

# Flame Retardants for Textiles

Description of test methods and their application

## **ISO - Standards**

- ▣ ISO 6940; 1995
- ▣ ISO 6941; 1995
- ▣ ISO 8191 – 1; 1987
- ▣ ISO 8191 – 2; 1987

# Flame Retardants for Textiles

## Description of test methods and their application

### ISO 6940; 1995

Textile fabrics – Burning behaviour: Determination of ease of ignition of vertically oriented specimens

#### 1. Scope:

Determination of ease ignition of vertically oriented specimens for apparel, curtains and drapes. The specimens may be single- or composite materials (coated, quilted, multi-ply, composites and similar combinations).

#### 2. Preparation of specimens:

- \* A sufficient amount of samples have to be prepared, so that at least 5 times “ignition” and 5 times “no ignition” can be observed. If both surfaces of a sample act differently in a preliminary examination, it is necessary for the surface ignition that the front and back side of the fabric are examined –frame 1: 80 mm x 80 mm vertically and horizontally oriented –frame 2: 200 mm x 80 mm vertically and horizontally oriented

#### 3. Test procedure:

- \* Setting for the surface ignition (apparel, curtains and drapes) –fix 40 mm flame height in vertical position and let it stabilize for 2 min
    - vertical arrangement of specimen
    - Ignition (horizontal distance  $17 \pm 1$  mm to surface of specimen)
  - \* Setting for the edge ignition (tents, canopies and tents for events and possibly for curtains when there was no ignition with surface ignition) –fix 40 mm flame height in vertical position and let it stabilize for 2 min
    - vertical arrangement of specimen
    - Ignition in an  $30^\circ$ – angle to the vertical distance  $20 \pm 1$  mm to the lower edge)
  - \* Determination of the average ignition time –Minimum ignition time has to be determined in a preliminary test
- Ignition means, that the afterflame time is longer than 5 sec or that the specimens burns to the top or the side edges*

# Flame Retardants for Textiles

## Description of test methods and their application

### ISO 6940; 1995

Textile fabrics – Burning behaviour: Determination of ease of ignition of vertically oriented specimens

- If the specimen burns with frame 1 to the upper edge, use frame 2.
- Start with the minimum ignition time and note down if the specimen ignites. If it ignites, shorten the ignition time by 1 sec, if there is no ignition, increase the ignition time by 1 sec up to a maximum ignition time of 20 sec. If with an ignition time of 1 sec there is an ignition, note down the following non-ignition with “0” sec. Repeat until you have 5 cases of ignition and 5 cases of no ignition.
- If a textile does not ignite within 20 sec, carry out five tests in vertical and horizontal direction and if necessary at every side for 20 sec.
- Using the surface ignition the examination may be carried out at the second side of the specimen.

#### 4. Apparatus:

Burning equipment acc. to ISO 6941

#### 5. Assessment:

\* Calculation of average ignition time: Calculate the ignition time from the noted times of ignition or no ignition, depending on which was more often (Add the times of ignition or no ignition and divide through the number of times). After calculation of the average ignition time, subtract 0.5 sec from the ignition or add 0.5 sec to the non-ignition. Round up to whole seconds.

\* Please indicate:

- each case of ignition and no ignition with corresponding ignition time
- Average ignition time for each direction and side of the specimen
- Note, if the specimen could not be ignited after 20 sec.

# Flame Retardants for Textiles

## Description of test methods and their application

### ISO 6941; 1995

Textile fabrics – Burning behaviour: Measurement of flame spread properties vertically oriented specimens

#### 1. Scope:

Determination of flame spread properties of vertically oriented fabrics, used for apparel, curtains and drapes, big tents with canopy and tents for events of one- or multi- component fabrics (coated, quilted, multi-ply, sandwich construction and similar combinations).

#### 2. Preparation of specimens:

3 specimens of 560 mm x 170 mm each, vertically and diagonally oriented

#### 3. Test procedure:

\* Area ignition (for apparel, curtains and drapes)

- adjust flame height to approx. 40 mm in vertical position and pre-heat for 2 min
- vertical arrangement of specimen
- adjust the marking threads into the defined holders (1st thread 240 mm; 2nd thread 390 mm and 3rd thread 540 mm from the lower edge of the specimen)
- area ignition for 5 and 15 sec (horizontal distance  $17 \pm 1$  mm to the surface of the specimen)

\* Edge ignition (for big tents, canopies and tents for events and possibly curtains and drapes, if there was no ignition with area ignition)

- adjust flame height to approx. 40 mm in vertical position and pre-heat for 2 min
- vertical arrangement of specimen
- adjust the marking threads into the defined holders (1st thread 240 mm; 2nd thread 390 mm and 3rd thread 540 mm from the lower edge of the specimen)
- edge ignition for 5 and 15 sec. in a vertical angle of 30°C (distance to burner and lower edge of specimen: 20 mm)

# Flame Retardants for Textiles

## Description of test methods and their application

### **ISO 6941; 1995**

Textile fabrics – Burning behaviour: Measurement of flame spread properties vertically oriented specimens

#### 4. Apparatus:

Burning apparatus acc. to ISO 6941

#### 5. Assessment:

- Times from beginning of ignition to burning through of marking thread
- Afterflame time in sec.
- Afterglow time in sec.

#### If necessary:

- Burned or damaged length and width
- If a flame has reached a vertical edge of the specimen
- Flaming debris
- Hole formation

# Flame Retardants for Textiles

## Description of test methods and their application

### **ISO 8191 - 1; 1987**

Furniture – Assessment of the ignitability of upholstered furniture: Part 1: Ignition source: smouldering cigarette

#### 1. Scope:

Determination of ignition of material combinations like covers and filling material for upholstery when they are exposed to a smouldering cigarette

#### 2. Preparation of specimens:

1 specimen of  $800 \pm 10$  mm x  $650 \pm 10$  mm each ( in warp direction)

#### 3. Test procedure:

- \* Setting of the testing equipment Pull the specimen behind the hinge pole and arrange the filling material under the covering and make up a sofa (seat + back) out of these pieces.
- \* Setting of the ignition source Light up the cigarette and draw on it till the peak is glowing, 5 – 8 mm must burn down. Then the cigarette is placed along the joint between seat and and back (at least 50 mm distance from the edge or other burnings)

#### 4. Apparatus:

- \* Testing apparatus acc. to ISO 8191 (BS 5852)
- \* Cigarette with the following measurements: length:  $70 \pm 4$  mm diameter:  $8 \pm 0.5$  mm weight:  $1 \pm 0.1$  g burning time:  $12 \pm 3$  min/50 mm

# Flame Retardants for Textiles

## Description of test methods and their application

### **ISO 8191 - 1; 1987**

Furniture – Assessment of the ignitability of upholstered furniture: Part 1: Ignition source: smouldering cigarette

#### 5. Assessment:

If an ignition by increased smouldering and burning of the filling material or cover can be viewed one hour after placing the cigarette, the material does not correspond to the norm. In this case, the test is carried out at another part of the upholstery. If there is no ignition after two cigarettes, the material meets the norm requirements. The destroyed area is measured and indicated.

#### 6. Notes:

The test specimen shall be representative of the components and make – up of the finished mattress, mattress pad or upholstered bed base. If we do not receive any information from the customer concerning the filling material, we use here in Langweid combustible PUR – foam.

# Flame Retardants for Textiles

## Description of test methods and their application

### **ISO 8191 - 2; 1988**

Furniture – Assessment of the ignitability of upholstered furniture: Part 2:  
Ignition source: match flame equivalent

#### 1. Scope:

Determination of ignition of material combinations like covers and filling material for upholstery when they are exposed to a little flame

#### 2. Preparation of specimens:

1 Specimen of  $800 \pm 10$  mm x  $650 \pm 10$  mm ( in warp direction)

#### 3. Test procedure:

- \* Setting of the testing equipment Pull the specimen behind the hinge pole and arrange the filling material under the covering and make up a sofa (seat + back ) out of these pieces
- \* Setting of the ignition source Light up the match burner, fix it to a flame height of approx. 35 mm and let it stabilize for 2 min. Place the burning tube along the joint between seat and back (at least 50 mm distance from the edge or other burnings). The testing combination has to be ignited for  $20 \pm 1$  s; after that, the flaming has to be stopped by carefully removing the burning tube from the combination

#### 4. Apparatus:

- \* Testing apparatus acc. to ISO 8191 (BS 5852)
- \* Match burner acc. to ISO 8191 ( BS 5852)



# Flame Retardants for Textiles

## Description of test methods and their application

### **ISO 8191 - 2; 1988**

Furniture – Assessment of the ignitability of upholstered furniture: Part 2: Ignition source: match flame equivalent

#### 5. Assessment:

The burning process must be examined and every sign of increased smouldering or burning of the upholstery and/or cover must be noted. Flames, afterglow, smoke or smouldering, stopping after 120 s after removing of the burning tube, can be ignored. If the burning lasts longer than 120 s, the material does not correspond to the norm. In this case, the test must be repeated. If then there is none of the above mentioned appearances, the material meets the norm requirements.

#### 6. Notes:

The test specimen shall be representative of the components and make – up of the finished mattress, mattress pad or upholstered bed base. If we do not receive any information from the customer concerning the filling material, we use here in Langweid combustible PUR – foam.