

## **SilForce™ SL5040**

### **SilForce\* SL5040 Release Coating**

#### **Description**

The SL5000 system is a multi-component, addition curing, thermal solventless release coating designed for use in the manufacture of pressure sensitive tapes and labels. The system consists of easy and tight release polymers, catalysts, inhibitor and crosslinking agent. These can be combined in various proportions to obtain a release system which is optimum for a particular substrate, adhesive or coating condition.

#### **Key Features and Benefits**

- High or low temperature cure
- System formulation to specific application
- Suitable for both paper and plastic substrates
- Lower oven temperature or higher line speed
- Applicable to many types of adhesives
- Eliminates shelf age effects

**Typical Physical Properties**

<b>Component</b>	<b>Type/Use</b>	<b>Viscosity CSTKS @ 25C (77C)</b>	<b>Specific Gravity</b>	<b>Density Lbs./Gal</b>	<b>Flash PT PMCC °C(°F)</b>
SL5000	Easy release polymer	350-600	0.99	8.3	177 (350)
SL5010	Pt catalyst concentrate	300-600	0.99	8.3	131 (268)
SL5020	Inhibitor - I	–	0.97	8.1	-6.6 (20)
SL5030	Tight release polymer	300-600	0.997	8.35	135 (275)
SL5040	Inhibitor - II (Alternate)	–	1.0345	8.61	127 (260)
SL5070	Tight release polymer	1000-3000	1.01	8.7	121 (250)
SS4300c	Crosslinker	15-30	1.01	8.34	177 (350)

**Patent Status**

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**Product Safety, Handling and Storage****Caution**

SS4300c crosslinker will generate flammable hydrogen gas upon contact with strong

acids, bases or oxidizing agents. Do not reuse the container.

## **Warning**

SL5020 (Vinyl Acetate): NTP and IARC do not currently regulate Vinyl Acetate as a carcinogen. The Celanese Chemical Co., Inc. MSDS for Vinyl Acetate cites studies which suggest exposure related tumor formation. Refer to Momentive Performance Materials MSDS for further information.

SL5000, SL5030, SL5070 polymers and SL5020, SL5040 inhibitors are stable materials when stored in original sealed containers at 25° C (77° F). When stored free of contaminants their reactivity will remain constant up to one year for SL5000, SL5030 and SL5070, up to six months for SL5020, and up to three months for SL5040.

SL5010 Pt concentrate and SS4300c crosslinker will each have a shelf life up to one year from date of shipment from Momentive Performance Materials when stored at 25° C (77° F) in their original unopened container.

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## **Processing Recommendations**

### **Application**

The SL5000 system can be applied by any of the methods now being used commercially for solventless silicone. These include three roll offset gravure and various smooth roll configurations.

Heat should be applied immediately after coating to initiate cure. When fast curing formulations, i.e., high SL5010 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 web exit 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.

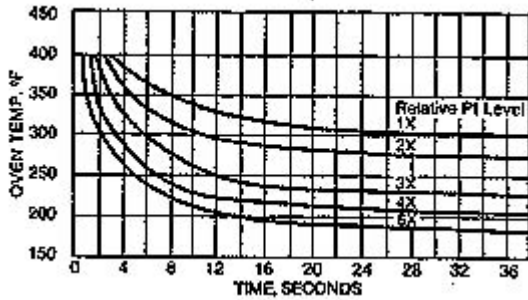
**TABLE I**

**APPROXIMATE MIN. WEB TEMPERATURES AS A FUNCTION OF CATALYST LEVEL**

Relative Pt Level	Approx Min Web Temp	
	°C	°F
1X	140	285
3X	120	250
4X	107	225
6X	93	200

Curing time as a function of oven air temperature at various catalyst levels is shown in Figure 1. These curves, in conjunction with web temperature, may be useful in establishing initial machine conditions.

**Figure 1** Curing times for SL5000 polymer with varying levels of SL5010 Pt concentrate, SS4300c crosslinker @ 4%  
 Oven - 15' Air Flotation  
 Air Velocity - 7200 FPM



## TYPICAL FORMULATIONS

Cure rate may be controlled with the SL5000 series to match substrate or equipment limitations by varying the Pt and/or inhibitor level of the coating bath. As SL5010 Pt 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 III.

## PREPARING THE COATING BATH

### Master Batching

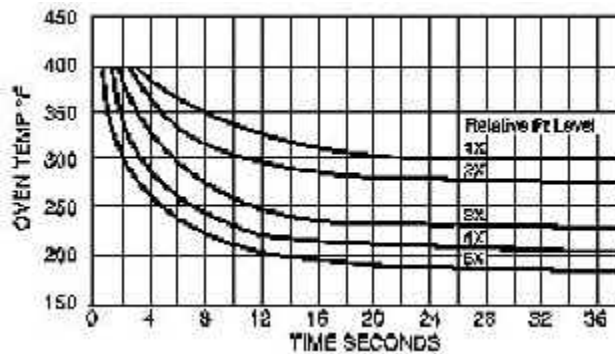
The final coating bath should be prepared just prior to use. Where large volumes of a given formulation are used, master batches of several components may be prepared in advance. Master batches which do not form 'activated' baths may be stored up to one year. For example, master batches should not contain both SL5010 Pt concentrate and SS4300c crosslinker. Also, master batches containing both Pt concentrate and SL5020 or SL5040 inhibitor, should be used within 8-10 hours in order to obtain optimum cure rate. Several stable master batches are illustrated in Table II.

As indicated, cure rate increases as SL5010 Pt concentrate level is increased. Cure rate will increase slightly as SL5020 or SL5040 inhibitor level is decreased. Decreasing inhibitor will, however, also decrease bath life. In general, SL5020 or SL5040 inhibitor should be used at a level which is 2-2.5% of the SL5010 level.

When high levels of SL5010 Pt concentrate, i.e. 3X and up, are used, optimum coating integrity and, thus, release properties, are obtained by use of zoned ovens. A temperature of 93-120°C (200-250°F) in the first zone permits leveling of the coating to give a continuous film before cure is initiated.

The normal level of SS4300c crosslinker is 4% based on the overall bath weight. When SL5030 controlled release polymer is used at concentrations up to 30 wt %, the SS4300c crosslinker level should be at 5%. At SL5030 polymer levels greater than 30%, 6% SS4300c crosslinker should be used.

**TABLE II**  
**Multicomponent SL5000 Series**  
**Stable Master Batches**



**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 III will have a minimum life of 8 hours.

**TABLE III**

**SUGGESTED STARTING FORMULATIONS**

<b>REL. CAT LEVEL</b>	<b>1X</b>	<b>2X</b>	<b>3X</b>	<b>4X</b>	<b>12X</b>	<b>1/2 INHIB 3X</b>	<b>10% C.R. 1X</b>	<b>25% C.R. 2X</b>
SL5000	91.7	83.3	75.0	66.6	0.0	75.0	81.7	58.3
SL5010	8.3	16.7	25.0	33.4	100.0	25.0	8.3	16.7
SL5040	0.2	0.35	0.5	0.67	2.5	0.25	0.2	0.35
SL5030	—	—	—	—	—	—	10.0	25.0
SS4300c	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0

**Limitations**

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**Specifications**

**FDA STATUS**

This product may be used in the preparation of release surfaces subject to FDA regulations, provided that the user complies with the conditions of use as detailed in the applicable regulations.

**Availability**

The multicomponent SL5000 series products (SL5000, SL5010, SL5020, SL5030,

SL5070 and SL5040) and SS4300c crosslinker may be ordered as separate items from Momentive Performance Materials, Waterford, NY, 12188, the Momentive Performance Materials sales office nearest you or an authorized Momentive Performance Materials, product distributor.

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