Safe Welding, Cutting, and Hot Work Practices in the Petroleum and Petrochemical Industries

API RECOMMENDED PRACTICE 2009
SEVENTH EDITION, FEBRUARY 2002

REAFFIRMED, MARCH 2020

AMERICAN PETROLEUM INSTITUTE

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Safety & Fire Protection

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FOREWORD

This publication provides guidelines for the protection of personnel and property when performing welding, cutting or other hot work in the petroleum and petrochemical industries. This recommended practice distinguishes between normal hot work activities and those which involve hot work on equipment in service. It provides guidance for certain of these special "in-service" activities.

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SECTION 1—INTRODUCTION

1.1 PURPOSE

Gas and electric welding and cutting operations are important activities to support petroleum and petrochemical operations. Personnel engaged in these operations should have a thorough understanding of the duties they are to perform and the potential hazards associated with the activity and materials involved. This recommended practice provides information to assist welding, cutting and other hot work activities to be done safely in petroleum and petrochemical operations. The understanding of potential hazards, and application of this knowledge, can help reduce the probability and severity of incidents.

1.2 SCOPE

This recommended practice provides guidelines for safely conducting welding, cutting or other hot work activities in refineries, gas plants, petrochemical plants and other facilities in the petroleum and petrochemical industries. It includes specific guidance to evaluate procedures for certain types of work on equipment in service.

Not included in the scope are:

a. Guidance for compliance with regulations or codes.
b. Hot tapping (it is the subject of API Recommended Practice 2201 *Procedures for Hot Tapping on Equipment in Service*).
c. Welding techniques, craft skills or qualification of welders.
d. Normal "safe work" practices such as fall protection, PPE, slip/trip/fall, etc.
e. Entry or work in inert environments (see API 2217A).

The principles and resources provided in this document are widely applicable. Some activities (such as oil drilling or offshore operations) may be subject to specific regulations or unique work requirements which should be considered when developing welding and hot work programs.

While personnel doing welding and other hot work require a high degree of skill and shall be qualified for the work they are doing, the qualification of personnel falls outside the scope of this document.

API 2009 intends to maintain consistency and compatibility with ANSI/AWS Z49.1 which provides much more detail on welding equipment, PPE and certain procedures and NFPA 51B that focuses on fires and explosions with guidance covering a broad spectrum of applications including structures. Additional guidance relating to welding equipment, techniques, processes and testing used in the chemical, oil, gas and pipeline industries is provided by API RP 582, API Std 1104 and API RP 1107.

1.3 RETROACTIVITY

Any provisions in this publication related to procedures or design are intended for new projects reference such as revising procedures or designing new facilities, or when considering major revisions or expansions. It is not intended that any recommendations in this publication be applied retroactively to existing facilities or evaluation of prior practice. This recommended practice should provide useful guidance when there is a desire or need to review programs or facilities.

1.4 CONCEPT OF HAZARD VS RISK

Hazards are properties of materials with the inherent ability to cause harm. Flammability, toxicity, corrosivity, and stored chemical or mechanical energy all are hazards associated with various industrial materials. Risk requires exposure. A hot surface or material 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. There is no risk when there is no potential for exposure.

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

1.5 GENERAL HOT WORK PROCESS

The discussion of safe "hot work" in this publication follows the process flow chart shown in Figure 1. This chart shows a typical flow sequence for welding activities in the petroleum and petrochemical industries. Sections of this document that discuss those steps are indicated. Other facilities may have alternative work flow processes, or may combine some steps.