

Thermoplastic Valves Aid a Variety of Applications

Corrosion and chemical resistance help drive these material choices.

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When water is not clean and pure, it can be a detriment to more than the environment and our health. Whether water is combined with waste, chemicals or other natural elements like salt, if the system it runs through is not designed with the proper materials and components, the results can be costly—even hazardous.

Understanding the benefits and limitations of available materials when designing or replacing a system can alleviate repetitive repairs and system shutdowns. Approximately 70 percent of all industrial valve applications meet the temperature and pressure ranges for thermoplastic valves, which offer advantages such as corrosion and chemical resistance, light weight and low installation costs.

Cost is often the driving force behind decisions made in system repair and design, but there are a variety of other factors to consider. The chemical or media, temperature, and pressure in the system should shape a majority of its elements. Maintenance and service options, available materials of construction, valve body styles and valve operators should also come into play.

Common Valve Materials

Polyvinyl chloride (PVC) and chlorinated polyvinyl chloride (CPVC) are two of the most common valve body materials. Both offer reliable chemical resistance and a maximum working pressure of 150 pounds per square inch (psi). But CPVC has a higher working temperature than PVC.

For applications that require a broader temperature range than CPVC, polypropylene (PP) and polyvinylidene fluoride (PVDF) are additional material options with excellent chemical resistance.

When considering a butterfly valve, the liner, seat and seal materials should also be carefully considered as they are affected by temperature, chemical composition and abrasion caused by particulate in the media.

Ethylene propylene diene monomer (EPDM) and fluorocarbon rubbers (FKM) are the most common liner materials. Both can handle temperatures equal to or greater than PVC and CPVC, but FKM becomes difficult to operate at temperatures below 23 F.

Valve Styles

Butterfly and ball valves are the standard for on/off flow control. For modulating flow, butterfly valves are preferred because they have a flow-controlling disc that operates at right angles to the flow, which is straight through and has only a low pressure drop. Ball valves contain a flow-controlling ball within the valve body. A hole through the center of the ball connects the inlet and outlet ports of the valve. The ball rotates 90 degrees. When the valve is in the open position, flow is straight through and pressure drop is minimal if the port through the ball matches the inside diameter of the pipe, which is commonly known as full port. Both butterfly and ball valves can be manually, electrically or pneumatically actuated. Other popular valve styles include diaphragm valves, check valves and gate valves.

Media Considerations

Slurry applications, or applications where particles are suspended in the media, can be just as damaging to a valve as chemicals. Butterfly valves are preferred over ball valves in these instances because the valve can be fitted with disc and seat materials that are more abrasion resistant. The movement of the valve disc when opened will wipe particles from the seat and allow collected particles to pass through the valve and downstream.

Using a ball valve in these conditions can score the ball of the valve, which can create leak paths through the valve. Particulate may also become lodged in the seats.

Maintenance

After considering all available options for the system's components, the last thing end users want to do is repair or replace them. But under certain conditions, it may be inevitable. It does not hurt to be prepared for a worst-case scenario, especially if the application is critical. Asking if the manufacturer offers replacement parts, operation and maintenance manuals, and technical support is a good place to start a preparedness plan. If repairing or rebuilding the valve is not an option, consider keeping a spare on hand.

