UL 123

STANDARD FOR SAFETY

Oxy-Fuel Gas Torches

UL Standard for Safety for Oxy-Fuel Gas Torches, UL 123

Eleventh Edition, Dated June 15, 2007

Summary of Topics

This revision of ANSI/UL 123 dated September 4, 2019 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 June 21, 2019.

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UL 123

Standard for Oxy-Fuel Gas Torches

The first edition was titled Standard for Blowpipes or Torches for Welding, Cutting, Heating, Lead Burning, and Soldering, UL 252. The second edition was titled Standard for Torches for Welding, Cutting, Heating, Lead Burning, and Soldering, UL 252(A).

Fifth Edition – February, 1975
Sixth Edition – January, 1982
Seventh Edition – October, 1986
Eighth Edition – December, 1992
Ninth Edition – December, 1995
Tenth Edition – October, 1999

Eleventh Edition

June 15, 2007

This ANSI/UL Standard for Safety consists of the Eleventh Edition including revisions through September 4, 2019.

The most recent designation of ANSI/UL 123 as a Reaffirmed American National Standard (ANS) occurred on September 4, 2019. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, and Title Page.

The Department of Defense (DoD) has adopted UL 123 on September 26, 1988. 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 oxy-fuel gas torches used in operations such as welding, cutting, heating, scarfing, powder cutting, or other allied processes.

1.2 These requirements do not apply to metal-spraying torches.

1.3 A product that contains features, characteristics, components, materials, or systems new or different from those covered by the requirements in this standard, and that involves a risk of fire or of electric shock or injury to persons shall be evaluated using appropriate additional component and end-product requirements to maintain the level of safety as originally anticipated by the intent of this standard. A product whose features, characteristics, components, materials, or systems conflict with specific requirements or provisions of this standard does not comply with this standard. Revision of requirements shall be proposed and adopted in conformance with the methods employed for development, revision, and implementation 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 Values stated without parentheses are the requirement. Values in parentheses are explanatory or approximate information.

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.

2A Glossary

2A.1 For the purpose of this standard the following definitions apply.

2A.2 BACKFIRE[a] – The momentary recession of the flame into the torch, potentially causing a flashback or sustained backfire. It is usually signaled by a popping sound, after which the flame may either extinguish or reignite at the end of the tip. See also flashback and sustained backfire.

[a] Reproduced/adapted with permission of the American Welding Society (AWS), Miami, Florida.

2A.3 BACKFIRE, SUSTAINED[a] – The recession of the flame into the torch body with continued burning characterized by an initial popping sound followed by a squealing or hissing sound, potentially burning through the torch body. See also backfire and flashback.

2A.4 FLASHBACK[a] – The recession of the flame through the torch and into the hose, regulator, and/or cylinder, potentially causing an explosion. See also backfire and sustained backfire.

CONSTRUCTION

3 Materials

3.1 Devices of this type shall be constructed of materials that are compatible with the gas or gases with which they are used. Metal parts shall be inherently corrosion resistant or protected to resist corrosion.

3.2 With reference to 3.1, elastomeric and polymeric materials shall be subjected to the Volume Change and Weight Loss Test, Section 12 and the Accelerated Aging Test, Section 13.

Exception: Chlorotrifluoroethylene polymers, tetrafluoroethylene, fluorinated ethylene propylene polymers and polyamides of composition polyhexamethylene adipamide or polycaproamide polymers (nylon 6 or 6/6) are acceptable without test.

4 Hose Connections

4.1 Hose connections shall be union connections which do not require gaskets. They shall have left-hand threads for the attachment of fuel-gas hose fittings and right-hand threads for oxygen hose fittings and shall comply with the specifications of the Compressed Gas Association in the Standard Connections for Regulator Outlets, Torches, and Fitted Hose for Welding and Cutting Equipment, E-1.

4.2 With reference to 4.1, a slip-joint connection is allowed to be used for connecting hose having an internal diameter of 3/16 inch (4.8 mm) or smaller.

5 Venting of Handles

5.1 Nongas-carrying spaces in handles shall be vented.

6 Valve Stems

6.1 The valve stem of a gas control valve shall be so constructed that it cannot be removed without removing the packing nut or stem-retaining means.

PERFORMANCE

7 Normal Operation Test

7.1 The torch, equipped with its manufacturer's tips or nozzles, shall perform the intended operations as specified in 7.2 and shall not produce flashback when connected to the gas supplies at the required pressure specified by the manufacturer.

7.2 In making this test, the torch is to be connected to a gas supply maintained at the pressures specified by the manufacturer. Tips or nozzles of various capacities are inserted and typical welding, cutting, heating, scarfing, powder cutting, or other allied processes for which the torch is intended are performed.

8 Abnormal Operation Test

8.1 The torch, equipped with its manufacturer's tips or nozzles, when subjected to abnormal and abusive conditions (conducive to making the torch backfire or produce flashback), such as contact of the tip with firebrick or steel shall not produce flashback (sustained burning within the torch) or produce other hazardous effects. No damage to the torch shall result from this test. To determine that the torch complies with this specification, the torch is to be tested as described in 8.4 and 8.5. The fuel-gas supply and oxygen supply shall be provided with quick-closing manual valves or the equivalent that shuts off gas supplies in the event of flashback.

8.2 BACKFIRE – The term backfire refers to momentary retrogression of the flame into the torch tip with a popping sound as the flame is extinguished. Immediately following the withdrawal of the tip from the work, the gases are capable of reigniting or the use of a torch lighter shall be required.

8.3 FLASHBACK – The term flashback refers to the sustained retrogression of the flame back into the mixing chamber accompanied by a hissing or squealing sound and a characteristic smokey, sharp-pointed flame. This condition necessitates the immediate cutting off of the gas supplies, oxygen first, fuel gas second, to prevent severe overheating and possible destruction of the torch head and/or gas tubes.

8.4 In this test, the device (torch and tip or nozzle) is to be connected to the gas supply by lengths of hose. The gas pressures are to be set and maintained at the values specified by the manufacturer. With the fuel-gas valve adjusted as specified by the manufacturer, the oxygen valve is to be adjusted so that a normal, neutral flame is established at the tip end. A neutral flame is indicated by a well-defined white inner cone at the torch tip. The abusive and abnormal conditions described in 8.5 are then to be imposed. During this test, the cutting oxygen valve lever is not operated on a cutting torch.

8.5 Without touching the torch valves, the fuel-gas pressure is to be increased 10 percent above the specified value, and the oxygen pressure is to be decreased 10 percent below the specified value. The lighted tip or nozzle is then to be touched on steel or firebrick so as to produce at least 30 backfires at a frequency of 30 to 50 backfires per minute. If 30 backfires cannot be obtained after 100 touches on the steel or firebrick, the test is to be discontinued. The gas pressures are then to be inverted and the same procedure is to be repeated.

8.6 At the conclusion of the test described in 8.5, the gas torch shall be subjected to and comply with the Normal Operation Test, Section 7, to determine whether there has been any damage to the torch as required in 8.1.

9 Leakage Test

9.1 A torch unit is to be subjected for one minute to an internal aerostatic pressure of not less than 1-1/2 times the service pressure specified in Service Pressure Ratings, Section 15. There shall be no observable leakage.

9.2 This test is to be conducted on three samples of each torch unit design without the welding or cutting tips installed. The samples are to be tested with the shutoff valves in the closed position so that seat leakage can be checked.

10 Valve-Endurance Test

10.1 Each torch shutoff valve is to be subjected to repeated cycles of opening and closing as specified in 10.2. After the endurance test, the valve shall comply with the requirements specified in the Leakage Test, Section 9.

10.2 Samples of each different style of valve are to be subjected to a 1500-cycle test, conducted manually and with a closing force sufficient to stop leakage. The valve inlet is to be pressurized aerostatically during the test at 15 psig (103 kPa) for acetylene and 200 psig (1379 kPa) for oxygen.

11 Temperature Test

11.1 A torch is to be subjected to the temperature test described in 11.2 – 11.3. The temperature rise:

a) On a supporting surface of a torch when placed in its intended stationary position shall not exceed 90°F (50°C).

b) Of any handle or surface intended for hand manipulation or support shall not exceed:

1) 45°F (25°C) for a metallic surface and

2) 63°F (35°C) for a nonmetallic surface.

c) Of any control knob or lever that must be used by the operator to regulate or shut off the torch shall not exceed:

1) 54°F (30°C) for a metallic part and

2) 90°F (50°C) for a nonmetallic part.

11.2 The values specified in 11.1 are based on an assumed ambient temperature of 77° F (25° C). However, tests may be conducted at any ambient temperature within the range of 50 – 104°F (10 – 40°C).

11.3 The device (torch and tip or nozzle with the largest orifice) is to be connected to the gas supply by lengths of hose. The gas pressures are to be set and maintained at the values specified by the manufacturer. When a range of pressure is specified, the lowest pressure recommend is to be used. With the fuel gas valve adjusted as specified by the manufacturer, the oxygen valve is to be adjusted so that a normal, neutral flame is established at the tip end. A well-defined white inner cone at the torch tip indicates a neutral flame. The torch is to be mounted in a vice or other similar device and operated for one (1) hour. The maximum temperature reached is to be recorded.

12 Volume-Change and Weight-Loss Tests

12.1 General

12.1.1 A nonmetallic part in contact with the gases described in Table 12.1 is to be subjected to the tests described in 12.2.1 and 12.3.1. Polymeric parts other than those described in the exception to 3.2 shall show no evidence of appreciable shrinkage, warpage, cracking, or other signs of deterioration following the immersion test(s). The elastomeric part shall not show a change in volume of more than 25 percent swelling or 1 percent shrinkage, and a weight loss (extraction) of more than 10 percent.