

Is this something you've seen recently?



01-Company

22 February 2010

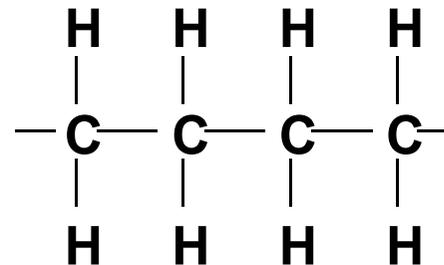
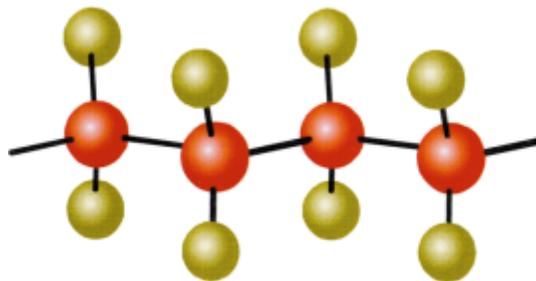
An Answer to Corrosion



Non-Fluorinated Polymers

Ultra High Molecular Weight Polyethylene (UHMW-PE)

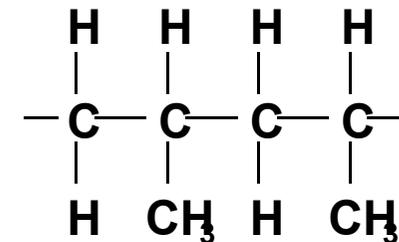
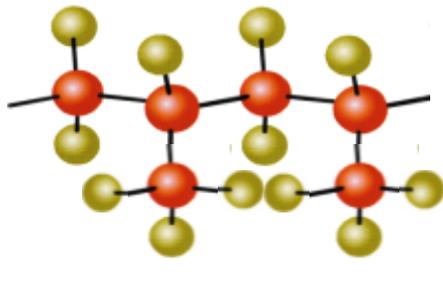
- Melting point 130°C. Application temp. range -140°C to 90°C
- Tradenames (manufacturers): RCH100 (Celanese)



Non-Fluorinated Polymers

Polypropylene (PP)

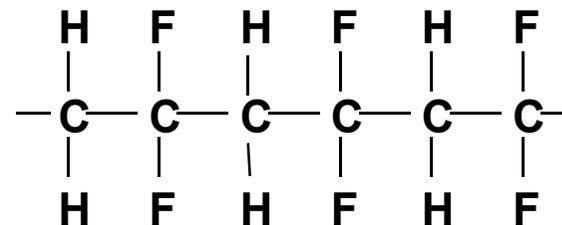
- Melting point 160 °C. Application temp. range -20 °C to 90 °C
- Very limited chem. resistance
- Tradenames (manufacturers): Hostalen PP (Basell)
Vestolen (Sabic)
etc....



Partially fluorinated plastics

Polyvinylidene fluoride (PVDF)

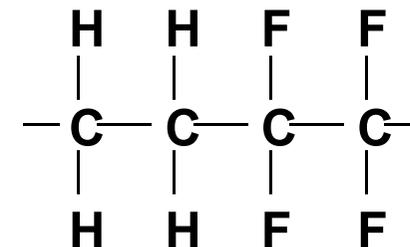
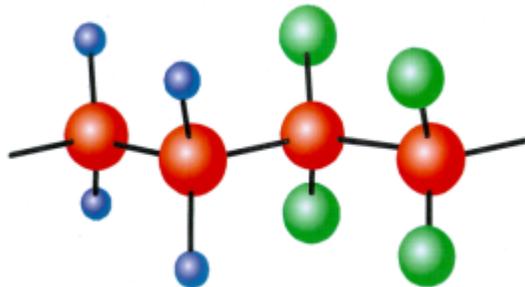
- Melting point range about 170 to 180°C
Application temperature range approx. –100 °C to 130 °C.
- Limited chem. resistance but considerably better than PE and PP.
- PVDF is attacked e.g. by ketone, ester and organic amines.
- Tradenames (manufacturers): Kynar (Arkema)



Partially fluorinated plastics

Ethylene-Tetrafluoroethylene-Copolymer (ETFE)

- Semi-crystalline copolymer made of tetrafluoroethylene (TFE) and ethylene.
- Very high toughness, tear strength and good abrasion resistance.
- Good chemical resistance, Application temperatures up to 150 °C.
- Processing: transfermoulding, extrusion, injection moulding, rotomoulding.
- Tradenames (manufacturers): Tefzel (DuPont)
Dyneon (Dyneon)
Aflon (AGF)
Neoflon (Daikin)

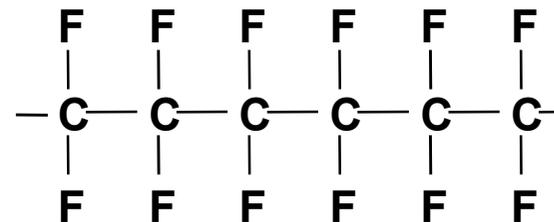
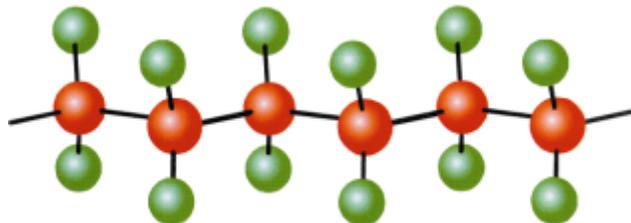


Fully fluorinated plastics

Polytetrafluorethylene (PTFE)

- Semi-crystalline material, polymerised TFE monomer
- Extremely strong bond btw. fluorine and carbon atoms
- Melting point 327°C. Application temperature range –200 °C to 260 °C
- Tradenames (manufacturers): Dyneon (Dyneon)

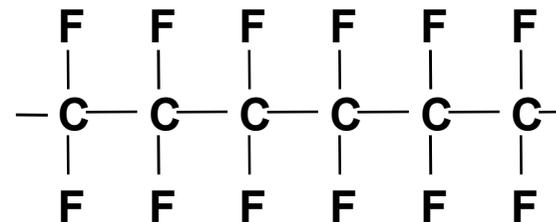
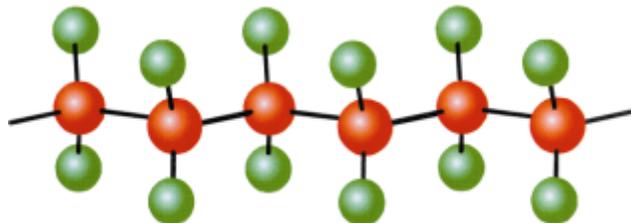
Teflon (DuPont) ...



Fully fluorinated plastics

Polytetrafluoroethylene (PTFE)

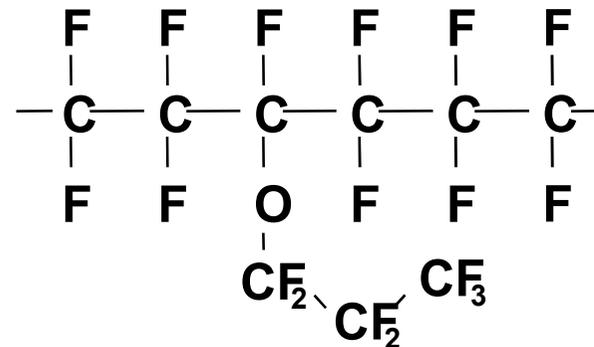
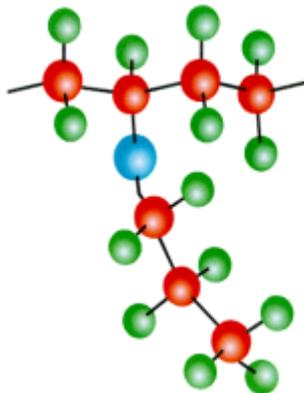
- Semi-crystalline material, polymerisation of monomer tetrafluoroethylene (TFE).
- Extremely stable link btw. fluorine and carbon atoms
Fluorine atoms form a tight protection around the carbon chain.
- Melting point 327°C. Application temperature range
–200 °C to 260 °C (for valve / pump designs max. 200 °C)



Fully fluorinated plastics

Perfluoroalkoxy – Copolymer (PFA)

- PTFE with approx. 4 % modifier perfluoropropylvinylether (PPVE)
- Melting point 310 °C. Application temperature range approx. –200 °C to 260 °C (for valves / pumps max. 200 °C).
- best chemical and high thermal resistance, nearly identical to PTFE
- Tradenames (manufacturer): Dyneon (Dyneon)
Teflon (DuPont)



Summary

	Material	Corrosion resistance	Max. Temp. °C ¹⁾ (°F) ¹⁾	Temp. shock resist.	Impact resist.	Abrasion resist.
<u>Fully fluorinated</u>	PTFE	universal	200 (400)	good	good	limited
	PFA	universal	200 (400)	good	good	limited
<u>Partially fluorinated</u>	PVDF	limited ³⁾	120 (250)	good	good	fairly good
	ETFE	limited ³⁾	120 (250)	good	good	fairly good
<u>Not fluorinated</u>	PP	limited ³⁾	90 (195)	good	good	limited
	UHMW-PE	limited ³⁾	90 (195)	good	good	good

1) for applications in Richter valves and pumps

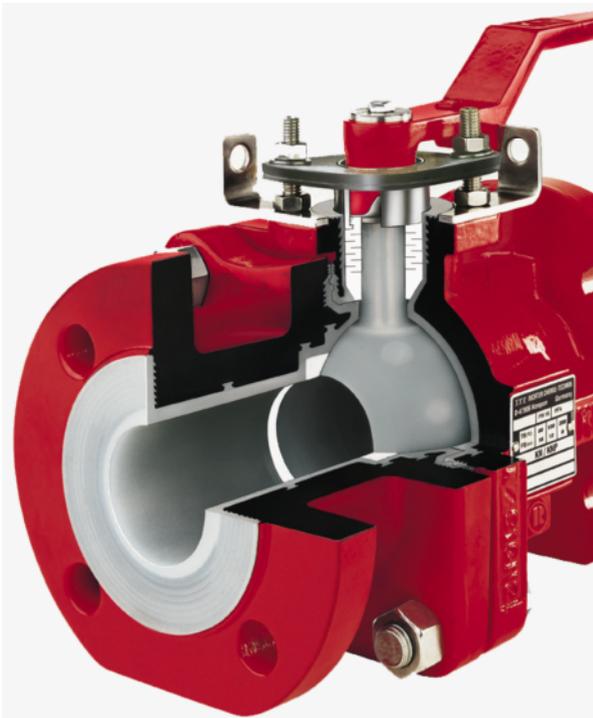
2) attention to exceptions for temperatures > 100 °C (210 °F)

3) also depending on temperature

The Company

Products: Lined Valves

Ball Valves

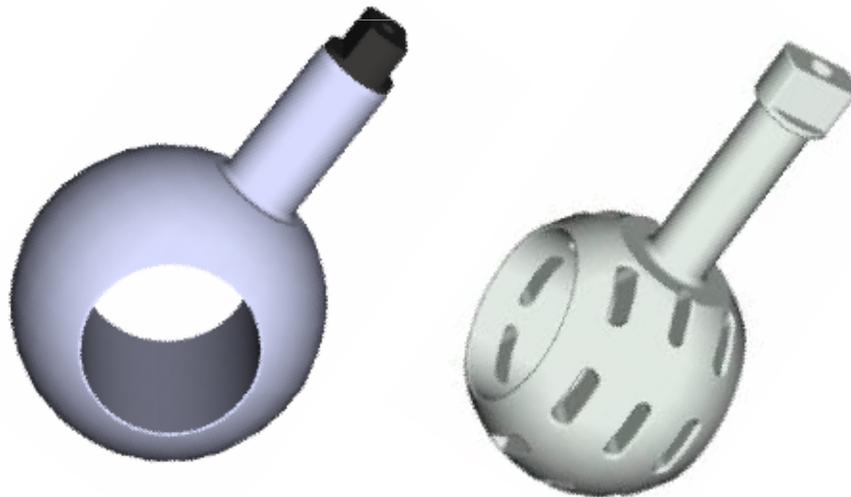


The Company

Products: Lined Valves

Ball Valves

One piece ball/stem design,
PFA lined.



Metal core = one piece stainless steel 1.4462 or 1.4542

Two-piece: Al_2O_3
with lined SS stem



Ceramic ball

The Company

Products: Lined Valves

Control Ball Valves

K_{v100} values:

from 0.8 to 400 m³/h



The Company

Products: Lined Valves

Butterfly Valves:

- Wafer Design
- Lug Design
- Double Flange



The Company

Products: Lined Valves

Globe Control Valves

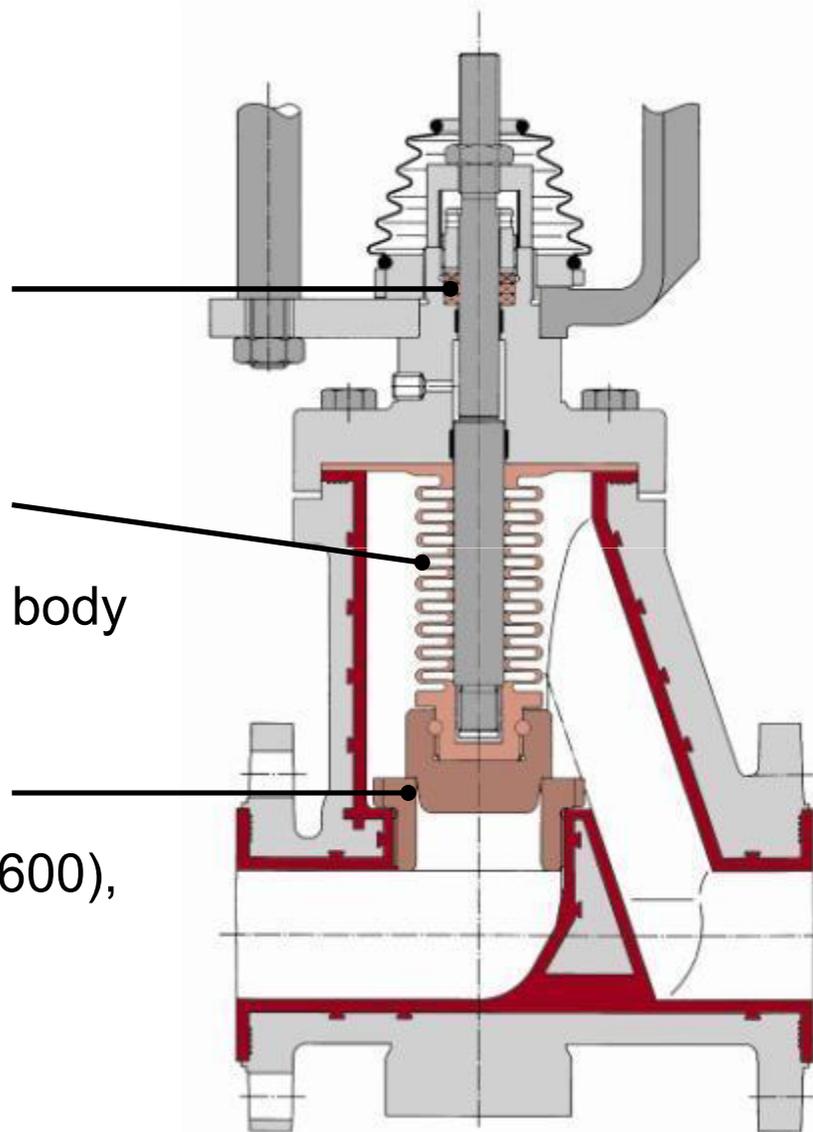


Globe Control Valve RSS Sectional Drawing

Safety stuffing box,
manually adjustable

PTFE bellows,
protects the valve stem from
corrosion and seals the valve body
to the atmosphere.

Seat and plug,
made of modif. PTFE (TFM 1600),
interchangeable



The Company

Products: Lined Valves

Diaphragm Valves

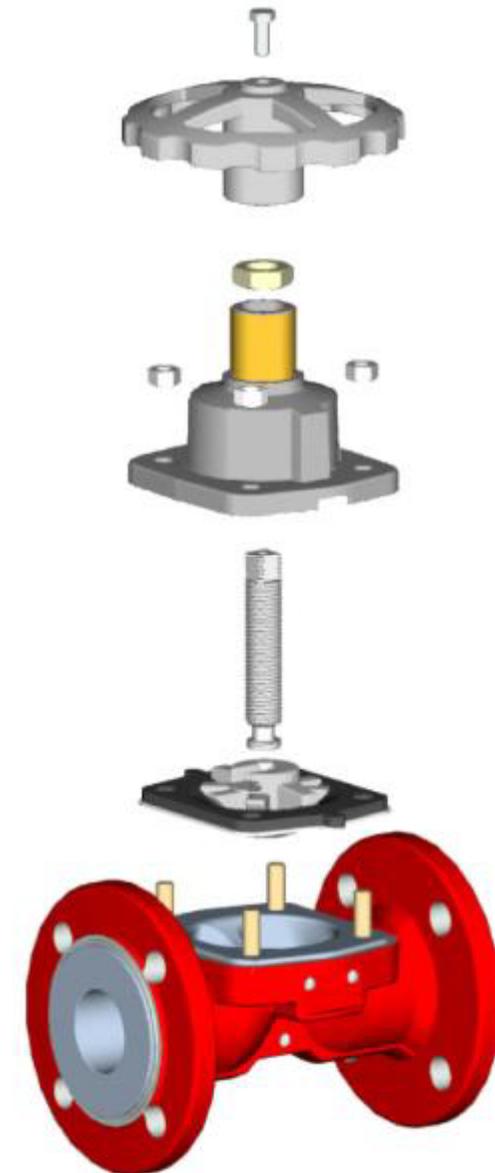


The Company

Products: Lined Valves

Diaphragm Valves

- n ***Upper parts of stainless steel:*** bonnet, handwheel, stem, compressor, tube nut and screws
- n ***Diaphragms:***
 - o TM (PTFE) + EPDM
 - o Conductive
 - o 3-layer (TM + PVDF + EPDM)
- n ***Lining:*** PFA, PFA-P or PFA-L
- n ***Various face-to-face dimensions available:*** ISO/DIN, MSS, BS, ANSI



The Company

Products: Lined Valves

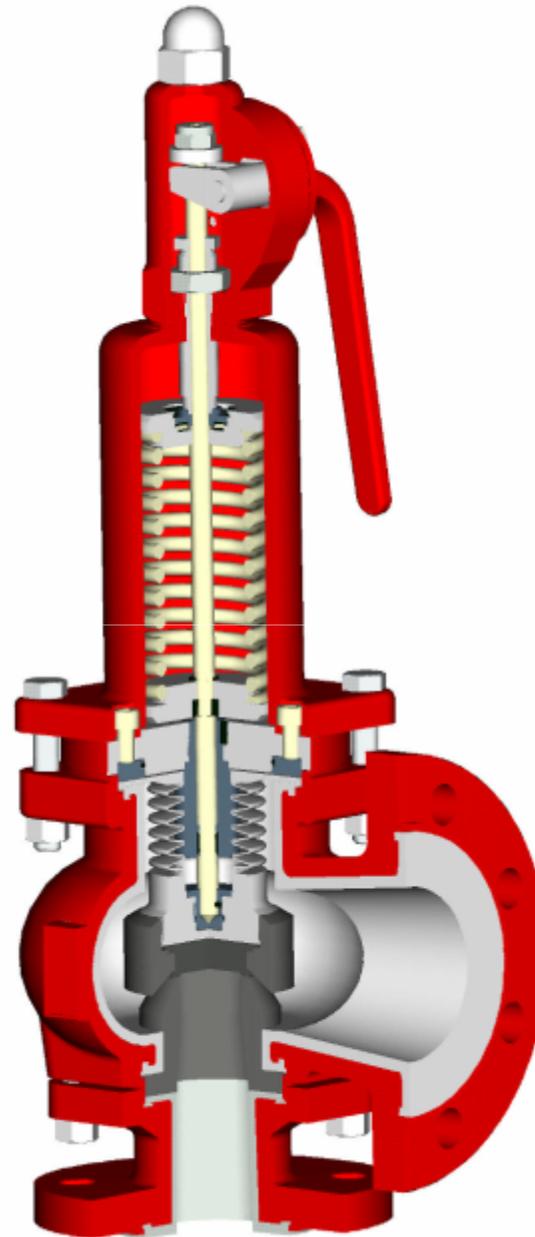
Safety Valves



Series KSE/F

Valve Design

- n **Standard-Safety Valve**
for highly corrosive fluids
vapours / gases / liquids
- n **Spring loaded**
- n **Valve body - pressure rating**
PN 16
- n **Valve Sizes (Inlet / Outlet)**
DN 25/50,
DN 50/80,
DN 80/100,
DN 100/150
- n **Set pressures 0.1 bar - 13 bar**
- n **Type Test No. -871- D/G/F**
Vapours / Gases / Liquids



The Company

Products: Lined Valves

Overflow and Pressure Relief Valves



The Company

Products: Lined Valves

Ball Check Valves:



Strainers:



The Company

Products: Lined Process Pumps

- **Standards:**

Both to **ISO 2858/DIN EN 22858** and **ASME/ANSI B 73**

- **Sealing:**

Both mechanical seal and sealless

- **Capacity / Delivery:**

up to 600 m³/h / up to 90 m



The Company



The Company

Kempen, Germany

- Established 1957
- Staff: 260 worldwide (220 in Kempen)
- Processing of PTFE & PFA (transfer moulding and press-sintering)
- CNC machining centres for metal parts
- Research & Development, Manufacturing and Testing of Pumps & Valves



Typical Applications

- manufacture / processing
base / intermediate chemicals:

Hydrofluoric acid

Sulfuric acid

Phosphoric acid

Hydrochloric acid

Caustic soda

Potassium hydroxide

Chlorine

Bromine

Fluorine



Typical Applications

- Fertiliser industry

Phosphoric acid

Sulfuric acid

Nitric acid

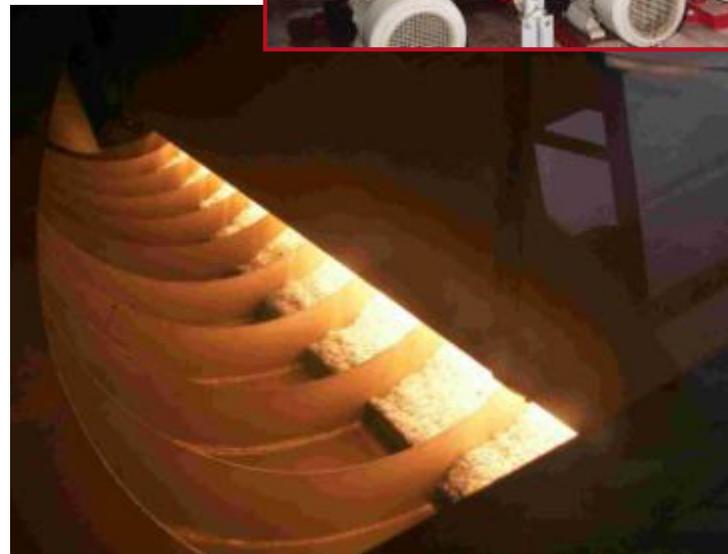
Ammonia



- Production of TiO₂ pigments

Chlorine

Sulfuric acid



Typical Applications

- Desalination / Water Treatment

*Sea Water
Chlorine*

- Electro-Chlorination

*Chlorine
Caustic soda
Brine
Dryer Acid*

