



Plastic containers with nominal capacities up to 5 litres for petroleum-spirit: requirements for testing and marking or labelling

Approved Code of Practice

(C) Crown copyright 1938

First published 1983

Third impression 1984

Enquires regarding this publication should be made to the appropriate enforcing authority.

ENFORCING AUTHORITY

District Councils
Department of Agriculture
Department of Economic Development

MAIN ACTIVITIES

Offices and Shops
Agricultural operations
Most other activities including
factories, mines and quarries

In case of doubt, enquiries should be made to:

Department of Economic Development
Health and Safety Inspectorate
Maryfield, 100 Belfast Road
Holywood, Co. Down BT18 9QX
Telephone: Holywood (02317) 4232

This Code of Practice is based very closely on the approved Code of Practice issued by the Health and Safety Commission in Great Britain whose assistance is gratefully acknowledged.

Contents

Notice of Approval v

Approved Code of Practice 1

Introduction (*para 1 - 7*)

Requirements (*para 8 - 21*)

Type testing (*para 22 - 27*)

Production testing (*para 28 - 31*)

Marking or labelling (*para 32 - 33*)

Test methods (*para 34- 45*)

Notice of approval

By virtue of Article 18(1) of the Health and Safety at Work (Northern Ireland) Order 1978, after consultation in accordance with Article 18(2) of that Order, the Health and Safety Agency for Northern Ireland has on 15 March 1983, with the consent of the Department of Economic Development and the Department of the Environment, approved the Code of Practice entitled "Approved Code of Practice for the Petroleum-Spirit (Plastic Containers) Regulations (Northern Ireland) 1983 Requirements for testing and marking or labelling".

The Code of Practice is approved for the purpose of providing practical guidance with respect to the Petroleum-Spirit (Plastic Containers) Regulations (Northern Ireland) 1983 (S.R. 1983NO.43).

The Code of Practice comes into effect on 1 June 1983 which is the date when the Regulations come into operation.

Signed

LEWIS A. NESBITT

Secretary to the Health and Safety Agency for Northern Ireland

Approved Code of Practice

Introduction

- 1** This Code of Practice has been drawn up following consultation with representatives of employers, the trade unions, the district councils, and government departments.
- 2** The Code has been approved by the Health and Safety Agency for Northern Ireland, with the consent of the Department of Economic Development and the Department of the Environment, under Article 18 of the Health and Safety at Work (Northern Ireland) Order 1978 for the purpose of providing practical guidance with respect to the provisions of the Petroleum-Spirit (Plastic Containers) Regulations (Northern Ireland) 1983.
- 3** Although failure to comply with any provision of this Code is not in itself an offence, that failure may be used in criminal proceedings as evidence that a person has contravened a Regulation to which the provision relates. In such a case however it will be open to that person to satisfy the court that he has complied with the Regulation in some other way.
- 4** Words and expressions which are defined in the Health and Safety at Work (Northern Ireland) Order 1978 have the same meaning in this Code.
- 5** This Code provides for a polyethylene container which satisfies the requirements of Regulation 3 of the Petroleum-Spirit (Plastic Containers) Regulations (Northern Ireland) 1983. The Code gives practical guidance on the design, construction, materials and marking or labelling of containers, and to ensure the adequacy of such containers as required by the Regulations, specifies certain constructional and performance requirements, together with type testing and production testing procedures necessary to prove that the requirements are satisfied.
- 6** The Code applies to plastic containers for keeping petroleum-spirit for use as a fuel for any internal combustion engine. For the purpose of this Code, petroleum-spirit will be referred to as *petrol*.
- 7** The containers to which this Code applies are not intended for storage in direct sunlight, but the plastic material of which the containers are to be constructed should include adequate ultra violet radiation stabilisation so that they would not be adversely affected if subjected to outdoor exposure.

Requirements

Materials

- 8** The containers must be made of moulded polyethylene of a specification suitable for the intended application, having regard to the characteristic properties of petrol, and the requirements set out in paras 16 to 20. The composition of the polyethylene material should be known, and polyethylenes of uncontrolled composition, and mixtures of different grades should not be used.
- 9** The moulded polyethylene material must be of a composition such that the performance characteristics of the container as set out in paras 16 to 20 are not significantly diminished by exposure to naturally occurring ultra violet radiation.
- 10** The moulded polyethylene material must not contain more than 3% by weight of pigment. Dispersion of the pigment should be homogeneous.

Capacity and design

- 11** The nominal capacity of the containers must not exceed 5 litres. The nominal capacity is the maximum volume of liquid the container is intended to hold at $20 \pm 2^\circ\text{C}$.
- 12** The total capacity of the containers must be at least 10% greater than the nominal capacity, but not more than 15% greater than the nominal capacity.
- 13** The containers should have a single opening of not less than 26 mm internal diameter for filling and emptying. The opening should allow safe filling from a petrol pump without using a funnel.
- 14** The containers should be equipped with a plastic pouring spout which is not stored inside the container, capable of being firmly attached to the opening in such a manner as to allow emptying without spillage.

15 The containers should be fitted with a captive plastic screw closure (cap) for the opening. The closure should be made of material which meets the requirements of paras 8 to 10.

Strength: impact resistance

16 The containers should remain intact and show no visible leakage when subjected to dropping through a vertical height of 1.8 m onto an unyielding surface, after conditioning at temperatures of - 25°C and + 50°C in accordance with the test method described in paras 34 to 37.

Tightness of closure

17 The closure should provide an effective seal at all times when applied. The closure should show no visible leakage when subjected to an internal pressure of 1.6 bar for 10 min at a temperature of + 20°C, when the container is filled with a 5% aqueous solution of wetting agent, in accordance with the test method described in para 38.

Strength: internal pressure

18 The containers should remain intact and show no sign of leakage when subjected to internal pressure in accordance with the method and schedule of pressures, temperatures and durations described in paras 39 and 40.

Permeability

19 The loss in weight of the contents of a closed container should be not more than 5 g when a full container is kept for 4 hours at a temperature of + 75°C in accordance with the test method described in paras 41 and 42.

Strength: stress cracking

20 The container should remain intact and show no sign of leakage when subjected to an internal pressure of 0.5 bar for 5 hr duration at a temperature of + 75°C whilst filled with and immersed in a 5% solution of wetting agent, in accordance with the test method described in para 43.

Weight and wall thickness

21 Every container should have a weight and wall thickness not less than the minimum weight and wall thickness which satisfies the requirements of paras 8 to 20. The minimum weight should be determined according to the method described in para 44 and the minimum wall thickness according to the method in para 45.

Type testing

22 A sample number of containers should be tested by an independent person or body competent to ascertain whether when tested according to the test methods described in paras 34 to 45, the containers satisfy the requirements set out in paras 11 to 21. The person or body carrying out the tests should certify on completion of successful testing that:

- (a) the container type has satisfactorily passed the tests set out in paras 11 to 21;
- (b) the minimum weight and minimum wall thickness have been declared in accordance with paras 25 and 26.

23 The tests should be carried out on containers, each of whose individual weight (without cap and accessories) does not differ by more than $\pm 5\%$ from the mean weight of the total sample of containers selected for testing. The total number of containers required is 24.

24 Before testing is carried out the sample containers should be examined to establish that the requirements of paras 11 to 15 are satisfied.

25 The weight (without closure or spout) of the lightest of the 24 containers should be determined in accordance with para 44, and recorded. This is then considered to be the minimum container weight for further production.

26 The smallest wall thickness of the three lightest of the 24 containers should be determined in accordance with para 45, and recorded. The smallest wall thickness recorded is then considered to be the minimum wall thickness for further production.

27 Testing should be carried out in the following sequence.

Drop test, according to paras 34 to 37.

Tightness of closure test, according to para 38.

Internal pressure test, according to paras 39 and 40.

Permeability test, according to paras 41 and 42.

Stress cracking test, according to para 43.

Each test should be carried out on three containers, all of which should, when tested, satisfy the requirements specified in paras 11 to 20. If any container does not satisfy the requirements of the test in any respect, that container type should be deemed to have failed the type test.

Production testing

28 The manufacturer should undertake production tests to ensure that material quality and minimum weight and wall thickness of the containers are maintained.

29 The composition of polyethylene material should be tested to ensure that the specification satisfying the requirement of para 8 and the type tests, is maintained.

30 No container (without closure and accessories) should weigh less than the lowest weight recorded in accordance with para 25.

31 Spot checks should be carried out during each production run to ensure that the wall thickness of the containers is maintained at not less than the minimum wall thickness recorded in accordance with para 26.

Marking or labelling

Hazard warning sign

32 The hazard sign with which the container must be marked or labelled, should

- (a) be in the form of a square set with its sides at an angle of 45° to the vertical;
- (b) include in black the symbol and words as shown below in the parts of the square as shown below:-



- (c) should have a black border at least 1 mm wide;
- (d) with the exceptions of the symbol, words and border, should be coloured red, a suitable colour match for which would be No. 537 (Signal Red) contained in British Standards Specification BSS No. 381 C(1980).

Safety phrases

33 Phrases with which the container must be marked or labelled to indicate precautions to be taken for the safe keeping and use of petrol should include

- (a) KEEP CONTAINER AWAY FROM SOURCES OF IGNITION - DO NOT SMOKE.
- (b) DO NOT STORE IN DIRECT SUNLIGHT.

Test methods

(Note: Appropriate safety precautions must be taken to ensure the health and safety of all persons involved in these tests.)

Impact (or drop) test

34 This test should be carried out on three containers which have been filled to their nominal capacity with the appropriate test liquid and are closed with the cap applied using a torque of 3 Nm.

35 The three containers having been filled with water with an anti-freeze additive, should be kept for 16 hours at -25°C . Immediately thereafter, each should be tested at room temperature by dropping it from a height of 1.80 m in such a way that it falls once on a corner, once on the cap and once on the point on which it naturally drops when released from a handle-hold. The landing area should be a flat, horizontal, unyielding steel plate or slab concrete or stone.

36 The same containers should be emptied, cleaned out and refilled to nominal capacity using the alternative test liquid, a mixture of water and 20 ml pentane. They should be subsequently kept for 6 hours at $+50^{\circ}\text{C}$ and immediately afterwards subjected to the same drop test under the conditions described above.

37 It should be determined by visual examination whether leaks have occurred in the containers or their caps.

Tightness of closure

38 This test should be carried out on the caps of three containers whose bases are provided with a connection for a pressure line. Each container should be filled to nominal capacity with a test liquid (60 : 40 mixture of filling station regular grade (two-star) petrol : toluene or benzene), closed by application of the cap tightened using a torque of 3 Nm. They should be kept for 14 days at room temperature so that the inside of the caps are in contact with the test liquid. Each container should then be emptied and the pressure line joined to its connection at the base. It should be filled with a 5% aqueous solution of suitable wetting agent (e.g. ADINOL CO-630) at room temperature, closed by application of the cap using a torque of 3 Nm, and with the cap pointing downwards, subject to an internal pressure of 1.6 bar, at room temperature for 10 minutes. It should then be visually examined for any sign of leakage on or around the cap.

Internal pressure endurance test

39 The internal pressure endurance test should be carried out for each testing pressure shown in Table 1 on three containers with caps.

Table 1 Testing conditions for internal pressure endurance test

Testing pressure bar gauge	Testing temperature $^{\circ}\text{C} + 1^{\circ}$	Duration of test minimum endurance time) hours
1.6	+75	5
1.0	+75	25
0.5	+75	80

40 Each container should be filled with water at a temperature of $+75^{\circ}\text{C}$ and with the cap applied and tightened using a torque of 3 Nm, placed in a water bath

at a constant temperature of + 75°C for one hour. At the end of this time the tightening torque should be checked and adjusted if necessary to 3 Nm. The containers in the water bath, should then be subjected to pressure applied through the caps each of which shall be provided with a connection for a pressure line. At the start of each test the appropriate testing pressure should be reached within 10 to 15 seconds. When the test pressure is reached the pressurised test apparatus and container should be isolated, and the test temperature maintained for the appropriate test period. During the test, the pressure gauge readings should be observed to establish whether the containers are leak tight.

Permeability (or petrol diffusion) test

41 Three containers should be filled to their nominal capacity with a test liquid (60 : 40 mixture of filling station regular grade (two star) petrol : toluene or benzene) and closed by application of the caps tightened using a torque of 3 Nm. They should be kept for 14 days at + 20°C, placed in such a way that the inside of the caps are in contact with the test mixture. The containers should be subsequently emptied, refilled to their nominal capacity with test liquid, mixture as before, and kept for 4 hours at + 75°C in a hot cabinet for which appropriate precautions have been taken to prevent or minimise the effects of a vapour fire or explosion. The filled containers should be weighed at room temperature prior to the period of storage at + 75°C and again after they and the contents have regained room temperature following the latter period.

42 The loss of weight in grams should be determined as an indication of the permeability to petrol vapour.

Stress cracking test

43 The test should be carried out on three containers with caps which are provided with connections for pressure lines. The containers should be filled with a 5% solution of suitable wetting agent (e.g. ADINOL CO-630) at + 75°C, closed with the cap applied and tightened using a torque of 3 Nm. They should be kept for one hour in a bath of the same wetting agent solution at the same temperature. Each container should then be subjected to a pressure of 0.5 bar which should be reached within 10 to 15 seconds. When the test pressure is reached the pressurised test apparatus and container should be isolated, and the test temperature maintained for the test period of 5 hours. During the test, the pressure gauge readings should be observed to establish whether the containers are leak tight.

Weight of the container

44 Each container should be weighed without cap and pouring spout. The weight of the lightest of the 24 containers chosen as samples in accordance with para 23 should be determined. This weight rounded up to the nearest 10g should be regarded as the minimum weight.

Wall thickness of the container

45 The smallest wall thickness should be determined to the nearest 0.1 mm from the three lightest containers selected as samples in accordance with para 23. The smallest individual value determined in this manner is then regarded as the minimum wall thickness.

Leaflets in the HSA Series

- HSA 1 The Order outlined
- HSA 2 Advice to employers
- HSA 3 Advice to the self-employed
- HSA 4 Advice to employees
- *HSA 6 Safety representatives and safety committees
- *HSA 7 A guide to the Safety Signs Regulations Northern Ireland) 1981
- HSA 9 A guide to the Notification of Accidents and Dangerous Occurrences Regulations (Northern Ireland) 1981
- HSA 10 Reporting an accident
- HSA 11 Employers policy statements for health and safety at work
- HSA 12 Stress at work
- *HSA 15 Work with Asbestos Insulation and Asbestos Coating
- HSA 16 First Aid at Work in Northern Ireland
- HSA 17 First Aid provision in small workplaces

*Available at various prices from:

HER MAJESTY'S STATIONERY OFFICE:

Government Bookshops

80 Chichester Street, Belfast BT1 4JY
49 High Holborn, London WC 1V 6HB
13a Castle Street, Edinburgh EH2 3AR
Brazennose Street, Manchester M60 8AS
Southey House, Wine Street, Bristol BS1 2BQ
258 Broad Street, Birmingham B1 2HE

Government publications are also available through booksellers

The remaining leaflets are available free from

Health and Safety Agency for Northern Ireland
Canada House
22 North Street
Belfast BT1 1NW

HSA 18

£2.00

ISBN 0 337 11085 9