

**AWS C4.3/C4.3M:2004**  
**An American National Standard**



# **Recommended Practices for Safe Oxyfuel Gas Heating Torch Operation**



**American Welding Society**



**Key Words**—Heating torch, fuel gas, oxyfuel gas,  
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procedures

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**Approved by**  
**American National Standards Institute**  
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# **Recommended Practices for Safe Oxyfuel Gas Heating Torch Operation**

**Supersedes ANSI/AWS C4.3-83**

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AWS C4 Committee on Oxyfuel Gas Welding and Cutting

Under the Direction of  
AWS Technical Activities Committee

Approved by  
AWS Board of Directors

## **Abstract**

The newly revised manual for oxyfuel gas heating torch operation includes the latest procedures to be used in conjunction with oxyfuel gas heating equipment. The manual also includes the latest safety requirements. Complete lists of equipment are available from individual manufacturers.



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# Recommended Practices for Safe Oxyfuel Gas Heating Torch Operation

## 1. General

**1.1 Scope.** This manual describes the equipment, procedures, and safe practices for oxyfuel gas heating torch operation. It is written for the operators of torches using single or multiple heating tips and heads. It is also recommended for management personnel associated with the oxyfuel gas heating torch operation and process.

Oxyfuel heating is an operation whereby various metals are heated in order to perform the following operations:

- (1) Straightening and bending with mechanical force
- (2) Flame straightening, and cambering
- (3) Stress relieving
- (4) Preweld and postweld heating
- (5) Fusion of coatings
- (6) Flame hardening
- (7) Flame shrinking

The metal is heated by the direct application of single or multi flames to a desired elevated temperature. The heating process may be applied to all types of metal forms or shapes. An operator can make proper compensation for the effect of the metallurgical conditions, part geometry, and physical changes that may occur during the heating process.

In general, torch heating does not require any lengthy start-up. Operations can be performed in most locations, confined to very limited areas, under almost any conditions and, with relatively low equipment cost. Torch heating can also be performed on completed structures without dismantling them.

**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 parentheses or in appropriate columns in tables and figures. The measurements may not be exact equivalents; therefore, each system shall be used independently.

## 2. Applicable Documents

### 2.1 AWS Standards<sup>1</sup>

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

(2) AWS C4.4/C4.4M:2004, *Recommended Practices for Heat Shaping and Straightening with Oxyfuel Gas Heating Torches*

(3) AWS F4.1, *Recommended Safe Practices for Preparation for Welding and Cutting of Containers and Piping*

### 2.2 NFPA Standards<sup>2</sup>

(1) NFPA-51, *Oxygen-Fuel Gas Systems for Welding and Cutting*

### 2.3 RMA Standards<sup>3</sup>

(1) RMA IP-7, *Specifications for Rubber Welding Hose*

### 2.4 ISO Standards<sup>4</sup>

(1) ISO 3821, *Gas Welding Equipment—Rubber Hoses for Welding, Cutting, and Allied Processes*

(2) ISO 3253, *Hose Connections for Welding, Cutting, and Related Processes*

(3) ISO 5175, *Equipment used in Gas Welding, Cutting, and Allied Processes—Safety Devices for Fuel*

1. AWS standards can be obtained from Global Engineering Documents, 15 Inverness Way East, Englewood, CO 80112-5776, tel: 800-854-7179, website: global.ihs.com.

2. NFPA standards can be obtained from National Fire Protection Association (NFPA), One Batterymarch Park, Box 9101, Quincy, MA 02269-9101, tel: 617-770-3000, website: www.nfpa.org.

3. RMA standards can be obtained from Rubber Manufacturers Association, 1400 K Street N.W., Suite 1004, Washington, DC 20005, tel: 202-682-4800, website: www.rma.org.

4. ISO standards can be obtained from American National Standards Institute (ANSI), 11 West 42nd Street, 13th Floor, New York, NY 10036-8002, tel: 212-642-4900, website: www.ansi.org.