Strain Gage Selection

Backing Materials

Conventional foil strain gage construction involves a photo-etched metal foil pattern mounted on a plastic backing or carrier. The backing serves several important functions:

- provides a means for handling the foil pattern during installation
- presents a readily bondable surface for adhering the gage to the test specimen
- provides electrical insulation between the metal foil and the test object

Backing materials supplied on Micro-Measurements strain gages are of two basic types: polyimide and glass-fiber-reinforced epoxy-phenolic. As in the case of the strain-sensitive alloy, the backing is not completely an independently specifiable parameter. Certain backing and alloy combinations, along with special construction features, are designed as systems, and given gage series designations. As a result, when arriving at the optimum gage type for a particular application, the process does not permit the arbitrary combination of an alloy and a backing material, but requires the specification of an available gage series. Each series has its own characteristics and preferred areas of application; and selection recommendations are given in the Gage Series and Adhesive Selection table. The individual backing materials are discussed here, as the alloys were in the previous section, to aid in understanding the properties of the series in which the alloys and backing materials occur.

Polyimide

The Micro-Measurements polyimide E backing is a tough and extremely flexible carrier, and can be contoured readily to fit small radii. In addition, the high peel strength of the foil on the polyimide backing makes polyimide-backed gages less sensitive to mechanical damage during installation. With its ease of handling and its suitability for use over the temperature range from -320 deg to +350 deg F (-195 deg to +175 deg C), polyimide is an ideal backing material for general-purpose static and dynamic stress analysis. This backing is capable of large elongations, and can be used to measure plastic strains in excess of 20%. Polyimide backing is a feature of Micro-Measurements EA- , CEA- , EP- , EK- , S2K- , N2A- , and ED- Series strain gages.

Epoxy-Phenolic

For outstanding performance over the widest range of temperatures, the glass-fiber-reinforced epoxy-phenolic backing material is the most suitable choice. This backing can be used for static and dynamic strain measurement from -452 deg to +550 deg F (-269 deg to +290 deg C). In short-term applications, the upper temperature limit can be extended to as high as +750 deg F (+400 deg C). The maximum elongation of this carrier material is limited, however, to about 1 to 2%. Reinforced epoxy-phenolic backing is employed on the following gage series: WA , WK , SA , SK , WD , and SD .