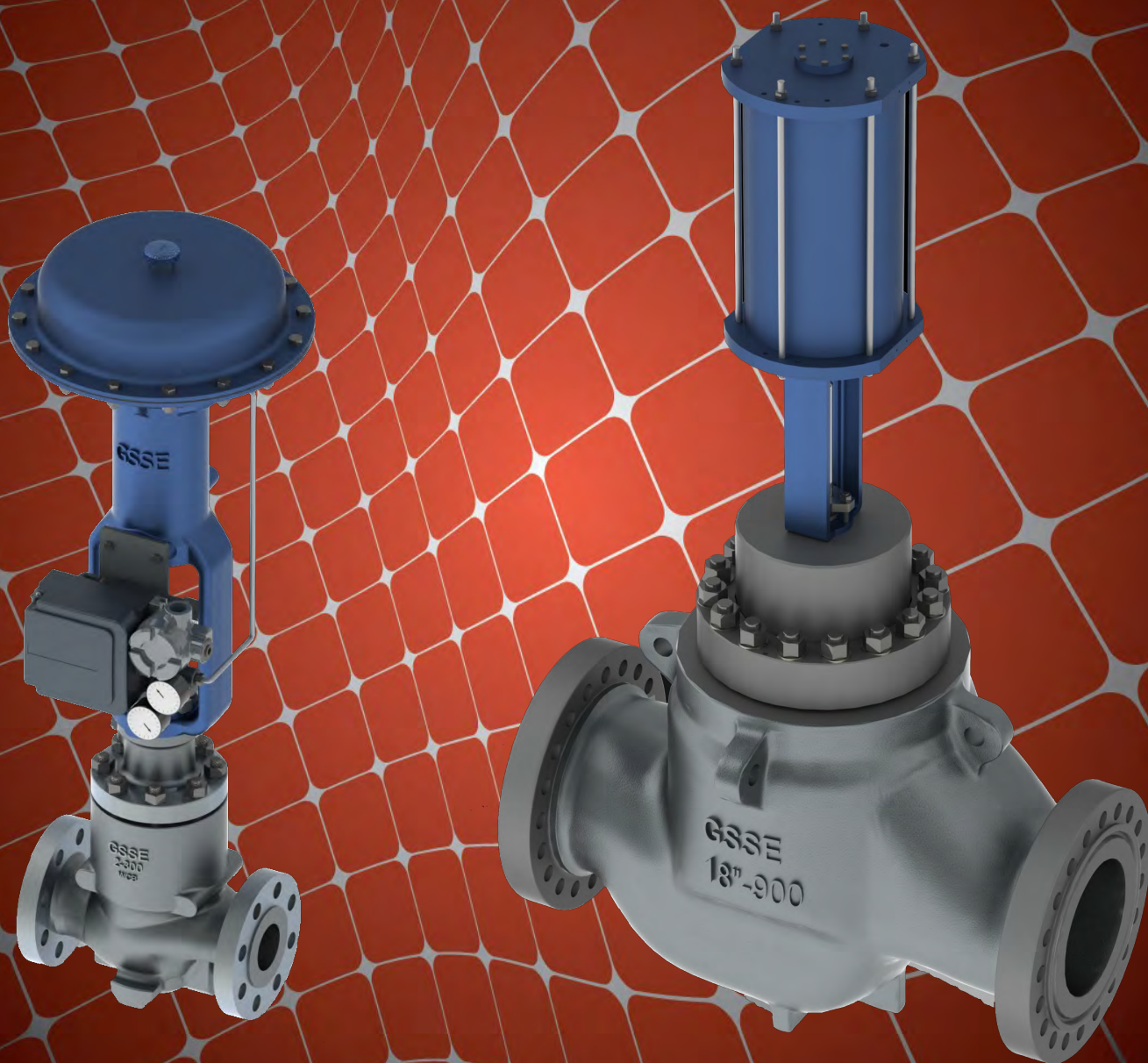


GSSE

CONTROL VALVE CATALOGUE

MADE IN IRAN



**TOTAL SOLUTION FOR YOUR
PROCESS REQUIREMENT**

INNOVATIVE FLUID MANAGEMENT

Goroohe Sazandegan Sanat Espadana

Company Overview

GSSE is a private company active in manufacturing of valves for Oil and Gas, Power plant and industrial plants. Our skilled engineering team design and simulated all of our products while considering international standards API, ASME, ANSI, MSS, NACE, ISO, ISA, BS, ATEX, IPS and IGS. We use latest software for sizing and selection, design, simulation and manufacturing of our products.

GSSE is manufacturing various types of valves including:

Control Valves

Pressure Safety Valves

Ball valves , On-Off, ESDV , HIPPS

Plug valves

Butterfly Valves

Gate, Globe, Check Valves

Wellhead and Christmas tree API 6A products in various size and pressure rating.

Our valves has been in service in oil and gas refineries, petrochemicals and power plant industries.

GSSE fully modernized CNC machining facility, assembly and test equipment enable us to offer best service to our clients.

CAD-CAM online network from our engineering office to the manufacturing shop help us to make our job in the shortest time



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Quality

GSSE is totally committed to Quality and a smooth integration of all departments with the Quality Assurance and Quality Procedures.

GSSE is qualified to ISO 9001, 10668, 14001, HSE-MS, BS OHSAS 18001, ISO/TS 29001, 100004.

This guarantees that all our products are designed, manufactured and delivered in accordance with the most strict customer requirements. By this we achieve our main goal “to offer a high quality product and service to ensure a high degree of satisfaction and fidelity of our customers”.

Markets

Our Valves are used in many different applications such as oil and gas, upstream and downstream offshore, chemical, petrochemical & cryogenic services.

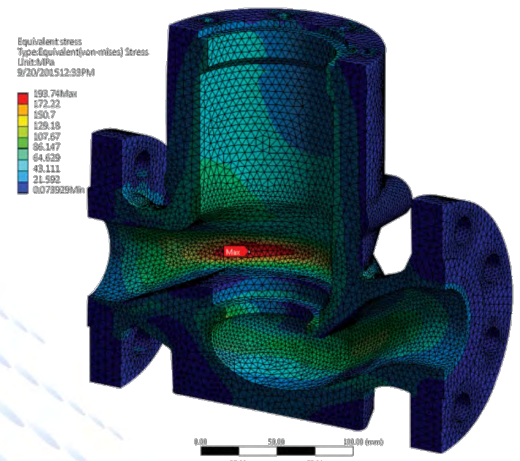
We provide spare parts to support our customers.

Design, Research and Development

Using advanced software applications including Finite Element Analysis (FEA), Computational Fluid Dynamics (CFD) and Casting Simulation helps GSSE's engineers to design superior quality valves for any demanding performance requirement.

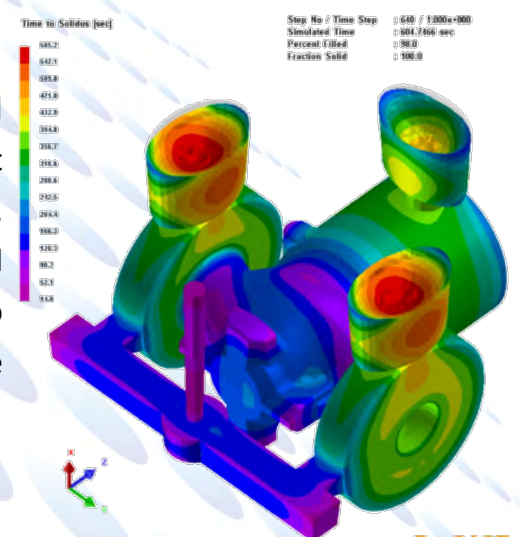
FEA Simulation

Stress calculation using 3D finite element analysis will be done for all GSSE products, specially for the pressure containing parts in control valves and pressure safety valves to make sure about safety factor in all required process conditions as well as testing criteria. We will also do custom design for our valuable clients.



Casting Simulation

Casting process is simulated using the Finite Element Method (FEM). It allows the modeling of Thermal Heat Transfer (Heat flow), including Radiation with View Factors, Fluid flow, including mold filling, Stresses fully coupled with the thermal solution (Thermo mechanics). Besides that, it includes also Microstructure/Heat treatment modeling, Grain structure modeling and Porosity modeling.



CFD Simulation

In a growing number of industries, numerical simulations of flow processes are becoming more and more popular and are increasingly used as a development tool. At the basis of this tool is a CFD (Computational Fluid Dynamics) code, which has already been integrated into numerous software programs.

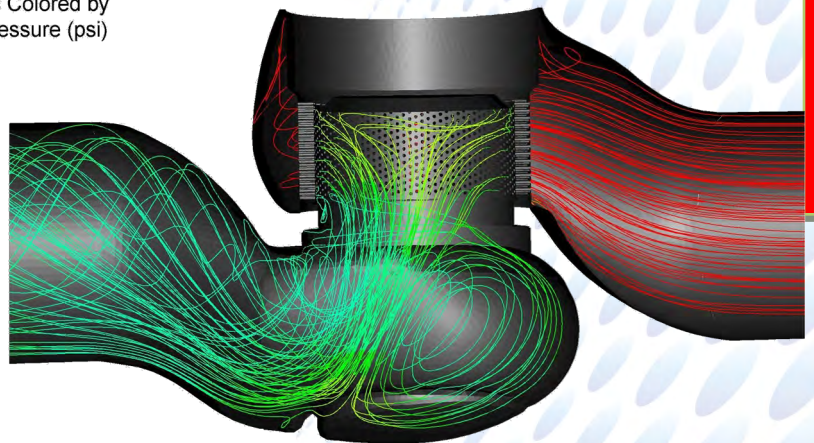
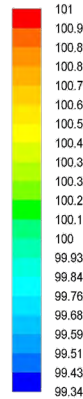
Today, CFD tools are indispensable as a supplementary tool in control valve development in certain construction stages of a component. CFD not only allows valve plugs and bodies to be optimized during the construction stages. It also permits to determine very high flow

coefficients. This benefit plays a major role as only very few test benches are built to test valves in large sizes with the associated Cv coefficients. The increasing size of industrial plants, however, calls for higher flow capacities and consequently also larger valve sizes. Non-optimized valve geometry is usually the main cause for many problems related to response time, actuation force and energy consumption. To overcome these limitations and problems we have done a thorough numerical and experimental analysis of control valves. The main influential geometry parameters of the control valve are defined for numerical analyses. In the next step the basic theory of the numerical simulation, including the 3D modelling, meshing and parameterization, is used. The validation of the numerical fluid model of the valve is done by comparing simulation and experimental results.

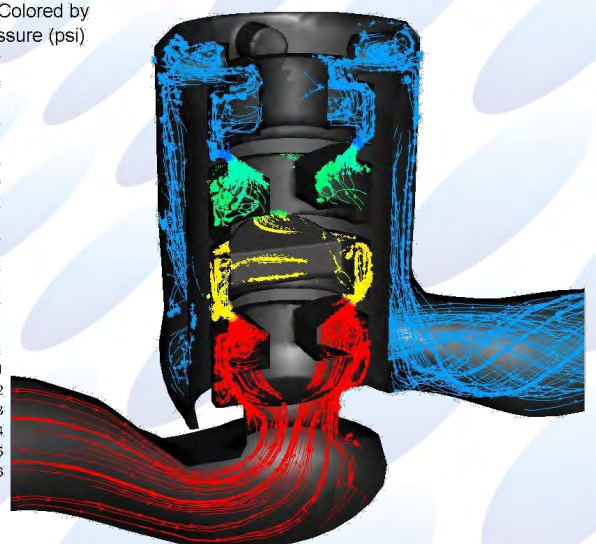
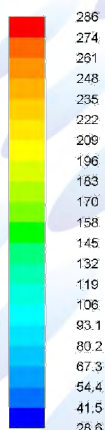
In control valves regulating the flow of liquid media, cavitation may occur depending on the process data and valve type. Under cavitating conditions, the noise emission increases considerably and erosion can occur at the valve trim depending on the cavitation intensity.

Using CFD, the point of incipient cavitation can partly be determined. Cavitation is understood to mean the process during which the pressure at the narrowest cross-section inside the valve reaches vapor pressure and the first small vapor bubbles start to form. These bubbles are dragged along by the flow into areas of higher pressures where they implode. Expressed in numerical terms, the process occurs when the static pressure inside the valve falls below the vapor pressure.

Pathlines Colored by Static Pressure (psi)



Pathlines Colored by Static Pressure (psi)



Control Valve

Contrarily to other types of valves, the function of control valves is to absorb a fraction of the inlet pressure to modulate the fluid flow rate and maintain under control the plant conditions.

In this process an amount of energy proportional to the pressure drop and the flow rate is converted into turbulences, heat, vibration, noise and wearing of valve components.

Best approach to the problem is the cage guided valve. In the cage guided design, the plug is guided along its full stroke by the cage, with very small clearance, so that vibration is suppressed. Cage guided design is recognized as the best design in heavy duty service control valves.

Designs include unbalanced plug disc for valve sizes up to 4" and balanced plug disc for valve sizes 3" and larger. The use of balanced plugs allows achieving Class IV and V seat leak rates, whichever the pressure and the temperature. Also, if temperature does not exceed 250oC / 480oF, Class VI (bubble tight) can be given as an option.

GSSE control valves have been designed to be operated by pneumatic, electric or electro-hydraulic actuators, including any type of accessories, at request, and accepting any type of control signals. When electric actuators / accessories are used all type of protections can be provided, including explosion proof or intrinsically safe.

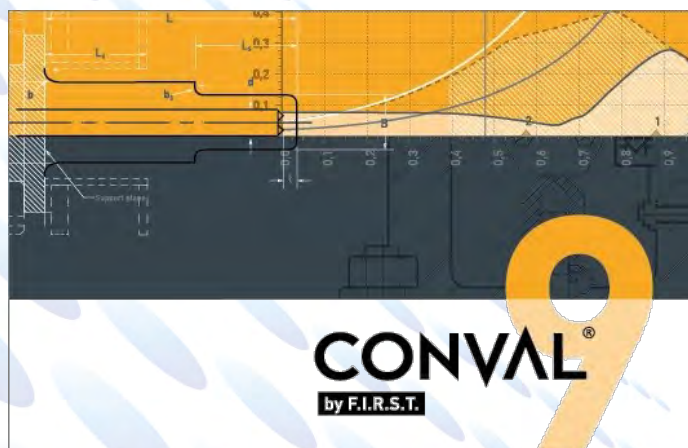
Our designs have been successfully used in power plants as well as gas, oil, fertilizers and other process industries. Noise and vibration have been reduced, and valve internals life has been extended.

Sizing And Selection

We use latest version of CONVAL sizing software to calculates the flow properties based on client process specification, and select from the GSSE database the control valve which is the most accurate for this process.

Some of the possible parameters which can be calculated with this program are:

- Cv calculation
- Fluid properties and state in operation condition
- Noise level
- Fluid velocity
- Power loss inside the valve
- Two phase fluid conditions if it is required
- Actuator forces



Valve Materials

Body and Bonnet Materials

Selection of materials of body and bonnet are based on design pressure and design temperature as well as in the type of fluid.

As standard, carbon steel, stainless steel and alloy steel are commonly used. Special alloys material can also be provide for special application such as duplex, super duplex, Hastelloy, Inconel and Monel.

MATERIAL	FORGE		CAST	
	ASTM	DIN	ASTM	DIN
CARBON STEEL	A105	1.0460	A216 WCB	1.0619
ALLOY STEEL	A182 F11	1.7335	A217 WC6	1.7357
	A182 F22	1.7380	A217 WC9	1.7379
STAINLESS STEEL	A182 F316	1.4401	A315 CF8M	1.4408

Trim Materials

Selection of the internal material is based on two factors: corrosion resistance and wear resistance.

Pressure drop and temperature condition are considered to choose the best ware resistance material. Our selection includes, but is not limited to:

Standard materials for seat, plug, cage and balancing cylinder are 316 stainless steel and hardened 410 or 420 corrosion resistant stainless steel alloys. Higher hardness in trims with Stellite overlay.

Optional materials are hard faced series 300, 17-4PH and 440 stainless steel alloys. Other alloy trim available on application. (see page 34)

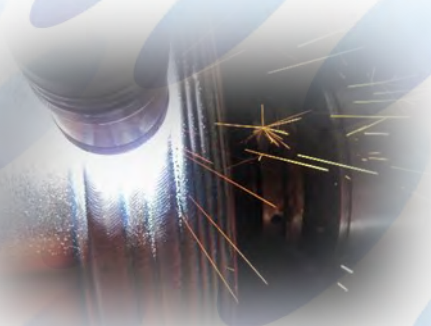
Tungsten carbide for extra high hardness is a good choice for high erosive fluids.

Hard Facing

Stellite No. 6 is the most common of all hard facing materials used in the control valve industry. It has one of the best combinations of corrosion, abrasion and impact resistance. In addition, it has a low coefficient of friction with itself and an even lower one with Stellite No. 12, for higher hardness, we use Stellite 6H which gives similar property like HVOF Tungsten Carbide.

We use PTA method for Stellite hard facing. The PTA process is easily automated, providing a high degree of reproducibility of the weld overlays. In addition, because of the highly concentrated heat source, this process benefits from high powder utilization and can achieve a very low level of iron dilution in the overlay.

Because the hard facing materials are in powder form, it is possible to produce overlays from many different materials and combinations of materials with a wide range of hardness and other properties.



TG Series

Single ported, heavy top-guided control valves are designed with built-in versatility making them the most widely used control valve, well-suited to handle a wide variety of process applications.

Standard features include:

Top Guiding

Rugged, heavy top guiding provides maximum support to ensure plug stability. Valve plug shank is guided within the lower portion of the bonnet and such guiding minimizes the effect of lateral thrust on the valve plug and eliminates trim vibration.

Anti-cavitation / Lo-dB Trim

Replacing conventional plug with the Lo-dB plug provides excellent noise attenuation and cavitation control.

Hardened / Exotic Trims

For severe service, in lieu of standard SS410 / SS 316 trims, hard faced trims, precipitation hardened stainless steel 17.4 PH, martensitic stainless steel CA6NM, 440C etc. are used. For corrosive service, trims in Alloy 20, Monel, Hastelloy, Nickel, Urea Grade SS316LN, Ferralium-255, HVD1, APX etc. are used. Other special materials are available on request.

Reduced Capacity

Series of reduced area trim is available to provide wide flow range capabilities in all valve sizes. Reduced trim also permits larger outlet-to-orifice area relationship which result in lower exit velocities.

Tight Shut-off

Class IV leakage is standard. Optional constructions meet ANSI/FCI 70.2 Class V & Class VI leakage.

Purge Connection

½" NPT or ¾" NPT purging connection can be provided with optional flushing for the plug or body.



Quick-Change Trim

Optional clamped seat ring facilitates easy seat removal. The retaining cage and seat ring are held in place by the bonnet.

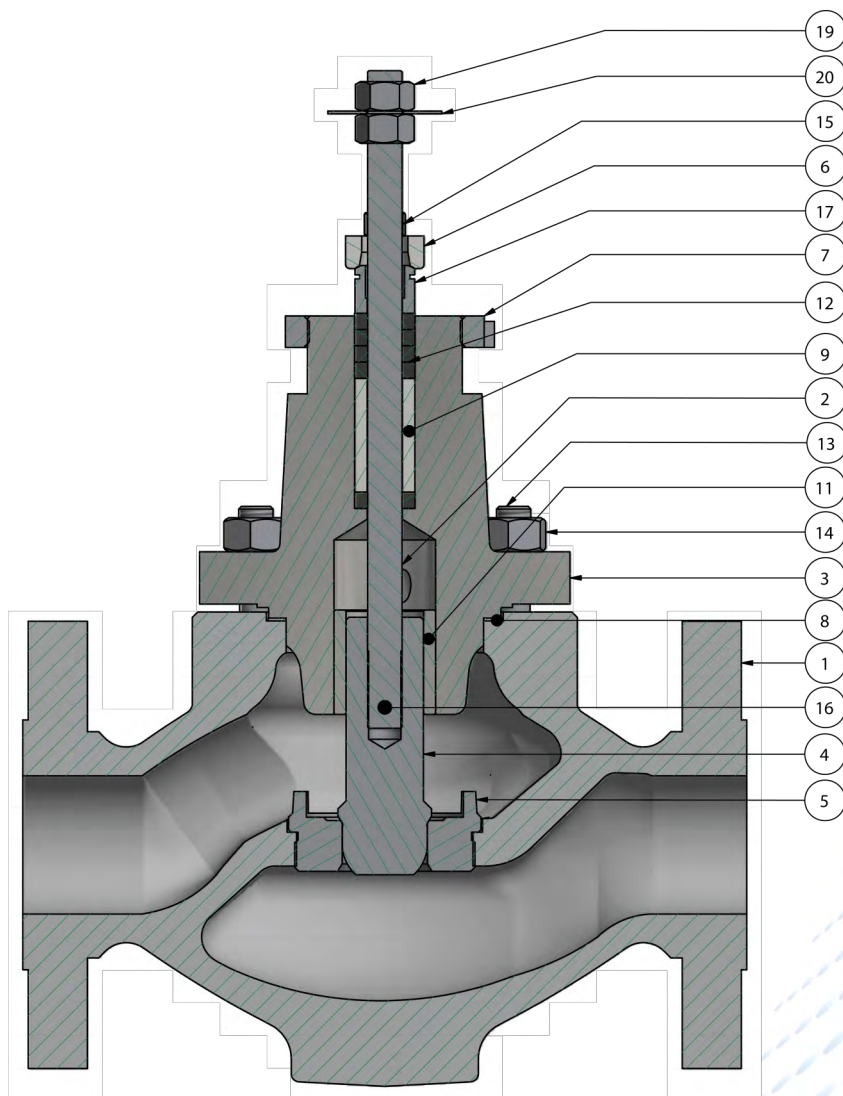


Angle Body

Optional angle body design with venturi seat is particularly suitable for handling slurries and corrosive liquids. Their angle design provides flow surfaces that slopes down permitting the valve to self drain. Smoothly contoured surfaces minimize turbulence and prevents entrapment of particles which can cause valve clogging. These valves are also ideally suited for special applications like flashing liquids, choked flow conditions and high pressure hydrocarbon service.

Extension Bonnet

Standard bonnet for TG series valves are designed for a temperature range of -27 deg C to 427 deg C. Optional constructions with extension bonnet are used up to 540 deg C and down to -100 deg C.



ITEM	PART NAME
1	Body
2	Stem
3	Bonnet
4	Plug
5	Seat Ring
6	Packing Flange
7	Drive Nut
8	Bonnet Gasket
9	Packing Spacer
10*	Packing Flange Stud
11	Guide Bushing
12	Packing
13	Stud
14	Nut
15	Packing Flange Nut
16	Plug Pin
17	Gland Packing
18	Bonnet Plug
19	Stem Luck Nut
20	Washer

*: Not Shown

Size, Rating and Connection:

Flanged (RF,RTJ,T&G,FF): 1/2"-10" , ANSI 150-2500
 Welded: SW: 1/2"-2" , ANSI 150-2500 / BW: 3/4"-2" ,
 ANSI 900-2500 3"-10" , ANSI 150-2500
 Screwed: 1/2"-2" , ANSI 150-600

Body Materials:

Carbon Steel
 Stainless Steel
 Super-alloy

Actuators:

Model DS Spring Diaphragm
 Model DM Multi Spring Diaphragm

Trim:

Single Seat Plug Top Guided
 Anti-noise and Anti-cavitation Trims, Single or Double
 Stage Are Available

Characteristic:

Standard: Linear or Equal% or Quick Opening
 Anti-cavitation/Anti-noise: Linear



CG Series

The rugged cage guiding, optional pressure balancing and a host of custom engineered trim designs makes these valves suitable for higher pressure drops and other severe service applications, where conventionally designed control valves fail to perform satisfactorily.

Standard features include:

Higher Allowable Pressure Drops

CG series control valves provide exceptional and dependable performance over a wide range of pressure drops typical of severe services. Just as important, it handles a vast majority of all shut-off pressures with standard pneumatic spring-diaphragm actuators.

Greater Capacity With Low Recovery

Rated capacity for each CG series valve is at top levels established for contemporary cage guided valves.

These unusually high capacities are attained with minimum pressure recovery, as indicated by the high critical flow factors, which minimizes possibility of cavitation in liquid service.

Tight Shut-off

CG series valves can provide single-seat leak tightness of Class IV in accordance with ANSI/FCI 70.2, or the exceptional leak tightness of Class V.

Wide Temperature Range

Standard CG series valves handle temperatures from -30°C to 566°C. Standard bonnet is designed with a moderately finned extension, so no bonnet change is necessary in this temperature range. Optional bonnet design makes CG series control valves suitable for operations up to -196°C.

High Performance Material Is Standard

Without exception, the material specified as standard for CG series valves have been tested and selected to provide trouble free operation in services with high pressures and extreme temperatures. The superior trim material employed ensures durability of the valve for any severe application.



Simple, High Performance Trim Design

Every valve is available with standard and reduced Cv cages. For balanced design, common plug and seat result in reduced spare parts inventory. For applications where cavitation or high noise is anticipated, standard cage is replaced with multi-hole cage. Clamped seat and cage facilitate easy trim removal and valve maintenance.

Variety Of Specially Engineered Trim Packages

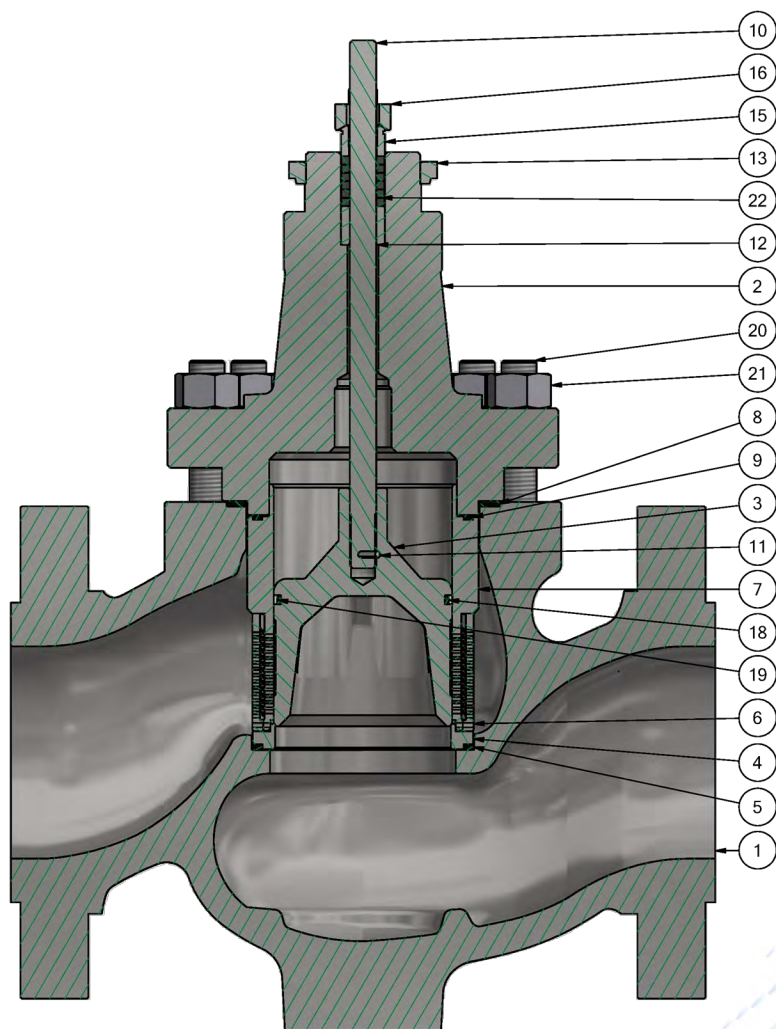
Lo-dB / Anti-Cavitation Single Stage Trim: Provides excellent noise attenuation for compressible fluids and cavitation protection for liquid service.

Lo-dB / Anti-Cavitation Multi-Stage Trim: Designed for noise control on gas or steam at high pressure drop ratios and high pressure drops for liquid service.

Auxiliary Shut-off Pilot Plug: Used for tight shut-off requirements, with a pilot plug closing the balancing holes in shut-off condition.

Tec Seal Ring: Tight shut off attained by arresting the leakage past the seal ring by means of a pressure energized polymeric seal ring located in the plug pressing against the walls of the cage.

Static Seal Ring: Designed for high pressure tight shut-off and continuous throttling applications. The special seal ring with a longer heel located in the cage imparts excellent dynamic stability while throttling.



ITEM	PART NAME
1	Body
2	Bonnet
3	Plug
4	Seat Ring
5	Seat Ring Gasket
6	Cover cage
7	Cage
8	Body Gasket
9	Cage Gasket
10*	Stem
11	Plug Pin
12	Guide Bushing
13	Drive Nut
14*	Packing Flange Stud
15	Packing Follower
16	Packing Flange
17*	Packing Flange Nut
18	Internal Seal Ring
19	External Seal Ring
20	Valve Body Stud
21	Valve body Nut
22	Packing

*: Not Shown

Size, Rating and Connection:

Flanged (RF,RTJ,T&G,FF): 3/4"-14" , ANSI 150-2500 / 16"-24" , ANSI 150-600

Welded: SW: 3/4"-2" , ANSI 150-2500 / BW: 3/4"-14" , ANSI 150-2500 / 16"-24" , ANSI 150-600

Body Materials:

Carbon Steel
Stainless Steel
Super-alloy

Actuators:

Model DS Spring Diaphragm
Model DM Multi Spring Diaphragm
Model PS & PD Cylinder

Trim:

Single Stage (Anti-noise and Anti-cavitation) Or
Multi- Stage (Anti-noise and Anti-cavitation)

Characteristic:

Standard: Linear or Equal%
Anti-cavitation/Anti-noise: Linear



LG Series

LG series control valves offer excellent control of liquid services with high pressure drops and entrained particulate. The dirty service anti-cavitation trims feature multi-stage protection against damaging effects of cavitation and erosive solids.

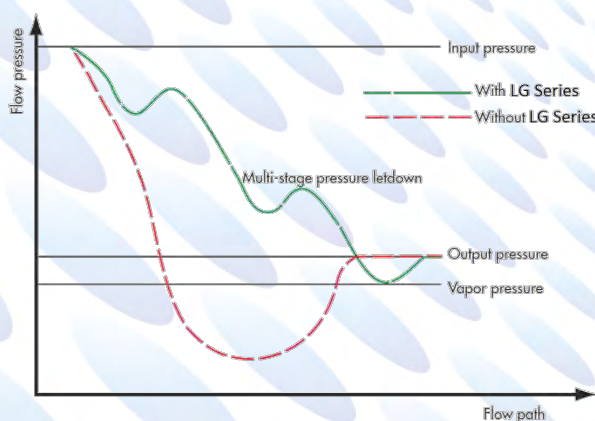
Standard features include:

High Pressure Drops

Rugged cage guiding of the plug, combined with a staged pressure drop, enables the LG control valve to be effective in a wide range of allowable high pressure drop applications. It can be operated by either spring and diaphragm or piston actuators, depending on plug design (balanced or unbalanced) and application requirements.

Cavitation Elimination

The multi-step flow path created by the LG series trim design, reduces the pressure drop in multiple stages without allowing the local pressure to drop below the fluid vapor pressure thus preventing cavitation. These active stages throttle in unison to avoid taking the full pressure drop across any individual stage.



Simplified diagram of simple and multi-stage pressure letdown

Simple Trim Maintenance

The multiple step trim, made from specially chosen hard material gives maximum service life and the quick change seat ring design provides ease of trim replacement.

Long Trim Life

LG Series control valves feature a protected seat design whereby the shutoff function is separate from the throttling areas of the trim.



Special Soft Seat Design

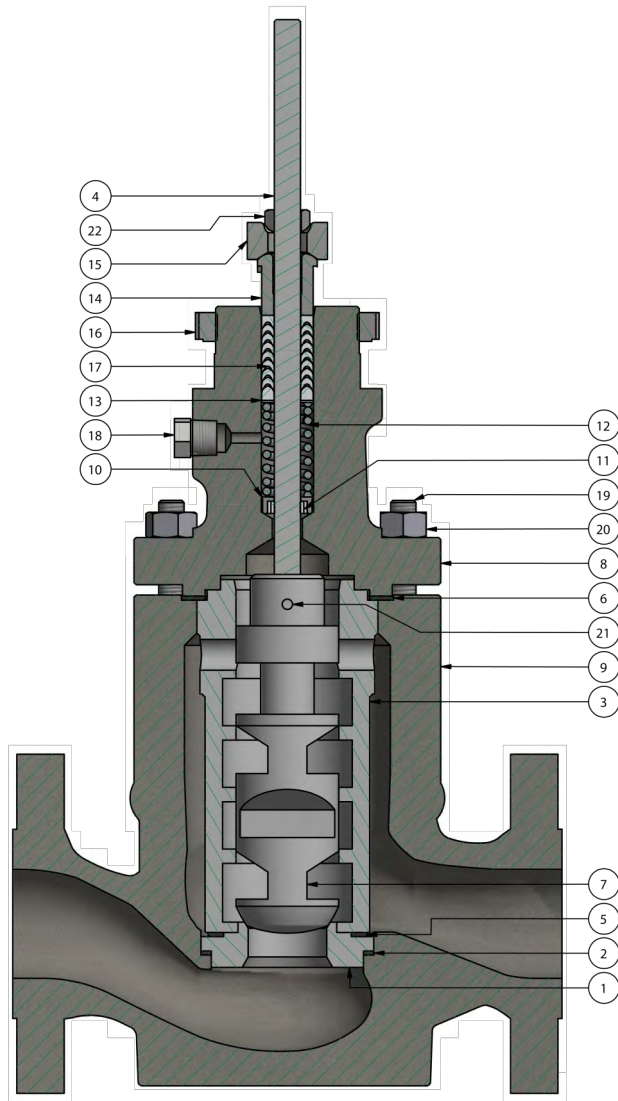
Bubble tight leak tightness as per FCI 70.2 Class VI can be achieved when optional soft seats are supplied. The special seat ring with sliding collar shelters the resilient insert from the high-pressure fluid, when the valve opens.

Low Pressure Recovery

The valve trim is designed to reduce pressure recovery (exhibits high C_f) to lessen chances of vaporization at the orifice and consequently, eliminates cavitation for liquid service and contributes towards reduction of noise for all fluids. When the plug is in the wide-open position, the fluid velocity is nearly constant through the trim.

The tortuous flow path adds significantly to the overall pressure losses. In the wide-open position, ideal conditions are approached, that is, continuous pressure drop and no appreciable recovery. At this point, the C_f is practically equal to 1.

At reduced lift positions, the throttling mechanism is similar to a piping system with a number of single stage valves in series. Each stage throttles a portion of the total pressure drop with an increase in velocity and subsequent pressure recovery. Overall pressure recovery factor varies with the number of stages.



ITEM	PART NAME
1	Seat Ring
2	Seat Gasket
3	Cage
4	Stem
5	Cage Gasket
6	Body Gasket
7	Plug
8	Bonnet
9	Body
10	Packing Ring
11	Lower Packing
12	Spring
13	Washer
14	Packing Follower
15	Packing Flange
16	Drive Nut
17	Packing
18	Bonnet Plug
19	Body Stud
20	Body Nut
21	Plug Pin
22	Packing Flange Nut
23*	Packing Flange Stud

*: Not Shown

Size, Rating and Connection:

Flanged (RF,RTJ,T&G,FF): 1"-8" , ANSI 300-2500

Welded: SW: 1"-2" , ANSI 300-1500 / BW: 1"-8" , ANSI 300-2500

Screwed: 1"-2" , ANSI 300-600

Body Materials:

Carbon Steel

Stainless Steel

Super-alloy

Actuators:

Model DS Spring Diaphragm

Model DM Multi Spring Diaphragm

Model PS & PD Cylinder

Trim:

Multi step axial flow (3, 4, 6, 8 and 10 stages)

Characteristic:

Standard: Linear

Optional : Mod. Equal



DP Series

The DP series double ported control valves are designed to handle a wide variety of process applications. Construction features have been carefully selected to provide optimum performance. The concept of the top and bottom guided double seated design helps to improve the rigidity of the valve at higher flow rates and pressure drops.

Standard features include:

High Allowable Pressure Drop

Incorporates the simplest form of balanced construction and provides high pressure drop capability with standard actuators. High Capacity with Low Recovery Flow capacity is at top levels for contemporary double ported control valves and is attained with very little pressure recovery as indicated by its high critical flow factors.

Top and Bottom Guiding

A well accepted industry standard particularly suited for double ported plugs to provide adequate support against side loads.

Dirty Service Design

Large flow areas within the DP Series design, makes it an excellent choice for applications involving dirty fluids. Foreign particles can pass through the valve without negatively affecting control performance.

Invertible Body and Plug

All DP series bodies and plugs are invertible for seat leakage class II and III trim design, so either air-to-open or air-to-close action can be obtained with the same spring diaphragm actuator.

Reduced Capacity Trim

The most practical double ported trim design giving a substantial reduction in capacity while maintaining desirable flow characteristics.

High Performance Materials

Materials of construction have been selected for high performance and long life when handling the high pressure drop capability of the valve.



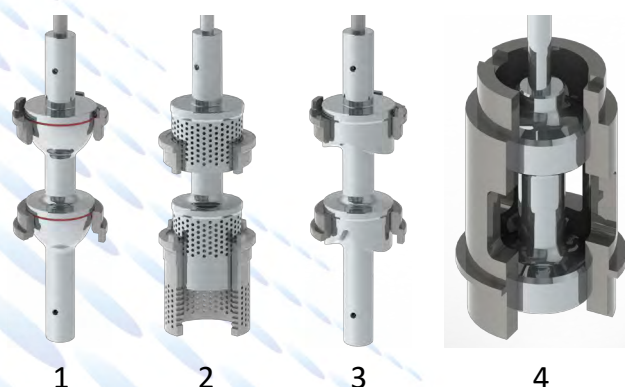
Special Soft Seat Design

Bubble tight leak tightness as per FCI 70.2 Class VI can be achieved when optional soft seats are supplied. The special seat ring with sliding collar shelters the resilient insert from the high-pressure fluid, when the valve opens.

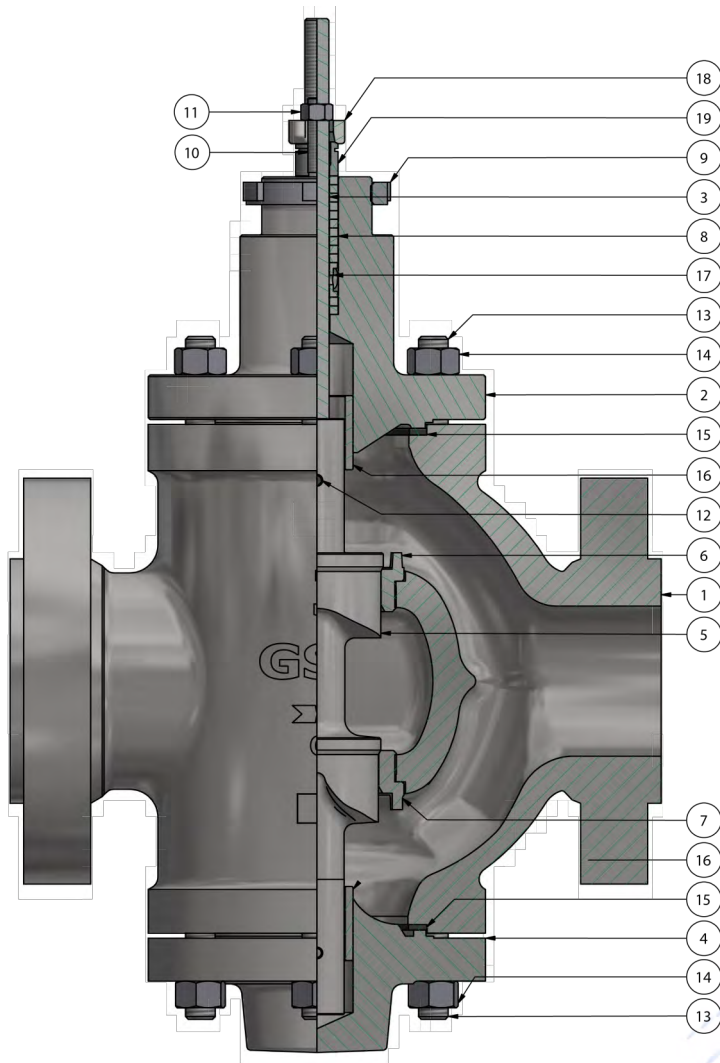
Easy Field Maintenance

The DP Series is designed for top and bottom entry, allowing for quick access to the key trim and soft good components. This also permits easy access to the top and bottom guides for repair or replacement.

Some Of DP Series Trims



- 1: Soft Seal Trim
- 2: Anti-noise Trim
- 3: V Type Trim
- 4: Combined Trim



ITEM	PART NAME
1	Body
2	Bonnet
3	Stem
4	Blind Flange
5	Plug
6	Upper Seat Ring
7	Lower seat ring
8	Packing
9	Drive Nut
10	Packing Flange Stud
11	Packing Flange Nut
12	Plug Pin
13	Body Stud
14	Body Nut
15	Body Gasket
16	Guide Bushing
17	Packing Spacer
18	Packing Flange
19	Packing Follower
20*	Bonnet plug

*: Not Shown

Size, Rating and Connection:

Flanged (RF,RTJ,T&G,FF): 2"-12" , ANSI 150-1500 / 14"-24" , ANSI 150-600

Welded: SW: 3/4"-2" , ANSI 150-2500 / BW: 3"-12" , ANSI 150-1500 3"-10" , ANSI 150-2500

Screwed: 3/4"-2" , ANSI 150-600

Body Materials:

Carbon Steel
Stainless Steel
Super-alloy

Actuators:

Model DM Multi Spring Diaphragm
Model PS & PD Cylinder

Trim:

Double Seat, V-Port Or Contoured, Elastomer seat version for high leakage class.

Anti-noise trim for Steam management.

Characteristic:

Standard: Linear or Equal% or Quick Opening

Anti-cavitation/Anti-noise: Linear



MF Series

MF series designed specifically for low flow applications, the micro flow series provides excellent throttling control performance with a wide range of options and capabilities. Design optimization has also resulted in an extremely integrated and compact assembly.

Standard features include:

Anti-Cavitation Trim

Micro flow is also available with an effective high pressure liquid letdown anti-cavitation trim solution. This unique design includes a multi-stage axial flow plug and liner, which provides dirt tolerant operation and high wear resistance.

Heavy Top-Guiding

Rugged valve plug support is provided along the entire stroke length using an integrated plug guide and seat ring. This ensures excellent plug stability and control even under high pressure drop conditions. Heavy guiding is critical for controlling vibration damage, providing dependable control and seating performance, and minimizing trim mechanical wear.

Design Flexibility

Other standard configurations include a High Pressure ANSI Class 2500 design, a zero emissions Bellows Seal design, and a design for cryogenic applications. The MF series is also available with an angle body design to accommodate existing piping configurations.

Application Flexibility

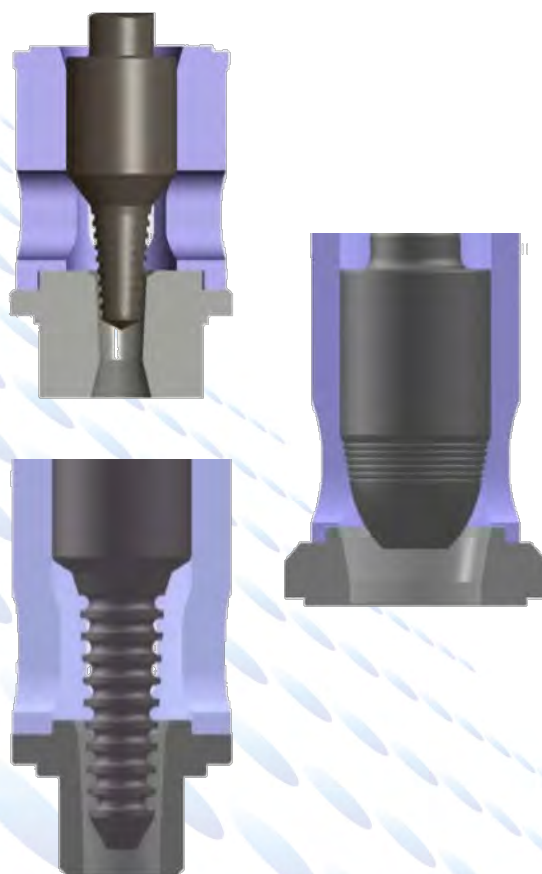
standard contoured trim designs are available providing flexible application using the same body platform. This helps to eliminate the effects of valve oversizing and improves control loop performance resulting in higher process efficiency.

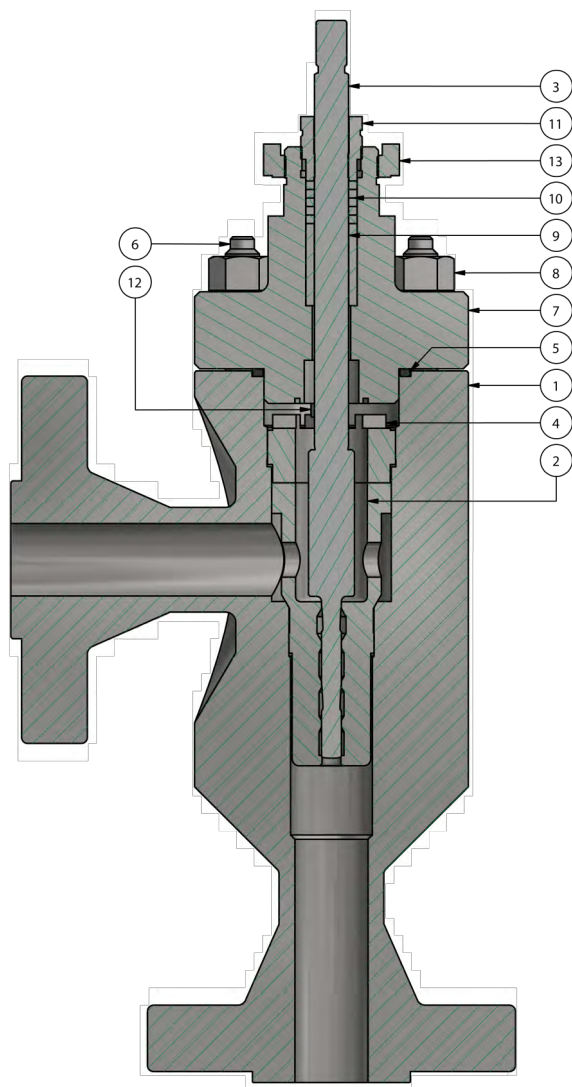


Ease of Maintenance

Simple top-entry body construction includes an integrated body and bonnet design, which allows for easy access and removal of the quick change trim. The integral liner and seat ring also reduces components and simplifies assembly and disassembly. Modularity of the actuator design further enhances maintainability of this unique valve assembly.

Some Of MF Series Trims





ITEM	PART NAME
1	Body
2	Seat
3	Plug
4	Thread Ring
5	Gasket
6	Stud
7	Bonnet
8	Nut
9	Guide Bushing
10	Packing
11	Stuffing Box screw
12	Screw
13	Slotted nut

Size, Rating and Connection:

Flanged (RF,RTJ,T&G,FF): 1/2"-2" , ANSI 150-1500
 Welded: SW: 1/2"-2" , ANSI 150-1500 / BW: 1" , ANSI 150-1500
 Screwed: 1/2"-2" , ANSI 150-1500

Body Materials:

Carbon Steel
 Stainless Steel
 Super-alloy

Actuators:

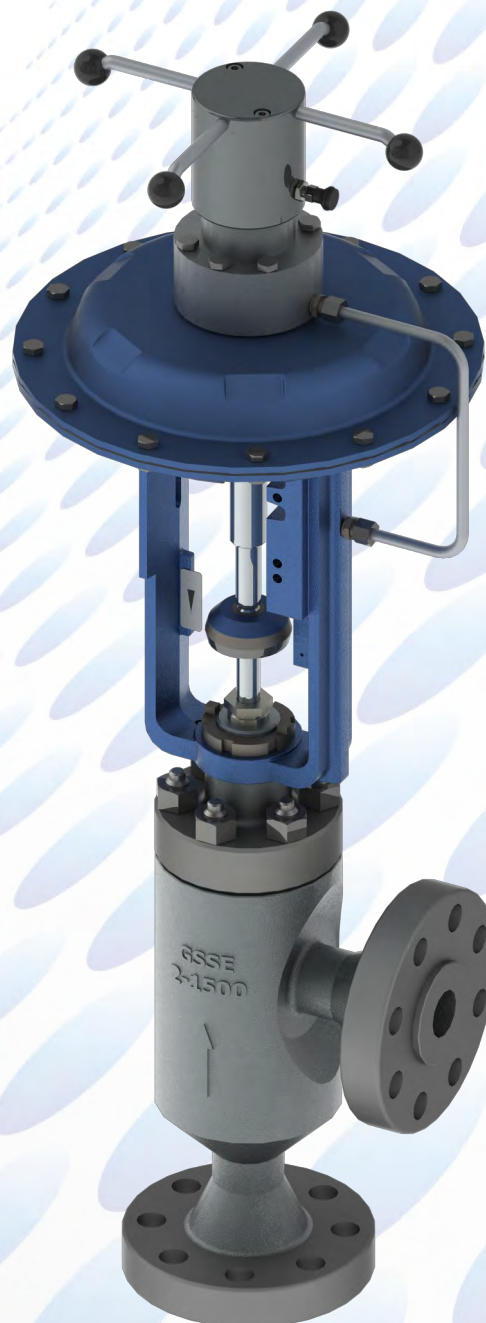
Model DM Multi Spring Diaphragm
 Model PS & PD Cylinder
 Electrohydraulic

Trim:

Multi Staged Anti -cavitation (3, 4, 6 Stages)

Characteristic:

Standard: Linear
 Optional: Modified Linear



BA Series

A heavy duty ball control valve with parabolic segment ball, excellent solution for high viscosity fluid application.

Standard features include:

Exceptional Capacity

Straight through flow pattern provides exceptional capacities.

Installation Flexibility

Two face to face dimensions are available. Standard construction is in accordance with ISA S75.04 and IEC 534-3-2. Also available in ANSI B16.10 short pattern face to face dimensions (ANSI class 150 only)

Easy Maintenance

The seal ring may be changed by simply removing two machine screws on the inlet flange. Actuator removal or complete valve disassembly is not required.

Backlash Elimination

Full involute spline connections on plug, shaft and actuator connections virtually eliminate backlash, providing reliable operation and ease of maintenance.

Wide Range Temperature Support

Standard integral extension bonnet allows for a wide range of fluid temperature applications (-320°F to 750°F), (-196°C to 400°C).

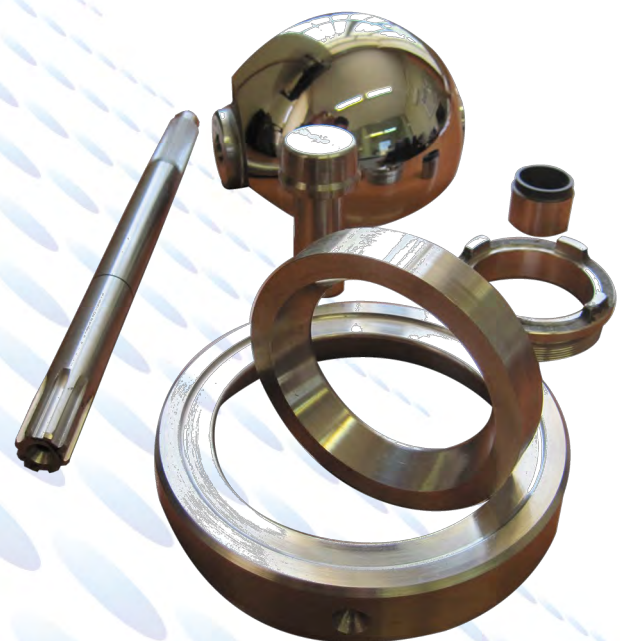
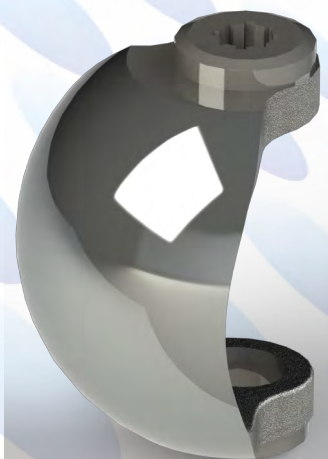


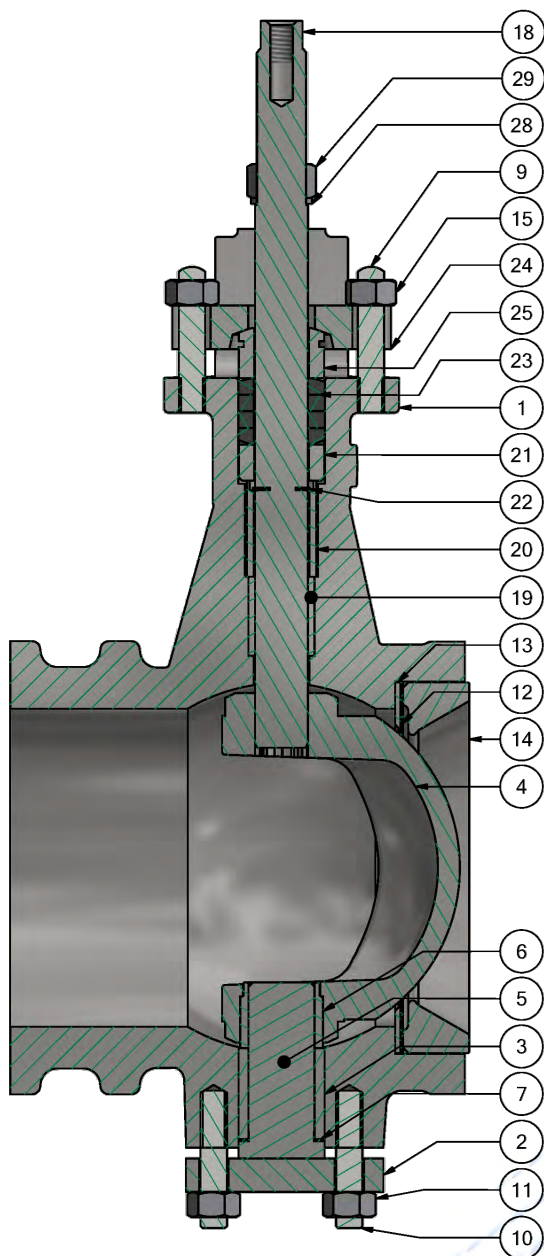
Special Soft Seat Design

Bubble tight leak tightness as per FCI 70.2 Class VI can be achieved when optional s-friction polymeric seal ring are supplied.

Excellent Flow Characterization

Parabolic shaping of the ball's leading edge provides excellent flow characterization combined with shearing action to ensure non clogging operation.





ITEM	PART NAME
1	Body
2	End Flange
3	Lower Bushing
4	Ball
5	Pin Shaft
6	Ball Bushing
7	Gasket
8*	Body Stud
9	Packing Flange Stud
10	End Flange Stud
11	End Flange Nut
12	Seal Ring
13	Backup ring
14	Retainer
15	Packing Flange Nut
16*	Set Screw
17*	Cap Nut
18	Stem
19	Upper Bushing
20	Cover Bushing
21	Packing Adapter
22	Shaft Ring
23	Packing
24	Packing Flange
25	Packing Follower
26*	Cap Nut Washer
27*	Safety Pin
28	Spring Washer
29	Body Nut

*: Not Shown

Size, Rating and Connection:

Flanged : 1"-12" , ANSI 150-300

Flangeless (Mounting Between Flanges): 1"-12" , ANSI 150-300

Body Materials:

Carbon Steel
Stainless Steel
Super-alloy

Actuators:

Model DM Spring Diaphragm

Trim:

high capacity "V" contoured segmented ball

Characteristic:

Equal%



BT Series

The BT series butterfly valves are high quality, multi purpose control valves. They incorporate all the advantages inherent in butterfly valves, including good flow control characteristics, high capacity at low pressure drops, substantial savings in initial, installation, and maintenance costs, and compatibility with a variety of actuators, both power and manual.

Standard features include:

Long Seal Life

Eccentric operation gets the disc off the seal quickly, minimizing sliding contact and friction, resulting in reduced seal wear and lower breakaway and seating torque requirements.

Fast/Dynamic Operation

Offset (eccentric) operation eliminates disc-to-seal friction throughout the operating range resulting in fast response to input signals. Also, the disc tends to move in the direction of flow, assisting the valve and actuator to maximize the allowable operating pressures.

Excellent Flow Characteristics

The offset (eccentric) disc design provides an approximate equal percentage flow characteristic through its full travel of 90° rotation yielding a Cv ratio of 100:1



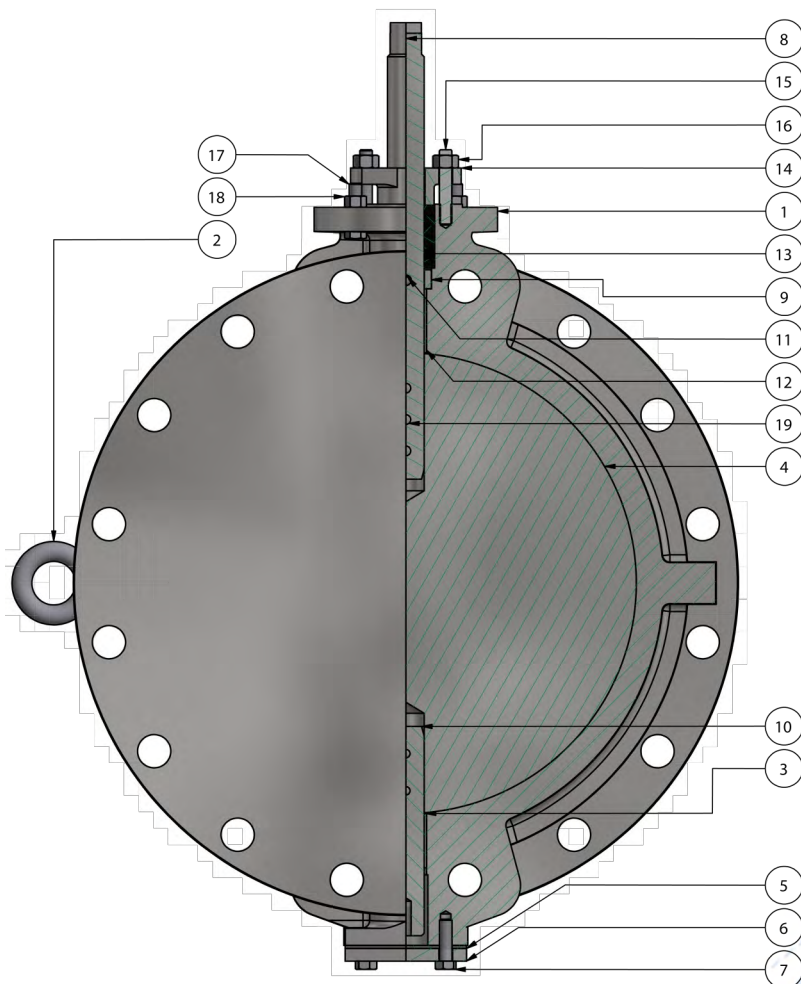
Flexibility Of Design

Generally, the valve body is rated at full line working pressure, although trims can be down rated when circumstances dictate.

An extensive range of body and trim options - Special trims and materials are available for specific requirements.

Full range of packing and bearing designs to suit various temperatures and fluids, even severe service applications.





ITEM	PART NAME
1	Body
2	Lifting Eye
3	Lower Bearing
4	Disk
5	Gasket
6	Lower Plate
7	Plate screw
8	Upper Stem
9	Lantern
10	Lower Stem
11	Lantern Pin
12	Upper Bearing
13	Packing
14	Gland Flange
15	Gland Flange Stud
16	Gland Flange Nut
17	Body Stud
18	Body Nut
19	Pin
20*	Parallel key

*: Not Shown

Size, Rating and Connection:

Wafer (Mounting Between Flanges): 2"-24" ,
ANSI 150-300

Body Materials:

Carbon Steel
Stainless Steel
Aluminum-Bronze

Actuators:

Model DS Spring Diaphragm
Model DM Multi Spring Diaphragm

Trim:

Butterfly Disc

Characteristic:

Equal%



NA / CAV Series

Multistage Cage Ball

Heavy duty automatic throttling control ball valve.

Standard features include:

Superior Flow Capacity

GSSE Ball valve offers superior flow capacity compared to cage style valves. GSSE features a control trim design that permits less restriction and greatest capacity when demand requires.

Aggressive Noise Attenuation

We provides the maximum noise attenuation of Ball Valve range. The multi-stage trim design dissipates kinetic energy by forcing the fluid through a series of pressure reducing holes and angles. This frictional path decreases velocity and vibration – providing up to 25 dB of noise attenuation.

Wide Controllability

Natural gas systems often call for control of a wide range of flow rates. Rotary design offers high turndown ratio (200:1) for excellent control range. A wide flow range can be controlled by a single run where cage style valves require multiple runs and valves.

Minimize Emissions

The rotary quarter turn design of our Ball valve provides quick, easy and low impact automation. The constant linear motion forces associated with globe and axial valves can cause damage to stem packing, releasing fugitive emissions.

The quarter turn design incorporates pressure seal seating technology that does not require excessive forces to ensure flow shutoff.

Compact Size

The high capacity NA/CAV Ball design allows for the valve to be one or two sizes smaller than cage style valves. Not only does this reduce the station footprint, but less material and resources are required to support the valve.

Bi-Directional Control

Our design provides standard bi-directional flow capability without sacrificing control accuracy. This can reduce a system's assets up to 50% – cage style valves may require a valve and supporting materials for each direction.

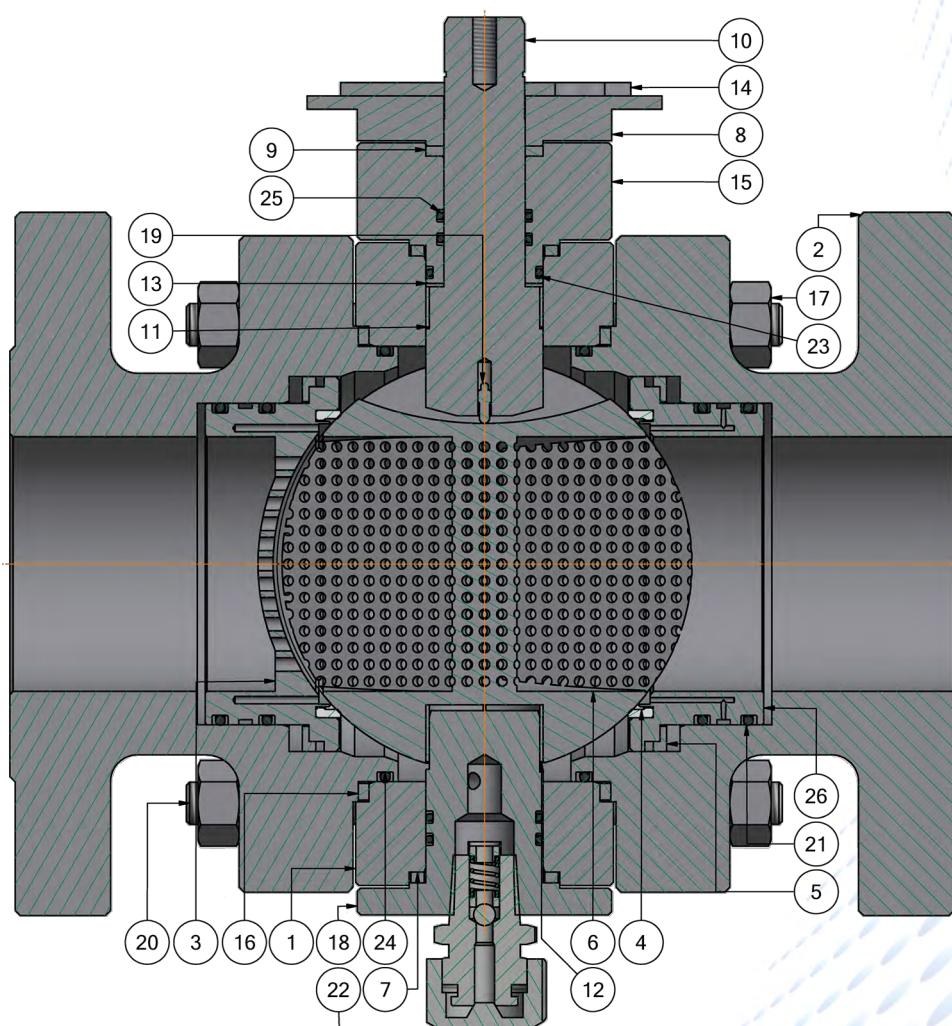
High Pressure Differential

Through an aggressive multi-stage pressure let down design, is capable of handling pressure differentials over 1500 psi (104 bar). For extremely severe conditions, Stellite weld overlay can be applied to provide further erosion resistance.

Customized Configurations

Applications vary in service requirements. GSSE Ball valve can be configured in an array of exotic materials, ANSI class ratings, and end connections. Material selection is based on fluid composition and process conditions to maximize performance and service life. For the most aggressive





ITEM	PART NAME
1	Body
2	Closure
3	Drilled Seat Ring
4	Seat Insert
5	Seat Follower
6	Ball
7	Gasket
8	Top Flange
9	Gasket
10	Stem
11	Stem Bearing
12	Trunnion Bearing
13	Thrust Washer
14	Stop Plate
15	Gland Cap
16	Body Gasket
17	Body Nut
18	Bottom Flange
19	Grounding Plunger
20	Body Bolt
21	O-Ring
22	Vent Valve
23	O-Ring
24	O-Ring
25	O-Ring
26	Seat Ring

Size, Rating And Connection:

1"-48" ,ANSI 150-4500

Body Materials:

Carbon Steel
Stainless Steel
Super-alloy

Actuators:

GSSE Model DS Pneumatic Spring Diaphragm
GSSE Model PS Pneumatic Spring Cylinder
GSSE Model PD Pneumatic Double Acting Cylinder
Electrohydraulic
Electronic, CVA Rotork

Trim:

Segment, V port, Special

Characteristic:

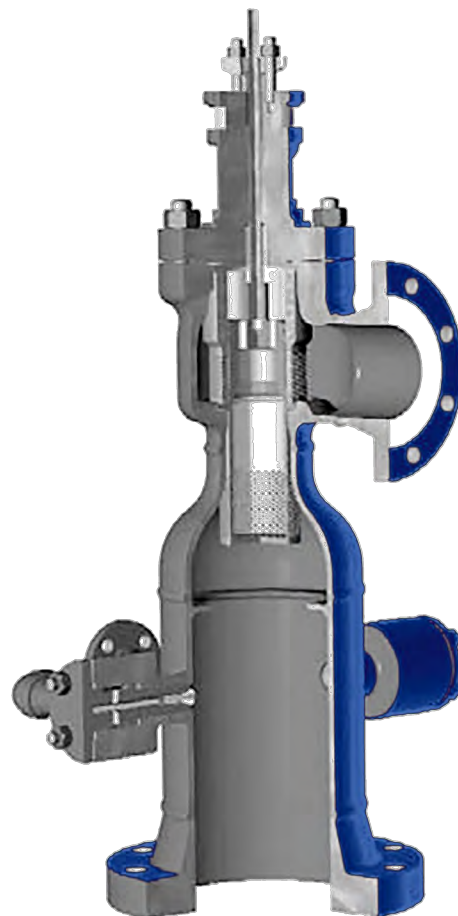
Modified Linear, Modified Equal Percentage



SF Series

Steam conditioning or desuperheater control valve.

This package is designed to manage steam condition by injection of water into passing steam



Size, Rating and Connection:

1"-48" ,ANSI 150-4500

Body Materials:

Carbon Steel
Stainless Steel
Super-alloy

Actuators:

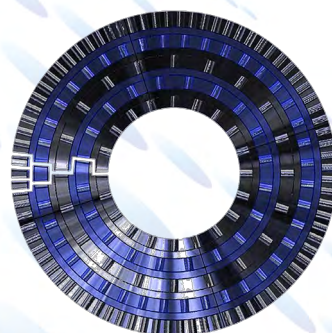
Model DS Pneumatic Spring Diaphragm
Model PS Pneumatic Spring Cylinder
Model PD Pneumatic Double Acting Cylinder
Electrohydraulic
Electronic

Trim:

Contoured, Heavy Top Guided, Multi-staged Anti-cavitation

Characteristic:

Linear



HIPPS (High Integrity Pressure Protection Systems) is a specific application of SIS (Safety Instrumented Systems). In other words HIPPS is an integrated set including some mechanical and electronic devices whose main function is high quality over-pressure protection by shutting off the source of the high pressure .

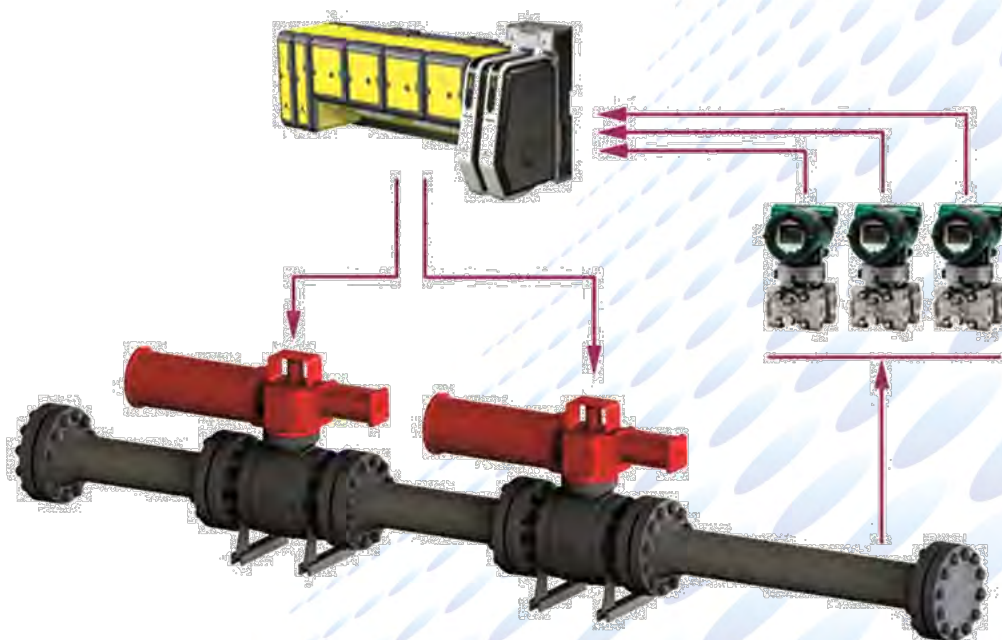
HIPPS package includes an instrument loop which consists 3 major section

1: Initiators: Process sensor that measures process variable such as pressure, Temperature or flow rate

2: Logic Solver: The programmable Electronic System (PES) receives signal from the initiators, performs the required logics and drive the final element

3: Final Element: block valves such as ball , axial flow or slab gate valves with solenoid actuators working on logic solver

GSSE HIPPS PACKAGES covers full range of size 2-36 inch and pressure rating 150-2500 and API up to 10000 PSI



ESDV

(Emergency Shutdown Valve)

GSSE Emergency Shutdown Valve designed for accuracy and dependability
Trunnion mounted ball valve
Fail safe spring return actuator
Anti-blow out stem design configuration
Low emission
Fast response time



Pneumatic Actuators

DS And DM Series

DS and DM series are Single and Multi spring diaphragm pneumatic actuators are designed to provide high performance. Their features include:

Heavy One-Piece Yoke

Provides maximum strength and rigidity.

Diaphragm Cases

Pressed steel upper and lower cases combine lightness, high mechanical strength and adequate protection in the event of severe over-pressurization.

Thrust Capability

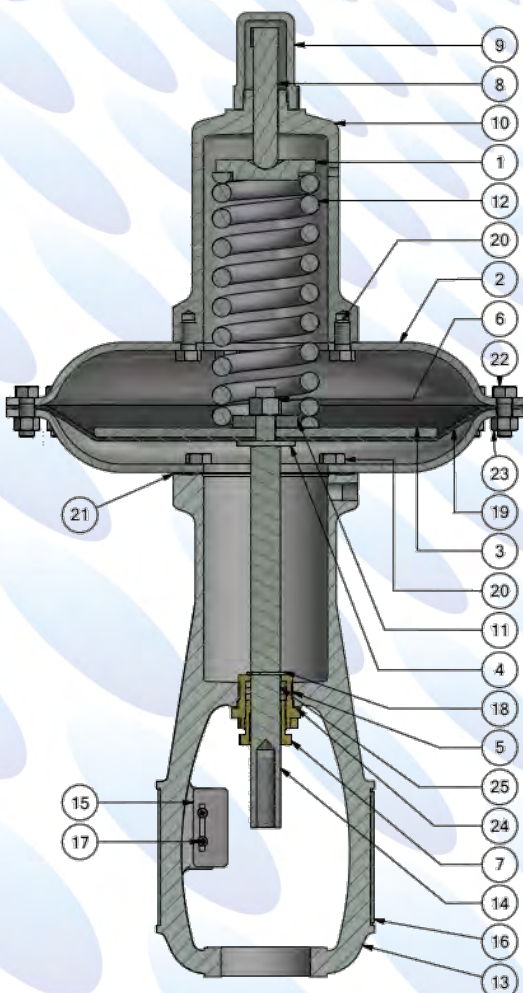
Two actuator types and seven sizes provide a wide range of applications.

Diaphragm

Molded elastomer with fabric insert for strength, long life and high sensitivity.

Linearity

The molded diaphragm and deep cases minimize area change and produce a linear relationship between travel and air pressure .



ITEM	PART NAME
1	Spring Guide
2	Diaphragm Case
3	Diaphragm Plate
4	Diaphragm Washer
5	Packing Box
6	Stem Hex Nut
7	Packing Nut
8	Spring Adjuster
9	Spring Barrel Cap
10	Spring Barrel
11	Spring Button
12	Spring
13	Yoke
14	Actuator Stem
15	Travel Indicator Scale
16	Name Plate
17	Machine Screw
18	Snap Ring
19	Diaphragm



ITEM	PART NAME
20	Cap Screw
21	Gasket
22	Case Screw
23	Case Nut
24	Packing Box Gasket
25	Yoke Packing

PS Series

PS series are cylinder pneumatic actuators with high power actuating units, for use in on/off or modulating service, have a thrust capability which is much greater than similar size diaphragm spring actuators due to air pressure up to 150 psi (10 bar) being used. Their features include:

High Thrust Capability

Multi sizes provide a wide range of applications.

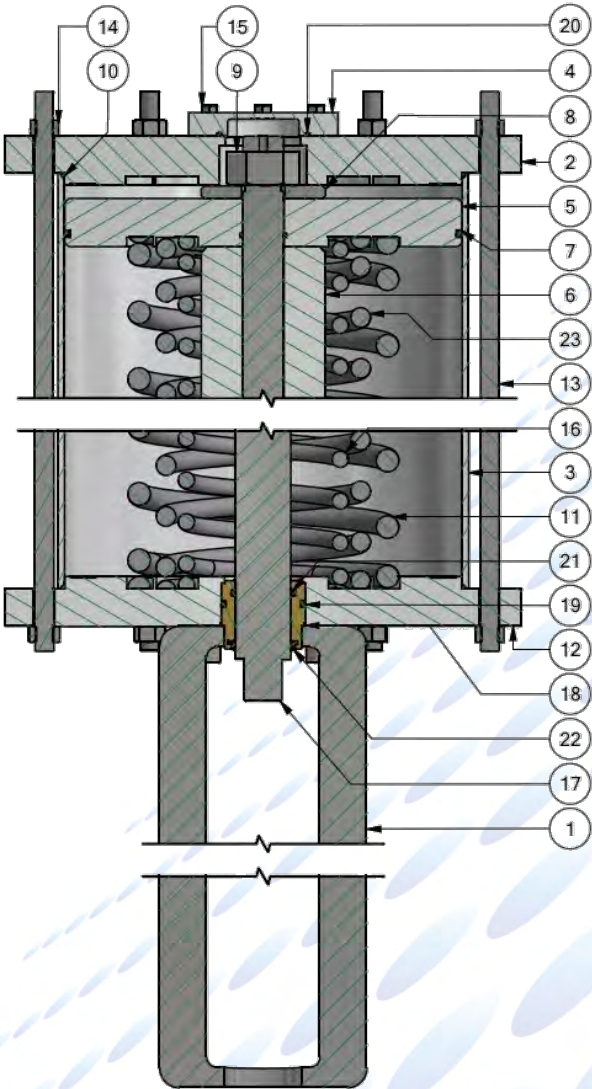
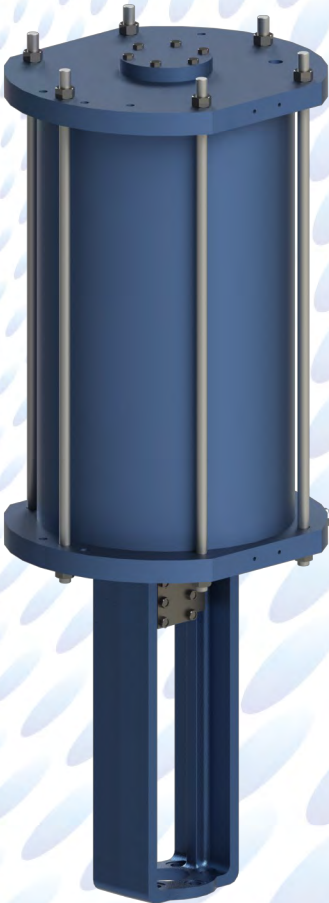
Long Stroke

Light weight And Corrosion Resistant Construction

Capable Of Using Air Supplies Up To 150 psig (10 bar)

Very Responsive With Minimum Latency On Positioning

High Stable Providing Inherent Stiffness Over Full Stroke



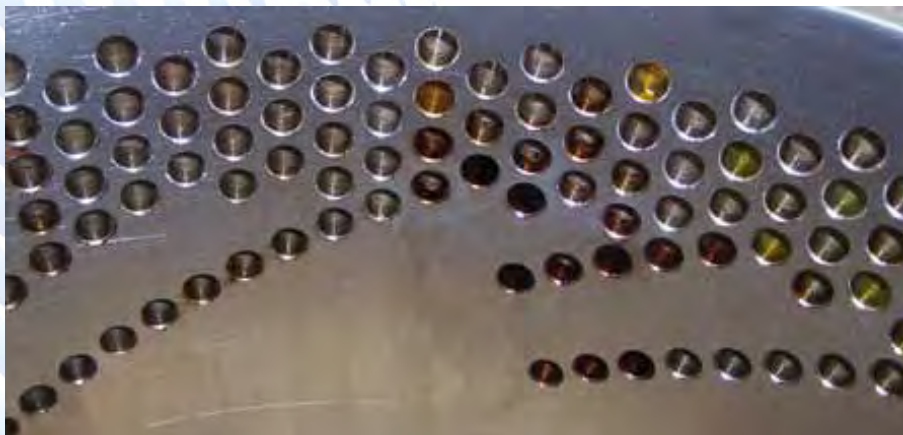
ITEM	PART NAME
1	Yoke
2	Top Plate
3	Cylinder
4	Cap
5	Piston
6	Spacer
7	O-Ring Seal
8	Washer
9	Nut
10	Cylinder Seal
11	Outer Spring
12	Lower Plate
13	Tie Rod
14	Tension Nut
15	Cap Screw
16	Inner Spring
17	Actuator Stem
18	Seal Bushing
19	O-Ring

ITEM	PART NAME
20	Cap Seal
21	O-Ring
22	Stem Wiper
23	Middle Spring

Anti Noise Devices

Large, medium size valve in gas or steam service, may give unacceptable noise levels, even if multistage cages are used, and sonic conditions avoided.

The answer to the problem is the increased number of holes of flow passages with the reduction of jet-diameters, and reduction of Fd factor. Depending on the size of the valve and the number of stage additional reductions, up to 25 dB (A) can be obtained.



Again here, engineering programs let us to know the number of holes required to reduce noise level down to acceptable levels.

When high pressure drops applications in gas or steam recommend the outlet pipe to be larger than inlet pipe, a good recommendation is to have one or more diffuser plates downstream the valve to match the pipe size. The combination of valve and baffles, diffusers or multi hole plates, when correctly calculated, offers several advantages:

Reduce the velocity of gas/ steam at valve outlet

Allows the use of smaller size valves

Reduces the valve and baffle overall noise levels

Reduces noise and vibration transmitted by the downstream pipe

We have the technology and can advise on customers about the use, sizing and design of baffles or diffuser plates.



Corrosion Protection

Control valves operate in some of the most severely corrosive conditions imaginable. Valves used near or on the sea are constantly subjected to corrosive salt-laden atmospheres.

In chemical, pulp, and other processing plants, any variety of chemicals can be expected to be in contact with the exterior surfaces and fasteners. In addition, in-valve and ambient temperatures can cycle considerably. These are ideal conditions for corrosion of valve components and fasteners.

To protect your investment from attack and deterioration, GSSE protects exposed metal valve parts with excellent protective coatings for components and fasteners.

Standard Coatings For GSSE Control Valves			
Coating	Powder Coating	NCF (Non Corroding Finish)	Heavy Zinc Plating
Typical Uses	Cast Iron and steel valve Bodies, actuator yokes, casing and cylinders	Steel bolts, studs, and nuts; yoke locknuts	Instrument feedback arms, valve actuator stem connectors

Powder Coating

Powder coating is an electrostatically applied and baked-on finish consisting of a mixture of finely ground resin, pigments, and binders, very similar to wet-spray coatings. Unlike wet-spray coatings, however, powder coating is nearly 100% VOC free, thereby reducing some of the environmental concerns associated with wet-spray coatings.

Powder coating is the standard finish for actuator casings, yokes, and cylinders, as well as for cast iron and carbon steel valve body assemblies. During the powder coating process, the part is cleaned, and a conversion coating is formed on the substrate. A seal coat is then applied over the conversion coating. These steps prepare the part surface for the application of the powder coating and improve the adhesion of cured powder to the part. This pretreatment process is the foundation for the powder coating and is critical in assuring the durability of this coating in corrosive environments.



NCF (Non Corroding Finish)

Standard steel fasteners such as bonnet bolting, actuator casing bolting, and steel fasteners for GSSE instruments have NCF (non-corroding finish) coating.

NCF coating improve resistance to corrosion from acids, bases, salts, and many other chemicals and to follow the parameters listed in ASTM F1136 (Standard Specification for Zinc/Aluminum Corrosion Protective Coatings for Fasteners). NCF coating is a polymer-based coating consisting of multiple coats applied to all surfaces of bolts, studs, and nuts. (NCF coating is not used on steel bolting for temperatures over 427°C or 800°F). NCF coating is silver or gray in color and the finish is dull when compared with zinc plating.

Heavy Zinc Plating

For hardware items such as instrument feedback arms and stem connectors, heavy zinc plating is standard. Heavy zinc plating is used for non-threaded parts that require protection from corrosion.

Quality Assurance

Quality and reliability are our first priority. All GSSE valve are subject to a continuous quality inspection from the planning and development during the production and up to the final inspection. Every valve is inspected in order to guarantee absolute reliability and plan safety, taking into consideration previous defined application condition.

Inspection and Test Plan

Sub Category	Requirements	Standard
Regulation & Design Code	ASME B16.34	
Pressure Containing Parts (Body ,Bonnet ,Cover ...)	Melt Chemical Analysis And Mechanical Properties	CMTR / EN 10204 3.1 / ISO 10474 3.1B
	Visual Examination Accessible Areas	MSS SP-55
Pressure Retaining Parts (Trim)	Melt Chemical Analysis And Mechanical Properties	COC / EN 10204 2.1 / ISO 10474 2.1
Body bonnet bolting	Melt Chemical Analysis And Mechanical Properties	COC / EN 10204 2.1 / ISO 10474 2.1
NDT/Inspection	Visual Inspection Of BW	ASME B31.3 / B31.1
Testing	Hydrostatic Test	ASME B16.34/EN 12266.1/IEC 60534-4/ISA S 75.19
	Plug/Seat Leakage Test	FCI 70.2/IEC 60534-4/EN 1349
	Packing Leakage Test	IEC 60534-4
	Standard Functional Test	IEC 60534-4
Final Inspection	Inspection of Assembled Product	Visual / Dimensional / Marking / Identification / Painting Visual Check and Document Review
Cleaning	Standard	
Painting	GSSE Standard	
Packaging	GSSE Standard	
Certification	NDT Operators Level II	SNT TC1A or EN 473 Or Equivalent
	Process & Welders Certified	ASME IX

Applicable International Standards For Inspection and Testing:

API (598, 589, 622, 591,)

ASME (16.34)

MSS (SP61, SP25, SP 53, SP55, SP117)

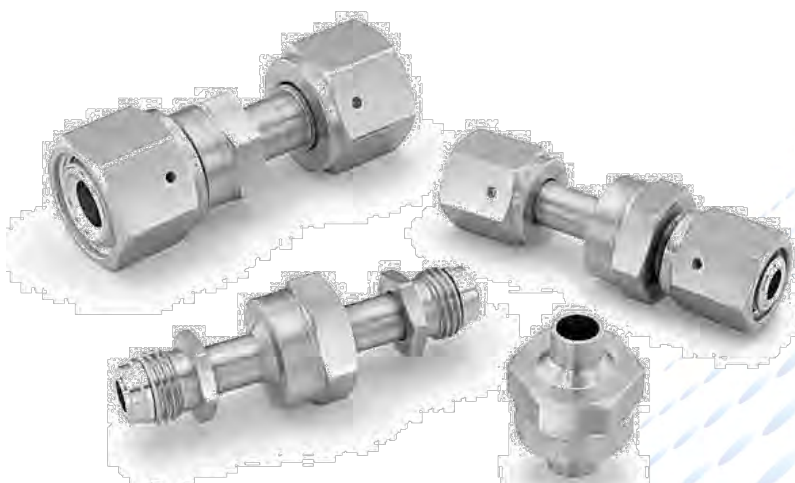
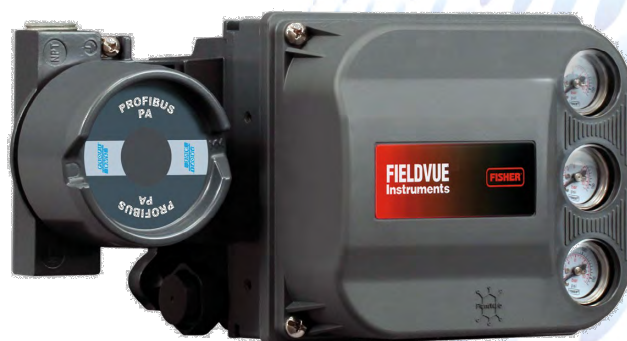
ISA (75.19.01, 75.02, 75.25, 75.17)

ISO (15848, 5208, 10497)

FCI (70.2)

Control Equipment and Accessories

Pneumatic & electro-pneumatic positioners with HART protocol and explosion proof according to ATEX are available. Fittings ,Tubing ,Air set and other components will be supplied from AVL.



HART Communicator

in different model and brands are available



		Goroohe Sazandegan Sanat Espadana		Customer Project Location P&ID No.		Data Sheet Date Spec Tag Dwg		of	
Ref. No.		Item							

		label	Unit	@Max Flow	@Norm Flow	@Min Flow	label	Unit	value
1	SERVICE CONDITIONS	Mass flow	kg/h				Fluid		
2		Inlet Temperature	°C				Service		
3		Inlet Pressure	bar(a)				Crit Press	bar(a)	
4		Outlet Pressure	bar(a)				Shut-Off pressure		
5		Operating density	kg/m³						
6									
7		Dynamic viscosity	mPa s					-	
8		Vapor Pressure	bar(a)					-	
9		Vapor Temperature	°C					-	
10								-	
11								-	
12		Valve modifier (FL ²)							
13		Line velocity	m/s						
14		Calculated Kv	m³/h				Selected Kv	m³/h	
15		Travel	%						

16	PERFORMANCE	Flow type					Controlled variable	
17							Control range	
18		Outlet velocity	m/s				Loop gain ratio	
19		Differential Pressure	bar				Valve authority	
20		Predicted SPL	dB(A)				Optimum tuning point	%
21		Power loss	kW				Static controllability index	
22		Reliability index						

23	LINE	Pipe Line Size	In		
24		& Schedule	Out		
25		Pipeline Insulation			

26	VALVE BODY / BONNET	Type	
27		Size	
28		ANSI Class	
29		Max Press/Temp	
30		Mfr / Model	
31		Body/Bonnet Matl	
32		Liner Matl/ID	
33		End Connection	In
34		Size	Out
35		Connection Type	
36		Flow Direction	
37		Type of Bonnet	
38		Lub & Iso Valve	Lube
39		Packing Material	
40		Packing Type	
41			

42	TRIM	Type	
43		Size	Rated Travel
44		Characteristic	
45		Balanced/Unbalanced	
46		Plug/Ball/Disk Material	
47		Seat Material	
48		Cage/Guide Material	
49		Stem Material	
50			

51	POSITIONER	Type	
52		Mfr & Model	
53		Input signal	
54		On Increasing Signal Output Incr/Decr	
55		Gauges	Bypass
56		Cam Characteristic	
57			

58	ACTUATOR	Type	
59		Mfr & Model	
60		Size	Eff. Area
61		On/Off	Modulating
62		Spring Action Open/Close	
63		Max Allowable Pressure	
64		Min Required Pressure	
65		Available Instr. Air	Max
66		Supply Pressure	Min
67		Bench Range	
68		Act Orientation	
69	Handwheel Type		
70	Air Fails Valve	Set at	
71			

72	SWITCHES	Type	Quantity
73		Mfr & Model	
74		Contacts/Rating	
75		Actuation Points	
76			

77	AIRSET	Mfr & Model	
78		Set Pressure	
79		Filter	Gauges
80			

81	TESTS	Hydrostatic Pressure	
82		ANSI/FCI Leakage Class	
83			
84			

85	SPECIAL / ACCESSORIES	Class	Group	Div.
86				
87				
88				
89				

Rev	Date	Name	Revision

Notes:

Other Products

Pressure Safety Valve

Pressure safety valves is an automatically actuated valve, when a sudden pressure increase happens in process control system to save other equipment from mechanical damage, release of excess pressure from the disk and nozzle bring the system pressure level to a safe pre set value.

GSSE pressure safety valves are the following types, size and class:

Closed Bonnet, Compact, Open Bonnet, Pilot Operated

Size: 1/2 inch to 10

Pressure rating: 150 - 6000

Material: Carbon steel, Stainless Steel, Duplex



GSSE control valve range covers Stem Guided, Cage Guided, Dual Port, Multistage Globe, Butterfly, Segment Ball, Multistage cage ball and special design control valves, we have no limit in size, Pressure rating and material of construction



API 6A Wellhead & X-Tree

Conventional, Unitized and ESP wellhead, Gate valve, SSV, Choke valve, check and ball valves

Pressure rating: 2000-10000 psi

Material: Carbon steel, Stainless Steel, Inconel Cladded



API 6D valves

Top entry ball valve, Fully welded, 2 pieces and 3 pieces ball valve Plug valves, Full bore, venture Gate, Globe, Check and Butterfly

Pressure rating: 150-2500 psi

Material: Carbon steel, Stainless Steel, Duplex



Applicable International Standards (Design and Material)

API (6A, 6D, 600, 602, 599)

ASME (B16.34, B16.5, B16.10, 16.25, 16.47)

IPS (E-IN-160, C-IN-160, G-IN-160, M-IN-160)

BS (1873, 5353, 12516, 2080, 5351, 1414, 1868)

NACE (MR0175)

ATEX

PED

•Other Material and Special Design Applicable On Request.

Other Material Selection

Common Name	Main Ingredients	Casting	Forging
254-SMO	20Cr - 18Ni- 6Mo	A351-CK3MCuN	A182-F44
Duplex 2205	22Cr - 5Ni- 3Mo - N	A890 Gr.4A CD3MN	A182-F51
Super Duplex 2507	25Cr - 7Ni- 4Mo - N	A890 Gr.5A CE3MN	A182-f53
Super Duplex Zeron 100	25Cr - 7Ni- 3.5Mo - N	A890 Gr. 6A CD3MWCuN	A182-F55
Ferrailium 255 - Super Duplex	25Cr - 5.5Ni- 3Mo - Cu - N	A890 Gr. 1A CD4MCu A890 Gr. 1B CD4MCuN	A182-F61
Hastelloy C276	58Ni - 16Cr - 16Mo - 6Fe - 4W	A494 CW-12MW	B564-N10276
Hastelloy C (Modified)	54Ni- 20Cr - 20Mo - 3fe	A494 CW-6M	N/A
Hastelloy C4	62Ni- 16Cr - 16Mo - 2fe	A990 CW2M	N/A
Hastelloy C22	58Ni - 21Cr - 14Mo - 4Fe - 3W	A494 CX2MW	N/A
Inconel 600	78Ni- 15Cr - 5Fe	A494-CY40	B564- N06600
Inconel 625	65Ni- 22Cr - 9Mo - 3.5Nb	A494-CW6MC	B564- N06625
Incoloy 800	33Ni - 20Cr - 45Fe - Nb	A351-CT15C	B564- N08800
Monel 400	67Ni- 30Cu	A494 M35-1	B564- N04400



Solid Inconel Forged Valve



Casting & Forging Inventory



Ring Rolled Forged Ball & Seat



Contact Us

No. 173, 13th Street, Oshtorjan
Industrial Town, Esfahan, IRAN

Tel: +98 31 37607478—80

Fax: +98 31 37607583

Email: info@gsse-co.com

