
STATUTORY INSTRUMENTS

1972 No. 917

FACTORIES

**The Highly Flammable Liquids and Liquefied Petroleum Gases
Regulations 1972**

<i>Made</i>	- - -	20th June 1972
<i>Laid before Parliament</i>		3rd July 1972
<i>Coming into Operation—</i>		
<i>All Regulations except 10(4)</i>		21st June 1973
<i>Regulation 10(4)</i>		21st June 1974

The Secretary of State:—

- (a) by virtue of his powers under sections 50, 76 and 180(6) and (7) of the Factories Act 1961(a) and of all other powers enabling him in that behalf; and
- (b) after publishing, pursuant to Schedule 4 to the said Act of 1961, notice of the proposal to make the Regulations and after the holding of an inquiry under that Schedule into objections made to the draft,

hereby makes the following special Regulations:—

Citation, commencement and revocation

1.—(1) These Regulations may be cited as the Highly Flammable Liquids and Liquefied Petroleum Gases Regulations 1972 and shall come into operation on 21st June 1973 with the exception of Regulation 10(4) which shall come into operation on 21st June 1974.

(2) The Regulations (b) dated 12th August 1902 with respect to the manufacture of felt hats are hereby revoked.

(3) The Cellulose Solutions Regulations 1934(c) are hereby revoked—

- (a) in the case of the second proviso to the preamble, the definitions and Regulations 3, 4 and 17 as from 21st June 1974; and
- (b) in the case of the remainder of those Regulations, as from 21st June 1973.

Interpretation

2.—(1) The Interpretation Act 1889(d) shall apply to the interpretation of these Regulations as it applies to the interpretation of an Act of Parliament, and as if these Regulations and the Regulations hereby revoked were Acts of Parliament.

(a) 1961 c. 34.

(b) S.R. & O. 1902/623 (Rev. VII, p. 316: 1902, p. 106).

(c) S.R. & O. 1934/990 (Rev. VII, p. 241: 1934 I, p. 567).

(d) 1889 c. 63.

(2) In these Regulations, unless the context otherwise requires, the following expressions have the meanings hereby assigned to them respectively, that is to say—

“aqueous ammonia” means ammonia gas dissolved in water;

“commercial butane” means a hydrocarbon mixture consisting predominantly of butane, butylene or any mixture thereof;

“commercial propane” means a hydrocarbon mixture consisting predominantly of propane, propylene or any mixture thereof;

“dangerous concentration of vapours” means a concentration greater than the lower flammable limit of the vapours;

“factory” includes any premises and place to which these Regulations apply;

“fire resisting structure” means any of the following, that is to say, any building, part of a building, structure, cabinet and enclosure which is constructed in conformity with a specification for fire resisting structures being a specification approved for the time being for the purposes of these Regulations by certificate of the Chief Inspector;

“highly flammable liquid” means any of the following, other than aqueous ammonia, liquefied flammable gas and liquefied petroleum gas, that is to say, any liquid, liquid solution, emulsion or suspension which, when tested in the manner specified in Schedule 1 to these Regulations, gives off a flammable vapour at a temperature of less than 32 degrees Celsius and, when tested in the manner specified in Schedule 2 to these Regulations, supports combustion;

“liquefied flammable gas” means any substance which at a temperature of 20 degrees Celsius and a pressure of 760 millimetres of mercury would be a flammable gas, but which is in liquid form as a result of the application of pressure or refrigeration or both;

“liquefied petroleum gas” means commercial butane, commercial propane and any mixture thereof;

“undertaking” includes the Crown and any municipal or other public authority.

(3) References in these Regulations to any enactment shall be construed as references to that enactment as amended by or under any other enactment.

Application of Regulations

3.—(1) Except as provided in paragraphs (4) to (6) of this Regulation and in Regulations 12 and 17, these Regulations shall apply to—

(a) all factories; and

(b) all premises, places, processes, operations and works to which the provisions of section 50 (so far as the Secretary of State may make Regulations thereunder) and of Part IV (with respect to special regulations for safety and health) of the Factories Act 1961 are applied by any of the following provisions of that Act, namely, section 123 (which relates to electrical stations), section 124 (which relates to institutions), section 125 (which relates to certain dock premises and certain warehouses), section 126 (which relates to ships) and section 127 (which relates to building operations and works of engineering construction),

where any highly flammable liquid is present for the purposes of, or in connection with, any undertaking, trade or business.

(2) Except as provided in paragraphs (4) to (6) of this Regulation, Regulations 1 to 4, 7 and 18 shall apply to all factories and all such premises, places, processes, operations and works as are mentioned in paragraph (1) of this Regulation where any liquefied petroleum gas is present for the purposes of, or in connection with, any undertaking, trade or business.

(3) Where in any factory there is any highly flammable liquid or liquefied petroleum gas of which the occupier is not the owner and the highly flammable liquid or liquefied petroleum gas is used by or under the direction of some person other than the occupier or a person in the employment of the occupier, that other person or (if he is in the employment of the owner) the employer of that other person shall, in relation to that highly flammable liquid or liquefied petroleum gas, be deemed for the purposes of these Regulations to be the occupier of the factory.

(4) These Regulations shall not apply to any premises or parts of premises in respect of which a licence or a continuing certificate under the Explosives Act 1875(a)—

(a) is in force; or

(b) would, but for the fact that the premises or parts of premises are under the control, or held for the service, of the Crown, be required to be in force.

(5) Nothing in these Regulations shall apply as respects any highly flammable liquid in a factory so long as it is present in such circumstances that provisions of the Factories (Testing of Aircraft Engines and Accessories) Special Regulations 1952(b) apply to or in relation to it or to anything done to, with or in relation to it.

(6) Nothing in these Regulations shall apply to any highly flammable liquid or liquefied petroleum gas stored (as fuel, cargo or otherwise) in any fixed storage tanks on a ship.

(7) The provisions of these Regulations shall be in addition to and not in substitution for or in diminution of other requirements imposed by or under the Factories Act 1961.

Exemption certificates

4. The Chief Inspector may (subject to such conditions as may be specified therein) by certificate in writing (which he may in his discretion revoke at any time) exempt from all or any of the requirements of these Regulations—

(a) any factory or part of any factory; or

(b) any class or description of factories or parts thereof; or

(c) any machine, plant, apparatus, process, operation or work, or any class or description of machines, plant, apparatus, processes, operations or works; or

(d) any highly flammable liquid or liquefied petroleum gas or any class or description of highly flammable liquids or liquefied petroleum gases,

if he is satisfied that the requirements in respect of which the exemption is granted are not necessary for the protection of persons employed.

(a) 1875 c. 17.

(b) S.I. 1952/1689 (1952 I, p. 988).

Storage

5.—(1) Except as provided in paragraph (4) of this Regulation and except in the case of highly flammable liquids present in any place in accordance with Regulation 8(3) or being conveyed within the factory, all highly flammable liquids shall be stored—

- (a) in suitable fixed storage tanks in safe positions; or
- (b) in suitable closed vessels kept in a safe position in the open air and, where necessary, protected against direct sunlight; or
- (c) in suitable closed vessels kept in a storeroom which either is in a safe position or is a fire resisting structure; or
- (d) in the case of a workroom where the aggregate quantity of highly flammable liquids stored does not exceed fifty litres, in suitable closed vessels kept in a suitably placed cupboard or bin being a cupboard or bin which is a fire resisting structure.

(2) Except in the case of tanks and vessels which have been emptied and made free of vapour from highly flammable liquids, all openings (other than those necessary for venting) in cupboards, bins, tanks and vessels which have at any time been used for storing highly flammable liquids (whether or not for the time being containing any highly flammable liquid) shall be kept closed except as necessary for the use, operation or maintenance of these cupboards, bins, tanks and vessels.

(3) Wherever highly flammable liquids are stored in accordance with paragraph (1)(a), (b) or (c) of this Regulation, all reasonably practicable steps shall be taken to ensure that any highly flammable liquid which leaks, is spilt or otherwise escapes shall be contained or immediately drained off to a suitable container or to a safe place, or otherwise treated to make it safe.

(4) Nothing in this Regulation shall apply to—

- (a) highly flammable liquids (being petroleum-spirit or any substance to which provisions of section 1 of the Petroleum (Consolidation) Act 1928(a) were applied by the Petroleum (Mixtures) Order 1929(b) and the Petroleum (Liquid Methane) Order 1957(c) authorised to be kept by a licence in force under the said Act of 1928 or which, but for the fact that the highly flammable liquids are kept in premises occupied by the Crown, would be required to be so authorised;
- (b) highly flammable liquids in the fuel tanks of vehicles or engines for the purpose of operating the vehicles or engines;
- (c) any suitable small closed vessel containing not more than 500cc of highly flammable liquid.

Marking of storerooms, tanks, vessels, etc.

6.—(1) Except where it is impracticable to do so and except as provided in paragraph (3) of this Regulation, every storeroom, cupboard, bin, tank and vessel used for storing highly flammable liquid shall be clearly and boldly marked “Highly Flammable” or “Flashpoint below 32°C” or “Flashpoint in the range of 22°C to 32°C” or otherwise with an appropriate indication of flammability.

(2) Where it is impracticable to mark any storeroom, cupboard, bin, tank or vessel in accordance with the foregoing paragraph of this Regulation, the

(a) 1928 c. 32.

(b) S. R. & O. 1929/993 (Rev. XVIII, p. 7: 1929, p. 1143).

(c) S.I. 1957/859 (1957 II, p. 1847).

words "Highly Flammable Liquid" shall be clearly and boldly displayed as near to it as possible.

(3) Nothing in this Regulation shall apply to—

- (a) any of the following, that is to say, any cupboard, bin, tank or vessel, which contains spirits intended for human consumption;
- (b) the fuel tanks of vehicles or engines which contain any highly flammable liquid for the purpose of operating the vehicles or engines;
- (c) any suitable small closed vessel containing not more than 500cc of highly flammable liquid;
- (d) any aerosol dispenser in which the amount of highly flammable liquid contained is not in excess of either 45 per cent by weight of the total contents or 250 grammes in weight.

Liquefied petroleum gas—storage and marking of tanks, vessels, cylinders, etc.

7.—(1) Except as provided in paragraphs (2), (3) and (6)(a) of this Regulation, all liquefied petroleum gas not in use shall be stored—

- (a) in suitable underground reservoirs below ground the surface of which is wholly or mainly in the open air, or in suitable fixed storage tanks or suitable fixed storage vessels being tanks or vessels in safe positions either in the open air or below ground the surface of which is wholly or mainly in the open air; or
- (b) in suitable movable storage tanks or suitable movable storage vessels kept in safe positions in the open air; or
- (c) in the pipe-lines and pumps or other appliances forming part of a totally enclosed pipe-line system; or
- (d) in suitable cylinders kept in safe positions in the open air, or where this is not reasonably practicable, in a storeroom constructed of non-combustible material being a storeroom which is adequately ventilated, which either is in a safe position or is a fire resisting structure and which is not used for any purpose other than the storage of liquefied petroleum gas or acetylene cylinders.

(2) No liquefied petroleum gas other than in suitable cylinders or suitable pipe-lines shall be present in any workplace and the number of liquefied petroleum gas cylinders or pipe-lines present at any one time in any workplace shall be as small as is reasonably practicable having regard to the processes or operations being carried on.

(3) Every liquefied petroleum gas cylinder shall be stored until such time before being first required for use or manipulation as is reasonable, and when its contents have been expended shall, as soon as reasonably practicable, be removed from the workplace and stored or refilled without delay.

(4) Except where it is impracticable to do so, and except as provided in paragraph (6) of this Regulation, every tank, vessel, reservoir, cylinder and storeroom used for storing liquefied petroleum gas shall be clearly and boldly marked "Highly Flammable—L.P.G." or otherwise to the like effect.

(5) Where it is impracticable to mark any tank, vessel, reservoir, cylinder or storeroom in accordance with the last foregoing paragraph of this Regulation, the words "Highly Flammable—L.P.G." shall be clearly and boldly displayed as near to it as possible.

(6) (a) Nothing in this Regulation shall apply to—

- (i) liquefied petroleum gas in the fuel tanks of vehicles or engines for the purpose of operating the vehicles or engines;
- (ii) any suitable small closed vessel containing not more than 500 cc of liquefied petroleum gas.

(b) Nothing in paragraphs (4) and (5) of this Regulation shall apply to any aerosol dispenser in which the amount of liquefied petroleum gas contained is not in excess of either 45 per cent by weight of the total contents or 250 grammes in weight.

(7) In this Regulation “cylinder” means any container designed, fabricated and tested in accordance with a pressure vessel code for the time being approved for the purpose of these Regulations by the Chief Inspector.

Precautions against spills and leaks

8.—(1) Where highly flammable liquids are to be conveyed within a factory they shall, where it is reasonably practicable so to do, be conveyed through a totally enclosed system incorporating pipe-lines and pumps or similar appliances. Where conveyance of highly flammable liquids within a factory through such a totally enclosed system is not reasonably practicable, they shall be conveyed in vessels which are so designed and constructed as to avoid so far as is practicable the risk of spilling.

(2) A totally enclosed system used for such conveyance shall so far as is practicable be so designed, constructed, installed, placed and maintained as to avoid leakage.

(3) The quantity of any highly flammable liquid present at any one time in any workplace in course of manufacture or for use or manipulation and in the process tanks, process vessels, pipe-lines, pumps, plant, equipment and apparatus in the workplace shall be as small as is reasonably practicable having regard to the processes or operations being carried on.

(4) All reasonably practicable steps shall be taken to ensure that tanks or vessels containing any highly flammable liquid do not leak. Every such tank and vessel shall be kept closed except as necessary during the manufacture, use or manipulation of the highly flammable liquid therein, or for the operation or maintenance of the tank or vessel, and every such tank and vessel shall be so designed, constructed and placed as to avoid so far as is reasonably practicable the risk of spilling.

(5) Where in any process or operation any highly flammable liquid is liable to be spilled or to leak, all reasonably practicable steps shall be taken to ensure that any highly flammable liquid which is spilt or leaks shall be contained or immediately drained off to a suitable container or to a safe place, or otherwise treated to make it safe.

(6) Any tank or vessel used to contain any highly flammable liquid, other than a fixed process tank, a fixed process vessel, a fixed storage tank or a fixed storage vessel, shall, when its contents have been expended, unless it has been made free of vapour from the liquid or is to be immediately re-used, be removed without delay to a safe place in the open air or to a suitably placed storeroom being a storeroom which is a fire resisting structure or be placed in a suitably placed cupboard or bin being a cupboard or bin which is a fire resisting structure.

(7) All such empty tanks and vessels as aforesaid which have not been made free of vapour from the liquid shall be kept in such a safe place or

such a storeroom, cupboard or bin as aforesaid until next required for use or disposal, and any such tank or vessel shall be kept closed.

Sources of ignition

9.—(1) No means likely to ignite vapour from any highly flammable liquid shall be present where a dangerous concentration of vapours from highly flammable liquids may reasonably be expected to be present.

(2) Where in any place a dangerous concentration of vapours from highly flammable liquids may reasonably be expected to be present, any cotton waste or other material in that place which—

(a) has been used in such a manner as to render the cotton waste or other material liable to spontaneous combustion; or

(b) is contaminated with any highly flammable liquid,

shall be deposited without delay in a metal container having a suitable cover or be removed without delay to a safe place.

(3) Where any cellulose nitrate is present in any highly flammable liquid, all practicable steps shall be taken to prevent the deposit of any solid residue resulting therefrom on any surface which is liable to attain a temperature of 120 degrees Celsius.

(4) Nothing in paragraph (2) of this Regulation shall apply to lagging in position on pipework.

Prevention of escape of vapours and dispersal of dangerous concentrations of vapours

10.—(1) Where any highly flammable liquid is present in any workplace, steps shall be taken to prevent so far as is reasonably practicable the escape of vapours from any such highly flammable liquid into the general atmosphere of that or any other workplace.

(2) Except as provided in paragraph (5) of this Regulation, where a dangerous concentration of vapours from highly flammable liquids may reasonably be expected to be evolved in any process or operation, the process or operation shall, where reasonably practicable, be carried on within a cabinet or other enclosure which, in either case, is effective to prevent the escape of such vapours into the general atmosphere of the workroom or any other workroom, is adequately ventilated by mechanical means and is a fire resisting structure:

Provided that in the case of a batch-loaded box-type oven used to evaporate highly flammable liquid being an oven with a cubic capacity of less than one and a half cubic metres and having natural ventilation sufficient to prevent the occurrence of a dangerous concentration of vapours in the oven, the oven shall not be required to be ventilated by mechanical means.

(3) Except as provided in paragraph (5) of this Regulation, where it is not reasonably practicable to comply with the requirement of the last foregoing paragraph of this Regulation where in any workroom any such dangerous concentration of vapours may reasonably be expected to be evolved in any process or operation, the workroom shall have exhaust ventilation provided by mechanical means, being exhaust ventilation adequate to remove such vapours from the workroom.

(4) A workroom required by the last foregoing paragraph of this Regulation to have exhaust ventilation shall be a fire resisting structure with the

exception of any of the following forming part of it, that is to say, any external doors, external windows and external walls, any openings provided for ventilation and any tops or ceilings of single storey buildings or of top floor rooms.

(5) Nothing in paragraphs (2) and (3) of this Regulation shall apply to any room if the only work with highly flammable liquids which is being carried on therein is work to the room and if there is secured natural or other ventilation of the room adequate to prevent the occurrence there of a dangerous concentration of vapours from the liquids.

(6) Ventilation provided or secured in pursuance of this Regulation shall be kept in operation or use at all necessary times.

(7) All ducts, trunks and casings used in connection with ventilation provided or secured in pursuance of this Regulation shall be fire resisting structures.

(8) In the case of electric motors used in connection with exhaust ventilation systems provided in pursuance of this Regulation which comprise ducts, being systems constructed or installed after the date of commencement of these Regulations or constructed or installed before that date and substantially reconstructed after that date, such electric motors shall not be situated in the path of vapours from any highly flammable liquids being exhausted by the systems.

(9) All venting devices of fixed tanks and fixed vessels containing highly flammable liquids shall discharge to a safe place and, where necessary, shall be provided with a suitable wire gauze effective as a flame arrestor or other suitable flame arrestor.

Explosion pressure relief of fire resisting structures

11.—(1) Where in accordance with provisions of Regulations 5, 8 or 10 a storeroom, workroom, cabinet or enclosure is a fire resisting structure provision may be made in its structure for pressure relief in the case of explosion and, in the case of a storeroom, for adequate natural ventilation notwithstanding, in either case, anything contained in any specification approved for the purposes of the definition of the expression “fire resisting structure” contained in Regulation 2.

(2) Where in pursuance of the foregoing paragraph of this Regulation provision is made in a fire resisting structure for pressure relief in the case of explosion such provision shall be so arranged that any pressure will vent to a safe place.

Means of escape in case of fire

12.—(1) There shall be adequate and safe means of escape in case of fire from every room in which any highly flammable liquid is manufactured, used or manipulated.

(2) This Regulation shall not apply to factories other than premises and places to which provisions of the Factories Act 1961 are applied by section 125 (which relates to certain dock premises and certain warehouses) or section 127 (which relates to building operations and works of engineering construction) of that Act.

Prevention and removal of solid residues

13.—(1) Without prejudice to Regulation 9(3), whenever as a result of any process or operation involving any highly flammable liquid a deposit of any solid waste residue liable to give rise to a risk of fire is liable to occur on any surface—

- (a) steps shall be taken where reasonably practicable to prevent as far as possible the occurrence of all such deposits; and
- (b) where any such deposit occurs, effective steps shall be taken, as often as necessary to prevent danger, to remove all such residues as aforesaid and put them in a safe place.

(2) No removal of any such residue containing cellulose nitrate shall be effected by the use of an iron or steel implement.

Smoking

14.—(1) No person shall smoke in any place in which any highly flammable liquid is present and the circumstances are such that smoking would give rise to a risk of fire.

(2) The occupier shall take all reasonably practicable steps to ensure compliance with the foregoing paragraph of this Regulation and such steps shall include—

- (a) the display at or as near as possible to every place to which the said paragraph applies of a clear and bold notice indicating that smoking is prohibited in that place; or
- (b) the display at every entrance to the factory at which employed persons enter of a clear and bold notice indicating that smoking is prohibited throughout the factory except at those places where there is displayed a notice indicating that smoking is permitted.

Control of ignition and burning of highly flammable liquids

15.—(1) Except where the sole purpose is to dispose of it as waste by burning it and except as provided in paragraph (3) of this Regulation, no highly flammable liquid shall be ignited except in plant or apparatus suitable for the purpose of burning that highly flammable liquid safely and by the proper use of that plant or apparatus.

(2) Where the sole purpose is to dispose of any highly flammable liquid as waste by burning it, it shall be burnt either—

- (a) in plant or apparatus suitable for the purpose of burning that highly flammable liquid safely; or
- (b) by a competent person, in a safe manner and in a safe place.

(3) The prohibition contained in paragraph (1) of this Regulation shall not apply where highly flammable liquid is burnt in order to provide persons with training in fighting fire if—

- (a) it is burnt by a competent person, in a safe manner and in a safe place; and
- (b) the training is carried out under the direct and continuous supervision of a competent person.

Power to take samples

16.—(1) An inspector may at any time after informing the occupier or, if the occupier is not readily available, a foreman or other responsible person, take for testing sufficient samples of any material in the factory which in his opinion may prove on testing to be a highly flammable liquid.

(2) The occupier or the foreman or other responsible person may, at any time when a sample is taken under this Regulation, and on providing the necessary appliances, require the inspector to divide the sample into three parts, to mark and seal up each part and—

- (a) to deliver one part to the occupier, or the foreman or other responsible person;
- (b) to retain one part for future comparison;
- (c) to submit one part to testing,

and any test under this Regulation shall, if so required, be carried out by a government department.

(3) The provisions of this Regulation are without prejudice to the provisions of section 78 of the Factories Act 1961.

Fire fighting

17.—(1) There shall in every factory where any highly flammable liquid is manufactured, used or manipulated be provided and maintained appropriate means for fighting fire, which shall be so placed as to be readily available for use.

(2) This Regulation shall not apply to factories other than premises and places to which provisions of the Factories Act 1961 are applied by section 125 (which relates to certain dock premises and certain warehouses) or section 127 (which relates to building operations and works of engineering construction) of that Act.

Duties of persons employed

18. It shall be the duty of every person employed in a factory to which any of these Regulations apply to comply with such of the requirements of the Regulations as relate to the doing of or refraining from an act by him and to the use by him of any plant, equipment or appliance and to co-operate in carrying out these Regulations. If a person employed as aforesaid discovers any defect in the plant, equipment or appliances, it shall be his duty to report such defect without delay to the occupier, manager or other responsible person.

20th June 1972.

Maurice Macmillan,
Secretary of State for Employment.

METHOD OF TEST BY FLASHPOINT (CLOSED CUP METHOD)

Scope

1. The method describes a procedure for determining if a flammable liquid when maintained at the specified temperature of 32°C and under the conditions of test, gives off sufficient flammable vapour at this temperature to cause ignition on application of an external source of flame applied in a standard manner.

Principle of the method

2.—(1) The test portion is heated in an Abel closed cup in a suitable water-bath. The ignition trial is carried out after the test portion has been maintained under equilibrium conditions for at least 10 minutes at 32°C at 760 mm of mercury or at the equivalent temperature having made due allowance for variation in barometric pressure (see paragraph 5(2) of this Schedule).

(2) This procedure ensures that the air/vapour space above the test sample has attained the saturation concentration of flammable vapour at the required temperature before the ignition trial is performed. The test report records whether or not a flash occurs at this temperature.

Apparatus

3.—(1) The test cup shall be the Abel closed cup and cover, with or without stirrer, as illustrated in the Appendix to this Schedule and constructed to the dimensions specified in Tables 1, 2 and 3 to this Schedule within the limits of accuracy prescribed by the tolerances there stated. If the stirrer is used during the heating up period it should be stopped during the ignition test. If the stirrer is removed, the aperture in the lid should be securely plugged before starting the tests.

(2) Any suitable water-bath capable of being adjusted to a temperature of 32°C and of adequate heat capacity to meet the requirements of paragraph 5(7) of this Schedule may be used. A bath fitted with a stirrer and an adjustable thermostat is convenient.

(3) The test cup shall be fitted with a thermometer which is immersed in the sample for measuring its temperature. The water-bath shall be fitted with a thermometer of equal precision for measuring the water temperature. The test cup thermometer shall be the Abel oil cup Celsius thermometer (10°C to 65°C) (see Table 4 to this Schedule for the specification).

(4) A suitable support shall be provided for holding the test cup so that the lid and upper edge are horizontal and the cup is immersed in direct contact with the water in such a position that the level of the test sample in the cup is the same as that of the water in the water-bath.

Sampling

4.—(1) The sample shall be representative of the material being tested and shall be kept, prior to test, in an air tight container.

(2) Because of the possibility of loss of volatile constituents the sample shall receive only the minimum treatment to ensure uniformity. After removing a portion for test, the sample container shall be immediately closed tightly to ensure that no volatile flammable components escape from the container.

Procedure

5.—(1) Obtain and prepare the test sample as described in paragraph 4 of this Schedule, and ensure that at all times during this preparation its temperature does not exceed 30°C.

(2) Adjust the temperature of the bath to and maintain it at 32°C (within an accuracy of $-0 \pm 0.5^\circ\text{C}$) or to the corrected temperature after allowing for difference of barometric pressure from the standard (760 mm of mercury or 1013 millibar) by raising the test temperature for a higher or lowering the test temperature for a lower pressure at the rate of 1°C for each 30 mm of mercury (40 millibar) difference.

(3) Carefully clean and dry the Abel cup, the cover and the cup thermometer and then cool to at least 30°C.

(4) Fill the Abel cup with the test sample until the internal level indicator just disappears under the surface of the liquid. Take care to avoid the formation of bubbles and contact between the sample and the cup wall above the level indicator. If this occurs to a significant extent, empty the cup, prepare it again according to paragraph 5(3) of this Schedule and fill it with a fresh portion of the sample.

(5) Immediately after filling the test cup, place the cover in position and support the cup in the bath so that the cover is horizontal and the cup is immersed with the surface of the test portion at the same level as the water in the bath.

(6) Light the flame of the ignition device and adjust it to the size of the bead of diameter 3.5 ± 0.5 mm.

(7) Ten minutes after the test portion has reached within 0.5°C of 32°C or the equivalent temperature adjusted for barometric pressure difference perform the ignition trial by opening the slide, inserting and removing the nozzle of the ignition device, and closing the slide again, in a period of 2.5 ± 0.5 seconds.

(8) The material shall only be deemed to have flashed if a comparatively large blue flame appears and propagates over the surface of the liquid. In case of doubt the test should be repeated with a fresh portion of the sample and if the doubt is not resolved by the second test, the sample should be regarded as having flashed.

(9) If a large blue flame does not appear as a flash but instead a continuous luminous flame burns in the orifice caused by opening the slide when the ignition flame is introduced, then the flashpoint will be considerably below 32°C.

Report of the test

6. The test report should include the following information:—

- (1) The type and identification of the material under test.
- (2) The test temperature in °C and barometric pressure in mm of mercury or millibar.
- (3) A statement as to whether a flash occurred in the course of carrying out the test procedure described in paragraph 5 of this Schedule.
- (4) The date of the test.

TABLE 1
DIMENSIONS OF OIL CUP

	Dimensions in mm
Cup, wall and bottom thickness	$1.4 \pm .1$
Cup, internal diameter	49.5 — 52.0
Cup, internal depth	55 — 57
Flange, thickness	$1.4 \pm .1$
Flange, width	12.5 — 13.5
Flange, distance of upper side from top edge of cup	8.2 — 10.8
Gauge, thickness	$3.35 \pm .1$
Gauge, distance of point from level of upper edge of cup	17.7 — 17.9

TABLE 2
DIMENSIONS OF COVER

	Dimensions in mm
Cover thickness	1.3 — 1.6
Cover, central hole, length (in direction of slide)	12.6 — 12.8
width	10.0 — 10.3
Cover, peripheral holes, length (in direction of slide)	4.9 — 5.1
width	7.5 — 7.7
Slide, thickness	0.9 ± 0.1
Slide, width of upper surface	12.7 — 12.9
Lamp, overall length of jet	15 approx.
Lamp, bore of jet at end	1.46 — 1.71
Bead, diameter	3.0 — 4.0
Thermometer socket: Internal diameter	15.0 — 15.5
Length of short side measured from under surface of cover	13 approx.
Length of long side measured from under surface of cover	19 approx.
Distance of centre of socket from centre of cover measured on the underside	18 approx.
The dimensions relating to the thermometer socket are subject to the correct placing of the thermometer when in position.	
Vertical depth of lowest part of thermometer below centre of underside of cover	35.5 — 40.5

TABLE 3
DIMENSIONS OF STIRRER

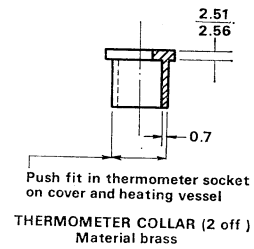
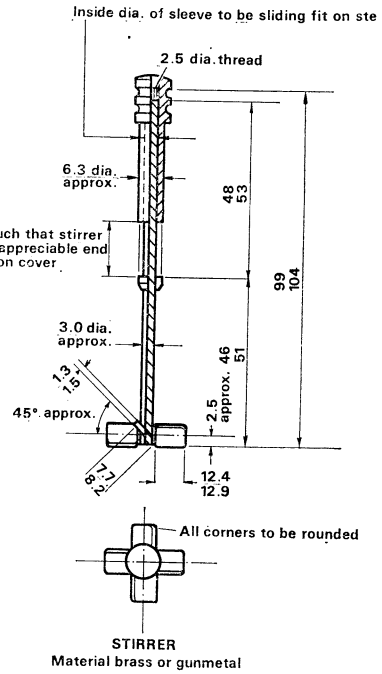
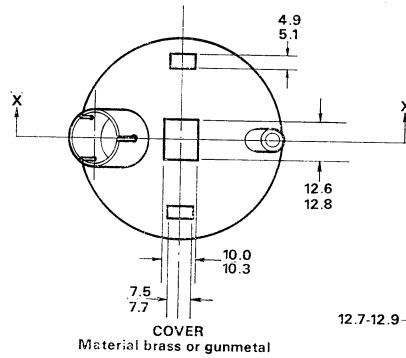
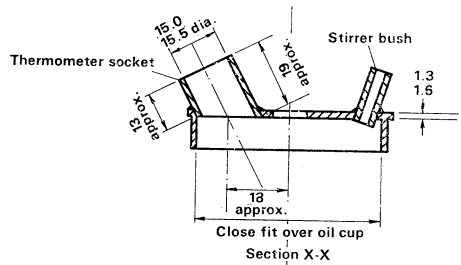
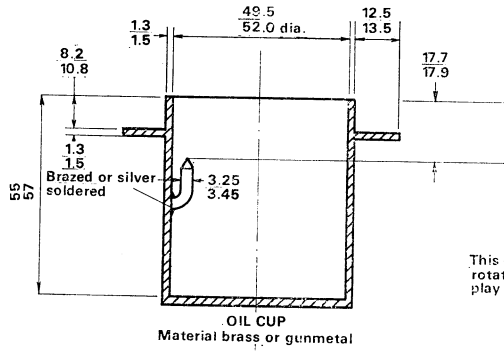
	Dimensions in mm
Stem, length overall	99 — 104
Stem, length. Lower end to point of attachment blades	2.5 approx.
Stem, length. Lower end to upper surface of collar	46 — 51
Stem, length. Upper surface of collar to lower end of thread	48 — 53
Diameter of stem	3 approx.
Diameter of stem collar	6.3 approx.
Blades, thickness	1.4 ± .1
Blades, length excluding root	12.4 — 12.9
Blades, breadth (all corners of blades rounded)	7.7 — 8.2
Blades, blade angle	45° approx.
Sleeve, length	To suit stem, giving free rotation with no appreciable vertical play when screwed home
Diameter of bore	Sliding fit on stem
Diameter of sleeve collar	6.3 approx.

TABLE 4
THERMOMETER SPECIFICATION

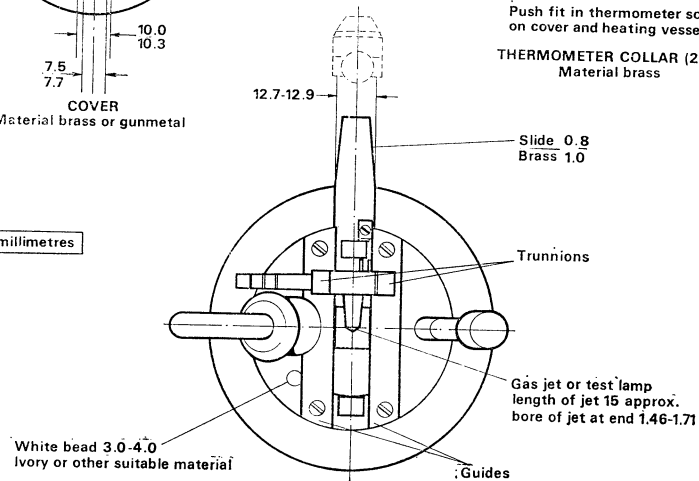
Name	Abel Oil Cup Celsius (10°C — 65°C)
Range	10°C — 65°C
Graduation	0.5°C
Overall length	228 mm \pm 10 mm
Stem diameter	6 — 7 mm
Bulb shape	Spherical
Bulb diameter	8.8 — 9.0 mm
Length of graduated portion	At least 120.6 mm
Distance, bottom of bulb to 10°C mark	70 — 80 mm
Longer lines at each	1°C and 5°C
Figured at each	5°C
Expansion chamber	Required
Top finish	Plain
Scale error not to exceed	0.2°C

Immersion—A swelling is to be provided in the stem of the oil cup thermometer to ensure that the thermometer can be fitted in its brass collar so that the distance from the top of the collar to the bottom of the bulb is 61 ± 1.5 mm.

APPENDIX



Dimensions in millimetres



METHOD OF TEST FOR COMBUSTIBILITY

Scope

1. The method describes a procedure for determining if the product when heated under the conditions of test and exposed to an external source of flame applied in a standard manner supports combustion.

Principle of the method

2.—(1) A block of aluminium alloy, or other non-rusting metal of suitable heat conductivity, with a concave depression (called the well) is heated to the required temperature. A standard source of flame capable of being swivelled over the centre of the well and at a given distance from it is attached to the metal block.

(2) Two millilitres of product under test are transferred to the well and its combustibility characteristics are noted in relation to the standard flame.

Apparatus

3.—(1) A combustibility tester consisting of an aluminium alloy or non-rusting metal block of suitable heat conductivity fitted with a concave depression or well. The metal block has a thermometer embedded in it. A small gas jet on a swivel is attached to the metal block. The exact dimensions of the metal block, and its well, the gas jet and its positioning, and the embedded thermometer are shown on the drawing set out in the Appendix to this Schedule and are specified in Table 1 to this Schedule.

(2) A simple gauge to check height of gas jet above the top of the well.

(3) The thermometer in the metal block shall be a Celsius thermometer conforming to the dimensions and tolerances given in Table 2 to this Schedule.

(4) A hot plate fitted with a temperature controlling device or other means of heating the metal block.

(5) A stop watch or other suitable timing device.

(6) A graduated pipette or hypodermic syringe capable of delivering two millilitres to an accuracy of ± 0.1 ml.

Sampling

4.—(1) The sample shall be representative of the material being tested and shall be kept prior to test in an airtight container.

(2) Because of the possibility of loss of volatile constituents the sample shall receive only the minimum treatment to ensure uniformity. After removing a portion for test the sample container shall be immediately closed tightly to ensure that no volatile flammable components escape from the container.

Procedure

5.—(1) Set up the apparatus in a draught free area. Place the metal block on the hot plate fitted with a temperature controlling device or heat the metal block by other suitable means so that its temperature is maintained at 50°C (within an accuracy of $-0+5^{\circ}\text{C}$) or to the corrected temperature allowing for difference of barometric pressure from the standard (760 mm of mercury or 1013 millibar) by raising the test temperature for a higher or lowering the test temperature for a lower pressure at the rate of 1°C for each 30 mm of mercury (40 millibar) difference. Ensure that the top of the metal block is exactly level. Use a gauge to check that the jet is 2.2 mm above top of the well.

(2) Using the pipette or graduated hypodermic syringe withdraw from the sample container at least 2 ml. of the test material and transfer 2 ml. ± 0.1 ml. of it to the well of the combustibility tester.

(3) Immediately start the timing device.

(4) Light the test flame with the jet in the “off” position away from the well. Adjust the size of the flame so that it is spherical and approximately 4 mm in diameter. The size of the flame is matched to a 4 mm diameter circle engraved on the surface of the combustibility tester.

(5) After exactly one minute (at this time the test-portion will be deemed to have reached the test temperature as indicated by the thermometer embedded in the metal block) swing the test flame into a position exactly central over the well. Hold it in this position for exactly 15 seconds and then return it to the “off” position.

Interpretation of observation

6. For the purpose of these Regulations a product will be deemed to support combustion if, when tested in the manner set out above, either:—

- (a) when the flame is over the well the product ignites and the combustion is sustained for more than 15 seconds when the flame is removed, or
- (b) when the flame is in the “off” position the product flashes and burns.

Report of Test

7. The test report should include the following information:—

- (1) The type and identification of the material under test.
- (2) The test temperature in °C and barometric pressure in mm of mercury or millibar.
- (3) A statement as to whether the products support combustion as defined in paragraph 6 of this Schedule.
- (4) The date of the test.

TABLE 1
DIMENSIONS OF COMBUSTIBILITY TESTER

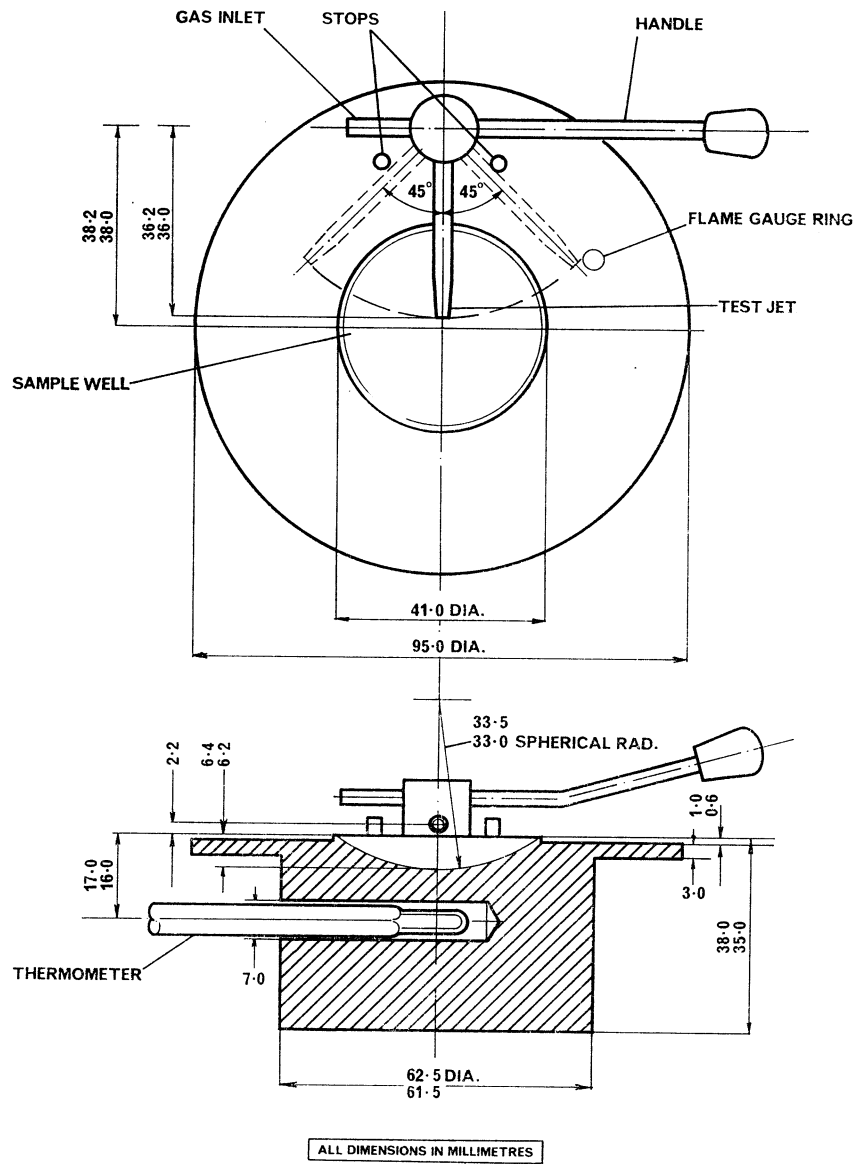
(a) Sample block details	Dimensions in mm	
Diameter of block	62	± 0.5
Height of block	36.5	± 1.5
Diameter of flange	95	± 0.5
Flange thickness	3.0	approx.
Height of well 'lip' above flange	0.8	± 0.2
Diameter of well 'lip'	41.0	approx.
Spherical radius of well	33.25	± 0.25
Depth of well	6.3	± 0.1
Distance from top of block to thermometer hole	16.5	± 0.5
Thermometer hole diameter	7.0	approx.
(b) Test gas jet details	Dimensions in mm	
Outside diameter of jet	3.5	± 0.5
Jet end tapered to	2.0	± 0.3
Bore of jet	0.7	± 0.1
Length of jet (from centre of axis to tip)	36.1	± 0.1
Distance of axis from centre of well	38.1	± 0.1
Flame gauge ring diameter	4.0	approx.
'Swing' of jet (from stop to stop)	90°	$\pm 1^\circ$
Height of jet above top of well 'lip'	2.2	approx.
Note: Adjust with suitable gauge		

TABLE 2
THERMOMETER SPECIFICATION

Type: Mercury in glass, nitrogen filled for horizontal operation	
Range	0°C — 110°C
Graduation	Each degree C
Overall length	200 mm \pm 5
Stem diameter	6.5 mm \pm 0.5
Bulb shape	Elongated
Bulb diameter	5.0 mm \pm 1.0
Bulb length	12.0 mm \pm 2.0
Length of graduated portion	125 mm \pm 10.0
Distance, bottom of bulb to 0°C mark	50 mm \pm 2.0
Longer lines at each	10°C
Figured at each	10°C
Top finish	Plain
Scale error not to exceed	0.5°C

NOTE: Seal thermometer in block with suitable thermal compound.

APPENDIX



EXPLANATORY NOTE

(This Note is not part of the Order.)

These Regulations impose requirements for the protection of persons employed in factories and other places to which the Factories Act 1961 applies in which any highly flammable liquid or liquefied petroleum gas is present for the purposes of, or in connection with, any undertaking, trade or business.

As respects highly flammable liquids, the Regulations contain requirements as to the manner of their storage, the marking of storage accommodation and vessels, the precautions to be taken for the prevention of fire and explosion, the provision in certain cases of fire fighting apparatus and the securing in certain cases of means of escape in case of fire.

As respects liquefied petroleum gases, the Regulations contain requirements as to the manner of their storage and the marking of storage accommodation and vessels.

The Regulations dated 12th August 1902 with respect to the manufacture of felt hats are revoked, and the Cellulose Solutions Regulations 1934 are revoked in two stages as from the dates specified in the Regulations.