The coefficient of discharge for the design shall be not greater than 0.878 (the product of 0.9 × 0.975). The coefficient shall not be applied to valves whose beta ratio (ratio of valve throat to inlet diameter) lies outside the range of 0.15 to 0.75, unless tests have demonstrated that the individual coefficient of discharge, \( K_D \), for valves at the extreme ends of a larger range, is within ±5% of the average coefficient, \( K_D \).

For designs where the lift is used to determine the flow area, all valves shall have the same nominal lift to seat diameter ratio \( L/D \).

**PG-69.2.4 Alternative Method for Valves Exceeding the Laboratory Pressure Capability.** If the design exceeds the laboratory pressure capability, PG-69.2.2 or PG-69.2.3 shall be followed with the exception that the valves shall be tested with their disks fixed at the minimum design lift to establish the rated capacity. See PG-69.2.6.

**PG-69.2.5 Alternative Method for Valves Exceeding the Laboratory Size or Capacity Capability.** If the design exceeds the laboratory size or capacity capability, PG-69.2.3 shall be followed with the exception that flow models of three different sizes, each tested at three different pressures, shall be used in place of valves required in PG-69.2.3(a). Such flow models shall be sized consistent with the capabilities of the accepted test laboratory where the test will be conducted and shall accurately model those features that affect flow capacity, such as orifice size, valve lift, and internal flow configuration. The test models need not be functional pressure-relieving valves but shall be geometrically similar to the final design lift. See PG-69.2.6.

**PG-69.2.6 Valve Design.** For PG-69.2.4 or PG-69.2.5, the valve design (parameters such as spring properties, seat geometry, and mechanical valve lift) shall be evaluated to ensure that production valves will achieve design lift as modeled above.

**PG-69.3** If a manufacturer wishes to apply the Certification Mark to a power-actuated pressure-relieving valve under PG-67.4.1, the power-actuated pressure-relieving valve or valves shall be certified in accordance with PG-69.2.2 or PG-69.2.3.

**PG-69.4** Power-actuated pressure-relieving valves, having capacities certified in accordance with the provision of PG-69.3, shall be marked as required by PG-110 with the computed capacity, corresponding to 3% above the full load operating pressure and temperature conditions at the valve inlet when the valve is operated by the controller, and they shall also be stamped with the set pressure of the controller. When the valve is marked as required by this paragraph, it shall be the guarantee by the manufacturer that the valve also conforms to the details of construction herein specified.

**PG-69.6** When changes are made in the design of a pressure relief valve or power-actuated pressure-relieving valve in such a manner as to affect the flow path, lift, or performance characteristics of the valve, new tests in accordance with this Section shall be performed.

**PG-70 CAPACITY OF PRESSURE RELIEF VALVES**

**PG-70.1** Subject to the minimum number required by PG-67.1, the number of pressure relief valves required shall be determined on the basis of the maximum designed steaming capacity, as determined by the boiler Manufacturer, and the relieving capacity marked on the valves by the manufacturer.

**PG-71 MOUNTING OF PRESSURE RELIEF VALVES**

**PG-71.1** When two or more pressure relief valves are used on a boiler, they may be mounted either separately or as twin valves made by placing individual valves on Y-bases, or duplex valves having two valves in the same body casing. Twin valves made by placing individual valves on Y-bases, or duplex valves having two valves in the same body, shall be of approximately equal capacity.

When not more than two valves of different sizes are mounted singly on the same component (e.g., drum, economizer, superheater, etc.) the relieving capacity of the smaller valve shall be not less than 50% of that of the larger valve.

**PG-71.2** The pressure relief valve or valves shall be connected to the boiler independent of any other connection, and attached as close as possible to the boiler or the normal steam flow path, without any unnecessary intervening pipe or fitting. Such intervening pipe or fitting shall be not longer than the face-to-face dimension of the corresponding tee fitting of the same diameter and pressure under the applicable ASME Standard listed in PG-42 and shall also comply with PG-8 and PG-39. Every pressure relief valve shall be connected so as to stand in an upright position, with spindle vertical. On high-temperature water boilers of the watertube forced-circulation type, the valve shall be located at the boiler outlet.

**PG-71.3** The opening or connection between the boiler and the pressure relief valve shall have at least the area of the valve inlet. No valve of any description shall be placed between the required pressure relief valve or valves and the boiler, nor on the discharge pipe between the pressure relief valve and the atmosphere. When a discharge pipe is used, the cross-sectional area shall be not less than the full area of the valve outlet or of the total of the areas of the valve outlets, discharging thereinto. It shall be as short and straight as possible and so arranged as to avoid undue stresses on the valve or valves.

All pressure relief valve discharges shall be so located or piped as to be carried clear from running boards or platforms. Ample provision for gravity drain shall be made in the discharge pipe at or near each pressure relief