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UL 67377

Outline of Investigation for Oxygen Reduction Fire Protection System Units

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Summary of Topics

This second issue of the Outline of Investigation for Oxygen Reduction Fire Protection System Units, UL 67377, corrects editorial errors and covers fire protection system units that produce a flux of reduced-oxygen atmosphere within an enclosed space. The oxygen reduction fire protection system units typically include equipment for compression, high pressure storage, distribution, and discharging of gases, control of the enclosed space environment, electronic control, communication, etc. The system unit may contain other ancillary equipment related to the functioning of the oxygen reduction fire protection system units.

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INTRODUCTION

1 Scope

1.1 These requirements cover oxygen reduction fire protection system units, intended to separate oxygen and nitrogen from ordinary air to produce a flux of reduced-oxygen (elevated nitrogen) air for limiting the potential for ignition of Class A and Class B fires and fire spread of Class A combustibles in a protected volume.

1.2 These requirements apply to oxygen reduction fire protection system units intended for design, installation, operation and maintenance in accordance with Fixed firefighting systems – Oxygen reduction systems – Design, installation, planning and maintenance, prEN 16750. The oxygen reduction fire protection system units typically include equipment for compression, high pressure storage, distribution and discharging of gases, control of the enclosed space environment, electronic control, and communication. The system units may contain other ancillary equipment related to the functioning of the oxygen reduction fire protection system units. These requirements only apply to nitrogen based oxygen reduction fire protection system units. In addition, these requirements do not apply to oxygen reduction fire protection system units intended for use in applications such as explosion suppression, explosion prevention, fire suppression using gaseous extinguishing agents, and non-fire protection reduced oxygen atmospheres (e.g., aviator training, food preservation).

1.3 The design, installation, operation and maintenance of these oxygen reduction fire protection system units shall comply with regulations in the local jurisdiction where the system will be installed.

1.4 Oxygen reduction fire protection system units shall meet the requirements specified herein.

2 Components

2.1 Except as indicated in 2.2, a component of a product covered by this Outline 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 Outline, or
- b) Is superseded by a requirement in this Outline.

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 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, in SI units. Values in parentheses are explanatory or approximate information, in US customary units.

4 Undated References

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

UL Standards

UL 50

Enclosures for Electrical Equipment, Non-Environmental Considerations

UL 50E

Enclosures for Electrical Equipment, Environmental Considerations

UL 429

Electrically Operated Valves

UL 499

Electric Heating Appliances

UL 508

Industrial Control Equipment

UL 508A

Industrial Control Panels

UL 1004-1

Rotating Electrical Machines – General Requirements

UL 1450

Motor Operated-Air Compressors, Vacuum Pumps and Painting Equipment

UL 2196

Tests for Fire Resistive Cables

UL 60947-4-1

Low-Voltage Switchgear and Controlgear – Part 4-1: Contactors and Motor-Starters – Electromechanical Contactors and Motor-Starters

UL 60947-5-2

Low-voltage Switchgear and Controlgear – Part 5-2: Control Circuit Devices and Switching Elements – Proximity Switches

UL 61010-2-201

Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use – Part 2-201: Particular Requirements for Control Equipment

UL 61131-2

Programmable Controllers – Part 2: Equipment Requirements and Tests

IEC Standards

IEC 60950

Information technology equipment – Safety – Part 1: General requirements

IEC 61508-1

Functional safety of electrical/electronic/programmable electronic safety-related systems – Part 1: General requirements

IEC 61508-2

Functional safety of electrical/electronic/programmable electronic safety-related systems – Part 2: Requirements for electrical/electronic/programmable electronic safety-related systems

IEC 61508-3

Functional safety of electrical/electronic/programmable electronic safety-related systems – Part 3: Software requirements

IEC 61508-4

Functional safety of electrical/electronic/programmable electronic safety-related systems - Part 4: Definitions and abbreviations

IEC 61508-5

Functional safety of electrical/electronic/programmable electronic safety-related systems – Part 5: Examples of methods for the determination of safety integrity levels

IEC 61508-6

Functional safety of electrical/electronic/programmable electronic safety-related systems – Part 6: Guidelines on the application of IEC 61508-2 and IEC 61508-3

IEC 61508-7

Functional safety of electrical/electronic/programmable electronic safety-related systems – Part 7: Overview of techniques and measures

IEC 62368-1

*Audio/Video, Information and Communication Technology Equipment – Part 1: Safety Requirements***EU Directive**

(PED) Pressure Equipment Directive

(MD) Machinery Directive

EN Standards

EN 54-3

Fire detection and fire alarm systems – Part 3: Fire alarm devices – Sounders

EN 54-4

Fire detection and fire alarm systems – Part 4: Power supply equipment

EN 54-23

Fire detection and fire alarm systems – Part 23: Fire alarm devices – Visual alarm devices

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EN 50104

Electrical apparatus for the detection and measurement of oxygen – Performance requirements and test methods

prEN 16750: 2014 edition

Fixed firefighting systems – Oxygen reduction systems – Design, installation, planning and maintenance

5 Glossary

5.1 For the purpose of this outline of investigation, the following definitions apply.

5.2 AIR SEPARATION DEVICE – Equipment used to generate reduced oxygen air for use in the protected volume.

5.3 BUFFER TANK – A pressure vessel used to store compressed air.

5.4 COMBUSTIBLE MATERIAL – Class A or Class B combustible material present in the protected volume in a significant quantity. The significant quantity is determined by means of a risk analysis as part of the fire protection design.

a) Class A – Materials including ordinary combustible materials such as wood, cloth, paper, rubber, and many plastics.

b) Class B – Materials including flammable liquids, oils, petroleum greases, tars, oil-base paints, solvents, lacquers, alcohols, and flammable gases.

5.5 CONDITION – A situation, environmental state, or equipment state of an oxygen reduction fire protection system unit.

a) Abnormal Condition – A situation, environmental state, or equipment state that warrants some type of signal, notification, communication, response, action, or service.

b) Alarm Condition – An abnormal condition that poses an immediate threat to life, property, or mission.

c) Normal Condition – Circuits, systems, and components are functioning as designed and no abnormal condition exists.

d) Pre-Alarm Condition – An abnormal condition that poses a potential threat to life, property, or mission, and time is available for investigation.

e) Supervisory Condition – An abnormal condition in connection with the supervision of other systems, processes, or equipment.

f) Trouble Condition – An abnormal condition in a system due to a fault.