Assuming good furnace construction and use of proper heating element material, premature burn-outs are rare. Use these photos as reference to diagnose common failures.

### IDENTIFY FAILURES

**“GREEN ROT” CORROSION**
*Symptoms:* Green “warty” surface. Strongly magnetic. Very brittle. Will break if bent and fracture will show heavy green oxide scale extending below surface.

**CARBURIZATION**
*Symptoms:* Black, dirty surface. Loss of ductility and heat resistance. Internal melting in advanced stages.

**OVERHEATING OF ELEMENTS**
*Symptoms:* Rough and wrinkled surface. Loss of ductility and deformation of cross-section. Sag caused by internal melting.

**SULFUR ATTACK**
*Symptoms:* Extremely “warty” surface, often silvery in color. Strongly magnetic. Extremely brittle.

### REPORT FAILURES

Most elements failures can be attributed to improper use of the equipment or improper control of its operation. National Element can perform a metallurgical analysis on any element if desired. Please submit sample of melted element sections.

In the event you need to report problems, please be ready to provide the following information:

**GENERAL INFORMATION**
- Type of Furnace
- Furnace Process
- Element Material
- Size of Material

**SPECIFIC INFORMATION REQUIRED**
- Furnace Atmosphere
- Chamber Temperature
- Element Temperature
- Thermocouple Locations
- Location of Elements
- Age of Element
- Past History
- Other related factors including insulation conditions, external contaminants, & Refractory Materials.