

SilForce™ SL6110

SilForce* SL6110 Release Coating

Description

The SL6100-D1 release coating system is a multi-component, addition curing, thermal solventless release coating designed for use in the manufacture of release liners for pressure sensitive tapes and labels. Characterized by fast cure at low temperatures, the SL6100-D1 system is suitable for both paper and plastic substrates. One- and two-sided constructions are possible.

SYSTEM COMPONENTS

The SL6100-D1 release coating system consists of easy and tight release polymers, catalyst, inhibitor and copolymer crosslinker.

- SL6100-D1 Easy Release Polymer
- SL6110-D1 Platinum Catalyst Concentrate
- SL6020-D1 Copolymer Crosslinker
- SL6030-D1 Tight Release Polymer
- SL6040-D1 Inhibitor

Key Features and Benefits

PERFORMANCE FEATURES

- Fast cure at low temperatures
- Improved acrylic adhesive compatibility
- Decreased 'spike', slip/stick effect commonly associated with addition cure systems, also referred to as static release
- Good coverage, better dye stain fidelity
- Controlled release - high resin content SL6030-D1 provides efficient response with a variety of adhesives, useful for differential release on double-sided products
- Good bulk and thin film bath life
- Flexibility in formulation, cost effectiveness

Typical Physical Properties

Property	SL6100-D1	SL6110-D1
Viscosity, cps, 25°C(77°F)	250	240
Specific gravity, 25°C(77°F)	0.97	0.97
Density, lbs/gal	8.05	8.05
Flash point, closed cup, °C(°F)	177 (350)	170 (350)

Patent Status

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Product Safety, Handling and Storage

CAUTION

SL6020-D1 and SS4300c crosslinkers will generate flammable hydrogen gas upon contact with strong acids, bases or oxidizing agents. Do not reuse containers.

The warranty period for SL6100-D1, SL6110-D1, SL6030-D1, SL6040-D1, and SL6020-D1 is 12 months from the date of shipment from Momentive Performance Materials if stored in the original unopened container at 25°C (77°F) or below.

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Processing Recommendations

APPLICATION

The SL6100-D1 system can be applied by any of the methods now being used commercially for solventless silicone release coatings. These include three roll differential offset gravure and various smooth roll configurations.

Heat should be applied immediately after coating to initiate cure. When fast curing formulations, i.e. high SL6110-D1 concentrations are used, best results are obtained with zoned ovens. Operating the first zone at 90-120 °C(200-250 °F) will allow the coating to level, forming a continuous film before cure is initiated. Subsequent zones should be sufficiently high to achieve the required exit web temperature. Approximate temperatures for several catalyst levels are listed in the following tables.

The temperatures shown in Table I should be used only as a guide. Actual temperatures required for complete cure will be highly dependent on machine conditions. In general, minimum web temperature must be maintained a finite time to obtain complete cure, the time being dependent on oven length and air velocity.

Table 1

Approximate Min. Web Temperature as a Function of Catalyst Level

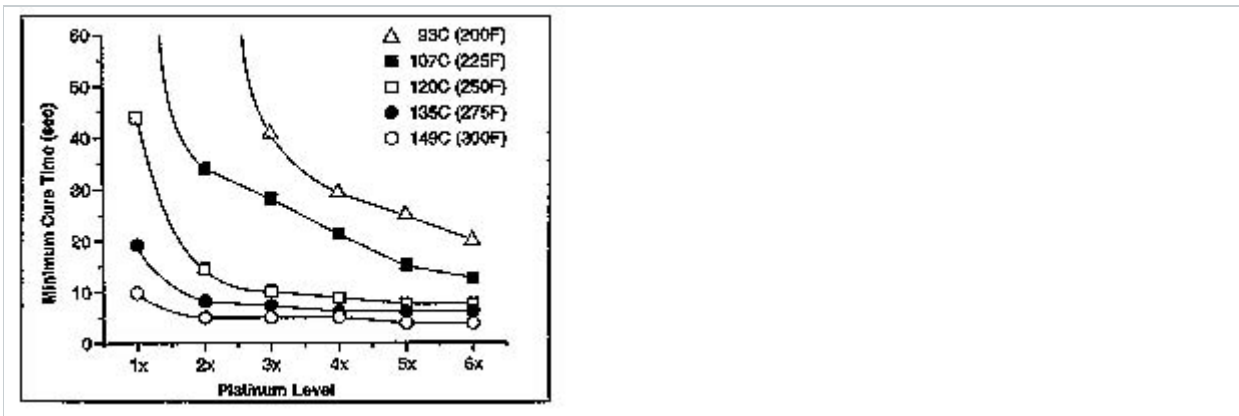
Relative Pt Level	(PPM Pt)	Approx. Min. Web Temp °C(°F)
1x	25	140 (285)
3x	75	120 (250)
4x	100	107 (225)
6x	150	93 (200)

Curing time as a function of platinum level at various oven air temperatures is shown in

Figure I. These curves in conjunction with web temperature may be useful in establishing initial machine conditions.

Figure 1

**Cure Profile of SL6100 Polymer System
Using Recommended Starting Formulations**



TYPICAL FORMULATIONS

Cure rate may be controlled with the SL6100-D1 series to match substrate or equipment limitations by varying the platinum and/or inhibitor level of the coating bath. As SL6110-D1 platinum concentrate level increases, speed of cure increases proportionately.

Having control of the catalyst (Pt) level allows the converter to match cure rate with other parameters, such as substrate properties or oven capabilities, to obtain optimum performance at minimal cost. Several starting formulations are listed in Table II.

Table II

Suggested Starting Formulations

	1x	2x	3x	4x	6x	15% CRA 4x	30% CRA 4x
SL6100-D1	91.7	83.4	75.0	66.6	50.0	51.6	36.6
SL6110-D1	8.3	16.6	25.0	33.4	50.0	33.4	33.4
SL6020-D1	5.0	5.0	5.0	5.0	5.0	6.0	8.0
SL6030-D1	-	-	-	-	-	15.0	30.0
SL6040-D1	0.25	0.25	0.30	0.35	0.35	0.30	0.30

Important Note:

- To improve anchorage to certain substrates, the SL6020-D1 crosslinker may be substituted with SS4300c crosslinker. To calculate the amount of SS4300c in a formulation from Table II, multiply the amount of SL6020-D1 by a factor of 0.66.
- The suggested starting formulations in Table II are based on cure optimization. Destabilized (high) release may occur with some adhesives, solution acrylics in particular, at the suggested crosslinker levels. Please contact a Momentive Performance Materials Technical Service Representative for further information and guidance.

BATH LIFE

The working life of an activated bath will vary depending on catalyst and inhibitor levels as well as ambient conditions. In general, the suggested formulations in Table II will have a minimum life of 8 hours.

PREPARING THE COATING BATH

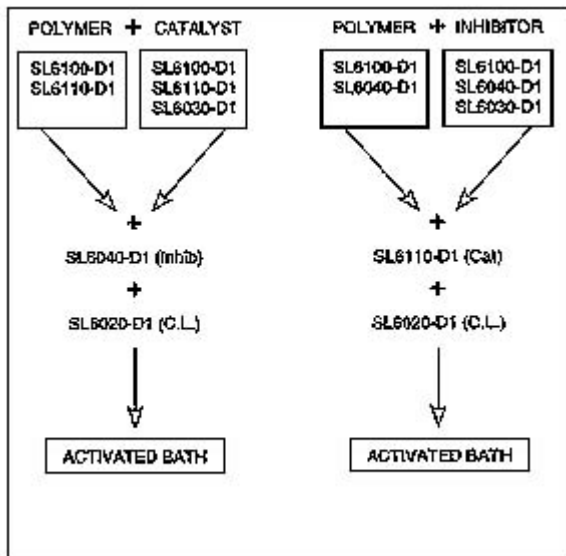
Master Batching

The final coating bath should be prepared just prior to use. Where large volumes of a given formulation are used, master batches of several components may be prepared in advance. Master batches, which do not form 'activated' baths may be stored up to one

year. For example, master batches should NOT contain both SL6110-D1 platinum concentrate and SL6020-D1 crosslinker. Several master batches are illustrated in Table III.

Table III

Multi-component SL6100 Series Stable Master Batches



Bath Preparation

To ensure consistent results and maximize bath life, components should be mixed in the following order:

1. Weigh and add base polymers (SL6100/SL6110/SL6030-D1) and inhibitor (SL6040-D1) to a clean, rust-free container/mixing vessel.
2. Agitate thoroughly.
3. Weigh and add the crosslinker (SL6020-D1) to above mix.
4. Agitate thoroughly for 10-15 minutes to ensure homogeneity.

Coating Weight/Substrates

The SL6100-D1 system is suitable for a variety of paper, plastic and plastic laminated

substrates. These include supercalendered kraft, glassine, clay coated kraft, polyethylene coated kraft, polyester film, etc.

Coating weight will depend on the hold out and resolution of the surface, but generally 0.8-1.6 g/m² (0.5-1.0 lbs/3000 ft²) will provide a continuous silicone film.

Coating weights are determined by x-ray fluorescence. For machine trials a simple, inexpensive method to calculate coating weight is available from Momentive Performance Materials.

Limitations

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Specifications

FDA STATUS

The SL6100-D1 multi-component system complies with the following FDA regulations:

- 175.320, resinous and polymeric coatings for polyolefin films
- 176.170, components of paper and paperboard in contact with aqueous and fatty foods
- 176.180, components of paper and paperboard in contact with dry foods for use as release surfaces for pressure sensitive adhesives.

Consult these regulations for limitations of use with respect to platinum content, food type and use conditions. SL6030-D1 may only be used as a release coating for pressure sensitive adhesives.

PATENTS

This system is protected by United States Patent 4,448,815.

Availability

All components of the SL6100-D1 system may be ordered from Momentive

Performance Materials, Waterford, NY 12188, the Momentive Performance Materials sales office nearest you or an authorized Momentive Performance Materials distributor.

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