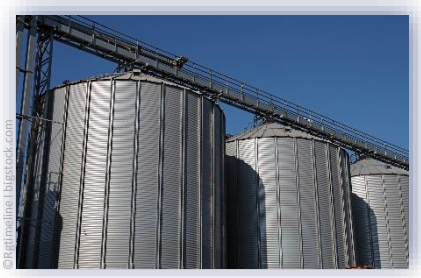
Gate Valves

Plate, Wedge & Knife Valves

SchuFl

Table of Contents



SchuF is fully registered, accredited and certified worldwide

General Introduction

Gate Valve History

The term Gate Valve originated from the words gatan, gap, gasse and gat, and implies a passage with a barrier, which can be hinged on one side, allowing it to be OPENED and CLOSED. Some of the first known gate valves were used by the Egyptians, Greeks and Romans when irrigating fields with water. These were simple wooden barriers, but they were well-suited for the requirements of the task.
In the 19th century, intensive development of gate valves moved quickly forward due to their increasing use in industrial operations. Over time the materials involved in their manufacture were improved and modified to suit different applications. In addition, there were significant improvements in the efficiency of both internal and external sealing methods.

Modern-Day Gate Valves

The modern gate valve reflects the basic features of the original gate idea, even though it now operates on a linear-stroke basis rather than a rotary one. The 'gate' itself is either of a round construction or a square design, and the valve is primarily used for ON / OFF service. Its main advantage is its compact design relative to pipe-length, and also its basic simplicity. One further main feature is the rising or non-rising stem design. The rising-stem arrangement gives an external visual indication of the valve position. Non-rising stems can be used where there is a space limitation.

Gate valve designs vary greatly depending on their intended service.
Please see the table below which gives an overview of Gate Valve types and their suggested Applications.

Valve Type	Key Features	Application	Media
Standard Plate	Compact & Light = Standard = LOW COST	Isolation in tanks & silos without pressure and low temperature service	granulate, pellets, dry powders
Wedge Types	Low External & Internal Leakage rate	(see wedge types)	(see wedge types)
Solid Tapered Wedge	Tapered plate for best internal sealing; rigid design	Isolation in tanks at mid. pressure and low temperature service	Low viscosity liquids
Solid Pliable Wedge	Hybrid design to give the adavantages of solid and double plate	Isolation in tanks at mid. pressure and elevated temperature service	Mid temperture fluids
Double-Plate Wedge	Two independent tapered plates which can adjust independently	Isolation in tanks at mid. pressure and higher temperature service	High temperature fluids, as well as corrosive fluids
Bellow Design	Primary sealing bellow, secondary stuffing box sealing	Isolation in tanks where external emission is not permitted	Lethal media
Cryogenic Design	Large third expansion chamber to stop sealing from freezing; extended yoke	Low temperature application	Low temperature liquids
Knife Plate	Compact & light weight with good internal sealing; knife-plate is designed for low friction when cutting through viscous media	Isolation in tanks at low pressure and low temperature service	Mainly viscous liquids, but also suitable for granulate, pellets, dry powders
Hulk Plate	Special massive plate design; spring loaded sealing; soft or metallic	High pressure application	Relatively clean liquids, such as Oils, Gas, etc.

Gate Valves

75FS Standard Plate Gate Valves

The Standard Gate Valve utilises a very compact design in terms of both length and height. It is particularly suitable for isolating granulate, pellets, powders and other forms of resin at **LOW COST.**

In addition, this design allows for a very light working weight, making it well-suited for mounting onto less robust process-line constructions. The valve is usually installed with the plate aligned horizontally, but it can also be installed vertically. This valve is not designed for internal or external (to atmosphere) gas-tight shut-off, due to the protruding plate and rectangular stuffing-box area.

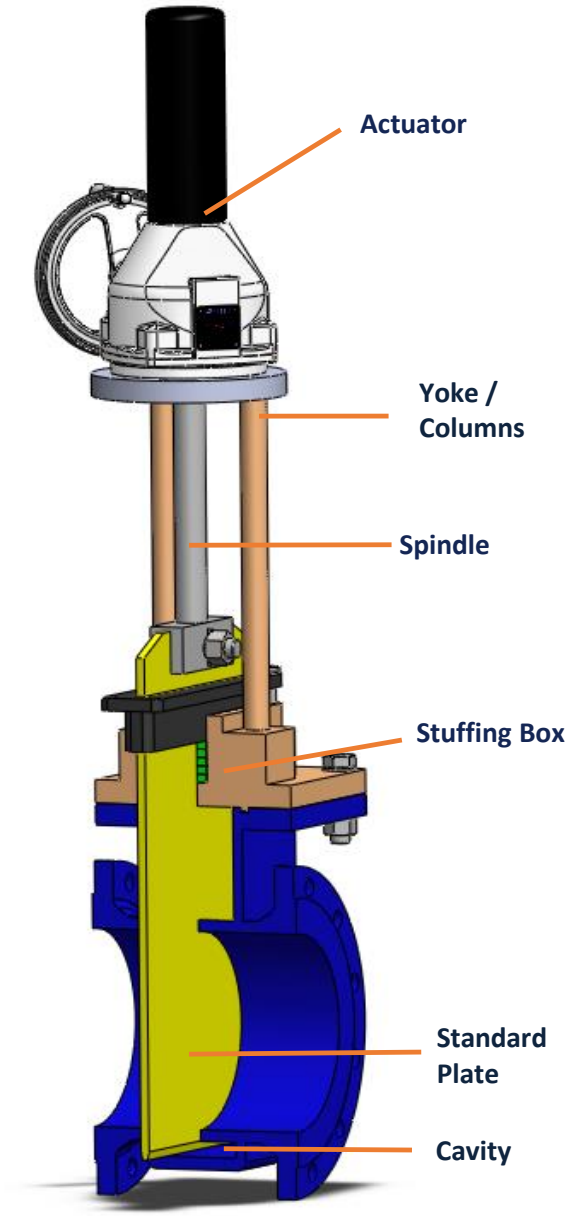
KEY FEATURES

- Compact design and low weight
- Full port flow and piggable
- Self-aligning guided plate
- Easy maintenance
- Reliable response
- Possibility of automation
- Low piping stress from static and dynamic loads
- High-speed operation possible
- Rugged, heavy-duty parts provide extended life

There is a large variety of materials available, providing corrosion- and abrasion-resistant construction.

A special gate design option is available with plate protruding at the top and bottom, allowing the valve to fit into space-restricted areas

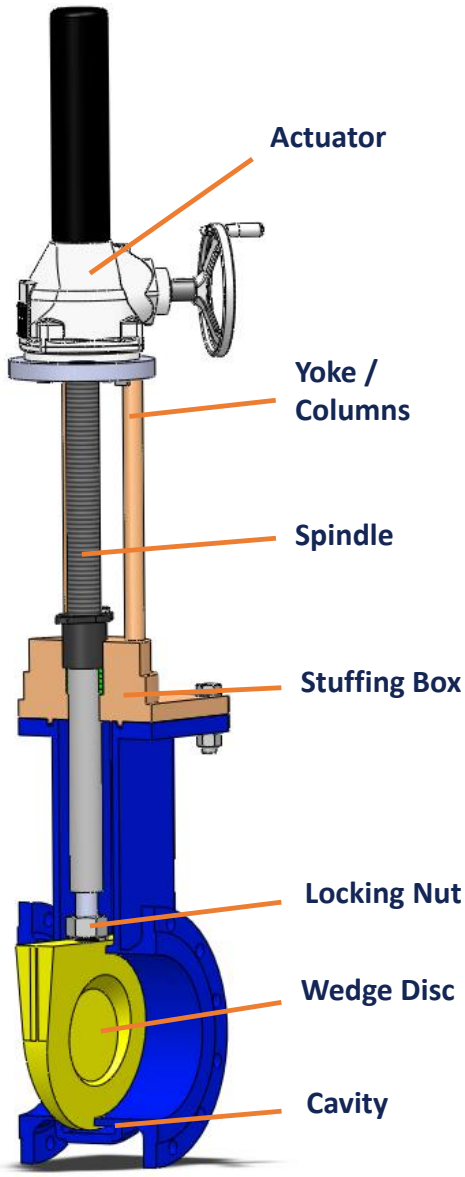
Model 75FS – Standard Plate Gate Valves



Gate Valves

77KS Wedge Gate Valves

The Wedge Gate Valve has a very compact design, particularly in terms of its length. Its main strength is its ability to isolate low-viscosity liquids. The gate, which is of a “tapered“ design, transmits the optimum internal sealing force from the actuator. The internal sealing can be soft-seal or metal-to-metal seal-type. The valve‘s body chamber is larger than that of conventional gate valves, so the plate is not exposed to the outside during operation. In both OPEN & CLOSED positions, the plate is always situated in one of the two internal chambers of the valve – as per the “Double Chamber“ design.
This design also has the advantage of allowing a polished spindle surface, which ensures the optimum sealing-to-atmosphere via the stuffing box. The valve is usually installed with the plate aligned horizontally, but it can also be installed in the vertical position. This valve design can provide internal or external (to atmosphere) gas-tight shut-off capability.

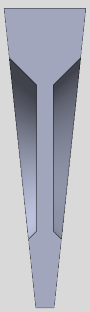


KEY FEATURES

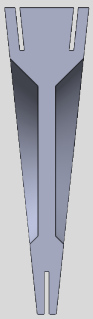
- Compact design and low weight
- Low piping stress from static and dynamic loads
- Full port flow and piggable
- Low-turbulence flow design
- Self-aligning guided plate
- Tight external shut-off via spindle and stuffing box design
- Easy maintenance
- Reliable response
- Possibility of automation
- High-speed operation possible
- Large variety of materials available, providing corrosion- and abrasion-resistant construction
- Rugged, heavy-duty parts provide extended life

Wedge Designs

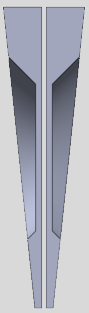
Solid Tapered Wedge

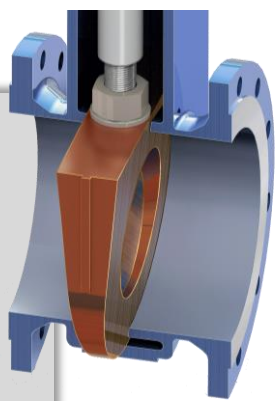


Solid Pliable Wedge



Double-Plate Wedge





Gate Valves

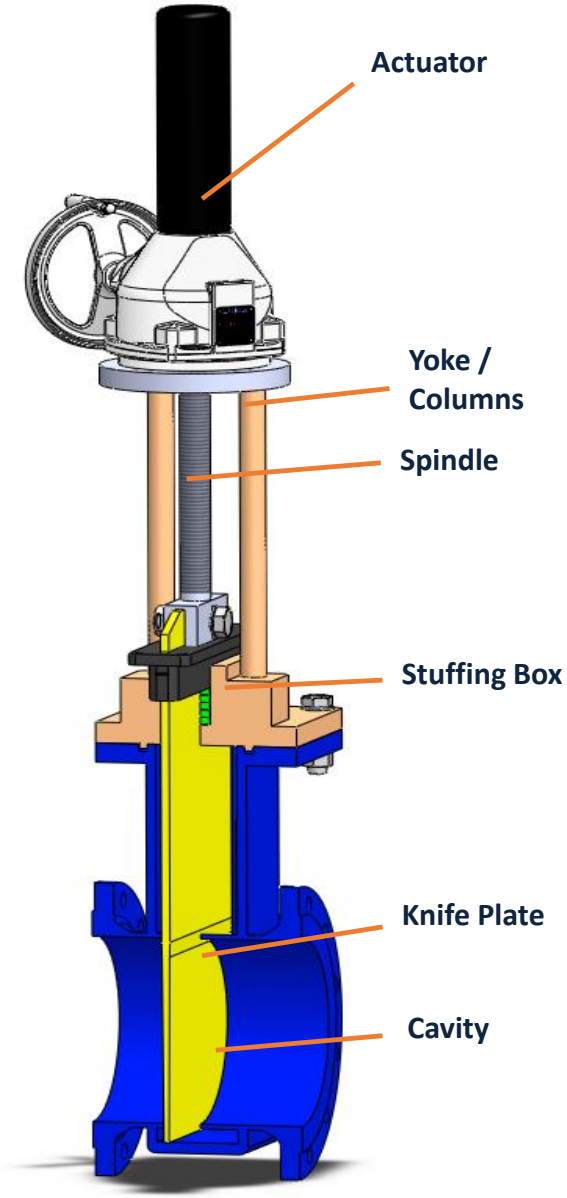
75MS Knife Gate Valves

The Knife Gate Valve utilises a very compact design in terms of both length and height. It is particularly suitable for isolating viscous liquids and dry powders and granulates.

The “Knife“-type gate can cut through viscous media easily with low force at high speeds. Its construction is similar to that of the standard plate gate valve, but has better internal metal-to-metal sealing.

The valve is usually installed with the plate aligned horizontally, but it can also be installed vertically. This valve is not designed for external (to atmosphere) gas-tight shut-off, due to the protruding plate and rectangular stuffing-box area. There is a large variety of materials available, providing corrosion- and abrasion-resistant construction.

Model 75MS –
Knife Gate Valves

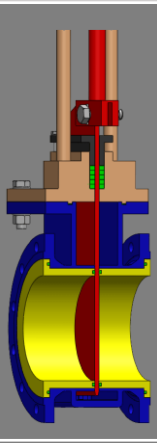
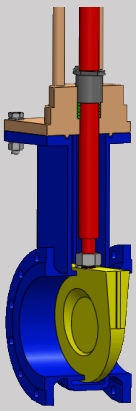
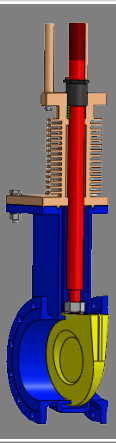
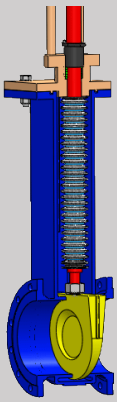


KEY FEATURES

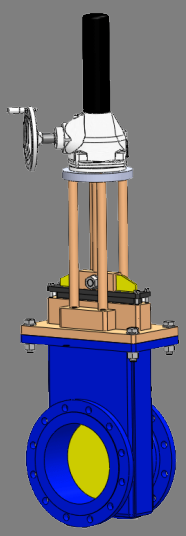
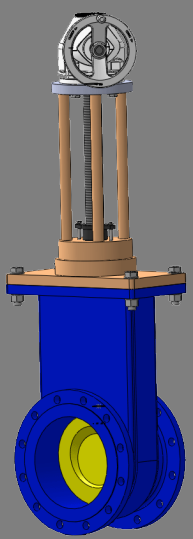
- Compact design and low weight
- Low piping stress from static and dynamic loads
- Pressure-assisted sealing
- Full port flow and piggable
- Self-aligning guided plate
- Easy maintenance
- Reliable response
- Possibility of automation
- High-speed operation possible
- Rugged, heavy-duty parts provide extended life

Body and Bonnet Designs

Body Design Schematics

Single-Chamber Design	Double-Chamber Design	Triple-Cryogenic-Chamber Design	Bellows Design
			
Single-Chamber Body Design Square Stuffing-Box Design Low-Pressure / Low-Temperature Applications	Double-Chamber Body Design Usually Spindle 'Pass-Through' Design High-Pressure / High-Temperature Design	Triple-Chamber-Cryogenic Body Design Spindle 'Pass-Through' Design Elevated Pressure Low Temperature	Bellows Body Design Bellows with Emergency Stuffing-Box Design Elevated Pressure Elevated Temperature Zero Emissions

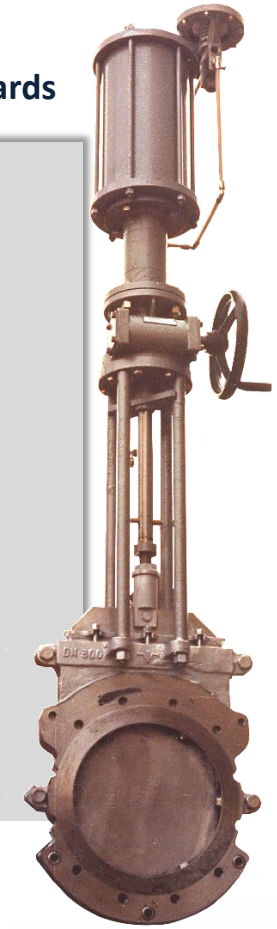
Bonnet Design Schematics

Plate 'Pass-Through' Design		Spindle 'Pass-Through' Design	
	Plate 'Pass-Through' Design Compact, Simple Body Design Low-Pressure Applications		Spindle 'Pass-Through' Design Multi-Chamber Body Design High-Pressure Applications

Gate Valve General Standards

SchuF valves fully comply with the following up-to-date standards

- **Flange connections** to ASME B16.34/B16.5, EN 1092-1
- **Butt Weld connections** B16.25
- **Socket Weld connections** B16.11
- **Face-to-Face Dimensions** B16.10
- **Pressure Class** up to ASME 300#/ DIN PN 40
- **Valve Design** to API 600/602/603/6D/ BS 14846/ EN 12516
- **Valve Testing** to API 598/ DIN 1.2266-1/ EN 10204/ FCI 70-2
- **Fire-Safe Design** according to BS6755 / EN ISO 10497



Valve Actuator Options

Manual

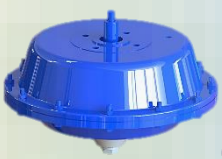
Handwheel

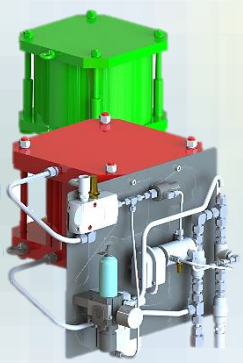
Bevel Gear Box

Pneumatic

PKE Series
Single Acting
Spring returned

PM Series
Single Acting
Spring returned

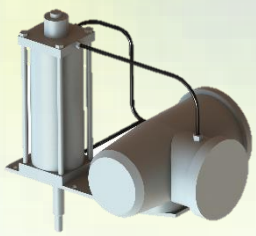




PKD Series
Double Acting
Air tank for fail position

Hydraulic

HY Series
Double Acting
Accumulator for
fail position



EMH Series
Electro-Hydraulic
actuator

Electric

EM Series
Electric Actuator

Body and Bonnet Materials

Gate Valve Body & Bonnet Materials					
Pressure Rating	Standard: ASME 150 to ASME 600 - Other pressure applications are possible				
Temperature Rating	Standard: -29°C to 260° C - Other temperature applications are possible				
Shut-Off Class	API 598 / EN 1022-1				
Trim Material	Standard	Stainless	Titanium	Alloys	Specials
Recommended Service	-	Corrosive	Highly Corrosive	Highly Corrosive	Abrasive
Body	Carbon Steel A216 / WCB DIN 1.0619 or similar materials	Duplex Steel DIN 1.4462 or Stainless Steel DIN 1.4571 DIN 1.4401 DIN 1.4404	Titanium Grade 2 or 3	Hastelloy® Incoloy® Inconel® Monel® or similar materials	Cladded with Alloy Steel or Ceramic or Tungsten Carbide
Bonnet	Carbon Steel A216 / WCB DIN 1.0619 or Similar materials	Duplex Steel DIN 1.4462 or Stainless Steel DIN 1.4571 DIN 1.4401 DIN 1.4404	Titanium Grade 2 or 3	Hastelloy® Incoloy® Inconel® Monel® or Similar materials	-
Trim	Carbon Steel A216 / WCB or Stainless Steel DIN 1.4571 DIN 1.4401 DIN 1.4404	Stainless Steel DIN 1.4571 DIN 1.4401 DIN 1.4404 or Duplex Steel DIN 1.4462	Titanium Grade 2, 3 or 5 or Oher alloys	Titanium Grade 2, 3 or 5 or Other alloys	Special

Standard Dimensions

ASME STANDARD

#150	DN	1"	1-1/2"	2"	2-1/2"	3"	4"	5"	6"	8"	10"	12"
	D	108	127	152	178	190	229	254	279	343	406	483
	L	127	165	178	191	203	229	254	267	292	330	356
	Hc	280	330	370	410	460	550	610	715	880	1050	1200
	Ha	310	375	425	480	545	660	745	875	1090	1315	1520
	V	150	175	200	200	225	250	300	350	400	500	500

#300	DN	1"	1-1/2"	2"	2-1/2"	3"	4"	5"	6"	8"	10"	12"
	D	124	156	165	191	210	25	279	318	381	445	521
	L	165	191	216	241	283	305	381	403	419	457	502
	Hc	300	350	415	435	500	600	680	760	965	1150	1300
	Ha	330	395	470	510	590	710	815	925	1175	1415	1620
	V	150	175	225	225	250	300	350	400	400	500	500

DIN STANDARD

PN10	DN	25	32	40	50	65	80	100	125	150	175	200
	D	115	140	150	165	185	200	220	250	285	315	340
	L	125	130	140	150	165	180	190	200	210	220	230
	Hc	250	270	290	310	370	390	470	550	600	700	750
	Ha	275	300	330	360	435	470	570	675	750	875	950
	V	150	150	165	165	165	165	200	200	200	200	250

PN10	DN	250	300	350	400	450	500	600	700	800	900	1000
	D	395	445	505	565	615	670	780	895	1015	1115	1230
	L	250	270	290	310	330	350	390	430	470	510	550
	Hc	880	1040	1190	1350	1550	1650	1940	2200	2570	2800	3100
	Ha	1130	1340	1540	1750	2000	2150	2540	2900	3370	3700	4100
	V	350	400	500	500	500	500	650	650	650	700	800

PN16	DN	25	32	40	50	65	80	100	125	150	175	200
	D	115	140	150	165	185	200	220	250	285	315	340
	L	225	230	240	250	270	280	300	325	350	380	400
	Hc	290	320	350	365	460	490	600	660	820	930	1035
	Ha	350	380	410	425	535	580	720	800	985	1120	1255
	V	165	165	200	200	200	200	250	300	350	350	350

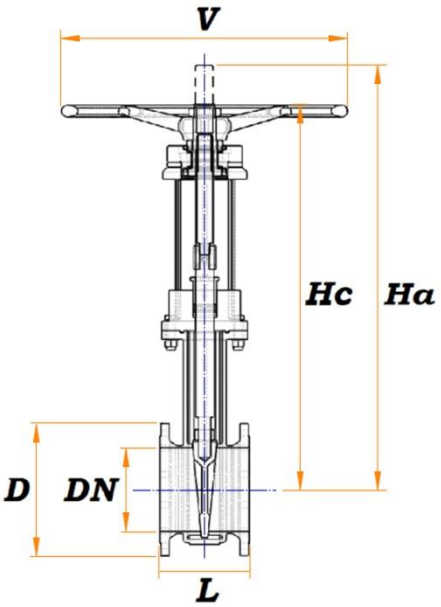
PN16	DN	250	300	350	400	450	500	600	700	800	900	1000
	D	405	460	520	580	650	715	840	960	1080	1200	1320
	L	450	500	550	600	650	700	800	840	880	920	960
	Hc	1110	1250	1320	1520	1580	1630	1750	2000	2260	2520	2780
	Ha	1380	1570	1690	1940	2050	2150	2400	2750	3000	3250	3500
	V	450	500	500	500	550	600	700	700	700	750	750

PN25	DN	25	32	40	50	65	80	100	125	150	175	200
	D	115	140	150	165	185	200	235	270	300	330	360
	L	225	230	240	250	270	280	300	325	350	380	400
	Hc	290	320	350	365	460	490	600	660	820	930	1035
	Ha	350	380	410	425	535	580	720	800	985	1120	1255
	V	165	165	200	200	200	200	250	300	350	350	350

PN25	DN	250	300	350	400	450	500	600	700	800	900	1000
	D	425	485	555	620	670	730	845	960	1080	1200	1320
	L	450	500	550	600	650	700	800	840	880	920	960
	Hc	1110	1250	1320	1520	1580	1630	1750	2000	2260	2520	2780
	Ha	1380	1570	1690	1940	2050	2150	2400	2750	3000	3250	3500
	V	450	500	500	500	550	600	700	700	700	750	750

PN40	DN	25	32	40	50	65	80	100	125	150	175	200
	D	115	140	150	165	185	200	235	270	300	330	360
	L	225	230	240	250	290	310	350	400	450	380	550
	Hc	290	320	350	365	460	490	600	660	820	930	1035
	Ha	350	380	410	425	535	580	720	800	985	1120	1255
	V	200	200	200	200	200	200	250	300	350	350	350

PN40	DN	250	300	350	400	450	500	600	700	800	900	1000
	D	425	485	555	620	670	730	845	960	1080	1200	1320
	L	650	750	850	950	650-	-	-	-	-	-	
	Hc	1110	1250	1320	1520	1580	1630	1750	2000	2260	2520	2780
	Ha	1380	1570	1690	1940	2050	2150	2400	2750	3000	3250	3500
	V	450	500	500	500	550	600	700	700	700	750	750



Note- this table gives a brief overview of some standard ASME and DIN sizes.

Additional sizes, connections and configurations are available upon request. Dimensions are subject to change.

Threaded, BWE, RF, RTJ and special connectors are available for all sizes and configurations

Special Gate Valves

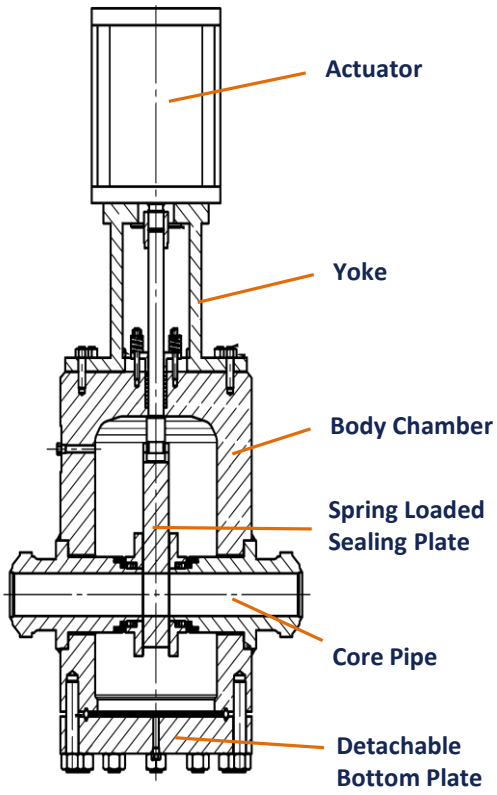
77HP Hulk Plate Valve

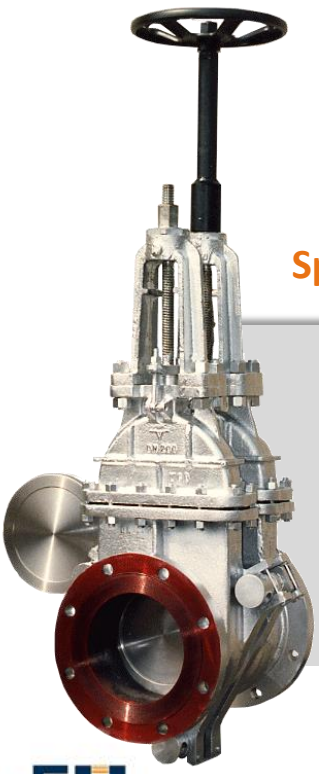
The main feature of SchuF's Hulk Plate Gate valve is its rigid and solid design. It is built for critical high-pressure service where there is a space restriction in the pipe length. The plate has a precise guiding arangement and a spring-loaded sealing surface.

Depending on the application for which it is used, it can be supplied with a double- or triple- chamber design, with a spindle running through a stuffing box ensuring an optimum seal to atmosphere. Furthermore, although the valve is usually installed with the plate aligned horizontally, it can also be installed in the vertical position. This valve design can provide internal and external (to atmosphere) gas tight shut-off.

KEY FEATURES

- Rigid, sturdy design
- Compact design in terms of pipe length, in comparison to other high-pressure valves
- Full-port flow and piggable
- Low-turbulence flow design
- Self-aligning guided plate
- High sealing forces achievable due to spring-loaded sealing ring design
- Tight external shut-off via spindle and stuffing-box design
- Easy maintenance
- Reliable response
- Suitable for automation
- Large variety of materials available



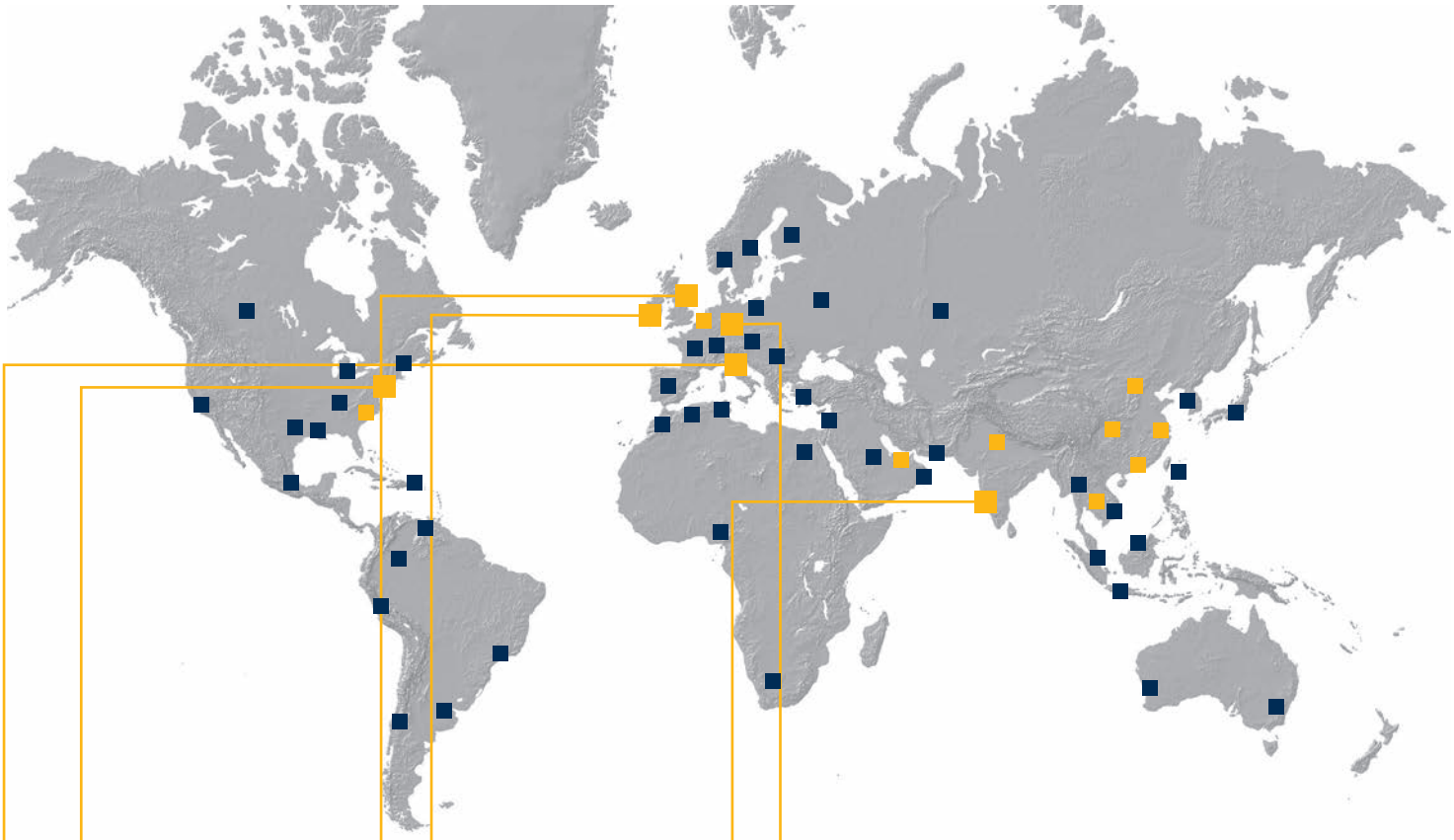


Special Valve Combinations

SchuF, as the leading manufacturer of custom-made valves, can build various combinations of different valve types to meet the highly-specific requirements of our customers.

The photo (left) shows a triple-block gate valve.
This consists of two gate valves and a swing-blind Cam-Set.

SchuF Worldwide



www.schuf.com · www.schuf.de

USA

Fetterolf Corporation
info@fetterolfvalves.com

USA Sales Channel
SchuF (USA) Inc.
sales@schuf.us

IRELAND

SchuF Valve Technology GmbH
sales@schuf.ie

GERMANY

SchuF-Armaturen und Apparatebau GmbH
sales@schuf.com

Your Sales Channel:

SchuF Benelux B.V.
rklink@schuf.com

SchuF Middle East F.Z.C.
ecalnan@schuf.com

SchuF South East Asia Pte. Ltd.
mmulder@schuf.com

SchuF Valves China Ltd.
schufchina@schuf.com

ITALY

La Tecnovalvo S.r.l.
info@latecnovalvo.com

UNITED KINGDOM

SchuF (UK) Ltd.
sales@schuf.co.uk

INDIA

SchuF Speciality Valves India Private Limited
sales@schuf-india.com

Your Local Agent: