



## Repulable Silicone Release Liner Paper with Dissolvable Layer

**Product:**

Repulable Silicone Release Liner Paper with Dissolvable Layer

**Development Stage:**

Method Established

**Primary Inventor:**

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target surface. While most people are familiar with product packaging labels or parcel shipping labels, there are numerous other adhesive label applications in manufacturing, electronics assembly, and the medical field, among others. In fact, for the entire spectrum of adhesive label applications, release liners collectively account for approximately 1-2% of global paper waste.

One of the best and most widely used materials for providing the slightly sticky yet releasable surface for paper-based release liners is Polydimethylsiloxane (PDMS or silicone). Very thin layers of PDMS are coated onto the base paper, sometimes on top of another thin barrier coating layer ("surface size"). When used, barrier coatings help prevent the silicone from absorbing into the paper. Examples of barrier coatings include clay and polyvinyl alcohol.

However, separating the silicone layer from the base paper during subsequent recycling is not easy. Residual PDMS "specks" not separated from the base paper are found in the recycled paper causing a variety of problems with paper and print quality. As such, use of recycled fiber derived from release liner paper stock is often shunned by the printing industry.

Accordingly, there is a need to improve the separation of silicone from the base paper during recycling of release liner paper. This would be of interest to paper companies, adhesive label OEMs, silicone coaters, label converters, repulpers/recyclers, and various industry groups interested in promoting sustainability.

**Technology Description**

At WMU, a method of making repulable silicone release liner paper has been developed, which enables better separation of silicone from liner base paper during recycling, thereby increasing repulping process speed, throughput and recycled paper quality.

Specifically, the WMU technology involves coating the release liner base paper with a water soluble material before coating the water soluble material with silicone. The water soluble "sacrificial" layer readily dissolves in the primarily water and heat based repulping process, completely releasing the silicone layer for separation from the base-paper. The sacrificial layer can be applied either directly on the paper fiber surface (Fig. 1, dissolvable layer shown in gray) or on a barrier coating (Fig. 2).

Examples of compounds for the water soluble layer include:  
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**T**he adhesive label industry accounts for a substantial amount of printing activity and consequently produces a sizeable amount of industrial waste, particularly in the form of "spent" release liners. Release liners are the backing material that keeps the adhesive protected until the label is peeled away and applied to the

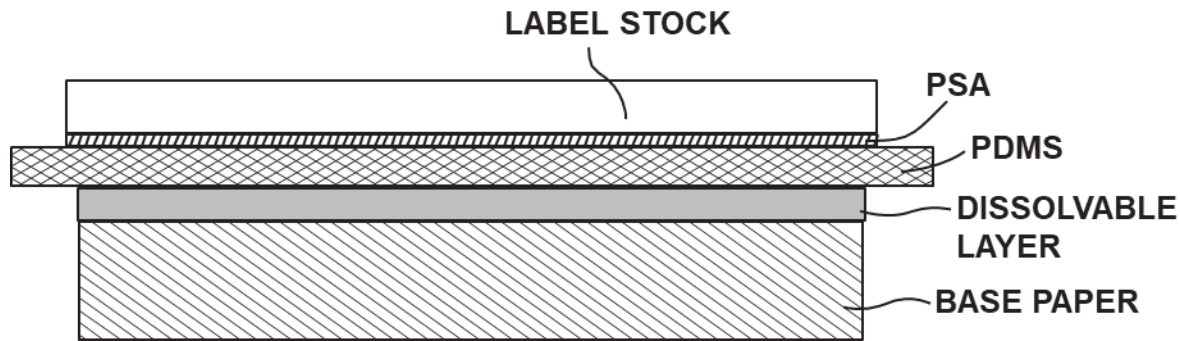
polyvinyl alcohol, sodium alginate, ethylated starch, carboxymethylated cellulose, and carboxylated soy protein, or other water soluble

polymers. One useful water soluble layer combination is a mixture of sodium alginate and partially hydrolyzed polyvinyl alcohol. For the silicone layer,

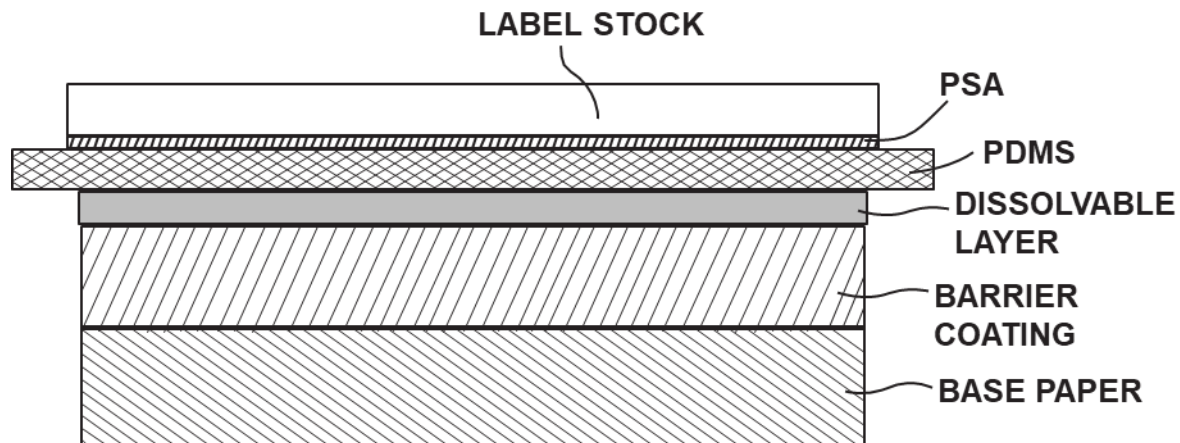
solvent-based, water-based and solvent-less silicone materials may be used.

**Potential Benefits**

- A Promotes release liner paper recycling by facilitating complete separation of the silicone layer from the base paper
- Increases the repulping process speed and throughput
- Standard equipment and coating processes are used for incorporating the water soluble layer



**Figure 1. Dissolvable layer applied directly on release liner base paper in a pressure sensitive adhesive (PSA) assembly**



**Figure 2. Dissolvable layer deposited on base paper barrier coating**