Providing Solutions in
Pressure-Sensitive Films

FLEXCON

WHITE PAPER

The Economies of Scaling Back:
How Pressure-Sensitive Labels Can Help Lower TAC

Despite the economic downturn, the consumer electronics / AHR (air conditioning, heating, and refrigeration) and home appliance segments continue to grow. Freedonia Group Inc.'s Commercial Refrigeration Equipment market reports find that the demand for commercial refrigeration equipment in the United States is forecasted to rebound through 2014, growing more than 7 percent per year, to exceed $8 billion annually. In addition, Freedonia Group stated that overall, "Global major appliance demand will rise 2.8 percent annually through 2013, driven primarily by market penetration in developing countries. In developed regions, appliance sales will depend mainly on steady replacement demand, new home building and the development of new features that prompt upgrading." The Association of Home Appliance Manufacturers historical data shows this forecast to be obtainable and reasonable.

Increased demand, however, does not guarantee increased profits. Even with these positive sales predictions, appliance manufacturers are acutely aware of the challenges before them. As the public tightens its financial belt, manufacturers must remain vigilant as they seek to reduce total applied costs (TAC) without sacrificing the quality or performance that is expected.

At the same time, manufacturers are relying more and more on just-in-time manufacturing to reduce inventory and associated overhead costs. Finally, original equipment manufacturers (OEMs) are aware that to take advantage of market fluctuations, they need to have lightning fast development cycles to increase the speed to market.

What is true for the appliance market as a whole is also true for those who supply it with labels. Although labeling may appear to be a small cost when compared with the actual manufacturing of the appliance, OEMs are exploring every avenue of possible cost containment. More and more, they are turning to pressure-sensitive label manufacturers in an effort to lower TAC while remaining in compliance with all labeling requirements. This has prompted label stock manufacturers and label converters to re-examine not only their product offerings, but also how they can reduce the quantity and total area of the labels themselves.

Looking at the Components of the Pressure-Sensitive "Sandwich"

To fully understand how label options can lead to reduced costs, one first needs to understand the components of the pressure-sensitive film "sandwich". The sandwich gives design engineers virtually limitless possibilities in meeting appliance labeling requirements.

Each component of the sandwich offers converters and OEMs either aesthetic or functional characteristics, or sometimes, both. In many cases, the wide-ranging characteristics and potential of pressure-sensitive film can be the catalyst for new product designs. This is because the sandwich is comprised of four layers (i.e., film, adhesive, topcoat, and liner) of widely varying material components.

FIGURE 1: The Construction
The functional components of a Pressure-Sensitive Film

In the case of the film or substrate, converters and design engineers can select a product to match, say, the gloss level of an LCD display, the grain pattern of walnut, or the texture of brushed metal. There is a seemingly endless array of colors, gloss intensities and finishes available for the film layer to match or enhance the look of virtually any application. Yet substrate options also go beyond aesthetics. Its material composition, for example, is key to providing necessary durability characteristics to the pressure-sensitive adhesive film solution. Film gauges and thicknesses can play an important role here — they can range anywhere from .5 mil to 10 mil, depending on the application needs.

The adhesive layer of the pressure-sensitive film is a functional component of the label. A viscous substance when pressure is applied, the adhesive enables the label to adhere permanently to the application surface. The product surface, in addition to the environmental conditions the adhesive is likely to encounter, will largely dictate what the adhesive properties should be. These properties are characterized in terms of tack, peel and shear, as well as other attributes such as resistance to chemicals, UV radiation, heat, humidity and other environmental conditions. The ability of a warning label to stay adhered to the engine housing on a dryer is one example of where this adhesive layer is key in the appliance industry.

The number one job of the topcoat layer of the pressure-sensitive film is to ensure proper ink adhesion to the surface of the film. Therefore, depending on the application, topcoats need to be compatible with a range of conventional, UV and water-based inks, as well as printing methods such as screen-printing, flexographic, letterpress and offset printing. The proper topcoat is necessary to determine or conform to the printing technology that the film will be encountering, and it will need to accommodate variable printing requirements and digital printing methods.

Liners serve a functional process as a base to die-cut against, as well as serve as the support material to assist in the manufacturing process. Although sometimes viewed as the "throw away portion" of the label, liners serve an important role. Liners need to withstand the printing, die-cutting, lamination and application steps inherent in the converting industry, as well as in the various electronic product testing and manufacturing processes. Furthermore, far from being thrown away, today, some liners are recyclable.

Each component has an impact on the label as a whole. For example, in the case of an exterior graphic application, you would want to select a durable film that would offer color fastness when exposed to UV light, as well as the necessary strength to withstand varying weather conditions, such as freezing cold temperatures, strong winds, and exposure to moisture. By choosing the right substrate, as well as the proper adhesive, topcoat, and liner combination, you can help ensure the success of the application.

Assessing Appliance Industry Demands

Many appliance design engineers think of pressure-sensitive film solely as a material to be used in warning, product identification, instructional, circuit board, battery wraps, and brand labels. This is understandable, given how well pressure-sensitive film and adhesives meet the challenges presented by today's electronic products and appliance labels.

Designers are acutely aware of the range of demanding conditions that the label may face. There may be finished surfaces composed of entirely new materials, to which labels must adhere for the life of the product. At the same time, the more compact size of many appliances provides labels with a shrinking share of real estate to do their appointed jobs.

The label may also face hotter operating temperatures than before, with appliances tailored to meet the demands of a digitally mobile society that is always looking to reduce wait times. This can mean that appliances need to run faster for shorter periods of time. Similarly, an appliance label will likely face additional environmental stressors. A portable electronic device may be exposed to the stiflingly hot or subzero cold while sitting in an automobile. It could also face exposure to oil, radiator fluids, or other harsh chemicals. Design engineers can obtain pressure-sensitive films to meet all of these challenges.

Reducing Costs Through Substitution

Once the demands have been assessed, an experienced label manufacturer can offer OEMs alternatives that retain and even enhance the functional aspect of labeling, but at a reduced cost. Further, working with an experienced label material supplier can help reduce labeling timeframes, thus consolidating design-to-market schedules and ensuring a further reduction of the TAC of the product.

Thus, design engineers can specify a pressure-sensitive film that can provide affordable alternatives to other identification options. For example, an OEM may be using a stainless steel brand tag for a washing machine. In this case, the OEM may be using stainless steel because it offers a rugged representation of both the brand and the product: the presence of stainless steel implies endurance and quality.

However, that same impression can be successfully imparted by using a 2 mil polyester label that gives the appearance of stainless steel. When coated with an aggressive permanent adhesive and protected with a clear overlaminate, the resulting label retains the appearance and long-term durability of stainless steel, but at a fraction of the manufacturing and application costs of stainless steel.

Even within the realm of pressure-sensitive labeling, there are numerous cost-reducing options. In some cases, a label supplier may be able to suggest a thinner, but equally durable, substrate or liner, either of which can reduce both waste and expense. For example, in some applications, a 1.6 mil liner achieves the same converting experience as a 2 mil liner. If this can be accomplished without sacrificing any functional aspects, there are potential economies.

Reducing Costs By Reducing Time and Labor

Although one may be able to achieve some cost reduction through material choice, there are other options available, some of which can also help reduce the time and labor associated with label application.

Experienced label providers often provide OEMs with a battery of questions to help understand their labeling needs. The label provider, working closely with the OEM, can also perform an inventory of labeling needs. For example, almost every element in an appliance features a work-in-process (WIP) label at some point in the manufacturing process to help keep the final product in compliance with ISO or other quality assurance programs.

WIP labeling allows for a clear picture of the manufacturing chain, where the development and installation of every element can be traced. This is especially important in today's just-in-time manufacturing environment. In many cases, first level suppliers are fulfilling orders as they come in, making the need to track and account for each component even more critical. This necessity for accountability can potentially provide an opportunity for combining labels.

This is where assistance from the label manufacturer or pressure-sensitive material solution provider is best utilized. With this assistance, they can identify what labeling needs can be combined and thus help in streamlining the process and reduce labeling costs. The right combination of film, topcoat, adhesive, and liner can then be formulated to minimize the total applied cost and get the product to market as quickly as possible.

An example of this can be found in the manufacturing of stovetop appliances. In one case, a work-in-process label was being used to track individual components during production. At the same time, a mask was being applied to prevent certain areas from being powder coated. A diagnostic conversation with the appliance first tier supplier and the product identification solution specialist from either the label manufacturer or pressure-sensitive material provider could result in a label that would serve both purposes.

At first, this seems like a small change, but when one looks at the impact on the overall process, the true cost savings become apparent. The cost of printing and diecutting both labels can potentially be cut in half, and those reductions would continue throughout the rest of the manufacturing process. Instead of two or more labels being applied in the manufacturing line, only one is applied. Perhaps the manufacturer can eliminate the cost of removing the mask and the WIP label. The potential for WIP label failure during the powder coat process is also reduced. The list of potential cost reductions is long. The economic benefit can be measured and is usually quite surprising to both the supplier and OEM.

Changing Perceptions

Traditional mindsets regarding pressure-sensitive film are changing as new technologies create new opportunities in today's AHR, electronics, pharmaceutical, and appliance markets. Advancements in polymers and chemistry, combined with the creative minds in the pressure-sensitive film industry, have led to more options than ever before. As long as the film is specified early and there is a full understanding of the OEM's needs, an experienced film supplier can help ensure the long-term performance demanded by consumers, while enabling designers to get their product to market quicker and at the lowest total applied cost.

About the Author

Ken Koldan focuses on providing FLEXcon's expertise and product solutions to design engineers and economic buyers within the Consumer Electronics, HVAC, Security, and Appliance markets. He served as Chairman of The UID Supplier Alliance for the 2010 term. The UID Supplier Alliance (USA) Committee includes many of the leading providers of UID and other automatic identification and data capture (AIDC) solutions for asset visibility applications.

Ken was previously at a Fortune 100 corporation where he served as Director of Business Development and gained extensive experience in strategic planning and new market development. Throughout his career, Ken has held a variety of roles, including Engineering Manager, Program Manager, and Systems Engineer. He has worked in various industries ranging from Theoretical Physics to Banking and most recently in Mission Critical Wireless Communications.

Ken holds an MBA from Keller Graduate School of Management at DeVry University and a Bachelor of Science degree in Electrical Engineering from the University of Illinois. He also holds Project Management Professional (PMP) certification from the Project Management Institute.

About FLEXcon

FLEXcon is an ISO 9001:2008 worldwide manufacturer of pressure-sensitive films and adhesives for applications including indoor and outdoor advertising, bonding/mounting, and product identification, safety, hazard, bar-coded, and primary labels. The company's Value-Better-Supreme (VBS) product offering is the most extensive standard product offering in the pressure-sensitive film industry. FLEXcon is also a leader in developing custom solutions to meet unique converting or application needs. FLEXcon's mission is to provide its customers the highest quality products with exceptional service. The company is headquartered in Spencer, Massachusetts, and has operations throughout North America and Europe, with distribution worldwide. For more information on FLEXcon, visit www.FLEXcon.com.

Let's Talk Solutions

Bring your challenges or next big idea to FLEXcon and we will work together to find a solution. Call us at (508) 885-8200 or visit our website at www.FLEXcon.com.

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