GPTC GUIDE FOR GAS TRANSMISSION AND DISTRIBUTION PIPING SYSTEMS

2003 EDITON

ADDENDUM NO. 6, September 2006

The changes in this addendum are marked by wide vertical lines inserted to the left of modified text or by overwriting the left border of most tables. The Federal Regulations were changed by 1 amendment that affected 30 sections of the guide. Nine transactions affected 12 sections of the guide.

Editorial updates include application of the Editorial Guidelines, updating reference titles, adjustments to page numbering, and adjustment of text on pages. While only significant editorial updates are marked, all affected pages carry the current addendum footnote. Editorial updates affected 24 sections of the guide (plus other sections impacted by page adjustments).

The following table shows the affected sections, the pages to be removed, and their replacement pages.

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FS Amendment - Amdt. Number
New or Updated GM - TR Number
GM Under Review - GMUR
Editorial Update - EU

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Table of Contents		EU		
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Historical Record of Amendments to Part 192		EU	xlix/l thru lix/lx	xlix/l thru lix/lx
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GMA G-191-5	EU	PHMSA form (dated 12/03) and instructions for Transmission and Gathering Systems Annual Report 2004	PHMSA form (dated 12/05) and instructions for Transmission and Gathering Systems Annual Report 2005
GMA G-192-1	EU, TR04-13, TR04-30, TR04-39, TR05-04,	315/316 thru 326(c)/326(d)	315/316 thru 326(c)/326(d)
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PLEASE NOTE

Addenda to this Guide will also be issued in loose-leaf format so that users will be able to keep the Guide up-to-date by replacing the pages that have been revised with the new pages. It is advisable, however, that pages which have been revised be retained so that the chronological development of the Federal Regulations and the Guide is maintained.

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	[192.17]	01/01/71	192-1, 192-27A Ext., 192-38 (removed)
SUBPART B – MATERIALS	192.51		
	192.53		
	192.55		192-3, 192-12, 192-51, 192-68, 192-85
	192.57		192-62 (removed and reserved)
	192.59		192-19, 192-58
	192.61		192-62 (removed and reserved)
	192.63		192-3, 192-31, 192-31A, 192-61, 192-61A, 192-62, 192-68, 192-76
	192.65		192-12, 192-17, 192-68

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HISTORICAL RECONSTRUCTION OF PART 192

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Part 192 Subpart	Part 192 Section	Effective Date of Original Version if other than 11/12/70	Amendments (if any)
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	192.113		192-37, 192-51, 192-62, 192-68, 192-85, 192-94
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	192.117		192-37, 192-62 (removed and reserved)
	192.119		192-62 (removed and reserved)
	192.121		192-31, 192-78, 192-85, 192-94, 192-103
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	192.149		
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	192.229		192-18, 192-18A, 192-37, 192-78, 192-85, 192-94, 192-103
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	192.233		
	192.235		
	[192.237]		192-37, 192-52 (removed)
	[192.239]		192-37, 192-52 (removed)
	192.241		192-18, 192-18A, 192-37, 192-78, 192-85, 192-94, 192-103
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	192.287	07/01/80	192-34 + Ext., 192-94

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	App. B		192-3, 192-12, 192-19, 192-22, 192-32, 192-37, 192-41, 192-51, 192-61, 192-62, 192-65, 192-68, 192-76, 192-85, 192-94, 192-103
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	App E	12/15/03	192-95

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HISTORICAL RECORD OF AMENDMENTS TO PART 192

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Amdt 192-	Subject	Vol FR Pg#	Published Date	Docket No.	Effective Date	Affected Sections 192.
102	Gas Gathering Line Definition	71 FR 13289	03/15/06	RIN 2137-AB15	04/14/06	1, 7, 8, 9, 13, 452, 619
103	Update of Regulatory References to Technical Standards	71 FR 33402	06/09/06	RIN 2138-AD68	07/10/06	7, 121, 123, 145, 225, 227, 229, 241, 283, 616, 619, Header before 761, Subpart O Header, 903, 907, 911, 913, 917, 921, 923, 925, 927, 929, 931, 933, 935, 937, 939, 945, App. B

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		Distribution	Manufacturers	Transmission	Design	DP/ER	IMP/Corrosion	O&M/OQ	Plastic Pipe	Regulations	Editorial	Executive	Liaison
Abraham, Richard A. New England Gas Co., Providence, RI	X	X				X					X		
Affonso, Joaquin J. Consumers Energy Co., Jackson, MI	X			X		X	X						
Alexander, Thomas D. Willbros Engr., Inc., Tulsa, OK	X			X	X								
Armstrong, Glen F., Jr. EN Engineering, Woodridge, IL	X	Chair				X	X		X	X		X	
Barkei, David E. We Engeries, Milwaukee, WI		X			X		X						
Batten, Charles H. Batten & Associates., Inc., Locust Grove, VA	X	X				X		X					
Beaver, Brett Advantica, Carlise, PA		X			X		X						
Becken, Robert C. Energy Experts Int. Pleasant Hill, CA	X			X	X			X			X		
Bennett, Frank M. PPL Gas Utilities Corp., Lancaster, PA		X				X	X						
Bezner, William A. CSR PolyPipe, Inc., Gainesville, TX			X						X				

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Blaney, Steven D. NY State Dept. of Public Service, Albany, NY	X	X				X	X				X		
Blanton, Glynn TN Regulatory Authority, Nashville, TN		X				X		X					
Booth, Lloyd E. Southern Cross Corp., Coppell, TX			X		X			X					
Boros, Stephen Plastics Pipe Institute, Washington, DC			X						X				
Borski, Lawrence W. Williams Gas Pipeline-Transco, Houston, TX				X				X					
Bull, David E. ViaData LP, Tobyhanna, PA	X	X				SEC		X					
Cabot, Paul W. American Gas Association, Washington, DC	SEC											SEC	
Cadorin, Robert J. Great Lakes Gas Trmn. Co., Troy, MI	X			X				X					
Carey, Willard S. Public Service Elec. & Gas Co., Newark, NJ	X	X				X		Chair				X	
Chin, John S. El Paso Corp., Farmington Hills, MI	X			X	X	X	Chair			X		X	

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		Distribution	Manufacturers	Transmission	Design	DP/ER	IMP/Corrosion	O&M/OQ	Plastic Pipe	Regulations	Editorial	Executive	Liaison
Clarke, Allan M. Duke Energy Corp., Houston, TX				Sec	X	X	X						
Cody, Leo T. KeySpan Corp., Waltham, MA		X				X		X					
Craig, Jim M. McElroy Mfg., Inc., Tulsa, OK			X					X	X				
De Leon, Cesar PanAm P/L Technology, Inc., San Antonio, TX	X			X				X					
Del Buono, Amerigo J. Steel Forgings, Inc., League City, TX	X		X										
DeVore, James C. Consultant, Green Valley, AZ	X		X		X		X		X				
Dockweiler, Kenneth D. Kinder Morgan, Inc., Casper, WY	X			X		X		X					
Erickson, John P. American Public Gas Association, Washington, DC		X						X					
Fleet, F. Roy F. Roy Fleet, Inc., Westmont, IL	X			X		X					X		
Frantz, John H. PECO Energy, Philadelphia, PA	X											X	Chair

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		Distribution	Manufacturers	Transmission	Design	DP/ER	IMP/Corrosion	O&M/OQ	Plastic Pipe	Regulations	Editorial	Executive	Liaison
Frederick, Victor M., III Utility Line Services, Conshohocken, PA		X						X	X				
Fuller, William R. Xcel Energy, Inc., Denver, CO	X	X			X		X		X				
Groeber, Steve A. Philadelphia Gas Works, Philadelphia, PA		X				X		X	X		X		
Gunther, Karl M. NTSB, Washington, DC	X	X							X				
Hansen, Jim Perfection Corp., Madison, OH			X				X						
Hart, Thomas L. NSTAR Electric & Gas Corp., Westwood, MA		X				X		X					
Hazelden, Glyn Gas Technology Institute, Des Plaines, IL		X				X		X					
Heintz, James R. UGI Utilities, Inc., Reading, PA	X	X				X	X		X	X		X	
Henningsgaard, David R. CenterPoint Energy-Minnegasco, Minneapolis, MN		X			X	X		X					
Henry, Jill A. Ohio PUC, Columbus, OH	X	X				X			X				

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	Main Body	**Distribution**	**Manufacturers**	**Transmission**	**Design**	**DP/ER**	**IMP/Corrosion**	**O&M/OQ**	**Plastic Pipe**	**Regulations**	**Editorial**	**Executive**	**Liaison**
Hotinger, James M. VA State Corp. Comm., Richmond, VA		X				X	X						
Humes, Dennis W. Mueller Co.- Gas Products Div., Decatur, IL	X		X							X			
Hurbanek, Stephen F. Pennsylvania PUC, Darlington, PA		X				X							
Huriaux, Richard D. PHMSA, Washington, DC	X			X			X						
Kirkland, David L. Columbia Gas Trmn. Corp., Charleston, WV				X		X	X						
Kottwitz, John D. MO Public Service Comm., Jefferson City, MO	X	X				Chair		X			X	X	
Krummert, Lawrence Columbia Gas of PA		X						X					
Lathrap, Philip A. Retired-Pacific Gas & Elec. Co., Lafayette, CA	X	X			X	X		X					
Lee, Stewart Pacific Gas and Electric Co.				X	X			X					
Lewis, Raymond D. Rosen USA, Houston, TX	X			X			X						

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		Distribution	Manufacturers	Transmission	Design	DP/ER	IMP/Corrosion	O&M/OQ	Plastic Pipe	Regulations	Editorial	Executive	Liaison
Lively, Karen S. Performance Pipe, Plano, TX			X		X				X				
Loker, Jon O. Pipeline Safety Consultant, Saint Albans, WV	X			X							Chair	X	
Lomax, George S. Heath Consultants, Inc., Montoursville, PA	X		X			X		X					
Lueders, John D. DTE Energy - MichCon, Grand Rapids, MI		X				X		X					
Mackay-Smith, Seth UMAC, Inc., Exton, PA	X		X		X	X							
Marek, Marti Southwest Gas Corp., Las Vegas, NV	Chair											X	
Mason, James F. Arkema, Inc., King of Prussia, PA			X						X				
McKenzie, James E. Atmos Energy Corp., Jackson, MS		X					X						
McMaine Jeffrey B. Texas Gas Trmn., LLC, Owensboro, KY				X	X		X						
Miller, D. Lane Transportation Safety Inst., Oklahoma City, OK	X	X					X		X		Sec		

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		Distribution	Manufacturers	Transmission	Design	DP/ER	IMP/Corrosion	O&M/OQ	Plastic Pipe	Regulations	Editorial	Executive	Liaison
Naper, Robert C. KeySpan Corp., Waltham, MA		X				X							
Oleksa, Paul E. Oleksa & Assoc., Akron, OH	X	X			X		X				X		
Palermo, Eugene F. Palermo Plastics Pipe Consulting, Oak Hill, VA	X		X		X				X				
Peters, Kenneth C. El Paso Corp. Pipeline Group, Birmingham, AL	X			Chair		X		X				X	
Pioli, Christopher A. Jacobs Consultancy, Pasadena, CA		X			X	X	X						
Quezada, Leticia Nicor Gas, Naperville, IL	X	X				X			X	Chair		X	
Reynolds, Donald Lee NiSource Inc., Columbus, OH		X			Chair		X					X	
Roberson, Edwin H. Natural Gas Odorizing, Katy, TX			X					X					
Robertson, Joseph P. Williams Gas Pipeline-NW, Salt Lake City, UT				X		X	X						
Schmidt, Robert A. Trinity Industry, Russellville, AR	X		Chair		X							X	

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GAS PIPING TECHNOLOGY COMMITTEE MEMBERSHIP LIST

(Continued)

Abbreviations: Chairperson: Chair First Vice Chairperson: 1st V Chair Second Vice Chairperson: 2nd V Chair Secretary: Sec Damage Prevention - Emergency Response: DP/ER Operation and Maintenance: O&M	Main Body	DIVISIONS			TASK GROUPS					SECTIONS			
		Distribution	Manufacturers	Transmission	Design	DP/ER	IMP/Corrosion	O&M/OQ	Plastic Pipe	Regulations	Editorial	Executive	Liaison
Scott, Edward W. AmerenIP, Pawnee, IL		X					X		X				
Seamands, Patrick A. Laclede Gas Co., Saint Louis, MO		X				X			X		X		
Sher, Philip CT Dept. Public Utility Control, New Britain, CT	2nd V Chair											X	
Siedlecki, Walter AEGIS Insurance Services, Inc., Jersey City, NJ		X						X					
Slagle, Richard Vectren Energy Delivery of OH, Evansville, IN	X	SEC				X			Chair				
Sprenger, Roger W. San Diego Gas & Elec. Co., San Diego, CA		X				X		X					
Stewart, Lee Pacific Gas and Electric Co.				X		X		X					
Strohm, Billy J. George Fischer Sloane, Little Rock, AR			X						X				
Themig, Jerome S. Ameren Services Co., Pawnee, IL		X				X		X					
Torbin, Robert Cutting Edge Solutions, LLC, Framingham, MA		X					X						

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(Continued)

Abbreviations: Chairperson: Chair First Vice Chairperson: 1st V Chair Second Vice Chairperson: 2nd V Chair Secretary: Sec Damage Prevention - Emergency Response: DP/ER Operation and Maintenance: O&M	Main Body	DIVISIONS			TASK GROUPS					SECTIONS			
		Distribution	Manufacturers	Transmission	Design	DP/ER	IMP/Corrosion	O&M/OQ	Plastic Pipe	Regulations	Editorial	Executive	Liaison
Troch, Steven J. Baltimore Gas & Electric Co., Baltimore, MD		X					X						
Ulanday, Alfredo S. Peoples Energy Corp., Chicago, IL		X				X		X					
Veerapaneni, Ram DTE Energy - MichCon, Detroit, MI		X				X	X				X		
Volgstadt, Frank R. Volgstadt & Associates, Inc., Madison, OH	X		SEC						SEC				
Weber, David E. Keyspan Corp., Waltham, MA	X	X							X		X		
Wilkes, Al Performance Pipe, Plano, TX			X		X				X				
Wolf, Brian D. Iroquois Pipeline Operating Co., Shelton, CT					X	X	X						
Wolf, Russell A. Willbros Engr., Inc., Tulsa, OK				X	X								
Zapalac, Daniel P. R.W. Lyall & Co., Inc., Corona, CA			X						X				

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Tensile strength is the highest unit tensile stress (referred to the original cross section) that a material can sustain before failure (psi)

Thermoplastic is a plastic, which is capable of being repeatedly softened by increase of temperature, and hardened by decreases of temperature.

Thermosetting plastic is a plastic that is capable of being changed into a substantially infusible or insoluble product when cured under the application of heat or by chemical means.

Thickness. See *Nominal wall thickness*.

Valve. See *Curb valve and Service line valve*.

Vault is an underground structure which may be entered, and which is designed to contain piping and piping components (such as valves or pressure regulators).

Yield strength is the strength at which a material exhibits a specified limiting permanent set, or produces a specified total elongation under load. The specified limiting set or elongation is usually expressed as a percentage of gage length, and its values are specified in the various material specifications acceptable under this Guide.

GLOSSARY OF COMMONLY USED ABBREVIATIONS

Abbreviation	Meaning
ABS	acrylonitrile-butadiene-styrene
ASV	automatic shut-off valve
BAP	baseline assessment plan
CAB	cellulose acetate butyrate
CDA	confirmatory direct assessment
CGI	combustible gas indicator
DA	direct assessment
ECDA	external corrosion direct assessment
EFV	excess flow valve
EFVB	excess flow valve – bypass (automatic reset)
EFVNB	excess flow valve – non-bypass (manual reset)
ERW	electric resistance welded
ESD	emergency shutdown
FAQ	frequently asked question
HCA	high consequence area
HDB	hydrostatic design basis
HFI	hydrogen flame ionization
IC	internal corrosion
ICDA	internal corrosion direct assessment
ILI	In-line inspection
IMP	integrity management program
IR drop	voltage drop
LEL	lower explosive limit
LNG	liquefied natural gas
LPG	liquid petroleum gas
LTHS	long-term hydrostatic strength
MAOP	maximum allowable operating pressure
MRS	minimum required strength
NPS	nominal pipe size
O&M	operations and maintenance
OCS	outer continental shelf
OQ	operator qualification

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GLOSSARY OF COMMOMLY USED APPBREVIATIONS (Continued)	
Abbreviation	**Meaning**
PA	Polyamide
P&M measures	preventive and mitigative measures
PDB	pressure design basis
PE	polyethylene
PVC	poly (vinyl chloride), also written as polyvinyl chloride
RCV	remote control valve
SCADA	supervisory control and data acquisition
SCC	stress corrosion cracking
SCCDA	stress corrosion cracking direct assessment
SDB	strength design basis
SDR	standard dimension ratio
SMYS	specified minimum yield strength

§192.5

Class locations.

[Effective Date: 7-13-98]

(a) This section classifies pipeline locations for purposes of this part. The following criteria apply to classifications under this section.

(1) A "class location unit" is an onshore area that extends 220 yards (200 meters) on either side of the centerline of any continuous 1- mile (1.6 kilometers) length of pipeline.

(2) Each separate dwelling unit in a multiple dwelling unit building is counted as a separate building intended for human occupancy.

(b) Except as provided in paragraph (c) of this section, pipeline locations are classified as follows:

(1) A Class 1 location is:

(i) An offshore area; or

(ii) Any class location unit that has 10 or fewer buildings intended for human occupancy.

(2) A Class 2 location is any class location unit that has more than 10 but fewer than 46 buildings intended for human occupancy.

(3) A Class 3 location is:

(i) Any class location unit that has 46 or more buildings intended for human occupancy; or

(ii) An area where the pipeline lies within 100 yards (91 meters) of either a building or a small, well-defined outside area (such as a playground, recreation area, outdoor theater, or other place of public assembly) that is occupied by 20 or more persons on at least 5 days a week for 10 weeks in any 12-month period. (The days and weeks need not be consecutive.)

(4) A Class 4 location is any class location unit where buildings with four or more stories above ground are prevalent.

(c) The length of Class locations 2, 3, and 4 may be adjusted as follows:

(1) A Class 4 location ends 220 yards (200 meters) from the nearest building with four or more stories above ground.

(2) When a cluster of buildings intended for human occupancy requires a Class 2 or 3 location, the class location ends 220 yards (200 meters) from the nearest building in the cluster.

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[Amdt. 192-27, 41 FR 34598, Aug. 16, 1976; Amdt. 192-56, 52 FR 32924, Sept. 1, 1987; Amdt. 192-78, 61 FR 28770, June 6, 1996 with Amdt. 192-78 Correction, 61 FR 30824, June 18, 1996 and Amdt. 192-78 Correction, 61 FR 35139, July 5, 1996; Amdt. 192-85, 63 FR 37500, July 13, 1998]

GUIDE MATERIAL

No guide material available at present.

§192.7

What documents are incorporated by reference partly or wholly in this part?

[Effective Date: 7-10-06]

(a) Any documents or portions thereof incorporated by reference in this part are included in this part as though set out in full. When only a portion of a document is referenced, the remainder is not incorporated in this part.

(b) All incorporated materials are available for inspection in the Pipeline and Hazardous Materials Safety Administration, 400 Seventh Street, SW., Washington, DC, or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202–741–6030 or go to: *http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html*. These materials have been approved for incorporation by reference by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. In addition, the incorporated materials are available from the respective organizations listed in paragraph (c) (1) of this section.

(c) The full titles of documents incorporated by reference, in whole or in part, are provided herein. The numbers in parentheses indicate applicable editions. For each incorporated document, citations of all affected sections are provided. Earlier editions of currently listed documents or editions of documents listed in previous editions of 49 CFR part 192 may be used for materials and components designed, manufactured, or installed in accordance with these earlier documents at the time they were listed. The user must refer to the appropriate previous edition of 49 CFR part 192 for a listing of the earlier listed editions or documents.

(1) Incorporated by reference (IBR). List of Organizations and Addresses:

A. Pipeline Research Council International, Inc. (PRCI), c/o Technical Toolboxes, 3801 Kirby Drive, Suite 520, Houston, TX 77098.

B. American Petroleum Institute (API), 1220 L Street, NW, Washington, DC 20005.

C. American Society for Testing and Materials (ASTM), 100 Barr Harbor Drive, West Conshohocken, PA 19428.

D. ASME International (ASME), Three Park Avenue, New York, NY 10016–5990.

E. Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. (MSS), 127 Park Street, NE, Vienna, VA 22180.

F. National Fire Protection Association (NFPA), 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269–9101.

G. Plastics Pipe Institute, Inc. (PPI), 1825 Connecticut Avenue, NW, Suite 680, Washington, DC 20009.

H. NACE International (NACE), 1440 South Creek Drive, Houston, TX 77084.

I. Gas Technology Institute (GTI), 1700 South Mount Prospect Road, Des Plaines, IL 60018.

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(2) Documents incorporated by reference (Numbers in Parentheses Indicate Applicable Editions).

Source and name of referenced material	49 CFR reference
A. Pipeline Research Council International, Inc. (PRCI):	
(1) AGA Pipeline Research Committee, Project PR–3–805, ''A Modified Criterion for Evaluating the Remaining Strength of Corroded Pipe,'' (December 22, 1989). The RSTRENG program may be used for calculating remaining strength.	§§192.933(a); 192.485(c).
B. American Petroleum Institute (API):	
(1) API Specification 5L ''Specification for Line Pipe,'' (43rd edition and errata, 2004).	§§192.55(e); 192.113; Item I of Appendix B.
(2) API Recommended Practice 5L1 ''Recommended Practice for Railroad Transportation of Line Pipe,'' (6th edition, 2002).	§192.65(a).
(3) API Specification 6D ''Pipeline Valves,'' (22nd edition, January 2002).	§192.145(a).
(4) API 1104 ''Welding of Pipelines and Related Facilities,'' (19th edition, 1999, including Errata October 31, 2001).	§§192.227(a); 192.229(c)(1); 192.241(c); Item II, Appendix B.
(5) API Recommended Practice 1162 ''Public Awareness Programs for Pipeline Operators,'' (1st Edition December 2003).	§§192.616(a); 192.616(b); 192.616(c).
C. American Society for Testing and Materials (ASTM):	
(1) ASTM A 53/A53M–04a (2004) ''Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.''	§§192.113; Item I, Appendix B.
(2) ASTM A106/A106M-04b (2004) ''Standard Specification for Seamless Carbon Steel Pipe for High-Temperature Service.''	§§192.113; Item I, Appendix B.
(3) ASTM A333/A333M-05 (2005) ''Standard Specification for Seamless and Welded Steel Pipe for Low-Temperature Service.''	§§192.113; Item I, Appendix B.
(4) ASTM A372/A372M-03 (2003) ''Standard Specification for Carbon and Alloy Steel Forgings for Thin-Walled Pressure Vessels.''	§ 192.177(b)(1).
(5) ASTM A381–96 (Reapproved 2001) ''Standard Specification for Metal-Arc-Welded Steel Pipe for Use With High-Pressure Transmission Systems.''	§§192.113; Item I, Appendix B.
(6) ASTM A671-04 (2004) ''Standard Specification for Electric-Fusion-Welded Steel Pipe for Atmospheric and Lower Temperatures.''	§§192.113; Item I, Appendix B.
(7) ASTM A672-96 (Reapproved 2001) ''Standard Specification for Electric-Fusion-Welded Steel Pipe for High-Pressure Service at Moderate Temperatures.''	§§192.113; Item I, Appendix B.

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Source and name of referenced material 49 CFR (Continued)	49 CFR reference (Continued)
(8) ASTM A691-98 (Reapproved 2002) ''Standard Specification for Carbon and Alloy Steel Pipe, Electric-Fusion-Welded for High-Pressure Service at High Temperatures.''	§§192.113; Item I, Appendix B.
(9) ASTM D638-03 ''Standard Test Method for Tensile Properties of Plastics.''	§§192.283(a)(3); 192.283(b)(1).
(10) ASTM D2513-87 ''Standard Specification for Thermoplastic Gas Pressure Pipe, Tubing, and Fittings.''	§192.63(a)(1).
(11) ASTM D2513-99 ''Standard Specification for Thermoplastic Gas Pressure Pipe, Tubing, and Fittings.''	§§192.191(b); 192.281(b)(2); 192.283(a)(1)(i); Item I, Appendix B.
(12) ASTM D2517-00 ''Standard Specification for Reinforced Epoxy Resin Gas Pressure Pipe and Fittings.''	§§192.191(a); 192.281(d)(1); 192.283(a)(1)(ii); Item I, Appendix B.
(13) ASTM F1055-1998 ''Standard Specification for Electrofusion Type Polyethylene Fittings for Outside Diameter Controlled Polyethylene Pipe and Tubing.''	§192.283(a)(1)(iii).
D. ASME International (ASME):	
(1) ASME B16.1-1998 ''Cast Iron Pipe Flanges and Flanged Fittings.''	§192.147(c).
(2) ASME B16.5-2003 (October 2004) ''Pipe Flanges and Flanged Fittings.''	§§192.147(a); 192.279.
(3) ASME B31G-1991 (Reaffirmed; 2004) ''Manual for Determining the Remaining Strength of Corroded Pipelines.''	§§192.485(c); 192.933(a).
(4) ASME B31.8-2003 (February 2004) ''Gas Transmission and Distribution Piping Systems.''	§192.619(a)(1)(i).
(5) ASME B31.8S-2004 ''Supplement to B31.8 on Managing System Integrity of Gas Pipelines.''	§§192.903(c); 192.907(b); 192.911, Introductory text; 192.911(i); 192.911(k); 192.911(l); 192.911(m); 192.913(a) Introductory text; 192.913(b)(1); 192.917(a) Introductory text; 192.917(b); 192.917(c); 192.917(e)(1); 192.917(e)(4); 192.921(a)(1); 192.923(b)(2); 192.923(b)(3); 192.925(b) Introductory text; 192.925(b)(1); 192.925(b)(2); 192.925(b)(3); 192.925(b)(4); 192.927(b); 192.927(c)(1)(i); 192.929(b)(1); 192.929(b)(2); 192.933(a); 192.933(d)(1); 192.933(d)(1)(i); 192.935(a); 192.935(b)(1)(iv); 192.937(c)(1); 192.939(a)(1)(i); 192.939(a)(1)(ii); 192.939(a)(3); 192.945(a).

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Source and name of referenced material (Continued)	49 CFR reference (Continued)
(6) ASME Boiler and Pressure Vessel Code, Section I, "Rules for Construction of Power Boilers," (2004 edition, including addenda through July 1, 2005).	§192.153(a).
(7) ASME Boiler and Pressure Vessel Code, Section VIII, Division 1, ''Rules for Construction of Pressure Vessels,'' (2004 edition, including addenda through July 1, 2005).	§§192.153(a); 192.153(b); 192.153(d); 192.165(b)(3).
(8) ASME Boiler and Pressure Vessel Code, Section VIII, Division 2, ''Rules for Construction of Pressure Vessels - Alternative Rules,'' (2004 edition, including addenda through July 1, 2005).	§§192.153(b); 192.165(b)(3).
(9) ASME Boiler and Pressure Vessel Code, Section IX, ''Welding and Brazing Qualifications,'' (2004 edition, including addenda through July 1, 2005).	§§192.227(a); Item II, Appendix B.
E. Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. (MSS):	
(1) MSS SP44–1996 (Reaffirmed; 2001) ''Steel Pipe Line Flanges.''	§192.147(a).
(2) [Reserved].	
F. National Fire Protection Association (NFPA):	
(1) NFPA 30 (2003) ''Flammable and Combustible Liquids Code.''	§192.735(b).
(2) NFPA 58 (2004) ''Liquefied Petroleum Gas Code (LP–Gas Code).''	§§192.11(a); 192.11(b); 192.11(c).
(3) NFPA 59 (2004) ''Utility LP-Gas Plant Code.''	§§192.11(a); 192.11(b); 192.11(c).
(4) NFPA 70 (2005) ''National Electrical Code.''	§§192.163(e); 192.189(c).
G. Plastics Pipe Institute, Inc. (PPI):	
(1) PPI TR–3/2004 (2004) ''Policies and Procedures for Developing Hydrostatic Design Basis (HDB), Pressure Design Basis (PDB), Strength Design Basis (SDB), and Minimum Required Strength (MRS) Ratings for Thermoplastic Piping Materials or Pipe."	§192.121.
H. NACE International (NACE):	
(1) NACE Standard RP0502–2002 ''Pipeline External Corrosion Direct Assessment Methodology.''	§§192.923(b)(1); 192.925(b) Introductory text; 192.925(b)(1); 192.925(b)(1)(ii); 192.925(b)(2) Introductory text; 192.925(b)(3) Introductory text; 192.925(b)(3)(ii); 192.925(b)(iv); 192.925(b)(4) Introductory text; 192.925(b)(4)(ii); 192.931(d); 192.935(b)(1)(iv); 192.939(a)(2).
I. Gas Technology Institute (GTI):	
(1) GRI 02/0057 (2002) ''Internal Corrosion Direct Assessment of Gas Transmission Pipelines—Methodology.''	§192.927(c)(2).

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[Amdt. 192-37, 46 FR 10157, Feb. 2, 1981; Amdt. 192-51, 51 FR 15333, Apr. 23, 1986; Amdt. 192-68, 58 FR 14519, Mar. 18, 1993; Amdt. 192-78, 61 FR 28770, June 6, 1996 with Amdt. 192-78 Correction, 61 FR 30824, June 18, 1996; Amdt. 192-94, 69 FR 32886, June 14, 2004 with Amdt. 192-94 Correction, 69 FR 54591, Sept. 9, 2004; RIN 2137-AD77, 70 FR 11135, Mar. 8, 2005; Amdt. 192-99, 70 FR 28833, May 19, 2005 with Amdt. 192-99 Correction, 70 FR 35041, June 16, 2005; Amdt. 192-102, 71 FR 13289, Mar. 15, 2006; Amdt. 192-103, 71 FR 33402, June 9, 2006]

GUIDE MATERIAL

This guide material is under review following Amendment 192-103.

Additional standards and specifications recommended for use under this Guide, and the names and addresses of the sponsoring organizations, are shown in Guide Material Appendix G-192-1. See Guide Material Appendix G-192-1A for documents previously incorporated by reference in the Regulations.

§192.8

How are onshore gathering lines and regulated onshore gathering lines determined?

[Effective Date: 4-14-06]

(a) An operator must use API RP 80 (incorporated by reference, see §192.7), to determine if an onshore pipeline (or part of a connected series of pipelines) is an onshore gathering line. The determination is subject to the limitations listed below. After making this determination, an operator must determine if the onshore gathering line is a regulated onshore gathering line under paragraph (b) of this section.

(1) The beginning of gathering, under section 2.2(a)(1) of API RP 80, may not extend beyond the furthermost downstream point in a production operation as defined in section 2.3 of API RP 80. This furthermost downstream point does not include equipment that can be used in either production or transportation, such as separators or dehydrators, unless that equipment is involved in the processes of ''production and preparation for transportation or delivery of hydrocarbon gas'' within the meaning of ''production operation.''

(2) The endpoint of gathering, under section 2.2(a)(1)(A) of API RP 80, may not extend beyond the first downstream natural gas processing plant, unless the operator can demonstrate, using sound engineering principles, that gathering extends to a further downstream plant.

(3) If the endpoint of gathering, under section 2.2(a)(1)(C) of API RP 80, is determined by the commingling of gas from separate production fields, the fields may not be more than 50 miles from each other, unless the Administrator finds a longer separation distance is justified in a particular case (see 49 CFR §190.9).

(4) The endpoint of gathering, under section 2.2(a)(1)(D) of API RP 80, may not extend beyond the furthermost downstream compressor used to increase gathering line pressure for delivery to another pipeline.

(b) For purposes of §192.9, ''regulated onshore gathering line'' means:

(1) Each onshore gathering line (or segment of onshore gathering line) with a feature described in the second column that lies in an area described in the third column; and

(2) As applicable, additional lengths of line described in the fourth column to provide a safety buffer:

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Type	Feature	Area	Safety Buffer
A	— Metallic and the MAOP produces a hoop stress of 20 percent or more of SMYS. If the stress level is unknown, an operator must determine the stress level according to the applicable provisions in subpart C of this part. — Non-metallic and the MAOP is more than 125 psig (862 kPa).	Class 2, 3, or 4 location (see §192.5).	None.
B	— Metallic and the MAOP produces a hoop stress of less than 20 percent of SMYS. If the stress level is unknown, an operator must determine the stress level according to the applicable provisions in subpart C of this part. — Non-metallic and the MAOP is 125 psig (862 kPa) or less.	Area 1. Class 3 or 4 location. Area 2. An area within a Class 2 location the operator determines by using any of the following three methods: (a) A Class 2 location. (b) An area extending 150 feet (45.7 m) on each side of the centerline of any continuous 1 mile (1.6 km) of pipeline and including more than 10 but fewer than 46 dwellings. (c) An area extending 150 feet (45.7 m) on each side of the centerline of any continuous 1000 feet (305 m) of pipeline and including 5 or more buildings.	If the gathering line is in Area 2(b) or 2(c), the additional lengths of line extend upstream and downstream from the area to a point where the line is at least 150 feet (45.7 m) from the nearest dwelling in the area. However, if a cluster of dwellings in area 2(b) or 2(c) qualifies a line as Type B, the Type B classification ends 150 feet (45.7 m) from the nearest dwelling in the cluster.

[Issued by Amdt. 192-102, 71 FR 13289, Mar. 15, 2006]

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(4) Is used in a fabricated assembly, (including separators, mainline valve assemblies, cross-connections, and river crossing headers) or is used within five pipe diameters in any direction from the last fitting of a fabricated assembly, other than a transition piece or an elbow used in place of a pipe bend which is not associated with a fabricated assembly.

(c) For Class 2 locations, a design factor of 0.50, or less, must be used in the design formula in §192.105 for uncased steel pipe that crosses the right-of-way of a hard surfaced road, a highway, a public street, or a railroad.

(d) For Class 1 and Class 2 locations, a design factor of 0.50, or less, must be used in the design formula in §192.105 for --

(1) Steel pipe in a compressor station, regulating station, or measuring station; and

(2) Steel pipe, including a pipe riser, on a platform located offshore or in inland navigable waters.

[Amdt. 192-27, 41 FR 34598, Aug. 16, 1976]

GUIDE MATERIAL

1 USE OF DESIGN FACTOR (*F*) FOR STEEL PIPE IN §§192.111(b), (c), and (d)

INSTALLATION CONDITION	LOCATION CLASS			
	1	2	3	4
Crossings without casings of:				
Private roads (See Note 1)	.72	.60	.50	.40
The rights-of-way of unimproved public roads	.60	.60	.50	.40
The rights-of-way of hard surfaced roads, highways, public streets, railroads	.60	.50	.50	.40
Crossings with casings of:				
Private roads (See Note 1)	.72	.60	.50	.40
The rights-of-way of unimproved public roads	.72	.60	.50	.40
The rights-of-way of hard surfaced roads, highways, public streets, railroads	.72	.60	.50	.40
Parallel encroachments on:				
Private roads (See Note 1)	.72	.60	.50	.40
The rights-of-way of unimproved public roads	.72	.60	.50	.40
The rights-of-way of hard surfaced roads, highways, public streets, railroads	.60	.60	.50	.40

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INSTALLATION CONDITION (Continued)	LOCATION CLASS			
	1	2	3	4
Pipelines on bridges	.60	.60	.50	.40
Fabricated assemblies (See Note 2)	.60	.60	.50	.40
Compressor, regulating, or measuring station piping	.50	.50	.50	.40
Pipe, including pipe risers, on platforms located offshore	.50	N/A	N/A	N/A
Pipe, including risers, on platforms located in inland navigable waters	.50	.50	.50	.40

Notes:

1. "Private roads" are roads that are not intended for use by the general public and over which travel and transportation are restricted.
2. Section 192.165(b)(3) requires that liquid separators located in compressor stations and constructed of pipe and fittings without internal welding must be fabricated with a design factor (*F*) of 0.40, or less.

TABLE 192.111i

2 DESIGN OF UNCASED PIPELINE CROSSINGS OF HIGHWAYS AND RAILROADS (§§192.111(b)(1), (b)(2) and (c))

See Guide Material Appendix G-192-15.

§192.113

Longitudinal joint factor (*E*) for steel pipe.

[Effective Date: 7-14-04]

The longitudinal joint factor to be used in the design formula in §192.105 is determined in accordance with the following table:

Specification	Pipe Class	Longitudinal Joint Factor (*E*)
ASTM A 53/A53M	**Seamless**	**1.00**
	Electric resistance welded	**1.00**
	Furnace butt welded	**0.60**
ASTM A 106	**Seamless**	**1.00**
ASTM A 333/A 333M	**Seamless**	**1.00**
	Electric resistance welded	**1.00**
ASTM A 381	**Double submerged arc welded**	**1.00**
ASTM A 671	**Electric-fusion-welded**	**1.00**

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Specification (Continued)	Pipe Class	Longitudinal Joint Factor (*E*)
ASTM A 672	Electric-fusion-welded	1.00
ASTM A 691	Electric-fusion-welded	1.00
API 5L	Seamless	1.00
	Electric resistance welded	1.00
	Electric flash welded	1.00
	Submerged arc welded	1.00
	Furnace butt welded	0.60
Other	Pipe over 4 inches (102 millimeters)	0.80
Other	Pipe 4 inches (102 millimeters) or less	0.60

If the type of longitudinal joint cannot be determined, the joint factor to be used must not exceed that designated for "Other".

[Amdt. 192-37, 46 FR 10157, Feb. 2, 1981; Amdt. 192-51, 51 FR 15333, Apr. 23, 1986; Amdt. 192-62, 54 FR 5625, Feb. 6, 1989; Amdt. 192-68, 58 FR 14519, Mar. 18, 1993; Amdt. 192-85, 63 FR 37500, July 13, 1998; Amdt. 192-94, 69 FR 32886, June 14, 2004]

GUIDE MATERIAL

Manufacture of furnace lap-welded pipe was discontinued and process deleted from API Spec 5L in 1962.

§192.115

Temperature derating factor (*T*) for steel pipe.

[Effective Date: 7-13-98]

The temperature derating factor to be used in the design formula in §192.105 is determined as follows:

Gas temperature in degrees Fahrenheit (Celsius)	Temperature derating factor (*T*)
250 °F (121 °C) or less	1.000
300 °F (149 °C)	0.967
350 °F (177 °C)	0.933
400 °F (204 °C)	0.900
450 °F (232 °C)	0.867

For intermediate gas temperatures, the derating factor is determined by interpolation.

[Amdt. 192-85, 63 FR 37500, July 13, 1998]

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GUIDE MATERIAL

No guide material necessary.

§192.117

(Removed and reserved.)

[Effective Date: 3-8-89]

§192.119

(Removed and reserved.)

[Effective Date: 3-8-89]

§192.121

Design of plastic pipe.

[Effective Date: 7-10-06]

Subject to the limitations of §192.123, the design pressure for plastic pipe is determined in accordance with either of the following formulas:

$$P = 2S \frac{t}{(D-t)} 0.32$$

$$P = \frac{2S}{(SDR-1)} 0.32$$

Where:

P **= Design pressure, gauge, kPa (psig).**

S **= For thermoplastic pipe, the HDB is determined in accordance with the listed specification at a temperature equal to 73 °F (23 °C), 100 °F (38 °C), 120 °F (49 °C), or 140 °F (60 °C). In the absence an HDB established at the specified temperature, the HDB of a higher temperature may be used in determining a design pressure rating at the specified temperature by arithmetic interpolation using the procedure in Part D.2. of PPI TR–3/2004, *HDB/PDB/SDB/MRS Policies* (incorporated by reference, *see* §192.7). For reinforced thermosetting plastic pipe, 11,000 psig (75,842 kPa).**

t **= Specified wall thickness, mm (in.).**

D **= Specified outside diameter, mm (in.).**

SDR **= Standard dimension ratio, the ratio of the average specified outside diameter to the minimum specified wall thickness, corresponding to a value from a common numbering system that was derived from the American National Standards Institute preferred number series 10.**

[Amdt. 192-31, 43 FR 13880, Apr. 3, 1978 with Amdt. 192-31 Correction, 43 FR 43308, Sept. 25, 1978; Amdt. 192-78, 61 FR 28770, June 6, 1996 with Amdt. 192-78 Correction, 61 FR 30824, June 18, 1996; Amdt. 192-85, 63 FR 37500, July 13, 1998; Amdt. 192-94, 69 FR 32886, June 14, 2004; Amdt. 192-103, 71 FR 33402, June 9, 2006]

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GUIDE MATERIAL

This guide material is under review following Amendments 192-94.

1 NATURAL GAS

(a) Hydrostatic Design Basis (HDB) values are awarded by the Hydrostatic Stress Board (HSB) of the Plastics Pipe Institute (PPI) and are listed in PPI TR-4, which can be accessed at www.plasticpipe.org.
(b) ASTM D 2513 requires elevated temperature HDB listings for plastic piping materials used at temperatures above 73 °F. PPI publishes elevated temperature HDB values for PE and PA materials in TR-4.
(c) Magnetically-filled PE (reference ASTM D 2513, Annex A.6) is considered as either PE 2406 or PE 3408 material.
(d) Long-term hydrostatic strength (LTHS) for reinforced thermosetting plastic covered by ASTM D 2517 is 11,000 psi.
(e) HDB values apply only to materials meeting all the requirements of ASTM D 2513 and are based on engineering test data analyzed in accordance with ASTM D 2837, "Standard Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials or Pressure Design Basis for Thermoplastic Pipe Products."
(f) HDB values at 73 °F for thermoplastic materials covered by ASTM D 2513 are listed in Table 192.121i. The values used in the design formula for thermoplastic materials are actually HDB values that are a categorized value of the long-term hydrostatic strength.

Pipe Material	HDB @ 73 °F, psi
PA 32312 (PA 11)	2500
PE 2406	1250
PE 3408	1600
PVC Type I, Grade 1, Class 12454B (PVC 1120)*	4000
PVC Type II, Grade 1, Class 1433D (PVC 2116)*	3200
* Editions of ASTM D 2513 issued after 2001 no longer permit use of PVC piping for new gas piping installations, but do specify that it may be used for repair and maintenance of existing PVC gas piping. The Regulations may continue to reference an edition of ASTM D 2513 earlier than 2001. The operator is advised to check §192.7.	

TABLE 192.121i

2 PETROLEUM GASES

PE and PA materials listed in ASTM D 2513 may be used for liquid petroleum gas (LPG) piping applications. NFPA 58 (referenced by §192.7) prescribes the following:
(a) PA may be used in liquid or vapor LPG systems up to the design pressure of the piping material. PPI recommends a chemical derating factor of 1.0 (no derating) for PA 11 piping.
(b) PE, when recommended by the manufacturer, may be used in vapor-only LPG systems up to 30 psig pressure. PPI recommends a 0.5 chemical derating factor for the use of PE piping.
(c) PVC is not permitted.

Some information on the strengths of polyethylenes with propane is given in PPI TR-22, “Polyethylene Piping Distribution Systems for Components of Liquid Petroleum Gases.” See guide material under §192.123.

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3 MINIMUM REQUIRED WALL THICKNESS

The minimum wall thickness (t_m) for a given design pressure is determined from the formula below. Also, see §§192.123 (c) and (d) plus 3 of the guide material under §192.123.

$$t_m = \frac{PD}{(P + 0.64\,S)}$$

Where:

P = Design pressure, gauge, kPa (psi)
D = Specified outside diameter, mm (in.)
S = The long-term hydrostatic strength, for thermoplastic pipe, kPa (psi) determined at 23 °C (73 °F), 38 °C (100 °F), 49 °C (120 °F), or 60 °C (140 °F); for reinforced thermosetting pipe, 75,800 kPa (11,000 psi)

4 INTERPOLATION OF HYDROSTATIC DESIGN BASIS (HDB) VALUES

(a) For thermoplastic pipe that is to be installed at a service temperature greater than 73 ºF and less than that at which the next HDB has been established, the HDB at the anticipated service temperature can be determined by interpolation. The pipe manufacturer should be consulted for assistance in determining an interpolated HDB.

(b) The interpolation formula as prescribed in §192.121 is published in PPI TR-3 as follows.

$$S_T = S_L - \frac{(S_L - S_H)\left(\frac{1}{T_L} - \frac{1}{T_T}\right)}{\left(\frac{1}{T_L} - \frac{1}{T_H}\right)}$$

Where:

S_T = Interpolated LTHS for the anticipated service temperature (psi)
S_L = LTHS established at a temperature below the anticipated service temperature (psi)
S_H = LTHS established at a temperature above the anticipated service temperature (psi)
T_L = Temperature at which the lower LTHS (S_L) was established (K)
T_T = Anticipated service temperature (K)
T_H = Temperature at which the higher LTHS (S_H) was established (K)

(c) Section 192.121 requires that the interpolation be made between the LTHS values at the lower and higher temperatures. The resulting interpolated LTHS is categorized into an HDB. This interpolated HDB is then used to determine the design pressure under §192.121.

(d) Example:
An operator is installing SDR 11 PE pipe where the anticipated service temperature is 78 ºF. HDB values are established and published in PPI TR-4 at 73 ºF (296 K) and 140 ºF (333 K). Thus, the operator has the option of establishing an interpolated HDB at the anticipated service temperature, 78 °F (299 K), or using the 140 °F HDB of 800 psi.

(1) In order to calculate the HDB for the anticipated service temperature, the operator must obtain the actual LTHS values established for the material at the nearest temperature above and below the temperature for which the interpolated value is to be determined. These values are typically available from the pipe supplier. If these LTHS values are not available, the lowest LTHS for the HDB category in Table 192.121ii may be used as a conservative estimate.

(2) Once the LTHS values are obtained, the interpolation calculation input is as follows.

$S_{L(73\,°F)}$ = 1567 psi
$S_{H(140\,°F)}$ = 845 psi
T_L = 73 ºF (295.93 K)
T_T = 78 ºF (298.71 K)
T_H = 140 ºF (333.15 K)

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Hence, the interpolation calculation determines that S_T = 1506.86 psi or 1507 psi.

(3) To determine the HDB at 78 ºF, the interpolated LTHS value is categorized using Table 1 from ASTM Standard D 2837-04, a selection of which is shown in Table 192.121ii.

Range of Calculated LTHS Values		Hydrostatic Design Basis (HDB)	
Psi	**(MPa)**	**psi**	**(MPa)**
600 to <760	(4.14 to <5.24)	630	(4.34)
760 to <960	(5.24 to <6.62)	800	(5.52)
960 to <1200	(6.62 to <8.27)	1000	(6.89)
1200 to <1530	(8.27 to <10.55)	1250	(8.62)
1530 to <1920	(10.55 to <13.24)	1600	(11.03)

TABLE 192.121ii

(4) Based upon an interpolated LTHS value of 1510 psi, the HDB to be used in the design formula for this example is 1250 psi.

For this SDR 11 PE pipe with an anticipated service temperature of 78 °F, the design pressure is calculated in accordance with §192.121 using the interpolated HDB of 1250 psi as follows.

$$P = \frac{2S}{(SDR-1)}(.32) = \frac{2(1250\,psi)}{(11-1)}(.32) = 80\,psig$$

5 REFERENCES

(a) PPI TR-4, "PPI Listing of Hydrostatic Design Basis (HDB), Strength Design Basis (SDB), Pressure Design Basis (PDB) and Minimum Required Strength (MRS) Ratings for Thermoplastic Piping Materials or Pipe."

(b) PPI TR-22, "Polyethylene Piping Distribution Systems for Components of Liquid Petroleum Gases."

§192.123

Design limitations for plastic pipe.

[Effective Date: 7-10-06]

(a) Except as provided in paragraph (e) of this section, the design pressure may not exceed a gauge pressure of 100 psig (689 kPa) for plastic pipe used in:

(1) Distribution systems; or

(2) Classes 3 and 4 locations.

(b) Plastic pipe may not be used where operating temperatures of the pipe will be:

(1) Below –20 °F (–29 °C), or –40 °F (–40 °C) if all pipe and pipeline components whose operating temperature will be below –20 °F (–29 °C) have a temperature rating by the manufacturer consistent with that operating temperature; or

(2) Above the following applicable temperatures:

(i) For thermoplastic pipe, the temperature at which the HDB used in the design formula under §192.121 is determined.

(ii) For reinforced thermosetting plastic pipe, 150 °F (66 °C).

(c) The wall thickness for thermoplastic pipe may not be less than 0.062 inches (1.57 millimeters).

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(d) The wall thickness for reinforced thermosetting plastic pipe may not be less than that listed in the following table:

Nominal size in inches (millimeters)	Minimum wall thickness in inches (millimeters)
2 (51)	0.060 (1.52)
3 (76)	0.060 (1.52)
4 (102)	0.070 (1.78)
6 (152)	0.100 (2.54)

(e) The design pressure for thermoplastic pipe produced after July 14, 2004 may exceed a gauge pressure of 100 psig (689 kPa) provided that:

(1) The design pressure does not exceed 125 psig (862 kPa);

(2) The material is a PE2406 or a PE3408 as specified within ASTM D2513 (incorporated by reference, *see* §192.7);

(3) The pipe size is nominal pipe size (IPS) 12 or less; and

(4) The design pressure is determined in accordance with the design equation defined in §192.121.

[Amdt. 192-31, 43 FR 13880, Apr. 3, 1978; Amdt. 192-78, 61 FR 28770, June 6, 1996 with Amdt. 192-78 Correction, 61 FR 30824, June 18, 1996; Amdt. 192-85, 63 FR 37500, July 13, 1998; Amdt. 192-93, 68 FR 53895, Sept. 15, 2003; Amdt. 192-94, 69 FR 32886, June 14, 2004 with Amdt. 192-94 Correction, 69 FR 54591, Sept. 9, 2004; Amdt. 192-103, 71 FR 33402, June 9, 2006]

GUIDE MATERIAL

This guide material is under review following Amendment 192-94.

1 IMPACT AND DUCTILITY

The impact and ductility properties of plastics should be evaluated when the material is intended for use in facilities subjected to low temperatures.

2 PETROLEUM GASES

The pressure-temperature relationship with petroleum gases should be such that condensation will not occur when using PE piping.

3 HOT TAPS

(a) To minimize the probability of a blowout when making a hot-plate saddle fusion on polyethylene (PE) pipe with a wall thickness of 0.216 inches or less, operating at pressures up to and including 100 psig, it may be necessary to require heavier wall thickness than determined by the pressure design formula. The manufacturer of the PE pipe should be contacted for recommendations.

(b) For those PE pipelines operated at pressures greater than 100 psig, the probability of blowouts when making hot-plate saddle fusions increases due to the increased pressure. The pipeline pressure may need to be reduced during such fusions.

(c) Electrofusion tapping tees may be used as an alternate to hot-plate fusion tapping tees to reduce the probability of blowouts when hot tapping PE pipes. The manufacturer of the electrofusion fitting should be contacted for recommendations.

(d) Mechanical tapping tees may be used as an alternative to heat-fusion tapping tees to avoid the possibility of blowouts when tapping PE pipes.

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