



Material Selection Guide: Acetal



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Although smaller parts are just as important as larger components, designers tend to underestimate the importance of material selection, usually picking “standard” materials or simply seeking out the least expensive options.

Now widely recognized as a low-cost, high-performance alternative to metal for application-critical components like washers and spacers, plastics are becoming more and more popular. Acetal resins — highly crystalline plastic products — are strong, rigid, and resistant to moisture, heat, solvents, and other chemicals.

What is Acetal?

An acetal is a plastic that is created by an organic reaction called acetalization. Acetalization most commonly involves the addition of an alcohol compound to an aldehyde or ketone compound.

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Several compounds have an acetal function group, but Polyoxymethylene and 1,1-Diethoxyethane are most commonly referred to as “acetal” for short.

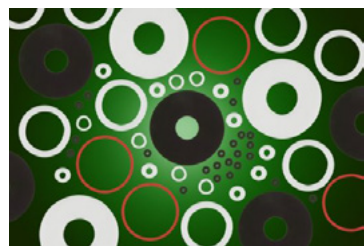
Polyoxymethylene is often used in industrial scenarios. An engineering thermoplastic, this acetal is a homopolymer, meaning it’s comprised of a single variety of repeating molecular units. Copolymers, also acetals, are comprised of a mix of

repeating molecular units. Acetal homopolymer resins and acetal copolymer resins each feature unique properties and benefits.

Properties of Acetal Copolymer Resins

Acetal copolymers are strong, highly versatile resins ideal for many industrial applications.

They feature high tensile and flexural strength as well as excellent hardness, fatigue resistance, creep resistance, and lubricity. Acetal copolymers can maintain their strength and toughness



across a wide range of operating temperatures, and thanks to their very low moisture absorption rate, they’re able to operate in a range of environments while withstanding humidity fluctuations.

With strong electrical properties and a UL rating of 100° C, acetal copolymers are also ideal for electrical applications, including ones that demand stability over a long period of time.

Aging slowly and at low rates, acetal copolymers generally don’t show any signs of weakening for at least 9 to 15 months, whether in submerged or unsubmerged scenarios.

Aside from strong physical properties, acetal copolymers also have superior chemical properties.



They are extremely resistant to a wide range of solvents and other chemicals, including oils, organic reagents, and alkalis.

In fact, room-temperature submersion tests conducted over a full year showed that acetal copolymers experience little to no degradation in organic and inorganic solutions. The exception was solutions with high concentrations of very strong mineral acids, including sulfuric, nitric, and hydrochloric acids. Ammonium hydroxide and sodium chloride, in concentrations of 10%, discolored acetal resins but affected neither physical nor mechanical properties.

Which Industries is Acetal Best Suited for?

Because of their wide range of mechanical, physical, and chemical properties, acetal copolymers are ideal for use in various applications and industries. In fact, virtually all applications can benefit from this versatile material.

With high mechanical and physical strength, acetal copolymers are well suited to both industrial and automotive applications. Acetal copolymer components function particularly well in gear, cam, and bushing applications; their high strength and low coefficient of friction allows them to withstand high-stress, high-friction environments. They are also much more lightweight than traditional metal parts — particularly important in the automotive industry, which aims to improve the fuel efficiency of vehicles by decreasing overall weight.

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Because of their high corrosion resistance, acetal copolymers are well-suited for use as washers, spacers, and gaskets in piping systems across a range of industries, including petrochemical. FDA-approved food-grade resins, meanwhile, are particularly useful in food and beverage production industries. Acetal copolymers' corrosion resistance — plus their resistance to water and water vapor absorption — makes them ideal for many commercial and residential plumbing and marine industry applications.

Another very common use of acetal copolymers is guitar picks. The strength of acetal allows just enough stiffness to strum a guitar, but has a fair amount of give as well, so the guitarist doesn't break any strings. Acetal is sold in sheet form to other companies who imprint their logo onto the sheet before stamping to create the guitar pick.

To help guitarists distinguish the different thickness of the guitar pick, many companies color coordinate; so while a blue pick may be .038 thick, a red one may be only 0.18 thick.





Acetal in Action: The Fruit Industry

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Recently, a client in the fruit industry approached the team at New Process Fibre to discuss washer needs for a particular process.

After learning more about the process and the washer application, we recommended acetal copolymer resin washers, which could effectively meet food industry-specific requirements. The client is currently field testing the acetal resin washers, and so far the results are very promising. Going forward, we expect the fruit industry to show increasing interest in acetal copolymer resin products.

Learn More

For nearly 90 years, New Process Fibre has been an industry-leading manufacturer of stamped plastic parts, rolls, and sheet goods. Dedicated to providing full-service manufacturing, we're proud to offer a range of in-house capabilities, from plastic sheet extrusion to tool making, prototyping to full-scale production runs.

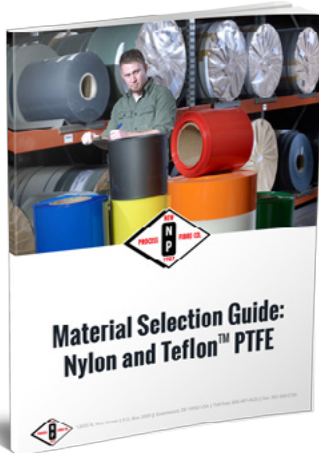
To learn more about the many benefits of acetal and how New Process Fibre can help you integrate it into your process systems, [contact us today](#).



About New Process Fibre

In 1927, New Process Fibre was founded with the desire to improve manufacturing processes. Though our products and the processes have both changed in the years since our founding, the desire for constant improvement has never wavered.

Today, the tradition continues in an uncommon dedication to in-house manufacturing capability. The reason behind it is simple: if we perform every step ourselves, we can be sure it is performed at the highest standards. Our extensive inventory of production equipment makes it possible to complete virtually any job, from a small prototype run to an order in the millions – without outsourcing.



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