

## Design of Experiments (DoE)

DoE is based on the fundamental equation that states process output is a function of process inputs. The customer desires process output that is well on the target. This means the manufacturer must select the optimum input settings to get the desired output. The identification of key inputs and their settings are generally selected based on prior experience, R&D trials, and engineering reference books; however, only in few select situations the input settings are truly optimized to get the output on the target.

DoE technique is a powerful tool that calculates the proper settings (levels) of the key inputs. Participants will understand the historical development of non-scientific approach to the experimental techniques leading to the structured technique of design of experiment (DoE). The discussion will center around a hypothetical situation of injection molded part critical dimension. A structured experimental design will be presented and analyzed leading to the equation that connects the critical dimension to the key inputs such as injection temperature, nozzle profile, and injection speed.