Codes and Standards
(Extension of ASME)

Objectives of this Presentation. Knowledge to Learn.

This presentation intends to illustrate the various **Codes and Standards** which apply to the manufacture of safety valves.

The **Codes and Standards** covered are:

- American Society of Mechanical Engineers (ASME) Code
- National Board of Boiler and Pressure Vessel Inspectors (NB)
- American Petroleum Institute (API)

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Codes & Standards. American Society of Mechanical Engineers (ASME).

The **ASME establishes rules of safety** governing the design, the fabrication and the inspection during construction of boilers and unfired pressure vessels, and interprets these rules when questions arise regarding their intent.

Different **Sections of the ASME Code** deal with the manufacture of safety valves:

- **ASME Code Section I**
- **ASME Code Section II**
- **ASME Code Section VIII**

Codes & Standards. ASME Code Section I.

This is a construction code covering power, electric and miniature boilers and high temperature boilers used in stationary service above 15 psig.

Here are the **requirements of Section I**:

- 3% maximum overpressure at rated capacity.
- Blowdown tolerance:
  - < 67 psi — 4 psi
  - ≥ 67 and ≤ 250 psi — 6% of set pressure
  - > 250 and ≤ 375 psi — 15 psi
  - > 375 psi — 4% of set pressure
- Set pressure tolerance:
  - Pset ≤ 70 psig — +/- 2 psi
  - 70 psi < Pset ≤ 300 psi — +/- 3 psi
  - 300 psi < Pset < 10 — +/- 10 psi
  - Pset ≥ 1000 psi — +/- 1%
- Must have lifting lever
- Nameplate showing rated capacity in lb/hr steam

This is a **construction code listing materials** suitable for the construction of safety valves according to ASME Code.

In order for a part to be used in the construction of a safety valve, the material must appear in **ASME Code Section II***.

This section also provides the pressure and temperature limits for the available materials of:

- Safety valve bodies
- Safety valve bonnets

***** Materials found in ASME Code Cases are allowable to the limits specified in the code case.

This is a **construction code covering the basic rules** for the construction, design, fabrication, inspection and certification of pressure vessels (unfired) above 15 psig. Here are the requirements of Section VIII:

- Maximum overpressure at rated capacity:
  - 10% (or 3 psi) - single valve
  - 16% (or 4 psi) - multiple valves (non-fire)
  - 21% – overpressure due to fire
- **No mandatory blowdown**; however, adjustable blowdown valves must meet 7% during test for certification
- Set pressure tolerance:
  - Pset ≤ 70 psi +/- 2 psi
  - Pset > 70 psi +/- 3%
- Lifting lever for water (>140°F), air or steam service required Nameplate showing rated capacity in SCFM air, US-GPM water or lb/hr steam

The **NB represents the enforcement agencies** who assure adherence to provisions of the ASME boiler and pressure vessel codes.

The NB:

- Sets inspection standards
- Qualifies inspectors
- Works for owners, insurers
- Maintains records (Red Book – NB-18)
- Looks into violations
- Covers repair (VR Stamp)

Codes & Standards. American Petroleum Institute (API).

API publishes **several standards** dealing with safety valves:

- **API 520 Part 1 –** Sizing & Selection of Pressure Relief Devices
- **API 520 Part 2 –** Installation of Pressure Relief Devices
- **API 521 –** Guide for Pressure-Relieving & Depressurizing Systems
- **API 526 –** Flanged Steel Safety Relief Valves
- **API 527 –** Seat Tightness of Pressure Relief Valves

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API 520 Part 1

Applies to the sizing and selection of pressure relief devices for equipment with an MAWP of 15 psig or greater.

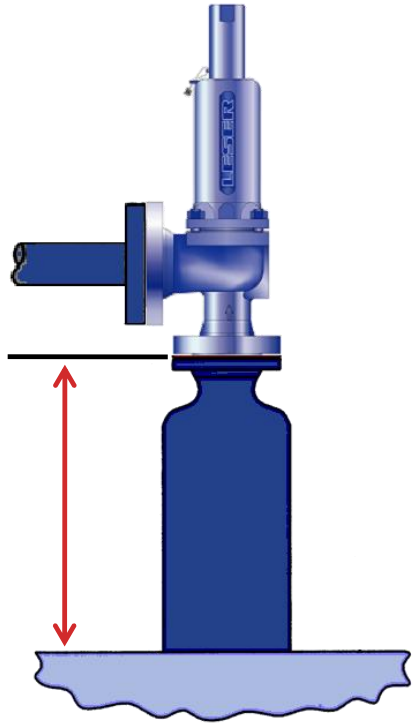
- Protection of unfired vessels
- Basic definitions
- Operational characteristics of pressure relief devices
- **Sizing procedures and methods**

API 520 Part 2

Covers methods of installation for pressure relief devices on equipment with an MAWP of 15 psig or greater.

Codes & Standards. API 520 Part 2 – Installation of Pressure Relief Devices.

According to **API 520 Part 2**, inlet piping must be sized so that non-recoverable pressure losses from vessel to pressure relief valve inlet flange do not exceed 3% of set pressure.



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API 521 is designed to **aid in the selection of the system** that is most appropriate for the risks and circumstances involved in various installations.

This standard provides **guidelines** for:

- Examining the principal causes of overpressure
- Determining individual relieving rates
- Including fire vapor generation and fire gas expansion
- Selecting and designing disposal systems

API 526 is a **purchasing specification** for flanged steel pressure relief valves. Requirements are given for spring loaded pressure relief valves and pilot-operated relief valves.

API 526 has standardized the following items:

- Orifice designation and area
- Valve size and pressure rating, inlet and outlet
- Materials
- Pressure-temperature limits
- Center-to-face dimensions, inlet and outlet
- Inspection and shop tests
- Identification and preparation for shipment

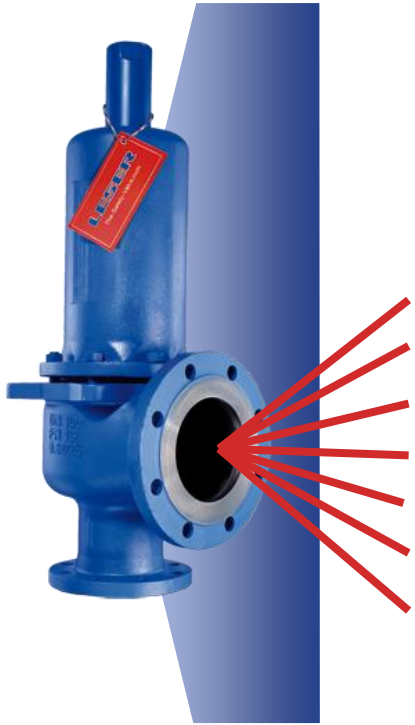
API 527 describes **tests to determine the seat tightness** of metal and soft-seated pressure relief valves.
Valves of conventional, bellows, and pilot-operated designs are covered.
Acceptable leakage rates are defined.

It contains criteria for:

- Testing with air
- Testing with steam
- Testing with water
- Testing with air – another method

LESER holds approvals for different types of safety valves for worldwide operation:

- CE-marking
- VdTÜV (Germany)
- ASME/NB (US)
- TSSA/CSA/CRN/ABSA (Canada)
- AQSIQ (China)
- KOSHA (Korea)
- EAC (Russia, Belarus, Kazakhstan)



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Codes and Standards

Thank you for your attention.