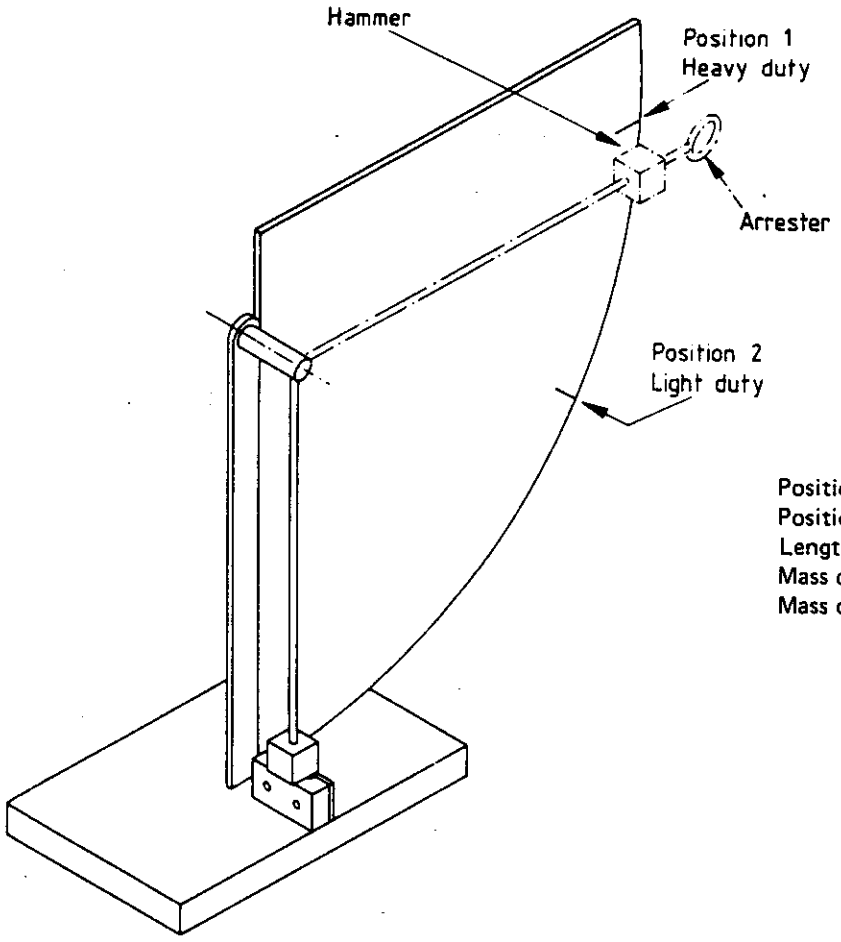


Figure 1. Tension test



Position 1 to base line	125 mm
Position 2 to base line	80 mm
Length of rod (centre to centre)	130 mm
Mass of hammer	53 g
Mass of rod	16 g

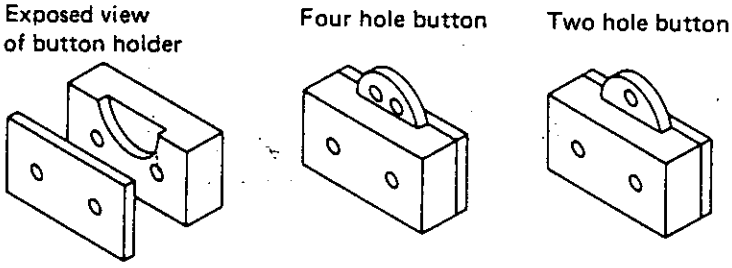


Figure 2. Swinging pendulum impact machine

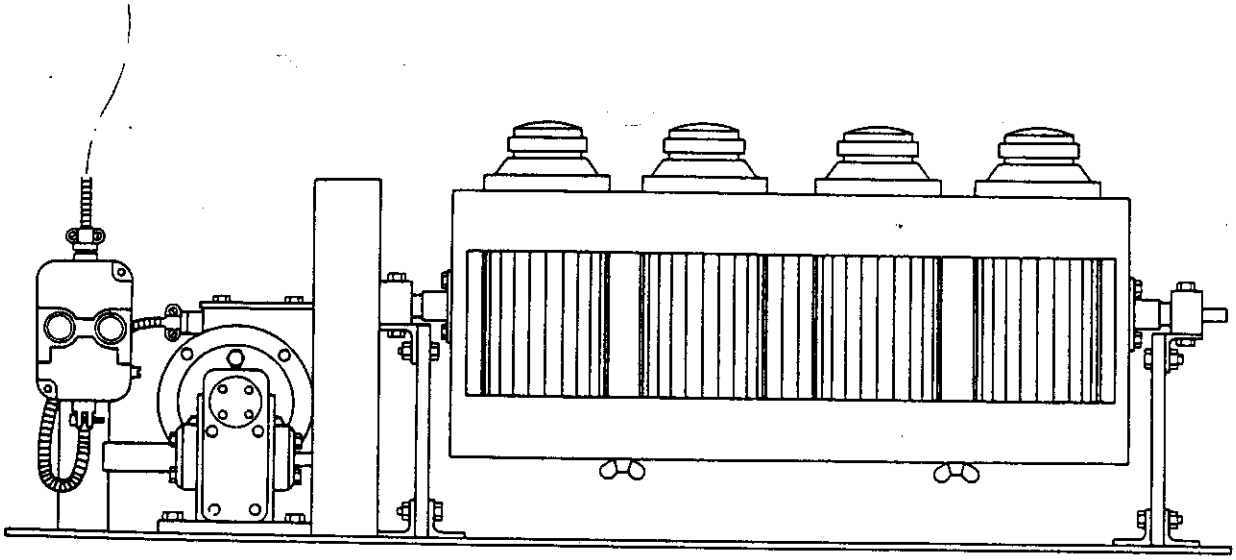


Figure 3. Rotary mechanical washing device

Appendix A

Rotary mechanical washing device

The device* (figure 3) driven by a fractional horsepower motor, consists of a wooden frame, measuring 533 mm x 213 mm x 140 mm constructed from 9.5 mm timber, supported on metal brackets, fitted with bearings.
The frame holds four vacuum flasks, referred to in the test methods as the containers, each of 1 L capacity, which are singly held in position at the top by a strip of ebonite cut and drilled to fit over the shoulders of the flasks. These are secured in pairs at the base, by means of a removable strip of metal, held in position by a wingnut.

It is essential that the vacuum flasks should have neither polystyrene necks nor polystyrene stoppers. Each polyamide (or cork) stopper is held down by a broad elastic band, fastened on one side of the flask, passing over the stopper to a hook on the other side. It is essential that the containers are sufficiently large to accommodate the test specimens. They should be at least 10 mm larger in both length and diameter. The mouth should be at least 5 mm larger than the largest diameter of the buttons tested.

*For information on the availability of the rotary mechanical washing device, apply to Central Enquiries Section, BSI, 2 Park Street, London W1A 2BS, enclosing a stamped addressed envelope for reply.

Publications referred to

BS 580 Trichloroethylene
BS 1006 Methods of test for colour fastness of textiles and leather
BS 1593 Perchloroethylene (tetrachloroethylene)
BS 1912 Soap flakes