

# VELAN

## CAST STEEL Gate, Globe and Check Valves



Please note this is a condensed catalog.  
For a complete version, contact Velan directly.

API 600 & 603 • ASME Class 150–1500 • 2 – 60" (50 – 1500 mm)

# VELAN COMPANY PROFILE

Velan is one of the world's leading manufacturers of industrial valves, supplying forged and cast steel gate, globe, check, ball, butterfly and knife gate valves for critical applications in the chemical, petrochemical, oil and gas, fossil and nuclear power, cogeneration, pulp and paper and cryogenic industries.

Founded in 1950, Velan earned a reputation for excellence as a major supplier of forged valves for nuclear power plants and the U.S. Navy. Velan Inc., pioneered many designs which became industry standards, including bellows seal valves, all stainless steel knife gate valves and forged valves up to 24".

Velan valves are manufactured in 12 specialized manufacturing plants, including five in Canada, two in Korea, and one each in the U.S., France, U.K., Portugal and Taiwan. We have a total of 1,126 employees in North America and 374 overseas.

The **Velan Corporate Philosophy** is to bring to the market new and innovative valve designs with special emphasis on quality, safety, ease of operation, simple in-line maintenance and most of all, long service life. All this combined with the use of high quality materials, advanced manufacturing technology and automation in all stages of manufacturing ensures the highest possible quality at a competitive price. Velan is strongly committed to defending its market position and aggressively competing in all countries around the world.

**NOTE:** *The material in this catalog is for general information. For specific performance data and proper material selection, consult your Velan representative. Although every attempt has been made to ensure that the information contained in this catalog is correct, Velan reserves the right to change designs, materials or specifications without notice.*

## CONTENTS

Manufacturing Program .....	3
Manufacturing Technology .....	5-9
Low-Emission Technology .....	10-12
Design Features .....	13-17
Gate Valves .....	18-19
Globe & Stop Check Valves .....	20-21
Check Valves .....	22-23
Special Service Valves .....	24-27
Stainless Steel Valves .....	28-30
Accessories .....	31-32
Engineering Data .....	34-35
How to Order .....	36

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# VELAN API 600 & 603 CAST STEEL VALVES

## FOR THE OIL, GAS, PETROCHEMICAL, CHEMICAL AND PULP & PAPER INDUSTRIES

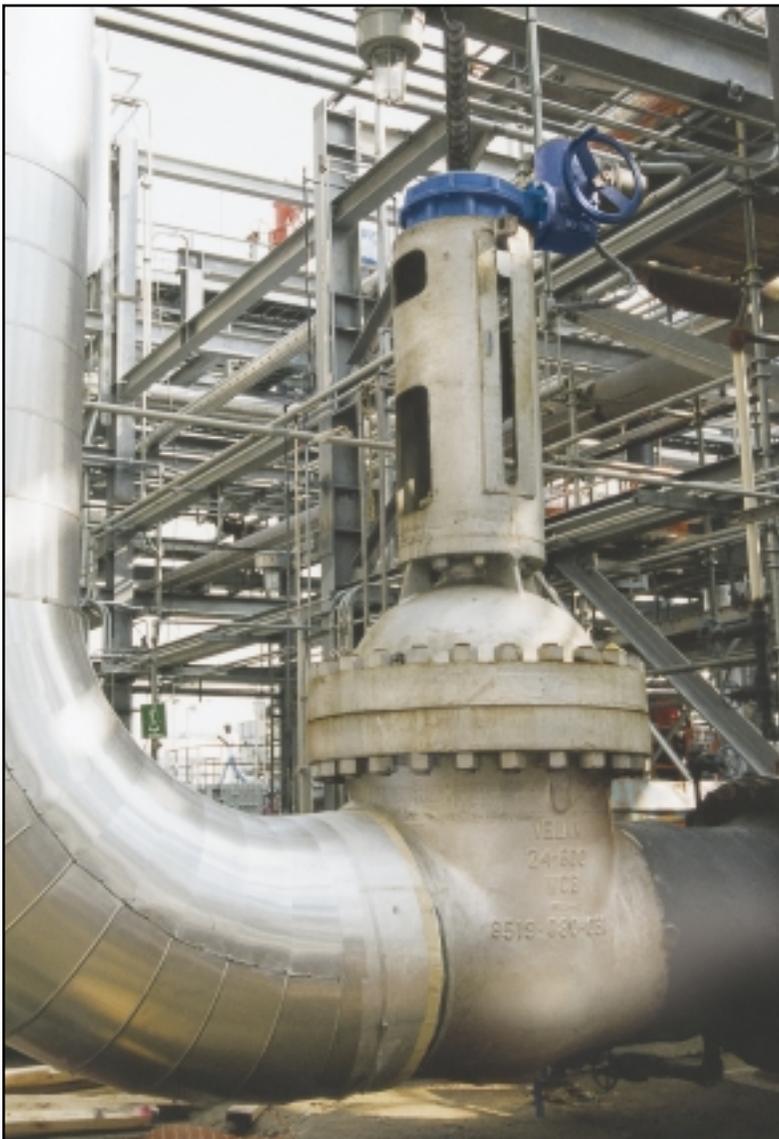
### LOW FUGITIVE EMISSIONS

Velan's comprehensive line of cast steel gate globe and check valves features leading edge design, engineering and manufacturing technology. Our valves meet the most stringent national and international standards for fugitive emissions.

Our gate globe and check valves are widely used in many industries including:

- **Process Industries** – Oil, Chemical, Petrochemical, Refining, Pulp & Paper, Pharmaceutical and Food Processing.
- **Power Industries** – Nuclear, Fossil Fuel, Combined Cycle, Cogeneration and District Heating.

In addition, our valves are used for Shipbuilding, LNG Tanker Carriers, Offshore Platforms, Water Treatment, Mining and more.



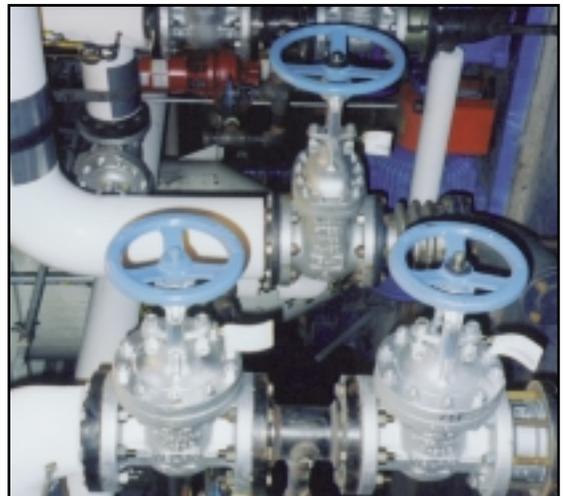
Carbon steel gate valve (ASME Class 600), used for boiler feed water installation at a Hydrogen Plant in Texas.



Cast steel valve installation at an oil refinery.



A geothermal power plant valve installation for sour gas service.



API 600 gate valves in service for a boiler feed installation.

# CAST STEEL VALVES MANUFACTURING PROGRAM

## API 600 CAST STEEL GATE, GLOBE & CHECK VALVES

VALVE TYPE & CLASS		SIZE (in, mm)																					
		2 50	2½ 65	3 80	4 100	6 150	8 200	10 250	12 300	14 350	16 400	18 450	20 500	24 600	28 700	30 750	32 800	36 900	40 1000	42 1100	48 1200	54 1350	60 1500
GATE	150	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	300	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	600	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	900	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	1500	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
GLOBE	150	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	300	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	600	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	900	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	1500	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CHECK	150	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	300	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	600	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	900	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	1500	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

## API 603 CAST STAINLESS STEEL GATE, GLOBE & CHECK VALVES

VALVE TYPE & CLASS		SIZE (in, mm)															
		½ 15 <sup>(1)</sup>	¾ 20 <sup>(1)</sup>	1 25 <sup>(1)</sup>	1½ 40 <sup>(1)</sup>	2 50	2½ 65	3 80	4 100	6 150	8 200	10 250	12 300	14 350	16 400	18 450	20 500
GATE	150	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	300	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
GLOBE	150	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	300	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CHECK	150	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	300	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

(1) Refer to API 603 catalog.

### API 600 BONNET GASKET MATERIALS

VALVE TYPE	MATERIAL
GATE	Class 150: corrugated steel/graphite (except 2-2½" (50-65 mm) spiral wound)
	Class 300-1500: spiral wound stainless steel and graphite
GLOBE	Spiral wound stainless steel and graphite
CHECK	Spiral wound stainless steel and graphite

### API 603 BONNET GASKET MATERIALS

VALVE TYPE	MATERIAL	
GATE, GLOBE and CHECK	Trim SX or SY	Trim GX, GY or GS
	PTFE with stainless wire mesh	graphite with stainless steel foil

### OPTIONAL BODY MATERIALS

ASTM SPEC. GRADE	NOMINAL DESIGNATION	MIN. TEMP		MAX. TEMP.		VELAN CODE
		°F	°C	°F	°C	
A216-WCB	Carbon steel	-20	-29	800	427	02
A217-WC6	1¼ CR-½ Mo	-20	-29	1100*	593	05
A217-WC9	2¼ CR-1 Mo	-20	-29	1100*	593	06
A217-C5	5 CR-½ Mo	-20	-29	1200*	649	04
A217-C12	9 CR-1 Mo	-20	-29	1200*	649	09
A352-LCB	Carbon steel	-50	-46	650	343	25
A352-LCC	Carbon steel	-50	-46	700	371	31
A352-LC2	2½ Ni	-100	-73	650	343	26
A351-CF8M	18 CR-9 Ni-2 Mo	-425	-254	1500*	816*	13
A351-CF3M	18 CR-9 Ni-2 Mo	-425	-254	850	454	14

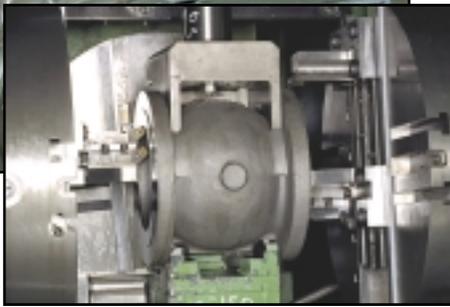
Note: \*Flanged end ratings terminate at 1000°F (538°C) for Class 150.

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# WORLD'S LARGEST MASS PRODUCTION OF API 600 CAST STEEL VALVES



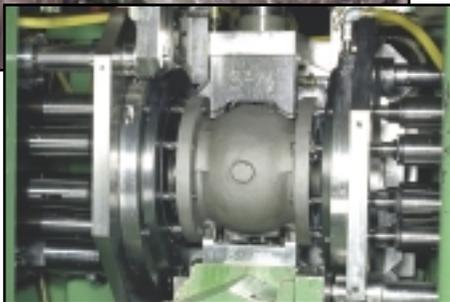
*Automatic 3-way facing machine.*



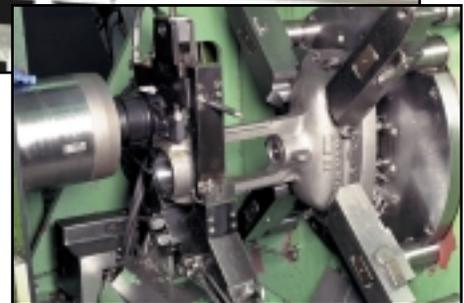
*For smaller runs, complete automatic machining and drilling in one set-up.*



*Automatic multiple drilling machine.*



*Automatic bonnet machine.*

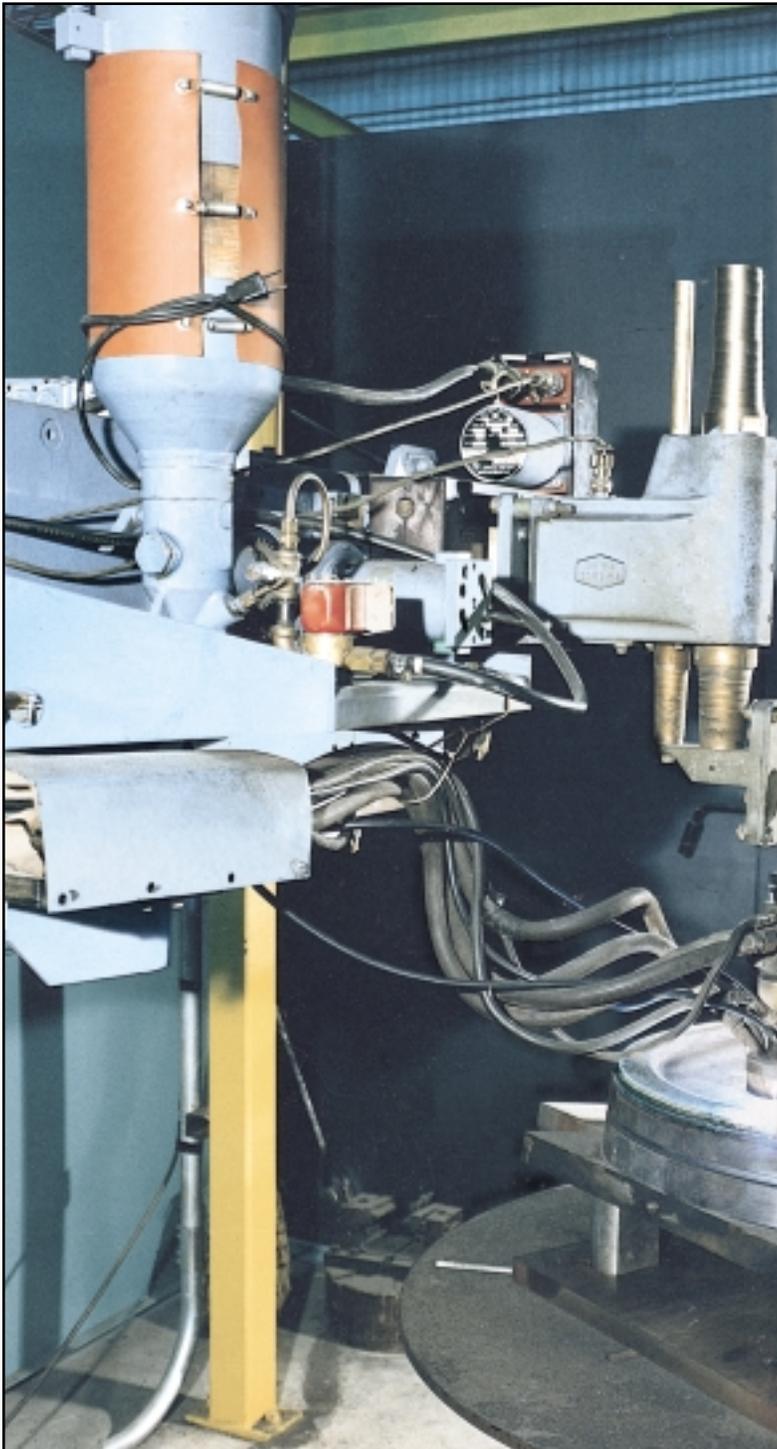


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## AUTOMATIC PLASMA ARC HARDFACING FOR SEATS AND DISCS

High quality deposits of Stellite 6 and other hardfacing alloys are assured by the use of the following state of the art technology: controlled preheating, automatic Plasma Arc hardfacing equipment and a controlled cooling process. Shown below is the hardfacing of a gate valve wedge and to the right a cast steel seat.



# RELIABILITY THROUGH TESTING



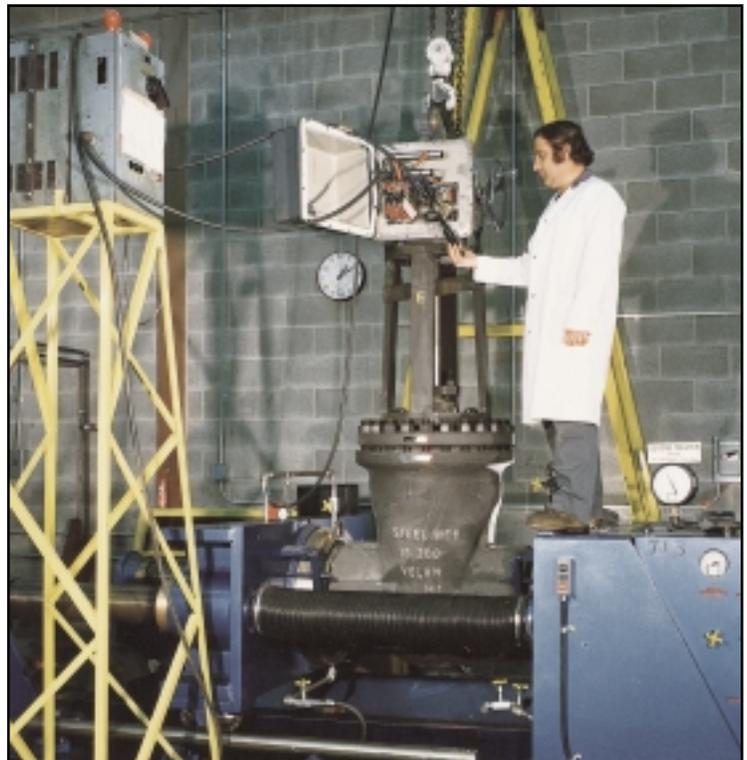
**Top:**  
*Semi-automatic stations for testing 2–12" (50–300 mm) valves to API 598.*

**Bottom Right:**  
*Operational test for electric actuators.*

**Bottom Left:**  
*TA-LUFT qualification test on a 4" Class 600 gate valve with live-loading. The test medium is helium at 1500 psi (100 bar).*



All valves are tested during production for reliability with pressurized air and hydrotested for bubble-free tightness in accordance with API 598 specifications.



# CONTINUOUS CASTING QUALITY IMPROVEMENT AND COMPUTERIZED CASTING PROCESS SIMULATION

## VELAN'S VEL-QCI-955 PROGRAM (API 600/ISO 10434)

The **Velan VEL-QCI-955 Program** was implemented to set the quality control standards for pressure boundary castings, and to ensure a consistent supply of quality castings to Velan.

1. X-Ray Sample (pattern) Approval Process;
2. X-Ray Monitoring Program;
3. Casting Monitoring Program.

## SAMPLE CASTINGS

Before castings are released for production, the Velan NDE Inspector Level III, evaluates and approves the submitted x-ray films (100% coverage) as per B16.34 acceptance standard.

## X-RAY MONITORING:

Random x-ray monitoring requires that castings taken every six months from each vendor, randomly by size and quantity sets and x-rayed per B16.34 requirement.

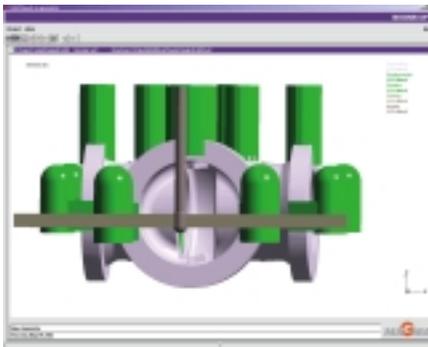


*Pro-Engineering model imported into Magmasoft® casting simulation program.*

If casting fails to meet the x-ray requirements of B16.34, Velan's Senior Metallurgist will issue a corrective action request to the vendor, including recommendations for detailed methoding change and re-x-ray.

## CASTING MONITORING:

Rejected castings due to defects such as hydro-test leakage, porosity, inclusions, shrinkage indication discovered by x-ray or machining, are entered into the computer, as part of the statistical control of each vendor.

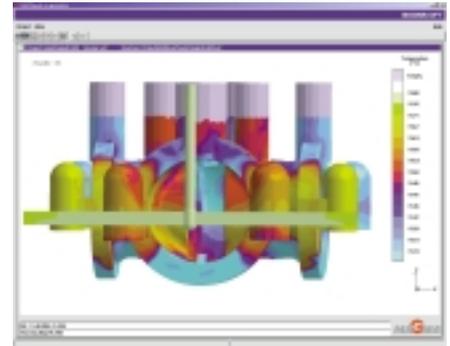


*Riser and gating simulation on a 30" Class 600 gate body.*

## 3-D SOLIDIFICATION SIMULATION:

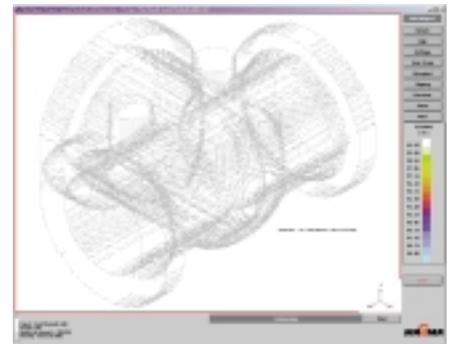
Velan is one of the first valve manufacturers in the world to have the MAGMASOFT® computer casting simulation program at its design facilities.

Working together with foundry engineers and our designers, we continue improving the internal integrity of castings, to X-Ray Level II or better as a general standard.



*90% filling simulation on a 30" Class 600 gate body.*

One example of the successful cooperation of Engineering, our Metallurgist and the foundry, using the MAGMASOFT® simulation, is shown for 30" Class 600 Gate body on this page.



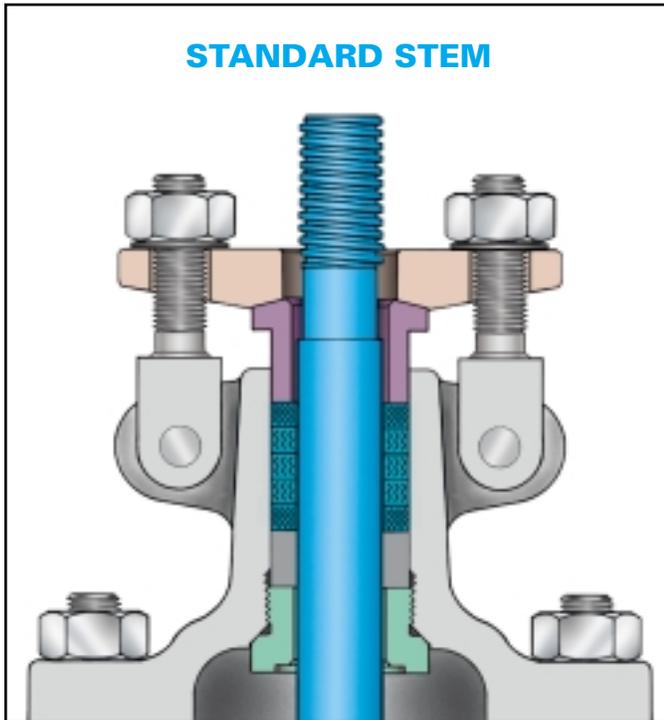
*No shrinkage on a 30" Class 600 gate body simulation.*

## Benefits to Velan's customers and to the foundries:

- Shorter delivery time,
- Higher quality of commercial castings,
- Optimum methoding system,
- Elimination of trial at sample approval,
- Improves the internal integrity of castings (RT level 2 or better) at pattern approval,
- Optimizes the metal flow and solidification pattern,
- Predicts internal defects,
- Reduces scrap,
- Optimizes the design of the castings,
- Solves problems such as shrinkage and porosity, without test castings,
- Reduces NDE (x-ray) upgrading.

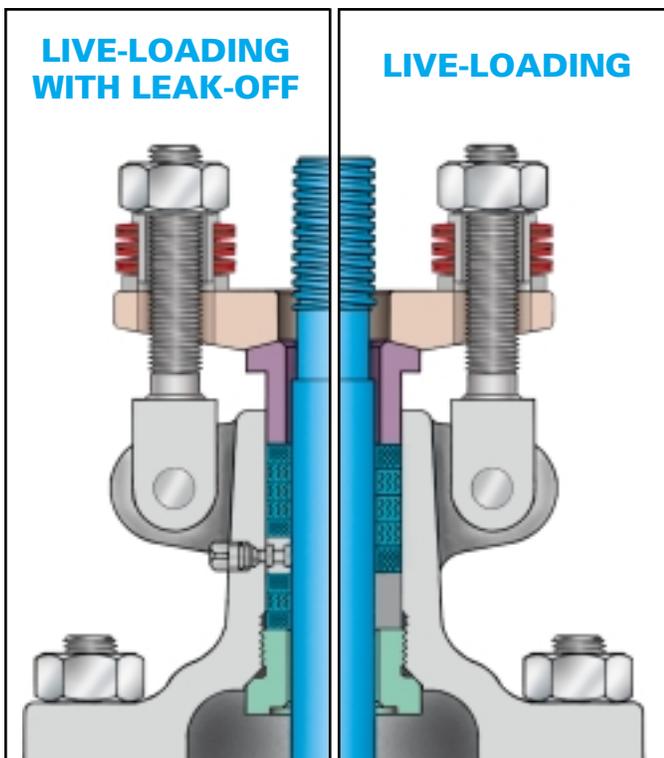
# DESIGN OF STEM SEALS

*Velan now offers standard cast steel bolted bonnet gate and globe valves qualification tested for compliance with EPA fugitive emissions regulations*



The Velan stem seal evolved from these test findings:

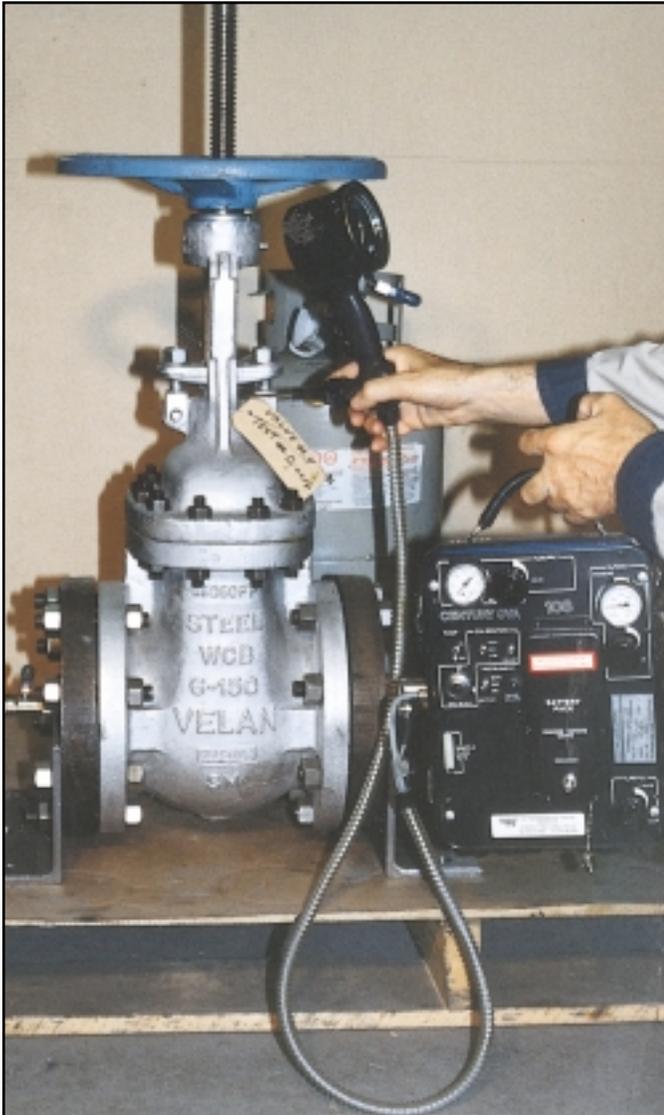
- **Ensures leakage of less than 100 ppm** as demonstrated through extensive laboratory testing.
- **Large loads.** Sealing is achieved when compression load is high and packing forms a mass of low porosity and permeability (4,000 psi for graphite).
- **Small clearances between vital parts.**
- **Precision stem and packing chambers.** Straightness, roundness and fine finish of stem and packing chamber wall are essential.
- **Short and narrow packing chambers improve sealing.** Maximum six rings in a single set chamber and wherever possible, only ¼" wide.
- **Stem and packing chamber walls.** Close roundness, straightness and superior surface finish of 6 RMS or better for the stem and 63 RMS for the packing chamber.



## LIVE-LOADING OPTIONS

- **Live-loading.** Two sets of Belleville springs maintain a permanent packing stress of 3500–4000 psi. Live-loading extends low emission service life especially in service with large pressure/temperature transients or frequent cycling.
- **Leak-off.** For critical service a lantern ring and double packing can be provided with a leak-off connection. The leak-off is provided to allow collection of leakage from the lower packing set.
- **Rings individually compressed in packing chamber** to 3500–4000 psi for graphite and 2,000 psi PTFE to ensure equal stress distribution and effectiveness of all rings.
- Velan has extensive experience in valve live-loading. The original live-loading concept was developed by Velan in 1972 in a research project for AECL to eliminate leakage in Nuclear service. Velan has been supplying live loaded valves for Nuclear and non-Nuclear service for more than 30 years.

# API 600 CAST STEEL VALVES TYPICAL TEST REPORT



## TEST CONDITIONS

**Test Medium:** Propane at 115 psi, ambient temperature

**Instrument:** Organic vapor analyzer OVA-108, range 1–10,000 ppm

**Valve Type:** Gate, Class 150, API 600

**Sizes:** 3", 6", 12" (80, 150, 300 mm)

**Packing:** Graphite

**Gasket:** Corrugated steel with graphite filler

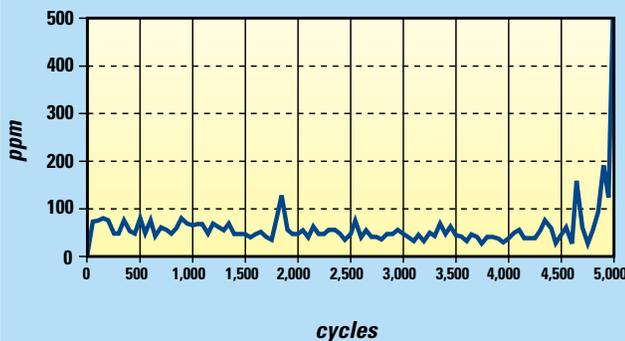
**Trim:** Wedge: 13 CR  
Seat: Stellite

**Quantity:** 3" (80 mm)–one valve  
6" (150 mm)–four valves  
12" (300 mm)–one valve

## TEST COMPARISON TO API 598 TEST

- API 598 test standard requires no visible external leakage (gasket, packing chamber and casting). The organic vapor analyzer measures leakage in parts per million (ppm). "Visible leakage" in API 598 is one drop of liquid per minute which we estimate is equivalent to about 2,400 ppm of gas. The API 598 test does not invoke cycling while we have cycled valves between 100 and 5000 cycles in our research testing.
- Critical factors in low emission service life include severity of pressure-temperature transients, number of cycles and cleanliness. During extensive cycling tests it was found that after leak paths developed, leakage could be reduced or eliminated by retightening gland bolts. For example a 150 ppm leak that developed after 350 cycles could be reduced to zero after retightening gland bolts.

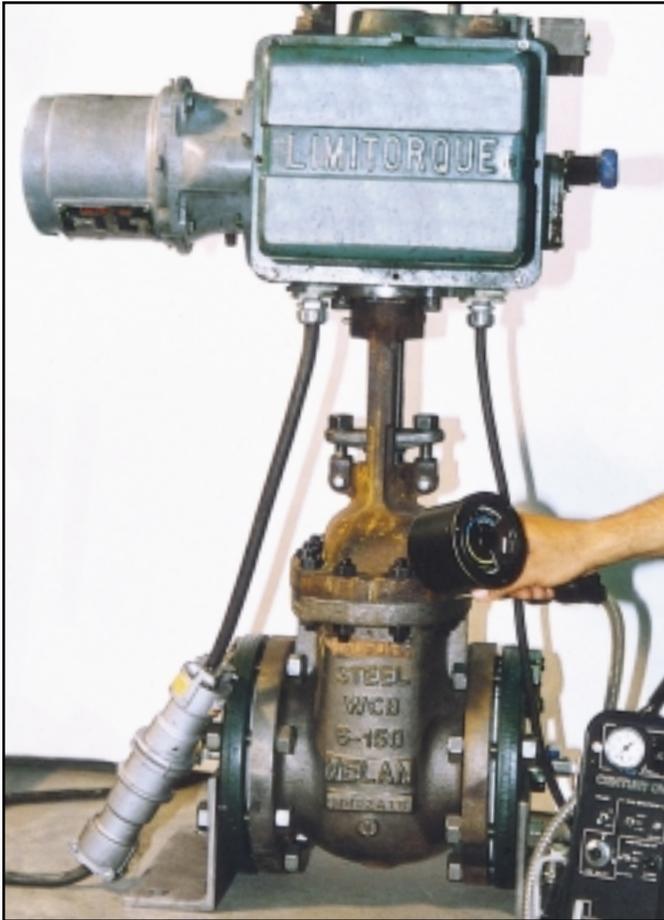
## 6" GATE VALVE 5,000 CYCLE TEST



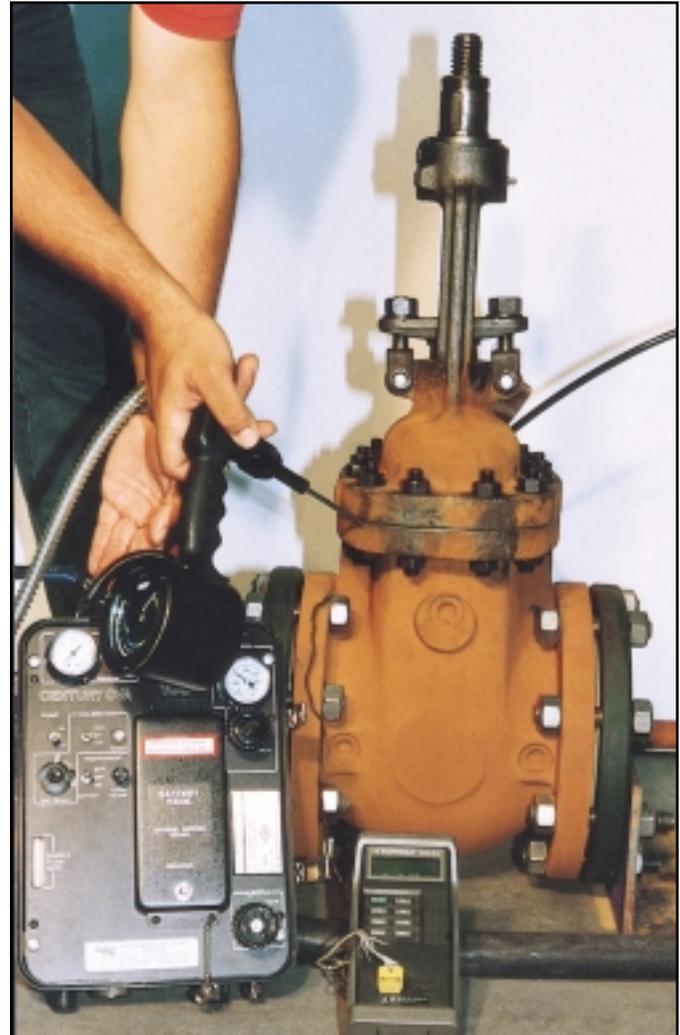
## 3", 6" & 12" GATE VALVES 100 CYCLE TEST



# TESTING GASKET PERFORMANCE



**Upper left:**  
3000 cycles  
with propane  
at 125 psi  
Leakage:  
zero ppm.



**Upper right:** 50 cycles with steam at 400°F (204°C)  
Leakage: zero ppm.

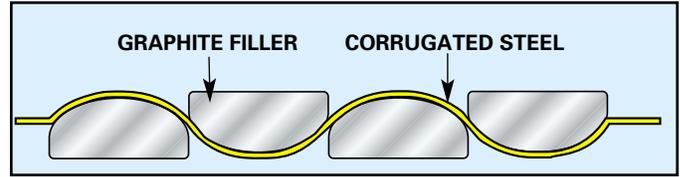


**Left:**  
Thermal shock  
with water at  
60°F (15°C)  
Leakage:  
zero ppm.

<b>Valve type:</b>	<b>Class 150 gate valve</b>
<b>Size:</b>	<b>6" (150 mm)</b>
<b>Gasket:</b>	<b>Corrugated steel with graphite filler</b>
<b>Instrument:</b>	<b>OVA-108 vapor analyzer Range: 1–10,000 ppm</b>

# BODY-BONNET GASKET DESIGN

## GATE VALVES WITH OVAL FLANGES



Standard corrugated steel gaskets without graphite as specified in API 600 were found to be an unacceptable choice for low emission service, even under ideal laboratory test conditions, and regardless of flange finish and gasket load. After testing several alternative gaskets, we selected the best performing gasket in our tests - a corrugated steel gasket with graphite filled channels.

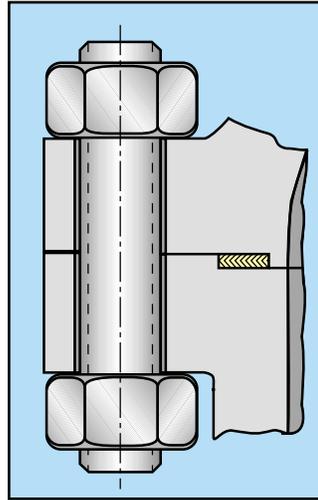
### TYPICAL TEST RESULT:

3700 cycles with zero ppm for 6" Class 150.

### DESIGN FEATURES:

- Ensures leakage of no more than 20 ppm as demonstrated through extensive laboratory testing.
- Requires no retorquing after long cycling.
- Effective under wide fluctuations of temperature and pressure.
- Insensitive to flange finish.
- Steel walls of graphite channels provide additional protection from oxidation, corrosion and blow-out.
- Seal offers the advantage of flexible graphite (0-14pH, -328°F to +2000°F).
- Lower bolt torques.
- Modern torquing methods.

## API 600 CAST STEEL VALVES WITH ROUND BODY-BONNET FLANGES



### FULLY-ENCASED SPIRAL WOUND 316 or 347 SS/GRAPHITE BODY-BONNET GASKET

<b>Gate</b>	Class 150: 2-2½" (50-65 mm) Class 300-1500: 2-36" (50-900 mm)
<b>Globe</b>	Class 150-600: 2-16" (50-400 mm)
<b>Check</b>	Class 150-1500: 2-36" (50-900 mm)

### DESIGN FEATURES:

- Full enclosure to allow gasket to retain positive radial support during loading.
- Ensures leakage of no more than 20 ppm as demonstrated through extensive laboratory testing.
- Accurate control of compression through close tolerance of gasket groove and allowance for radial expansion.
- No radial machine marks.
- Minimum of three inner wraps to prevent buckling.
- Minimum of three tack welds.
- Minimum of three filler wraps.
- Close tolerance ( $\pm 0.005"$  or 0.13 mm) for gasket thickness.
- Regular testing of gasket resiliency and inspection at Receiving due to sensitivity to inconsistent quality.
- Modern torquing methods.

### TYPICAL TEST RESULT:

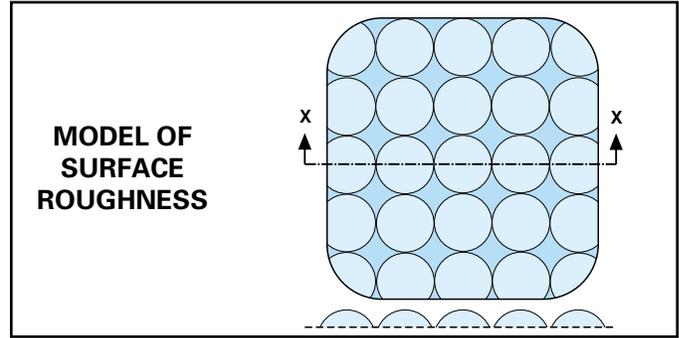
3100 cycles with zero ppm for 10" Class 300.

# TECHNOLOGY OF SEAT-DISC TIGHTNESS

The initial seat tightness of valves which can be proven by hydro-testing has little effect on extended long-term tightness.

## SEAT-DISC CONTACT MECHANICS

- When magnified, even a ground, lapped surface appears irregular and rough.
- The rate of leakage is a function of the smoothness and finish of the surfaces.
- The seat-disc (wedge) contacts are between the peaks.
- For absolutely leak-tight joints, the peaks must be deformed with torque until a large portion of mating surfaces is in microscopic contact.
- The compression stress is approximately 3 times the yield (for 70,000 psi–210,000 psi).
- Sufficient contact pressure generated by the torque is essential. A small increase in contact pressure produces a rapid decrease in leakage.
- The valve seat should be either very narrow or very wide, depending on the valve type.



<b>Globe Valves</b>	Conical seat-line contact
<b>Gate Valves and Swing Check Valves</b>	Large, flat-faced seats

# VELAN API 600 GATE VALVE SEAT TIGHTNESS

## GATE VALVE SEAT TIGHTNESS

- Welded-in Stellite 6 faced seats and a flexible wedge in 13 CR, SS 316, Monel or hardfaced with Stellite 6.
- Seating faces ground and lapped to 2 RMS.

## Factory Acceptance Standard for Gate Valve Seat Leakage

Size in	Velan Standard (VEL-NDT-571)	Seat Leakage Rate <sup>(1)</sup> (API 598 – October 1996)	
		Low Pressure Test	High Pressure Test
2	0	0	0
2½–6	0	24	12
8–12	0	40	20
14+	28	56	28

(1) Leakage rates are in bubbles per minute for low pressure test and drops per minute for high pressure test

# EIGHT IMPORTANT STEPS IN ASSEMBLY & TESTING

*Make the Difference in Seat Tightness and Performance*

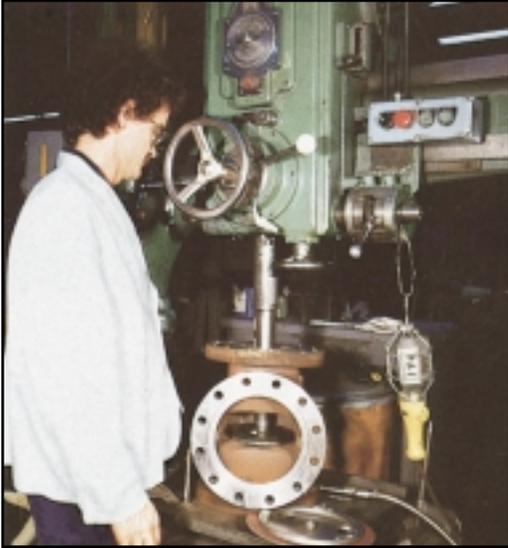


**1** Automatic seal welding of Stellite 6 hardfaced seats.

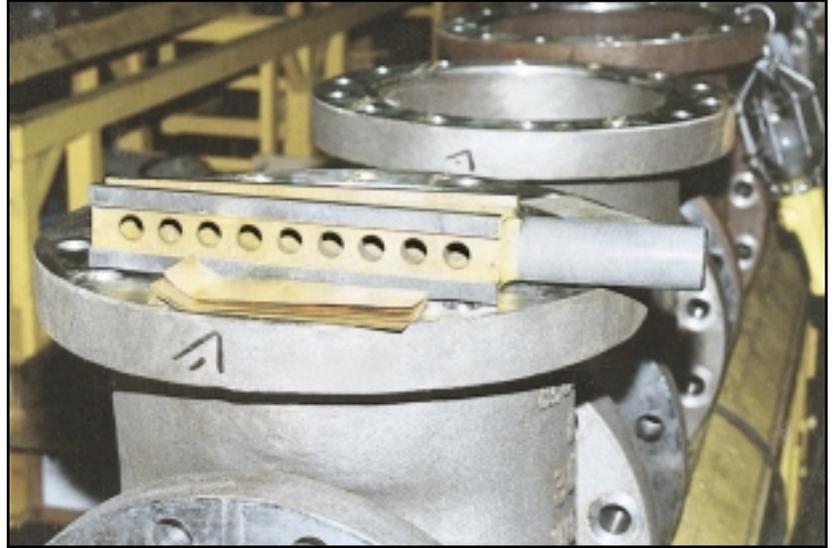


**2** Air-under-water test of the seat's welds.

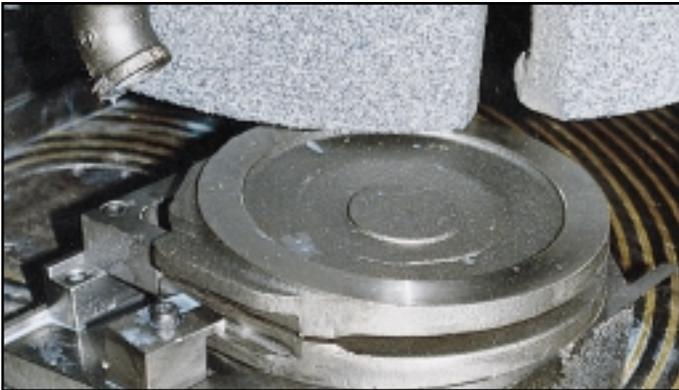
Please note this is a condensed catalog. For a complete version, contact Velan directly.



**3** Relapping of seating faces after seal welding.



**4** Determination of final seat/seat angle with gauge and shims to determine ideal wedge angle (6-60").



**5** Precision grinding of individually fit wedge seating surfaces.



**6** Lapping of wedge seating surfaces.

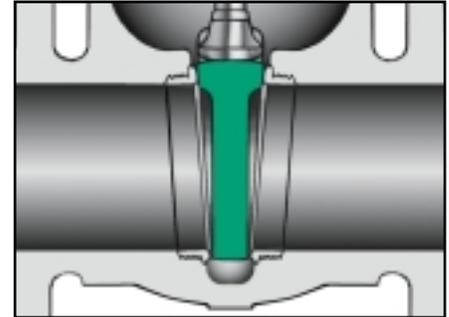


**7** Assigning the ideally fitted wedge, ground and lapped, to proper valve body.



**8** After assembly, pressure testing of shell, seats, packing and backseat to API 598.

# VELAN API 600 GATE VALVES FLEXIBLE WEDGE VERSUS SOLID WEDGE



## FLEXIBLE ROUND WEDGE PIONEERED BY VELAN

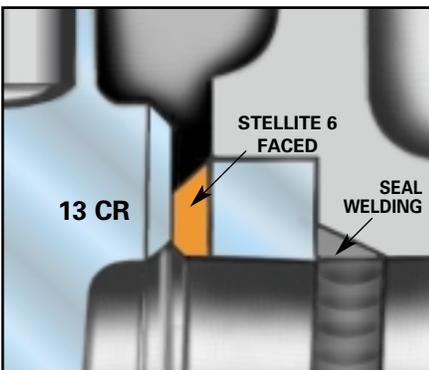
- Universal use for temperatures up to 1000°F (538°C).
- Flexibility compensates for seat face distortion.
- Compensates for deformation of body due to pipe stresses.
- Long cycle life.
- Ideal for processes with large temperature fluctuations.

- Assures valve tightness on both seats over wide range of pressures.
- Stem to wedge connection is inside the seating faces supporting the wedge ears during opening.
- More robust with less mass.

## CLASSICAL SOLID WEDGE ON COMPETITIVE DESIGNS

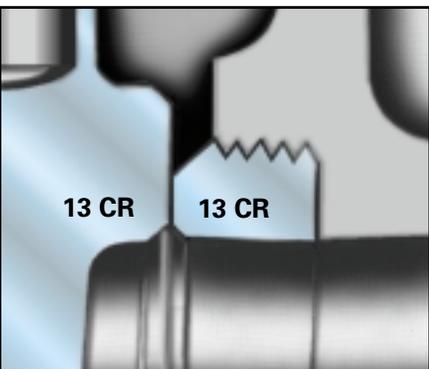
- Wedge may cause severe jamming at temperatures over 200°F (93°C).
- Suitable for small valves (½–2", 15–50 mm).
- Wedge will stick when valve is closed hot and allowed to cool.
- No compensation for deformation of body due to pressure-temperature or pipe stresses.
- Difficult to make valve tight on both seats due to seat face distortion.

# SEAL WELDED SEATS VS SCREWED-IN SEATS



## VELAN STANDARD GROUND AND LAPPED SEAL WELDED SEAT RINGS FACED WITH STELLITE 6

- Pioneered by Velan and considered state-of-the-art technology.
- Welded-in leakproof.
- Weld quality 100% tested.
- Stellite 6 seating faces for long service life.
- Ground and lapped to 2 RMS finish after weld-in.
- Standardized use for steam up to 1000°F (538°C), oil and gas.
- Stellite face will wear less than the 13 CR wedge, which can easily be repaired or replaced.

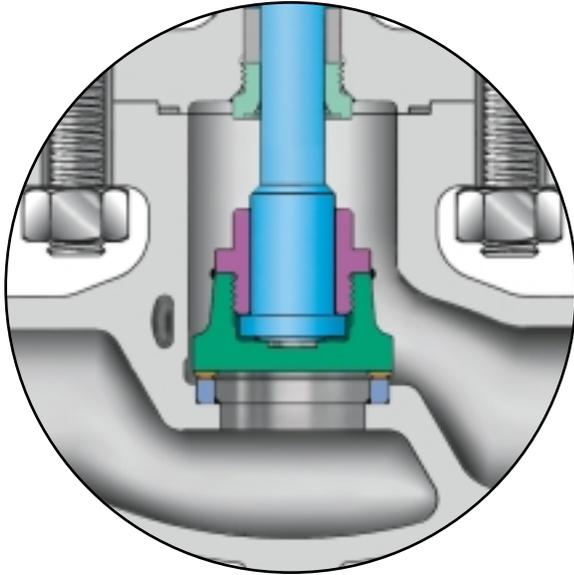


## COMPETING SCREWED-IN SEATS IN 13 CR

- Can loosen up due to corrosion and cause substantial leakage.
- Replacement is difficult if not impossible.
- Threads can corrode and cause leakage.
- Seat is unsecured from unscrewing.
- Seat can become loose due to temperature fluctuations, corrosion or vibration, and can leak.
- Not suitable for steam service. Steam and other fluids will wire draw body threads of loose seats beyond repair.
- 13 CR seat suitable only for certain fluids.

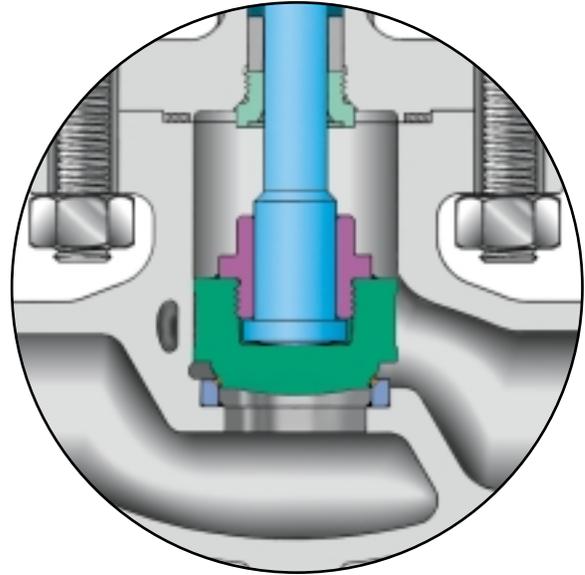
## VELAN API 600 GLOBE VALVES FLAT AND CONICAL SEATS

FLAT SEAT



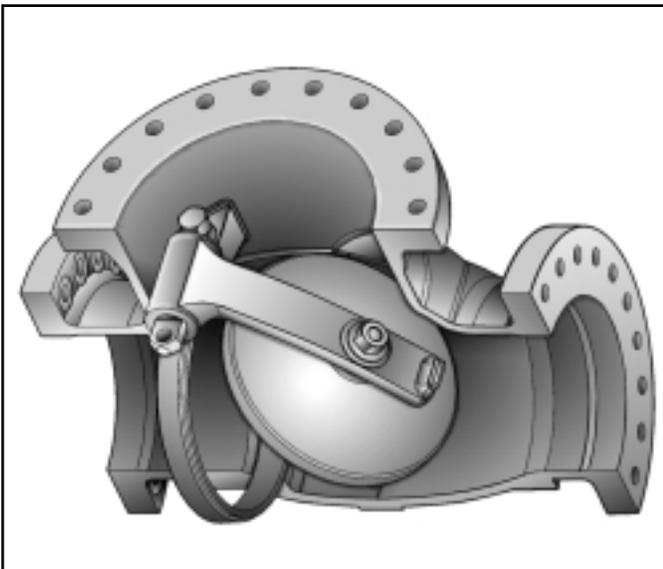
- Machining, lapping to close tolerances is easy.
- Flatness tolerance easy to control.
- Area contact wide seat.
- Disc is guided by the mating surface of the seat.
- Hard thrust pad prevents galling.
- Faster maintenance in-line. Flat seating faces can be lapped and checked for flatness easier.

CONICAL SEAT



- Line contact seal.
- Contact pressure increase by 1.5–5 with same stems and yokes.
- Seat has greater elasticity.
- Lower closing torques.
- Recommended for high pressure-temperature.

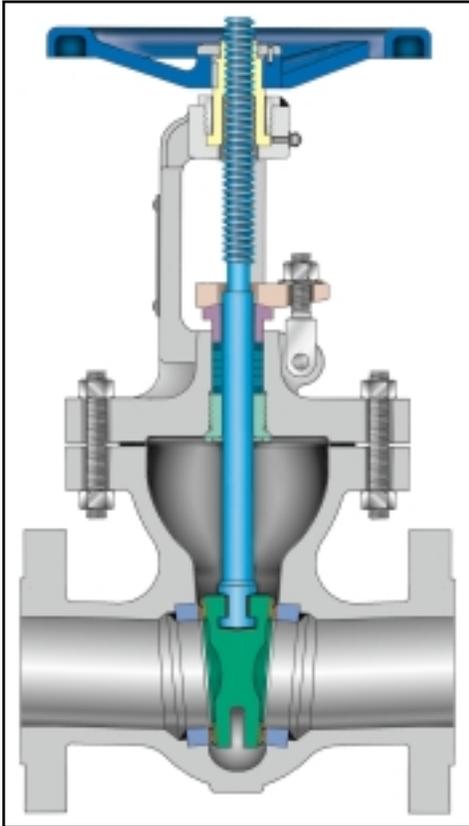
## VELAN API 600 SWING CHECK VALVES



- Cage unit design with no penetration of body prevents:
  - a) Possibility of leakage with gasketed or packed hinge pin.
  - b) Possibility of pin ejection.
- All parts are accessible from the top for easy servicing.
- Welded-in seat is Stellite 6 faced.
- Disc is free to rotate to prevent localized wear.
- Ground and lapped seating surfaces.



# CAST CARBON, STAINLESS OR ALLOY STEEL API 600 BOLTED BONNET GATE VALVES, 2–60" (50–1500 mm) ASME CLASSES 150, 300, 600, 900 AND 1500



CLASS	FIGURE NUMBER
150	0064C
300	1064C
600	2064C
900	7064C
1500	3064C

## DESIGN SPECIFICATIONS

ITEM	APPLICABLE SPECIFICATION
Wall thickness and general valve design	API 600, BS1414
Pressure-temperature rating	ASME B16.34
Face to face dimensions for butt weld and flanged valves	ASME B16.10
Flange design	ASME B16.5
Butt welding design	ASME B16.25
Materials	ASTM

## DESIGN FEATURES:

- **Universal Trim.** 13 CR stem, wedge in CA 15 or 13 CR faced, and Stellite seat API Trim 8 suitable for applications up to 850°F (454°C).
- **Seat face** Stellite, ground and lapped to a mirror finish.
- **Flexible Wedge** with low center stem-wedge contact, in solid CA15 (13 CR) or hardfaced with 13 CR, SS 316, Monel or Stellite. Wedge is ground and lapped to a mirror finish and tightly guided to prevent dragging and seat damage. A Stellite 6 hardfaced CF8M wedge is also available.
- **Non-rotating stem** with precision Acme threads and burnished finish. Double Acme for faster operation.
- **Body and bonnet joint** accurately machined. Gasket materials on page 3, details on page 13.
- **Body and bonnet** castings are precision machined. One-piece bonnet up to 12" (300 mm) for better alignment and fewer parts.
- **Gland** has two-piece construction for easy alignment.
- **Flanges:**  
Classes 150–300: 1/16" raised face,  
Class 600–1500: 1/4" raised face.  
Finish 125–250 AARH for all valves.
- **Rotating stem nut** is Austenitic ductile iron Gr. D-2C renewable in line (as shown). Thrust bearings are supplied as follows:  
**150–300:** 10–12" (250–300 mm),  
1 bearing (top),  
16" (400 mm) and up,  
two bearings  
**600:** 6" (150 mm) and up  
**900–1500:** 6" (150 mm) and up.

For information on BELLOWS SEAL VALVES see VEL-BS catalog.

## GATE VALVE DIMENSIONS CLASSES 150-600

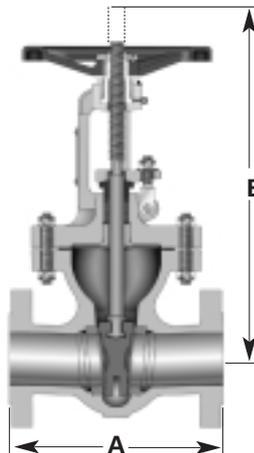
SIZE	ASME 150 (PN 20)		ASME 300 (PN 50)		ASME 600 (PN 100)		
	A		B <sup>(1)</sup>	A <sup>(3)</sup>	B <sup>(1)</sup>	A <sup>(3)</sup>	B <sup>(1)</sup>
	BW	FL					
2	8.50	7.00	15.63	8.50	15.63	11.50	15.66
50	216	178	397	216	397	292	398
2½	9.50	7.50	16.88	9.50	16.94	13.00	18.59
65	241	191	429	241	430	330	472
3	11.12	8.00	18.56	11.12	20.22	14.00	21.63
80	282	203	471	283	514	356	549
4	12.00	9.00	22.25	12.00	23.90	17.00	25.75
100	305	229	565	305	607	432	654
6	15.88	10.50	31.19	15.87	32.31	22.00	36.28
150	403	267	792	403	821	559	922
8	16.50	11.50	38.19	16.50	40.94	26.00	43.72
200	419	292	970	419	1040	660	1110
10	18.00	13.00	47.16	18.00	49.19	31.00	49.06
250	457	330	1198	457	1249	787	1246
12	19.75	14.00	55.91	19.75	59.00	33.00	61.13
300	502	356	1420	502	1499	838	1553
14	22.50	15.00	61.50	30.00	61.38	35.00	72.50
350	572	381	1562	762	1559	889	1842
16	24.00	16.00	68.75	33.00	68.75	39.00	82.25
400	610	406	1746	838	1746	991	2089
18	26.00	17.00	73.25	36.00	77.88	43.00	87.06
450	660	432	1861	914	1978	1092	2211
20	28.00	18.00	83.00	39.00	86.50	47.00	103.00
500	711	457	2108	991	2197	1194	2616
24	32.00	20.00	97.00	45.00	101.25	55.00	115.00
600	813	508	2464	1143	2572	1397	2921
26	34.00	22.00	114.50	49.00	114.50	-	-
650	864	559	2908	1245	2908	-	-
28	36.00	24.00	118.63	53.00	118.63	-	-
700	914	610	3013	1346	3013	-	-
30	36.00	24.00	124.12	55.00	124.12	65.00	122.50
750	914	610	3153	1397	3153	1651	3112
32	38.00	26.00	129.63	60.00	129.63	-	-
750	965	660	3293	1524	3293	-	-
36	40.00	28.00	146.68	68.00	147.81	68.00	145.13
900	1016	711	3726	1727	3754	1727	3686
40	42.00	30.00	158.66	-	--	-	-
1000	1067	762	4030	-	-	-	-
42	44.00	31.00	166.50	-	-	-	-
1050	1118	787	4229	-	-	-	-
48	-	36.00	189.81	-	-	-	-
1200	-	914	4821	-	-	-	-
54	52.00	40.00	216.56	-	-	-	-
1350	1321	1016	5501	-	-	-	-
60	-	42.00	238.80	-	-	-	-
1500	-	1067	6066	-	-	-	-

(1) Height does not include actuator. (2) Gear actuator.

(3) Butt weld and flanged valves have the same end-to-end dimensions for Class 300 and up.

## CLASSES 900-1500

SIZE	ASME 900 (PN 150)		ASME 1500 (PN 250)	
	A <sup>(3)</sup>	B <sup>(1)</sup>	A <sup>(3)</sup>	B <sup>(1)</sup>
2	14.50	21.25	14.50	21.25
50	368	540	368	540
3	15.00	25.75	18.50	25.75
80	381	654	470	654
4	18.00	28.75	21.50	28.75
100	457	730	546	730
6	24.00	39.00	27.75	39.00
150	610	991	705	991
8	29.00	51.75	32.75	45.25
200	737	1315	832	1149
10	33.00	57.75	39.00	57.75
250	838	1467	991	1467
12	38.00	66.57	-	-
300	965	1691	-	-
14	40.50	73.88	-	-
350	1029	1877	-	-
16	44.50	80.44	-	-
400	1130	2043	-	-



BW = Butt weld  
FL = Flanged

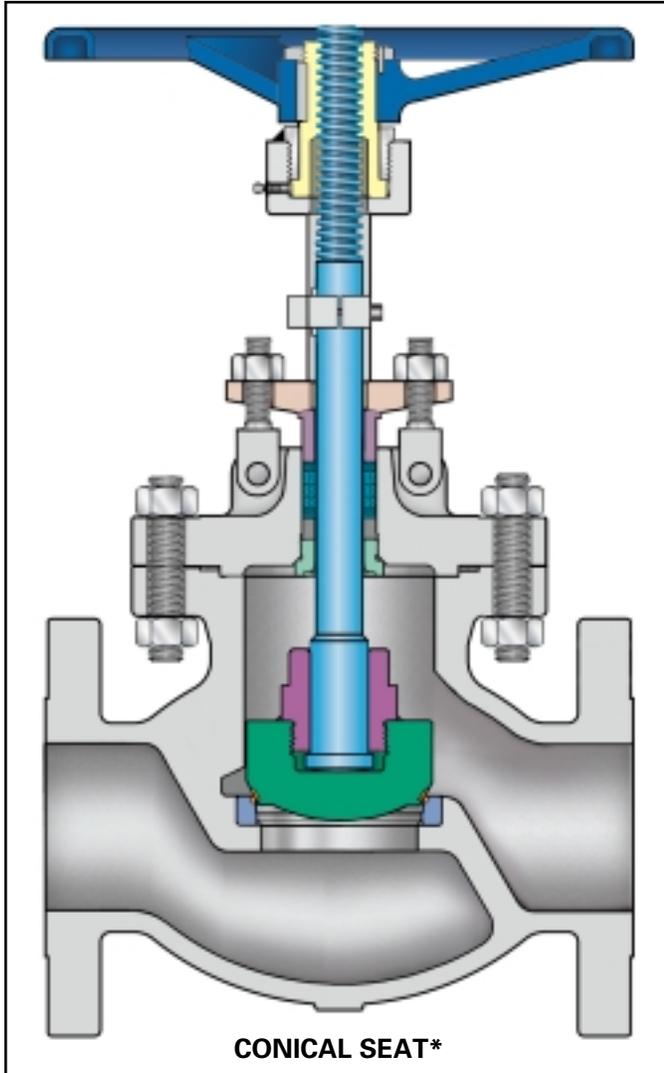
B = Center-to-Top,  
Open

Classes 900-2500  
forged gate valves  
also available.  
See page 32 & 33 for  
valve weights and CVs.

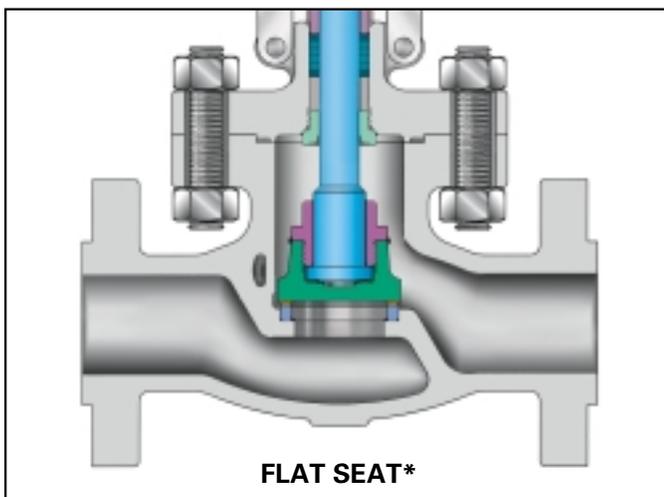


# CAST CARBON, STAINLESS OR ALLOY STEEL API 600 BOLTED BONNET GLOBE AND STOP CHECK VALVES, 2–16" (50 – 400 mm) ASME CLASSES 150, 300 AND 600

**NOW THE ONLY API 600 GLOBE VALVE WITH NON-ROTATING STEM**



CONICAL SEAT\*



FLAT SEAT\*

## DESIGN FEATURES:

- **Non-rotating Stem** with precision Acme threads and burnished finish. Valve suitable for horizontal installation.
- **Universal Trim.** 13 CR stem, 13 CR faced disc and Stellite 6 faced seats API Trim 8 suitable for service up to 850°F.
- **Seat face** Stellite, ground and lapped to a mirror finish. Conical seat machined to 8 RMS.
- **Flat disc.** Floating stem-disc engagement, hardfaced with 13 CR, Stellite 6, SS 316 or Monel, ground and lapped with seat. Disc in SS 316 hardfaced with Stellite 6 also available.
- **Tapered disc.** Disc is guided by the mating surface of the seat, hardfaced with 13 CR, Stellite 6, SS 316 or Monel, ground and lapped with seat. Disc in SS 316 hardfaced with Stellite 6 also available. 2–6" (50–150 mm) valves may have solid CA15 (13 CR) discs.
- **Body and bonnet.** Castings are precision machined. One-piece bonnet for better alignment, fewer parts.
- **Stuffing box** finish to 63 RMS or better.
- **Body and bonnet joint** accurately machined. Fully enclosed gasket. Gasket materials on page 3. Details on page 13.
- **Gland** has two-piece construction for easy alignment.
- **Rotating Stem nut.** Austenitic ductile iron Gr. D-2C, renewable in-line.
- **Torque arm.** To reduce wear on packing rings, to enable better sealing and to reduce torque.
- **Impactor handwheels.** Globe and stop check valves require higher closing torques than gate valves with the same seat diameter and pressure class. The most economical mechanism for tight shutoff is the impactor handwheel. Two lugs cast under the wheel strike simultaneous blows and give 3–10 times the closing force of standard handwheels. Impactor handwheels are supplied at manufacturer's option unless specified by customer (see page 21).
- **Flanges.** Class 150–300:  $\frac{1}{16}$ " raised face. Class 600:  $\frac{1}{4}$ " raised face. Finish 125–250 AARH for all valves.

**\*NOTE:** Most sizes and pressure classes have conical seats. Choice of flat or conical seat is manufacturer's option unless specified by customer.

For information on BELLOWS SEAL VALVES see VEL-BS catalog.

## GLOBE VALVE DIMENSIONS (CLASSES 150-600)

SIZE in mm	ASME 150 (PN 20)		ASME 300 (PN 50)		ASME 600 (PN 100)	
	A	B <sup>(1)</sup>	A	B <sup>(1)</sup>	A	B <sup>(1)</sup>
2	8.00	16.85	10.50	16.85	11.50	17.10
50	203	428	267	428	292	434
2½	8.50	17.10	11.50	17.10	13.00	18.67
65	216	434	292	434	330	474
3	9.50	18.42	12.50	18.42	14.00	20.19
80	241	468	318	468	356	513
4	11.50	20.88	14.00	20.88	17.00	23.88
100	292	530	356	530	432	607
6	16.00	25.75	17.50	26.38	22.00	31.22
150	406	654	445	670	559	793
8	19.50	30.73	22.00	32.00	26.00	41.75
200	495	780	559	813	660	1060
10	24.50	39.25	24.50	42.34	31.00	47.16
250	622	997	622	1075	787	1198
12	27.50	42.52	28.00	46.19	—	—
300	699	1080	711	1173	—	—
14	31.00	54.21	33.00	54.21	—	—
350	787	1377	838	1377	—	—
16	36.00	59.94	34.00	59.94	—	—
400	914	1522	863	1522	—	—
18	38.50	59.62	38.50	59.62	—	—
450	978	1514	978	1514	—	—

(1) Height does not include actuators.

CLASS	FIGURE NUMBERS		
	GLOBE	STOP CHECK	NEEDLE
150	0074C	0084C	0094C
300	1074C	1084C	1094C
600	2074C	2084C	2094C
900	7074C	7084C	7094C
1500	3074C	3084C	3094C

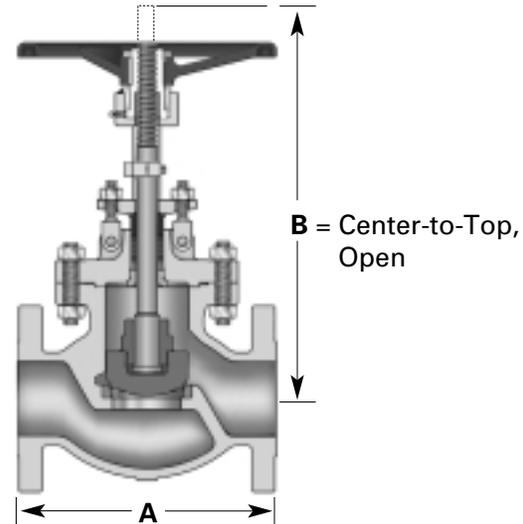
## DESIGN SPECIFICATIONS

ITEM	APPLICABLE SPECIFICATION
Wall thickness and general valve design	API 600, BS 1873
Pressure-temperature rating	ASME B16.34
Face-to-face dimensions for butt weld and flanged valves	ASME B16.10
Flange design	ASME B16.5
Butt welding design	ASME B16.25
Materials	ASTM

## CLASSES 900-1500

SIZE in mm	ASME 900 (PN 150)		ASME 1500 (PN 250)	
	A	B <sup>(1)</sup>	A	B <sup>(1)</sup>
2	14.50	19.75	14.50	19.75
50	368	502	368	502
3	15.00	24.09	18.50	24.09
80	381	612	470	612
4	18.00	27.50	21.50	27.50
100	457	699	546	699

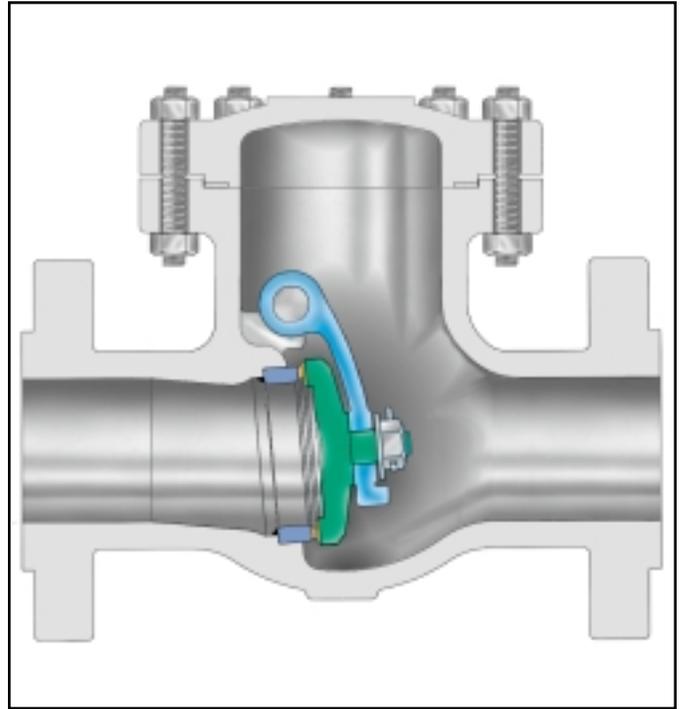
Inclined cast globe valves  
classes 900-2500 also available



Forged globe valves classes 900–2500 also available.  
See page 32 & 33 for valve weights and CVs.



**CAST CARBON, STAINLESS OR ALLOY STEEL API 600  
SWING CHECK VALVES, 2–36" (50–900 mm)  
ASME CLASSES 150, 300, 600, 900 AND 1500**



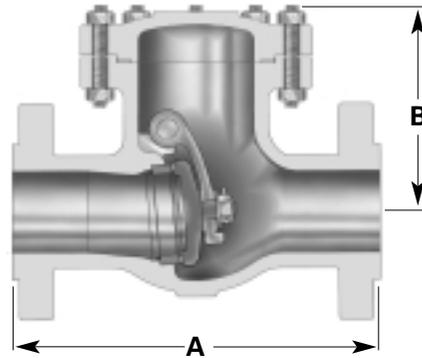
**DESIGN FEATURES:**

- **Body and cover.** Precision machined castings.  
*Exclusive:* Disc shaft does not penetrate body.
- **Body and cover joint.** Accurately machined, fully-enclosed gasket (gasket materials on page 3).
- **Disc.** Robust one-piece construction to withstand the severe shock of check valve service. Hardfaced with 13 CR, Stellite 6, SS 316, or Monel, ground and lapped to mirror finish. Sizes 2–6" (50–150 mm) may have solid CA15 (13CR) disc. SS 316 disc with Stellite 6 facing also available.
- **Disc assembly.** Disc is fastened securely to disc hanger with a lock nut and cotter pin. Disc is free to rotate to avoid localized wear. Disc hanger is supported on a sturdy disc carrier hinge pin of excellent bearing qualities. All parts are accessible from top for easy servicing.
- **Flanges.**  
Class 150/300: 1/16" raised face.  
Class 600: 1/4" raised face.  
Finish: 125–250 AARH for all valves.

CLASS	FIGURE NUMBER	CLASS	FIGURE NUMBER
150	0114C	900	7114C
300	1114C	1500	3114C
600	2114C		

## DESIGN SPECIFICATIONS

ITEM	APPLICABLE SPECIFICATION
Wall thickness and general valve design	API 600, BS1868
Pressure-temperature rating	ASME B16.34
Face-to-face dimensions for butt weld and flanged valves	ASME B16.10
Flange design	ASME B16.5
Butt welding design	ASME B16.25
Materials	ASTM



## CHECK VALVE DIMENSIONS

SIZE in mm	ASME 150 (PN 20)		ASME 300 (PN 50)		ASME 600 (PN 100)		ASME 900 (PN 150)		ASME 1500 (PN 250)	
	A	B	A	B	A	B	A	B	A	B
2 50	8.00 203	5.75 146	10.50 267	6.00 152	11.50 292	6.25 159	14.50 368	9.50 241	14.50 368	9.50 241
2½ 65	8.50 216	6.25 159	11.50 292	6.25 159	13.00 330	6.50 165	16.50 419	10.00 254	16.50 419	10.00 254
3 80	9.50 241	7.75 197	12.50 318	7.75 197	14.00 356	8.75 222	15.00 381	10.50 267	18.50 470	11.50 292
4 100	11.50 292	8.75 222	14.00 356	8.75 222	17.00 432	9.25 235	18.00 457	11.75 299	21.50 546	12.00 305
6 150	14.00 356	10.75 273	17.50 445	10.75 273	22.00 559	11.50 292	24.00 610	15.00 381	27.75 705	16.50 419
8 200	19.50 495	12.75 324	21.00 533	12.75 324	26.00 660	13.50 343	29.00 737	19.25 489	32.75 832	21.00 533
10 250	24.50 622	15.50 394	24.50 622	16.25 413	31.00 787	16.75 425	– –	– –	– –	– –
12 300	27.50 699	17.00 432	28.00 711	17.00 432	33.00 838	18.50 470	– –	– –	– –	– –
14 350	31.00 787	19.63 499	33.00 838	19.63 499	35.00 889	20.93 532	– –	– –	– –	– –
16 400	34.00 864	22.00 559	34.00 864	22.50 572	39.00 991	23.38 594	– –	– –	– –	– –
18 450	38.50 978	25.00 635	38.50 978	25.00 635	43.00 1092	28.67 728	– –	– –	– –	– –
20 500	38.50 978	26.50 673	40.00 1016	26.50 673	47.00 1194	27.12 689	– –	– –	– –	– –
24 600	51.00 1295	31.25 794	53.00 1346	31.25 794	55.00 1397	35.69 907	– –	– –	– –	– –
26 650	51.00 1295	32.63 829	53.00 1346	32.63 829	– –	– –	– –	– –	– –	– –
28 700	57.00 1448	36.55 928	59.00 1499	36.55 928	– –	– –	– –	– –	– –	– –
30 750	60.00 1524	36.89 937	– –	– –	– –	– –	– –	– –	– –	– –
36 900	77.00 1956	41.78 1061	– –	– –	– –	– –	– –	– –	– –	– –

See page 32 & 33  
for valve weights  
and CVs.

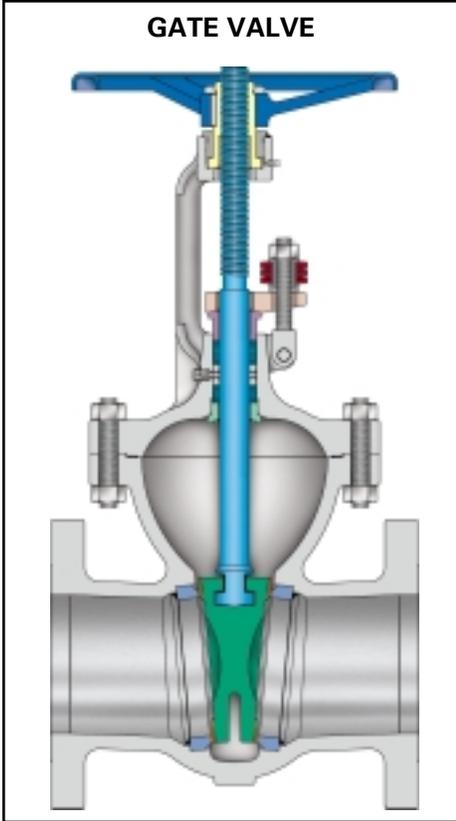
See catalog VEL-PS  
for Classes 900 & 1500  
FORGED STEEL  
CHECK VALVES.

Other sizes on  
application.

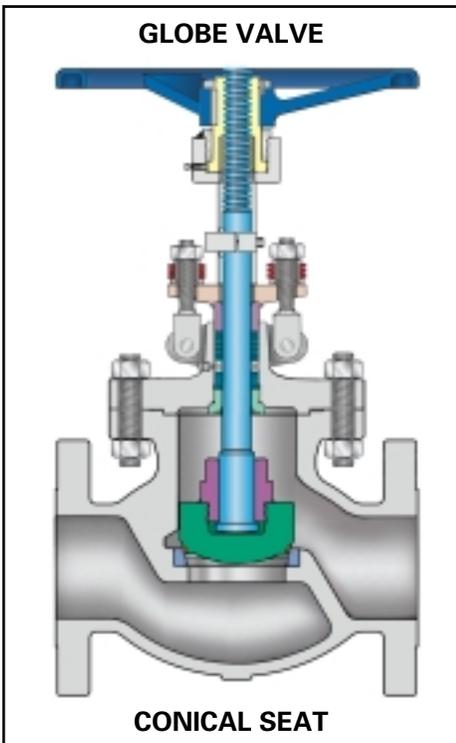


# CAST STEEL API 600 GATE, 2– 60" (50– 1500 mm) & GLOBE VALVES, 2–16" (50– 400 mm)

ASME CLASSES 150, 300, 600, 900 AND 1500 WITH SINGLE OR DOUBLE PACKING, LEAK-OFF AND LIVE-LOADING  
**LIVE-LOADED VALVES**



GATE VALVE



GLOBE VALVE

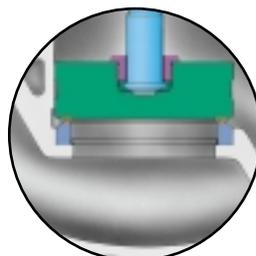
CONICAL SEAT

## DESIGN FEATURES:

- **Safer and tighter stem seal.**
- **Short and narrow packing chamber** improves sealing effectiveness.
- **Long-life leakproof packing chamber** with double packing and leak-off or single set packing.
  - Double packing:** two sets of graphite packing rings compressed to 4000 psi. A lantern ring and leak-off provide option for removal of leakage, if any, from lower packing set.
  - Single set packing:** three or four graphite rings between braided rings, 80-90 lbs./cu. ft. density.
- **Live-loading.** Two sets of Belleville springs keep stem tight for long periods of time without maintenance.
- **Two-piece stem drive** is renewable in-line.
- **Stronger leakproof body-bonnet joint.**
  - Class 150:** Corrugated graphite-filled steel gasket.
  - Class 300-600:** Fully-encased spiral wound graphite-filled stainless steel gasket.
- **Classes 300, 600, 900 and 1500** have round bonnet and encased gasket
- **Welded-in seats** hardfaced with Stellite 6.
- **Flexible one-piece wedge**, hardfaced with Stellite 6 or 13 CR (solid 13 CR up to 8").
- **13 CR hardened stem** with mirror-like, burnished finish for longer packing life.

For dimensions on Gate valves see page 19.  
For dimensions on Globe valves see page 21.  
For other Globe valve design features see page 20.

Most sizes and pressure classes have conical seats.



FLAT SEAT

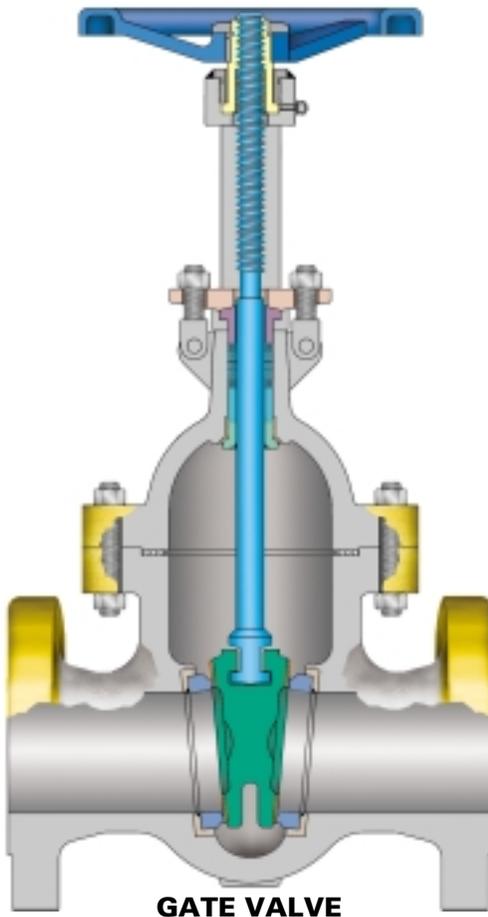
Choice of flat or conical seat is manufacturer's option unless specified by customer.

For BELLOWS SEAL GATE & GLOBE VALVES ½–12" (15–300 mm) see VEL-BS catalog.



*Hydrofluoric Acid is one of the strongest and most corrosive acids. Industries using HF acid in their manufacturing process have placed an increasing emphasis on safety in using this product.*

Fugitive emissions are a critical factor in the performance of any HF Acid valve and at Velan, we have been committed to reducing emissions beyond the industry standards, and providing the highest quality products to our customers for over 50 years. Velan offers a comprehensive line of Phillips approved and UOP listed API 600 gate, globe and check HF acid valves with several benefits.

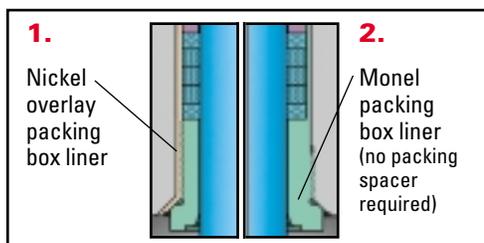


#### DESIGN FEATURES:

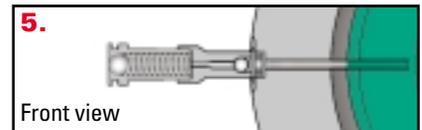
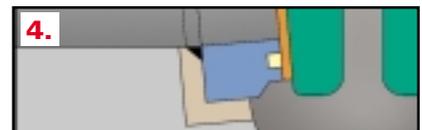
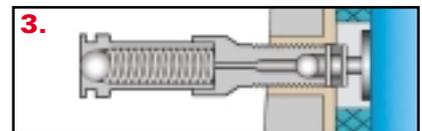
- **Nickel plated overlay on backseat in stem hole** to combat severe alkylation conditions.
- **HF acid detecting paint** to ensure valve integrity.
- **Stem** - made from solid age hardened K-Monel 500 for increased strength and corrosion resistance.
- **Casting design**  
X-ray "RT" quality castings as per B16.34 acceptance standards. Velan is one of the first valve manufacturers to have the MAGMASOFT® computer casting simulation program to ensure high quality levels.
- **Bonnet Joint** - accurately machined for better service life.
- **Seal Welded Seats in Monel**  
Monel seats are welded-in for ensuring zero leakage behind and around the seat and then ground and lapped after welding using state of the art technology to prevent in-service corrosion.
- **Body/Bonnet wall thickness** to API 600.
- **Velan's low-fugitive emissions guarantee**  
Based on extensive laboratory testing and field experience.

#### OPTIONAL DESIGN FEATURES

- 1. Nickel overlay packing box liner**
- 2. Packing box in Monel**  
– to combat severe alkylation conditions in this critical area.

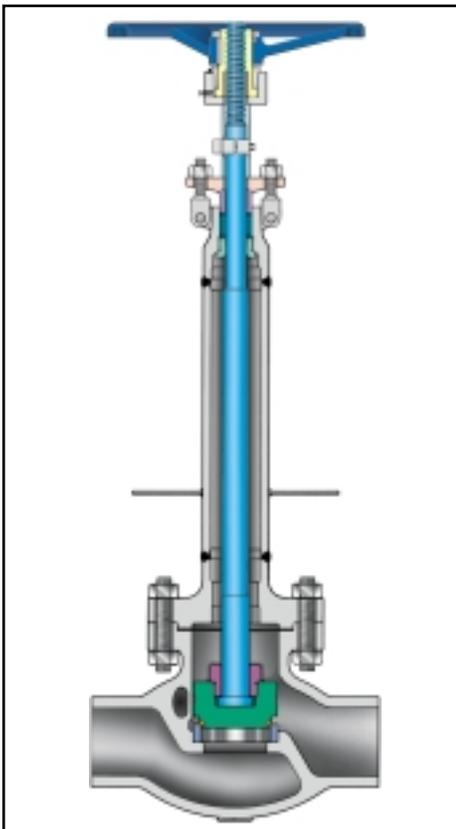
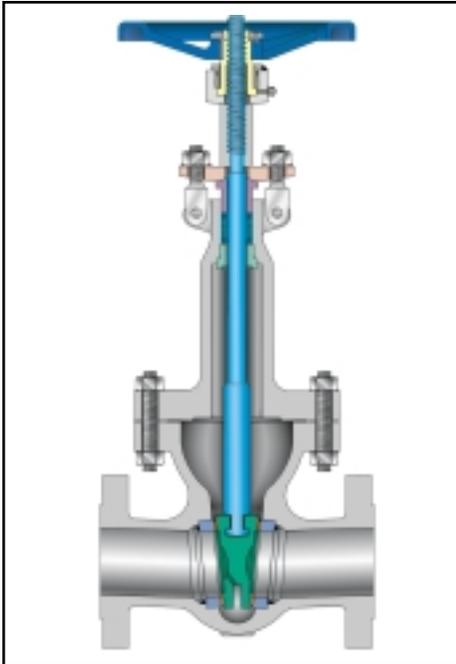


- 3. Grease injector & lantern ring**  
– where grease injection is a requirement (UOP only).
- 4. PTFE seat insert** – resists abrasion and corrosion
- 5. PTFE seat seal grease injection**  
– when required (UOP only)



For more information on  
**VELAN HF ACID GATE, GLOBE  
& CHECK VALVES**  
see VEL-HFA catalog.

### CAST STEEL CRYOGENIC VALVES



For more details on Cryogenic Gate, Globe & Check Valves see VEL-CRYO catalog.

The production, transport and storage of liquefied gases such as oxygen, nitrogen, argon, natural gas, hydrogen or helium (down to -425°F), presents several technical problems. Velan specially-adapted extended bonnet cast valves offer safe and efficient service.

#### MATERIALS:

- **Body and bonnet:** Austenitic stainless steel castings used for bodies and bonnets offer excellent impact strength, minimal heat loss and protection against corrosion.
- **Stem:** Austenitic stainless steel. To reduce galling, stems are also offered in A479 grade XM-19 with high tensile strength even at extreme low temperatures, excellent low friction and galling-free movement at points of stem contact.
- **Wetted parts:** All Austenitic stainless steel and Stellite 6.
- **Stem nut/yoke bushing:** Austenitic ductile iron Gr. D-2C.
- **Packing:** PTFE or graphite packing protected from freezing by a column of insulating gas.
- **Seating faces:** Stellite 6 is used to prevent seizing and galling. When extremely tight shutoff is required, globe and check valves are supplied with Neoflon, PTFE or other soft inserts.
- **Bolting:** Strain-hardened Austenitic stainless steel.
- **Lubrication of stem nut:** Exxon Nebula Lubriplate No. 930-AA or Shell Darina EPI or equivalent.

#### DESIGN FEATURES:

- **Extended bonnets** with sufficient gas column length, usually specified by customer, are supplied for all valves to keep stem packing at sufficient distance away from the cold fluid to remain functional.
- **Flexible wedges** with Stellite seating faces for cryogenic service.
- **Neoflon inserts** are available for globe, piston, and swing check discs.
- **Cleaning:** All cryogenic valves are thoroughly degreased and cleaned and pipe ends are sealed to prevent contamination.

TABLE OF LIQUEFIED GASES

Type	Boiling Point		Liquid Density lb/ft. <sup>3</sup>	Type	Boiling Point		Liquid Density lb/ft. <sup>3</sup>
	°C	°F			°C	°F	
Natural gas (LNG)	-168	-270	26	Air	-194.4	-318	57.87
Methane (CH <sub>4</sub> )	-161.5	-258	26.20	Nitrogen (N <sub>2</sub> )	-195.8	-320	50.45
Oxygen (O <sub>2</sub> )	-182.9	-296	71.20	Hydrogen(H <sub>2</sub> )	-252.7	-423	4.43
Argon (Ar)	-185.9	-303	87.40	Helium (He)	-268.9	-452	7.82
Carbon Dioxide (CO <sub>2</sub> )	-78.5	-109	50.60	Absolute zero	-273.16	-460	–



Valve shown has a special "Pipeline" bonnet.

Standard bonnets with regular yoke also available.

#### DESIGN FEATURES:

- **Positive shutoff** with visual or remote proof of seat tightness.
- **No product contamination** absolute tightness.
- **Dual seating.** Elastomer-to-metal seat plus metal-to-metal secondary seal.
- **Fire Safe.** The metal-to-metal seat ensures tightness if the secondary elastomer seat is damaged during the fire.
- **PTFE seat insert** resists corrosive media, has high abrasion resistance and operates up to +400°F (204°C).
- **Seat hardfaced** with SS 410 and seal welded.

#### AVAILABLE RANGE

Velan block and bleed gate valves are available in the following sizes:

Class 150: carbon steel, flanged or butt weld, 2–60" (50–1500 mm).

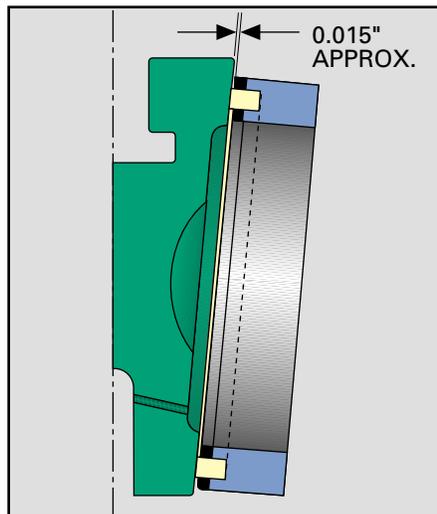
Class 300: carbon steel, flanged or butt weld, 2–36" (50–900 mm).

#### EASY IN-LINE VALVE RESEATING

Seats are hardfaced with SS 410 and welded-in for lifetime service. A worn soft seat insert can easily be replaced after removal of wedge from the body. Shut off flow and relieve pressure before replacing the seat insert.

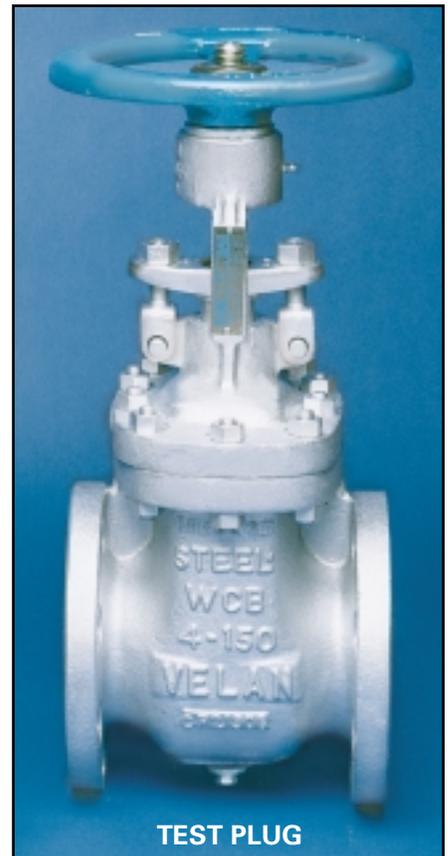
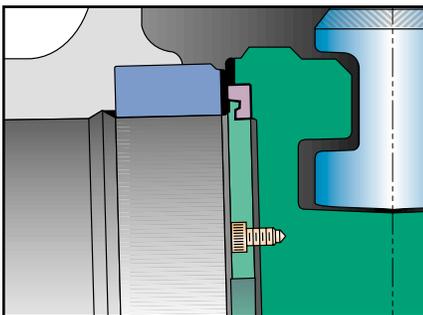
#### STYLE A

##### 2–12" SEAT - WEDGE DESIGN



#### STYLE B

##### 14–60" SEAT - WEDGE DESIGN\*



\*14–24" (350–600 mm) may be STYLE A or B at manufacturer's option

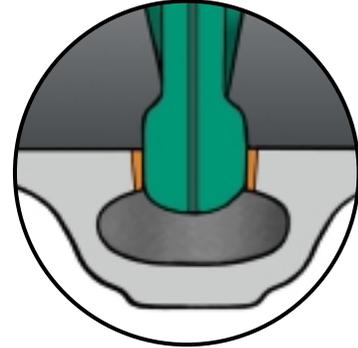
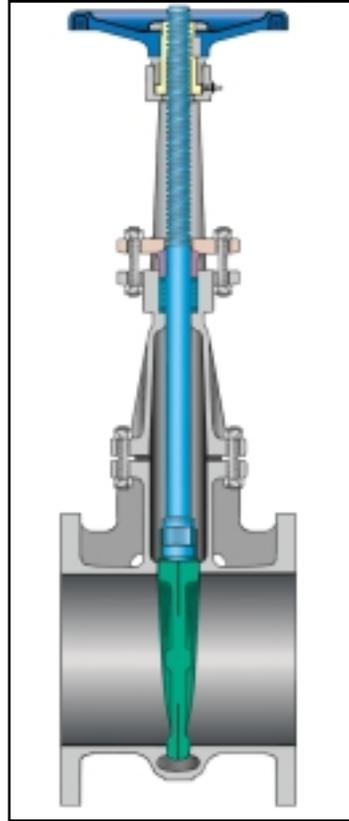
#### SPECIFICATIONS FOR SEAT INSERT MATERIALS

TYPE	MAXIMUM OPERATING TEMPERATURE	NOT RECOMMENDED
PTFE	-100°F to +400°F -73°C to +204°C	Fluorinated hydrocarbons
Buna-N	-20°F to +200°F -29°C to +93°C	Halogenated hydrocarbons, Nitrobenzene, Aniline, Hydraulic fluids, Skydrol, Cellulube, Pydrasil, Acetone
Viton	-20°F to +400°F -29°C to +240°C	Acetone, Anines, Anhydrous ammonia, Hot Hydrofluoric acid, Ester, Ethers



# CAST STAINLESS STEEL GATE VALVES API 603 INTEGRAL SEAT, 2–24", (50–600 mm)

FLANGED, ASME CLASSES 150, 300, WALL THICKNESS TO B16.34  
WITH FLEXIBLE WEDGE

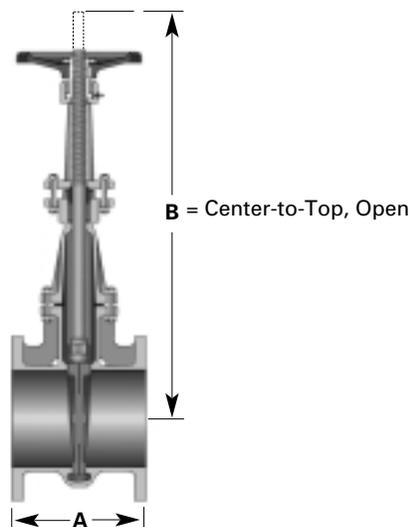


*Optional integral  
Stellite seat face  
available for longer  
service life.*

CLASS	FIGURE NUMBERS	
	STAINLESS SEAT	STELLITE SEAT
150	0064C-13SX or GX	0064C-13SY, GS or GY
300	1064C-13SX or GX	1064C-13SY, GS or GY

## DIMENSIONS AND WEIGHTS

SIZE in mm	FLANGED, ASME 150 (PN 20)		FLANGED, ASME 300 (PN 50)	
	A	B	A	B
2 50	7.00 178	13.00 330	8.50 216	14.00 356
2½ 65	7.50 191	15.75 400	9.50 241	16.75 425
3 80	8.00 203	17.75 451	11.13 283	18.50 470
4 100	9.00 229	21.50 546	12.00 305	22.63 575
6 150	10.50 267	28.25 718	15.88 403	29.75 756
8 200	11.50 292	36.50 927	16.50 419	39.19 995
10 250	13.00 330	45.00 1143	18.00 457	45.50 1150
12 300	14.00 356	60.25 1530	19.75 502	65.38 1661
14 350	15.00 381	65.005 1651	—	—
16 400	16.00 406	75.00 1905	—	—
18 450	17.00 432	81.00 20576	—	—
20 500	18.00 457	93.00 2362	—	—
24 600	20.00 508	107.00 2718	—	—



For API 603 GATE VALVES  
see VEL-API-603 catalog.

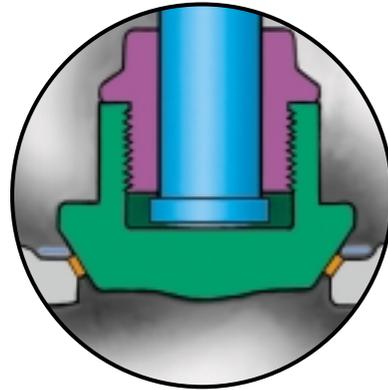
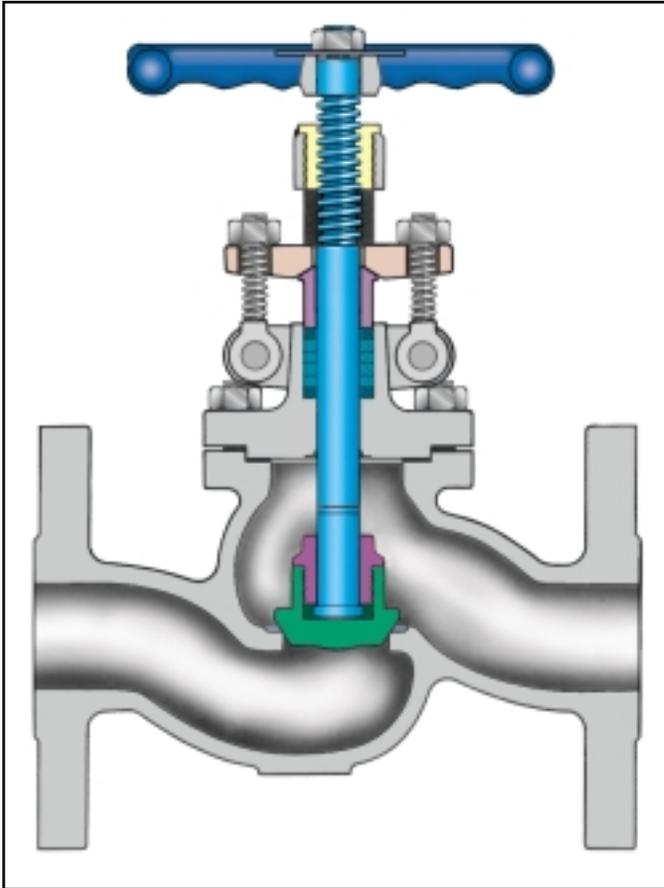
Please note this is a condensed catalog.

28 For a complete version, contact Velan directly.



**CAST STAINLESS STEEL GLOBE VALVES API 603  
INTEGRAL SEAT, 2–6" (50–150 mm)**

FLANGED, ASME CLASSES 150, 300, WALL THICKNESS TO B16.34



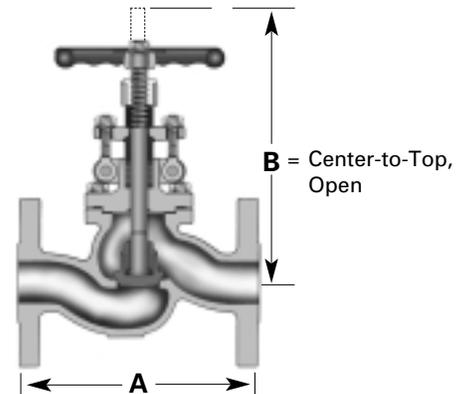
*Optional integral  
Stellite seat face  
available for longer  
service life.*

For API 603 GLOBE VALVES see VEL-API-603 catalog.

CLASS	FIGURE NUMBERS	
	STAINLESS SEAT	STELLITE SEAT
150	0074C-13SX or GX	0074C-13SY, GS or GY
300	1074C-13SX or GX	1074C-13SY, GS or GY

**DIMENSIONS AND WEIGHTS**

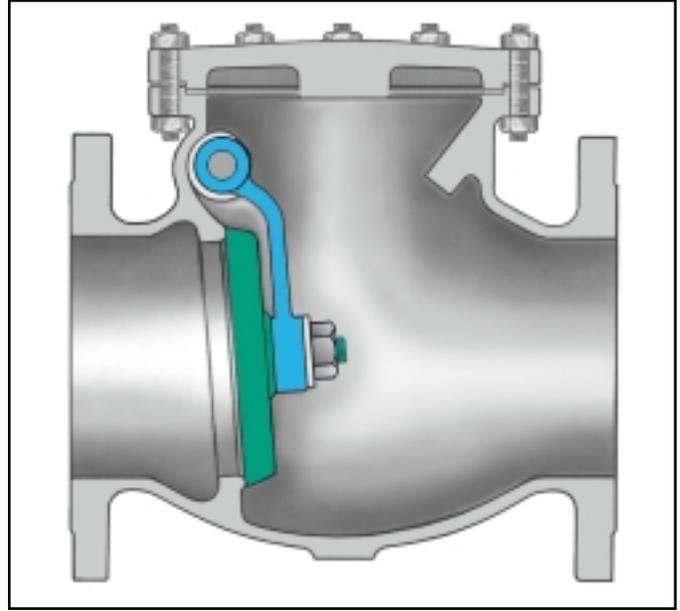
SIZE in mm	FLANGED, ASME 150 (PN 20)					FLANGED, OASME 300 (PN 50)				
	A	B	C	D	WEIGHT lb (kg)	A	B	C	D	WEIGHT lb (kg)
2 50	8.00 203	9.50 241	8.00 203	2.00 51	27 12.3	10.50 267	11.06 281	8.00 203	2.00 51	45 20.4
2½ 65	8.50 216	10.44 265	10.00 254	2.50 64	40 18.2	11.50 292	12.25 311	10.00 254	2.50 64	70 31.7
3 80	9.50 241	12.19 310	10.00 254	3.00 76	50 22.7	12.50 318	13.75 349	10.00 254	3.00 76	87 39.5
4 100	11.50 292	14.81 376	10.00 254	4.00 102	83 37.6	14.00 356	16.44 418	10.00 254	4.00 102	130 59.0
6 150	16.00 406	19.19 487	10.00 254	6.00 152	154 69.9	17.50 445	21.38 543	14.00 356	6.00 152	252 114.3



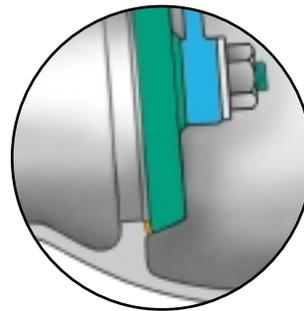


# CAST STAINLESS STEEL SWING CHECK VALVES API 603 INTEGRAL SEAT, 2–12" (50–300 mm)

FLANGED, ASME CLASSES 150, 300, WALL THICKNESS TO B16.34



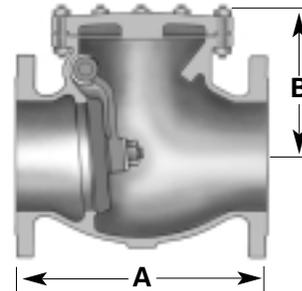
CLASS	FIGURE NUMBERS	
	STAINLESS SEAT	STELLITE SEAT
150	0114C-13SX or GX	0114C-13SY, GS or GY
300	1114C-13SX or GX	1114C-13SY, GS or GY



*Optional integral  
Stellited seat  
face available  
for longer  
service life.*

## DIMENSIONS AND WEIGHTS

SIZE in mm	FLANGED, ASME 150 (PN 20)		FLANGED, ASME 300 (PN 50)	
	A	B	A	B
2 50	8.00 203	4.00 102	10.50 267	4.75 121
2½ 65	8.50 216	4.50 114	11.50 292	5.50 140
3 80	9.50 241	5.00 127	12.50 318	6.25 159
4 100	11.50 292	5.75 146	14.00 356	7.00 178
6 150	14.00 356	7.56 192	17.50 445	8.63 219
8 200	19.50 495	9.50 241	21.00 533	10.63 270
10 250	24.50 622	10.75 273	24.50 622	12.00 305
12 300	27.50 699	13.00 330	28.00 711	15.00 381



For API 603 CHECK VALVES see VEL-API-603 catalog.

# ACCESSORIES



## GEAR ACTUATORS

Gearing is generally applied to valves to make operation easier. The gearing may be of the spur, bevel or worm type—any of which may be applied to Velan valves.

The gears and gear brackets may be either cast iron or cast steel and may have cast or cut teeth, depending on the loads and the application. Gearing is too often neglected when valve operation is considered, resulting in unsatisfactory operation requiring expensive changes.

	CLASS	OPTIONAL	STANDARD
GATE	150	6–24" (150–600 mm)	30–60" (750–1500 mm)
	300	6–16" (150–400 mm)	18–36" (450–900 mm)
	600	4–12" (100–400 mm)	14–36" (350–900 mm)
	900	3–6" (80–150 mm)	8–10" (200–250 mm)
	1500	3–4" (80–100 mm)	6–10" (150–250 mm)
GLOBE	150	6–12" (150–300 mm)	14–16" (350–400 mm)
	300	6–12" (150–300 mm)	14–16" (350–400 mm)
	600	4–10" (100–250 mm)	—
	900	2–4" (50–100 mm)	—
	1500	2–4" (50–100 mm)	—



## ELECTRIC ACTUATORS

Motorized controls may be applied to valves of almost any size for operation in practically any position or location.

All units, whether installed directly on a valve or on a floor stand, can be manually operated in case of power failure. The units are available for either alternating or direct current.

Motor units supplied by Velan are the high torque type with windings impregnated to resist both oil and moisture. They are completely weather-proof, explosion-proof (optional) and dust and steam tight. Various sizes and styles are available for different applications, and systems and can be varied to fit special requirements.



## CYLINDER ACTUATORS

The most commonly-used cylinders are actuated by air, but oil and water types are also available if required. In all designs, the valve stem normally serves as a piston rod with disc fastened directly

to them. Tail rods are also supplied as standard equipment to serve as position indicators and for emergency opening. Handwheels and gear heads can be mounted on top of cylinders for operation in an emergency which may arise due to the loss of operating medium in the cylinder.

Velan cylinders can be furnished with mounting pads for one of the commercial cylinders or valve positioners which provide throttling control. High pressure cylinders are also available for specific applications.

## VALVE ACTUATOR SIZING

The Velan philosophy for selecting an actuator is to calculate the required thrust and torque to operate the valve at the required service conditions. A reasonable margin of excess actuator capability over that required is always allowed for in the final actuator selection, but grossly oversized actuators are avoided.

Because of the wide variations in system operating conditions, actuator sizing is based on the following:

ACTUATOR TYPE	LINE PRESSURE	DIFFERENTIAL PRESSURE (CLOSED)	POWER SUPPLY
ELECTRIC	Specified by customer	Specified by customer	Voltage, type, phase and frequency specified by customer
PNEUMATIC	Specified by customer	Specified by customer	Air pressure specified by customer
HYDRAULIC	Specified by customer	Specified by customer	Hydraulic pressure specified by customer
HANDWHEEL/GEAR ACTUATED	70% of CWP <sup>(1)</sup> unless otherwise advised by customer	70% of CWP <sup>(1)</sup> unless otherwise advised by customer	200 lb. rimpull <sup>(2)</sup> unless otherwise advised by customer

(1) CWP = cold working pressure per ASME B16.34 at 100°F (e.g., Class 150, CWP = 285 psig, 70% of CWP = 200 psig).

(2) Rimpull is defined as the total tangential force acting on the handwheel (e.g., 200 lb. rimpull requires 100 lb force per hand). This rimpull figure is given for closing/opening conditions. For running conditions (travel from open to closed or vice versa), the rimpull is considerably less. For details, contact the company.

## CHAIN WHEELS

Chain wheels are available for all types of Velan cast steel valves. They may be substituted for a plain handwheel or may be used in addition to the existing handwheel.

## FLOOR STANDS

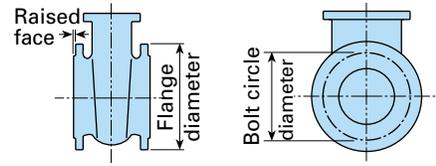
Floor stands are available in a number of sizes, and the size to be used depends on the stem size and stem load of the valve.

**Please note this is a condensed catalog. For a complete version, contact Velan directly.**

# FLANGES, WEIGHTS & CV FLOW COEFFICIENTS

## API 600 CAST STEEL VALVES CLASS 150

DRILLED AND FACED AS FOLLOWS: 2-24" ASME B16.5<sup>(1)</sup>



ASME CLASS	DIMENSIONS IN INCHES					
	SIZE in	FLANGE DIAM.	BOLT CIRCLE DIAM.	HOLE DIAM.	QTY. HOLES	DIAM. BOLTS
150 1/16 RAISED FACE	2	6.00	4.75	0.75	4	5/8
	2½	7.00	5.50	0.75	4	5/8
	3	7.50	6.00	0.75	4	5/8
	4	9.00	7.50	0.75	8	5/8
	6	11.00	9.50	0.88	8	3/4
	8	13.50	11.75	0.88	8	3/4
	10	16.00	14.25	1.00	12	7/8
	12	19.00	17.00	1.00	12	7/8
	14	21.00	18.75	1.13	12	1
	16	23.50	21.25	1.13	16	1
	18	25.00	22.75	1.25	16	1 1/8
	20	27.50	25.00	1.25	20	1 1/8
	24	32.00	29.50	1.38	20	1 1/4
	26 <sup>(1)</sup>	34.25	31.75	1.38	24	1 1/4
	28 <sup>(1)</sup>	36.50	34.00	1.38	28	1 1/4
	30 <sup>(1)</sup>	38.75	36.00	1.37	28	1 1/4
	32 <sup>(1)</sup>	41.75	38.50	1.62	28	1 1/2
	36 <sup>(1)</sup>	46.00	42.75	1.63	32	1 1/2
	40 <sup>(1)</sup>	50.75	47.25	1.62	36	1 1/2
	42 <sup>(1)</sup>	53.00	49.50	1.63	36	1 1/2
48 <sup>(1)</sup>	59.50	56.00	1.63	44	1 1/2	
54 <sup>(1)</sup>	66.25	62.75	1.88	44	1 3/4	
60 <sup>(1)</sup>	73.00	69.25	1.88	52	1 3/4	
300 1/16 RAISED FACE	2	6.50	5.00	0.75	8	5/8
	2½	7.50	5.88	0.88	8	3/4
	3	8.25	6.62	0.88	8	3/4
	4	10.00	7.88	0.88	8	3/4
	6	12.50	10.62	0.88	12	3/4
	8	15.00	13.00	1.00	12	3/4
	10	17.50	15.25	1.13	16	1
	12	20.50	17.75	1.25	16	1 1/8
	14	23.00	20.25	1.25	20	1 1/8
	16	25.50	22.50	1.38	20	1 1/4
	18	28.00	24.75	1.38	24	1 1/4
	20	30.50	27.00	1.38	24	1 1/4
	24	36.00	32.00	1.63	24	1 1/2
	26 <sup>(1)</sup>	38.25	34.50	1.75	28	1 1/2
	28 <sup>(1)</sup>	40.75	37.00	1.75	28	1 1/2
	30 <sup>(1)</sup>	43.00	39.25	1.88	28	1 3/4
32 <sup>(1)</sup>	45.25	41.50	2.00	28	1 3/4	
36 <sup>(1)</sup>	50.00	46.00	2.13	32	2	
600 1/4 RAISED FACE	2	6.50	5.00	0.75	8	5/8
	2½	7.50	5.88	0.88	8	3/4
	3	8.25	6.62	0.88	8	3/4
	4	10.75	8.50	1.00	8	7/8
	6	14.00	11.50	1.13	12	1
	8	16.50	13.75	1.25	12	1 1/8
	10	20.00	17.00	1.38	16	1 1/8
	12	22.00	19.25	1.38	20	1 1/4
	14	23.75	20.75	1.50	20	1 3/8
	16	27.00	23.75	1.62	20	1 1/2
	18	29.25	25.75	1.75	20	1 3/8
	20	32.00	28.50	1.75	24	1 3/8
	24	37.00	33.00	2.00	24	1 3/4
	30 <sup>(1)</sup>	44.50	40.25	2.12	28	2
36 <sup>(1)</sup>	51.75	47.00	2.62	28	2 1/2	

ASME CLASS	DIMENSIONS IN INCHES					
	SIZE in	FLANGE DIAM.	BOLT CIRCLE DIAM.	HOLE DIAM.	QTY. HOLES	DIAM. BOLTS
900 1/4 RAISED FACE	2	8.50	6.50	1.00	8	7/8
	2½	9.63	7.50	1.12	8	1
	3	9.50	7.50	1.00	8	7/8
	4	11.50	9.25	1.25	8	1 1/8
	6	15.00	12.50	1.25	12	1 1/8
	8	18.50	15.50	1.50	12	1 3/8
	10	21.50	18.50	1.50	16	1 3/8
	12	24.00	21.00	1.50	20	1 3/8
	14	25.25	22.00	1.62	20	1 1/2
	16	27.75	24.25	1.75	20	1 3/4
1500 1/4 RAISED FACE	2	8.50	6.50	1.00	8	7/8
	2½	9.63	7.50	1.12	8	1
	3	10.50	8.00	1.25	8	1 1/8
	4	12.25	9.50	1.37	8	1 1/4
	6	15.50	12.50	1.50	12	1 3/8
	8	19.00	15.50	1.75	12	1 3/4
	10	23.00	19.00	2.00	12	1 3/4

(1) 30" and up: ASME B16.47 Series A (MSS-SP-44), for Series B (API 605) contact the factory.

# ENGINEERING DATA

## PRESSURE-TEMPERATURE RATINGS STANDARD CLASS VALVES, FLANGED AND BUTT WELD END

NOTE: FOR SPECIAL CLASS VALVES, WHICH HAVE HIGHER RATINGS CONTACT THE COMPANY.

### CAST

ASTM MATERIAL STANDARD—TO ASME B16.34

ASME Boiler and Pressure Vessel Code Section II materials that also meet the requirements of the listed ASTM specifications.

psig/°F (bar/°C) CLASSES 150–4500

#### A216 Gr. WCB

TEMP. °F	WORKING PRESSURE by classes, psig						
	150	300	600	900	1500	2500	4500
100	285	740	1480	2220	3705	6170	11110
200	260	675	1350	2025	3375	5625	10120
300	230	655	1315	1970	3280	5470	9845
400	200	635	1270	1900	3170	5280	9505
500	170	600	1200	1795	2995	4990	8980
600	140	550	1095	1640	2735	4560	8210
650	125	535	1075	1610	2685	4475	8055
700	110	535	1065	1600	2665	4440	7990
750	95	505	1010	1510	2520	4200	7560
800	80	410	825	1235	2060	3430	6170
850 <sup>(1)</sup>	65	270	535	805	1340	2230	4010
900 <sup>(1)</sup>	50	170	345	515	860	1430	2570
950 <sup>(1)</sup>	35	105	205	310	515	860	1545
1000 <sup>(1)</sup>	20	50	105	155	260	430	770

(1) Permissible, but not recommended for prolonged usage above 800°F (427°C).

TEMP. °C	GAGE WORKING PRESSURE BY RATING NUMBER, bar						
	PN 20	PN 50	PN 100	PN 150	PN 250	PN 420	PN 760
38	19.6	51.1	102.1	153.2	255.3	425.5	765.8
50	19.2	50.1	100.2	150.2	250.4	417.3	751.1
100	17.7	46.4	92.8	139.1	231.9	386.5	695.7
150	15.8	45.2	90.5	135.7	226.1	376.9	678.4
200	14.0	43.8	87.6	131.5	219.1	365.2	657.3
250	12.1	41.7	83.4	125.2	208.6	347.7	625.8
300	10.2	38.7	77.5	116.2	193.7	322.8	581.0
350	8.4	37.0	73.9	110.9	184.8	308.0	554.4
375	7.4	36.5	72.9	109.4	182.3	303.9	547.0
400	6.5	34.5	69.0	103.5	172.5	287.5	517.5
425	5.6	28.8	57.5	86.3	143.8	239.6	431.4
450 <sup>(1)</sup>	4.7	20.0	40.1	60.1	100.2	166.9	300.5
475 <sup>(1)</sup>	3.7	13.5	27.1	40.6	67.7	112.9	203.2
500 <sup>(1)</sup>	2.8	8.8	17.6	26.4	44.0	73.3	131.9
525 <sup>(1)</sup>	1.9	5.2	10.4	15.5	25.9	43.2	77.7
540 <sup>(1)</sup>	1.3	3.3	6.5	9.8	16.3	27.2	48.9

#### A217 Gr. WC6

TEMP. °F	WORKING PRESSURE by classes, psig						
	150	300	600	900	1500	2500	4500
100	290	750	1500	2250	3750	6250	11250
200	260	750	1500	2250	3750	6250	11250
300	230	720	1445	2165	3610	6015	10830
400	200	695	1385	2080	3465	5775	10400
500	170	665	1330	1995	3325	5540	9965
600	140	605	1210	1815	3025	5040	9070
650	125	590	1175	1765	2940	4905	8825
700	110	570	1135	1705	2840	4730	8515
750	95	530	1065	1595	2660	4430	7970
800	80	510	1015	1525	2540	4230	7610
850	65	485	975	1460	2435	4060	7305
900	50	450	900	1350	2245	3745	6740
950	35	320	640	955	1595	2655	4785
1000	20	215	430	650	1080	1800	3240
1050	20 <sup>(1)</sup>	145	290	430	720	1200	2160
1100	20 <sup>(1)</sup>	95	190	290	480	800	1440

(1) For welding end valves only. Flanged end ratings terminate at 1000°F (538°C).

TEMP. °C	GAGE WORKING PRESSURE BY RATING NUMBER, bar						
	PN 20	PN 50	PN 100	PN 150	PN 250	PN 420	PN 760
38	20.0	51.7	103.4	155.2	258.6	431.0	775.9
50	19.5	51.7	103.4	155.2	258.6	431.0	775.9
100	17.7	51.4	103.0	154.5	257.4	429.1	772.4
150	15.8	49.6	99.6	149.2	248.8	414.5	746.3
200	13.9	48.1	95.9	143.9	239.8	399.6	719.6
250	12.1	46.2	92.4	138.6	231.0	385.0	692.6
300	10.2	42.9	85.8	128.6	214.4	357.2	642.8
350	8.3	40.3	80.3	120.8	201.1	335.4	603.5
375	7.4	38.9	77.6	116.6	194.1	323.3	582.0
400	6.5	36.5	73.3	109.8	183.1	305.0	548.7
425	5.6	35.2	70.2	105.4	175.7	292.6	526.3
450	4.6	33.7	67.7	101.4	169.1	281.9	507.2
475	3.7	31.7	63.4	95.1	158.2	263.9	475.0
500	2.8	25.3	50.6	75.7	126.1	210.1	378.6
525	1.9	18.1	36.3	54.5	90.8	151.2	272.5
550	1.4 <sup>(1)</sup>	12.7	25.4	38.1	63.6	105.9	190.7
575	1.4 <sup>(1)</sup>	8.8	17.7	26.3	44.0	73.4	132.1
600 <sup>(2)</sup>	1.4 <sup>(1)</sup>	6.0	12.0	18.3	30.3	50.5	90.8

(2) Not to be used over 593°C.

#### A217 Gr. WC9

TEMP. °F	WORKING PRESSURE by classes, psig						
	150	300	600	900	1500	2500	4500
100	290	750	1500	2250	3750	6250	11250
200	260	750	1500	2250	3750	6250	11250
300	230	730	1455	2185	3640	6070	10925
400	200	705	1410	2115	3530	5880	10585
500	170	665	1330	1995	3325	5540	9965
600	140	605	1210	1815	3025	5040	9070
650	125	590	1175	1765	2940	4905	8825
700	110	570	1135	1705	2840	4730	8515
750	95	530	1065	1595	2660	4430	7970
800	80	510	1015	1525	2540	4230	7610
850	65	485	975	1460	2435	4060	7305
900	50	450	900	1350	2245	3745	6740
950	35	375	755	1130	1885	3145	5665
1000	20	260	520	780	1305	2170	3910
1050	20 <sup>(1)</sup>	175	350	525	875	1455	2625
1100	20 <sup>(1)</sup>	110	220	330	550	915	1645

(1) For welding end valves only. Flanged end ratings terminate at 1000°F (538°C).

TEMP. °C	GAGE WORKING PRESSURE BY RATING NUMBER, bar						
	PN 20	PN 50	PN 100	PN 150	PN 250	PN 420	PN 760
38	20.0	51.7	103.4	155.2	258.6	431.0	775.9
50	19.5	51.7	103.4	155.2	258.6	431.0	775.9
100	17.7	51.6	103.1	154.6	257.7	429.5	773.2
150	15.8	50.3	100.3	150.6	250.9	418.3	753.0
200	13.9	48.8	97.5	146.3	244.1	406.6	731.9
250	12.1	46.3	92.7	139.1	231.9	386.3	695.0
300	10.2	42.9	85.8	128.6	214.4	357.2	642.8
350	8.3	40.3	80.3	120.8	201.1	335.4	603.5
375	7.4	38.9	77.6	116.6	194.1	323.3	582.0
400	6.5	36.5	73.3	109.8	183.1	305.0	548.7
425	5.6	35.2	70.2	105.4	175.7	292.6	526.3
450	4.6	33.7	67.7	101.4	169.1	281.9	507.2
475	3.7	31.7	63.4	95.1	158.2	263.9	475.0
500	2.8	27.7	55.7	83.4	139.0	231.8	417.4
525	1.9	21.6	43.3	64.9	108.4	180.6	325.3
550	1.4 <sup>(1)</sup>	15.4	30.7	46.1	77.0	127.9	230.7
575	1.4 <sup>(1)</sup>	10.6	21.1	31.7	52.7	87.7	158.1
600 <sup>(2)</sup>	1.4 <sup>(1)</sup>	6.9	13.8	20.7	34.6	57.4	103.2

(2) Not to be used over 593°C.

# ENGINEERING DATA

## A217 Gr. C5

TEMP. °F	WORKING PRESSURE by classes, psig						
	150	300	600	900	1500	2500	4500
100	290	750	1500	2250	3750	6250	11250
200	260	745	1490	2235	3725	6205	11170
300	230	715	1430	2150	3580	5965	10740
400	200	705	1410	2115	3530	5880	10585
500	170	665	1330	1995	3325	5540	9965
600	140	605	1210	1815	3025	5040	9070
650	125	590	1175	1765	2940	4905	8825
700	110	570	1135	1705	2840	4730	8515
750	95	530	1055	1585	2640	4400	7920
800	80	510	1015	1525	2540	4230	7610
850	65	485	965	1450	2415	4030	7250
900	50	370	740	1110	1850	3085	5555
950	35	275	550	825	1370	2285	4115
1000	20	200	400	595	995	1655	2985
1050	20 <sup>(1)</sup>	145	290	430	720	1200	2160
1100	20 <sup>(1)</sup>	100	200	300	495	830	1490
1150	20 <sup>(1)</sup>	60	125	185	310	515	925
1200	15 <sup>(1)</sup>	35	70	105	170	285	515

(1) For welding end valves only. Flanged end ratings terminate at 1000°F (538°C).

TEMP. °C	GAGE WORKING PRESSURE BY RATING NUMBER, bar						
	PN 20	PN 50	PN 100	PN 150	PN 250	PN 420	PN 760
38	20.0	51.7	103.4	155.2	258.6	431.0	775.9
50	19.5	51.7	103.3	155.0	258.6	430.3	774.6
100	17.7	51.1	102.3	153.4	257.2	425.9	766.8
150	15.8	49.3	98.6	148.2	246.8	411.2	740.5
200	13.9	48.7	97.4	146.1	243.7	406.0	730.8
250	12.1	46.3	92.7	139.1	231.9	386.3	695.0
300	10.2	42.9	85.8	128.6	214.4	357.2	642.8
350	8.3	40.3	80.3	120.8	201.1	335.4	603.5
375	7.4	38.9	77.5	116.4	193.9	323.0	581.5
400	6.5	36.5	72.6	109.2	181.8	303.0	545.4
425	5.6	35.2	70.1	105.4	175.6	292.4	526.1
450	4.6	33.7	67.1	100.8	167.9	280.1	504.0
475	3.7	27.6	55.0	82.6	137.7	229.7	413.5
500	2.8	21.3	42.6	64.0	106.4	177.4	319.5
525	1.9	16.1	32.3	48.3	80.5	134.1	241.7
550	1.4 <sup>(1)</sup>	12.1	24.3	36.0	60.3	100.3	180.8
575	1.4 <sup>(1)</sup>	9.0	17.9	26.6	44.3	74.1	133.2
600	1.4 <sup>(1)</sup>	6.2	12.6	18.8	31.1	52.0	93.4
625	1.3 <sup>(1)</sup>	3.9	8.1	12.0	20.0	33.3	59.9
650	1.0 <sup>(1)</sup>	2.4	4.8	7.2	11.7	19.7	35.5

## A217 Gr. C12

TEMP. °F	WORKING PRESSURE by classes, psig						
	150	300	600	900	1500	2500	4500
100	290	750	1500	2250	3750	6250	11250
200	260	750	1500	2250	3750	6250	11250
300	230	730	1455	2185	3640	6070	10925
400	200	705	1410	2115	3530	5880	10585
500	170	665	1330	1995	3325	5540	9965
600	140	605	1210	1815	3025	5040	9070
650	125	590	1175	1765	2940	4905	8825
700	110	570	1135	1705	2840	4730	8515
750	95	530	1065	1595	2660	4430	7970
800	80	510	1015	1525	2540	4230	7610
850	65	485	975	1460	2435	4060	7305
900	50	450	900	1350	2245	3745	6740
950	35	375	755	1130	1855	3145	5655
1000	20	255	505	760	1270	2115	3805
1050	20 <sup>(1)</sup>	170	345	515	855	1430	2570
1100	20 <sup>(1)</sup>	115	225	340	565	945	1695
1150	20 <sup>(1)</sup>	75	150	225	375	630	1130
1200	20 <sup>(1)</sup>	50	105	155	255	430	770

(1) For welding end valves only. Flanged end ratings terminate at 1000°F (538°C).

TEMP. °C	GAGE WORKING PRESSURE BY RATING NUMBER, bar						
	PN 20	PN 50	PN 100	PN 150	PN 250	PN 420	PN 760
38	20.0	51.7	103.4	155.2	258.6	431.0	775.9
50	19.5	51.7	103.4	155.2	258.6	431.0	775.9
100	17.7	51.6	103.1	154.6	257.7	429.5	773.2
150	15.8	50.3	100.3	150.6	250.9	418.3	753.0
200	13.9	48.8	97.5	146.3	244.1	406.6	731.9
250	12.1	46.3	92.7	139.1	231.9	386.3	695.0
300	10.2	42.9	85.8	128.6	214.4	357.2	642.8
350	8.3	40.3	80.3	120.8	201.1	335.4	603.5
375	7.4	38.9	77.6	116.6	194.1	323.3	582.0
400	6.5	36.5	73.3	109.8	183.1	305.0	548.7
425	5.6	35.2	70.2	105.4	175.7	292.6	526.3
450	4.6	33.7	67.7	101.4	169.1	281.9	507.2
475	3.7	31.7	63.4	95.1	158.2	263.9	475.0
500	2.8	27.7	55.7	83.4	139.0	231.8	417.0
525	1.9	21.4	42.8	64.1	107.1	178.6	321.1
550	1.4 <sup>(1)</sup>	15.0	30.0	45.0	75.0	125.1	225.0
575	1.4 <sup>(1)</sup>	0.4	21.0	31.4	52.1	87.2	156.7
600	1.4 <sup>(1)</sup>	7.2	14.3	21.5	35.8	59.9	107.5
625	1.4 <sup>(1)</sup>	4.9	9.9	14.8	24.7	41.5	74.5
650	1.4 <sup>(1)</sup>	3.4	7.2	10.7	17.6	29.7	53.1

## A351 Gr. CF8M<sup>(3)</sup>, A351 Gr. CF3M<sup>(2)</sup>

TEMP. °F	WORKING PRESSURE BY CLASSES, psig						
	150	300	600	900	1500	2500	4500
100	275	720	1440	2160	3600	6000	10800
200	235	620	1240	1860	3095	5160	9290
300	215	560	1120	1680	2795	4660	8390
400	195	515	1025	1540	2570	4280	7705
500	170	480	955	1435	2390	3980	7165
600	140	450	900	1355	2255	3760	6770
650	125	445	890	1330	2220	3700	6660
700	110	430	870	1305	2170	3620	6515
750	95	425	855	1280	2135	3560	6410
800	80	420	845	1265	2110	3520	6335
850	65	420	835	1255	2090	3480	6265
900	50	415	830	1245	2075	3460	6230
950	35	385	775	1160	1930	3220	5795
1000	20	350	700	1050	1750	2915	5245
1050 <sup>(3)</sup>	20 <sup>(1)</sup>	345	685	1030	1720	2865	5155
1100 <sup>(3)</sup>	20 <sup>(1)</sup>	305	610	915	1525	2545	4575
1150 <sup>(3)</sup>	20 <sup>(1)</sup>	235	475	710	1185	1970	3550
1200 <sup>(3)</sup>	20 <sup>(1)</sup>	185	370	555	925	1545	2775
1250 <sup>(3)</sup>	20 <sup>(1)</sup>	145	295	440	735	1230	2210
1300 <sup>(3)</sup>	20 <sup>(1)</sup>	115	235	350	585	970	1750
1350 <sup>(3)</sup>	20 <sup>(1)</sup>	95	190	290	480	800	1440
1400 <sup>(3)</sup>	20 <sup>(1)</sup>	75	150	225	380	630	1130
1450 <sup>(3)</sup>	20 <sup>(1)</sup>	60	115	175	290	485	875
1500 <sup>(3)</sup>	20 <sup>(1)</sup>	40	85	125	205	345	620

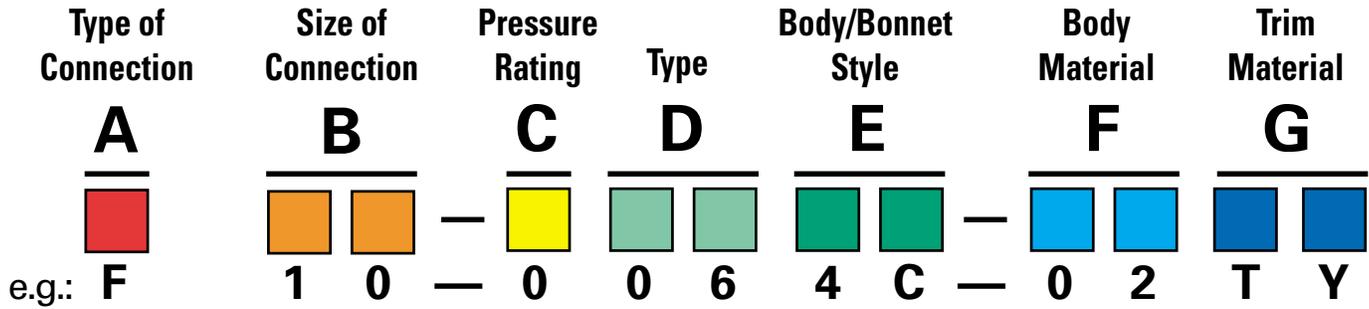
(1) For welding end valves only. Flanged end ratings terminate at 1000°F (538°C).

(2) CF3M: Not to be used over 850°F (454°C).

(3) At temperatures over 1000°F (538°C), use only when the carbon content is 0.04% or higher.

TEMP. °C	GAGE WORKING PRESSURE BY RATING NUMBER, bar						
	PN 20	PN 50	PN 100	PN 150	PN 250	PN 420	PN 760
38	19.0	49.3	98.6	148.2	246.8	411.2	744.8
50	18.3	48.1	96.3	144.4	240.6	401.0	721.9
100	16.1	42.3	84.6	126.8	211.0	351.7	633.2
150	14.8	38.6	77.1	115.7	192.4	320.8	577.7
200	13.6	35.8	71.2	107.0	178.5	297.2	535.2
250	12.0	33.5	66.8	100.3	167.0	278.2	500.8
300	10.2	31.6	63.1	95.0	158.1	263.6	474.6
350	8.3	30.4	61.0	91.3	152.3	253.9	456.9
375	7.4	29.6	59.9	89.7	149.3	249.1	448.3
400	6.5	29.3	59.0	88.2	147.2	245.4	441.9
425	5.6	29.0	58.3	87.3	145.6	242.9	437.2
450	4.6	29.0	57.7	86.7	144.3	240.4	432.8
475	3.7	28.7	57.3	86.1	143.4	239.0	430.3
500	2.8	27.3	54.8	82.1	136.7	228.0	410.5
525	1.9	25.2	50.6	75.9	126.4	210.7	379.2
550 <sup>(3)</sup>	1.4 <sup>(1)</sup>	24.0	47.8	71.8	119.8	199.5	359.0
575 <sup>(3)</sup>	1.4 <sup>(1)</sup>	22.8	45.4	68.3	114.1	190.1	341.9
600 <sup>(3)</sup>	1.4 <sup>(1)</sup>	19.9	39.9	59.7	99.5	166.0	298.6
625 <sup>(3)</sup>	1.4 <sup>(1)</sup>	15.7	31.7	47.4	79.2	131.7	237.3
650 <sup>(3)</sup>	1.4 <sup>(1)</sup>	12.6	25.3	37.9	63.2	105.7	189.8
675 <sup>(3)</sup>	1.4 <sup>(1)</sup>	10.1	20.6	30.8	51.4	86.1	154.8
700 <sup>(3)</sup>	1.4 <sup>(1)</sup>	8.3	16.9	25.1	42.0	69.8	125.8
725 <sup>(3)</sup>	1.4 <sup>(1)</sup>	6.9	13.9	21.1	35.0	58.2	104.9
750 <sup>(3)</sup>	1.4 <sup>(1)</sup>	5.7	11.3	17.1	28.7	47.7	85.7
775 <sup>(3)</sup>	1.4 <sup>(1)</sup>	4.6	9.0	13.7	22.8	38.1	68.4
800 <sup>(3)</sup>	1.4 <sup>(1)</sup>	3.5	7.0	10.6	17.4	29.2	52.6

# CAST STEEL GATE, GLOBE & CHECK VALVES



**Example:** Flanged 3" class 150 cast carbon steel full bore gate valve with TY trim.

The figure numbers shown on this key are designed to cover essential features of Velan valves. Please use figure numbers to ensure prompt and accurate processing of your order. A detailed description must accompany any special orders.

<b>A TYPE OF CONNECTION</b>			
A - Special	F - Flanged B16.5 (B16.47 series A)	R - Flanged ring joint	U - Undrilled flanges
B - Butt weld	P - Flanged B16.47 series B (API 605)	U - Undrilled flanges	X - Butt weld (intermediate class)
C - Combination			
D - DIN flanged			
E - Welded stubs			
<b>B SIZE OF CONNECTION</b>			
Customers have the choice of specifying valve size as part of the valve figure number (B) using the numbers below, or indicating valve size separately.			
<b>EXAMPLES:</b>			
F10-0064C-02TY (valve size is part of figure number)			
3"F-0064C-02TY (valve size is shown separately)			
08 - 2" (50 mm)	16 - 10" (250 mm)	26 - 26" (650 mm)	44 - 44" (1100 mm)
09 - 2½" (65 mm)	18 - 12" (300 mm)	28 - 28" (700 mm)	46 - 46" (1150 mm)
10 - 3" (80 mm)	19 - 14" (350 mm)	30 - 30" (750 mm)	48 - 48" (1200 mm)
11 - 3½" (90 mm)	20 - 16" (400 mm)	32 - 32" (800 mm)	54 - 54" (1350 mm)
12 - 4" (100 mm)	21 - 18" (450 mm)	34 - 34" (850 mm)	60 - 60" (1500 mm)
13 - 5" (125 mm)	22 - 20" (500 mm)	36 - 36" (900 mm)	99 - Special
14 - 6" (150 mm)	23 - 22" (550 mm)	40 - 40" (1000 mm)	
15 - 8" (200 mm)	24 - 24" (600 mm)	42 - 42" (1050 mm)	
<b>C PRESSURE RATING</b>			
0 - 150	1 - 300	2 - 600	3 - 1500    7 - 900
<b>D VALVE TYPE</b>			
01 - Flow control	07 - Stop globe	09 - Needle	99 - Special
06 - Full port gate	08 - Stop check	11 - Swing check	
<b>E BODY / BONNET STYLE</b>			
4 - Vertical	A - Special C - Bolted bonnet (cast) E - Extended bonnet (cryogenic) V - Cast bolted bonnet bellows seal		
<b>F BODY MATERIAL</b>			
01 - Special	09 - C12	19 - Monel M35	31 - LCC
02 - WCB	11 - CF8	23 - Alloy 20	34 - C12A (F91)
03 - WC1	12 - CF3	25 - LCB	38 - LC1
04 - C5	13 - CF8M	27 - LC3	39 - LC2
05 - WC6	14 - CF3M	28 - CG8M	46 - GS-C25N
06 - WC9	15 - CF8C	29 - CG3M	

<b>G TRIM</b>				API Number	If applicable BELLOWS <sup>(2)</sup>	
CODE	WEDGE/DISC SURFACE <sup>(1)</sup>	SEAT SURFACE <sup>(1)</sup>	STEM			
MS	Stellite 6 <sup>(3)</sup>	Stellite 6 <sup>(3)</sup>	316	STANDARD	12	321
MY	CF8M or 316	Stellite 6 <sup>(3)</sup>	316		5	321
TS	Stellite 6 <sup>(3)</sup>	Stellite 6 <sup>(3)</sup>	13 CR (410) <sup>(4)</sup>		8	321
TY	13 CR (410 or CA15)	Stellite 6 <sup>(3)</sup>	13 CR (410)			
NA	13 CR (410 or CA15) HRC 22 max	Stellite 6 <sup>(3)</sup>	13 CR (410) HRC 22 max.	NACE SERVICE <sup>(6)</sup>	8 <sup>(6)</sup>	
NB	CF8M	Stellite 6 <sup>(3)</sup>	316		12 <sup>(6)</sup>	321
NC	Monel	Stellite 6 <sup>(3)</sup>	Monel		11 <sup>(6)</sup>	Hastelloy C
ND	Stellite 6 <sup>(3)</sup>	Stellite 6 <sup>(3)</sup>	630 (H1150M)			
NE	Stellite 6 <sup>(3)</sup>	Stellite 6 <sup>(3)</sup>	13 CR (410) HRC 22 max.	5 <sup>(6)</sup>		
NF	Stellite 6 <sup>(3)</sup>	Stellite 6 <sup>(3)</sup>	Same as Body			
NG	Stellite 6 <sup>(3)</sup>	Stellite 6 <sup>(3)</sup>	316			321
NN	CF8M	Stellite 6 <sup>(3)</sup>	316			IN 625
NX	Monel	Monel	Monel			
AS	Stellite 6 <sup>(3)</sup>	Stellite 6 <sup>(3)</sup>	321		321	
AY	CF8C/F321	Stellite 6 <sup>(3)</sup>	321		321	
CC	Alloy 20	Alloy 20	Alloy 20	13		
ES	Stellite 6 <sup>(3)</sup>	Stellite 6 <sup>(3)</sup>	347			
EY	CF8C/F347	Stellite 6 <sup>(3)</sup>	347			
HC	Hastelloy C	Stellite 6 <sup>(3)</sup>	Hastelloy C			Hastelloy C
MF	CF8M or 316 w/ Teflon insert <sup>(5)</sup>	Stellite 6 <sup>(3)</sup>	316			
MH	Stellite 6 <sup>(3)</sup>	Stellite 6 <sup>(3)</sup>	316			Hastelloy C
MN	Stellite 6 <sup>(3)</sup>	Stellite 6 <sup>(3)</sup>	316			IN 625
MX	CF8M	316	316	10		
TF	13 CR (410 or CA15) w/ Teflon insert <sup>(5)</sup>	Stellite 6 <sup>(3)</sup>	13 CR (410)			
TH	Stellite 6 <sup>(3)</sup>	Stellite 6 <sup>(3)</sup>	13 CR (410) <sup>(4)</sup>			Hastelloy C
TN	Stellite 6 <sup>(3)</sup>	Stellite 6 <sup>(3)</sup>	13 CR (410) <sup>(4)</sup>			IN 625
XS	Stellite 6 <sup>(3)</sup>	Stellite 6 <sup>(3)</sup>	Monel			
XX	Monel	Monel	Monel	9		
XY	Monel	Stellite 6 <sup>(3)</sup>	Monel	11		
SX <sup>(7)</sup>	Same as body	Integral	Same as body	API 603	10	
GX <sup>(7)</sup>	Same as body	Integral	Same as body		10	
SY <sup>(7)</sup>	Same as body	Stellite 6 <sup>(3)</sup>	316		12	
GY <sup>(7)</sup>	Same as body	Stellite 6 <sup>(3)</sup>	316		12	
GS	Stellite 6 <sup>(3)</sup>	Integral	316			
SB <sup>(7)</sup>	Bronze	Integral	316			

(1) Base material is either the same as the body or solid trim at manufacturer's option.  
 (2) Bellows material shown as standard, Inconel can be used in lieu of 321 and Hastelloy C in lieu of Inconel, where design and/or pressure class applicable.  
 (3) Stellite 6 or Stellite 21 based on material or application at manufacturer's option.  
 (4) 616HT Manufacturer's Std. (F91 and C12A only).  
 (5) Inserts may be in seat or wedge at manufacturer's option.  
 (6) NACE service valves are supplied with all materials conforming to NACE MRO175. (Including bolting with max. hardness of RC22).  
 (7) SB, SX, SY PTFE gasket and packing GS, GX, GY Graphite gasket and packing.

**Note:** For a more detailed list of available trims, contact the factory or visit our web site at [www.velan.com](http://www.velan.com)