

**ASME B31.8S-2004**  
(Revision of ASME B31.8S-2001)

# Managing System Integrity of Gas Pipelines

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**ASME Code for Pressure Piping, B31  
Supplement to ASME B31.8**

**AN AMERICAN NATIONAL STANDARD**



**The American Society of  
Mechanical Engineers**

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Three Park Avenue • New York, NY 10016

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## FOREWORD

Pipeline system operators continuously work to improve the safety of their systems and operations. In the United States, both liquid and gas pipeline operators have been working with their regulators for several years to develop a more systematic approach to pipeline safety integrity management.

The gas pipeline industry needed to address many technical concerns before an integrity management standard could be written. A number of initiatives were undertaken by the industry to answer these questions; as a result of two years' intensive work by a number of technical experts in their fields, 20 reports were issued that provided the responses required to complete the 2002 edition of this Standard. (The list of these reports is included in the reference section of this Standard.)

This Standard is nonmandatory, and is designed to supplement B31.8, ASME Code for Pressure Piping, Gas Transmission and Distribution Piping Systems. Not all operators or countries will decide to implement this Standard. This Standard becomes mandatory only when pipeline regulators include it as a requirement in their regulations.

This Standard is a process standard, which describes the process an operator may use to develop an integrity management program. It also provides two approaches for developing an integrity management program: a prescriptive approach and a performance or risk-based approach. Pipeline operators in a number of countries are currently utilizing risk-based or risk-management principles to improve the safety of their systems. Some of the international standards issued on this subject were utilized as resources for writing this Standard. Particular recognition is given to API and their liquids integrity management standard, API 1160, which was used as a model for the format of this Standard.

The intent of this Standard is to provide a systematic, comprehensive, and integrated approach to managing the safety and integrity of pipeline systems. The task force that developed this Standard hopes that it has achieved that intent.

This Supplement was approved by the ASME Standards Committee and by the ASME Board on Pressure Technology Codes and Standards. It was approved as an American National Standard on March 17, 2004.

# ASME CODE FOR PRESSURE PIPING, B31

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## SUMMARY OF CHANGES

Changes given below are identified on the pages by a margin note, (04), placed next to the affected area.

<i>Page</i>	<i>Location</i>	<i>Change</i>
1-3	1.3	Seventh paragraph revised
	2.1	Last paragraph revised
5, 6	2.3.4	Last paragraph revised
	2.4.2	Title revised
10, 11	4.5	Examples revised
	5.3	Last paragraph revised
14	5.7(j)	Revised
15, 16	5.10	Third and next ultimate paragraphs revised
	5.11	Second paragraph revised
	5.12	Revised
	6.1	Third paragraph revised
17	6.2	Revised
18	6.2.6	Second paragraph revised
19	6.3.2	Second and third paragraphs revised
20, 23	7.2.1	Last paragraph revised
24	7.3.1	First paragraph revised
26	7.4.1	First paragraph revised
27	7.2	Second paragraph revised
	9.2.2	Revised
31, 32	10.2	Last paragraph revised
	11(b)(1)	Revised
33, 36	12.2(b)(4)	Revised
	13	(1) <i>B31G</i> deleted (2) <i>right-of-way</i> revised
45	A3.4.2(d)(2)(a)	Revised
60	Appendix C	Added

# MANAGING SYSTEM INTEGRITY OF GAS PIPELINES

## 1 INTRODUCTION

### 1.1 Scope

This Standard applies to onshore pipeline systems constructed with ferrous materials and that transport gas. *Pipeline system* means all parts of physical facilities through which gas is transported, including pipe, valves, appurtenances attached to pipe, compressor units, metering stations, regulator stations, delivery stations, holders, and fabricated assemblies. The principles and processes embodied in integrity management are applicable to all pipeline systems.

This Standard is specifically designed to provide the operator (as defined in para. 13) with the information necessary to develop and implement an effective integrity management program utilizing proven industry practices and processes. The processes and approaches within this Standard are applicable to the entire pipeline system.

### 1.2 Purpose and Objectives

Managing the integrity of a gas pipeline system is the primary goal of every pipeline system operator. Operators want to continue providing safe and reliable delivery of natural gas to their customers without adverse effects on employees, the public, customers, or the environment. Incident-free operation has been and continues to be the gas pipeline industry's goal. The use of this Standard as a supplement to the ASME B31.8 Code will allow pipeline operators to move closer to that goal.

A comprehensive, systematic, and integrated integrity management program provides the means to improve the safety of pipeline systems. Such an integrity management program provides the information for an operator to effectively allocate resources for appropriate prevention, detection, and mitigation activities that will result in improved safety and a reduction in the number of incidents.

This Standard describes a process that an operator of a pipeline system can use to assess and mitigate risks in order to reduce both the likelihood and consequences of incidents. It covers both a prescriptive- and a performance-based integrity management program.

The prescriptive process, when followed explicitly, will provide all the inspection, prevention, detection, and mitigation activities necessary to produce a satisfactory integrity management program. This does not preclude conformance with the requirements of ASME

B31.8. The performance-based integrity management program alternative utilizes more data and more extensive risk analyses, which enables the operator to achieve a greater degree of flexibility in order to meet or exceed the requirements of this Standard specifically in the areas of inspection intervals, tools used, and mitigation techniques employed. An operator cannot proceed with the performance-based integrity program until adequate inspections are performed that provide the information on the pipeline condition required by the prescriptive-based program. The level of assurance of a performance-based program or an alternative international standard must meet or exceed that of a prescriptive program.

The requirements for prescriptive- and performance-based integrity management programs are provided in each of the paragraphs in this Standard. In addition, Normative Appendix A provides specific activities, by the categories, that an operator shall follow in order to produce a satisfactory prescriptive integrity management program.

This Standard is intended for use by individuals and teams charged with planning, implementing, and improving a pipeline integrity management program. Typically, a team will include managers, engineers, operating personnel, technicians, and/or specialists with specific expertise in prevention, detection, and mitigation activities.

### 1.3 Integrity Management Principles

(04)

A set of principles is the basis for the intent and specific details of this Standard. They are enumerated here so that the user of this Standard can understand the breadth and depth to which integrity shall be an integral and continuing part of the safe operation of a pipeline system.

Functional requirements for integrity management shall be engineered into new pipeline systems from initial planning, design, material selection, and construction. Integrity management of a pipeline starts with sound design, material selection, and construction of the pipeline. Guidance for these activities is primarily provided in ASME B31.8. There are also a number of consensus standards that may be used, as well as pipeline jurisdictional safety regulations. If a new line is to become a part of an integrity management program, the functional requirements for the line, including prevention, detection, and mitigation activities, shall be considered in order to meet this Standard. Complete records