

## IN-DEPTH DESCRIPTION OF MATERIALS

*For my fellow nerds\**



ABS plastic: The same stuff as Legos. This is, in its long form, acrylonitrile butadiene styrene. It's a human-made plastic polymer with 3 separate monomers, and it has a shiny surface that is often pigmented. As the [material safety sheet](#) states, it's generally pretty stable and nonreactive. It is somewhat resistant to heat, but most ABS will start to warp if you try to boil it, since it is a thermoplastic (i.e. melts and reforms). ABS is also common in 3D printing, but because 3D printing works by layering, there are all kinds of nooks and crannies in 3D printed material, so you shouldn't use 3D printed ABS for anything like eating/sex toys, where it would come in contact with bacteria. ABS is considered food-safe, but a concern for body safety is the pigment applied. This is most likely only an issue if you notice chipping. In terms of sex toys, ABS plastic is most often used in handles or in external vibrators.

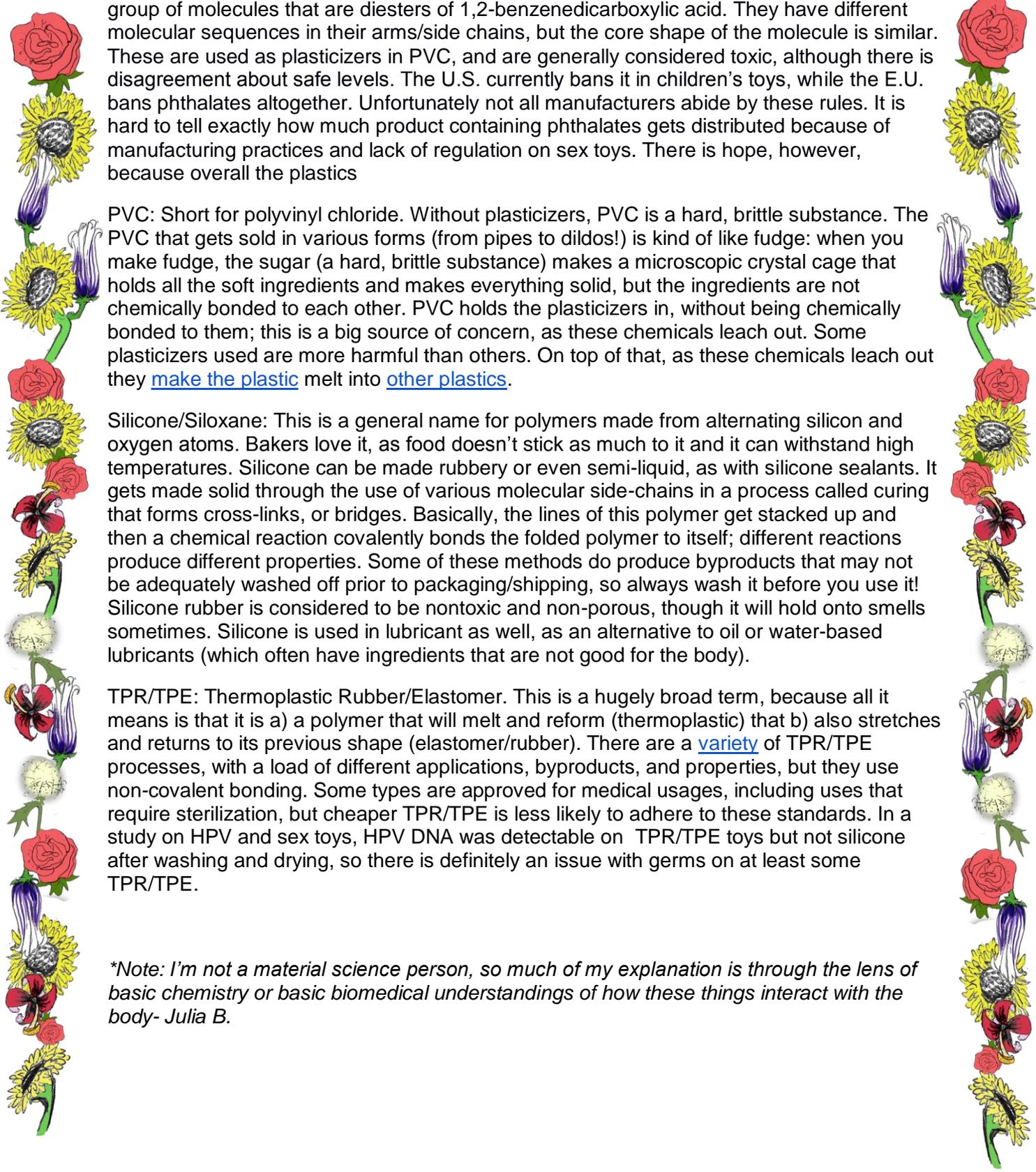
Ceramic: The same stuff as in mugs and vases! Clay, shaped and fired, this is one of humanity's longest-used materials. Ceramics meant for sex toys should be glazed, with a glaze that is body safe, as any sort of leaching can be a concern for lead poisoning. As long as the glaze doesn't leach and covers all areas that come in contact with the body, and there are no cracks, ceramics should be body safe. A [test](#) used to determine whether a ceramic glaze is leaching is called the vinegar test, though you can do it with other acids. Essentially, you soak or fill a glazed area with vinegar, leave it for at least 3 days, then compare the area that was in contact with the area that wasn't in contact. If it is body safe there shouldn't be any clear difference (you can also buy home kits if you want to be super certain). Ceramic should stand up to boiling and other forms of sanitizing, and some ceramic sex toys can be filled with hot or cold water to produce temperature effects.

Glass: This is usually either borosilicate or soda lime glass; think about glass brownie pans or other thick glassware. These are heat resistant, nonporous, and usually fairly resilient. The main concern is with pigmentation; if paint is on the outside, as opposed to pigment added in the process of creating the object, it's at risk for chipping, and chipped pigment isn't something you want in your body. Another aspect to glass is the annealing process, where heated glass is allowed to cool slowly. This makes for an overall stronger glass object than quicker/cheaper cooling, and the only real impact is that poorly annealed glass is more liable to break if you drop it. Remember, always check for chips before using!

Latex: AKA natural rubber. This is used in all kinds of things, from latex gloves to condoms. Allergies to latex are super common, and while most folks might experience an itch or rash, it can be life threatening in some. While the layers of latex in a condom or glove make a barrier that infectious agents can't cross, one reason such things are one use only is that bacteria love to chow down on latex, meaning that over long periods of time it can harbor and grow microbes. Latex is either derived from plants or is synthesized by humans. In plants, it looks like a milky, sticky, bitter liquid and is a complex mix of proteins, oils, sugars, resins, gums and other junk. The rubber is primarily a polymer of isoprene, usually subjected to a process called vulcanization.

Metal: Usually aluminum or steel. Some people do have metal allergies. There are also different grades of metal, which are often related to their alloy composition (mostly relevant to those with allergies). Words like "surgical steel" refer to the metal's general suitability for biomedical applications, not specific alloys or allergenic properties. These are cleanable and, like glass, easily sanitized.





Phthalates: These are not technically a material, but they are a component. Phthalates are a group of molecules that are diesters of 1,2-benzenedicarboxylic acid. They have different molecular sequences in their arms/side chains, but the core shape of the molecule is similar. These are used as plasticizers in PVC, and are generally considered toxic, although there is disagreement about safe levels. The U.S. currently bans it in children's toys, while the E.U. bans phthalates altogether. Unfortunately not all manufacturers abide by these rules. It is hard to tell exactly how much product containing phthalates gets distributed because of manufacturing practices and lack of regulation on sex toys. There is hope, however, because overall the plastics

PVC: Short for polyvinyl chloride. Without plasticizers, PVC is a hard, brittle substance. The PVC that gets sold in various forms (from pipes to dildos!) is kind of like fudge: when you make fudge, the sugar (a hard, brittle substance) makes a microscopic crystal cage that holds all the soft ingredients and makes everything solid, but the ingredients are not chemically bonded to each other. PVC holds the plasticizers in, without being chemically bonded to them; this is a big source of concern, as these chemicals leach out. Some plasticizers used are more harmful than others. On top of that, as these chemicals leach out they [make the plastic](#) melt into [other plastics](#).

Silicone/Siloxane: This is a general name for polymers made from alternating silicon and oxygen atoms. Bakers love it, as food doesn't stick as much to it and it can withstand high temperatures. Silicone can be made rubbery or even semi-liquid, as with silicone sealants. It gets made solid through the use of various molecular side-chains in a process called curing that forms cross-links, or bridges. Basically, the lines of this polymer get stacked up and then a chemical reaction covalently bonds the folded polymer to itself; different reactions produce different properties. Some of these methods do produce byproducts that may not be adequately washed off prior to packaging/shipping, so always wash it before you use it! Silicone rubber is considered to be nontoxic and non-porous, though it will hold onto smells sometimes. Silicone is used in lubricant as well, as an alternative to oil or water-based lubricants (which often have ingredients that are not good for the body).

TPR/TPE: Thermoplastic Rubber/Elastomer. This is a hugely broad term, because all it means is that it is a) a polymer that will melt and reform (thermoplastic) that b) also stretches and returns to its previous shape (elastomer/rubber). There are a [variety](#) of TPR/TPE processes, with a load of different applications, byproducts, and properties, but they use non-covalent bonding. Some types are approved for medical usages, including uses that require sterilization, but cheaper TPR/TPE is less likely to adhere to these standards. In a study on HPV and sex toys, HPV DNA was detectable on TPR/TPE toys but not silicone after washing and drying, so there is definitely an issue with germs on at least some TPR/TPE.

*\*Note: I'm not a material science person, so much of my explanation is through the lens of basic chemistry or basic biomedical understandings of how these things interact with the body- Julia B.*