

# Understanding Plastic Fillers in Plastic Fasteners

Plastic is everywhere. From plastic water bottles to toys and even car parts, you simply can't escape the wonders of this versatile material. Because we're surrounded by plastic, we assume that all that plastic is, well, plastic! However, the truth is a bit more complex. Most plastic is made up of many other materials as well, and that includes plastic fasteners.

There are many different fillers that are used in plastic fasteners. They include:

- Mineral, or inorganic fillers
- Organic fillers
- Polymers

There are a few reasons why a plastic fastener might be composed of a filler. Sometimes fillers are used to make a fastener cheaper. The filler material costs much less than the primary plastic material, which can greatly reduce its cost. In other cases, fillers actually enhance the plastic by making it stronger or more durable. No matter what the reason, plastic fasteners can contain up to 70 percent organic or inorganic fillers!

Some of these fillers you may already be familiar with. Here are some of the most common mineral and inorganic fillers that are used in plastics because they can be transformed into a plastic material themselves.



## Calcium carbonates (limestone)

This is the most popular plastic filler as it represents over half of the inorganic fillers that are used throughout the plastic industry, including fasteners. You've likely come in contact with this material before because it can be found in egg shells, pearls, blackboard chalk, and seashells. In addition to being used in plastic fasteners, calcium carbonate is also used in calcium supplements and antacids.

The reasons for using calcium carbonate are twofold. First, it's much cheaper than many expensive base resins, ultimately lowering the cost of a fastener, but it can also add some beneficial properties. It does reduce overall strength, but it increases tensile modulus and density, provides opacity, and improves impact strength

## Hydrous magnesium silicates (talc)



You may be familiar with talc powder, but you have likely come in contact with this substance on an almost daily basis. That's because it's used in plastic bags, making them easier to pull apart. This material is often used in plastic fasteners as well.

It is the softest additive on the market, but it can add a lot to a regular plastic fastener. It can increase stiffness, rigidity, lubricity, and impact strength. With these added benefits, plastic fasteners can easily be used in applications where they weren't commonly used before. For example, fasteners with as much as 40% talc can be used in automotive bumpers, interior plastic ductwork, and fasciae. Fasteners with hydrous magnesium can also be found in household appliances.

## Mica



You aren't likely to have direct experience with mica, unless you have an affinity for rocks and minerals, but this is a material that you use every single day and don't even know it. Without it, we wouldn't experience electricity the way that we do. This substance is also used as filler in plastic fasteners.

Like calcium carbonate, this material reduces strength, but it provides many other benefits. It can increase stiffness, modulus, and density, it has high dimensional stability, and it has good dielectric properties. It isn't uncommon for plastic hardware to be composed of 20 to 40 percent mica, but loads of up to 60 percent can be found in some products.

## Calcium metasilicate (wollastonite)



Calcium metasilicate is a compound of its own, being made up of 52 percent silicon dioxide and calcium oxide. Its most common form emerges when limestone and diatomaceous earth are ground into a white free-flowing powder. It is an ingredient that is used in antacid products.

It is often used in fasteners as an extender, allowing expensive plastics to go further, but it is also used as a reinforcing fiber. It provides a smooth molded surface and allows for less water absorption than other plastics.

## Calcium sulphate (gypsum)



If you've done any crafting with plaster of Paris, you've had some experience with calcium sulphate. It is used in drywall, and it's even used in the process of making tofu.

In general, this material is used to lower costs, as it doesn't add any additional benefits when combined with plastic. It is strictly used to extend a more expensive material, so a balance of calcium sulphate and primary plastic is essential so that the strength and durability of the fastener isn't compromised.