Management of Atmospheric Storage Tank Fires

API RECOMMENDED PRACTICE 2021
FOURTH EDITION, MAY 2001

REAFFIRMED, MARCH 2020

AMERICAN PETROLEUM INSTITUTE

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Safety & Fire Protection

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FOREWORD

Although there are more than one hundred thousand petroleum storage tanks in service in all phases of petroleum operations, only a very small percentage of tanks ever experience a fire. Consequently, relatively few people have had direct experience with fighting tank fires. This guide was prepared to help provide a basic understanding of tank fire suppression. The information presented is based primarily upon experience in the petroleum industry over a number of years. It is not intended to exclude or limit the use of other approaches of comparable merit.

API strongly supports the principles of fire prevention as the most effective means of ensuring personnel and property protection. Many API publications such as Std. 2610 *Design, Construction, Operation, Maintenance and Inspection of Terminal and Tank Facilities* provide guidance for reducing the probability of fire. The information provided in this document emphasizes planning and preparation as additional steps to protect people and property in those infrequent situations where fires occur.

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1 General

1.1 PURPOSE

This recommended practice provides experience-based information to enhance the understanding of fires in atmospheric storage tanks containing flammable and combustible materials. It presents a systematic management approach which can assist tank fire prevention. If fires do occur, this information can help responders optimize fire suppression techniques to reduce the severity of an incident and reduce the potential for escalation.

1.1.1 Retroactivity

Any provisions in this recommended practice related to design are intended for reference use when designing new facilities or when considering major revisions or expansions. It is not intended that the recommendations in this publication be applied retroactively to existing facilities. This publication should provide useful guidance when there is a need or desire to review programs or facilities.

1.2 SCOPE

This recommended practice provides information to assist management and fire suppression personnel to manage the needs associated with safely fighting fires in above ground atmospheric storage tanks. The discussion includes planning, preparation, suppression, investigation and follow-up activities as shown in Figure 1.

If a liquid at a petroleum facility can burn and is stored in an unheated tank at atmospheric pressure, it fits the scope of this publication. Fires can be fueled by flammable or combustible liquids ranging from gasoline to lube oil, asphalt or crude oil. Some chemicals used in the petroleum industry fit this scope. Heated tanks are not addressed in this publication, but are the subject of API 2023.

This publication is based on industry experience. It emphasizes planning and preparation along with practical tank fire suppression strategy and tactical guidelines. Guidance and precautions address developing and implementing fire suppression plans for fighting fires in and around flammable and combustible liquid atmospheric storage tanks. A review of fire suppression agents is provided; emphasis is on firefighting foam, with dry chemical agents discussed for seal fires and vents. It should be understood that this document provides basic guidelines. Its application must remain flexible to relate to changing technology, philosophy and regulations. Appendix N provides “Lessons Learned” information organized in the same general categories shown in Figure 1.

This publication specifically excludes fighting fires in tanks containing pressurized gases (see API Publs 2510 and 2510A) and nonmetallic tanks. Detailed discussion of types of fire protection equipment and maintenance are also outside the scope of this publication. They are covered in publications such as API Publ 2001, NFPA 11, NFPA 30 and the NFPA *Fire Protection Handbook*; further references are noted in Section 2.

There may be situations in which it may not be possible, or appropriate, to mount an aggressive attack to extinguish a fire (as noted in 6.6). In most cases, if sufficient resources are available, extinguishing tank fires is conceptually simple. When enough of an appropriate extinguishing agent (firefighting foam) is properly applied to the burning fuel surface, the fire goes out. If the foam blanket is maintained until the fuel and tank metal are sufficiently cooled, the fire stays out. Accomplishing these conceptual goals involves both art and science—and provides a significant logistical challenge in addition to the fire suppression challenge. This publication provides guidance to assist understanding and systematically addressing these challenges.

While this publication provides guidance for fighting tank fires, in considering tank fire issues it is prudent to review prevention of such fires. Preventing tank fires is preferable to fighting them. Section 5 and Appendix I provide brief discussions of fire prevention issues. Appendix O briefly reviews personal protective equipment for firefighters in the tank fire environment.

2 Referenced Publications

The most recent editions of each of the following standards, codes, and publications are referenced in this publication as useful sources of information. Additional information also may be available from the cited Internet World Wide Web sites.

API

Spec 12B	*Bolted Tanks for Storage of Production Liquids*
Publ 327	*Aboveground Storage Tank Standards: A Tutorial*
Publ 340	*Liquid Release Prevention and Detection Measures for Aboveground Storage Facilities*
API 570	*Piping Inspection Code: Inspection, Repair, Alteration, and Rerating of In-Service Piping Systems*
RP 574	*Inspection Practices for Piping System Components*
RP 575	*Inspection of Atmospheric and Low-Pressure Storage Tanks*
RP 576	*Inspection of Pressure Relieving Devices*