NATIONAL BED FEDERATION
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Best Practice Guidance

FLAMMABILITY TESTING TO BS 7177: MATTRESSES, MATTRESS PADS, DIVANS & BED BASES

LOW HAZARD DOMESTIC USE

PART 2: GUIDELINES FOR TEST LABORATORIES

The following guidelines have been drawn up by the National Bed Federation (NBF) with input from the flammability working group of the UK Textile Laboratory Forum (UKTLF)

Part 2: Guidelines for Test Laboratories

1.0 Testing process – best practice guidance for test laboratories

The intention of the NBF Best Practice guidance document is to ensure that testing is carried out in accordance with the requirements of BS 7177. It is not intended to place additional requirements onto the manufacturer.

Part 1 of this document explains the requirements in more detail to assist the manufacturer in preparing the samples correctly to ensure consistency and accuracy of results (as far as is practically possible).

Some of the wording in the standard could be open to interpretation, and Part 2 of this document aims to help provide clarity on what should and should not be tested and how testing should be carried out to ensure that the requirements of BS 7177 are met.

It is extremely important that there is as much consistency in the testing process as practically possible to ensure consistency in repeatability of results between different laboratories.

1.1 PRINCIPLES OF TESTING

EN 597 describes the principle of testing as subjecting a full upper surface (or upper surface characteristics) of the mattress / pad / bed base to the contact of the ignition source so that all zones having different characteristics are tested.

It also states in the test method that the burner tube shall be positioned on a flat portion of the upper surface.

The position and application of the ignition source has a direct impact on the result achieved and ultimately can affect the results achieved between different test laboratories if they are choosing different sites to apply the ignition source. Please refer to section 1.4 for guidance on this matter.

1.2 PREPARATION OF SAMPLES

The manufacturer shall be responsible for preparing the test samples in accordance with Part 1 of this document and shall submit paperwork together with the test sample as outlined in Part 1 and **ANNEX A** of this guidance document.

The test laboratory shall respect the confidentiality of the information contained within the paperwork as this will give specification details of the product and is therefore commercially sensitive information.

1.3 CUT DOWN SAMPLES

The use of cut-down mattresses or divans or bed-bases is not permitted.

This is because of difficulties in replicating the tension in the cover fabric (ticking) after cutting and the cut permits both air ingress and heat escape which can influence the test results obtained and compromise the validity of the test results.

Although it is permitted to use smaller scale test specimens in the test method EN 597, it also states that representative tension shall be maintained by means of pins or clips if the sample has been produced by 'cutting'.

In practice, it is very difficult to replicate the exact tension of the original full-size item once the mattress has been cut. This could therefore lead to discrepancies in results and this may not be a true representation of the product being sold to the consumer.

It is recommended that for surveillance testing of samples obtained on the open market a test laboratory with facilities to test a full-size finished product is specified. This avoids anomalies in results due to cutting down the mattress to fit into a test enclosure and the resulting difficulty in achieving representative tension on cut down samples.

Testing conducted on 'cut down' samples shall be regarded as indicative only and is strongly discouraged except as an option of last resort. **ANNEX D** – see page 23.

1.4 SELECTION OF TEST POSITION FOR APPLICATION OF IGNITION SOURCES

The test laboratory shall test strictly in accordance with the requirements of BS 7177 and shall select the area to conduct the test. This could include (but is not limited to) the selection of some or all of the following types of surface characteristics;

- Flat fabric part of upper surface *;
- Tape edge or pipe edge (if present) *;
- Tufting and/or buttoning (if present);
- Quilting lines;
- Areas on which an ignition source can be positioned without external support (e.g. between pillow-top and base layer of mattress in pillow-top constructions);
- Areas within the above constructions where there is variation in tension or construction not covered by the above;
- Other.

*** It is considered best practice to ensure that both warp and weft materials are tested by ensuring that one test is conducted in one direction and another test on the adjacent (orthogonal) direction, rather than two tests in the same direction.**

Note – BS 7177 testing is conducted to show compliance with the General Product Safety Regulations. Therefore, if a model has several features, selection may be conducted by means of a risk assessment to ascertain if there would be a risk of failure on the particular feature. The test laboratory should discuss this with the manufacturer / client if this is ambiguous in any way or subject to different interpretation or opinion.

1.4.1 NON-IDENTICAL SURFACES

The standard, BS 7177:2008 + A1:2011 clause 4.1.1, is clear – **BOTH** sides of a mattress shall be tested unless they are identical (i.e. If they are not constructed differently in ANY way).

If there is a difference in the combination and sequence of construction of ticking and/or filling(s) and/or spring units between the upper and lower surfaces of a mattress", then this shall be classed as 'non-identical'.

1.4.2 ZONED CONSTRUCTIONS

If a mattress is 'zoned' then each 'zone' may also be a different construction and therefore would not be classed as identical. Each 'zone' may therefore require testing. An example of different zones is where a section of latex may be used in the centre of a mattress but not at the head and foot end – so there are different 'zones'.

- The ignition source should be positioned in each zone with different characteristics. This may mean that more than the minimum 2 tests must be performed to satisfy this requirement.

Examples of where to position the ignition sources on different construction types can be found in **ANNEX C** – see pages 19 - 22.

1.4.3 LABELS PLACED ON SURFACE OF PRODUCT

BS 7177 does not specifically refer to labels; however, the size of the label could inadvertently result in it being categorised as part of the surface characteristics if sufficiently large enough.

Labels greater than 500 cm^2 (e.g. 25cm x 20cm) are deemed sufficiently large enough to be tested and classed as part of the surface characteristics and therefore should be tested to the requirements of BS 7177 as part of the surface.

If the label is less than 500 cm^2 then it would not be deemed large enough to test and therefore would not be tested.

It is also common for fillings to be placed underneath the mattress label to add volume / raise the label. **You must ensure that any fillings you use to do so comply with the flammability requirements for fillings. (BS 7177 clause 4.1.2).**

2.0 Airflow during testing

It is preferable to conduct testing in a chamber with volume exceeding 20 m^3 to reduce air flow as far as possible.

If testing is conducted in a smaller enclosure, the airflow shall be reduced to the minimum level possible whilst remaining in compliance with the requirements of BS 7177 (with a maximum airflow of 0.2 m/s).

3.0 Smouldering cigarette test

- Where a feature exists such that it would be likely the cigarette would roll to that position, the cigarette test shall be carried out at that position. I.e. on a deeply quilted mattress, a dropped cigarette would roll off the crown of the fabric into the channel caused by the quilting.
- Cigarette should be placed lit end down touching the centre of the feature (e.g. tuft).
- Cigarette testing shall be carried out on the surface and on the surface positioned against the tape edge of the sample.

4.0 Match flame equivalent test

- The tube shall be held in contact with, but not applying any undue downward pressure to, the surface of the sample. The test is intended to simulate the presence of a match on the surface of the product and the pressure of the tube on the surface should reflect this.

  If there are any attachments or additions to the tube care should be taken to ensure that the added weight does not result in the tube being pressed more firmly onto the surface.
- The tube shall be held as horizontal as practically possible, not angled vertically downwards into the product and must be held still for the duration of the test. If for some reason the burner tube is moved within the test application period, that test shall be aborted and repeated elsewhere.
- At the end of the test period the burner tube shall be removed smoothly from the surface of the sample. The tube shall be pulled steadily back from the test position and simultaneously upwards.
- The tube shall not be dragged across the surface of the sample as this causes further damage to the product, extending charred or melted fabric and exacerbating flaming behaviour.
- The burner tube shall not be allowed to come back into contact with the surface of the sample after the test period, during its removal
- When testing the Tape edge, the burner tube shall be placed on the surface of the sample in contact with the tape edge, where the two materials are joined. The tube shall not be placed on the top of the tape edge or on the outside of the tape edge.

5.0 Contamination present on test sample

If any contamination is observed on the test sample, testing shall not be conducted on the contaminated area as this could affect the test results.

Examples of contamination can include but are not limited to: - dirt, marker pen, adhesive residue from sticky label etc...

Good housekeeping in the laboratory and manufacturing facility can help avoid contamination.

6.0 Test report

The test report should include the following information in addition to the requirements of BS 7177: -

- Record the condition of the sample as received (USED / NEW / CONTAMINATED etc…)
- Record whether a full-size product or small-scale production sample was provided for test (and size of sample if small scale);
- Product specification number or reference details shall be recorded - as provided with the sample submission **along with an image of the finished product showing the area tested;**
- Details of whether both top and bottom surfaces were tested or not. (were they identical or not?). If tested as separate surfaces, then this shall be detailed in the report.
- The position of where the ignition source was applied to capture the different characteristics that were present on the test sample and the result for that position.
- Time taken for sample to cease all smouldering / flaming – to allow the client to understand whether it was a clear pass or borderline result.

This detail would help to capture if there are any differences when tested at different laboratories.

CUT-DOWN SAMPLE TESTING IS NOT CONSIDERED TO BE ACCEPTABLE AS BEST PRACTICE

However, if cut down sample testing has been conducted for market surveillance purposes, then the following additional information shall be detailed on the report: -

- Details of how representative tension was maintained in accordance with the requirements shall be recorded;
- If the exact representative tension could not be replicated, a statement that the results are 'indicative only' and should not be relied upon as a sole means of determining compliance.

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