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# TECHNOLOGY

## Strain Gage Thermal Output and Gage Factor Variation with Temperature

### Introduction

Ideally, a strain gage bonded to a test part would respond only to the applied strain in the part, and be unaffected by other variables in the environment. Unfortunately, the resistance strain gage, in common with all other sensors, is somewhat less than perfect. The electrical resistance of the strain gage varies not only with strain, but with temperature as well. In addition, the relationship between strain and resistance change, the gage factor, itself varies with temperature. These deviations from ideal behavior can be important under certain circumstances, and can cause significant errors if not properly accounted for. When the underlying phenomena are thoroughly understood, however, the errors can be controlled or virtually eliminated by compensation or correction.

In the next section of this publication, thermal output (sometimes referred to as "temperature-induced apparent strain") is defined, and the causes of this effect are described. Typical magnitudes of the thermal output are then given, followed by the commonly used methods for compensation and correction. A later section treats gage factor variations with temperature in a similar but briefer manner since this error source is generally much less significant. Methods for the simultaneous correction of both thermal output and gage factor errors are given in the last section, accompanied by numerical examples.



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