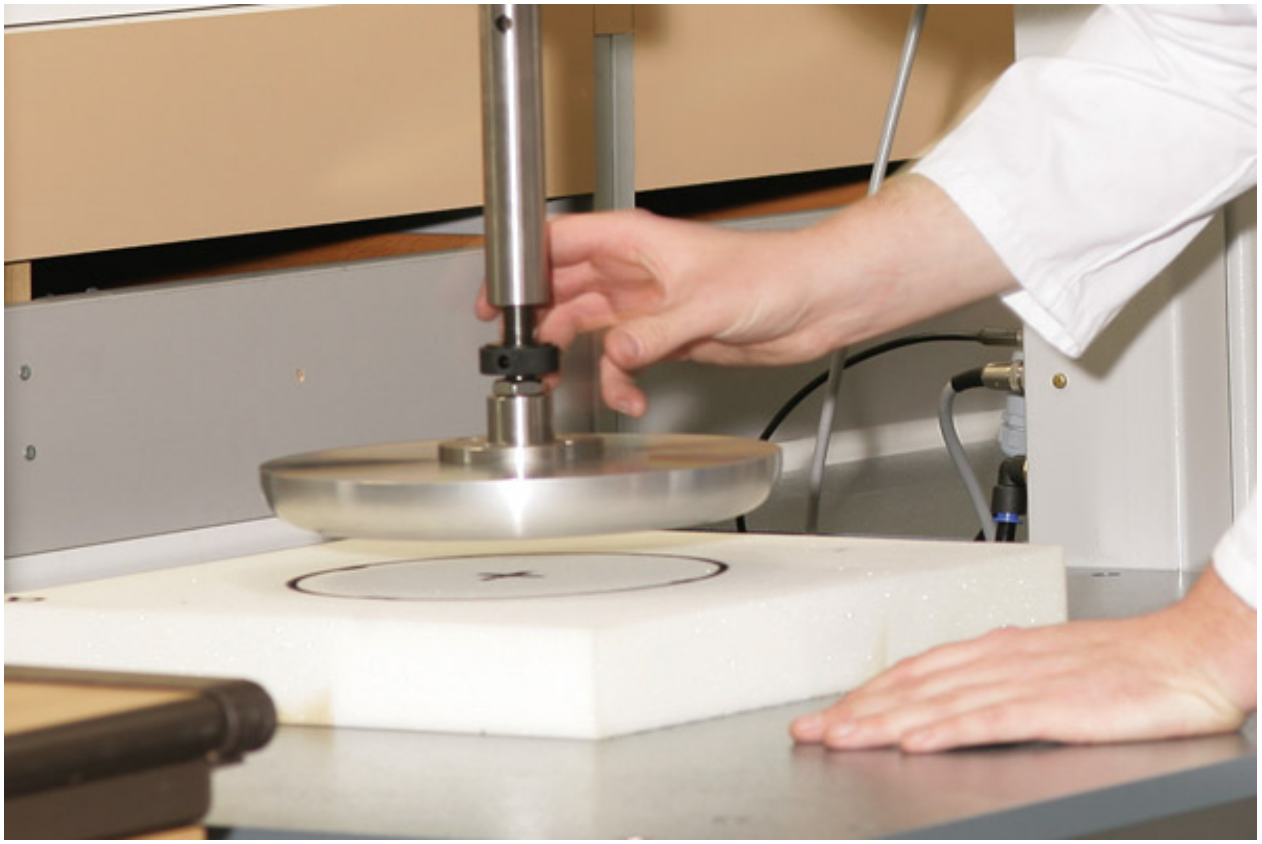
© SATRA Technology Centre. Reproduction is not permitted in any form without prior written permission from SATRA.

SATRA SPOTLIGHT

Pounding flexible furniture foam fillings

Pounding machines provide performance data to help the correct selection of upholstery fillings.



Upholstered furniture relies heavily on flexible cellular foam fillings to provide the appropriate level of comfort and support for the user over the life of the product.

Designers of upholstered furniture strive to select fillings that meet customers' expectations with regard to comfort and 'feel'. Experience in selecting foam materials is most valuable, but where experience is not available, the designer might need to specify the performance of the foam filling using the data quoted in the foam suppliers' product literature. In addition, the furniture designer and the manufacturer will want to be assured that the foam fillings will perform satisfactorily throughout the life of the product. Performance of foam fillings can be measured by carrying out fatigue testing using a pounding machine and taking hardness (sometimes called 'firmness') measurements of the foam before and after pounding. Using this data, the performance of various fillings can be measured and compared to one another.

Hardness of foams

The indentation harness index of the foam is measured using EN ISO 2439:2008 Method A. This provides a measure of the foam's load-supporting characteristics. The higher the value, the firmer the foam. This test is

often used for process control purposes – for example, to ensure the consistency of either production or purchased goods.

Durability

In use, all foams soften and lose height (thickness on seat cushions and depth on back cushions). To predict softening and height loss characteristics SATRA uses EN ISO 3385:2014 Constant Load Pounding Test. The latest 2014 version of EN ISO 3385 requires that the testing is carried out in a controlled atmosphere (25ºC, 50 per cent relative humidity). To carry out this test, SATRA uses three individual pounding machines (each test requires three nominally identical specimens). Each machine has a station fitted with a 250 mm radiused indentor (see picture above) which applies a load of 750 newtons at a rate of 70 cycles per minute. Each continuously-monitored loading cycle is measured and displayed digitally on the instrument control screen, together with the number of completed cycles. SATRA customers use these test results to check on the quality of the foams they are supplying or purchasing. BS 3379:2005+A1:2011 provides a classification scheme for foam fatigue performance. Foams can be measured and characterised as suitable for light/average/severe/very severe/extremely severe service. BS 3379 also provides a way of grading the hardness based on the indentation hardness index of the foam. Such grades include '100', '130' and '170'. For example, if a foam has an indentation hardness index of between 115 and 150 N, it is graded as '130'.

In some cases, the pounding and hardness measurement routines are used for comparative testing of loose cushions. Here the cushion will have one or more fillings inside a sewn-on cover. The test routine may be used to compare the performance of different filling arrangements – perhaps a 'known good' filling with a novel filling arrangement. To allow proper comparison, the overall dimensions of the two cushions being compared should be the same. It is possible to adapt the test methods for use on loose-filled pillows, but test results then require careful interpretation.

Some SATRA customers use foam pounding and hardness tests as quality control procedures, to measure the consistency of supplied foams and cushions. Cold-cure moulded seat pads can also be assessed in a similar way, although a shaped former may be needed to hold the items during assessment.

How can we help?

15 PER CENT DISCOUNT ON FIRST SATRA TEST — please click here.

Please e-mail furniture@satra.com for further information on the services offered by SATRA or for a demonstration of the foam pounding test.

©2023 SATRA Technology Centre. Reproduction is not permitted in any form without prior written permission from SATRA.