

Specification for

Cleanliness of fillings and stuffings for bedding, upholstery, toys and other domestic articles —

Supplement No. 1: Appendices

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The Bedding Industry Standards Committee, under whose supervision this Supplement was prepared, consists of representatives from the following Government departments and industrial organizations:

- Furnishing Spring Makers' Federation
- Institute of Iron and Steel Wire Manufacturers
- Ministry of Defence, Army Department*
- Ministry of Health
- Ministry of Public Building and Works*
- National Association of Retail Furnishers*
- National Bedding Federation*
- National Union of Furniture Trade Operatives*
- Ticking Group
- Women's Advisory Committee of the BSI*
- Representatives of filling materials manufacturers

The Government departments and industrial organizations marked with an asterisk in the above list, together with the following, were directly represented on the committee entrusted with the preparation of this Supplement:

- Association of Public Analysts
- Association of Public Health Inspectors
- British Cotton Waste Association
- British Furniture Manufacturers' Federated Associations
- British Furniture Trades Confederation
- British Man-made Fibres Federation
- British Toy Manufacturers' Association Ltd.
- Drapers Chamber of Trade
- Furniture Industry Research Association
- Household Textiles Association
- Manchester Chamber of Commerce Testing House and Laboratory
- Ministry of Technology — Laboratory of the Government Chemist
- National Curled Woollen Flock Manufacturers' Association
- National Feather Purifiers Association
- National Fillings Trades Association
- Society for Analytical Chemistry
- Society of Medical Officers of Health
- Waste Trade Federation
- West of England Washed Flock Manufacturers' Association

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Foreword

This standard makes reference to the following British Standards:

BS 410, *Test sieves*.

BS 506, *Methanol*.

BS 507, *Ethanol*.

BS 509, *Acetone*.

BS 572, *Interchangeable conical ground glass joints*.

BS 1752, *Laboratory sintered or fritted filters*.

BS 1780, *Pressure gauges*.

BS 2071, *Soxhlet extractors*.

BS 2792, *Method for the quantitative analysis of intimate mixtures of secondary cellulose acetate with certain other fibres*.

BS 2822, *Quantitative chemical analysis of mixtures of protein and non-protein fibres*.

BS 2889, *Method of test for trash content of cotton and for trash and lint content of waste, intended for spinning, by means of the Shirley analyser*.

BS 3068, *Method for the quantitative analysis of mixtures of viscose rayon and cotton*.

BS 3069, *Method for the quantitative chemical analysis of binary mixtures of nylon 6 or nylon 6.6 and certain other fibres*.

BS 3591, *Industrial methylated spirits*.

This supplement contains the complete texts of Appendix A to Appendix P inclusive. Appendix A, Appendix B, Appendix C, Appendix D, Appendix E, Appendix G, Appendix K and Appendix P have been revised. Appendix F, as amended by Amendment No. 1 (PD 4041), incorporates only one further addition (item d) to the list of apparatus. The remainder (Appendix H, Appendix J, Appendix L, Appendix M, Appendix N and Appendix O) as amended by Amendments Nos. 1 and 3 (PD 4041 and PD 4687) are, with the exception of minor editorial alterations, reprinted without change.

This publication thus includes full and up-to-date details of all technical requirements for sampling, preparation of test specimens and testing of filling materials under BS 1425.

The fourth (1960) edition (i.e. the third revision) of BS 1425 introduced the concept that the whole of any consignment or stock of filling material complying with the standard should be capable of passing the cleanliness test. It was also established that a sample for testing might be drawn from any one bag, bale or other package or from any one finished article containing the filling in question. At the same time retesting and the recording of the mean of three test results, in cases where a high test figure had been obtained, was withdrawn.

As regards the test limits themselves, the Foreword of the previous (i.e. 1954) edition of the standard had explained that to obtain the necessary data on which to base the standard, comparative tests had been made on samples of good, bad and borderline quality of each type of filling by a number of analysts working independently and in different laboratories. Limits for each test had been agreed after very careful consideration of the results so obtained, making due allowances for slight variations in reproducibility of tests done in different laboratories and for variability of the materials themselves.

The changes in approach introduced by the 1960 edition clarified and simplified the position of the user or purchaser of filling materials. They also ensured that there would be no differences in the attitude of persons taking samples, whether in the capacity of an inspector taking samples under the Rag Flock Regulations or for the BSI marking scheme, or on behalf of a purchaser, or as part of the production control arrangements set up by a producer in his factory. In each case the gross sample taken by the sampling officer, and sent to the analyst for testing, needed simply to be as representative as possible, or reasonably representative within prescribed terms, of the bulk from which it was taken. This requirement would hold good for a sample of feathers or down taken from a single pillow or a sample of flock taken from a consignment of many bales. But the problem of the manufacturer is to establish means to keep his eye on a long run of production, and this problem is discussed at some length below.

Problem of the manufacturer. A significant part of the background to the new approach implicit in the 1960 edition is the onus placed on the manufacturer or producer of any filling material to *satisfy himself* that his production is run consistently in a manner which would enable *any sample* to pass the test requirements. That calls for either a high degree of confidence and commercial “know how”, or some reliable means of quality control (based presumably on sampling of current production and rapid testing and recording of test results on these samples) to ensure that the production line is consistently working to considerably *stricter limits* than those required by the standard. For that purpose the basic problem of the manufacturer is to take samples from his current product and measure their properties at such intervals as will give adequate and timely warning of any failure to control production at the required level of cleanliness. The frequency of sampling necessary for this purpose will depend on the uniformity of production (and for some fillings, of course, indirectly on the uniformity of the intake of raw materials). The method and frequency of sampling therefore cannot be specified in advance but must be determined by the manufacturer himself in the light of his own experience.

Accordingly the revised Appendix A does not include any recommended rate of sampling for the manufacturer’s own production control purposes, but specific directions are given about the methods and procedure for taking samples.

Duplicate and triplicate samples. This revised version of certain appendices in BS 1425 has been issued in order to make the working of the standard and the related certification marking scheme operated by the BSI as simple and effective as possible. Analysts regularly engaged in testing for BS 1425 have from time to time checked the reliability of their technique by comparing the results they severally obtained on carefully prepared duplicate or triplicate samples. It is recognized that the limits specified in the standard were originally fixed with due regard to accepted experimental errors and the known variability of the materials being tested, but it is natural that manufacturers also have, from time to time, expressed doubts about the accuracy of the results obtained from different laboratories. Consequently the recent history of this particular standard had been punctuated by occasional complaints and investigations about allegedly differing results from various testing laboratories on what purported to be identical samples.

BS 1425 specifies requirements and methods of test for two different kinds of properties. Some properties are directly concerned with the effectiveness of the cleaning process, and the tests are designed to show whether the material has or has not been effectively processed. For this first kind, i.e. the cleanliness tests, provided that the cleaning process (e.g. washing or dust extraction) is effective and sufficient, test figures could reasonably be expected to be fairly uniform throughout a batch.

Other properties are connected only with verification of the correct description of the material. For this second kind a typical example is the requirement for a stated animal fibre content in certain fillings. Because of the nature of the raw materials which are processed, for example in washed fillings, the distribution of animal fibre may be patchy rather than uniform, and likely to be very variable, especially before garnetting and layering of the product. The manufacturing problem in such cases is to include sufficient of the animal fibre component to make sure of achieving a sufficient proportion everywhere. Test results for this property must be expected to vary, because of the likelihood of irregular distribution.

In the light of the various facts outlined above, the appendix on sampling lays down the requirement for drawing gross samples (i.e. the samples which are sent to analysts for testing) and also the laboratory procedure for taking out from the gross sample the various test specimens. In each case careful descriptions are included of the procedures to be followed when duplicate or triplicate samples are required because it is regarded as never satisfactory for one larger sample or test specimen to be drawn and then divided into two or three.

The revised text of Appendix A dealing with sampling is also being made available separately, so that copies can easily be put in the hands of everyone likely to be directly concerned with the sampling of fillings for the cleanliness tests required by BS 1425 which are also required by the Rag Flock and Other Filling Materials Regulations 1961 (S.I. 1961, No. 1389) and 1965 (S.I. 1965, No. 1437).

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

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

Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 23 and a back cover.

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

Appendix A Sampling

A.1 Gross sample

A sample of filling materials taken for the purpose of testing or inspection is commonly known as the gross sample. Such samples shall be not less than 1 lb (0.5 kg) in weight except in the case of down and feathers and man-made fibres, when the gross sample shall weigh not less than ½ lb (0.23 kg). If the material is of such a nature that dust or short fibres tend to get separated from the filling, the person taking the sample shall take care to include a proper amount of such particles. The gross sample shall then be packed and sealed in a suitable package, e.g. a sampling envelope, and sent (suitably protected from rain, etc.) to the laboratory where tests are to be made. Gross samples of layered materials supplied in rolls should be taken in the form of strips cut across the full width of the roll together with any backing or inter-leaving material, which should remain with the filling material until it reaches the analyst.

A gross sample may be taken from a bulk stock or consignment of filling material or finished articles or, if the sampler deems it desirable, it may be taken from any one bag, bale or other package or finished article. It is recommended that an indication should be given on the sample bag if a sample has been taken only from one unit out of a considerable number.

A.2 Sampling of loose material

Loose material is defined as filling material in such a condition that a quantity of it has no inherent shape. For loose material each gross sample is to be collected by taking at random, from at least 20 places in the bulk, or in each unit selected for sampling, a number of separate fractions, each of which weighs approximately 1 oz (28 g) or in the case of down, feathers or man-made fibres ½ oz (14 g).

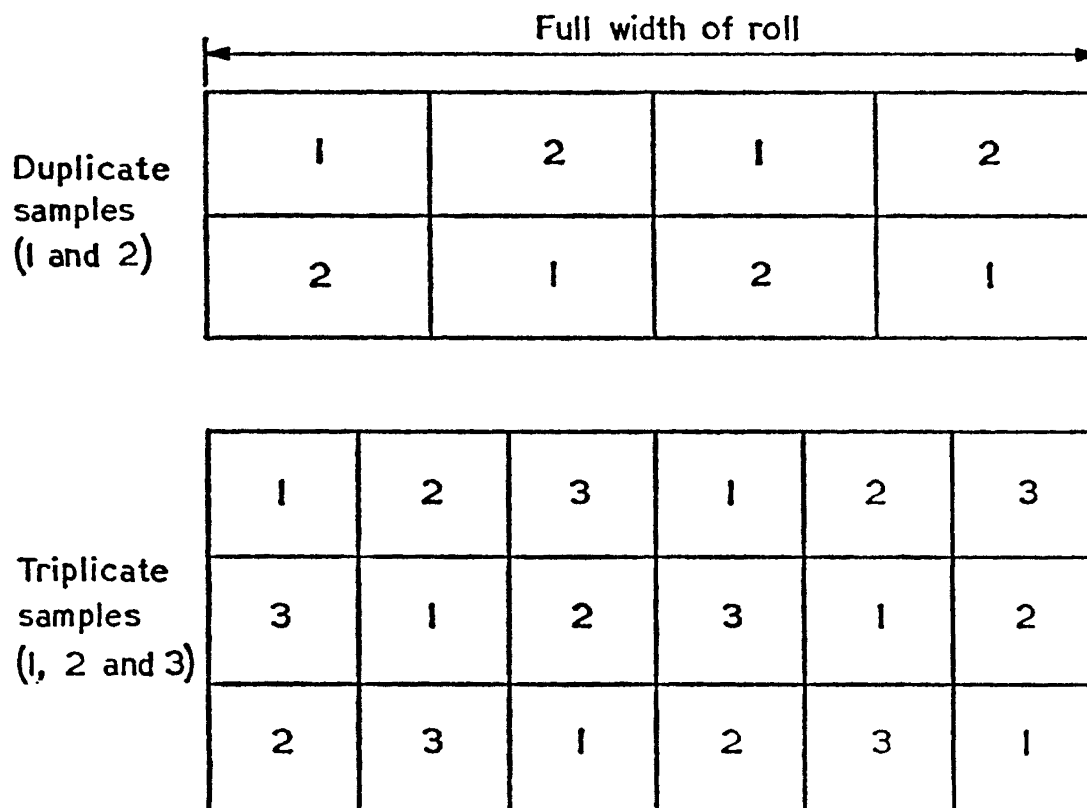
When duplicate (or triplicate) samples are required it is important for the several samples to be drawn at the same time and in the same manner, by taking two (or three) fractions from the same place or from adjacent places, putting one of these into each of two (or three) sample bags, and repeating this process until the two (or three) gross samples are completed. When flocculent materials are being sampled this is best achieved by taking one handful for each fraction, and dividing it immediately and carefully between the two (or three) sample bags. It is stressed that any other procedure, such as taking one large gross sample and then dividing it into two (or three), is to be deprecated.

A.3 Sampling of layered material

Layered material is defined as filling material which has been processed to form a coherent layer of approximately uniform thickness.

A gross sample shall either consist of one or more made-up pads or similar articles (to make up the required sample weight) or be obtained by cutting strips not less than 12 inches wide across the full width of the roll of the material. Backing or inter-leaving material shall not be disturbed and shall accompany the sample.

When duplicate (or triplicate) samples are required adjacent strips of material from a roll shall be used, and careful cutting of the strips into portions is recommended so that any variation due to layering can be reflected in each sample. For example, if duplicate (or triplicate) samples are obtained by cutting two (or three) adjacent strips across a roll, each strip shall be cut into twice as many pieces as the number of samples required, as shown in the following diagram. The first gross sample will then comprise all the pieces numbered (1), the second sample all the pieces numbered (2), and so on.



A.4 Preparation of test specimens in the laboratory

It is the responsibility of the analyst to unpack and handle the gross sample and to prepare from it the various test specimens required for the tests described in other appendices in such a manner as to ensure that each test specimen is reasonably representative of the gross sample. The first operation is to open the parcel containing the sample carefully, and to arrange the whole of the sample on a sampling table after removing from layered materials any backing or inter-leaving material. The gross sample, whether it is loose or layered material, is then divided up and arranged in 20 parts roughly equal in bulk. The preparation of the test specimen is then done by taking small quantities of material from each of the 20 piles or heaps. In the case of any material from which short fibres or dust fall readily, a proportional amount by weight of any short fibres and dust is to be included in each test specimen. The use of a sampling table marked out into rectangles has sometimes been found useful but it is not considered essential, nor (in view of the differing bulk of different types of materials) necessarily helpful.

The following procedure is therefore recommended:

Carefully spread out the whole of the gross sample, dividing it into 20 heaps or portions of approximately equal bulk.

For each test specimen take a pinch of material from each of the 20 parts. Draw the test specimens required in ascending order of size as follows:

1. Dry matter: 5 g
2. Animal fibre: 5 g
3. Oil and soap: 5 g

NOTE For Tests 2 and 3 the same sample may be used, provided that in such cases 5 g weighed to an accuracy of ± 0.05 g is used.

4. Cleanliness test: 25 g (12.5 g in the case of fibre, hair/fibre mixtures, feathers and down)
5. Soluble chlorides: 50 g
6. Dust index: 50 g
7. Dross: 50 g
8. Trash: 100 g

If duplicate (or triplicate) test specimens are required for any reason, prepare the second (and third) samples by the same procedure, working again right through the 20 heaps. (It is realized that sometimes the need for preparing a duplicate test specimen for a repeat test may arise only after the remainder of the gross sample has been returned to the bag or package in which it arrived, or moved to one side. In such cases spread out the whole of the remainder of the sample again, and divide it into 20 roughly equal heaps.)

Appendix B Determination of dry matter

NOTE Results of the tests for cleanliness (Appendix C), oil and soap (Appendix D), chlorides (Appendix G) and acetone-resistant material in bonded secondary cellulose acetate (Appendix O) are required to be expressed as a percentage of the dry weight of the test specimen. This test is therefore necessary in order to determine the dry weight of test specimens. It is not applicable in the case of Appendix K (Determination of cotton in mixtures of cotton with man-made fibres) or Appendix N (Determination of down in mixtures with poly-acrylonitrile fibres) because in those tests the dry weight of the test specimen is determined directly during the test.

B.1 Apparatus

- a) *Chemical balance*
- b) *Weighing bottles with lids*
- c) *Drying oven* (ventilated)
- d) *Desiccator*. Silica gel, silica gel mixed with aluminium oxide, anhydrous calcium chloride, phosphorus pentoxide or sulphuric acid may be used as desiccant.

Periodic servicing and checking of the balance, renewal of the drying agent used in the desiccator, and other such normal laboratory precautions shall be observed.

B.2 Procedure

Weigh, to an accuracy of ± 0.005 g, a 5 g test specimen of the material in a tared weighing bottle fitted with a lid. Dry to constant weight by removing the lid and heating in the oven at 105–110 °C. Replace the lid before cooling, or cool in a desiccator for ½ hour and then replace the lid before re-weighing.

Express the oven-dry weight as a percentage (*D*), to the nearest whole number, of the original weight of the test specimen.

B.3 Alternative procedure

The use of a direct-reading moisture meter or other suitable apparatus is acceptable, provided that the results obtained thereby are periodically checked by the oven-drying method described above.

Appendix C Cleanliness test

C.1 Principle

A test specimen weighed to an accuracy of ± 0.05 g is shaken in a specified type of glass jar with glass lid under controlled conditions. The resultant liquid is poured through a test sieve and measured portions of the fluid are evaporated before or after filtration to determine total extracted matter, soluble extracted matter and (by subtraction) insoluble extracted matter.

C.2 Apparatus

- a) *Chemical balance*
 - b) *Drying-oven*
- } As in Appendix B
- c) *Water bath, sand bath*, etc., for evaporation of filtrate.
 - d) *Glass jars*¹⁾ with liquid-tight closures comprising glass lid, rubber ring and metal screw-cap as shown in Figure 2. For this purpose the 4 lb size commercial jar type X426 shall be used. Types of domestic preserving jar with metal, or plastics-coated metal, closures are not considered satisfactory.
 - e) *Shaking machine*, suitable for rotating one or more glass jars in a vertical plane about the axis of rotation shown in Figure 2, at a constant speed of between 59 rev/min and 61 rev/min.

¹⁾ The commercial jar type X426 4 lb size is manufactured by Messrs. Johnson and Jorgensen, 30 St. Bride Street, London, E.C.4 (Telephone Ludgate 0701). Supplies are also obtainable through the BSI Hemel Hempstead centre, Maylands Avenue, Hemel Hempstead, Herts (Telephone Hemel Hempstead 2341).