

POWERSPORTS INDUSTRIAL DESIGNERS & ENGINEERS SHAPING FUTURE POWERSPORTS PRODUCTS USING POLYOLEFIN PLASTICS & PERMANENT LABELING

BY MATTHEW STEVENSON



"THE GLOBAL POLYOLEFIN MARKET SIZE WAS ESTIMATED AT 149.78 MILLION TONS IN 2016" – GRAND VIEW RESEARCH

In 2014, Sea-Doo® made a monumental shift in how they manufactured their watercraft! Industrial Designers & Engineers made a technological advancement that moved Sea-Doo to the forefront of the personal watercraft industry, a segment inside the Powersports industry, for good. By 2015, Sea-Doo's sales of the SPARK watercraft had grown by 35% due to it being more affordable than any other comparable craft on the market, and because it had proved to be more durable, lighter & economical than its competitors as well.

What was this technological advancement? It's called Polytec™. As BRP Inc. states, "Polytec is a recyclable, low density and high-impact composite material that includes polypropylene and long glass fiber reinforcements. It was designed for hull and deck applications to maintain the structural integrity of the watercraft under stress while providing light yet durable parts to support the construction of the product."

Just how durable and functional is Polytec? Do yourself a favor and have a good laugh by watching Sea-Doo's

Highly Scientific Test #1: Impact Resistance here. To top it all off, Polytec, which for all intents and purposes is just another variation of polypropylene, can be recycled and re-used in future products at its end of life use!

Even though Sea-Doo's Polytec is considered a somewhat new technology, polyolefin materials like polyethylene and polypropylene have been spec'd throughout the Powersports industry for years in products like fuel tanks, motocross fenders, panels, UTV beds, dash boards and much more.



Peel Strength Test shown on Stainless Steel (left photo). Automotive Grade Permanent Pressure Sensitive Adhesive Label on polypropylene (right photo).

But Sea-Doo began thinking outside the box by using it differently than anyone else had ever done. And now, the personal watercraft industry is beginning to take a closer look at durable and low-cost polyolefin materials for their OEM and aftermarket components more than ever before.

So, choosing polyolefins for their durability and low-cost is a no brainer, right? Not so quick! There's always been one negative drawback that has plagued the polyolefin plastics industry ever since the invention of polyethylene back in the late 1930's that has forced manufacturers to choose less durable and costlier materials instead.

LABELING & DECORATING!

"A business's most valuable asset is its good name, its Brand and Reputation!"

It's essential that labels remain on products until their end-of-life for two very important reasons. First, to attract customers by displaying a specific Brands (brand's name or brand name) name, logo and reputation on their Powersports durable goods products. "More than 60% of buyers decisions are based on the Logo and the perceived value of the Brand it represents." Secondly, and in many cases a lawful mandate, labels are needed to warn customers of dangers while explaining a products proper use. It's branding that differentiates a Sea-Doo from a Yamaha® and attracts new customers while it's warning and instructional labels that keep customers informed and

Powersports companies free of liability!

Like it was said earlier, polyolefins are typically desired by Industrial Designers & Engineers for their low-cost and durable traits like impact and chemical resistance. But when it comes time to labeling and decorating polyolefin durable goods products, having your cake and eating it too becomes very problematic.

Standard decorating and labeling methods, specifically for plastics, may all be different in their construction makeup and how they are each applied. But when it comes using them on polyolefin plastics, they all share one very important and negative characteristic. "Adhesion"!

AN UNCOMFORTABLE SURFACE TENSION!

Nothing adheres to polyolefin plastics and for good reason!

The Industry Standards and Practices Manual states "pressure sensitive adhesives are categorized as permanent or removable. Loosely defined, an adhesive with two pounds or more of peel strength from stainless steel is permanent."

You see, what's specified as permanent pressure sensitive adhesive labels are only "loosely" defined that way when they achieve two pounds or more of peel strength from stainless steel, not polyolefin plastic. "So what," people might say. "A substrate is a substrate. Does it really matter?"

Actually, it does, a lot! When it comes to adhesion and peel strength, it all boils down to something called Surface Tension, or better put, Surface Energy!

It's the surface energy of a substrate that will either receive or reject something trying to adhere to it. For reference, Teflon®, one of the most non-stick products known to man, has a very low surface energy of just 18 dynes/cm. You probably remember those "cheesy" infomercials back in the day showing foods sticking to regular frying pans (high surface energy) while sliding right off the Dupont® Teflon coated ones (low surface energy). You may not have realized it then, but Dupont was teaching us all about surface energy to sell products that would solve people's frustrations in the kitchen.

I know this is a lot, but if you only remember one thing about this article remember this. High surface energy substrates attract adhesion while low surface energy substrates reject it! And that my friends, explains why a "permanent" pressure sensitive adhesive label will stick well to high surface energy stainless steel at 700-1100 dynes/cm, and not to low surface energy polyolefins at 30-31 dynes/cm.

Fact! Polyolefin plastics like polyethylene and polypropylene are only a few dynes/cm away from Teflon!

SUBSTRATE	SURFACE ENERGY (DYNES / cm)
Stainless Steel	700-1000
Polyethylene Plastic	31
Polypropylene Plastic	30
Teflon	18



Wetting out of rain water on high surface energy vehicle (left photo). Beading of rain water on waxed low surface energy vehicle (right photo).

A great real-world example of low vs. high surface energy you've probably experienced yourself is the difference a good wax job can do for your car. Prior to waxing, your car will have had a

high level of surface energy as does the rain water at 72 dyne/cm which easily wets out over most of the surface. After waxing though, the surface energy of the car has been reduced significantly to 23

dyne/cm which then causes the water to bead and run off freely.

Not only are polyolefins considered LSE (Low Surface Energy), these



(Failed labels on polyolefins shown left to right: In Mold Label (IML), Pressure Sensitive Adhesive Label, Screen Printed Ink, Hot Stamp Foil).

thermoplastic plastics that are used in a variety of durable goods products in a variety of industries also have a high coefficient of thermal expansion (meaning they expand & contract with changes in temperature) along with a high rate of outgassing (they emit VOC's). At the molecular level, force of attraction between these plastics and labels of all types ultimately determines adhesion where wetting out is necessary to form a strong bond. Thus, these types of labels have difficulty "sticking" or "bonding" during decorating operations that only deteriorate when exposed to mechanical, chemical & environmental inputs.

"The pessimist sees difficulty in every opportunity. The optimist sees the opportunity in every difficulty."
- Winston Churchill

SOMETHING DIFFERENT!

At Mold In Graphic Systems® (MIGS®), we pride ourselves on being different! Instead of making labels like everyone else does, going to same old toolbox grabbing standard inks, coatings and adhesives, we took the challenge of decorating LSE polyolefin plastics head-on on saw the opportunity to solve problems for multiple industries that need it. Our labels work because they're made from 100% compatible materials that are heat-fused (cohesion) to LSE polyolefin durable goods products without the need of adhesion. This means that a MIGS label cannot be removed by mechanical, chemical or environmental inputs apart from destroying the durable goods product they're fused to.

And because Powersports products are continually exposed to heat/cold cycles, UV, moisture, fuels & oils along with daily wear & tear of abrasion and use, it means that their Branding name & logos along with warning & informative labels will be on those products until their end-of-life (ELV), guaranteed. Something Industrial Designers & Engineers should consider when designing new products!

A SUSTAINABLE FUTURE!

Speaking of ELV, let's look at the automotive industry for a moment. There are 3 main polymers that currently make up 66% of the plastic being used in making vehicles today.



Polypropylene by itself makes up 32% of that total for interior and under hood applications which is important and here's why. ELV was developed by automotive OEM's to establish directives for the recycling of vehicles once they've reached the end of their useful life. The goal of automotive OEM's is to manufacture future vehicles so that at least 95% of their weight can be recycled! To read and learn more about this initiative, you can visit

<https://www.mdsystem.com/imdsnt/startpage/index.jsp>

That said, it's only a matter of time before the Powersports industry begins their own initiative outlining the same types of recycling goals.

Recycling by the way is an industry of its own. Dave Cornell, technical consultant to the Association of Plastic Recyclers made the following statement: *"To be profitable, recycling processors must make a product that when sold creates profit that supports the rest of the manufacturing chain."* In other words, recyclers want to have clean recyclate as it has the greater value and keeps them profitable. Grade A bales, or 94-95% indicated plastic, get the best price and are most sought after by buyers of recyclable HDPE for example.

The 5% is other incompatible materials that cannot be recycled with the plastic. Other labeling methods such as hot stamp, screen print, sticker, heat transfer and IML's contain multiple layers of incompatible inks, coatings, substrates and adhesives end up as non-biodegradable contaminant that has to be removed prior to recycling or

during a pre-recycle phase both of which are labor-intensive, costly and time consuming. As a side note, after those other labeling methods have been removed, they become waste that has to be thrown away.

The great news is that MIGS labels are 100% recyclable with the polyolefin products they're applied to. No removal, no labor, no waste! Imagine a world of grade A bales of recyclate that are 100% indicated plastic with no contaminant and no waste!

The Plastics Industry Association has been a major proponent in showing the countless benefits of plastics in everyday life throughout multiple industries while pushing the sustainability message of recycling & re-use. This message comes as much of the world has been armed with mis-information, pushing an anti-plastic initiative to rid the world of plastics. The problem with that theory is that it throws the baby out with the bathwater.

To learn more about the Plastics Industry Association's work in sustainability, visit <https://www.plasticsindustry.org/supply-chain/sustainability>

Plastics make us safer! Whether it's the bumpers or air bags in our cars, to the lawn mower chutes, helmets and other safety equipment we use every day in our jobs and play. Plastics, specifically polyolefins, do what other materials cannot!

Polyolefins have also shown to help our environment in a different way! As automotive OEM's have learned, dropping an average 500lb. in overall vehicle weight

has helped them meet stringent CAFE fuel efficiency standards. By switching from fiberglass to the more durable and cheaper polypropylene Polytec material mentioned earlier, the Sea-Doo SPARK weighs in roughly 150lbs. lighter than any of its competition. That weight savings allowed Sea-Doo to utilize a lighter, more compact and fuel-efficient engine. The outcome was a better performing watercraft that's more durable while using less fuel.

POLYOLEFINS OUTLOOK FOR POWERSPORTS!

There are currently multiple online lists showing hundreds of prominent Powersports OEM manufacturers around the world on top of thousands of aftermarket product manufacturers. With increasing popularity, these OEM and aftermarket manufacturers are expected to witness significant growth in the forecasted period between 2018-2023 according to a report by Market Watch.

In 2018, the global production of polypropylene hit 55.9 million metric tons at a value of \$97.4 billion U.S. Dollars and is poised to grow at a rate of 5.84% annually. Polyethylene production hit 99.6 million metric tons at a value of \$164 billion U.S. Dollars and is poised to grow at a rate of 3.78% annually!

What does all this mean? It shows us that the expected growth of the Powersports industry will go hand-in-hand with an increase in the polyolefin thermoplastics that make up much of the construction of Off-Road Vehicles

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(ORV's), All-Terrain Vehicles (ATV's), Side-By-Side Vehicles (SxS or UTV's), snowmobiles, motorcycles, and personal watercraft (PWC's) as well as make up much of the aftermarket parts that equip them. For a sustainable future, Industrial Designers & Engineers should consider using durable and cost-effective polyolefin materials to help Powersports OEM's meet stringent standards while making their vehicles more appealing & efficient.

To learn more about Powersports industry standards, visit <https://www.opei.org/services/>

A SHIFT IN APPEARANCE!

Unfortunately, even as Powersports products have advanced in design to resist harsh use in environmental hazards like moisture, dirt/debris, vibration/shock along with high operating temperatures, the adhesion based labeling options available to OEM's and aftermarket manufacturers have not and it shows. While customers should never have to guess who's Brand the product they're using came from, a Powersports Brand shouldn't have to worry about that occurring. And while customers should also never have wonder what hazards are associated with a product's use, a Powersports Brand shouldn't have to

worry about a lawsuit because it wasn't clearly defined.

INVESTING IN YOUR BRANDS FUTURE!

Every polyolefin durable goods product should proudly wear a Brand's name & logo, and other descriptive labels, in the most permanent and durable way to continually spark emotion, turn prospects into customers, and create raving fans for the life use of those products. Labels available to Powersports Brands today are just upfront expenses that would never dream about guaranteeing something like that.

It's time to start looking at labeling & decorating differently. If the definition of amortize is to "gradually write off the initial cost over a period of time" then consider a MIGS label as part of an amortized advertising budget that gives a return of investment everyday a polyolefin durable good is out in the field being used.

Example:

A durable rotomolded polyethylene kayak costs \$1,200.00 and comes with an expected 10-year life use. A MIGS label that costs \$3.50, is .003% of the kayak's value and is guaranteed to last that life use.

Over a 10-year period, that \$3.50 MIGS label ended up being a \$.0009589 per day write off that continually represented that kayak Brand, sold more kayaks, kept customers informed, and saved that Brand from potential litigation.

So, it's no surprise that with an increase in polyolefin thermoplastics use in the Industrial Design & Engineering of Powersports products, will also come the need for permanent labeling that showcases a brand's image while informing proper use & safety instructions. This is the reason why Mold In Graphic Systems® and Polyfuzer® Graphics Corporation exists. We are the only company's in the world that manufactures labels specifically designed for LSE polyolefin materials that also happen to be guaranteed to last the life of the Powersports products they're applied to.

MIGS has produced permanent labeling solutions for a variety of industries & OEM manufacturers that utilize LSE polyolefin materials from Yeti® Coolers & Rubbermaid® Commercial Products to tier 1 suppliers for General Motors, Ford and many more...

Our Brand Specialists are ready to help you adorn your polyolefin products today! Visit www.moldinggraphics.com and www.polyfuzer.com



(Failed labels on polyolefins shown left to right: In Mold Label (IML), Pressure Sensitive Adhesive Label, Screen Printed Ink, Hot Stamp Foil).