Preparing Tank Bottoms for Hot Work

API RECOMMENDED PRACTICE 2207
EIGHTH EDITION, APRIL 2022

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Suggested revisions are invited and should be submitted to the Standards Department, API, 200 Massachusetts Avenue, NW, Suite 1100, Washington, DC 20001, standards@api.org.

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Introduction

Two API Individual Certification Programs (ICPs) are referenced in this RP. The API 653 Aboveground Storage Tanks Inspector Certification Program evaluates individual personnel qualifications to inspect and determine conformance with API Standard 653, *Tank Inspection, Repair, Alteration, and Reconstruction*. Because tank entry is often an integral part of the process, the API Tank Entry Supervisor Individual Certification Program provides a tool for certifying supervisors who will evaluate hazards to minimize any risks associated with tank entry.

API 2207 primarily discusses work practices that have been used safely and is not a regulatory compliance document. However, it does update the listing of potentially relevant regulations. Federal, state, and local regulations or laws may contain additional requirements that must be taken into account when a tank repair program is developed for a specific facility. Since the essential elements of this publication are based on current industry safe operating practices and existing consensus standards, these listings have also been updated and expanded.

References made to “OSHA” refer to U.S. federal regulations. Comparable or more restrictive requirements may exist in other jurisdictions (states or countries), and the appropriate requirements should be used. Where no regulations or other legal requirements exist, the OSHA standards provide a useful reference and are readily available for download from the Internet at www.osha.gov.

This RP provides information to assist safe performance of hot work on the bottoms of storage tanks that have been in service to store flammable products. This work activity has specific precautions and work practices. The understanding of potential hazards, relevant procedures and techniques, and application of this knowledge can help improve safety performance and reduce the probability of incidents.

Tanks that previously have contained flammable or combustible liquids, regardless of their age and type of construction, must be considered unsafe for hot work until inspected and approved by a qualified person. These inspections include visual examination and atmospheric testing to evaluate physical and atmospheric hazards (flammability, oxygen deficiency, and potentially toxic contaminants). This RP emphasizes the special techniques required in the performance of hot work to prevent the ignition of flammable gases or vapors that may be trapped under the tank bottom.

Each repair of tank bottoms must receive careful consideration and individual evaluation. The safety procedures described in this RP provide various methods that have been used successfully for preparing tank bottoms for hot work. These procedures will apply to most situations; however, each job must be independently evaluated to ensure safe work.

Preparing Tank Bottoms for Hot Work

1 Scope

1.1 This RP addresses only the safety aspects of hot work performed on petroleum storage tank bottoms. It discusses safety precautions for preventing fires, explosions, and associated injuries. The term “hot work,” as used in this publication, is defined as an operation that can produce a spark or flame hot enough to ignite flammable vapors. API Recommended Practice 2009 provides more in-depth information on safe hot work practices, and its requirements are not duplicated here.

1.2 This RP does not contain all safety precautions and procedures that may be required prior to, during, or after a specific hot work activity. All hot work should be performed in compliance with applicable federal, state, and local regulatory requirements and recognized industry practices. Work practices of concern for working on tank bottoms include, but are not limited to, confined space entry, lockout/tagout, atmospheric testing, ventilation, and requirements for use of personal protective equipment (PPE). API Standard 2015 provides guidance for tank entry consistent with OSHA regulations noted in Section 2, Normative References. This RP does not repeat the detailed information provided in the referenced documents. Some of the relevant OSHA regulations from 29 *CFR* Part 1910 and 29 *CFR* Part 1926 are included in the references. It is the responsibility of each organization to review and comply with applicable regulatory requirements.

1.3 This RP does not cover the following:

— guidance for compliance with safety or environmental regulations or codes;

— engineering specifications for tank construction or rebuilding (see API tank standards);

— specific guidance for repair of shop-fabricated tanks, which is addressed by STI/SPFA SP031. These tanks include those built to UL 142, API 650, STI/SPFA aboveground tank standards, as well as others;

— specific guidance for tank entry (see API 2015);

— welding techniques, craft skills, or qualification of welders (see referenced welding standards);

— normal “safe work” practices such as fall protection, PPE, slip/trip/fall, etc.;

— entry or work in inert environments (see API 2217A);

— entry into confined spaces for construction activities (see OSHA 29 *CFR* Part 1926, Subpart AA, and Part 1926.1200).

1.4 Hazards have the inherent ability to cause harm. Flammability, toxicity, corrosivity, and stored chemical or mechanical energy all are hazards associated with various industrial materials or situations. Risk requires exposure. A fire or hot surface can cause thermal skin burns or a corrosive acid can cause chemical skin burns, but these can occur only if there is contact exposure to skin. In an empty tank, a floating roof represents a “stored mechanical energy” hazard that might fall on persons working underneath, and so must be properly secured to reduce the risk of contact before performing entry work. Risk is created when hazards have a potential for exposure.

1.5 Determining the level of risk involves understanding hazards and estimating the probability of exposure and severity of consequences that could lead to harm. While the preceding examples relate hazards to the risk to people, the same principles are valid for evaluating property and environmental risk. For instance, a flammable mixture of hydrocarbon vapors in air can ignite if exposed to a source of ignition, resulting in a fire that could damage property, as well as injure people.