



SOLVAY

asking more from chemistry®



High-Performance Polymers for
**Plumbing, Heating and
Sanitary Systems**

**SPECIALTY
POLYMERS**



Reliable Performance

Our specialty polymers are perfectly-suited for medium to very long-term plumbing, sanitary and heating water applications (50+ years). Our solutions cover both low and high-pressure piping systems, from cold to hot water to steam - whether for high-purity drinking water, for heating chemically-aggressive water or for mixtures.

In the constant attempt to reduce weight and make plumbing components less expensive to transport and less demanding to install, metal parts are being replaced by plastic alternatives that are 4 to 5 times lighter than the brass or copper they replace.



For 20-plus years, Solvay has supplied lightweight, high-performance polymers that can cost-effectively outperform metals. This expertise extends to all pressurized cold and hot water systems, including pipes, fittings, faucet components, valves, flexible hoses and water meters.

- Over 20 years in pressurized systems
- Resistance to hot chlorinated water
- Ease of installation
- Lower overall costs than metal
- Global agency approvals

Dedicated Global Support

At Solvay, we place great value in helping our customers succeed. That's why we have a dedicated global network of marketing, sales and technical support staff – all of whom understand the industry's unique requirements. Our highly-experienced staff are all eager to help you in selecting your material, your product and application development, MoldFlow® process modeling, finite element analysis and product testing. They can also assist with design, processing and assembly techniques. As we fully understand the importance of reliable support, we work extra hard to earn your confidence and so become your preferred materials supplier.

Better than Metal

Showing specific performance and cost benefits, high-performance plastics are a definite improvement on metal. The advantages range from lighter weight, stronger resistance to oxidative aging, greater strength at elevated temperatures, higher chemical and chlorine resistance as well as higher heat resistance. Their injection-molding process too provides easier forming, fewer finishing phases and a faster production cycle. Further critical advantages include:

Corrosion Resistance

Metals are sensitive to oxidizers such as sodium hypochloride, which is widely-used in tap water sanitation. Over time, tap water in stainless steel can provoke rust formation. As a copper and zinc alloy, brass is sensitive to galvanic corrosion. This leads to dezincification and the formation of microporous holes during installation. Brass-fittings in multilayer pipes containing aluminum leads to electric potential between the aluminum and the brass as well as subsequent galvanic corrosion of the aluminum.

No Scale Deposit

Depending on the hardness level of tap water, it can easily precipitate a high level of calcium and magnesium carbonate. Better known as scale, this precipitate can stick hard to metal surfaces. It is significantly diminished on polymer surfaces, thanks to their high smoothness and low surface tension.

No Biofilm Adhesion

The elevated surface smoothness achievable in polymers considerably reduces biofilm adhesion - limiting bacteria build-up, even in dead zones, and so resulting in cleaner water.

No Contamination by Heavy Metals

Unlike for metal plumbing systems, with polymeric installations there is no contamination of tap water by heavy metals.

Ease of Assembly

Assembly of metal installations usually comprises hot gas welding at high temperatures. For systems based on multilayer pipes and polymeric fittings, professionals have a wide variety of fixation systems available, as well as do-it-yourself installers. No welding is required.



Low Noise

Polymeric piping systems transmit less noise from the motion of water - important for waste water pipes. For pressure piping systems however, this is only a factor in areas where there are connections to older installations with different diameters.

Good Thermal Insulation

In plumbing, thermal conductivity for polymers is a factor 100 to 1,000 times lower than it is for metals. The “intrinsic” insulation properties of polymers thus make them the material of choice, especially for hot water distribution and heating systems.

Lower Cost

The cost of corrosion-resistant metal fittings – brass in particular – is about 50 % higher than it is for polymer fittings. That difference is partly due to volatile metal prices, while those of polymeric raw material have remained at approximately the same level. Manufacturing costs are another important factor. Whereas metal fittings need several manufacturing steps, polymeric fittings can often be produced in one injection-molding step.

Reduced Environmental Footprint

High-performance polymers are produced through injection-molding, which replaces earlier machining for metals. This requires less elaborate manufacturing, considerably limiting the environmental footprint of processes.



An Offer to Meet Every Need

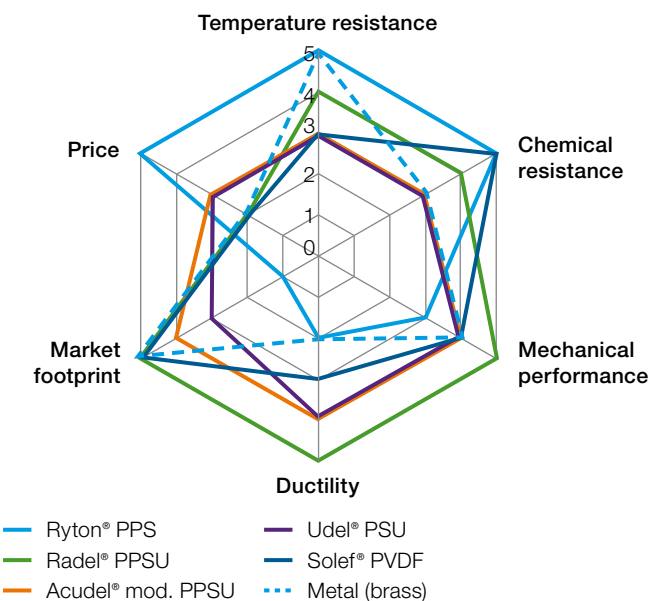
Specialty polymers' extensive portfolio of reinforced and unreinforced solutions offers multiple options. Specific benefits are various and depend greatly on the peculiar characteristics of the polymer selected (e.g. sulfones for enhanced dimensional stability, sulfides for prolonged exposure to water at high temperatures, etc). Each is developed to best assist Original Equipment Manufacturers (OEM's) and molders in the demanding selections they must make, both when receiving their regulation approvals and in meeting their technical and commercial requirements.

Typical Operating Temperature

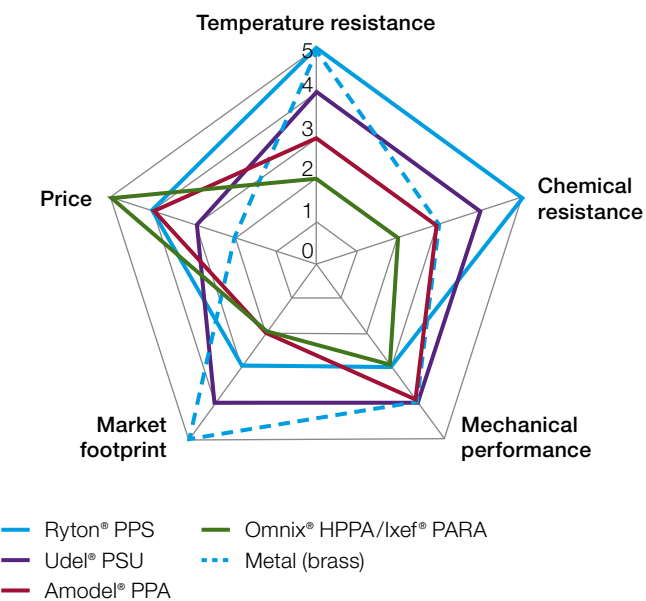
	23–40 °C	60 °C	85 °C	95 °C	105 °C	135 °C
Plumbing	Fitting bodies	PSU	PVDF	PPSU		
	Fitting components	PSU	PVDF	PPSU		
	Manifolds	PSU	PVDF	PPSU		
	Pipes				PVDF	PEEK PAEK
	Linings & coatings	PARA	PVDF	PVDC		
	Water meters	HPPA	PPA	PPS		
Heating	Manifolds	PSU	PVDF	PPSU		
	Floor heatings	PPA				
	Heat meters		PPA		PPS	
	Boiler tanks & components	HPPA	PPA	PSU	PPSU	PPS
	Balancing valves		PPA	PSU	PPSU	PPS
Sanitary	Faucet cartridges		PPA	PPS PPSU		
	Stop valves		PPA	PSU		PPS

● Cold water ● Warm to hot water ● Boiling water to district heating

Performance of Unreinforced Resins



Performance of Reinforced Resins



A Proven Track-Record

With its vast experience in supplying fitting manufacturers, pipe extruders and flexible hose producers globally, Solvay has helped establish a consistent, reliable and durable polymeric supply chain for the Plumbing industry. This activity has now expanded to cover the Heating and Sanitary markets through more recently developed innovative solutions for water meters, boilers, faucets, stop valves and other components.

	HPPA	PARA	PPA	PSU	PESU	Mod. PPSU	PPSU	PPS	PEEK/PAEK	PVDF	ECTFE	PVDC
Plumbing	Fitting bodies			●	●	●	●	●		●		
	Fitting components	●	●	●	●	●	●	●		●		
	Manifolds	●	●	●	●	●	●	●		●		
	Pipes							●	●	●		
	Linings & coatings		●				●			●	●	●
	Pumps			●				●	●			
	Water meters	●	●	●	●	●	●	●	●	●		
Heating	Manifolds	●	●	●	●	●	●	●		●		
	Heat meters			●	●	●	●	●	●			
	Boiler tanks & components						●	●	●			
	Pumps							●				
	Balancing valves	●	●	●	●	●	●	●		●		
Sanitary	Faucet cartridges	●	●	●	●	●	●	●		●		
	Stop valves	●	●	●	●	●	●	●		●		

● Commercial
● Under development & potential



Solvay High Performance Polymers Solutions: Value and Key Benefits

Plumbing

In meeting the safety regulations, durability and competitive cost demands of the market, Solvay offers lead-free, high performing plastics (up to 95 °C) that are also internationally-approved for drinking water (NSF61, KTW, WRAS, ACS). In addition to cost reduction owing to easy assembling, all these combine low water pick-up, high hydrolysis resistance and anti-weatherability as required.

Heating Systems

For boilers and other heating systems, Original Equipment Manufacturers (OEMs) and their direct suppliers seek integrated functionality as well as cost and weight reduction. Both expect Solvay's advanced performance plastics to prevent corrosion and to guarantee efficient long-term metal replacement. Such solutions must exhibit creep resistance, improved moldability as well as welding line reinforcement. Outstanding resistance to both hot and cold chlorinated water is also a prerequisite.

Sanitary Systems

Meeting demand by faucet manufacturers and other component producers of stop valves, cartridges and fixtures, Solvay has developed a large portfolio of high-performing, lead-free plastics (up to 95 °C) offering high stiffness, good dimensional stability, excellent chemical resistance, attractive surface finish and international approvals for drinking water (NSF61, KTW, WRAS, ACS).



Specialty Polymers Certified for Drinking Water Contact

Agency Approvals

Independent global organizations such as NSF, WRc and KTW set standards and certify products that come into contact with drinking water. They carefully evaluate plastics under their expected end-use conditions, ensuring that no substances are extracted which potentially cause health concerns. Some agencies conduct additional tests to evaluate a material's effect on taste and odor as well as its tendency to support microbiological growth.

Solvay voluntarily certifies its plastics worldwide in order to assist Original Equipment Manufacturers in expediting the approval process required for components used in potable cold and hot water systems.

Approval	Aromatics					Fluoropolymers	
	HPPA	PPA	PEEK	Sulfone	PPS	PVDF	ECTFE
NSF 61	●	●		●	●	●	●
KTW	●	●	●	●	●	●	
W270/DVGW	●	●		●	●	●	
ACS	●	●		●	●	●	
WRAS	●	●	●	●	●	●	
DM174				●	●		
AS/NZS 4020				●			



Performance You Can Trust

The Broadest Selection of High-Performance Polymers for Water-Handling Systems

Sulfone Polymers

Radel® PPSU

Offers higher fatigue resistance, better chemical resistance and significantly higher impact strength than PSU. It has the highest creep rupture resistance (LTHS) of any sulfone polymer, making it well-suited for fittings used in multilayer piping systems that operate under high pressure (up to 10 bar) and temperatures of up to 95 °C.

Veradel® PESU

It combines low creep, high deflection temperature and good resistance to oxidative aging to make it suitable for applications in contact with hot chlorinated water. Compared to PPSU, it exhibits a lower impact and chemical resistance. Reinforced Veradel® PESU grades are especially dedicated to the production of cartridges and faucets.

Acudel® modified PPSU

Proprietary formulation that fills the cost-performance gap between PPSU and PSU. It provides toughness and chemical resistance along with hydrolytic and dimensional stability for plumbing systems with less demanding pressure and temperature requirements.

Udel® PSU

Exhibits low creep, good toughness and excellent dimensional stability in hot water and steam. These attributes combine oxidative aging with proven resistance to make cost-effective material applications that require continuous exposure to hot chlorinated water.

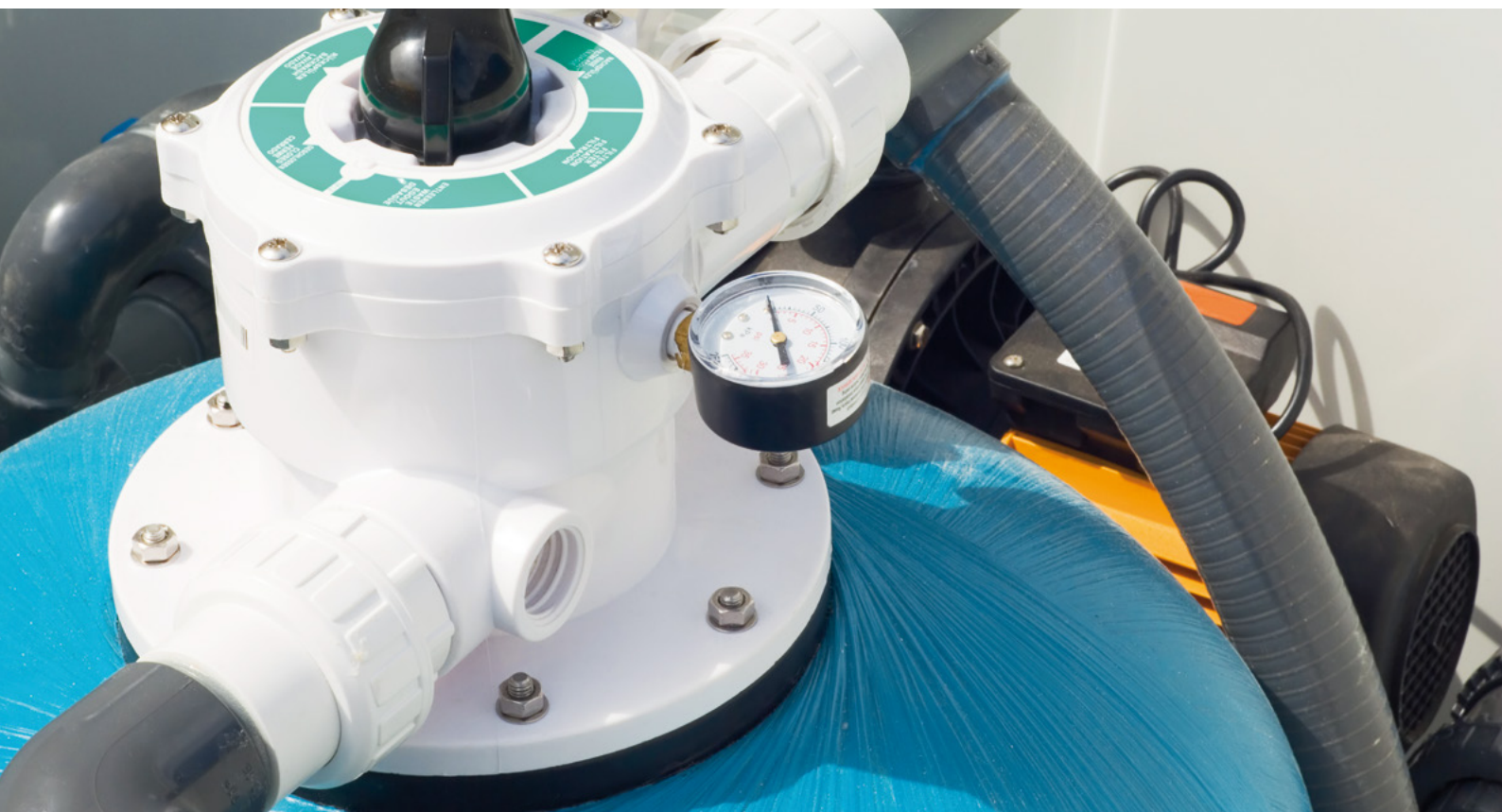
Fluoropolymers

Solef® PVDF

Provides outstanding resistance to chemicals, UV light and fatigue, along with exceptional barrier properties, scratch resistance and ease of processing. High Long-term Hydrostatic Strength (LTHS) values make it well-suited for fittings used in multilayer piping systems that operate under high pressure (up to 10 bar) and temperatures up to 95 °C.

Halar® ECTFE

A partially-fluorinated polymer that combines excellent mechanical properties with exceptional resistance to heat and chemicals.



Polyphenylene Sulfide

Ryton® PPS

Ryton® PPS compound for injection-molding or extrusion provides excellent chemical resistance along with exceptional dimensional stability in water, thanks to its low water pick-up. Its very low viscosity allows Ryton® PPS to be injected in thin-walled parts. Ryton® PPS compound can bear temperatures above 95 °C which in extreme cases can reach up to 220 °C.

Aromatic Polyamides

Amodel® PPA

High-performance polyamide suitable for applications with intermittent exposure to hot chlorinated water. It delivers a number of performance advantages over conventional polyamides, including higher operating temperatures, lower moisture absorption, better dimensional stability and superior resistance to creep and fatigue.

Ixef® PARA

Shows an exceptional combination of high stiffness and strength, excellent creep resistance and easy processing, together with low shrinkage, low warpage, and low water pick-up. Even with 50% glass fiber reinforcement, Ixef® PARA provides a smooth, high-quality surface finish. This makes it an excellent candidate for applications where aesthetics are important.

Omnix® HPPA

High-performance polyamide that bridges the cost-performance gap between lower performing PA66 and higher performing polyphthalamides such as Amodel® PPA.

It exhibits lower moisture absorption than PA66 for higher strength and stiffness, better dimensional stability and lower warpage as well as good chemical resistance and efficient, cost-effective manufacturing.





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