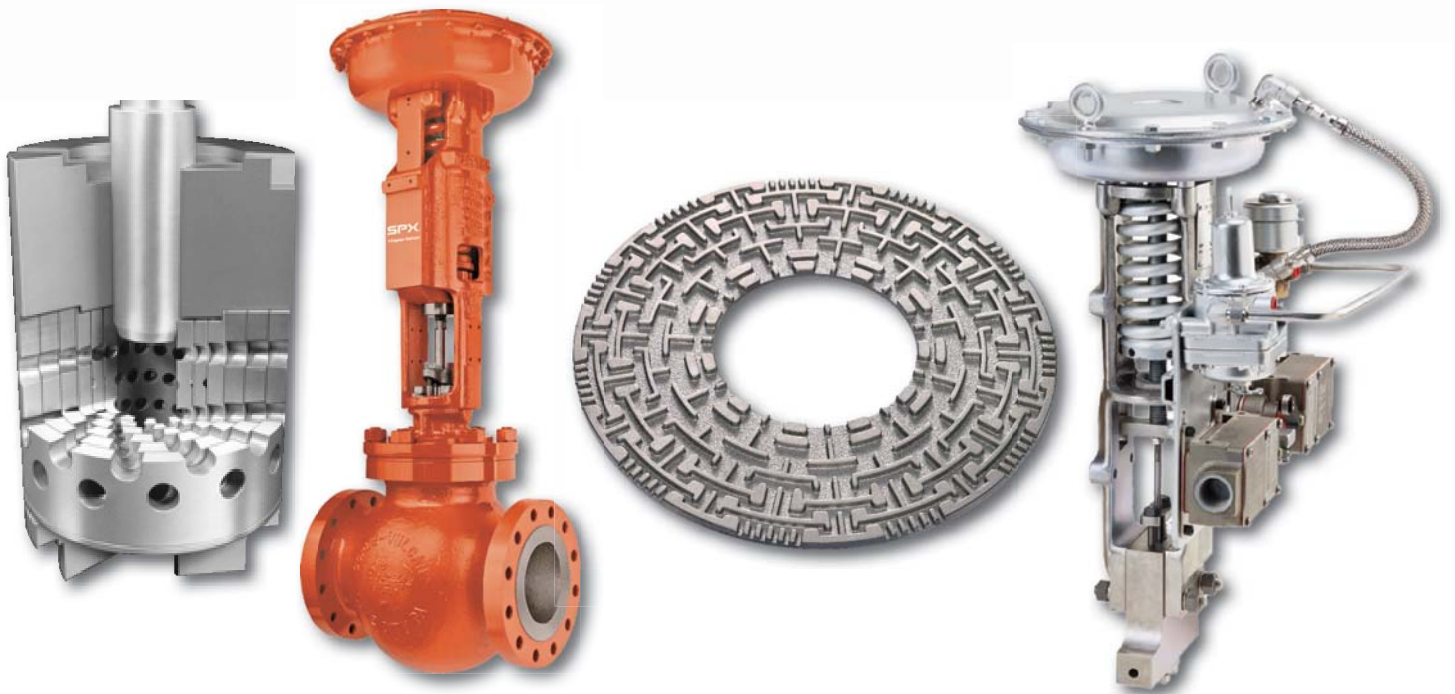


## Nuclear Valve Overview



With its Copes-Vulcan brand, SPX FLOW has been providing control valves and desuperheaters for the power, process and nuclear industries since 1903. SPX FLOW provides a wide range of valves for the control of pressure, temperature and flow-induced noise in all types of power plants. Products include severe service and general service control valves, variable orifice desuperheaters, Raven™, trim and steam-conditioning valves and nuclear control valves, as well as custom designed specialty valves. The Copes-Vulcan brand is recognized worldwide as a leader in valves for severe and critical service applications. Our strength lies in our ability to provide innovative valve solutions for our customers' application needs.

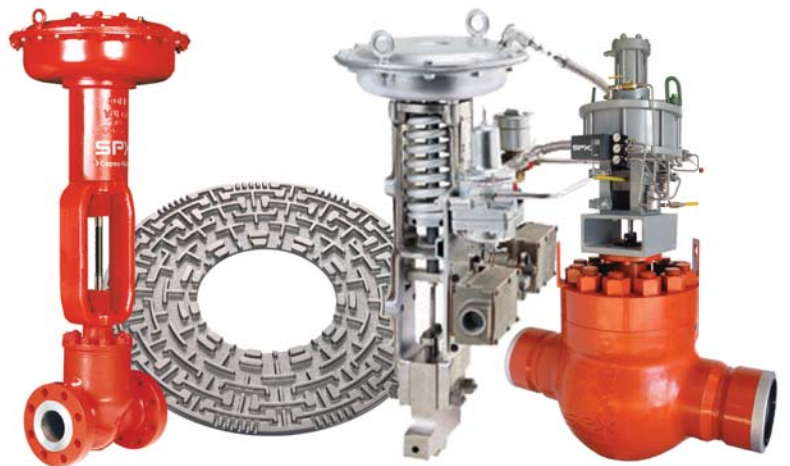
Finding innovative ways to help the world meet its ever growing demand for power is a key focus for SPX FLOW so we can provide creative solutions that serve global energy markets in a myriad of ways. Our ideas are helping build more efficient power plants and renovate older existing facilities. SPX FLOW supplies a wide range of components - from air preheaters to filter systems for nuclear, coal-fired, combined cycle, solar, thermal and geothermal power plants. With operations in over 35 countries, SPX FLOW has the global experience and regional presence, products and powerful ideas it takes to help our customers compete more effectively, and more efficiently deliver power to almost any part of the world.

## Critical Nuclear Valve Solutions

SPX FLOW has been engineering and manufacturing Copes-Vulcan valves for the nuclear industry for over forty years, and has proudly produced globe, gate, swing check, butterfly, ball and sampling valves for their nuclear customers. SPX FLOW has provided technical solutions for a variety of nuclear applications including feedwater, steam dump, pressurizer spray, reactor coolant, sampling, service water, and safety injection valves.

In 2000, SPX FLOW acquired Copes-Vulcan and optimized its operations by separating the commercial and nuclear valve manufacturing, moving its nuclear operations to McKean, Pennsylvania. The McKean facility holds the following certification 'N', 'NPT', and 'NR' and is certified by ASME to manufacture valves and components to the Boiler and Pressure Vessel Code. SPX FLOW offers field service technicians and technical support to their customers, and has been actively providing refurbishments and upgrades of existing equipment to help the utilities to reduce their maintenance costs and support power updates.

Copes-Vulcan valves are manufactured for boiling water reactors (BWR), heavy water reactors (CANDU) and pressurized water reactors (PWR), and are supplied to many countries including the United States, Canada, Mexico, South Korea, China, Japan, Switzerland, Brazil and more.



# Typical nuclear product applications



SPX FLOW offers experienced field service technicians and qualified engineering support to customers, and has been actively providing refurbishments and upgrades of installed equipment which has reduced nuclear power plant maintenance and operation costs while improving plant performance.

In addition, SPX FLOW has expanded its product offering to include nuclear refurbishments and upgrades in response to quality concerns over non OEM suppliers. SPX FLOW continually strives to meet our customers' critical needs for improved cost savings as part of plant life extension, power uprate and other nuclear plant programs.

We offer:

- Refurbishment of existing valve components and assemblies to extend the life of the OEM equipment.
- Upgrade and modernization of original equipment such as:
  - Quick disconnect kits for D100 actuators which eliminates the need for spinning actuator on and off during maintenance.
  - Replacing threaded trim with quick change trim
  - Configuration/material changes to resolve potential operational issues due to changes in operating temperatures, pressures or flow rates.

## Feedwater (Start-up, Main)



## Atmospheric Dump



## Sampling

## High Pressure Safety Injection



## Reactor Coolant



## Service Water (RHR)

## 3-Way Diverting and Converting



## Closed Cooling Water

## Heater Drains





## Globe Valves

As a manufacturer who has supplied valves to their customers for over one hundred years, SPX FLOW has developed a proven, comprehensive line of Copes-Vulcan globe valves. Available for standard to severe duty valve applications, bodies configurations include angle, three way and straight through, and can be cast, or forged. Valves have been supplied in a variety of materials including, but not limited to, carbon, stainless steel, and chrome moly steels. The Copes-Vulcan control valves can be supplied with a variety of actuation options including pneumatic (diaphragm or piston), electric, or hydraulic, and may feature either digital or analog controls.

### FEATURES

- 3/8 – 24 inch, Class 150 - 4500
- Quick change trim with linear, equal percent, modified parabolic or custom flow characteristics
- Large interior flow passageways in valve bodies allow for maximum pressure recovery
- Diaphragm maintains a constant effective area throughout the full stroke
- No other life limiting elastomeric seals or gaskets are used within the actuator
- Field adjustment of the main spring set-point is a standard feature
- Class IV, V, VI shutoff available

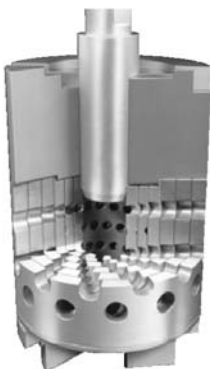


## Trim Options

SPX FLOW boasts one of the largest selections of control valve trims available in the nuclear market. Our wide variety of trim configurations allows us to customize our valve designs to meet our customers' requirements and conditions, while optimizing performance with designs ranging from general service port throttling trim to Raven™, a stacked disc, velocity control trim.

### FEATURES

- Designs ranging from general service port throttling trim to Raven™, a stacked disc, velocity control trim
- Our trim selection can be fitted to all of our globe valves and steam conditioning valves



# Containment Sampling Isolation Valve

The Copes-Vulcan globe valve products include a specialized valve for sampling applications, custom designed for the nuclear industry. The sampling valve features a robust stainless steel body, with a diaphragm operator. It provides FCI 70-2 Class V shutoff, with excellent performance in high differential pressure applications. One of the key benefits of the Copes-Vulcan sampling valve is the ability to replace the plug and the seat in the field without removing the actuator.

Such high-pressure water, steam and gas applications demand exceptional seat tightness. The Copes-Vulcan design incorporates a high-thrust actuator with thru-hardened trim components to ensure better than ANSI 70-2 Class V leakage at 2500 psid (17,225 kPa).

The valve was designed, built and tested in accordance with ASME Boiler and Pressure Vessel Code Section III for Classes 1, 2 or 3. ANSI B16.34 valves are also available. A maximum design pressure and temperature rating of 2500 psig (17,225 kPag) at 680°F (360°C) is standard.

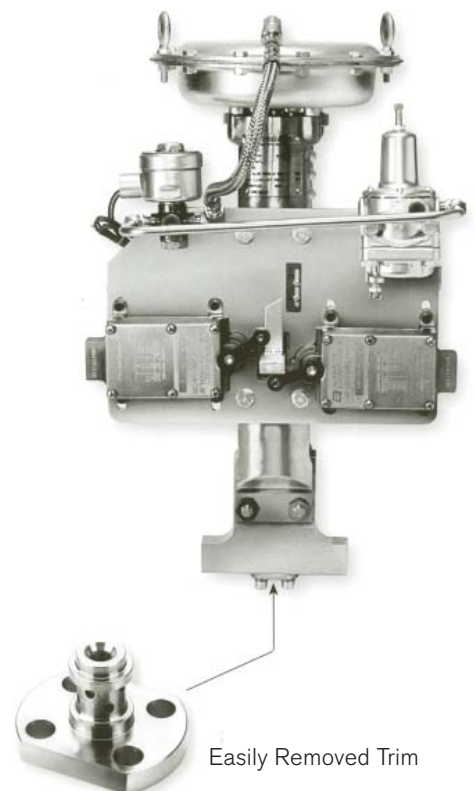
Materials of construction were chosen for borate water service. These same materials are excellent choices for service water, steam and hydrogen media. Stainless steel is used for body, seat, plug/stem, actuator frame, frame-to-body mounting components and packing gland. The absence of hardfacing limits cobalt to minor residual elements.

The use of inert and radiation-resistant materials reduces maintenance and the risk of failure. The only non-metallic component used on the valve assembly that could experience degradation from exposure to radiation is the diaphragm. SPX FLOW has qualified the EPDM diaphragm material to 20 years service at  $2.0 \times 10^7$  rads.

## FEATURES

The Copes-Vulcan Model F100-40 valve can solve your leakage problems in critical applications by offering:

- Positive shutoff
- Reliable operation
- Radiation resistant materials
- Fast, easy maintenance
- No need for piping supports or restraints





## High Performance Butterfly Valves

The proven performance of the Copes-Vulcan High Performance Butterfly Valve is the result of 30 years of experience with quarter turn designs, ensuring the development of a highly reliable valve with exceptional sealing capabilities.

### FEATURES

- 2 – 36 inch, Class 150 – 600
- Torque or position seated
- Offset disc minimizes seat-to-disc interference reducing torque requirements
- Independent flow testing to EPRI guidelines
- MOV sizing per EPRI NP-7501
- Bi-directional Class V and Class VI shutoff available

## Nuclear Ball Valves

The Copes-Vulcan Nuclear Ball Valve line was developed in response to requests from our customers. They needed a “nuclear” valve – not an upgraded commercial design. The ball valve line has evolved to include two and three piece designs, and can be customized to fit within existing face-to-face dimensions for replacements of existing equipment. The Copes-Vulcan ball valve is robust and requires minimal maintenance.

### FEATURES

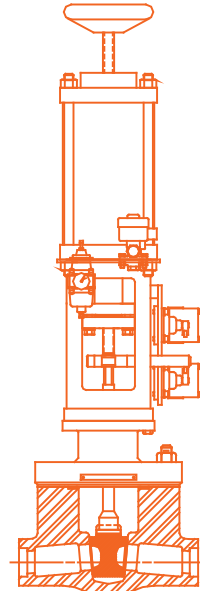
- 1 – 8 inch, Class 150/300
- Bi-directional Class V and Class VI shutoff available
- Pneumatic piston or manual operators
- Two and three piece designs

## Gate Valve

The Copes-Vulcan nuclear gate valve was originally supplied to the industry in the 1970's. The design has continued to be enhanced to ensure compliance with NRC Generic Letter 89-10 and the EPRI MOV Performance Prediction Methodology.

### FEATURES

- 3 – 18 inch, Class 150 – 1500+
- Bolted bonnet and pressure seal configurations
- Addresses pressure locking and thermal binding
- Full port and Venturi port designs
- Compliant with EPRI PPM guidelines
- Flex wedge and parallel slide configurations



## Check Valves

Copes-Vulcan check valves have been supplied to the nuclear industry since the early 1970's. It is designed to provide positive shutoff even at low differential pressures.

### FEATURES

- 3 – 18 inch, Class 150 – 1500+
- Bolted bonnet
- Available without cobalt
- Carbon, stainless and special materials





## Global locations

### SPX FLOW, INC.

5620 West Road  
McKean, PA 16426  
United States of America  
+1 814 476 5800

### SPX FLOW, INC.

Road Two, Industrial Estate  
Winsford, Cheshire CW7 3QL  
England  
+44 1606 552041

### SPX FLOW, INC.

25 International Business Park  
#03-03/12 German Centre  
Singapore 609916  
+65 6264 4366

### SPX FLOW, INC.

7F Nanfung Tower  
1568 Hua Shan Road  
Shanghai 200052 China  
P: +86 (21) 22085889

Based in Charlotte, North Carolina, SPX FLOW, Inc. (NYSE:FLOW) is a leading global supplier of highly engineered flow components, process equipment and turn-key systems, along with the related aftermarket parts, serving the food and beverage, power and energy and industrial end markets. For more information, please visit [www.spxflow.com](http://www.spxflow.com).

### SPX FLOW, INC.

5620 West Rd.  
McKean, PA 16426  
P: (814)476-5800  
F: (814)476-5854  
E: [cv@spxflow.com](mailto:cv@spxflow.com)

SPX FLOW, Inc. reserves the right to incorporate our latest design and material changes without notice or obligation.

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