

ADVANCED ADHESIVES REPORT

YOUR CORRUGATING NEWSLETTER FROM HARPERLOVE

February 2021

FDA Compliance of Food Packaging

by John Fitzgerald

Food Compliant Packaging comprises a significant segment of the corrugated box industry, yet many corrugated manufacturers are not fully aware of the FDA requirements that govern the selection and use of raw materials for this segment.

This article will provide a basic overview of the regulations that apply to indirect ingredients that are intended for incidental or indirect exposure to the foodstuffs that they surround.

The specific regulation governing these ingredients is 21 CFR 175.105, commonly known as the “indirect food contact” regulation. It applies to adhesives and adhesive additives. Inks and OPVs, while similar, do not fall under this regulation. Similarly, the native and modified starches that compose most of corrugator adhesive formulations have their own FDA regulations.

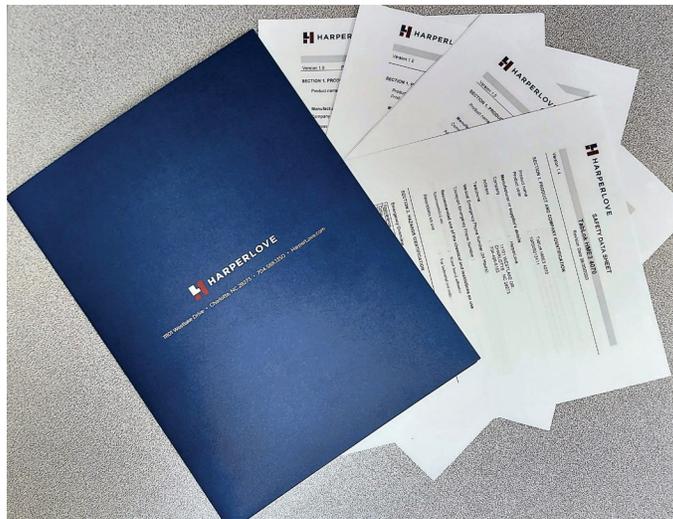


The indirect food contact regulation is, for the most part, a compositional regulation. If all the individual ingredients of an adhesive mixture (usually identified by either chemical name or CAS number) are on the approved list within the regulation, then the mixture itself is deemed compliant. There are occasional qualifiers for usage which may limit either the total amount of an ingredient or specify the functional use of the ingredient within the formula.

An alternative approach is available for new chemistries which are not on the compositional list within 21 CFR 175.105. This approach involves complex analysis of extractive studies to determine whether a chemical substance, subject to predetermined loadings or usage rates, will migrate and create a direct risk of food contact. Because the testing and subsequent commercial use of a given chemical substance could be subject to specific loading and usage limitations, this can be thought of as a conditional FDA approval. In this case the user (e.g., the corrugated manufacturer) assumes complete responsibility for the mixing and dosing of the chemical mixture. The user must therefore ensure their process does not exceed the “no migratory effects” limits to maintain FDA compliance.

While the manufacturer, marketer or distributor of the chemical mixture should clearly state the use limitations that allow the chemistry to be used

in a food packaging application, it is the responsibility of the user (e.g., corrugated manufacturer) to ask for the appropriate FDA Food Contact Statement or seek that information's inclusion on the product Safety Data Sheet. In some cases, special documentation tracing the product's use may be required.



suitability for a particular use, if stated, is absolute.

The documentation can be included in the regulatory section of a GHS-Compliant Safety Data Sheet. However, it is important to note that this notification is not required to be included in the Safety Data Sheet. Many chemical suppliers have created separate Food Safety Compliance

Upon request, the manufacturer, marketer or distributor of a chemical mixture shall provide documentation to a user indicating compliance with either the above statute or one of the other direct food contact statements (e.g., 21 CFR 176.170, 21 CFR 176.180). The manufacturer's documentation is a definitive statement of suitability in a specific use, such as a glue lap adhesive or as an ingredient in the starch used to make a corrugated box. Suitability is not dependent on any process variables or conditions (e.g., application rate). The

Statements that list food contact compliances for which a chemical mixture is approved.

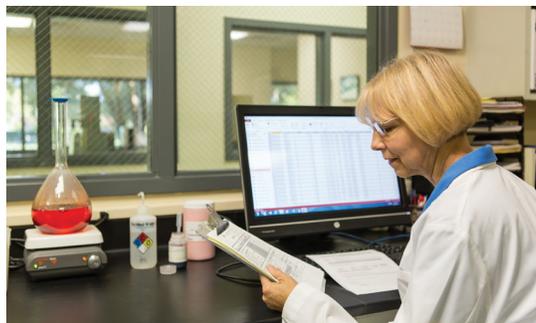
Harper Love includes the compliance statement for 21 CFR 175.105 in section 15 of the Safety Data Sheet for most of our products. Separate FDA certification letters of compliance are available from your HarperLove Sales or Technical Service Representative.

Polymers in Starch Chemistry

by Peter Snyder

Specialty starch adhesive polymers have evolved significantly over the years. In the 1970's, chemically modified starches were popular. These starches were chemically treated to make them thinner than unmodified starches. This allowed for more starch to be added to the primary portion of the batch while keeping the viscosity of the adhesive the same. The extra dissolved solids brought improved initial bite into the paper and better overall bonding even on

heavier liners. As such corrugator line speeds and board quality improved with the use of this simple additive.



As starch mixing systems advanced to become fully automatic and corrugator speeds continued to increase, operators found that the modified starches could not dry fast enough to keep up with the higher corrugator speeds. The need for line speed

outweighed the value of the improved bonding that modified starches brought to the table. Specialty chemical companies began researching new liquid raw materials that could bring the positives of modified starches back to the adhesive without the negatives. Some of the desired improvements in these early days included:

1. Water management on the glue line to complete the gelatinization of the slurry starch.
2. Enhanced adhesive tack to grip the fluted medium to the liner.
3. More rapid adhesive set back to speed up the bonding set time.
4. Stronger fiber-to-fiber bonds.

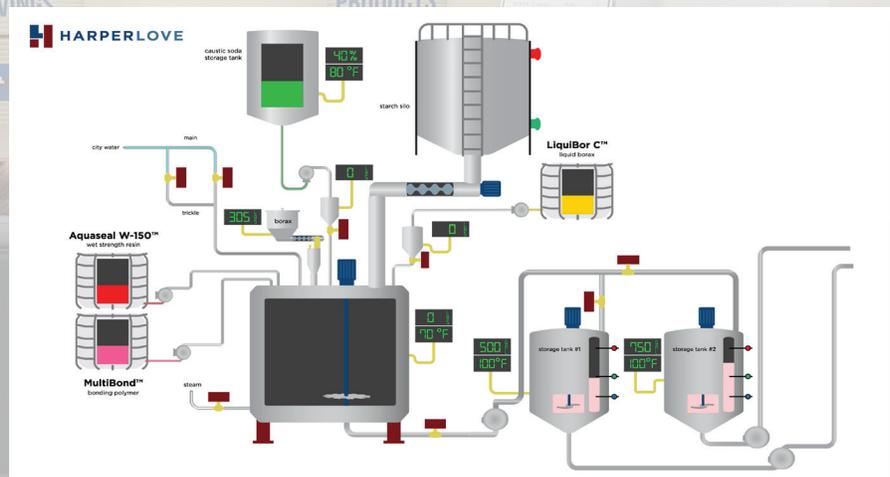
One of the more common performance additives used in corrugated adhesive today is polyvinyl

alcohol (PVOH). PVOH brings improved film forming and faster drying to the starch adhesive. This allows for more precise transfer of the adhesive to the flute tips and generally faster run speeds. PVOH comes in a variety of molecular weight sizes and degrees of hydrolysis. Certain grades of PVOH can provide a water-resistant barrier when dried. Other grades do not provide water resistance but can improve paper penetration which is quite helpful for maximizing bond strength when running highly recycled papers.

As industry requirements continue to evolve, specialty additive suppliers continue to research new raw materials to further enhance corrugating adhesive properties. Advances in faster/wider corrugators, recycled content, coated papers, print quality and numerous other areas continually drive additive suppliers to find new ways to maximize corrugator line throughputs and the quality of the finished board through better adhesives.

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