



UL 1803

STANDARD FOR SAFETY

Factory Follow-Up on Third Party
Certified Portable Fire Extinguishers

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UL Standard for Safety for Factory Follow-Up on Third Party Certified Portable Fire Extinguishers, UL 1803

Fourth Edition, Dated February 15, 2012

Summary of Topics

This revision of ANSI/UL 1803 dated December 1, 2021 is being issued to update the title page to reflect the most recent designation as a Reaffirmed American National Standard (ANS). No technical changes have been made.

Text that has been changed in any manner or impacted by UL's electronic publishing system is marked with a vertical line in the margin.

The requirements are substantially in accordance with Proposal(s) on this subject dated October 8, 2021.

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FEBRUARY 15, 2012
(Title Page Reprinted: December 1, 2021)



ANSI/UL 1803-2012 (R2021)

1

UL 1803

Standard for Factory Follow-Up on Third Party Certified Portable Fire

Extinguishers

First Edition – July, 1986
Second Edition – November, 1994
Third Edition – December, 2006

Fourth Edition

February 15, 2012

This ANSI/UL Standard for Safety consists of the Fourth Edition including revisions through December 1, 2021.

The most recent designation of ANSI/UL 1803 as a Reaffirmed American National Standard (ANS) occurred on December 1, 2021. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, and Title Page.

Comments or proposals for revisions on any part of the Standard may be submitted to UL at any time. Proposals should be submitted via a Proposal Request in UL's On-Line Collaborative Standards Development System (CSDS) at <https://csds.ul.com>.

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CONTENTS

INTRODUCTION

1	Scope	5
2	Reference Standards	5
3	Glossary	5
4	Agreements	6
5	Certification Mark	6
6	Requirements for Third Party Certification and Inspection Body	7

THIRD PARTY CERTIFICATION BODY INSPECTION PROGRAM

7	General	8
---	---------------	---

MINIMUM MANUFACTURER'S CONTROL PROGRAM

8	General	10
9	Non-DOT/TDGR Cartridge Proof-Pressure Test (+, ++, +++++)	11
10	Non-DOT/TDGR Cartridge Burst Test (+, ++, +++++)	11
11	Rupture Disc Assembly Test	11
12	Nitrogen Cylinder Leakage Test (+, ++, +++++)	11
13	Cylinder Proof-Pressure Test (+, ++, +++++, +++++)	11
14	Hydrostatic Burst Pressure Test (+, ++, +++++, +++++)	11
15	Thread Test	11
16	Pressure Regulator Test (+, ++, +++++)	12
17	Discharge Hose and Nitrogen Hose Assembly Test	12
18	Locking Devices and Seals	12
19	Discharge Duration, Minimum Dry Chemical Discharged, and Weight of Charge Determinations (Hand Extinguishers) (+)	12
20	Discharge Duration and Weight of Carbon Dioxide Determinations (Hand Extinguishers) (+++)	13
21	Discharge Duration, Minimum Extinguishing Agent Discharged, and Range of Discharge (++++, +++++)	13
22	Rate-of-Flow Test (+)	14
23	Discharge Tests (Wheeled Extinguishers) (+, ++, +++++, +++++)	14
24	Cartridge Assembly Leakage Test (+, ++, +++++)	14
25	Extinguisher Leakage Test	15
26	Pressure Gauge/Indicator Test (+, ++, +++++, +++++)	15
27	Dry Chemical Extinguishing Agent Tests (+)	15
27.1	General	15
27.2	Sieve test	16
27.3	Hygroscopicity Test	16
27.4	Water repellency test	16
27.5	Packed chamber test	17
28	Horn Impact Test (+++)	17
29	Test Records	17
30	Calibration of Testing and Measuring Equipment	17

INSPECTOR'S COUNTERCHECK PROGRAM AT FACTORY

31	Verification of Material	18
32	Examination of Parts and Subassemblies	18
33	Critical Dimensions and Parts Verification	18
34	Visual Inspection of Completed Extinguishers	19

35	Countercheck Tests Each Inspection	20
36	Periodic Countercheck Tests	21
37	Review of Records	21

TESTS TO BE CONDUCTED AT TEST LABORATORY

38	Frequency of Test	21
39	Salt Spray Test	21
40	Qualitative Infrared Analysis	21
41	Extinguishing Agent Tests (+)	22
42	Extinguisher Tests (Hand Extinguishers) (+++)	22
43	Freezing Point Determination of Antifreeze Charge (++++)	22
	43.1 Apparatus	22
	43.2 Method	22
	43.3 Results	22
44	Foam Quality (+++++)	23
	44.1 Apparatus	23
	44.2 Method	23
	44.3 Results	23
45	Foam Identification Tests – Specific Gravity (+++++)	23
	45.1 General	23
	45.2 Qualitative infrared analysis	23
46	Carbon Analysis of Stainless Steel Cylinders (++++, +++++)	23
	46.1 Apparatus	23
	46.2 Method	24
	46.3 Results	24

CONTROL OF CERTIFICATION MARK

47	Inspection Program	24
48	Frequency of Inspections	24

INTRODUCTION

1 Scope

1.1 This standard covers the basic elements of a Third Party Certification and Inspection Program for various types of portable fire extinguishers, hand and wheeled, including the following: carbon dioxide, dry chemical, water based, clean agent, and stored pressure water.

2 Reference Standards

2.1 Products covered under this program shall comply with the requirements in effect on the date of production in the Standard for the Rating and Fire Testing of Fire Extinguishers, ANSI/UL 711, and in one of the following standards:

- a) Standard for Water Based Agent Fire Extinguishers, ANSI/UL 8.
- b) Standard for Carbon Dioxide Fire Extinguishers, ANSI/UL 154.
- c) Standard for Dry-Chemical Fire Extinguishers, ANSI/UL 299.
- d) Standard for Water Fire Extinguishers, ANSI/UL 626.
- e) Standard for Clean Agent Fire Extinguishers, ANSI/UL 2129.

3 Glossary

3.1 For the purpose of this standard, the following definitions apply.

3.2 CERTIFICATION – A process of product evaluation to:

- a) Determine conformance of a product with a nationally-recognized safety standard;
- b) Provide for product Listing in a product directory;
- c) Provide for application of a Certification Mark to those products which conform to the standard; and
- d) Provide for audit of a manufacturer's quality control program, all under terms of an agreement(s) signed by the manufacturer and the Third Party Certification and Inspection Body.

3.3 CERTIFICATION MARK – A distinctive registered mark of a Third Party Certification and Inspection Body that the Manufacturer, by the terms of the Third Party Certification and Inspection Body, is authorized to apply to his product as his declaration that the product has been manufactured under the Follow-Up Program and complies with the requirements of the program.

3.4 FOLLOW-UP DOCUMENT – A document describing the Certified product and essential elements of the Follow-Up Program, prepared by the Third Party Certification and Inspection Body and loaned to the Manufacturer while the Certification is in effect.

3.5 FOLLOW-UP PROGRAM – The sampling, inspections, tests, or other measures taken by the Manufacturer and supplemented by the Certification Body as a check on the means that the Subscriber exercises to determine compliance of Certified products with the requirements. Such activities are generally conducted at the manufacturing location, but examination and testing is also conducted by the Certification and Inspection Body on samples selected from the factory, the open market, or elsewhere.

3.6 MANUFACTURER – A manufacturer or assembler of a Certified product at whose factory a Third Party Certification and Inspection Program is established.

4 Agreements

4.1 A manufacturer participating in the Third Party Certification and Inspection Program shall be required to sign a legally binding agreement with a Third Party Certification Body. Such an agreement shall provide for at least the following elements, duties, and responsibilities:

- a) The Certification Body shall determine, by means of product evaluation and review of the Manufacturer's quality assurance measures, that the product is eligible for coverage under a Certification Program.
- b) The manufacturer shall agree that the Certification and Inspection Body may test production samples or prototype models. If a prototype model is tested, the Certification and Inspection Body shall inspect the first production and repeat selected tests to verify that the production samples comply with the appropriate requirements. Products that comply will be covered under a Follow-Up Program as indicated in (c), and will be subject to additional production sampling and testing as described in (g) and (h).
- c) The Certification and Inspection Body shall prepare a Follow-Up Document, publish a Listing in a suitable form, and establish a Follow-Up Program for a product found to be in compliance with the appropriate standards and otherwise to be eligible for coverage under the Certification Program.
- d) The Follow-Up Inspection Document shall identify, describe, and set forth requirements for the Certified product and shall specify the authorized Certification Mark that shall be used only on or in connection with a Certified product.
- e) The establishment of coverage under the Program shall be contingent upon the manufacturer demonstrating to the Certification Body's satisfaction that the product will be produced in accordance with the Certification Program.
- f) The manufacturer shall agree that the Certification Mark shall only be used on products manufactured by him at the locations specified in the Follow-Up Document.
- g) Under a Follow-Up Program, the Certification and Inspection Body shall perform all necessary examinations, tests, and inspections to determine compliance of randomly selected samples of the Certified product with the requirements specified in the Follow-Up Inspection Document. Samples are to be selected from production intended to bear the Certification Mark, finished products at the manufacturer's factory bearing the Certification Mark, and products that bear the Certification Mark that have been purchased on the open market.
- h) The Certification and Inspection Body shall have the right to conduct unannounced inspections at the factory, and to control Certification Marks, including the right to require that the manufacturer remove a Mark from a product that does not comply with the requirements.
- i) The manufacturer shall agree to have the product investigated by the Certification and Inspection Body to determine compliance with changes in standards or shall agree to discontinue application of the Certification Mark when such changes become effective.

5 Certification Mark

5.1 The Certification and Inspection Body shall permit the use of a Certification Mark only on products that comply with all of the requirements of the Certification and Inspection Program. The Certification Mark shall be owned and controlled by the Certification and Inspection Body, shall be used exclusively to identify products as being Certified, and shall be Federally registered as a Certification Mark with the U. S.

Patent and Trademark Office under the Trademark Act of 1946, commonly referred to as the Lanham Act (15 U.S.C. 1051 et. seq.).

6 Requirements for Third Party Certification and Inspection Body

6.1 To qualify as a Third Party Certification Body, a Certification Body shall be recognized by the authority having jurisdiction as:

- a) Being engaged, as a regular part of its business, in performing inspections and tests that are the same as or similar to the inspections and tests required for the product being considered for Certification;
- b) Having, or having access to, the equipment, facilities, personnel, and calibrated instruments that are necessary to inspect and test the products under the Certification Program;
- c) Not being owned or controlled by:
 - 1) A manufacturer, vendor, or buyer of the products to be inspected or tested, or by a manufacturer of similar products.
 - 2) A supplier of materials to the manufacturer.
- d) Having sufficient breadth of interest or activity, so that loss or award of a specific contract to determine compliance of a product would not be a substantial factor in the financial well-being of the Certification Body;
- e) Not advertising, promoting, or designing the manufacturer's product nor performing consulting work for the manufacturer of products covered under the Certification Program that impairs the impartiality of the Certification Body;
- f) Not contracting or transferring to another person or organization responsibility for the performance or supervision of inspections or tests, or both, required under the Certification Program; and
- g) Providing a mechanism for appealing decisions of the Certification Body to a panel of noncommercially involved third parties.

6.2 The Third Party Certification and Inspection Body shall prepare a follow-up document that includes:

- a) Photographs, drawings, text, or other means to the extent necessary to accurately describe all important features of the Certified product.
- b) Detailed information describing the periodic tests required to be performed by the manufacturer at the factory, the way in which the inspection by the Certification Body is carried out at the factory, and the periodic tests required to be performed at the laboratory of the Certification Body.

6.3 The Certification and Inspection Body shall complete a report at the time of each inspection and shall prepare data sheets showing the tests performed and results obtained.

6.4 If the production samples are not in compliance with the requirements, the Certification and Inspection Body shall require the manufacturer before shipping to:

- a) Remove any markings referencing certification and inspection markings from the product;
- or
- b) Modify all products to comply with the requirements of the standard.

THIRD PARTY CERTIFICATION BODY INSPECTION PROGRAM

7 General

7.1 The follow-up program on a component used in a product but not specifically covered by requirements in this standard shall comply with the follow-up requirements for that component. Such a component shall be used in accordance with its recognized rating and other limitations for use.

7.2 The Minimum Manufacturer's Control Program and the Inspector's Countercheck Program at Factory contained in this document exemplify the minimum standard for a Certification Program for Portable Fire Extinguishers. Other methods or means of control considered equivalent shall conform to the same minimum standard for a Certification Program.

7.3 These requirements apply to all types of portable fire extinguishers unless otherwise indicated by the following symbols:

- + – Denotes requirements applicable to Dry Chemical Type Fire Extinguishers (ANSI/UL 299)
- ++ – Denotes requirements applicable to Clean Agent Type Fire Extinguishers (ANSI/UL 2129)
- +++ – Denotes requirements applicable to Carbon Dioxide Type Fire Extinguishers (ANSI/UL 154)
- ++++ – Denotes requirements applicable to Water/Antifreeze Type Fire Extinguishers (ANSI/UL 626)
- +++++ – Denotes requirements applicable to Water based Agent Type Extinguishers (ANSI/UL 8)

7.4 A tabulation of the Minimum Manufacturer's Control Program, Inspector's Countercheck Program at Factory, and Tests at Test Laboratory for Various Types of Portable Fire Extinguishers is shown in [Table 7.1](#).

Table 7.1
Minimum manufacturer's control program, inspector's countercheck program at factory and tests at test laboratory for various types of portable fire extinguishers

Section	Description	Extinguisher type and related ANSI/UL standard				
		Dry chemical 299	Clean Agent 2129	Carbon dioxide 154	Water and anti-freeze 626	Water based 8
	MINIMUM MANUFACTURER'S CONTROL PROGRAM:					
8	General	X	X	X	X	X
9	Non-DOT/TDGR Cartridge Proof Pressure Test	X	X			X
10	Non-DOT/TDGR Cartridge Burst Test	X	X			X
11	Rupture Disc Assembly Test	X	X	X	X	X
12	Nitrogen Cylinder Leakage Test	X	X			X

Table 7.1 Continued on Next Page

Table 7.1 Continued

Section	Description	Extinguisher type and related ANSI/UL standard				
		Dry chemical 299	Clean Agent 2129	Carbon dioxide 154	Water and anti-freeze 626	Water based 8
13	Cylinder Proof Pressure Test	X	X		X	X
14	Hydrostatic Burst Pressure Test	X	X		X	X
15	Thread Test	X	X	X	X	X
16	Pressure Regulator Test	X	X			X
17	Discharge Hose and Nitrogen Hose Assembly Test	X	X	X	X	X
18	Locking Devices and Seals	X	X	X	X	X
19	Discharge Duration, Minimum Dry Chemical Discharged and Weight of Charge Determinations (Hand Extinguishers)	X				
20	Discharge Duration and Weight of Carbon Dioxide Determination (Hand Extinguishers)			X		
21	Discharge Duration, Minimum Extinguishing Agent Discharged and Range of Discharge				X	X
22	Rate-of Flow Test	X				
23	Discharge Tests (Wheeled Extinguishers)	X		X	X	X
24	Cartridge Assembly Leakage Test	X	X			X
25	Extinguisher Leakage Test	X	X	X	X	X
26	Pressure Gauge Indicator Test	X	X		X	X
27	Dry Chemical Extinguishing Agent Tests	X				
28	Horn Impact Test			X		
29	Test Records	X	X	X	X	X
30	Calibration of Testing and Measuring Equipment	X	X	X	X	X
	INSPECTOR'S COUNTERCHECK PROGRAM AT FACTORY:					
31	Verification of Material	X	X	X	X	X
32	Examination of Parts and Subassemblies	X	X	X	X	X

Table 7.1 Continued on Next Page

Table 7.1 Continued

Section	Description	Extinguisher type and related ANSI/UL standard				
		Dry chemical 299	Clean Agent 2129	Carbon dioxide 154	Water and anti-freeze 626	Water based 8
33	Critical Dimension and Parts	X	X	X	X	X
34	Visual Inspection of Completed Extinguishers	X	X	X	X	X
35	Countercheck Tests Each inspection	X	X	X	X	X
36	Periodic Countercheck Tests	X	X	X	X	X
37	Review of Records	X	X	X	X	X
	TESTS AT TEST LABORATORY:					
39	Salt Spray Test	X	X	X	X	X
40	Qualitative Infrared Analysis	X	X	X	X	X
41	Extinguishing Agent Tests	X				
42	Extinguishing Tests (Hand Extinguishers)			X		
43	Freezing Point Determination of Anti-Freeze Charge				X	
44	Foam Quality					X
45	Foam Identification Tests					X
46	Carbon Analysis on Stainless Steel Cylinder				X	X

MINIMUM MANUFACTURER'S CONTROL PROGRAM

8 General

8.1 The manufacturer shall provide a system to identify and isolate material as having been tested or not tested, found to comply or not to comply, scheduled for rework, or the like. Tags, or a similar means of identification, to indicate the required information, are acceptable for this purpose.

8.2 The manufacturer shall be responsible for instituting corrective action when unacceptable features are found. The manufacturer shall bring unacceptable features of incoming parts and subassemblies to the vendor's attention so that corrective action is taken.

8.3 Certification Marks shall not be applied to extinguishers that do not comply with the requirements.

8.4 The manufacturer shall keep records of raw materials, parts, and subassemblies to verify correct material specifications and compliance with plating and painting specifications, where appropriate. These records shall be made available to the inspector upon request.

8.5 As a minimum, the manufacturer shall conduct the tests described in Sections [9](#) – [28](#), except these tests need not be conducted on authorized components that have been previously evaluated and covered under another Follow-Up Program of the Certification and Inspection Body.

9 Non-DOT/TDGR Cartridge Proof-Pressure Test (+, ++, +++++)

9.1 The manufacturer shall subject each non-DOT/TDGR gas cartridge to the appropriate proof-pressure for not less than 30 seconds. Any cartridge showing evidence of leakage shall be rejected.

9.2 The test apparatus and method is to be as described in ANSI/UL 299.

10 Non-DOT/TDGR Cartridge Burst Test (+, ++, +++++)

10.1 The manufacturer shall select samples from each lot of non-DOT/TDGR gas cartridges used and hydrostatically test them to rupture. The burst pressure shall comply with the applicable requirements.

10.2 The equipment and method described in 9.2 shall be used, except that the manufacturer shall also supply a test cage or other enclosure capable of containing the cartridge and its parts upon rupture.

11 Rupture Disc Assembly Test

11.1 Sample rupture discs selected from each lot of rupture discs received, or from each lot cut and assembled at the factory, shall be subjected to an increasing hydraulic pressure until the disc ruptures.

11.2 Any hydraulic pump capable of supplying the necessary pressure is acceptable. The test gauge is to be graduated in increments of 20 psi (137.89 kPa) or less. The burst pressure shall be as required.

11.3 Each sample disc is to be placed in a valve assembly or test fixture and connected to the hydraulic pump. The pressure is to be rapidly increased to 85 percent of the rated bursting pressure, held at that value for at least 30 seconds, and then increased at a rate no greater than 100 psi (689.46 kPa) per minute until the disc ruptures.

12 Nitrogen Cylinder Leakage Test (+, ++, +++++)

12.1 The manufacturer shall test each pressurized nitrogen cylinder for leakage.

12.2 A soap solution, leak check solution, or other equivalent method is to be applied to the threaded connection between the cylinder and cylinder valve, the discharge opening, the relief device and between the gauge, stuffing box, and hand wheel. The cylinders shall not exhibit evidence of leakage as indicated by the appearance of bubbles.

13 Cylinder Proof-Pressure Test (+, ++, +++++, +++++)

13.1 Each non-DOT/TDGR extinguisher cylinder shall be subjected to the required proof pressure for not less than 30 seconds as specified in the applicable ANSI/UL standard. Any cylinder showing evidence of leakage shall be rejected.

14 Hydrostatic Burst Pressure Test (+, ++, +++++, +++++)

14.1 Sample extinguisher cylinders from each lot of cylinders shall be pressurized to rupture as specified in the applicable ANSI/UL standard. The rupture pressure shall comply with required values.

15 Thread Test

15.1 The collar threads of samples from each lot of cylinders shall be checked with a suitable go/no-go gauge to determine compliance with the thread specification.

16 Pressure Regulator Test (+, ++, +++++)

16.1 The manufacturer shall test samples selected from each shipment of pressure regulators to determine that the low pressure setting complies with required values.

16.2 A test gauge graduated in increments of 20 psi (137.89 kPa) or less is to be connected to the low side of the regulator that is connected to a nitrogen cylinder whose valve is fully opened.

17 Discharge Hose and Nitrogen Hose Assembly Test

17.1 Sample discharge hose assemblies and high and low pressure nitrogen hose assemblies selected by the manufacturer shall be checked for leakage and permanent movement of couplings as specified in the applicable ANSI/UL standard.

17.2 For vendor-supplied assemblies, the manufacturer shall select samples from each shipment. For in-house assemblies, the manufacturer shall select samples from each assembly shift or define production in terms of lots, and select samples on that basis.

18 Locking Devices and Seals

18.1 The manufacturer shall select sample extinguishers from each production shift to determine that the force required to remove or activate the locking device complies with requirements.

Exception: Locking devices using seals that comply with a recognized component program for fire extinguishers shall not be required to be tested.

18.2 A spring scale is to be used to measure the force required to remove or activate the locking device, or a weight may be used as a go/no-go test. The scale or weight is to be attached to the locking device and the device operated in the intended manner. However, if the extinguisher is designed so that the seal is broken by performing the action needed to initiate discharge of the extinguisher, the spring scale or weight is to be attached toward the end of the operating lever and the lever operated in the intended manner. Tension is to be applied initially so that the locking device just begins to apply tension to the seal. Then the tension is to be increased uniformly until the seal is broken. The measured force shall be tested and comply with the specified value for each extinguisher.

19 Discharge Duration, Minimum Dry Chemical Discharged, and Weight of Charge Determinations (Hand Extinguishers) (+)

19.1 The manufacturer shall select sample hand portable extinguishers during each production shift to determine that the discharge duration to gas point, the minimum dry chemical discharged (complete discharge), and weight of charge comply with the requirements.

19.2 For the purpose of these requirements, the charge weight is to be the full weight of the extinguisher minus the empty weight, the gas point is to be the point during discharge when the discharge stream first becomes a mixture of gas and dry chemical, and complete discharge is the point during discharge after which nothing further is expelled from the extinguisher.

19.3 For cartridge-operated units, sample cartridges shall be selected during each production shift to determine that the weight of gas charge and the stamped full weight of the cartridge comply with the requirements. The samples used for these determinations need not be the same samples used to verify discharge duration and minimum dry chemical discharge.

19.4 A stopwatch, a scale graduated in ounces (for weighing the extinguishers), and a balance/scale graduated in 1/8-ounce (3.89-g) increments (for weighing the gas cartridges) are to be used for these determinations.

19.5 The extinguisher is to be conditioned at $21 \pm 3^{\circ}\text{C}$ ($70 \pm 5^{\circ}\text{F}$). The full weight of the extinguisher is to be recorded. The extinguisher is then to be discharged to complete discharge; cartridge operated units are to be allowed 5 seconds for the agent chamber to become pressurized after the cartridge puncturing mechanism is actuated. The extinguisher is to be held vertically and approximately 3 feet (914.14 mm) above the ground except that extinguishers with hoses may be placed on the floor and the hose held horizontally. The discharge duration to gas point and the weight of the extinguisher after complete discharge are to be recorded. The valve shall then be removed and the remaining contents of extinguishing agent emptied from the cylinder. The weight of the emptied extinguisher (cylinder and valve assembly) is to be recorded.

20 Discharge Duration and Weight of Carbon Dioxide Determinations (Hand Extinguishers) (+++)

20.1 The manufacturer shall select sample extinguishers during each production shift to determine that the discharge duration to gas point and the weight of charge comply with the requirements. The samples selected to check the charge weight need not be the same samples used to verify discharge duration.

20.2 For the purpose of these requirements, the charge weight is the filled weight of the extinguisher minus the empty weight, and the gas point is the point during discharge when the combined snow and gas discharge changes into a purely gaseous condition.

20.3 A stopwatch and scale graduated in ounces are to be used for these determinations.

20.4 The extinguisher is to be conditioned at $21 \pm 3^{\circ}\text{C}$ ($70 \pm 5^{\circ}\text{F}$). The full weight of the extinguisher is to be recorded. The extinguisher is then to be discharged to complete discharge. The extinguisher is to be held vertically and approximately 3 feet (914.14 mm) above the ground except that extinguishers with hoses may be placed on the floor and the hose held horizontally. The discharge duration to gas point and the weight of the extinguisher after complete discharge is to be recorded. The valve shall then be removed and the remaining contents of extinguishing agent emptied from the cylinder. The weight of the emptied extinguisher (cylinder and valve assembly) is to be recorded.

21 Discharge Duration, Minimum Extinguishing Agent Discharged, and Range of Discharge (++++,+++++)

21.1 The manufacturer shall select sample hand portable extinguishers during each production shift to determine that the discharge duration to gas point, the minimum extinguishing agent discharged at complete discharge, and range of discharge comply with the requirements.

21.2 For the purpose of these requirements, the gas point is the point during discharge when the discharge stream becomes a mixture of gas and liquid. Complete discharge is the point during discharge after which nothing further is expelled from the extinguisher.

21.3 A stopwatch and a scale graduated in ounces are to be used for these determinations.

21.4 The extinguisher is to be conditioned at $21 \pm 3^{\circ}\text{C}$ ($70 \pm 5^{\circ}\text{F}$). The extinguisher is to be held vertically and approximately 3 feet (914.14 mm) above the ground except that extinguishers with hoses may be placed on the floor and the end of the discharge hose directed upward at an angle of 45 degrees from the horizontal. The full weight of the extinguisher is to be recorded. The extinguisher is then to be discharged to complete discharge, and the discharge duration to gas point, the weight of the extinguisher after complete discharge, and the range of the discharge stream recorded.

22 Rate-of-Flow Test (+)

22.1 Two samples each of the model extinguisher shall be tested and comply with the specified rate of flow value for each extinguisher.

22.2 The extinguishers are to be charged with their rated capacity of dry chemical and expellant gas pressure or fitted with a cartridge if cartridge-operated and conditioned at $21 \pm 3^{\circ}\text{C}$ ($70 \pm 5^{\circ}\text{F}$). Then the extinguishers are to be discharged for the time specified with the nozzle held in a horizontal position. The rate-of-flow is to be calculated from the loss in weight during discharge.

22.3 For extinguishers of the cartridge-operated type, a 5 s period is to be allowed between puncturing the cartridge and operation of the extinguisher.

23 Discharge Tests (Wheeled Extinguishers) (+, ++, +++, +++++, ++++++)

23.1 The manufacturer shall select sample wheeled extinguishers from each type manufactured to determine that the discharge duration to gas point, minimum agent discharged, and weight of charge comply with the requirements. Sample selection shall vary so that each size and type of extinguisher is periodically tested.

23.2 For the purpose of these requirements:

- a) Complete discharge is the point during discharge after which nothing further is expelled from the extinguisher.
- b) The gas point for dry chemical fire extinguishers is the point during discharge when the discharge stream first becomes a mixture of gas and dry chemical.
- c) The gas point for carbon dioxide and water based agent extinguishers is the point during discharge when the combined liquid and gas discharge changes into a gaseous condition, as observed by a change in appearance or sound.

23.3 A stopwatch and scale graduated in no more than 1-pound (0.45-kg) increments are to be used for these determinations.

Exception: The scale may be graduated in 2-pound (0.91-kg) increments for extinguishers having a gross weight in excess of 500 pounds (226.8 kg).

23.4 The extinguisher is to be conditioned at $21 \pm 3^{\circ}\text{C}$ ($70 \pm 5^{\circ}\text{F}$). With the hose unwound, the full weight of the unit is to be recorded. The nozzle is to be held horizontally approximately 3 feet (914.14 mm) above the ground. The nitrogen cylinder valve (or extinguishing agent chamber valve, if a stored pressure type is being tested) is then to be opened, 15 to 30 seconds allowed for the agent chamber to become pressurized, and a short burst of discharge generated to bring the extinguishing agent to the nozzle. The extinguisher is then to be discharged to complete discharge, and the discharge time to gas point recorded. With the agent chamber emptied, the extinguisher weight is to be recorded.

24 Cartridge Assembly Leakage Test (+, ++, +++++)

24.1 Each charged cartridge assembly is to be tested for leakage by being submerged in water maintained at a temperature of not less than 90°F (32.3°C) nor more than 110°F (43°C). A transparent bell jar is to be completely filled with water and then placed over the assembly. The collection of escaping gas in the bell jar is evidence of leakage. The cartridges shall show no evidence of leakage while submerged for 1 hour.

24.2 Other leak detection devices or systems may be used provided they have been evaluated, determined to be at least equivalent to the systems indicated in [24.1](#).

25 Extinguisher Leakage Test

25.1 Extinguishers shall not show evidence of leakage in excess of the maximum specified leakage rate values when the manufacturer subjects each extinguisher to an extinguisher leakage test as described in the applicable ANSI/UL standard. Extinguishers are to be tested with the hose and horn assembly, if provided, disconnected from the valve assembly.

25.2 Extinguishers that show evidence of leakage in excess of the maximum specified leakage rate values shall be rejected and may be reworked, or at the manufacturer's option, may be set aside for 24 hours and retested for leakage. The retested extinguishers are acceptable if they show no leakage in excess of the maximum specified values for the individual extinguisher and the gauge pointer of the extinguisher gauge reads between the upper and lower limit of the operable range in close proximity to the charging mark when conditioned at $21 \pm 3^{\circ}\text{C}$ ($70 \pm 5^{\circ}\text{F}$).

25.3 The leakage test method in [25.4](#) – [25.7](#) shall be permitted for all stored pressure-type extinguishers required to be subjected to the Extinguisher Leakage Test.

25.4 A leak detection system capable of detecting either the gas used to pressurize the extinguisher, the extinguishing agent or a tracer gas used for this purpose, shall be provided with a probe or leakage chamber, a display providing a visual indication of leakage, and capable of performing as described below, shall be used for this test. A leak standard representing the detectable media shall be as specified.

25.5 The leak rate of the leak standard shall be set as appropriate to detect the level of leakage based on the extinguisher being tested. The sensitivity of the leak detection equipment shall be set such that exposure of the probe or chamber to the leak standard will result in a maximum value indication of the range of the display or meter. An audible signal shall be used only as a warning indicator.

25.6 Calibration of the leak system using the leak standard shall be conducted periodically during each shift to verify the maximum value indication of the display. The manufacturer shall maintain records for each leak detector showing the date and the times at which the detector was verified.

25.7 Other leak detection devices or systems may be used provided they have been evaluated, determined to be at least equivalent to the systems indicated above.

26 Pressure Gauge/Indicator Test (+, ++, +++, +++++)

26.1 The manufacturer shall calibrate each pressure gauge or pressure indicator using the required equipment and test method. Pressure gauges that comply with a recognized component program for fire extinguishers shall not be required to be tested.

27 Dry Chemical Extinguishing Agent Tests (+)

27.1 General

27.1.1 The manufacturer shall conduct sieve tests during production in accordance with the requirements for each type of dry chemical produced. In the case of purchased dry chemical, the manufacturer shall conduct sieve tests for each type of dry chemical received.

27.1.2 The manufacturer shall conduct the Hygroscopicity and Water repellency Tests on each type of dry chemical in this Section. The results shall be as required. Representative samples are to be obtained,

avoiding taking stratified samples. Before conducting the tests, all dry chemical samples are to be conditioned for 48 hours at room temperature, and in a desiccator containing anhydrous calcium chloride or equivalent.

27.1.3 In lieu of conducting the tests required in [27.1.2](#), the manufacturer may conduct apparent density checks and packed chamber tests on each type of dry chemical produced or received. In order to exercise this option, the manufacturer shall furnish to the Certification Body a complete description of his method of determining apparent density and shall specify the resultant values that he considers acceptable. The Certification Body shall review this method and conduct comparison tests using this method. If the determination of compliance and noncompliance of batches is consistent, as determined by the apparent density values and by the tests normally required once each quarter, the apparent density and packed chamber test options may be utilized.

27.2 Sieve test

27.2.1 The apparatus for determining fineness of the dry chemical is to be a Cenco-Meinzer Cat. No. 18480 sieve shaker or equivalent, with standard 140-, 200-, and 270-, or 100-, 200-, 325-mesh sieves, cover, bottom pan, and an analytical balance. The sieves are to be made of brass wire and are to be unsupported.

27.2.2 The standard sieves are to be placed on the shaker, appropriate sized dry chemical for the sieves being used poured into the coarsest (top) screen, and the machine operated for not less than 15 minutes until constant weight has been attained. If constant weight (less than 3 grams change in weight in any single portion during a 10-minute operation period) has not been attained, the machine may be operated for one or more 10-minute periods until constant weight has been attained. The weight of sample retained on each sieve and on the bottom pan is to be determined after each operating period. The weight of dry chemical retained on each sieve and on the bottom pan shall be as required.

27.3 Hygroscopicity Test

27.3.1 The apparatus for conducting the hygroscopicity test is to consist of 249 mL beakers, 65 mm watch glasses, a humidity jar, a desiccator jar, and an analytical balance.

27.3.2 Hygroscopicity tests are to be conducted on a 100 g sample in a standard 250 mL beaker. The sample is to be placed in a humidity jar maintained at a temperature of $21 \pm 3^{\circ}\text{C}$ ($70 \pm 5^{\circ}\text{F}$) and at approximately 80 percent relative humidity. This relative humidity can be obtained by maintaining a saturated solution of ammonium chloride, containing an excess of undissolved crystals, at the bottom of the jar.

27.3.3 After 2 days at 80 percent relative humidity, the 100 g sample is to be placed in a desiccator jar containing anhydrous calcium chloride for 2 days and then returned to the humidity jar. This alternating cycle is to be continued for three weeks, with observations made for caking of the dry chemical. Any lumps found are to be dropped from a height of 100 mm (4 in) onto a smooth, hard surface to determine whether they are friable.

27.4 Water repellency test

27.4.1 For the water repellency test, weighed portions (50 grams of the dry chemical in tared 250-milliliter beakers) are to be covered with 50 milliliters of distilled water at a temperature of $77 \pm 5^{\circ}\text{F}$ ($25 \pm 2.8^{\circ}\text{C}$). After 2 minutes, the water and dry chemical are to be poured out and the beakers dried in an oven at 140°F (60°C) for 1/2 hour. After cooling in a desiccator, the beakers are to be weighed and the percent by weight of the dry chemical retained in the beakers is to be calculated. The results shall be as required.

27.5 Packed chamber test

27.5.1 Two sample extinguishers are to be completely filled with dry chemical without jarring and placed in an impact machine designed to permit free fall of the extinguisher. The samples are to be dropped four times from a height of 1 in. (25.4 mm). Dry chemical is then to be added, without jarring, until the cylinder is again filled. The extinguishers are to be again placed in the impact machine and dropped three times from a height of 1 in. The extinguishers are to be removed from the machine and once again completely filled with dry chemical as in the previous step. Fifteen minutes are to elapse between each filling operation. The extinguishers are to be weighed, pressurized to the maximum expellant gas pressure (top of pie-shaped area on the pressure gauge) or fitted with a cartridge if cartridge-operated, and conditioned at 120°F (48.9°C) for 24 h. Following the conditioning period, the extinguishers are to be operated. The weight is to be recorded before and after discharge. The amount of dry chemical discharged is to be calculated.

27.5.2 For extinguishers of the cartridge-operated type, a 5 s period is to be allowed between puncturing the cartridge and operation of the extinguisher.

27.5.3 Each extinguisher shall discharge at least 80 percent of the total dry chemical charge.

28 Horn Impact Test (+++)

28.1 The manufacturer shall select sample horns from each incoming shipment of each type (fixed, swivel mounted, and for use with flexible hose) for this test.

28.2 The equipment, method, and results shall be as specified in ANSI/UL 154.

29 Test Records

29.1 The manufacturer shall maintain performance records that include the following:

- a) Identification of parts, subassemblies, or completed extinguishers;
- b) Test(s) conducted;
- c) Dates of tests;
- d) Number of samples tested; and
- e) Results of testing (data obtained).

29.2 The records shall be retained for at least 6 months and be available to the inspector upon request. These records are not required for tests conducted on a 100-percent basis.

30 Calibration of Testing and Measuring Equipment

30.1 The manufacturer shall maintain a program to assure that testing and measuring equipment used in production and/or inspection is clean, is maintained in proper working order, and is in calibration.

30.2 Measuring devices and production aids, such as micrometers, calipers, steel scales, and gauges (go/no-go, ring, hole, etc.), normally do not need to be subjected to a formal calibration program. Accordingly, for these devices, the manufacturer is to maintain surveillance over these devices and replace or adjust any equipment, which is found to be inaccurate.

30.3 Scales shall be calibrated quarterly with records of calibration maintained.

30.4 The pressure gauges used for the required tests shall be calibrated monthly against the manufacturer's deadweight tester or master gauge. The accuracy shall be ± 1 percent of the intended test pressure. Records of these calibrations, showing the date of calibration, calibration pressure values and results shall be kept on file by the manufacturer and made available to the Field Representative upon request.

30.5 If a master gauge is used for the above calibrations, the master gauge is to be calibrated annually, against a deadweight tester. The certificate of calibration supplied by the outside calibrating agency shall serve as a record of calibration.

30.6 Devices found out of calibration shall be replaced or repaired.

INSPECTOR'S COUNTERCHECK PROGRAM AT FACTORY

31 Verification of Material

31.1 At each inspection, the inspector shall review the manufacturer's records to determine compliance with material including purchased extinguishing agents, expellant gases, plating, and paint specifications.

32 Examination of Parts and Subassemblies

32.1 The inspector shall select samples of each part or subassembly to be examined.

32.2 Threads are to be checked with the appropriate thread gauge. Nozzle orifices are to be checked with drill or other appropriate gauges. All other dimensions are to be checked with measuring instruments such as micrometers, steel scales, calipers, and hole gauges.

32.3 The following tolerances shall apply unless other tolerances are specified in the Follow-Up Procedure: +++

a) Pipe Threaded Valve Body – A standard ring gauge shall fit flush with the bottom end of the threaded valve body. A tolerance of one full turn large or one full turn small is acceptable.

b) Pipe Threaded Cylinder Necks – A standard plug gauge shall screw in by hand until the notch on the gauge is approximately flush with the face of the neck of the cylinder. If the thread is chamfered, the notch shall be flush with the bottom of the chamfer. A tolerance of one full turn large or one full turn small is acceptable.

c) Straight Threaded Valve Body and Cylinder Neck – Appropriate go/no-go gauges shall be employed. The no-go gauge may screw into the body or neck provided that a definite metal-to-metal drag exists.

33 Critical Dimensions and Parts Verification

33.1 The critical dimensions on the illustrations shall be verified at each inspection for all parts except cartridges, where the dimensions shall be verified each quarter. The general design, location of threaded openings, holes, etc., shall be surveyed to determine they are as shown on the illustrations.

33.2 Critical dimensions are those that can directly affect the performance characteristics of the product. These include, but are not limited to:

a) Flow path geometry for fluid transmission components;

b) Wall thickness for pressure retaining components;

- c) Special close (or tight) tolerances;
- d) Clearance or interference fit between mating components;
- e) Specific geometric, positional, or angle tolerances;
- f) Form tolerances for single features and for related features;
- g) Surface roughness, waviness, and lay, and;
- h) Corrosion protection or corrosion resistant coatings.

34 Visual Inspection of Completed Extinguishers

34.1 At each inspection, the inspector shall examine the completed extinguishers and determine:

- a) That the cylinder assemblies have been painted and handled in such a manner as to prevent nicks or scratches;
- b) That all fittings are firmly affixed, all welded carriage assembly sections are finished in a neat manner, clamps and bolts are tightened and affixed securely, and wheels turn freely;
- c) The pressure gauge, label, hose retainer tamper indicator and mounting device are in the proper orientation as specified in this Procedure. All required parts and material are included with the extinguisher for shipment. These parts include a record tag, installation manual, wall mounting device (portable extinguishers only), and discharge hose assembly (if equipped) (++++, +++++).

d) That the extinguishers are packed as follows:

- 1) Each extinguisher, except a wheeled type, shall be charged with the proper amount and type of extinguishing agent. Stored pressure type extinguishers shall be charged with the proper amount of expellant gas. Cartridge operated type extinguishers shall have a charged gas cartridge assembly in place. The charged extinguisher with expellant gas or cartridge shall be packed in an individual carton. A flexible hose-nozzle assembly need not be attached to the extinguisher, but shall be packed in the same carton. (+, ++)

Each extinguisher shall be fully charged and packed in an individual carton. A flexible hose-horn assembly or horn need not be attached to the extinguisher but shall be packed in the same carton. (+++)

An extinguisher may be shipped empty but shall be provided with the proper amount and type of antifreeze or foam, as appropriate. The extinguisher shall be packed in an individual carton. A flexible hose-nozzle assembly need not be attached to the extinguisher, but shall be packed in the same carton. (++++, +++++)

- 2) Either a bracket or a mounting hook shall be shipped with each hand type extinguisher except that an extinguisher weighing less than 3 pounds gross and having a cylinder diameter of 3 inches or less are not required to be supplied with a mounting hook or bracket.

- 3) The shipping carton of an extinguisher with marine type classification shall state that the marine approval is valid only when the extinguisher is equipped with an approved marine type bracket, and whether or not the marine type bracket is included. The actual wording shall be as required.

- 4) Wheeled extinguishers with a separate expellant gas cylinder that are shipped empty shall have the expellant gas cylinder mounted in place. The dry chemical charge and hose may be packaged separately. (+, ++, +++++)