

# **Sky / Startup Vents**

## Modulating Control Valves

# Sky Vent / Startup Vent

To address issues of high-temperature, extreme noise and absolute tight shutoff during initial operation of combined cycle plant start-up, ValvTechnologies introduces sky vent valves. Sky vent valves are designed to address the high-performance demands of steam power generation start-up, ensuring plant piping and equipment do not rise in temperature too quickly protecting it from thermal induced stresses. ValvTechnologies' sky vent valves relieve pressure during a plant trip or upset condition.

Not to be confused with the electronic relief valve (ERV) which can be included in the overall relief capacity of the main steam pressure relief system, the sky vent is a modulating control valve that enables larger amounts of steam discharge to vent during plant startup. This valve can serve as a pressure control function to prevent system upset as the plant ramps up to pressure and temperature.

The modulating control functionality eliminates this problem. Assuming the valve needs to be fully open to 105% of normal operating pressure. The valve can be programmed to discharge at a range of capacity for 104% to 105%. An example is if the valve had a total discharge capacity of 500,000 lbs. per hr. The valve will open partially to flow at 100,000 lbs. per hr. If the upset continues and the pressure continues to increase, then at 104.3% the valve would discharge at 200,000 lbs. per hr. At 104.6% the flow would be 300,000 lbs. per hr. and at 105% the valve would be fully open to discharge the full capacity.

- 6" – 12" typical
- ASME / ANSI class up to 4500
- Integral isolation valve available
- Adaptable to most existing controls
- Repeatable tight shut-off
- High-precision reliability
- Low-maintenance requirements
- Accurate control = major cost savings
- Seat out of flow path when open



***Cutting-Edge Isolation Technology***

# The Benefits of a ValvTechnologies' Sky Vent Solution

Sky vent valves are installed in the highest-cost energy systems in the plant. If this valve does not isolate fully, high-cost energy passes directly to the atmosphere, decreasing plant efficiency during all hours of plant operation. The ability to isolate with zero-leakage is critical in this application and ValvTechnologies' sky vents are uniquely suited to meet this requirement.

Due to enormous pressure drops, extreme noise is an issue. The ValvTechnologies' sky vent design provides a less torturous flow path than competing globe valve designs, mitigating noise abatement issues.

ValvTechnologies' sky vent design features offer higher capacities (Cv) than competing globe valve designs of the same nominal size, allowing ValvTechnologies to offer a customer savings in piping and valve costs.

Features	Benefits
Tight shut-off	As a standard, ValvTechnologies meets zero-leakage requirements on low-pressure air and high-pressure water
High spring load	ValvTechnologies' very high spring load not only assures contact between the ball and seat, but at all positions from open to close
High-precision reliability	Consistent reliable operation
Low maintenance requirements	Low cost-of-ownership
Seat out-of-flow path when open	Unimpeded flow path with no impingement
Various standard control packages	Highly customizable
Integral isolation valves available	Two valves in one for easy installation



SECTION A-A

# Dynamics of a Mark III Xactrol® Control Valve

Upstream pressure reducing plates are stacked so maximum flow (pressure) travels through plate A (Fig. 3) then splits and pressure continues to be reduced as flow proceeds to follow tortuous 90° paths through succeeding holes in various stacked pressure reducing plates. See plates B, C & D (Fig. 3).

Multi-stage pressure reducing plates are positioned such that the diverging streams through the various plates actually collide with each other – greatly reducing their energy – before entering the next plate (Fig. 1).

Pressure reduction is at the upstream side of the valve, thus reducing the torque required to open and close the valve.

Downstream sealing face is protected from flow, thus offering repeatable zero-leakage.

***Precise flow control.  
Zero-leakage.  
All in a single unit.***

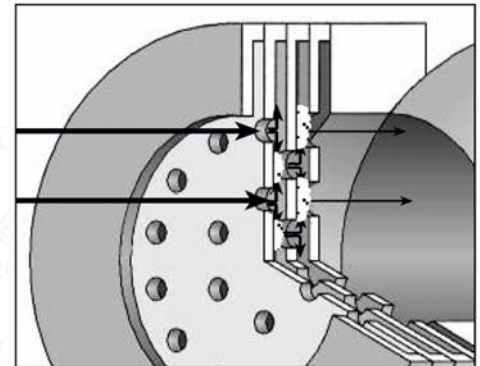


Figure 1

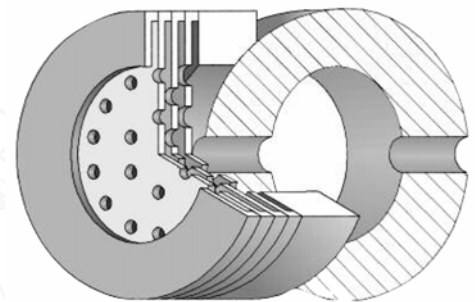


Figure 2

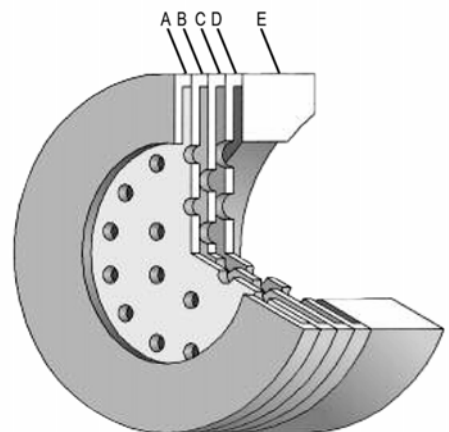


Figure 3

# Standard Sky Vent Packages

ValvTechnologies' zero-leakage valves for this application are commonly supplied with the following items:

ValvTechnologies' zero-leakage, V Series valve with and without Xactrol® Mark III Trim.

- Actuator - options include:
  - Air
  - Spring
  - Hydraulic
  - D.C. electric
  - A.C. electric
  - Fail-safe last position
  - Fail-safe (pneumatic tank or spring return)
  - Pressure transducer
  - Weatherproof control box
  - DCS signal input

Additional options are also available, including:

- Remote panel
- Lockable switch
- Drip pans / exhaust pans
- Voltages
- Silencers
- Heaters



SECTION A-A

# V Series Metal Seated Ball Valves

## 1. Integral metal seat

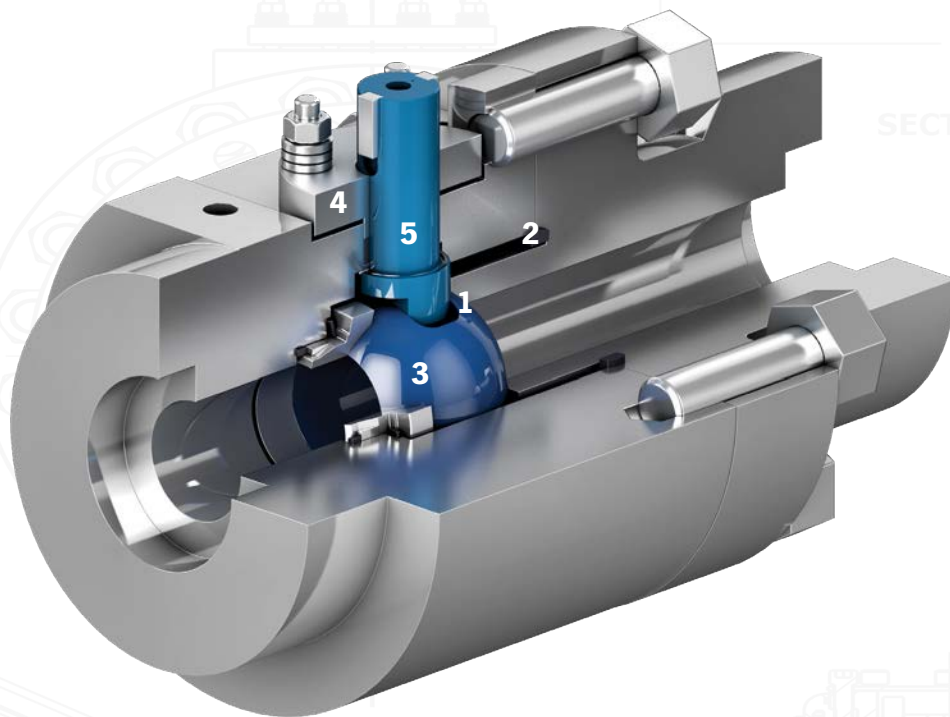
With our patented HVOF RiTech® coating technology, the integral seat in ValvTechnologies' valves is resistant to the attack of abrasive and corrosive production applications.

## 2. Body seal ring

ValvTechnologies employs a field-proven seal ring technology to ensure sealing under all operating conditions, up to 1400°F. The body seal ring is loaded at a pressure higher than 20,000 psi. In addition, valves sized 3" and above contain a secondary Grafoil® seal to further guarantee reliability.

## 3. Patented coating process

The sealing surfaces are overlaid with tungsten or chromium carbide using our HVOF RiTech® coating process. These surfaces have a hardness of 68 - 72 Rc to provide uninterrupted operation in the most severe conditions with zero-leakage.



## 4. Live-loaded gland area

The V Series' sealing design features a four stud, live-loaded assembly designed for heavy industrial applications. The sealing material is high purity Grafoil® surrounded by stainless steel wire mesh anti-extrusion rings. The six Belleville® springs (per stud) provide constant load pressure through extreme thermal shocks and prevent wear leaks in high-cycle service.

## 5. Blow-out proof stem

ValvTechnologies' design utilizes a one-piece, hard-coated, blow-out proof stem that is inserted through the inside of the body cavity eliminating the possibility of blow-out through the gland area. There are no pins, collars or other devices used to retain the stem in the valve body.

# Applications

ValTechnologies' sky vent / startup valves are built to withstand the most severe applications. High-pressure, high-temperature, high-cycle, abrasive, corrosive and caustic media have all been considered in the design of our product line.



## Fossil Fuel

- Above and below seat drains
- Ash handling
- Attemperator spray control
- Boiler drains
- Boiler feed pump isolation
- Continuous boiler blowdown
- Electronic relief
- Feedwater heater drains
- Feedwater isolation
- Instrument isolation
- Main steam stop
- Recirculation
- Seal steam regulators
- Sight/gauge glass drains
- Soot blower regulators
- Startup vents
- Steam dump
- Turbine bypass systems
- Turbine drain

## Nuclear Generation

- Boiler feedwater
- Circulating water system
- Component cooling
- Condensate extraction
- Condensate cooling water
- Emergency feedwater
- Fire protection system
- HP safety injection
- HP and LP heater drains
- Heat exchanger vent and drains
- Main steam system isolation, drain and vent
- Power operated relief valve (PORV)
- Pressurizer drain and vent
- Rad waste system
- Reactor coolant pump drain and vent
- Reactor head vents
- Reactor water cooling vents and drains
- Safety injection system
- Secondary system isolation, drain and vent
- Service water system isolation
- Steam generator system
- Turbine bypass
- Turbine drain and vent
- Fukushima tie ins
- Reliable hardened vents

***ValTechnologies provides field-proven solutions for severe service applications.***

SECTION A-A

# Zero-leakage Valve Solutions



## Worldwide Office Locations

**Australia**

**Brazil**

**Canada**

**Chile**

**China**

**Colombia**

**India**

**Japan**

**Kazakhstan**

**Malaysia**

**Poland**

**Saudi Arabia**

**Singapore**

**South Korea**

**Spain**

**Thailand**

**Turkey**

**United Arab Emirates**

**United Kingdom**

**United States**

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