KYDEX, LLC: Reduction of Dust Dispersion in Masterbatch Mixing Process

Overview
The team needed to reduce the dust generation in the filling of mixing containers during the masterbatch creation process. The old system utilized an ineffective lid and an easily-damaged tube to transport powder. The lid was redesigned and the tube was replaced with a more durable, non-collapsing alternative.

Objectives
The production of masterbatch results in powder dispersion in the form of airborne dust. This dust results in lost product, down time due to cleaning, and is a potential health hazard, as the dust can be ingested. KYDEX, LLC needed this dust to be reduced by redesigning the tube and lid used to transport masterbatch into the mixing containers used at the facilities.

Approach
- The team gathered customer needs from Tom Kisiel, the team’s contact from KYDEX.
- The team created possible concepts to replace or modify the current system at KYDEX.
- Patents were researched to determine what ideas could be implemented for each concept.
- These concepts were weighted to determine the most effective and least-costly solution.
- Three site visits were conducted to gather data, feedback, and test designs.
- The team utilized CAD drawings to render concepts for KYDEX.
- After these CAD drawings were approved by Tom Kisiel, fabrication commenced.
- Materials were procured from vendors. These materials include a ¼” thick aluminum plate, a wire helix tube, hose clamps, various sized aluminum pipes, and foam seals.
- The lid was fabricated and then tested at KYDEX on April 16th, 2013.
- The lid, seal, tube, and vacuum attachments worked and continued to work for over one week of use.

Outcomes
- The team created a viable solution for approximately $570 out of $1,000.
- The new lid weighs approximately 1/3 the weight of the current lid, reducing the exertion of the workers to raise and lower the lid.
- The vacuum attachment saves the employees time and energy during the transport of powder. It also decreases the chances for dust generation.
- The wire helix tube is more durable than the current tube and will not collapse during the use of the vacuum.