Instructions for Using PC-10 Adhesive

Introduction

PL-10 is a fast-curing, room-temperature adhesive for bonding PhotoStress® coatings, type PS-1, PS-2, and PS-8 flat sheets, and contoured sheets made from type PL-1 and PL-8 liquid plastics. Its cure time is four hours at room temperature as opposed to the normal 12-hour cure time for type PC-1 adhesive.

Because of its fast cure, PC-10 has a shorter pot life than PC-1. Only small amounts of the adhesive can be mixed at one time; the area of coverage and working time during application is reduced, compared to PC-1. Therefore, PC-10 is most commonly used on small areas of coverage, or when fast test results are desired requiring same-day testing after application of the coating. PC-10 is also advantageous to use for obtaining quick calibration results of the coating.

Important Note: These instructions apply for temperature conditions between 70° to 75°F [21° to 24°C] only. Because PC-10 adhesive is exothermic, its pot life, working time, and curing time will be longer for lower temperatures, and shorter for higher temperatures.

Before attempting to use PC-10, the general instructions for bonding flat and contoured PhotoStress sheets, presented in Application Note IB-223, should be thoroughly reviewed. This application note contains additional step-by-step procedures (including pictorial details) that must be followed without exception in order to achieve a good bond between the coating and the test part.

Application

1. ***Surface Preparation of the Test Part*** - See detailed instructions in Application Note IB-223.

2. ***Preparation of the PhotoStress Plastic*** - See detailed instructions in Application Note IB-223.

3. ***Final Surface Preparation*** - Because of possible contamination of the bonding surface during the plastic preparation, a final surface cleaning may be required. In most instances, a thorough wash-down with Neutra-Sol is all that is necessary for this final surface preparation.

4. ***Masking the Bond Area*** - Place the cleaned plastic sheet over the cleaned surface of the test part. Then, using masking tape, mask off an open space around the plastic leaving about 1/4 in [6 mm] space between the edge of the plastic and tape. When the tape is removed after bonding, this procedure will leave a clean, neat glue line.

5. ***Adhesive Preparation*** - The amount of adhesive required must be calculated in advance. One gram of mixed adhesive will cover approximately a 1.5 in^2 [10 cm^2] area. However, because of the accelerated exotherm with PC-10, no more than 60 grams of adhesive should be prepared per mix.

Resin/Hardener Proportion - The amount of hardener required is calculated in parts per hundred, or “pph”. For PC-10 the amount is 15 pph. In other words, 15 pph of hardener means 15 grams of hardener for 100 grams of resin.

Example: If a total of 50 grams of mixed adhesive is required, the resin-hardener amounts are calculated as follows:

PC-10 Resin: 50 x 100 / 115 = 43.48 grams

PLH-10 Hardener: 50 x 15 / 115 = 6.52 grams

Note: PC-10 Resin is prone to settlement during storage and should be thoroughly mixed in its original bulk container before weighing.

When mixing 40 to 60 grams of adhesive, a container approximately 3 in [76 mm] in diameter should be used. For smaller quantities, a 6-ounce mixing cup will suffice (Part No. 012-8 or equivalent). The mixing container should be made of a nonabsorbent material that can be discarded after using the adhesive.

After the hardener has been added to the resin, mix thoroughly using a wooden mixer (Part No. 011-13 or equivalent). The mixing time required to ensure a homogeneous blend is two to three minutes. When mixing, the container should not be cradled in the palm of the hand since the resulting body heat will accelerate the exotherm and decrease the pot life.

6. ***Bonding Procedure*** - Immediately after mixing, pour or brush the adhesive (using Part

No. 011-14 or equivalent) onto the prepared area in a uniform layer approximately .031 to .063 in [0.8 to 1.6 mm] thick, depending on the regularity of the surface. Any adhesive left in the mixing container should be poured onto a clean paper towel and the mixing container discarded. If the adhesive is immediately spread in a thin layer after it has been mixed, its working time will be 10 to 15 minutes.

Carefully place the plastic over the adhesive. Now, beginning at one end, press down on the plastic with moderate finger pressure and slowly work toward the opposite end. This technique will allow air bubbles that form to flow out with excess adhesive. If air pockets return when finger pressure is relaxed, reapply pressure and brush additional adhesive along the edge of the plastic. Then, after releasing the pressure, adhesive will flow in instead of air. A layer of adhesive approximately 0.003 to 0.005 in [0.076 to 0.13 mm] is optimum, although the actual thickness will vary according to the surface condition and complexity of the test part.

After all of the excess is squeezed out, apply a thin coating of adhesive around all edges of the plastic (including holes that may have been drilled), to provide a seal against moisture absorption. Depending on the application, the coating may have a tendency to slide from its bonded position before the adhesive begins to set. This is particularly true when bonding flat sheets, and when bonding coatings to vertical and overhead surfaces. In these situations, masking tape can be used to securely hold the coating in place.

The adhesive will become stiffer as it cures. After 30 minutes or so, it will begin to develop the consistency of putty. At this time adhesive bevels, if required, should be built and any remaining adhesive on top of the coating should be cleaned off using the recommended solvent. The masking tape should also be removed at this time and a final clean up made. After four hours of cure from the start of mixing the PC-10 adhesive, the part will be ready for testing.

CAUTION

Epoxy resins and hardeners may cause dermatitis or other allergic reactions, particularly in sensitive persons. The user is cautioned to: (1) avoid contact with either the resin or hardener; (2) avoid prolonged or repeated breathing of the vapors; and (3) use these materials only in well-ventilated areas. If skin contamination occurs, thoroughly wash the contaminated area with soap and water immediately. In case of eye contact, flush immediately and secure medical attention. Rubber gloves and aprons are recommended, and care should be taken not to contaminate working surfaces, tools, container handles, etc. Spills should be cleaned up immediately. For additional health and safety information, consult the Material Safety Data Sheet.

Refer to these publications for detailed information on:

Tech Note TN-704, "*How to Select Photoelastic Coatings*."

Document 11222, "*PhotoStress Coating Materials and Adhesives*."

Application Note IB-221, "*Instructions for Casting and Contouring PhotoStress Sheets*."

Application Note IB-223, "*Instructions for Bonding Flat and Contoured PhotoStress Sheets*."

For applications involving special materials or unusual testing conditions, consult the Vishay Micro-Measurements Applications Engineering Department.