

A close-up photograph of a petri dish containing a yellowish agar medium. Numerous small, red, circular bacterial colonies are scattered across the surface, with a higher concentration on the left side. The petri dish is white, and the background is black.

Microbiological Growth/ Control in Corrugated Adhesives

Microbiological Degradation

Carbohydrates, including starch, are often considered food for bacteria, yeasts, fungi and other microorganisms. It has been found that some organisms will survive, and may even thrive, in a strong alkaline medium like starch-based corrugated adhesives. Such alkalophiles (alkali loving) require attention by quality-minded corrugating personnel.

If the population of organisms increases to, or exceeds, 10,000 colony-forming units (cfu) per gram, starch adhesives will frequently show viscosity losses and a separation tendency (settling of raw starch occurs because gelled or partially gelled starch is more easily used by the microbe). At levels greater than 1,000,000 cfu, an odor may or may not accompany the other symptoms. It is best, however, not to rely on foul smells as an indication of growth.

Prevention of the Problem

To prevent microbiological growth, biocide should be used with care; most, if not all, manufacturers recommend alternating types of biocides regularly to prevent the generation of a colony that may be resistant to a particular biocide.

Plants using treated or untreated wastewater in the adhesive process have another major contributor to potential microbial contamination. Unlike corrugating adhesives which limit microbial growth because of their high pH, wastewater will have a larger variety and incidence of microbial growth and can quickly overwhelm preservatives in adhesives. Wastewater needs to be microbially treated with chemicals specific for their larger variety of organisms. Consult your biocide and preservative supplier specifically for wastewater microbial control.

Regular cleaning is one of the best methods for keeping microorganisms under control. In addition to being a good housekeeping practice, this may help maintain quality and consistency of the board. The following procedures are recommended (see reverse):

For 666 Gallon Primary/ Secondary Units

Step 1 -- Primary Mixer

Fill mixer with 150 gallons of water and heat to 130°F [54.4°C]. Add 15 pounds of a commercially available industrial strength cleaner and agitate for 30 minutes. DO NOT discard the solution. Proceed to Step 2.

Step 2 — Secondary Mixer

Fill mixer with 300 gallons of water and heat to 130°F [54.4°C]. Add 30 pounds of a commercially available industrial strength cleaner and agitate for 30 minutes. Add the solution in the primary mixer into the secondary mixer. Pump the combined solutions into a storage tank and through the circulation lines for 30 minutes. Dispose of the solution in an appropriate manner.

Step 3 — Primary Mixer

Fill mixer with 150 gallons of water (DO NOT HEAT). Add 2 quarts of commercial household bleach and agitate for 15 minutes. DO NOT discard the solution. Proceed to Step 4.

Step 4 — Secondary Mixer

Fill mixer with 300 gallons of water (DO NOT HEAT). Add 1 gallon of commercial household bleach and agitate for 15 minutes. Add the solution in the primary mixer into the secondary mixer. Pump the combined solutions into the storage tank and through the circulation lines for an additional 15 minutes. Dispose of the solution in an appropriate manner.

Step 5 — Flush all mixers, tanks and lines with clean water to remove all trace amounts of chemicals.

Note: Growth can occur in an empty section of a pipe or on the underside of tank covers. Using proper discretion, the solutions can also be used to clean the starch pans at the machine.

For High Shear Systems & Single Tank Mix Systems

Step 1 — Mixer

Fill mixer to 50% level with water and heat to 130°F [54.4°C]. Add 5-10 pounds of a commercially available industrial strength cleaner for every 100 gallons capacity of mixer and agitate for 30 minutes. Pump the solution to the storage tank and through the circulation lines for 30 minutes. Dispose of the solution in an appropriate manner.

Step 2 — Mixer

Fill mixer to 50% level with water (DO NOT HEAT). Add 1 quart for every 100 gallons of commercial household bleach and agitate for 15 minutes. Pump the solution into the storage tank and through the circulation lines for an additional 15 minutes. Dispose of the solution in an appropriate manner.

Step 3 — Flush all mixers, tanks and lines with clean water to remove all trace amounts of chemicals.

Note: Growth can occur in an empty section of a pipe or on the underside of tank covers. Using proper discretion, the solutions can also be used to clean the starch pans at the machines.



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This information is intended as a resource on starch and its relationship to and use in corrugating. The information presented is based upon actual field and laboratory work. However, it should not be viewed as providing advice or solutions to particular applications, each of which will be unique and not susceptible to general advice. We encourage you to call a representative to discuss your specific situation.

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Solutions Through Starch