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 1: GUIDELINES FOR MANUFACTURERS

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 1: Guidelines for manufacturers

1.0 Testing samples – best practice guidance for manufacturers

1.1 SUBMITTING A TEST REQUEST

When submitting a finished product sample for testing, BS 7177 shall be requested along with the hazard category required;

- Low Hazard (Domestic Use)
- Medium Hazard
- High Hazard

If the laboratory test submission form does not state BS 7177 as an option, add this as a special instruction on the form.

Note - It is not advisable to tick boxes that just state EN 597-1 or EN 597-2.

The reason for this is that BS 7177 calls up a very specific dated version of the test methods in EN 597, and it is important to use the version quoted in BS 7177.

1.2 FREQUENCY OF TESTING FINISHED PRODUCT

Testing shall be carried out at the frequency as required in BS 7177 clause 5 – sampling and frequency of testing, which is summarised in the table below:

A sample of each mattress, mattress pad, divan or bed base specification shall be tested at the frequency specified:

NUMBER OF UNITS PRODUCED PER MONTH	NUMBER OF UNITS TESTED
More than 2400	1 per month
Between 400 and 2400	1 per 2400 units
Less than 400	1 every 6 months

1.3 PRODUCT SPECIFICATION INFORMATION TO BE SUBMITTED WITH TEST SAMPLES

The test sample provided to the laboratory for testing shall be fully representative of the item being sold. This means that the features present in the production model shall be replicated for testing purpose - including spacing between features. This may require the use of larger samples in order to replicate actual production.

It is difficult to demonstrate that this requirement has been met if only limited details are provided with the test sample and the laboratory can only put on the report the information that they are provided with when the sample is submitted.

It is therefore recommended that a full technical specification for the product is held on file and allocated a specification number / reference. This specification number / reference shall then be given on the test request submission form.

A copy of the technical specification along with an image of the finished product shall also be submitted to the test laboratory with the sample submission to enable the test laboratory to understand the construction of the product and select the appropriate test zones.

For products that have more complicated features such as 'zoned' areas, it is recommended that a schematic diagram is provided so that the test laboratory can understand the different areas.

An example of a product specification can be found in ANNEX A – see pages 15 & 16.

1.4 PRODUCTS REQUIRED TO BE TESTED

The standard, BS 7177:2008 + A1:2011 applies to mattresses, mattress pads, divans and bed bases.

Whilst many of the examples given in this document relate to mattresses, this is mainly due to mattresses being more complex in design and specification therefore causing the greatest differences in interpretation. Therefore, we have given several examples to assist with this.

The standard, BS 7177:2008 + A1:2011 applies to mattresses, mattress pads, divans and bed bases.

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'.

Mattresses specifically designed for use on one side only are NOT exempt from this requirement.

EXAMPLES OF IDENTICAL AND NON-IDENTICAL SURFACES / CONSTRUCTIONS

IDENTICAL	NON- IDENTICAL	NON- IDENTICAL	NON- IDENTICAL
Top Surface	Top Surface	Top Surface	Top Surface
Ticking 1	Ticking 1	Ticking 1	Ticking 1
Filling A	Filling A	Filling A	Filling A
Filling B	Filling B	Filling B	Filling B
SPRING UNIT	**SPRING UNIT**	**SPRING UNIT**	**SPRING UNIT**
Filling B	Filling B	**Filling C**	**Filling B**
Filling A	Filling A	Filling A	**Ticking 1**
Ticking 1	**Ticking 2**	Ticking 1	Bottom Surface
Bottom Surface	Bottom Surface	Bottom Surface	(Filling A has not been used on the underside)

Please also note that a variance in spring unit (for example pocket spring vs open coil) would have an impact where medium or high hazard testing is conducted and should also be classed as non-identical in this respect.

2.0 Common variables that may require additional / further testing

2.1 DIFFERENT SURFACE TYPES – I.E. TUFTED / MQ / DQ / PLAIN SURFACES

If a mattress is quilted on the top, but plain on the bottom (no quilting) then this would affect the test and the bottom surface would NOT be classed as identical. It would therefore need testing separately as an additional sleeping surface.

Examples of these different surface types can be found in **ANNEX B** – see pages 17 & 18.

2.2 SINGLE SIDED MATTRESS (WITH A NON - SLEEPING SURFACE)

Some items are specifically designed so that only the uppermost surface is intended as a sleeping surface and the underside is designed as a non-sleeping surface.

Mattresses sold as non-turn or single sided are usually constructed differently on both upper and lower surfaces and therefore as per the requirements of BS 7177, **BOTH** sides must be tested.

Please refer to the examples of different constructions highlighted in section 1.1.

Examples of images of single sided mattresses can be found in **ANNEX B** – see pages 17 & 18.

Note – It is necessary when submitting single sided mattresses for testing that the intended sleep surface is clearly identified to the test laboratory.

2.3 ZONING

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' across the upper surface of the mattress.

It may be difficult for the test laboratory to identify the different zones just from an external visual examination.

It is recommended that in these circumstances, a full-size single mattress (90 x 190cm) is submitted for test in order to truly replicate zoning.

It is also recommended that a diagram / image showing the zoning of the mattress is also submitted with the test submission form so that the laboratory can test correctly.

2.4 TAPE EDGING

It is important that the same tape edge material is used as will be used in full production, including any fillers and correct stitching materials / sewing thread.

2.5 TICKING MATERIALS

Major basic alteration that would require re-testing is classed as: -

- A change in fibre content greater than +/- 5%;
- A change in the mass per unit area of 15% or more;
- A change in the construction of more than 2 ends or picks per centimetre;
- A change of flame retardant and / or finish applied
- A change of supplier.

2.6 BORDER MATERIALS

If the border is not constructed the same all the way around the mattress or divan (i.e. one side has one filling and another side has a different filling or no filling), then this is a different construction, and this will affect the test results. The test sample shall be representative of production and therefore this must be reflected in the test sample.

It is critical to identify to the test laboratory the different locations of each border construction and to mark this on the mattress submitted for testing where appropriate.

2.7 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 cm² (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 cm² 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).**

3.0 Test sample preparation

The way that the test sample is prepared can directly affect the results of the testing.

3.1 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 as 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.

3.2 FULL SIZE MATTRESSES (FINISHED PRODUCT)

Whilst testing samples cut down from full size mattresses is not permitted due to various issues, it does not necessarily mean that full size mattress testing should become obligatory as part of Best Practice, because:

- It would be prohibitively expensive, especially for more premium products;
- Some test labs do not have the facilities available;
- Disposal of tested mattresses may be difficult and costly;
- The current standard does allow for small scale samples to be tested subject to such items being representative of larger (full size) finished product.

For some designs, such as those incorporating zoning, full size mattress testing would be preferable whereas for simpler designs the use of small-scale samples may be preferred.

General Product Safety Regulations require us to only place on the market a safe product. Full size finished product mattress testing is therefore preferable to show the 'product' is compliant.

3.3 SMALL SCALE SAMPLES - RECOMMENDED TEST SAMPLE SIZE

BS 7177 allows the use of small-scale samples for testing purposes - providing that the test sample is fully representative of the model being produced.

This means that ALL features and characteristics must be included on any small-scale sample and the correct spacing and tension between these features must be provided – see diagram.

Where small scale samples are produced for testing purposes, the samples shall be made on production manufacturing machines to ensure that the samples are fully representative of production

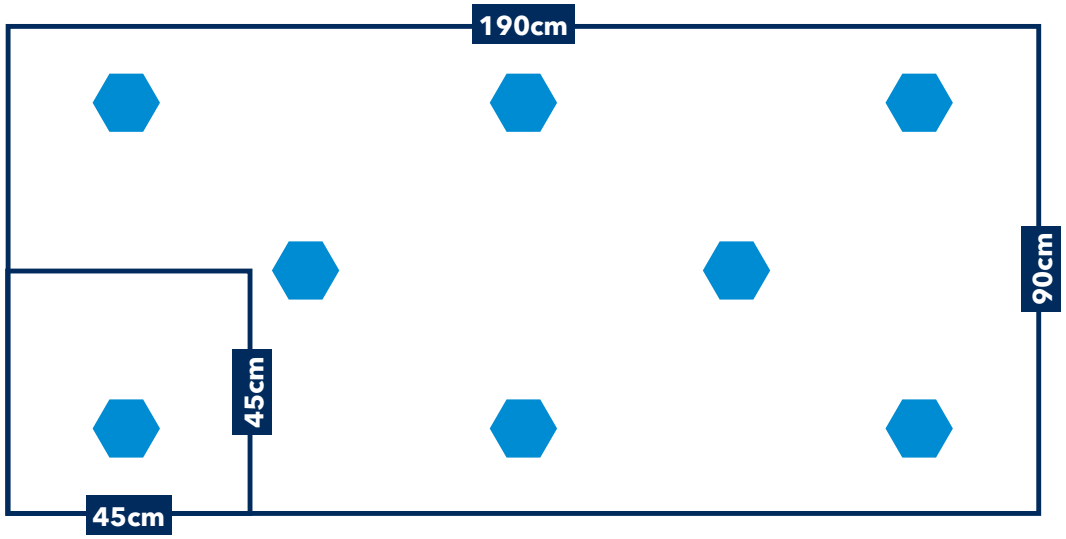
Note - Failure to replicate the exact features and spacings between features on small scale samples may result in a different outcome than if a finished product had been used for testing purposes. In these circumstances, the results from the finished product test (where conducted) will be deemed as valid and will override small scale testing conducted.

How spacing of features can affect test sample size

This diagram is to represent a test sample at 45 cm x 45 cm that is NOT correct.

This size would be INCORRECT for this type of tuft pattern as the edge of the sample would not give the correct tension due to the tuft position. It is NOT acceptable to simply move the tuft to the middle of the sample either as this would then not be the same as the production model.

NBF would therefore recommend a MINIMUM test sample size of 75 cm x 90 cm in this instance to ensure the tuft spacing and tension is correct. Please discuss with your test laboratory and take advice based on your specification and positioning of features.



NOT TO SCALE

BS 7177 suggests a minimum small-scale test sample size of at least 450mm x 350mm, however in practice many test samples are produced at 450mm x 450mm.

In some cases, a 450mm x 450mm sample may be adequate to conduct the testing.

In other cases, it may NOT be adequate and therefore necessary to provide a larger test sample or use a full-size finished product due to the features.

Unless otherwise directed by your test laboratory, it is recommended that a test sample size of 900mm x 750mm is used as a minimum size in order to ensure that features are replicated in the test sample.

Note - It is important to disclose full information on the product specification to the test laboratory about the item being tested (as specified in section 1.3) so that they can help to advise the appropriate test sample size required.

It is recommended that for product with complicated features, including zoning, a full-size single mattress (90 x 190cm) is submitted for test to truly replicate the construction.

If using small scale samples for testing purposes, it would be best practice to periodically also conduct testing on a finished product for the purposes of due diligence to ensure full compliance with General Product Safety Regulations to ensure that the small-scale testing conducted gives the same results as a finished product test.

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