VELAN

TORQSEAL™

Triple-Offset Metal-Seated Butterfly Valves

ASME Classes: 150–600
Sizes: 3–48” (80–1200 mm)
Temperatures to 1112°F (600°C)

• Zero Leakage • Bi-Directional • Firesafe to API 607
Velan is one of the world’s leading manufacturers of industrial steel valves, supplying 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. See the back cover of this catalog for a summary of the many quality products that Velan designs and manufactures.

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 5 in Canada and U.S.A., 4 in Europe and 3 in Asia. We have a total of over 1,500 employees, 75% of whom are located in our North American operations.

Velan’s Zero Leakage Torqseal Triple-Offset Butterfly Valves are high quality valves built for long, reliable service life in critical services. From offshore oil platforms, to nuclear power plants, to petroleum refineries, leading construction/engineering firms and industrial end user companies rely on Velan’s Torqseal Triple-Offset Butterfly Valves to keep their operations running smoothly. The wide product line extends from valves for cryogenics to high temperatures and pressures (ASME Class 600), standard to specialty materials (monel, inconel, tantalum) and sizes up to 48”.

Velan has sales offices & distributors located worldwide. Visit the Velan website at www.velan.com for an updated contact list.

NOTE: The material in this catalog is for general information only and shall not be used for specific performance data and material selection without first consulting Velan. Velan reserves the right to change designs, materials or specifications without notice. Velan does not accept any liability or damages arising from the use of information in this catalog.

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VELAN’S GLOBAL NETWORK

MONTREAL, CANADA
109,000 sq. ft. (10,126 m²), ¾–4” (8–100 mm) forged gate, globe & check valves

LYON, FRANCE - Velan S.A.S
160,000 sq. ft. (14,900 m²) ¾–42” (8–1,050 mm) forged & cast steel gate, globe and butterfly valves

MILAN, ITALY - Velan SRL
93,000 sq. ft. (8,400 m²) 1–64” (25–1600 mm) API 6D & 6A trunnion mounted ball valves

MONTREAL, CANADA
170,000 sq. ft. (15,800 m²), 2–60” (50–1500 mm) forged & cast steel gate, globe, check, ball, knife and 3–36” (80–700 mm) butterfly valves

LEICESTER, ENGLAND - Velan Valves Ltd
14,000 sq. ft. (1,300 m²) steam traps, ¾–2” (10–50 mm) bonnetless globe valves

WILLICH, GERMANY - Velan GmbH
12,000 sq. ft. (1,115 m²)

MARIETTA, GA, U.S.A. - VELEAST
6,500 sq. ft. (600 m²)

BENICIA, CA, U.S.A. - VELCAL
15,000 sq. ft. (1,400 m²)

WILLISTON, VT, U.S.A. - Velan Valve Corp.
155,000 sq. ft. (14,400 m²) 2–24” (50–600 mm) forged & cast steel gate, globe and check valves
- VELNORTH 8,000 sq. ft. (743 m²)

MILAN, ITALY - Velan SRL
93,000 sq. ft. (8,400 m²) 1–64” (25–1600 mm) API 6D & 6A trunnion mounted ball valves

LEICESTER, ENGLAND - Velan Valves Ltd
14,000 sq. ft. (1,300 m²) steam traps, ¾–2” (10–50 mm) bonnetless globe valves

BELICHA, TAIWAN - Velan-Valvac
20,000 sq. ft. (1,840 m²) ¼–2” (8–50 mm) ball valves

12 Manufacturing Plants
5 Stocking Distribution Centers
27 Sales Offices
Over 200 Distributors in over 500 locations
Over 70 Service Shops

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- 5 Stocking Distribution Centers
- 27 Sales Offices
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VELAN TRIPLE-OFFSET ZERO LEAKAGE BUTTERFLY VALVE
STANDARD PRODUCTION RANGE

Carbon and Alloy Steel, 316 Stainless, Duplex, Monel, Hastelloy, Inconel, Alloy 20 and Titanium.
For valve sizes, ASME Classes and designs not shown below, please consult Velan Engineering.

FLANGED SHORT PATTERN TO ISO 5752
3 – 48” (80 – 1200 mm)
ASME Classes 150 – 600
Face-to-face to ISO 5752

BUTT WELD TYPE TO B16.34
4 – 24” (100 – 600 mm)
ASME Class 150 – 300

FLANGED LONG PATTERN TO B16.10
3 – 48” (80 – 1200 mm)
ASME Classes 150 – 600
Gate valve
Face-to-face to B16.10
Body conforms to API 600 wall thickness

LUG TYPE TO API 609
3 – 48” (80 – 1200 mm)
ASME Classes 150 – 600
Face-to-face to API 609

WAFFER TYPE TO API 609
3 – 48” (80 – 1200 mm)
ASME Classes 150 – 600
Face-to-face to API 609

Valves fire tested to API 607, Re. 4 (see pg. 17).
APPLICATIONS IN MAJOR INDUSTRIES

Fossil & Cogeneration Power
- Pump Isolation
- Condenser Cooling
- Pump & Steam Extraction Isolation
- Heat Exchanger, Condenser Cooling Isolation
- District Heating & Cooling

Nuclear
- Containment Isolation
- Saltwater Service
- Core Spray Systems
- Pump Isolation (Velan holds the ASME N-stamp)

Refining
- Oil Storage Isolation
- Hot Cracking Gas
- Flare Gas Hydrogen, Sour Gas Isolation
- Product Segregation
- Steam Supply Valves
- Catalytic Cracker Units
- Desulphurization Systems & Tail Gas Treaters

Petrochemicals
- Brine, CO₂ Vapor, Steam Service
- Hydrogen Gas, Propane Gas
- Ethylene Plants
- Ethylene Crackers
- Propylene Plants
- Oxygen Service
- Flare Inlet & Manifold Isolation
- PSA & Molecular Sieves
- Coker Plants

Pulp & Paper
- Steam Isolation, Boiler Water
- Black and White Liquors
- Oxygen Lines
- Lime and Slurries

LNG & Cryogenics
- All Liquid Gases
- Oilfield Recovery
- Liquid Natural Gas
- Gasification Plants and Storage
- LNG Ships
- Tank Farm Isolation

All over the world, Velan valves are used by the world’s leading industrial companies to help keep their operating facilities running smoothly. In fact, Velan valves have a long history of proving themselves in many of the industrial world’s toughest applications.
Our aim is to offer products and services which not only meet, but clearly exceed, the expectations of our customers.

Through training, teamwork and performance, our employees strive to achieve continuous improvement of all processes.

Our goal is Total Quality and On-Time Delivery; our method is Total Commitment.

A.K. Velan, Founder and C.E.O.

Velan’s number one priority is quality. From order entry to design engineering to the shop floor, the entire company is totally committed to offering products and services that not only meet, but exceed customer expectations. All Velan valves are designed and manufactured with an emphasis on low emissions, safety, simple maintenance, ease of operation, and above all, long and reliable service life.

TOTAL PROCESS IMPROVEMENT

While Velan has always made quality a priority, in 1990 the company adopted a formal Total Quality Management Program, aimed at improving production processes and was awarded ISO 9001 status the following year.

Today, Velan’s Total Process Improvement Program brings together a group of industry best practices, including Lean Manufacturing and Six-Sigma, with the goal of creating a more balanced and efficient production system.

CERTIFICATES/APPROVALS

Velan holds all major applicable approvals, including ISO 9001:2000, PED, ASME N/NPT, TÜV, and TA-Luft. Velan’s comprehensive quality program is fully compliant with the most stringent industry standards and has been surveyed and audited by leading organizations, regulatory bodies, utilities and architect/engineers from around the world.

TOTAL PROCESS IMPROVEMENT PROGRAM:

- Total Quality Management Program (since 1990)
- Lean Manufacturing
- Six-Sigma

CERTIFICATIONS/APPROVALS:

- PED
- ASME N and NPT (since 1970)
- AD2000-Merkblatt HP 0 and A4/TRD 110
- TA-Luft
- QA Program fully compliant with NCA 4000, ASME NQA-1 and 10 CFR 50 Appendix B
- Quality Programs surveyed by ASME and audited by NUPIC, Northrop Grumman Newport News, DCMA, utilities, architect/engineers and other organizations from around the world
Velan’s Engineering Design and Applications Group is comprised of approximately 50 professional engineers with extensive experience in critical applications across a broad range of industries. Equipped with advanced software applications, including finite element analysis (FEA), computational fluid dynamics (CFD) and 3D solid modeling, Velan engineers design superior quality valves that meet the most demanding performance requirements. Velan’s R&D facilities, equipped with steam boilers and superheaters, flow loops and cryogenic test stands, provide the company with extensive testing capabilities.

Whether we are refining the design of our standard valves, or engineering valves to meet the demands of a specific application, Velan’s vast engineering resources can handle the task. In fact, Velan has a long history of partnering with major architect/engineers, electric utilities and other end users to develop innovative solutions for their valving needs.

**VELOCITY FIELD**

A. Acceleration over disc  
B. Deceleration of flow at stagnation point  
C. Vortex behind the seat  
D. Wake with vortices

A Computer Simulation of flow through Velan Torqseal Triple-Offset Butterfly Valves destined for nuclear containment isolation service.

Velan’s production machinery and equipment are specially engineered to meet the requirements of advanced large valve manufacturing. This includes large CNC horizontal and vertical boring mills with tool changers, CNC lathes and CNC machining centers. Over 150 CNC machines are in operation in Velan’s North American plants.

All welding techniques employed at Velan are in accordance with qualified welding procedures for SMAW, GTAW, GMAW, PTAW and SAW processes.

Production testing equipment is designed to safely and efficiently test high pressure valves in strict accordance with industry codes and standards, as well as customer imposed criteria.
The Velan Triple-Offset Butterfly Valve provides a bi-directional bubble tight shut-off. This geometry ensures that the disc seal contacts the body seat only at the final shut-off position without rubbing or galling, providing a torque generated resilient seal with sufficient “wedging” to ensure a uniform seal contact.

**THE TRIPLE-OFFSET GEOMETRY**

OFFSET 1: The shaft is offset behind the seat axis to allow complete sealing contact around the entire seat.

OFFSET 2: The shaft centerline is offset from the pipe and valve which provides interference free opening and closing of the valve.

OFFSET 3: The seat cone axis is offset from the shaft centerline to eliminate friction during closing and opening and to achieve uniform compressive sealing around the entire seat.

**FRICTION FREE SEALING FOR LONG CYCLE LIFE**

The laminated disc seal

Torque seating during closing of the valve provides uniform forces around the entire circumference of the valve seat. The resilient seal flexes and energizes, assuming the shape of the seat. The compression forces equally distributed around the perimeter provide a tight bi-directional shut off. The resiliency of the seal allows the valve body and disc to contract or expand, without the risk of jamming due to temperature fluctuations. It is self-adjusting.

Velan provides an extra rigid retaining ring with bolting, designed in response to ASME stress calculations.

(1) Seat is hardfaced with Stellite as standard.

(2) The gasket is spiral wound SS/Graphite for zero leakage.
VALVE DESIGN FEATURES

The Torqseal’s advanced design features three-way eccentricity and unique elliptical seat geometry ensuring compressive sealing around the entire seat and a “tight”, bubble free valve.

- **STELLITE HARDFACED SEAT**

  Raised, conical seat prevents solids build-up from interfering with the seal. Seat is hardfaced with Stellite to meet severe service (in lieu of soft 316SS hardfacing).

- **STANDARD LAMINATED RESILIENT DISC SEAL TO 800°F (427°C)**

  One to four graphite layers are carefully assembled between stainless steel rings and graphite using phenolic resin bond. Solid seal rings are available for abrasive services as well as high temperature applications up to 1112°F (600°C).

- **“ZERO LEAKAGE” - SEAT TIGHTNESS (API 598 RESILIENT SEAT STANDARD)**

  The disc seal, evenly compressed around its circumference, produces a wedging effect which flexes the seal ring and reacts like a spring. The resilient seal assures “zero leakage” of liquids or gases to API 598 - resilient seat standard. Resiliency in the seal allows disc movement during thermal cycles while retaining tight shutoff as shown.

- **NO CAVITY**

  There is no cavity to allow build-up of solids.

- **ONE-PIECE SHAFT**

  Large diameter shaft for safety is connected to the disc close to the bearings to absorb loads with taper pin and key to allow for differential expansion due to temperature.

- **SHAFT BEARINGS**

  The shaft is centered on two long bearings, chromed, nitrided, or as stellite (option) protected against the entrance of solids by bearing seals which are standard on Torqseal valves.

- **LOW EMISSION SHAFT SEALS 0 – 100 ppm**

  Shaft is burnished to 8 RMS, ID of packing chamber finish 32 RMS. Live-loading available for long maintenance-free service. Easy access for packing adjustment. (See page 8–9 for details and alternative stem seals.)

- **CERTIFIED TO API 591, PED & ASME N (UPON REQUEST)**

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**NOTE:** The valve is marked HP for the preferred pressure side when installing the valve (shaft side is the high pressure side for flow assisted sealing). Valve is bi-directional.

- **TRIPLE SHAFT BLOWOUT PROTECTION CONFORMS TO API 609**
As a result of extensive tests conducted by Velan between 1966 and 1972, a new technology emerged at the time for high performance, leakproof, long life, and low maintenance stem seals for nuclear power, now available for all industries and applications.

1. STANDARD LOW EMISSION STEM SEAL WITH 0-100 PPM

![Diagram of standard low emission stem seal]

- **Short and narrow packing chamber**
  - Maximum 5 rings, 1/4” wide.

- **Large compression load required**
  - Graphite rings precompressed to 4000 psi for effectiveness of all rings. Gland torque must be maintained after installation and in service to levels shown in manuals.

- **Superior finish** (32 RMS) of packing chamber and stem (8 RMS) to assure long cycle life.

- **Stem bearing** to assure concentric stem rotation, allowing stem packing to provide maximum sealing effectiveness.

- **Two-piece gland** with spherical mating surfaces to assure an even packing load over 360°.

2. STEM SEAL WITH “0” HELIUM BUBBLES

![Diagram of stem seal with “0” helium bubbles]

**Special High Performance Packing** is installed and then compressed using gland bolting to approximately 80% of its “free length”.

The inherent sealing ability due to its cup and cone technology and excellent quality of materials has been proven in standard and very difficult valve applications, all backed up by an intensive research program.

**Optional Live-Loading**

provides predictable and constant packing compression for more than 5000 cycles before adjustment or re-packing.

1) **Short and narrow packing chamber**
   - Maximum 5 rings, 1/4” wide.

2) **Large compression load required**
   - Graphite rings precompressed to 4000 psi for effectiveness of all rings. Gland torque must be maintained after installation and in service to levels shown in manuals.

3) **Superior finish** (32 RMS) of packing chamber and stem (8 RMS) to assure long cycle life.

4) **Stem bearing** to assure concentric stem rotation, allowing stem packing to provide maximum sealing effectiveness.

5) **Two-piece gland** with spherical mating surfaces to assure an even packing load over 360°.
The new European specification, called TA-LUFT which is controlled by a section of the German TUV agency (Technischer Überwachungs-Verein), demands a maximum leakage of less than 1 ppm (0.0014 ppm) for critical valves. Certification issued after extensive pressure and cycling tests with H.P. helium, witnessed by TA-LUFT inspectors, assures the design and performance of a given stem seal to be equivalent to a bellows seal design. Velan has qualified two different stem seal designs to the TA-LUFT regulations.

3. THE TA-LUFT* SEAL WITH LESS THAN 1 PPM (0.0014 PPM) EMISSIONS

* Technical instructions to maintain cleanliness of air.

1) Fully-guided stem
   Stem bearings in body and gland follower prevent wobbling and packing leakage due to side thrust on stem.

2) Precompressed packing rings to 4000 psi.

3) Two O-Rings in gland follower provide additional stem seal protection to assure emissions of less than 1 ppm.

4) Live-loading
   Provides constant packing compression and is essential for this packing arrangement.

5) Two-piece flanged gland.

6) Superior finish of packing chamber (32 RMS) and stem (8 RMS) to assure long life.

4. LANTERN RING OPTION DOUBLE PACKED WITH LEAK-OFF MONITORING PURGE PORT

Double packing with leak-off monitoring purge port. Two sets of packing rings, precompressed to 4000 psi (graphite). A lantern ring and leak-off connection allows removal of leakage, if any, from bottom packing set.
See page 7 for external blowout protection detail.

See page 8–9 for live-loading and lantern ring option.
<table>
<thead>
<tr>
<th>ITEM</th>
<th>QTY</th>
<th>DESCRIPTION</th>
<th>UP TO 800°F (427°C)</th>
<th>UP TO 600°F (316°C)</th>
<th>UP TO 800°F (427°C)</th>
<th>UP TO 1112°F (600°C)</th>
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<td></td>
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<td></td>
<td>CARBON STEEL</td>
<td>STAINLESS STEEL</td>
<td>STAINLESS STEEL</td>
<td>WC6, C5, C12 OR CF8C</td>
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<td>Valve body</td>
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<td>A 351 Gr. CF8M</td>
<td>A 351 Gr. CF8M</td>
<td>WC6, C5 or C12</td>
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<td>Stellite 21</td>
<td>Stellite 21</td>
<td>Stellite 21</td>
<td>Stellite 21</td>
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<td>A 216 Gr. WCB</td>
<td>A 351 Gr. CF8M or A182 F316</td>
<td>A 351 Gr. CF8M or A182 F316</td>
<td>WC6, C5 or C12 nickel plated</td>
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<td></td>
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<td>(1) 3” (80 mm) to 12” (300 mm) = A182 F316</td>
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<td>3</td>
<td>1</td>
<td>Bottom cover</td>
<td>A 105 CS</td>
<td>A 182 F 316</td>
<td>A 182 F 316</td>
<td>F11, F5 or F9</td>
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<td>Shaft</td>
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<td>Type 630 ASTM 564</td>
<td>A 638 Type 660</td>
<td>B 637 Inconel 718 Nitrided</td>
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<td>5</td>
<td>1</td>
<td>Laminated seal</td>
<td>Duplex + Graphite</td>
<td>Duplex + Graphite</td>
<td>Duplex + Graphite</td>
<td>Nitronic 50 Solid Seal</td>
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<td>Thrust bearing</td>
<td>A 479 Type 316 Nitrided</td>
<td>A 479 Type 316 Chrome Plated</td>
<td>A 479 Type 316 Chrome Plated</td>
<td>UNS 21800 Nitronic 60 Nitrided</td>
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<td>Retaining ring</td>
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<td>A 351 Gr CF8</td>
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<td>Type 304</td>
<td>A 479 Type 410</td>
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<td>2</td>
<td>Packing</td>
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<td>Graphite die-formed</td>
<td>Graphite die-formed</td>
<td>Graphite die-formed</td>
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<tr>
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<td>3</td>
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<td>Graphite braided</td>
<td>Graphite braided</td>
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<tr>
<td>13C</td>
<td>4</td>
<td>Bearing protector</td>
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<td>A 479 Type 410</td>
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<td>15</td>
<td>2</td>
<td>Gland stud</td>
<td>A 193 Gr B7</td>
<td>A 193 Gr B8M</td>
<td>A 193 Gr B8M</td>
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<td>16A</td>
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<td>Gland heavy hex nut</td>
<td>A 194 Gr 2H</td>
<td>A 194 Gr 8M</td>
<td>A 194 Gr 8M</td>
<td>A 193 Gr. 4</td>
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<td>16B</td>
<td>1</td>
<td>Taper pin hex nut</td>
<td>SS 316</td>
<td>SS 316</td>
<td>SS 316</td>
<td>A 194 Gr. 6</td>
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<td>17A</td>
<td>4</td>
<td>Actuator bracket head cap screw</td>
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<td>Alloy steel</td>
<td>A 193 Gr. B6</td>
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<td>17B</td>
<td>Set</td>
<td>Retainer socket head cap screw</td>
<td>SS 316</td>
<td>SS 316</td>
<td>SS 316</td>
<td>A 193 Gr. B6</td>
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<td>Bottom cover spiral wound gasket</td>
<td>SS 347 + Graphite</td>
<td>SS 347 + Graphite</td>
<td>SS 347 + Graphite</td>
<td>SS 347 + Graphite</td>
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<td>1</td>
<td>Disc spiral wound gasket</td>
<td>SS 347 + Graphite</td>
<td>SS 347 + Graphite</td>
<td>SS 347 + Graphite</td>
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<td>26B</td>
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<td>Disc key</td>
<td>A 479 Type 410</td>
<td>Type 630 ASTM 564</td>
<td>A 638 Type 660</td>
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<td>1</td>
<td>Locking plate</td>
<td>A 479 Type 316</td>
<td>A 479 Type 316</td>
<td>A 479 Type 316</td>
<td>UNS 21800 Nitronic 60 Nitrided</td>
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<tr>
<td>55</td>
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<td>Body bushing</td>
<td>A 479 Type 316 Nitrided</td>
<td>A 479 Type 316 chrome plated</td>
<td>A 479 Type 316 chrome plated</td>
<td>UNS 21800 Nitronic 60 Nitrided</td>
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<tr>
<td>56A</td>
<td>2</td>
<td>Thrust bearing hex head cap screw</td>
<td>A 193 Gr B8M</td>
<td>A 193 Gr B8M</td>
<td>A 193 Gr B8M</td>
<td>A 193 Gr. B6</td>
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<tr>
<td>56B</td>
<td>4</td>
<td>Cover heavy hex head cap screw</td>
<td>A 193 Gr B8M</td>
<td>A 193 Gr B8M</td>
<td>A 193 Gr B8M</td>
<td>A 193 Gr. B16</td>
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<td>61A</td>
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<td>Taper pin</td>
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<td>Type 630 ASTM 564</td>
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<td>Actuator bracket</td>
<td>Carbon steel</td>
<td>Carbon steel</td>
<td>Carbon steel</td>
<td>Carbon steel</td>
</tr>
</tbody>
</table>

Alternative materials for body, disc and other parts are available to meet specific conditions.
(1) 3” (80 mm) to 12” (300 mm) = A182 F316
(2) Lock nut with deformed thread
### DIMENSIONS & WEIGHTS

#### FLANGED TYPE METAL-SEATED BUTTERFLY VALVES

**ASME CLASSES 150–600, 3–48" (80–1200 mm), FLANGE DIMENSIONS TO B16.5**

**DIMENSIONS & WEIGHTS / Wafer and Lug Valves - ASME Class 150–600**

<table>
<thead>
<tr>
<th>SIZE / CLASS</th>
<th>GEAR OPERATOR MODEL NUMBER</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
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<td>3 DN80</td>
<td>M10</td>
<td>11.00</td>
<td>4.94</td>
<td>8.36</td>
<td>9.74</td>
<td>8.00</td>
<td>4.50</td>
<td>2.05</td>
<td>6.00</td>
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<tr>
<td>4 DN100</td>
<td>M10</td>
<td>12.80</td>
<td>5.78</td>
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**CLASS 300**

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<th>C</th>
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*NOTE:* Velan reserves the right to substitute gear operators when required.

---

**TABLE FOOTNOTES:**

1. For sizes over 36" (900 mm), consult the factory.
## DIMENSIONS & WEIGHTS

**BUTT WELD TYPE METAL-SEATED BUTTERFLY VALVES**

**ASME CLASS 150 & 300, 4–24” (100–600 mm), TO B16.34**

---

### DIMENSIONS & WEIGHTS / BUTT WELD TYPE - ASME Class 150 & 300

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<th>D</th>
<th>E</th>
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(1) For sizes over 24” (600 mm), consult the factory. **NOTE:** Velan reserves the right to substitute gear operators when required.
Torqseal Butterfly Valve in a thermo electric power plant.

Torqseal Butterfly Valve in hot hydrocarbon service.

40” Torqseal Butterfly Valve destined for installation on the steam system of an LNG tanker, being tested to API 598.
RELIABILITY THROUGH FUNCTIONAL QUALIFICATION

Reliability of valve operation affects service life and maintenance. To predict reliability, a sound valve design, backed up by a stress analysis must be subjected to functional cycle testing under critical operating conditions.

To develop the Velan Torqseal Triple-Offset Metal-Seated Butterfly valves, it required an unusual effort and extended period of time as many competitive valves in the same category, tested in our R&D, showed repeated leaks of seats and laminated disc gaskets. Some highlights of the tests performed in our R&D laboratory are shown here. Detailed reports are available on request.

HYDROSTATIC TESTS

Valve passed testing with zero leakage.

ACCEPTABLE RESULTS

API 598 resilient seat standard for laminated seal.
API 598 metal seat standard for solid seal.

COLD CYCLING TEST (1000 CYCLES)

820 psi water to test preferred seat side.
490 psi water to test non-preferred seat side.

Cold temperature testing to -314°F.
R&D testing of the Cryogenic Torqseal valve in our Lyon, France facility.

AMBIENT CYCLING TESTS

Valve passed: 5000 Cycles with preferred flow direction, 3000 Cycles with nonpreferred flow direction and zero leakage at seats and gasket.

Also tested 8” Class 300 to 30,000 cycles with no jamming.

Seat bubble test performed on 8”ISO Class Lug style Torqseal valve. (0 bubbles accepted).

HOT CYCLING TESTS

Requirement: 1000 Cycles 150–200 psi superheated steam at 650–900°F.
The valve under flow of steam at 150–200 psi superheated to 800–900°F passed 7250 cycles without seizing or jamming.

8” Class 300 valve during hot cycling test (see above).

Steam test on 14” Class 150 valve.
1. The valve was tested first to API 598 with zero seat leakage in preferred and non-preferred direction and zero external leakage.

2. Valve during burn period is exposed to 1400-1800°F (760-980°C) flames for the duration of 30 minutes. Then the test is repeated in the non-preferred direction.

3. Rapid water quenching lowers the valve temperature to below 212°F (100°C). This is performed twice, once in each direction.

RESULTS AFTER 2 FIRE TESTS

<table>
<thead>
<tr>
<th>TYPE OF TEST</th>
<th>FIRST OPERATIONAL TEST PREFERRED</th>
<th>SECOND OPERATIONAL TEST NON-PREFERRED</th>
<th>ALLOWABLE LEAKAGE ml/min</th>
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<tr>
<td>Seat leakage</td>
<td>0 ml/min</td>
<td>0 ml/min</td>
<td>160 ml/min</td>
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<tr>
<td>External leakage</td>
<td>0 ml/min</td>
<td>0 ml/min</td>
<td>200 ml/min</td>
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</table>

Valve after two fire tests, maintains zero seat and stem seal leakage.
Air and Electric Actuators

Velan supplies high quality actuators for pneumatically, electrically and hydraulically operated butterfly valves. All actuators are totally enclosed. All moving parts are permanently lubricated. Actuators can be installed in the field although it is preferable that they be installed and tested in the factory.

Actuation Guidelines

The Torqseal Triple-Offset design concept of the Torqseal Butterfly Valve differs from that of a standard quarter-turn valve in terms of seating characteristic.

A typical valve (i.e. ball or high performance butterfly) is position seated and has a set rotation of 0 to 90°. In order to prevent over-traveling when automating this type of valve, travel stops are used on air operators and limit switches on motor operators.

The Torqseal Triple-Offset Butterfly Valve, on the other hand, is torque seated and requires a set torque from the operator to fully close the valve. Because of this characteristic, there is no defined seating position, and in general the valve requires 5-10° of over-travel for a tight seal. Therefore, the travel stop or limit switch should not be used on the closed position.

The actuator’s closing torque, properly sized for the application and valve size, should be used instead. In order to protect the valve stem, this torque should always be limited by either:

a) The torque switch in a motor operator.
b) The spring torque in a fail-closed air operator.
c) A regulator for a double-acting or fail-open air operator.

Options

Stem Extensions

Torqseal valves are available with stem extension for buried service applications among others.

Chain wheel operators are also available.

Special Cleaning

Special cleaning (oxygen, chlorine etc.) available on all Torqseal valves.

Please consult the factory for further information.

Steam Jackets

Steam jackets are also available for Torqseal valves in both the bolt-on and weld on design. Torqseal valves with steam jackets are an ideal choice for applications where the media tends to crystallize when cooled down, such as sulphur and other applications.

Bearing Lubrication

Grease from a standard grease fitting is distributed to the shaft through a groove in the outside diameter of the bearing and from radial holes in the bushing’s well.
\[ Q = C_v \sqrt{\frac{\Delta p}{G_L}} \]

WHERE:
Q = Flow in gpm
(U.S. gallons per minute).
\( \Delta p \) = Pressure drop through the valve (psi)
G_L = Specific gravity
(for water at 60°F = 1)

FLOW DATA
Cv AT 90°– FULLY OPEN VALVE

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<td>CLASS 150</td>
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<tr>
<td>CLASS 300</td>
<td>100</td>
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<tr>
<td>CLASS 600</td>
<td>–</td>
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</table>

Cv for partially open valve

Cv for open at 80° = 99%
at 60° = 70%
at 40° = 30%
at 20° = 10%

PRESSURE/TEMPERATURE RATINGS (ASME B16.34)

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<th>Stainless Steel A 351 Gr. CF8M</th>
<th>CLASS 300 Carbon Steel A 216 Gr. WCB</th>
<th>Stainless Steel A 351 Gr. CF8M</th>
<th>CLASS 600 Carbon Steel A 216 Gr. WCB</th>
<th>Stainless Steel A 351 Gr. CF8M</th>
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<td>BAR</td>
<td>PSIG</td>
<td>BAR</td>
<td>PSIG</td>
<td>BAR</td>
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Cv for partially open valve

Cv for open at 80° = 99%
at 60° = 70%
at 40° = 30%
at 20° = 10%
The top two graphs show closing torques arranged by valve size. The same curves are valid for both pressure classes. The bottom two diagrams indicate torques related to 150, 290 and 750 psi (1, 2 and 5 MPa) differential pressure.

NOTE: Torques are for full bi-directional sealing. Please consult Quarter Turn Metal-Seated Marketing Division for torque calculations.
**HOW TO ORDER TORQSEAL® BUTTERFLY VALVES**

**GENERAL INFORMATION ON HOW TO ORDER:**
- The figure numbers shown on this brochure are designed to cover essential features on Velan valves.
- Please use figure numbers to ensure prompt and accurate processing of your order.
- A detailed description must accompany any special orders.

### TYPE OF CONNECTION

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<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
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<td>C</td>
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</table>

*Example:* Flanged B16.5, 6" (150 mm), Class 300, short pattern, butterfly valve, with Duplex & Graphite seat seal rings and a carbon steel body with stainless steel trim for standard service.

### CONNECTION SIZE

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<th>D</th>
<th>E</th>
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### BODY MATERIAL

- F105, WCB
- F1, WC1
- F5, C5
- F11, WC6
- F22, WC9
- F9, C12
- F316H/F316(CF8M)
- F9, C12
- F316H/F316(CF8M)
- F9, C12
- F316H/F316(CF8M)

### BEARING MATERIAL

- Monel M35
- Hastelloy C
- Titanium Gr. 5
- Carbon Steel

### DISC MATERIAL

- Monel M35
- Hastelloy C
- Titanium Gr. 5
- Carbon Steel

### SHAFT MATERIAL

- Carbon Steel
- Hastelloy C
- Titanium Gr. 5
- Carbon Steel

### SPECIAL SERVICE

- Double packed
- Teflon packed
- Double packed

**NOTES:**
1. Must specify grade.
2. Material code “10” F316H/F316 (CF8M) has a minimum carbon content of 0.04 and is to be used if temperatures are over 1000°F (538°C).
3. Not suitable for temperatures above 600°F.
4. NACE service valves are supplied with all materials conforming to NACE MR0103. (Including bolting with max. hardness of RC22). For compliance to NACE MR0175/ISO 15156 consult Engineering.
THE MOST COMPREHENSIVE LINE OF INDUSTRIAL FORGED AND CAST STEEL
GATE, GLOBE, CHECK, BALL, BUTTERFLY AND KNIFE GATE VALVES

ASME Pressure Classes 150–4500 in Carbon, Alloy and Stainless Steel

VELAN | Pressure Seal & Bolted Bonnet
VELAN | FORGED STEEL Y-PATTERN GLOBE VALVES
VELAN | FORGED STEEL SWIVEL BODY GLOBE & CHECK VALVES
VELAN | FORGED STEEL GATE & GLOBE BELLOW SEAL VALVES
VELAN | ORGANICALLY THERMOSEAL GATE AND GLOBE BELLOW SEAL VALVES
VELAN | CAST STEEL Gate, Globe and Check Valves
VELAN | API 600 CAST STAINLESS STEEL GATE, GLOBE & CHECK VALVES
VELAN | KNIFE GATE VALVES
VELAN | Dual Plate Check Valves
VELAN | Global Leader in Valves for Nuclear Power
VELAN | Triple-Offset Metal-Seated Butterfly Valves
VELAN | Valves Made with High Purity Materials
VELAN | The world leader in COCKER BALL VALVES
VELAN | API 60 & 6A Trunnion-Mounted Ball Valves
VELAN | VALVAC Three-Piece Ball Valves
VELAN | General Purpose Ball Valves
VELAN | ADIABICO™ Control Valves
VELAN | Universal Bimetallic Steam Traps

VEL-PS | VEL-BG | VEL-SFV | VEL-BS | VEL-CRYO
VEL-CSV | VEL-API-603 | VEL-KGV | VEL-PRO-CV | VEL-NCP
VEL-BF | VEL-MS | VEL-PBV | VEL-CBV | VEL-BV6D
VEL-BV | VEL-VTP | VEL-GP2BV | VEL-ADCV | VEL-ST

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