Creep test glue, visco elastic materials, SMD

Time dependent deformation is an important failure mechanism. Our experience with solder has led us to develop methods for applying loads to small samples as the solder joint is the weakest connection in a printed circuit board.

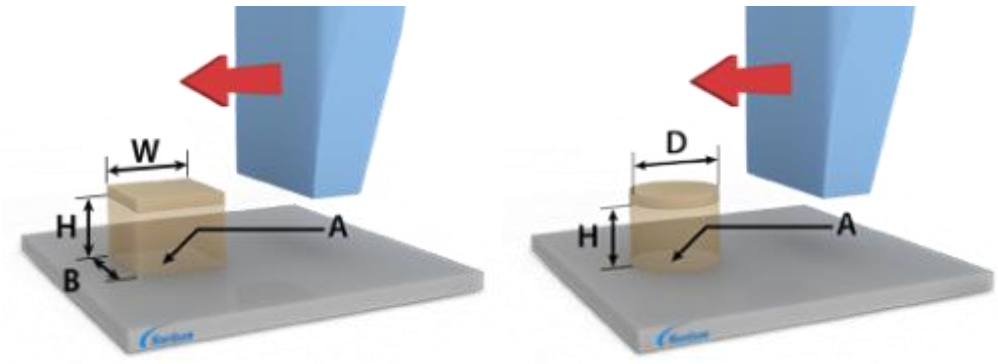
The dimensional changes that occur with time when materials are statically loaded, is referred to as creep. Creep measurements are important for solders, polymers and adhesives where large strains can develop over time and strain rates are very temperature sensitive.

- Creep measurements are important for solders, polymers and adhesives where large strains can develop over time and strain rates are very temperature sensitive
- The applied stress can be substantially below the yield point and in all cases the time dependent deformation is due to a thermally activated process
- Creep measurements are highly sensitivity to temperatures so that they can often need to be made at the component's operating temperature
- In addition, creep mechanisms can only be fully characterised if measurements are made over a range of temperature and stress levels

https://youtu.be/7iMxc74K0iI

Using Nordson DAGE Materials testers it is possible to perform creep testing at different heights on small components.This is particularly useful for solder research in electronics industry. Solders have low melting points. At room temperature, solder behave as other metals would do at high temperature. Large amounts of deformation can occur and under load the material continues to extend.

As a rule of thumb, creep is important for temperatures above half the materials absolute melting point. For solder room, temperature (20°C = 293K) is greater than half the melting point (188°C = 461K for 60/40 Sn/Pb).

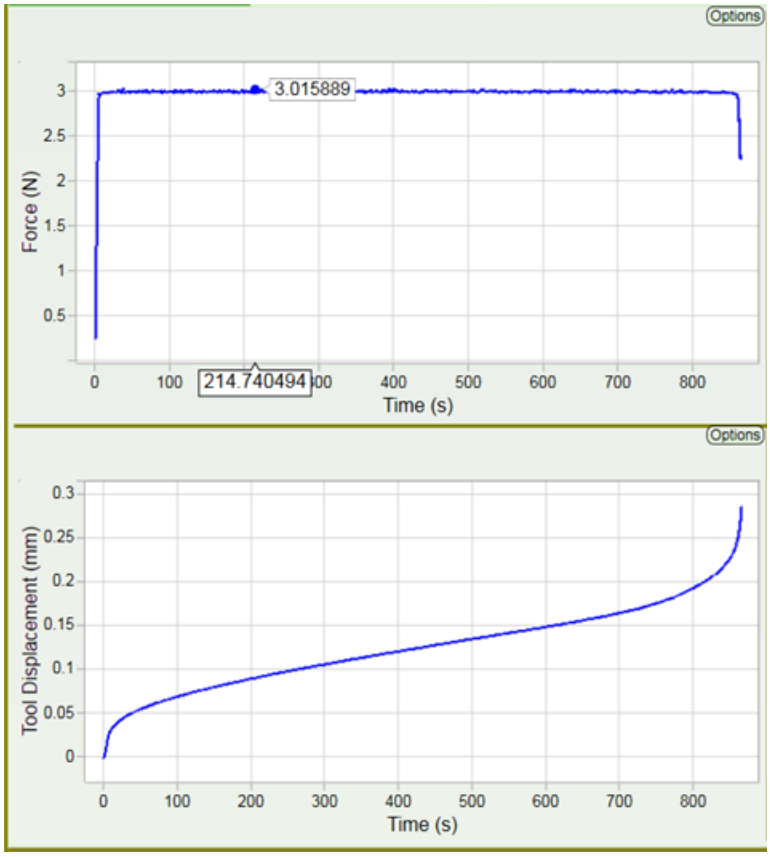


Load control is useful when you want to apply a know load or stress.The load is always maintained, even if the sample creeps. As the load approaches the target load, the axis slows

down to avoid overshoot. During the hold period load is maintained by constantly adjusting the axis position.

In an ideal situaiton the load should not change during the experiment. To achieve this, we use a very accurate feedback loop to control the position of the stage.

This allows for a uniform load to be applied to the sample, even as it starts to move or creep. This can be observed from our live graphs during test (shown below) where the force data is a straight line (top), while the tool displacement (bottom) is changing. This suggest the experiment is a success as the load is constant but thee material is creeping.



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