

Carbotac™ CS and Doresco® CS Engineered Polymers

For Cold Seal Packaging Applications

Carbotac™ CS and Doresco® CS Engineered Polymers enhance the performance of cold seal adhesives coatings used in cold seal packaging applications. They are part of a comprehensive line of products developed by Lubrizol for the packaging industry that includes both cold seal adhesives and release lacquers designed specifically to work in conjunction with our synthetic adhesives.

Synthetic emulsions

- Process Controlled glass transition temperatures (Tg) impart thermal stability and maintain adhesion over time.
- Low cling
- High optical clarity (for the release lacquers)
- High gloss
- High Solids
- Controlled slip

Description

Cold Seal packaging films are multilayer structures produced by subsequent coatings on specific substrates used for confectionary products where usual heat sealed packaging cannot be used or could lead to some product degradation during sealing, such as ice creams, chocolate etc. The structure consists of at least three different coatings each one with a function in the overall structure. These layers coated on a specific film are inks, release lacquers and cold seal adhesive which is printed in the reverse of the films. The technology used in the cold seal adhesive coating involves water based acrylic technology specifically modified for controlled sealing over time, stable and consistent peels and controlled blocking on the release lacquer which is coated on top of the inks, providing excellent printability using conventional impact printing technologies like gravure or flexographic processes.

The Release lacquers applied on top of the inks used for cold seal work provide protection of the inks to avoid blocking of the adhesive with the inks and also provide high gloss and controlled slip, characteristics which are extremely important in the packaging lines to improve productivity. Doresco CS products line is designed to work in conjunction with our Carbotac CS cold seal adhesives products in order to provide the best performance during the packaging process.

Background

Cold Seal adhesives are formulated conventionally with a cold blend on a natural rubber latex (an elastomer) which will provide cohesion and a low Tg acrylic to provide the tack consistently with different batches of natural rubber latex. Other material can be used instead of an acrylic emulsion like vinyl acetate polymers, but they tend not to give the desired tack properties and they are also keen to give some blocking problems during the run. Blocking or an excess of cling may give problems in the packaging lines and cause stops and also a decrease in the packaging line. Acrylics have also the ability to give coatings with higher clarity than vinyl acetate polymers.

Cold Seal adhesives are products with the ability to seal to themselves when pressure only is applied, this property makes them very useful for packaging of heat sensitive products as there will be no exposure to the heat during the closure of the packaging. The absence of heat during the packaging of the product has an additional benefit during packaging line stops, as the amount of film damaged during the stop is nonexistent and there will be no waste as will be if a heat seal closure is used.

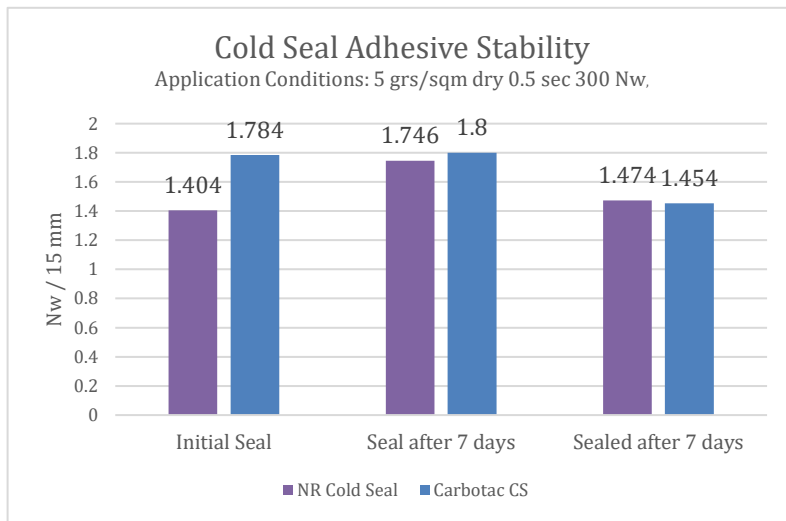
Cold Seal adhesives provide an added benefit which is a lower sealing time. A Cold Seal Adhesive can seal with 0.5 secs dwelling time as opposed to a heat seal that will need 1 or even 2 seconds dwelling time. That will increase the productivity of the packaging line significantly.

Synthetic Cold Seal Adhesives avoid the use of natural rubber latexes, which in turn solves the concerns on using these type of natural materials. Natural rubber latex could cause some allergenic reaction due one of the ingredients in it. Also, the harvest of natural rubber latex is a very labor-intensive product which is only sustainable if the crude oil prices are high. Natural rubber latex has an average Mw of 300.000 and wide particle size, this normally causes mechanical unstability on press and they must be carefully formulated and use special equipment for press handling (low shear pumps, high diameter pipes). Also, its composition varies each harvest and care must be taken by the formulator in order to modify their formulation of the cold seal adhesive depending on the harvest they will be using

Technical Performance

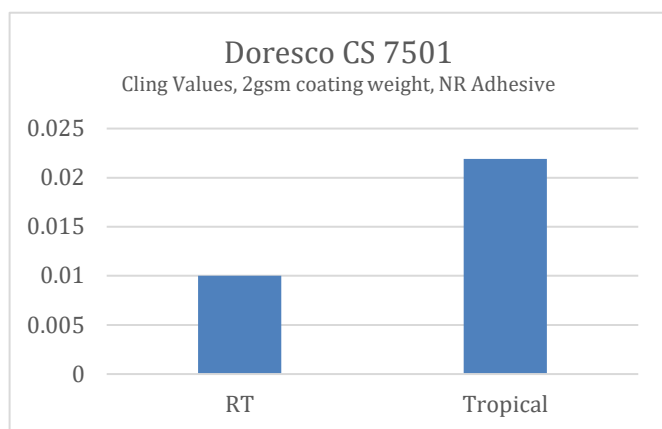
Carbotac™ CS Cold Seal Adhesive Performance

Carbotac CS engineered polymers are based on modified acrylics to impart consistent and stable peels over time.



Control of the peel at low temperatures must be done as most of the products packaged using cold seal technology would be stored at freezing temperatures so care must be taken that the Cold Seal Adhesive does not loose bonds after storing at -5°C.

Cold Seal adhesives may vary bonds depending on the testing conditions and cling must be kept stable at different storage conditions.



Also, cold seal adhesive performance vary depending on the nature of the film used for any particular job as can be seen in the table below

Cold Seal adhesives must pass odour and flavor requirements for food packaging and testing must be conducted in order to evaluate in any noticeable odour is detected after storing the coated material in a sealed jar in an oven at 40°C overnight and evaluate the odour using blank material as control.

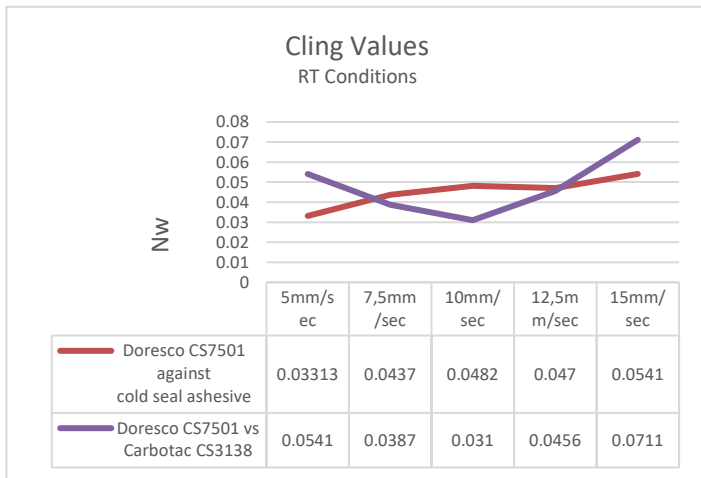
Doresco® CS Cold Seal Release Lacquer Performance

Gloss	Doresco CS 7501	
	OPP foil*	Black-white contrast card 3NT-3
20°	44.6	29.3
60°	102	73.5
85°	75.6	85.0

Cold Seal release lacquers must be carefully designed in order to meet three key properties needed for this application. Gloss of the lacquer applied on different type of inks is key in order to allow no gloss decrease depending on the type and nature of inks used and to provide aesthetic performance on the packaging.

Cold Seal Release lacquers must also be formulated to meet specific slip values depending on the job and the design of the packaging line. These values would vary between 0.20 and 0.36. Both Static and Dynamic slip must be measured and also another particular slip measurement is Slip under pressure or “Throughslip” must also be considered as some of the packaging lines apply significant pressures on the packaging during sealing. Care must also be taken on the inks used as they should be wax free, if not, migratory waxes in the ink would affect the final readings of slip on the packaging.

Slip		US	DU
200 gr Sled	6µm	0,1495	0,157
	12µm	0,150	0,157
300 gr Sled	6µm	0,174	0,186
	12µm	0,182	0,182



The third and most important property of the Release Lacquers is the release property itself, so, the level of blocking of the lacquer with the adhesive also called Cling. Cling must always be measured under different conditions to simulate different storage conditions, like tropical conditions, Normal testing would include cling tested at Standard conditions, 25°C and 50% humidity and Tropical conditions of 40°C and 90% humidity.

Coating weight is a critical factor in order to get the optimal properties of a release lacquer. A coating

weight between .5 and 2 gsm is desirable in order to obtain a smooth layer to prevent the cold seal adhesive to contact the inks. Care must be taken in order to avoid insufficient wetting or pores that may lead to picking or even blocking.

Release lacquers must always be stored over 4°C as they normally gel and temperatures below and they normally do not recover.

