AWS F4.1:2017
An American National Standard

Safe Practices for the Preparation of Containers and Piping for Welding, Cutting, and Allied Processes

American Welding Society®

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Approved by
American National Standards Institute
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Safe Practices for the Preparation of Containers and Piping for Welding, Cutting, and Allied Processes

6th Edition

Supersedes AWS F4.1:2007

Prepared by the
AWS Committee on Labeling and Safe Practices

Under the Direction of the
AWS Committee on Safety and Health

Approved by the
AWS Board of Directors

Abstract

This standard informs the reader of the necessary safe practices to be followed in the cleaning and preparation of containers and piping for welding or cutting. It describes various methods for cleaning, including water, steam, hot chemical and mechanical, and techniques to be used for their proper preparation, such as inerting.

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Foreword

This foreword is not part of this standard but is included for informational purposes only.

In 1940, the AWS Committee on Safety Recommendations published *Recommended Procedure to Be Followed in Preparing for Welding or Cutting Certain Types of Containers which have Held Combustibles*. The document was updated in 1952 and 1965. Based on this earlier document, the first edition of AWS F4.1 was published in 1980 with subsequent revisions in 1988, 1994, 1999, and 2007. This revision is the sixth edition of AWS F4.1. Changes from the fifth edition include: The title was changed from "*Safe Practices for the Preparation of Containers and Piping for Welding and Cutting*" to "*Safe Practices for the Preparation of Containers and Piping for Welding, Cutting, and Allied Processes*." Safety information was added to the Scope and references were updated. Changes in text are indicated by a vertical margin line.

This document addresses one of the leading causes of accidents among welders and cutters, that is, work on closed containers where previous contents are unknown. It provides the safety precautions necessary for prevention of such accidents, and the techniques used for preparation of containers, including piping, and represents current practice in various segments of U.S. industry.

Comments and suggestions for the improvement of this standard are welcome. They should be sent to the Secretary, Safety and Health Committee, American Welding Society, 8669 NW 36 St, # 130, Miami, FL 33166.

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Safe Practices for the Preparation of Containers and Piping for Welding, Cutting, and Allied Processes

1. Introduction and Scope

1.1 Introduction. Explosions, fires, and health hazards may result if welding, cutting, heat, friction, impact, or other hot work is applied on containers that are not free of hazardous substances, such as combustible, reactive, or toxic solids, liquids, vapors, dusts, and gases. No container shall be presumed to be clean or safe, but containers can be made safe for work, provided the safe practices prescribed herein or their equivalent are followed.

1.2 Scope. These safe practices shall apply to the preparation for welding or cutting of metal containers and piping. For the purposes of this document, references to precautions for welding or cutting are also intended to apply to all metal working operations (i.e., brazing, grinding, soldering, thawing pipes, using heat guns, using spark-producing power tools, straightening, thermal spraying) involving heat. Cleaning of used containers is necessary in all cases before welding or cutting. The term *container*, as used herein, includes piping.

The safe practices presented here are not intended to replace either regulatory standards or more stringent practices of industries that have expert knowledge of handling hazardous substances. Even a water tank should be considered hazardous unless a qualified person has declared it safe to weld or cut. Consequently, safe practices presented here are not intended to apply to the following:[1]

(1) Containers and confined spaces that can be entered by workers (see ANSI Z117.1, *Safety Requirements for Confined Spaces*).

(2) Containers that have contained radioactive substances

(3) Compressed gas containers

(4) Containers that have held explosive substances (such as nitrocellulose, pyroxylin solution, etc.)

(5) Tanks, bunkers, or compartments on ships

(6) Gasometers or gas holders for natural and manufactured gases

(7) Outside, above-ground, petroleum storage tanks

(8) Containers holding flammables that are to be repaired while in service

1.3 Safety. Safety and health issues and concerns are addressed in this standard.

Safety and health information is available from the following sources:

American Welding Society:

(1) ANSI Z49.1, *Safety in Welding, Cutting, and Allied Processes*

(2) AWS Safety and Health Fact Sheets

(3) Other safety and health information on the AWS website

Material or Equipment Manufacturers:

(1) Safety Data Sheets (SDS) supplied by materials manufacturers

[1] See Annex A, Bibliography, for other standards and practices.