

**AWS C4.7/C4.7M:2020**  
**An American National Standard**



# **Recommended Practices for Oxyacetylene Welding of Steel**



**AWS C4.7/C4.7M:2020**  
**An American National Standard**

**Approved by**  
**American National Standards Institute**  
**January 7, 2020**

**Recommended**  
**Practices for Oxyacetylene**  
**Welding of Steel**

**1st Edition**

Prepared by the  
American Welding Society (AWS) C4 Committee on Oxyfuel Gas Welding and Cutting

Under the Direction of the  
AWS Technical Activities Committee

Approved by  
AWS Board of Directors

**Abstract**

These recommended practices for oxyacetylene welding include the latest procedures to be used in conjunction with oxyacetylene equipment and the latest safety recommendations. Complete lists of equipment are available from individual manufacturers.



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# Foreword

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

Oxyacetylene welding is alive and well in welding shops around the world. Oxyacetylene welding is very useful in maintenance and repair work. The process is flexible and mobile, and it can be used as a stand-alone process or as a supplement to other welding processes in large welding facilities concerned with both job-shop type work and industrial processes. This recommended practice will address only the use of acetylene because of its combustion and chemical reaction qualities. This is the first edition of the document.

The safety concerns are the same as those documented in C4.2, *Recommended Practices for Oxyfuel Gas Cutting Torch Operation*, C4.3, *Recommended Practices for Oxyfuel Gas Heating Torch Operation*, and ANSI Z49.1, *Safety in Welding, Cutting, and Allied Processes*.

This recommended practice describes the equipment, applications, and safe practices for oxyacetylene gas welding operations. It can be used as a teaching and training tool for the safe operation of an oxyacetylene torch in welding operations. This recommended practice is intended for use by the oxyacetylene welder and/or his or her instructor. This document includes all the information necessary for the end user (welder) or management to oxyacetylene gas weld steel. While slower than arc welding, oxyacetylene welding produces high-quality welds. It is inexpensive, flexible, and mobile. It requires no electricity. It is clean and produces no slag or spatter. This recommended practice describes the process and provides information relating to equipment, safety, and operating procedures. Much of the information in this recommended practice is general in nature. There is a variety of equipment available from several manufacturers; therefore, it is recommended that each manufacturer's equipment manual be consulted for details about the operation of said equipment before putting it to use.

Acetylene is the only fuel gas suitable for welding of steel. The other alternative fuel gases (e.g., Propane, Propylene, and Natural Gas) are not really viable fuel gases for gas welding. This process (e.g., Oxyfuel Gas Welding) will be hereby known as Oxyacetylene Welding (OAW) in this recommended practice. Thus, Oxyacetylene Welding can be used for the welding of steel pipe and tubing, steel sheet metal, and small sized structural steel shapes and bars. This recommended practice is meant to be used in shops and for field maintenance. It does not cover welding in confined spaces, welding over coatings of any kind, and welding where there may be exposure to potentially hazardous substances. The process is generally not recommended for welding high-strength heat treatable steels such as that used on most modern automobiles. ICAR (Inter-Industry Conference on Collision Repair) no longer accepts the use of OAW for repairs. They recommend the use of Gas Metal Arc Welding (GMAW) for most repairs.

Comments and suggestions for the improvement of this recommended practice are welcome. They should be sent to the Secretary, AWS C4 Committee on Oxyfuel Gas Welding and Cutting, American Welding Society, 8669 NW 36 St, # 130, Miami, FL 33166-6672.

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# Recommended Practices for Oxyacetylene Welding of Steel

## 1. General Requirements

**1.1 Scope.** This recommended practice describes the equipment, procedures, and safe practices for the oxyacetylene welding of steel. This process is most commonly used for welding carbon steels; however, it is sometimes used on alloy steels, cast iron, aluminum, brass, bronze, copper, nickel, and tin. It is for manual welding using hand torches and is recommended for end users (welders) and management personnel associated with the oxyacetylene welding process.

Oxyacetylene Welding (OAW) is a process where a metal (usually an iron base alloy) is heated to its melting point by an oxyacetylene flame. A welding torch is used for this operation. OAW uses the combustion of acetylene gas in a mixture with oxygen. Acetylene is the fuel gas of choice because it has the ability, along with oxygen, to form a gaseous shield around the molten metal protecting it from ambient contaminants until the molten metal cools. Acetylene is also preferred because most of the heat is concentrated at the tip of the inner cone. This heat focus allows better control to move the weld pool. Virtually all the commercial fuel gases can produce temperatures high enough to melt most metals but acetylene remains the fuel gas of choice because acetylene has the higher combustion temperature. During the welding process, filler material may be added, but it is not always needed. The filler material is used to fill in, build up, and strengthen the weld. OAW is a better choice because the flame condition (reducing, natural, and oxidizing) is easy to adjust compared to other fuel gas mixtures. OAW is not suggested for the fabrication or repair of high-strength steels or heat-treatable metals. OAW is very widely used for maintenance and repair, where flexibility and mobility are important.

Although this recommended practice is not written with mandatory requirements, mandatory language, such as the use of “shall,” will be found in those portions of the document where failure to follow the instructions or procedures could produce inferior, misleading, or unsafe results.

AWS A3.0M/A3.0, *Standard Welding Terms and Definitions*, are included in Annex B of this recommended practice for information only.

**1.2 Units of Measure.** This standard makes use of both U.S. Customary Units and the International System of Units (SI). The latter are shown within brackets ([ ]) or in appropriate columns in tables and figures. The measurements may not be exact equivalents; therefore, each system must be used independently.

**1.3 Safety.** Safety issues and concerns are addressed in this standard, while some safety and health information is provided; some issues and concerns are not fully addressed herein as they are beyond the scope of 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) ANSI Z87.1, *American National Standard for Occupational and Educational Eye and Face Protection*
- (3) AWS Safety and Health Fact Sheets
- (4) Other safety and health information on the AWS website

Material or Equipment Manufacturers:

- (1) Safety Data Sheets supplied by materials manufacturers
- (2) Operating Manuals supplied by equipment manufacturers