

# Angle Choke Valves



**SchuF** 

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*SchuF is fully registered, accredited and certified worldwide*



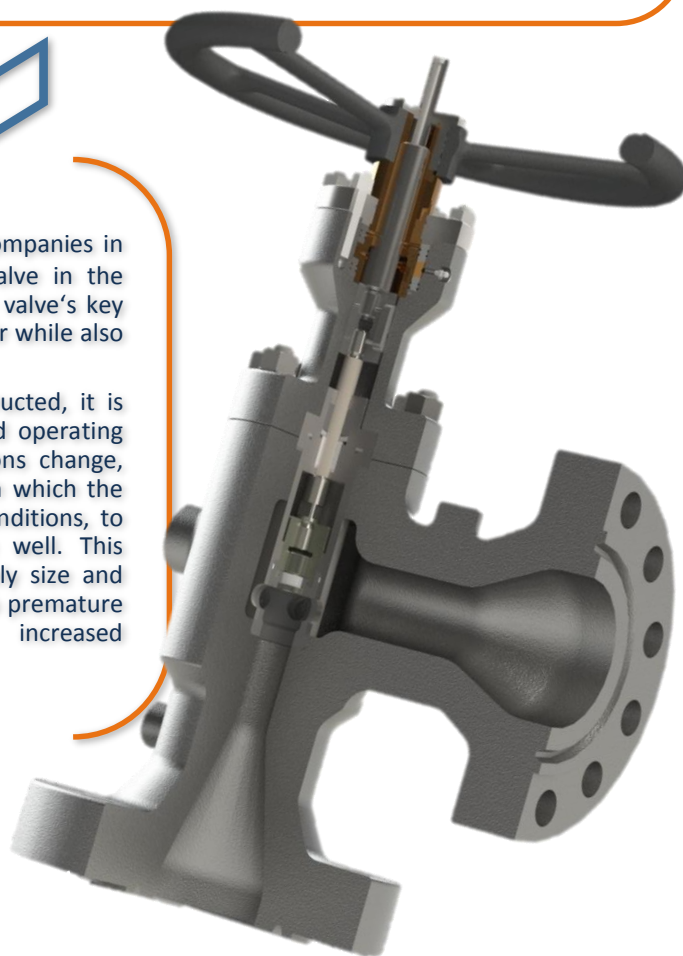
## SchuF Choke Valve Design



**The SchuF Group** is an industry-renowned valve supplier with over 100 years of experience in designing and manufacturing application-specific valve solutions. SchuF has the capability to ship their unique and highly-praised valve solutions worldwide from production facilities located in the United States, Germany, Ireland, India, and the United Kingdom. SchuF has an extensive product selection with a vast and diverse range of applications, from oil production to concrete manufacturing. SchuF's skilled team of engineers and product specialists design each valve from the ground up to meet specific application requirements and provide optimal service life and performance.

**Choke Valves** are regarded by most major companies in the oil industry as the single most important valve in the production process. This is mostly due to a choke valve's key role in controlling the varying pressure of a reservoir while also protecting downstream valves and the pipeline.

In oil production, when a wellhead is first constructed, it is done so with respect to its current or anticipated operating conditions. However, over time the well conditions change, making it virtually impossible for a choke valve, in which the trim was designed around the initial operating conditions, to properly regulate and control the flow of the well. This constant change makes it very hard to adequately size and design these valves properly, and typically leads to premature failure, decreasing production rates, and increased maintenance costs.



**SchuF** has come up with a solution to combat this pragmatic issue; the valve must be able to continuously adapt to the well's ever-changing operating conditions. This "change" must also be cost-effective and quick, in order to minimize production loss and maintenance costs.

**Therefore** SchuF design valves with easily replaceable interchangeable trims, within a simple and universal body construction. Furthermore, SchuF has adapted its valve designs to provide interchangeability and compatibility with those of most competitors, enabling customers to upgrade to SchuF choke valves while maintaining inter-valve compatibility.

# SchuF Choke Valve Design

The **SchuF Group** offers customers a wide range of trim options, each of which has specific key advantages when used in the proper application. SchuF will guide you through the selection process to ensure that you receive the most optimal choke valve design based on your piping requirements. **One of the most critical steps in designing your choke valve is the selection of the correct materials.**

Two key factors that should be kept in mind when determining an appropriate choke valve design are the **process medium properties** and the **maximum operating temperature**.

Temperature Classification	Material Operating Temperature Range	
	Minimum °F (°C)	Maximum °F (°C)
K	-75°F (-60°C)	180°F (82°C)
L	-50°F (-46°C)	180°F (82°C)
P	-20°F (-29°C)	180°F (82°C)
R	Room Temperature	
S	0°F (-18°C)	150°F (66°C)
T	0°F (-18°C)	180°F (82°C)
U	0°F (-18°C)	250°F (121°C)
V	35°F (2°C)	250°F (121°C)

After taking into account the operating temperature, the process medium will indicate which materials should be used.

## Recommended Selection Process

### 1) Material Selection

A material class should initially be chosen based upon the operating temperatures of the valve, and then the materials selected based on the medium.

### 2) Choke Trim Selection

We recommend looking through our trim options and selecting a trim based upon your specific service application and requirements.

### 3) Actuator Selection

We have a large actuator selection along with several custom options to choose from.

### 4) Bonnet Selection

We carry several bonnet variants including clamped, threaded, and bolted bonnets in both top- and bottom-mounted configurations.

### 5) Defender Sleeve + Options

Defender Sleeves guard against large high-velocity particles prematurely destroying the trim. We can provide several additional options including bleeding, purging, and flushing connections.

Other Factors that will often determine the correct material selection for your choke valve are the **level of sublimated gas** that will escape from the medium, and the severity of **flashing**. SchuF's Highly qualified engineers will help you determine the magnitude of these variables and will recommend materials that are optimal for your choke valve application

Type 70 Choke Valve Specifications & Recommended Material Applications <sup>1</sup>						
Pressure Rating	ASME 600# - 4500# / API 2000 - 15000 PSI CWP					
Temperature Rating	-59° to 177° C (-75° to 350° F) API Temperature Classifications K,L,N,P,R,S,T,U,V,X,Y					
Flow Control	Equal Percentage, Linear, Patented X <sup>3</sup> , Bell Curve, On-Off					
Shut-Off Class	ANSI/ FCI Class IV (ANSI/ FCI Class V is optional)					
Trim Material	API AA & BB	API CC	API DD <sup>2</sup> & EE <sup>2</sup>	API FF <sup>2</sup>	API HH <sup>2</sup>	
Recommended Service	General Oil Corrosive (CO <sub>2</sub> )	General Oil Corrosive (CO <sub>2</sub> )	Sour (H <sub>2</sub> S) Low Corrosive (CO <sub>2</sub> )	Sour (H <sub>2</sub> S) Corrosive (CO <sub>2</sub> )	High Sour (H <sub>2</sub> S) High Corrosive (CO <sub>2</sub> )	
1	Body	API 60K Carbon Steel Low Alloy Steel	Duplex SS Carbon Steel Stainless Steel	API 60K Carbon Steel Low Alloy Steel	Duplex SS Clad Low Alloy Steel Stainless Steel	Clad Low Alloy Steel Corrosion Resistant Alloy
2	Bonnet	API 60K Carbon Steel Low Alloy Steel	Duplex SS Carbon Steel Stainless Steel	API 60K Carbon Steel Low Alloy Steel	Duplex SS Clad Low Alloy Steel Stainless Steel	Clad Low Alloy Steel Low Alloy Steel Corrosion Resistant alloy
3	Seat/ Bean	Low Alloy Steel Stainless Steel Tungsten Carbide	AISI 17-4PH Stainless Steel Tungsten Carbide	AISI 17-4PH Low Alloy Steel Tungsten Carbide	AISI 17-4PH Stainless Steel Tungsten Carbide	Corrosion Resistant alloy Tungsten Carbide
4	Sleeve	Low Alloy Steel Stainless Steel Tungsten Carbide	AISI 17-4PH Stainless Steel Tungsten Carbide	AISI 17-4PH Low Alloy Steel Tungsten Carbide	AISI 17-4PH Stainless Steel Tungsten Carbide	Corrosion Resistant alloy Tungsten Carbide
5	Plug	Low Alloy Steel Stainless Steel Tungsten Carbide	AISI 17-4PH Stainless Steel Tungsten Carbide	AISI 17-4PH Low Alloy Steel Tungsten Carbide	AISI 17-4PH Stainless Steel Tungsten Carbide	Corrosion Resistant alloy Tungsten Carbide
6	Stem	AISI 17-4PH Low Alloy Steel	AISI 17-4PH Low Alloy Steel	AISI 17-4PH Low Alloy Steel	AISI 17-4PH Inconel 718	AISI 17-4PH Inconel 718
7	Lower Seal	Carbon Steel Stainless Steel Soft Seal	Low Alloy Steel Stainless Steel Soft Seal	Carbon Steel Inconel 625 Soft Seal	Low Alloy Steel Inconel 625 Soft Seal	Ni-Alloy Inconel 625 Soft Seal
8	Bonnet Seal	Carbon Steel Stainless Steel Soft Seal	Low Alloy Steel Stainless Steel Soft Seal	Carbon Steel Inconel 625 Soft Seal	Inconel 625 Stainless Steel Soft Seal	Ni-Alloy Inconel 625 Soft Seal

<sup>1</sup> Recommended Standard Construction, more options are available upon request

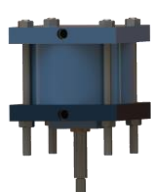
<sup>2</sup> Material is NACE MR0175 Compliant

# SchuF Choke Valve Design

## Adjustable Vs. Fixed Choke?

- Positive chokes provide a fixed-flow condition, with a variety of bean sizes.
- Adjustable chokes provide a variable flow-rate, with the ability to be "locked-in" to a fixed flow-rate.

## Actuator Options



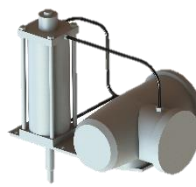
Pneumatic



Hydraulic



Electric



Electro-Hydraulic

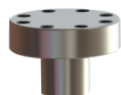


Stepping



Manual

## Bonnet Cap Options



Positive Cap



Actuated Yoke



Adjustable Bonnet

## Bonnet Options



Bolted Bonnet



Clamped Bonnet



Threaded Bonnet

## Trim Options

SchuF Angle Dynamic & Passive Trims  
Please see pages 6-15

## Adapter Options



Positive Bean Adapter



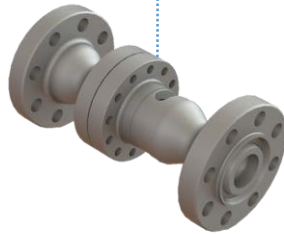
Defender Sleeve

## Body Options

ASME Flanged  
API Flanged  
ISO/ DIN Flanged  
Clamped  
Hubbed  
Threaded  
Butt Weld  
Union



Angle Body



Axial Body



Globe Body

SchuF choke valves are designed to be interchangeable with a vast selection of actuators, bonnets, trims, and body options. The SchuF choke design is easily adaptable, enabling you to quickly update SchuF valves to ever-changing well conditions, while allowing for a fairly diverse range of applications. SchuF choke valves are available with a wide array of dynamic trim options, along with positive choke options, all within the same body design. SchuF specialise in designing and manufacturing choke valve assemblies, custom-tailored to your piping layout and specifications, if our standard trims and bodies cannot fit your requirements.



# 70FK High Pressure Angle Choke Valves (HPAC)

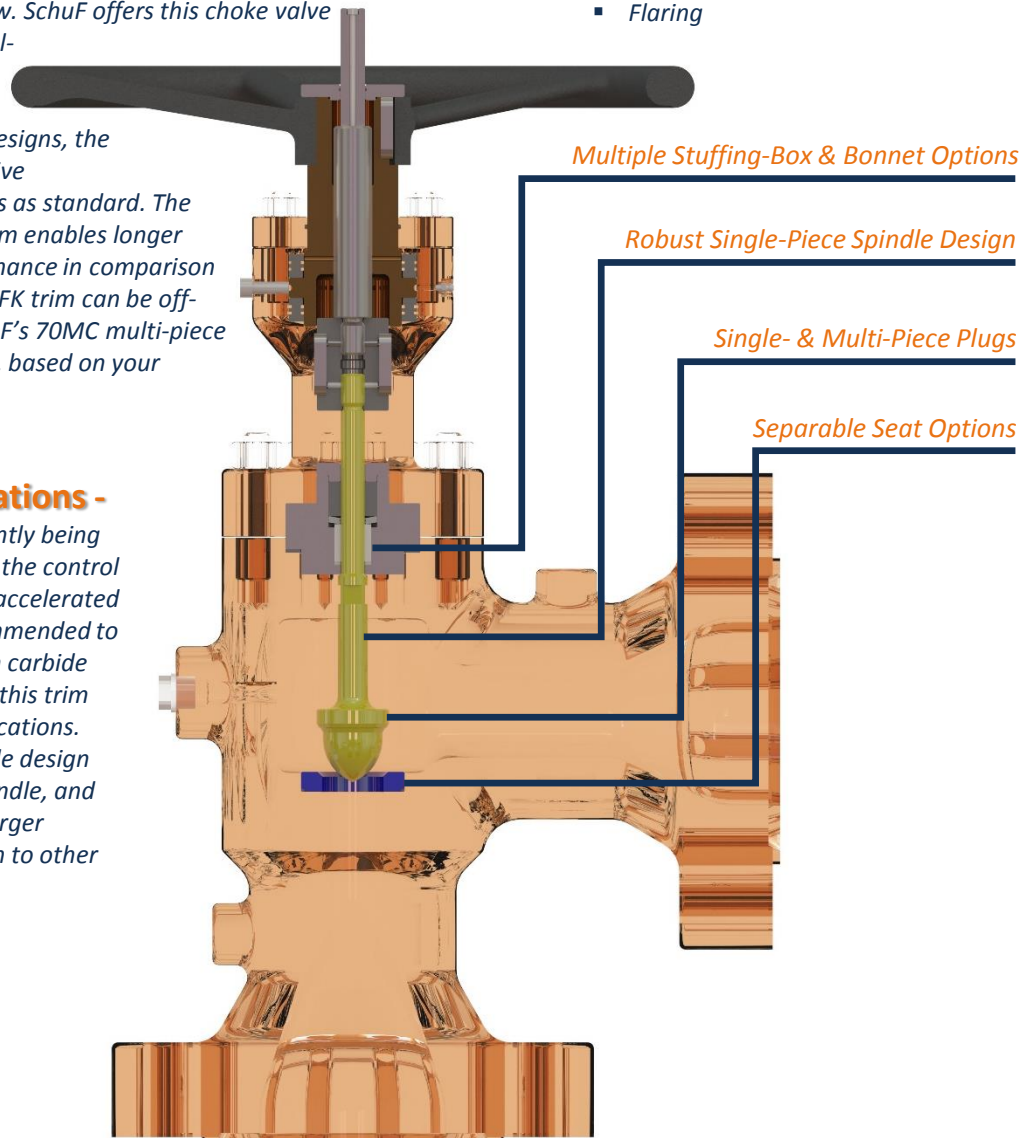
**Features & Benefits** - This trim boasts an incredibly robust & rugged erosion-resistant design. HPAC trims are traditionally considered to be the most optimised method of flow-control. The simple vibration-resistant design makes it an ideal candidate for high-pressure erosive and corrosive services. The 70FK trim utilises a single control surface, allowing for larger particulates and denser suspensions to pass through without clogging the valve. Specially-designed enlarged-port options are available for dirty well clean-up services, along with higher capacity trims for minimised pressure loss during the well depletion stage. Bi-directional sealing allows this choke trim to operate in reverse flow. SchuF offers this choke valve with a wide variety of control-curve options for use with liquid, gas, and multiphase processes. Like other SchuF designs, the 70FK is equipped with explosive decompression-resistant seals as standard. The simple inline design of this trim enables longer service life and lower maintenance in comparison to other choke valves. The 70FK trim can be offered in conjunction with SchuF's 70MC multi-piece or 70KS single-sleeve designs, based on your specifications.

## Additional Considerations -

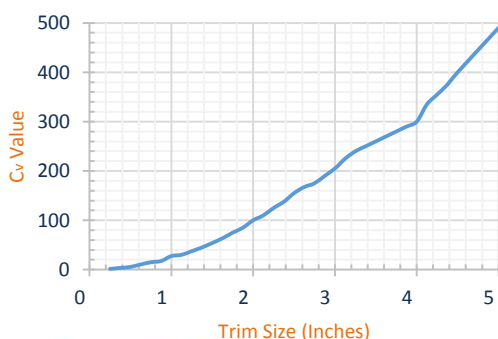
As a result of the trim constantly being present within the flow path, the control surfaces can be subjected to accelerated non-uniform wear. It is recommended to utilise hard-faced or tungsten carbide sealing elements when using this trim in erosive and corrosive applications. Additionally, the 70FK's simple design does allow for a balanced spindle, and therefore typically requires larger actuator forces in comparison to other trims.

## Typical Industry Applications:

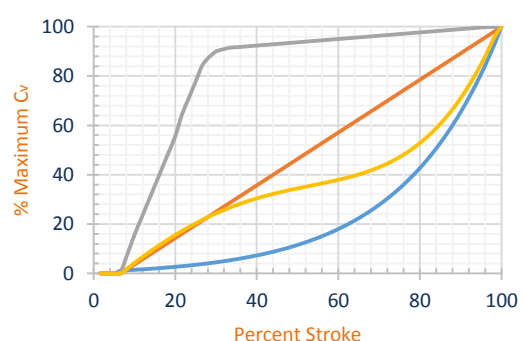
- Oil Production Start-Up/ Shut-Down
- Gas & Condensate Production
- Gas Lift
- Well Testing
- Choke & Kill Manifolds
- Multi-Phase Flows
- Pump Discharge
- Fracturing Clean-up
- Flaring



70FK Trim



70KS Flow Curves



## 70NV Needle Spline Choke Valves (NSC)

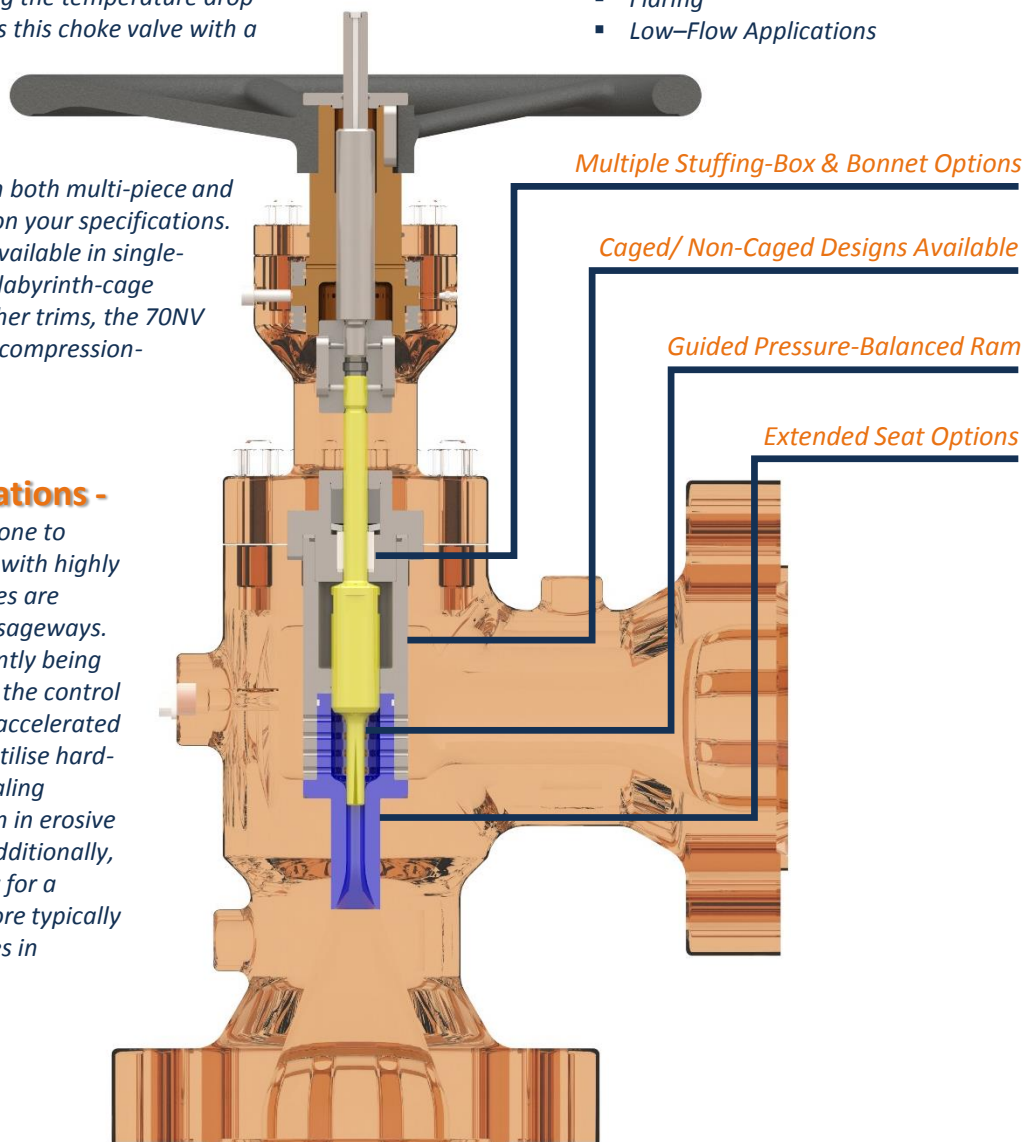
**Features & Benefits** - Needle Spline trims are the perfect solution for low-flow-rate, high-pressure-drop choking applications. With micro-spline capabilities, the Needle Spline is designed with the maximum level of flow control precision. With the ram constantly being guided by the seat, the Needle Spline trim offers a greater level of stability and vibration resistance in comparison to other trims. The 70NV is a low-pressure-recovery trim, offering superior cavitation attenuation and protection for down-stream components. Needle Spline trims are commonly used for methanol injection, to prevent hydrate formation by reducing the temperature drop across the choke. SchuF offers this choke valve with a wide variety of control-curve options for use with liquid, gas, and multi-phase processes. The 70NV single-stage trim is offered in both multi-piece and single-sleeve designs, based on your specifications. SchuF needle trims are also available in single-stage, multi-stage cage, and labyrinth-cage designs. Like all of SchuF's other trims, the 70NV is equipped with explosive decompression-resistant seals as standard.

### Additional Considerations -

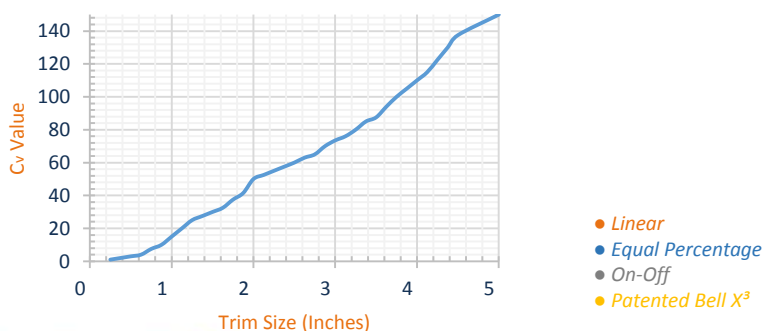
Needle Spline trims can be prone to clogging and build-up if used with highly viscous fluids or if particle sizes are greater than the internal passageways. As a result of the trim constantly being present within the flow path, the control surfaces can be subjected to accelerated wear. It is recommended to utilise hard-faced or tungsten-carbide sealing elements when using this trim in erosive and corrosive applications. Additionally, the 70NV's design does allow for a balanced spindle, and therefore typically requires larger actuator forces in comparison to other trims.

### Typical Industry Applications:

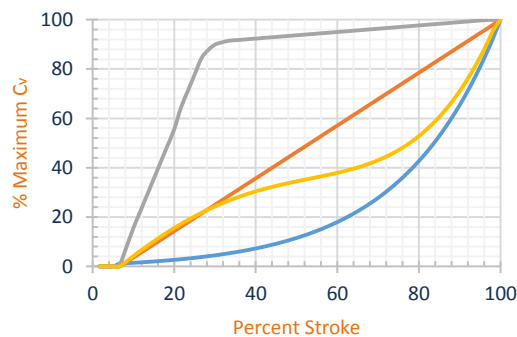
- Gas & Condensate Production
- Gas Injection
- Gas Lift
- Water Injection
- Chemical Injection
- Methanol Injection
- Heater Bypass
- Flaring
- Low-Flow Applications



70NV Trim



70KS Flow Curves



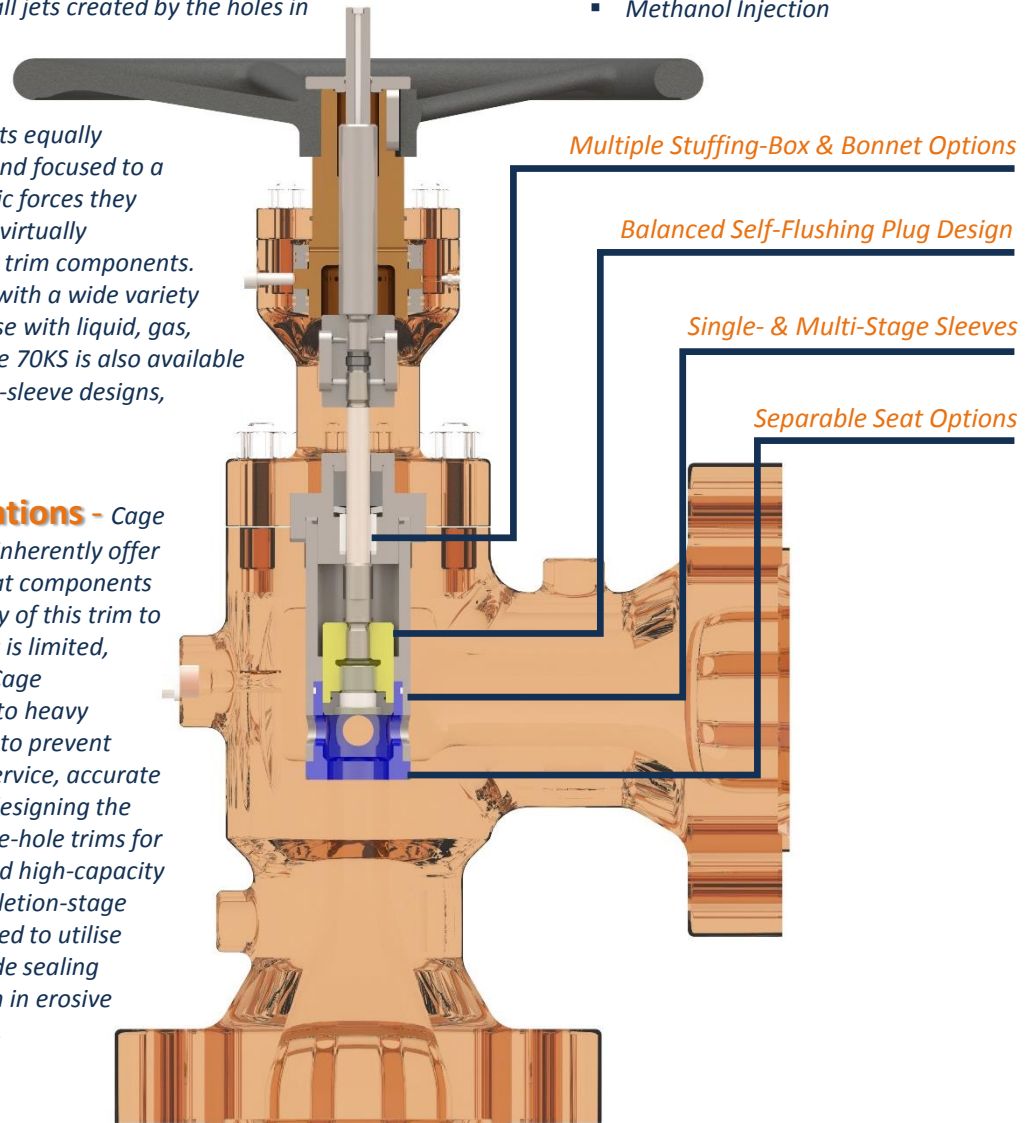
## 70KS Cage Choke Valves (CC)

**Features & Benefits** - Cage Choke Valve trims offer accurate high-capacity flow control, making them ideal for both well start-up and well depletion production. SchuF's uniquely-designed 'gallery' is optimised to provide an evenly-distributed flow into the cage, reducing wear of the trim components, and minimising body erosion. The pressure-balanced plug of the 70KS reduces actuator forces, and is offered in both single- and multi-piece constructions. Like the 70NV Needle Spline trim, Cage Choke Valve trims are also ideal for low-pressure-recovery applications. By comparison, the Cage Choke Valve utilises a greater number of flow paths, drastically reducing and de-localising erosion. The small jets created by the holes in the cage create an increased noise frequency, reducing resonance and noise by up to 40dBA. With these small jets equally distributed around the cage and focused to a single point, the hydrodynamic forces they create cancel each other out, virtually eliminating wear on the inner trim components. SchuF offers this choke valve with a wide variety of control-curve options for use with liquid, gas, and multiphase processes. The 70KS is also available in both multi-piece and single-sleeve designs, based on your specifications.

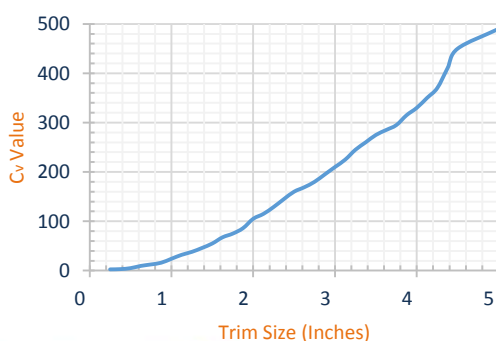
**Additional Considerations** - Cage trims are unique in that they inherently offer protection of the plug and seat components from debris impact. The ability of this trim to protect the inner components is limited, however, and so a Defender Cage is recommended if moderate to heavy debris is anticipated. In order to prevent clogging of the cage during service, accurate debris-sizing is critical when designing the trim. SchuF offers special large-hole trims for dirty well clean-up service, and high-capacity Cage trims for use in well depletion-stage applications. It is recommended to utilise hard-faced or tungsten-carbide sealing elements when using this trim in erosive and/or corrosive applications.

### Typical Industry Applications:

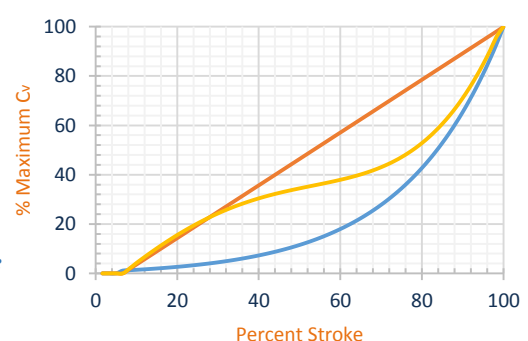
- Oil Production
- Gas & Condensate Production
- Gas Storage
- Gas Injection
- Water Injection
- Pump Discharge
- Flowback
- Chemical Injection
- Methanol Injection



70KS Trim



70KS Flow Curves





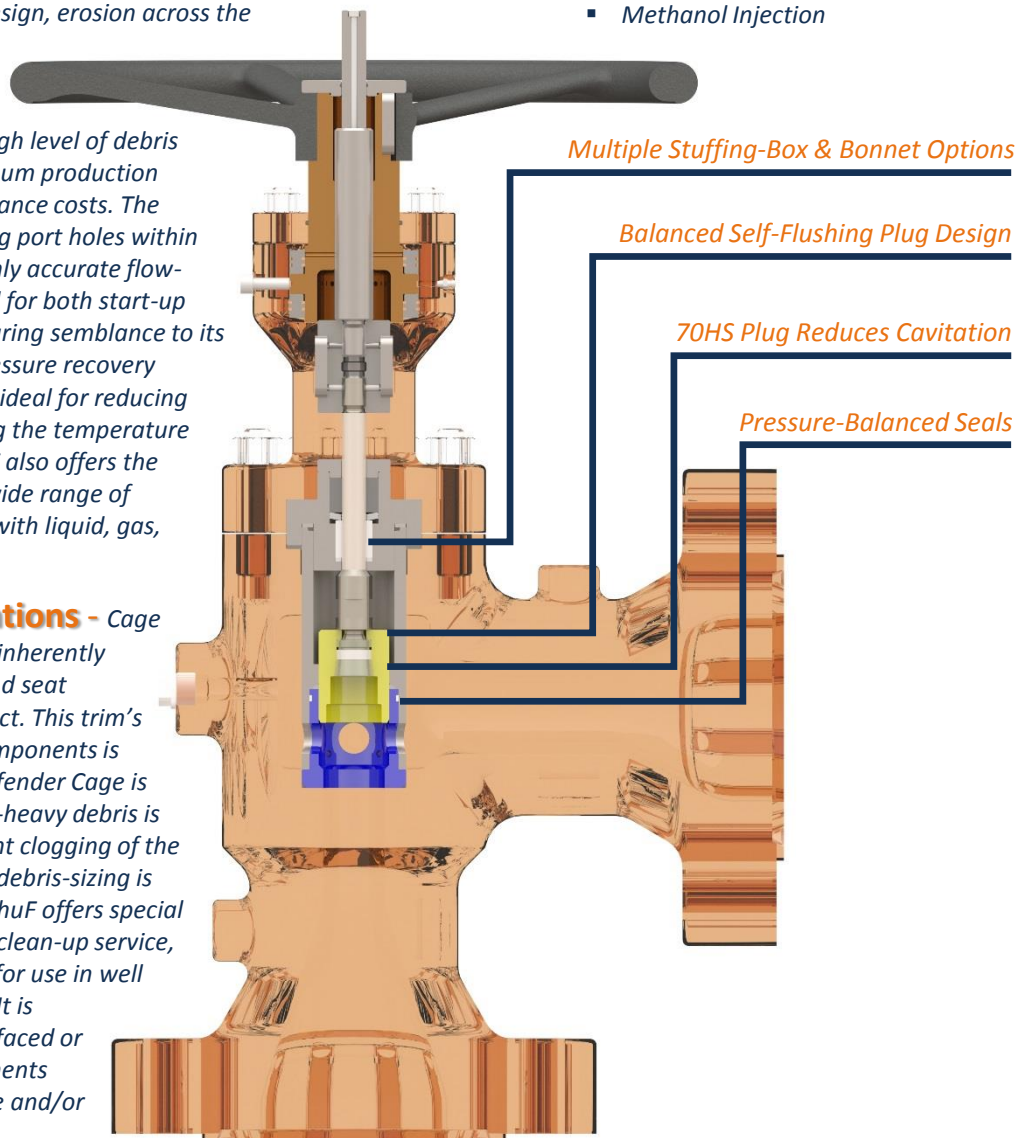
## 70HS Anti-Cav Cage Choke Valves (ACC)

**Features & Benefits** - Similarly to the 70KS, the ACC trim offers highly-accurate flow control, with the added benefit of cavitation reduction and attenuation. The hollow cavity at the base of the plug creates a vortex within the flow path, effectively reducing flow cavitation and vibration. By reducing the preferential flow within the trim, the 70HS reduces wear across the sealing surfaces of the valve, increasing field service life and reducing overall operational costs. The increased annulus area within the cage and plug of the ACC trim offers a greater flow capacity over standard cage trim designs, making it the quintessential choice for high-capacity applications. Coupled with our increased 'gallery' design, erosion across the sealing surfaces and trim is effectively reduced by a factor of four. Tungsten-carbide trim options offer a high level of debris protection, resulting in maximum production up-time and reduced maintenance costs. The Pressure-balanced self-flushing port holes within the plug assembly enable highly accurate flow-control, making this trim ideal for both start-up and depletion production. Bearing semblance to its 70KS counterpart, the low-pressure recovery attributes of this trim make it ideal for reducing hydrate formation by reducing the temperature across the choke valve. SchuF also offers the ACC choke valve trim with a wide range of control-curve options for use with liquid, gas, and multiphase processes.

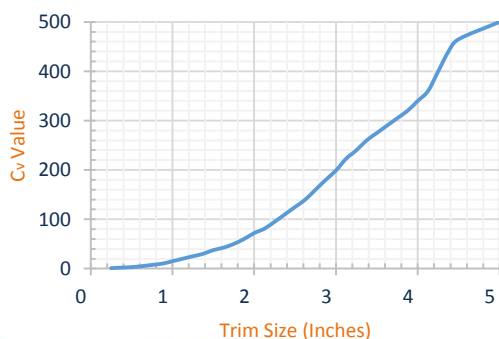
**Additional Considerations** - Cage trims are unique, in that they inherently offer protection of the plug and seat components from debris impact. This trim's ability to protect the inner components is limited, however, and so a Defender Cage is recommended if moderate-to-heavy debris is anticipated. In order to prevent clogging of the cage during service, accurate debris-sizing is critical at the design stage. SchuF offers special large-hole trims for dirty well clean-up service, and high-capacity cage trims for use in well depletion-stage applications. It is recommended to utilise hard-faced or tungsten-carbide sealing elements when using this trim in erosive and/or corrosive applications.

### Typical Industry Applications:

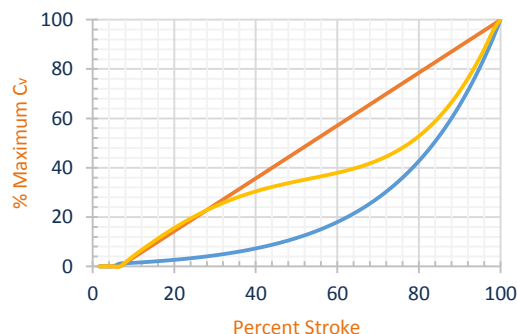
- Oil Production
- Gas & Condensate Production
- Gas Storage
- Gas Injection
- Water Injection
- Pump Discharge
- Flowback
- Chemical Injection
- Methanol Injection



70HS Trim



70HS Flow Curves



# 70MC Multi-Stage Cage Choke Valves (MCC)

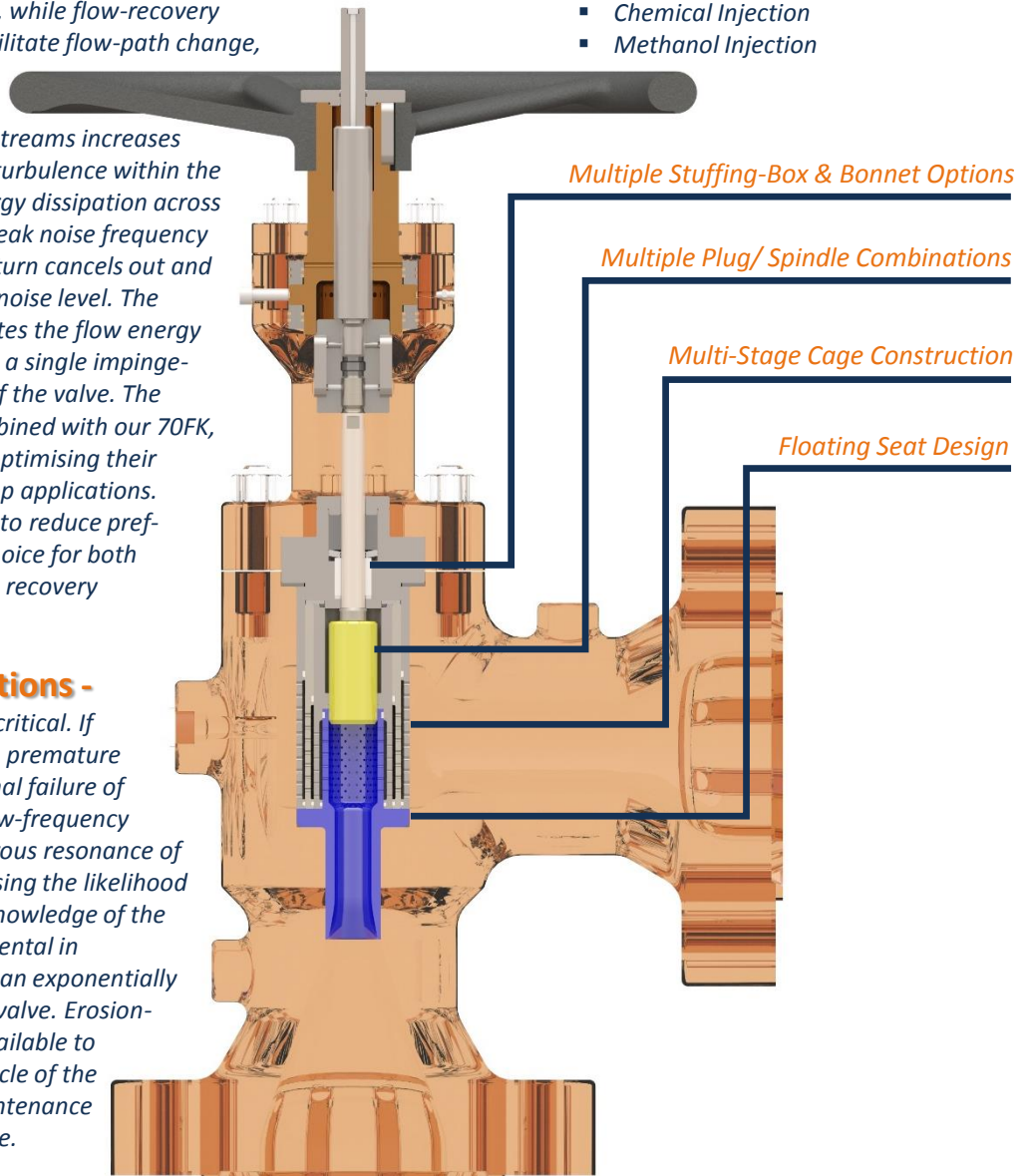
**Features & Benefits** - The most arduous choke valve applications demand equally robust trim designs with resilience to fluid-impingement and intense pressure-drops. Multi-Stage choke valves offer a unique solution for these demanding applications. By breaking down the pressure-drop across the trim into several smaller steps, flow cavitation can be eliminated or minimised, significantly reducing noise, vibration, and erosion. MCC choke valves use a series of cages, nested concentrically within one another, to create these stages of differential pressure regions. Flow-specific hole patterns control the discharge between each stage, while flow-recovery chambers within the cages facilitate flow-path change, reducing incipient cavitation. Separating the initial flow into a larger number of small streams increases the peak noise frequency and turbulence within the valve, amplifying the wall energy dissipation across the trim. This increase in the peak noise frequency creates interference, which in turn cancels out and ultimately reduces the overall noise level. The final trim stage further dissipates the flow energy by focusing low velocity jets to a single impingement point within the center of the valve. The 70MC choke valve can be combined with our 70FK, 70NV, 70KS, and 70HS trims, optimising their designs for larger pressure-drop applications. The MCC valve, with its ability to reduce preferential flow, is an excellent choice for both mixed-phase and low-pressure recovery operations.

## Additional Considerations -

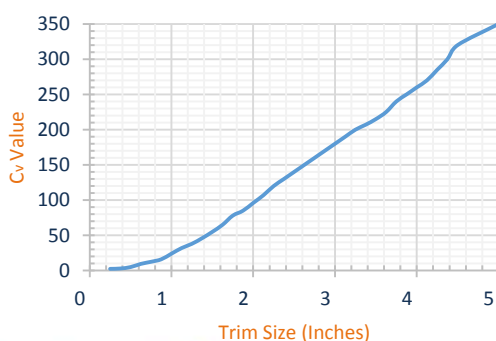
Hole-sizing of the MCC trim is critical. If improperly done, it can lead to premature wear, clogging, and the terminal failure of the valve. Larger jets create low-frequency noise that can create a dangerous resonance of the choke components, increasing the likelihood of fatigue failure. Therefore, knowledge of the process particle-size is instrumental in combating these effects, and can exponentially increase the service life of the valve. Erosion-resistant trim packages are available to supplement the operational cycle of the valve, reducing expensive maintenance costs and production downtime.

## Typical Industry Applications:

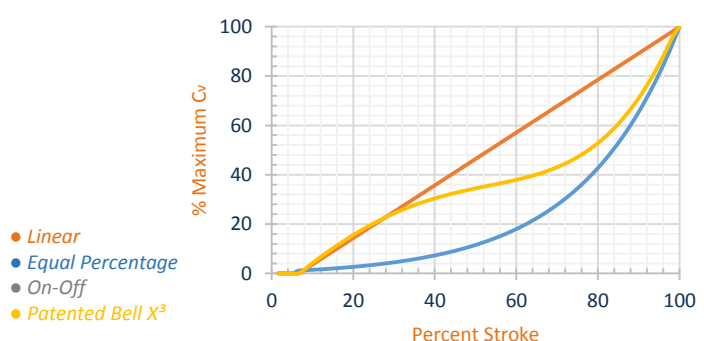
- Oil Production
- Gas & Condensate Production
- Gas Storage
- Gas Injection
- Water Injection
- Pump Discharge
- Flowback
- Chemical Injection
- Methanol Injection



70PC Trim



70MC Flow Curves



## 70EC External Sleeve Choke Valves (ESC)

**Features & Benefits** – External-sleeve-style choke valves are one of the most widely accepted and conventional trims used throughout the oil and gas industries. By raising and lowering a sleeve mounted around a central ported cage, with a flow-specific hole pattern, precise throttling of the flow can be achieved. The 70EC choke valve is especially well-suited for applications which feature lower-capacity flows with elevated pressure-drops. Due to its unique design, the ‘ESC’ trim also offers superior erosion protection for formidable pressure drop operations with heavy sand concentrations. Relocating the throttling element to the outside of the cage increases the trim’s annulus area, which in turn reduces the risk of premature erosion and failure caused by high-velocity flow. An increased ‘gallery’ provides

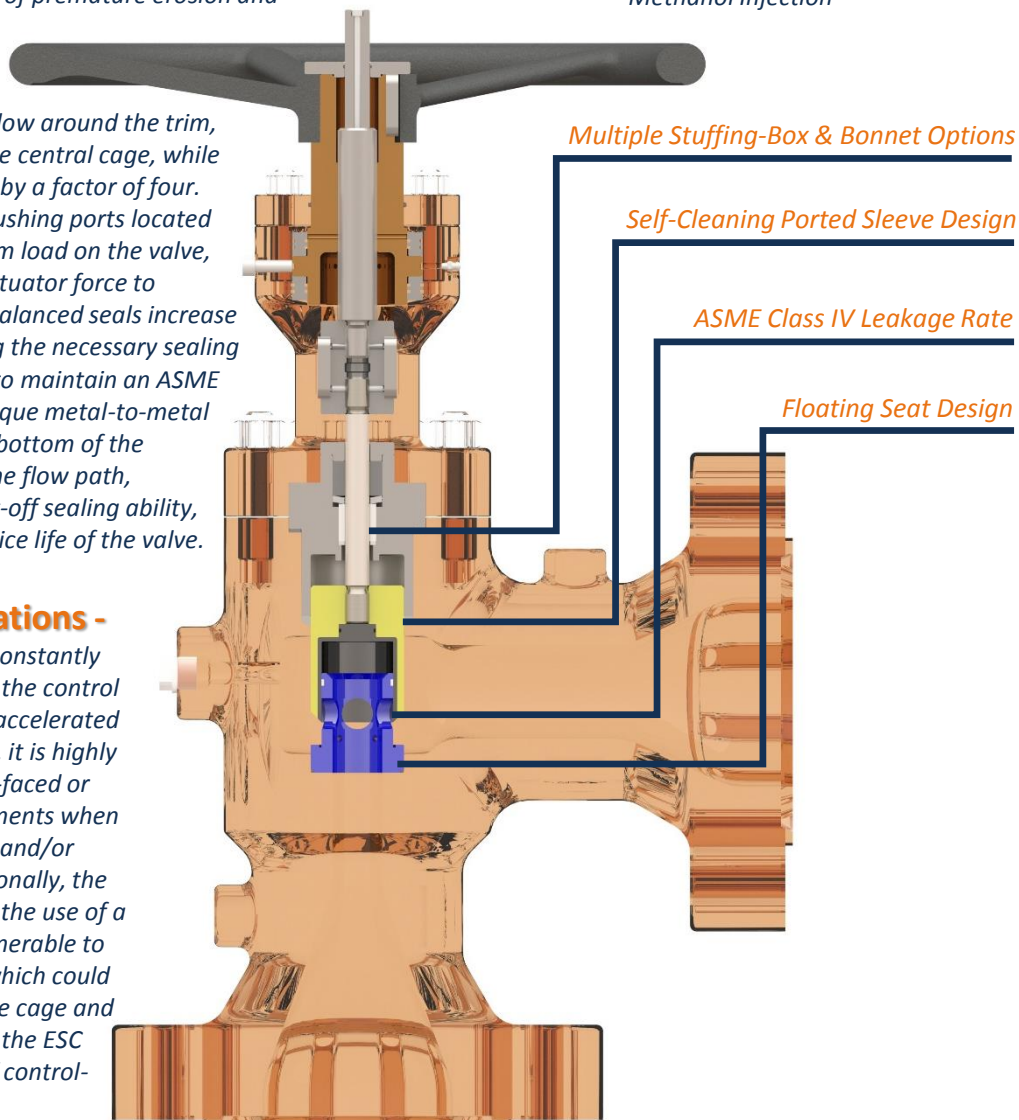
homogenous distribution of flow around the trim, reducing localised wear on the central cage, while also decreasing body erosion by a factor of four. The pressure-balanced self-flushing ports located on the sleeve reduces the stem load on the valve, thus reducing the required actuator force to operate the valve. Pressure-balanced seals increase adjustability while minimising the necessary sealing forces required for the valve to maintain an ASME Class IV leakage rate. The unique metal-to-metal seat design is located on the bottom of the sleeve, placing it outside of the flow path, safeguarding its positive shut-off sealing ability, while also increasing the service life of the valve.

### Additional Considerations -

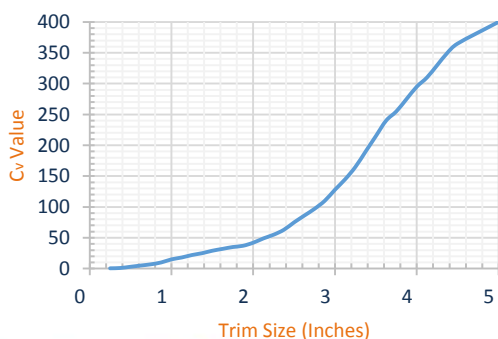
As a result of the trim being constantly present within the flow path, the control surfaces can be subjected to accelerated non-uniform wear. Therefore, it is highly recommended to utilise hard-faced or tungsten-carbide sealing elements when operating this trim in erosive and/or corrosive applications. Additionally, the 70EC’s design doesn’t permit the use of a Defender Cage, making it vulnerable to high-speed particle impact, which could cause premature failure of the cage and sleeve components. We offer the ESC choke trim in a wide range of control-curve options.

### Typical Industry Applications:

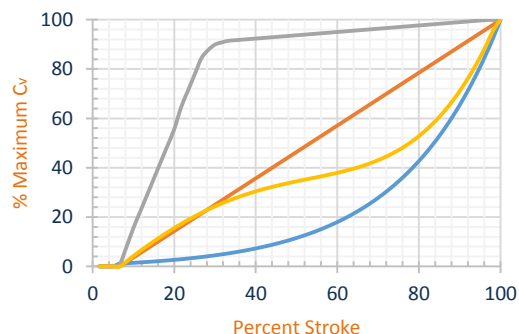
- High-Sand Oil-Production
- Gas & Condensate Production
- Gas Storage
- Gas Injection
- Water Injection
- Pump Discharge
- Flowback
- Chemical Injection
- Methanol Injection



70PC Trim



70EC Flow Curves





## 70DF Turn-Style Disc Choke Valves (TDC)

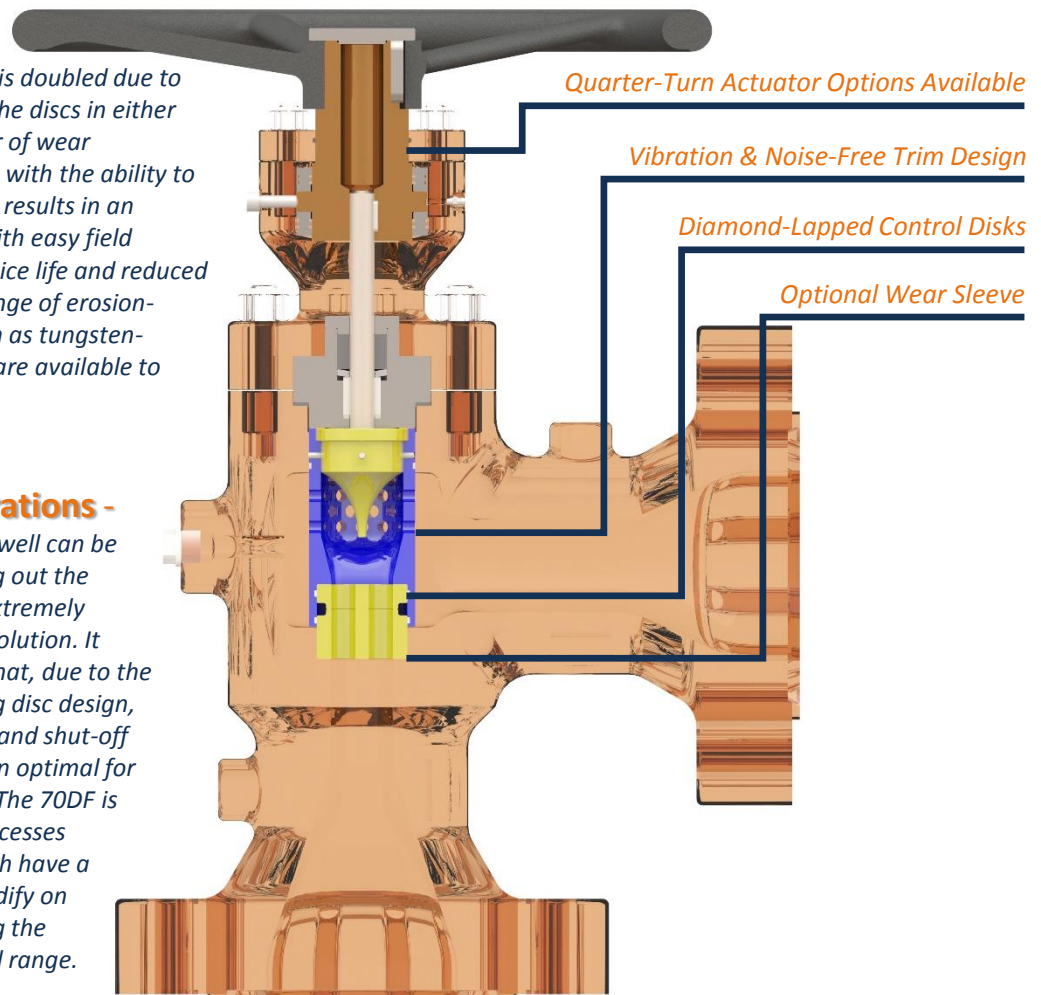
**Features & Benefits** - This unique trim consists of two diamond-polished concentric discs with matching hole or slot patterns, one positively mounted, and the other rotating on center to adjust the flow path. By varying the orifices size and shape within the discs, we are able to provide multiple flow-curve options along with higher rangeability and extended service life. The 70DF is extremely versatile and can be offered with custom-designed hole, pie, spiral, slot, and combination-style orifices for optimum flow control. Each orifice design is inherently unique to its application- for instance, a spiral-shaped port is effective in high-rangeability applications such as water injection. Pie-shaped orifices, which utilise a half-moon shaped hole, are particularly effective for drilling applications with high mud content. Tight machining tolerances along with the compact design of the 70DF eliminate vibration, noise and fatigue, which are commonly associated with other trim designs. For most orifice styles, with the exception of the spiral shape, the service life of this valve trim is doubled due to the unique ability to rotate the discs in either direction. A very low number of wear components, in combination with the ability to meet ASME class IV shut off, results in an extremely durable design, with easy field maintenance, increased service life and reduced operational costs. A wide range of erosion-resistant disc materials, such as tungsten-carbide and silicon-carbide, are available to further improve service life.

### Additional Considerations -

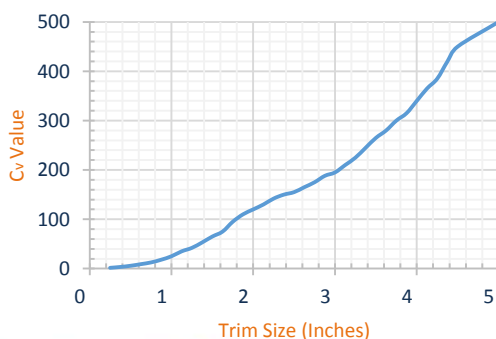
Flow control for the life of a well can be achieved by simply swapping out the 70DF's discs, making it an extremely versatile and cost effective solution. It should be noted, however, that, due to the TDC's concentrically-rotating disc design, there is an increased dead-band shut-off area, thus making it less than optimal for quick-opening applications. The 70DF is highly recommended for processes containing asphaltines, which have a tendency to deposit and solidify on linear motion trims, reducing the Valve's effective flow control range.

### Typical Industry Applications:

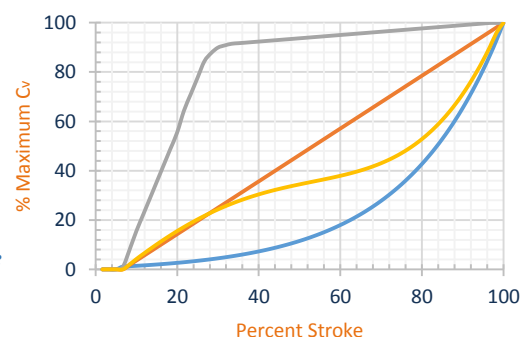
- Wellhead Control
- Manifold Pressure Control
- Gas & Condensate Production
- Separator Letdown
- Heater Bypass
- Gas Lift/ Injection/ Flow Control
- CO<sub>2</sub>/ Methanol/ Water Injection
- Pump Start-Up & Bypass Control
- Gas Blow-Down Line



70DF Trim



70DF Flow Curves



# 70MS Multi-Stage Disc Choke Valves (MDC)

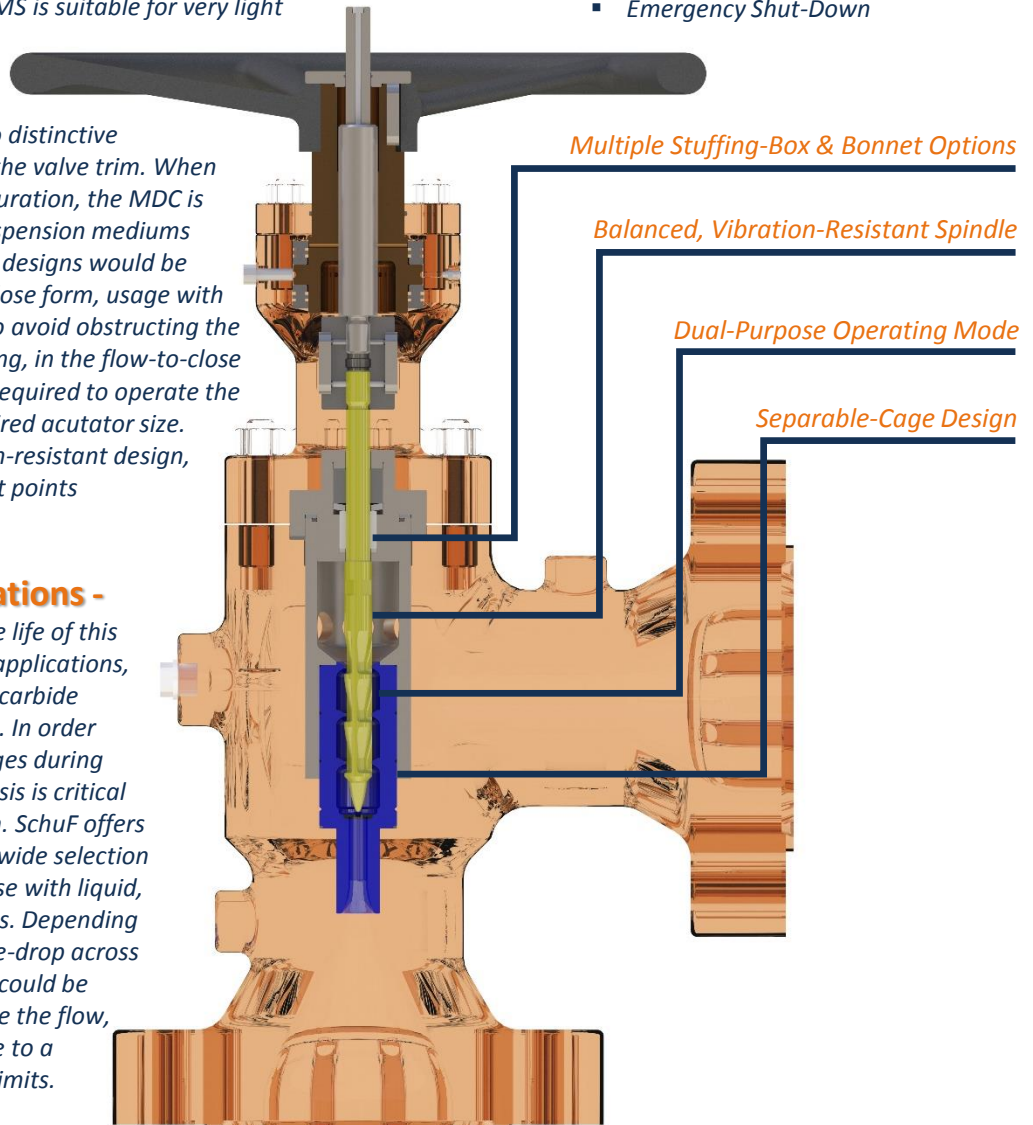
**Features & Benefits** - By sequentially reducing the inlet pressure through multiple flow control stages, the 70MS has the capability to effectively handle massive pressure-drop applications. This unique trim design prevents cavitation by reducing the inlet pressure in sequential controllable stages so that it doesn't sharply fall below the vapor-pressure of the medium, which would in turn cause premature wear of the trim components. The MDC's internal design and construction is based on our highly-successful 74MB & 74MC Multi-Stage Disc Control Valves, which have been in production since 1999. Typically used in secondary-recovery and reservoir-maintenance water-injection applications, the 70MS is suitable for very light erosive services with minimal solids content. However, by changing the orientation of the control discs, we gain two distinctive operational functions within the valve trim. When used in a flow-to-open configuration, the MDC is optimally suited for heavy suspension mediums in which normal choke valve designs would be encumbered. In the flow-to-close form, usage with finer suspensions is advised to avoid obstructing the flow path- the advantage being, in the flow-to-close layout, less actuator force is required to operate the valve, thus reducing the required actuator size. The 70MS is a highly vibration-resistant design, utilising multiple plug-support points throughout the trim stages.

## Additional Considerations -

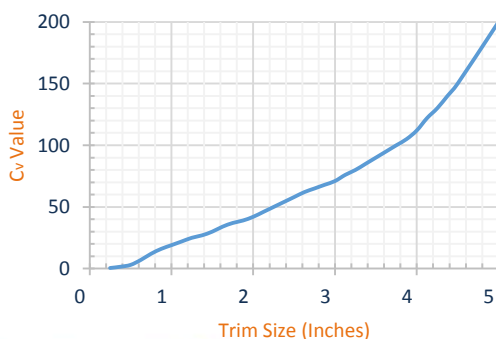
To further increase the service life of this trim in erosive and corrosive applications, Tungsten-carbide and silicon-carbide plugs and cages are available. In order to prevent clogging of the cages during service, accurate debris analysis is critical when designing the MDC trim. SchuF offers the 70MS choke valve with a wide selection of control-curve options for use with liquid, gas, and multiphase processes. Depending upon the operational pressure-drop across the valve, up to seven stages could be required to properly attenuate the flow, reducing cavitation and noise to a level within acceptable local limits.

## Typical Industry Applications:

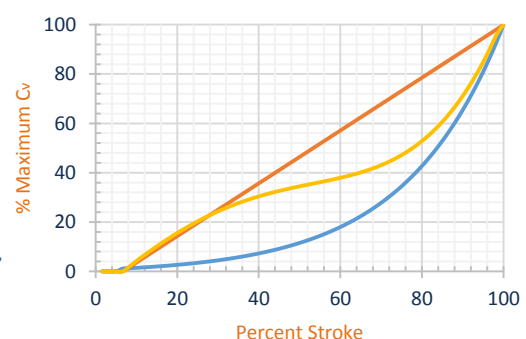
- Gas Injection
- Gas & Condensate Production
- Gas Lift
- Water Injection
- Pump Discharge & Recirculation
- Overboard Dump Applications
- Chemical Injection
- Heat Exchanger
- Emergency Shut-Down



70MS Trim



70MS Flow Curves



## 70SC Stacker Choke Valves (sc)

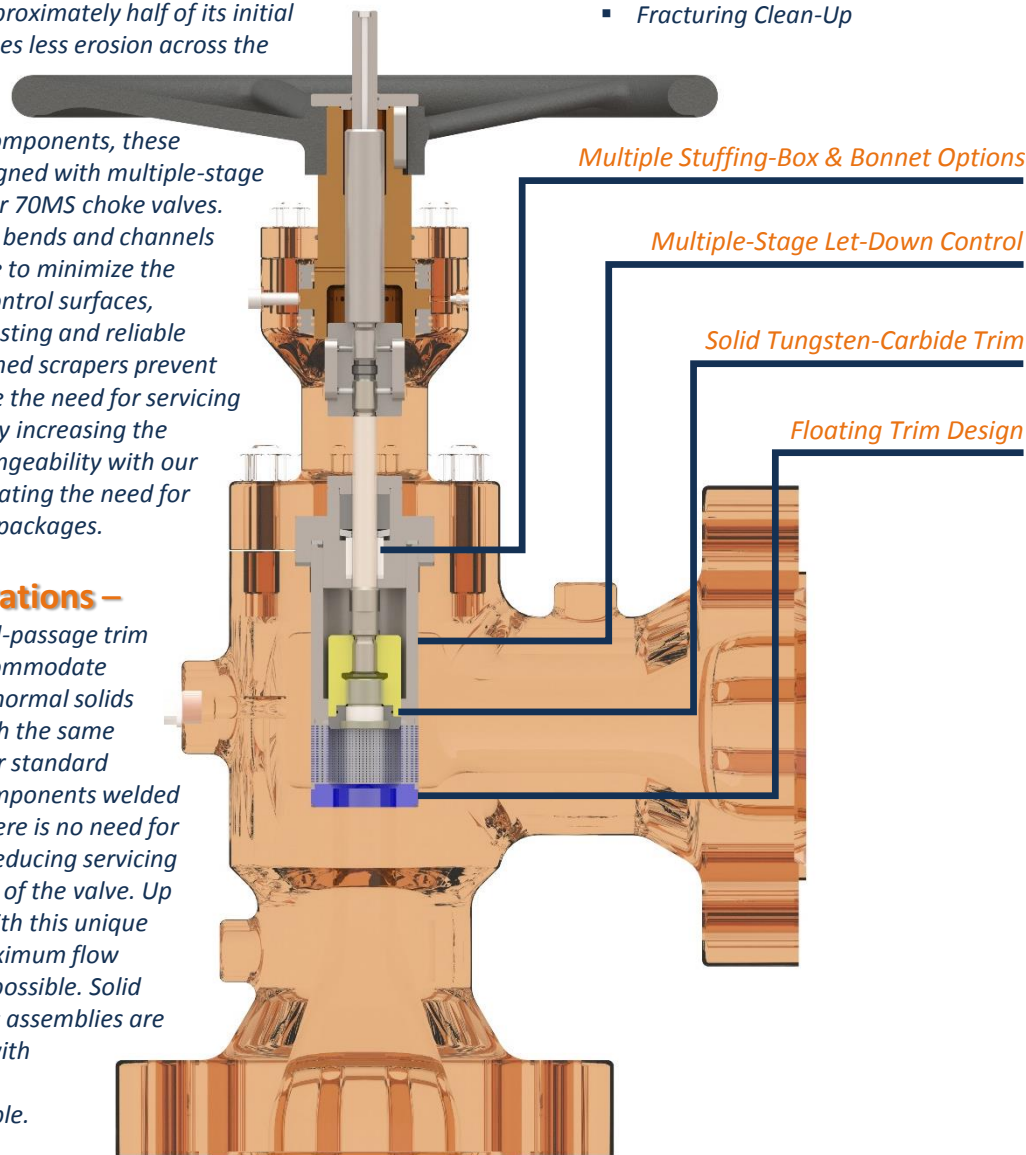
**Features & Benefits** - SchuF Stacker choke valves offer our customers the ability to utilise higher differential operating pressures for extended periods of time during production. By forcing the process through a series of sharp turns and splitting channels, the 70SC Stacker valve is able to break the flow velocity down to manageable levels by de-localising the flow streams. The flow resistance created by these turns and channels limits the process fluid's exit velocity to a less aggressive level, greatly reducing wear, noise, vibration, and erosion. Significant research has shown that the rate of erosion within the valve is directly proportional to the velocity of the medium through the trim. In fact, reducing the flow rate to approximately half of its initial value yields almost eight times less erosion across the trim control surfaces. To further prevent premature failure of the internal trim components, these bends and channels are designed with multiple-stage Pressure-drops, similar to our 70MS choke valves. By constantly expanding the bends and channels through the trim we are able to minimize the wear and erosion of these control surfaces, resulting in a much longer-lasting and reliable valve design. Specially designed scrapers prevent solids building up and reduce the need for servicing and production downtime. By increasing the stroke, we offer a greater rangeability with our SC valves, reducing or eliminating the need for swapping of additional trim packages.

### Additional Considerations –

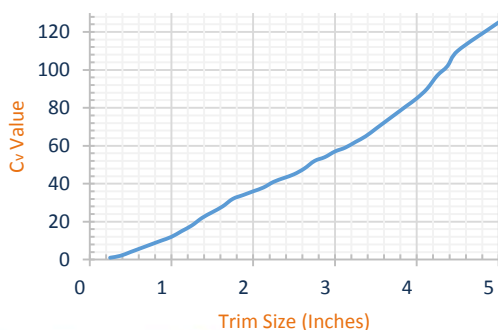
Specially-designed expanded-passage trim designs are available to accommodate processes with higher-than-normal solids content, while operating with the same unparalleled reliability as our standard models. With no internal components welded or screwed into the body, there is no need for special maintenance tools, reducing servicing time and overall operational of the valve. Up to six stages are available with this unique trim design, offering the maximum flow attenuation and protection possible. Solid tungsten-carbide plug & disc assemblies are standard on our SC model, with additional erosion-resistant material options also available.

### Typical Industry Applications:

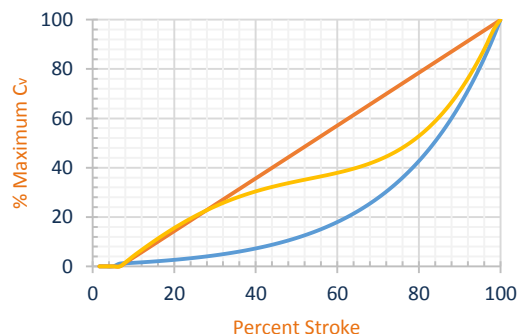
- Oil Production Start-Up/ Shut-Down
- Gas & Condensate Production
- Gas & Methanol Injection
- Gas Lift
- Water Injection
- Pump Discharge
- Overboard Dump Applications
- Chemical Injection
- Fracturing Clean-Up



70SC Trim



70SC Flow Curves





## 70PC Positive Angle Choke Valves (PAC)

**Features & Benefits** - The PAC is the simplest of the choke valve trims, utilizing a passive orifice design to regulate pressure and flow conditions across the valve. Positive choke valves are distinctly different from dynamic choke valves due to their lack of adjustable flow control. In lieu of an actuator and movable throttling mechanism, positive choke valves employ a specially-sized "bean" to provide a narrower band of fixed flow conditions. Offered in increments of 1/64", these beans are instrumental in protecting line equipment from pressure spikes and surges. Typically installed on 'Christmas trees' and wellheads, positive choke valves are selected for applications that require little or no adjustment over a significant period of time. Our one-of-a-kind proprietary floating-seat design enables quick servicing and replacement of the bean without the need for special tools or equipment. Adaptability is crucial for choke valves components in the WOG market sector, and with ever-changing flow conditions, valves should possess the ability to be highly rangeable while also offering trim interchangeability.

All SchuF choke valves are designed to be easily interchangeable without the need of specialized equipment or training. Our innovative 'Quick-Lok' design reduces servicing time, and also provides a safe and secure trim-retention system. Direct competitor replacement designs are also available in a wide range of designs, beans, and material selections.

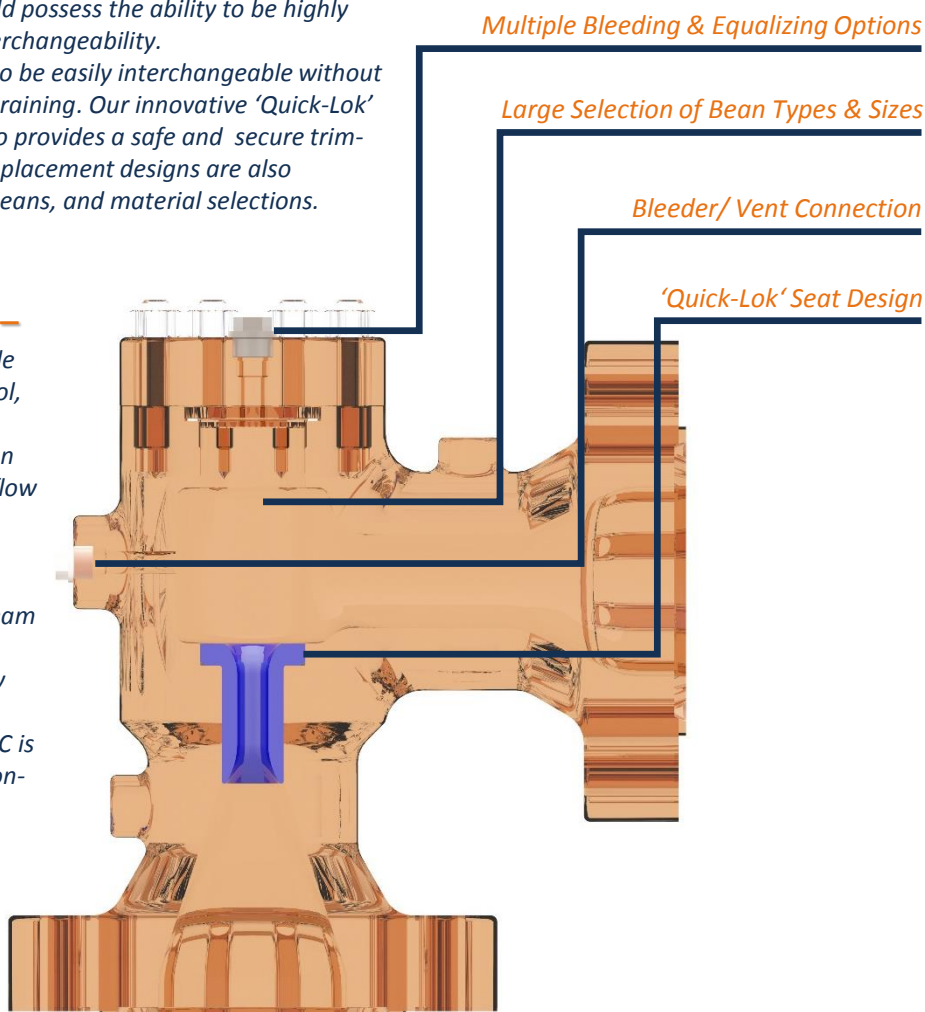
### Additional Considerations –

'Fixed' choke valve designs are a simple and inexpensive method of flow control, with a wide variety of advantages but also some drawbacks. Special attention should always be paid to the process flow when dealing with elevated concentrations of mud, sand, and asphaltenes as they can clog the trim, compromising the valve and downstream equipment. Flow conditions should be accurately recorded and disclosed fully during any customer enquiry.

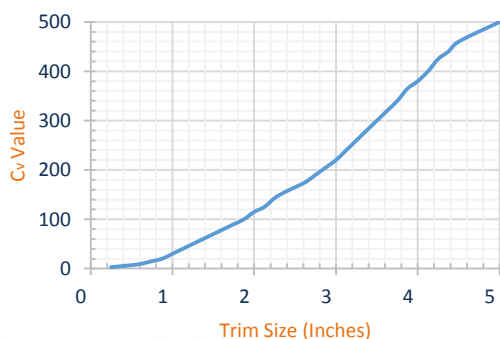
Like all SchuF dynamic trims, the 70PC is equipped with explosive decompression-resistant seals as standard.

### Typical Industry Applications:

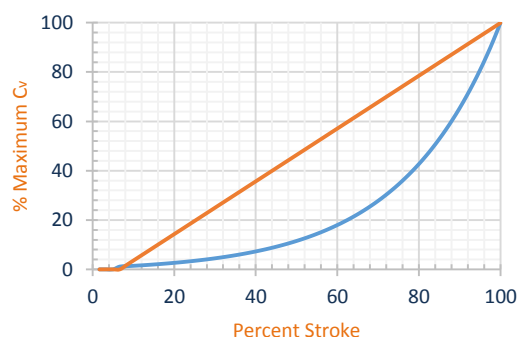
- Oil Production Start-Up/ Shut-Down
- Gas & Condensate Production
- Gas Injection
- Gas Lift
- Pump Discharge
- Overboard Dump Applications
- Chemical Injection
- Fracturing Clean-Up
- Methanol Injection
- Flaring



70PC Trim



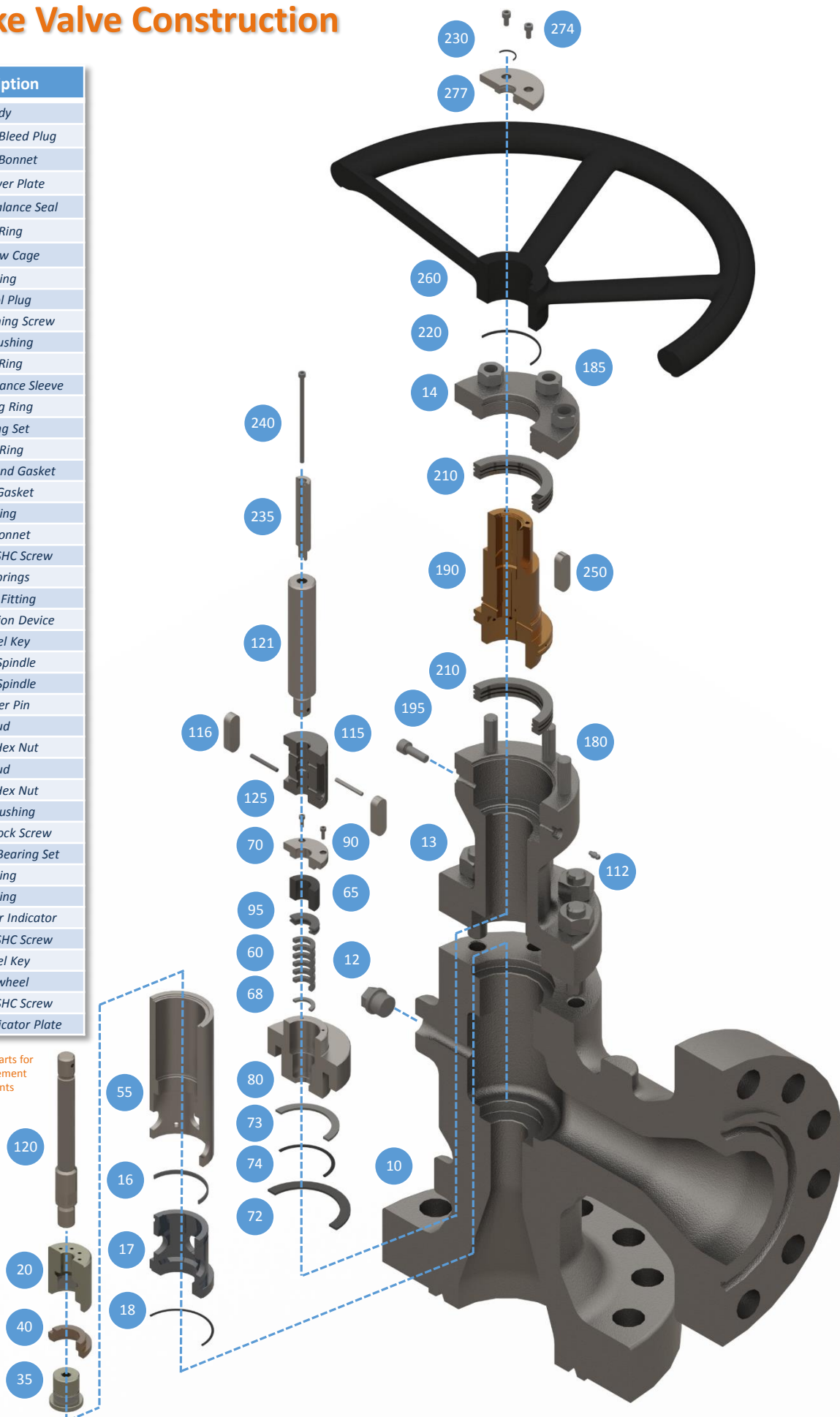
70PC Flow Curves



# SchuF Choke Valve Construction

Position	Description
10	Body
12	Hex. Head Bleed Plug
13	Upper Bonnet
14	Drive Cover Plate
(15)	Pressure Balance Seal
(16)	Seal Ring
17 •	Seat Flow Cage
(18)	O-Ring
20 •	Control Plug
35 •	Disc Retaining Screw
40 •	Seat Bushing
(50)	Seal Ring
55 •	Pressure Balance Sleeve
(60)	Packing Ring
(65)	Packing Set
(68)	Junk Ring
(72)	Spiral Wound Gasket
(73)	Crush Gasket
(74)	O-Ring
80 •	Mid-Bonnet
90	Hexagon SHC Screw
95 •	Cup Springs
112	Grease Fitting
115	Anti-Rotation Device
116	Parallel Key
120 •	Lower Spindle
121 •	Upper Spindle
125	Cylinder Pin
140	Stud
160	Heavy Hex Nut
180	Stud
185	Heavy Hex Nut
190	Drive Bushing
195	Position Lock Screw
210 •	Cylindrical Bearing Set
(220)	O-Ring
(230)	O-Ring
235	Micrometer Indicator
240	Hexagon SHC Screw
250	Parallel Key
260	Handwheel
274	Hexagon SHC Screw
277	Position indicator Plate

( ) Indicates recommended spare parts for start-up & 2 year service replacement  
 • Indicates capitol spare components



# SchuF Angle Choke Valve Features

## Precision Position Control

A dual-function corrosion-resistant true-barrel micrometer & position indicator allow for pin-point accuracy when adjusting and reading the choke position

S

## Sensor Connection Options

Temperature and pressure sensors are critical when it comes to monitoring and controlling the flow, and we offer sensor connections as a standard option

## Position Lock

Our streamlined tangential locking mechanism allows the trim to be locked into any desired position, without damaging the drive bushing

## Bonnet Seal

Lens ring and spiral wound gasket designs provide an absolute fire safe containment of the process

## Vent/ Bleed Plug

The bleed plug assembly, with integrated blowout lock, allows for safe venting of the valve prior to servicing

## Optimised Gallery

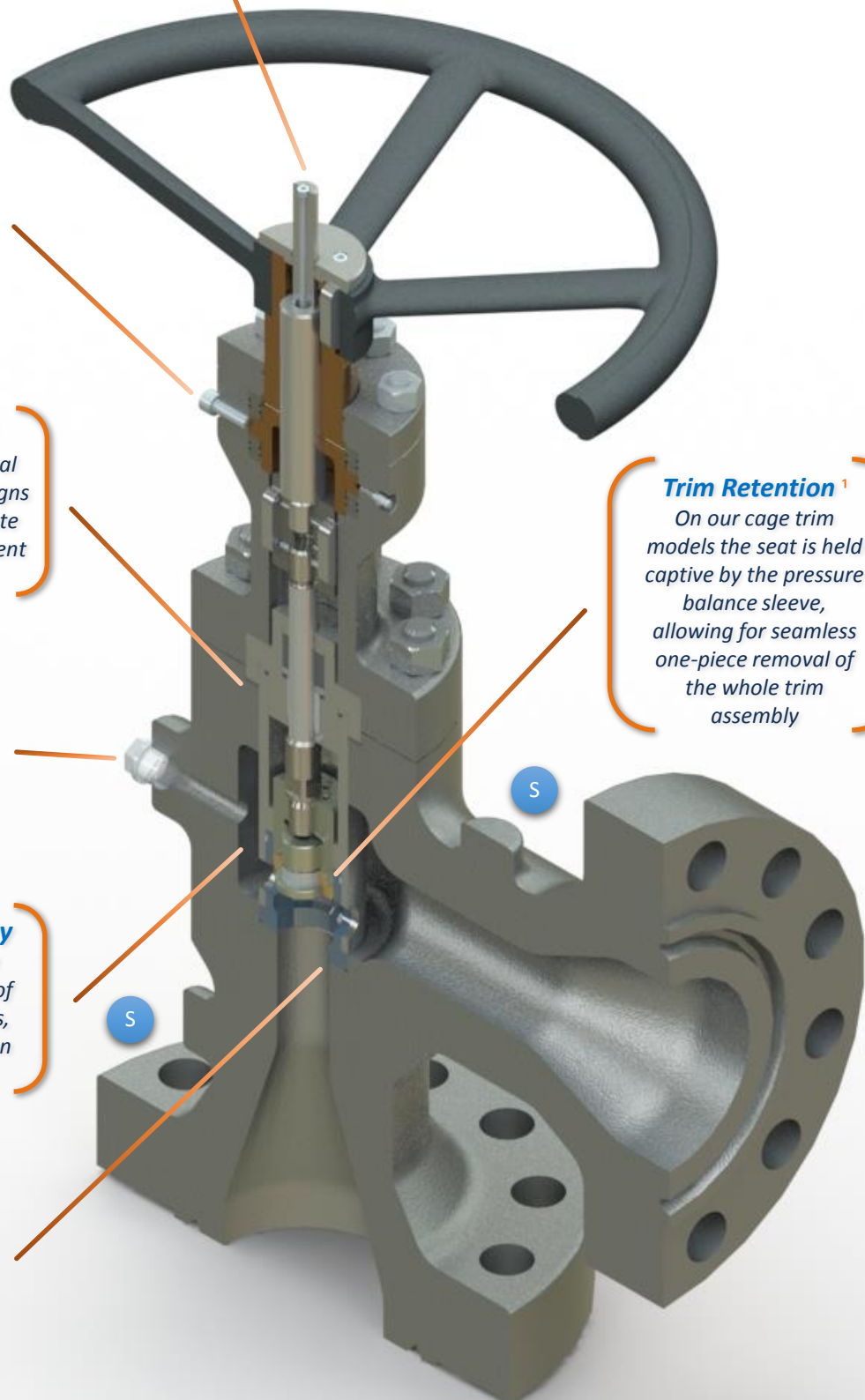
Streamlined gallery reduces the velocity of the incoming process, reducing body erosion by a factor of four

## Floating Seat

Our innovative 'floating seat' design allows for quick & easy removal of the trim without the need for special tools or equipment

## Trim Retention<sup>1</sup>

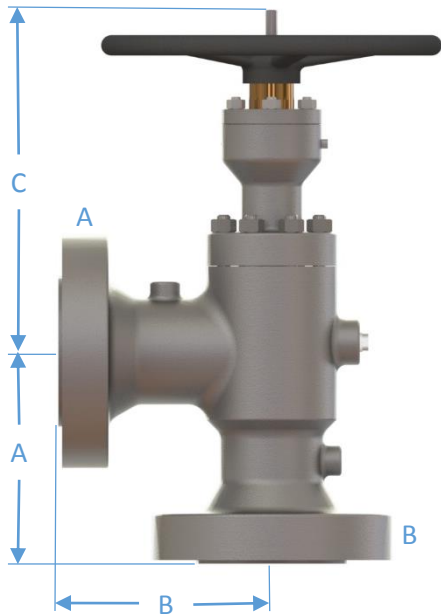
On our cage trim models the seat is held captive by the pressure balance sleeve, allowing for seamless one-piece removal of the whole trim assembly



<sup>1</sup> „Trim Retention“ is available on our 70FK, 70NV, 70KS, 70HS, and 70EC models.



# ASME Angle Choke Valve Dimensions



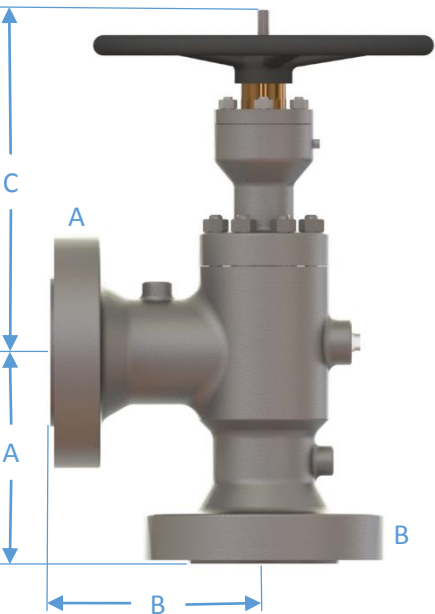
ASME RF Flanged Angle Choke Valve Dimensions <sup>12</sup>							
Trim	Model (A x B)	„A“ (mm) <sup>3</sup>	„B“ (mm) <sup>3</sup>	„C“ (mm)	„C <sub>Mo</sub> “ (mm) <sup>4</sup>	Weight (Kg) <sup>5</sup>	Max. C <sub>v</sub> <sup>6</sup>
1/8 (3)	2" x 2"-600#	9,88 (251)	7,77 (197)	14,76 (375)	22,24 (565)	55 (25)	0,3
	3" x 3"-600#	9,66 (245)	7,72 (196)	17,13 (435)	25,59 (650)	110 (50)	
	2" x 2"-900#	10,41 (264)	8,22 (209)	17,90 (455)	26,97 (685)	120 (55)	
	3" x 3"-900#		8,47 (215)			130 (60)	
	2" x 2"-1500#	9,88 (251)	7,77 (197)	25,00 (635)	31,30 (795)	120 (55)	
	3" x 3"-1500#	11,00 (280)	9,06 (230)	25,59 (650)	32,09 (815)	165 (75)	
	2" x 2"-2500#	11,44 (291)		31,50 (660)	32,48 (825)		
	3" x 3"-2500#	13,00 (330)	11,06 (281)	27,56 (700)	41,34 (1050)	220 (100)	
1/4 (6)	2" x 2"-600#	9,88 (251)	7,77 (197)	14,76 (375)	22,24 (565)	55 (25)	1,5
	3" x 3"-600#	9,66 (245)	7,72 (196)	17,13 (435)	25,59 (650)	110 (50)	
	4" x 4"-600#	17,32 (439)	9,16 (232)	32,68 (830)	40,94 (1040)	200 (90)	
	2" x 2"-900#	10,41 (264)	8,22 (209)	17,90 (455)	26,97 (685)	120 (55)	
	3" x 3"-900#		8,47 (215)			130 (60)	
	4" x 4"-900#	17,82 (452)	9,66 (245)	33,07 (840)	41,34 (1050)	220 (100)	
	2" x 2"-1500#	9,88 (251)	7,77 (197)	25,00 (635)	31,30 (795)	120 (55)	
	3" x 3"-1500#	11,00 (280)	9,06 (230)	25,59 (650)	32,09 (815)	165 (75)	
	4" x 4"-1500#	18,17 (460)	10,01 (254)	33,46 (850)	41,93 (1065)	265 (120)	
	2" x 2"-2500#	11,44 (291)	9,25 (230)	31,50 (660)	32,48 (825)	165 (75)	
	3" x 3"-2500#	13,00 (330)	11,06 (281)	27,56 (700)	41,34 (1050)	220 (100)	
	4" x 4"-2500#	20,76 (526)	12,63 (320)	36,02 (915)	45,28 (1150)	440 (200)	
1/2 (12)	2" x 2"-600#	9,88 (251)	7,77 (197)	14,76 (375)	22,24 (565)	55 (25)	5,5
	3" x 3"-600#	9,66 (245)	7,72 (196)	17,13 (435)	25,59 (650)	110 (50)	

ASME RF Flanged Angle Choke Valve Dimensions <sup>12</sup>							
Trim	Model (A x B)	„A“ (mm) <sup>3</sup>	„B“ (mm) <sup>3</sup>	„C“ (mm)	„C <sub>mo</sub> “ (mm) <sup>4</sup>	Weight (Kg) <sup>5</sup>	Max. C <sub>v</sub> <sup>6</sup>
1/2 (12)	4" x 4"-600#	17,32 (439)	9,16 (232)	32,7 (830)	40,9 (1040)	200 (90)	5,5
	6" x 6"-600#	23,28 (591)	18,40 (467)	43,9 (1115)	54,9 (1395)	430 (195)	
	2" x 2"-900#	10,41 (264)	8,22 (209)	17,9 (455)	27,0 (685)	120 (55)	
	3" x 3"-900#		8,47 (215)			130 (60)	
	4" x 4"-900#	17,82 (452)	9,66 (245)	33,1 (840)	41,3 (1050)	220 (100)	
	6" x 6"-900#	24,16 (613)	19,28 (489)	45,9 (1165)	57,5 (1460)	465 (210)	
	2" x 2"-1500#	9,88 (251)	7,77 (197)	25,0 (635)	31,3 (795)	120 (55)	
	3" x 3"-1500#	11,00 (280)	9,06 (230)	25,6 (650)	32,1 (815)	165 (75)	
	4" x 4"-1500#	18,17 (460)	10,01 (254)	33,5 (850)	41,9 (1065)	265 (120)	
	6" x 6"-1500#	25,38 (643)	20,50 (519)	66,9 (1700)	83,7 (2125)	530 (240)	
	2" x 2"-2500#	11,44 (291)	9,25 (230)	31,5 (660)	32,5 (825)	165 (75)	
	3" x 3"-2500#	13,00 (330)	11,06 (281)	27,6 (700)	41,3 (1050)	220 (100)	
	4" x 4"-2500#	20,76 (526)	12,63 (320)	36,0 (915)	45,3 (1150)	440 (200)	
	6" x 6"-2500#	29,38 (744)	24,50 (620)	49,8 (1265)	62,4 (1585)	880 (400)	
3/8 (16)	2" x 2"-600#	9,88 (251)	7,77 (197)	14,8 (375)	22,2 (565)	55 (25)	10,5
	3" x 3"-600#	9,66 (245)	7,72 (196)	17,1 (435)	25,6 (650)	110 (50)	
	4" x 4"-600#	17,32 (439)	9,16 (232)	32,7 (830)	40,9 (1040)	200 (90)	
	6" x 6"-600#	23,28 (591)	18,40 (467)	43,9 (1115)	54,9 (1395)	430 (195)	
	2" x 2"-900#	10,41 (264)	8,22 (209)	17,9 (455)	27,0 (685)	120 (55)	
	3" x 3"-900#		8,47 (215)			130 (60)	
	4" x 4"-900#	17,82 (452)	9,66 (245)	33,1 (840)	41,3 (1050)	220 (100)	
	6" x 6"-900#	24,16 (613)	19,28 (489)	45,9 (1165)	57,5 (1460)	465 (210)	

- Additional sizes, connections, and configurations are available upon request; dimensions are subject to change.
- Threaded, BWE, RF, RTJ, API, BX, and PE connections are available for all sizes and configurations.
- ASME RF flanged dimensions are shown. Threaded, BWE, RTJ and ISO flanged dimensions are available upon request.
- „C<sub>mo</sub>“ dimension is the same as the „C“ dimension shown on the drawing, with the addition of a pneumatic actuator.
- Weights are based on a standard choke with out actuator(s), weights may vary based on trims and options selected.
- C<sub>v</sub> Values given are subject to variation based upon valve end connections, trim selection, wear sleeves, and other options.



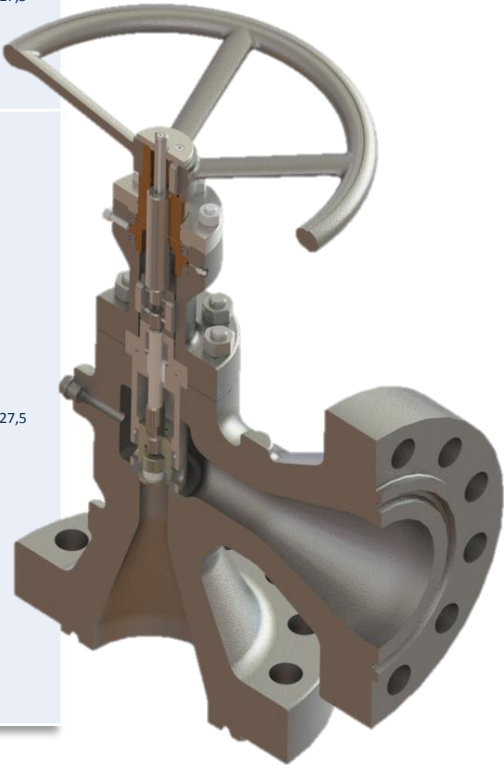
# ASME Angle Choke Valve Dimensions



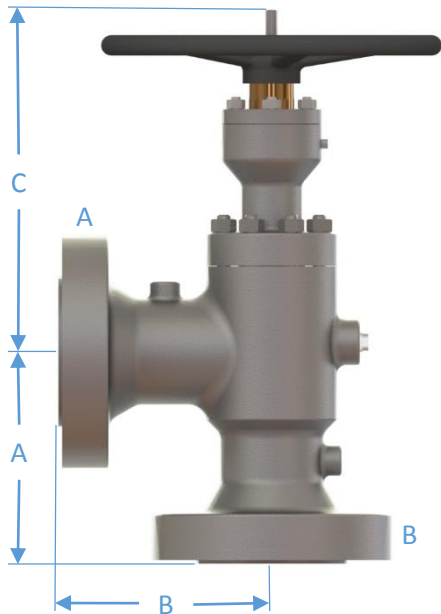
ASME RF Flanged Angle Choke Valve Dimensions <sup>12</sup>							
Trim	Model (A x B)	„A“ (mm) <sup>3</sup>	„B“ (mm) <sup>3</sup>	„C“ (mm)	„C <sub>mo</sub> “ (mm) <sup>4</sup>	Weight (Kg) <sup>5</sup>	Max. C <sub>v</sub> <sup>6</sup>
3/8 (16)	2" x 2"-1500#	9,88 (251)	7,77 (197)	25,0 (635)	31,3 (795)	120 (55)	10,5
	3" x 3"-1500#	11,00 (280)	9,06 (230)	25,6 (650)	32,1 (815)	165 (75)	
	4" x 4"-1500#	18,17 (460)	10,01 (254)	33,5 (850)	41,9 (1065)	265 (120)	
	6" x 6"-1500#	25,38 (643)	20,50 (519)	66,9 (1700)	83,7 (2125)	530 (240)	
	2" x 2"-2500#	11,44 (291)	9,25 (230)	31,5 (660)	32,5 (825)	165 (75)	
	3" x 3"-2500#	13,00 (330)	11,06 (281)	27,6 (700)	41,3 (1050)	220 (100)	
3/4 (19)	4" x 4"-2500#	20,76 (526)	12,63 (320)	36,0 (915)	45,3 (1150)	440 (200)	15,0
	3" x 3"-600#	9,66 (245)	7,72 (196)	17,1 (435)	25,6 (650)	110 (50)	
	4" x 4"-600#	17,32 (439)	9,16 (232)	32,7 (830)	40,9 (1040)	200 (90)	
	6" x 6"-600#	23,28 (591)	18,40 (467)	43,9 (1115)	54,9 (1395)	430 (195)	
	3" x 3"-900#	10,41 (264)	8,47 (215)	17,9 (455)	27,0 (685)	130 (60)	
	4" x 4"-900#	17,82 (452)	9,66 (245)	33,1 (840)	41,3 (1050)	220 (100)	
	6" x 6"-900#	24,16 (613)	19,28 (489)	45,9 (1165)	57,5 (1460)	465 (210)	
	2" x 2"-1500#	9,88 (251)	7,77 (197)	25,0 (635)	31,3 (795)	120 (55)	
	3" x 3"-1500#	11,00 (280)	9,06 (230)	25,6 (650)	32,1 (815)	165 (75)	
	4" x 4"-1500#	18,17 (460)	10,01 (254)	33,5 (850)	41,9 (1065)	265 (120)	
	6" x 6"-1500#	25,38 (643)	20,50 (519)	66,9 (1700)	83,7 (2125)	530 (240)	
	3" x 3"-2500#	13,00 (330)	11,06 (281)	27,6 (700)	41,3 (1050)	220 (100)	
7/8 (22)	4" x 4"-2500#	20,76 (526)	12,63 (320)	36,0 (915)	45,3 (1150)	440 (200)	17,5
	6" x 6"-2500#	29,38 (744)	24,50 (620)	49,8 (1265)	62,4 (1585)	880 (400)	
	3" x 3"-600#	9,66 (245)	7,72 (196)	17,1 (435)	25,6 (650)	110 (50)	
	4" x 4"-600#	17,32 (439)	9,16 (232)	32,7 (830)	40,9 (1040)	200 (90)	

ASME RF Flanged Angle Choke Valve Dimensions <sup>12</sup>								
Trim	Model (A x B)	„A“ (mm) <sup>3</sup>	„B“ (mm) <sup>3</sup>	„C“ (mm)	„C <sub>mo</sub> “ (mm) <sup>4</sup>	Weight (Kg) <sup>5</sup>	Max. C <sub>v</sub> <sup>6</sup>	
¾ (22)	3" x 3"-900#	10,41 (264)	8,47 (215)	17,9 (455)	27,0 (685)	130 (60)	17,5 	
	4" x 4"-900#	17,82 (452)	9,66 (245)	33,1 (840)	41,3 (1050)	220 (100)		
	3" x 3"-1500#	11,00 (280)	9,06 (230)	25,6 (650)	32,1 (815)	165 (75)		
	4" x 4"-1500#	18,17 (460)	10,01 (254)	33,5 (850)	41,9 (1065)	265 (120)		
	3" x 3"-2500#	13,00 (330)	11,06 (281)	27,6 (700)	41,3 (1050)	220 (100)		
	4" x 4"-2500#	20,76 (526)	12,63 (320)	36,0 (915)	45,3 (1150)	440 (200)		
1,00 (25)	2" x 2"-600#	9,88 (251)	7,77 (197)	14,8 (375)	22,2 (565)	55 (25)	27,5 	
	3" x 3"-600#	9,66 (245)	7,72 (196)	17,1 (435)	25,6 (650)	110 (50)		
	4" x 4"-600#	17,32 (439)	9,16 (232)	32,7 (830)	40,9 (1040)	200 (90)		
	6" x 6"-600#	23,28 (591)	18,40 (467)	43,9 (1115)	54,9 (1395)	430 (195)		
	8" x 8"-600#	32,88 (835)	21,88 (555)	55,5 (1410)	69,3 (1760)	995 (450)		
	2" x 2"-900#	10,41 (264)	8,22 (209)	17,9 (455)	27,0 (685)	120 (55)		
	3" x 3"-900#		8,47 (215)			130 (60)		
	4" x 4"-900#	17,82 (452)	9,66 (245)	33,1 (840)	41,3 (1050)	220 (100)		
	6" x 6"-900#	24,16 (613)	19,28 (489)	45,9 (1165)	57,5 (1460)	465 (210)		
	8" x 8"-900#	34,01 (863)	23,03 (584)	56,5 (1435)	70,7 (1795)	1100 (500)		
	1½" x 1½"-1500#	8,00 (203)	8,00 (203)	31,5 (800)	44,5 (1125)	350 (160)		
	1½" x 2"-1500#	8,75 (222)						
	2" x 2"-1500#	9,88 (251)	7,77 (197)	25,0 (635)	31,3 (795)	120 (55)		
	2" x 3"-1500#	9,38 (238)	8,75 (222)	31,5 (800)	44,5 (1125)	350 (160)		
	3" x 3"-1500#		9,38 (238)					
	4" x 4"-1500#	18,17 (460)	10,01 (254)	33,5 (850)	41,9 (1065)	400 (180)		

<sup>1</sup> Additional sizes, connections, and configurations are available upon request; dimensions are subject to change.  
<sup>2</sup> Threaded, BWE, RF, RTJ, API, BX, and PE connections are available for all sizes and configurations.  
<sup>3</sup> ASME RF flanged dimensions are shown. Threaded, BWE, RTJ and ISO flanged dimensions are available upon request.  
<sup>4</sup> „C<sub>mo</sub>“ dimension is the same as the „C“ dimension shown on the drawing, with the addition of a pneumatic actuator.  
<sup>5</sup> Weights are based on a standard choke with out actuator(s), weights may vary based on trims and options selected.  
<sup>6</sup> C<sub>v</sub> Values given are subject to variation based upon valve end connections, trim selection, wear sleeves, and other options.



# ASME Angle Choke Valve Dimensions



ASME RF Flanged Angle Choke Valve Dimensions <sup>12</sup>							
Trim	Model (A x B)	„A“ (mm) <sup>3</sup>	„B“ (mm) <sup>3</sup>	„C“ (mm)	„C <sub>mo</sub> “ (mm) <sup>4</sup>	Weight (Kg) <sup>5</sup>	Max. C <sub>v</sub> <sup>6</sup>
1,00 (25)	6" x 6"-1500#	25,38 (643)	20,50 (519)	66,9 (1700)	83,7 (2125)	665 (300)	27,5
	8" x 8"-1500#	36,01 (912)	25,01 (632)	58,5 (1485)	73,4 (1865)	1325 (600)	
	1½" x 1½"-2500#	9,13 (232)	9,13 (232)	31,5 (800)	44,5 (1125)	500 (225)	
	1½" x 2"-2500#	9,75 (248)					
	2" x 2"-2500#	9,75 (248)					
	2" x 3"-2500#		11,38 (289)				
	3" x 3"-2500#	11,38 (289)					
	4" x 4"-2500#	20,76 (526)	12,63 (320)	36,0 (915)	45,3 (1150)	705 (320)	
6" x 6"-2500#	29,38 (744)	24,50 (620)	49,8 (1265)	62,4 (1585)	880 (400)		
1,75 (45)	3" x 3"-1500#	10,12 (257)	10,12 (257)	59,0 (1500)	68,5 (1750)	635 (290)	75,0
	3" x 4"-1500#	10,38 (264)					
	4" x 4"-1500#	10,38 (264)					
	3" x 3"-2500#	12,12 (308)	850 (385)				
	3" x 4"-2500#	12,12 (308)					
	4" x 4"-2500#	13,00 (330)					
2,50 (65)	3" x 3"-1500#	11,00 (280)	9,06 (230)	33,5 (850)	41,9 (1065)	660 (300)	155,0
	4" x 4"-1500#	11,62 (295)	11,62 (295)	60,0 (1525)	70,0 (1800)	900 (405)	
	4" x 6"-1500#	13,50 (343)					
	6" x 6"-1500#	13,50 (343)					
	4" x 4"-2500#	14,25 (362)	14,25 (362)			1380 (625)	
	4" x 6"-2500#	17,50 (445)					
	6" x 6"-2500#						

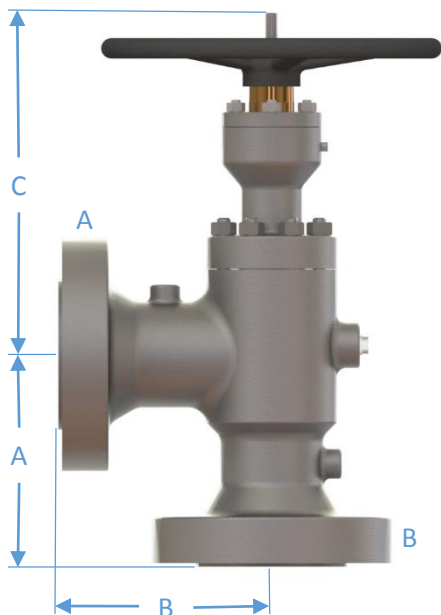
ASME RF Flanged Angle Choke Valve Dimensions <sup>12</sup>							
Trim	Model (A x B)	„A“ (mm) <sup>3</sup>	„B“ (mm) <sup>3</sup>	„C“ (mm)	„C <sub>MO</sub> “ (mm) <sup>4</sup>	Weight (Kg) <sup>5</sup>	Max. C <sub>v</sub> <sup>6</sup>
3,25 (85)	4" x 4"- 1500#	11,62 (295)	11,62 (295)	62,0 (1575)	73,0 (1850)	1080 (490)	240,0
	4" x 6"- 1500#	13,50 (343)					
	6" x 6"- 1500#	13,50 (343)	14,25 (362)				
	4" x 4"- 2500#	14,25 (362)					
	4" x 6"- 2500#	17,50 (445)	1700 (775)				
	6" x 6"- 2500#	17,50 (445)					
4,00 (100)	6" x 6"- 1500#	14,50 (368)	14,50 (368)	63,0 (1600)	75,0 (1900)	1565 (710)	300,0
	6" x 8"- 1500#	18,12 (460)					
	8" x 8"- 1500#	18,12 (460)	18,50 (470)				
	6" x 6"- 2500#	18,50 (470)				2465 (1120)	
	6" x 8"- 2500#	22,25 (565)	22,25 (565)				
	8" x 8"- 2500#	22,25 (565)					
5,00 (125)	6" x 6"- 1500#	16,50 (419)	16,50 (419)	65,0 (1650)	80,0 (2000)	2585 (1175)	490,0
	6" x 8"- 1500#	18,12 (460)					
	8" x 8"- 1500#	18,12 (460)	21,50 (546)				
	8" x 10"- 1500#	21,50 (546)					
	10" x 10"- 1500#	20,50 (521)	20,50 (521)				
	6" x 6"- 2500#	20,50 (521)				22,25 (565)	
	6" x 8"- 2500#	22,25 (565)	22,25 (565)				
	8" x 8"- 2500#	22,25 (565)				28,00 (711)	
	8" x 10"- 2500#	28,00 (711)	28,00 (711)				
	10" x 10"- 2500#	28,00 (711)					

- <sup>1</sup> Additional sizes, connections, and configurations are available upon request; dimensions are subject to change.
- <sup>2</sup> Threaded, BWE, RF, RTJ, API, BX, and PE connections are available for all sizes and configurations.
- <sup>3</sup> ASME RF flanged dimensions are shown. Threaded, BWE, RTJ and ISO flanged dimensions are available upon request.
- <sup>4</sup> „C<sub>MO</sub>“ dimension is the same as the „C“ dimension shown on the drawing, with the addition of a pneumatic actuator.
- <sup>5</sup> Weights are based on a standard choke with out actuator(s), weights may vary based on trims and options selected.
- <sup>6</sup> Cv Values given are subject to variation based upon valve end connections, trim selection, wear sleeves, and other options.





# API Angle Choke Valve Dimensions



API RF Flanged Angle Choke Valve Dimensions <sup>12</sup>							
Trim	Model (A x B)	„A“ (mm) <sup>3</sup>	„B“ (mm) <sup>3</sup>	„C“ (mm)	„C <sub>MO</sub> “ (mm) <sup>4</sup>	Weight (Kg) <sup>5</sup>	Max. Cv <sup>6</sup>
1/8 (3)	2 1/16" x 2 1/16" - 2000	9,94 (252)	7,83 (199)	14,8 (375)	22,2 (565)	55 (25)	0,3
	2 9/16" x 2 9/16" - 2000	9,60 (244)	7,41 (188)	31,5 (615)	36,4 (925)	100 (45)	
	3 1/8" x 3 1/8" - 2000	9,72 (247)	7,78 (197)			110 (50)	
	2 1/16" x 2 1/16" - 3000	9,94 (252)	7,83 (199)	14,8 (375)	22,2 (565)	90 (40)	
	2 9/16" x 2 9/16" - 3000	10,60 (269)	8,41 (213)	25,2 (640)	31,5 (800)	135 (60)	
	3 1/8" x 3 1/8" - 3000	10,47 (266)	8,53 (216)			145 (65)	
	2 1/16" x 2 1/16" - 5000	9,94 (252)	7,83 (199)	14,8 (375)	22,2 (565)	90 (40)	
	2 9/16" x 2 9/16" - 5000	10,57 (269)	8,38 (213)	25,2 (640)	31,5 (800)	135 (60)	
1/4 (6)	3 1/8" x 3 1/8" - 5000	11,07 (281)	9,13 (232)	25,6 (650)	32,1 (815)	165 (75)	1,5
	2 1/16" x 2 1/16" - 2000	9,94 (252)	7,83 (199)	14,8 (375)	22,2 (565)	55 (25)	
	2 9/16" x 2 9/16" - 2000	9,60 (244)	7,41 (188)	31,5 (615)	36,4 (925)	100 (45)	
	3 1/8" x 3 1/8" - 2000	9,72 (247)	7,78 (197)			110 (50)	
	4 1/16" x 4 1/16" - 2000	17,38 (440)	9,22 (234)	32,7 (830)	40,9 (1040)	200 (90)	
	2 1/16" x 2 1/16" - 3000	9,94 (252)	7,83 (199)	14,8 (375)	22,2 (565)	90 (40)	
	2 9/16" x 2 9/16" - 3000	10,60 (269)	8,41 (213)	25,2 (640)	31,5 (800)	135 (60)	
	3 1/8" x 3 1/8" - 3000	10,47 (266)	8,53 (216)			145 (65)	
	4 1/16" x 4 1/16" - 3000	17,88 (453)	9,72 (246)	33,3 (845)	41,7 (1060)	220 (100)	
	2 1/16" x 2 1/16" - 5000	9,94 (252)	7,83 (199)	14,8 (375)	22,2 (565)	90 (40)	
	2 9/16" x 2 9/16" - 5000	10,57 (269)	8,38 (213)	25,2 (640)	31,5 (800)	135 (60)	
	3 1/8" x 3 1/8" - 5000	11,07 (281)	9,13 (232)	25,6 (650)	32,1 (815)	165 (75)	
	4 1/16" x 4 1/16" - 5000	18,24 (462)	10,07 (255)	33,5 (850)	41,7 (1060)	265 (120)	
	2 1/16" x 2 1/16" - 2000	9,35 (237)	7,16 (182)	23,8 (605)	29,9 (760)	100 (45)	5,5

API RF Flanged Angle Choke Valve Dimensions <sup>12</sup>							
Trim	Model (A x B)	„A“ (mm) <sup>3</sup>	„B“ (mm) <sup>3</sup>	„C“ (mm)	„C <sub>MO</sub> “ (mm) <sup>4</sup>	Weight (Kg) <sup>5</sup>	Max. Cv <sup>6</sup>
1/2 (12)	2 9/16" x 2 9/16" - 2000	9,60 (244)	7,41 (188)	31,5 (615)	36,4 (925)	100 (45)	5,5
	3 1/8" x 3 1/8" - 2000	9,72 (247)	7,78 (197)	31,5 (615)	36,4 (925)	110 (50)	
	4 1/16" x 4 1/16" - 2000	17,38 (440)	9,22 (234)	32,7 (830)	40,9 (1040)	200 (90)	
	2 1/16" x 2 1/16" - 3000	10,47 (266)	8,28 (210)	25,0 (635)	31,3 (795)	120 (55)	
	2 9/16" x 2 9/16" - 3000	10,60 (269)	8,41 (213)	25,2 (640)	31,5 (800)	135 (60)	
	3 1/8" x 3 1/8" - 3000	10,47 (266)	8,53 (216)			145 (65)	
	4 1/16" x 4 1/16" - 3000	17,88 (453)	9,72 (246)	33,3 (845)	41,7 (1060)	220 (100)	
	2 1/16" x 2 1/16" - 5000	10,47 (266)	8,28 (210)	25,0 (635)	31,3 (795)	120 (55)	
	2 9/16" x 2 9/16" - 5000	10,57 (269)	8,38 (213)	25,2 (640)	31,5 (800)	135 (60)	
	3 1/8" x 3 1/8" - 5000	11,07 (281)	9,13 (232)	25,6 (650)	32,1 (815)	165 (75)	
3/8 (16)	4 1/16" x 4 1/16" - 5000	18,24 (462)	10,07 (255)	33,5 (850)	41,7 (1060)	265 (120)	10,5
	2 9/16" x 2 9/16" - 2000	9,60 (244)	7,41 (188)	31,5 (615)	36,4 (925)	100 (45)	
	3 1/8" x 3 1/8" - 2000	9,72 (247)	7,78 (197)			110 (50)	
	4 1/16" x 4 1/16" - 2000	17,38 (440)	9,22 (234)	32,7 (830)	40,9 (1040)	200 (90)	
	2 1/16" x 2 1/16" - 3000	10,47 (266)	8,28 (210)	25,0 (635)	31,3 (795)	120 (55)	
	2 9/16" x 2 9/16" - 3000	10,60 (269)	8,41 (213)	25,2 (640)	31,5 (800)	135 (60)	
	3 1/8" x 3 1/8" - 3000	10,47 (266)	8,53 (216)			145 (65)	
	4 1/16" x 4 1/16" - 3000	17,88 (453)	9,72 (246)	33,3 (845)	41,7 (1060)	220 (100)	
	2 1/16" x 2 1/16" - 5000	10,47 (266)	8,28 (210)	25,0 (635)	31,3 (795)	120 (55)	
	2 9/16" x 2 9/16" - 5000	10,57 (269)	8,38 (213)	25,2 (640)	31,5 (800)	135 (60)	
	3 1/8" x 3 1/8" - 5000	11,07 (281)	9,13 (232)	25,6 (650)	32,1 (815)	165 (75)	
	4 1/16" x 4 1/16" - 5000	18,24 (462)	10,07 (255)	33,5 (850)	41,7 (1060)	265 (120)	

<sup>1</sup> Additional sizes, connections, and configurations are available upon request; dimensions are subject to change.

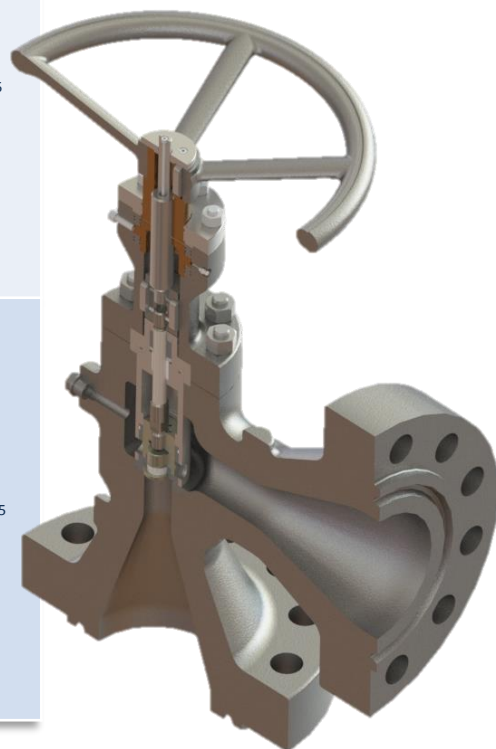
<sup>2</sup> Threaded, BWE, RF, RTJ, API, BX, and PE connections are available for all sizes and configurations.

<sup>3</sup> ASME RF flanged dimensions are shown. Threaded, BWE, RTJ and ISO flanged dimensions are available upon request.

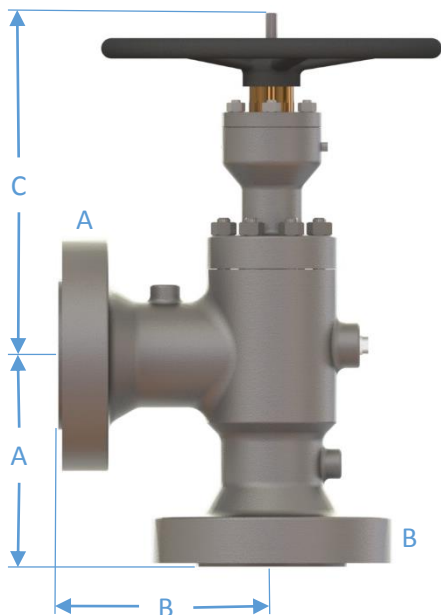
<sup>4</sup> „C<sub>MO</sub>“ dimension is the same as the „C“ dimension shown on the drawing, with the addition of a pneumatic actuator.

<sup>5</sup> Weights are based on a standard choke with out actuator(s), weights may vary based on trims and options selected.

<sup>6</sup> Cv Values given are subject to variation based upon valve end connections, trim selection, wear sleeves, and other options.



# API Angle Choke Valve Dimensions



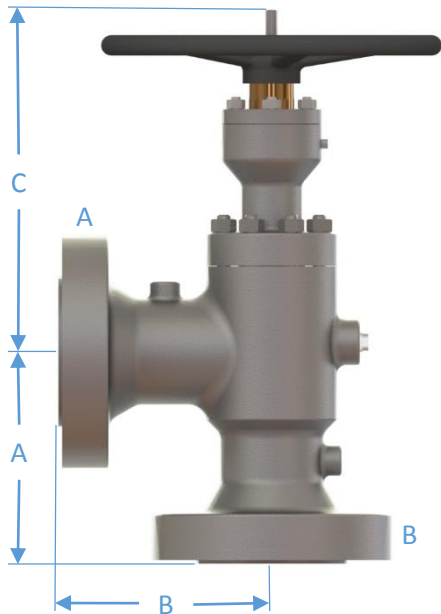
API RF Flanged Angle Choke Valve Dimensions <sup>12</sup>							
Trim	Model (A x B)	„A“ (mm) <sup>3</sup>	„B“ (mm) <sup>3</sup>	„C“ (mm)	„C <sub>90°</sub> “ (mm) <sup>4</sup>	Weight (Kg) <sup>5</sup>	Max. C <sub>v</sub> <sup>6</sup>
3/4 (19)	2 9/16" x 2 9/16"- 2000	9,60 (244)	7,41 (188)	31,5 (615)	36,4 (925)	100 (45)	15,0
	3 1/8" x 3 1/8"- 2000	9,72 (247)	7,78 (197)			110 (50)	
	4 1/16" x 4 1/16"- 2000	17,38 (440)	9,22 (234)	32,7 (830)	40,9 (1040)	200 (90)	
	2 1/16" x 2 1/16"- 3000	10,47 (266)	8,28 (210)	25,0 (635)	31,3 (795)	120 (55)	
	2 9/16" x 2 9/16"- 3000	10,60 (269)	8,41 (213)	25,2 (640)	31,5 (800)	135 (60)	
	3 1/8" x 3 1/8"- 3000	10,47 (266)	8,53 (216)			145 (65)	
	4 1/16" x 4 1/16"- 3000	17,88 (453)	9,72 (246)	33,3 (845)	41,7 (1060)	220 (100)	
	2 1/16" x 2 1/16"- 5000	10,47 (266)	8,28 (210)	25,0 (635)	31,3 (795)	120 (55)	
	2 9/16" x 2 9/16"- 5000	10,57 (269)	8,38 (213)	25,2 (640)	31,5 (800)	135 (60)	
	3 1/8" x 3 1/8"- 5000	11,07 (281)	9,13 (232)	25,6 (650)	32,1 (815)	165 (75)	
7/8 (22)	4 1/16" x 4 1/16"- 5000	18,24 (462)	10,07 (255)	33,5 (850)	41,7 (1060)	265 (120)	17,5
	2 9/16" x 2 9/16"- 2000	9,60 (244)	7,41 (188)	31,5 (615)	36,4 (925)	100 (45)	
	3 1/8" x 3 1/8"- 2000	12,66 (321)	8,47 (215)	28,0 (710)	35,0 (890)	145 (65)	
	4 1/16" x 4 1/16"- 2000	17,28 (438)	12,40 (315)	37,8 (960)	47,2 (1200)	420 (190)	
	2 1/16" x 2 1/16"- 3000	10,47 (266)	8,28 (210)	25,0 (635)	31,3 (795)	120 (55)	
	2 9/16" x 2 9/16"- 3000	10,60 (269)	8,41 (213)	25,2 (640)	31,5 (800)	135 (60)	
	3 1/8" x 3 1/8"- 3000	13,41 (340)	9,22 (234)	28,7 (730)	36,0 (915)	175 (80)	
	4 1/16" x 4 1/16"- 3000	17,78 (451)	12,90 (327)	38,4 (975)	48,0 (1220)	440 (200)	
	2 1/16" x 2 1/16"- 5000	10,47 (266)	8,28 (210)	25,0 (635)	31,3 (795)	120 (55)	
	2 9/16" x 2 9/16"- 5000	10,57 (269)	8,38 (213)	25,2 (640)	31,5 (800)	135 (60)	
	3 1/8" x 3 1/8"- 5000	14,01 (354)	9,82 (249)	29,3 (745)	36,8 (935)	210 (95)	
	4 1/16" x 4 1/16"- 5000	18,13 (460)	13,25 (336)	38,6 (980)	48,2 (1225)	540 (245)	

API RF Flanged Angle Choke Valve Dimensions <sup>12</sup>							
Trim	Model (A x B)	„A“ (mm) <sup>3</sup>	„B“ (mm) <sup>3</sup>	„C“ (mm)	„C <sub>90°</sub> “ (mm) <sup>4</sup>	Weight (Kg) <sup>5</sup>	Max. C <sub>v</sub> <sup>6</sup>
1,00 (25)	4 1⁄16" x 4 1⁄16"- 2000	17,28 (438)	12,40 (315)	37,8 (960)	47,2 (1200)	420 (190)	27,5
	2 9⁄16" x 2 9⁄16"- 3000	10,60 (269)	8,41 (213)	25,2 (640)	31,5 (800)	135 (60)	
	3 1⁄8" x 3 1⁄8"- 3000	13,41 (340)	9,22 (234)	28,7 (730)	36,0 (915)	175 (80)	
	4 1⁄16" x 4 1⁄16"- 3000	17,78 (451)	12,90 (327)	38,4 (975)	48,0 (1220)	440 (200)	
	2 1⁄16" x 2 1⁄16"- 5000	8,81 (224)	8,81 (224)	31,5 (800)	44,5 (1130)	350 (160)	
	2 1⁄16" x 2 9⁄16"- 5000	8,94 (227)					
	2 9⁄16" x 2 9⁄16"- 5000	9,44 (240)	8,94 (227)				
	2 9⁄16" x 3 1⁄8"- 5000		9,44 (240)				
	3 1⁄8" x 3 1⁄8"- 5000	9,44 (240)	9,44 (240)				
	4 1⁄16" x 4 1⁄16"- 5000	18,13 (460)	13,25 (336)	38,6 (980)	48,2 (1225)	540 (245)	
	1 13⁄16" x 1 13⁄16"- 10000	8,25 (210)	8,25 (210)	57,5 (1460)	70,0 (1775)	425 (195)	
	1 13⁄16" x 2 1⁄16"- 10000	8,81 (224)					
	2 1⁄16" x 2 1⁄16"- 10000	8,81 (224)	9,38 (238)				
	2 1⁄16" x 2 9⁄16"- 10000						
	2 9⁄16" x 2 9⁄16"- 10000	9,38 (238)					
	2 9⁄16" x 3 1⁄16"- 10000						
	3 1⁄16" x 3 1⁄16"- 10000	10,75 (273)					
1,75 (45)	2 9⁄16" x 2 9⁄16"- 5000	9,69 (246)	9,69 (246)	58,0 (1475)	75,0 (1900)	650 (295)	75,0
	2 9⁄16" x 3 1⁄8"- 5000	10,19 (259)					
	3 1⁄8" x 3 1⁄8"- 5000	10,19 (259)					
	3 1⁄8" x 4 1⁄16"- 5000						
	4 1⁄16" x 4 1⁄16"- 5000	10,44 (265)	10,44 (265)				

- <sup>1</sup> Additional sizes, connections, and configurations are available upon request; dimensions are subject to change.
- <sup>2</sup> Threaded, BWE, RF, RTJ, API, BX, and PE connections are available for all sizes and configurations.
- <sup>3</sup> ASME RF flanged dimensions are shown. Threaded, BWE, RTJ and ISO flanged dimensions are available upon request.
- <sup>4</sup> „C<sub>90°</sub>“ dimension is the same as the „C“ dimension shown on the drawing, with the addition of a pneumatic actuator.
- <sup>5</sup> Weights are based on a standard choke with out actuator(s), weights may vary based on trims and options selected.
- <sup>6</sup> C<sub>v</sub> Values given are subject to variation based upon valve end connections, trim selection, wear sleeves, and other options.



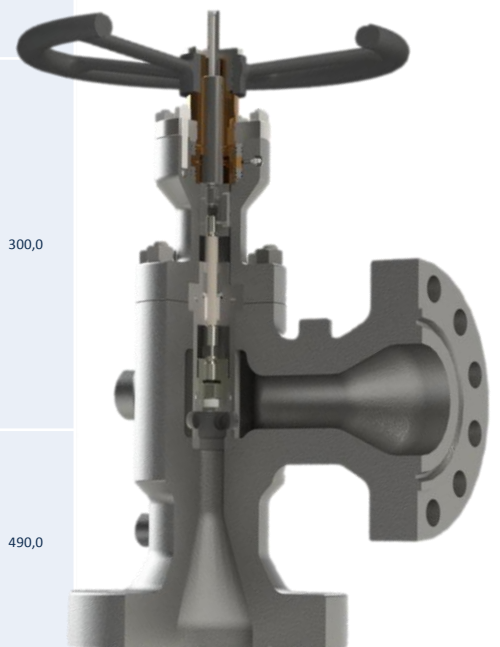
# API Angle Choke Valve Dimensions



API RF Flanged Angle Choke Valve Dimensions <sup>12</sup>							
Trim	Model (A x B)	„A“ (mm) <sup>3</sup>	„B“ (mm) <sup>3</sup>	„C“ (mm)	„C <sub>MO</sub> “ (mm) <sup>4</sup>	Weight (Kg) <sup>5</sup>	Max. C <sub>v</sub> <sup>6</sup>
1,75 (45)	4 1⁄16" x 4 1⁄16" - 5000	10,44 (265)		58,0 (1475)	75,0 (1900)	650 (295)	75,0
	2 9⁄16" x 2 9⁄16" - 10000	11,38 (289)	11,38 (289)	59,0 (1500)	80,0 (2030)	770 (350)	
	2 9⁄16" x 3 1⁄16" - 10000	12,00 (305)					
	3 1⁄16" x 3 1⁄16" - 10000	12,00 (305)					
	3 1⁄16" x 4 1⁄16" - 10000		13,00 (330)				
	4 1⁄16" x 4 1⁄16" - 10000	13,00 (330)					
2,50 (65)	3 1⁄8" x 3 1⁄8" - 5000	10,19 (259)	10,19 (259)	60,0 (1525)	75,0 (1900)	850 (385)	155,0
	3 1⁄8" x 4 1⁄16" - 5000	11,69 (297)	10,19 (259)				
	3 1⁄8" x 3 1⁄8" - 5000	10,19 (259)					
	3 1⁄8" x 4 1⁄16" - 5000	11,69 (297)	11,69 (297)				
	4 1⁄16" x 4 1⁄16" - 5000	12,94 (329)					
	4 1⁄16" x 5 1⁄8" - 5000		12,94 (329)				
	5 1⁄8" x 5 1⁄8" - 5000	12,00 (305)	12,00 (305)				
	3 1⁄16" x 3 1⁄16" - 10000	13,00 (330)			13,00 (330)		
	3 1⁄16" x 4 1⁄16" - 10000	14,81 (376)					
	4 1⁄16" x 4 1⁄16" - 10000		14,81 (376)				
	4 1⁄16" x 5 1⁄8" - 10000	14,81 (376)					
	5 1⁄8" x 5 1⁄8" - 10000						
3,25 (85)	4 1⁄16" x 4 1⁄16" - 5000	11,69 (297)	11,69 (297)	62,0 (1575)	85,0 (2160)	1000 (455)	240,0
	4 1⁄16" x 5 1⁄8" - 5000	12,94 (329)	12,94 (329)				
	5 1⁄8" x 5 1⁄8" - 5000	13,62 (346)					
	5 1⁄8" x 7 1⁄16" - 5000						

API RF Flanged Angle Choke Valve Dimensions <sup>12</sup>								
Trim	Model (A x B)	„A“ (mm) <sup>3</sup>	„B“ (mm) <sup>3</sup>	„C“ (mm)	„C <sub>MO</sub> “ (mm) <sup>4</sup>	Weight (Kg) <sup>5</sup>	Max. C <sub>v</sub> <sup>6</sup>	
3,25 (85)	7 1⁄16" x 7 1⁄16"- 5000	13,62 (346)		62,0 (1575)	85,0 (2160)	1000 (455)	240,0	
	4 1⁄16" x 4 1⁄16"- 10000	14,00 (356)	14,00 (356)		90,0 (2285)	1700 (770)		
	4 1⁄16" x 5 1⁄8"- 10000	14,81 (376)	14,81 (376)					
	5 1⁄8" x 5 1⁄8"- 10000	14,81 (376)	14,81 (376)					
	5 1⁄8" x 7 1⁄16"- 10000	18,75 (476)	18,75 (476)					
	7 1⁄16" x 7 1⁄16"- 10000	18,75 (476)	18,75 (476)					
4,00 (100)	5 1⁄8" x 5 1⁄8"- 5000	13,94 (354)	13,94 (354)	65,0 (1650)	100,0 (2540)	350 (160)	300,0	
	5 1⁄8" x 7 1⁄16"- 5000	14,62 (371)	14,62 (371)					
	7 1⁄16" x 7 1⁄16"- 5000	14,62 (371)	14,62 (371)					
	7 1⁄16" x 9"- 5000	18,31 (465)	18,31 (465)					
	9" x 9"- 5000	18,31 (465)	18,31 (465)					
	5 1⁄8" x 5 1⁄8"- 10000	14,74 (374)	14,74 (374)		425 (195)	650 (295)		
	5 1⁄8" x 7 1⁄16"- 10000	16,18 (411)	16,18 (411)					
	7 1⁄16" x 7 1⁄16"- 10000	16,18 (411)	16,18 (411)					
	7 1⁄16" x 9"- 10000	20,38 (518)	20,38 (518)					
5,00 (125)	7 1⁄16" x 7 1⁄16"- 5000	16,62 (422)	16,62 (422)	72,0 (1830)	120,0 (3050)	650 (295)	490,0	
	7 1⁄16" x 9"- 5000	18,31 (465)	18,31 (465)					
	9" x 9"- 5000	18,31 (465)	18,31 (465)					
	7 1⁄16" x 7 1⁄16"- 10000	18,18 (462)	18,18 (462)					
	7 1⁄16" x 9"- 10000	20,38 (518)	20,38 (518)					
	9" x 9"- 10000	20,38 (518)	20,38 (518)					

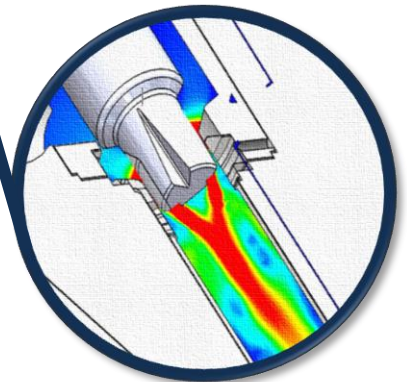
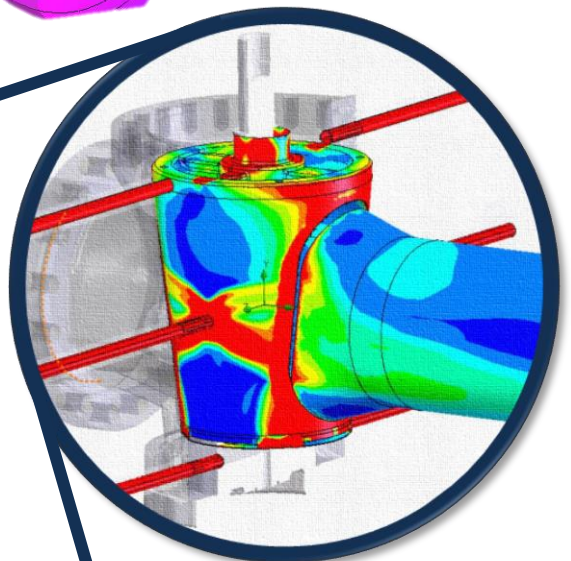
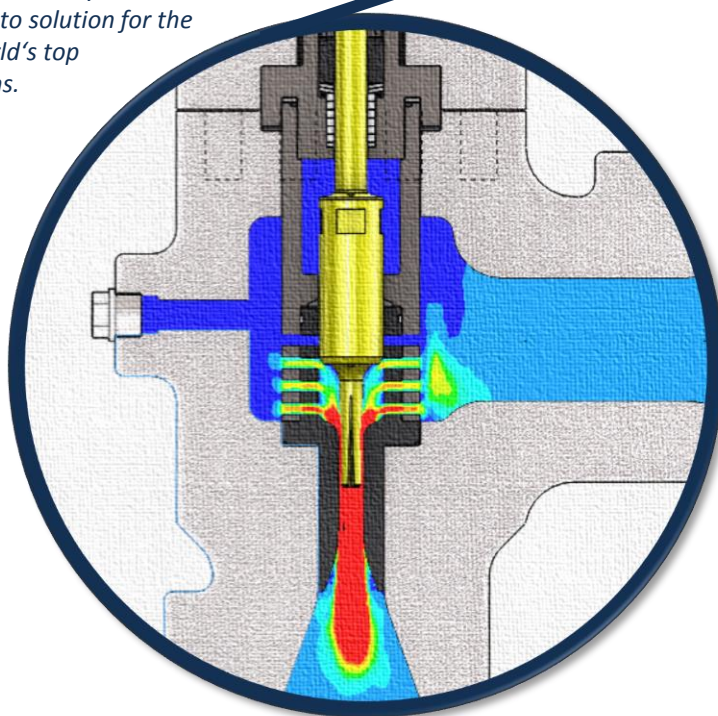
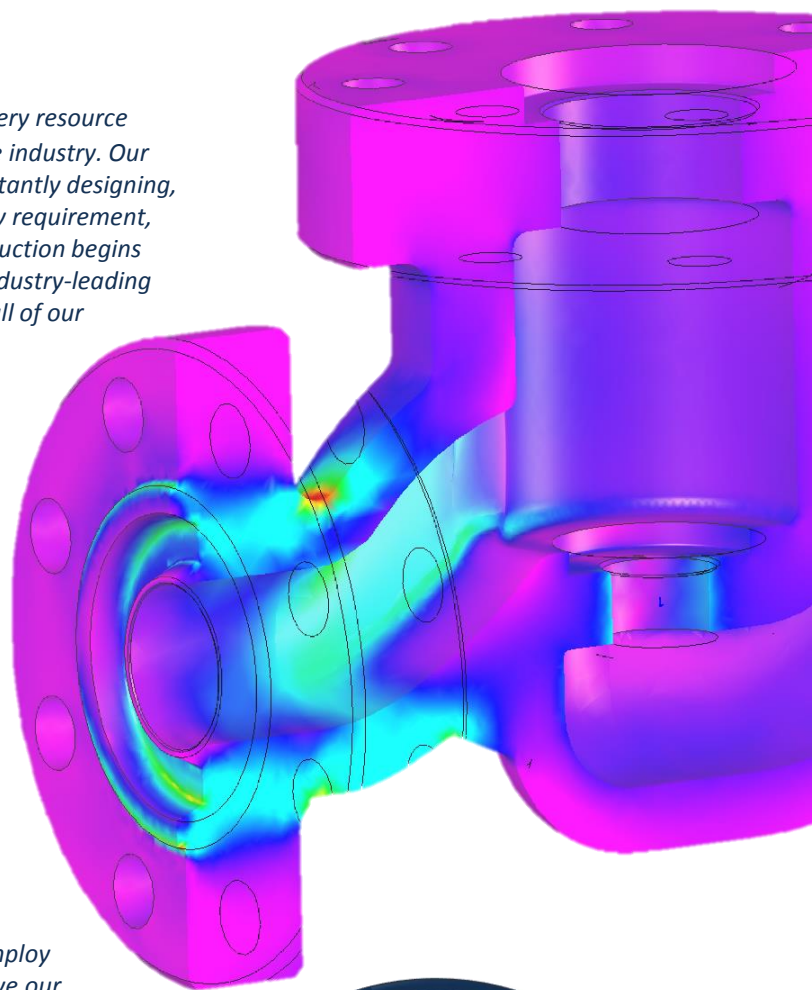
- <sup>1</sup> Additional sizes, connections, and configurations are available upon request; dimensions are subject to change.
- <sup>2</sup> Threaded, BWE, RF, RTJ, API, BX, and PE connections are available for all sizes and configurations.
- <sup>3</sup> ASME RF flanged dimensions are shown. Threaded, BWE, RTJ and ISO flanged dimensions are available upon request.
- <sup>4</sup> „C<sub>MO</sub>“ dimension is the same as the „C“ dimension shown on the drawing, with the addition of a pneumatic actuator.
- <sup>5</sup> Weights are based on a standard choke with out actuator(s), weights may vary based on trims and options selected.
- <sup>6</sup> C<sub>v</sub> Values given are subject to variation based upon valve end connections, trim selection, wear sleeves, and other options.





## Inside SchuF Fetterolf Design

**The Cutting Edge** - At SchuF Fetterolf, we employ every resource available to deliver some of the most advanced valves in the industry. Our expert staff of mechanical engineers and designers are constantly designing, testing, and redeveloping products to outperform your every requirement, even in the most demanding of applications. Valve pre-production begins within one of our four international design facilities using industry-leading CAD and 3D modeling software. Prior to initial production, all of our valves and actuators are run through an extensive battery of tests utilising cutting-edge analysis software. This attention to detail, along with stringent quality standards, ensures our products are designed to be the pinnacle of reliability. Finite Element Analysis (FEA) and Computational Fluid Dynamics (CFD) are the core foundation for our pre-production testing, and are run on every critical service valve component within each valve. It isn't enough to just run the tests, however- the real difference comes from having the experience required to understand the results. SchuF Fetterolf has that knowledge, with over 100 years of valve design and production experience incorporated into every valve design. That equates to just under one million cumulative years of operational service expertise, with a considerable portion of that being in severe service applications. Valve design technology is ever-changing, and we make every possible effort to incorporate the latest methods into our concept design, testing, and manufacturing processes. 3D-printing is one of the newest manufacturing methods we employ to further our concept design analysis, and to further improve our existing designs. With two 3D printers currently in service, we are able to print fully-functional prototype designs, customer-shapeable seat inserts, and new products that were previously impossible to manufacture using existing methods. With everything we have to offer, it's clear why SchuF are the go-to solution for the world's top firms.



# Choke Valve Standards





# Choke Valve Inquiry Form

Application:

Site Conditions:

		Units	Minimum	Normal	Maximum	Start-Up
Pressure	Inlet					
	Outlet					
	Delta ( $\Delta P$ )					
Temperature	Operating					
	Design					
Flow Rate	Process Medium					
	Water					
	Gas/ Vapor					
Process Medium	Specific Gravity (Sg)					
	Viscosity (cP)					
	Critical Pressure (Pc)					
	Vapor Pressure (Pv)					
Liquid	Specific Gravity (Sg)					
	Viscosity (cP)					
	Critical Pressure (Pc)					
	Vapor Pressure (Pv)					
Gas/ Vapor	Molecular Weight (SG)					
	Specific Heat Ratio ( $\gamma$ )					
	Compressibility (z)					

## Valve Design Specifications

Inlet Connection

Outlet Connection

Inlet Pipe/ Schedule

Outlet Pipe/ Schedule

CV Requirements

Body Material

Trim Material

Body/ Adapter/ Trim Type

Bonnet/ Bonnet Cap/ Actuator Type

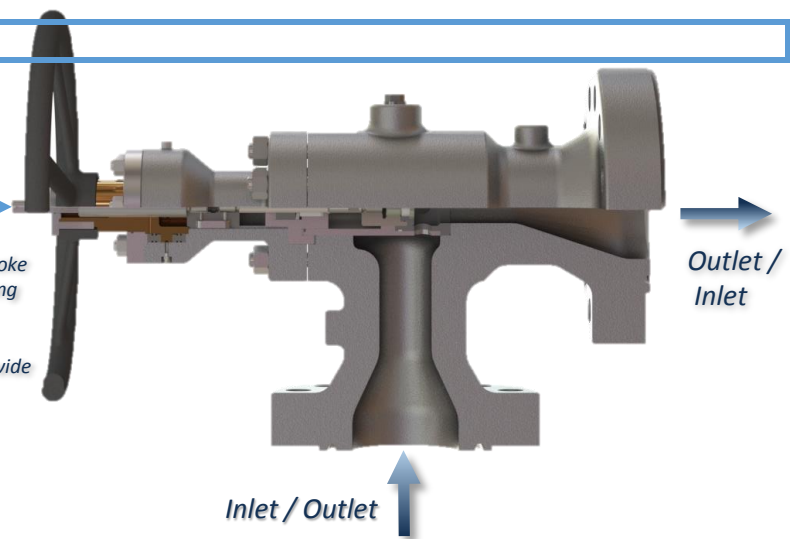
ANSI/ API Class Rating

Choke Pressure Rating/ Bean

API PSL & Quality Requirements

Start Up Frequency

The SchuF Group offers custom and customer-specific choke valve designs outside of our standard product range, along with a wide variety of options and accessories to accommodate all applications. If you are requesting a unique design not illustrated in this brochure, please provide us with a sketch along with your inquiry data above.





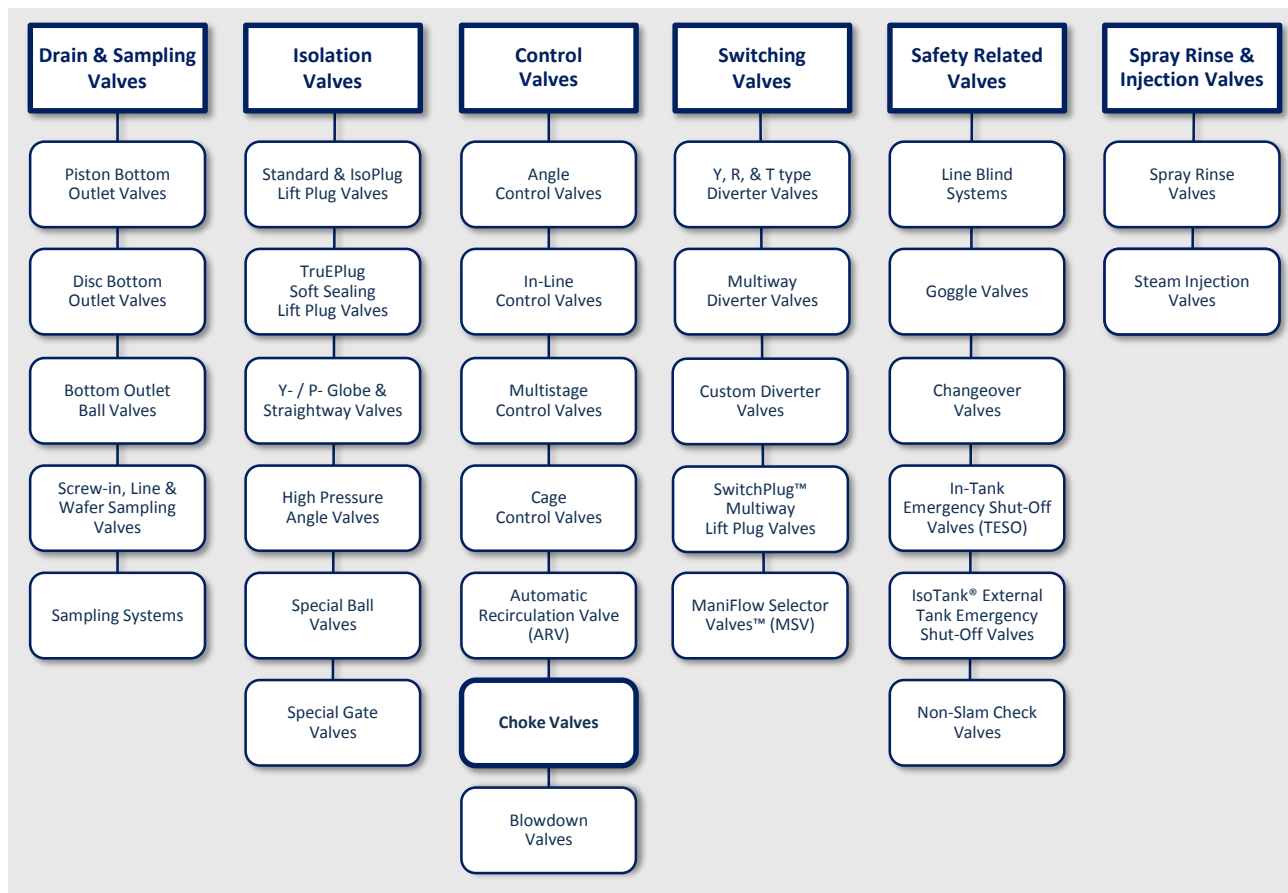
## Product Portfolio Overview

The SchuF Group has delivered over one million valves during its 100 year history, to a wide variety of industries in over 50 countries worldwide.

Headquartered near Frankfurt, Germany, the company has additional design and manufacturing centres in India, Ireland, Italy, UK, and the USA.

The SchuF Group has sales and agent offices servicing virtually every country in the world.

We manufacture valve products that control, isolate, divert, and sample liquids, gases, powders, and slurries. Our extensive product range of engineered, customized valves includes:



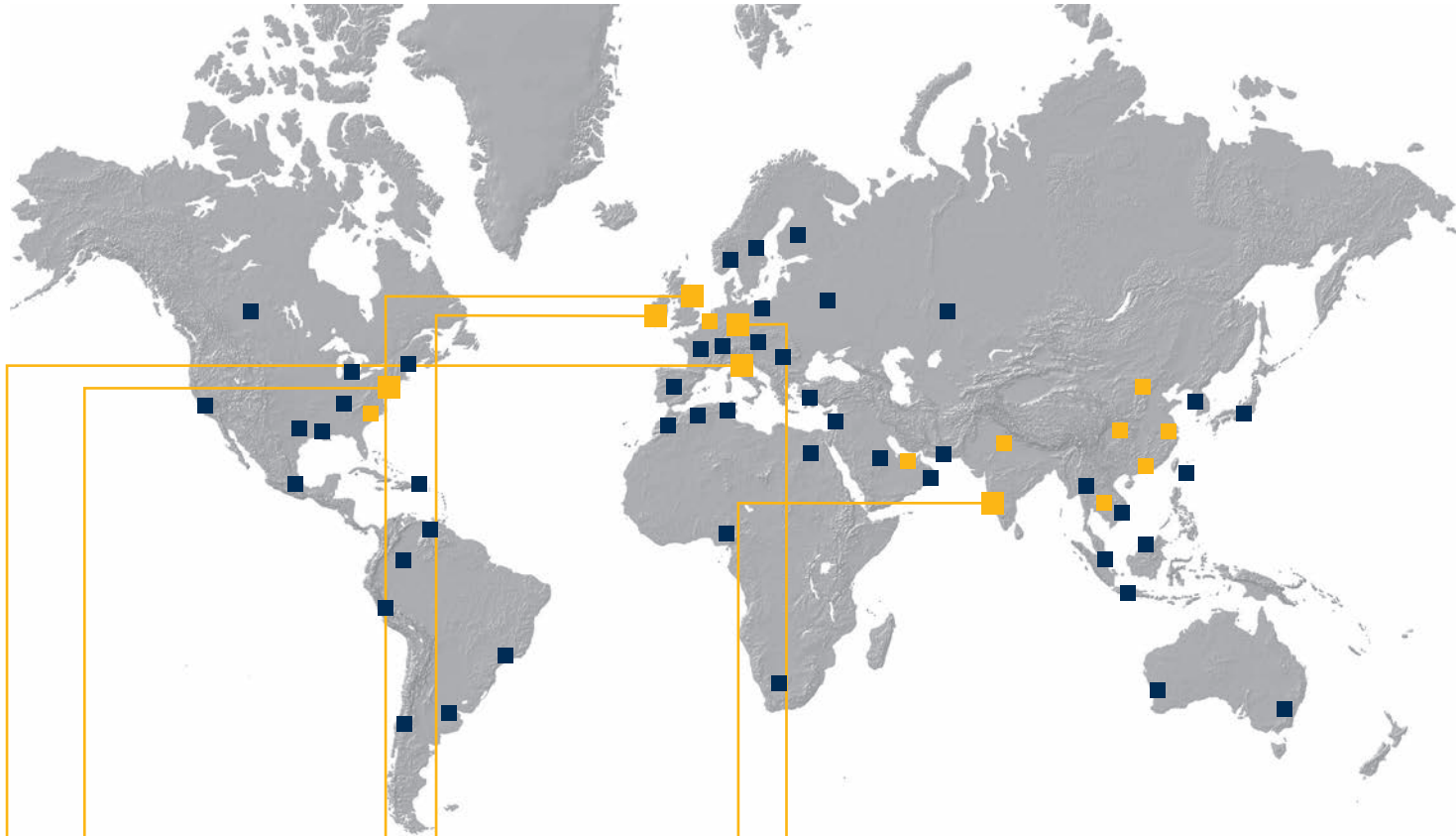
### Choke Valve Client List:

- |                          |                     |
|--------------------------|---------------------|
| ▪ Borealis Kallo         | ▪ PetroSA           |
| ▪ CNTIC Nanjing          | ▪ SAMIR Refinery    |
| ▪ Dalian Petrochemical   | ▪ SASREF            |
| ▪ Kuwait Oil Tanker Co.  | ▪ Saudi Aramco      |
| ▪ Petroleos de Venezuela | ▪ Shell Nederland   |
| ▪ Petrobras Replan       | ▪ Statoil Norge AS  |
| ▪ Petrobras Laranjeira   | ▪ Turkish Petroleum |
| ▪ Petrobras Reduc        |                     |



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100 YEARS OF INNOVATION

# SchuF Worldwide



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