Bump Pump

Molder: Dymotek Molding Technologies

Moldmaker: Elmet

Material Supplier: Momentive

Designer: Rick Baron / Steve Garbee / Val Quadros

Supporting Documentation:

Vitality Pump with Callouts
Vitality Pump - Photo
Vitality Pump and Bag Assembly

international plastics design competition

Product Description

An economical positive displacement disposable pump for beverage concentrates. This FDA approved, precision low dose pump consists of only two parts; a two shot pump body with a rigid thermoplastic fitment and LIM silicone pumping chamber, and a rigid plastic valve/nozzle. Joined to a flexible pouch package for fluid containment, the pump inserts downward into a special variable rate pumping mechanism with the pouch held above in a support structure. This system delivers an accurate dose of liquid beverage concentrate which blends with water for a finished drink of any desired strength.

Why is the product innovative?

First five items are considered most important -

- Accuracy - The present embodiment of the design delivers .4 ml. per pump stroke. The accuracy of this small dose allows the pump to produce high ratio products with excellent repeatability drink to drink. This ensures consumer satisfaction and reliable yields.
- Two Part Simplicity - Similar disposable pumps used in the industry have many more component parts.
- Dual Benefit Single Valve Design - The valve design of the pump makes it virtually immune to the ill effects of small particulate inclusions and viscosity variation, and prevents spillage from manual manipulation of the pump when out of the mechanism.
- Efficient Two shot (two component) Molding Process - The silicone two shot technology allows for multiple functional elements in the pump body: a flexible pumping chamber and inlet pinch valve, a cone sealing element for the outlet valve, a seal for the Nozzle Insert, a seal for the fitment into the bag connector, and a translucent window for the LED product sold out detection. The pump is manufactured by Dymotek Molding Technologies. The precision, 4+4 cavity mold was built by Elmet and runs in an Arburg press.
- Cost Benefit - Two shot molding technology and automated assembly have made cost effective an inherently expensive disposable pumping concept.
- Automated Assembly - Robotic ejection and handling is employed for assembly and functional testing.
- Flexibility - By using a stepper motor for precision speed control, the special variable rate pumping mechanism is accurately controlled from 2-10 cycles per second. In the current liquid coffee concentrate application, this provides a product blend range of 15 to 50 parts water per part of concentrate.
- Package Elegance - The bag/pump combination makes efficient use of materials to produce a high performance package with the least possible waste. The pouch design and the choice of film materials have created a flexible package with sufficient stability and rigidity to make it a suitable alternative to a rigid bottle. The pouch has the added benefit of exceptionally low product loss.

- Low Product Loss - The combination of a flexible pouch and the high performance pump results in essentially 100% evacuation with no need for venting.
- Thawing - For best storage, the liquid coffee concentrate is shipped and stored frozen. Unlike other packaging materials, the pump and pouch allows product thawing in hot water or microwave.
- Other Applications - This pump design could be adapted for any number of other uses, and the pump could be scaled up or down as required for different delivery per stroke requirements.