

Historically, distinct differences have existed between cast and calendered vinyl films, but in recent years, that gap has narrowed considerably. Calendering advancements are allowing manufacturers to approximate the thickness and gloss of cast products at production economies. This has been accomplished by reducing and evening the internal tension which translates to less shrinkage.

### **CALENDERED VINYL VS. CAST VINYL**

Originally cast vinyl was thinner, had lower internal tension, higher gloss, and was formulated for longer exterior life. In today's market, there are now various calendered formulations that can exceed five years exterior durability. Calendered smooth surface finishes can accept various print methods without additional top coatings. Being a standard in the graphic arts industry, pressure sensitive vinyl films are formulated with polyvinyl chloride resin (PVC) for a wide variety of applications. In addition to formulation variables, there are two common methods of producing vinyl films; calendaring and casting. As a producer of pressure sensitive vinyl films, General Formulations has seen a shift in the performance of calendered vinyl films over the last decade.

**Calendering** of polyvinyl chloride (PVC) formulations is the most common method of producing vinyl films. This method uses temperature and pressure to create a vinyl film at a specific thickness and offers speed of production for economic advantages making calendering common when producing economy grade vinyl films. These films are used for general purpose signage and are designed for short to medium-term exposure applications. Specific formulations can produce long term vinyl film, such as high-performance calendered polymeric vinyl.

**Casting** of vinyl films is the alternate method of production. Casting allows for thinner films, less internal tension, potentially higher surface gloss and formulation variables that can extend exterior life. This combination of formulation and production methods produces premium vinyl films designed to extend exterior resistance with color and gloss stability.

### **TECHNICAL EVALUATION OF FILMS**

In the past, calendered films were only meant for flat surfaces and for short-term durability, but due to manufacturing advancements, calendered vinyl films are now approaching the thickness and quality of cast vinyl. Calendered vinyl film thickness in the range of 2.4 to 4.0 mils (60 to 100 microns) are now quite common. Surface gloss of pigmented calendered vinyl films now can be greater than 80 when measured at a 60° observation angle. Internal tension of the calendering process is now reduced and equalized to minimize inherent shrink as a function of application time. A higher gloss level also produces a smoother surface finish which helps with print resolution, especially with four color digital printing. All of these improvements can now yield a calendered vinyl film that can be rated for up to five years for exterior resistance.

Long-term signage is not nearly as important as it was twenty years ago when longevity was specified and expected. In this new age of quick turn around and short-term installations, instant gratification means higher demand for easy to install and shorter-term products. Calendered vinyl is an ideal substrate where thickness aids in application and removal. Calendered PVC vinyl can offer quick change of signage messages when using removable PSA's, and can offer up to five years exterior durability for permanent decals depending on the adhesive choice. Manufacturers' of calendered vinyl can now formulate their products with higher gloss levels which increases signage appeal. Additionally the point of purchase industry has moved to shorter term

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promotions at higher frequency. It is exceedingly rare for a promotional signage campaign to have an expected life over sixty days. In these cases, the use of premium cast vinyl films in that type of promotion is a waste of resources and probably overkill for the intended application. Calendered vinyl films easily meet the requirements of those applications. General Formulations' has a wide variety of calendered vinyl films and a selection of removable pressure sensitive adhesives to meet the needs of any point of purchase promotion. Color and gloss level of the calendered vinyl can be tailored to meet most application requirements.

### **GENERAL FORMULATIONS CAPABILITIES**

When a longer term sign exterior resistance is required (5 years), calendered vinyl films can also be considered. When formulated with the correct adhesive, calendered pressure sensitive vinyl films of various colors and surface gloss are available. These products are the basis for extended use signage for commercial and retail establishments, safety and warning signage and directional signage. Calendered print media offers an economic advantage over signage produced using cast vinyl films, especially in the 3 to 5 year expected application period. When signage is expected to perform over five years, then premium cast vinyl film products may have to be considered.

General Formulations offers a complete line of calendered pressure sensitive vinyl products to meet nearly any application up to five years exterior. These vinyl films are clear, white, various colors and range in thickness from 2.4 mils to 12 mils (60 to 300 microns). General Formulations has a complete line of pressure sensitive adhesives to match just about any requirement for these vinyl films. From short term point of purchase decals to five year exterior signage, the Concept® line of products offers a pressure sensitive vinyl to meet any requirement. Pressure sensitive calendered vinyl films also can be printed using flexographic, screen printing and offset, making calendered vinyl the ideal print substrate for most applications.

General Formulations' offers a wide variety of calendered vinyl films to meet fast changing consumer demands. Our films are receptive to the most popular inks on the market and can be run through most any digital print systems including solvent, eco-solvent, latex and UV curable inks.