

19000 Series Safety Relief Valve

The **Consolidated™ 19000 Series safety relief valves** are designed and manufactured in compliance with ASME BPVC, Section XIII (UV Designator) and Section III (Class I, II, and III), and are CE compliant to the European Pressure Equipment Directive PED 2014/68/EU.

Seat tightness, blowdown and capacity on all types of media meet industry needs for overpressure protection in chemical, petrochemical, refinery, power generation (nuclear and conventional) and other commercial applications.

Features

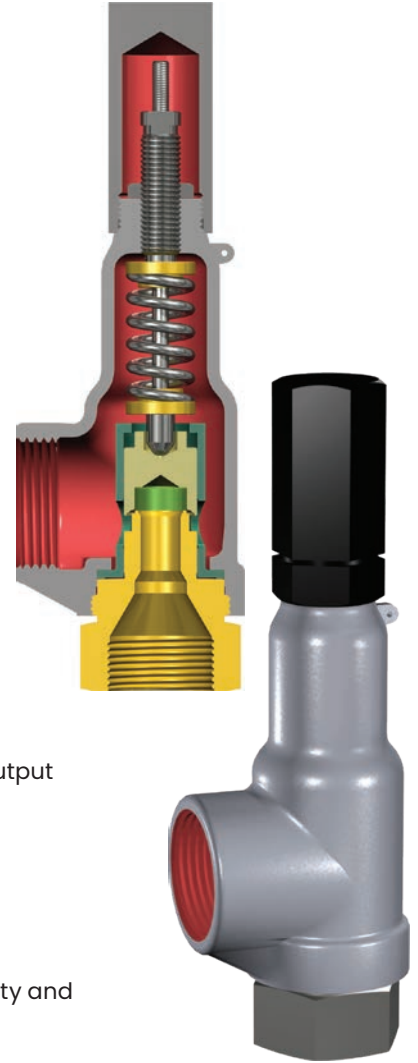
- Leak-tight seats
- Tight seats at high operating pressures
- Simple replacement of soft seat
- Large selection of soft seat materials
- Soft seats in standard O-ring sizes
- Proven seat design
- Back up metal seat

Benefits

- Reduces potential loss of system pressure and process media
- Maximizes process efficiency and product output
- Reduces maintenance costs
- Suitable for varied process applications
- Replacement seats readily available
- Dependable performance
- Back-up metal seat provides additional safety and minimized product loss

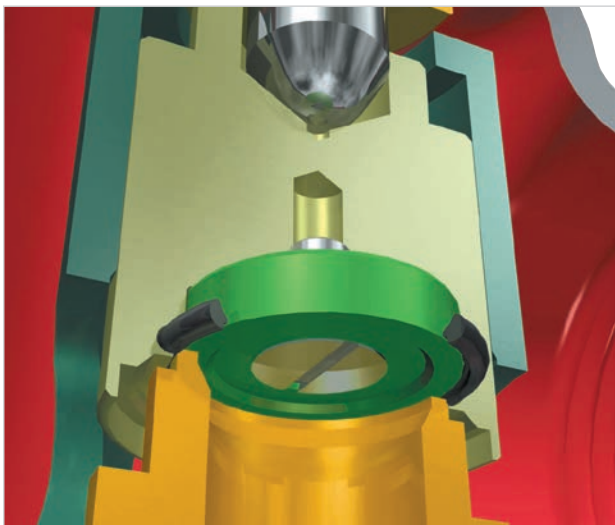
Specifications

Inlet Sizes	0.5 in through 2 in (13 mm through 51 mm)	Orifice Sizes	6 sizes: 0.096 in ² (61.9 mm ²) 0.110 in ² (70.9 mm ²) 0.126 in ² (81.3 mm ²) 0.226 in ² (185.8 mm ²) 0.357 in ² (230.3 mm ²) 0.567 in ² (365.8 mm ²)
Inlet Ratings	ANSI Class 150 through API 10000		
Outlet Sizes	1 in through 2.5 in (25 mm through 64 mm)		
Outlet Ratings	ANSI Class 150	Temperature Range	-450°F to 1100°F (-267.8°C to 593.3°C)
Connection Types		Materials	316 stainless steel trim (standard) Optional materials available
	Threaded: MNPT and FNPT		
	Welded: Socket Weld (SW)		
	Flanged: Slip-On Flange (standard design) SW Flange (optional design) Integral Cast Flange (optional design)		



Soft Seat Design (DA)

19000-DA



Tightness

The Consolidated O-ring seat valves are bubble tight at or above 97 percent of the set pressure (101 psig and above).

Pressure at which valve will be bubble tight on air			
Set Pressure		Bubble Tight Pressure	
psig	barg	psig	barg
3	0.206	1.5	0.103
4	0.275	2	0.137
5	0.345	2.5	0.172
6	0.414	3	0.207
7 to 14	0.483 to 0.965	3 below set	0.207 below set
15 to 30	1.03 to 2.06	90% of set	
31 to 50	2.13 to 3.44	92% of set	
51 to 100	3.51 to 6.89	94% of set	
101 and greater	6.96 and greater	97% of set	

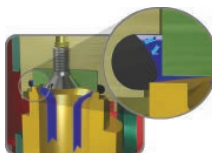
Note: Set Pressures below 15 psig (1.03 barg) are outside the scope of API 527

Consolidated O-ring seat seals provide positive seat tightness at service pressures closer to the set pressure than is possible with metal-to-metal seats. This assures continuous, trouble-free service and complete valve closure after numerous "pops."



Valve in Closed Position

- 90 percent of set pressure
- Metal seat contains media
- No leakage - bubble tight



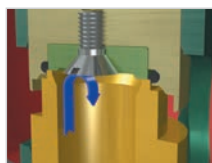
Valve above 90 percent of set pressure

- Metal seats separate
- System pressure acts on the O-ring, and pressure forces the O-ring against the lip of the nozzle and curved recess of the disc holder. As the pressure within the valve rises to the set point, the O-ring is pressed tightly against the nozzle to maintain maximum sealing force until breakaway pressure is reached
- Bubble tight seat to 97 percent of set pressure (101 psig and above)



Valve Flowing

- Full lift
- Flowing rated capacity
- O-ring is protected from blowouts as the encapsulating retainer prevents the O-ring from being pulled from its seat by the high-velocity, low-pressure discharge inside the valve



Valve Returns to Closed Position

- 90 percent of set pressure
- Metal seat contains media
- No leakage - bubble tight
- Seat tightness maintained at pressures above 90 percent after initial closure

19000M-BP Series Valve Design

The Consolidated 19000M-BP Series balanced-piston safety relief valve is designed specifically to be used on gas, vapor and liquid applications, where high built-up or variable back pressure exists. The 19000M-BP valve’s versatile design can be used in both compressible and incompressible services.

Blowdown performance is typically less than 7 percent on compressible fluids and typically 15 percent for fixed blowdown on incompressible applications. This performance minimizes the loss of process fluids during an overpressure excursion, and assists in the reduction of operating costs and fugitive emission.

An O-ring seat design provides leak-tight seals during normal system operation and after cycling during a pressure-relieving occurrence. Media loss due to seat leakage is eliminated, resulting in savings from the cost of lost product. A simple and easily maintained design reduces maintenance costs and parts inventory.

Versatile Service Conditions

- Compressible and incompressible media
- Upper spring chamber not exposed to process media
- Corrosion-resistant stainless steel trim
- Special alloy construction available

Increased Operating Efficiency

- Soft seat design provides maximum seat tightness
- Reduced product loss due to leakage
- Consistent fixed blowdown

19000M-BP Valve Performance Criteria	
Specific Criteria	Valve Attribute
Typical blowdown as a percent of set pressure (At the low end of the spring range with the maximum allowed back-pressure applied, the blowdown is shortest)	Liquid: 6 percent to 20 percent
	Gas: 3 percent to 16 percent
Allowable total back-pressure (This is the sum of the variable and constant back-pressure, superimposed and built-up)	Liquid: 70 percent of set pressure (Thermal relief applications may be supplied with back-pressure up to 90 percent of set pressure) ¹
	Gas: 50 percent of set pressure. ¹
Temperature limits – Determined by O-ring material selection	Minimum : 60°F (-51°C)
	Maximum: 600°F (315°C)
Seat Tightness	Set pressure range 50 psig (3.45 barg) to 100 psig (6.8 barg): 94 percent
	Set pressure range 101 psig (6.9 barg) to maximum rating: 97 percent

1. Total back-pressure for liquid or gas shall not exceed 400 psig (27.58 barg)

19000M-BP Valve General Features											
Orifice	Pressure Range		Standard Valve			Standard Connections					
			Size		Type	Inlet Size		Inlet Type	Outlet Size		Outlet Type
	psig	barg	in.	mm		in.	mm		in.	mm	
0.096 in² (0.619 cm²)	50 to 2000	3.45 to 137.9	0.5	12.7	19096M-BP	0.5	12.7	MNPT	1	25.4	FNPT
			0.75	19.1	19096M-BP	0.75	19.1				
			1	25.4	19096M-BP	1	25.4				
0.110 in² (0.71 cm²)	50 to 2000	3.45 to 137.9	0.5	12.7	19110M-BP	0.5	12.7	MNPT	1	25.4	FNPT
			0.75	19.1		0.75	19.1				
			1	25.4		1	25.4				
0.126 in² (0.813 cm²)	75 to 2000	5.17 to 137.9	0.75	19.1	19126M-BP	0.75	19.1	MNPT	1	25.4	FNPT
			1	25.4		1	25.4				
0.226 in² (1.458 cm²)	195 to 2000	13.44 to 137.9	1	25.4	19226M-BP	1	25.4	MNPT	1.5	38.1	FNPT

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 XIII (UV) (Gas, Liquid, and Steam Service)	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, 521, 527	American Petroleum Institute	Standard
ASME B & PVC, Section III, Class 1, 2 & 3 (gas, vapor and liquid service)	American Society of Mechanical Engineers	As Required
CRN	Canada	As Required
NACE MR0175	Nace International Institute	As Required
NACE MR0103	Nace International Institute	As Required
PED 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 (CU TR)	Customs Union	As Required
AQSIQ - China Manufacturing License	Peoples Republic of China	As Required
Australian Standards	Council of Standards Australia	As Required
NORSOK	Norwegian Petroleum Industry	As Required
ATEX 2014/34/EU Zone 2, Group 2 Category 3	European Union	As Required
49 CFR 192.199	U.S. Department of Transportation (D.O.T.)	Standard
Korean High Pressure Gas Safety Control Act	Korea	Standard