

Australian/New Zealand Standard™

Portable fire extinguishers

Part 1: General requirements



AS/NZS 1841.1:2007

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee FP-003, Fire Extinguishers. It was approved on behalf of the Council of Standards Australia on 10 June 2007 and on behalf of the Council of Standards New Zealand on 6 July 2007.

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Australian/New Zealand Standard™

Portable fire extinguishers

Part 1: General requirements

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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee FP-003, Fire Extinguishers, to supersede AS/NZS 1841.1:2007.

This Standard is part of the following series on portable fire extinguishers:

AS/NZS

1841	Portable fire extinguishers
1841.1	Part 1: General requirements (this Standard)
1841.2	Part 2: Specific requirements for water type extinguishers
1841.3	Part 3: Specific requirements for wet chemical type extinguishers
1841.4	Part 4: Specific requirements for foam type extinguishers
1841.5	Part 5: Specific requirements for powder type extinguishers
1841.6	Part 6: Specific requirements for carbon dioxide type extinguishers
1841.7	Part 7: Specific requirements for vaporizing liquid type extinguishers
1841.8	Part 8: Specific requirements for non-rechargeable type extinguishers

The objective of this Standard is to provide general requirements for portable fire extinguishers other than aerosol type, the requirements for which are specified in AS/NZS 4353, *Portable fire extinguishers—Aerosol type*.

The objective of this revision is to bring the Standard up to date with current practices.

Requirements for the selection and location of portable fire extinguishers in Australia are set out in AS 2444, *Portable fire extinguishers and fire blankets—Selection and location*.

Provisions for the maintenance of fire extinguishers are set out in AS 1851, *Maintenance of fire protection systems and equipment*, for Australia and NZS 4503, *Hand-operated fire-fighting equipment*, for New Zealand.

The main differences between this Standard and the 1997 edition are as follows:

- (a) The inclusion of a filling tolerance on liquid level indication.
- (b) The inclusion of a filling tolerance on the extinguishant charge.
- (c) Inclusion of an alternative method for determining the effective discharge time of an extinguisher.
- (d) Inclusion of an alternative method for the discharge testing of carbon dioxide extinguishers after the high temperature component material test, and some clarification of the labelling requirements.

Statements expressed in mandatory terms in notes to tables are deemed to be requirements of this Standard.

The term ‘normative’ has been used in this Standard to define the application of the appendix to which it applies. A ‘normative’ appendix is an integral part of a Standard.

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Australian/New Zealand Standard

Portable fire extinguishers

Part 1: General requirements

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard specifies requirements for portable fire extinguishers. It covers materials, methods of manufacture and performance of the extinguisher and any associated compressed gas container, instructions and markings.

NOTES:

- 1 Specific requirements for individual types of fire extinguishers are given in AS/NZS 1841.2, AS/NZS 1841.3, AS/NZS 1841.4, AS/NZS 1841.5, AS/NZS 1841.6, AS/NZS 1841.7 and AS/NZS 1841.8
- 2 A portable fire extinguisher is generally referred to in this Standard as 'an extinguisher' or 'the extinguisher' and typical components used in portable fire extinguishers are illustrated in Figure 1.1.
- 3 Manufacturers making a statement of compliance with this Australian/New Zealand Standard on a product, or on packaging or promotional material related to that product, should ensure that such compliance is capable of being verified.

1.2 NEW DESIGNS AND INNOVATIONS

Any material, design, method of assembly or procedure that does not comply with the specific requirements of this Standard may be used provided the following criteria are met:

- (a) The portable fire extinguisher complies with the performance and test requirements of the Standard.
- (b) A certifying body having JAS-ANZ registration for product certification to Australian/New Zealand Standard AS/NZS 1841 attests in writing that it is no less safe than a portable fire extinguisher manufactured in accordance with the specific requirements of this Standard. The relative safety of the portable fire extinguishers is determined with regard to the purpose of the extinguishers, any instructions and warnings relating to the use of the extinguishers, and what might reasonably be expected to be done with or in relation to the extinguishers.

1.3 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS

1777	Aluminium cylinders for compressed gases—Seamless—0.1 kg to 130 kg
1851	Maintenance of fire protection systems and equipment
2030	The verification, filling, inspection, testing and maintenance of cylinders for the storage and transport of compressed gases
2030.1	Part 1: Cylinders for compressed gases other than acetylene

AS

- 2444 Portable fire extinguishers and fire blankets—Selection and location
- 2484 Fire—Glossary of terms
- 2484.2 Part 2: Fire protection and firefighting equipment
- 2700 Colour standards for general purposes

AS/NZS

- 1841 Portable fire extinguishers
- 1841.2 Part 2: Specific requirements for water type extinguishers
- 1841.3 Part 3: Specific requirements for wet chemical type extinguishers
- 1841.4 Part 4: Specific requirements for foam type extinguishers
- 1841.5 Part 5: Specific requirements for powder type extinguishers
- 1841.6 Part 6: Specific requirements for carbon dioxide type extinguishers
- 1841.7 Part 7: Specific requirements for vaporizing liquid type extinguishers
- 1841.8 Part 8: Specific requirements for non-rechargeable type extinguishers
- 1850 Portable fire extinguishers—Classification, rating and performance testing

NZS

- 5807 Code of practice for industrial identification by colour, wording or other coding

ASTM

- D1125 Standard Test Methods for Electrical Conductivity and Resistivity of Water
- D1693 Standard Test Method for Environmental Stress-Cracking of Ethylene Plastics

Hazardous Substances (Compressed Gases) Regulations 2001 (New Zealand)

Hazardous Substances and Noxious Organisms Regulations 2001 (New Zealand)

1.4 DEFINITIONS

For the purpose of this Standard, the definitions of AS 2484.2 and those below apply. Typical components used in portable fire extinguishers are illustrated in Figure 1.1.

1.4.1 Anti-discharge device

A device designed to prevent accidental discharge of the extinguisher.

1.4.2 Anti-tamper seal

A device that indicates visually that an attempt has been made to actuate the extinguisher.

1.4.3 Cap

Cylinder closure.

1.4.4 Carry handle

A handle used to carry the extinguisher.

1.4.5 Compressed gas container

A gas container having a design pressure of 3.5 MPa or greater.

1.4.6 Control nozzle

A discharge nozzle incorporating a control mechanism by which the discharge can be interrupted.

1.4.7 Cylinder

Extinguishant container with attachments.

1.4.8 Discharge fittings

The system through which the extinguishant is discharged and may include any siphon tube.

1.4.9 Effective discharge time

Time during which the extinguishant is discharged, without any interruption in the discharge and with the valve fully opened, to its gas point.

1.4.10 Extinguishant

Agent used to control fire.

1.4.11 Extinguisher size

The mass or volume of extinguishant with which the extinguisher was fire rated.

1.4.12 Gas point

The moment when the discharge stream changes from predominantly extinguishant to predominantly propellant.

1.4.13 Hanging bracket

An attachment to the extinguisher that mates with the support fitting.

1.4.14 Interstitial space

A void into which water can penetrate but not circulate, such as unsealed lap joints or butt joints with incomplete weld penetration.

1.4.15 Maximum developed pressure

The pressure developed by the contents of a cylinder in equilibrium at the maximum service temperature.

1.4.16 Maximum service temperature

The maximum temperature to which an extinguisher will be subjected in normal service, to be taken as 65°C

1.4.17 Neck ring

That portion of the cylinder designed to accept the valve or cap.

1.4.18 Operating mechanism

The mechanism that sets in train an action that unseals, releases, pierces or fractures a valve, seal or frangible tip, to initiate discharge or enable discharge to be commenced by the operation of any flow control nozzle, and which may be capable of being resealed.

1.4.19 Periodic test pressure

The greater of 2.0 MPa or 1.5 times the working pressure.

1.4.20 Portable fire extinguisher

An appliance containing an extinguishant that can be discharged onto a fire by the action of internal pressure, and which is designed to be carried and operated by hand and have a gross mass that does not exceed 23 kg.

1.4.21 Pressure indicator

A device that indicates the pressure status of the extinguisher.

1.4.22 Quick release bracket

A bracket that retains an extinguisher in more than one axis and is provided with a retaining device.

1.4.23 Rechargeable

Capable of being recharged in accordance with AS 1851, which essentially involves filling the extinguisher with extinguishant and either pressurizing with gas (for stored-pressure types) or replacing the expired gas container with a charged gas container (for gas-container types).

1.4.24 Siphon tube

A tube through which the extinguishant is conveyed to the valve.

1.4.25 Skirt

A protective ring attached to, or part of, the bottom of the extinguisher cylinder, and not part of the pressure-retaining portion of the cylinder.

1.4.26 Strainer

A device to prevent the entry of foreign matter to the siphon tube.

1.4.27 Support fitting

A quick-release bracket or hook that retains the extinguisher when fixed to a surface.

1.4.28 Valve

1.4.28.1 *Gas-container type*

The subassembly designed for attachment to the neck ring and may include the operating mechanism.

1.4.28.2 *Stored-pressure type*

The component or assembly that breaks, ruptures or opens the primary seal.

1.4.29 Visible length

The length of the cylinder that is visible when the valve or cap is attached.

1.4.30 Working pressure

The pressure required within an extinguisher, at $23 \pm 2^\circ\text{C}$, that will result in the designed performance of that extinguisher.

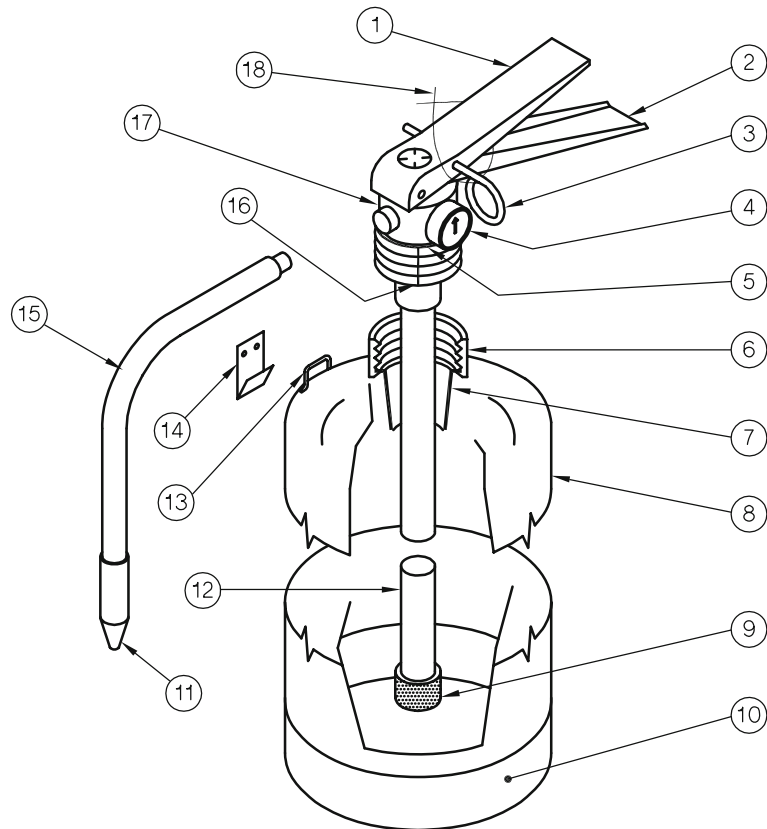
1.5 CLASSIFICATION AND RATING

Classification and rating of extinguishers shall be determined from the results of test fires set out in AS/NZS 1850 and expressed in alphabetical order.

The minimum 'B' rating for portable fire extinguishers shall be—

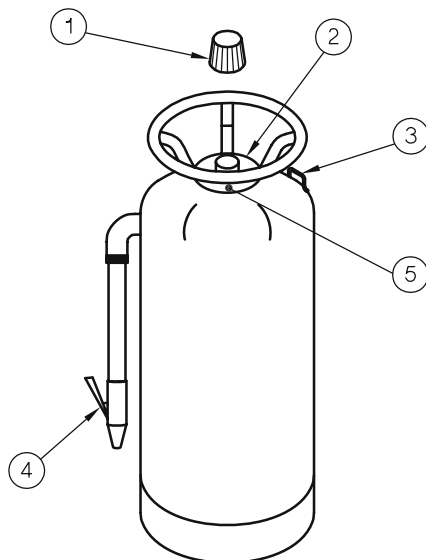
- (a) '2B', for carbon dioxide type; and
- (b) '5B', for extinguishers other than carbon dioxide type.

NOTE: The '2B' has been retained for carbon dioxide type extinguishers only, to meet the community need to protect small electrical switchboards using a clean extinguishant.



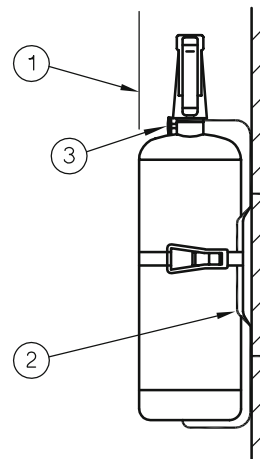
LEGEND:

- | | | |
|---------------------------|--------------------------|------------------------------|
| 1 = Squeeze lever | 7 = Anti-overfill device | 13 = Hanging bracket |
| 2 = Carry handle | 8 = Cylinder | 14 = Support fitting |
| 3 = Anti-discharge device | 9 = Strainer | 15 = Discharge hose assembly |
| 4 = Pressure indicator | 10 = Skirt | 16 = Pressure release vents |
| 5 = O-ring seal | 11 = Discharge nozzle | 17 = Operating head |
| 6 = Neck ring | 12 = Siphon tube | 18 = Anti-tamper seal |



LEGEND:

- | | |
|-------------------------|----------------------------|
| 1 = Safety cap | 4 = Control nozzle |
| 2 = Cap with carry ring | 5 = Pressure-release vents |
| 3 = Hanging bracket | |



LEGEND:

- | |
|---------------------------|
| 1 = Projection line |
| 2 = Quick-release bracket |
| 3 = Pressure indicator |

FIGURE 1.1 TYPICAL PORTABLE FIRE EXTINGUISHER COMPONENTS

SECTION 2 MATERIALS OF CONSTRUCTION

2.1 GENERAL

All components of an extinguisher shall be of corrosion-resistant material or shall be suitably treated to resist corrosion and degradation, as defined in the components material test (see Clause 6.5).

2.2 CYLINDER

The cylinder shall be of stainless steel, carbon steel or non-ferrous metal complying with an appropriate Australian, New Zealand, ASTM, EN or ISO Standard, or for carbon dioxide extinguishers, as specified in AS/NZS 1841.6. All materials used in the cylinder assembly shall be mutually compatible as defined in the component materials test (see Clause 6.5).

2.3 COMPRESSED GAS CONTAINERS

Compressed gas containers shall comply with Section 11.

2.4 VALVE OR CAP

The valve or cap of an extinguisher shall be of stainless steel, carbon steel or non-ferrous metal complying with an appropriate Australian, New Zealand, ASTM, EN or International Standards Organization Standard, or of plastics materials complying with the requirements of Clause 6.13.

Valves on carbon dioxide type extinguishers shall comply with AS/NZS 1841.6.

Components of plastics materials that have been fitted to extinguishers of 1.5 kg capacity or less, approved under a previous Australian Standard (before 1 November 1991) and which have demonstrated satisfactory performance are excluded from the provisions of Clause 6.13.

2.5 STABILITY

When tested in accordance with Clause 6.5, materials in contact with the extinguishant or expellant gas shall—

- (a) be resistant to degradation by the extinguishant and expellant gas; and
- (b) be capable of retaining their dimensional stability to the extent that performance of the extinguisher is not adversely affected.

2.6 EXPOSED NON-METALLIC COMPONENTS

Materials used in the manufacture of non-metallic components that are exposed to ultraviolet light shall be UV stabilized.

2.7 CORROSION TEST

The extinguisher shall pass the corrosion test specified in Clause 6.7.

S E C T I O N 3 D E S I G N

3.1 GENERAL

The extinguisher design shall provide for the following:

- (a) Operation by one operator.
- (b) Operation in an essentially upright position.
- (c) The valve of the extinguisher to be at the top.
NOTE: The operation of the extinguisher should be initiated by a squeeze lever mechanism incorporated in the valve.
- (d) An anti-discharge device, to prevent accidental operation, which, when designed for re-use, will remain attached to the extinguisher.
- (e) An anti-tamper device.
- (f) The anti-discharge device, with the anti-tamper device fitted, to release in response to an applied tensile force not exceeding 100 N.
- (g) A carry handle or grip, if applicable, in accordance with Clause 4.5.
- (h) Intermittent operation, in accordance with Clause 5.2.

3.2 MAXIMUM DEVELOPED PRESSURE

Except for CO₂ extinguishers, the maximum developed pressure at equilibrium shall be calculated on the following basis:

- (a) *Stored-pressure type extinguishers* The maximum developed pressure shall be the pressure in an extinguisher correctly charged at $23 \pm 2^\circ\text{C}$, when the extinguisher is maintained at a temperature of $65 \pm 5^\circ\text{C}$ for a minimum of 24 h, which may be determined by calculation.
- (b) *Gas-container type extinguishers* The maximum developed pressure shall be the pressure developed at equilibrium in an extinguisher correctly charged at $23 \pm 2^\circ\text{C}$, when the extinguisher is maintained at a temperature of $65 \pm 5^\circ\text{C}$ for a minimum of 24 h, and then operated with the outlet blocked.

The compressed gas containers shall be designed in accordance with Section 11.

3.3 CYLINDERS

3.3.1 General

Except for cylinders constructed to comply with AS 2030.1, the requirements set out in this Clause (3.3) shall apply to all cylinders.

3.3.2 Shape

The shape of cylinders shall be as follows:

- (a) The top shall be concave to pressure.
- (b) Unless the cylinder is capable of passing the pulsation test set out in Clause 6.8, the minimum radius of curvature in any drawn section shall be four times the minimum calculated wall thickness in accordance with Clause 3.3.3.

3.3.3 Wall thickness

Except for CO₂ extinguishers, the minimum wall thickness (d), expressed in millimetres, of a cylinder shall be the greater of—

$$d = 2.45 \frac{D}{\sigma}$$

and

$$d = 0.6$$

where

D = internal diameter of cylinder, in millimetres

σ = minimum tensile strength of metal used for the cylinder, in megapascals

3.3.4 Neck ring opening

In order to permit inspection of the interior of rechargeable type extinguishers, the cylinder shall have a minimum opening as given in Table 3.1.

TABLE 3.1
MINIMUM NECK RING OPENINGS

Extinguisher charge size		Minimum opening diameter, mm
kg	L	
≤ 2.5	≤ 2	18
> 2.5 ≤ 5.5	> 2 ≤ 6.5	20
> 5.5	> 6.5	25

NOTE: Maximum charge size is governed by the maximum gross mass of a portable extinguisher being 23 kg.

3.4 METHOD OF OPERATION

3.4.1 General

Suitable means shall be provided whereby the sealing device is opened, pierced or ruptured allowing the contents of the extinguisher to be discharged.

3.4.2 Operating mechanism

The operating mechanism of an extinguisher valve (see Figures 3.1 and 3.2) shall—

- not necessitate any movement to be repeated in order to initiate discharge of the extinguisher;
- permit intermittent discharge (see Clause 5.2);
- be designed to seal the unit to prevent the ingress of contaminants; and
- operate at an applied force not exceeding the values given in Table 3.2 for temperatures of 10°C–25°C.

NOTE: When testing, the force is applied to the extremity of the lever and normal to the axis of operation of the mechanism.

TABLE 3.2
OPERATING FORCE

Method of operation	Maximum force required, N
With one finger or thumb	100
With full hand	200 (see Note)
With impact	400

NOTE: Where a frangible tip or seal has to be broken or ruptured, the force for impact shall apply.

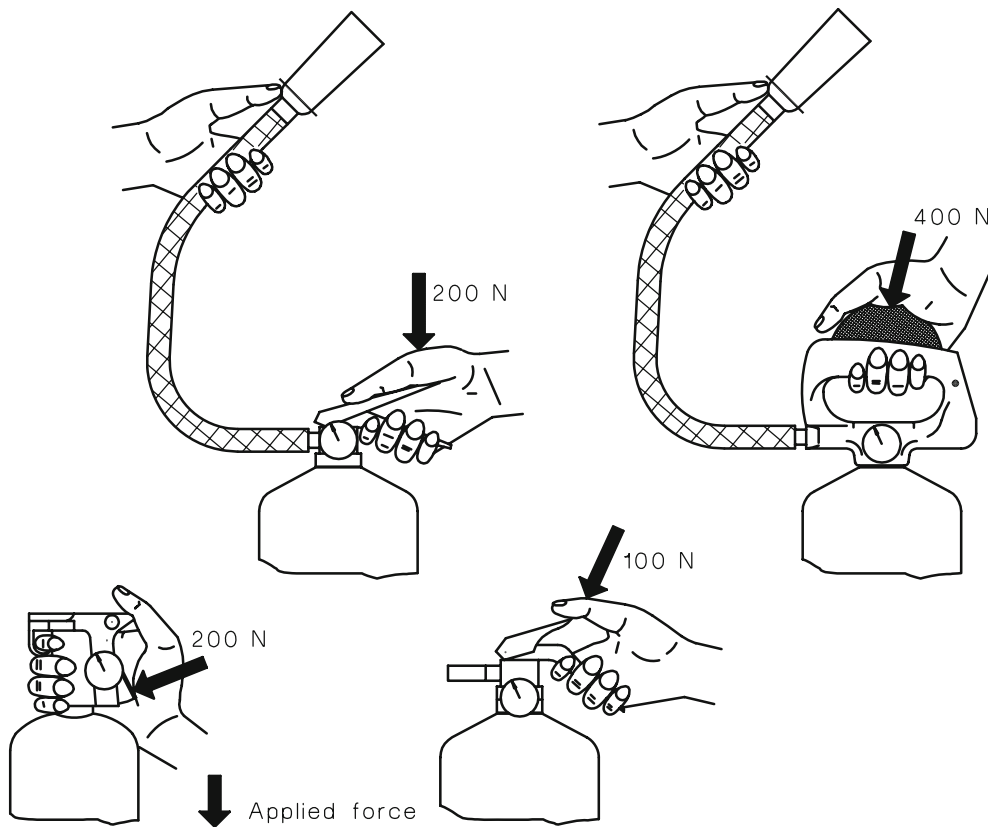


FIGURE 3.1 TYPICAL SQUEEZE GRIP OPERATING MECHANISM

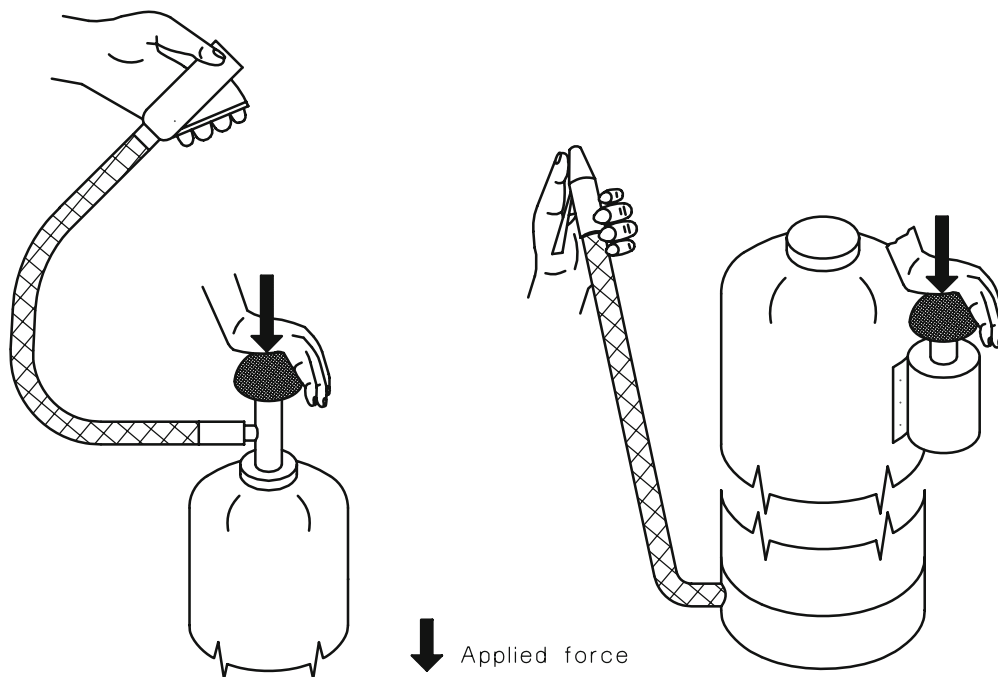


FIGURE 3.2 TYPICAL STRIKE KNOB OPERATING MECHANISM

3.5 LIQUID LEVEL INDICATION

Water, wet chemical and foam-type extinguishers shall be provided with a means to ensure that they can be consistently filled to the correct level in order to provide the design ullage. The accuracy required by Clause 3.10 shall be obtained.

3.6 EXPANSION DEVICE

For gas-container type extinguishers using liquid extinguishants, means shall be provided to prevent the liquid content in the siphon tube being above the normal level due to the expansion of air in the extinguisher body with the rise in temperature.

3.7 PRESSURE-INDICATING DEVICE

3.7.1 General

All stored-pressure type extinguishers, except the carbon dioxide type, shall incorporate a pressure-indicating device. The device shall be clearly visible when the extinguisher is mounted in the support fixture, unless the location of the pressure-indicating device is identified.

3.7.2 Rechargeable type extinguishers

Pressure-indicating devices fitted to rechargeable type extinguishers shall comply with the following:

- There shall be visual indication whether the extinguisher is charged to its nominal operating pressure, is undercharged or overcharged.
- The minimum range of the indicator shall extend from 0.5 to 1.5 times the working pressure of the extinguisher.
- The accuracy of the indicator shall be $\pm 10\%$ of the nominal working pressure at $23 \pm 2^\circ\text{C}$, at the designated nominal pressure.

- (d) The pressure indicator shall indicate the operable pressure range of the extinguisher in contrasting colour to the remainder of the indicator. The working pressure shall be shown in numerals.
- (e) That portion of the pressure indicator below the operable pressure range shall be red in colour with the word 'RECHARGE' printed on it.

3.7.3 Non-rechargeable type extinguishers

Pressure-indicating devices fitted to non-rechargeable type extinguishers shall comply with AS/NZS 1841.8.

3.8 DISCHARGE FITTINGS

3.8.1 Siphon tube

A siphon tube shall be provided to ensure the discharge of the quantity of extinguishant as specified in Table 3.3, at a temperature between 10°C and 25°C. The siphon tube and its attachments shall be located and secured such as not to be inadvertently disengaged (see Clause 6.12).

Siphon tubes fitted to water and foam type extinguishers shall be provided with a strainer at the intake end complying with Clause 3.8.2.

NOTE: Where the tube is integral with the cylinder it should be as straight as practicable and located so that the cleaning of the interior of the cylinder is not impeded.

3.8.2 Strainer

Where a strainer is fitted, the following shall apply:

- (a) The area of each hole in the strainer shall be less than the area of the smallest orifice between the strainer and the discharge nozzle and shall be smaller than the area of the discharge nozzle outlet.
- (b) The aggregate area of the holes in the strainer shall be such that the discharge requirements for the appropriate extinguisher type are complied with when 50% of the holes are blocked.
- (c) The strainer shall be attached to the intake end of the siphon tube.

3.8.3 Discharge hose and fitting

Extinguishers having a size of 3.0 kg, or 3.0 L or greater, shall be fitted with a discharge hose. Where a discharge hose is provided, the following shall apply:

- (a) The hose and its fittings (including a shut-off nozzle where applicable) shall comply with the test requirements of Clauses 6.2.2 or 6.3.2, as applicable, and Clause 6.4.
- (b) The hose shall not be under pressure until the extinguisher is operated.
- (c) Where any reinforcement is used in the hose it shall be completely embedded.
- (d) Where provision is made for the hose to wrap around the cylinder and for the nozzle end of the hose to be attached to the valve, or where the nozzle end of the hose is attached to a clip on the cylinder, the length of the hose shall not exceed 1 m.

Where no such provision is made and the hose hangs down by the side of the extinguisher, the hose shall be of such a length that the nozzle terminates at a point not less than 10 mm above the base of the extinguisher.

- (e) Any extinguisher fitted with a fixed nozzle shall discharge in the direction parallel to the plane of the handle.

TABLE 3.3
MASS OR VOLUME OF DISCHARGE

Extinguisher type	Discharge %
Water	95
Wet chemical	95
Foam	95
Carbon dioxide	95
Vaporizing liquid	95
Powder	85

3.9 FILLING (CHARGING)

The following shall apply for filling (charging) of extinguishers:

- (a) Special tools (except for pressuring adaptors) shall not be needed for recharging and the routine replacement of components other than seals shall not be required.
- (b) All charging operations shall be carried out in a manner that precludes the ingress of contaminants that may have an injurious effect on the extinguisher performance.
- (c) Immediately prior to filling, the interior of the extinguisher shall be determined to be free from contaminants and corrosion.
- (d) Water used to charge extinguishers shall be potable.
NOTE: Where water, wet chemical and foam extinguishes are imported in a filled state, the charge may need to meet biological requirements specified by AQIS (Australia) or MAF (New Zealand).
- (e) A non-combustible, non-toxic trace gas may be added to the charge to facilitate the testing for gas leakage.
- (f) The extinguishant, propellant or pressurizing gas and trace gas shall be compatible with each other and the materials of construction of the extinguisher, as defined in the component materials test (see Clause 6.5).

3.10 FILLING TOLERANCE

The actual charge of an extinguisher shall be the nominal charge within the following limits:

- (a) Water-based extinguishers: $\pm 2.5\%$ by volume.
- (b) Powder extinguishers—
 - (i) ≤ 1 kg nominal charge $\pm 5\%$ by mass;
 - (ii) > 1 kg but < 3 kg nominal charge $\pm 3\%$ by mass; or
 - (iii) ≥ 3 kg nominal charge $\pm 2\%$ by mass.
- (c) Vaporizing liquid extinguishers: $\pm 2.5\%$ by mass.
- (d) Carbon dioxide extinguishers: $+0 -2.5\%$ by mass.

3.11 SUPPORT FITTING

3.11.1 General

Every extinguisher shall be provided with a support fitting for at least static mounting.

Any support fitting shall be capable of supporting not less than five times the gross mass of the extinguisher (see Figure 1.1 and Clause 6.9).

3.11.2 Quick-release brackets

Where an extinguisher is supplied with a bracket or holder into, or on, which the extinguisher can be mounted and the operation of any release mechanism allows the extinguisher to fall, the operating end of the release mechanisms shall not protrude beyond the front projection line of the extinguisher.

SECTION 4 CONSTRUCTION

4.1 CYLINDER

4.1.1 General

Cylinders for carbon dioxide extinguishers shall comply with AS/NZS 1841.6.

Cylinders for all other extinguisher types shall comply with Clauses 4.1.2 to 4.1.5.

4.1.2 Joints

The following shall apply to joints:

- (a) All non-threaded joints in the cylinder shall be made by welding, brazing or riveting and soldering.
- (b) Interlocking methods of jointing shall not be used, nor shall soldering or riveting be used alone.
- (c) Cylinders for use with liquid extinguishants shall be either seamless or shall have no interstitial space between welded joints below the extinguishant level when the extinguisher is in the upright position.

NOTE: Typical examples of types of cylinder construction are shown in Figure 4.1.

4.1.3 Neck ring

Any neck ring shall—

- (a) be firmly secured to the cylinder by brazing or welding, with the exception of stainless steel neck rings, which shall be secured by welding only; or
- (b) be integral with the cylinder.

4.1.4 Anti-corrosion treatment of internal surfaces

Where necessary, to provide for anti-corrosion treatment, metallic or organic linings shall be applied to internal surfaces of the cylinder. Any organic lining shall comply with Clause 4.2.

4.1.5 Anti-corrosion treatment of external surfaces

The cylinder and fittings shall be suitably protected to resist corrosion, unless made from corrosion-resistant material.

Prior to the application of any protective finish, the cylinder and fittings of the extinguisher shall be determined by visual examination to be clean, dry and free from corrosion.

The external surface finish of the cylinder shall comply with the requirements of Section 8.

4.2 ORGANIC LININGS

4.2.1 General

Materials for use as internal organic linings shall be selected to resist the action of the extinguishant under the service conditions likely to be encountered. This selection shall be based on either long-term service history or appropriate materials tests (not limited to those in Clauses 4.2.2 and 4.2.3).

NOTES:

- 1 In the case of polyethylene for use in foam extinguishers, ASTM D1693 provides a suitable test method.
- 2 In some areas of Australia, diurnal temperature ranges of 60°C are not uncommon.

4.2.2 Adhesion test

Extinguishers with an internal plastic lining shall show no visible evidence of cracking, separation from the wall of the body or lifting of the lining, nor shall there be any bubbles between the lining and the body when tested by the method given in Appendix A. After the adhesion test has been carried out but before any sectioning of the extinguisher body, which may be required, the extinguisher shall be subjected to the continuity test set out in Clause 4.2.3.

4.2.3 Continuity test

Every extinguisher body with an internal organic lining shall be tested as follows:

- (a) Fill the extinguisher to within 10 mm from the bottom of the neck ring with approximately 1% by mass sodium chloride solution containing sufficient hydrocarbon surfactant to reduce the surface tension of the test solution to less than 40 mN/m.
- (b) Check the lining for continuity by the application of a 500 ± 50 V d.c. insulation resistance test across the lining through connections made to the metal body and to an electrode introduced into the solution in the extinguisher body.

The resistance shall be not less than 500 M Ω .

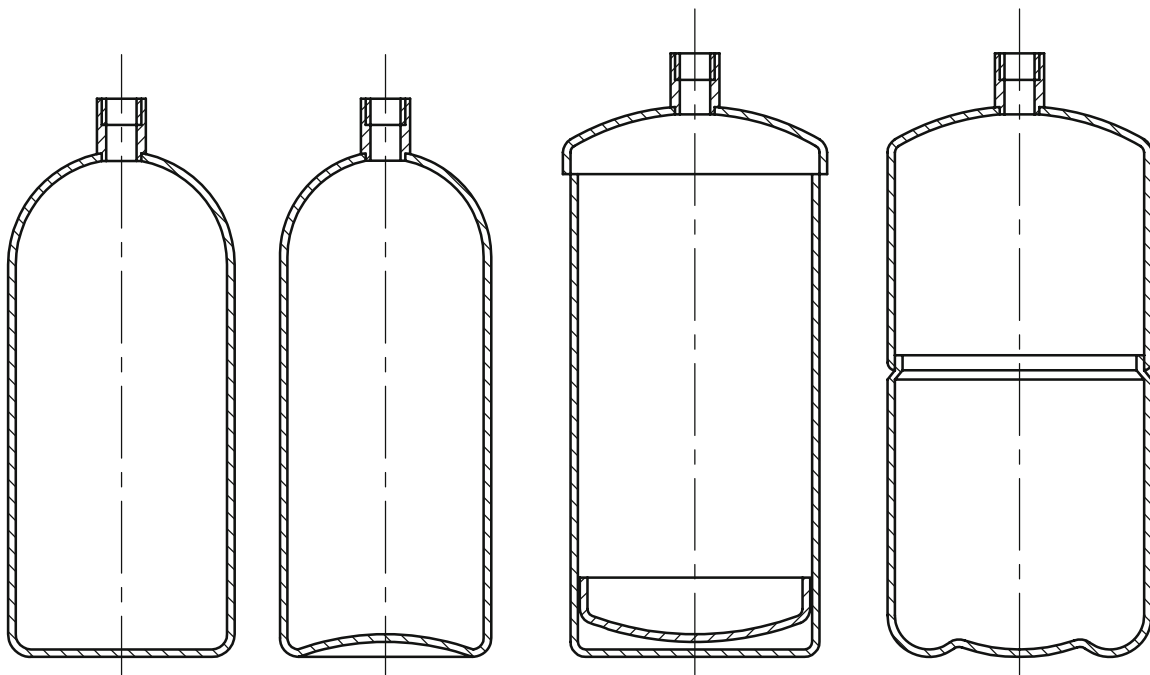


FIGURE 4.1 TYPICAL CYLINDER CONSTRUCTION

4.3 SKIRTS

Skirts, if included, shall be integral, or attached, to the cylinder.

4.4 VALVE OR CAP

When the valve or cap is secured to the cylinder by a parallel screw thread, one or more vents shall be provided to permit the release of pressure remaining in the cylinder while not less than two full threads are engaged.

Valves secured by a method other than a screw thread shall be such that it is not possible to remove the head while a pressure 10 kPa above atmospheric pressure is contained in the extinguisher.

NOTE: The intention of this provision is to prevent injury to personnel occurring when the valve is removed when pressure remains in the extinguisher.

The valve of a carbon-dioxide type extinguisher shall comply with AS/NZS 1841.6.

4.5 HANDLE AND HANGING BRACKET

4.5.1 General

Any carry handle, grip or hanging bracket shall be capable of supporting not less than five times the gross mass of the extinguisher when fitted to the extinguisher. Any carry handle or hanging bracket fixed to the cylinder shall be welded or brazed to the cylinder.

4.5.2 Carry handle or grip

Extinguishers having a gross mass greater than 1.5 kg shall be provided with a carry handle or grip.

SECTION 5 PERFORMANCE REQUIREMENTS

5.1 FIRE RATING

Extinguishers designed to this Standard shall be required to pass at least one of the test fires given in AS/NZS 1850, except where specifically exempted.

A rating shall only be applied to an extinguisher that can be shown to have the same performance and extinguishant characteristics as the one that was rated.

5.2 INTERMITTENT DISCHARGE

The extinguisher shall be capable of operating satisfactorily with an interrupted discharge cycle as follows:

- (a) For extinguishers with minimum effective discharge times as given in Table 5.1 of 12 s or greater—
 - (i) the extinguisher shall be discharged for nominally one-half the minimum discharge time with the valve open; and
 - (ii) to a minimum of two cycles of 10 s nominal with the valve closed, and 3 s with the valve open.
- (b) For extinguishers having minimum effective discharge times as given in Table 5.1 of less than 12 s—
 - (i) the extinguisher shall be discharged for nominally the minimum discharge time less 6 s with the valve open; and
 - (ii) to a minimum of two cycles of 10 s nominal with the valve closed, and 3 s with the valve open.

Not more than 3 s shall elapse between the operation of the valve or control nozzle and the commencement of discharge of the extinguishant.

5.3 EFFECTIVE DISCHARGE

5.3.1 General

The minimum effective discharge time of an extinguisher shall be in accordance with Table 5.1 and in no case shall be less than 8 s.

The effective discharge time shall also comply with the requirements of AS/NZS 1850 for the extinguisher classification and rating.

TABLE 5.1
MINIMUM EFFECTIVE DISCHARGE TIMES

Extinguisher nominal charge	Minimum duration of discharge in seconds		
	Water and wet chemical	Foam	Others
kg or L			
≤2	10	10	8
>2 ≤6	30	20	9
>6 ≤10	45	30	12
>10	45	30	15

5.3.2 Test procedure

If the gas point is not readily determined in the discharge or the fire-rating test, the following test procedure shall be applied:

- (a) A minimum of three fully charged extinguishers shall be tested as follows:
 - (i) Weigh the extinguisher ($M1$).
 - (ii) Discharge into free air for the minimum required effective discharge time, as specified in Clause 5.3.1, and then stop discharge.
 - (iii) Weigh the extinguisher ($M2$).
 - (iv) Complete discharge to full discharge.
 - (v) Weigh the extinguisher ($M3$).
 - (vi) Empty the extinguisher and record the tare ($M4$).
- (b) Verify the charge mass ($M1 - M4$).
- (c) Determine the amount discharged during the minimum discharge time ($M1 - M2$).
- (d) Determine the total amount discharged ($M1 - M3$).

The amount discharged during the minimum discharge time shall not be greater than 95% of the total amount discharged.

The above is expressed in formulaic terms as follows:

$$\frac{M1 - M2}{M1 - M3} < 0.95$$

For production discharge tests, the same method shall be used as was used to determine the rating, and the results shall be comparable with those obtained at the rating test.

NOTE: This test verifies that the effective discharge time is more than the minimum, but it does not produce an effective discharge time.

5.4 ELECTRICAL CAPABILITY

5.4.1 Suitability

The suitability of an extinguishant for use on fires that involve energized electrical equipment shall be determined in accordance with AS/NZS 1850.

5.4.2 Water-based extinguishants

Before a water-based extinguishant is submitted for Class E testing, as required by Clause 5.4.1, the extinguishant shall be tested in accordance with Method A of ASTM D1125 following the conditioning specified in Clause 6.5(c), and shall have a conductivity not exceeding 1.0 $\mu\text{S/cm}$.

SECTION 6 TESTING

6.1 VAPORIZING LIQUID EXTINGUISHERS

Fire extinguishers designed for use with a substance that is controlled by government regulation may be charged with water to the same fill ratio as its usual charge and pressurized with nitrogen or air, in order to establish compliance with the requirements of Clauses 3.4, 5.2, 6.7, 6.9, 6.10 and 6.11.

Where an extinguisher is being tested for compliance with Clause 6.5, the discharge test is only necessary to verify extinguisher function after being conditioned and the test may be considered valid if the extinguisher is discharged into an extinguishant recovery unit.

NOTE: Attention is drawn to regulations governing the use of some types of vaporizing liquids.

6.2 PRESSURE TESTS FOR EXTINGUISHERS OTHER THAN CARBON DIOXIDE TYPE

6.2.1 Strength test

Samples of cylinders shall be tested to destruction by internal hydrostatic pressure.

Samples of other pressure-retaining components, except for pressure indicators and safety devices, shall be tested by internal hydrostatic pressure.

In neither case shall rupture occur at a pressure less than 3.75 times the maximum developed pressure, or 4.13 times the maximum developed pressure if failure occurs at a joint or in the heat-affected zone of a weld.

6.2.2 Proof test

All cylinders and samples of valves, hose assemblies and associated fittings shall withstand for a period of not less than 30 s an internal pressure of 1.5 times the maximum developed pressure (see Clause 3.2) or 2.5 MPa, whichever is greater, without leakage or visible distortion. If 30 s is insufficient for visual inspection of each cylinder in a multi-head test rig, the time shall be extended to permit inspection of each assembly. Fittings may be tested separately.

Testing of extinguisher cylinders shall be carried out before any external finish is applied to the extinguisher.

6.3 PRESSURE TESTS FOR CARBON DIOXIDE TYPE EXTINGUISHERS

6.3.1 Extinguisher body

Every extinguisher body shall pass the hydrostatic pressure test specified in the relevant Standard referenced in AS 2030.1, or Hazardous Substances (Compressed Gases) Regulations 2001 (New Zealand), as applicable.

6.3.2 Valves and fittings

Components subject to pressure during the discharge of the extinguisher, including every hose assembly, valve and their associated fittings, shall be checked for free passage and pressure-tested to 10 MPa for a period of not less than 30 s. A sample shall be proof-tested for not less than 30 s to a pressure equal to the cylinder test pressure at a temperature of 10°C to 25°C without failure. Safety devices need not be proof-tested. Fittings may be tested separately.

6.4 CLEAR PASSAGE TEST

The entire path through which the extinguishant flows shall be tested for clear passage.

For a flexible hose, the test shall be conducted in the same direction as the intended extinguishant flow.

6.5 COMPONENT MATERIALS TEST

Three specimen extinguishers shall be inspected. The general condition and principal dimensions shall be recorded. The extinguishers shall be assembled, correctly charged at 10°C to 25°C and stored for 30 days, at the following temperature:

- (a) One between –10°C and 0°C.
- (b) One at ambient (10°C to 25°C).
- (c) One between 65°C and 74°C.

Following the storage period, the extinguishers shall be conditioned for not less than 24 h at ambient temperature for stabilization, and then tested for discharge in accordance with Clause 5.2.

Discharge characteristics shall be unimpaired and components in contact with the extinguishant shall not exhibit deterioration or abnormal change in principal dimensions.

WARNING: Carbon dioxide type fire extinguishers are fitted with bursting discs, which may rupture during the test of Clause 6.5(c). It is dangerous to test such extinguishers with the bursting discs blanked off, as, in most cases, bursting discs will rupture at temperatures lower than 65°C.

Where the bursting disc ruptures, the valve may be tested using compressed air. Provided the valve functions in accordance with Clause 5.2 and there is no abnormal change in principal dimensions or deterioration of components exposed to the extinguishant, the unit shall be regarded as having passed the test.

6.6 GAS LEAKAGE TESTS

6.6.1 General

Every stored-pressure type extinguisher shall be correctly charged at 10°C to 25°C and subjected to one of the gas leakage tests given in Clauses 6.6.2, 6.6.3 or 6.6.4, as appropriate. Water, wet chemical and foam extinguishers shipped empty may be pressurized with air or inert gas for the purpose of gas leakage tests.

Every compressed gas container shall be tested for leakage of gas in accordance with the requirements of Clause 11.3.

6.6.2 Test by electronic leak detection

A leak detector test shall be used to detect a loss of contents.

For carbon dioxide and vaporizing liquid extinguishers, any extinguisher showing a loss of contents exceeding the equivalent of 5% of mass per year of contents shall be rejected.

For other stored-pressure type extinguishers, any extinguisher showing a loss exceeding the equivalent of 5% of mass of contents of gas over one year shall be rejected.

6.6.3 Test by immersion

With the exception of vaporizing liquid extinguishers, an immersion test may be used to check the contents, provided it does not cause long-term deleterious effects on the extinguisher. The charged extinguisher shall be completely immersed in a tank of water for at least 24 h and provision shall be made to trap escaping gas.

For carbon dioxide extinguishers, any extinguisher showing a loss of contents exceeding the equivalent of 5% of mass per year of contents shall be rejected.

For other stored-pressure type extinguishers, any extinguisher showing a loss exceeding the equivalent of 5% of mass of contents of gas over one year shall be rejected.

NOTE: Where doubt exists as to the long-term deleterious effects on the extinguisher, an extinguisher should be set aside for a period of not less than three months and then examined for evidence of corrosion.

6.6.4 Test by weighing

When the contents of a carbon dioxide or vaporizing liquid extinguisher are checked by mass, the mass of the extinguisher shall be determined both before and after a bond period of 21 +4, -0 days. Any extinguisher showing a loss of mass exceeding the following shall be rejected:

- (a) For extinguishers of 3.5 kg size or below—5 g.
- (b) For extinguishers above 3.5 kg in size—the equivalent of 5% of the mass per year.

6.6.5 Alternative methods

Methods other than those given in Clauses 6.6.2 to 6.6.4 may be used, provided it can be demonstrated that they give results that are repeatable, and they accurately detect the leaks at the maximum rates specified by Clause 6.6.2.

6.7 EXTERNAL CORROSION TEST

Two charged extinguishers shall be subjected to the corrosion test given in Appendix B for a period of not less than 480 h.

At the conclusion of the test, the extinguishers shall pass the discharge test in accordance with Clause 5.3.

6.8 PULSATION TEST

Where required by Clauses 3.3.2(b) or 6.13(a), the component under test shall be subjected to 5000 cycles of liquid pressurization at a frequency not exceeding 0.25 Hz. The pressure shall cycle from a minimum of 0% to 5% of the proof test pressure to a maximum of 95% to 105% of the proof test pressure (see Clause 6.2.2). The liquid used shall be non-corrosive to the component and, if necessary, be cooled to ensure that the outside surface of the component does not exceed 50°C.

On completion of the 5000 cycles, the component shall comply with Clause 6.2.1.

6.9 SUPPORT FITTING TEST

The support fitting shall be affixed to a vertical supporting surface in accordance with the manufacturer's instructions. A correctly charged extinguisher shall be mounted on the support fitting and a load of not less than four times the gross mass of the extinguisher shall be applied vertically downward to the top of the extinguisher and maintained for a period not less than 5 min.

Upon removal of the test load, the extinguisher shall remain supported by the support fitting. In addition, it shall then be possible to remove the extinguisher from the support fitting in the normal manner. The extinguisher shall be operable.

NOTE: Failure of the fastenings used to affix the support fitting to the backing does not constitute failure of the support fitting. If such failure should occur, the test should be repeated.

6.10 EXTINGUISHER DROP TEST

A correctly charged extinguisher shall be held approximately horizontal, with any projections uppermost, and dropped from a height of not less than 600 mm onto a concrete slab not less than 80 mm thick in such a way as to strike the concrete in a substantially horizontal position. The test shall then be repeated with the extinguisher held approximately vertical, with the valve at the top and the base at a height of not less than 600 mm above the slab, so that the extinguisher strikes the concrete in a substantially vertical position.

The extinguisher shall pass the intermittent discharge test given in Clause 5.2 not less than 5 min after the conclusion of the drop test.

6.11 VALVE IMPACT TEST

When tested in accordance with Appendix C, the valve shall comply with the following:

- (a) The valve shall not leak.
- (b) No defects shall be evident, which would prevent the extinguisher from complying with the discharge requirement as specified in Clause 5.2.
- (c) For rechargeable extinguishers, the valve or cap shall retain the capability of being disassembled.

6.12 SIPHON TUBE TEST

The siphon tube and any attachments shall not disengage when subjected to a steady, axially applied tensile force (F) at a temperature of 10°C to 25°C for 1 min:

where

$F = 1.5(P \times A)$, in Newtons

P = working pressure, in megapascals

A = internal cross-sectional area of siphon tube, in square millimetres

6.13 TESTS FOR PLASTICS MATERIALS

Components made from plastics materials that are continuously retaining pressure shall be subjected to the following tests:

- (a) *Pulsation test* A pulsation test using the procedure given in Clause 6.8. On completion of the test, the component shall comply with Item (b).
- (b) *Impact test* In addition to the requirements of Clause 6.11 and the procedures given in Appendix C, the test shall be repeated at a temperature of $65 \pm 5^\circ\text{C}$, with the component conditioned at the test temperature for not less than 4 h prior to each test series.
- (c) *Pressure test* The component shall withstand, without rupture, a pressure of not less than 5 times the maximum developed pressure. The test shall be conducted at the test temperatures of $0 - 5^\circ\text{C}$ and $65 \pm 5^\circ\text{C}$, with the component conditioned at the test temperature for not less than 24 h for test at $0 - 5^\circ\text{C}$ and 4 h for test at $65 \pm 5^\circ\text{C}$ prior to the test.

NOTE: For components of plastics materials approved under a previous Australian Standard, see Clause 2.4.

SECTION 7 DETERMINATION OF COMPLIANCE

7.1 SCOPE

This Section sets out the applicable tests and test methods for determining compliance of portable fire extinguishers with this Standard, as given in Table 7.1.

7.2 GENERAL

Tests for characteristics of portable fire extinguishers, including type tests and production tests, are given in Table 7.1.

Should conflict exist between the contents of Table 7.1 and the text of this Standard, the text of the Standard shall prevail.

Production tests shall be applied either to every extinguisher and component or, where applicable, to a sample from each batch.

TABLE 7.1
MINIMUM COMPLIANCE TEST SCHEDULE

Characteristic	Reference clause	Test method	Applicability		
			Type test	Production tests	
				% (see Note)	100%
Materials of construction	2.1	6.5	✓	✓	
Corrosion test	2.7		✓		
Maximum developed pressure	3.2		✓		
Minimum drawn radius—Cylinder ends	3.3.2	6.8	✓		
Operating mechanism	3.4.2		✓		
Liquid level indication	3.5		✓	✓	
Expansion device	3.6		✓		✓
Pressure-indicating device	3.7		✓	✓	
Filling (charging)	3.9				✓
Strainer	3.8.2		✓		
Support fitting	6.9		✓		
Internal surfaces—Anti-corrosion treatment	4.1.4		✓		✓
Adhesion test	4.2.2	Appendix A	✓		
Continuity test	4.2.3		✓		✓
Carry handle	4.5.1		✓		
Component material test	6.5		✓		
Intermittent discharge	5.2		✓	✓	
Effective discharge	5.3		✓	✓	
Fire rating	5.1	AS/NZS 1850	✓		
Powder compaction		AS/NZS 1841.5	✓		
Electrical capability	5.4	AS/NZS 1850	✓		
Pressure test other than CO ₂ type	6.2				
–Test to destruction	6.2.1		✓	✓	
–Proof test	6.2.2				✓

(continued)

TABLE 7.1 (continued)

Characteristic	Reference clause	Test method	Applicability		
			Type test	Production tests	
				% (see Note)	100%
Pressure test CO ₂ type	6.3	AS 2030.1 or Hazardous Substances and Noxious Organisms Regulations 2001 (New Zealand)			
–Extinguisher body	6.3.1		✓		✓
–Valves and fittings	6.3.2		✓	✓	✓
Clear passage test	6.4	Appendix B			✓
Stored pressure, gas leakage tests	6.6				✓
External corrosion test	6.7		✓		
Pulsation test	6.8		✓		
Support fitting test	6.9		✓		
Extinguisher drop test	6.10		✓		
Valve impact test	6.11		✓		
Siphon tube test	6.12	6.8 Appendix C	✓		
Plastics material tests	6.13		✓		
–Pulsation	6.13(a)		✓		
–Impact	6.13(b)		✓		
–Hydrostatic burst	6.13(c)		✓	✓	
Marking	Section 9		✓		
Compressed gas containers	11.2.4				
–Proof test	11.2.4.1		✓	✓	
–Routine test	11.2.4.2				✓
Checking for leakage of gas	11.3				✓

NOTE: Sample assurance tests may vary from manufacturer to manufacturer. Therefore, sample sizes are governed by the results of in-house quality assurance.

SECTION 8 IDENTIFICATION COLOURS

8.1 GENERAL

The colours used shall approximate the standard colours specified in AS 2700.

8.2 BODY COLOUR

The exterior surface of the cylinder, including the skirt if any, shall be coloured red (R13). Any boot or foot ring shall be red in colour. The maximum width of the hose clip-retaining band shall be 10 mm, unless it is red.

8.3 IDENTIFICATION COLOUR

With the exception of water-type extinguishers, a coloured band shall be used on extinguishers to identify the extinguisher type. This band shall—

- (a) be of the appropriate colour, as specified in Table 8.1;
- (b) have a width of not less than 10% and not more than 12% of the visible length of the extinguisher cylinder;
- (c) be applied circumferentially to the cylinder within the top one-third of its height;
- (d) cover not less than 270° of the arc of the cylinder circumference, with any uncovered section centralized at the back of the cylinder; and
- (e) not include or be obstructed by any other labelling or instructions.

TABLE 8.1
IDENTIFICATION COLOURS FOR PORTABLE
FIRE EXTINGUISHERS

Extinguisher	Colour name	AS 2700 reference
Water	Signal red	R13
Wet chemical	Oatmeal	Y54
Foam	Ultramarine blue	B21
Powder	White	—
Powder (metal fires)	Lime green	G35
Carbon dioxide	Black	—
Vaporizing liquid	Golden yellow	Y14

SECTION 9 INSTRUCTIONS AND MARKING

9.1 GENERAL

The cylinder of each extinguisher manufactured for markets in Australia or New Zealand shall be marked with identification colour and operating instructions in accordance with this Section.

The following shall apply for instructions and marking:

- (a) Unspecific terms relating to the application such as 'multi', 'general' or 'universal' shall not appear on any marking or literature relating to a fire extinguisher.
- (b) For a support fitting that is a wall hook, the marking required by Clause 9.3 shall be fully visible when the extinguisher is mounted in the support fitting.
- (c) For quick-release type brackets, the colour identification band and use code pictographs shall be fully visible when the extinguisher is mounted in the bracket.
- (d) The cylinder of each extinguisher shall be marked with information required for servicing (see Clause 9.4). This marking shall be separate from the identification and operating instructions.

NOTE: Servicing information need not be clearly visible when the extinguisher is mounted in its fixture.

- (e) Markings shall be displayed on the extinguisher by means of painting, durable labels or other permanent means.
- (f) Markings shall be applied in a contrasting colour against a background that is—
 - (i) red; or
 - (ii) the identification colour for that type of extinguisher; or
 - (iii) a neutral colour (that is a colour that is not an identification colour for another type of extinguisher).

9.2 PERMANENT MARKING

Each cylinder shall be externally and visibly marked with the date of manufacture by stamping, etching, engraving or embossing on the extinguisher body or permanent attachment. As a minimum, the date shall include the month and year of manufacture. The depth of stamping shall be such as to maintain the minimum wall thickness (see Clause 3.3.3) at all relevant points on the pressure envelope.

The date of manufacture marking shall consist of figures not less than 3 mm in height and shall, as a minimum, be in the form of—

- (a) MM/YY; or
- (b) MM/YYYY.

Carbon dioxide type extinguisher cylinders shall be permanently marked in accordance with the requirements of AS 2030.1.

The date of manufacture marking shall remain legible after application of any coating or protective finishing.

9.3 MAIN LABEL

9.3.1 General

The information required in Clauses 9.3.2 and 9.3.3 shall be displayed on the front of the extinguisher and be contained within an arc no greater than 120° of the arc of the cylinder circumference. The lettering shall be—

- (a) not less than 4 mm high;
- (b) separated from all other markings by not less than 4 mm;
- (c) in a plain style upper case; and
- (d) in a colour contrasting with the background.

9.3.2 Instructions

Illustrated instructions for operation shall include simple numerically sequenced pictographs or drawings that are clear and proportional to each other, in not more than four stages. A single pictograph may include two instructions.

The operating instruction sequence shall be as follows:

- (a) Preparing the extinguisher by disengaging the anti-discharge device, anti-tamper seal or both.
- (b) Aiming the extinguisher at the base of the fire, including any recommended distance from the fire at which to begin discharge, and indicating the intended operating attitude of the extinguisher.
- (c) Taking whatever action is necessary to initiate intended discharge of the extinguisher.
- (d) Describing the intended method of applying the extinguishant onto the fire.

The word 'INSTRUCTIONS' shall be at the top of the panel and the markings shall include the type of extinguisher

NOTE: For types of extinguishers, see the subsequent parts of AS/NZS 1841.

9.3.3 Use code pictographs

The intended use of the extinguisher shall be shown in pictographs, as illustrated in Figure 9.1 and 9.2. The following shall apply to pictographs:

- (a) Each pictograph shall occupy not less than 30° of the arc of the cylinder circumference.
- (b) A safe condition pictograph, as provided in Figure 9.1, shall be applied to a fire extinguisher where the extinguisher has achieved a rating, or has had a capability established, according to AS/NZS 1850.

The safe condition pictograph shall comprise white symbols on a green field. The green shall approximate G21 jade from AS 2700 or safety green from NZS 5807.

- (c) A prohibition pictograph, as provided in Figure 9.2, shall be applied to a fire extinguisher where it is dangerous to use the extinguisher on a specific class of fire, as described in AS 2444. Water extinguishers shall carry a prohibition pictograph for Class E and Class F fires. Foam extinguishers shall carry a prohibition sign for Class E fires.

The prohibition pictograph shall comprise black symbols on a white field with a red diagonal bar and border. The red shall approximate R13 signal red of AS 2700 or safety red of NZS 5807.

- (d) Extinguishers required to bear a pictograph that indicates the extinguisher is dangerous to be used on certain classes of fire shall not carry any information that implies that the extinguisher may be suitable for that class of fire.

9.4 IDENTIFICATION

The following information shall be displayed on the extinguisher:

- (a) The manufacturer's or distributor's name, trade name or trademark.
- (b) The extinguisher size in terms of extinguishant mass or volume and type as appropriate (see relevant Part of AS/NZS 1841 for the specific type of extinguisher).
- (c) The classification and rating in accordance with AS/NZS 1850.

Extinguishers shall not be permitted to carry any rating other than that obtained under AS/NZS 1850.



(a) Class 'A'



(b) Class 'B'



(c) Class 'C'



(d) Class 'E'



(e) Class 'F'

NOTE: The signs shall comprise white symbols on a green field. The green shall approximate G21 jade of AS 2700 or safety green of NZS 5807.

FIGURE 9.1 TYPICAL USE OF CODE PICTOGRAPHS—SAFE CONDITION



(a) Class 'A'



(b) Class 'B'



(c) Class 'C'



(d) Class 'E'



(e) Class 'F'

NOTE: The signs shall comprise black symbols on a white field with a red diagonal bar and border. The red shall approximate R13 signal red of AS 2700 or safety red of NZS 5807.

FIGURE 9.2 TYPICAL USE OF CODE PICTOGRAPHS—
PROHIBITION

9.5 SERVICING INFORMATION

With the exception of carbon dioxide portable fire extinguishers, to which Items (b), (d) and (h) below do not apply, the following minimum information shall be supplied:

- (a) The name, phone number and street address of the manufacturer or the responsible vendor. At least one phone number and address shall be in Australia or New Zealand.
- (b) Working pressure, in kilopascals, at $23 \pm 2^\circ\text{C}$.
- (c) For a single bore, non-aspirating nozzles, the orifice diameter in millimetres.
- (d) For rechargeable extinguishers, the periodic test pressure, in megapascals.

- (e) The nominal gross mass of the extinguisher (including any horn and hose assembly) when fully charged, in kilograms.
- (f) The words 'RECHARGE AFTER USE' or 'DISCARD AFTER USE' as appropriate.
- (g) Words to the effect that it is important that only those recharging materials specified on the extinguisher nameplate be used and that the use of other recharging materials may impair the efficiency or cause malfunction of the extinguisher.
- (h) The type and manufacturer's identification of the extinguishant contained in the extinguisher.
- (i) Instructions for recharging, which shall include the type and manufacturer's identification of the extinguishant.
NOTE: This information may be given on a pamphlet.
- (j) For gas container type extinguishers, the chemical name and mass (in grams) of the propellant gas and the tolerance of the mass.

9.6 POLYCARBONATE CAUTION

All extinguishers fitted with a polycarbonate valve or cap shall have a metal or plastic tag with the words 'AVOID SOLVENT CONTACT', in letters not less than 2 mm high, either—

- (a) attached to the valve or cap; or
- (b) moulded into the valve or cap.

9.7 SERVICE INFORMATION

The manufacturer shall make available service information that includes an appropriate parts list, recharging instructions and guidance on serviceability and maintenance.

9.8 EXTINGUISHERS INTENDED FOR SALE IN OTHER COUNTRIES

Extinguishers manufactured to this Standard for markets outside Australia or New Zealand may be coloured and labelled to meet the regulations of the country in which they are to be sold. Such extinguishers shall have an additional label with wording to the following effect:

THIS EXTINGUISHER COMPLIES WITH AS/NZS 1841 EXCEPT THE IDENTIFICATION COLOUR AND LABELS WHICH ARE SPECIFIC TO (NAME OF COUNTRY OF SALE), AND FOR THIS REASON IS NOT TO BE SOLD IN AUSTRALIA OR NEW ZEALAND.

SECTION 10 PACKING AND SHIPMENT

10.1 GENERAL

Where an extinguisher is not packed for shipment in the fully assembled and charged condition, any horn, nozzle or aerator and any hose may be removed. Any parts removed for shipment shall be included in the same package as the extinguisher.

An extinguisher that is partially dismantled for shipping shall have a warning tag or label attached to the valve indicating the extinguisher is incomplete. Instructions setting out the steps necessary for assembly shall be provided.

NOTE: Where extinguishers are to be shipped by air, advice should be sought as to the necessity of shipping them unpressurized (see Clause 10.3).

10.2 WATER, WET CHEMICAL AND FOAM FIRE EXTINGUISHERS

Water, wet chemical and foam fire extinguishers may be shipped empty. Where an extinguisher is shipped empty, the following shall apply:

- (a) The manufacturer shall be responsible for ensuring that the correct charge material (excluding water) is provided with the extinguisher before it leaves that manufacturer's branch depot.
- (b) A warning tag or label shall be attached to the valve, indicating that the extinguisher is empty or not charged.
- (c) Instructions setting out steps necessary for assembly and charging shall be provided.
- (d) Foam extinguishers shall include the foam compound in the same package as the extinguisher.
- (e) The wet chemical charge shall be included in, or attached to, the same package as the extinguisher.

The extinguisher may be pressurized with air or dry nitrogen to prevent crushing.

10.3 POWDER, CARBON DIOXIDE AND VAPORIZING LIQUID EXTINGUISHERS

Carbon dioxide, powder and vaporizing liquid extinguishers shall be shipped in the fully charged condition.

SECTION 11 COMPRESSED GAS CONTAINERS

11.1 GENERAL

11.1.1 Rechargeable compressed gas containers

Rechargeable compressed gas containers shall be designed and constructed to comply with AS 2030.1. Alternatively, rechargeable compressed gas containers not exceeding 0.1 L water capacity may be designed and constructed in accordance with Clause 11.2, according to their rated filling pressure.

11.1.2 Non-rechargeable compressed gas containers

Notwithstanding any requirements for rechargeability and the requirements of Clause 11.1.1, a single non-rechargeable compressed gas container may be used. If a single non-rechargeable compressed gas container is used, it shall comply with Clauses 11.2.3, 11.2.4, 11.3, 11.4 and 11.5.2.

11.2 HIGH-PRESSURE COMPRESSED GAS CONTAINERS

11.2.1 General

Compressed gas containers with a filling pressure exceeding 3.5 MPa, at a temperature of 15°C, shall comply with Clauses 11.2.2 to 11.2.4.

11.2.2 Materials

The containers shall have no longitudinal seams and shall be constructed of—

- (a) steel;
- (b) copper;
- (c) copper alloy; or
- (d) aluminium alloy.

The aluminium alloy shall comply with Clause 11.6.

11.2.3 Design

The containers shall be designed to withstand a developed pressure of not less than 1.25 times the pressure of the contents of an uninsulated container at 65°C. Where containers are filled with carbon dioxide, the standard test pressure shall be not less than 21 MPa and the maximum filling ratio shall be determined on the basis that the maximum service pressure shall not exceed 0.8 times the developed pressure.

NOTE: This 'developed pressure' for a gas container is not to be confused with the 'maximum developed pressure' defined in Clause 3.2, which refers to extinguisher containers, not gas containers.

11.2.4 Tests

11.2.4.1 Proof test

Sample containers shall be tested by internal pressure. Rupture shall not occur at a pressure of less than 1.5 times the developed pressure (see Clause 11.2.3).

If any container so tested ruptures at a pressure below this minimum pressure, the total batch represented by it shall be discarded.

Every container subjected to this proof test shall be discarded.

11.2.4.2 Routine test

Every container shall be subjected to a pressure equal to the developed pressure, that is, 1.25 times the pressure of the gas at $65 \pm 5^\circ\text{C}$ for a period of not less than 30 s. The container shall not show signs of leakage or permanent distortion.

11.3 CHECKING FOR LEAKAGE OF GAS

The container and the gas shall be free from moisture.

Every gas container shall be correctly charged and shall be tested for leakage of gas by one of the following methods:

- (a) *By mass* The mass of the container shall be determined before and after a bond period of not less than 21 days (containers filled with carbon dioxide only).
- (b) *By a leak detector*.
- (c) *By the immersion method* To check the contents, the container shall be filled and be completely immersed in a tank of water for 24 h. Means shall be provided for trapping escaping gas.

Containers showing loss of contents in excess of 5% over one year in any of the above tests shall be rejected.

Methods other than those given above may be used, provided it be demonstrated they give results that are repeatable, and leaks are accurately detected at the maximum rates specified.

11.4 PROTECTIVE FINISHES

The charged container shall comply with the requirements of Clause 6.5 or Clause 6.7, as appropriate.

11.5 MARKING OF COMPRESSED GAS CONTAINERS

11.5.1 Rechargeable compressed gas containers

Every rechargeable compressed gas container, which has been designed, constructed and tested in accordance with the relevant Standard listed in AS 2030.1, shall be permanently and clearly marked as required by the relevant Standard.

Where the gas container is constructed in accordance with Clause 11.2, it shall be permanently and clearly marked with the following:

- (a) Name, trade name, or trademark of the manufacturer.
- (b) Name of gas used in the container.
- (c) The mass empty, in grams.
- (d) The mass full, in grams, and the tolerance on the mass.
- (e) The test pressure, in megapascals (see Clause 11.2.4.2).
- (f) The year of manufacture.

Where the gas container is designed and constructed in accordance with AS 2030.1, the test pressure shall be as specified by the appropriate Standard.

Where the gas container is a high-pressure container designed and constructed in accordance with Clause 11.2, the test pressure shall be the pressure specified in Clause 11.2.4.2.

11.5.2 Non-rechargeable compressed gas containers

Every non-rechargeable container, complying with Clause 11.1.2, shall be permanently and clearly marked with the following:

- (a) Name, trade name, or trademark of the manufacturer.
- (b) Name of gas used in the container.
- (c) The mass full, in grams, and the tolerance on the mass.
- (d) The year of manufacture.

11.6 ALUMINIUM ALLOY CONTAINERS—CHEMICAL COMPOSITION

The chemical composition of aluminium alloy containers used for fire extinguishers shall be in accordance with the material requirements of AS 1777.

APPENDIX A
ADHESION TEST
(Normative)

A1 SCOPE

This Appendix sets out the method for determining the resistance to external impact of an internal organic lining.

NOTE: See Clause 4.2.2 for the test criteria of acceptance.

A2 PRINCIPLE

An extinguisher body is impacted, charged for a period and examined.

A3 APPARATUS

Apparatus shall be as follows:

- (a) An unfilled, lined extinguisher body.
- (b) A steel hammer of mass 4.5 ± 0.20 , -0.00 kg.

A4 PROCEDURE

The procedure shall be as follows:

- (a) Lay an unfilled lined extinguisher body horizontally on its side on a hard surface. Drop a steel hammer of mass 4.5 ± 0.20 , -0.00 kg with a hemispherical striking surface of 24 ± 1 mm diameter from a height of 450 ± 5 mm onto the horizontal surface of the extinguisher body. A tubular guide may be used to direct the hammer; however, the hammer shall be capable of falling freely and vertically.
- (b) Conduct a continuity test in accordance with Clause 4.2.3.
- (c) After impacting the cylinder as above, assemble and charge the extinguisher using its recommended extinguishant and store for a minimum of 120 h at 10°C to 25°C . Discharge the extinguisher and examine the cylinder internally for visible cracking, separation of the lining from the body wall or bubbles between the lining and body.

NOTE: It may be necessary to section the body to permit thorough examination.

A5 RESULTS

The following shall be reported:

- (a) Information identifying the extinguisher body.
- (b) Any evidence of cracking, separation of the lining from the body wall or bubbles between the lining and body.
- (c) Results of continuity test.
- (d) Results of examination and adhesion test.
- (e) Reference to this test method i.e., AS/NZS 1841.1, Appendix A.

APPENDIX B
EXTERNAL CORROSION TEST
(Normative)

B1 SCOPE

This Appendix sets out the method for determining the resistance to corrosion of a fire extinguisher, regardless of its content.

NOTE: See Clause 6.7 for the test criteria of acceptance.

B2 PRINCIPLE

An extinguisher is suitably positioned within a test cabinet and subjected to a 5% neutral salt spray test for a period of not less than 480 h. At the conclusion of test, it is checked for normal operation.

B3 APPARATUS

A suitable test cabinet having a salt spray cone of approximately 20° included angle.

B4 PROCEDURE

The procedure shall be as follows:

- (a) Select a fully charged extinguisher.
- (b) Position the extinguisher within the test cabinet between 15° and 30° to the horizontal, to ensure satisfactory concentration of salt spray on the extinguisher.

NOTE: The preferred angle is 20°.

Where fittings are attached to the cylinder by welding, the extinguisher shall be positioned so as to limit the salt solution build-up on such fittings.

- (c) Expose the extinguisher to the salt spray for a period of not less than 480 h.
- (d) Wash the extinguisher under running tap water and dry it by standing in a suitable ambient temperature environment prior to the assessment.
- (e) Operate the extinguisher in its operational mode within 24 h of the conclusion of the test.

B5 ASSESSMENT

The following shall be reported:

- (a) Information identifying the extinguisher.
- (b) Result of the discharge test.
- (c) Description of any corrosion observed.
- (d) Reference to this test method, i.e., AS/NZS 1841.1, Appendix B.

APPENDIX C

VALVE IMPACT TEST

(Normative)

C1 SCOPE

This Appendix sets out the method for determining the resistance to impact of fire extinguisher valves.

NOTE: See Clause 6.11 for the test criteria of acceptance.

C2 PRINCIPLE

A correctly charged extinguisher is mounted on a prepared base and its operating head is subjected to an impact test in the vertical direction, with safety device fitted.

C3 APPARATUS

The following apparatus is required:

- (a) A striker of 4 kg mass, with a flat striking surface approximately 75 mm diameter, mounted in guides so as to strike the extinguisher at the nominated test point.
- (b) A heavy rigid base, on which the extinguisher can be mounted directly below the striker in the upright position.

C4 PROCEDURE

The procedure shall be as follows:

- (a) Assemble the valve to the extinguisher cylinder and fully charge the extinguisher to the normal operating pressure. If the extinguisher is of the gas-container type, the gas container shall be fitted, but the extinguisher shall not be activated.

For water-based extinguishers, sufficient anti-freeze shall be added to the charge to prevent freezing and enable the intermittent discharge test to be carried out.

- (b) Condition the fully charged extinguisher for a period of not less than 24 h at a temperature between -5°C and 0°C .
- (c) Immediately after the extinguisher's removal from the conditioning equipment, place the extinguisher on the prepared base in an upright position and drop the striker from a height calculated by the following equation to impact on the uppermost part of the valve assembly including any operating handle:

$$h = m / 20$$

where

h = height of fall of the striker, in metres

m = total mass of the extinguisher, in kilograms

- (d) Visually inspect the valve for any defects that would prevent its operation. If leaks or defects are detected, the test shall be terminated.
- (e) Conduct an intermittent discharge test in accordance with Clause 5.2 at least 5 min after the impact.

C5 RESULTS

The following shall be reported:

- (a) Information identifying the valve.
- (b) Any evidence of pressure leaks or defects in the valve that would prevent its operation following the inspection specified in Paragraph C4(d).
- (c) Results of the examination and intermittent discharge test.
- (d) Reference to this test method, i.e., AS/NZS 1841.1, Appendix C.

NOTES

NOTES

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Standards Australia is an independent company, limited by guarantee, which prepares and publishes most of the voluntary technical and commercial standards used in Australia. These standards are developed through an open process of consultation and consensus, in which all interested parties are invited to participate. Through a Memorandum of Understanding with the Commonwealth government, Standards Australia is recognized as Australia's peak national standards body.

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