

SCOPE

- I 1.1 This practice covers the design, inspection, testing and preparation for shipment of pressure relief valves.
- I 1.2 Pressure relief valves within the scope of ASME Code Section 1, Power Boilers, are not covered by this practice.
- I 1.3 **An asterisk (*)** indicates that a decision by the purchaser is required or that additional information is furnished by the purchaser.

SUMMARY OF ADDITIONAL REQUIREMENTS

- I ↗ 2.1 **Table 1** lists the code and standards, which shall be used with this practice.
- I * 2.2 **Table 2** lists the practices and standards, which shall be used with this practice as specified by the purchaser.

TABLE 1

CODE AND STANDARDS	
API Standards	
526	Flanged Steel Safety Relief Valves
527	Seat Tightness of Pressure Relief Valves
ASME Standard	
B1.20.1	Pipe Threads, General Purpose (Inch)
ASME Code	
Section VIII - Pressure Vessels, Division I	
Section VIII - Pressure Vessels, Alternative Rules, Division 2	
ASTM Standard	
A 370	Standard Test Methods and Definitions for Mechanical Testing of Steel Products

TABLE 2

PRACTICES	
IP 3-12-9	General Requirements for Valves
IP 3-16-1	Flanged Joints, Gaskets, and Bolting
STANDARDS	
NACE Standard	
MR-0175	Sulfide Stress Corrosion Cracking Resistant Metallic Material for Oil Field Equipment
ASME Standard	
B16.5	Pipe Flanges and Flanged Fittings

- I * 2.3 The vendor shall comply with any local rules or regulations specified by the purchaser.

MATERIALS

- R 3.1 **Materials shall be per API 526.** Disk, nozzle, and stem material shall be at least as follows:

VALVE COMPONENTS	MATERIAL OR MATERIAL STANDARD	REMARKS
Disc and Nozzle	High corrosion resistant alloy of Chromium-Nickel or Nickel Chromium	Ferritic Steels not acceptable
Stem	Wrought 13 Cr	If body is ferritic
	18 Cr 8 Ni Steel	If body is austenitic

- R 3.2 The need for **impact testing** shall be based on code requirements, e.g., ASME code, and the minimum specified temperature. Any impact testing shall be in accordance with ASTM A370. Acceptable alternatives when ASME code compliance is not required include: ISO 148, BS 131 Part II, or JIS B7722 and Z2242.

DESIGN

- S * 4.1 **Valves, which do not bear the ASME Code marking**, shall be calibrated and the capacity demonstrated in the manner prescribed by ASME Code Section VIII.
- If test certifications for spring-loaded valves show the valve coefficient (API coefficient of discharge, K_d) to be less than 0.95, vendors proposals for that particular valve design shall be submitted to purchaser for verification of valve sizes.
- Valves not marked, but which are identical with designs which have been previously certified and marked per ASME Code Section VIII, shall be considered acceptable without further qualifying tests. Vendor's certification to this effect shall be furnished.
- R 4.2 **Valve types** shall be as follows:
- a. All valves, except thermal relief valves, shall be flanged, spring loaded, high lift, "high capacity type," with a top guided disc. Valves shall not be provided with a lifting device. All valves shall be provided with pressure tight bonnets except bellows type valves.
- * b. The use of pilot-operated valves shall be approved by the Owner's Engineer.
- R 4.3 **Flanged valves** shall have full nozzles arranged so that the nozzle and the parts comprising the disc are the only parts exposed to inlet pressure or to the corrosive action of the inlet fluid when the valve is closed. This does not apply to pilot-operated valves with semi-nozzle design.
- R 4.4 **Body flanges accommodating a full nozzle** may be modified to accommodate the nozzle except that the thickness shall be not less than ASME B16.5 minimum thickness.
- R 4.5 **Body flanges attached by welding** shall have the complete circumference of each attachment weld 100% radiographed. The radiography and acceptance criteria shall be per ASME Code Section VIII, Div. 1.
- R * 4.6 **Thermal relief valves** specified with threaded ends shall have internal taper threads.
- R * 4.7 **Flange rating and type of facing** will be specified. Flange facing finish shall be per ASME B16.5.
- R 4.8 Individual **pressure relief valve specifications** shall be communicated by the API 526 specification sheets, or equivalent substitute provided by the Owner's Engineer. When the relieving contingency is vapor and liquid, rates and properties for each at the allowable overpressure shall be provided.
- R * 4.9 **Materials for valves in wet H₂S service** shall meet local plant standards. Where a plant standard is not available for wet H₂S, materials shall conform to NACE MR0175. Wet H₂S service is > 50 wppm H₂S in free water.
- R 4.10 **Test gags** (as defined by API 526) are not permitted.

IDENTIFICATION

- R 5.1 **Marking of springs** 0.125 in. (3 mm) wire diameter and larger shall be with symbols which will identify as a minimum either the manufacturer, and the spring characteristics, i.e., pressure-temperature range, material and size, or the manufacturer and part number which will allow characteristics to be determined. For springs less than 0.125 in. (3 mm) wire diameter, the designation shall be shown on a metal attached tag.

INSPECTION AND TESTING

- R 6.1 **Components of pressure relief valves** shall be hydrostatically tested before assembly, as given below. Parts made from forgings or bar stock are exempt.

VALVE COMPONENT	HYDROSTATIC TEST PRESSURE
Nozzles, both full and semi, Bodies for semi-nozzle valves, Bodies with integral nozzles, Primary pressure containing components of pilot-operated main valve	1-1/2 times the maximum allowable design pressure per the manufacturer's catalog
Bodies for valves with full nozzles, Closed Bonnets with caps	1-1/2 times lower of the maximum outlet flange rating pressure or maximum allowable back pressure per the manufacturer's catalog
Bellows for balanced type valves	Minimum of 30 psig (210 kPa)
Primary pressure containing parts of pilot valves	1-1/2 times the maximum inlet flange rating

- R * 6.2 The Owner reserves the right to witness shop tests and inspect valves at the manufacturer's plant, as specified in API 526.