

**COPES-VULCAN**  
AN SPX BRAND

## Soft Seated HUSH™ Trim



**SPX**®

## General

The long-standing and high cost problem of leaking control valves in severe duty power and process applications has been solved through the development of a unique soft seat trim design. It is not unusual for generating plants to lose up to 10% of capacity through leakage, often costing from USD \$500,000 to \$1,000,000 per year. Trim leakage often occurs in severe duty applications such as boiler feed pump recirculation valves. These valves typically are required to remain closed approximately 95% of the time, against shutoff pressures of up to 5000 psig (34450 kPa).

Copes-Vulcan's Soft Seated HUSH® Trim can save money by preventing lost capacity, plus a substantial reduction in maintenance costs.

Copes-Vulcan's Engineering Center has developed and tested a patented<sup>1</sup> soft seated trim which maintains zero (bubble tight)<sup>2</sup> leakage throughout the service life of the trim.

The trim is designed for new as well as existing valve installations. Known as the Soft Seated HUSH Trim, the design is unique in that it uses a dual plug, with a primary plug engaging the soft seat and an inner plug engaging the secondary metal seat, thereby preventing throttling at the soft seat. The soft seated trim, when used in conjunction with Copes-Vulcan's HUSH Trim, reduces all likelihood of damaging cavitation.

## Field Documentation

Soft Seated HUSH Trims have been operating in boiler feed pump recirculation valves at numerous generating stations since May of 1985. Test apparatus designed at Copes-Vulcan's Engineering Center verifies seat tightness, and hence zero leakage.

© HUSH is a registered trademark of DeZURIK/Copes-Vulcan

<sup>1</sup> Patent Numbers 598859 & 599252

<sup>2</sup> Leakage rate equals 0 cc/minute at maximum service differential pressure with water at 60°F (16°C).

## Applications

Soft Seated HUSH Trim is designed for new or replacement trims in Copes-Vulcan valves as well as valves of other manufacturers. Any liquid control valve taking a pressure drop up to 5000 psi (34,450 kPa) which spends more than 90% of the trim in the closed position **must** use Soft Seated HUSH Trim to maintain zero leakage.

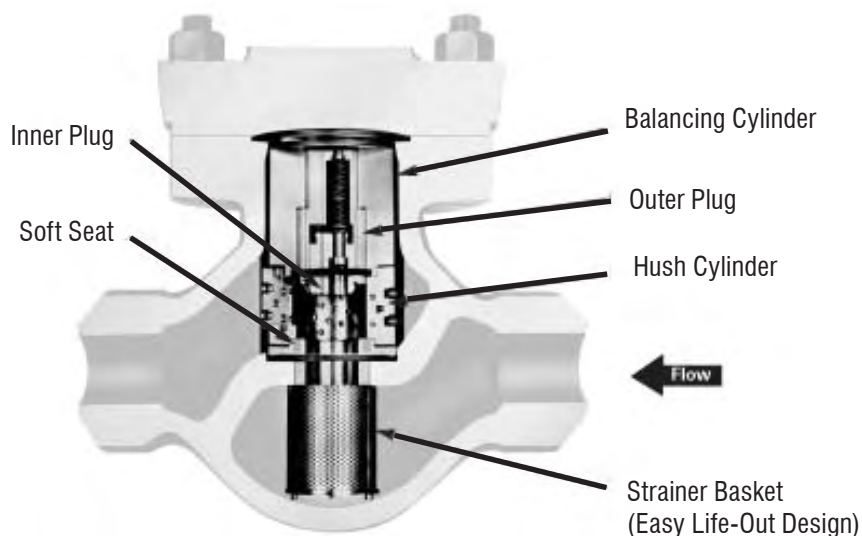
Typical applications include:

- Boiler feed pump recirculation valves
- Start-up feedwater control valves
- Attenuator spray block valves
- Attenuator spray control valves which do not have a block valve
- Heater drain valves
- Process block, vent and anti-surge valves

**Note:** In the event that maximum continuous operating temperature (not design temperature) exceeds 500°F (260°C), consult Copes-Vulcan.

## Features

- Designed for differential pressures to 5000 psi (34,000 kPa)
- Double plug design protects the soft seat assuring a long lasting tight seal
- Soft seat is further protected by use of a strainer which entraps entrained solids 1/16" (.065mm) and larger
- Flow under the seat directs discharge flow into the valve body outlet and away from the seat area
- Quick change design for ease of maintenance
- Constructed of 420 stainless steel for corrosion/erosion resistance
- Balanced design minimizes actuator sizing
- Surface hardened main plug eliminates galling



## Seat Wire Drawing—The Major Problem

Zero leakage is imperative, since even the smallest amount of leakage will cause trim failure. Once a leak occurs, seat wire drawing will follow. Subsequent to the initial stages of wire drawing, damage due to cavitation occurs.

The primary reason conventional soft seat designs have been unable to maintain zero leakage is that the soft seat is the primary throttle surface at the valve opening, thus the soft seat trim rapidly deteriorates. Conventional soft seats last through only one or two cycles.

Copes-Vulcan's design provides a means of opening the valve without throttling at the soft seat, protecting the seat from premature damage and maintaining tight shutoff.

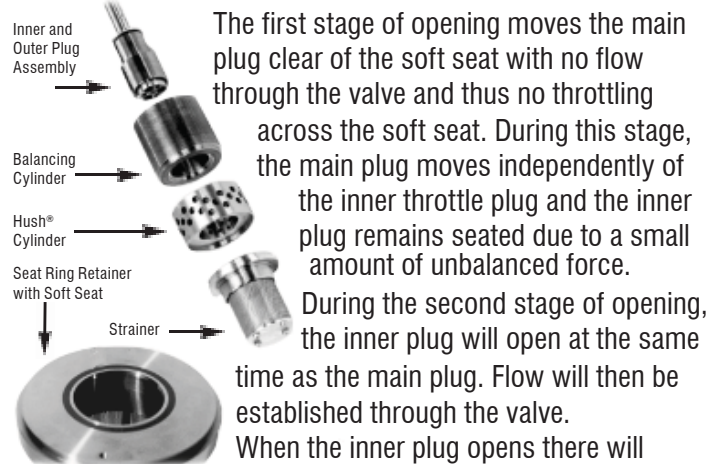
The damaging effects of wire drawing from metal-seated trims being unable to maintain zero leakage will be eliminated by the use of the Soft Seated Trim.

Shown is a typical conventional metal-seated trim which was unable to maintain seat tightness throughout the service life of the valve.



## Soft Seated Hush Trim Operation

Copes-Vulcan's patented Soft Seated HUSH Trim design provides a means for opening and closing the valve without throttling at the soft seat itself. This is achieved by opening or closing the valve in two stages.



Any foreign particles lodged between the valve seats and plug can cause premature wire drawing by preventing full valve closure. Therefore, Copes-Vulcan's soft seat design is provided with an integral strainer element installed below the seat retainer.

## Sizing Requirements

### On/Off or Modulating Service

Indicate whether the valve is for on/off or modulating service.

### Inlet Pressures

When considering the valve inlet pressure be certain to account for line losses and head pressure from the inlet piping. The inlet pressure given must be the valve inlet and not the pump discharge pressure or the source pressure.

### Outlet Pressures

When considering the valve outlet pressure be certain to account for downstream piping losses and head pressure, as well as effects from downstream orifice plates, diffusers, spargers or capillary tubes. If any such devices are used, the sizing information must be present on the valve specification sheet.

### Flows

The full range of inlet flows must be given and, in the case of a modulating valve, the minimum flow must be given.

### Actuator Air Supply Pressures

The minimum available air supply must be known prior to sizing the actuator.

### Maximum Differential Pressure Condition

The maximum differential pressure condition must be given with the range of inlet temperatures in order to provide adequate cavitation protection within the trim.

### Additional Cv Requirements

Any requirements for full flow at a reduced travel or additional flow capacity beyond the normal conditions must be known.

# Specifications\* for Control Valve Assembly

## Valve Body/Subassemblies

STD Sizes	3, 4, 6, 8" and others available
ANSI Rating	900, 1500, and 2500
Materials	Carbon Steel Stainless Steel Chrome-Moly Other Castable Materials
End Connections	Butt Weld, Integral Flanges per Application

## Bonnet

Types	Standard
Material	Same as Body
Construction	Bolted

## Packing

Materials	Teflon® – Temperatures to 450°F (232°C) Grafoil® – Temperatures to 500°F (260°C)
-----------	---

## Trim

Characteristics	Linear
Materials	420 Stainless Steel with a Surface Hardened Plug
Soft Seat	Recita™ 1116 Rated at 500°F (260°C)
All Other Elements	316 Stainless Steel (Standard)

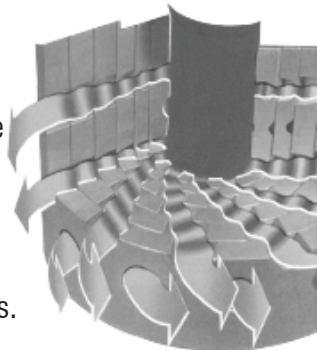
\* Specifications subject to change without notice.

For conditions other than those specified above, please consult Copes-Vulcan.

Teflon® is a registered trademark of E.I. DuPont Co., Inc.  
Grafoil® is a registered trademark of Union Carbide Corp.  
Recita™ is a trademark of Copes-Vulcan.

## Hush Cylinders

Usually the soft seated design will be used with HUSH Trim, thus further protecting the valve's integrity and resistance to cavitation. All trims will use a HUSH cylinder or a drilled hole cage as determined in sizing sections.



For other conditions or more information, please contact Copes-Vulcan.

## Actuators

Valve Size	Actuator Model Required
3" (80mm)	1000-160
4" (100mm)	1000-160
6" (150mm)	1000-160
8" (200mm)	1000-260

Model 1000 diaphragm actuators are designed for severe duty applications where vibration and stress are factors. The unique frame/yoke design provides maximum strength and rigidity for heavy duty performance. Direct-acting actuators normally are required with this trim.



# SPX®

## FLOW CONTROL

Your local contact:



SPX Flow Control  
5620 West Rd.  
McKean, PA 16426  
Phone: (814)476-5800 Fax: (814)476-5854  
E-mail: cv@spx.com



For more information about our worldwide locations, approvals, certifications, and local representatives, please visit [www.spxfc.com](http://www.spxfc.com).

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

Design features, materials of construction and dimensional data, as described in this bulletin, are provided for your information only and should not be relied upon unless confirmed in writing. Certified drawings are available upon request.