

KYNAR<sup>®</sup> PVDF COMPONENTS

# Solving the world's water challenges.





**THIS PLASTIC MIGHT JUST BE TOUGHER THAN YOUR APPLICATION.**





**Your investment in a Kynar® PVDF fluid and chemical handling system is an investment in the SAFETY, RELIABILITY and LONGEVITY of your process.**

The Kynar® business & technical team speaks almost every day with process engineers, maintenance personnel and facility managers – people just like you. When we mention Kynar® products, your most common concerns relate to the chemical resistance, high temperature performance, abrasion resistance, and physical strength of plastics. To be sure, most plastics can only handle non-corrosive chemicals at low temperatures.

But Kynar® PVDF is not “most plastics.” You may be surprised to discover that you can use Kynar® polyvinylidene fluoride (PVDF) high performance plastic in many of the applications you once thought were limited to specialty metal alloys or stainless steel.

**HEAR US OUT . . .**

**Why you should consider components made from Kynar® PVDF instead of stainless steel or exotic metal alloys:**

- While metals rust and rouge with age, Kynar® components do not corrode and do not need to be passivated
- Kynar® components are strong, tough and provide long-lasting, corrosion-free service
- Kynar® systems have installed costs comparable to stainless steel—without the maintenance costs
- Kynar® components are lighter weight and more abrasion resistant than stainless steel and are easily assembled with heat

**Why you should consider components made from Kynar® PVDF instead of PVC, HDPE, polypropylene or CPVC:**

- Kynar® systems can operate at a much higher temperature – up to 302°F (150°C) in some chemical environments
- Kynar® components are more resistant to radiation and to a broader range of chemicals
- Kynar® PVDF contains no additives and is suitable for use in high purity applications
- Kynar® components exhibit excellent flame and smoke characteristics and are UL listed as such.
- Kynar® systems exhibit greater mechanical strength
- A wide range of Kynar® components are available due to its ease of processing
- Kynar® components are resistant to chemicals with a pH up to 13.5 for copolymers and up to 12 with homopolymers

## Common Kynar® Applications:

Application	Instead of:	Up to:	For:
Exposure to chlorinated & brominated chemicals	Titanium Alloy 20 PTFE-lined steel PFA-lined steel	275°F (135°C)	Lower cost Easier installation Lower permeation
Exposure to hot acids (eg: HF, HCl, H <sub>2</sub> SO <sub>4</sub> , HNO <sub>3</sub> , chromic, HBr)	Titanium Alloy 20 PTFE-lined steel	275°F (135°C)	Lower cost Easier installation Chemical resistance to varied concentrations
Alcohol + acids/chlorides/hydrocarbons	Polypropylene HDPE	194°F (90°C)	Broad chemical resistance to varied concentrations
High pressure + high temperature	PVC Polypropylene CPVC PFA	230 psi at RT and 285°F (141°C)	High temperature rigidity High pressure rating Broad chemical resistance
Microfiltration & ultrafiltration membranes	Polysulfone (PSU) Polyethersulfone (PES) Cellulose Acetate Polyamide Polypropylene (PP)	302°F (150°C)	Membrane BioReactors (MBR) Virus Rejection Chemical Resistance Protein Bacteria Spores Sediment
UPW, DI water, potable water	HDPE PP PVC Stainless Steel Metal Alloys	302°F (150°C)	Resistance to Sterilization Techniques Low Biofilm Build Up Low Leachables



## Common Chemicals Handled by Kynar® Components:

Alcohols	Calcium hypochlorite	Nitric Acid	Sodium carbonate
Aluminum chlorides (<40%)	Chlorine	Phosphates	Sodium chlorite
Aluminum sulfate	Chlorine dioxide	Phosphoric acid	Sodium hydroxide
Ammonium chloride	Ferrous chloride	Potassium permanganate	Sodium hypochlorite
Bromine	Ferrous sulfate	Sodium benzoate	Sulfuric acid (<98%)
Bromobenzene	Hydrochloric Acid	Sodium bicarbonate	Urea
Calcium carbonate	Hydrofluoric Acid	Sodium bisulfate	Zinc chloride
Calcium chloride	Hydrogen peroxide (<30%)	Sodium bisulfite	Zinc sulfate

## Common Sterilization Techniques:

Steam, irradiation, ozone, ultraviolet (UV), alcohols, and chemical

For more detailed information about the chemical resistance of Kynar® components, including corresponding operating temperatures, please visit the Literature section of [www.kynar.com](http://www.kynar.com) and download our **Kynar® Chemical Resistance Chart**.

## Vessels<sup>1</sup>

Type	Description	Temperature <sup>2</sup>	Pressure <sup>1</sup>	Available Sizes	Polymer Layer Thickness
Sheet-lined steel	Fabric-backed Kynar <sup>®</sup> or Kynar Flex <sup>®</sup> sheet is applied to all fluid contact surfaces and welded in place to form a continuous corrosion and purity barrier	Up to 225°F (107°C)	Up to the limit of the steel vessel	Any size tank can be lined	59 mil - 197 mil (1.5 mm - 5 mm)
Spray-coated steel	Kynar <sup>®</sup> or Kynar Flex <sup>®</sup> powder or liquid is applied to metal surface in layers and baked to form a continuous layer	Up to 200°F (93°C)	Full vacuum up to the limit of the steel vessel	Up to 6.5' x 20' (2m x 6m)	25 mil - 90 mil (0.64 mm - 2.29mm))
Dual-laminate	Kynar <sup>®</sup> or Kynar Flex <sup>®</sup> sheet is formed into the shape of the container and wrapped with fiberglass reinforced plastic (FRP)	Up to 257°F (125°C)	Up to 150 psi (1.03 MPa)	Up to 20' x 100' (6m x 30.5m)	79 mil - 197 mil (2mm - 5 mm)
Solid	Solid Kynar <sup>®</sup> or Kynar Flex <sup>®</sup> vessels are either injection-molded (generally small sizes), welded or rotomolded	Up to 284°F (140°C)	Typically atmospheric	Any size can be fabricated	1/8" -4" (3 mm - 101 mm)

## Pipe, Valves & Fittings<sup>1</sup>

Type	Description	Temperature <sup>2</sup>	Pressure <sup>1</sup>	Available Diameters	Joining Methods
Solid	Uncovered extruded, machined or injection-molded Kynar <sup>®</sup> or Kynar Flex <sup>®</sup> components	Up to 284°F (140°C)	Full vacuum up to 580psi (4 MPa)	1/2" - 16" (20 - 400 mm)	Butt fusion, socket fusion, mechanical, threaded, flanged, IR, smooth inner bore, bead and crevice free, electrofusion
FRP-wrapped	Extruded or machined Kynar <sup>®</sup> or Kynar Flex <sup>®</sup> components, covered with a thick layer of fiberglass reinforced plastic	Up to 284°F (140°C)	Full vacuum up to 150 psi (1.03 MPa)	Almost any size can be fabricated	Butt fusion, flanged
Lined steel	Extruded Kynar Flex <sup>®</sup> lining surrounded by carbon steel	Up to 275°F (135°C)	Full vacuum up to 475 psi (3.28 MPa)	1" - 10" (25 - 254 mm)	Welded, flanged, extruded, molded
Fittings	Machined or Injection molded solid Kynar or Kynar Flex components	Up to 284°F (140°C)	Full vacuum up to 580psi (4 MPa)	All sizes	Butt fusion, socket fusion, mechanical, threaded, flanged, IR, smooth inner bore, bead and crevice free, electrofusion

Solid Kynar<sup>®</sup> valves and Kynar<sup>®</sup>-lined steel valves are available in many forms, such as ball, diaphragm, butterfly, ball check, relief, check and plug valves.



# Tubes & Fittings<sup>1</sup>

Type	Temperature <sup>2</sup>	Pressure <sup>1</sup>	Available Diameters
Flexible tubing	Up to 225°F (107°C)	Rating up to 300 psi (2.07 MPa)	1/16" - 2" (1.6 - 50.8 mm)
Rigid tubing	Up to 250°F (121°C)	Vacuum rating up to 230 psi (1.59 MPa)	1/8" - 12-3/4" (3.2 - 324 mm)

## Filter Fibers & Textiles

Type	Temperatures	Tenacity (cn/tex)	Available Denier
Multi-filament Fiber	Up to 302° F (150°C)	>26	10-40µ *
Textiles	Up to 302° F (150°C)	>26	10-40µ *

\*Fiber down to 1µ have been produced using Kynar® 705 PVDF resin.

Tubes are joined by compression or push-in fittings and are available in the following forms, among others:

- Threaded adaptors, barbed elbows & nipples
- Reduction couplers
- Leak-proof couplers, elbows, tees, Y's and threaded plugs

1- Note that the Kynar® component temperature, pressure and sizing data above are compiled from industry data and are for illustrative purposes only. The actual temperature and pressure ratings of your system, as well as its resistance to chemical attack, are dependent on many environmental factors. Higher operating temperatures will reduce the Kynar® system's maximum operating pressure; higher operating pressures will reduce the system's maximum operating temperature. Higher operating pressures or temperatures may also require increased component wall thickness. Consult your Kynar® component supplier about your system's operating parameters before purchasing a Kynar® system.

2- Kynar® components can withstand continuous temperatures as low as -30°C (-22°F) under certain conditions. Please contact your Kynar® component supplier with specific information about your application to determine the lowest recommended operating temperature of your Kynar® system.

## Common Markets

**Filtration** - Hollow Fiber Membranes, filter housings, supported and unsupported flat sheet membranes, multi and monofilament wovens, non-wovens, fabrics, and mesh screens

**Disinfection** - Chemical Injection Systems for chlorine gas, chlorine, dioxide, sodium hypochlorite, ozone, etc., and UV Systems

**Transfer** - Components including pipes, tubes, valves, pumps, nozzles, spigots, lined steel pipe, and lined steel vessels for transferring Potable, Deionized, and Ultra Pure Water

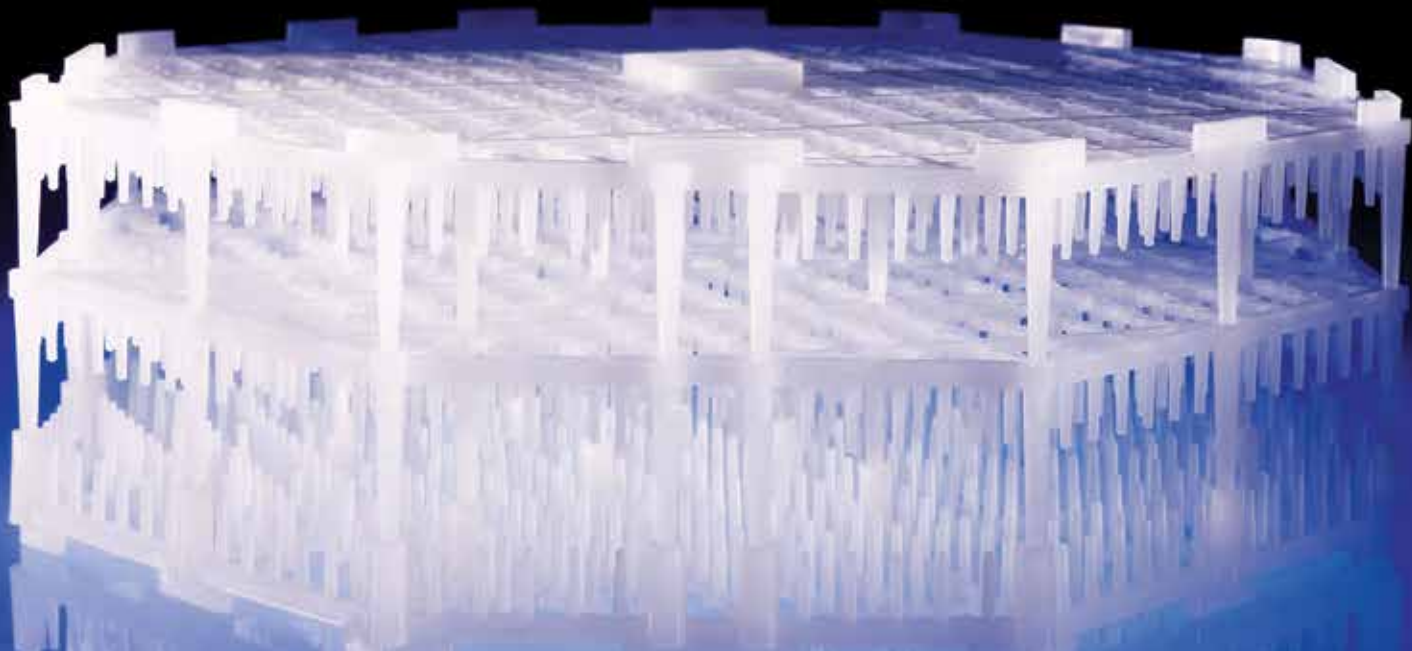
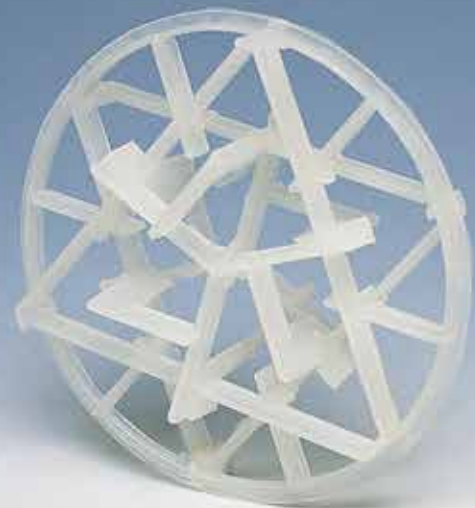
## Joining of Kynar® Systems

Mechanical Joining using threaded components Welding by using heat contact, hot gas using welding rod, ultrasonic, hot lamination, infrared (IR), resistance heating, spin, and radio frequency for bonding Kynar® PVDF to itself

### Kynar® components are also available in the following forms:

- Pumps (centrifugal, sump, ball, diaphragm, chamber, magnetic drive and more)
- Membranes
- Nozzles and ozone injectors
- Foams
- Tower packings
- Mist eliminators
- Filter housings
- Stock shapes (rod, sheet, film)
- Flow meters
- Monofilament fibers
- Multifilament fibers
- Non-woven fibers





## Select KYNAR® and KYNAR FLEX® PVDF GRADES have the following regulatory listings and approvals

Organization	Regulation
National Sanitation Foundation (NSF)	NSF-61 Potable Water, NSF-51 Food Equipment, NSF-14 Plumbing System Components
Food & Drug Administration (FDA)	177.2510 & 177.2600 Repeated Contact with Food, 177.1520 Single-Use Adjuvant for Use in Polyolefins 1% Concentration
United States Department of Agriculture (USDA)	Use in Process or Storage Areas to Contact with Meat or Poultry Food Products
3-A Sanitary Standards Inc. (3-A SSI)	Multiple-Use Plastic Materials Used as Product Contact Surfaces for Dairy Equipment
United States Pharmacopeia (USP) Class V	USP Class VI
Chicago Rabbinical Council (CRC)	Kosher Certified

Questions about Kynar® products? Visit [www.kynar.com](http://www.kynar.com) and download the Kynar® Performance Characteristics and Data Brochure, or contact our Technical Sales Group at 1.800.KYNAR-50.

Contact information for Kynar® fabricators and component suppliers is available upon request.

### Offices In:

Arkema Inc.  
900 First Avenue  
King of Prussia, PA 19406  
U.S.A.  
Tel.: 610-205-7535  
Fax: 610-205-7497  
[www.kynar.com](http://www.kynar.com)

Arkema  
420 rue d'Estienne d'Orves,  
F-92705 Colombes Cedex  
France  
Tel.: +33 (0)1 4900 7767  
Fax: +33 (0)1 4900 5588  
[www.Arkema.com](http://www.Arkema.com)

Arkema (China)  
6/F, Block 1, Life Hub@Daning  
1868 Gonghexin Road,  
Shanghai 200072  
P. R. China  
Tel.: +86 21 6147 6888  
Fax: +86 21 6147 6777  
[www.Arkema.com](http://www.Arkema.com)

Arkema K.K.  
Fukoku Semiei Bldg 15F  
2-2-2 Uchisaiwaicho  
Chiyoda-Ku, Tokyo 100-0011  
Japan  
Tel.: +81 3 5251 9919  
Fax: +81 3 5251 9930  
[www.Arkema.com](http://www.Arkema.com)

### Additional Offices In:

Beijing, China • Sao Paulo, Brazil • Argentina • Seoul, Korea • Mexico • United Kingdom • Mumbai, India • Singapore • Australia • Hungary  
Russia • Taiwan • Germany • Switzerland

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See MSDS for Health & Safety Considerations.

For environmental, safety and toxicological information, contact our Customer Service Department at 1-800-596-2790 to request a Material Safety Data Sheet or visit our web site at [www.kynar.com](http://www.kynar.com).

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**ARKEMA**  
INNOVATIVE CHEMISTRY

**Kynar.com**

**Arkema Inc.**  
900 First Avenue  
King of Prussia, PA 19406  
USA  
Tel.: (+1) 610-205-7000

**Headquarters: Arkema France**  
420, rue d'Estienne d'Orves  
92705 Colombes Cedex – France  
Tel.: +33 (0)1 49 00 80 80  
Fax: +33 (0)1 49 00 83 96  
[arkema.com](http://arkema.com)