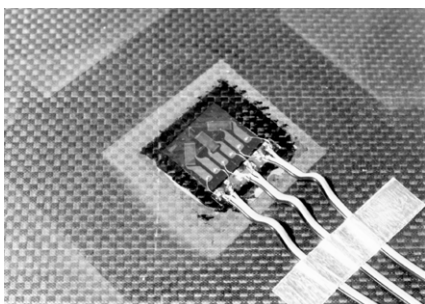


Surface Preparation of Composites

Micro-Measurements Application Note B-129, Surface Preparation for Strain Gage Bonding, provides the general procedures for properly preparing surfaces of test specimens for strain gage bonding. Many of the methods described there are also appropriate for composite materials.



Following are some supplementary techniques for producing a chemically clean, dull matte finish needed for making good strain gage installations on these materials.

SOLVENT CLEANING

The number of resin systems, fibers, and fillers used in composites is ever increasing. No single cleaning solvent is ideal for them all. However, isopropyl alcohol (GC-6) is satisfactory for many resin systems. If in doubt about compatibility with a solvent, consult the resin system manufacturer. And don't forget to verify compatibility with any exposed fibers and fillers.

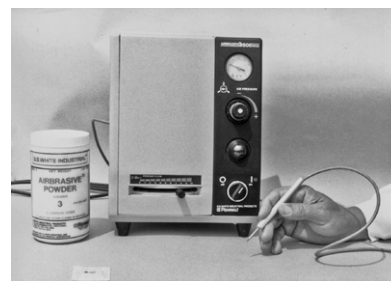
Composites fabricated with silicone releasing agents, or structures coming into contact with silicone greases or oils prior to gaging, require special cleaning. Strain gages cannot be successfully bonded to surfaces contaminated with these materials. Light concentrations can often be removed by several washing/drying cycles performed with M-Prep Conditioner A warmed to approximately +95 deg F (+35 deg C). Procedures recommended by the silicone manufacturer must be used on heavier contaminations, or when water-based cleaners are disallowed.

SURFACE ABRASION

Matrix-rich surfaces can usually be abraded with 320-grit silicon carbide paper (SCP-2) to produce a satisfactory matte finish. However, unless their surfaces have been machined flat, test specimens of matrix-poor composites or those with textured surfaces require alternate techniques. For these, the grit on the silicon carbide paper will not reach into the "valleys" to produce the desired finish. For small areas (a square inch or so), try a fiberglass brush as shown here.



For larger areas or a large number of smaller areas, an air-abrasive unit may be used to advantage.



Care must be taken, however, to ensure that neither the air nor the abrasive contaminate the surface. Accordingly, either bottled dry air or shop air highly filtered at the unit inlet is recommended. Clean alumina in the 27-50 micron size is the ideal abrasive. Prior to abrasion, mask the gage area with drafting tape (PDT-1). Handling the air nozzle as if spray painting, start and finish each pass on the drafting tape to avoid excess abrasion. Dust off loose particles (with a brush if necessary) and wipe the area with surface cleaning solvent and gauze sponges (GSP-1). Repeat as necessary until the surface has a satisfactory matte finish. Dry the surface with a hair dryer for a few seconds prior to gage installation to ensure complete solvent removal.

CONDITIONING AND NEUTRALIZING

A final cleaning with Micro-Measurements M-Prep Conditioner A and Neutralizer 5A is recommended following solvent cleaning and abrasion, provided water-based surface preparations are permitted. To minimize absorption, however, these materials should be applied and removed as quickly as possible. Further, in most cases, the surface should be warm-air dried following their application.

The surface preparation of composite materials for strain gage installation is relatively straightforward, provided these special requirements are taken into account. Our Applications Engineering Department will be pleased to provide you with additional details about these techniques and installation accessories.