

Micro-Measurements

Instructions for Using PC-8 Adhesive

Introduction

PC-8 is a room-temperature-curing high-elongation adhesive for bonding PhotoStress[®] coatings, type PS-1 and PS-8 flat sheets, and contoured sheets made from type PL-1 and PL-8 liquid plastics. It is normally used in post-yield tests when the elongation is expected to exceed 3%. The maximum elongation that can be achieved with PC-8 is approximately 10%, when used with PS-1 sheets.

Because of its high elongation properties, PC-8 requires a longer cure time than that used for the more common type PC-1 adhesive (48 hours at room temperature for PC-8 as opposed to 12 hours for PC-1).

Important: Before attempting to use PC-8, the general instructions for bonding flat and contoured PhotoStress sheets presented in Application Note IB-223 must 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 the detailed instructions given in Application Note IB-223.

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

Note: The preparation of the plastic coating for high elongation applications deserves special attention in order to achieve the results expected. The edges of the plastic that do not match up with the edges of the test parts should be beveled, and a generous fillet of adhesive built around the beveled edge. It is also recommended that the plastic sheet be extended beyond the area on the test part where the highest elongation is expected to take place so that the edges of the plastic are in areas of lower strains. This procedure will reduce the risk of the plastic becoming un-bonded during the test.

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 M-Prep Neutralizer 5A 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 in² [10 cm²] area. No more than 100 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-8 the amount is 50 pph. In other words, 50 pph of hardener means 50 grams of hardener for 100 grams of resin.

Example: If a total of 60 grams of mixed adhesive is required, the resin-hardener amounts are calculated as follows:

PC-8 Resin: $60 \times 100 / 150 = 40$ grams

PCH-8 Hardener: $60 \times 50 / 150 = 20$ grams

Note: PC-8 Resin is prone to settlement during storage and should be thoroughly mixed in its original bulk container before weighing. Also, both the resin and hardener should be preheated to 90°F [32°C] before mixing.

When mixing 50 to 100 grams of adhesive, 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 is three to five minutes to ensure a homogeneous blend.

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 20 to 30 minutes.

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Micro-Measurements

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 of the test part and complexity of the contour.

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. (See Note in Step 2.) 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 three to four hours, it will be about 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 cleanup made. After 48 hours of cure from the start of mixing the PC-8 adhesive, the part will be ready for testing.

Important Note: These instructions apply for temperature conditions between 70°F to 75°F [21° to 24°C] only. Because PC-8 adhesive is exothermic, its pot life, working time, and curing time will be longer for lower temperatures, and shorter for higher temperatures.

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 PhotoStress 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 Micro-Measurements Applications Engineering Department.

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