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NATIONAL STANDARD

ANSI/CAN/UL/ULC 1254:2019

STANDARD FOR SAFETY

Pre-Engineered Dry and Wet Chemical Extinguishing System Units



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ANSI/CAN/UL/ULC 1254:2019

Sixth Edition, Dated April 3, 2019

Summary of Topics

This revision of ANSI/CAN/UL/ULC 1254 dated December 6, 2019 is an editorial update to Annex [B](#).

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ANSI/CAN/UL/ULC 1254:2019

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Preface

This is the Sixth Edition of the ANSI/CAN/UL/ULC 1254, Standard for Safety for Pre-Engineered Dry and Wet Chemical Extinguishing System Units.

UL is accredited by the American National Standards Institute (ANSI) and the Standards Council of Canada (SCC) as a Standards Development Organization (SDO).

This Standard has been developed in compliance with the requirements of ANSI and SCC for accreditation of a Standards Development Organization.

This ANSI/CAN/UL/ULC 1254 Standard is under continuous maintenance, whereby each revision is approved in compliance with the requirements of ANSI and SCC for accreditation of a Standards Development Organization. In the event that no revisions are issued for a period of four years from the date of publication, action to revise, reaffirm, or withdraw the standard shall be initiated.

In Canada, there are two official languages, English and French. All safety warnings must be in French and English. Attention is drawn to the possibility that some Canadian authorities may require additional markings and/or installation instructions to be in both official languages.

Annex A, identified as informative, is for informational purposes only.

Annex B, identified as normative, forms a mandatory part of this Standard.

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This Edition of the Standard has been formally approved by the UL Standards Technical Panel (STP) on Extinguishing Systems, STP 300.

This list represents the STP 300 membership when the final text in this standard was balloted. Since that time, changes in the membership may have occurred.

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Andrew Von Holt	Canadian Association of Fire Chiefs – Brampton Fire and Emergency Services	AHJ	Ontario, Canada
Nicolette Weeks	Underwriters Laboratories Inc.	STP Project Manager - Non-voting	USA

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For further information on UL standards, please contact:

Underwriters Laboratories Inc.
 171 Nepean Street, Suite 400
 Ottawa, Ontario K2P 0B4
 Phone: 1-613.755.2729
 E-mail: cec@ul.com
 Web site: ul.com

This Standard is intended to be used for conformity assessment.

The intended primary application of this standard is stated in its scope. It is important to note that it remains the responsibility of the user of the standard to judge its suitability for this particular application.

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INTRODUCTION

1 Scope

1.1 These requirements cover the construction and operation of fixed pre-engineered dry chemical fire extinguishing system units and fixed automatic extinguisher units intended to be used in accordance with the Standard for Dry Chemical Extinguishing Systems, NFPA 17 and with the National Fire Code of Canada, as applicable; and; fixed pre-engineered wet chemical fire extinguishing system units intended to be used in accordance with the Standard for Wet Chemical Extinguishing Systems, NFPA 17A; and with the National Fire Code of Canada, as applicable.

1.2 Automatic extinguisher units do not have a manual means of operation and are intended to be used in accordance with the manufacturer's installation instructions. Automatic extinguisher units are not intended for use as a substitute for pre-engineered dry chemical extinguishing system units, or for protection of fire risks larger than those specified in the manufacturer's instructions for a single unit by using multiple units.

1.3 Pre-engineered dry chemical extinguishing system units covered by these requirements are intended to be used in the following fire protection systems:

- a) Industrial Total Flooding Protection System – A system arranged to discharge dry chemical throughout the intended protected volume. See Fire Test – Total Flooding Protection System, Section [26](#).
- b) Class B Local Application Protection System – A system arranged to discharge dry chemical directly onto a specific area of protection. This application of chemical is normally used where no fixed enclosure exists or an extinguishing system is unable to totally flood the fixed enclosure to achieve extinguishment. See Fire Test – Class B Local Application Protection System, Section [27](#).
- c) Commercial Cooking Equipment Protection System – A system arranged to discharge dry chemical onto cooking surfaces of cooking appliances and into hood and duct systems used for ventilation of commercial cooking appliances. See the Standard for Fire Testing of Fire Extinguishing Systems for Protection of Commercial Cooking Equipment, UL 300.
- d) Automobile Service Station Fueling Area Protection System – A system arranged to discharge dry chemical directly onto small spill fires that originate and are maintained within the protected area. See Fire Test – Automobile Service Station Fueling Area Protection System, Section [28](#).
- e) Open-Face Paint Spray Booth Protection System – A system arranged to discharge dry chemical into paint spray working areas and into the plenum and duct systems used for ventilation of paint spraying operations. See Fire Test – Open-Face Point Spray Booth Protection System, Section [29](#).
- f) Vehicle Paint Spray Booth – A system arranged to discharge dry chemical into paint spray working areas and onto the plenum and duct systems used for ventilation of paint spraying operations. See Fire Test – Vehicle Paint Spray Booth Protection System, Section [30](#).
- g) Off-the-Road Vehicle Protection System – A system arranged to discharge dry chemical onto fire risk areas and into volumes of vehicles such as aboveground mobile mining equipment, and mobile earthmoving equipment. See Fire Test – Total Flooding Protection System, Section [26](#), and/or Fire Test– Class B Local Application Protection System, Section [27](#), as applicable.

1.4 Pre-engineered wet chemical extinguishing system units covered by these requirements are intended to be used in the following fire protection systems:

- a) Commercial Cooking Equipment Protection System – A system arranged to discharge wet chemical onto cooking surfaces of cooking appliances and into hood and duct systems used for

ventilation of commercial cooking appliances. See the Standard for Fire Testing of Fire Extinguishing Systems for Protection of Commercial Cooking Equipment, UL 300.

b) Off-the-Road Vehicle Protection System – A system arranged to discharge wet chemical onto fire risk areas and into volumes of vehicles such as aboveground mobile mining equipment, and mobile earthmoving equipment. See Fire Test – Total Flooding Protection System, Section 26, and/or Fire Test – Class B Local Application Protection System, Section 27, as applicable.

2 Components

2.1 Except as indicated in 2.2, a component of a product covered by this standard shall comply with the requirements for that component.

2.2 A component is not required to comply with a specific requirement that:

- a) Involves a feature or characteristic not required in the application of the component in the product covered by this standard, or
- b) Is superseded by a requirement in this standard.

2.3 A component shall be used in accordance with its rating established for the intended conditions of use.

2.4 Specific components are incomplete in construction features or restricted in performance capabilities. Such components are intended for use only under limited conditions, such as certain temperatures not exceeding specified limits, and shall be used only under those specific conditions.

3 Units of Measurement

3.1 Values stated without parentheses are the requirement. Values in parentheses are explanatory or approximate information.

3.2 Where these requirements reference extinguishing system unit or units, the requirements also apply to automatic extinguisher units unless specifically noted otherwise.

4 Undated References

4.1 Any undated reference to a code or standard appearing in the requirements of this standard shall be interpreted as referring to the latest edition of that code or standard.

5 Glossary

5.1 For the purpose of these requirements, the following definitions apply.

5.2 AUTOMATIC EXTINGUISHER UNIT – A unit that has no manual means of actuation and discharges extinguishing agent upon thermal actuation is intended for use in a normally unoccupied space and is limited to a single protected area.

5.3 AUTOMOBILE SERVICE STATION FUELING AREA PROTECTION DEFINITIONS:

- a) ISLAND – A raised portion of the service station protection area where the fuel dispensing devices are located.

b) PARKING AREA – The area immediately adjacent to the island where automobiles are parked for purposes of fueling.

c) GROUNDSWEEP PROTECTION – Protection that is achieved by nozzles that are installed near the ground and discharge dry chemical parallel to the protected surface.

5.4 CYLINDER/VALVE ASSEMBLY – A container that incorporates a valve and that provides storage of the extinguishing agent and expellant gas until the valve is actuated. For cartridge operated units, this assembly includes the extinguishing agent storage container and cartridge mechanism. When actuated, the valve releases the agent into the distribution network of the extinguishing system.

5.5 DISCHARGE RATE – The ratio of the quantity of agent discharged from a nozzle to the discharge time measured within ± 1 second. When a minimum discharge rate is indicated, reference is made to the minimum quantity of agent discharged and the time measured within ± 1 second.

5.6 DISCHARGE NOZZLE – A device that is used to uniformly distribute the extinguishing agent over or into a specific area, or within a specific volume, or both.

5.7 DISCHARGE TIME – The time interval between the first appearance of extinguishing agent at the nozzle and the time at which the discharge becomes predominantly gaseous.

5.8 EXPELLANT GAS – Dry nitrogen, dry air, or other gas used to facilitate the discharge of the extinguishing agent.

5.9 EXTINGUISHING AGENT, DRY CHEMICAL – A powder of very small particles, typically including either ammonium phosphate, potassium bicarbonate, or sodium bicarbonate with additional particulate matter, which has been treated to provide desirable properties such as proper flow capabilities and resistance to moisture absorption and packing.

5.10 EXTINGUISHING AGENT, WET CHEMICAL – An aqueous solution typically including either inorganic salts, organic salts, or a combination of inorganic and organic salts.

5.11 EXTINGUISHING SYSTEM UNIT – Identified components that are to be assembled into a system for the discharge of an extinguishing agent through fixed piping and/or hose, and nozzles for the purpose of extinguishing fires.

5.12 GAS CARTRIDGE – A container that provides storage for an expellant gas.

5.13 HEPTANE – Commercial grade heptane having the following characteristics:

- a) A minimum initial Boiling Point of 88°C (190°F);
- b) A maximum dry point of 100°C (212°F); and
- c) A specific gravity of 0.67 – 0.73 [15.6°C/15.6°C (60°F/60°F)].

5.14 INDUSTRIAL PAINT SPRAY BOOTH PROTECTION DEFINITIONS:

- a) DUCT – A continuous enclosed passageway for the exhaust of air and paint vapors.
- b) FILTERS – A component of a paint spray booth ventilation system that is intended to remove paint spray residues.
- c) SPRAY AREA – A power ventilated area that is used for open spraying of flammable or combustible materials.

d) PLENUM – The volume of enclosed space between the paint filters and the duct entrance.

e) PIT – A plenum located beneath the floor of the spray booth.

5.15 MANUAL MEANS OF ACTUATION – A means of system actuation in which the system operator initiates system discharge either mechanically or electrically.

5.16 MASTER VALVE – A discharge valve that upon automatic or manual actuation operates other valves or devices in an extinguishing system and achieves full system discharge.

5.17 OPEN FACE SPRAY BOOTH – A paint spray booth having one side open to the spray area and uncloseable. These types of spray booths consist of a spray area, plenum, and duct.

5.18 OPERABLE PRESSURE RANGE – The pressure range corresponding to the pressures in the storage container at the specified minimum and maximum temperatures for which the extinguishing system unit is intended to be operable.

5.19 OPERATING PRESSURE – The pressure in a fully charged storage container at 70°F (21°C).

5.20 OVERHEAD PROTECTION – Protection achieved by nozzles installed above the protected area that discharge extinguishing agent downward, directly onto the protected surface.

5.21 PRE-ENGINEERED SYSTEM – A system that is tested in accordance with the limitations prescribed by the manufacturer for maximum and minimum pipe lengths, accessories, number of fittings, number and types of nozzles and nozzle placement, types of fire risks and their maximum areas, volumes, or both areas and volumes of protection.

5.22 PRESSURE VESSEL (CYLINDER) – A container that provides storage for extinguishing agent and expellant gas, or when used at a location remote to the extinguishing system unit, provides storage for expellant gas.

5.23 PROOF TEST PRESSURE – The factory test pressure of each cylinder used to evaluate cylinder leakage and construction integrity. For Department of Transportation (DOT) or Transport Canada, Transportation of Dangerous Goods Regulations (TDGR) approved cylinders, the factory test pressure is specified in the appropriate DOT specification. For ASME vessels the factory test pressure is specified in Section VIII, Pressure Vessels of the ASME Boiler and Pressure Vessel Code. For non-DOT cylinders and non-ASME cylinders, the factory test pressure is at least three times the cylinder operating pressure at 70°F (21°C).

5.24 TANK SIDE PROTECTION – Protection achieved by nozzles installed in close proximity to the fuel surface and that discharge dry chemical parallel to the protected surface.

5.25 VEHICLE PAINT SPRAY BOOTH – A paint spray booth intended for the specific purpose of painting vehicles. These types of spray booths are typically of the cross-draft or down-draft variety with plenums located at the rear, below, or at both sides of the spray booth.

CONSTRUCTION

6 General

6.1 After discharge of the extinguishing agent is initiated, an extinguishing system unit shall maintain the maximum rate of application of the extinguishing agent without requiring an additional manual action.

6.2 All exposed parts of a dry chemical extinguishing system unit, including the finishes on coated or painted parts, the assemblies of moving parts, the nameplates as secured in place, and the mounting bracket, shall be resistant to commonly encountered atmospheric corrosive influences, and to galvanic corrosion, as determined by the Salt Spray Corrosion Test, Section [36](#).

6.3 A wet chemical extinguishing system unit's agent storage container shall either:

- a) Have corrosion resistance equivalent to brass or austenitic stainless steel;
- b) Have corrosion resistance equivalent to mild steel alloy, such as SAE 1010, having a minimum thickness of 0.028 inch and be sealed from atmosphere; or
- c) Have corrosion resistance as determined by the Wet Chemical Extinguishing Agent Exposure Test for Metallic Parts, Section [37](#).

6.4 A wet chemical extinguishing system unit's metallic agent valve, metallic siphon tube, and other metallic parts that are exposed to both the extinguishing agent and its vapors shall have corrosion resistance equivalent to brass or austenitic stainless steel.

6.5 When the deterioration, breakage, or other malfunction of a material for an extinguishing system unit results in the extinguishing system to become inoperable, the material shall not be susceptible to stress cracking, as determined by the 10-Day Moist Ammonia Air Stress Cracking Test, Section [49](#).

6.6 Components of an extinguishing system unit include:

- a) Actuating assemblies;
- b) An extinguishing agent storage container and valve assembly with actuating cartridge where applicable;
- c) Discharge nozzle or nozzles;
- d) Indicators that show the condition of the extinguishing system;
- e) A means for mounting the extinguishing system;
- f) Remote manual controls; and
- g) Other accessory equipment.

6.7 Where U.S. customary units are employed, the minimum storage temperature of an extinguishing system unit shall be 32°F (0°C), 0°F (minus 17.8°C), minus 40°F (minus 40°C), minus 65°F (minus 54°C) or in increments of 10°F (5.5°C) for temperatures lower than 0°F (minus 17.8°C); and a maximum storage temperature of either 100°F (37.8°C), 120°F (48.9°C), 130°F (54.4°C), or higher in increments of 10°F (5.5°C), except that the 100°F (37.8°C) maximum storage temperature applies to an automatic extinguisher unit only.

6.8 Where SI (System International) units are employed, extinguishing system units shall have a minimum storage temperature of 0°C (32°F), -20°C (minus 4°F), minus 40°C (minus 40°F), minus 54°C (minus 65°F) or in increments of 5°C (9°F) for temperatures lower than minus 20°C (minus 4°F); and a maximum storage temperature of 37.8°C (100°F), 50°C (122°F), or higher in increments of 5°C (9°F), except that the 37.8°C (100°F) maximum storage temperature applies to an automatic extinguisher unit only.

6.9 When used as part of a multiple unit system, an extinguishing system unit shall be provided with a means for simultaneous operation of all system units.

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7 Electrically Operated Alarms

7.1 When an electrically operated alarm is used, it shall comply with the Standard for Audible Signal Appliances, UL 464 and/or the Standard for Audible Signal Devices for Fire Alarm Systems, Including Accessories, CAN/ULC-S525, as applicable.

8 Controls and Indicators

8.1 An extinguishing system unit shall be provided with the following controls and indicators:

- a) An automatic and manual means of actuation, or a manual means only.
- b) A pressure gauge for each pressure vessel containing a pressurized extinguishing agent, showing the pressure within the container. See Pressure Gauges, Section [14](#).

8.2 An automatic extinguisher unit shall be provided with the following controls and indicators:

- a) An automatic means of actuation only.
- b) A pressure gauge for each pressure vessel containing a pressurized extinguishing agent, showing the pressure within the container. See Pressure Gauges, Section [14](#).

8.3 When an electrical power source is used for a manual actuation mechanism included in an extinguishing system unit (see [8.1](#)), the electrical power source shall be independent of the power source for the automatic actuation mechanism. Manual and automatic actuation mechanisms are permitted to be electrically powered by the same source only when a backup source, such as a battery, is provided.

8.4 A control unit, such as a control panel, and push-button station, used as part of an extinguishing system shall comply with the Standard for Control Units and Accessories for Fire Alarm Systems, UL 864 and/or Control Units for Fire Alarm Systems, CAN/ULC-S527, as applicable.

9 Caps, Valves, and Closures

9.1 The fill opening of an extinguishing system unit shall have a minimum inside diameter of 3/4 inch (19.1 mm).

9.2 A collar with external threads shall be as high as required so the cap does not contact the dome or the bottom of the pressure vessel when the gasket is removed.

9.3 A threaded cap, closure, or valve shall engage the collar or the threaded opening by not less than four full threads with the gasket in place.

9.4 A cap, valve, or closure shall withstand the hydrostatic pressure test as specified for the pressure vessel. See [33.2.1](#).

9.5 A cap, plug, cylinder valve or other component except a pressure gauge, shall be provided with a means of relieving pressure when it is removed while the extinguishing agent chamber is still under pressure. The pressure shall be relieved with not less than two threads engaged.

10 Pressure Vessels and Cylinders

10.1 A pressure vessel shall be fabricated of a material having rigidity, durability, and resistance to corrosion at least equivalent to:

- a) An aluminum alloy, such as 6061-T6 (see the Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate, ASTM B209), having a minimum thickness of 0.028 inch (0.71 mm);
- b) An aluminum alloy, such as 1100, 1170, and 3003, having a minimum thickness of 0.028 inch;
- c) A mild steel alloy, such as SAE 1010, having a minimum thickness of 0.028 inch; or
- d) An austenitic stainless steel having a maximum of 0.03 percent carbon content and having a wall thickness of at least 0.025 in.

10.2 The requirements in this section do not apply to a rechargeable pressure vessel marked as complying with local transport requirements, such as, U.S. Department of Transportation (DOT), Transport Canada, Transportation of Dangerous Goods Regulations (TDGR) or ASME specifications, unless otherwise specifically indicated.

10.3 An extinguishing system unit pressure vessel intended to be shipped with pressurization shall be designed, constructed, inspected, marked, and certified in accordance with applicable regulations governing the transport of dangerous goods or hazardous materials.

10.4 An extinguishing system unit pressure vessel intended to be shipped without pressurization shall be designed, constructed, inspected, marked, and certified in accordance with pressure vessel codes and/or standards that are applicable to its intended use as required by local, state, provincial/territorial, regional, national, and/or international regulations, as applicable.

10.5 A pressure vessel/valve assembly having an operating pressure greater than 300 psi (2.07 MPa) at 70°F (21°C) shall be provided with a pressure relief device that complies with the applicable requirements specified in DOT 49CFR, 173.34 and CGA Pamphlet S-1.1, Pressure Relief Device Standards Part 1 – Cylinders for Compressed Gases.

10.6 For the purpose of these requirements, thickness measurements of the sidewall shall be measured on uncoated metal. The thickness of the dome and of the bottom shall be measured at several points after forming and before coating.

10.7 The minimum width of a brazed joint on the sidewall shall be at least four times the thickness of the sidewall.

10.8 Pressure vessels with an operating pressure of 240 psi (1.65 MPa) or less at 70°F (21°C), and an internal volume not exceeding 1100 cubic inches (16.4 m³), shall be constructed so that the stress in any part of the pressure vessel does not exceed 80 percent of the yield strength of the material or 50 percent of the ultimate tensile strength of the material, whichever is less, when subjected to the proof test pressure specified in [33.1.2](#). See [10.9](#) and [10.11](#) – [10.18](#).

Exception: See [10.10](#).

10.9 With reference to the requirements of [10.8](#), the maximum allowable stress at proof pressure for commonly used materials and fabricating processes is as specified in [Table 10.1](#).