



Driving innovation

Changing substrates require new industrial label solutions



Plastics are helping today's automakers respond to tougher fuel efficiency standards and consumer trends by providing a lighter, more attractive alternative to metal parts.

Replacing treated metal bumpers, body trim and interior panels with plastics reduces weight to make cars more fuel efficient. It also improves aesthetics, vibration and noise control at a lower cost than traditional metals like steel and aluminum.

The same trend can be seen in other industrial applications — such as medical devices, household appliances, lawn and garden equipment, electronics and chemical drums — as manufacturers strive to develop sleeker, more sustainable consumer products.

While their benefits are wide-ranging, plastics also introduce new challenges for industrial manufacturers — particularly with labeling. Sleek, easy-to-clean surfaces are inherently difficult to label, as traditional adhesives don't bond easily to low surface energy (LSE) plastic substrates. Plastic parts that are curved, textured, coated or exposed to contaminants make labeling even more difficult.

In this complex marketplace, manufacturers need to partner with label makers that deeply understand industrial applications, can consult end-users about effective labeling options, and can develop innovative solutions for changing original equipment manufacturers (OEM) needs.



Changing substrates

Even though substrates are changing, manufacturers still expect the same performance from labels. In addition to peel adhesion, resistance to chemicals, abrasion, extreme temperatures and moisture, industrial labels must withstand the harsh conditions that are common in industrial environments.

Label makers face two key challenges:

- **Traditional adhesives do not bond well with LSE plastics.** Rubber adhesives lack the chemical, temperature and UV resistance required in industrial environments, while the more resistant acrylic adhesives aren't tacky enough to stick.
- **Other types of thermoplastics tend to outgas.** Certain volatile chemicals evolve from most injection-molded plastics over time. As they exit they can become trapped underneath the labels, creating bubbles and blisters that affect label quality, performance and appearance. As regulatory labels continue to get larger, these outgassing issues become more prolific.

While label makers have responded to these challenges with new products, most are not without their own issues.

To deal with the bonding issue, label makers developed soft, "tackified" acrylic adhesives that flow more easily on uneven or LSE surfaces. However, these adhesives are generally softer than pure acrylic adhesives and have a greater tendency to ooze out during label converting, causing buildup on label rolls that forces converters to stop the presses and clean up sticky messes.

Outgassing solutions typically have involved using perforated labels that leave undesirable holes. Other approaches call for repeatedly reapplying labels, which increases the chance of misalignment.

Innovative applications for plastics

These shortcomings make it clear that higher-performance solutions are needed to address the problems arising from the increased use of LSE or outgassing plastics.

In response, Avery Dennison sought to combine the high adhesion properties of rubber with the strength and resistance of acrylic. Using a unique rubber hybridized acrylic technology, it developed the first hybrid self-adhesive label material for the automotive industry. The resulting adhesive — called S8409 — is strong inside and sticky outside, with a heavy coat weight ideal for labelling rough or structured surfaces.

S8049 is durable enough for industrial applications and resistant enough to withstand exposure to greasy solvents and other harsh conditions. Its performance has been confirmed by more than 1,500 hours of environmental testing against the most stringent specifications.

To combat the issue of outgassing more efficiently, Avery Dennison developed a patterned adhesive to allow air to escape from underneath the label. A micro-embossed texture promotes increased airflow, giving labels a smooth, flawless appearance, even after environmental aging. The adhesive technology has been developed into a portfolio of products — called Air Egress — that enables bubble-free application on even the most difficult plastic substrates, while eliminating wasteful reworking.

As industrial manufacturing processes become more complex, they span a wider variety of difficult substrates and more stringent end-user specifications across global supply chains. OEMs can gain peace of mind by working with suppliers that can validate that label materials will stand up to these challenges and that labels will perform despite changing substrates or harsh conditions.

Avery Dennison is committed to developing cost-effective products to meet the toughest challenges. Contact your sales representative to discuss a durable label solution for your brand.

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