

Match the Tube to the Task

Know the difference between adhesives, sealants, and caulks.

By John Wagner

Adhesives, sealants, and caulks are distinctly different, and some are greener than others. I spoke with James W. Downing Jr., market manager for Bostik's construction adhesives, sealants, and caulks. He has forgotten more about this subject than I'll ever know. With him as a source, let's explain the basics.

Adhesives: "Adhesive" is a broad term that includes subcategories of adhesives, sealants, or caulks.

Construction adhesives demonstrate very little "movement capability," which you want when gluing down wood floors, for instance, or when setting granite countertops on a wood base. **Sealants** exhibit the *highest* movement capability, which you want when sealing joints between materials that expand and contract with heat and cold. **Caulks** fall between these two extremes.

Sealants: When sealant is applied to substrates that expand and contract (wood, metal, glass, stone, plastic), it must move with them or the bond breaks, letting in water or air. Sealants are really chemically modified adhesives that allow movement. The term for this is "dynamic movement capability," and it is on the label as "Class." A "Class-25" sealant can expand 25% and contract 25%, so its total dynamic movement capability would be 50%. Class-50 (best in class) can expand 50% and contract 50%, with a total dynamic movement capability of 100%.

Caulks: This same Class rating may be used on caulk labels, too. Those that don't feature a Class typically are not engineered for anything beyond being a "gap filler". Caulks are adhesives that have been chemically modified to offer some adhesion and some elasticity. When you don't need a sealant's extreme elasticity (e.g. interior trim), you can pay less for a caulk.

Five Types

Sealants and caulks fall into five general chemical "technology platforms.

1) Water-based products tend to have good adhesion and good movement capability. Most are acrylic latex, a kind of plastic or synthetic polymer chemically dispersed in water. It's a myth that water-based products are low-performers, but they must not become wet when freshly applied. These tend to be the greenest choices because they often contain low or no solvents, and hence fewer volatile organic compounds (VOCs), which can cause smog and respiratory problems. (The EPA, California Air Resources Board [CARB], or South Coast Air Quality Management District [SCAQMD] VOC limits are the standards most manufacturers cite on their "green" labels.)

2) Polyurethane products grab tenaciously to nearly anything, and are highly paintable. They don't dry; they cure, like concrete. For pure polyurethane products, nothing aerosolizes (flashes off) as they cure except CO₂. They can be green choices too, if they don't contain high levels of solvent additives, which enhance the sealant's ability to "bite" into a substrate. Many green polyurethane sealants are in the VOC range of water-borne sealants, so look for acceptance by LEED, Green Globes, or NAHB.

3) Solvent-based products contain rubber dissolved in petroleum derivatives such as xylene and benzene. When solvents flash off, you get VOCs in the air. These are your least-green choices. In fact, look for these products to be phased out entirely in the next decade.

4) Silicones. Silicones typically have a lower “modulus of elasticity” (they can be deformed by force and recover their original shape) and thus are more elastic than most polyurethanes. Silicones do not have the great adhesion of urethane, but silicones place less stress on the bond line (where adhesive meets substrate) and therefore may be the best option for a construction project. However, silicones are typically not paintable. A paintable silicone product has been modified with filler that accepts paint. (The fumes you smell are from a solvent chemically identical to vinegar.)

5) Hybrids offer the best of silicone with the best of polyurethane: Good elasticity, good gripping power, and paintability. Hybrids also cure rather than dry; many are solvent free, and therefore very green options.

Guiding Customers “You have to ‘match the tube to the task,’” says James Downing. “You can caulk interior wainscoting with a .99-cent tube of Class 12.5 water-based acrylic latex product. But sealing the gap between a plastic window frame and vinyl siding may demand a Class-50 hybrid technology at five times the cost.” More questions? Give James Downing a call. 215.957.0690 ext. 6002.

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