

JULY 9, 2015

1

UL 1489

**Outline of Investigation for Fire Resistant Pipe Protection Systems Carrying
Combustible Liquids**

Issue Number: 1

July 9, 2015

Summary of Topics

Certain jurisdictions require a fire resistance rating for the fire protection of pipe carrying combustible liquids in the interior of a building (enclosed structures and semi conditioned spaces). This outline is being created to aide in evaluating fire protection systems to satisfy the prescriptive code requirements (such as the 2008 New York City Mechanical Code Section 1305.9.3 for Horizontal Offsets) for such piping networks.

This first issue of the Outline of Investigation for Fire Resistant Pipe Protection Systems Carrying Combustible Liquids, UL 1489, covers products such as, but not limited to, sleeve, wrap or spray-on type fire protection systems applied over or on to rigid piping networks typically consisting of short sections of thick wall pipe connected with threaded or welded fittings that are assembled on site.

This Outline of Investigation describes a standard test method to develop the data necessary for certifying fire resistive pipe protection systems for specific applications.

UL's Outlines of Investigation are copyrighted by UL. Neither a printed nor electronic copy of an Outline of Investigation should be altered in any way. All of UL's Outlines of Investigation and all copyrights, ownerships, and rights regarding those Outlines of Investigation shall remain the sole and exclusive property of UL.

COPYRIGHT © 2015 UNDERWRITERS LABORATORIES INC.

**UL COPYRIGHTED MATERIAL –
NOT AUTHORIZED FOR FURTHER REPRODUCTION OR
DISTRIBUTION WITHOUT PERMISSION FROM UL**



Documents

Document Sharing Hub

No Text on This Page

*UL COPYRIGHTED MATERIAL –
NOT AUTHORIZED FOR FURTHER REPRODUCTION OR
DISTRIBUTION WITHOUT PERMISSION FROM UL*



Documents
Document Sharing Hub

CONTENTS

INTRODUCTION

1 Scope	4
2 Units of Measurement	5
3 References	5
4 Glossary	6

PERFORMANCE

5 Fire Exposure Test	6
5.1 Test sample	6
5.2 Conditioning	7
5.3 Protection of assembly and sample	7
5.4 Furnace temperature control and measurement	8
5.5 Furnace thermocouple preparation	9
5.6 Sample temperature measurement	9
5.7 Differential pressure measurements	11
5.8 Duration of test	13
6 Hose Stream Test	13
7 Leakage Test	13

CONDITIONS OF ACCEPTANCE

8 General	14
8.1 Fire exposure	14
8.2 Thermal protection	14
8.3 Correction – fire exposure test	14
8.4 Leakage	15

REPORT

9 Results	15
10 Application of Results	16
11 Other Reference Material	16

APPENDIX A

**UL COPYRIGHTED MATERIAL –
NOT AUTHORIZED FOR FURTHER REPRODUCTION OR
DISTRIBUTION WITHOUT PERMISSION FROM UL**



Documents
Document Sharing Hub

INTRODUCTION

1 Scope

1.1 These requirements cover the investigation of products such as, but not limited to, sleeve, wrap or spray-on type fire protection systems of various materials and construction intended to protect rigid piping networks containing combustible liquids from a fire exposure, such as diesel fuel or heating oil, that are routed in buildings between the supply tank and utilizing equipment.

1.2 Under these requirements, samples of fire resistive pipe protection systems are exposed to a fire exposure for a duration based on a desired hourly rating, and then to an application of a water hose stream. The fire resistive pipe protection system will also be evaluated for its ability to resist leakage of liquid from the pipe. The following measurements and determinations are made during the fire exposure and water hose stream tests:

- a) Measurement of temperature on the outer surface of the pipe.
- b) Determination of the integrity of the fire resistive pipe protection systems during the fire exposure and water hose stream test.
- c) Determination of tightness and air leakage resistance of the pipe after the fire exposure and water hose stream test.

1.3 The fire exposure and water hose stream tests may not be representative of all fire conditions, conditions may vary with changes in the amount, nature, and distribution of fire loading, ventilation, compartment size and configuration, and heat conducting and dissipating characteristics of the compartment in which the fire resistive pipe protection system is installed. These requirements provide a relative measure of fire performance of comparable assemblies under these specified fire exposure conditions. Any variation from the construction or operating condition tested, such as size, method of assembly, and materials, may substantially change the performance characteristics of the system.

1.4 The classifications for building construction and materials are intended to register performance during the period of fire exposure and are not intended to be interpreted as having determined their acceptability for use after fire exposure.

1.5 This standard does not evaluate the fuel pipe construction in terms of components or assembly techniques. This is a test to evaluate the fire protection element of the assembly. It is assumed that fuel pipe requirements (e.g. sealing compounds/lubricants etc.) that are established by other codes and standards for the will be satisfied outside of this test method.

1.6 These requirements do not cover:

- a) Accumulation of data as to performance of fire resistive pipe protection systems constructed with components or sizes other than those tested.
- b) Evaluation of the contribution of the fire resistive pipe protection systems generation of smoke, toxic gases, or other products of combustion.
- c) Measurement of flame spread over the surface of the tested elements.
- d) Evaluation of the firestop system in openings penetrated by the fire resistive pipe protection systems, unless specifically provided for in the system tested.

**UL COPYRIGHTED MATERIAL –
NOT AUTHORIZED FOR FURTHER REPRODUCTION OR
DISTRIBUTION WITHOUT PERMISSION FROM**

Documents
Document Sharing Hub

e) Evaluation of the impact of fire and elevated temperatures on the pipe and associated fittings and other construction features.

f) Pipe systems that carry fuels with a boiling point below room temperature.

g) The compatibility between the protection system and the pipe material. It is recommended that the compatibility between the protection system and the pipe material should be evaluated by an independent third party and proven acceptable to the Authority Having Jurisdiction.

1.7 The results obtained by use of this test method are intended to develop data that will assist designers, authorities having jurisdiction, end-users, installers and others in determining the acceptability, with reference to fire resistive pipe protection systems for use with specific pipe applications.

1.8 Tests for burning characteristics of building materials, based on rate of flame spread and the density of smoke developed when exposed to a standard fire, can be found in the requirements for surface burning characteristics of building materials in the Standard for Test for Surface Burning Characteristics of Building Materials, UL 723.

1.9 Tests for fire resistance of firestop systems which penetrate walls, floors and other membranes can be found in the requirements for the Standard for Fire Tests of Penetration Firestops, UL 1479.

1.10 Application of these test results to predict fire resistance of pipe protection systems in actual installations requires careful evaluation of the pipe and fire resistive pipe protection system materials under normal operating conditions.

2 Units of Measurement

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

3 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 purpose of this outline, the following definitions apply.

4.2 FIRE RESISTIVE PIPE PROTECTION SYSTEM – A specific construction of devices, materials or protective coatings installed around (such as sleeve or wrap types), or applied to (such as spray-on types), pipe and associated components (for example pipe hangers) to maintain the integrity of pipe subjected to a standardized fire exposure.

4.3 RIGID PIPING NETWORK – An assembly of pipe, connections, fittings and other components that when combined provide a stable and continuous channel for conveying combustible liquids. Such pipe shall meet the minimum specifications established by others for its anticipated use in the field.

4.4 TEST ASSEMBLY – The construction on to which the fire resistive pipe protection system is installed and suspended.

4.5 TEST SPECIMEN – The fire resistive pipe protection system being evaluated.

PERFORMANCE

5 Fire Exposure Test

5.1 Test sample

5.1.1 Each representative type of fire resistive pipe protection system for which rating is desired is to be tested beneath a floor assembly unless it is determined that all features of its intended use can be evaluated by testing in a wall assembly. A minimum of 5 ft of the test specimen shall be exposed to the fire.

5.1.2 The floor or wall assembly is to be constructed of materials which offer adequate support for the fire resistive pipe protection system during both the fire exposure and water hose stream tests, but which do not influence the physical fire performance of the fire resistive pipe protection system due to excessive deflection or falling debris.

5.1.3 The pipe and fire resistive pipe protection system are to be installed as complete systems and are to each incorporate at least one intermediate support and all connections and fittings for which is representative of that for which a rating is desired. If the fire resistive pipe protection system is applied in segments, a segment (splice, joint or overlap) representative of the field application shall be included in the test sample.

5.1.4 If a rating is desired only for a specific rigid fuel pipe network, the installed fire resistive pipe protection system shall simulate the condition for which rating is desired.

5.1.5 Unless a rating is desired for a specific construction, the firestop system for the floor opening is to be constructed using materials and techniques that provide an effective heat and smoke seal without influencing the performance of the fire resistive pipe protection system as a result of degradation or excessive heat transfer to the fire resistive pipe protection system within the firestop system.