Principles document

for the purpose of developing regulations, standards and test methods for fire safe upholstered furniture and mattresses

Introduction

This document describes the principles that standards and test methods for determining the fire safety of upholstered furniture and mattresses should meet in forthcoming legislation, according to the *Community of Practice (CoP) 'Fire-safe Furniture and Mattresses'*.

This Community of Practice was established by the Netherlands Institute of Public Safety (NIPV) to support the legislative process in the Netherlands. It is not an official representation of the industry; any producer and retailer can participate in the CoP. The CoP currently includes 15 representatives from companies, ranging from large to small businesses, different product groups, brands and supplying industries (see the list of participants in the annex).

The participants have expressed their wish to support the improvement of the fire safety of upholstered furniture and mattresses and their willingness to cooperate. That said, the participants represent different companies with various (product) interests. What one participant regards as a solution, another may see as a threat to his or her product. The NIPV has tried to balance all ideas and concerns as much as possible when drafting this document.

In this document, the principles are explained. The CoP is happy to help drafting a more concrete elaboration in the next stage.

Principles

Starting points	
1	Promoting fire safety (improving the ability to escape or survive a fire)
2	Solution-independent (do not exclude any solution or innovation)
3	Fire safety and circularity / sustainability should be complementary
4	Focus on the end-use product (the whole chair, sofa, or mattress)
5	Focus on the prevention of ignition and the behaviour after ignition
6	Use existing (EU) tests (if possible)
7	Economically implementable

Principle 1

Promoting fire safety

For upholstered furniture and mattresses, promoting fire safety means improving the possibilities of escape and survivability in the event of a fire in these products. This means that if the product burns, the spread of the fire and smoke development is such that people still have enough time to escape or, if this is impossible, for instance due to their physical or mental condition, have enough time to survive the fire until they are rescued by the fire brigade.

As escape and survival are difficult to determine with a test method (e.g., the combustion products that are released must be captured and measured), this principle will have to be translated into the probability of ignition of the product and/or the fire and smoke behaviour after ignition. After all, limiting the probability of a product catching fire and the effect of a fire have a direct relationship with the possibility to escape or survivability.

Current European standards take only into account the prevention of ignition or the prolonging of the ignition time regarding a specific ignition source. However, a product that burns slowly and produces limited harmful combustion products (such as gases), also limits the risk to people, as there is plenty of opportunity to extinguish the fire and/or escape.

A dual system can also be considered, where the product should meet requirements that limit or delay ignition and/or, if it burns, ensure a limited fire spread and smoke development. It is recommended to aim for such a dual system, but at the moment it seems too complicated to implement in the forthcoming legislation. Testing for ignition is currently the easiest to achieve.

Summary of principle 1:

> The aim is to enable people to escape or survive in the event of fire.
> Translate this aim into the probability of ignition and/or fire behaviour after ignition.
> Investigate (in the future) the possibility of a dual system.

Principle 2

Solution-independent

There are more and more developments that allow multiple solution options. As a solution fire safe (alternative) filling materials, interlayers, covers or a combination of these solutions can be considered. Upcoming regulations should not exclude any of these possibilities, that should also be taken into account when determining standards and test methods. Enabling different solutions also allows for a spread of costs for consumers at different levels. It should also be possible to easily implement future innovative solutions without standards or test methods hampering this.

There are more and more possibilities to use materials that are already inherently fire-retardant, such as polyester for fillings and wool for cladding. Additionally, in the future new materials will be used that may need additives to prevent ignition and positively influence fire behaviour. REACH provides a basis for allowing the use of these additives.

Manufacturers could look into jointly developing solutions that they know are feasible and usable for their -individual- products.

Summary of principle 2:
> Do not rule out solutions options.
> Ensure that (innovative) future solutions can be easily implemented.

Principle 3

Fire safety and circularity / sustainability should be complementary

Many products are subject to compositional changes due to wishes and requirements concerning the product's circularity and sustainability (including recyclability), both during production, use and discarding the product. Sometimes these (coincidentally) go hand in hand with improved fire safety, but occasionally they do not. This can be a missed opportunity. Legislation to improve fire safety should match the requirements for circularity and sustainability as closely as possible. On the one hand, the aim of the upcoming legislation must be to improve fire safety, but on the other hand, circularity and sustainability should not be subordinated to this.

It is therefore important that the circularity and sustainability of materials are already considered when developing materials to improve fire safety. Requirements for circularity and sustainability should not be an obstacle to improving fire safety, but rather be complementary.

Summary of principle 3:
> Connect fire safety requirements with circularity and sustainability requirements.

Principle 4

Focus on the end-use product

Focusing on the end-use product (i.e., on the assembly of the components used) means that, unlike testing individual components, the real-life situation is approximated as much as possible when testing the product. Another advantage is that not every component needs to be tested individually, so no unnecessary adjustments have to be made to the components to meet component-level requirements.

A possible disadvantage is that there are many potential end-use products and that the end-use product has a large volume. It is therefore necessary to consider which combinations need to be tested. Consider, for example established worst-case combinations. However, it needs to be taken into account that a worst-case combination might be rarely used in practice and testing it also seems (too) harsh. Testing can also be done on a mock-up (consisting of the combination of materials that make up the end-use product). If one component is changed, the entire combination does not have to be retested, as an assessment by a test institute based on existing tests could suffice.

Focusing on the end-use product can be very cost-intensive for smaller manufacturers, who often make only one or a few of the same products. A solution could be to distinguish between mass production and custom-made products. In the case of custom-made products, one could think of testing on a mock-up done by the manufacturer or setting up a database of tested combinations (the

industry could be responsible for this database or for filling it, while an authority could be responsible for managing it).

Summary of principle 4:
> Focus on testing the end-use product, not individual components.
> Use mock-ups and worst-case assemblies in testing.
> Consider whether a different approach is needed for mass products and custom-made products.
> Investigate the possibilities of a database.

Principle 5

Focus on the prevention of ignition and behaviour after ignition

Currently, standards and testing methods focus only on the prevention of ignition. This has several disadvantages. Firstly, it provides only limited safety, as the product is only resistant to certain ignition sources during a limited exposure time. Secondly, if post-ignition fire behaviour is included, it is possible that the product meets the requirement that people can escape from a fire and/or survive the fire, but at the same time does not comply with the tests requirements for preventing ignition.

Involving fire behaviour after ignition is therefore important for improving the fire safety of products. The question is how to determine the fire behaviour and what criteria should be set for it. These could include the speed of fire propagation (the flame front), the flame height or a combination of both. Other industries (automotive, industrial, construction) already pay attention to this topic and have standards in place.

It is also important to look at smoke production. However, this is complicated and not feasible or realistic at first glance. Partly because the relationship between the fire, smoke production, smoke propagation and possibility to escape and/or survivability in case of fire depends on the volume of the room where the fire occurs. For now, as far as smoke is concerned, the principle: less fire = less smoke (i.e., looking at ignition and fire behaviour) seems the highest achievable here.

Summary of principle 5:
> Consider limiting the ignition of the product, but also limiting the fire behaviour after ignition.
> Look at industries that already have experience in studying fire behaviour after ignition.

Principle 6

Use existing (EU) tests

There are two existing EU standards: the so-called cigarette test and the small open flame test. Both are needed as a basis, but a test to limit ignition by a larger ignition source (larger flame) should also be met. The UK's (forthcoming revised) tests can serve as inspiration in this regard, but the present UK tests concern testing individual components, while we are thinking of testing the end-use product.

Connecting to existing test methods that are partly already carried out by producers active on the Dutch market, makes implementation easier. A step-by-step (phased) introduction complying with all tests (cigarette, small flame, large flame) on the end-use product should be considered.

However, these existing tests only look at preventing ignition, and not at the other important aspect, behaviour after ignition. A separate standard will have to be developed. Alternatively, existing standards can be used from, for example, the automotive, aviation or construction industries.

Summary of principle 6:

> In terms of limiting ignition, connect to existing standards.
> Consider a gradual introduction of these standards.
> Develop standards for fire behaviour after ignition.

Principle 7

Economically implementable

A key issue is the feasibility of the regulations in the standards and the requirements for testing. Assuming that the standards and tests must provide for more fire-safe products, the products must also be economically feasible. In particular, the cost of testing is seen as problematic. Ultimately, any additional costs due to different material use and testing are reflected in the consumer price. Again, the introduction in the automotive industry could be considered as an example. Whether the test institutes can meet the demand for testing should also be considered.

For reasons of financial feasibility, a step-by-step plan could be developed, which encompasses compliance with standards and testing. In predetermined steps the standards and tests are raised to achieve the desired level of fire safety. A stagnation of production and/or sales caused by the introduction of legislation should be avoided.

Summary of principle 7:

> Make requirements for standards and testing economically feasible for producers.
> Consider a step-by-step plan to achieve the desired fire safety level.

Annex

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