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# Review of ASME BPVC Section XIII Overpressure Protection

May 26, 2022

# Agenda

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- **Background**
- **BPVC Section XIII Content**
- **Changes to Construction Codes**
- **What's Next**
- **Becoming Involved**

# BPV XIII Background

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- 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

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- **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**

# Philosophy for Changes

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- **Construction Code 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

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- **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 2021 Editions were minimized**
  - ✦ **Reorganized for the various stakeholders**
  - ✦ **Some changes needed for normalization**

# BPVC XIII Organization

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- **Main body is divided into thirteen Parts covering individual topics such as:**
  - ✦ **General requirements**
  - ✦ **Pressure relief valves**
  - ✦ **Combination devices**
  - ✦ **Capacity and flow resistance certification**
- **Four Mandatory Appendices**
- **Three Nonmandatory Appendices**

# BPVC XIII Content

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- **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**



# BPVC XIII Content

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- **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 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**

Device or Method	I	III			IV	VIII			X	XII
		NB	NCD	NE		Division 1	Division 2 [(1)]	Division 3		
Direct spring-loaded pressure relief valve	V	NV-1	NV-2, NV-3	NV-1, NV-2 [(2)]	HV, V	UV, V [(3)]	UV, V [(3)]	UV3, UV [(4)]	UV, HV, V [(3)]	TV, UV [(5), (6)]
Pilot-operated pressure relief valve	V	NV-1	NV-2, NV-3	...	...	UV	UV, V [(3)]	...	UV	...
Power-actuated relief valve	V	NV-1	NV-2, NV-3	P	...	...	...	P [(7)]	...	...
Rupture disk	...	P	P	[(8)]	...	UD	UD	UD3, UD [(9)]	UD	TD, UD [(5), (6)]
Pin device	...	...	...	[(8)]	...	UD	UD	...	UD	TD, UD [(5), (6)]
Spring-loaded non-reclosing pressure relief valve	...	...	...	[(8)]	...	UV	UV	...	...	...
Temperature and pressure relief valves	...	...	...	...	HV	...	...	...	...	...
Rupture disk upstream of pressure relief valve (see 8.2) [(10)]	P [(11)]	...	P	...	...	P	P	P	...	P [(12)]
Rupture disk downstream of pressure relief valve (see 8.3) [(10)]	...	P	P	...	...	P	P	P	...	...
Pin device upstream of pressure relief valve (see 8.4) [(10)]	...	...	...	...	...	P	P	...	...	P [(12)]
Open flow paths or vents	...	...	...	...	...	P	P	P	P	...
Fusible plugs	...	...	...	...	...	...	...	...	...	P [(13)]
Overpressure protection by system design	...	...	...	...	...	P	P	...	P	...
Vacuum relief devices	...	...	NV-2, NV-3	NV-2	...	...	...	...	...	...

**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

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- **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

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- **Part 8: Requirements for Devices in Combination**
  - ✦ Rupture disk upstream and downstream of pressure relief valves
  - ✦ Pin devices upstream of a pressure relief valve
  - ✦ Marking requirements
- **Part 9: Capacity and Flow Resistance Certification**
  - ✦ Includes requirements common to all devices and designator specific requirements

# BPVC XIII Content

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- **Part 10: Authorization to Use the ASME Certification Mark**
  - ✦ Requirements for all pressure relief device Designators
  - ✦ 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

# BPVC XIII Content

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## ➤ 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 code of construction for this edition
- ✦ **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.

# BPVC XIII Content

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- **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**
  - ✦ **Have acquired SME within BPV XIII to support this technology**

# BPVC XIII Content

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## ➤ **Mandatory Appendices**

- ◆ **I - Definitions**

- ◆ **II - Adhesive attachment of nameplates**

- ◆ **III - Quality Control System**

- ◆ **IV - Capacity Conversion**



# BPVC XIII Content

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## ➤ 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

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- 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 a Non-Mandatory Appendix
  - ✦ Relocated text within the construction code
  - ✦ Relocated text to BPV XIII

# Summary for Changes

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- **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

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- **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**
- **New Nonmandatory Appendix G contains a cross reference list.**

# Section III Changes

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- **The 2021 Edition adopted Only 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

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- **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**
- **New Nonmandatory Appendix PP has been added to provide a complete cross-reference list**

# Section VIII Div. 1 Changes

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- **UG-150 – General Requirements**
- **UG-151 – Responsibilities**
- **UG-152 – Determination of Pressure Relieving Requirements**
- **UG-153 – Overpressure Limits**

# Section VIII Div. 1 Changes

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- **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

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- **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**
- **New Nonmandatory Appendix PP has been added to provide a complete cross-reference list**

# Section X Changes

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- **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**
- **New Nonmandatory Appendix AM has been added to provide a complete cross-reference list**

# Section XII Changes

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- **All Section XII pressure relief device requirements were transferred from Part TR to Section XIII**
- **The remaining overpressure protection requirements were restructured withing 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**
- **New Nonmandatory Appendix M has been added to provide a complete cross-reference list**

# Summary

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- Existing overpressure requirements divided between the vessel construction codes and Section XIII
  - ✦ Section XIII requirements adopted by reference by the construction code
  - ✦ Very few requirement changes between 2019 and 2021
    - Some normalization changes were made
- Where practical, requirements reorganized into common topics with new paragraph numbers
- New Nonmandatory Appendices with a paragraph number cross reference list for 2019 and 2021 editions

# What's Next

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- **Modernization of Section III rupture disk requirements by referencing Section XIII**
- **PTC 25 Pressure Relief Devices into Section XIII**
- **Developing a strategic items list to enhance the technology**
- **Some potential strategic items include:**
  - ✦ **ASME marked pressure relief valves with the UV Designator for set pressures less than 15 psig**
  - ✦ **Update Overpressure Protection by System Design as suggested in WRC Bulletin 498**
  - ✦ **Provide structural integrity design guidance for pressure relief devices**

# Becoming Involved

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- **BPVC XIII Committee Structure**
  - ✦ **Standards Committee**
    - **Subgroup General Requirements**
    - **Subgroup Design and Materials**
    - **Subgroup Testing**
    - **Subgroup Nuclear**

# Becoming Involved

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- **Interest Categories Being Sought**
  - ◆ **Designer/Constructor**
  - ◆ **General Interest**
  - ◆ **Insurance Inspection**
  - ◆ **Manufacturer**
  - ◆ **Regulatory**
  - ◆ **User**
  - ◆ **Repair/Manufacturing Organization**
  - ◆ **Pressure Relief Device Manufacturer**

# Becoming Involved

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- **Membership Options**

  - ◆ **Member**

  - ◆ **Contributing Member**

- **Membership Process**

  - ◆ **Attend Meeting (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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