



TYPICAL MATERIALS TO CONSIDER SEALING BALL VALVES WITH ELASTOMERS vs POLYMERS

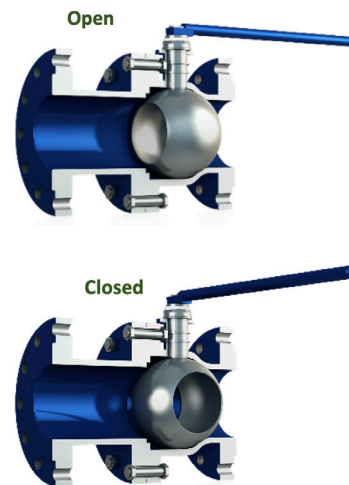
WHAT TYPE OF ELASTOMERS ARE USED IN BALL VALVES?

Typical materials are NBR, EPDM, FKM (Viton) and PTFE (Teflon). The material choice depends strongly on the chemical properties and the temperature of the medium. The right choice is of utmost importance to guarantee a long life span and optimal valve performance. Today's extreme temperatures in light hydrocarbons, elastomers are challenged in dynamic applications during extreme temperature swings. Elastomers are elastic materials with high flexibility and low strength molecular bonds (like rubber).

WHAT TYPE OF POLYMERS ARE USED IN BALL VALVES?

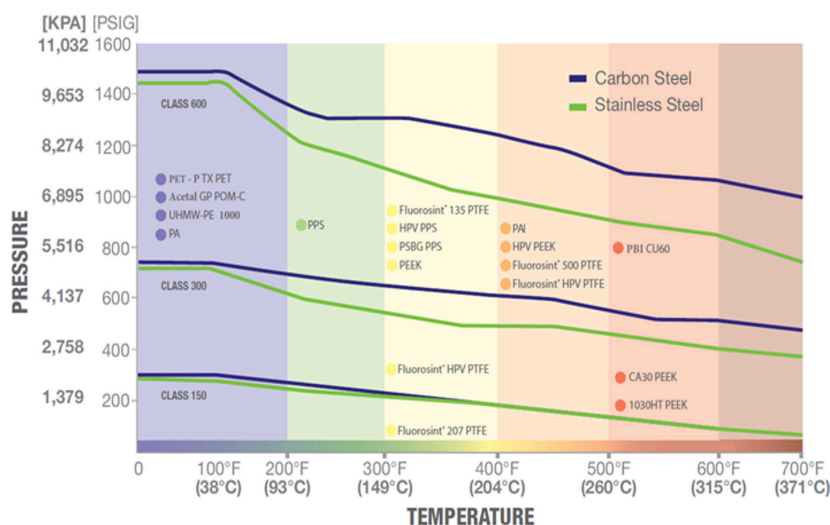
The most utilized grades are PTFE, RPTFE, PCTFE, FEP, PFA, POLYAMIDE and POLYETHER KETONE. The most utilized and applicable grade here is PTFE or RPTFE which is in the Fluoropolymer family. Both Fluoropolymers and thermoplastics are basically inert to most chemicals and are developed for strength, stability, and performance. Polymer fibers consist of polymer chains that have stronger molecular bonds than elastomers. Fibers are more rigid and less elastic than elastomers and can be composed of both natural and synthetic materials.

The chart below provides information about a few elastomers and polymers materials commonly used, although, other materials are available. Once you have narrowed your search, review of specific physical and chemical performance characteristics can help identify the most appropriate material for use.



Material Selection ensures seal performance and extended service life	
Pros	Cons
Good resistance to compression, shear, and wear. Compatible with oil products, Solvents and alcohol up to 80°C.	Impacted by weather conditions, moderate temperature resistances, not compatible with certain fluids and Polar solvents
strong overall chemical resistance. The temperature range is -10°C to 120°C. Good Mechanical properties, resistance to compression set, works in High temperatures (not in hot water/steam) Chemical resistance to oil/solvents such as aliphatic, aromatic, and halocarbons, acids, animal & vegetable oil, Not resistance to methanol	Poor resistance to hot water and steam. Swelling occurs at higher temperatures. Not compatible with certain solvents, certain esters and others, glycol based brake fluids.
PTFE is inert to almost all fluids. Its has high tensile strength suitable for higher operating pressures and temperatures. The temperature range is -30°C to 180°C.	This material has limited flexibility and not recommended for cryogenic temperatures and pressures
PEEK is a semicrystalline thermoplastic with excellent mechanical and chemical resistance properties that are retained to high temperatures. PEEK can be used continuously in operating temperatures up to 250°C	Limited flexibility, high cost, This material's crystallization rate is extremely high, meaning it crystallizes too quickly after even the slightest temperature drop

VALVE MATERIAL SELECTION CHART BY PRESSURE AND TEMPERATURE, AND CLASS



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