Green Garden Products – K-2-K Sprayer

Overview
Despite the superior engineering concepts incorporated in the design of the K-2-K hose-end stream sprayer, its usability is not ideal—thus making it inadequate in the market. There are two opportunities for improvement in the K-2-K sprayer: the excessive force needed to initially move the thumb switch from the “off” position and overcoming the hydraulic force of a hose to select the “H₂O” position.

Objectives
1. Alleviate the amount of force needed to actuate sprayer thumb switch
2. Increase the likelihood of making a positive operation selection
3. Maintain childproofing and the ability to be competitively priced in the market

Approach
- Developed an objective experiment to analyze the performance of the current K-2-K Sprayer design
- Conducted market research for commonly used sprayer design features
- Benchmarked the performance of the K-2-K Sprayer versus market competitors
- Conducted statistical analysis to determine significantly beneficial design features
- Generated initial model concepts in CAD using knowledge of beneficial design features
- Selected best concept using Analytical Hierarchy Processing based on the values of Green Garden Products and consumer
- Finalized CAD rendering of best concept using SolidWorks and ProEngineer
- Rapid prototyped best concept using FDM 3000 rapid prototyping machine
- Assembled prototype and subjected it to developed objective experiment
- Used performance of prototype in objective experiment to assess limitations, advantages, and future recommendations for the concept design

Outcomes
- Prototype was not functional
- Future projects should research and account for solidification shrinkage during the prototyping process
- Incorporation of design features provide the potential to decrease force needed to actuate thumb switch, increase probability of making a positive selection, and maintains childproofing
- Large scale production promotes a green manufacturing process plan

Figure 1. Redesigned K-2-K Sprayer Model.