



PAT for freeze drying: cycle optimization in the laboratory

ABSTRACT:

Freeze drying is generally known to be a time consuming and therefore expensive process. In order to lower costs during manufacturing, the effective cycle time must be reduced. This goal can be achieved by optimizing a freeze drying cycle in the laboratory.

This paper discusses the steps required to optimize a freeze drying cycle utilizing Manometric Temperature Measurement (MTM). Case studies illustrate how MTM allows a non-invasive methodology for characterizing temperature at the sublimation interface as well as product resistance thus contributing to superior cycle design and performance in the Research and Development phase.