

Ignition Hazards and Safe Work Practices for Abrasive Blasting of Atmospheric Storage Tanks in Hydrocarbon Service

API RECOMMENDED PRACTICE 2027
FIFTH EDITION, SEPTEMBER 2024



American
Petroleum
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Contents

	Page
1 Scope.....	1
1.1 General.....	1
1.2 Applicability.....	1
1.3 Ignition Sources.....	1
1.4 Non-applicability.....	1
1.5 Other Hazards and Applications Not Covered.....	2
2 Normative References.....	2
3 Terms and Definitions.....	2
4 General Requirements and Procedures.....	6
4.1 General Requirements.....	6
4.2 Potential Ignition Hazards.....	6
5 Potential Ignition Sources and Controls.....	6
5.1 Potential Ignition Sources.....	6
5.2 Static Electric Discharge.....	7
5.3 Internal Combustion Engines and Electric Motors.....	7
5.4 Why Friction Sparks Are Not an Ignition Source.....	8
5.5 Why Heated Metal Surfaces from Abrasive Blasting Are Not an Ignition Source.....	8
5.6 Potential External Ignition Sources.....	8
6 Operational Considerations.....	8
6.1 Product Level and Movement.....	8
6.2 Isolation.....	9
6.3 Tank Condition.....	9
6.4 Abrasive (Grit) Selection.....	9
7 Abrasive Blasting Precautions.....	9
7.1 General Precautions.....	9
7.2 Permits and Other Requirements.....	9
7.3 Control of Vapor Releases.....	10
7.4 Testing and Monitoring Requirements.....	10
7.5 Use of Audible Alarms.....	10
8 Specific Requirements Based on Tank Components.....	10
8.1 Open-top External Floating Roof Tanks.....	12
8.2 Covered External Floating Roof Tank.....	14
8.3 Fixed Roof Tank (With and Without Internal Floating Roof).....	15
8.4 Exterior Shell, Roof, and Appurtenances Storing Class III Fuels.....	17
9 Class I and Class II Fuels at Elevated Temperatures.....	18
Bibliography.....	19

Contents

	Page
Tables	
1	Summary of Procedures for Abrasive Blasting Tanks in Service by Component..... 11
2	Flammability of the Vapor Space in Fixed Roof Tanks Containing Various Flammable Liquids with Vapor-Air Mixture in Equilibrium 17

Ignition Hazards and Safe Work Practices for Abrasive Blasting of Atmospheric Storage Tanks in Hydrocarbon Service

1 Scope

1.1 General

This recommended practice (RP) provides safe work practices for the prevention and control of vapor, ignition, and other potential hazards during abrasive blasting of aboveground storage tanks in liquid hydrocarbon service at atmospheric pressure. It is generally recognized in the petroleum industry that the preferable method is to empty, vapor-free, and clean aboveground petroleum storage tanks before starting abrasive blasting work. However, this may not be practical or even possible and may increase the risk of an undesirable hazard or incident in some situations. It is, therefore, necessary to understand the potential ignition and safety hazards when planning abrasive blasting and to implement the appropriate safeguards before starting this work.

This RP helps employers in developing operating procedures that provide for hazard recognition to significantly reduce ignition risks during abrasive blasting of hydrocarbon storage tanks in service that may contain or have the potential to develop a flammable atmosphere in the vapor space.

This RP does not cover all the precautions that may be required to safely perform abrasive blasting. Owner/operators and contractors shall conduct a thorough hazard analysis and pre-job start-up safety and health review for each specific abrasive blasting job to ensure that all necessary precautions and safeguards have been identified and implemented prior to beginning work.

1.2 Applicability

This RP applies to safe work practices required for abrasive blasting of exterior shells and exterior roofs of all aboveground atmospheric storage tanks in liquid hydrocarbon service. It also applies to safe work practices for abrasive blasting conducted on the roofs and inner portions of the exposed surfaces of shells (that portion of the shell above the roof level) on open-top (external) floating roof tanks.

1.3 Ignition Sources

This RP also covers recognition and control of ignition hazards that are specific to and may be present during abrasive blasting of aboveground storage tanks in liquid hydrocarbon service at atmospheric pressure. The ignition sources covered in this RP include static electricity, internal combustion engines, electric motors, friction sparks, hot metal surfaces, and external-to-the-work ignition sources.

1.4 Non-applicability

This RP does not apply to the abrasive blasting of the following types of tanks or vessels:

- pressure vessels and low-pressure tanks;
- cryogenic or refrigerated vessels or tanks;
- vacuum vessels;
- process vessels;
- underground storage tanks; or
- storage tanks containing heated hydrocarbons.

NOTE If the tank heating system is isolated, and the temperature of the hydrocarbon in the tank is at or near ambient temperature, then the tank is not considered to contain heated products and is covered by this RP.

Although this RP does not specifically cover these tanks and vessels, many of the abrasive blasting recommendations and safe practices included herein would be applicable to these vessels. Employers shall develop and implement specific procedures for abrasive blasting on tanks and vessels not covered by this RP.

1.5 Other Hazards and Applications Not Covered

This RP does not cover specific physical, health, or environmental hazards that are associated with abrasive blasting of aboveground storage tanks. It does not cover the hazards associated with the use of and exposure to abrasive grit and the dust, rust, scale, paint, and other material removed by abrasive blasting.

This RP does not provide information for either the classification of tanks and tank roofs as confined spaces or for entry into confined spaces, although such entry may be required for abrasive blasting on top of the open-top floating roofs and interior shells of open-top floating roof tanks.

This RP does not cover requirements for personal safety, such as use of scaffolding, protection from flying particles, and hearing conservation; confined space classification; or requirements for entry onto floating roofs, on top of cone roofs, or into tanks.

The RP does not address requirements for personal protective equipment including hoods, gloves, fire protective clothing, and supplied air respiratory protection.

This RP does not cover requirements for regulatory permits, reports, record keeping, or similar activities associated with abrasive blasting.

This RP does not and cannot cover every possible unique hazard or situation that may arise during abrasive blasting on aboveground atmospheric storage tanks in liquid hydrocarbon service. These site-specific, product-specific, and tank-specific hazards and situations shall be identified and addressed by employers using appropriate principles and considerations provided in this RP and other applicable regulations, codes, standards, RPs, and publications when developing and implementing safe abrasive blasting procedures.

2 Normative References

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any addenda) applies.

API Standard 650, *Welded Tanks for Oil Storage*

API Standard 2015, *Requirements for Safe Entry and Cleaning of Petroleum Storage Tanks*

API Recommended Practice 2003, *Protection against Ignitions Arising Out of Static, Lightning, and Stray Currents*

API Recommended Practice 2026, *Safe Access/Egress Involving Floating Roofs of Storage Tanks in Petroleum Service*

NFPA 30,¹ *Flammable and Combustible Liquids Code*

3 Terms and Definitions

For the purposes of this document, the following terms and definitions apply.

¹ National Fire Protection Association, 1 Batterymarch Park, Quincy, Massachusetts 02169-7471, www.nfpa.org.

3.1

abrasive blasting

The removal of rust, coating, deposits, or residue from tank surfaces by using compressed air, water pressure, or centrifugal force to apply abrasive particles against the surface.

3.2

abrasive (grit)

Particles that are impinging upon the metal to clean the surface to a recognized standard.

3.3

bonding

The joining of metal parts to form an electrically conductive path to ensure electrical continuity. The bond has the capacity to safely conduct any current likely to be generated.

3.4

centrifugal blasting

A blasting process whereby abrasive shot or grit is propelled by centrifugal force.

3.5

class I liquid

A hydrocarbon liquid having a closed cup flash point below 38 °C (100 °F). (NFPA flammable liquid.)

3.6

class II liquid

A hydrocarbon liquid having a closed cup flash point equal to or greater than 38 °C (100 °F) and less than 60 °C (140 °F).

3.7

class III liquid

A hydrocarbon liquid having a closed cup flash point equal to or above 60 °C (140 °F).

3.8

combustible gas indicator

An instrument used to sample the atmosphere to indicate the concentration of vapor or gas present in the atmosphere as a percentage of the lower explosive (flammable) limit.

3.9

confined space

Any tank or space that meets all three of the following requirements:

- is large enough and so configured that an employee can bodily enter and perform assigned work,
- has limited or restricted means for entry or exit, and
- is not designed for or meant to be continuously occupied by employees.

3.10

covered external floating roof tank

An open-top external floating roof tank that has been provided or equipped with a permanently attached cover (geodesic dome or similar weather protection) over the top of the tank shell.

3.11

deposits

See "residue".