

Release the potential of silicone performance

DOW

®



**Silicone
release coatings
from Dow**

SYL-OFF™



Meeting the needs of the global release coatings market

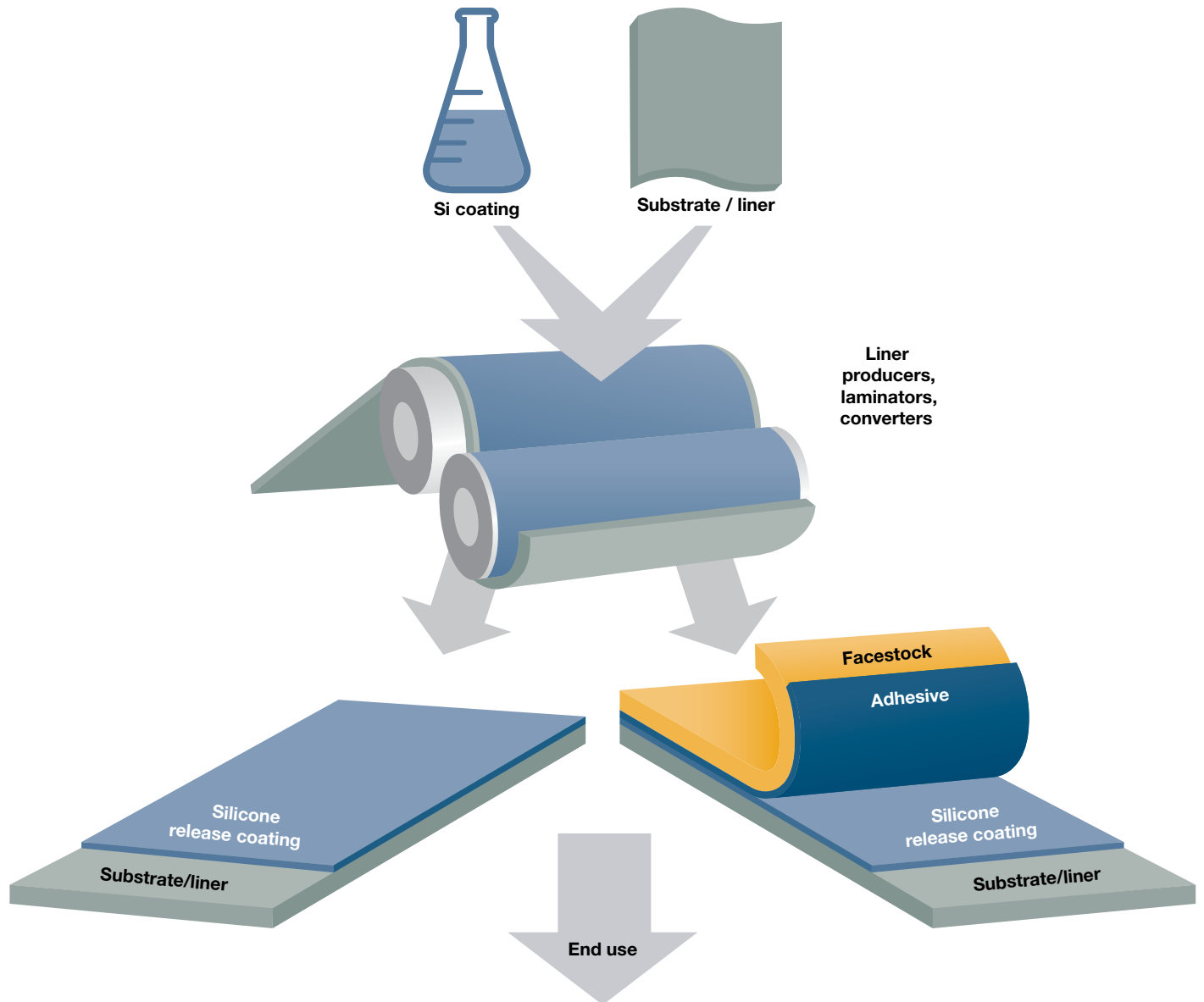
As a global leader in silicone chemistry, Dow innovation has always helped the industry develop the next standard. We've been exploring the potential of silicones since 1943. With our extensive global reach, we have the resources to deliver the broadest range of silicone offerings and solutions, along with the knowledge, technical support and service for all your release coating challenges, competitively priced and reliably supplied.

Solutions with silicones

From food and healthcare to graphic arts and labels, SYL-OFF™ brand silicone release coatings from Dow provide a range of technologies to deliver the right solution for any application.

This brochure will help you discover the many ways Dow can help you overcome your release coating challenges. We are with you throughout every step of your process—from choosing the right silicone release coating formulation and selecting the right equipment and coating technique for your substrate, to achieving success in your end-use applications. Dow will help you release the potential of silicone performance.

Silicone release coatings: from application to end use



Release coating delivery systems for different equipment and substrates

SYL-OFF™ silicone release coatings from Dow are applied at extremely low coating weights onto a wide range of substrate surfaces using many different coating techniques. The choice of coating technique is strongly influenced by the type of delivery system for the silicone release coating (solventless, solvent-based or emulsion). Optimal coating of the substrate requires the right coating process. Table 1, below, lists the SYL-OFF™ release coating delivery

systems and notes the preferred processing equipment to achieve optimal coating.

Substrate compatibility

SYL-OFF™ silicone release coatings are well suited for a variety of substrates. Table 2, below, lists the SYL-OFF™ release coating families within each delivery system and notes their compatibility with a variety of substrate surfaces.

Table 1: Preferred Processing Techniques

SYL-OFF™ brand Release Coating Delivery System	Metered Coating (Meyer bar/rod coaters, direct gravure, air knife, squeeze roll, reverse roll, slot die extrusion)	Transfer Coating (3-roll differential offset gravure, 5- and 6-roll multi-roll coat)	Size Press (standard size press as well as film-press or metered size-press)
Solventless	Secondary	Primary	Not recommended
Solvent-based	Primary	Not recommended	Not recommended
Emulsion	Primary	Secondary	Primary

Primary = Preferred coating technique for application
 Secondary = May be used, but not ideal

Contact your Dow representative for the coating formulation most suitable for your specific application.

Table 2: Substrate Compatibility

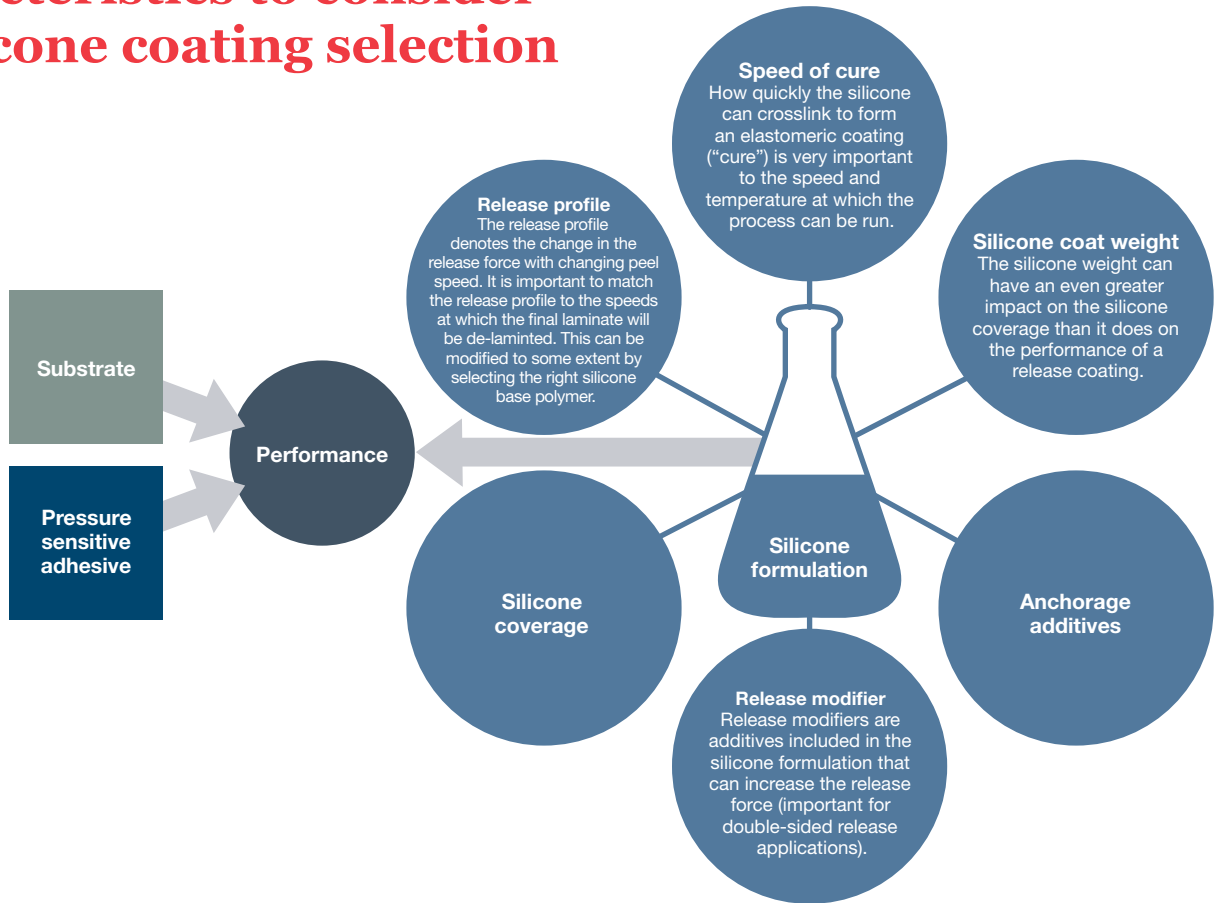
SYL-OFF™ brand Release Coating Family	Uncoated Papers			Coated Papers					
	Uncoated Kraft MG/MF, etc.	Board	Parchment, Greaseproof	Super-Calendered Kraft (SCK)	Glassine	Clay-Coated Kraft (CCK)	Poly-Coated Kraft (PEK, PPK, etc.)	Plastic Films (PET, OPP, etc.)	Metal Foils
Solventless Platinum				a	a	a	a	a	a
Solventless Rhodium				a	a	a			a
Solvent-based Platinum			a	a	a	a	a	a	a
Solvent-based Tin				a	a	a	a	a	a
Emulsion	a	a	a	a	a	a		a	

^a = generally compatible with this group of substrates

^a = may be applied, but only on certain grades or within certain limitations

Contact your Dow representative for the coating formulation most suitable for your specific application.

Characteristics to consider in silicone coating selection



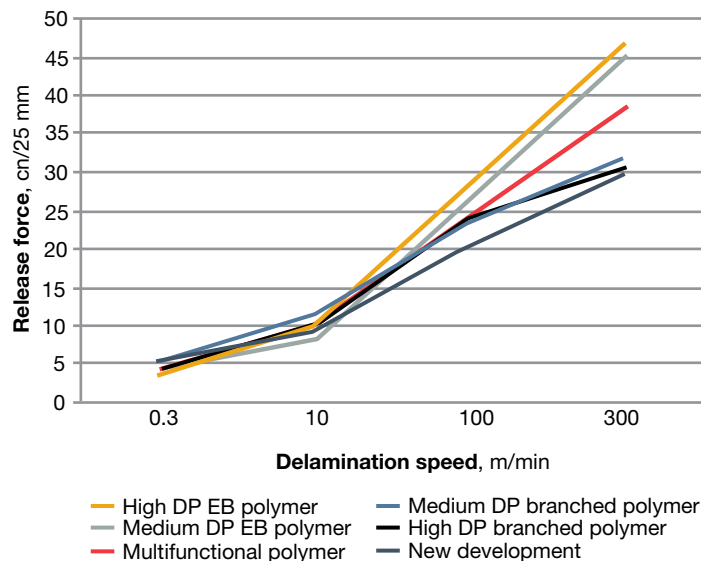
Choose the right silicone release coating

The choice of SYL-OFF™ silicone release coating for your specific application depends not only on the available coating equipment and the substrate being used, but also on the desired release characteristics for the end-use application. (See Tables 1 and 2 in this brochure for guidance on the suitability of release coating delivery systems for specific substrate surfaces, equipment and applications.)

The performance characteristics of a laminate made using a silicone release coating can be controlled or modified to some degree through formulation and processing of the silicone. One key performance characteristic is the release profile, which can be influenced by choice of silicone system as depicted in the graph to the right. Other factors to consider are raw materials being used, such as the adhesive and substrates (both base and face substrate, where applicable).

The graph shows how different silicone coatings affect the release force as the laminate is separated at different speeds.

Release profiles of different silicones vs. Waterborne acrylic PSA





Overview of silicone delivery systems

Each of the SYL-OFF™ silicone release coating delivery systems – solventless, solvent-based, and emulsion – offers particular benefits based on application needs. There are also different families of SYL-OFF™ silicone release coatings within each delivery system that provide distinctive advantages depending

on application, substrate or coating equipment. Table 3 compares the technologies.

Solventless – 100% solids blends of silicone polymers, typical viscosity of 200 – 800 cPs.

Solvent-based – dispersions of silicones in organic solvents. Initial viscosity of ~40,000 cPs may be reduced by adding more solvent.

Emulsion – dispersions of silicone oils in water. Typical viscosity ~40 cPs; usually further diluted in water to coat.

Table 3: SYL-OFF™ brand silicone release coatings – Comparison of technologies

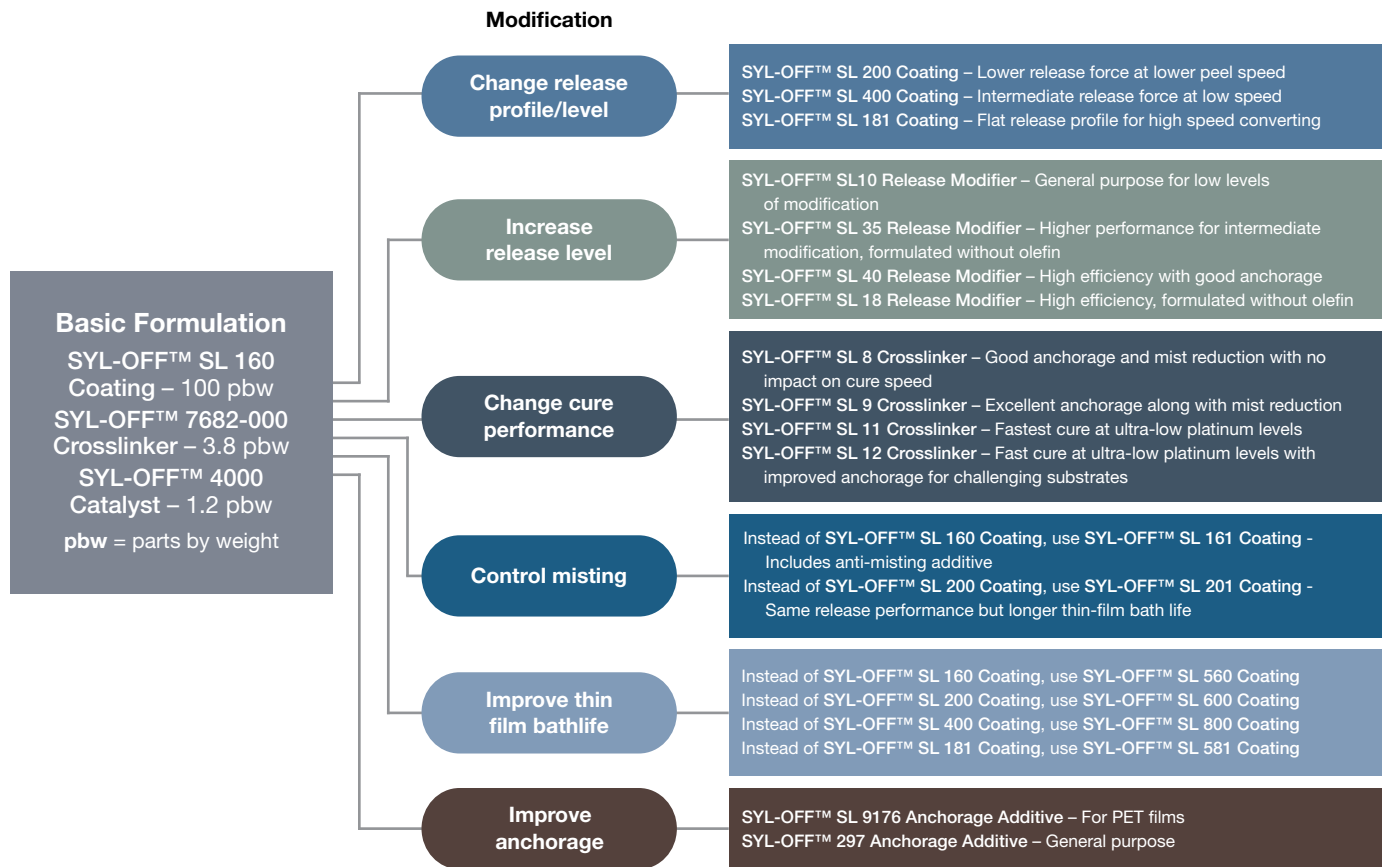
	Solventless		Solvent-based		Emulsion
	Platinum Catalyzed	Rhodium Catalyzed	Platinum Catalyzed	Tin Catalyzed	Platinum Catalyzed
Substrates	Least versatile but still suitable for highly calendared papers, some coated papers and films.		Generally applied to many different substrates, good anchorage. Solvent choice may be adapted to specific substrates.		Usable on a broad range of substrates.
Typical Application Solids	100% (may be diluted in solvent if needed)	100% (may be diluted in solvent if needed)	Up to 12 wt %	Up to 6 wt %	5 - 20 wt % (Can be extended with thickeners)
Typical Coat Weight	1.0 - 2.0 g/m ²	1.0 - 2.0 g/m ²	0.5 - 1.3 g/m ²	0.5 - 1.3 g/m ²	0.5 - 1.1 g/m ²
Cure – Typical Curing Temperature	80 - 180°C	140 - 200°C	80 - 180°C	70 - 200°C	100 - 180°C
Cure Time/Dwell Time	2 - 10 sec	2 - 10 sec	5 - 10 sec	10 - 20 sec	5 - 20 sec
Typical Line Speed	100 - 800 m/min	100 - 400 m/min	50 - 300 m/min	50 - 200 m/min	100 - 600 m/min
Comments/Features	Widest product range selection. May require additives for good anchorage performance on filmic surfaces.	Specifically suitable for release of most aggressive adhesives. Require higher temperatures to cure.	Can be applied at very low coat weight. Line speed may be limited by LEL requirements for solvent. EHS concerns and expensive solvent recovery systems.	Can be applied at very low coat weight. Line speed limited by LEL requirements. Very slow cure speed, but suitable for substrates where platinum can't be used. Very stable release.	Can be applied at low coat weight on a wide range of substrates (mainly paper-based). Potential issues for buckling/curling or cockling on paper substrates. May be combined with some non-silicone materials.

For more information or specific questions about Dow chemistries, please contact your Dow representative.

Achieve the right silicone performance for your application

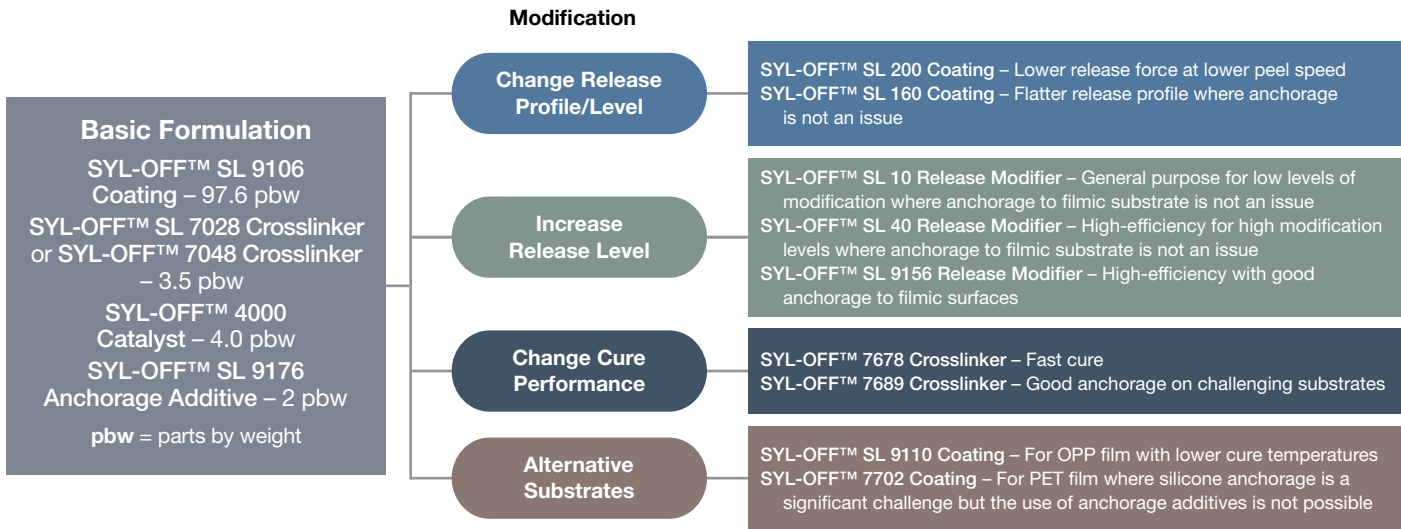
The following charts start with the basic formulation for the specific delivery system and substrate, then provide a range of SYL-OFF™ silicone release coating product options to customize performance based on your specific application needs.

Performance modification of silicone Platinum solventless coatings for paper

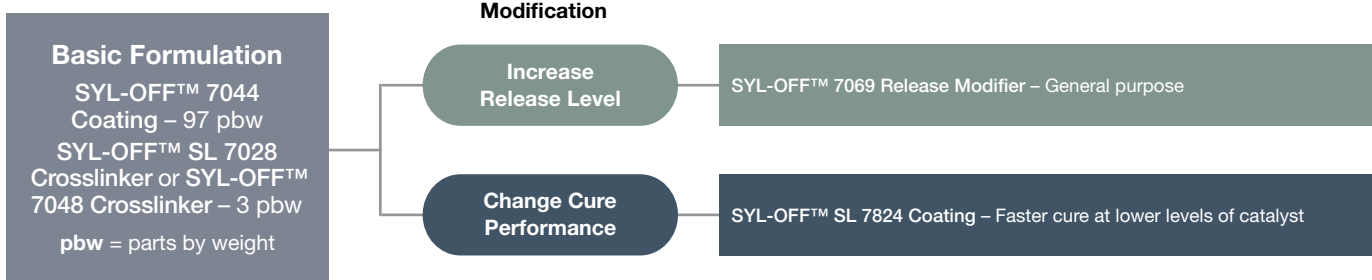


Your Dow representative will help you select the coating formulation most suitable for your specific application.

Modification of Silicone Performance
Platinum Solventless Coatings for Films

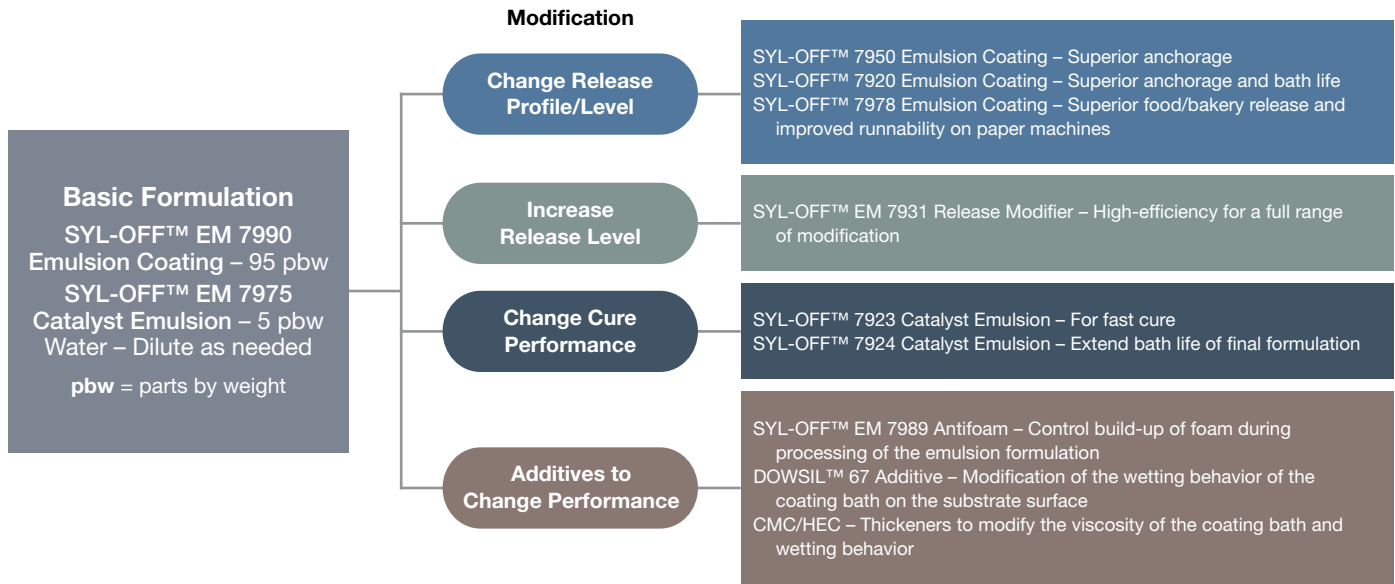


Modification of Silicone Performance
Rhodium Solventless Coatings for Use with Challenging Adhesives

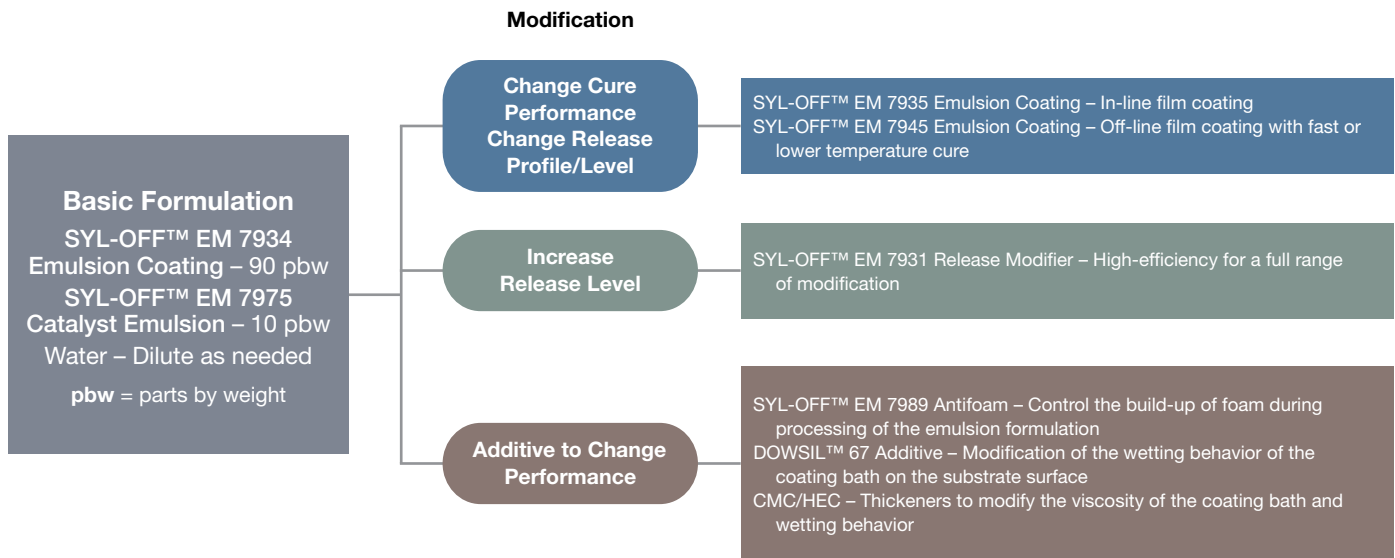


Your Dow representative will help you select the coating formulation most suitable for your specific application.

Modification of Silicone Performance
Platinum Emulsion Coatings for Paper



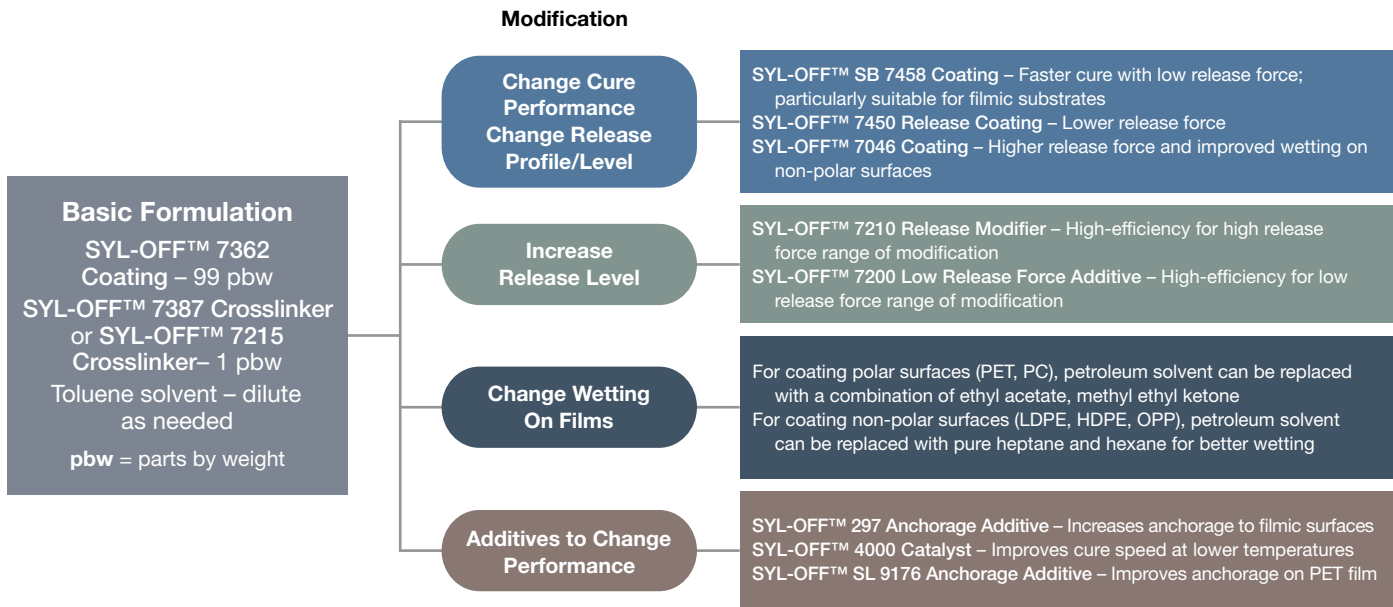
Modification of Silicone Performance
Platinum Emulsion Coatings for Films



Your Dow representative will help you select the coating formulation most suitable for your specific application.

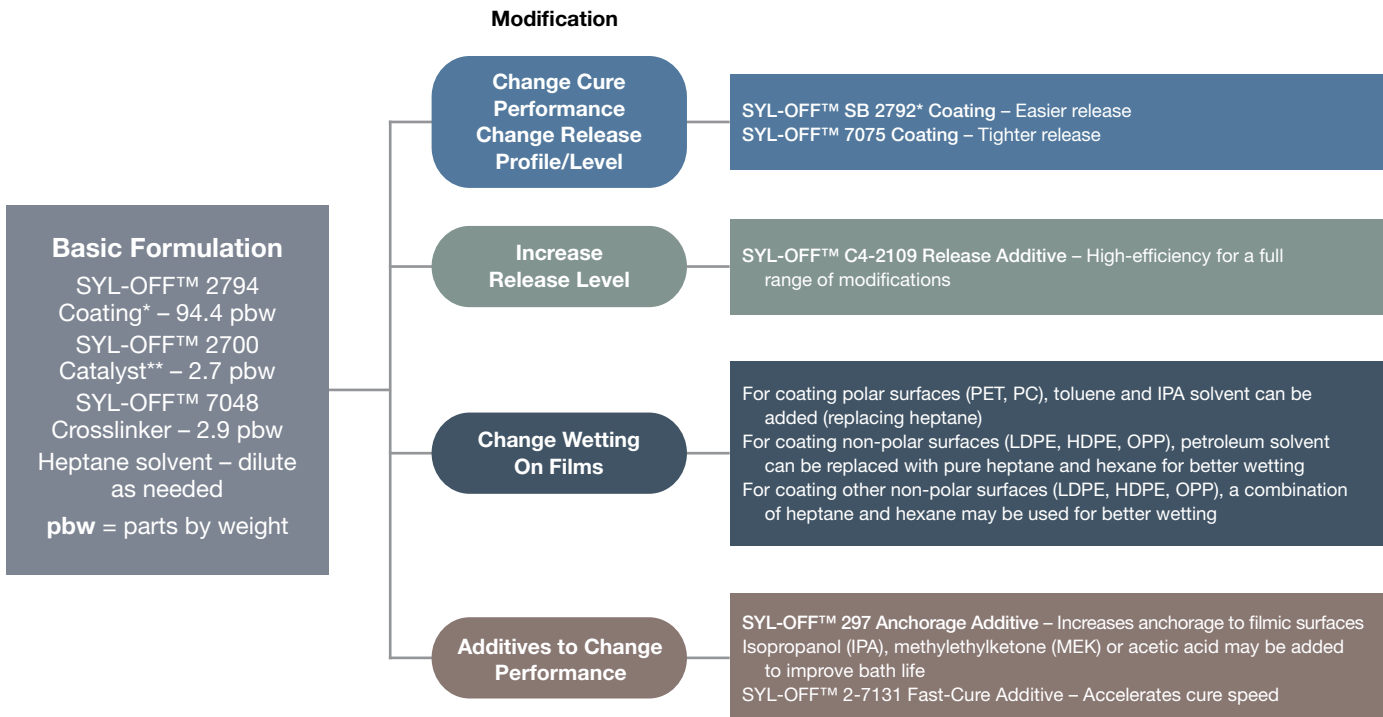
Modification of Silicone Performance

Platinum Solvent-based Coatings for Paper and Films



Modification of Silicone Performance

Tin Solvent-based Coatings for Paper and Films



* Contact your local Dow representative for availability of this material in your area

** Certain organotin catalysts are less suitable for the European Union due to their REACH status. Please contact your Dow representative for information on the use of organotin catalysts in the EU.

Select the right delivery system

SYL-OFF™ silicone release coatings from Dow are used in many different applications and require specific silicone delivery systems to achieve optimal results. The following table lists a variety of typical SYL-OFF™ silicone release coating applications and the recommended delivery systems for each application.



Table 4: Applications and Delivery Systems

Application	Solventless		Solvent-based		Emulsion
	Platinum Catalyzed	Rhodium Catalyzed	Platinum Catalyzed	Tin Catalyzed	Platinum Catalyzed
Labels	a		a		a
Tapes with Release Liner	a	a	a	a	a
Graphic Arts	a		a		
Composite Release	a	a	a	a	a
Hygiene Release	a		a		a
Envelope Release	a		a		a
Bakery Paper			a	a	a
Roofing (Self-Adhesive)	a	a	a	a	
Medical Tapes/Labels	a	a	a	a	a

^a = this delivery system is recommended and typically used for this application

^a = this delivery system can be used, but may not achieve optimal results

Your Dow representative will help you select the coating formulation most suitable for your specific application.

For more information

For product data sheets, selection guides and an overview of Dow's comprehensive line of products and services for the Films, Tapes and Release Liners industry, visit our website: www.dow.com.

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