UL 971A

Outline of Investigation for Metallic Underground Fuel Pipe

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Summary of Topics

This Third Issue of UL 971A, Outline of Investigation for Metallic Underground Fuel Pipe dated June 19, 2026 includes revisions to test fluid specifications within the Permeation Test, 23.2.

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CONTENTS

INTRODUCTION

1 Scope 5
2 Units of Measurement 5
3 Undated References 5
4 Glossary 5

CONSTRUCTION

5 General 7

PERFORMANCE

6 General 8
7 Short Term Pressure Tests 10
7.1 General 10
7.2 Leakage test 11
7.3 Hydrostatic test 11
7.4 Breakdown test 11
8 Long Term Pressure Tests 11
8.1 General 11
8.2 Sustained pressure test 12
8.3 Cyclic pressure test 12
9 Vacuum Tests 12
9.1 General 12
9.2 Static vacuum test 13
9.3 Cyclic vacuum test 13
10 Fitting Torque Test 13
11 Fitting Bending Test 13
12 Pipe Bending Test 14
13 Drop Test 14
14 Drop Test After Conditioning 14
15 Ball Impact Test 15
16 Ball Impact Test After Conditioning 15
17 Pipe Burial Tests 16
17.1 General 16
17.2 Pull strength test 16
17.3 Puncture resistance test 16
17.4 Crush resistance test 17
18 Long Term Compatibility Test 17
19 Interstitial Communication Test 22
20 UV Compatibility Test 22
21 Nonmetallic Fitting Stress Crack Test 23
22 Metallic Fitting Stress Crack Test 23
23 Permeation Test 23

MANUFACTURING AND PRODUCTION TESTS

24 General 25
25 Leakage Test 25

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MARKING

26 General 25

INSTRUCTIONS

27 General 26

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INTRODUCTION

1 Scope

1.1 These requirements cover metallic and composite primary carrier, secondary containment, and integral primary/secondary pipe systems (pipe and fittings) intended for underground use in distribution and venting applications of petroleum-base flammable and combustible liquids, alcohols, and alcohol-blended fuels as identified in this outline.

1.2 The piping covered by these requirements is intended to be installed and used in accordance with the Flammable and Combustible Liquids Code, NFPA 30, Code for Motor Fuel Dispensing Facilities and Repair Garages, NFPA 30A, and applicable Federal and State regulations for underground piping.

1.3 These requirements cover completely metallic and composite metallic/nonmetallic pipe constructions with manufacturer-supplied fittings for underground use only. The products covered by this outline have been evaluated for assembly in normal soil applications by qualified persons in accordance with the manufacturer's instructions.

1.4 The products covered by this outline have not been evaluated for applications in sumps (more than 12 inches (30.5 cm) from sump walls), as connector pipe (between underground pipe and dispensing device), aboveground or marine use, or other applications exceeding ambient temperatures of 75 °F (23 °C).

2 Units of Measurement

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

3 Undated References

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

4 Glossary

4.1 For the purposes of this outline the following definitions apply.

4.2 BARRIER LINER – The thin inner or outer layer of a composite pipe that contains internal fuels, provides permeation resistance, and protects the outer structural pipe wall from exposure to fuels or external fluids.

4.3 CHASE PIPE – An underground pipe that is used to route primary carrier, secondary containment, or integral primary/secondary pipe between storage tanks and containment sumps. Typically used to extract pipe without excavation and is not considered secondary containment.

4.4 CLOSED SECONDARY CONTAINMENT PIPING SYSTEM – A secondary piping system with ends normally closed at the tank and sump with a minimum rated pressure of 50 psig (350 kPa).

4.5 COMPOSITE PIPE SYSTEM – An underground piping system in which the pipe design contains both metallic and nonmetallic major, critical components.

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4.6 FITTING – A manufacturer-supplied component designed to connect, branch, or terminate pipe sections and contain liquids. Connections may be threaded, welded, crimped, clamped, compressed, thermo fused, solvent welded, or adhesive joined. Sump boots are not considered fittings.

4.7 FLEXIBLE PIPING – Pipe with a manufacturer's recommended minimum bend radius less than or equal to 6 feet (1.8 m). Typically constructed from thermoplastic materials.

4.8 INTEGRAL – Two or more separate components physically joined together or combined to form a single part at the manufacturer. Primary and secondary pipe joined in the field with a common fitting is not considered integral.

4.9 INTEGRAL PRIMARY/SECONDARY PIPE – A single pipe, constructed at the manufacturer, that combines both primary carrier and secondary containment with an interstitial space that can be monitored for leakage.

4.10 METALLIC – Pipe, fittings, or components primarily consisting of metals (typically corrosion-resistant malleable types such as steel, aluminum, copper, and brass) with or without minor nonmetallic components (such as gaskets, seals, sleeves or bushings).

4.11 METALLIC PIPE SYSTEM – An underground piping system in which the pipe design contains major critical components that are formed from metals.

4.12 NON-INTEGRAL PRIMARY/SECONDARY PIPE – A pipe system with independent primary carrier and secondary containment connected in the field with an interstitial space that can be monitored for leakage.

4.13 NONMETALLIC – Pipe, fittings, or components primarily consisting of nonmetals (typically polymeric thermoplastics, thermosets or composites) with or without minor metallic components (such as foils, braids, tapes, sleeves, or bushings).

4.14 NONMETALLIC PIPE SYSTEM – An underground piping system in which the pipe design contains major critical components that are not formed from metals.

4.15 NORMAL VENT PIPE – A pipe system intended to transfer displaced gases (air and fluid vapors) from the top of an underground tank to grade during filling and provide atmospheric pressure equalization.

4.16 OPEN SECONDARY CONTAINMENT PIPING SYSTEM – A secondary piping system with ends normally open at the sump and a minimum rated pressure of 5.0 psig (35 kPa).

4.17 PIPE – A long cylindrical thin-walled structure designed for the intended use of underground burial and conveying or containing liquids. The pipe structure may be formed from homogenous (single material), composite (multiple materials mixed together) or integral (individual materials joined as one component) elements.

4.18 PIPE OR FITTING SIZE – Nominal or trade size (inches or mm) based on inside diameters of pipe and fittings.

NOTE: Nominal or trade sizes may not be equivalent to the actual measurements.

4.19 PIPING SYSTEM – A combination of pipes and fittings joined to contain liquids transferred between a storage tank and sumps or dispensers (primary, secondary, or integral primary/secondary types) and vapor or air transfer between dispenser or tank to atmosphere (normal vent and vapor recovery types). The system may be primary, secondary, or an integral primary/secondary type. Also known as system.

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4.20 PRIMARY CARRIER PIPE – Pipe intended to be in continuous contact with the liquid flowing in a piping system under normal use. Also known as carrier pipe, primary pipe, or product pipe.

4.21 QUALIFIED PERSON – A worker specifically trained by the manufacturer to perform proper installations of its piping systems in the field in accordance with the specified instructions. The qualified person is not required to be an employee of the manufacturer.

4.22 RIGID PIPING – Pipe with a manufacturers recommended minimum bend radius greater than 6 feet (1.8 m). Typically constructed from thermoset materials.

4.23 SECONDARY CONTAINMENT PIPE – Pipe intended to contain the liquid of a piping system during abnormal use (for example, primary carrier pipe leaks and sump or dispenser spills).

4.24 SUMP – Accessible atmospheric enclosure located underground, typically below a dispenser or above a tank, and designed to monitor leaks, contain spills and house connector pipe and control valves.

4.25 UNDERGROUND – Physically located below the surface layer of the earth in contact with soil (direct burial) or routed in a secondary or chase pipe (indirect burial). Underground does not include sump use more than 12 inches (30.5 cm) from the sump wall.

4.26 VAPOR RECOVERY PIPE – A pipe system intended to transfer collected gasses (air and fluid vapors) from a vacuum system to an underground tank during dispensing. Also known as vapor pipe.

CONSTRUCTION

5 General

5.1 System determination shall be made using guidelines specified in 5.2 (metallic), 5.3 (nonmetallic), or 5.4 (composite). All materials used in the construction of pipe, fittings, or systems shall be suitable for their intended use with respect to normal (expected use within marked ratings) and abnormal (reasonable foreseeable misuse) conditions per the required performance tests described in Table 6.1.

5.2 Metallic pipe (as covered by the requirements in this outline) shall be either completely constructed of metals or contain structural or critical metal components such as primary pipe or secondary pipe. Metallic components that are not considered critical, with respect to standard determination, are containment liners, fittings, wraps, covers, and rings. Metal joining methods, such as welding, shall not significantly change the metallurgical properties or impede corrosion protection methods.

5.3 Nonmetallic pipe (as covered by the requirements in the Standard for Nonmetallic Underground Piping for Flammable Liquids, UL 971) shall be either completely constructed of polymers, or contain structural or critical nonmetallic components such as primary pipe or secondary pipe. Nonmetallic components that are not considered critical, with respect to standard determination, are corrosion liners, fittings, wraps, covers and seals.

5.4 Composite pipe (as covered by the requirements in this outline) shall be constructed from an integral or nonintegral mixture of metals and polymers such as coaxial pipe with a metal primary and polymer secondary, a polymer primary and metal secondary, or multi-layer pipe with mixtures of metals and polymers. Polymer pipe with thin metal foils used for liners or covers or metals in fittings are not considered critical in system determination.

5.5 Metallics used in the construction of pipe, fittings, or systems shall be stainless steel, aluminum, brass, or other metals with similar corrosion-resistant properties. Other metals may be used if protected against corrosion per 5.6 or 5.7. All metals shall comply with all applicable requirements in this outline and shall not promote dielectric corrosion of dissimilar metals.

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