(Revision of ASME B31.8-2010)

Gas Transmission and Distribution Piping Systems

ASME Code for Pressure Piping, B31

AN AMERICAN NATIONAL STANDARD



ASME B31.8-2012

(Revision of ASME B31.8-2010)

Gas Transmission and Distribution Piping Systems

ASME Code for Pressure Piping, B31

AN AMERICAN NATIONAL STANDARD



Date of Issuance: January 4, 2013

The next edition of this Code is scheduled for publication in 2014. This Code will become effective 6 months after the Date of Issuance.

ASME issues written replies to inquiries concerning interpretations of technical aspects of this Code. Interpretations, Code Cases, and errata are published on the ASME Web site under the Committee Pages at http://cstools.asme.org/ as they are issued.

Errata to codes and standards may be posted on the ASME Web site under the Committee Pages to provide corrections to incorrectly published items, or to correct typographical or grammatical errors in codes and standards. Such errata shall be used on the date posted.

The Committee Pages can be found at http://cstools.asme.org/. There is an option available to automatically receive an e-mail notification when errata are posted to a particular code or standard. This option can be found on the appropriate Committee Page after selecting "Errata" in the "Publication Information" section.

ASME is the registered trademark of The American Society of Mechanical Engineers.

This code or standard was developed under procedures accredited as meeting the criteria for American National Standards. The Standards Committee that approved the code or standard was balanced to assure that individuals from competent and concerned interests have had an opportunity to participate. The proposed code or standard was made available for public review and comment that provides an opportunity for additional public input from industry, academia, regulatory agencies, and the public-at-large.

ASME does not "approve," "rate," or "endorse" any item, construction, proprietary device, or activity.

ASME does not take any position with respect to the validity of any patent rights asserted in connection with any items mentioned in this document, and does not undertake to insure anyone utilizing a standard against liability for infringement of any applicable letters patent, nor assumes any such liability. Users of a code or standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, is entirely their own responsibility.

Participation by federal agency representative(s) or person(s) affiliated with industry is not to be interpreted as government or industry endorsement of this code or standard.

ASME accepts responsibility for only those interpretations of this document issued in accordance with the established ASME procedures and policies, which precludes the issuance of interpretations by individuals.

No part of this document may be reproduced in any form, in an electronic retrieval system or otherwise, without the prior written permission of the publisher.

The American Society of Mechanical Engineers Three Park Avenue, New York, NY 10016-5990

Copyright © 2013 by
THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS
All rights reserved
Printed in U.S.A.

CONTENTS

Foreword		viii
Committee Roster .		х
		xiv
	S	xvi
<i>-</i>	General Provisions and Definitions	
801	General	1
802	Scope and Intent	1
803	Piping Systems Definitions	2
804	Piping Systems Component Definitions	4
805	Design, Fabrication, Operation, and Testing Terms and Definitions	6
806	Quality Assurance	12
807	Training and Qualification of Personnel	12
Chapter I	Materials and Equipment	
810	Materials and Equipment	14
811	Qualification of Materials and Equipment	14
812	Materials for Use in Low Temperature Applications	15
813	Marking	15
814	Material Specifications	15
815	Equipment Specifications	16
816	Transportation of Line Pipe	16
817	Conditions for the Reuse of Pipe	16
	conditions for the rease of ripe	10
Table	Tanaila Tastina	17
817.1.3-1	Tensile Testing	17
Chapter II	Welding	
820	Welding	19
821	General	19
822	Preparation for Welding	19
823	Qualification of Procedures and Welders	19
824	Preheating	20
825	Stress Relieving	20
826	Weld Inspection Requirements	21
827	Repair or Removal of Defective Welds in Piping Intended to Operate at Hoop Stress Levels of 20% or More of the Specified Minimum Yield Strength	22
Chapter III	Piping System Components and Fabrication Details	
830	Piping System Components and Fabrication Details	23
831	Piping System Components	23
832	Expansion and Flexibility	29
833	Design for Longitudinal Stress	30
834	Supports and Anchorage for Exposed Piping	33
835	Anchorage for Buried Piping	33
	- menorage vor 2 miles - Amile	55
Tables	Rainforcement of Wolded Branch Connections Special	
831.4.2-1	Reinforcement of Welded Branch Connections, Special	20
832.2-1	Requirements	28
0.52.2-1	Thermal Expansion or Contraction of Piping	30

832.5-1	Modulus of Elasticity for Carbon and Low Alloy Steel	31
Chapter IV	Design, Installation, and Testing	
840	Design, Installation, and Testing	35
841	Steel Pipe	37
842	Other Materials	50
843	Compressor Stations	58
844	Pipe-Type and Bottle-Type Holders	61
845	Control and Limiting of Gas Pressure	62
846	Valves	67
847	Vaults	68
848	Customers' Meters and Regulators	69
849	Gas Service Lines	70
Tables		
841.1.6-1	Basic Design Factor, F	40
841.1.6-2	Design Factors for Steel Pipe Construction	40
841.1.7-1	Longitudinal Joint Factor, E	41
841.1.8-1	Temperature Derating Factor, <i>T</i> , for Steel Pipe	41
841.1.11-1	Pipeline Cover Requirements	43
841.2.3-1	Pipeline Field Cold Bend Requirements	44
841.3.2-1	Test Requirements for Steel Pipelines and Mains to	
	Operate at Hoop Stresses of 30% or More of the Specified Minimum Yield Strength of the Pipe	48
841.3.3-1	Maximum Hoop Stress Permissible During an Air or Gas	
842.1.1-1	Test	49
040 0 0 1	Iron Pipe	51
842.2.2-1	Wall Thickness and Standard Dimension Ratio for Thermoplastic Pipe	53
842.2.3-1	Diameter and Wall Thickness for Reinforced Thermosetting Plastic Pipe	53
842.2.9-1	Nominal Values for Coefficients of Thermal Expansion of Thermoplastic Pipe Materials	55
844.3-1	Design Factors, F	61
844.3-2	Minimum Clearance Between Containers and Fenced	
0.47.0.0.4	Boundaries	61
845.2.2-1	Maximum Allowable Operating Pressure for Steel or Plastic Pipelines or Mains	62
845.2.3-1	Maximum Allowable Operating Pressure for Pipelines	60
0.45.0.0	Operating at 100 psig (690 kPa) or More	63
845.2.3-2	Maximum Allowable Operating Pressure for Pipelines Operating at Less Than 100 psig (690 kPa)	63
Chapter V	Operating and Maintenance Procedures	
850	Operating and Maintenance Procedures Affecting the	
	Safety of Gas Transmission and Distribution Facilities	74
851	Pipeline Maintenance	7 4 76
852	•	82
	Distribution Piping Maintenance	
853 854	Miscellaneous Facilities Maintenance	85
854	Location Class and Changes in Number of Buildings Intended for Human Occupancy	88
855	Pipeline Service Conversions	89
856	Odorization	90
857	Uprating	91

Figure 851.4.1-1	Allowable Ripple Heights	78
Table	11 0	
851.4.4-1	Wall Thickness for Unlikely Occurrence of Burn- Through	80
854.1-1	Location Class	88
857.4-1	Wall Thickness Allowance for Uprating a Ductile Iron	00
00771	High-Pressure Main or System	93
Chapter VI	Corrosion Control	
860	Corrosion Control — General	94
861	External Corrosion Control for Steel Pipelines	95
862	Cathodic Protection Criteria	97
863	Operation and Maintenance of Cathodic Protection	
244	Systems	97
864	Internal Corrosion Control	97
865	Steel Pipelines in Arctic Environments	98
866	Steel Pipelines in High-Temperature Service	99
867	Stress Corrosion and Other Phenomena	100
868	Cast Iron, Wrought Iron, Ductile Iron, and Other Metallic Pipelines	100
Chapter VII	Intentionally Left Blank	
Chapter VIII	Offshore Gas Transmission	
A800	Offshore Gas Transmission	102
A801	General	102
A802	Scope and Intent	102
A803	Offshore Gas Transmission Terms and Definitions	102
A811	Qualification of Materials and Equipment	103
A814	Material Specifications	103
A817	Conditions for the Reuse and Requalification of Pipe	104
A820	Welding Offshore Pipelines	104
A821	General	104
A823	Qualification of Procedures and Welders	104
A825	Stress Relieving	104
A826	Inspection of Welds	105
A830	Piping System Components and Fabrication Details	105
A831	Piping System Components	105
A832 A834	Expansion and Flexibility	105
A835	Supports and Anchorage for Exposed Piping Anchorage for Buried Piping	105 105
A840	Design, Installation, and Testing	105
A841	Design Considerations	106
A842	Strength Considerations	107
A843	Compressor Stations	110
A844	On-Bottom Stability	111
A846	Valves	112
A847	Testing	112
A850	Operating and Maintenance Procedures Affecting the	
	Safety of Gas Transmission Facilities	112
A851	Pipeline Maintenance	113
A854	Location Class	114
A860	Corrosion Control of Offshore Pipelines	114
A861	External Corrosion Control	114
A862	Cathodic Protection Criteria	116
4 Xb/L	Intornal Lorrogion Lontrol	116

Table		
A842.2.2-1	Design Factors for Offshore Pipelines, Platform	
	Piping, and Pipeline Risers	109
Chanter IV	Sour Gas Service	
Chapter IX B800	Sour Gas Service	117
B801	General	117
B802		117
	Scope and Intent	
B803 B813	Sour Gas Terms and Definitions	117 118
	Marking	
B814	Material Specifications	118
B820	Welding Sour Gas Pipelines	118
B821	General	118
B822	Preparation for Welding	118
B823	Qualification of Procedures and Welders	118
B824	Preheating	118
B825	Stress Relieving	119
B826	Welding and Inspection Tests	119
B830	Piping System Components and Fabrication Details	119
B831	Piping System Components	119
B840	Design, Installation, and Testing	119
B841	Steel Pipe	119
B842	Other Materials	120
B843	Compressor Stations	120
B844	Pipe-Type and Bottle-Type Holders	120
B850	Additional Operating and Maintenance Considerations Affecting the Safety of Sour Gas	
	Pipelines	120
B851	Pipeline Maintenance	121
B854	Location Class and Changes in Number of Buildings	
	Intended for Human Occupancy	122
B860	Corrosion Control of Sour Gas Pipelines	122
B861	External Corrosion Control for Steel Pipelines	122
B864	Internal Corrosion Control	122
B867	Stress Corrosion and Other Phenomena	123
Tables		
B850.1-1	100-ppm ROE	121
B850.1-2	500-ppm ROE	121
B850.1-3	Metric Example for 100-ppm ROE	121
B850.1-4	Metric Example for 500-ppm ROE	122
Appendices		
Mandatory Appendix A	References	125
Mandatory Appendix B	Numbers and Subjects of Standards and Specifications	129
Nonmandatory Appendix C	That Appear in Mandatory Appendix A Publications That Do Not Appear in the Code or	
Mandatory Appendix D	Mandatory Appendix A Specified Minimum Yield Strength for Steel Pipe	130
M 1 / A 1: E	Commonly Used in Piping Systems	133
Mandatory Appendix E	Flexibility and Stress Intensification Factors	136
Mandatory Appendix F	Extruded Headers and Welded Branch Connections	142
Mandatory Appendix G	Testing of Welders Limited to Work on Lines Operating at Hoop Stresses of Less Than 20% of the Specified	150
Mandatawa Assess 11 TT	Minimum Yield Strength	150
Mandatory Appendix H	Flattening Test for Pipe	151
Mandatory Appendix I	End Preparations for Buttwelding	152
Nonmandatory Appendix J	Commonly Used Conversion Factors	161

Mandatory Appendix K	Criteria for Cathodic Protection	165
Nonmandatory Appendix L	Determination of Remaining Strength of Corroded	
, ,,	Pipe	167
Nonmandatory Appendix M	Gas Leakage Control Criteria	168
Nonmandatory Appendix N	Recommended Practice for Hydrostatic Testing of	
	Pipelines in Place	175
Nonmandatory Appendix O	Preparation of Technical Inquiries	177
Nonmandatory Appendix P	Nomenclature for Figures	178
Mandatory Appendix Q	Scope Diagrams	179
Nonmandatory Appendix R	Estimating Strain in Dents	182
Index		183