UL 246

STANDARD FOR SAFETY

Hydrants for Fire-Protection Service

UL Standard for Safety for Hydrants for Fire-Protection Service, UL 246

Eighth Edition, Dated May 25, 2011

Summary of Topics

This revision of UL 246 dated July 29, 2020 includes barrel wall thickness requirements; 8.1, Table 8.1

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 revised requirements are substantially in accordance with Proposal(s) on this subject dated June 12, 2019 and May 14, 2020.

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Standard for Hydrants for Fire-Protection Service

Previous numbered and unnumbered editions of standards covering Hydrants for Fire-Protection Service have been published predating 1912. Editions published prior to 1938 were not identified by edition number.

The First, Second and third editions were titled "Hydrants, Private and Municipal Fire Department Service".

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Second Edition – April, 1947
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Fifth Edition – May, 1973
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Eighth Edition

May 25, 2011

This UL Standard for Safety consists of the Eighth Edition including revisions through July 29, 2020.

The Department of Defense (DoD) has adopted UL 246 on June 1, 1982. The publication of revised pages or a new edition of this Standard will not invalidate the DoD adoption.

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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INTRODUCTION

1 Scope

1.1 These requirements cover the performance of and methods for testing hydrants intended for use in piping systems supplying water for fire-protection service.

1.2 Hydrant types covered by this standard include:

a) Base valve design and

b) Wet barrel design.

1.2A Traffic model hydrants of both the base valve and wet barrel design may be covered by this Standard. However, these requirements are not intended to cover the performance of and methods for testing break features of traffic model hydrants.

1.3 Requirements for the installation and use of hydrants covered by these requirements include, among others, the Standard for the Installation of Private Fire Service Mains, NFPA 24.

1.4 A product that contains features, characteristics, materials, or systems new or different from those in use when the standard was developed, and that involves a risk of fire, electric shock, or injury to persons shall be evaluated using the appropriate additional component and end-product requirements as determined by the intent of this standard.

2 General

2.1 Components

2.1.1 Except as indicated in 2.1.2, a component of a product covered by this standard shall comply with the requirements for that component.

2.1.2 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.

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

2.1.4 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.

2.2 Units of measurement

2.2.1 If a value for measurement is followed by a value in other units in parentheses, the second value may be only approximate.

2.3 Undated references

2.3.1 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.

3 Glossary

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

3.2 BASE VALVE DESIGN HYDRANT (DRY BARREL) – A hydrant intended for use in all climates where the main valve is installed below the frost line and the main valve is either the compression type, opening with the pressure or against pressure, or gate type with the outlets individually valved or without valves.

3.3 HYDRANT – An exterior valved connection to a water supply system that provides connections for hoses.

3.4 NPS (NOMINAL PIPE SIZE) – A dimensionless designator for pipe sizes defined in standards including the Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless, ASTM A53/A53M; Standard Specification for Electric-Resistance-Welded Steel Pipe, ASTM A135/A135M; and Standard Specification for Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Fire Protection Use, ASTM A795/A795M. Used to replace terms such as "nominal diameter" and "nominal size."

3.5 WET BARREL HYDRANT – A hydrant with each outlet equipped with a valve that has pressurized water at the outlet valves at all times and is intended for use in climates where there is no danger of freezing weather.

3.6 FULL-FACED GASKET – A circular gasket with a rectangular cross section and an outside diameter that exceeds the diameter formed by a circle that is tangent to the inner side of the bolt holes.

3.7 RING GASKET – A circular gasket with a rectangular cross section used in conjunction with a gasket bearing surface whose outside diameter is less than that of a circle that is tangent to the inner side of the bolt holes.

3.8 O-RING GASKET – A circular seal with a circular cross section.

4 Metallic Materials

4.1 Metallic materials used in hydrant samples shall conform to the minimum physical property requirements of the latest edition of the applicable ASTM or equivalent material standard as specified by the manufacturer.

CONSTRUCTION

5 Outlets

5.1 A hydrant shall have not less than two outlets, each of which shall have an inside diameter not smaller than 2-1/2 inches (64 mm).

Exception: A hydrant incorporating a monitor elbow (see Hydrants With Monitor Elbows, Section 16, may be provided with only one outlet.

5.2 Outlets of a base valve hydrant, if individually valved, shall be provided with hose valves of the gate type complying with the Standard for Hose Valves for Fire-Protection Service, UL 668.

5.3 Outlets of a wet barrel hydrant shall be provided with hose valves of the built-in compression type or the equivalent.

5.4 The top of a wet barrel hydrant may have a threaded boss of sufficient thickness to permit installation of a supplementary hose outlet valve.

5.5 Outlet threads of hydrants for coupling of fire and pumper hose shall have external threads and shall conform to the Standard for Screw Threads and Gaskets for Fire Hose Connections, NFPA 1963. Essential features of these threads are given in Table 5.1.

Table 5.1
National fire protection association standard hose thread details[a]

Nominal inside diameter of hose coupling, inches	Number of threads per inch	Length of threaded portion of nozzle, inches (approx.)	Outside diameter of male threads, inches (approx.)	Length, pilot to start of second thread, inches
2-1/2	7-1/2	1	3-1/16	1/4
3	6	1-1/8	3-5/8	5/16
3-1/2	6	1-1/8	4-1/4	5/16
4	4	1-1/4	5	7/16
4-1/2	4	1-1/4	5-3/4	7/16

[a] 1 inch = 25.4 mm

5.6 Outlet threads of hydrants for coupling of fire and pumper hose shall be permitted to have external threads that differ from the Standard for Fire Hose Connections, NFPA 1963, where the Authorities Having Jurisdiction (AHJs) designates other thread specifications.

5.7 Nonthreaded outlets shall be permitted for pumper outlets in the 4- and 5-inch sizes when the outlets include evaluation for compliance with the requirements for construction of metal-face hydrant connections, Internal Strength, Tensile Strength, Corrosion Resistance, Gasket Materials, Vacuum, Force to Connect and Disconnect as applicable, specified in the Standard for Fire Hose Connections, NFPA 1963 and the requirements of this standard.

6 Rated Pressure

6.1 A hydrant shall be constructed for a minimum rated pressure of 150 psig (1034 kPa).

7 Tops for Base Valve Hydrants

7.1 The hydrant top or bonnet shall be made of material having strength, rigidity, and resistance to corrosion equivalent to cast iron, be free-draining, be weather resistant, and of a type that will maintain the operating mechanism in readiness for use under freezing conditions. It shall be tamper resistant and shall be provided with a convenient means for lubrication.

8 Barrels

8.1 A hydrant barrel shall be made of material having strength, rigidity, and resistance to corrosion equivalent to cast-iron having a wall thickness not less than specified by Table 8.1. A barrel of fractional inch diameter shall be made to the thickness of the next larger diameter. Threaded sections of the hydrant intended for a mating part are excluded from wall thickness requirements provided the cross-section of the assembly meets minimum wall thickness requirements. The first exposed barrel thread root shall be used for determining the wall thickness of threaded areas in this case. A sealant or coating shall be used to inhibit corrosion on bare metal from the thread forming operation.

Table 8.1
Minimum barrel and base wall thickness, inches[a]

Inside diameter of barrel	Statically cast gray iron	Centrifugally cast gray iron	Ductile iron
5 (minimum)	0.35	0.32	0.25
6	0.36	0.33	0.26
7	0.40	0.35	0.27
8	0.43	0.36	0.28
9	0.50	0.37	0.28
10	0.56	0.38	0.29

[a] 1 inch = 25.4 mm

8.2 A barrel of a base valve hydrant and a wet barrel hydrant made in two sections shall have the upper flanged connection located at least 2 inches (51 mm) above the ground line, except where purchase specifications for a wet barrel hydrant require a deviation.

8.3 The part of a barrel for underground service shall be constructed so that there is no projection, flange, taper, or roughness by which the action of frost may lift the part.

8.4 A projection used to mark the bury depth of the hydrant, shall be permitted where the projection is not raised more than 1/8 inch (3.2 mm) above the casting surface.

8.5 When outlets for pressure gauges are required, the barrel of a base valve hydrant shall be drilled and tapped with 1/4 inch (6.4 mm) pipe threads at a point back of and on a level with the hose outlets to receive a pressure gauge during field tests of pipe systems. Such an opening is to be closed by a bronze plug.

8.6 The bolting of pressure-holding castings, with exception of bolting at the inlet joint, shall be such that the maximum stress on any bolt will not exceed one-fourth of the elastic limit of the material, as computed using the stress area of the bolt threads. The stress area is defined by the formula:

$$A_S = 0.7854\left(D - \frac{0.9743}{n}\right)^2$$

Where:

A_s = The stress area in square inches

$$\left(\frac{mm^2}{645} = Inches^2\right)$$

D = The nominal bolt diameter in inches

$$\left(\frac{mm}{25.4} = Inches\right)$$

n = The number of threads per inch of bolt.

The load on the bolts is to be computed on the basis of the rated water pressure acting over the effective stress area. The diameter used to calculate the effective stress area of a given joint shall be based on the specific joint design and shall be one of the following:

a) In full-faced gasket seal applications, the effective stress area is the area circumscribed by a diameter that is tangent to the inner edge of the bolt pattern.

b) In O-ring seal applications, the effective stress area is the area circumscribed by the center line of the O-ring.

c) In ring gasket seal applications, the effective stress area is the area circumscribed by the effective gasket sealing diameter as described in the following section.

8.7 The effective gasket sealing diameter is located at the midpoint between the inside and outside diameters of the gasket contact surfaces.

8.8 The effective stress area for non-circular gasket contact surfaces or for gaskets or joints whose geometry varies from those described above shall be determined using the gasket seating area based on a sealing boundary using the appropriate gasket seating width according to Tables 2-5.1 and 2-5.2 of the ASME Boiler and Pressure Vessel Code VIII.1.

9 Inlets

9.1 The base of the hydrant, known as the foot piece or elbow, shall be made of material having strength, rigidity, and resistance to corrosion equivalent to cast-iron. It may have either a side or bottom inlet which shall be provided with a bell, flange, or other type of acceptable joint or end for connecting the hydrant to the branch from the main. Ends shall conform to Standards for Pipe Flanges and Fittings, ANSI A21.10, ANSI A21.11, ASME B16.1, and ASME B16.10.

9.2 The inlet shall be suitable for connection to not less than a 6 NPS.

10 Main Valves for Base Valve Hydrants

10.1 The net area of the waterway of the barrel and footpiece at the smallest part shall be not less than 120 percent of that of the net opening of the main valve. The area of the net opening of the main valve is the area of the waterway, when the valve is wide open, between the valve face and seat ring, based on the internal diameter of the ring and corrected for the presence of guiding vanes and/or drain valve mechanism. In no case shall the diameter of the main valve opening be less than 4 inches (102 mm).

10.2 The hydrant main valve, when shut, shall remain closed and tight against leakage in case of damage or breakage of the upper portion of the barrel of the hydrant.

10.3 The construction of the hydrant shall be such that the main valve and its movable parts, as well as the movable parts of the drain valve, can be removed from the assembly of an installed hydrant without excavating the hydrant.

11 Main Valves for Wet Barrel and Base Valve Hydrants

11.1 The disc holder and stem shall be so arranged that the disc may seat without any rotary or scraping action that will injure the disc.

11.2 A disc shall be made of a nonmetallic material, secured and assembled so that it may be replaced.

12 Clearances

12.1 The diametrical clearance between the inside of the seat and the disc nut or clamping ring shall be not less than 1/8 inch (3.2 mm), except that metal parts of guide vanes or bosses may have a minimum of 0.005 inch (0.13 mm) diametrical clearance for a circumferential distance of not more than 3/4 inch (19 mm) each.

13 Hydrant Drip Valves (Drain Valves) for Base Valve Hydrants

13.1 If provided, a drain or drip valve shall be corrosion resistant, positive operating, and shall provide a drain for the barrel of the hydrant when the main valve is in the closed position and seal when the main valve is in the open position.

13.2 The seat of a drain valve shall be made of material having strength, rigidity, and resistance to corrosion equivalent to brass or bronze, and shall be fastened securely in the hydrant. An outlet for drainage from the drip valve shall be provided in the inlet casting or in the barrel casting, or between the inlet and barrel sections of the hydrant. It shall be made of material as specified for the seat, or bushed therewith completely from the valve to the outside.

14 Operating Stems and Mechanisms for Base Valve Hydrants

14.1 The threaded section of an operating stem, if located in the waterway, and the stem nut, shall be made of material having strength, rigidity, and resistance to corrosion equivalent to brass or bronze.

14.2 The threaded section of an operating stem, if above the stuffing box, may be of wrought iron or mild steel, in which case the stem nut shall be made of material having resistance to corrosion equivalent to brass or bronze.

14.3 The operating threads formed on the stem of a hydrant shall be constructed so as to avoid the working of any iron or steel parts against either iron or steel.

14.4 Stem threads shall be acme, modified acme, half "V", or square.

14.5 That portion of an operating stem, in contact with the stuffing box and gland or any cast-iron part, shall be made of material having resistance to corrosion equivalent to brass or bronze.

14.6 The operating stem shall be attached to the main valve and other parts in a manner that will prevent it from becoming detached during hydrant operation.

14.7 That portion of the operating nut at the upper end of the operating stem, which is designed to receive a wrench or handle, shall be either pentagonal or square in shape except where purchase specifications require a deviation covering a different size or shape of operating nut.

14.8 If pentagonal, the operating nut shall measure 1-1/2 inches (38 mm) from point to flat at the base of the nut and 1-7/16 inches (37 mm) at the top. Faces shall be tapered uniformly, and the height of the nut shall be not less than 1 inch (25 mm). The point to flat dimension of the pentagon shall be measured to the theoretical point where the faces would intersect were there no rounding off at the corners.

14.9 When a hydrant is designed to protect the operating nut with a cover or security device, the operating nut height shall be permitted to be not less than 13/16 inches (20 mm).

14.10 If square, the operating nut shall be 1-1/4 by 1-1/4 inches (32 by 32 mm) at the base, 1-3/16 by 1-3/16 inches (30 by 30 mm) at the top, and at least 1 inch (25 mm) in height.

14.11 A wrench for an operating nut shall be reversible.

14.12 The number of complete turns of the hydrant wrench required to close the hydrant main valve from the fully open position shall not be less than:

a) Eight complete turns to close hydrants with the diameters of the base valve less than 5 inches (127 mm),

b) Ten complete turns to close hydrants with the diameters of the base valve 5 inch (127 mm) to less than 6 inch (152 mm) or

c) Twelve complete turns to close hydrants with the diameters of the base valve a 6 inch (152 mm) and larger.

14.13 The direction of rotation to open a hydrant shall conform to the practice in the water system where the hydrant is to be installed. Unless otherwise ordered, hydrants shall open by turning the operating stem counterclockwise.

15 Fire Hose and Pumper Connections and Valves

15.1 General

15.1.1 Threaded fire hose and a pumper connections shall be of material having strength, rigidity, and resistance to corrosion equivalent to brass to bronze.

15.1.2 A fire hose and a pumper connection shall be fastened to the hydrant barrel in such a manner that the tightness of assembly will not be affected during service use.

15.1.3 Hydrants having caps that are not intended to be threaded to the hose or pumper connections shall be permitted to use connection materials with corrosion resistance equivalent to ANSI 630 stainless steel.

15.2 Base valve hydrants

15.2.1 Fastening methods complying with 15.1.2 include the following:

a) Threaded (straight thread) and pinned,

b) Locked in and leaded,

c) 2-1/2 inch (64 mm) connections bolted in place by means of two side lugs cast integrally with the connections and valves and provided with two bolt holes, having their center lines spaced 5-5/8 inches (143 mm) apart, to receive 3/4 inch (19.1 mm) bolts, and

d) Taper threaded into place with torque wrench.

15.2.2 The diameter of a waterway through a connection and a valve shall be a nominal size or a specified size ± 0.01 inch (0.3 mm). A waterway shall be smooth and free of projections other than driving lugs.

15.2.3 A hose valve of the gate type, if provided, may be of the outside detachable type or may be built into the barrel.

15.2.4 A hose valve shall be of the inside-screw gate type, placed in a vertical position with the handwheel at least 2 inches (50 mm) below the base of the operating nut. See 5.2.

15.3 Wet barrel hydrants

15.3.1 A fire hose and a pumper connection shall be fastened to the hydrant in such a manner that the tightness of assembly will not be affected during service use.

15.3.2 Fastening methods that have been found acceptable for the fastening specified in 15.3.1 include the following:

a) Threaded (straight thread) and pinned or held with locknut,

b) Taper threaded into place with torque wrench, and

c) Straight threaded into place against a gasket with torque wrench.

15.3.5 A fire hose and a pumper connection valve shall be equivalent to a hose valve acceptable for fire protection service.

16 Hydrants With Monitor Elbows

16.1 If provided, a monitor elbow shall be an integral part of the hydrant, such as by being cast as a part of or by being bolted to the hydrant.

16.2 A monitor elbow shall be made of material having strength, rigidity, and resistance to corrosion at least equivalent to cast iron.

17 Hose Caps

17.1 A hose cap shall be available for each outlet.

17.2 Threaded hose caps shall be made of a material having strength, rigidity, and resistance to corrosion equivalent to cast-iron.

17.3 Hose-cap threads shall conform to those on the fire hose and pumper connections, except the cap thread is permitted to omit the blunt start thread at the end of the hose thread (Higbee Cut).

17.4 The cap nut on the hose cap shall have dimensions corresponding to those of the operating nut on the hydrant.

17.5 The cap nut shall be permitted to have dimensions corresponding to the tool provided by the hydrant manufacturer for operation of the hydrant.

17.6 If a cap gasket is required, a gasket recess shall be provided in the cap at the inner end of the threads.

17.7 A hydrant shall be constructed to retain the hose caps when the hydrant is not in operation.

17.8 Chain or cable shall be permitted to be used to secure caps to the hydrant. When chain or cable is used to secure caps, a swivel attachment for the chain or cable shall be provided to secure the cap to a hydrant or hose valve on which it is used.

17.9 When a chain or cable is provided to fasten a hose cap to the hydrant, the cap shall be securely fastened to a hydrant body. A chain shall be made from steel stock not less than 1/8 inch (3.2 mm) in diameter, or the chain or cable shall be made from material having equivalent strength, with the chain or cable length and its swivel attachment arranged to permit removal of the cap without binding.

17.10 Hose caps intended for wet barrel hydrants shall be permitted to be equipped with a means of preventing pressurization of the area between the valve and the cap, when the cap is fully tightened onto the outlet.

18 Stuffing Boxes and Seals

18.1 An operating stem shall include a stuffing box, or other means for sealing, to prevent leakage. The bearing surface provided in a stuffing-box gland or seal retainer for the stem shall be of material having resistance to corrosion equivalent to cast-iron.

18.2 A stuffing box, if used, shall embody a gland or follower with packing nut or gland bolts or studs.

18.3 A gland bolt or a stud shall be made of either brass or bronze or of steel which has been protected against corrosion. If of brass or bronze, a bolt or stud shall be at least 5/8 inch (15.9 mm) in diameter, and if of steel, at least 1/2 inch (12.7 mm) in diameter. A nut for a gland bolt or a stud shall be of brass or bronze.

18.4 The width of stuffing box shall be sufficient to contain adequate packing to prevent leakage around the stem and to offer sufficient space for entrance of packing-removal tools.

18.5 The bottom of a stuffing box and the end of the gland shall be slightly beveled.

18A Protective Interior Coatings

18A.1 Protective coatings on interior hydrant surfaces of ferrous materials that are upstream of the hydrant main valve for dry and individual outlet valves for wet barrel hydrants, and in constant contact with the water supply shall be optional.

18A.2 When the hydrant manufacturer references that a protective coating is provided as specified in 18A.1 the coating shall comply with Tests on Protective Coatings, Section 28A, and the hydrant shall be marked to indicate the presence of the coating as specified in 30.5.

18A.3 The protective coatings shall not contain coal tar.

PERFORMANCE

19 Samples

19.1 Representative samples of each size and type hydrant shall be subjected to the tests described in these requirements. Test bars of metal used in castings and additional samples of parts constructed of nonmetallic materials, such as rubber seal rings, are required for physical and chemical tests.

20 Metallic Materials

20.1 All parts of a hydrant made of a copper alloy containing more than 15 percent zinc shall withstand, without cracking, the 10-Day Moist Ammonia Air Stress Cracking Test, see Section 21.

21 10-Day Moist Ammonia Air Stress Cracking Test

21.1 After being subjected to the conditions described in 21.2 – 21.4, a brass part containing more than 15 percent zinc when examined using 25X magnification shall:

a) Show no evidence of cracking; or

b) Comply with the Leakage Test, Section 24, and the Operating Torque Test, Section 27, if there is evidence of cracking.

Exception: Cracking complies with 21.1(a) when the cracking does not impact the ability of the product to comply with the requirements of this Standard.

21.2 Each test sample is to be subjected to the physical stresses normally imposed on or within a part as the result of assembly with other components. Such stresses are to be applied to the sample prior to and maintained during the test. Samples with threads, intended to be used for installing the product in the field, are to have the threads engaged and tightened to the torque specified in Table 21.1. Teflon tape or pipe compound are not to be used on the treads.

21.3 Three samples are to be degreased and then continuously exposed in a set position for ten days to a moist ammonia-air mixture maintained in a glass chamber approximately 12 by 12 by 12 inches (305 by 305 by 305 mm) having a glass cover.

21.4 Approximately 600 ml of aqueous ammonia having a specific gravity of 0.94 is to be maintained at the bottom of the glass chamber below the samples. The samples are to be positioned 1-1/2 in. (38.1 mm) above the aqueous ammonia solution and supported by an inert tray. The moist ammonia-air mixture in the chamber is to be maintained at atmospheric pressure and at a temperature of 93°F (34°C).

Table 21.1
Torque requirements for pipe connection

Pipe size, NPS	Torque, pound-inches (N·m)	
2-1/2	1750	(198)
3	1800	(203)

22 Nonmetallic Materials Test

22.1 Plastic or other nonmetallic parts (excluding rubber and synthetic elastomers)

22.1.1 Air oven aging

22.1.1.1 After air-oven aging for 90 days at 100 ±1°C (212 ±2°F), there shall be no warping, creeping, cracking, or other evidence of deterioration of a plastic (or other like material) component which may impair the intended operation of the hydrant. Additionally, a hydrant with aged plastic (or other like material) components shall be subjected to the tests and comply with the requirements in the Leakage, Strength of Body, Loss of Head and Operating Torque tests as applicable for the component being evaluated. See Sections 24, 25, 26 and 27, respectively.

22.1.1.2 If a material cannot withstand the temperature specified in 22.1.1.1 without softening, distortion, or deterioration, an air-oven aging test at a lower temperature for a longer period of time may be applied. The duration of exposure is to be calculated from the following equation:

$$D = (92{,}000)e^{-0.0693t}$$

in which:

D is the test duration in days, and

t is the test temperature in degrees C.

22.1.1.3 A complete hydrant sub-assembly that includes the plastic (or other like) parts, and sample plastic (or other like) components to be aged, are to be supported in a full draft, circulating air oven that has been preheated at full draft to 100 ±1°C (212 ±2°F). Samples are to be supported so that they do not contact one another or the sides of the oven. The samples are to be aged for 90 days, at full draft, and then allowed to cool in air at 23 ±2°C (73 ±4°F) for at least 4 hours before any test or dimensional check is conducted. As used in this test, the term "full draft" refers to the air flow over the samples in the oven with air inlet and outlet full open. The oven used for accelerated aging is to be Type IIA as specified in the Standard Specification for Gravity-Convection and Forced-Ventilation Ovens, ASTM E145.

22.1.2 Water aging

22.1.2.1 After immersion in tap water at 87 ±2°C (188 ±4°F) for 90 days, there shall be no warping, creeping, cracking, or other signs of deterioration of a plastic (or other like) component which may impair the intended operation of the hydrant. Additionally, a hydrant with aged components shall comply with the requirements in the Leakage, Strength of Body, Loss of Head and Operating Torque tests as applicable for the component being evaluated. See Sections 24, 25, 26 and 27, respectively.

22.1.2.2 If a material cannot withstand the temperature specified in 22.1.2.1 without softening, distortion, or deterioration, a water aging test at a lower temperature for a longer period of time may be applied. The duration of exposure is to be calculated from the following formula:

$$D = (37{,}000)e^{-0.0693t}$$

in which:

D is the test duration in days, and

t is the test temperature in degrees C

22.2 Elastomeric parts (except gaskets)

22.2.1 An elastomeric part used to provide a seal shall have the following properties when tested as specified in the Standard for Gaskets and Seals, UL 157:

a) For silicone rubber (having poly-organo-siloxane as its constituent characteristic), a minimum tensile strength of 500 psig (3.4 MPa) and a minimum ultimate elongation of 100 percent.

b) For natural rubber and synthetic rubber other than silicone rubber, a minimum tensile strength of 1500 psig (10.3 MPa) and minimum ultimate elongation of 150 percent; or a minimum tensile strength of 2200 psig (15.2 MPa) and a minimum ultimate elongation of 100 percent.

c) Those properties relating to maximum tensile set; minimum tensile strength and elongation after oven aging; and hardness after oven aging, all as specified in UL 157. The maximum service temperature used to determine the oven time and temperature for oven aging is considered to be 60°C (140°F).

22.2.2 The Standard for Gaskets and Seals, UL 157, provides for the testing of either finished elastomeric parts or sheet or slab material. Sheet or slab material is to be tested when the elastomeric parts are O-rings having diameters of less than 1 inch (25.4 mm). The material tested is to be the same as that used in the product, regardless of whether finished elastomeric parts or sheet or slab material is tested.