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Instructions to Voters/Comments on API 520 Part I Ballot – “Effective vs Rated Capacity”

- This ballot covers Action Item 2024-04 and modifies the definition of Rated Capacity in 3.1.47 and clarifies the usage in paragraph 5.2.4.
- The work group decided against creating a new definition for “Effective Rated Capacity” and instead clarified how the rated capacity can be estimated using the effective coefficient of discharge and effective orifice area.
- Your comments should be limited to the **red-lined portions of the ballot only.**
- If you are voting negative, please indicate which of your comment or comments are the reason for your negative vote. API’s Balloting system will categorize all of your comments as Negative.

Thanks to Jeremy Grace and his team for working on this item.

Phil Henry

API 520 Task Force Chair

DRAFT - FOR COMMITTEE REVIEW

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BALLOT FOR ACTION ITEM AI-2024-04 – “Effective Vs Rated Capacity”

3.1.47 rated capacity/rated relieving capacity

The capacity of the pressure-relief device determined using the properties of the actual fluid flowing through the pressure-relief device at the certification test overpressure. The overpressure is specified by the applicable code of construction. This capacity can be determined-estimated using the effective coefficient of discharge and effective orifice area, or determined using the certified coefficient of discharge and actual orifice area (see 5.2).

NOTE 1 The certification test overpressure for ASME BPVC, Section VIII valves is typically the greater of 10 % or 3 psi.

NOTE 2 The rated capacity retains the code-required capacity derating when determined using the certified coefficient of discharge and actual orifice area.

5.2 API Effective Area and Effective Coefficient of Discharge

5.2.1 PRVs may be initially sized using the equations presented in 5.6 through 5.11 as appropriate for vapors, gases, liquids, or two-phase fluids. These equations utilize effective coefficients of discharge and effective areas that are independent of any specific valve design. In this way, the designer can determine a preliminary PRV size.

5.2.2 The designer can use API 526 to select a PRV. API 526 is a purchase specification for steel flanged valves. This standard lists specific valve configurations specified by inlet/outlet size and flange configuration, materials of construction, pressure/temperature limits, inlet and outlet center to face dimensions, and effective orifice designation. When a valve is specified per this standard, the orifice size is expressed in terms of a letter designation ranging from the smallest, “D,” to the largest, “T.” An effective area is specified for each letter orifice.

5.2.3 Sections 5.6 through 5.11 provide sizing information that may be used for the initial selection of a PRV from the incremental D through T orifice sizes specified in API 526. The effective orifice areas listed in API 526 and the effective coefficient of discharge used for the initial selection are nominal values not directly related to a specific valve design.

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5.2.4 The certified coefficient of discharge for a PRV, as determined per the applicable certification standards, is generally less than the effective coefficient of discharge used in API 520 (particularly for vapor service valves where the effective coefficient of discharge is 0.975). This is true of valves certified per the rules of the ASME Code, where the average coefficient from a series of valve test results is multiplied by 0.9 to establish a certified coefficient of discharge. For this reason, the actual orifice area for most valve designs is greater than the effective orifice area specified for that valve size per API 526. This allows the rated capacity determined using the certified coefficient of discharge and actual orifice area of most valve designs to meet or exceed the effective-rated capacity estimated using the effective coefficient of discharge and effective orifice area for preliminary sizing ~~determined~~ per the API 520 calculations.

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