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Starch adhesive preparation and distribution systems: housekeeping

Scope

The starch adhesive is subject to microbial contamination and attack (spoilage). The result can be a loss of viscosity of the combining adhesive. Viscosity loss can have significant detrimental effects on quality and productivity. In short, unless precautions such as the following are taken, the adhesive preparation, storage and circulation system can act as a large fermentation system, since starch, especially the cooked or carrier portion that provides viscosity, can provide a food source for microbes.

Safety precautions

Use of chemicals requires proper personal protection. Mix chemicals as prescribed by manufacturer's directions.

Content

Cleaning and sterilization

It is absolutely necessary and therefore customary to add a preservative to a starch adhesive to inhibit or slow the growth of microbes that will unavoidably contaminate the material. However, preservatives do not kill these microorganisms; they only slow their growth rate and inhibit their proliferation. In general, chemicals that kill them will also chemically change the starch itself and cause serious problems. Therefore, sterilization and preservation are different processes.

Cleaning, or the removal of old, potentially contaminated adhesive, is the first step. This is followed by sterilization with a material that is a strong oxidizing agent. This can be done simply with hot water and inexpensive chemicals.

The materials suggested are trisodium phosphate for cleaning and laundry bleach (sodium hypochlorite or its equivalent) for sterilization.

Cleaning can be accomplished in standard adhesive mixing equipment as follows:

1. Thoroughly scrape all rust and dried starch from all storage and mixing tanks. Dispose of residue in accordance with state and local regulations.
2. Fill primary mixer to 5 in. (127 mm) from the top; heat to 150°F (65°C). Add 50 lb (22.7 kg) trisodium phosphate, and agitate 15 min.
3. Drop contents of primary mixer to secondary, add water to about 5 in. (127 mm) down, heat to 150°F (64°C), agitate and recirculate for 15 min.
4. Pump to clean storage tank and agitate.
5. Repeat steps 1-4 until storage tank is full.

6. Circulate continuously through lines for at least an hour and drain cleaning solution to sewer or other approved disposal site.
7. To sterilize, repeat above steps substituting 10 gal (37.9 L) of laundry bleach (5.5% sodium hypochlorite) or an equivalent oxidizing agent (consult local chemical supplier for alternative chemicals and equivalent concentrations). *Do not* heat the water.
8. After circulating bleach through the system for at least an hour, drain to sewer or other approved disposal site.
9. Rinse system with clean water to remove residual bleach.

Cleaning and sterilization must be done on a regular basis. At a minimum, cleaning should occur at least once every three months and monthly during summer months or in warm climates. It is strongly suggested that it be done every four weeks. Many adhesive viscosity problems can be attributed to microbial contamination. It is important to understand that serious contamination can exist without the evidence of an odor. When any odor is noted, immediate cleaning and sterilization is mandated.

Preservatives

A small amount of a preservative should be added to each batch of adhesive as a bacteriostat, again not to kill microorganisms but to arrest their growth and proliferation. Many commercial preservatives are available that have proven to be safe and effective. Since the FDA status, recommended handling procedures, use levels, etc. vary widely, the adhesive supplier should be consulted. They in turn can suggest a number of appropriate products and a variety of manufactures.

It is highly advisable to rotate between two or more preservatives using different types of active ingredients. This prevents microorganisms from becoming resistant to any one preservative. Rotation should take place at least every three months. Again, consult your preservative supplier.

Keywords

Starch, Adhesives, Preservatives, Bacteria, Sterilization

Additional information

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