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1 SCOPE

- 1.1 This method describes procedures for testing utility lighters which use a gaseous fuel and are used for lighting fire places, barbecues, candles and gas stoves, etc. but not for cigarettes, cigars or pipes.
- 1.2 This method covers disposable and refillable utility lighters.
- 1.3 This method is based on Hazardous Products (Lighters) Regulations. While most tests are same as in the Lighters Regulations, the Inversion Test and Extended Operations Test procedures have been somewhat varied because of the end-use of utility lighters.
- 1.4 Utility lighters generally have an on/off switch. This switch is not considered a child resistance mechanism. A child resistance mechanism should function as defined in the lighters regulations.

2 APPLICABLE DOCUMENTS


- 2.1 Hazardous Products (Lighters) Regulations (see Appendix 3).
- 2.2 Reference Manual Book 5, Part B, Method F-19: Test Method for Lighters.
- 2.3 Product Safety Reference Manual, *Book 4 : Flammable Products*.
- 2.4 Product Safety Laboratory Project Report # 2001-0629, *Revision of Method F-23*.

3 DEFINITIONS

- 3.1 Abnormal Burning Characteristics: See section 9 of the Lighters Regulations.
- 3.2 For other definitions, see section 2 (*Interpretation*) of the Lighters Regulations.
- 3.3 Afterburn: presence of a flame above the fuel orifice of a lighter after the normal action to extinguish the flame has been taken (see paragraph 8(f) of the Lighters Regulations).


4 APPARATUS

- 4.1 Flame Height and Inversion Tests
 - 4.1.1 A test box of a suitable size that is equipped with a steel ruler having 1 mm divisions, vertically mounted on the rear wall of the box. A second ruler mounted at 45° or a scale drawn at 45° on the rear wall of the box with 10 mm divisions or

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smaller. (The box provides for protection against air drafts which could affect flame-height measurements.)

- 4.1.2 A set of wooden or aluminum blocks may or may not be required, depending on the size of the lighter being tested, to serve as mounts to ensure that the lighter being tested is at the correct height relative to the zero division of the ruler. Alternatively, the ruler may be mounted such that it can be adjusted upwards or downwards to accommodate the height of the lighter.
- 4.1.3 A stopwatch capable of emitting a beep signal at 5 second intervals.
- 4.1.4 Stopwatch (± 0.2 seconds), connected to a foot switch.
- 4.2 Drop Test
 - 4.2.1 A freezer that is capable of maintaining a temperature of $-10 \pm 2^\circ\text{C}$.
 - 4.2.2 A concrete slab with a minimum mass of 55 kg and dimensions of at least 60 cm x 60 cm x 6 cm. See Appendix 2 for further specifications. The concrete slab should be enclosed to contain flying debris; this can be accomplished by surrounding it with a barrier which is at least 30 cm high.
 - 4.2.3 An analytical balance.
 - 4.2.4 Either a stopwatch (± 0.2 second), or a computer linked to the balance. The computer should have software capable of registering the mass at least once per second while tracking the times when the mass registers within 0.1 second.
- 4.3 Temperature Test
 - 4.3.1 An explosion-resistant, air-circulating oven that is capable of maintaining a temperature of $54 \pm 2^\circ\text{C}$.
- 4.4 Extended Operation Test
 - 4.4.1 Stand and fixtures (e. g. clamps).
 - 4.4.2 Safety shield.
 - 4.4.3 A stopwatch (± 1 second).
- 4.5 Pressure Test
 - 4.5.1 A bench-top drill and a 3.06 mm (1/8") drill bit.


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- 4.5.2 A device that is capable of producing an internal gauge pressure of 2 MPa (Figure 1) equipped with a manometer capable of measuring the pressure to the nearest kPa.
- 4.5.3 A cylinder of nitrogen gas.
- 4.5.4 An unbreakable container (metal or plastic) of approximately 4 L capacity.
- 4.5.5 A stopwatch (± 1 second).

5 TEST PROCEDURES

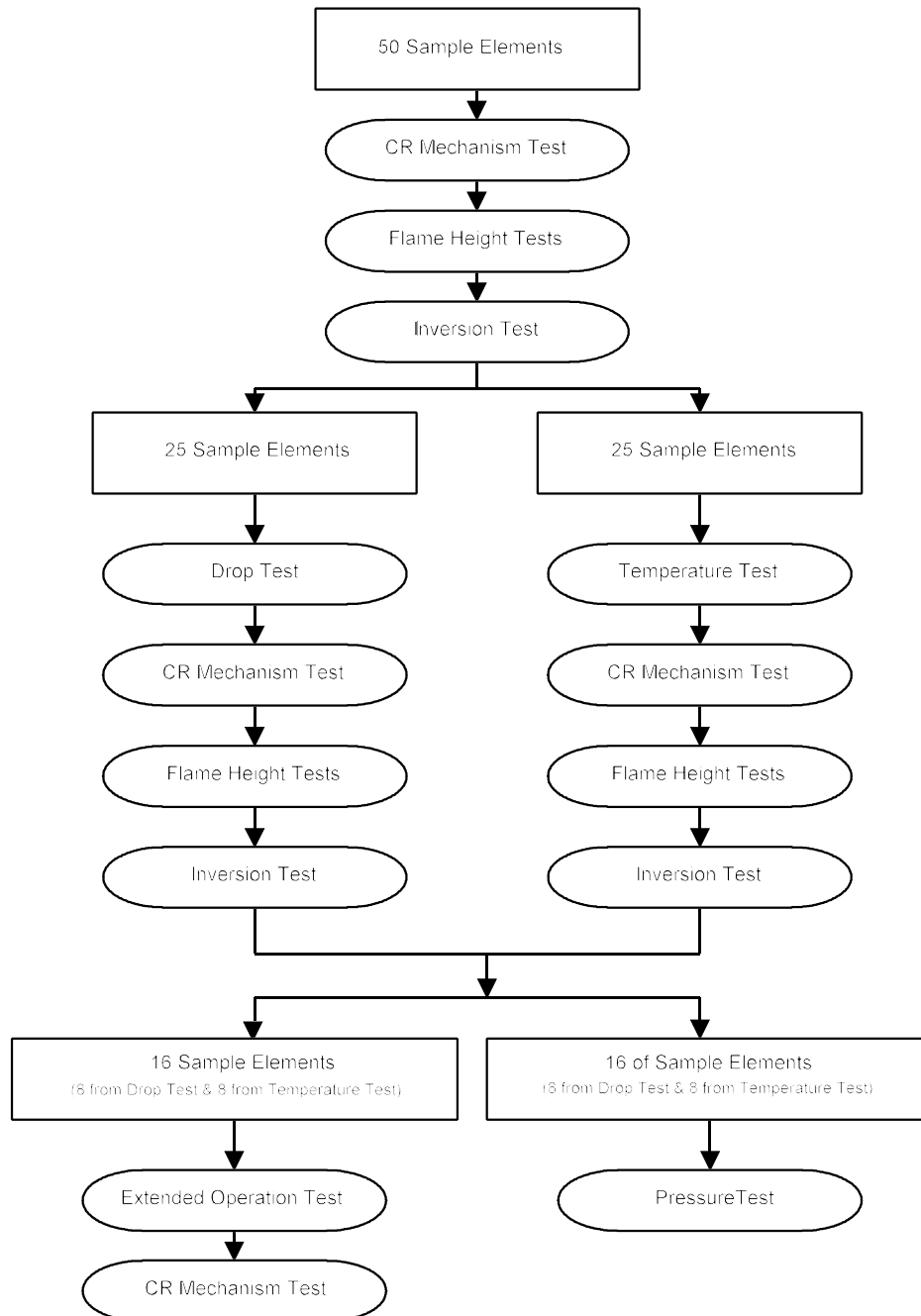
5.1 General


- 5.1.1 Record product characteristics such as adjustable or nonadjustable, disposable or refillable, child resistance, lot number etc. Record any inscriptions/identity marks/writings on the body of the lighter.
- 5.1.2 Verify and record that all the lighters in the sample have the same lot number. If there is no identifiable lot number then the sample is treated as one lot.
- 5.1.3 Number each lighter in the sample (50 lighters). In the case of disposable lighters, make note of any lighter that is empty. Replace empty lighters with filled ones if any spares are available (i.e. if more lighters than the number required in section 9 were received).
- 5.1.4 Remove a label from one of the lighters and attach it to the record sheet. If the lighter is adjustable, record whether the product complies with section 5 of the Lighters Regulations. If the lighter is refillable, record whether the product was accompanied by refuelling instructions. If so, retain one of the instruction sheets for the records.
- 5.1.5 Follow the procedures in sections 1 to 4 of the Schedule to the Lighters Regulations as applicable to gas lighters only, i.e. ignore reference to sections 11 and 12.
- 5.1.6 Any lighter that, during testing, is perceived to present a hazard to the analyst shall be immediately withdrawn from testing. Record having done so and the reason why.
- 5.1.7 If a lighter runs out of fuel during testing, it will be re-fuelled if it is a refillable type except after the Temperature Test.
- 5.1.8 As a safety measure, if the lighter fails to light after 4-5 attempts, it will be carefully dismantled to see if the tubing connections to the fuel reservoir are intact. If the

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gas tube is dislodged, the lighter will be pulled from testing because such a lighter is considered hazardous for the analyst to test. Record this information.

- 5.1.9 Record any incident of fuel leakage and, if possible, indicate the location of the leak.



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5.2 Child Resistance (CR) Mechanism Test

5.2.1 Without unlocking the CR mechanism, attempt to light each lighter at least three times and make note of the lighters that light. Lighters that have only an on-off switch are not subjected to this test.

5.3 Flame Height Tests

5.3.1 Stand the lighter vertically on the mount in the test box, ensuring that the end of the barrel is aligned with the zero on the vertical ruler.

5.3.2 Test the lighters according to the procedures of section 5 (a), (b), (e) and (f) of the Schedule to the Lighters Regulations and record:

- (i) all flame heights
- (ii) flame height ranges (fluctuations) for lighters that show sudden increase in flame height
- (iii) duration of afterburn
- (iv) any abnormal burning characteristics
- (v) any occurrence of the CR mechanism not resetting automatically after a test.


5.3.3 The five-second beep interval of the stopwatch is used to time the flame height measurements.

5.3.4 Use the stopwatch connected to the foot switch to measure any afterburn that occurs.

5.4 Inversion Test

5.4.1 The Inversion Test on each lighter is conducted immediately after its flame height tests. If the lighter is adjustable, set the flame height to maximum, light the lighter and adjust the flame height to 50 mm. If, during this flame height adjustment step, the flame height at maximum is significantly different from the one recorded in 5.3, record it. The same applies for any other abnormal burning characteristics. Hold the lighter with its barrel rotated downward at 45° below the horizontal and light it. Let the lighter burn for 10 s and then record:

- (i) flame fluctuation ranges for lighters that show sudden increase in flame lengths
- (ii) duration of afterburn
- (iii) any abnormal burning characteristics
- (iv) any occurrence of the CR mechanism not resetting automatically after the test (during the whole test, the lighter is kept in the inverted orientation).

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5.5 Drop Test


- 5.5.1 Test the lighters according to section 8 of the Schedule to the Lighters Regulations. The three drops are, in order: (i) Vertical drop with the barrel pointing upwards; (ii) Vertical drop with the barrel pointing downwards, (inverted drop) and (iii) Horizontal drop.
- 5.5.2 If the concrete slab has a border around its top surface, drop the lighters on the middle area of the slab only.
- 5.5.3 After each of the first two drops, check, by listening (the hissing sound) or feeling (cooling effect due to evaporation of fuel) if the lighter is leaking. If a leak is detected, place the lighter on an analytical balance and record the mass loss in milligrams over a period of one minute. After the third drop, even if no leak is apparent, place the lighter on the balance for a minimum of 10 seconds. If a leak is detected, measure the mass loss in milligrams over a period of one minute.
- 5.5.4 If a lighter loses the major part of its fuel on impact, an attempt to measure the rate of fuel loss can still be made as above. However, if this results in a rate of fuel loss of less than 15 mg/min, it should be recorded and reported that the lighter lost all fuel on impact. In the case where the raw data from the balance is collected by a computer, it is also possible to evaluate the rate of fuel loss from the first five seconds (for example) that the lighter was on the balance.

5.6 Temperature Test

- 5.6.1 Test the lighters according to section 9 of the Schedule to the Lighters Regulations.
- 5.6.2 The fuel status in the lighter is examined by any means, i.e. looking through the lighter casing or, if the casing is opaque, by activating the fuel-release lever and listening to the hissing sound due to escaping fuel or by attempting to light the lighter. As a last resort, in the case of an opaque casing, a hole can be drilled in the fuel reservoir while listening for gas escaping.

5.7 Extended Operation Test

- 5.7.1 Perform the test according to the procedures in section 7 of the Schedule to the Lighters Regulations except that the lighter is tested while being held with its barrel rotated downward at 45° below the horizontal.
- 5.7.2 Set up a lighter behind a safety shield, unlock the CR mechanism, depress the gas release lever, light the lighter and let it burn for two minutes. Record any of the burning characteristics given in section 16 of the Lighters Regulations and if the burning occurs at places other than at the end of the lighter barrel.

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5.8 Pressure Test


- 5.8.1 Perform the test according to the procedures of section 10 of the Schedule to the Lighters Regulations except that the test will be done on the fuel reservoirs taken out of the lighters.
- 5.8.2 Empty the lighters of the fuel in a fume hood by unlocking the CR mechanism and taping down the fuel release lever.
- 5.8.3 Take out the fuel reservoirs by dismantling the lighters and identify the fuel reservoir with the same number as on the lighter. Drill a hole in the broad side of the fuel reservoir while avoiding any partition.
- 5.8.4 Install a fuel reservoir into the pressure test device (see Figure 1) and immerse the assembly under water in the unbreakable container. Note: it is important to minimize the length and diameter of the tubing attached to the lighter in order to reduce as much as possible the bias on the results this tubing will introduce.
- 5.8.5 Pressurize the lighter with nitrogen at a rate not exceeding 150 kPa/s to a pressure of 1500 kPa and shut off the gas supply. (If at any time, i.e. during or after pressurizing, a leak is observed around the drill-hole, depressurize the assembly, tighten the clamp device a little more and try to re-pressurize).
- 5.8.6 Record the internal pressure of the lighter after one minute and make note of the location of leakage. Note: if it is suspected that a major structural failure (i.e. the lighter breaks apart) occurred due to the lighter being drilled, or from the clamping pressure, the results are not valid. A replacement lighter must then be tested.

6 **QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES**

- 6.1 Flame height measurements must be conducted in a draft free area (see F-00) under subdued lighting conditions.
- 6.2 Conditioning and testing are to be done at 23±2°C.

7 **TEST REPORT**

- 7.1 The test report should contain the following information (see Appendix 1 for a model test report):
 - 7.1.1 Description of the lighters (either in the body of the report or in the header).
 - 7.1.2 A scanned image of the label(s), and instructions for refuelling the lighter (in the case of refillable lighters).

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7.1.3 For each lighter, report the test results that do not meet the requirements (as per the H.P. (Lighters) Regulations) for the following tests:

7.1.4 CR Mechanism Test;

7.1.5 Flame Height Tests;

7.1.6 Inversion Tests;

7.1.7 Drop Test (also report the orientation in which the lighter was dropped);

7.1.8 Temperature Test;

7.1.9 Pressure Test;

7.1.10 Extended Operation Test, including burning that occurs in a place other than the end of the lighter barrel.

7.2 Also report:

7.2.1 Dislodging of gas tube from its fuel reservoir or any other damage to the tube;

7.2.2 Any incident of fuel leakage during testing and indicate the location of the leak, if possible; and

7.2.3 The removal of any other lighter from testing and the reason for its removal.

8 PRECISION AND BIAS

A statement on precision cannot be made due to the destructive nature of the tests.

A statement on bias cannot be made because the true values of the measured parameters are not known.

9 SAMPLING

A typical sample consists of 50 sample elements. However, a sample can still be tested if the number of lighters received is less than 50. All sample elements are taken from the same lot.

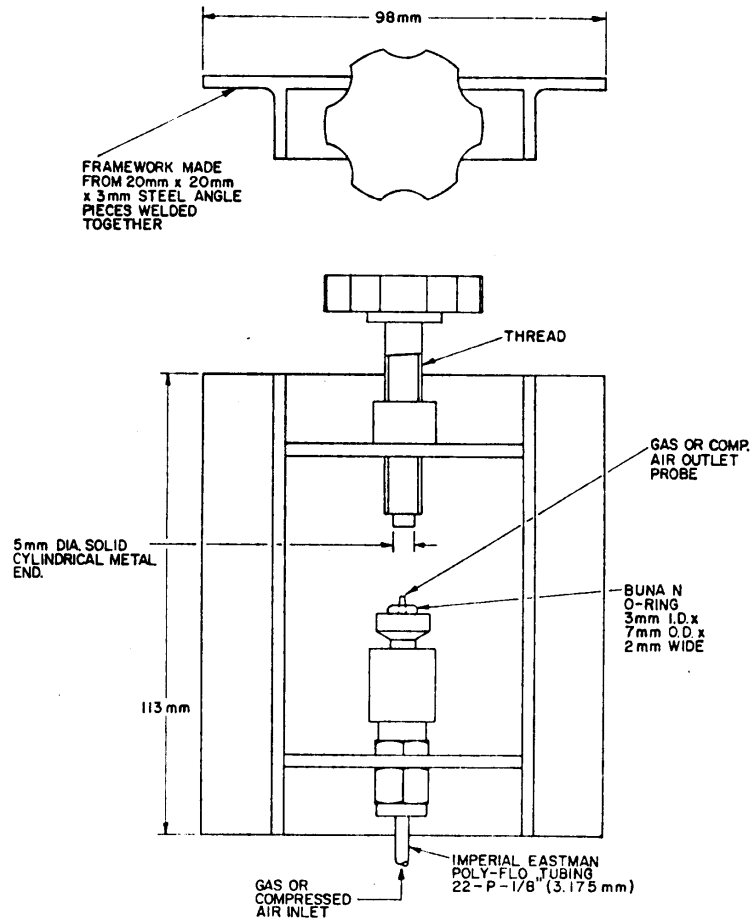



Figure 1: Pressure Test Device

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APPENDIX 1

Standard Report Format - Utility Lighters

Method Used: F23

Inscription(s) on product: none

Label(s) on product: (not to scale)

(Scan of packaging on last page)

**DANGER:EXTREMELY FLAMMABLE
 CONTENTS UNDER PRESSURE.**
 Contains butane. Do not use near sparks or
 flames. Do not puncture or incinerate container
 or store at temperatures above 120 degrees F.
 Keep out of the reach of children. Made in China

Initial Tests


CR Mechanism Test

- #15 lit without unlocking the CR mechanism.
- #37 failed to reset itself after every use

Flame Height and Inversion Tests

The following table lists only those lighters that exhibited some type of defects.

Lighter #	Flame Height (mm)				Inversion	
	Maximum	Abnormal Burning	Minimum	Abnormal Burning	Flame Height (mm)	Abnormal Burning
4	160-230	3.5 s afterburn	35			>30 s afterburn ^①
6	110-190 ^②	3.0 s afterburn	35			1.1 s afterburn
7	120-160	9.3 s afterburn	25			5.4 s afterburn
8	190-230	7.2 s afterburn	40			1.6 s afterburn
9	150		90-110			16.4 s afterburn
11	200	> 30 s afterburn ^③				
13	190	10.2 s afterburn	40			5.4 s afterburn
14	110-250		20			
19	90		25 ^④			
32	130-220	35.9 s afterburn	20	piezo	stopped	working
33	100		45			3.7 s afterburn

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Lighter #	Flame Height (mm)				Inversion	
	Maximum	Abnormal Burning	Minimum	Abnormal Burning	Flame Height (mm)	Abnormal Burning
35	100-140		30			4.0 s afterburn
38	⑤					
45	140-220	10.3 s afterburn	30			4.8 s afterburn
46	70		25			8.6 s afterburn
48	110		⑥			

- ① The trigger stuck in the open position and the lighter continued to burn. The trigger had to be forced out to shut off the lighter.
- ② Would not light at maximum setting - had to be lit at minimum setting and then increased to maximum.
- ③ Fuel release stuck in open position - testing discontinued.
- ④ Leaked fuel at valve unit of fuel reservoir, then stopped, while setting to minimum.
- ⑤ Leaked fuel at valve unit of fuel reservoir while setting to maximum - testing discontinued.
- ⑥ Leaked fuel at valve unit of fuel reservoir while setting to minimum - testing discontinued.

Drop Test

Lighters numbered from 1 to 25 (excluding #11) were subjected to the Drop Test. No fuel loss defects were observed.

In these utility lighters there is a plastic tube that carries fuel from the nozzle of the fuel reservoir to the nozzle at the end of the barrel. The tube in some lighters can become disconnected from the nozzle at the reservoir end thus causing the fuel to be released into the body of the lighter rather than out the end of the barrel. This problem is usually discovered during the Flame Height Tests which follow the Drop Test. The tube was disconnected in the following 15 lighters:

2, 3, 6, 8, 10, 12, 13, 15, 16, 17, 18, 20, 21, 23 and 25

In addition, the tube in lighter #1 became disconnected during flame height testing.

CR Mechanism Test

The requirements were met.

Flame Height and Inversion Tests (after the Drop Test)

The following table lists only those lighters that exhibited some type of defects.



Lighter #	Flame Height (mm)				Inversion	
	Maximum	Abnormal Burning	Minimum	Abnormal Burning	Flame Height (mm)	Abnormal Burning
4	140-170	10.0 s afterburn	30			1.3 s afterburn
7	120-230	3.7 s afterburn	20			1.3 s afterburn
9	⑦					
14	130->267*		20			

* 267 mm is the top of the test box.

⑦ Leaked fuel at valve unit of fuel reservoir while setting to maximum - testing discontinued.

Temperature Test

Lighters numbered from 26 to 50 (except #32, #38 and #48) were subjected to the Temperature Test. Lighter #31 was completely exhausted of fuel.


CR Mechanism Test

The requirements were met.

Flame Height and Inversion Tests (after the Temperature Test)

The following table lists only those lighters that exhibited some type of defects.

Lighter #	Flame Height (mm)				Inversion	
	Maximum	Abnormal Burning	Minimum	Abnormal Burning	Flame Height (mm)	Abnormal Burning
26	160-210	2.4 s afterburn	35			
28	200->267*	6.7 s afterburn	40			
29	130-180	6.6 s afterburn	40			1.4 s afterburn
30	150-190	2.9 s afterburn	40			
33	110-170		50			1.2 s afterburn

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Lighter #	Flame Height (mm)				Inversion	
	Maximum	Abnormal Burning	Minimum	Abnormal Burning	Flame Height (mm)	Abnormal Burning
34	150-210		30			
35	130-220		30			
36	130-210	5.2 s afterburn	30			3.2 s afterburn
37	⑧					
39	40		20		110	3.8 s afterburn ⑨

* 267 mm is the top of the test box.

⑧ Leaked fuel at valve unit of fuel reservoir while setting to maximum - testing discontinued.

⑨ Leaking fuel after test - testing discontinued.

Extended Operation Test


Eleven lighters were subjected to the Extended Operation Test. The following defects were observed:

- # 7 ignition took place half way up the barrel along the seam - testing discontinued
- #40 ignition of component parts
- #50 ignition of component parts

Pressure Test

Sixteen lighters were subjected to the Pressure Test. The following lighters exhibited drops in internal pressure in excess of 250 kPa/min:

- # 5 278 kPa/min
- #27 974 kPa/min

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APPENDIX 2

Specifications for concrete used in drop test

Note: The following directions mention dimensions for the frame into which the concrete mixture is poured. These dimensions are only one of many possibilities. The only restrictions on the dimensions of the final product are: minimum width and length of 60 cm, a minimum thickness of 6 cm and a minimum mass of 55 kg. The final product should have a middle area having a uniform texture measuring at least 60 cm x 60 cm, so care should be taken not to make the outside edge too wide (steps C-5 and C-8, below). The texture should not be too smooth, approximating that of a common sidewalk.

Glossary Of Terms

Segregation- The separation of coarse aggregates from the mortar or the water from the ingredients.

Straight Edge- A 2" x 4" wood or similar shaped object with a straight side used to level/flatten the excess concrete from the surface after placement.

Concrete Mixture Data

Components

Approximate quantities for producing
1 cubic metre of fresh concrete

Aggregate Size- 20 mm	1178 kg
Washed Concrete Sand	830 kg
Portland Cement- Type 10	300 kg
Potable Water	116 kg

Strength & Mixture

30 Mpa (Mega Pascals)
6-8% Air Entrainment
75 mm Slump


Construction of Concrete Slabs

A. Tools & Materials

Tools: Hammer, Hand Saw, Square, Pencil, Shovel, 12" Steel Rod, Concrete Vibrator (if available)
Materials: Half Sheet ¾" Plywood, 12' 2" x 4" Stock, 3" & 2" Common Nails (12 each)

B. Form Preparation


1. Using a three-quarter inch thick sheet of plywood, cut a rectangle having dimensions 28" x 28" (71 cm x 71 cm).

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2. Using 2" x 4" lumber, create a rectangular frame having outside dimensions 28" x 28" with the lumber standing on its narrowest side. Corners should be fastened into one another using 3" common nails.
3. With the 2" x 4" frame complete, place it over the plywood cut-out. Align the two units with each other then flip the entire box frame over and place it onto a flat hard surface. Fasten the plywood to the 2" x 4" frame using 2" common nails.
4. Once the box frame is secured flip the unit over and place it on a level flat surface.

C. Concrete Placement

1. Place concrete mixture (as per specifications) into box frame using a shovel or similar handling device. Care should be taken to avoid *segregation* of the mixture when placing into the form.
2. Once the box frame has been filled, consolidate the concrete into the corners and edges using a steel rod or concrete vibrator.
3. Place a *straight edge* (2" x 4" or equivalent) over the box frame resting over two opposite sides. Starting from one side work the straight edge over the concrete keeping it flat on the box frame edges.
4. Once the excess concrete has been stricken off the surface use a wooden float to further consolidate any openings on the surface. The wooden float should be worked back across the surface area in a flat circular motion.
5. Use a concrete edging tool to create a smooth outside surface along the perimeter of the form. Once complete allow concrete to set until surface has stiffened. *Note: Time required will vary depending on air temperature. Higher temperatures increase setting time. Concrete should be checked every 20 minutes for workability.*
6. Using an aluminum magnesium trowel, work the concrete surface in both directions to fill any small air pockets/voids until the surface is smooth.
7. With a smooth bristle broom create an even line pattern across the slab by pulling the broom in a backward direction.
8. Complete concrete finish by repeating step # 5.
9. After allowing to set for a 48 hour period, gently remove form work by extracting the nails.

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APPENDIX 3

Hazardous Products (Lighters) Regulations¹

SOR/89-514

P.C. 1989-2151 26 October, 1989

Her Excellency the Governor General in Council, on the recommendation of the Minister of Consumer and Corporate Affairs, pursuant to section 5* of the Hazardous Products Act, is pleased hereby to revoke the Hazardous Products (Lighters) Regulations, made by Order in Council P.C. 1979-3095 of November 15, 1979**, and to make the annexed Regulations respecting the advertising, sale and importation of hazardous products (lighters), in substitution therefor.

* R.S., c. 24 (3rd Supp.), s. 1

** SOR/79-843, 1979 Canada Gazette Part II, p. 4318

REGULATIONS RESPECTING THE ADVERTISING, SALE AND IMPORTATION OF HAZARDOUS PRODUCTS (LIGHTERS)

Short Title

1. These Regulations may be cited as the *Hazardous Products (Lighters) Regulations*.

Interpretation

2. In these Regulations,


"gas lighter" means a product utilizing as fuel liquefied hydrocarbons, such as n-butane and isobutane, with a vapour pressure at 24°C that exceeds a gauge pressure of 100 kPa; (briquet à gaz)

"luxury lighter" means a product that is designed to be refilled with fuel and that has, where the product is manufactured in Canada, a value of greater than \$2.50 on sale by the manufacturer and, where the product is imported into Canada, a value for duty of greater than \$2.50 as determined in accordance with section 46 of the Customs Act; (briquet de luxe)

"product" means a lighter included in item 34 of Part II of Schedule I to the Hazardous Products Act; (produit)

"production lot" means a group of substantially identical products manufactured by the same manufacturer under substantially identical conditions; (lot de production)

¹ This consolidation is prepared for convenience only. For all purposes of interpreting and applying the law, users should consult the regulations, as registered by the Clerk of the Privy Council and published in Part II of the Canada Gazette.

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"shield" means a structure that totally or partially surrounds the fuel orifice of a product and projects beyond it;
(écran de protection)

"spitting" means an escape of liquid fuel that produces a shower of burning droplets which separate from the main flame; (crachotement)

"successful operation" means the emission of an audible or visual signal, when a surrogate lighter is being tested;
(actionner)

"surrogate lighter" means a device used for testing purposes that

- (a) approximates the appearance, size and weight of the product that it represents,
- (b) is, within reasonable manufacturing tolerances, identical to the product that it represents in all factors that affect child-resistance, including the operation and force or forces required for operation,
- (c) has no fuel, and
- (d) produces a clearly discernible audible or visual signal instead of a flame. (briquet de substitution)

"wick lighter" means a product utilizing as fuel liquid hydrocarbons, such as hexane, with a vapour pressure at 24°C that does not exceed a gauge pressure of 34 kPa. (briquet à essence) SOR/91-261, s. 1; SOR/95-252, s. 1.

General

3. A product may be advertised, sold or imported if the product meets the requirements of these Regulations.

Luxury Lighter Records


3.1 Any person who manufactures or imports a luxury lighter shall, for a period of six years beginning on the date of sale by the manufacturer or the date of importation, as the case may be, maintain records that identify the luxury lighter and that show

- (a) in the case of a luxury lighter manufactured in Canada, the value on sale by the manufacturer; and
- (b) in the case of an imported luxury lighter, the value for duty as determined in accordance with section 46 of the Customs Act. SOR/95-252, s. 2.

Compliance Certificate

3.2 The manufacturer and the importer of a product other than a luxury lighter shall

- (a) possess a certificate that states in English or French that the surrogate lighter of the product has been tested and complies with the requirements set out in subsection 7.1(2) for child-resistance and
 - (i) the name and address of the person who issued the certificate;
 - (ii) the name and address of the manufacturer of the product, and
 - (iii) the name and model of the product;
- (b) keep a copy of the certificate for three years beginning on the date of manufacture or importation of the product, as the case may be; and

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(c) within 15 days after a request by an inspector, make available in English or French the test data on which the statement referred to in paragraph (a) is based, including the information set out in 1210.4(g)(1) to (10) of Title 16 of the Code of Federal Regulations (United States), as amended from time to time, and the name and model of the product to which the test data relates. SOR/95-252, s. 2.

PART I

LABELLING REQUIREMENTS

4. (1) Every product shall have permanently marked on it, in such a manner that the mark shall remain clear and visible throughout the useful life of the product,

- (a) the name of the manufacturer, in roman characters; or
- (b) a trade mark registered in Canada or for which an application for registration in Canada is pending.

(2) Where more than one production lot is offered for sale, every product shall have marked on it, in a clear and visible manner, a means of identifying the production lot of which that product forms a part.

(3) Subject to subsection (4), every product shall have marked on it, in a clear and visible manner,

- (a) where the product is manufactured in Canada, the principal place of business of the manufacturer or the name and principal place of business of the distributor;
- (b) where the product is not manufactured in Canada, the name and principal place of business of the importer or distributor in Canada; and
- (c) the warning: "KEEP OUT OF REACH OF CHILDREN/TENIR HORS DE LA PORTÉE DES ENFANTS" or any other warning that conveys the same meaning.


(4) The information required under subsection (3) may be marked

- (a) on the package, where the product is enclosed in a sealed package; or
- (b) on the package or on the instructions within the package, where the product is individually enclosed in an unsealed package. SOR/95-252, s. 3.

5. Every product that has a device to adjust the flame height shall have permanently marked on it, in such a manner that the mark shall remain clear and visible throughout the useful life of the product, an easily understood symbol indicating the direction in which force is to be applied to increase and decrease the flame height.

6. Every product that is designed to be refuelled shall be accompanied by instructions that clearly set out, in English and in French, the safe method of refuelling the product, including

- (a) information as to the type of fuel to be used to refill the product and a warning to use only that type of fuel;
- (b) a warning to keep lighters and fuels therefor out of the reach of children;
- (c) in the case of a gas lighter, a warning to ensure proper mating between the refill container and the fuel reservoir of the lighter; and
- (d) in the case of a wick lighter, a warning to fill the lighter slowly, to avoid overfilling and to wipe dry the lighter and the hands of the user before activating the lighter.

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PART II

DESIGN AND PERFORMANCE REQUIREMENTS

Application of Force

7. (1) Every luxury lighter shall be designed in such a manner as to require at least one of the following manual operations by a person using it in order to produce a flame:

- (a) a deliberate action to produce and maintain a flame;
- (b) two separate and distinct actions to achieve ignition; and
- (c) the application of a force equal to or greater than 15 N to produce a flame.

(2) Every product that has a device to adjust the flame height shall be designed in such a manner as to require the deliberate application of a reasonable force by a person using the product in order to adjust the flame height. SOR/95-252, s. 4.

Child-resistance Requirements

7.1 (1) All products, other than luxury lighters, shall be child-resistant.

(2) For the purposes of subsection (1), a product is child-resistant where its surrogate lighter has been tested in accordance with the test protocol described in section 1210.4, without regard to sections 1210.4(a)(3) and (b)(1), of Title 16 of the Code of Federal Regulations (United States), as amended from time to time, and has been resistant to successful operation by at least 85 per cent of the children participating in the test. SOR/95-252, s. 5.

7.2 The mechanism or system that makes a product child-resistant shall

- (a) require that the user perform at least two separate and distinct actions to achieve ignition;
- (b) reset itself automatically after each operation of the ignition mechanism of the product;
- (c) where the product is a gas lighter, continue to function effectively after each test set out in sections 5 to 9 of the schedule; and
- (d) where the product is a wick lighter, continue to function effectively after each test set out in sections 11 and 12 of the schedule. SOR/95-252, s. 5.


Flame Height of Gas Lighters

8. A gas lighter, when tested in accordance with the procedures described in sections 5 and 6 of the schedule and

- (a) section 8 of the schedule, followed by the procedures described in sections 5 and 6 thereof, or
- (b) section 9 of the schedule, followed by the procedures described in sections 5 and 6 thereof,

shall

- (c) where the lighter has neither a shield nor a device to adjust the flame height, have a vertical flame height not exceeding 50 mm,
- (d) where the lighter has a shield but no device to adjust the flame height, have a vertical flame height not exceeding 100 mm,

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- (e) where the lighter has a device to adjust the flame height, have a vertical flame height not exceeding
 - (i) 150 mm, where the device is adjusted to produce maximum flame height, and
 - (ii) 50 mm, where the device is adjusted to produce minimum flame height, and
- (f) not exhibit a flame above the fuel orifice for more than two seconds after the normal action to extinguish the flame has been taken.

Abnormal Burning of Gas Lighters

9. A gas lighter, when tested in accordance with at least one of the procedures described in sections 5, 6 and 8 to 10 of the schedule, shall not exhibit
- (a) a sudden increase in flame height of 50 mm or more;
 - (b) a vertical flame height in excess of the maximum values prescribed by section 8;
 - (c) an explosion;
 - (d) combustion at any place other than at the fuel orifice of the product or in the main flame;
 - (e) spitting; or
 - (f) any other abnormal or unsafe burning characteristics.

Abnormal Burning of Wick Lighters


10. A wick lighter, when tested in accordance with the procedures described in section 11 of the schedule and with the procedures described in section 12 thereof followed by those described in section 11 thereof, shall not exhibit
- (a) a sudden increase in flame height of 50 mm or more;
 - (b) an explosion;
 - (c) combustion at any place other than at the wick; or
 - (d) any other abnormal or unsafe burning characteristics.

Structural Integrity of Gas Lighters

11. A gas lighter, when tested in accordance with the procedures described in section 8 or 9 of the schedule, shall not exhibit damage that would make the operation of the lighter unsafe.
12. A gas lighter, when tested in accordance with the procedures described in section 8 of the schedule, shall not exhibit an escape of fuel exceeding 15 mg per minute.
13. A gas lighter, when tested in accordance with the procedures described in section 9 of the schedule, shall not exhibit leakage that results in total exhaustion of fuel after the cooling period described in paragraph 9(2)(c) of the schedule.

14. A gas lighter, when tested in accordance with the procedures described in section 10 of the schedule, shall not exhibit a drop in internal pressure of more than 250 kPa per minute.

Structural Integrity of Wick Lighters

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15. A wick lighter, when tested in accordance with the procedures described in section 12 of the schedule, shall not exhibit rupture of its fuel reservoir or any other damage that would affect its safe operation.

Extended Operation of Gas Lighters

16. A gas lighter, when tested in accordance with the procedures described in section 7 of the schedule, shall not exhibit, during a continuous burning time of two minutes,

- (a) ignition of the component parts;
- (b) expulsion of the valve mechanism; or
- (c) rupture of the fuel reservoir, with or without flame.

SCHEDULE
(ss. 8 to 16)

TEST PROCEDURES FOR LIGHTERS

GENERAL

1. Where a product is not fuelled at the point of sale, it shall be fuelled in accordance with the manufacturer's instructions using the fuel recommended by the manufacturer prior to testing in accordance with sections 5 to 9 and 11 and 12.

2. (1) The product shall be maintained at a temperature of $23 \pm 2^\circ\text{C}$ for at least 10 hours immediately preceding testing in accordance with sections 5 to 7 and 9 to 12.

(2) The area in which tests are conducted shall be maintained at a temperature of $23 \pm 2^\circ\text{C}$ during testing.

3. (1) Flame height measurements shall be taken

- (a) inside a draft-free chamber constructed from a suitable non-flammable material; and
- (b) with the product positioned to produce a vertically upward flame.


(2) The flame height shall be measured to the nearest 5 mm.

(3) All flame tests shall be conducted in subdued lighting conditions.

4. Any damage sustained by a product or any abnormal or unsafe functioning of the product during a test shall be recorded.

GAS LIGHTERS

Flame Tests

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Flame Height Test

5. The procedures to be used to measure the flame height of a gas lighter are as follows:

- (a) where the lighter is equipped with a device to adjust the flame height, test the lighter first with the device adjusted to produce maximum flame height and secondly with the device adjusted to produce minimum flame height;
- (b) activate the lighter to produce a flame for a continuous five-second period;
- (c) where the lighter has no shield, measure and record the maximum linear distance observed between the tip of the visible flame and the top of the fuel orifice;
- (d) where the lighter has a shield, measure and record the maximum linear distance observed between the tip of the visible flame and the top of the shield or, where the shield is retractable, the top of the shield in its fully withdrawn position;
- (e) take the normal action to extinguish the flame; and
- (f) measure and record the duration of any burning that occurs immediately after the normal action to extinguish the flame has been taken.

Inversion Test

6. The procedures to be used in conducting an inversion test of a gas lighter are as follows:

- (a) where the lighter is equipped with a device to adjust the flame height, adjust the device to produce a vertically upward flame with a flame height of 50 mm;
- (b) activate the lighter;
- (c) turn the lighter to an inverted hand-held position 45° below the horizontal for a continuous 10-second period after which return the lighter to the original vertical position;
- (d) take the normal action to extinguish the flame; and
- (e) measure and record the duration of any burning that occurs immediately after the normal action to extinguish the flame has been taken.

Extended Operation Test


7. The procedures to be used in conducting a gas lighter extended operation test are as follows:

- (a) where the lighter is equipped with a device to adjust the flame height, adjust the device to produce a flame height of 50 mm;
- (b) activate the lighter to produce a vertical flame for a continuous two-minute period after which take the normal action to extinguish the flame; and
- (c) observe and record any ignition of the component parts of the lighter, expulsion of the valve mechanism or rupture of the fuel reservoir, with or without flame.

Structural Integrity Tests

Drop Test

8. (1) The test apparatus required for a gas lighter drop test is a horizontal concrete slab with a minimum mass of 55 kg and dimensions of at least 60 cm × 60 cm × 6 cm.

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- (2) The procedures to be used in conducting a gas lighter drop test are as follows:
- (a) where the lighter is equipped with a device to adjust the flame height, adjust the device to produce a flame height of 50 mm;
 - (b) maintain the lighter at a temperature of $-10 \pm 2^{\circ}\text{C}$ for a period of at least 10 hours after which maintain the lighter at a temperature of $23 \pm 2^{\circ}\text{C}$ for a period of at least 10 hours;
 - (c) immediately after the procedure described in paragraph (b), cause the lighter to fall three times from a height of 1.5 m onto the concrete slab
 - (i) first, from an upright vertical position,
 - (ii) secondly, from an inverted vertical position, and
 - (iii) thirdly, from a horizontal position;
 - (d) inspect the lighter immediately after each fall for escape of fuel and record any damage; and
 - (e) measure and record any escape of fuel to the nearest milligram per minute.

Temperature Test

9. (1) The test apparatus required for a gas lighter temperature test is an oven, preferably explosion-resistant, capable of maintaining a temperature of $54 \pm 2^{\circ}\text{C}$.

- (2) The procedures to be used in conducting a gas lighter temperature test are as follows:
- (a) where the lighter is equipped with a device to adjust the flame height, adjust the device to produce a flame height of 50 mm;
 - (b) place the lighter in the oven and maintain a temperature in the oven of $54 \pm 2^{\circ}\text{C}$ for a period of four hours;
 - (c) remove the lighter from the oven and maintain the lighter at a temperature of $23 \pm 2^{\circ}\text{C}$ for a period of at least 10 hours; and
 - (d) inspect the lighter and record any damage and any instance of total loss of fuel.

Pressure Test


10. (1) The test apparatus required for a gas lighter pressure test is a device capable of producing a gauge pressure of 2 MPa.

- (2) The procedures to be used in conducting a gas lighter pressure test are as follows:
- (a) empty the fuel reservoir of the lighter;
 - (b) subject the fuel reservoir of the lighter to an internal pressure of 1.5 MPa but do not permit the internal pressure to rise at a rate which exceeds 150 kPa per second; and
 - (c) observe the lighter for 60 seconds and record any drop in internal pressure.

WICK LIGHTERS

Burn Test

11. The procedures to be used in conducting a wick lighter burn test are as follows:
- (a) position the lighter to produce a vertically upward flame;

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- (b) activate the lighter to produce a flame for a continuous 10-second period after which take the normal action to extinguish the flame;
- (c) reactivate the lighter and turn it to an inverted hand-held position 45° below the horizontal for a continuous 10-second period after which turn the lighter to the original vertical position;
- (d) take the normal action to extinguish the flame; and
- (e) observe and record any abnormal or unsafe burning characteristics.

Drop Test

12. (1) The test apparatus required for a wick lighter drop test is a horizontal concrete slab as described in subsection 8(1).

- (2) The procedures to be used in conducting a wick lighter drop test are as follows:
 - (a) cause the lighter to fall three times from a height of 1.5 m onto the concrete slab,
 - (i) first, from an upright vertical position,
 - (ii) secondly, from an inverted vertical position, and
 - (iii) thirdly, from a horizontal position; and
 - (b) inspect the lighter after each fall and record any damage.

..... END

