Flame Arresters for Vents of Tanks Storing Petroleum Products

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FOREWORD

This publication is intended to provide guidelines for evaluating the need for the use of flame arresters on the vents of tanks storing petroleum products.

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Flame Arresters for Vents of Tanks Storing Petroleum Products

1 Introduction

1.1 In addition to connections for liquid entry and withdrawal, every atmospheric fixed-roof tank requires a vent that allows escape or entry of air and/or vapors to avoid development of pressure or vacuum conditions sufficient to damage the tank during liquid transfer or changes in ambient conditions. This publication discusses the benefits and detriments associated with the use of flame arresters on these vents.

1.1.1 The provisions of this publication are intended for use when designing new facilities or when considering major expansions. It is not intended that the recommendations in this publication be applied retroactively to existing facilities. This publication also can be used as guidance when there is a need or desire to review existing facilities.

1.2 NFPA 30, *Flammable and Combustible Liquids Code,* lists requirements for tank vents in which flammable and combustible liquids are stored. API Standard 2000, *Venting Atmospheric and Low-Pressure Storage Tanks,* and NFPA 30 cover the size and venting capacity to accommodate normal and emergency conditions of the tanks. Devices that are normally closed, except when operating under pressure or vacuum conditions, are often called pressure-vacuum valves. Such valves are normally required for flammable liquids (see NFPA 30). Additional information on vents and pressure-vacuum valves can be found in API Standard 620, *Design and Construction of Large, Welded Low-Pressure Storage Tanks,* and API Standard 650, *Welded Steel Tanks for Oil Storage*. Under certain circumstances, flame arresters listed by the Underwriters' Laboratories or approved by the Factory Mutual Engineering and Research Corporation are used in conjunction with, or in lieu of, a pressure-vacuum valve. The publications cited are considered standards for good practice, and may be incorporated in mandatory codes or ordinances in some jurisdictions.

1.3 The most recent edition or revision of each of the following standards, codes, and publications are referenced in this Publication as useful sources of additional information supplementary to the text. Additional information may be available from the cited Internet World Wide Web sites.

API	*www.api.org*
Std 620	*Design and Construction of Large, Welded Low-Pressure Storage Tanks*
Std 650	*Welded Steel Tanks for Oil Storage*
Std 2000	*Venting Atmospheric and Low-Pressure Storage Tanks*
Publ 2028	*Flame Arresters in Piping Systems*
RP12N	*Recommended Practice for the Operation, Maintenance and Testing of Firebox Flame Arresters*
AIChE[1] (CCPS)	*www.aiche.org/docs/ccps*
	Guidelines for Engineering Design for Process Safety
FM[2]	*www.factorymutual.com*
	Approval Guide—A Guide to Equipment, Materials & Services Approved by Factory Mutual Research Corporation for Property Conservation
Class 6061	*Flame Arresters for Vent Pipes of Storage Tanks*
NFPA[3]	*www.nfpa.org*
30	*Flammable & Combustible Liquids Code*
69	*Standard on Explosion Prevention Systems*
OSHA[4]	*www.osha.gov*
1910.106	*Subpart H—Hazardous Materials*
UL[5]	*www.ul.com*
	Gas and Oil Equipment Directory
525	*Flame Arresters*

2 Scope

2.1 This publication covers flame arresters on vents for above-ground steel petroleum tanks operating essentially at atmospheric pressure as defined in API Standard 650, *Welded Steel Tanks for Oil Storage*.

[1]American Institute of Chemical Engineers, Center for Chemical Process Safety, 345 East 47th Street, New York, New York 10017.

[2]Factory Mutual Insurance Company, 1151 Boston Providence Turnpike, P.O. Box 9102, Norwood, Massachusetts 02062.

[3]National Fire Protection Association, 1 Batterymarch Park, Quincy, Massachusetts 02269.

[4]U.S. Department of Labor, Occupational Safety and Health Administration, 200 Constitution Ave. NW, Washington, D.C. 20210.

[5]Underwriters Laboratories, 333 Pfingsten Road, Northbrook, Illinois 60062.