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APPLICATION NOTES

CraigStik™ 3991, 3992, 3993 and 3994 Microsphere Series

EQUIPMENT

The first consideration is whether or not a recirculation system is in place. The least desirable scenario is to simply replenish a coating pan especially if the product is not being used up quickly. A recirculating system is preferred. The optimum design of a recirculation system would include mild agitation of the reservoir and a double diaphragm pumping system with a gravity return in which the end of tube is placed below the liquid level. Cascade effects of returning adhesive can cause excessive foam and should be minimized. Covering the pan or reservoir with damp, clean shop rags is desired to retard the volatilization of ammonia. Also, be cautious of “dead spots” in the pan, this could cause an uneven distribution of solids and application will not be even. Although, the coat weight may be the same, the solids will be higher in the area of the “dead spot” and fiber tear may result.

The CraigStik™ microsphere product can be pattern applied, roll coated, screened (195 or coarser twill mesh) or extruded (for example, through an 18 gauge needle in a D & R tank with 35 psi pressure on offset paper). Do not use equipment (roller pads, valve heads, etc.) in which Neoprene comes in direct contact with the wet adhesive. The adhesive may react with this material and “gum up”. Standard equipment for remoists such as Sheffer Double Round Gluer works well. Application is also suitable on Mark Andy presses (narrow web) with 75-125 line per inch anilox. Shallow walled aniloxes are better at transferring microspheres than steep wall cells. Typically 35-50 bcm is the desired cell volume. Refer to Technical Data Sheets for suggested coating weights for each product. Avoid doctor blades if possible, they can create shear resulting in a disruption of the sphere resulting in agglomeration and thickening of the product.

MIXING

The adhesive will separate some upon storage. We recommend thorough agitation at medium speeds prior to use to blend the stratified ingredients.

SOLIDS CONTROL

Some coating processes tend to selectively dewater microsphere adhesives of this type. Determination of whether or not this is occurring during coating is critical. If the percent solids climb above 45%, agglomeration of the microspheres is more likely to occur. This situation cannot be remedied by filtration of the agglomerates. The proper approach is to control solids in the process between 30-40% which will allow for continuous coating of the product. Please note that we do have some high solid products that are outside this range and, as a result, must be closely monitored. We recommend the use of our CraigStik™ 3991PID adhesive thinner to control solids. However, you may use a 50:50

mixture of ammonia and water if you do not have the 3991PID. If household ammonia is used, be sure that it is surfactant free. If the process is fairly consistent in its dewatering tendency, the thinner can be added to the reservoir on a continuous basis with the use of a metering pump. Never thin with just water, only use 3991PID or 50:50 ammonia to water mixture. Thinning with water alone can cause the pH to drop to low.

pH

The pH of the adhesive as supplied is in the range of 9.1 - 9.5. We recommend that the pH of the adhesive be maintained at this level during the coating process. Check product on press every hour or two for pH. Use 3991PID and mixture mentioned above to adjust pH. A pH meter is preferred to measure pH, however, pH strips with a range of 2.9-9.8 and a sensitivity of 0.2 are more than adequate. Stick pH paper into the 3991 product and, while still wet, compare to pH color chart - should be dark green to blue color. If color is too light, start adding 3991PID directly into pan (try 2-6 oz.) and stir. Or add up to 8-12 oz/pail by trickling (not dumping all at once) into pail while stirring. A squirt bottle may also be used to periodically apply 3991PID directly to pan and roller. Overshooting the pH range up to 9.9 produces no negative effects; however, a slight thinning of the product may occur. If the pH drops below 8.8, agglomeration of the microspheres may occur. If product coagulates (looks like cottage cheese) it cannot be reconstituted and must be disposed. Start job with all fresh material. For long runs, continuously *drip* 3991PID into product in pan.

FILTRATION

Generally, filtration is not necessary on press, but if the product is filtered, note the following information. Continuous filtration of the adhesive in the coating process causes deleterious shear effects on the adhesive and should be avoided. Ideally, the filter should be sized to remove the corresponding size of the adhesive agglomerate or contaminant, which is harmful to the process. In many applications this relates to a particle size in the 400-800 micron range. The smallest filter to be used with this adhesive is 250 micron mesh. Particular care must be taken when using filter bags, making sure that they are changed prior to full loading. When pressure builds in the filter bag, the adhesive may extrude through the bag much like "Play-dough", forming adhesive chunks in the process.

FROM DESIGN AND PRODUCTION VIEWPOINT

- The 3991 products will tend to separate in the container with thicker ingredients rising to the top and thin ones to the bottom of the container. Therefore, it is imperative to stir well. They are also shear sensitive and should test thoroughly if used with gear or piston pumps, doctor blades or rubber metering rolls.
- If wet folded (no drying), glue splits about 60% staying on the piece it was applied to and 40% transferring to folded piece. Using a release paper or coating (like 6960CLF) will minimize transfer. Silicone release paper is not recommended for 3991 Series as there will be little to no adhesion to the release paper.

- If applied to one side and **thoroughly** dried (oven), over 95% stays on the paper it was first applied to and less than 5% transfers depending on the paper stock. If not dried thoroughly, then the amount of transfer will be proportional to the degree of drying. (This could be useful if your application requires some transfer and you are experimenting with the amount that you need to achieve specific properties.)
- For any self-wound application of this series, any silicone release coating that transfers onto the adhesive kills the adhesion properties. Our Free-Radical UV Curable Release Coating, Craigcure™ 1021 and 1048 series work well. Please test for desired level of release.
- Long-term aging is very good - no greater than 10% increase in bond strength or aggressiveness over one year.
- CraigStik™ can be dyed (blue, etc.) and/or combined with scents if required, however care must be used to determine compatibility and long-term effects, including fading of the dyes.
- CraigStik™ has replaced standard pressure-sensitive and non-pressure-sensitive hot melts as fugitive tack glue. The 3991 products will not stain papers like hot melts do, and, they eliminate the possibility of burning an operator. Papers should be tested thoroughly as some coated or high spring-back stock may not be suitable.
- Heavier and coated (or higher Hercules # & more sizing) paper has less tendency to curl than lighter and uncoated papers.
- Anything that interferes with adhesion or “the ability to stick to” (silicones, Teflon, waxes, inks, etc.) will reduce the duration time (for example; stickers on erasable enamel wipe-off boards) and may result in the piece/sticker curling or falling off completely over time.
- Lab tests show good adhesion at cold temperatures, varying with substrate. Bonding to aluminum foil or polyethylene was good when exposed to 5 days in either the refrigerator or freezer. Bonding to glass at low temperatures was good initially but decreased gradually with paper stiffening. Paper to paper bonds also weakened over time at cold temperatures due to absorption of moisture by the stock.
- If necessary, use Craigadd 3991DEFO as defoamer.

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