

# CONTENTS

Foreword .....	v
Committee Roster .....	vi
Introduction .....	viii
Summary of Changes .....	x
<b>Chapter I Scope and Definitions .....</b>	<b>1</b>
500 General Statements .....	1
<b>Chapter II Design .....</b>	<b>7</b>
<b>Part 1 Conditions and Criteria .....</b>	<b>7</b>
501 Design Conditions .....	7
502 Design Criteria .....	8
<b>Part 2 Design of Piping Components .....</b>	<b>23</b>
503 Criteria for Design of Piping Components .....	23
504 Pressure Design of Piping Components .....	23
<b>Part 3 Design Application of Piping Components Selection and Limitations .....</b>	<b>32</b>
505 Pipe .....	32
506 Fittings, Bends, and Intersections .....	33
507 Valves .....	34
508 Flanges, Blanks, Flange Facings, Gaskets, and Bolting .....	34
<b>Part 4 Selection and Limitations of Piping Joints .....</b>	<b>34</b>
510 Piping Joints .....	34
511 Welded Joints .....	35
512 Flanged Joints .....	35
513 Expanded Joints .....	35
514 Threaded Joints .....	35
515 Flared, Flareless, and Compression Joints .....	35
517 Brazed and Soldered Joints .....	36
518 Sleeve Coupled and Other Novel or Patented Joints .....	36
<b>Part 5 Expansion, Flexibility, Structural Attachments, Supports, and Restraints .....</b>	<b>36</b>
519 Expansion and Flexibility .....	36
520 Design of Pipe Supporting Elements .....	45
521 Design Loads for Pipe Supporting Elements .....	46
<b>Chapter III Materials .....</b>	<b>48</b>
523 Materials — General Requirements .....	48
524 Materials Applied to Miscellaneous Parts .....	52
<b>Chapter IV Dimensional Requirements .....</b>	<b>55</b>
526 Dimensional Requirements for Standard and Nonstandard Piping Components .....	55
<b>Chapter V Fabrication and Assembly .....</b>	<b>57</b>
527 Welding .....	57
528 Brazing and Soldering .....	64
529 Bending — Hot and Cold .....	65
530 Forming .....	65
531 Heat Treatment .....	65
535 Assembly .....	68
<b>Chapter VI Examination, Inspection, and Testing .....</b>	<b>70</b>
536 Examination .....	70



537	Inspection .....	71
538	Testing .....	72
539	Records .....	73

**Figures**

502.3.2	Stress Range Reduction Factors .....	22
504.3.1-1	Reinforcement of Branch Connections .....	26
504.3.1-2	Extruded Outlet Header Notation .....	28
504.3.1-3	Mechanically Formed Tee Connections in Copper Materials .....	30
504.5.3	Blanks .....	32
519.4.5-1	Bends .....	43
519.4.5-2	Branch Connections .....	44
523.2.2	Reduction in Minimum Design Metal Temperature Without Impact Testing .....	53
527.1.2	Typical Joints With Backing Ring .....	57
527.2.1-1	Butt Welding End Preparation .....	58
527.2.1-2	Internal Trimming for Butt Welding of Piping Components With Internal Misalignment .....	58
527.3.3-1	Fillet Weld Size .....	59
527.3.3-2	Welding Details for Slip-On and Socket Welding Flanges, and Some Acceptable Types of Flange Attachment Welds .....	60
527.3.3-3	Minimum Welding Dimensions Required for Socket Welding Components Other Than Flanges .....	60
527.3.5-1	Typical Welded Branch Connection Without Additional Reinforcement .....	61
527.3.5-2	Typical Welded Branch Connection With Additional Reinforcement .....	61
527.3.5-3	Typical Welded Angular Branch Connection Without Additional Reinforcement .....	61
527.3.5-4	Some Acceptable Types of Welded Branch Attachment Details Showing Minimum Acceptable Welds .....	62
527.3.6-1	Acceptable Welds for Flat Plate Closures .....	63
527.3.6-2	Unacceptable Welds for Flat Plate Closures .....	63

**Tables**

500.2-1	Refrigerant Safety Classifications .....	4
500.2-2	Safety Classifications for Refrigerant Blends .....	6
502.3.1	Maximum Allowable Stress Values, ksi .....	10
519.3.1	Thermal Expansion Data (IP and SI) .....	38
519.3.2	Moduli of Elasticity (IP and SI) .....	39
519.3.6	Flexibility Factor, <i>k</i> , and Stress Intensification Factor, <i>i</i> .....	40
521.3.1	Minimum Sizes of Straps, Rods, and Chains for Hangers .....	47
523.1	Acceptable Materials — Specifications .....	49
523.2.2	Impact Exemption Temperatures .....	54
526.1	Dimensional Standards .....	56
531.2.1	Heat Treatment of Welds .....	66

**Nonmandatory Appendices**

A	Referenced Standards .....	75
B	Preparation of Technical Inquiries .....	78
C	Selecting Applicable Piping Codes .....	79

