 Health Canada / Santé Canada	Title of publication-Titre de la publication <b>Product Safety Bureau Reference Manual Book 5 - Laboratory Policies and Procedures</b>	Page <b>F06-1</b>	Effective En vigueur 2000-06-28
Chapter and/or Section;-Number and title-Chapitre ou section-Numéro et titre Part B: Test Methods Section, Method F-06 <b>TEST METHOD FOR EVALUATING MATTRESSES FOR COMBUSTION RESISTANCE BY THE CIGARETTE TEST</b>			Amendment number- Numéro de la modification 24

## 1 SCOPE


- 1.1 This method describes procedures for evaluating the combustion resistance of mattresses and is applicable to item 32 of Part II of Schedule I to the Hazardous Products Act (HPA).
- 1.2 This method is provided to facilitate laboratory procedures only. It is the trader's responsibility to ensure that the product is tested according to, and meets the requirements of, the HPA and its Regulations.

## 2 APPLICABLE DOCUMENTS

- 2.1 CGSB CAN2-4.2 Method No. 27.7-M77: *Combustion Resistance of Mattresses - Cigarette Test (Appendix 1)*
- 2.2 Hazardous Products (Mattresses) Regulations (SOR/94-689)
- 2.3 Product Safety Reference Manual: *Book 4 - Flammable Products*
- 2.4 Method F-00 of this manual: General Information for Flammability Test Methods
- 2.5 Product Safety Laboratory project report #99-0543 - Mattress Test Method Review

## 3 DEFINITIONS

- 3.1 "Mattress" means any product intended, promoted or normally used for the purpose of being slept on that contain resilient material enclosed in a ticking, whether or not such products are referred to as mattresses, excluding: mattress pads; sleeping bags; box springs or other mattress foundations and supports; parts of upholstered furniture that may be used for the purpose of being slept on that are not separate mattresses; infant product pads and crib mattresses; and one-of-a-kind prescription mattresses. **Futons** are considered to be mattresses and are covered by these requirements.
- 3.2 "Ticking" means the outermost layer of fabric or related material that encloses the upholstery and the core.
- 3.3 "Core" means the main support system such as springs, foam or fluid, that may be present in a mattress.
- 3.4 "Upholstery" means all material, either loose or attached, within the ticking, or between the ticking and the core.

 Health Canada Santé Canada	Title of publication-Titre de la publication <b>Product Safety Bureau Reference Manual Book 5 - Laboratory Policies and Procedures</b>	Page <b>F06-2</b>	Effective En vigueur 2000-06-28
Chapter and/or Section;-Number and title-Chapitre ou section-Numéro et titre Part B: Test Methods Section, Method F-06 <b>TEST METHOD FOR EVALUATING MATTRESSES FOR COMBUSTION RESISTANCE BY THE CIGARETTE TEST</b>			Amendment number- Numéro de la modification 24

#### 4 APPARATUS

- 4.1 See CGSB CAN2-4.2 Method No. 27.7-M77: *Combustion Resistance of Mattresses - Cigarette Test*, section 4 ([Appendix 1](#)) except section 4.3 which is replaced by section 6.2 below.

#### 5 PROCEDURE


- 5.1 Test according to the procedures set out in CGSB CAN2-4.2 Method No. 27.7-M77: *Combustion Resistance of Mattresses - Cigarette Test*, sections 5, 6 and 7 ([Appendix 1](#))

#### 6 QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES

- 6.1 The firmness tester should be calibrated in accordance with the manufacturer's recommended procedures.
- 6.2 The specifications of the cigarettes should be checked as follows:
- 6.2.1 The cigarette shall be without filter tip and made from natural tobacco,  $85 \pm 2$  mm long with a tobacco packing density of  $270 \pm 20$  kg/m<sup>3</sup> and a total mass of  $1.1 \pm 0.1$  g at  $65 \pm 2\%$  RH and  $20 \pm 2^\circ\text{C}$ . The cigarette, when conditioned at  $21 \pm 3^\circ\text{C}$  and 35-50% RH and ignited at one end, shall burn its entire length in  $1500 \pm 100$  s when placed horizontally on the surface of a piece of bonded glass fibre fabric ( $480\text{g/m}^2 \pm 5\%$ ).<sup>1 2</sup>
- 6.3 The specifications of the polyurethane foam should be checked as per CGSB CAN2-4.2 Method No. 27.7-M77: *Combustion Resistance of Mattresses - Cigarette Test*, section 4.6 ([Appendix 1](#))
- 6.4 Testing must be performed in a draft free area (see F-00)
- 6.5 Conditioning of the test specimens and the cigarettes is to be done at a temperature of  $21 \pm 3^\circ\text{C}$  and a relative humidity of 35-50%.
- 6.6 The Quality Control section of this method is under development and, when completed, will be added in a revised issue of this method.

<sup>1</sup>The following Canadian cigarette conforms to these specifications: Mark Ten King Size

<sup>2</sup>The 55 g/mm<sup>2</sup> bonded glass fabric referenced in the standard does not exist.

 Health Canada / Santé Canada	Title of publication-Titre de la publication <b>Product Safety Bureau Reference Manual Book 5 - Laboratory Policies and Procedures</b>	Page <b>F06-3</b>	Effective / En vigueur 2000-06-28
Chapter and/or Section;-Number and title-Chapitre ou section-Numéro et titre <b>Part B: Test Methods Section, Method F-06 TEST METHOD FOR EVALUATING MATTRESSES FOR COMBUSTION RESISTANCE BY THE CIGARETTE TEST</b>			Amendment number- Numéro de la modification 24


## 7 TEST REPORT

7.1 The test report shall contain the following information:

- 7.1.1 Whether the charring or melting extended more than 50 mm in any horizontal direction from the original location of the cigarette.
- 7.1.2 Whether any combustion continued in the mattress assembly 10 minutes after the cigarette had completely extinguished.
- 7.1.3 The firmness tester reading.
- 7.1.4 Whether compression was used to obtain the required firmness.
- 7.1.5 Whether standard foam was added to obtain the required firmness.
- 7.1.6 Composition of the mattress described as a cross-section.

7.2 The report may be prepared in the format illustrated below:

Specimen	Surface charring or melting extended beyond 50 mm	Continued combustion 10 minutes after the cigarette has completely extinguished
1	No	No
2	No	Yes
3	Yes	n/a
4	No	No
5	No	No
6	No	No
7	Yes	n/a
8	No	No
9	No	Yes
10	No	No

 Health Canada Santé Canada	Title of publication-Titre de la publication <b>Product Safety Bureau Reference Manual Book 5 - Laboratory Policies and Procedures</b>	Page <b>F06-4</b>	Effective En vigueur 2000-06-28
Chapter and/or Section;-Number and title-Chapitre ou section-Numéro et titre Part B: Test Methods Section, Method F-06 <b>TEST METHOD FOR EVALUATING MATTRESSES FOR COMBUSTION RESISTANCE BY THE CIGARETTE TEST</b>			Amendment number- Numéro de la modification 24

Compression Used:                               Yes  
 Standard Foam added:                           Yes  
 Firmness Tester Reading:                       75

Construction:   ticking   Ticking quilted to 4 mm foam and scrim  
                     2" batting   or           13 mm foam  
                     1" foam   5 mm pressed fibre pad  
                     2" synthetic batting  
                     1" foam  
                     2" batting  
                     ticking

Label:           CA12345  
                     Content - white cotton felt, polyurethane foam, polyester  
                     Outer covering - polyester 60%, cotton 40%  
                       
                     Or

Scan in the label


---

## 8       **PRECISION AND BIAS**

- 8.1      Precision: This section of the method is under development and will be added in a revised issue when completed
- 8.2      Bias: The true value of the combustion resistance of mattresses can only be described in the terms of a test method. Within this limitation, this test method has no known bias.

## 9       **SAMPLING**

- 9.1      Sufficient sample that will provide 10 specimens, each with an area of 300 mm x300 mm and a depth of 50 mm.
- 9.2      For spring core type mattresses where the construction on both sides of the core is the same, all layers from one side of a twin size mattress should be sufficient. If the two sides are not the same (i.e different ticking, different quilting style) then both sides must be tested.
- 9.3      For futons, one twin size should be sufficient if the thickness is greater than 100 mm.


 Health Canada / Santé Canada	Title of publication-Titre de la publication <b>Product Safety Bureau          Reference Manual          Book 5 - Laboratory Policies and Procedures</b>	Page <b>F06-5</b>	Effective En vigueur 2000-06-28
Chapter and/or Section;-Number and title-Chapitre ou section-Numéro et titre Part B: Test Methods Section, Method F-06 <b>TEST METHOD FOR EVALUATING MATTRESSES          FOR COMBUSTION RESISTANCE BY THE CIGARETTE TEST</b>			Amendment number- Numéro de la modification 24

## APPENDIX 1

### CAN2-4.2-M77, Method 27.7 - 1979

#### Notes

- A.1 The firmness tester described in section 4.2, Note 1 and Note 4 is now referred to as Model 302SL. There is no Canadian source for this instrument.
- A.2 The polyurethane foam described in section 4.6 and Note 3 is available from Domfoam International Inc., 8785 Boul. Langelier, St-Léonard, Montréal, Québec H1P 2C9 (514-325-6477)
- A.3 The bonded glass fibre fabric with a fabric mass of 55 g/m<sup>2</sup> described in section 4.3 does not exist. The Product Safety Laboratory uses a bonded glass fibre fabric with a fabric mass of 480 g/m<sup>2</sup> (±5%).

 Health Canada / Santé Canada	Title of publication-Titre de la publication <b>Product Safety Bureau          Reference Manual          Book 5 - Laboratory Policies and Procedures</b>	Page <b>F06-6</b>	Effective En vigueur 2000-06-28
Chapter and/or Section;-Number and title-Chapitre ou section-Numéro et titre <b>Part B: Test Methods Section, Method F-06          TEST METHOD FOR EVALUATING MATTRESSES          FOR COMBUSTION RESISTANCE BY THE CIGARETTE TEST</b>			Amendment number- Numéro de la modification 24

## APPENDIX 1

CAN2-4.2-M77

METHOD 27.7 – 1979

July 1979  
 Supersedes Issue of  
 July 1977

### Method of Test for COMBUSTION RESISTANCE OF MATTRESSES – CIGARETTE TEST

#### 1. PURPOSE AND SCOPE

- 1.1 This method is intended for use in assessing the combustion resistance of mattresses in contact with a lighted cigarette.
- 1.2 This method covers only resistance of mattresses to ignition by a burning cigarette and does not relate to resistance to any other source of ignition or fire condition.

#### 2. PRINCIPLE

2.1 The method involves the exposure of the surface of a mattress assembly to a lighted cigarette as the standard ignition source in a draft protected environment. Individual specimens are assessed by measuring the maximum distance of charring or melting on the specimen surface in any horizontal direction from the nearest point of the original location of the cigarette and by observing whether the combustion continues in the mattress covering and within the mattress specimen after the cigarette is extinguished.

#### 3. DEFINITIONS


- 3.1 The following definitions are applicable to this standard:
- 3.1.1 "Mattress" means a ticking filled with a resilient material used alone or in combination with other products and intended or promoted for sleeping upon (excluding sleeping bags).
- 3.1.2 "Ticking" means the outermost layer of fabric or related material that encloses the upholstery and core.
- 3.1.3 "Core" means the main support system such as springs, foam or fluid, that may be present in a mattress.
- 3.1.4 "Upholstery" means all material, either loose or attached, within the ticking, or between the ticking and the core of the mattress.

#### 4. APPARATUS

4.1 "Flammability Tester" as illustrated in Figures 1 and 2. The test device comprises an uncovered flame-resistant box approximately 300 x 300 x 300 mm. Within the box a platform (approximately 295 x 295 mm) is mounted on a scissor jack. The test specimen, which is mounted on this platform, can be clamped into position by raising the jack and compressing the edges against a clamping surround. The firmness of the specimen can be varied by adjusting the height of the platform. The box cover shown in Figure 1 is used to extinguish the fire in the box.

4.2 "Firmness Tester". The purpose of this instrument is to measure the firmness of the mattress assembly. Measurement is achieved by local depression of the specimen with a spring loaded probe, reaction to the spring loading being displayed on a scale readout. The instrument should be capable of measuring the indentation in the range of 1.0 to 2.0 mm, to an accuracy of 0.02 mm when a force of 2.5 N is applied through a flat circular probe tip measuring 11.4 mm in diameter. This will produce a pressure of 25 kPa. (NOTE 1).

*NOTE 1* An instrument that conforms to these requirements is the Hardness Tester (Model 302 S for foam and sponge rubber) available from Pacific Transducer Corporation, 2301 Federal Avenue, Los Angeles, California 90064, U.S.A. (Canadian source, Ontario Research Foundation, Sheridan Park Research Community, Mississauga, Ontario, Canada, L5K 1B3).

 <p>Health Santé Canada Canada</p>	<p>Title of publication-Titre de la publication</p> <p><b>Product Safety Bureau Reference Manual Book 5 - Laboratory Policies and Procedures</b></p>	<p>Page</p> <p><b>F06-7</b></p>	<p>Effective En vigueur</p> <p>2000-06-28</p>
<p>Chapter and/or Section;-Number and title-Chapitre ou section-Numéro et titre</p> <p>Part B: Test Methods Section, Method F-06 <b>TEST METHOD FOR EVALUATING MATTRESSES FOR COMBUSTION RESISTANCE BY THE CIGARETTE TEST</b></p>			<p>Amendment number- Numéro de la modification</p> <p>24</p>

**METHOD 27.7**

- 4.3 "Cigarettes". The cigarette shall be without filter tip and made from natural tobacco,  $85 \pm 2$  mm long with a tobacco packing density of  $270 \pm 20$  kg/m<sup>3</sup> and a total mass of  $1.1 \pm 0.1$  g at  $65 \pm 2\%$  RH and  $20 \pm 2^\circ\text{C}$ . The cigarette, when conditioned at  $21 \pm 3^\circ\text{C}$  and 35-50% RH and ignited at one end, shall burn its entire length in  $1500 \pm 100$  s when placed horizontally on the surface of a piece of bonded glass fiber fabric ( $55$  g/m<sup>2</sup>) (*NOTE 2*).
- 4.4 A fire extinguisher should be immediately available at all times at the test location.
- 4.5 A rule graduated in millimetres for recording extent of charring or melting.
- 4.6 A sheet of polyurethane foam, 300 x 300 x 25 mm, of density 24-27 kg/m<sup>3</sup> having a 25% indentation load deflection (ILD) value of 127-157 N. This is equivalent to a scale reading of 61-63 on the prescribed instrument. When required, this polyurethane layer shall be mounted directly beneath the specimen assembly and shall become part of it (par. 7.4) (*NOTE 3*).
- 4.7 The flammability tester should be placed in an area capable of both still-air conditions (during the test) and effective ventilation (after the test).

**5. TEST SPECIMEN**

- 5.1 The test specimen shall exclude any spring or fluid assembly, and shall include:
- the entire mattress assembly, where its thickness does not exceed 50 mm or, notwithstanding par. 5.1c. and 5.1 d., where it can be reasonably accommodated in the flammability tester;
  - all of the ticking and upholstery, where the thickness of such ticking and upholstery does not exceed 50 mm, measured in an unrestrained condition;
  - the outermost 50 mm of ticking and upholstery measured in an unrestrained condition, where the thickness of such ticking and upholstery is greater than 50 mm; or
  - the outermost 50 mm of ticking and plastic or natural or synthetic rubber measured in an unrestrained condition, where the mattress is a plastic or natural or synthetic rubber assembly exceeding 50 mm in thickness.
- 5.2 The test specimen shall be  $300 \pm 5$  x  $300 \pm 5$  mm. Unless otherwise specified, ten specimens shall be tested.

**6. SAMPLE CONDITIONING**


- 6.1 Specimens shall be conditioned at an R.H. of 35-50% and at a temperature of  $21 \pm 3^\circ\text{C}$  for at least 24 h immediately prior to testing.
- 6.2 Cigarettes used as the test ignition source shall be conditioned under the same conditions as above after being removed from the package.

**7. PROCEDURE**

- 7.1 Remove the front panel of the flammability tester and place the test specimen on the platform. In the case of a "deep scroll" assembly (in which all upholstery layers are quilted to the ticking) the scroll or stitch line shall be located as centrally as possible.
- 7.2 Calibrate the firmness tester in accordance with the manufacturer's instructions.
- 7.3 Place the firmness tester on a level section of the mattress, never in a stitch line and as close to the center of the specimen as possible.

*NOTE 2* The following Canadian cigarette conforms to these specifications:  
Mark Ten King Size

*NOTE 3* Polyurethane foam that conforms to these requirements is available from Reeves Bros. Canada Limited, 415 Evans Avenue, Toronto, Ontario, M8W 2T2 or Dominion Foam Corporation, 8785 Langelier Blvd., St. Leonard, Québec.

 Health Santé Canada Canada	Title of publication-Titre de la publication  <b>Product Safety Bureau Reference Manual Book 5 - Laboratory Policies and Procedures</b>	Page  <b>F06-8</b>	Effective En vigueur  2000-06-28
Chapter and/or Section;-Number and title-Chapitre ou section-Numéro et titre  <b>Part B: Test Methods Section, Method F-06 TEST METHOD FOR EVALUATING MATTRESSES FOR COMBUSTION RESISTANCE BY THE CIGARETTE TEST</b>			Amendment number- Numéro de la modification  24

#### METHOD 27.7

7.4 Turn the jack handle clockwise until the firmness tester registers a reading corresponding to an indentation of between 1.30 and 1.35 mm when a force of 2.5 N is applied to an area of 1 cm<sup>2</sup> (NOTE 4). If this figure cannot be met, the sheet of polyurethane foam described in par. 4.6 should be included as part of the test specimen and mounted immediately underneath the test assembly. Then turn the jack handle clockwise until the firmness tester registers a reading corresponding to that above. If this figure is exceeded by the relaxed test specimen then the test shall be carried out without applying any tension to the specimen.

7.5 Place an unlit cigarette on the mattress assembly surface in a central position. In the case of a quilted ticking or a deep panel scroll ticking, the cigarette should be placed with as much as possible of the length of the cigarette in the stitching line. This stitching line should be as close as possible to the center of the mattress assembly.

7.6 Draw a line around the cigarette such that any given point on the line is 50 mm distant from the closest point of the cigarette. A template as shown in Figure 3 may be used to facilitate this procedure.

7.7 After ensuring still-air conditions, remove and ignite the cigarette. Replace it on the test specimen exactly in its former position.

7.8 Terminate the test either (a) when combustion of the ticking exceeds a distance of 50 mm in any horizontal direction from the cigarette location, or (b) 10 min after the cigarette has extinguished.

7.9 Determine whether charring or melting on the specimen surface extends beyond the line drawn 50 mm from the original location of the cigarette.

7.10 If charring or melting on the specimen surface does not extend beyond the 50 mm line, examine all layers of the specimen for the presence of continuing combustion 10 min after the cigarette has extinguished.

7.11 Ventilate the test area.

#### 8. REPORT

8.1 Report the following:

- a. Whether charring or melting on the specimen surface extends more than 50 mm in any horizontal direction from the original location of the cigarette.
- b. Whether any combustion is continuing in the mattress assembly 10 min after the cigarette has extinguished.
- c. The reading of the firmness tester.
- d. The number of this method (27.7-M79).

**NOTE 4** This corresponds to a reading of 75 on the Model 302 S tester (NOTE 1).





CAN2-4.2-M77

Method 27.7

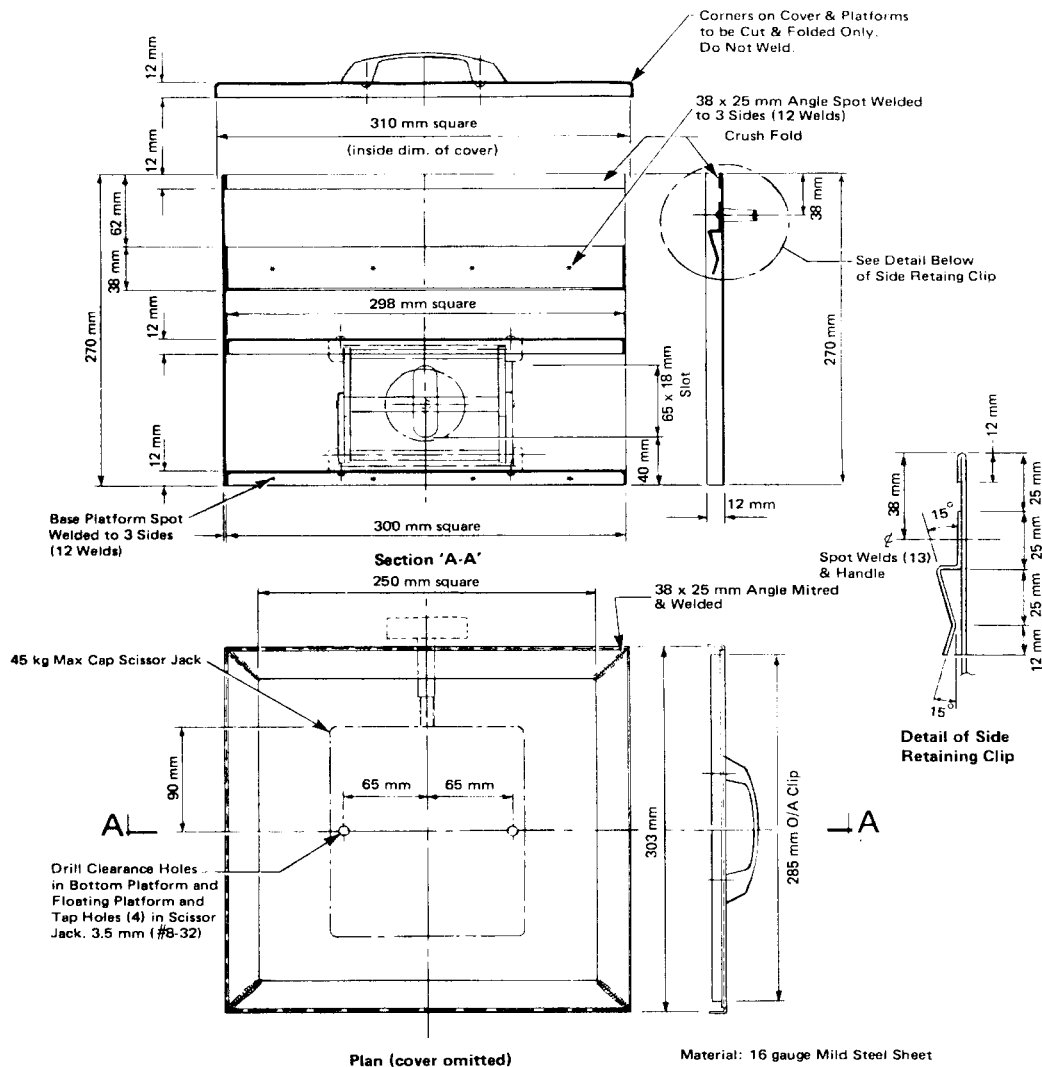

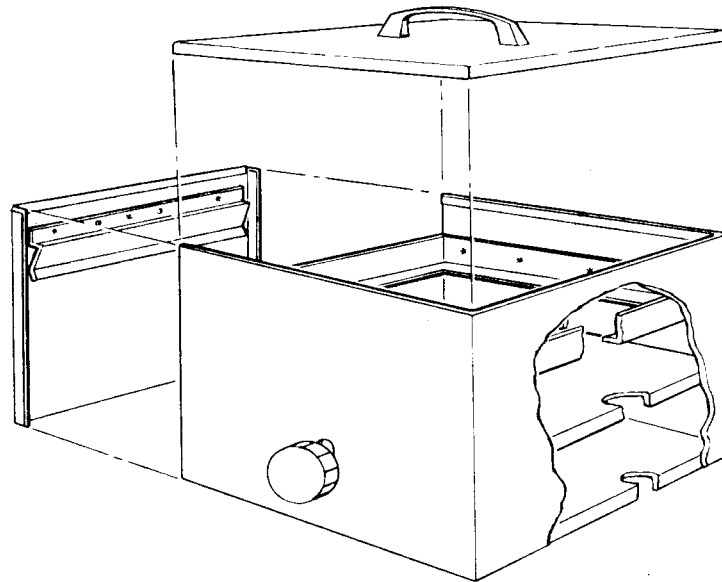


Figure 1.  
General Arrangement of  
Mattress Fire Testing Box


 Health Santé Canada Canada	Title of publication-Titre de la publication <b>Product Safety Bureau          Reference Manual          Book 5 - Laboratory Policies and Procedures</b>	Page <b>F06-10</b>	Effective En vigueur 2000-06-28
Chapter and/or Section;-Number and title-Chapitre ou section-Numéro et titre Part B: Test Methods Section, Method F-06 <b>TEST METHOD FOR EVALUATING MATTRESSES          FOR COMBUSTION RESISTANCE BY THE CIGARETTE TEST</b>			Amendment number- Numéro de la modification 24

CAN2-4.2-M77

Method 27.7



**Figure 2.  
 Pictorial View of Mattress  
 Fire Testing Box**

 Health Canada / Santé Canada	Title of publication-Titre de la publication <b>Product Safety Bureau          Reference Manual          Book 5 - Laboratory Policies and Procedures</b>	Page <b>F06-11</b>	Effective En vigueur 2000-06-28
Chapter and/or Section;-Number and title-Chapitre ou section-Numéro et titre Part B: Test Methods Section, Method F-06 <b>TEST METHOD FOR EVALUATING MATTRESSES          FOR COMBUSTION RESISTANCE BY THE CIGARETTE TEST</b>			Amendment number- Numéro de la modification 24

AN2-4.2-M77

Method 27.7

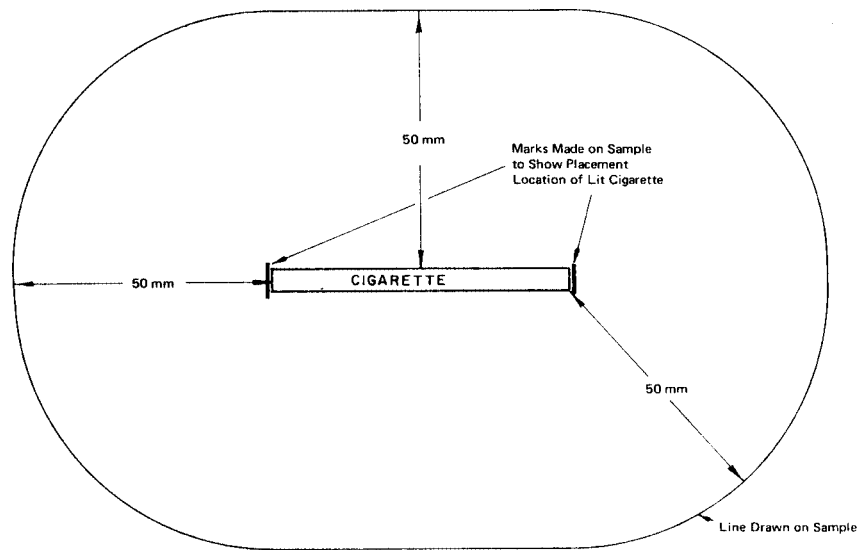


Figure 3.