12/9/2021

Chapter 5, Standard Specifications…

p. 131, Eq. 3 and Eq. 5: Replace D_o with D_i

3/15/2021

Chapter 14, Duct and Conduit

Chapter was completely revised and updated as shown at https://plasticpipe.org/pdf/chapter14.pdf

6/12/18

Chapter 8, Above-Ground Applications for PE Pipe

P. 326

Under Reference #9, change title as follows: Plastics ~~Addition~~ Additives Handbook …

Chapter 6, Design of PE Piping Systems

P. 200, Table 3-3

Update the Note as follows: … see ASTM ~~F7906~~ A796. Based ..

3/22/2018

Errata Sheet, PPI Handbook of Polyethylene Pipe, 2nd ed.

Chapter 6, Design of PE Piping

Systems P. 158

F_T = Average Annual Service Temperature Design Factor …

Chapter 3, Material Properties

P. 96: A.2- Values for Other Temperatures

3rd - 4th lines: … an average annual operating temperature (see References at the end of this Appendix) above the base temperature of 73°F (23°C) typically results in a decrease …

5th line: Conversely, an average annual operating temperature below the base

8th-9th line: … compensating factor for average annual operating temperatures that ….100°F (38°C) 140°F are shown in Table A.2. 10th line: delete full Paragraph While the effect …application under consideration.

P. 97: Table A.2

Table A.2 title: Change title to: PE4710 Temperature Compensating Multipliers, F_T Replace Table A.2 (and its 3 footnotes) with the following

6/24/2020 Revisions

Design Temperature[1] Average Annual Operating Temperature	Temperature[2] Compensation Multiplier, F_T
≤ 80°F (≤ 27°C)	1.0
> 80°F - 90°F (>27°C - 32°C)	0.9
> 90°F - 100°F (>32°C - 38°C)	0.8
> 100°F - 110°F (>38°C - 43°C)	0.8
> 110°F - 120°F (>43°C - 49°C)	0.7
> 120°F - 130°F (>49°C - 54°C)	0.7
> 130°F - 140°F (>54°C - 60°C)	0.6

[1] The average annual temperature is a weighted average of the daily operating temperature, and is not the highest temperature observed in the system.

[1] The design temperature is the expected steady-state operating temperature of the pipe. For some applications, the design temperature may be the Average Annual Temperature (AAT). The AAT is based on the annual seasonal temperature fluctuations a buried piping system may be exposed to over the course of a year. Above ground pipelines require additional engineering considerations. For applications with significant operating temperature fluctuation or if the maximum HDB temperature is occasionally exceeded, refer to applicable codes and standards (e.g. ASME NM.1, etc.) or contact the pipe manufacturer for guidance.

[2] The F_T values are based on PE 4710 compounds with HDB = 1600 psi at 73°F and HDB = 1000 psi at 140°F and are calculated using the temperature equation that is shown in the PPI Handbook, Chapter 3, Appendix A and in PPI TR-3. HDB values are listed in PPI TR-4. Contact the manufacturer for other HDB and other F_T values. The F_T values shown in here are conservative since they are based on the highest temperature within each temperature range and are rounded.

12/9/2021

Chapter 3, Material Properties

P. 97: Table A.2

Addition at the end of Footnote 2

The FT values in Table 2 are based on the performance of PE compounds during D2837 hydrostatic pressure testing which is testing at long durations. The applicability of these FT values has been shown to be equally valid during short duration D638 tensile testing by (Merah, 2006).

Chapter 3, Material properties

P. 93 References

Add

Merah, S. K. B. (2006, July 21) Effect of temperature on tensile properties of HDPE *Material. Plastics, Rubber and Composites, p 5.*

6/24/2020 Revisions

P. 98

2nd line: change F_I to F_T

3rd bullet: .. For example, AWWA ~~standards C 901 and C906 and~~ manual M55 which covers PE pressure class (PC) pipe already includes ~~an~~ similar abbreviated table of temperatu compensating multipliers ~~that differ slightly from what is presented in here~~.

Add at the end of Appendix A, Chp. 3: References on the use of Average Temperatures

IGN 4-32-18 (2003), The Choice of Pressure Ratings for Polyethylene Pipe Systems for Water Supply and Sewarage Duties- UK Water Industry Information & Guidance Note- See section 4.2.2.1 titled Average Operating Temperature.

Gran-Meyer, E. (2005), Polyethylene Pipes in Applied Engineering, Total Petrochemicals, Belguim- See Sec. 11.04.1 (p. 481) titled Operation - Service Life

Palermo, G., Zhou, J. and Farnum, R. (2007), Effect of Elevated Ground Temperature (from Electric Cables) on the Pressure Rating of PE Pipe in Gas Piping Applications, AGA Operations Conference, Grapevine, TX

CAN/CSA- Z662 (2011), Oil and Gas Pipeline Systems, Standards Council of Canada, See Sec. 12.4.2.5 (p. 259)

Wedgner, A. (2014), How to Design PE100 Pipes for Higher Operating Temperatures? Borouge Newsletter, BorPipe, Issue 33, p. 8-9.

6/6/12

Errata Sheet

PPI Handbook of Polyethylene Pipe, 2nd ed.

Chapter 6, Design of PE Piping Systems

Page 217

The equation for calculating $\Delta X/D_M$ uses the apparent modulus for the condition of a rapidly increasing stress or strain to solve for deflection due to only dead load; this calculation uses E= 130,000 psi per as shown in Table B2.1, p. 101. Instead, use E from Chp. 3, p. 99, Table B.1.1; for example, for PE 4710 and a load duration of 100 years, E = 28,000 psi. Also, under SOLUTION above the equation for ΔX/DM, change '130,000' to "28,000" and change 'B2.1' to "B1.1".

Page 229

Under '(From Equation 3-23)' change "0.57" to 0.56" to match the answer shown above in the equation for VAF

Page 236, Table 3-14

Change the heading of the 2nd column from "Saturated, unit weight of ground water, pcf" to "Saturated Unit Weight of Soil, pcf". Keep the current symbol w_s as shown.

Change the heading in the 3rd column from "Dry, the weight of saturated soil above the pipe, lbs per foot of pipe" to 'Dry Unit Weight of Soil, pcf'. Keep the shown symbol w_d as shown.

Page 261, Appendix A.3

The definition of the variable C (Hazen-Williams Friction Factor …) incorrectly refers the reader to see table 1-7. Change 'table 1-7' to "definitions below equation 2-12, p. 175"

Page 336 (3/4/16)

Under Mechanical Compression

change 4th sentence as follows: It is important that the ~~inside of the pipe wall …. avoid deflection of the pipe~~ use of stiffener to support the pipe wall may be required – refer to the manufacturer's instructions for specific detail on stiffener requirements.

Chapter 7, Underground Installation of PE Piping

p. 292, Table 4

Change title of Table to 'Minimum Long-Term Bend Radius for PE Pipe Installed in Open Cut Trench'
Change the heading of 1st column to "Dimension Ratio~~n~~ DR"

Chapter 8, Above-Ground Applications for PE Pipe

Page 318 Equation 6 is applicable where support spacing is relatively large and the spacing and support rigidity do not induce axial compression in the pipeline in response to changes in temperature.

Page 320 Equation 8 is applicable only when thermal expansion of the supported pipeline is not anticipated.

Page 322/323 Equation 11 and 13 are applicable where support spacing and support rigidity do not induce axial compression in the pipeline in response to changes in temperature.

Note: Where spans between support spacing are relatively short and the span length and support rigidity induce axial compression in the pipeline in response to changes in temperature, the reader is referred to 'Roark's Formulas for Stress & Strain' by Warren C. Young, Table 10, Page 166.

Chapter 10, Marine Installations

P. 379 Change title of table to: Table 3 ~~Pipe Diameter Multipliers for the Determining of~~ Minimum Short-Term Bending Radius'

Page 363, Step 3: Add this new Paragraph under the heading of Step 3: General: Calculation of 'maximum weighting' (Step 3b) and calculations to determine the percent air entrapment that may cause the pipe to refloat (Step 3d) are based on the selected DR. Calculations to determine the recommended weighting (Step 3c) is based on achieving a weighting that is 'equivalent' to the weight of the water displaced by the pipe and is independent of DR. Other marine installation handbooks include calculations to determine the recommended weighting that are dependent on DR. Contact the pipe manufacturer or contractors experienced in this field for additional advice.

Page 363, Step 3a: Change the title of this section to "Buoyant Force as a Percentage of Air Inside the Pipe."

Page 364, Step 3a: Add the following text to the end of Step 3a: “In a pond or otherwise under conditions of no current, the minimum weight required to anchor the pipe equals the buoyant force times a safety factor. The weight of individual anchors may be found by multiplying the safety factored buoyant force (per unit length) times the anchor spacing.”

Page 365, Step 3b: Change the title of this section to “Practical Limit of Individual Ballast Weight (in air) for Towing of 100% Air Filled Pipe”

Page 365, Step 3c: Add the following as the first sentence in this section: The methodology described in this section is for pipelines that remain full of water, such as pressurized water lines. If you put in a line that contains primarily air, the weighting factors will not be conservative and may not be sufficient to prevent flotation.

Page 367, step 3d: The ratio of the selected ballast weight (Step 3c) divided by the minimum ballast weight to offset anticipated % air (Step 3a) may be regarded as the Factor of Safety against refloating the pipe. This may provide some safety factor against air entrapment but at the cost of reducing the safety factor against current moving the line.

Page 392-393; Table A-3-1 and Table A-3-2 Add this text before Table A-3-1:
The ballast physical dimensions, ballast weights, and ballast spacing shown in tables A-3-1 and A-3-2 are approximate and are often significantly different than when calculated from first principles.

The reader is advised to calculate the volumes of anchor blocks from first principles and to determine weights based on the densities for ‘plain’ and ‘reinforced’ concrete shown on page 369. As there is often a discrepancy between the ‘produced’ weight of the anchor block versus the theoretical weight, the reader is referred to Section 3e for advice about adjusting the ballast spacing to achieve the desired ‘weighting percentage’.

The Tables assume the pipelines remain full of water, such as pressurized water lines. If you put in a line that contains primarily air, the weighting factors will not be conservative and may not be sufficient to prevent flotation.

12/9/2021 Texted highlighted in Yellow

P. 435

TABLE 1

Safe Pull Tensile Stress @ 73°F

	Proposed Table 1			
	Typical Safe Pull Stress (psi) @ 73°F			**Time under tension design factor per ASTM F1804, note 4**
	PE 2xxx	PE 3608	PE 4710	
ASTM D3350 Cell Classification	PE234373	PE345464	PE445574	
Minimum Tensile yield strength (psi) per ASTM D3350	2600	3000	3500	
HDD Tensile yield design factor per ASTM F1804	0.4	0.4	0.4	
Duration (hours)				
0.5	1040 ~~(use 1050)~~	1200	1400	1.0
1	1040 ~~(use 1050)~~	1200	1400	1.0
12 ~~(also used in PPI BoreAid and Calculator)~~	988 ~~(use 1000)~~	1140 ~~(use 1150)~~	1330 ~~(use 1300)~~	0.95
24	946 ~~(use 950)~~	1092 ~~(use 1100)~~	1274 ~~(use 1250)~~	0.91

12/9/2021

Replace existing footnote below this Table 1:

~~**The safe pull stress is the stress at 3% strain. For strains less than 3% the pipe will essentially have complete strain recovery after pullback. The stress values in Table 1 were determined by multiplying 3% times the apparent tensile modulus from the Appendix to Chapter 3 adjusted by a 0.60 factor to account for the high stress level during pullback.**~~

The safe pull stress values shown in the table may be considered to be associated with complete strain recovery after completion of the pullback and a suitable recovery period.

P. 423, Pilot Hole Reaming add the text in red: Normal-oversizing may be from 1.2 to 1.5 times the diameter of the carrier pipe, but at least 4" larger than the diameter of the carrier pipe.

Index The page numbers that are being referred to in the Index do not match the text. Reader is encouraged to use the search engine on the PPI website at http://plasticpipe.org/search.html