

The *Adsyl* and *Clyrell* Advantage

Boost Performance with the Advanced Sealing Resins from Industry Leader LyondellBasell



What customers tell us about *Adsyl* and *Clyrell* grades

Nowdays flexible packaging industry asks for polyolefin sealant materials with low seal initiation temperatures (SIT), no stickiness, high clarity, high purity plus additional properties of the film surface. That is why LyondellBasell has developed a broad range of skin resins offering a vast array of functionalities – marketed under the well-established *Adsyl* and *Clyrell* brands.

With increasing interest expressed by convertors and end-users of plastic packaging products, our recent research and development has developed non-phthalate catalysts to cover all PP applications.

As a result of the progressive introduction of these latest generation non-phthalate catalysts, LyondellBasell will be able to supply “non-phthalate” *Adsyl* and *Clyrell* grades where Customers and End Users find value in the final applications.



Through different comonomer compositions, the *Adsyl* advanced polyolefins offer a complete range of seal initiation temperatures combined with relatively high melting temperatures. The resulting favorable balance of thermal and mechanical properties outperforms standard polypropylene and polyethylene, making the *Adsyl* Low Sealing Temperature resins the materials of choice for bi oriented polypropylene films (BOPP) as well as for Cast and Blown unoriented films.

In co-extruded BOPP, cast film, and Double Bubble applications, the *Adsyl* grades are mainly used as skin layer material. While the core layer supplies the necessary mechanical properties, the skin layers provide either sealing functionality or a receptive layer that can be optimized for metallization, printing, lamination and more.

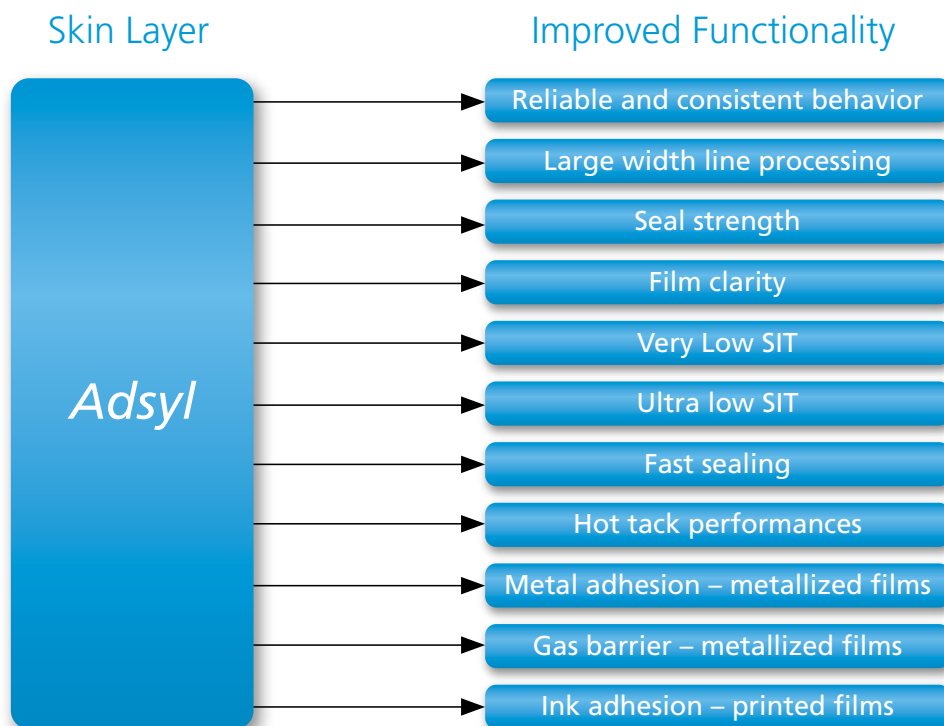
For applications, where a low SIT is not required, the *Clyrell* grades complement this comprehensive range of *Adsyl* products:

What customers tell us about the *Adsyl* and the *Clyrell* grades:

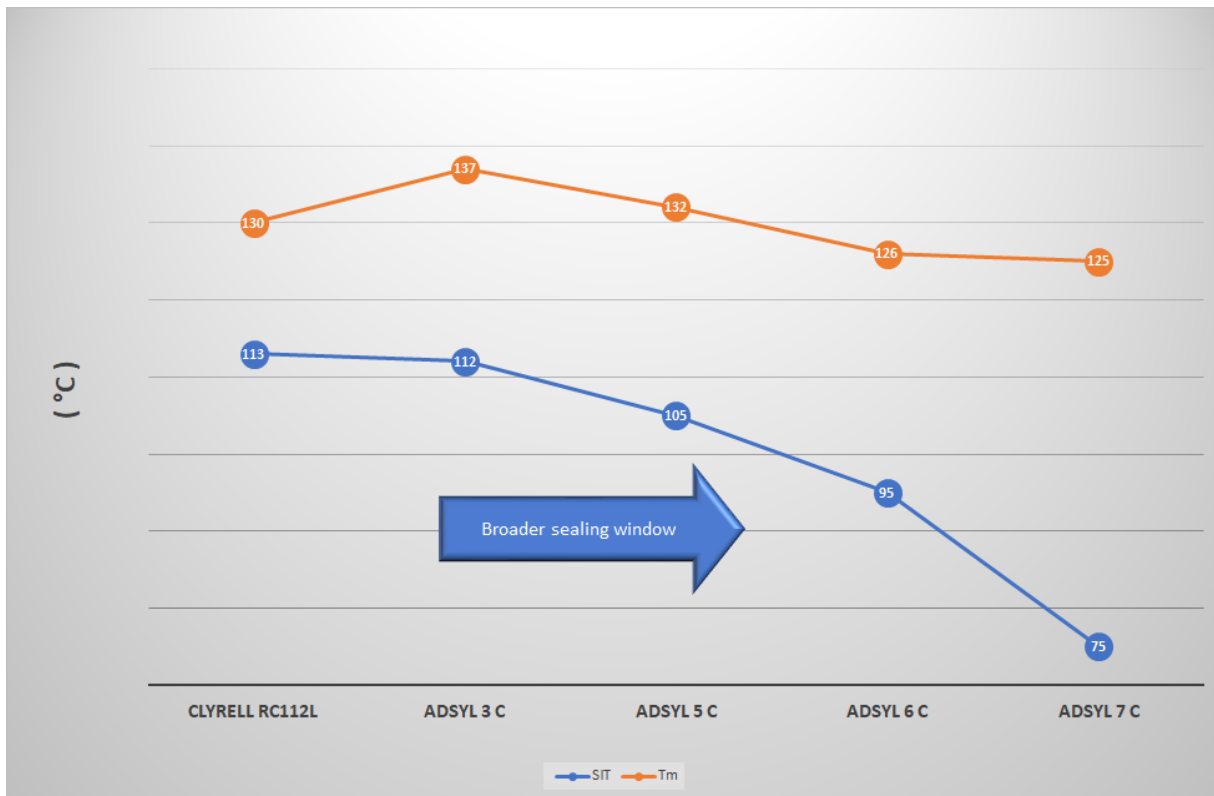
- The *Adsyl* 3 C 30 F HP increases the gas barrier properties for metallized BOPP film and improves the metal surface energy retention
- The *Adsyl* 5 C Low SIT family combined with high seal strength and hot tack improves the seal integrity of BOPP film
- The *Adsyl* 5 C ST improves the transparency of coextruded films and fits with the processability requirements of the largest and fastest BOPP lines
- The *Clyrell* RC112L improves the ink adhesion in BOPP printing

The *Adsyl* and the *Clyrell* grades have been successfully used in other film application areas such as:

- Shrink film – where faster shrinkage can be obtained at lower temperatures
- Blown film – as the non-fusion external layer of PE shrink films



The *Adsyl* grades offer a broad range of Sealing Initiation Temperature



Lyondellbasell internal test method:

BOPP Film Thickness = 25 micron

Sealing pressure = 1 bar

Sealing time = 0.5 sec

Sample width = 15 mm

Initial grip distance = 50 mm

Tensile machine speed = 100 mm/min

Main Product Portfolio

Phthalate grade name	Non Phthalate grade name	MFR [g/ 10'] 230 °C/2,16 kg	Tm	SIT	Additives	Features / Application
RANDOM COPOLYMERS – FUNCTIONAL SKIN LAYER						
<i>Clyrell</i> RC112G	NA	1.7	130	115	CSNA	Highly modified Random Copolymer – Shrink Film
<i>Clyrell</i> RC112L	NA	7.0	130	113	CSNA	Improved Print Adhesion and Quality
RANDOM COPOLYMERS – METALLIZABLE LAYER						
<i>Adsyl</i> 3 C 30 F HP	<i>Adsyl</i> AL 3 C 90 F HP	5.5	137	112	CSNA	High Barrier Metallized Film
<i>Clyrell</i> RC213M	<i>Clyrell</i> RC213M	10.5	140	120	CSNA - AB	High Barrier Metallized Film
MEDIUM SIT TERPOLYMER – SEALING LAYER						
<i>Adsyl</i> 7423 XCP	NA	5.5	130	115	AB	Treatment retention – Coex Film, Metallized Film
LOW SIT TERPOLYMERS – SEALING LAYER						
<i>Adsyl</i> 5 C 30 F	<i>Adsyl</i> 5 C 90 F	5.5	132	105		Coex Film, Metallized Film
<i>Adsyl</i> 5 C 37 F	<i>Adsyl</i> 5 C 97 F	5.5	132	105	S, AB	Coex Film
<i>Adsyl</i> 5 C 39 F	<i>Adsyl</i> 5 C 99 F	5.5	132	105	AB	Coex Film – Metallized Film
<i>Adsyl</i> 5 C 33 F	<i>Adsyl</i> 5 C 93 F	5.5	132	105	CSNA	Coex Film – Metallized Film
<i>Adsyl</i> 5 C 30 F ST	<i>Adsyl</i> 5 C 90 F ST	6.0	132	105		High processability – Fast lines – Coex, Metallized Film
<i>Adsyl</i> 5 C 37 F ST	NA	6.0	132	105	S, AB	High processability – Fast lines – Coex Film
<i>Adsyl</i> 5 C 39 F ST	<i>Adsyl</i> 5 C 99 F ST	6.0	132	105	AB	High processability – Fast lines – Coex, Metallized Film
VERY LOW SIT TERPOLYMER – SEALING LAYER						
<i>Adsyl</i> 6 C 30 F	NA	5.5	126	95		Fast packaging – Excellent optics
<i>Adsyl</i> 7572 XCP	NA	5.5	126	92		Fast packaging – Excellent optics
ULTRA LOW SIT TERPOLYMER – SEALING LAYER						
<i>Adsyl</i> 7410 XCP	NA	5.5	125	75	CSNA	Fast packaging – Excellent optics

CSNA = Calcium Stearate Not Added, AB = Anti-block additive, S = Slip agent, NC = Not Available

Product Benefits vs. Standard Resins



Adsyl 3 HP

The Adsyl 3 C 30 F HP grade is intended for the metallizable skin layer of metallized films with superior performances. Very high barrier properties can be reached thanks to a smooth surface and strong Aluminum adhesion. These are obtained through the specific comonomer type and distribution. The melting temperature delivers high thermal stability to the metallized film during the post conversion steps.

Adsyl 7423 XCP

The Adsyl 7423 XCP sealing resin with MEDIUM seal initiation temperature (SIT 115°C) is commonly utilized for the treated layer of coex films, providing a surface suitable for printing and lamination purposes. It is formulated with an antiblocking level that fits many end use applications.

Clyrell RC112L

Clyrell RC112L, a new PP random copolymer, is used by customers in BOPP film applications for its excellent ink adhesion, wide range of color transfers and surface finish desirable for multicolor, high quality printing.

Clyrell RC112G

Clyrell RC112G is used by customers as a functional skin layer providing medium SIT (115°C) or as a softener or modifier for the core layer of blown and cast film. It delivers good shrink performance when used in double bubble film applications and/or shrink hood blown film as non collant layer.

Adsyl 5 C

The Adsyl 5 C sealing resins with LOW Seal Initiation Temperature (SIT 105°C) are commonly utilized in many BOPP films applications.

Customers value their high consistency and reliability in quality and performance.

The new Adsyl 5 C 33 F grade is used by customers as a sealing or metallized layer in co-extruded film applications; it does not contain slip or anti-block additives and Calcium Stearate is not added.



Adsyl 5 C ST

The Adsyl 5 C ST sealing resins with LOW sealing initiation temperature (SIT 105°C) are used for smooth processing on the new state of the art BOPP lines with high width and speed (10 m, >400 m/min), where conventional terpolymers might have limitations.

The controlled rheology structure of the Adsyl 5 C ST allows an even distribution of the skin material, reducing the film defects during the stretching steps.

The film haze is reduced providing higher clarity. The improvement in the thickness profile is also achievable on conventional BOPP lines at lower speed.



Adsyl 6 and 7

The Adsyl 6 and 7 sealing resins with VERY LOW and ULTRA LOW seal initiation temperature (SIT range from 95°C to 75°C) can be successfully utilized for the production of films with demanding sealing properties. The low sealing temperature improves the operating flexibility of high speed packaging lines.

The Adsyl 7572 XCP grade can be used in very high speed packaging lines when an ultra-low SIT is not necessary.



ABOUT US

LyondellBasell (NYSE: LYB) is one of the largest plastics, chemicals and refining companies in the world. Driven by its employees around the globe, LyondellBasell produces materials and products that are key to advancing solutions to modern challenges like enhancing food safety through lightweight and flexible packaging, protecting the purity of water supplies through stronger and more versatile pipes, improving the safety, comfort and fuel efficiency of many of the cars and trucks on the road, and ensuring the safe and effective functionality in electronics and appliances. LyondellBasell sells products into more than 100 countries and is the world's largest producer of polymer compounds and the largest licensor of polyolefin technologies. In 2019, LyondellBasell was named to Fortune magazine's list of the "World's Most Admired Companies."

More information about LyondellBasell can be found at www.LyondellBasell.com.

For more information please contact:

Europe

EU.Polymers@lyb.com

North America

NA.Polymers@lyb.com

South America

SA.Polymers@lyb.com

Africa, Middle East, India

AFMEI.Polymers@lyb.com

Asia

AP.Polymers@lyb.com

Australia/New Zealand

AU.Polymers@lyb.com

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