Process Piping

ASME Code for Pressure Piping, B31
The next edition of this Code is scheduled for publication in 2020. This Code will become effective 6 months after the Date of Issuance.

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## CONTENTS

**Foreword** ................................................................. xiv
**Committee Roster** ..................................................... xvi
**Introduction** ............................................................ xx
**Summary of Changes** ................................................... xxii

| Chapter I | Scope and Definitions .................................................. 1 |
| Part 1   | Design ........................................................................ 10 |
| Part 2   | Conditions and Criteria ................................................ 10 |
| Part 3   | Pressure Design of Piping Components ............................. 19 |
| Part 4   | Fluid Service Requirements for Piping Components ............. 31 |
| Part 5   | Fluid Service Requirements for Piping Joints ................... 35 |
| Part 6   | Systems ...................................................................... 45 |

| Chapter II | Design ........................................................................ 10 |
| Part 1     | Conditions and Criteria ................................................ 10 |
| Part 2     | Pressure Design of Piping Components ............................. 19 |
| Part 3     | Fluid Service Requirements for Piping Components ............. 31 |
| Part 4     | Fluid Service Requirements for Piping Joints ................... 35 |
| Part 5     | Flexibility and Support ............................................... 37 |
| Part 6     | Systems ...................................................................... 45 |

| Chapter III | Materials ................................................................. 47 |

<p>| 322        | Specific Piping Systems .............................................. 45 |
| 323        | General Requirements ................................................ 47 |
| 325        | Materials — Miscellaneous ........................................... 58 |</p>
<table>
<thead>
<tr>
<th>Chapter IV</th>
<th>Standards for Piping Components</th>
<th>59</th>
</tr>
</thead>
<tbody>
<tr>
<td>326</td>
<td>Dimensions and Ratings of Components</td>
<td>59</td>
</tr>
<tr>
<td>Chapter V</td>
<td>Fabrication, Assembly, and Erection</td>
<td>63</td>
</tr>
<tr>
<td>327</td>
<td>General</td>
<td>63</td>
</tr>
<tr>
<td>328</td>
<td>Welding and Brazing</td>
<td>63</td>
</tr>
<tr>
<td>330</td>
<td>Preheating</td>
<td>71</td>
</tr>
<tr>
<td>331</td>
<td>Heat Treatment</td>
<td>72</td>
</tr>
<tr>
<td>332</td>
<td>Bending and Forming</td>
<td>75</td>
</tr>
<tr>
<td>333</td>
<td>Brazing and Soldering</td>
<td>78</td>
</tr>
<tr>
<td>335</td>
<td>Assembly and Erection</td>
<td>78</td>
</tr>
<tr>
<td>Chapter VI</td>
<td>Inspection, Examination, and Testing</td>
<td>81</td>
</tr>
<tr>
<td>340</td>
<td>Inspection</td>
<td>81</td>
</tr>
<tr>
<td>341</td>
<td>Examination</td>
<td>81</td>
</tr>
<tr>
<td>342</td>
<td>Examination Personnel</td>
<td>88</td>
</tr>
<tr>
<td>343</td>
<td>Examination Procedures</td>
<td>88</td>
</tr>
<tr>
<td>344</td>
<td>Types of Examination</td>
<td>88</td>
</tr>
<tr>
<td>345</td>
<td>Testing</td>
<td>90</td>
</tr>
<tr>
<td>346</td>
<td>Records</td>
<td>94</td>
</tr>
<tr>
<td>Chapter VII</td>
<td>Nonmetallic Piping and Piping Lined With Nonmetals</td>
<td>95</td>
</tr>
<tr>
<td>A300</td>
<td>General Statements</td>
<td>95</td>
</tr>
<tr>
<td>Part 1</td>
<td>Conditions and Criteria</td>
<td>95</td>
</tr>
<tr>
<td>A301</td>
<td>Design Conditions</td>
<td>95</td>
</tr>
<tr>
<td>A302</td>
<td>Design Criteria</td>
<td>95</td>
</tr>
<tr>
<td>Part 2</td>
<td>Pressure Design of Piping Components</td>
<td>97</td>
</tr>
<tr>
<td>A303</td>
<td>General</td>
<td>97</td>
</tr>
<tr>
<td>A304</td>
<td>Pressure Design of Piping Components</td>
<td>97</td>
</tr>
<tr>
<td>Part 3</td>
<td>Fluid Service Requirements for Piping Components</td>
<td>99</td>
</tr>
<tr>
<td>A305</td>
<td>Pipe</td>
<td>99</td>
</tr>
<tr>
<td>A306</td>
<td>Fittings, Bends, Miters, Laps, and Branch Connections</td>
<td>99</td>
</tr>
<tr>
<td>A307</td>
<td>Valves and Specialty Components</td>
<td>99</td>
</tr>
<tr>
<td>A308</td>
<td>Flanges, Blanks, Flange Facings, and Gaskets</td>
<td>99</td>
</tr>
<tr>
<td>A309</td>
<td>Bolting</td>
<td>100</td>
</tr>
<tr>
<td>Part 4</td>
<td>Fluid Service Requirements for Piping Joints</td>
<td>100</td>
</tr>
<tr>
<td>A310</td>
<td>General</td>
<td>100</td>
</tr>
<tr>
<td>A311</td>
<td>Bonded Joints in Plastics</td>
<td>100</td>
</tr>
<tr>
<td>A312</td>
<td>Flanged Joints</td>
<td>100</td>
</tr>
<tr>
<td>A313</td>
<td>Expanded Joints</td>
<td>100</td>
</tr>
<tr>
<td>A314</td>
<td>Threaded Joints</td>
<td>100</td>
</tr>
<tr>
<td>A315</td>
<td>Tubing Joints</td>
<td>101</td>
</tr>
<tr>
<td>A316</td>
<td>Caulked Joints</td>
<td>101</td>
</tr>
<tr>
<td>A318</td>
<td>Special Joints</td>
<td>101</td>
</tr>
<tr>
<td>Part 5</td>
<td>Flexibility and Support</td>
<td>101</td>
</tr>
<tr>
<td>A319</td>
<td>Flexibility of Nonmetallic Piping</td>
<td>101</td>
</tr>
<tr>
<td>A321</td>
<td>Piping Support</td>
<td>103</td>
</tr>
<tr>
<td>Part 6</td>
<td>Systems</td>
<td>103</td>
</tr>
</tbody>
</table>

iv
<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>A322</td>
<td>Specific Piping Systems</td>
<td>103</td>
</tr>
<tr>
<td>Part 7</td>
<td>Materials</td>
<td></td>
</tr>
<tr>
<td>A323</td>
<td>General Requirements</td>
<td>103</td>
</tr>
<tr>
<td>Part 8</td>
<td>Standards for Piping Components</td>
<td></td>
</tr>
<tr>
<td>A325</td>
<td>Dimensions and Ratings of Components</td>
<td>104</td>
</tr>
<tr>
<td>Part 9</td>
<td>Fabrication, Assembly, and Erection</td>
<td></td>
</tr>
<tr>
<td>A327</td>
<td>General</td>
<td>106</td>
</tr>
<tr>
<td>A328</td>
<td>Bonding of Plastics</td>
<td>106</td>
</tr>
<tr>
<td>A329</td>
<td>Fabrication of Piping Lined With Nonmetals</td>
<td>112</td>
</tr>
<tr>
<td>A332</td>
<td>Bending and Forming</td>
<td>112</td>
</tr>
<tr>
<td>A334</td>
<td>Joining Nonplastic Piping</td>
<td>112</td>
</tr>
<tr>
<td>A335</td>
<td>Assembly and Erection</td>
<td>112</td>
</tr>
<tr>
<td>Part 10</td>
<td>Inspection, Examination, and Testing</td>
<td></td>
</tr>
<tr>
<td>A340</td>
<td>Inspection</td>
<td>113</td>
</tr>
<tr>
<td>A341</td>
<td>Examination</td>
<td>113</td>
</tr>
<tr>
<td>A342</td>
<td>Examination Personnel</td>
<td>114</td>
</tr>
<tr>
<td>A343</td>
<td>Examination Procedures</td>
<td>114</td>
</tr>
<tr>
<td>A344</td>
<td>Types of Examination</td>
<td>114</td>
</tr>
<tr>
<td>A345</td>
<td>Testing</td>
<td>114</td>
</tr>
<tr>
<td>A346</td>
<td>Records</td>
<td>115</td>
</tr>
<tr>
<td>Chapter VIII</td>
<td>Piping for Category M Fluid Service</td>
<td></td>
</tr>
<tr>
<td>M300</td>
<td>General Statements</td>
<td>116</td>
</tr>
<tr>
<td>Part 1</td>
<td>Conditions and Criteria</td>
<td></td>
</tr>
<tr>
<td>M301</td>
<td>Design Conditions</td>
<td>116</td>
</tr>
<tr>
<td>M302</td>
<td>Design Criteria</td>
<td>116</td>
</tr>
<tr>
<td>Part 2</td>
<td>Pressure Design of Metallic Piping Components</td>
<td></td>
</tr>
<tr>
<td>M303</td>
<td>General</td>
<td>116</td>
</tr>
<tr>
<td>M304</td>
<td>Pressure Design of Metallic Components</td>
<td>116</td>
</tr>
<tr>
<td>Part 3</td>
<td>Fluid Service Requirements for Metallic Piping Components</td>
<td></td>
</tr>
<tr>
<td>M305</td>
<td>Pipe</td>
<td>116</td>
</tr>
<tr>
<td>M306</td>
<td>Metallic Fittings, Bends, Miters, Laps, and Branch Connections</td>
<td>117</td>
</tr>
<tr>
<td>M307</td>
<td>Metallic Valves and Specialty Components</td>
<td>117</td>
</tr>
<tr>
<td>M308</td>
<td>Flanges, Blanks, Flange Facings, and Gaskets</td>
<td>117</td>
</tr>
<tr>
<td>M309</td>
<td>Bolting</td>
<td>118</td>
</tr>
<tr>
<td>Part 4</td>
<td>Fluid Service Requirements for Metallic Piping Joints</td>
<td></td>
</tr>
<tr>
<td>M310</td>
<td>Metallic Piping, General</td>
<td>118</td>
</tr>
<tr>
<td>M311</td>
<td>Welded Joints in Metallic Piping</td>
<td>118</td>
</tr>
<tr>
<td>M312</td>
<td>Flanged Joints in Metallic Piping</td>
<td>118</td>
</tr>
<tr>
<td>M313</td>
<td>Expanded Joints in Metallic Piping</td>
<td>118</td>
</tr>
<tr>
<td>M314</td>
<td>Threaded Joints in Metallic Piping</td>
<td>118</td>
</tr>
<tr>
<td>M315</td>
<td>Tubing Joints in Metallic Piping</td>
<td>118</td>
</tr>
<tr>
<td>M316</td>
<td>Caulked Joints</td>
<td>118</td>
</tr>
<tr>
<td>M317</td>
<td>Soldered and Brazed Joints</td>
<td>118</td>
</tr>
<tr>
<td>M318</td>
<td>Special Joints in Metallic Piping</td>
<td>118</td>
</tr>
<tr>
<td>Part 5</td>
<td>Flexibility and Support of Metallic Piping</td>
<td></td>
</tr>
</tbody>
</table>

v
<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA319</td>
<td>Flexibility of Metallic Piping</td>
<td>118</td>
</tr>
<tr>
<td>M320</td>
<td>Analysis of Sustained Loads</td>
<td>118</td>
</tr>
<tr>
<td>M321</td>
<td>Piping Support</td>
<td>118</td>
</tr>
<tr>
<td><strong>Part 6</strong> Systems</td>
<td></td>
<td>119</td>
</tr>
<tr>
<td>M322</td>
<td>Specific Piping Systems</td>
<td>119</td>
</tr>
<tr>
<td><strong>Part 7</strong> Metallic Materials</td>
<td></td>
<td>119</td>
</tr>
<tr>
<td>M323</td>
<td>General Requirements</td>
<td>119</td>
</tr>
<tr>
<td>M325</td>
<td>Materials — Miscellaneous</td>
<td>119</td>
</tr>
<tr>
<td><strong>Part 8</strong> Standards for Piping Components</td>
<td></td>
<td>119</td>
</tr>
<tr>
<td>M326</td>
<td>Dimensions and Ratings of Components</td>
<td>119</td>
</tr>
<tr>
<td><strong>Part 9</strong> Fabrication, Assembly, and Erection of Metallic Piping</td>
<td></td>
<td>120</td>
</tr>
<tr>
<td>M327</td>
<td>General</td>
<td>120</td>
</tr>
<tr>
<td>M328</td>
<td>Welding of Metals</td>
<td>120</td>
</tr>
<tr>
<td>M330</td>
<td>Preheating of Metals</td>
<td>120</td>
</tr>
<tr>
<td>M331</td>
<td>Heat Treatment of Metals</td>
<td>120</td>
</tr>
<tr>
<td>M332</td>
<td>Bending and Forming of Metals</td>
<td>120</td>
</tr>
<tr>
<td>M335</td>
<td>Assembly and Erection of Metallic Piping</td>
<td>120</td>
</tr>
<tr>
<td><strong>Part 10</strong> Inspection, Examination, Testing, and Records of Metallic Piping</td>
<td></td>
<td>120</td>
</tr>
<tr>
<td>M340</td>
<td>Inspection</td>
<td>120</td>
</tr>
<tr>
<td>M341</td>
<td>Examination</td>
<td>120</td>
</tr>
<tr>
<td>M342</td>
<td>Examination Personnel</td>
<td>121</td>
</tr>
<tr>
<td>M343</td>
<td>Examination Procedures</td>
<td>121</td>
</tr>
<tr>
<td>M344</td>
<td>Types of Examination</td>
<td>121</td>
</tr>
<tr>
<td>M345</td>
<td>Testing</td>
<td>121</td>
</tr>
<tr>
<td>M346</td>
<td>Records</td>
<td>121</td>
</tr>
<tr>
<td>Parts 11 Through 20, Corresponding to Chapter VII</td>
<td></td>
<td>121</td>
</tr>
<tr>
<td>MA300</td>
<td>General Statements</td>
<td>121</td>
</tr>
<tr>
<td><strong>Part 11</strong> Conditions and Criteria</td>
<td></td>
<td>121</td>
</tr>
<tr>
<td>MA301</td>
<td>Design Conditions</td>
<td>121</td>
</tr>
<tr>
<td>MA302</td>
<td>Design Criteria</td>
<td>121</td>
</tr>
<tr>
<td><strong>Part 12</strong> Pressure Design of Nonmetallic Piping Components</td>
<td></td>
<td>121</td>
</tr>
<tr>
<td>MA303</td>
<td>General</td>
<td>121</td>
</tr>
<tr>
<td>MA304</td>
<td>Pressure Design of Nonmetallic Components</td>
<td>121</td>
</tr>
<tr>
<td><strong>Part 13</strong> Fluid Service Requirements for Nonmetallic Piping Components</td>
<td></td>
<td>121</td>
</tr>
<tr>
<td>MA305</td>
<td>Pipe</td>
<td>121</td>
</tr>
<tr>
<td>MA306</td>
<td>Nonmetallic Fittings, Bends, Miters, Laps, and Branch Connections</td>
<td>121</td>
</tr>
<tr>
<td>MA307</td>
<td>Valves and Specialty Components</td>
<td>122</td>
</tr>
<tr>
<td>MA308</td>
<td>Flanges, Blanks, Flange Facings, and Gaskets</td>
<td>122</td>
</tr>
<tr>
<td>MA309</td>
<td>Bolting</td>
<td>122</td>
</tr>
<tr>
<td><strong>Part 14</strong> Fluid Service Requirements for Nonmetallic Piping Joints</td>
<td></td>
<td>122</td>
</tr>
<tr>
<td>MA310</td>
<td>General</td>
<td>122</td>
</tr>
<tr>
<td>MA311</td>
<td>Bonded Joints</td>
<td>122</td>
</tr>
<tr>
<td>MA312</td>
<td>Flanged Joints</td>
<td>122</td>
</tr>
<tr>
<td>MA313</td>
<td>Expanded Joints</td>
<td>122</td>
</tr>
<tr>
<td>MA314</td>
<td>Threaded Joints</td>
<td>122</td>
</tr>
<tr>
<td>Section</td>
<td>Title</td>
<td>Page</td>
</tr>
<tr>
<td>---------</td>
<td>-------</td>
<td>------</td>
</tr>
<tr>
<td>Part 15</td>
<td>Flexibility and Support of Nonmetallic Piping</td>
<td>122</td>
</tr>
<tr>
<td>MA319</td>
<td>Piping Flexibility</td>
<td>122</td>
</tr>
<tr>
<td>MA321</td>
<td>Piping Support</td>
<td>122</td>
</tr>
<tr>
<td>Part 16</td>
<td>Nonmetallic and Nonmetallic-Lined Systems</td>
<td>122</td>
</tr>
<tr>
<td>MA322</td>
<td>Specific Piping Systems</td>
<td>122</td>
</tr>
<tr>
<td>Part 17</td>
<td>Nonmetallic Materials</td>
<td>122</td>
</tr>
<tr>
<td>MA323</td>
<td>General Requirements</td>
<td>122</td>
</tr>
<tr>
<td>Part 18</td>
<td>Standards for Nonmetallic and Nonmetallic-Lined Piping Components</td>
<td>123</td>
</tr>
<tr>
<td>MA326</td>
<td>Dimensions and Ratings of Components</td>
<td>123</td>
</tr>
<tr>
<td>Part 19</td>
<td>Fabrication, Assembly, and Erection of Nonmetallic and Nonmetallic-Lined Piping</td>
<td>123</td>
</tr>
<tr>
<td>MA327</td>
<td>General</td>
<td>123</td>
</tr>
<tr>
<td>MA328</td>
<td>Bonding of Plastics</td>
<td>123</td>
</tr>
<tr>
<td>MA329</td>
<td>Fabrication of Piping Lined With Nonmetals</td>
<td>123</td>
</tr>
<tr>
<td>MA332</td>
<td>Bending and Forming</td>
<td>123</td>
</tr>
<tr>
<td>MA334</td>
<td>Joining Nonplastic Piping</td>
<td>123</td>
</tr>
<tr>
<td>MA335</td>
<td>Assembly and Erection</td>
<td>123</td>
</tr>
<tr>
<td>Part 20</td>
<td>Inspection, Examination, Testing, and Records of Nonmetallic and Nonmetallic-Lined Piping</td>
<td>123</td>
</tr>
<tr>
<td>MA340</td>
<td>Inspection</td>
<td>123</td>
</tr>
<tr>
<td>MA341</td>
<td>Examination</td>
<td>123</td>
</tr>
<tr>
<td>MA342</td>
<td>Examination Personnel</td>
<td>123</td>
</tr>
<tr>
<td>MA343</td>
<td>Examination Procedures</td>
<td>123</td>
</tr>
<tr>
<td>MA344</td>
<td>Types of Examination</td>
<td>123</td>
</tr>
<tr>
<td>MA345</td>
<td>Testing</td>
<td>123</td>
</tr>
<tr>
<td>MA346</td>
<td>Records</td>
<td>123</td>
</tr>
<tr>
<td>Chapter IX</td>
<td>High Pressure Piping</td>
<td>124</td>
</tr>
<tr>
<td>K300</td>
<td>General Statements</td>
<td>124</td>
</tr>
<tr>
<td>Part 1</td>
<td>Conditions and Criteria</td>
<td>124</td>
</tr>
<tr>
<td>K301</td>
<td>Design Conditions</td>
<td>124</td>
</tr>
<tr>
<td>K302</td>
<td>Design Criteria</td>
<td>125</td>
</tr>
<tr>
<td>Part 2</td>
<td>Pressure Design of Piping Components</td>
<td>127</td>
</tr>
<tr>
<td>K303</td>
<td>General</td>
<td>127</td>
</tr>
<tr>
<td>K304</td>
<td>Pressure Design of High Pressure Components</td>
<td>127</td>
</tr>
<tr>
<td>Part 3</td>
<td>Fluid Service Requirements for Piping Components</td>
<td>131</td>
</tr>
<tr>
<td>K305</td>
<td>Pipe</td>
<td>131</td>
</tr>
<tr>
<td>K306</td>
<td>Fittings, Bends, and Branch Connections</td>
<td>131</td>
</tr>
<tr>
<td>K307</td>
<td>Valves and Specialty Components</td>
<td>132</td>
</tr>
<tr>
<td>K308</td>
<td>Flanges, Blanks, Flange Facings, and Gaskets</td>
<td>132</td>
</tr>
<tr>
<td>K309</td>
<td>Bolting</td>
<td>132</td>
</tr>
<tr>
<td>Part 4</td>
<td>Fluid Service Requirements for Piping Joints</td>
<td>132</td>
</tr>
<tr>
<td>K310</td>
<td>General</td>
<td>132</td>
</tr>
<tr>
<td>K311</td>
<td>Welded Joints</td>
<td>132</td>
</tr>
</tbody>
</table>
Chapter X High Purity Piping

Part 1 Conditions and Criteria

Part 2 Pressure Design of Piping Components

Part 3 Fluid Service Requirements for Piping Components

Part 4 Fluid Service Requirements for Piping Joints
### Part 10: Inspection, Examination, and Testing

- U340 Inspection ................................................................. 152
- U341 Examination ............................................................. 152
- U342 Examination Personnel ................................................. 153
- U343 Examination Procedures .............................................. 153
- U344 Types of Examination .................................................. 153
- U345 Testing .................................................................. 154
- U346 Records .................................................................. 154

### Part 11: High Purity Piping in Category M Fluid Service

- UM300 General Statements .................................................. 154
- UM307 Metallic Valves and Specialty Components ............... 154
- UM322 Specific Piping Systems ............................................. 155
- UM328 Welding of Materials ................................................. 155
- UM335 Assembly and Erection of Metallic Piping .................. 155
- UM341 Examination ............................................................. 155
- UM345 Testing .................................................................. 155

### Appendices

- A Allowable Stresses and Quality Factors for Metallic Piping and Bolting Materials .......... 156
- B Stress Tables and Allowable Pressure Tables for Nonmetals ........................................ 382
- C Physical Properties of Piping Materials ............................................. 391
- D Flexibility and Stress Intensification Factors ............................................. 412
- E Reference Standards ............................................................... 417
- F Guidance and Precautionary Considerations ............................................... 423
- G Safeguarding .................................................................... 429
- H Sample Calculations for Branch Reinforcement ............................................ 431
- J Nomenclature .................................................................... 439
- K Allowable Stresses for High Pressure Piping .......................................... 455
- L Aluminum Alloy Pipe Flanges .................................................. 470
- M Guide to Classifying Fluid Services .................................................. 473
### Tables

<table>
<thead>
<tr>
<th>Table Number</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>U335.7.1</td>
<td>Face Seal Joints</td>
<td>152</td>
</tr>
<tr>
<td>U335.8A</td>
<td>Hygienic Clamp Joint Assembly</td>
<td>152</td>
</tr>
<tr>
<td>U335.8B</td>
<td>Hygienic Clamp Types</td>
<td>153</td>
</tr>
<tr>
<td>U335.8C</td>
<td>Hygienic Ferrules</td>
<td>153</td>
</tr>
<tr>
<td>H301</td>
<td>Illustrations for SI Units Examples in Appendix H</td>
<td>432</td>
</tr>
<tr>
<td>H311</td>
<td>Illustrations for U.S. Customary Units Examples in Appendix H</td>
<td>436</td>
</tr>
<tr>
<td>M300</td>
<td>Guide to Classifying Fluid Services</td>
<td>474</td>
</tr>
<tr>
<td>R307</td>
<td>Surface and Subsurface Flaws</td>
<td>478</td>
</tr>
<tr>
<td>S301.1</td>
<td>Simple Code Compliant Model</td>
<td>480</td>
</tr>
<tr>
<td>S302.1</td>
<td>Lift-off Model</td>
<td>484</td>
</tr>
<tr>
<td>S303.1</td>
<td>Moment Reversal Model</td>
<td>487</td>
</tr>
</tbody>
</table>

#### Notes
- Status of Appendices in B31.3
- Increased Casting Quality Factors, $E_c$
- Acceptance Levels for Castings
- Longitudinal Weld Joint Quality Factor, $E_{lj}$
- Weld Joint Strength Reduction Factor, $W$
- Values of Coefficient $Y$ for $t < D/6$
- ASME BPVC References for Closures
- Permissible Sizes/Rating Classes for Slip-On Flanges Used as Lapped Flanges
- Minimum Schedule of Components With External Threads
- Requirements for Low Temperature Toughness Tests for Metals
- Tabular Values for Minimum Temperatures Without Impact Testing for Carbon Steel Materials
- Tabular Values for Reduction in Lowest Exemption Temperature for Steels Without Impact Testing
- Impact Testing Requirements for Metals
- Charpy Impact Test Temperature Reduction
- Minimum Required Charpy V-Notch Impact Values
- Component Standards
- Preheat Temperatures
- Postweld Heat Treatment
- Alternate Postweld Heat Treatment Requirements for Carbon and Low Alloy Steels, P-Nos. 1 and 3
- Exemptions to Mandatory Postweld Heat Treatment
- Acceptance Criteria for Welds — Visual and Radiographic Examination
- Criterion Value Notes for Table 341.3.2
- Requirements for Low Temperature Toughness Tests for Nonmetals
- Recommended Temperature Limits for Reinforced Thermosetting Resin Pipe
- Recommended Temperature Limits for Thermoplastics Used as Linings
- Component Standards
- Acceptance Criteria for Bonds
- Acceptable Severity Levels for Steel Castings
- Required Ultrasonic or Eddy Current Examination of Pipe and Tubing for Longitudinal Defects
<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>S302.1</td>
<td>Temperature/Pressure Combinations</td>
<td>484</td>
</tr>
<tr>
<td>S302.3</td>
<td>Generic Pipe Stress Model Input: Component Connectivity, Type, and Lengths</td>
<td>485</td>
</tr>
<tr>
<td>S302.5.1</td>
<td>Results for Operating Case 1: Reaction Loads on Support and Anchors</td>
<td>485</td>
</tr>
<tr>
<td>S302.6.1</td>
<td>Sustained Load Condition Listing</td>
<td>486</td>
</tr>
<tr>
<td>S302.6.3.1</td>
<td>Sustained Forces and Stresses for Sustained Condition 3 With Node 50 Support Removed [Allowable $S_h = 124.5$ MPa (18,100 psi): Fails]</td>
<td>487</td>
</tr>
<tr>
<td>S303.1</td>
<td>Pressure/Temperature Combinations</td>
<td>488</td>
</tr>
<tr>
<td>S303.3</td>
<td>Generic Pipe Stress Model Input: Component Connectivity, Type, and Lengths</td>
<td>488</td>
</tr>
<tr>
<td>S303.7.1</td>
<td>Case 1: Displacement Stress Range [Eq. (1a) Allowable $S_A = 248.2$ MPa (36 ksi): Passes]</td>
<td>489</td>
</tr>
<tr>
<td>S303.7.2</td>
<td>Case 2: Displacement Stress Range [Eq. (1a) Allowable $S_A = 248.2$ MPa (36 ksi): Passes]</td>
<td>490</td>
</tr>
<tr>
<td>S303.7.3</td>
<td>Load Combination Considering Cases 1 and 2, Total Strain Based: Displacement Stress Range [Eq. (1b) Allowable $S_A = 379.8$ MPa (55.1 ksi): Fails]</td>
<td>491</td>
</tr>
<tr>
<td>W301-1</td>
<td>Gamma Function Evaluation</td>
<td>496</td>
</tr>
<tr>
<td>W302.1-1</td>
<td>Fatigue Material Coefficients ($-3\sigma$)</td>
<td>497</td>
</tr>
<tr>
<td>W302.1-2</td>
<td>Fatigue Material Coefficients ($-2\sigma$)</td>
<td>497</td>
</tr>
<tr>
<td>W302.1-3</td>
<td>Optional Fatigue Material Coefficients When $N_{ti} &gt; 10^7$</td>
<td>497</td>
</tr>
<tr>
<td>W302.2-1</td>
<td>Environmental Fatigue Factors for Carbon Steel Piping, $T \leq 93$°C (200°F)</td>
<td>498</td>
</tr>
</tbody>
</table>
Responding to evident need and at the request of The American Society of Mechanical Engineers (ASME), the American Standards Association initiated Project B31 in March 1926, with ASME as sole administrative sponsor. The breadth of the field involved required that membership of the Sectional Committee be drawn from some 40 engineering societies, industries, government bureaus, institutes, and trade associations.

Initial publication in 1935 was as the American Tentative Standard Code for Pressure Piping. Revisions from 1942 through 1955 were published as American Standard Code for Pressure Piping, ASA B31.1. It was then decided to publish as separate documents the various industry Sections, beginning with ASA B31.8-1955, Gas Transmission and Distribution Piping Systems. The first Petroleum Refinery Piping Code Section was designated ASA B31.3-1959. ASA B31.3 revisions were published in 1962 and 1966.

In 1967–1969, the American Standards Association became first the United States of America Standards Institute, then the American National Standards Institute (ANSI). The Sectional Committee became American National Standards Committee B31 and the Code was renamed the American National Standard Code for Pressure Piping. The next B31.3 revision was designated ANSI B31.3-1973. Addenda were published through 1975.

A draft Code Section for Chemical Plant Piping, prepared by Section Committee B31.6, was ready for approval in 1974. It was decided, rather than have two closely related Code Sections, to merge the Section Committees and develop a joint Code Section, titled Chemical Plant and Petroleum Refinery Piping. The first edition was published as ANSI B31.3-1976.

In this Code, responsibility for piping design was conceptually integrated with that for the overall processing facility, with safeguarding recognized as an effective safety measure. Three categories of Fluid Service were identified, with a separate Chapter for Category M Fluid Service. Coverage for nonmetallic piping was introduced. New concepts were better defined in five Addenda, the fourth of which added Appendix M, a graphic aid to selection of the proper Fluid Service category.

The Standards Committee was reorganized in 1978 as a Committee operating under ASME procedures with ANSI accreditation. It is now the ASME Code for Pressure Piping, B31 Committee. Section committee structure remains essentially unchanged.

The second edition of Chemical Plant and Petroleum Refinery Piping was compiled from the 1976 Edition and its five Addenda, with nonmetal requirements editorially relocated to a separate Chapter. Its new designation was ANSI/ASME B31.3-1980.

Section Committee B31.10 had a draft Code for Cryogenic Piping ready for approval in 1981. Again, it was decided to merge the two Section Committees and develop a more inclusive Code with the same title. The work of consolidation was partially completed in the ANSI/ASME B31.3-1984 Edition.

Significant changes were made in Addenda to the 1984 Edition; integration of cryogenic requirements was completed; a new stand-alone Chapter on high-pressure piping was added; and coverage of fabrication, inspection, testing, and allowable stresses was reorganized. The new Edition was designated as ASME/ANSI B31.3-1987 Edition.

Addenda to the subsequent five Editions, published at three-year intervals, were primarily used to keep the Code up to date. New Appendices were added, however, on requirements for bellows expansion joints, estimating service life, submittal of Inquiries, aluminum flanges, and quality control in the 1990, 1993, 1999, and 2002 Editions, all designated as ASME B31.3.

In a program to clarify the application of all Sections of the Code for Pressure Piping, changes were made in the Introduction and Scope statements of the 1996 Edition, and its title was changed to Process Piping.

Under direction of ASME Codes and Standards management, SI (metric) units of measurement were emphasized. With certain exceptions, SI units were listed first in the 1996 Edition and were designated as the standard. Instructions for conversion were given where SI units data were not available. U.S. Customary units also were given. By agreement, either system may have been used.

Beginning with the 2004 Edition, the publication cycle of ASME B31.3 was changed to biennial. Other changes made in the 2004 Edition included the introduction of the weld joint strength reduction factor, W, and the additions of Appendix P, Alternative Rules for Evaluating Stress Range, and Appendix S, Piping System Stress Analysis Examples.

Changes that were made to the 2006 and 2008 Editions of ASME B31.3 included the requirement that valves have blowout-proof stems and the addition of a definition for elevated temperature fluid service, respectively. The most significant change that was made to the 2010 Edition of ASME B31.3 was the addition of Chapter X, High Purity
Piping. In the 2012 Edition, Tables A-1M and A-2M were added to Appendix A that give allowable design values in SI units, and Appendix N, Application of ASME B31.3 Internationally, was also added.

For the 2016 Edition, the allowable design values in SI units as shown in Tables A-1M and A-2M were changed from for information only to values that may be used to meet the requirements of the Code.

In this Edition, SI units are given first, with U.S. Customary units in parentheses. Table K-1 in Appendix K is an exception, containing only U.S. Customary units. The allowable design values in Tables A-1 and A-2 are given in U.S. Customary units, and the SI values are given in Tables A-1M and A-2M. Either the U.S. Customary units or the SI units for these allowable design values may be used. Except for Tables A-1, A-1M, A-2, A-2M, C-1, C-1M, C-6, C-6M, and K-1, values in SI units are to be regarded as the standard, unless otherwise agreed between the contracting parties. Instructions are given in Table K-1 for converting tabular data in U.S. Customary units to appropriate SI units.

Interpretations, Code Cases, and errata to the B31.3 Code on Process Piping are published on the following ASME web page: https://cstools.asme.org/csconnect/CommitteePages.cfm?Committee=N10020400.

ASME B31.3-2018 was approved by the American National Standards Institute on August 8, 2018.
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Code for Pressure Piping

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INTRODUCTION

The ASME B31 Code for Pressure Piping consists of a number of individually published Sections, each an American National Standard, under the direction of ASME Committee B31, Code for Pressure Piping.

Rules for each Section reflect the kinds of piping installations considered during its development, as follows:

B31.1 Power Piping: piping typically found in electric power generating stations, in industrial and institutional plants, geothermal heating systems, and central and district heating and cooling systems

B31.3 Process Piping: piping typically found in petroleum refineries; onshore and offshore petroleum and natural gas production facilities; chemical, pharmaceutical, textile, paper, ore processing, semiconductor, and cryogenic plants; food and beverage processing facilities; and related processing plants and terminals

B31.4 Pipeline Transportation Systems for Liquids and Slurries: piping transporting products that are predominately liquid between plants and terminals and within terminals, pumping, regulating, and metering stations

B31.5 Refrigeration Piping and Heat Transfer Components: piping for refrigerants and secondary coolants

B31.8 Gas Transmission and Distribution Piping Systems: piping transporting products that are predominately gas between sources and terminals, including compressor, regulating, and metering stations; gas gathering pipelines

B31.9 Building Services Piping: piping typically found in industrial, institutional, commercial, and public buildings, and in multi-unit residences, which does not require the range of sizes, pressures, and temperatures covered in B31.1

B31.12 Hydrogen Piping and Pipelines: piping in gaseous and liquid hydrogen service and pipelines in gaseous hydrogen service

This is the B31.3 Process Piping Code Section. Hereafter, in this Introduction and in the text of this Code Section B31.3, where the word Code is used without specific identification, it means this Code Section.

It is the owner’s responsibility to select the Code Section that most nearly applies to a proposed piping installation. Factors to be considered by the owner include limitations of the Code Section; jurisdictional requirements; and the applicability of other codes and standards. All applicable requirements of the selected Code Section shall be met. For some installations, more than one Code Section may apply to different parts of the installation. The owner is also responsible for imposing requirements supplementary to those of the Code if necessary to assure safe piping for the proposed installation.

Certain piping within a facility may be subject to other codes and standards, including but not limited to

— ANSI Z223.1 National Fuel Gas Code: piping for fuel gas from the point of delivery to the connection of each fuel utilization device

— NFPA Fire Protection Standards: fire protection systems using water, carbon dioxide, halon, foam, dry chemicals, and wet chemicals

— NFPA 99 Health Care Facilities: medical and laboratory gas systems

— building and plumbing codes, as applicable, for potable hot and cold water, and for sewer and drain systems

The Code specifies engineering requirements deemed necessary for safe design and construction of pressure piping. While safety is the primary consideration, this factor alone will not necessarily govern the final specifications for any piping installation. The Code is not a design handbook. Many decisions that must be made to produce a sound piping installation are not specified in detail within this Code. The Code does not serve as a substitute for sound engineering judgments by the owner and the designer.

To the greatest possible extent, Code requirements for design are stated in terms of basic design principles and formulas. These are supplemented as necessary with specific requirements to ensure uniform application of principles and to guide selection and application of piping elements. The Code prohibits designs and practices known to be unsafe and contains warnings where caution, but not prohibition, is warranted.

This Code Section includes the following:
(a) references to acceptable material specifications and component standards, including dimensional requirements and pressure-temperature ratings
(b) requirements for design of components and assemblies, including piping supports
(c) requirements and data for evaluation and limitation of stresses, reactions, and movements associated with pressure, temperature changes, and other forces
(d) guidance and limitations on the selection and application of materials, components, and joining methods
(e) requirements for the fabrication, assembly, and erection of piping
(f) requirements for examination, inspection, and testing of piping

ASME Committee B31 is organized and operates under procedures of The American Society of Mechanical Engineers that have been accredited by the American National Standards Institute. The Committee is a continuing one, and keeps all Code Sections current with new developments in materials, construction, and industrial practice. New editions are published at intervals of two years.

Code users will note that paragraphs in the Code are not necessarily numbered consecutively. Such discontinuities result from following a common outline, insofar as practical, for all Code Sections. In this way, corresponding material is correspondingly numbered in most Code Sections, thus facilitating reference by those who have occasion to use more than one Section.

This edition of Code Section B31.3 is not retroactive. Normally, agreement is made between contracting parties to use a specific edition, considering requirements of the authority having jurisdiction. When specified as the latest edition and when no edition is specified, the specific edition is the one issued at least 6 months prior to the original contract date for the first design activity.

Users of this Code are cautioned against making use of Code revisions without assurance that they are acceptable to the proper authorities in the jurisdiction where the piping is to be installed.

The B31 Committee has established an orderly procedure to consider requests for interpretation and revision of Code requirements. To receive consideration, such request must be in writing and must give full particulars in accordance with Appendix Z.

The approved reply to an inquiry will be sent directly to the inquirer. In addition, the question and reply will be published as part of an Interpretation supplement.

A Case is the prescribed form of reply when study indicates that the Code wording needs clarification, or when the reply modifies existing requirements of the Code or grants permission to use new materials or alternative constructions. The Case will be published as part of a Case supplement.

Code Cases remain available for use until annulled by the ASME B31 Standards Committee.

A request for revision of the Code will be placed on the Committee’s agenda. Further information or active participation on the part of the proponent may be requested during consideration of a proposed revision.

Materials ordinarily are listed in the stress tables only when sufficient usage in piping within the scope of the Code has been shown. Requests for listing shall include evidence of satisfactory usage and specific data to permit establishment of allowable stresses, maximum and minimum temperature limits, and other restrictions. Additional criteria can be found in the guidelines for addition of new materials in the ASME Boiler and Pressure Vessel Code, Section II. (To develop usage and gain experience, unlisted materials may be used in accordance with para. 323.1.2.)
ASME B31.3-2018
SUMMARY OF CHANGES

Following approval by the ASME B31 Committee and ASME, and after public review, ASME B31.3-2018 was approved by the American National Standards Institute on August 8, 2018.

ASME B31.3-2018 includes the following changes identified by a margin note, (18).

<table>
<thead>
<tr>
<th>Page</th>
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<tr>
<td>xx</td>
<td>Introduction</td>
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<tr>
<td>1</td>
<td>300</td>
<td>Subparagraphs (b)(1) and (c)(4) revised</td>
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<td>300.1</td>
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<td>3</td>
<td>300.2</td>
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<td>(2) indication, linear; indication, rounded; and stress ratio revised</td>
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<td></td>
<td></td>
<td>(3) owner, readily accessible (for visual examination), and representative added</td>
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<td>9</td>
<td>Table 300.4</td>
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<td>(2) First row added</td>
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<td>(3) General Note (b) and Notes (2), (3), and (9) revised</td>
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<td>311.2</td>
<td>Paragraphs 311.2.1, 311.2.2, and 311.2.3 deleted, and subsequent paragraphs redesignated</td>
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First paragraph added

Table 314.2.1 Revised in its entirety

Subparagraphs (a) and (b) revised

Subparagraph (a) revised

Revised

Second paragraph revised

Subparagraph (c) revised

Second paragraph revised

(1) First paragraph revised
(2) Last paragraph and footnote 10 added

Revised in its entirety

(1) Last two column heads revised
(2) Under Type of Material, third entry revised
(3) Notes (1), (3), (4), (6), and (7) revised

Previous Note (6) redesignated as (1) and revised; other Notes renumbered

In seventh group of rows, in fourth row, entries under Nominal Thickness revised

(1) Fahrenheit values corrected by errata and moved to bottom of illustration
(2) General Notes replaced by one General Note

Subparagraphs (b) and (c) revised

In first column, last entry revised

(1) ASME B18.31.2 added
(2) Notes (4) and (5) revised

For P-No. 5B, first two entries in third row revised

Subparagraph (a) revised

Revised

Subparagraph (b)(3) revised

Subparagraphs (a)(2) and (a)(3) revised

(1) Under Weld Imperfection, fifth entry revised
(2) For Criteria F and G, main entry under Measure revised

Note (2) [formerly Note (10)] revised

Revised

Revised

Revised

(1) Paragraph 345.8.1 added
(2) Existing text moved to new para. 345.8.2 and subpara. (a) revised

Revised

Footnote 1 revised
97 A302.3.4 Subparagraph (a) revised
101 A319.2.1 Revised in its entirety
102 A319.2.2 Subparagraph (a) revised
107 Table A326.1 (1) ASTM F1545 and AWWA C900 revised
          (2) Note (4) added
114 Table A341.3.2 Revised
119 M323.2 Revised
120 M335.1.1 First cross-reference corrected by errata to read 335.1
124 K300 Subparagraphs (a), (b)(1), and (e) revised
124 K300.1 Revised in its entirety
124 K300.4 Revised
124 K301 (1) First paragraph revised
          (2) Paragraph K301.1 deleted
          (3) Paragraph K301.2.1 revised
          (4) Paragraphs K301.4.2 and K301.7.3 added
125 K302.2.3 Revised in its entirety
125 K302.2.4 Revised
126 K302.3.3 First paragraph revised
127 K302.3.5 Subparagraph (c) revised
127 K302.3.6 Subparagraph (a) revised
128 K304.1.2 (1) Equations (34a), (34b), (34c), and (34d) revised
          (2) Footnote 3 deleted and subsequent footnotes renumbered
130 K304.7.4 Revised
131 K306.1.1 Revised
133 K314 Revised in its entirety
133 K315 Revised in its entirety
134 K318 Revised
134 K319 Revised
134 K320 Added
135 K323.2 Revised
135 K323.2.1 Revised
136 K323.2.4 Subparagraph (a) revised
139 K326.4 Revised in its entirety
144 Table K341.3.2 Under Type of Imperfection, fifth entry revised
145 Criterion Value Notes for Table K341.3.2 For Symbol C, Measure revised
146 K344.6.3 Subparagraph (b) revised
148 K346.2 Subparagraph (d) revised
151 U328.4 Revised
152 U341.3.2 Revised
157 Specification Index for Appendix A Revised in its entirety
161 Notes for Tables A-1, A-1M, A-1A, A-1B, A-2, and A-2M (1) General Note (a) and Notes (6), (30), and (65) revised
          (2) Note (79) added
165 Table A-1 (1) All Note (2) references deleted

xxiv
(2) Under Carbon Steel — Forgings and Fittings, A694 F42, F46, F52, F56, F60, F65, and F70; A707 L1, L2, and L3; and A860 WPHY 42, WPHY 46, WPHY 52, WPHY 60, WPHY 65, and WPHY 70 added
(3) Under Low and Intermediate Alloy Steel — Pipes, for A671 CFB70 and CFE70, Type/Grade revised
(4) Under Low and Intermediate Alloy Steel — Plates, for A387 9, P-No. revised
(5) Under Stainless Steel — Pipes and Tubes, A312 TP321, A312 TP321H, A376 TP321, and A376 TP321H revised
(6) A270 TP304L and TP316L added
(7) A358 321 and A409 TP321 revised
(8) A358 321H added
(9) A270 TP316 added
(10) A270 TP304 added
(11) A789 and A790 S82441 added
(12) A789 and A790 S32003 revised
(13) For A928 S32003, Size revised
(14) A789 and A790 S32760 revised
(15) Under Stainless Steel — Plates and Sheets, A240 321 and 321H revised
(16) A240 S82441 added
(17) For A240 S32003, Size revised
(18) A240 S32760 revised
(19) Under Stainless Steel — Forgings and Fittings, A182 F321 and F321H revised
(20) A403 WP321 and WP321H revised
(21) Under Stainless Steel — Bar, for A479 304, 304H, 304L, 316, 316L, Notes revised
(22) For A479 321 and 321H, stress value for 650°F and font for stress values revised
(23) A479 S82441 added
(24) Under Stainless Steel — Castings, for A351 CF8C, Notes and stress values revised
(25) Under Nickel and Nickel Alloy — Pipes and Tubes, N08825 B163, B474, and B704 added
(26) For N08825 B423 and B705, fonts for stress values corrected by errata
(27) N06690 B163 and B167 added
(28) N08120 B163, B407, B514, and B515 added
(29) Under Nickel and Nickel Alloy — Plates and Sheets, for N08825 B424, fonts for stress values corrected by errata
(30) N06690 B168 added
(31) N08120 B409 added
(32) Under Nickel and Nickel Alloy — Forgings and Fittings, for N02200 B366, stress value revised
(33) N02200 B564 deleted
(34) For N08825 B366 and B564, fonts for stress values corrected by errata
(35) N06690 B564 added
(36) N08120 B366 and B564 added
(37) Under Nickel and Nickel Alloy — Rod and Bar, for N08825 B425, fonts for stress values corrected by errata
(38) N06690 B166 added
(39) N08120 B408 added
(40) For the titanium and titanium alloys, Product Form and Class/Condition/Temper entries added, and stress values revised
(41) Under Titanium and Titanium Alloy — Pipes and Tubes, R50250, R50400, R50550, R52400, and R53400 B338 added
(42) R53400 B861 and B862 added
(43) Under Titanium and Titanium Alloy — Plates, Sheet, and Strips (formerly Plates and Sheets), for R50250 B265, Specified Min. Yield Strength revised
(44) R52400 and R53400 B265 added
(45) Under Titanium and Titanium Alloy — Forgings and Fittings (formerly Forgings), R50250, R50400, R50550, R52400, and R53400 B363 added
(46) For R50250 B381, Type/Grade and Specified Min. Yield Strength revised
(47) For R50400 and R50550 B381, Type/Grade revised
(48) R52400 and R53400 B381 added
(49) Under Titanium and Titanium Alloy — Bars, R50250, R50400, R50550, R52400, and R53400 B348 added
(50) Under Titanium and Titanium Alloy — Castings, R52550 and R52700 B367 added
(51) Under Aluminum Alloy — Seamless Pipes and Tubes, A83003, A91060, A93003, A95083, A95086, A96061, and A96063 B345 deleted
(52) Under Aluminum Alloy — Castings, for A03560 B26, P-Nos. added

(1) All Note (2) references deleted
(2) A694 F42, F46, F52, F56, F60, F65, and F70; A707 L1, L2, and L3; and A860 WPHY 42, WPHY 46, WPHY 52, WPHY 60, WPHY 65, and WPHY 70 added
(3) For A671 CFB70 and CFE70, Type/Grade revised
(4) For A387 9, P-No. revised
(5) A270 TP304L and TP316L added
(6) A312 TP321, A312 TP321H, A358 321, A376 TP321, A376 TP321H, and A409 TP321 revised
(7) A358 321H added
(8) A270 TP304, TP304L, TP316, and TP316L added
(9) A789 and A790 S82441 added
(10) A789 and A790 S32003 revised
(11) For A928 S32003, Size revised
(12) A789 and A790 S32760 revised
(13) A358 S34565 revised
(14) A240 321 and 321H revised
(15) A240 S82441 added
(16) For A240 S32003, Size revised
(17) A240 S32760 revised
(18) A182 F321 and F321H revised
(19) A403 WP321 and WP321H revised
(20) A182 and A815 S32760 revised
(21) For A479 304, 304H, 304L, 316, 316H, and 316L, Notes revised
(22) A479 321 and 321H revised
(23) A479 S82441 added
(24) A351 CF8C revised
(25) N08825 B163 added
(26) For N08825 B423, Notes revised
(27) N08825 B474 and B704 added
(28) N08825 B705 revised
(29) N06690 B163 and B167 added
(30) N08120 B163, B407, B514, and B515 added
(31) For N06230 B619, B622, and B626, font for stress values revised
(32) N06690 B168 added
(33) N08120 B409 added
(34) For N06230 B435, font for stress values revised
(35) N06230 B435 added
(36) For N02200 B366, stress values revised
(37) N02200 B564 deleted
(38) N06690 B564 added
(39) N08120 B366 and B564 added
(40) For N06230 B366, font for stress values revised
(41) N06690 B166 added
(42) N08120 B408 added
(43) For N06230 B572, font for stress values revised
(44) For titanium and titanium alloy materials, Product Form and Class/Condition/Temper entries added; and Min. Tensile Strength, Min. Yield Strength, and stress values revised
(45) R50250, R50400, R50550, R52400, and R53400 B338 added
(46) R53400 B861 and B862 added
(47) R52400 and R53400 B265 added
(48) R50250, R50400, R50550, R52400, and R53400 B363 and B381 added
(49) R50250, R50400, R50550, R52400, and R53400 B348 added
(50) R52550 and R52700 B367 added
(51) A83003, A91060, A93003, A95083, A95086, A96061, and A96063 B345 deleted
(52) For A03560 B26, P-Nos. added
Table A-1A
B367 added

(1) A105, A181, A350, A182, A487, B160, B164, B564, B247, and B345 deleted
(2) A813, A814, B517, and B862 revised
(3) A270, B163, B515, B704, and B338 added

Table A-1B
(1) A105, A181, A350, A182, A487, B160, B164, B564, B247, and B345 deleted
(2) A813, A814, B517, and B862 revised
(3) A270, B163, B515, B704, and B338 added

Table A-2
(1) A325 deleted
(2) F3125 A325 added
(3) A354 BC and BD lines revised and new BC line added
(4) For last B150 HR50, Size Range corrected by errata

Table A-2M
(1) For A307 B, Min. Yield Strength deleted by errata
(2) A325 deleted
(3) F3125 A325 added
(4) A354 BC and BD lines revised and new BC line added
(5) For last B150 HR50, Size Range corrected by errata

Table C-1M
Table C-2 redesignated as Table C-1M

Table C-6
Revised in its entirety

Table C-6M
Added

Table D300
General Note (b) added

Appendix E
Revised in its entirety

F300.1.4
Added

F301
(1) Paragraph F301.5.1 added
(2) Paragraph F301.11 deleted

F308.4
Revised

F312.1
Subparagraph (b) revised

F323.2.2
Revised

F323.4
Subparagraphs (a) and (c)(4) revised

FK300
Added

Appendix J
(1) Entry for X deleted by errata
(2) Appendix revised

Appendix K
ASTM A789, A790, and A815 added to Specification Index

Notes for Table K-1
(1) General Note (b) revised
(2) Notes (9) and (10) deleted
(3) Notes (19) and (20) added

Table K-1
(1) Under Carbon Steel — Pipes and Tubes, API 5L lines revised
(2) Under Carbon Steel — Forgings and Fittings, for A694 F42 through F70, stress values for highest temperatures deleted
(3) For Stainless Steel entries, UNS Nos. added
(4) Under Stainless Steel — Pipes and Tubes, A789 and A790 S32750 added
(5) Under Stainless Steel — Forgings and Fittings, A182 and A815 S32750 added
(6) Titanium and Titanium Alloy entries revised, and entries in columns for 350°C, 450°F, and 550°F added

Figure M300
Cross-references in Col. 1 revised

Appendix Q
Footnote 1 revised

R300
Subparagraph (a) corrected by errata
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<thead>
<tr>
<th>Page</th>
<th>Section</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>480</td>
<td>Appendix S</td>
<td>Footnote 1 added</td>
</tr>
<tr>
<td>482</td>
<td>S301.6</td>
<td>First paragraph revised</td>
</tr>
<tr>
<td>492</td>
<td>V303.1.1</td>
<td>Subparagraph (b) revised</td>
</tr>
<tr>
<td>493</td>
<td>V303.1.3</td>
<td>Revised</td>
</tr>
<tr>
<td>495</td>
<td>Appendix W</td>
<td>Added</td>
</tr>
<tr>
<td>502</td>
<td>X302.2.1</td>
<td>In subparagraph (d), last cross-reference corrected by errata to read Table 331.1.1</td>
</tr>
<tr>
<td>502</td>
<td>X302.2.3</td>
<td>Subparagraph (a) revised</td>
</tr>
<tr>
<td>504</td>
<td>Appendix Z</td>
<td>Revised in its entirety</td>
</tr>
</tbody>
</table>

NOTES:
(1) The ASME B31.3 Interpretations Volume will no longer be published with the Code.
(2) The B31.3 Code Cases will no longer be published with the Code.
Chapter I
Scope and Definitions

300 GENERAL STATEMENTS

(a) Identification. This Process Piping Code is a Section of The American Society of Mechanical Engineers Code for Pressure Piping, ASME B31, an American National Standard. It is published as a separate document for convenience of Code users.

(b) Responsibilities

(1) Owner. The owner of a piping installation shall have overall responsibility for compliance with this Code, and for establishing the requirements for design, construction, examination, inspection, and testing that will govern the entire fluid handling or process installation of which the piping is a part. The owner is also responsible for designating piping in Category D, Category M, High Pressure, and High Purity Fluid Services, and for determining if a specific Quality System is to be employed. [See paras. 300(d)(4) through (7) and Appendix Q.] Where applicable, the owner shall consider requirements imposed by the authority having jurisdiction regarding the piping installation. The owner may designate a representative to carry out selected responsibilities required by this Code, but the owner retains ultimate responsibility for the actions of the representative.

(2) Designer. The designer is responsible to the owner for assurance that the engineering design of piping complies with the requirements of this Code and with any additional requirements established by the owner.

(3) Manufacturer, Fabricator, and Erector. The manufacturer, fabricator, and erector of piping are responsible for providing materials, components, and workmanship in compliance with the requirements of this Code and of the engineering design.

(4) Owner’s Inspector. The owner’s Inspector (see para. 340) is responsible to the owner for ensuring that the requirements of this Code for inspection, examination, and testing are met. If a Quality System is specified by the owner to be employed, the owner’s Inspector is responsible for verifying that it is implemented.

(c) Intent of the Code

(1) It is the intent of this Code to set forth engineering requirements deemed necessary for safe design and construction of piping installations.

(2) This Code is not intended to apply to the operation, examination, inspection, testing, maintenance, or repair of piping that has been placed in service. See para. F300.1 for examples of standards that may apply in these situations. The provisions of this Code may optionally be applied for those purposes, although other considerations may also be necessary.

(3) The Code generally specifies a simplified approach for many of its requirements. A designer may choose to use a more rigorous analysis to develop design and construction requirements. When the designer decides to take this approach, the designer shall provide to the owner details and calculations demonstrating that design, construction, examination, and testing are consistent with the design criteria of this Code. These details shall be adequate for the owner to verify the validity and shall be approved by the owner. The details shall be documented in the engineering design.

(4) Piping elements shall conform to the specifications and standards listed in this Code or, if not prohibited by this Code, shall be qualified for use as set forth in applicable Chapters of this Code.

(5) The engineering design shall specify any unusual requirements for a particular service. Where service requirements necessitate measures beyond those required by this Code, such measures shall be specified by the engineering design. Where so specified, the Code requires that they be accomplished.

(6) Compatibility of materials with the service and hazards from instability of contained fluids are not within the scope of this Code. See para. F323.

(d) Determining Code Requirements

(1) Code requirements for design and construction include fluid service requirements, which affect selection and application of materials, components, and joints. Fluid service requirements include prohibitions, limitations, and conditions, such as temperature limits or a requirement for safeguarding (see Appendix G). Code requirements for a piping system are the most restrictive of those that apply to any of its elements.

(2) For metallic piping not designated by the owner as Category M, High Pressure, or High Purity Fluid Service (see para. 300.2 and Appendix M), Code requirements are found in Chapters I through VI (the base Code) and fluid service requirements are found in

(-a) Chapter III for materials
(-b) Chapter II, Part 3, for components
(-c) Chapter II, Part 4, for joints