

A Performance-Preserving Response to Rising Platinum Prices

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Of the nearly 27 billion square meters of release liners and films coated globally each year, more than 80 percent utilize silicone release coatings catalyzed by platinum.

Platinum can convert a coating from a pourable liquid to a hard rubber film in little more than a second. What's more, release liners made with platinum-cured silicone chemistry require minimal post-cure and exhibit no reversion. These factors are essential, especially for in-line lamination.

Unfortunately, increasing demand for platinum in other industries has seriously depleted the global supply, causing prices to rise sharply, a situation that is not expected to change for many years to come.

***Syl-Off*[®] Advantage Series Low-Platinum Silicone Release Coatings**

In response, Dow Corning Corporation has been working to develop a low-platinum, cost-control solution that would not require users to make processing or release performance compromises. *Syl-Off*[®] Advantage Series is the result of that work.

Syl-Off Advantage Series is a solventless, platinum-catalyzed, thermal-cure release coating system that features a selection of base polymers and crosslinkers with proprietary architectures plus a choice of release modifiers and catalysts. Two inhibitor choices were developed to meet differing needs for low-temperature cure vs. longer thin-film bath stability in hot, high-speed processing operations (Table 1).

Table 1. Processing and performance characteristics of maleate- vs. EtCH-inhibited Advantage Series coatings and release modifiers.

Parameter	Inhibitor	
	Maleate	EtCH
Bath Life at 40°C at 40 ppm Pt	>6 hours	>8 hours
Thin-Film Stability	Longer thin-film stability	
Coverage	Better coverage vs. coat weight	
Cure	More robust cure vs. bath age	Lower extractables at given dwell time; shorter dwell time/higher line speed

This “toolbox” approach enables flexible control of cure characteristics, release profile and costs.

Platinum Requirements vs. Performance

The Advantage Series enables significantly lower platinum usage: 20-50 ppm vs. the 100 ppm or more that conventional systems require. In many high-volume applications, this can result in a 10-15% savings in silicone costs. What's more, users do not have to compromise on bath life, anchorage, line speed or release stability to realize this cost savings.

Bath Life

Figure 1 illustrates the relative bath life of two Advantage Series coatings formulated with the same crosslinker as well as the effect of varying platinum levels.

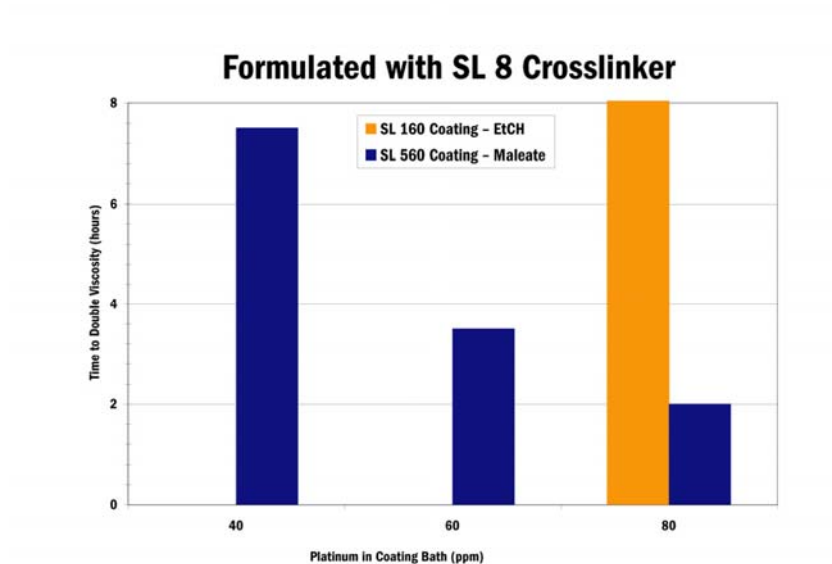


Figure 1. Bath life performance; baths aged at 40°C.

Anchorage

As demonstrated in Figure 2, the proprietary crosslinker architecture of Advantage Series crosslinkers enables excellent cure at very low levels of platinum.

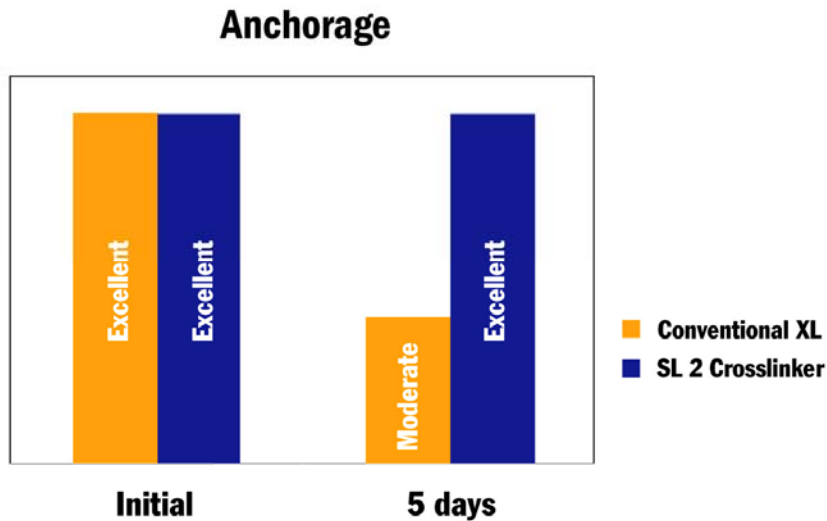


Figure 2. Humidity-aged anchorage performance, 95% humidity.

Release

Another result of Advantage Series' proprietary architectures is flatter release profiles across the peel speed range, while the availability of release modifiers allows coaters to tailor the release profile to their end use specifications. (Figures 3 and 4)

In customer trials, the new polymer and crosslinker architectures have yielded remarkable cure performance with very low platinum requirements. Converters have been able to achieve faster stripping speeds during label converting due to the flatter release profiles available from the range of Advantage Series coatings.

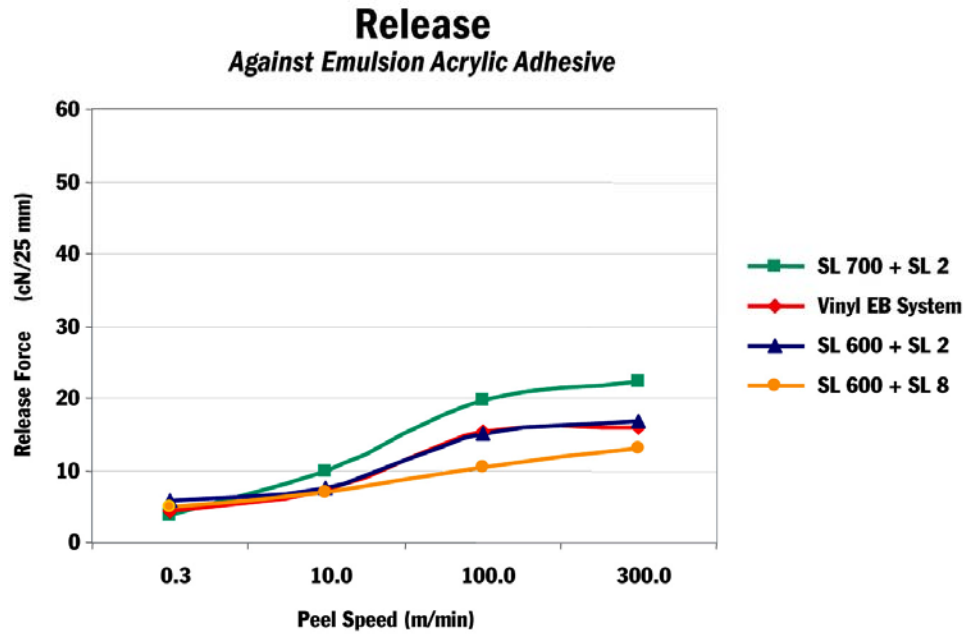


Figure 3. Release performance against an emulsion acrylic adhesive.

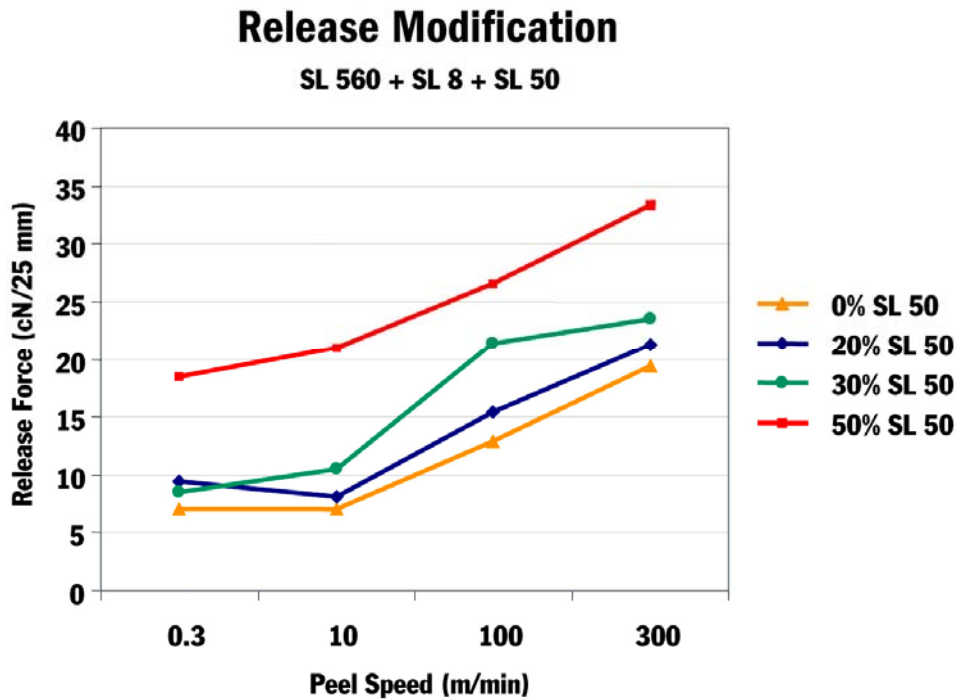


Figure 4. Effect of release modifiers on release performance.

Implementation Considerations

Advantage Series silicone release coatings are suitable for use with a wide range of adhesives and applications. They can be used to augment or replace a coater's current product line. Moreover, they are designed to minimize the processing and performance difficulties users sometimes encounter when changing release coating formulations. Advantage Series components have viscosities similar to those found in Dow Corning's standard platinum-catalyzed, solventless silicone release coating line. Equipment, substrate, cure and dwell requirements are also similar.

To ensure successful implementation, the Dow Corning technical support team is offering comprehensive changeover and troubleshooting assistance, including pilot coating and application testing support.

To help customers manufacture robust products at the lowest possible cost, Dow Corning also provides process optimization expertise, such as oven and coating line setups that promote optimal coat weights, eliminate waste and speed up production.

Summary

Dow Corning's new *Syl-Off* Advantage Series release coating product line is a cost-control solution that does not require trade-offs in processing or release performance. The proprietary coating and crosslinker architectures reduce user dependence on costly platinum, while the comprehensive "toolbox" of base coatings, crosslinkers, catalysts and release modifiers enables broad flexibility in controlling release, cure and cost. There is no need to compromise bath life, anchorage, line speed or release stability.

Product data, including typical properties, is available at www.dowcorning.com/psi.