

Consolidated™ 2700 Series Safety Valve

Overview

The Consolidated 2700 Series Safety Valve is designed to meet the needs of the Combined Cycle Gas Turbine (CCGT) segment.

Specifications

Inlet Sizes	1.5" (38 mm) through 6" (152 mm) in either flanged or weld neck design
Inlet Ratings	ASME Class 600, 900 and 1500
Outlet Sizes	3" (76 mm) through 8" (203 mm) flanged
Outlet Ratings	ASME Class 150 and 300
Orifice Sizes	Seven sizes: 1 through Q
Temperature Range	-20°F (-28.9°C) to 1050°F (565.6°C)
Materials	Alloy and carbon steel cast body with stainless steel trim (standard) special alloys are available for specific applications
Blowdown	4 percent
Back Pressure Limit	25 percent of set pressure

Valve Operation

In Figure 1, the upper adjusting ring (G) is positioned to attain full lift at pop and to control the pressure at which the valve will begin to close. The lower adjusting ring (O) ensures a sharp pop action at the set pressure and cushions the valve on closing.

When full lift is attained (Figure 2), the lift stop (M) rests against the yoke (T) to eliminate rapid opening and closing of the valve, adding stability to the valve. When the valve discharges in an open position, steam is bled into the chamber (H) through two bleed holes (J) in the roof of the disc holder. The steam escapes to the atmosphere through the pipe discharge connection (R).

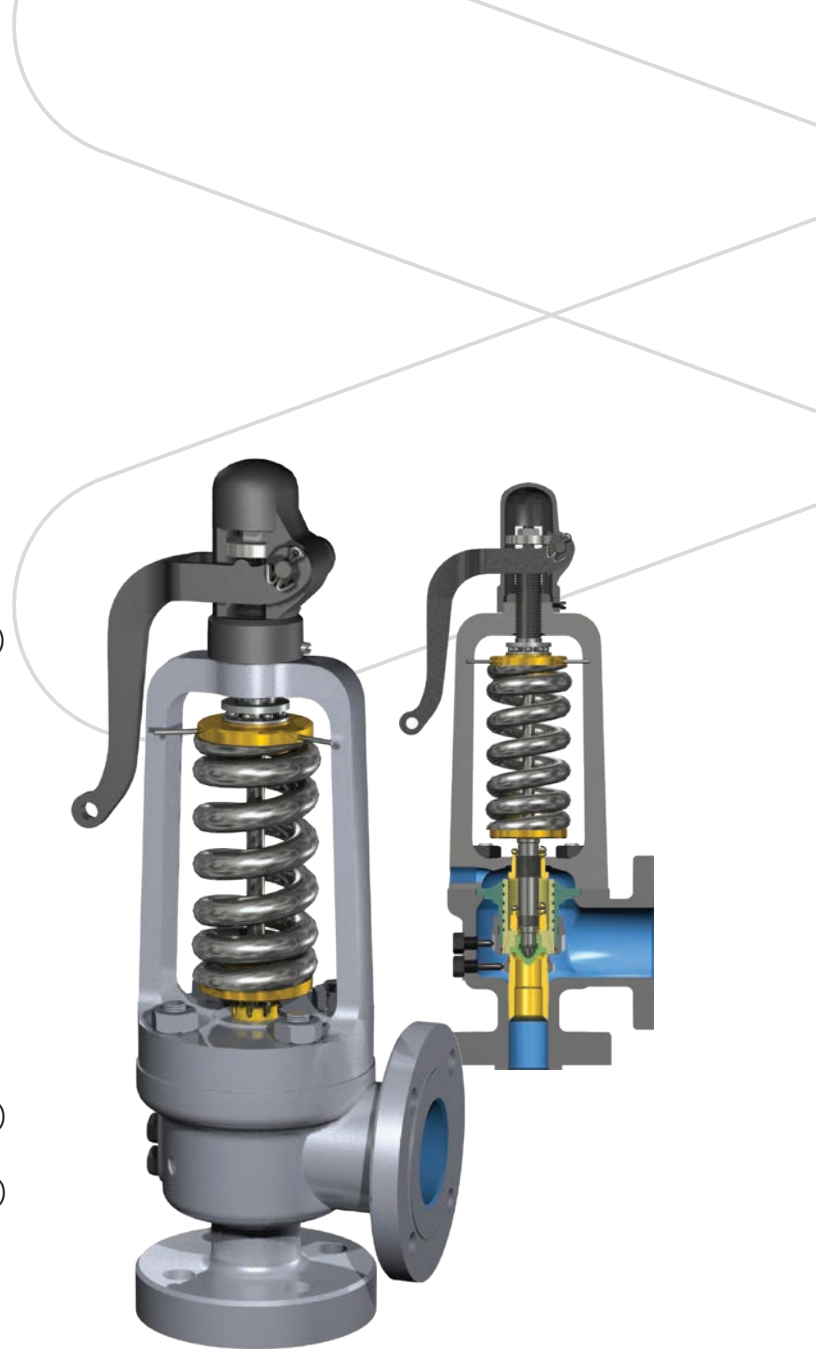


Figure 1: Closed

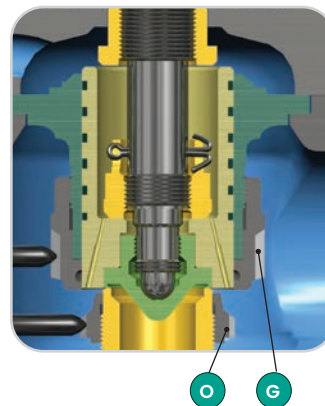
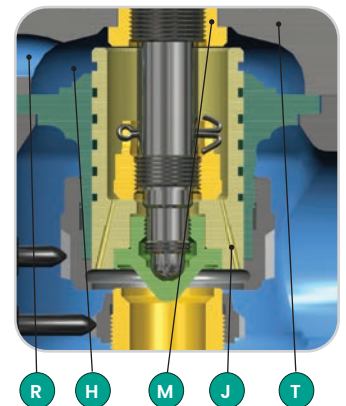


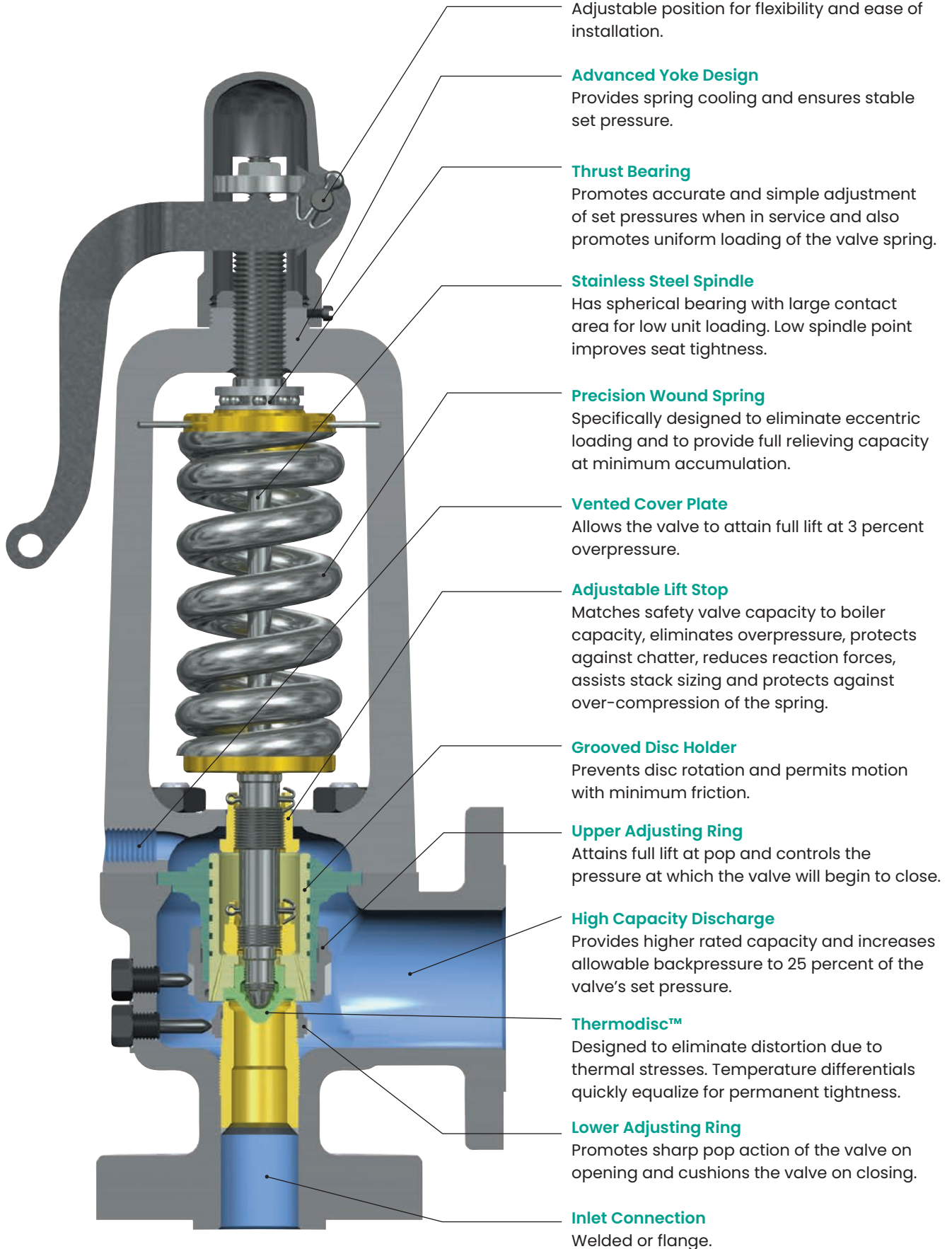
Figure 2: Full Lift



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Features and Benefits



Thermodisc Design

The Thermodisc seat was designed and developed to address the problem of safety valve leakage. The disc design uses Inconel material and has an improved spindle pocket with concentric loading of the disc. These features, when combined with a low spindle bearing point and a thin flexible seat can provide a superior safety valve that has repeatable seat tightness.

Inconel Disc Material

Inconel material can provide superior corrosive resistance and strength at high temperatures over a long period of time. The strength of the Inconel material prevents distortion in the spindle/disc contact area during actuation. A more durable disc material helps to maintain the safety valves original set pressure despite numerous actuations and further improves the longevity of the safety valve.

Concentric Disc Loading

Concentric disc loading equalizes the spring force being transmitted to the valve seating area. The disc remains concentric to the center line of the valve nozzle so that the valve will reseat in its original seating position. The effective seating area remains constant, producing repeatable valve opening pressures.

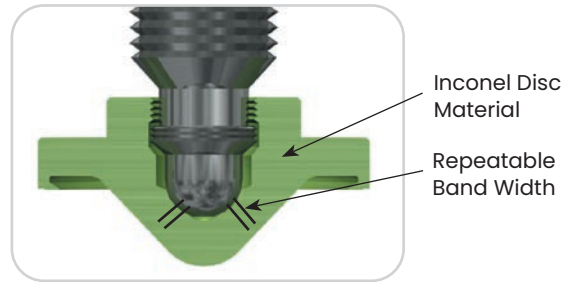
Low Spindle Bearing Point

A low spindle bearing point locates the point of spring force transmission below the horizontal seat line of the valve, which minimizes the natural tendency for the disc to assume a horizontally tilted position during the opening and closing cycle of the valve. The low spindle bearing point further promotes equalized spring force distribution at the valve seat and helps to maintain seat tightness.

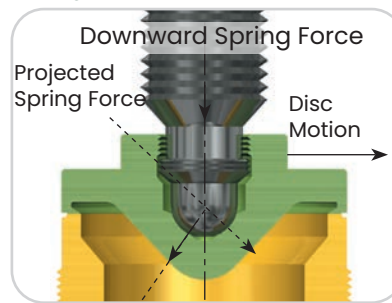
Thin Flexible Design

The thin seat design compensates for temperature changes by equalizing the temperature in the disc, thereby reducing distortions. Flexibility also allows the system pressure to assist the mechanical loading and produce a line contact at the sealing surface of the seat bushing; the critical seating area remains constant for consistent, repeatable valve opening.

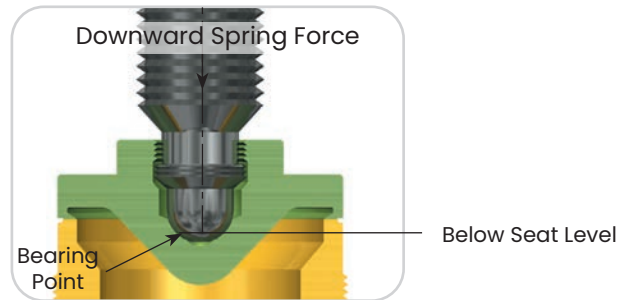
Improved Spindle/Disc Contact



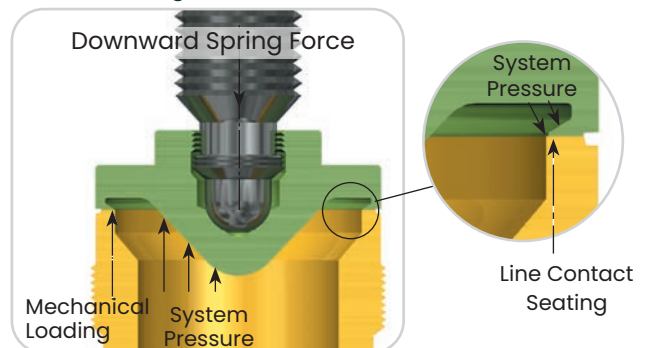
Spring Forces



Bearing Point



Thin Seat Design



Standards and Regulation Compliance

Standard/Regulation	Authority	Applicability
ISO 9001	International Organization for Standardization (ISO)	Standard
ISO 14001	International Organization for Standardization (ISO)	Standard
ASME B & PVC, Section I & VIII	American Society of Mechanical Engineers	Standard
ASME B16.34	American Society of Mechanical Engineers	Standard
ASME B16.5	American Society of Mechanical Engineers	Standard
API 520, 527	American Petroleum Institute	Standard
CRN	Canada	As Required
2014/68/EU	European Union	As Required
ISO 4126-1	International Organization for Standardization (ISO)	As Required
Indian Boiler Regulations (IBR)	India Boiler Act - Section 28 & 29	As Required
Customs Union Technical Regulation (CUTR)	Customs Union	As Required
AQSIQ - China Manufacturing License	Peoples Republic of China	As Required
Australian Standards	Council of Standards Australia	As Required
49 CFR 192.199	U.S. Department of Transportation (D.O.T.)	Standard