Review of ASME BPVC Section XIII Overpressure Protection

May 9, 2024
Agenda

- Background
- BPVC Section XIII Content
- Changes to Construction Codes
- What’s Next
- Becoming Involved
BPV XIII Background

- Each construction code had their own pressure relief rules and relief devices and relied upon:
  - Construction code members
  - Subcommittee Safety Valve Requirements
- A separate Overpressure Protection book was considered several times over the last 40+ years
BPV XIII Background

- In 2013 BPV Subcommittee Safety Valve Requirements developed proposal for new the standard
- Consolidate overpressure protection technology into one book to benefit all stakeholders by advancing the technology with participation from a broader SME pool
- ASME approved the development of BPV XIII in November 2015
- First Edition published July 2021
- Second Edition published July 2023
**Philosophy for Changes**

- Construction Codes and Section XIII have split responsibilities and requirements for overpressure protection.
- Some requirements had to remain with the referencing Code or Standard:
  - Types of permitted devices or methods
  - Maximum relief pressures
  - Installation as it pertains to the protection of the vessel
- The referencing Code or Standard specifies the objectives of the overpressure protection, methods to achieve it, and permissible devices based on Section XIII rules for the devices.
Philosophy for Changes

- Application of XIII rules invoked by construction code
  - Did not want to affect jurisdictional or legal requirements
- Rules could be adopted by other Codes and Standards
- Requirement changes for the first edition (2021) were minimized
  - Reorganized for the various stakeholders
  - Some changes needed for normalization
Main body is divided into thirteen Parts covering individual topics such as:

- General requirements
- Pressure relief valves
- Rupture disk devices
- Combination devices
- Capacity and flow resistance certification

- Four Mandatory Appendices
- Three Nonmandatory Appendices
BPVC XIII Content

- Part 1: General Requirements
  - Similar to what is in other BPVC Sections
  - Detailed Scope
  - Organization of the Standard
  - Location of Definitions
  - List of Standards referenced by this Section
  - Units of Measure
  - Tolerances
Part 2: Protection Against Overpressure

- Responsibilities and relationship to pressurized equipment codes and standards
- Requirements of BPV XIII must be referenced by the ASME Code or Standard for pressurized equipment before it becomes effective for that Code or Standard
- Summarizes what requirements are in the referencing Code or Standard and what are in BPV XIII
- States if conflict between the referencing Code or Standard and BPV XIII, the referencing Code or Standard takes precedence
- Provides summary of allowed relief devices by Section
Table 2.1-1 Permitted Pressure Relief Devices or Methods by ASME BPVC Section

<table>
<thead>
<tr>
<th>Device or Method</th>
<th>I</th>
<th>NE</th>
<th>NCD</th>
<th>NE</th>
<th>IV</th>
<th>Division 1</th>
<th>Division 2</th>
<th>Division 3</th>
<th>X</th>
<th>XII</th>
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<tr>
<td>Direct spring loaded pressure relief</td>
<td>V</td>
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<td>HV, V [[3]]</td>
<td>HV, V [[3]]</td>
<td>UV, V [[3]]</td>
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<td>Power actuated relief valve</td>
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</table>

GENERAL NOTES:

(a) If there is a difference between the information in Table 2.1-1 and the provisions of the ASME BPVC Section, the ASME BPVC Section shall apply.

(b) Allowable devices and methods are indicated by either the letter P (permitted) or one or more of the following Certification Mark Designators:

- HV = heating boiler pressure relief valve
- NV.1 = nuclear Class 1 pressure relief valve
- NV.2 = nuclear Class 2 pressure relief valve
- NV.3 = nuclear Class 3 pressure relief valve
- TV = transport tank pressure relief valve
- UD = pressure vessel pressure relief device
- UD3 = high pressure vessel pressure relief device, Section VIII, Division 3
- UV = pressure vessel pressure relief valve
- UV3 = high pressure vessel pressure relief valve, Section VIII, Division 3
- V = power boiler safety relief valve
BPVC XIII Content

- Parts 3 through 7: Requirements for Relief Devices
  - Each type of device has its own Part
    - Pressure relief valves, rupture disk devices, pin devices, spring-actuated non-reclosing devices, and temperature and pressure relief valves
  - Each Part includes requirements common to all devices and designator specific requirements including:
    - Requirements for the design, materials, inspection, testing, welding, and marking
BPVC XIII Content

- Part 8: Requirements for Devices in Combination
  - Rupture disk upstream of a pressure relief valve
  - Pin devices upstream of a pressure relief valve
  - Rupture disk downstream of a pressure relief valve

- Part 9: Capacity and Flow Resistance Certification
  - Includes requirements common to all devices and designator specific requirements
BPVC XIII Content

➢ Part 10: Authorization to Use the ASME Certification Mark
  ✦ Requirements for all pressure relief device Designators except V & NV
  ✦ Certificates of Authorization
  ✦ Designated oversight
  ✦ Quality management system
  ✦ Certified Individual (CI)
  ✦ Certificate of conformance

➢ Part 11: Requirements for Open Flow Paths or Vents
  ✦ Minimum guidance to be expanded
  ✦ Currently defers to the equipment code
Part 12: Installation

- As it pertains to the performance of the device (as compared to the protection of the vessel)
- Most installation rules remain in the referencing code of construction

12.1 Applicability – Pressure relief devices shall be installed in accordance with the equipment’s code or standard unless the code or standard has also adopted by reference specific requirements of Part 12. For installation requirements not addressed by the code or standard, the guidance in this Part may be used.
Part 13: Rules for Overpressure Protection by System Design

- Requirements for overpressure protection by system design (cf. UG-140 from 2019 BPVC Section VIII Division 1)
  - References vessel code of construction for maximum overpressure limits
  - When permitted by the referencing Code or Standard
  - Have SMEs within BPV XIII to support this technology
BPVC XIII Content

- Mandatory Appendices
  - I - Definitions
  - II - Adhesive attachment of nameplates
  - III - Quality Control System
  - IV - Capacity Conversion
BPVC XIII Content

- Non-Mandatory Appendices
  - A - Guidance for the use of USCS and SI units
  - B - Stop valves used in pressure relief systems
    - Contains the equivalent of the 2019 Edition of Section VIII Appendix M-5 on stop valves (M-5.1 through M-5.8).
    - Section VIII retains M-5.1 and refers to Section XIII for stop valve guidance
  - C - Guide to Manufacturer’s and Assembler’s Certificates of Conformance for pressure relief devices
    - Forms UV-1, UD-1, and etc.
Changes to Construction Codes

- In some Sections the text relocated to BPV XIII left large gaps in the remaining text
- Text was reorganized around common subjects
  - Some variations were required for some Sections
  - New paragraph numbers used to avoid confusion with references to existing paragraphs
- Content changes were minimized but some normalization and additions required for consistency among the codes
- Provided cross reference list in 2021 Ed. Non-Mandatory Appendix
  - Relocated text within the construction code
  - Relocated text to BPV XIII
Summary of 2021 Ed. Changes

- First edition of BPV XIII was published concurrent with construction code adoption in 2021 editions
  - BPV I – Capacity Certification Only
  - BPV III – Capacity Certification Only
  - BPV IV
  - BPV VIII, Div. 1, 2, and 3
  - BPV X
  - BPV XII
Section I Changes – 2021 Ed.

- Section I committee elected only to adopt Part 9 – Capacity and Flow Resistance Certification
- Some paragraphs in PG-69 now reference Section XIII Part 9
- No changes to the capacity certification process
- 2021 Ed. Nonmandatory Appendix G contains a cross reference list
Section III Changes – 2021 Ed.

- Section III committee elected only to adopt Part 9 – Capacity and Flow Resistance Certification
- Some paragraphs in Subsections NB, NCD, and NE now reference Section XIII Part 9
- No changes to the capacity certification process
Section VIII Div. 1 Changes – 2021 Ed.

- Pressure relief device requirements from UG-125 through UG-140, Mandatory Appendix 11 and Nonmandatory Appendix M-5 have moved to Section XIII

- Remaining overpressure protection requirements have been restructured into common subjects within new UG-150 through UG-156

- 2021 Ed. Nonmandatory Appendix PP provided a complete cross-reference list
Section VIII Div. 1 Changes – 2021 Ed.

- UG-150 – General Requirements
- UG-151 – Responsibilities
- UG-152 – Determination of Pressure Relieving Requirements
- UG-153 – Overpressure Limits
Section VIII Div. 1 Changes – 2021 Ed.

- UG-154 – Permitted Pressure Relief Devices And Methods
  - Pressure Relief Valves
  - Nonreclosing Pressure Relief Devices
    - Rupture Disks
    - Pin Devices
  - Combination Devices
  - Overpressure Protection by System Design
  - Open Flow Paths
- UG-155 – Pressure Settings and Performance Requirements
- UG-156 – Installation
Section IV Changes – 2021 Ed.

- Pressure relief device requirements from Article 4 moved to Section XIII
- Remaining overpressure protection requirements were restructured within a new Article 4A
- Content changes were minimized but some normalization and additions required for consistency among the codes
  - Use of pressure relief valve vs. safety valve or safety relief valve
- 2021 Ed. Nonmandatory Appendix P provided a complete cross-reference list
Section X Changes – 2021 Ed.

- All requirements in Part RR were moved to Part ROP and Section XIII
- Overpressure protection requirements were restructured within Part ROP
  - Used Section VIII common subjects where possible
- Requirements that were referenced to Section VIII were referenced to Section XIII or incorporated in ROP
- Mandatory Appendix 2, Capacity Conversions for Safety Valves was moved to Section XIII
- Content changes were minimized but some normalization and additions required for consistency among the codes
- 2021 Ed. Nonmandatory Appendix AM provided a complete cross-reference list
Section XII Changes – 2021 Ed.

- All Section XII pressure relief device requirements were transferred from Part TR to Section XIII
- The remaining overpressure protection requirements were restructured within the new Part TOP
  - Used Section VIII common subjects where possible
- Mandatory Appendix XIX, Capacity Conversions for Pressure Relief Devices, was moved to Section XIII
- Content changes were minimized but some normalization and additions required for consistency among the codes
- 2021 Ed. Nonmandatory Appendix M provided a complete cross-reference list
Section XIII Changes – 2021 to 2023 Ed.

- Clarified seat resistance to steam damage in 3.3.1 (d)
- Clarified capacity requirement for pilot valve and pin device failure in 3.1.2(b) and 5.2(j)
- Revised test fluid requirements for UV3 devices in 3.6.4(b)
- Refined definitions of Assembler and Manufacturer in Appendix I
- Revised replacement valve quantity for blowdown failure 3.4.2.3(a)
- Updated set pressure tolerance in Table 3.6.3.1-2 for BPV VIII-1 UG-153(a)(3) applications
- Corrected editorial/reference errors in Table 2.1.1 Note 9, 3.6.2(b), 3.9(e)(5)(-b), and 4.7.3
Committee Direction

- **2021 Edition** focus was to separate the information and publish the book
  - Minimal technical changes

- **2023 Edition** focus shifted to updating and improving the document
  - Minor technical changes and editorial corrections

- **2025 Edition** focus has shifted to changing the document and start making strategic improvements in the technology
  - Able to work on and complete more technical upgrades/changes
Strategic Items

- Incorporation of PTC 25 Pressure Relief Devices into Section XIII
- Pressure relief valve capacity certification for set pressures less than 15 psig
- Provide structural integrity design guidance for pressure relief devices
- Provide design requirements for pressure relief valve pilots, including tubing, fittings, and other components
- Develop pressure relief valve inlet line stability guidance
- Provide guidance for two-phase flow
Summary

- Overpressure requirements divided between the vessel construction codes and Section XIII
  - Section XIII requirements adopted by reference by the construction code
  - Very few technical changes between 2019 and 2023
    - Some normalization changes were made
- Where practical, requirements reorganized into common topics with new paragraph numbers
- Committee activity has shifted to making technical improvements
Becoming Involved

- BPVC XIII Committee Structure
  - Standards Committee
    - Subgroup General Requirements
    - Subgroup Design and Materials
    - Subgroup Testing
    - Subgroup Nuclear
Becoming Involved

- Interest Categories
  - General Interest
  - Insurance Inspection
  - Regulatory
  - User
  - Pressure Relief Device Manufacturer
  - Repair Manufacturing
Becoming Involved

- Membership Options
  - Member
  - Contributing Member

- Membership Process
  - Attend Meetings (open to the public)
  - Join a Subgroup
  - Join the Standards Committee

- Application Process Outlined on ASME.org
  https://www.asme.org/codes-standards/asme-code-committee/get-involved
Thank-you and Questions

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