

SECTION VIII

Rules for Construction of Pressure Vessels

2023

ASME Boiler and
Pressure Vessel Code
An International Code

Division 3

Alternative Rules for Construction
of High Pressure Vessels

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AN INTERNATIONAL CODE

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VIII RULES FOR CONSTRUCTION OF PRESSURE VESSELS

Division 3

Alternative Rules for Construction of High Pressure Vessels

ASME Boiler and Pressure Vessel Committee
on Pressure Vessels



The American Society of
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TABLE OF CONTENTS

| | |
|--|-------|
| List of Sections | xv |
| Foreword | xvi |
| Statement of Policy on the Use of the ASME Single Certification Mark and Code Authorization in Advertising | xviii |
| Statement of Policy on the Use of ASME Marking to Identify Manufactured Items | xviii |
| Personnel | xix |
| Correspondence With the Committee | xli |
| Summary of Changes | xliii |
| Cross-Referencing in the ASME BPVC | xlvi |
| Part KG | |
| General Requirements | 1 |
| Article KG-1 | |
| Scope and Jurisdiction | 1 |
| KG-100 Scope | 1 |
| KG-110 Geometric Scope of This Division | 1 |
| KG-120 Classifications Outside the Scope of This Division | 2 |
| KG-130 Assembly and Testing of Vessels at Field or Intermediate Sites | 2 |
| KG-140 Standards Referenced by This Division | 3 |
| KG-150 Units of Measurement | 3 |
| KG-160 Tolerances | 5 |
| Article KG-2 | |
| Organization of This Division | 6 |
| KG-200 Organization | 6 |
| Article KG-3 | |
| Responsibilities and Duties | 7 |
| KG-300 General | 7 |
| KG-310 User's Responsibility | 7 |
| KG-320 Manufacturer's Responsibility | 10 |
| KG-330 Designer | 12 |
| Article KG-4 | |
| General Rules for Inspection | 14 |
| KG-400 General Requirements for Inspection and Examination | 14 |
| KG-410 Manufacturer's Responsibilities | 14 |
| KG-420 Certification of Subcontracted Services | 15 |
| KG-430 The Inspector | 15 |
| KG-440 Inspector's Duties | 15 |
| Article KG-5 | |
| Additional General Requirements for Composite Reinforced Pressure Vessels (CRPV) | 17 |
| KG-500 General Requirements | 17 |
| KG-510 Scope | 17 |
| KG-520 Supplemental General Requirements for CRPV | 18 |
| Article KG-6 | |
| Additional General Requirements for Impulsively Loaded Vessels | 19 |
| KG-600 General Requirements | 19 |
| KG-610 Scope | 19 |
| Part KM | |
| Material Requirements | 20 |
| Article KM-1 | |
| General Requirements | 20 |
| KM-100 Materials Permitted | 20 |
| Article KM-2 | |
| Mechanical Property Test Requirements for Metals | 24 |
| KM-200 General Requirements | 24 |

| | | |
|---------------------|---|-----|
| KM-210 | Procedure for Obtaining Test Specimens and Coupons | 24 |
| KM-220 | Procedure for Heat Treating Separate Test Specimens | 26 |
| KM-230 | Mechanical Testing Requirements | 26 |
| KM-240 | Heat Treatment Certification/Verification Tests for Fabricated Components | 29 |
| KM-250 | Additional Toughness Requirements for Pressure-Retaining Component Materials | 30 |
| KM-260 | Retests | 31 |
| KM-270 | Notch Tensile Testing Procedure and Acceptance Criterion | 31 |
| Article KM-3 | Supplementary Requirements for Bolting | 37 |
| KM-300 | Requirements for All Bolting Materials | 37 |
| Article KM-4 | Material Design Data | 38 |
| KM-400 | Contents of Tables of Material Design Data | 38 |
| Article KM-5 | Requirements for Laminate Materials | 61 |
| Article KM-6 | Analytical Material Models | 62 |
| KM-600 | Scope | 62 |
| KM-610 | Ideally Elastic-Plastic (Non-Strain Hardening) Material Model | 62 |
| KM-620 | Elastic-Plastic Stress-Strain Curve Model | 62 |
| KM-630 | Cyclic Stress-Strain Curve | 62 |
| Article KM-7 | Rules for Covers on Impulsively Loaded Vessels | 67 |
| KM-700 | General | 67 |
| Part KD | Design Requirements | 68 |
| Article KD-1 | General | 68 |
| KD-100 | Scope | 68 |
| KD-110 | Loadings | 68 |
| KD-120 | Design Basis | 69 |
| KD-130 | Design Criteria | 70 |
| KD-140 | Fatigue Evaluation | 70 |
| Article KD-2 | Basic Design Requirements | 71 |
| KD-200 | Scope | 71 |
| KD-210 | Terms Relating to Stress Analysis | 71 |
| KD-220 | Equations for Cylindrical and Spherical Shells | 73 |
| KD-230 | Elastic-Plastic Analysis | 75 |
| Article KD-3 | Fatigue Evaluation | 82 |
| KD-300 | Scope | 82 |
| KD-310 | Stress Analysis for Fatigue Evaluation | 82 |
| KD-320 | Calculated Number of Design Cycles | 85 |
| KD-330 | Calculated Cumulative Effect Number of Design Cycles | 87 |
| KD-340 | Fatigue Assessment of Welds — Elastic Analysis and Structural Stress ... | 88 |
| KD-350 | Histogram Development and Cycle Counting for Fatigue Analysis | 91 |
| KD-370 | Welded Joint Design Fatigue Curves | 93 |
| Article KD-4 | Fracture Mechanics Evaluation | 116 |
| KD-400 | Scope | 116 |
| KD-410 | Crack Size Criteria | 116 |
| KD-420 | Stress Intensity Factor K_I Calculation | 117 |
| KD-430 | Calculation of Crack Growth Rates | 117 |
| KD-440 | Calculated Number of Design Cycles | 118 |
| Article KD-5 | Design Using Autofrettage | 119 |
| KD-500 | Scope | 119 |
| KD-510 | Limits on Autofrettage Pressure | 120 |
| KD-520 | Calculation of Residual Stresses | 120 |
| KD-530 | Design Calculations | 122 |

| | | |
|----------------------|--|-----|
| Article KD-6 | Design Requirements for Closures, Integral Heads, Threaded Fasteners, and Seals | 123 |
| KD-600 | Scope | 123 |
| KD-620 | Threaded Fasteners and Components | 123 |
| KD-630 | Load-Carrying Shell With Single Threaded End Closures | 124 |
| KD-640 | Integral Heads | 125 |
| KD-650 | Quick-Actuating Closures | 125 |
| KD-660 | Requirements for Closures and Seals | 125 |
| Article KD-7 | Design Requirements for Attachments, Supports, and External Heating and Cooling Jackets | 126 |
| KD-700 | General Requirements | 126 |
| KD-710 | Materials for Attachments | 126 |
| KD-720 | Welds Attaching Nonpressure Parts to Pressure Parts | 126 |
| KD-730 | Design of Attachments | 128 |
| KD-740 | Design of Supports | 128 |
| KD-750 | Jacketed Vessels | 128 |
| Article KD-8 | Special Design Requirements for Layered Vessels | 129 |
| KD-800 | General | 129 |
| KD-810 | Rules for Shrink-Fit Layered Vessels | 130 |
| KD-820 | Rules for Concentrically Wrapped and Welded Layered Vessels | 131 |
| KD-830 | Design of Welded Joints | 133 |
| KD-840 | Openings and Their Reinforcement | 133 |
| KD-850 | Supports | 133 |
| Article KD-9 | Special Design Requirements for Wire-Wound Vessels and Wire-Wound Frames | 140 |
| KD-900 | Scope | 140 |
| KD-910 | Stress Analysis | 140 |
| KD-920 | Stress Limits | 142 |
| KD-930 | Fatigue Evaluation | 142 |
| Article KD-10 | Special Requirements for Vessels in Hydrogen Service | 145 |
| KD-1000 | Scope | 145 |
| KD-1010 | Fatigue Life Evaluation Using Fracture Mechanics | 146 |
| KD-1020 | Fracture Mechanics Properties | 146 |
| KD-1040 | Test Method for K_{IH} Determination | 147 |
| KD-1050 | Fatigue Crack Growth Rate Tests | 148 |
| Article KD-11 | Design Requirements for Welded Vessels | 150 |
| KD-1100 | Scope | 150 |
| KD-1110 | Types of Joints Permitted | 150 |
| KD-1120 | Transition Joints Between Sections of Unequal Thickness | 150 |
| KD-1130 | Nozzle Attachments | 151 |
| Article KD-12 | Experimental Design Verification | 156 |
| KD-1200 | General Requirements | 156 |
| KD-1210 | Types of Tests | 156 |
| KD-1220 | Strain Measurement Test Procedure | 156 |
| KD-1230 | Photoelastic Test Procedure | 157 |
| KD-1240 | Test Procedures | 157 |
| KD-1250 | Interpretation of Results | 157 |
| KD-1260 | Experimental Determination of Allowable Number of Operating Cycles .. | 158 |
| KD-1270 | Determination of Fatigue Strength Reduction Factors | 162 |
| Article KD-13 | Additional Design Requirements for Composite Reinforced Pressure Vessels (CRPV) | 163 |
| KD-1300 | Scope | 163 |
| KD-1310 | General | 163 |

| | | |
|---------------------|---|-----|
| Part KF | Fabrication Requirements | 165 |
| Article KF-1 | General Fabrication Requirements | 165 |
| KF-100 | General | 165 |
| KF-110 | Material | 165 |
| KF-120 | Material Forming | 166 |
| KF-130 | Tolerances for Cylindrical and Spherical Shells and Heads | 167 |
| Article KF-2 | Supplemental Welding Fabrication Requirements | 168 |
| KF-200 | General Requirements for All Welds | 168 |
| KF-210 | Welding Qualifications and Records | 168 |
| KF-220 | Weld Joints Permitted and Their Examination | 169 |
| KF-230 | Requirements During Welding | 170 |
| KF-240 | Repair of Weld Defects | 172 |
| Article KF-3 | Fabrication Requirements for Materials With Protective Linings | 173 |
| KF-300 | Scope | 173 |
| KF-310 | Qualification of Welding Procedures | 173 |
| KF-320 | Integrally Clad Materials | 174 |
| KF-330 | Postweld Heat Treatment of Linings | 174 |
| KF-340 | Examination Requirements | 174 |
| KF-350 | Inspection and Tests | 174 |
| KF-360 | Stamping and Reports | 175 |
| Article KF-4 | Heat Treatment of Weldments | 176 |
| KF-400 | Heat Treatment of Weldments | 176 |
| KF-410 | Heating Procedures for Postweld Heat Treatment | 179 |
| KF-420 | Postweld Heat Treatment After Repairs | 180 |
| Article KF-5 | Additional Fabrication Requirements for Autofrettaged Vessels | 181 |
| KF-500 | General | 181 |
| KF-510 | Examination and Repair | 181 |
| KF-520 | Autofrettage Procedures | 181 |
| KF-530 | Examination After Autofrettage | 181 |
| KF-540 | Repair of Defects After Autofrettage | 181 |
| KF-550 | Stamping and Reports | 181 |
| Article KF-6 | Additional Fabrication Requirements for Quenched and Tempered Steels | 182 |
| KF-600 | General | 182 |
| KF-610 | Welding Requirements | 182 |
| KF-620 | Temporary Welds Where Not Prohibited | 183 |
| KF-630 | Postweld Heat Treatment | 183 |
| KF-640 | Examination and Testing | 184 |
| KF-650 | Stamping and Reports | 184 |
| Article KF-7 | Supplementary Requirements for Materials With Welding Restrictions | 185 |
| KF-700 | Scope | 185 |
| KF-710 | Repair of Defects | 185 |
| KF-720 | Methods of Forming Forged Heads | 185 |
| Article KF-8 | Specific Fabrication Requirements for Layered Vessels | 186 |
| KF-800 | Scope | 186 |
| KF-810 | Rules for Shrink-Fit Vessels | 186 |
| KF-820 | Rules for Concentrically Wrapped Welded Layered Vessels | 186 |
| KF-830 | Heat Treatment of Weldments | 192 |
| Article KF-9 | Special Fabrication Requirements for Wire-Wound Vessels and Frames | 194 |
| KF-900 | Scope | 194 |
| KF-910 | Fabrication Requirements | 194 |

| | | |
|----------------------|---|-----|
| Article KF-10 | Additional Fabrication Requirements for Aluminum Alloys | 195 |
| Article KF-11 | Additional Fabrication Requirements for Welding Age-Hardening Stainless Steels | 196 |
| KF-1100 | Scope | 196 |
| KF-1110 | Welding Requirements | 196 |
| KF-1120 | Base Metal Heat Treatment Condition | 196 |
| KF-1130 | Temporary Welds Where Not Prohibited | 196 |
| KF-1140 | Postweld Heat Treatment | 196 |
| KF-1150 | Production Weld Testing | 196 |
| KF-1160 | Examination and Testing | 197 |
| KF-1170 | Repair Welding | 197 |
| KF-1180 | Postweld Heat Treatment After Weld Repairs | 197 |
| Article KF-12 | Additional Fabrication Requirements for Composite Reinforced Pres- sure Vessels (CRPV) | 198 |
| KF-1200 | Scope | 198 |
| KF-1210 | Welding | 198 |
| Part KR | Pressure Relief Devices | 200 |
| Part KOP | Overpressure Protection | 201 |
| Article KOP-1 | General Requirements | 201 |
| KOP-100 | General Requirements | 201 |
| KOP-110 | Definitions | 201 |
| KOP-120 | Responsibilities | 201 |
| KOP-130 | Determination of Pressure Relieving Requirements | 202 |
| KOP-140 | Overpressure Limits | 202 |
| KOP-150 | Permitted Pressure Relief Devices and Methods | 202 |
| KOP-160 | Pressure Settings and Performance Requirements | 203 |
| KOP-170 | Installation | 203 |
| Article KOP-2 | Requirements for Power-Actuated Pressure Relief Systems | 205 |
| KOP-200 | General Requirements | 205 |
| KOP-210 | System Requirements | 205 |
| KOP-220 | Flow Capacity Testing | 205 |
| Article KOP-3 | Overpressure Protection for Impulsively Loaded Vessels | 207 |
| KOP-300 | General | 207 |
| Part KE | Examination Requirements | 208 |
| Article KE-1 | Requirements for Examination Procedures and Personnel Qualification | 208 |
| KE-100 | General | 208 |
| KE-110 | Qualification and Certification of Nondestructive Examination Personnel .. | 208 |
| Article KE-2 | Requirements for Examination and Repair of Material | 211 |
| KE-200 | General Requirements | 211 |
| KE-210 | General Requirements for Repair of Defects | 211 |
| KE-220 | Examination and Repair of Plate | 212 |
| KE-230 | Examination and Repair of Forgings and Bars | 212 |
| KE-240 | Examination and Repair of Seamless and Welded (Without Filler Metal) Tubular Products and Fittings | 214 |
| KE-250 | Examination and Repair of Tubular Products and Fittings Welded With Filler Metal | 215 |
| KE-260 | Examination of Bolts, Studs, and Nuts | 216 |
| Article KE-3 | Examination of Welds and Acceptance Criteria | 217 |
| KE-300 | Examination of Welds and Weld Overlay | 217 |
| KE-310 | Examination of Weld Edge Preparation Surfaces | 230 |

| | | |
|---------------------|---|-----|
| KE-320 | Types of Welds and Their Examination | 230 |
| KE-330 | Acceptance Standards | 231 |
| Article KE-4 | Final Examination of Vessels | 234 |
| KE-400 | Surface Examination After Hydrotest | 234 |
| KE-410 | Inspection of Lined Vessel Interior After Hydrotest | 234 |
| Article KE-5 | Additional Examination Requirements for Composite Reinforced Pressure Vessels (CRPV) | 235 |
| KE-500 | Scope | 235 |
| Part KT | Testing Requirements | 236 |
| Article KT-1 | Testing Requirements | 236 |
| KT-100 | Scope | 236 |
| KT-110 | Requirements for Sample Test Coupons | 236 |
| Article KT-2 | Impact Testing for Welded Vessels | 237 |
| KT-200 | Impact Tests | 237 |
| KT-210 | Location and Orientation of Specimens | 237 |
| KT-220 | Impact Tests for Welding Procedure Qualifications | 237 |
| KT-230 | Impact Test of Production Test Plates | 237 |
| KT-240 | Basis for Rejection | 238 |
| Article KT-3 | Hydrostatic Tests | 239 |
| KT-300 | Scope | 239 |
| KT-310 | Limits of Hydrostatic Test Pressure | 239 |
| KT-320 | Fluid Media for Hydrostatic Tests | 240 |
| KT-330 | Test Procedure | 240 |
| KT-340 | Exemption for Autofrettagged Vessels | 240 |
| KT-350 | Additional Requirements for Impulsively Loaded Vessels | 240 |
| Article KT-4 | Pressure Test Gages and Transducers | 241 |
| KT-400 | Type and Number of Gages or Transducers | 241 |
| KT-410 | Pressure Range of Test Gages and Transducers | 241 |
| KT-420 | Calibration of Test Gages and Transducers | 241 |
| Article KT-5 | Additional Testing Requirements for Composite Reinforced Pressure Vessels (CRPV) | 242 |
| KT-500 | Responsibility | 242 |
| KT-510 | Testing Requirements | 242 |
| Part KS | Marking, Stamping, Reports, and Records | 243 |
| Article KS-1 | Contents and Method of Stamping | 243 |
| KS-100 | Required Marking for Vessels | 243 |
| KS-110 | Application of Certification Mark | 244 |
| KS-120 | Part Marking | 244 |
| KS-130 | Application of Markings | 244 |
| KS-140 | Attachment of Nameplate or Tag | 245 |
| KS-150 | Special Stamping Requirements for Composite Reinforced Pressure Vessels (CRPV) | 245 |
| Article KS-2 | Obtaining and Using Certification Marks | 246 |
| KS-200 | Certification Mark Bearing Official Symbol | 246 |
| KS-210 | Application for Certificate of Authorization | 246 |
| KS-220 | Issuance of Authorization | 246 |
| KS-230 | Designated Oversight | 246 |
| KS-240 | Quality Control System | 246 |
| KS-250 | Evaluation of the Quality Control System | 246 |
| KS-260 | Code Construction Before Receipt of Certificate of Authorization | 246 |

| | | |
|-----------------------------|--|-----|
| KS-270 | Special Requirements Regarding Manufacturer's Certificates for Manufacture of Composite Reinforced Pressure Vessels (CRPV) | 246 |
| Article KS-3 | Report Forms and Maintenance of Records | 247 |
| KS-300 | Manufacturer's Data Reports | 247 |
| KS-310 | Maintenance of Radiographs | 248 |
| KS-320 | Maintenance of Records | 248 |
| Mandatory Appendix 1 | Nomenclature | 249 |
| 1-100 | Nomenclature | 249 |
| Mandatory Appendix 2 | Quality Control System | 257 |
| 2-100 | General | 257 |
| 2-110 | Outline of Features to Be Included in the Written Description of the Quality Control System | 257 |
| 2-111 | Authority and Responsibility | 257 |
| 2-112 | Organization | 257 |
| 2-113 | Drawings, Design Calculations, and Specification Control | 257 |
| 2-114 | Material Control | 258 |
| 2-115 | Examination and Inspection Program | 258 |
| 2-116 | Correction of Nonconformities | 258 |
| 2-117 | Welding | 258 |
| 2-118 | Nondestructive Examination | 258 |
| 2-119 | Heat Treatment | 258 |
| 2-120 | Calibration of Measurement and Test Equipment | 258 |
| 2-121 | Records Retention | 258 |
| 2-122 | Sample Forms | 258 |
| 2-123 | Inspection of Vessels and Vessel Parts | 258 |
| 2-124 | Certifications | 258 |
| Mandatory Appendix 5 | Adhesive Attachment of Nameplates | 259 |
| 5-100 | Scope | 259 |
| 5-200 | Nameplate Application Procedure Qualification | 259 |
| Mandatory Appendix 6 | Rounded Indications Charts Acceptance Standard for Radiographically Determined Rounded Indications in Welds | 260 |
| 6-100 | Applicability of These Standards | 260 |
| 6-110 | Terminology | 260 |
| 6-120 | Acceptance Criteria | 260 |
| Mandatory Appendix 8 | Establishing Governing Code Editions and Cases for Pressure Vessels and Parts | 269 |
| 8-100 | General | 269 |
| 8-200 | Construction | 269 |
| 8-300 | Materials | 269 |
| Mandatory Appendix 9 | Linear Elastic Analysis | 270 |
| 9-100 | General | 270 |
| 9-110 | Load Combinations | 270 |
| 9-200 | Derivation of Equivalent Stress | 270 |
| 9-210 | Stress Limits | 270 |
| 9-220 | Primary Membrane and Bending Stresses | 273 |
| 9-230 | Pure Shear Stress | 273 |
| 9-240 | Bearing Stress | 273 |
| 9-250 | Secondary Stresses | 273 |
| 9-260 | Simplified Elastic-Plastic Analysis | 273 |
| 9-270 | Thermal Stress Ratcheting Assessment | 273 |
| 9-280 | Triaxial Stresses | 274 |
| 9-290 | Upper Limit for Hydrostatic Test Pressure | 274 |
| 9-300 | Principal Stresses in Monobloc Vessels | 274 |

| | | |
|--------------------------------|---|------------|
| 9-400 | Analysis of Threaded Fasteners and Components | 274 |
| Nonmandatory Appendix A | Guide for Preparing Manufacturer's Data Reports | 276 |
| A-100 | Introduction | 276 |
| Nonmandatory Appendix B | Suggested Practice Regarding Extending Life Beyond the Cyclic Design | |
| | Life | 290 |
| B-100 | Extending Allowed Cyclic Limits While in Operation | 290 |
| Nonmandatory Appendix D | Fracture Mechanics Calculations | 291 |
| D-100 | Scope | 291 |
| D-200 | Crack Location and Stressing | 291 |
| D-300 | Crack Orientation and Shape | 291 |
| D-400 | Methods for Determining Stress Intensity Factor | 293 |
| D-500 | Calculation of Fatigue Crack Growth Rates | 299 |
| D-700 | References | 300 |
| Nonmandatory Appendix E | Construction Details | 301 |
| E-100 | Integral Heads (Blind Ends) | 301 |
| E-110 | Thick Wall Proportions | 301 |
| E-120 | Thin Wall Proportions | 302 |
| E-200 | Threaded End Closures | 302 |
| E-210 | Nomenclature (See Figures E-210.1 , E-210.2 , and E-210.3) | 302 |
| E-220 | Thread Load Distribution | 303 |
| Nonmandatory Appendix G | Design Rules for Clamp Connections | 308 |
| G-100 | Scope | 308 |
| G-200 | Materials | 308 |
| G-300 | Nomenclature | 308 |
| G-400 | Bolt Loads | 314 |
| G-500 | Longitudinal Loads | 316 |
| G-600 | Hub Moments | 316 |
| G-700 | Calculation of Hub Stresses | 317 |
| G-800 | Calculation of Clamp Stresses | 317 |
| G-900 | Allowable Design Stresses for Clamp Connections | 317 |
| Nonmandatory Appendix H | Openings and Their Reinforcement | 318 |
| H-100 | Scope | 318 |
| H-110 | Circular Openings Not Requiring Reinforcement | 318 |
| H-120 | Reinforcement for Openings in Shells and Formed Heads | 318 |
| H-130 | Reinforcement for Openings in Flat Heads | 320 |
| H-140 | Limits of Reinforcement | 320 |
| H-150 | Metal Available for Reinforcement | 321 |
| Nonmandatory Appendix I | Guidance for the Use of U.S. Customary and SI Units in the ASME Boiler | |
| | and Pressure Vessel Code | 323 |
| I-100 | Use of Units in Equations | 323 |
| I-200 | Guidelines Used to Develop SI Equivalents | 323 |
| I-300 | Soft Conversion Factors | 325 |
| Nonmandatory Appendix J | Stress Concentration Factors for Cross-Bores in Closed-End Cylinders | |
| | and Square Blocks | 326 |
| J-100 | Scope | 326 |
| J-110 | Methodology | 326 |
| Nonmandatory Appendix K | Fatigue and Fracture Assessment of Impulsively Loaded Vessels | 329 |
| K-100 | Scope | 329 |
| K-110 | Nomenclature | 329 |
| K-200 | Analysis | 329 |
| Nonmandatory Appendix L | Linearization of Stress Results for Stress Classification | 331 |

FIGURES

| | | |
|--------------|---|-----|
| KM-212 | Examples of Acceptable Impact Test Specimens | 27 |
| KM-270.1 | Machine Sharp Edge-Notch Specimen | 33 |
| KM-270.1M | Machine Sharp Edge-Notch Specimen | 33 |
| KM-270.2 | Reinforcing Plate for Specimen Head | 34 |
| KM-270.2M | Reinforcing Plate for Specimen Head | 35 |
| KM-270.3 | Standard Test Sections | 36 |
| KM-270.3M | Standard Test Sections | 36 |
| KD-320.1 | Design Fatigue Curves $S_a = f(N_f)$ for Nonwelded Machined Parts Made of Forged Carbon or Low Alloy Steels for Temperatures Not Exceeding 700°F | 95 |
| KD-320.1M | Design Fatigue Curves $S_a = f(N_f)$ for Nonwelded Machined Parts Made of Forged Carbon or Low Alloy Steels for Temperatures Not Exceeding 371°C | 98 |
| KD-320.2 | Design Fatigue Curve $S_a = f(N_f)$ for Nonwelded Parts Made of Carbon or Low Alloy Steels for Temperatures Not Exceeding 700°F | 101 |
| KD-320.2M | Design Fatigue Curve $S_a = f(N_f)$ for Nonwelded Parts Made of Carbon or Low Alloy Steels for Temperatures Not Exceeding 371°C | 102 |
| KD-320.3 | Fatigue Curve for Nonwelded Series 3XX High Alloy Steel, Nickel–Chromium–Iron Alloy, Nickel–Iron–Chromium Alloy, and Nickel–Copper Alloy for Temperatures Not Exceeding 800°F | 103 |
| KD-320.3M | Fatigue Curve for Nonwelded Series 3XX High Alloy Steel, Nickel–Chromium–Iron Alloy, Nickel–Iron–Chromium Alloy, and Nickel–Copper Alloy for Temperatures Not Exceeding 427°C | 104 |
| KD-320.4 | Design Fatigue Curve $S_a = f(N_f)$ for Nonwelded Machined Parts Made of 17-4PH/15-5PH Stainless Steel Bar or Forgings, for Temperatures Not Exceeding 550°F | 105 |
| KD-320.4M | Design Fatigue Curve $S_a = f(N_f)$ for Nonwelded Machined Parts Made of 17-4PH/15-5PH Stainless Steel Bar or Forgings, for Temperatures Not Exceeding 290°C | 106 |
| KD-320.5 | Design Fatigue Curve for High-Strength Steel Bolting for Temperatures Not Exceeding 700°F | 107 |
| KD-320.5M | Design Fatigue Curve for High-Strength Steel Bolting for Temperatures Not Exceeding 371°C | 108 |
| KD-320.6(a) | Roughness Factor K_r Versus Average Surface Roughness R_a (μin.) AA | 109 |
| KD-320.6M(a) | Roughness Factor K_r Versus Average Surface Roughness R_a (μm) AA | 110 |
| KD-320.6(b) | Roughness Factor K_r Versus Maximum Surface Roughness R_{max} (μin.) | 111 |
| KD-320.6M(b) | Roughness Factor K_r Versus Maximum Surface Roughness R_{max} (μm) | 112 |
| KD-320.7 | Design Fatigue Curve for Nonwelded 6061-T6 and 6061-T651 Aluminum for Temperatures Not Exceeding 225°F | 113 |
| KD-320.7M | Design Fatigue Curve for Nonwelded 6061-T6 and 6061-T651 Aluminum for Temperatures Not Exceeding 107°C | 114 |
| KD-372.1 | Burr Grinding of Weld Toe | 115 |
| KD-700 | Some Illustrative Weld Attachment Details | 127 |
| KD-812 | Diameters and Layer Numbers for Concentric Shrink-Fit Layered Cylinder | 131 |
| KD-830.1 | Acceptable Layered Shell Types | 133 |
| KD-830.2 | Some Acceptable Solid-to-Layered Attachments | 134 |
| KD-830.3 | Some Acceptable Flat Heads With Hubs Joining Layered Shell Sections | 135 |
| KD-830.4 | Some Acceptable Flanges for Layered Shells | 136 |
| KD-830.5 | Some Acceptable Welded Joints of Layered-to-Layered and Layered-to-Solid Sections | 137 |
| KD-830.6 | Some Acceptable Nozzle Attachments in Layered Shell Sections | 138 |
| KD-850 | Some Acceptable Supports for Layered Vessels | 139 |
| KD-900 | Wire-Wound Vessel and Frame Construction | 141 |
| KD-911 | Nomenclature for Wire-Wound Cylinders | 142 |
| KD-932 | Derivation of Design Fatigue Curve From Wire Fatigue Curve | 144 |
| KD-1112 | Typical Pressure Parts With Butt-Welded Hubs | 151 |
| KD-1121 | Joints Between Formed Heads and Shells | 152 |
| KD-1122 | Nozzle Necks Attached to Piping of Lesser Wall Thickness | 153 |

| | | |
|-----------|--|-----|
| KD-1130 | Some Acceptable Welded Nozzle Attachments | 154 |
| KD-1131 | An Acceptable Full-Penetration Welded Nozzle Attachment Not Readily Radiographable .. | 155 |
| KD-1260.1 | Construction of Testing Parameter Ratio Diagram | 160 |
| KD-1260.2 | Construction of Testing Parameter Ratio Diagram for Accelerated Tests | 161 |
| KF-131 | Example of the Maximum and Minimum Inside Diameters in a Cylindrical Shell | 167 |
| KF-822(a) | Solid-to-Layered and Layered-to-Layered Test Plates | 188 |
| KF-822(b) | Test Specimens for Weld Procedure Qualification | 189 |
| KF-825.4 | Indications of Layer Wash | 190 |
| KF-826 | Gap Area Between Layers | 191 |
| KE-242.1 | Axial Propagation of Sound in Tube Wall | 214 |
| KE-301-1 | Flaw Classification of Single Indication | 221 |
| KE-301-2 | Surface Flaw Acceptance Criteria | 222 |
| KE-301-3 | Subsurface Flaw Acceptance Criteria | 224 |
| KE-301-4 | Multiple Planar Flaws Oriented in Plane Normal to Pressure-Retaining Surface | 226 |
| KE-301-5 | Parallel Planar Flaws | 227 |
| KE-301-6 | Nonaligned Coplanar Flaws in Plane Normal to Pressure-Retaining Surface (Illustrative Flaw Configurations) | 228 |
| KE-301-7 | Multiple Aligned Planar Flaws | 229 |
| KE-321 | Illustration of Welded Joint Locations Typical of Categories A, B, C, and D | 231 |
| KS-100 | Official New Certification Mark to Denote the American Society of Mechanical Engineers' Standard | 243 |
| KS-132 | Form of Stamping | 245 |
| 6-1 | Aligned Rounded Indications | 261 |
| 6-2 | Groups of Aligned Rounded Indications | 262 |
| 6-3.1 | Charts for t $\frac{1}{8}$ in. (3 mm) to $\frac{1}{4}$ in. (6 mm), Inclusive | 263 |
| 6-3.2 | Charts for t Over $\frac{1}{4}$ in. (6 mm) to $\frac{3}{8}$ in. (10 mm), Inclusive | 264 |
| 6-3.3 | Charts for t Over $\frac{3}{8}$ in. (10 mm) to $\frac{3}{4}$ in. (19 mm), Inclusive | 265 |
| 6-3.4 | Charts for t Over $\frac{3}{4}$ in. (19 mm) to 2 in. (50 mm), Inclusive | 266 |
| 6-3.5 | Charts for t Over 2 in. (50 mm) to 4 in. (100 mm), Inclusive | 267 |
| 6-3.6 | Charts for t Over 4 in. (100 mm) | 268 |
| 9-200.1 | Stress Categories and Limits of Equivalent Stress | 272 |
| D-200 | Typical Crack Types | 292 |
| D-300 | Idealizations of a Crack Propagating From a Cross-Bore Corner | 293 |
| D-403.1 | Magnification Factors for Circumferential Crack | 298 |
| D-403.2 | Polynomial Representation of Stress Distribution | 298 |
| D-403.3 | Method of Correcting K_I at Discontinuities Between Regions | 299 |
| E-110 | Thick Wall Blind End Proportions Not Requiring Detailed Analysis | 301 |
| E-120 | Thin Wall Blind End Proportions Not Requiring Detailed Analysis | 302 |
| E-210.1 | Typical Threaded End Closure | 304 |
| E-210.2 | Thread Loading Distribution | 305 |
| E-210.3 | Detail of First Thread | 305 |
| G-100.1 | Clamp Nomenclature | 309 |
| G-100.2 | Typical Clamp Lug Configurations | 310 |
| G-100.3 | Typical Hub Design With the Bolts Contained Within the Body of the Clamp | 311 |
| G-300 | Typical Self-Energizing Gaskets Used in This Division, Showing Diameter at Location of Gasket Load Reaction G | 315 |
| G-300.1 | Values of f | 316 |
| H-101 | Straight Drill Connections for Thick-Walled Cylinders | 319 |
| H-120.1 | Chart for Determining Value of F | 320 |
| H-142 | Nozzle Nomenclature and Dimensions | 322 |
| J-110-1 | Geometries of Square Blocks and Cylinders With Cross-Bores | 327 |
| J-110-2 | Tangential Stress Concentration Factors for Openings in Cylinders | 327 |
| J-110-3 | Tangential Stress Concentration Factors for Openings in Square Cross-Section Blocks | 328 |
| K-200-1 | Stress History | 330 |
| K-200-2 | Toughness Temperature Curve | 330 |

TABLES

| | | |
|-------------|---|-----|
| KG-141 | Referenced Standards in This Division and Year of Acceptable Edition | 4 |
| KG-150 | Standard Units for Use in Equations | 5 |
| KM-212 | Charpy Impact Test Temperature Reduction Below Minimum Design Metal Temperature | 25 |
| KM-234.2(a) | Minimum Required Charpy V-Notch Impact Values for Pressure-Retaining Component Materials | 29 |
| KM-234.2(b) | Minimum Required Charpy V-Notch Impact Values for Bolting Materials | 29 |
| KM-400-1 | Carbon and Low Alloy Steels | 39 |
| KM-400-1M | Carbon and Low Alloy Steels (Metric) | 45 |
| KM-400-2 | High Alloy Steels | 52 |
| KM-400-2M | High Alloy Steels (Metric) | 55 |
| KM-400-3 | Nickel and Nickel Alloys | 58 |
| KM-400-3M | Nickel and Nickel Alloys (Metric) | 59 |
| KM-400-4 | Aluminum Alloys | 60 |
| KM-400-4M | Aluminum Alloys (Metric) | 60 |
| KM-620 | Tabular Values for Coefficients | 63 |
| KM-630 | Cyclic Stress–Strain Curve Data | 63 |
| KM-630M | Cyclic Stress–Strain Curve Data | 65 |
| KM-630.1 | Coefficients for the Welded Joint Fatigue Curves | 66 |
| KM-630.1M | Coefficients for the Welded Joint Fatigue Curves | 66 |
| KD-230.1 | Loads and Load Cases to Be Considered in Design | 76 |
| KD-230.2 | Load Descriptions | 77 |
| KD-230.3 | Combination for Analysis Exemption of Hydrostatic Test Criterion | 77 |
| KD-230.4 | Load Combinations and Load Factors for an Elastic–Plastic Analysis | 78 |
| KD-320.1 | Tabulated Values of S_a , ksi, From Figures Indicated | 96 |
| KD-320.1M | Tabulated Values of S_a , MPa, From Figures Indicated | 99 |
| KD-320.7 | Tabulated Values of S_a Alternating Stress Intensity From Figures KD-320.7 and KD-320.7M | 112 |
| KD-322.1 | Fatigue Penalty Parameters | 114 |
| KD-430 | Room-Temperature Crack Growth Rate Factors (U.S. Customary Units) | 118 |
| KD-430M | Room-Temperature Crack Growth Rate Factors (SI Units) | 118 |
| KF-234 | Maximum Allowable Offset in Welded Joints | 172 |
| KF-402.1 | Requirements for Postweld Heat Treatment of Pressure Parts and Attachments (U.S. Customary Units) | 177 |
| KF-402.1M | Requirements for Postweld Heat Treatment of Pressure Parts and Attachments (SI Units) | 178 |
| KF-630 | Postweld Heat Treatment Requirements for Quenched and Tempered Materials in Table KM-400-1 (U.S. Customary Units) | 183 |
| KF-630M | Postweld Heat Treatment Requirements for Quenched and Tempered Materials in Table KM-400-1M (SI Units) | 184 |
| KF-1211 | Permitted Weld Reinforcement | 198 |
| KE-101 | Thickness, Image Quality Indicator Designations, Essential Holes, and Wire Diameters (U.S. Customary Units) | 209 |
| KE-101M | Thickness, Image Quality Indicator Designations, Essential Holes, and Wire Diameters (SI Units) | 210 |
| KE-301-1 | Flaw Acceptance Criteria for 1 in. (25 mm) to 12 in. (300 mm) Thick Weld | 219 |
| KE-301-2 | Flaw Acceptance Criteria for 16 in. (400 mm) Thick Weld | 220 |
| KE-332 | Radiographic Acceptance Standards for Rounded Indications (Examples Only) | 232 |
| 9-100.1 | Load Case Combinations and Allowable Stresses for an Elastic Analysis | 271 |
| A-100.1 | Instructions for the Preparation of Manufacturer’s Data Reports | 282 |
| A-100.2 | Instructions for the Preparation of Manufacturer’s Data Reports Form CRPV-1A | 286 |
| D-401.1 | Coefficients G_0 Through G_3 for Surface Crack at Deepest Point | 295 |
| D-401.2 | Coefficients G_0 Through G_3 for Surface Crack at Free Surface | 296 |
| D-500 | Crack Growth Rate Factors | 300 |
| E-222.1 | Continuous Thread Example | 306 |
| E-222.2 | Interrupted Thread Example | 307 |
| G-900 | Allowable Design Stress for Clamp Connections | 317 |

| | | |
|-----------------|--|-----|
| J-110-2 | Tangential Stress Concentration Factors for Openings in Cylinders (Tabulated Values From Figure J-110-2) | 328 |
| J-110-3 | Tangential Stress Concentration Factors for Openings in Square Cross-Section Blocks (Tabulated Values From Figure J-110-3) | 328 |
| FORMS | | |
| KG-311.15 | Typical Certification of Compliance of the User's Design Specification | 11 |
| KG-324.1 | Typical Certification of Compliance of the Manufacturer's Design Report | 13 |
| K-1 | Manufacturer's Data Report for High Pressure Vessels | 277 |
| K-2 | Manufacturer's Partial Data Report for High Pressure Vessels | 279 |
| K-3 | Manufacturer's Data Report Supplementary Sheet | 281 |
| CRPV-1A | Manufacturer's Data Report for Composite Reinforced Pressure Vessels | 284 |
| CRPV-2A | Recommended Form for Qualifying the Laminate Design and the Laminate Procedure Specification Used in Manufacturing Composite Reinforced Pressure Vessels | 288 |
| ENDNOTES | | 333 |

LIST OF SECTIONS

(23)

SECTIONS

- I Rules for Construction of Power Boilers

- II Materials
 - Part A — Ferrous Material Specifications
 - Part B — Nonferrous Material Specifications
 - Part C — Specifications for Welding Rods, Electrodes, and Filler Metals
 - Part D — Properties (Customary)
 - Part D — Properties (Metric)

- III Rules for Construction of Nuclear Facility Components
 - Subsection NCA — General Requirements for Division 1 and Division 2
 - Appendices
 - Division 1
 - Subsection NB — Class 1 Components
 - Subsection NCD — Class 2 and Class 3 Components
 - Subsection NE — Class MC Components
 - Subsection NF — Supports
 - Subsection NG — Core Support Structures
 - Division 2 — Code for Concrete Containments
 - Division 3 — Containment Systems for Transportation and Storage of Spent Nuclear Fuel and High-Level Radioactive Material
 - Division 4 — Fusion Energy Devices
 - Division 5 — High Temperature Reactors

- IV Rules for Construction of Heating Boilers

- V Nondestructive Examination

- VI Recommended Rules for the Care and Operation of Heating Boilers

- VII Recommended Guidelines for the Care of Power Boilers

- VIII Rules for Construction of Pressure Vessels
 - Division 1
 - Division 2 — Alternative Rules
 - Division 3 — Alternative Rules for Construction of High Pressure Vessels

- IX Welding, Brazing, and Fusing Qualifications

- X Fiber-Reinforced Plastic Pressure Vessels

- XI Rules for Inservice Inspection of Nuclear Reactor Facility Components
 - Division 1 — Rules for Inspection and Testing of Components of Light-Water-Cooled Plants
 - Division 2 — Requirements for Reliability and Integrity Management (RIM) Programs for Nuclear Reactor Facilities

- XII Rules for Construction and Continued Service of Transport Tanks

- XIII Rules for Overpressure Protection

FOREWORD*

In 1911, The American Society of Mechanical Engineers established the Boiler and Pressure Vessel Committee to formulate standard rules for the construction of steam boilers and other pressure vessels. In 2009, the Boiler and Pressure Vessel Committee was superseded by the following committees:

- (a) Committee on Power Boilers (I)
- (b) Committee on Materials (II)
- (c) Committee on Construction of Nuclear Facility Components (III)
- (d) Committee on Heating Boilers (IV)
- (e) Committee on Nondestructive Examination (V)
- (f) Committee on Pressure Vessels (VIII)
- (g) Committee on Welding, Brazing, and Fusing (IX)
- (h) Committee on Fiber-Reinforced Plastic Pressure Vessels (X)
- (i) Committee on Nuclear Inservice Inspection (XI)
- (j) Committee on Transport Tanks (XII)
- (k) Committee on Overpressure Protection (XIII)
- (l) Technical Oversight Management Committee (TOMC)

Where reference is made to “the Committee” in this Foreword, each of these committees is included individually and collectively.

The Committee’s function is to establish rules of safety relating only to pressure integrity, which govern the construction* of boilers, pressure vessels, transport tanks, and nuclear components, and the inservice inspection of nuclear components and transport tanks. The Committee also interprets these rules when questions arise regarding their intent. The technical consistency of the Sections of the Code and coordination of standards development activities of the Committees is supported and guided by the Technical Oversight Management Committee. This Code does not address other safety issues relating to the construction of boilers, pressure vessels, transport tanks, or nuclear components, or the inservice inspection of nuclear components or transport tanks. Users of the Code should refer to the pertinent codes, standards, laws, regulations, or other relevant documents for safety issues other than those relating to pressure integrity. Except for Sections XI and XII, and with a few other exceptions, the rules do not, of practical necessity, reflect the likelihood and consequences of deterioration in service related to specific service fluids or external operating environments. In formulating the rules, the Committee considers the needs of users, manufacturers, and inspectors of pressure vessels. The objective of the rules is to afford reasonably certain protection of life and property, and to provide a margin for deterioration in service to give a reasonably long, safe period of usefulness. Advancements in design and materials and evidence of experience have been recognized.

This Code contains mandatory requirements, specific prohibitions, and nonmandatory guidance for construction activities and inservice inspection and testing activities. The Code does not address all aspects of these activities and those aspects that are not specifically addressed should not be considered prohibited. The Code is not a handbook and cannot replace education, experience, and the use of engineering judgment. The phrase *engineering judgment* refers to technical judgments made by knowledgeable engineers experienced in the application of the Code. Engineering judgments must be consistent with Code philosophy, and such judgments must never be used to overrule mandatory requirements or specific prohibitions of the Code.

The Committee recognizes that tools and techniques used for design and analysis change as technology progresses and expects engineers to use good judgment in the application of these tools. The designer is responsible for complying with Code rules and demonstrating compliance with Code equations when such equations are mandatory. The Code neither requires nor prohibits the use of computers for the design or analysis of components constructed to the

* The information contained in this Foreword is not part of this American National Standard (ANS) and has not been processed in accordance with ANSI’s requirements for an ANS. Therefore, this Foreword may contain material that has not been subjected to public review or a consensus process. In addition, it does not contain requirements necessary for conformance to the Code.

** *Construction*, as used in this Foreword, is an all-inclusive term comprising materials, design, fabrication, examination, inspection, testing, certification, and overpressure protection.

requirements of the Code. However, designers and engineers using computer programs for design or analysis are cautioned that they are responsible for all technical assumptions inherent in the programs they use and the application of these programs to their design.

The rules established by the Committee are not to be interpreted as approving, recommending, or endorsing any proprietary or specific design, or as limiting in any way the manufacturer's freedom to choose any method of design or any form of construction that conforms to the Code rules.

The Committee meets regularly to consider revisions of the rules, new rules as dictated by technological development, Code Cases, and requests for interpretations. Only the Committee has the authority to provide official interpretations of this Code. Requests for revisions, new rules, Code Cases, or interpretations shall be addressed to the Secretary in writing and shall give full particulars in order to receive consideration and action (see Submittal of Technical Inquiries to the Boiler and Pressure Vessel Standards Committees). Proposed revisions to the Code resulting from inquiries will be presented to the Committee for appropriate action. The action of the Committee becomes effective only after confirmation by ballot of the Committee and approval by ASME. Proposed revisions to the Code approved by the Committee are submitted to the American National Standards Institute (ANSI) and published at <http://go.asme.org/BPVCPublicReview> to invite comments from all interested persons. After public review and final approval by ASME, revisions are published at regular intervals in Editions of the Code.

The Committee does not rule on whether a component shall or shall not be constructed to the provisions of the Code. The scope of each Section has been established to identify the components and parameters considered by the Committee in formulating the Code rules.

Questions or issues regarding compliance of a specific component with the Code rules are to be directed to the ASME Certificate Holder (Manufacturer). Inquiries concerning the interpretation of the Code are to be directed to the Committee. ASME is to be notified should questions arise concerning improper use of the ASME Single Certification Mark.

When required by context in this Section, the singular shall be interpreted as the plural, and vice versa, and the feminine, masculine, or neuter gender shall be treated as such other gender as appropriate.

The words "shall," "should," and "may" are used in this Standard as follows:

- *Shall* is used to denote a requirement.
- *Should* is used to denote a recommendation.
- *May* is used to denote permission, neither a requirement nor a recommendation.

STATEMENT OF POLICY ON THE USE OF THE ASME SINGLE CERTIFICATION MARK AND CODE AUTHORIZATION IN ADVERTISING

ASME has established procedures to authorize qualified organizations to perform various activities in accordance with the requirements of the ASME Boiler and Pressure Vessel Code. It is the aim of the Society to provide recognition of organizations so authorized. An organization holding authorization to perform various activities in accordance with the requirements of the Code may state this capability in its advertising literature.

Organizations that are authorized to use the ASME Single Certification Mark for marking items or constructions that have been constructed and inspected in compliance with the ASME Boiler and Pressure Vessel Code are issued Certificates of Authorization. It is the aim of the Society to maintain the standing of the ASME Single Certification Mark for the benefit of the users, the enforcement jurisdictions, and the holders of the ASME Single Certification Mark who comply with all requirements.

Based on these objectives, the following policy has been established on the usage in advertising of facsimiles of the ASME Single Certification Mark, Certificates of Authorization, and reference to Code construction. The American Society of Mechanical Engineers does not “approve,” “certify,” “rate,” or “endorse” any item, construction, or activity and there shall be no statements or implications that might so indicate. An organization holding the ASME Single Certification Mark and/or a Certificate of Authorization may state in advertising literature that items, constructions, or activities “are built (produced or performed) or activities conducted in accordance with the requirements of the ASME Boiler and Pressure Vessel Code,” or “meet the requirements of the ASME Boiler and Pressure Vessel Code.” An ASME corporate logo shall not be used by any organization other than ASME.

The ASME Single Certification Mark shall be used only for stamping and nameplates as specifically provided in the Code. However, facsimiles may be used for the purpose of fostering the use of such construction. Such usage may be by an association or a society, or by a holder of the ASME Single Certification Mark who may also use the facsimile in advertising to show that clearly specified items will carry the ASME Single Certification Mark.

STATEMENT OF POLICY ON THE USE OF ASME MARKING TO IDENTIFY MANUFACTURED ITEMS

The ASME Boiler and Pressure Vessel Code provides rules for the construction of boilers, pressure vessels, and nuclear components. This includes requirements for materials, design, fabrication, examination, inspection, and stamping. Items constructed in accordance with all of the applicable rules of the Code are identified with the ASME Single Certification Mark described in the governing Section of the Code.

Markings such as “ASME,” “ASME Standard,” or any other marking including “ASME” or the ASME Single Certification Mark shall not be used on any item that is not constructed in accordance with all of the applicable requirements of the Code.

Items shall not be described on ASME Data Report Forms nor on similar forms referring to ASME that tend to imply that all Code requirements have been met when, in fact, they have not been. Data Report Forms covering items not fully complying with ASME requirements should not refer to ASME or they should clearly identify all exceptions to the ASME requirements.

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January 1, 2023

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V. K. Joshi

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V. V. P. Kumar
T. Mukherjee
P. C. Pathak
D. Prabhu
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M. P. Shah
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| A. Camanni | V. Calo, <i>Contributing Member</i> |
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| M. Kowalczyk | A. Viet |
| D. L. Kurle | K. Xu |
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| S. A. Marks | D. B. DeMichael, <i>Contributing Member</i> |
| P. Matkovic | |
| D. I. Morris | R. D. Dixon, <i>Contributing Member</i> |
| D. T. Peters | S. Kilambi, <i>Contributing Member</i> |
| F. L. Richter | R. Mahadeen, <i>Contributing Member</i> |
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| C. D. Rodery | T. P. Pastor, <i>Contributing Member</i> |
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| L. Constantinescu | C. E. Sainz |
| E. Cutlip | P. L. Sturgill |
| M. Denault | C. Zafir |
| S. E. Gingrich | V. G. V. Giunto, <i>Delegate</i> |
| L. S. Harbison | D. J. Kotecki, <i>Contributing Member</i> |
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| R. M. Jessee | W. J. Sperko, <i>Contributing Member</i> |
| T. Melfi | M. J. Stanko, <i>Contributing Member</i> |
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Subgroup on Plastic Fusing (BPV IX)

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| J. Johnston, Jr. | C. Violand |
| J. E. O'Sullivan | E. W. Woelfel |
| E. G. Reichelt | J. Wright |
| M. J. Rice | |

Subgroup on Welding Qualifications (BPV IX)

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| D. A. Bowers | J. P. Swezy, Jr. |
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| J. S. Lee | P. D. Flenner, <i>Contributing Member</i> |
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| S. B. Brown | T. V. Vo |
| T. L. Chan | J. G. Weicks |
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| D. O. Henry | R. E. Gimple, <i>Honorary Member</i> |
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| S. A. Norman | |

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| T. Ludwig | |

Italy International Working Group (BPV IX)

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| F. Ferrarese, <i>Vice Chair</i> | P. Pacor |
| R. Rahaman, <i>Staff Secretary</i> | P. Siboni |
| M. Bernasek | V. Calo, <i>Contributing Member</i> |
| A. Camanni | G. Gobbi, <i>Contributing Member</i> |
| P. L. Dinelli | A. Gusmaroli, <i>Contributing Member</i> |
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| A. S. Monastra | G. Pontiggia, <i>Contributing Member</i> |

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| F. R. Hermida, <i>Secretary</i> | A. B. Pascual |
| C. A. Celimendiz | S. Sevil |
| M. A. F. Garcia | G. Gobbi, <i>Contributing Member</i> |
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| D. Miro-Quesada, <i>Staff Secretary</i> | N. A. Palm |
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| M. J. Ferlisi | A. T. Roberts III |
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| L. R. Miño | |

China International Working Group (BPV XI)

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| H. D. Chen | Q. W. Wang |
| Y. Cheng | Z. S. Wang |
| Y. B. Guo | L. Xing |
| Y. Hongqi | F. Xu |
| D. R. Horn | S. X. Xu |
| Y. Hou | Q. Yin |
| S. X. Lin | K. Zhang |
| Y. Nie | Y. Zhe |
| W. N. Pei | Z. M. Zhong |
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Working Group on Spent Nuclear Fuel Storage and Transportation Containment Systems (BPV XI)

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| J. Broussard | M. A. Richter |
| C. R. Bryan | B. Sarno |
| T. Carraher | R. Sindelar |
| S. Corcoran | M. Staley |
| D. Dunn | J. Wellwood |
| N. Fales | K. A. Whitney |
| R. C. Folley | X. J. Zhai |
| G. Grant | P.-S. Lam, <i>Alternate</i> |
| B. Gutherman | G. White, <i>Alternate</i> |
| M. W. Joseph | J. Wise, <i>Alternate</i> |
| M. Keene | H. Smith, <i>Contributing Member</i> |
| M. Liu | |

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Task Group on Mitigation and Repair of Spent Nuclear Fuel Canisters (WG-SNFS & TCS) (BPV XI)

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| K. Dietrich | M. Richter |
| D. Dunn | K. E. Ross |
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| M. Brumovsky | R. M. Pace |
| H. D. Chung | J. C. Poehler |
| R. C. Cipolla | S. Ranganath |
| C. M. Faigy | D. A. Scarth |
| M. M. Farooq | D. J. Shim |
| B. R. Ganta | A. Udyawar |
| T. J. Griesbach | T. V. Vo |
| K. Hasegawa | G. M. Wilkowski |
| K. Hojo | M. L. Benson, <i>Alternate</i> |
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Task Group on Inspectability (BPV XI)

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| A. Cardillo | S. Matsumoto |
| K. Caver | D. E. Matthews |
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Task Group on Evaluation of Beyond Design Basis Events (SG-ES) (BPV XI)

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| P. R. Donavin | G. M. Wilkowski |
| R. G. Gilada | H. S. Mehta, <i>Contributing Member</i> |
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**Working Group on Flaw Evaluation
(SG-ES) (BPV XI)**

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| M. Brumovsky | K. Miyazaki |
| H. D. Chung | S. Noronha |
| N. G. Cofie | R. K. Qashu |
| M. A. Erickson | S. Ranganath |
| C. M. Faidy | D. A. Scarth |
| M. M. Farooq | W. L. Server |
| B. R. Ganta | D. J. Shim |
| R. G. Gilada | S. Smith |
| C. Guzman-Leong | M. Uddin |
| P. H. Hoang | A. Udyawar |
| K. Hojo | T. V. Vo |
| D. N. Hopkins | K. Wang |
| S. Kalyanam | B. Wasiluk |
| Y. Kim | G. M. Wilkowski |
| V. Lacroix | H. S. Mehta, <i>Contributing Member</i> |
| D. R. Lee | |

Working Group on Pipe Flaw Evaluation (SG-ES) (BPV XI)

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| M. L. Benson | G. A. Miessi |
| M. Brumovsky | K. Miyazaki |
| F. W. Brust | S. M. Parker |
| H. D. Chung | S. H. Pellet |
| R. C. Cipolla | C. J. Sallaberry |
| N. G. Cofie | W. L. Server |
| C. M. Faidy | D. J. Shim |
| M. M. Farooq | S. Smith |
| B. R. Ganta | M. F. Uddin |
| R. G. Gilada | A. Udyawar |
| S. R. Gosselin | T. V. Vo |
| C. E. Guzman-Leong | K. Wang |
| K. Hasegawa | B. Wasiluk |
| P. H. Hoang | G. M. Wilkowski |
| K. Hojo | S. X. Xu |
| D. N. Hopkins | Y. Zou |
| E. J. Houston | K. Gresh, <i>Alternate</i> |
| R. Janowiak | H. S. Mehta, <i>Contributing Member</i> |
| K. Kashima | |

**Working Group on Flaw Evaluation Reference Curves
(SG-ES) (BPV XI)**

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| M. L. Benson | S. Ranganath |
| F. W. Brust | D. J. Shim |
| R. C. Cipolla | S. Smith |
| M. M. Farooq | M. Uddin |
| A. E. Freed | T. V. Vo |
| P. Gill | G. White |
| K. Hasegawa | S. X. Xu |
| K. Hojo | H. S. Mehta, <i>Contributing Member</i> |

Task Group on Code Case N-513 (WG-PFE) (BPV XI)

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| G. A. Antaki | S. H. Pellet |
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| M. M. Farooq | D. A. Scarth |
| K. Gresh | S. X. Xu |

Working Group on Operating Plant Criteria (SG-ES) (BPV XI)

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| M. Brumovsky | S. Ranganath |
| M. A. Erickson | W. L. Server |
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| M. Hayashi | A. Udyawar |
| R. Janowiak | T. V. Vo |
| M. Kirk | H. Q. Xu |
| S. A. Kleinsmith | H. S. Mehta, <i>Contributing Member</i> |
| H. Kobayashi | |

**Task Group on Evaluation Procedures for Degraded Buried Pipe
(WG-PFE) (BPV XI)**

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| S. X. Xu, <i>Secretary</i> | M. Kassar |
| F. G. Abatt | M. Moenssens |
| G. A. Antaki | D. P. Munson |
| R. C. Cipolla | R. M. Pace |
| R. G. Gilada | S. H. Pellet |
| K. Hasegawa | D. Rudland |
| K. M. Hoffman | D. A. Scarth |

Task Group on Flaw Evaluation for HDPE Pipe (WG-PFE) (BPV XI)

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| M. Moenssens | J. Wright |
| D. P. Munson | S. X. Xu |
| D. A. Scarth | |

Task Group on Appendix L (WG-OPC) (BPV XI)

| | |
|------------------------------|--------------|
| N. Glunt, <i>Chair</i> | C.-S. Oh |
| R. M. Pace, <i>Secretary</i> | H. Park |
| J. I. Duo | S. Ranganath |
| A. E. Freed | A. Scott |
| M. A. Gray | D. J. Shim |
| T. J. Griesbach | S. Smith |
| H. Nam | A. Udyawar |
| A. Nana | T. V. Vo |
| A. D. Odell | |

Subgroup on Nondestructive Examination (SG-NDE) (BPV XI)

| | |
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| D. O. Henry, <i>Vice Chair</i> | K. J. Hacker |
| T. Cinson, <i>Secretary</i> | J. Harrison |
| M. Briley | D. A. Kull |
| C. Brown | C. Latiolais |
| A. Bushmire | F. J. Schaaf, Jr. |
| T. L. Chan | R. V. Swain |
| D. R. Cordes | C. A. Nove, <i>Alternate</i> |

Working Group on Personnel Qualification and Surface Visual and Eddy Current Examination (SG-NDE) (BPV XI)

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|-------------------------------|----------------|
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| M. Orihuela, <i>Secretary</i> | J. T. Lindberg |
| J. Bennett | C. Shinsky |
| T. Cinson | R. Tedder |
| S. E. Cumblidge | T. Thulien |
| A. Diaz | J. T. Timm |
| N. Farenbaugh | |

Working Group on Procedure Qualification and Volumetric Examination (SG-NDE) (BPV XI)

| | |
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| D. A. Kull, <i>Secretary</i> | C. A. Nove |
| M. Briley | D. R. Slivon |
| A. Bushmire | R. V. Swain |
| D. R. Cordes | D. Van Allen |
| K. J. Hacker | J. Williams |
| R. E. Jacob | B. Lin, <i>Alternate</i> |
| W. A. Jensen | |

Subgroup on Reliability and Integrity Management Program (SG-RIM) (BPV XI)

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| D. Vetter, <i>Secretary</i> | S. Kalyanam |
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| M. T. Audrain | R. J. McReynolds |
| N. Broom | R. Meyer |
| F. W. Brust | M. Orihuela |
| V. Chugh | C. J. Sallaberry |
| S. R. Doctor | F. J. Schaaf, Jr. |
| J. D. Fletcher | H. M. Stephens, Jr. |
| J. T. Fong | R. W. Swayne |
| R. Grantom | S. Takaya |
| K. Harris | R. Vayda |

Working Group on MANDE (SG-RIM) (BPV XI)

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| M. Turnbow, <i>Secretary</i> | R. J. McReynolds |
| T. Anselmi | R. Meyer |
| M. T. Audrain | M. Orihuela |
| N. A. Finney | K. Yamada |

Task Group on Nonmetallic Component Degradation and Failure Monitoring (SG-RIM) (BPV XI)

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| G. Beirnaert | J. Potgieter |
| C. Chen | |

ASME/JSME Joint Working Group on RIM Processes and System-Based Code (SG-RIM) (BPV XI)

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| M. T. Audrain | S. Okajima |
| K. Dozaki | A. T. Roberts III |
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| J. Hakii | F. J. Schaaf, Jr. |
| K. Harris | R. Vayda |
| M. Hayashi | D. Watanabe |
| S. Kalyanam | H. Yada |
| D. R. Lee | K. Yamada |
| H. Machida | T. Asayama, <i>Contributing Member</i> |

Subgroup on Repair/Replacement Activities (SG-RRR) (BPV XI)

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| M. Brandes | J. E. O'Sullivan |
| S. B. Brown | G. C. Park |
| R. Clow | R. R. Stevenson |
| S. J. Findlan | R. W. Swayne |
| M. L. Hall | D. J. Tilly |
| J. Honcharik | J. G. Weicks |
| A. B. Meichler | B. Lin, <i>Alternate</i> |

Working Group on Design and Programs (SG-RRR) (BPV XI)

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| R. Clow | M. A. Pyne |
| R. R. Croft | R. R. Stevenson |
| E. V. Farrell, Jr. | K. Sullivan |
| K. Harris | R. W. Swayne |
| B. Lin | |

Task Group on Repair and Replacement Optimization (WG-D&P) (BPV XI)

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| R. Clow | T. Nuoffer |
| K. Dietrich | G. C. Park |
| E. V. Farrell, Jr. | A. Patel |
| M. J. Ferlisi | R. R. Stevenson |
| R. C. Folley | J. G. Weicks |

Working Group on Nonmetals Repair/Replacement Activities (SG-RRR) (BPV XI)

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| S. Schuessler, <i>Secretary</i> | A. Pridmore |
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| D. R. Dechene | R. Stakenborghs |
| M. Golliet | P. Vibien |
| J. Johnston, Jr. | M. P. Marohl, <i>Contributing Member</i> |
| B. Lin | |

**Task Group on HDPE Piping for Low Safety Significance Systems
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**Task Group on Repair by Carbon Fiber Composites
(WG-NMRRRA) (BPV XI)**

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| D. R. Dechene | S. Rios |
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| L. S. Gordon | J. Sealey |
| P. Krishnaswamy | R. Stakenborghs |
| M. Kuntz | N. Stoeva |
| H. Lu | M. F. Uddin |
| M. P. Marohl | J. Wen |
| L. Nadeau | B. Davenport, <i>Alternate</i> |

**Working Group on Welding and Special Repair Processes
(SG-RRRA) (BPV XI)**

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| S. J. Findlan | S. L. McCracken |
| R. C. Folley | L. A. Melder |
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Task Group on Temper Bead Welding (WG-W&SRP) (BPV XI)

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| R. C. Folley | G. T. Olson |
| J. Graham | J. E. O'Sullivan |
| M. L. Hall | A. Patel |
| D. Jacobs | J. Tatman |
| H. Kobayashi | J. G. Weicks |

Task Group on Weld Overlay (WG-W&SRP)(BPV XI)

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| S. J. Findlan | A. Patel |
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Subgroup on Water-Cooled Systems (SG-WCS) (BPV XI)

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| S. T. Chesworth | T. Nuoffer |
| J. Collins | M. A. Pyne |
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| K. W. Hall | R. Thames |
| P. J. Hennessey | M. Weis |
| A. E. Keyser | I. A. Anchondo-Lopez, <i>Alternate</i> |

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| B. Lehman | S. G. Brown, <i>Alternate</i> |

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| K. Caver | A. Maekawa |
| C. Cueto-Felgueroso | T. Nomura |
| M. J. Ferlisi | J. C. Nygaard |
| M. L. Garcia Heras | S. Orita |
| K. W. Hall | A. W. Wilkens |

Working Group on Pressure Testing (SG-WCS) (BPV XI)

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| R. Haessler | P. J. O'Regan |
| J. Hakii | N. A. Palm |
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Working Group on General Requirements (BPV XI)

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| T. L. Chan | D. Vetter |
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Subgroup on Design and Materials (BPV XII)

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| K. W. A. Cheng | Y. Doron, <i>Contributing Member</i> |
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| T. A. Rogers | |
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Subgroup on Fabrication, Inspection, and Continued Service (BPV XII)

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| P. Chilukuri | S. Staniszewski |
| M. Koprivnak | Y. Doron, <i>Contributing Member</i> |
| P. Miller | R. D. Hayworth, <i>Contributing Member</i> |
| O. Mulet | G. McRae, <i>Contributing Member</i> |
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| J. Roberts | |

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| J. F. Ball | |

Subgroup on General Requirements (BPV XII)

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| W. L. Garfield | D. G. Shelton, <i>Contributing Member</i> |
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| M. Pitts | |

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Subgroup on General Requirements (BPV XIII)

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| J. F. Ball | G. D. Goodson, <i>Contributing Member</i> |
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Subgroup on Nuclear (BPV XIII)

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| S. Jones | J. Yu, <i>Alternate</i> |
| R. Lack | S. T. French, <i>Contributing Member</i> |
| D. Miller | D. B. Ross, <i>Contributing Member</i> |
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Subgroup on Testing (BPV XIII)

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| R. Houk, <i>Secretary</i> | Z. Wang |
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| B. Calderon | M. Mullavey, <i>Contributing Member</i> |
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US TAG to ISO TC 185 Safety Devices for Protection Against Excessive Pressure (BPV XIII)

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| A. Appleton | M. Burke, <i>Alternate</i> |
| J. F. Ball | P. J. Coco, <i>Alternate</i> |
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| G. Gobbi | K. M. Hottle, <i>Alternate</i> |
| J. W. Highlands | P. Krane, <i>Alternate</i> |
| K. A. Kavanagh | S. J. Montano, <i>Alternate</i> |
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| T. McGee | L. Ponce, <i>Alternate</i> |
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| T. E. Quaka | S. Yang, <i>Alternate</i> |
| T. N. Rezk | S. F. Harrison, Jr., <i>Contributing Member</i> |
| D. M. Vickery | |
| E. A. Whittle | |

CORRESPONDENCE WITH THE COMMITTEE

(23)

General

ASME codes and standards are developed and maintained by committees with the intent to represent the consensus of concerned interests. Users of ASME codes and standards may correspond with the committees to propose revisions or cases, report errata, or request interpretations. Correspondence for this Section of the ASME Boiler and Pressure Vessel Code (BPVC) should be sent to the staff secretary noted on the Section's committee web page, accessible at <https://go.asme.org/CSCcommittees>.

NOTE: See ASME BPVC Section II, Part D for guidelines on requesting approval of new materials. See Section II, Part C for guidelines on requesting approval of new welding and brazing materials ("consumables").

Revisions and Errata

The committee processes revisions to this Code on a continuous basis to incorporate changes that appear necessary or desirable as demonstrated by the experience gained from the application of the Code. Approved revisions will be published in the next edition of the Code.

In addition, the committee may post errata and Special Notices at <http://go.asme.org/BPVCerrata>. Errata and Special Notices become effective on the date posted. Users can register on the committee web page to receive e-mail notifications of posted errata and Special Notices.

This Code is always open for comment, and the committee welcomes proposals for revisions. Such proposals should be as specific as possible, citing the paragraph number(s), the proposed wording, and a detailed description of the reasons for the proposal, including any pertinent background information and supporting documentation.

Cases

(a) The most common applications for cases are

(1) to permit early implementation of a revision based on an urgent need

(2) to provide alternative requirements

(3) to allow users to gain experience with alternative or potential additional requirements prior to incorporation directly into the Code

(4) to permit use of a new material or process

(b) Users are cautioned that not all jurisdictions or owners automatically accept cases. Cases are not to be considered as approving, recommending, certifying, or endorsing any proprietary or specific design, or as limiting in any way the freedom of manufacturers, constructors, or owners to choose any method of design or any form of construction that conforms to the Code.

(c) The committee will consider proposed cases concerning the following topics only:

(1) equipment to be marked with the ASME Single Certification Mark, or

(2) equipment to be constructed as a repair/replacement activity under the requirements of Section XI

(d) A proposed case shall be written as a question and reply in the same format as existing cases. The proposal shall also include the following information:

(1) a statement of need and background information

(2) the urgency of the case (e.g., the case concerns a project that is underway or imminent)

(3) the Code Section and the paragraph, figure, or table number(s) to which the proposed case applies

(4) the edition(s) of the Code to which the proposed case applies

(e) A case is effective for use when the public review process has been completed and it is approved by the cognizant supervisory board. Cases that have been approved will appear in the next edition or supplement of the Code Cases books, "Boilers and Pressure Vessels" or "Nuclear Components." Each Code Cases book is updated with seven Supplements. Supplements will be sent or made available automatically to the purchasers of the Code Cases books until the next edition of the Code. Annulments of Code Cases become effective six months after the first announcement of the annulment in a Code Case Supplement or Edition of the appropriate Code Case book. The status of any case is available at <http://go.asme.org/BPVCCDatabase>. An index of the complete list of Boiler and Pressure Vessel Code Cases and Nuclear Code Cases is available at <http://go.asme.org/BPVCC>.

Interpretations

(a) Interpretations clarify existing Code requirements and are written as a question and reply. Interpretations do not introduce new requirements. If a revision to resolve conflicting or incorrect wording is required to support the interpretation, the committee will issue an intent interpretation in parallel with a revision to the Code.

(b) Upon request, the committee will render an interpretation of any requirement of the Code. An interpretation can be rendered only in response to a request submitted through the online Interpretation Submittal Form at <http://go.asme.org/InterpretationRequest>. Upon submitting the form, the inquirer will receive an automatic e-mail confirming receipt.

(c) ASME does not act as a consultant for specific engineering problems or for the general application or understanding of the Code requirements. If, based on the information submitted, it is the opinion of the committee that the inquirer should seek assistance, the request will be returned with the recommendation that such assistance be obtained. Inquirers may track the status of their requests at <http://go.asme.org/Interpretations>.

(d) ASME procedures provide for reconsideration of any interpretation when or if additional information that might affect an interpretation is available. Further, persons aggrieved by an interpretation may appeal to the cognizant ASME committee or subcommittee. ASME does not “approve,” “certify,” “rate,” or “endorse” any item, construction, proprietary device, or activity.

(e) Interpretations are published in the ASME Interpretations Database at <http://go.asme.org/Interpretations> as they are issued.

Committee Meetings

The ASME BPVC committees regularly hold meetings that are open to the public. Persons wishing to attend any meeting should contact the secretary of the applicable committee. Information on future committee meetings can be found at <http://go.asme.org/BCW>.

SUMMARY OF CHANGES

Changes listed below are identified on the pages by a margin note, **(23)**, placed next to the affected area.

| <i>Page</i> | <i>Location</i> | <i>Change</i> |
|-------------|------------------------------------|---|
| xv | List of Sections | (1) Under Section III, Division 4 added (2) Title of Section XI and subtitle of Section XI, Division 2 revised (3) Information on interpretations and Code cases moved to "Correspondence With the Committee" |
| xix | Personnel | Updated |
| xli | Correspondence With the Committee | Added (replaces "Submittal of Technical Inquiries to the Boiler and Pressure Vessel Standards Committees") |
| xlvi | Cross-Referencing in the ASME BPVC | Updated |
| 1 | KG-105 | Deleted |
| 2 | KG-120 | Subparagraphs (a) and (b) revised |
| 4 | Table KG-141 | Updated |
| 7 | KG-310 | (1) Second paragraph revised (2) Subparagraph (e) added |
| 7 | KG-311 | (1) Sentence below heading editorially revised (2) KG-311.1(a) and KG-311.2(d) revised |
| 8 | KG-311.8 | Subparagraph (c) deleted and subsequent subparagraph redesignated |
| 8 | KG-311.9 | Revised |
| 8 | KG-311.11 | Revised |
| 9 | KG-311.13 | Revised |
| 10 | KG-323 | (1) Subparagraph (c) revised (2) Subparagraph (h) added and subsequent subparagraph redesignated |
| 20 | KM-101 | First sentence revised |
| 26 | KM-213 | Paragraph below heading deleted |
| 26 | KM-230 | In subpara. (a), second line revised |
| 28 | KM-234.1 | Subparagraph (b) added and subsequent subparagraph redesignated and revised |
| 29 | Table KM-234.2(a) | General Note revised |
| 29 | KM-234.4 | Added |
| 30 | KM-250 | Title and paragraphs revised |
| 30 | KM-251 | Revised |
| 31 | KM-253 | "J-Integral" corrected by errata to "J-integral" |
| 31 | KM-261 | In first sentence, "J-Integral" corrected by errata to "J-integral" |

| <i>Page</i> | <i>Location</i> | <i>Change</i> |
|-------------|-----------------|--|
| 31 | KM-270 | (1) Revised in its entirety (2) Figures KM-270.1 through KM-270.3 (Figures KM-270.1M through KM-270.3M) added |
| 39 | Table KM-400-1 | (1) For "1Cr- $\frac{1}{5}$ Mo" and " $1\frac{3}{4}$ Ni- $\frac{3}{4}$ Cr- $\frac{1}{4}$ Mo," Spec. No. 574 added (2) Notes column updated (3) Notes (5), (16), and (17) revised |
| 45 | Table KM-400-1M | (1) For "1Cr- $\frac{1}{5}$ Mo" and " $1\frac{3}{4}$ Ni- $\frac{3}{4}$ Cr- $\frac{1}{4}$ Mo," Spec. No. 574 added (2) Notes column updated (3) Notes (5), (16), and (17) revised |
| 52 | Table KM-400-2 | Note (9) revised |
| 55 | Table KM-400-2M | Note (9) revised |
| 62 | KM-620 | Equation (KIM-620.2) added and subsequent equations renumbered |
| 63 | Table KM-630 | In first column, " $2\frac{1}{4}$ Cr- $\frac{1}{2}$ Mo" revised to " $2\frac{1}{4}$ Cr-1Mo" |
| 65 | Table KM-630M | In first column, " $2\frac{1}{4}$ Cr- $\frac{1}{2}$ Mo" revised to " $2\frac{1}{4}$ Cr-1Mo" |
| 66 | Table KM-630.1 | General Note revised |
| 66 | Table KM-630.1M | General Note revised |
| 68 | KD-110 | Subparagraph (i) revised |
| 71 | KD-200 | Subparagraph (e) revised |
| 76 | KD-231.3 | Opening paragraph and Step 3 revised |
| 85 | KD-313 | Revised |
| 85 | KD-322 | (1) Second paragraph added (2) Line directly below eq. (KD-322.3) revised |
| 96 | Table KD-320.1 | (1) General Note (c) revised (2) General Note (d) added, and subsequent General Notes redesignated |
| 99 | Table KD-320.1M | (1) General Note (c) revised (2) General Note (d) added, and subsequent General Notes redesignated |
| 117 | KD-430 | In subpara. (b)(2), description for ΔK_{th} revised |
| 123 | KD-620 | Subparagraph (e) added |
| 123 | KD-621 | First paragraph revised |
| 123 | KD-623 | Revised in its entirety |
| 124 | KD-634 | Subparagraph (c) added |
| 128 | KD-740 | Last paragraph added |
| 146 | KD-1021 | (1) In title, subscript for variable revised (2) In subpara. (b), last line revised |
| 146 | KD-1022 | Revised |
| 146 | KD-1023 | Revised |

| <i>Page</i> | <i>Location</i> | <i>Change</i> |
|-------------|----------------------------|--|
| 146 | KD-1024 | Added |
| 167 | KF-131 | Revised |
| 167 | Figure KF-131 | Title and General Note revised |
| 176 | KF-400 | Revised |
| 176 | KF-402 | Penultimate sentence revised |
| 200 | Part KR | Deleted |
| 201 | KOP-100 | Under title, Note added |
| 243 | KS-100 | Under subpara. (a)(7), "PHT" added in nomenclature |
| 249 | 1-100 | (1) Definitions of a , t , and $\Delta S_{ess,k}$ revised (2) Definition of ${}^{mn}\Delta S_{range}$ deleted |
| 257 | Mandatory Appendix 2 | Paragraph 2-124 deleted and subsequent paragraph redesignated |
| 272 | Figure 9-200.1 | Existing General Note designated as (a), and General Note (b) added |
| 274 | 9-400 | Added |
| 276 | Nonmandatory Appendix A | Cross-references updated |
| 282 | Table A-100.1 | Under "Instructions" column, entry for (34) revised |
| 286 | Table A-100.2 | (1) Former Table A-100.4 redesignated (2) Under "Instructions" column, entry for (35) revised |
| 288 | Form CRPV-2A | For "Method of Measurement," ASTM designator updated to delete space after "D" |
| 308 | G-100 | Subparagraph (a) revised |
| 308 | G-300 | In nomenclature, definition of A_5 revised |
| 332 | Nonmandatory Appendix M | Deleted |

CROSS-REFERENCING IN THE ASME BPVC

Paragraphs within the ASME BPVC may include subparagraph breakdowns, i.e., nested lists. The following is a guide to the designation and cross-referencing of subparagraph breakdowns:

(a) Hierarchy of Subparagraph Breakdowns

- (1) First-level breakdowns are designated as (a), (b), (c), etc.
- (2) Second-level breakdowns are designated as (1), (2), (3), etc.
- (3) Third-level breakdowns are designated as (-a), (-b), (-c), etc.
- (4) Fourth-level breakdowns are designated as (-1), (-2), (-3), etc.
- (5) Fifth-level breakdowns are designated as (+a), (+b), (+c), etc.
- (6) Sixth-level breakdowns are designated as (+1), (+2), etc.

(b) Cross-References to Subparagraph Breakdowns. Cross-references within an alphanumerically designated paragraph (e.g., PG-1, UIG-56.1, NCD-3223) do not include the alphanumeric designator of that paragraph. The cross-references to subparagraph breakdowns follow the hierarchy of the designators under which the breakdown appears. The following examples show the format:

- (1) If X.1(c)(1)(-a) is referenced in X.1(c)(1), it will be referenced as (-a).
- (2) If X.1(c)(1)(-a) is referenced in X.1(c)(2), it will be referenced as (1)(-a).
- (3) If X.1(c)(1)(-a) is referenced in X.1(e)(1), it will be referenced as (c)(1)(-a).
- (4) If X.1(c)(1)(-a) is referenced in X.2(c)(2), it will be referenced as X.1(c)(1)(-a).

PART KG

GENERAL REQUIREMENTS

ARTICLE KG-1

SCOPE AND JURISDICTION

KG-100 SCOPE

KG-101 INTENT

The rules of this Division constitute requirements for the design, construction, inspection, and overpressure protection of metallic pressure vessels with design pressures generally above 10 ksi (70 MPa). However, it is not the intent of this Division to establish maximum pressure limits for either Section VIII, Division 1 or 2, nor minimum pressure limits for this Division. Specific pressure limitations for vessels constructed to the rules of this Division may be imposed elsewhere in this Division for various types of fabrication. Whenever *Construction* appears in this document, it may be considered an all-inclusive term comprising materials, design, fabrication, examination, inspection, testing, certification, and pressure relief.

KG-102 DESCRIPTION

Pressure vessels within the scope of this Division are pressure containers for the retainment of fluids, gaseous or liquid, under pressure, either internal or external.

This pressure may be generated by

- (a) an external source
- (b) the application of heat from
 - (1) direct source
 - (2) indirect source
- (c) a process reaction
- (d) any combination thereof

KG-103 LAWS OR REGULATIONS

The scope of this Division has been established to identify components and parameters considered in formulating the rules given in this Division. Laws or regulations issued by municipal, state, provincial, federal, or other enforcement or regulatory bodies having jurisdiction at the location of an installation establish the mandatory applicability of the Code rules, in whole or in part, within the jurisdiction. Those laws or regulations may require the

use of this Division for vessels or components not considered to be within its scope. These laws or regulations should be reviewed to determine size or service limitations of the coverage, which may be different or more restrictive than those of this Division.

KG-104 LOCATION

KG-104.1 Fixed Location. Except as provided in [KG-104.2](#), these rules cover vessels to be installed at a fixed (stationary) location for a specific service where operation and maintenance control are maintained in conformance with the User's Design Specification and records retained during the life of the vessel by the User.

KG-104.2 Mobile Vessels. These rules also apply to pressure vessels that are relocated from work site to work site between pressurizations, and where operation and maintenance control are maintained in conformance with the User's Design Specification and records retained during the life of the vessel by the User.

KG-105 DIRECT FIRED

(23)

DELETED

KG-110 GEOMETRIC SCOPE OF THIS DIVISION

The scope of this Division includes only the vessel and integral communicating chambers and shall include the requirements specified in [KG-111](#) through [KG-117](#).

KG-111 EXTERNAL PIPING AND JACKETS

Where external piping is to be connected to the vessel (see [Article KD-6](#)):

- (a) the first threaded joint for screwed connections
- (b) the face of the first flange for flanged connections