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Materials of Construction

Thermoplastics

PVC (Polyvinyl Chloride)
The most economical and largest selection of Chemline valves are moulded from PVC. It offers excellent mechanical and chemical resistance properties at low cost. The working temperature range of PVC valves is **0 to 60°C (30 to 140°F)**.

PVC used for Chemline valves is identified by cell classification number **12454-A** as per ASTM Standard D 1784. The suffix **"A"** refers to the highest chemical resistance rating. Most other PVC valves as well as pipe and fittings have only a "B" chemical resistance rating.

The special PVC "A" compound used in Chemline valves resists attack of most acids, strong alkalais, salts and many other chemicals. High chemical resistance of this material allows its application on aggressive services such as 98% $H_2 SO_4$, dry chlorine and low pressure wet chlorine gas. PVC is attacked by chlorinated hydrocarbons, ketones, esters and some aromatic compounds. It can be used on solutions containing up to 1000 ppm solvents.

Chemline PVC valves are non-toxic. They meet CSA standard B137.0 for toxicity.

They are resistant to damaging effects of sunlight and weathering, thus painting is not necessary.

CPVC (Chlorinated Polyvinyl Chloride)
CPVC is very similar to PVC in mechanical properties and chemical resistance. It is suitable for applications from **0 to 95°C (30 to 200°F)**.

The special CPVC compound used for Chemline valves is classified as **23567-A** as per ASTM D 1784. The suffix "A" denotes conformance to the highest chemical resistance rating. The compound is non-toxic, conforming to CSA toxicity standard B137.0.

CPVC valves have proven to be an excellent choice for applications at temperatures too high for PVC or when an extra margin of safety is required.

PP (Polypropylene)
PP is light weight and high in chemical resistance. Valves are suitable for service from **-20 to 90°C (-5° to 195°F)**. PP is unaffected by alkalais, salts, organic solvents and most acids, particularly hydrochloric and phosphoric acid. It is unsuitable on strong acids, chlorinated hydrocarbons, aromatic compounds and high concentrations of free chlorine.

PP is very inert thus popular for high purity applications such as deionized water, etc. The material comes normally opaqued by addition of grey-beige pigment to prevent ultraviolet light penetration. Natural translucent material without pigment will degrade if exposed to UV light (sun light). Chemline offers PP pipe, fittings and valves in pigmented and unpigmented PP, both approved by the FDA for contact with food.

PVDF (Polyvinylidene Fluoride)
PVDF is superior to other valve thermoplastics in chemical resistance and abrasion resistance. It has remarkable strength over the largest working temperature range.

The working temperature range of PVDF valves is **-40 to 120°C (-40 to 250°F).**

PVDF's impact strength is over twice that of PVC. The valves are extremely durable under mechanical abuse even at -40°F. They also offer the highest abrasion resistance of thermoplastic valves.

PVDF has excellent chemical resistance against halogens such as chlorine and bromine, strong acids such as hydrofluoric and nitric acids, organic solvents and oils. PVDF is not resistant to hot bases.

It is also non toxic and imparts no odours or tastes into the fluid. Our PVDF conforms with USDA Title 21, P121.2593 requirements for contact with food.

Gas permeability of PVDF is extremely low. A patented PVDF gas permeability barrier is available on Type 14 and DV Series Diaphragm Valves. It is a backing to the Teflon® diaphragm and has proven to increase the life of diaphragm valves on chlorine and strong acid services.

Teflon® PTFE (Polytetrafluoroethylene)
PTFE is almost totally insoluble and chemically inert. It has high temperature resistance. Teflon® PTFE ball seats, because of natural lubricity, require no lubrication. Teflon® PTFE diaphragms and flange gaskets are used in the most severe chemical resistance applications.

Elastomers

EPDM (Ethylene Propylene Terpolymer)
EPDM is a synthetic rubber used as the standard seal material for most Chemline valves. It is the most economical choice of elastomer and has excellent chemical resistance on the great majority of applications including acids, alkalais, salts and many others at temperatures up to 90°C. EPDM is weak on organic compounds and cannot be used on oils and fats.

Chemline valves seals of EPDM meet CSA standard B137.0 for non-toxicity.

Viton® (Fluorocarbon Rubber, abv. FPM)
Viton® is more expensive than EPDM so is used as an alternate elastomer when required. It has excellent resistance to mineral acids, oils and many aliphatic and aromatic hydrocarbons. Viton® is weak on sodium hydroxide.

CPE (Chlorinated Polyethylene)
CPE is superior to all other elastomers on sodium hypochlorite. It resists hypochlorite up to full strength (13%). Ball valves supplied with CPE seals are very price competitive on this service.

NITRILE (Acrylonitrile-Butadiene Copolymer, abv. NBR)
Nitrile is also know as Buna-N. It has high chemical resistance to oil and petroleums but is weak on oxidizing media i.e. acids. Nitrile has excellent abrasion resistance and is less expensive than Viton® for butterfly valve seats.

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