



Vernay® Umbrella Check Valves

Custom-designed for precision performance

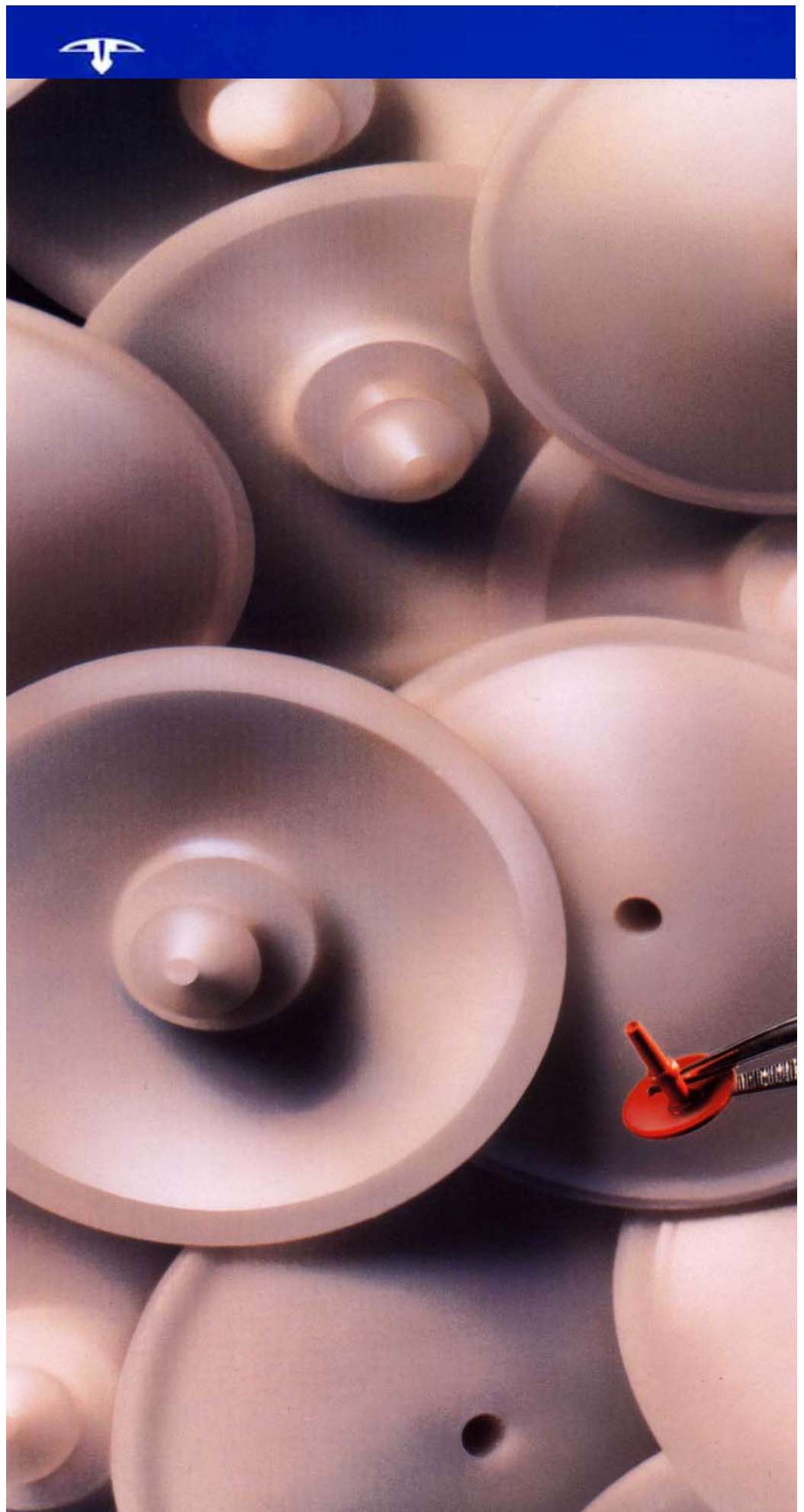
Vernay specializes in the innovative design and high-volume manufacture of precision elastomeric products. Vernay umbrella check valves, used in many industrial applications, are designed for demanding performance when precision is critical.

Vernay umbrella check valves are designed to open and close at a range of predetermined pressures and can be developed for high or low opening pressures from less than 0.3 to 55 kPa (1 in. H₂O to 8 psi). (Opening pressures vary with material properties, type of installation and method of measurement). Pressure drop across the valve is controlled by the modulus of material, effective flow area, the amount of pre-load on the sealing edge and the thickness of the umbrella skirt section.

We custom-engineer umbrella check valves to meet your specific requirements by making adaptations to design considerations.



*Elastomeric
Fluid Controls*





your applications + (our designs + materials) = new opportunities



Product advantages

Function: Our light-weight umbrella check valves allow flow in one direction and check flow in the opposite direction. They are self-actuating, easy to assemble and not affected by orientation (performance is the same even if the valve is mounted upside down). Umbrella check valves can be designed to function within a specified opening pressure range.

Choosing Vernay umbrella check valves usually reduces the number of valve components required (when compared to other mechanical methods).

Size: Vernay umbrella check valves require minimal space. Sizes generally range from 5 to 30 mm (0.2 to 1.2 in.) in diameter. See *Production Capability Examples*.

The sealing surface area of the umbrella affects opening pressure and flow capacity. When selecting a valve, choose as large a size as your assembly will allow for maximum design latitude.

Pre-load: Some umbrella check valve applications require the advantages of pre-load. The greater the degree of pre-load on the relaxed umbrella skirt, the greater the amount of pressure needed to open the seal.

Skirt design: Umbrella skirt thickness and shape influences opening pressure (in combination with umbrella diameter and pre-load).

Vernay umbrella check valves are designed to avoid inversion; when pressure is relieved they return to basic position.

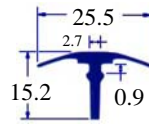
Stem design: Three stem designs are available: “pull-in” stem, “push-in” stem, and “inverted skirt.” Each design has its own advantages. Our engineers will work with you to select the option that best meets your application’s requirements.

Seat design: Umbrella check valves require a smooth metal, plastic or composite mating sealing set (we recommend a seat surface finish of 0.2 micron R_a maximum), because the seal is achieved through the interface of the umbrella to the seat. The seat affects proper valve function and requires precision manufacturing. It can be separate from or integrated into the assembly housing.

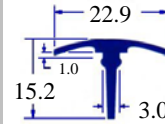
For more technical details, please refer to Vernay Technical Information Sheets.

Production Capability Examples

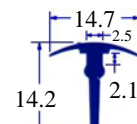
(All dimensions shown in millimeters)



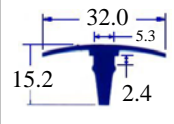
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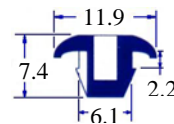
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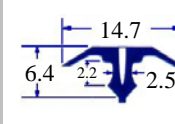
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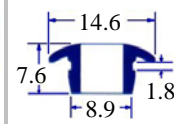
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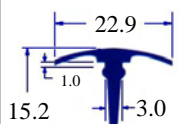
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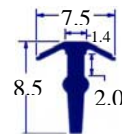
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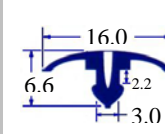
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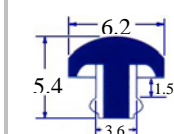
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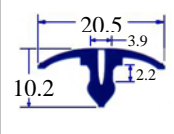
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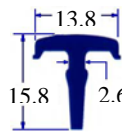
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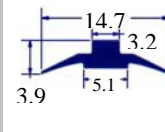
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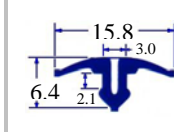
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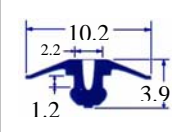
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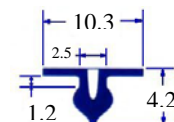
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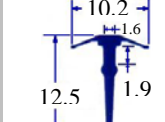
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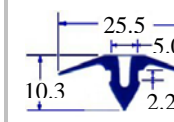
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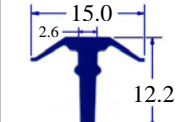
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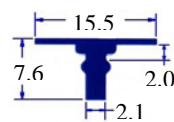
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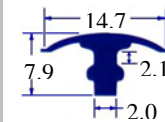
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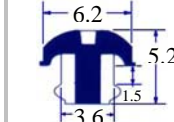
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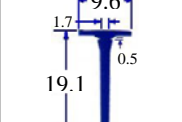
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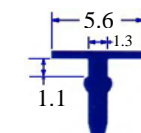
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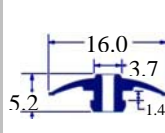
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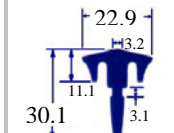
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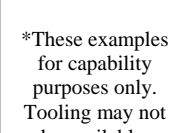
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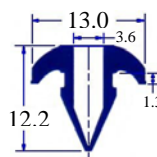
*VA 4521



*VA 4886



*These examples for capability purposes only. Tooling may not be available.



Vernay combination valves are free-flowing duckbill valves in one direction and normally closed umbrella valves in the other. This design eliminates the need for two separate valves.



Applications

Automotive: Fuel systems, emission controls, ABS, oil systems, reservoir check and relief valves, comfort control systems, windshield washers, vapor recovery systems, vacuum systems, valve pumps.

Medical: Disposable devices, diagnostic equipment, mixing chambers, breathing systems.

Appliance: Consumer appliances, fluid dispensers, vacuum and pressure pumps, soap dispensers.

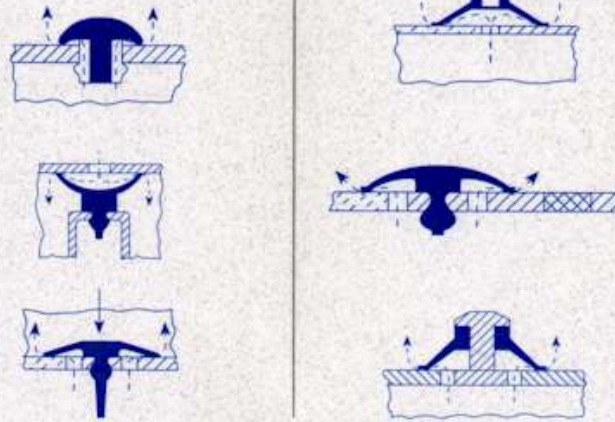
Specialty: Plumbing devices, anti-syphon devices, toys and sporting goods, pneumatic and fluid controls, liquid fertilizer pumps, irrigation devices.

Note: A pair of umbrella check valves can also operate as a simple, reliable pump.

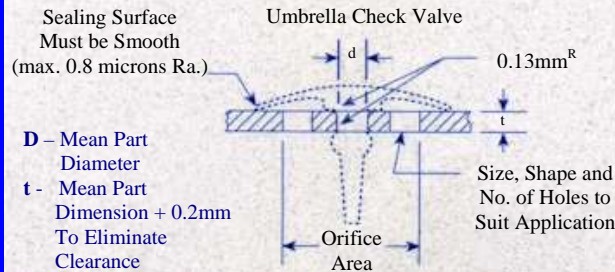


Typical Applications Suggested Guidelines

- The mounting plate thickness should be about 0.13mm (.005 in.) thicker than the stem length from the ball to the under head flange.
- All sealing surfaces must be smooth and clean.
- The size, shape and number of holes in the seat should be suited for the particular application.
- The stem hole size should be appropriate to the umbrella stem diameter so that the valve is held in place. It may contain a slight draft starting from the umbrella side.



Recommended Installation for Umbrellas



Compounding capabilities

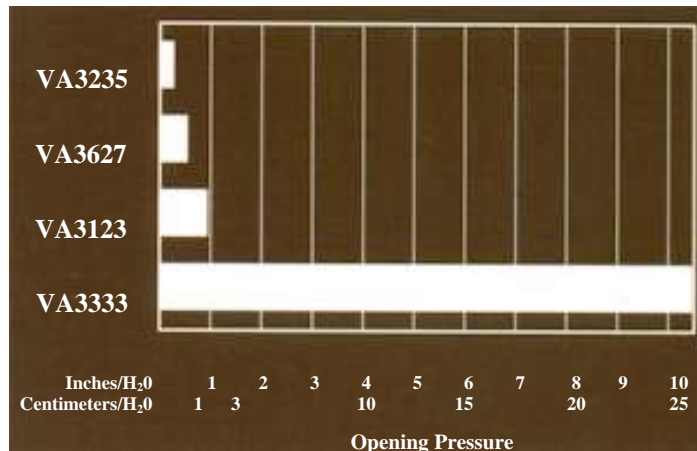
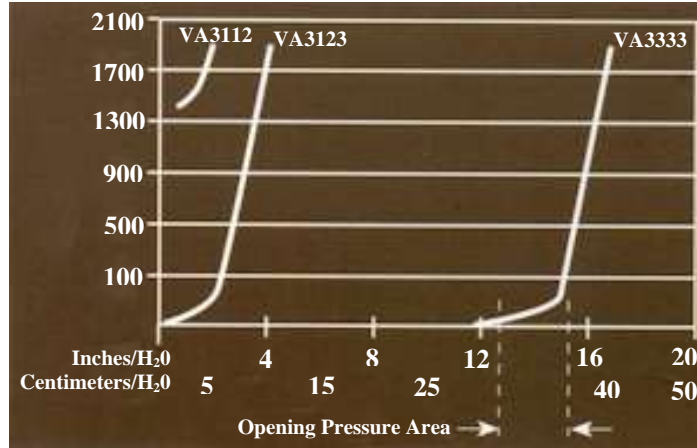
(Not limited to the following polymeric families.)

- Nitrile, NBR
- Fluorosilicone, FVMQ
- Ethylene Propylene, EPDM
- Silicone, VMQ, MQ, PVMQ
- Hydrogenated Nitrile, HNBR
- Butyl, IIR
- Fluorocarbon, FKM
- Polyisoprene, IR, NR
- Epichlorohydrin, CO/ECO
- Chloroprene, CR
- Polyurethane, AU/EU
- Styrene-butadiene, SBR
- Polyacrylate Acrylic, ACM/AEM/ANM

With access to over 23,000 proprietary elastomeric formulations stored in our database for quick retrieval, our engineers and chemists select custom-compound materials suited to your demanding product applications.

Production capability examples

Geometries listed here are for reference only. Actual production parts may or may not require compounding/processing development. Vernay is ready to work with you to custom-design the product that best suits your application.



Quality commitment

Vernay is committed to the philosophy of continuous improvement in everything we do. Product quality is achieved through the stabilization and continuous improvement of all processes and activities that impact quality.

The Vernay Quality System has been established to enforce the vital component of the customer-supplier relationship.

The Vernay Quality System is based on the ISO-9001 Quality System Standards, the Automotive QS-9000 and TS-16949 System Requirements, the FDA Quality System Regulations, and the ISO-14001 Environmental Quality Standard.

Actual quality certifications, for each of our global locations can be downloaded in PDF format on our website www.vernay.com/

Above Charts:

The data presented is solely for illustrative purposes and is not to be construed as absolute measurements. Flow and opening pressure will vary with material properties, installation and the method of measurement.



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