



Memory-Metalle GmbH

INFO SHEET No. 2

Shape Setting of NiTiInol

The application of a NiTiInol shape memory or superelastic element for a particular purpose generally requires the setting of a custom shape in a piece of NiTiInol. The process required to set the shape is similar whether beginning with NiTiInol in the form of wire, ribbon, strip, sheet, tubing, or bar. Shape setting is accomplished by constraining the NiTiInol element on a mandrel or fixture of the desired shape and applying an appropriate heat treatment. The heat treatment methods used to set shapes in both shape memory and superelastic forms of NiTiInol are similar.

The heat treatment parameters chosen to set both the shape and the properties of the part are critical, and usually need to be determined experimentally for each desired part's requirements. In general, temperatures as low as 400 deg.C and times as short as 1-2 minutes can set the shape, but generally one uses a temperature closer to 500 deg.C and times over 5 minutes. Rapid cooling of some form is preferred via a water quench or rapid air cool (if both the parts and the fixture are small). Higher heat treatment times and temperatures will increase the actuation temperature of the part and often gives a sharper thermal response (in the case of shape memory elements). However, there is usually a concurrent drop either in peak force (for shape memory elements) or in plateau stresses (for superelastic elements). There is also an accompanying decrease in the ability of the NiTiInol element to resist permanent deformation.