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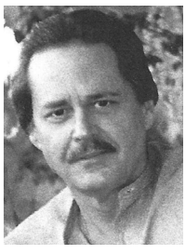
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DEDICATION



Martin Rene Asbra
1945–2012

The members of the Earthquake-Actuated Automatic Gas Shutoff Systems Standards Committee of the Structural Engineering Institute respectfully dedicate this edition of the standard in the memory of Martin R. “Marty” Asbra, who passed away in Tracy, California, in the spring of 2012. Marty was an ardent believer in the value of seismic valves and a founding member of this Committee.

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PREFACE

Initiation of a standard for earthquake valves began in 1977 with a request from the American National Standards Committee Z21 to the Automatic Valve Working Committee of the Z21 Subcommittee on Standards for Gas Appliance Control Devices, which appointed an Earthquake Valve Working Group in 1978 to prepare a draft standard.

The ensuing draft standard was distributed for review and comment in mid-1979. A revised draft standard was adopted by the American National Standards Committee Z21 by letter ballot in December 1979. The first edition of a standard for earthquake valves—ANSI/AGA Z21.70, *Earthquake-Actuated Automatic Gas Shutoff Systems*—was approved as an American National Standard by the American National Standards Institute on April 16, 1981.

In 1981, the secretariat for the standard was transferred from the American Gas Association to the American Society of Mechanical Engineers (ASME). The ASME committee that was assigned responsibility for the standard did not initiate any changes. In 1991, a proposal was approved for the formation of a Pre-Standard Committee within the Gas and Liquid Fuel Lifelines Committee of the Technical Council on Lifeline Earthquake Engineering (TCLEE) of the American Society of Civil Engineers (ASCE) to revise ANSI Z21.70.

A full standard committee was formed in late 1992 and met for the first time in early 1993. The Committee was formed of manufacturing, engineering, local and state government, and insurance representatives.

The extensive data collected following the January 17, 1994, Northridge, California, Earthquake (hereafter referred to as the Northridge Earthquake) provided a unique opportunity to assess the risk posed to the public by natural gas–related postearthquake fires and ground motions for which automatic gas shutoff would be beneficial. The Committee met in the months following the Northridge Earthquake and finalized the scope of research needed to support development for a revised standard.

The Committee focused its research on two key areas: (1) dynamic testing of current devices, which was needed to quantify performance characteristics; and (2) in-depth examination of Northridge Earthquake data on ground motions, structural damage, fire initiation, and actuation of existing earthquake-actuated automatic gas shutoff devices.

A proposal to perform research in these two areas was prepared for ASCE by the Committee, and the project was jointly funded by FEMA, natural gas utilities, and shutoff-device manufacturers. The research project was initiated in March 1995 and completed in November 1995.

Performance characteristics of the devices tested were determined and evaluated for both discrete dynamic loads and complex motions (e.g., simulated ground motions). The results of the dynamic testing of devices that were then on the market bracketed the ranges that were used in defining the actuation requirements in response to seismic disturbances.

The second edition of the standard, ASCE 25-97, was published in 1999. The third edition of the standard, ASCE 25-06, was published in 2008. The present edition—ASCE 25-16, *Earthquake-Actuated Automatic Gas Shutoff Devices*—is the fourth edition of the standard.

ACKNOWLEDGMENTS

The American Society of Civil Engineers (ASCE) acknowledges the work of the Earthquake-Actuated Automatic Gas Shutoff Systems Standards Committee of the Codes and Standards Activities Division of the Structural Engineering Institute. This Committee comprises individuals from a wide variety of backgrounds, including manufacturing, gas industry, consulting engineering, government, insurance industry, education, and private practice. This standard was prepared through the consensus-standards process, which includes balloting in compliance with procedures of ASCE's Codes and Standards Council. Individuals serving on the Committee are listed below.

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CHAPTER 1
GENERAL

Except as modified by this standard, devices qualified to this standard shall conform to the applicable specifications of ANSI/AGA Z21.21b/CSA 6.5b (ANSI/AGA/CSA 2004).

1.1 SCOPE

This standard provides minimum functionality requirements for earthquake-actuated automatic gas shutoff devices and systems (hereafter referred to as devices) meant to include mechanical devices consisting of a sensing means and a means to shut off the flow of gas. The components or parts of devices not covered by this standard or the applicable sections of ANSI/AGA Z21.21b/CSA 6.5b shall be in accordance with applicable American National Standards Institute and industry standards. The values stated throughout this document in in.-lb units are to be regarded as standard. The values stated within parentheses are mathematical conversions to SI units, which are provided for information only and are not considered standard.

1.2 APPLICABILITY

This standard applies to devices installed in lines carrying gaseous fuels, such as natural gas and propane. The purpose of these devices is to reduce the risk of gas leaks resulting from damage to gas systems caused by seismic shaking. The configurations considered in this standard are piping, equipment, or appliances typically found in single-family or multifamily structures of three stories or less. In lieu of engineering analysis and design, or other guidelines or standards, this standard may be applied for devices in industrial or commercial applications.

Devices that comply with this standard may not activate during design-level seismic shaking in a particular region.

1.2.1 Pressure Rating. This standard applies to devices having maximum operating gas-pressure ratings of 0.5 psi (3.4 kPa) up to and including 60 psi (414 kPa).

1.2.2 Mounting. This standard applies to devices that are to be mounted in strict accordance with their manufacturer's installation instructions and in a manner that is sensitive to earthquake ground motions and not motions that might result from the dynamic response of structures, equipment, or other appurtenances.

1.3 OPERATION

1.3.1 Mode of Operation. The device shall be designed to operate automatically. Actuation of the gas shutoff means may be accomplished either directly or indirectly by mechanical or other means. The use of one or more permanent magnets as valve components is not permitted if their placement might cause iron oxides, iron sulfides, or similar ferrous materials to collect on valve seating surfaces.

1.3.2 Operating Conditions. Devices covered by this standard shall be capable of operating at ambient temperatures of −10°F to +150°F (−23°C to +66°C), unless their manufacturer specifies lower minimum or higher maximum operating temperature limits.

1.3.3 Pressure Specification. All references to internal pressure throughout this standard are gauge pressures, unless otherwise noted.

1.4 MARKING

1.4.1 Permanent Label. In addition to the requirements of ANSI/AGA Z21.21b/CSA 6.5b, each device shall have permanent labeling to identify this standard, as follows:

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1.4.2 Installation Warning. All devices shall have the following warning affixed to the device with a tag and also to the device's packaging carton:

WARNING! This device must be installed by a qualified installer in accordance with the manufacturer's installation instructions; if improperly installed, failure to function as intended or unwarranted interruption of gas service could result.

1.4.3 Resetting Warning. All devices shall bear the following warning:

WARNING! Following actuation of this device, reset the device and restore service only after a qualified person has verified no gas leak exists.

1.5 WARRANTY

Manufacturers shall warrant the performance of devices for a specified time to meet this standard.