

## APPENDIX F – SEAT MATERIALS & SERVICES

### **PTFE**

Polytetrafluoroethylene – a synthetic fluoropolymer of tetrafluoroethylene – called Teflon® by DuPont®

- Soft seat capable of tight shutoff
- Relatively inexpensive material
- Low torque characteristics
- Excellent corrosion resistance
- Impervious to most chemicals
- Good temperature resistance
- Avoid temperatures in excess of 400° to 425°F (consult pressure temperature charts in catalog)
- Avoid high pressure (acceptable limits are defined in the pressure temperature charts for in Engineering section of catalog)
- Throttling and Erosive services should be closely examined prior to selection in order to avoid wire draw
- Not good for Styrene, Butadiene, Vinyl Chloride, Latex, Radioactive, or Erosive services

*Available in all steel valves; exception, the Three-Piece valve does not offer PTFE as an option.*

### **RPTFE**

Reinforced PTFE, RPTFE, called reinforced Teflon® by DuPont®

- Same basic performance properties as PTFE
- Reinforcing (filler materials) can be Glass Bead, Stainless Steel, 55% Bronze and 5% Molybdenum, Carbon Graphite, and more, but the most common is 15% Glass Filled
- Added structural strength
- Fillers increases operational torque more than basic PTFE
- Added erosion strength
- Service temperature should not exceed 450°F (consult pressure temperature charts in catalog)
- Caution when using with chemicals to make sure they are compatible with the filler materials
- Not good for Styrene, Butadiene, Vinyl Chloride, Latex, Radioactive or Erosive services
- Throttling and Erosive services should be closely examined prior to selection in order to avoid wire draw

*Available in all steel valves; exception, the Three-Piece valve does not offer RPTFE as an option.*

### **UHMWPE**

Ultra-High Molecular-Weight Polyethylene

- Soft seat capable of tight shutoff
- Still a relatively inexpensive material
- Best abrasion resistance of any soft seat we offer
- Good resistance in Radiation, Butadiene and Styrene services
- Used extensively in tobacco industry because not poison like PTFE based seats when it burns
- Service temperature should be limited to 180°F max on the upper end (consult pressure temperature charts in catalog)
- Caution – not good at all in Oxidizing Acid services

*This material is available as an option for all of the steel industrial valves.*

### **PFA**

Perfluoroalkoxy

- Typically an injection molded material
- Denser material than PTFE, but has similar characteristics
- Excellent in saline water applications
- Excellent for Butadiene, Styrene, Vinyl Chloride and Latex applications
- PFA does not “popcorn” like PTFE in similar applications
- Much more expensive than PTFE
- Maximum service temperature should be about 450°F (consult pressure temperature charts in catalog)

*This material is an option in the Top Entry valve (option “-C”)*

### **PCTFE**

Polychlorotrifluoroethylene

- a.k.a. – Kel-F® by 3-M, today known as Neoflon® by Daikin
- Higher compressive strength than PTFE based materials
- Very low “cold flow” characteristics
- Does not absorb moisture
- Very low gas permeability
- Very low shrinkage in low temperature applications
- More stable in thermal cycling applications than PTFE based materials
- Temperature limit thresholds are around 300°F

*This material is only available as an option. Consult the Technical Service Group for assistance.*

### **Multiseal**

Molecularly Modified PTFE

- Also known as “Super Teflon®”, Multiseal is a product of Dyneon®, more specifically Dyneon TFM™ 1600
- Low torque characteristics
- FDA approved as food service grade
- Impervious to most chemicals
- Better than PTFE in most similar services
- Fairly stable at higher service temperature 475° to 500°F depending upon operating pressures
- Expansion and contraction rates are higher than with PTFE in thermal cycling
- Improved resistance to “popcorning” caused by polymerization of Butadiene, Styrene, Vinyl Chloride and Latex, but still not as good as PFA for those services.

*This material is the standard seat material offering for all Three-Piece steel valves. It is also available as an optional seating material for Flanged End valves (option “-80”), and as an optional Seating material for Top Entry valves (option “-T”, and fire safe option “-L”).*

### **PEEK**

Polyether Ether Ketone

- Hard plastic like material
- Corrosion resistance similar to PTFE
- Excellent abrasion resistant material
- Good for use in higher temperature applications 500° to 550°F
- High torque characteristics
- Used in tobacco as well due to not being poison like PTFE based materials when it burns
- It is recommended that the factory be consulted before specifying this material

*This material is available for seats in all of the steel valves. It is also used as a stem bearing, when blended with PTFE to reduce friction. It is the standard stem bearing for all steel three-piece Apollo valves. CAUTION: Do Not use this material in Chlorine services*

### **Carbon Graphite**

- Ball and seats are lapped as a set
- Very hard material
- Material is not flexible
- Basic carbon graphite seat material good to 750°F
- High temperature graphite can be used to a maximum of 1000°F
- It is recommended that the factory be consulted before specifying this material

*At the present time this material is only available in the Top Entry valve, and is used only as a seat material.*

### **Ceramic**

Partially Stabilized Zirconia (PSZ)

- Very hard, very brittle material
- Very good compressive strength
- Excellent abrasive and corrosion resistance
- High temperature services up to 900°F
- It is recommended that the factory be consulted before specifying this material

*At the present time this material is only available in the Top Entry valve, and is used only for ball and seats*