

Case 5/Principle Five

Tolerance for Error

The “Squeeze-Meter” Dispenser Eliminates Measuring Tasks

McKechne Plastics

Gilmont, NY

October 1994

Background

Industrial designer Bob Donoghue knew he had a useful idea. It was one of those simple solutions to a problem everyone has at one time or another. How can you easily and accurately measure a specified amount of liquid, say a teaspoon? It was a problem that had caused its share of spills and waste, as well as concern over accurate dosage of medicines. Labeling of many over-the-counter medicines had become so complicated and small as to be impossible to read for all but the best eyes under ideal lighting.

A Simple but Effective Solution

Donoghue had devised a reservoir which could be molded into the top of any flexible plastic container. When the container was squeezed, a siphon tube carried the liquid into the reservoir. When the reservoir was full and the container was released, any additional liquid squeezed up would siphon back down into the bottle. Then the container could simply be inverted, and only the measured amount would pour out. By sizing the reservoir appropriately, any amount of liquid could be precisely metered without manual or visual precision. In fact, the user would not even have to look at the

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container, meaning it could be used accurately in the dark. Donoghue envisioned use of his invention in containers for liquid medical products, where dangerous measuring mistakes are common, especially in times of crisis or in the middle of the night, when the user's attention and vision are not at their best.

Getting the Idea into Production

Donoghue realized the potential of his invention, and was granted a patent in 1985. He first approached Johnson & Johnson about the application of the device to their ACT Fluoride Anti-Cavity Treatment. This seemed an ideal product, since using the correct amount of fluoride treatment was important. The “Squeeze-Meter” dispenser became part of the ACT package. For the ACT application, the dispenser was sized to dispense the correct 10 ml. dose of fluoride treatment.

In 1987, Weatherly Consumer Products of Lexington, Kentucky, adapted the Squeeze-Meter dispenser for use in its Jobe's Liquid Fertilizer containers. This product was intended for quick, accurate feeding of houseplants, a chore often neglected by busy homeowners.

The dispenser was sized to hold the correct amount of fertilizer for one quart of water, again requiring only a gentle squeeze, then a tip into the bucket of water.



Jobe's Liquid Fertilizer and Johnson & Johnson's ACT Fluoride bottles

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By 1992, Donoghue had sold the patent to McKechné Plastics of Gilmont, New York. McKechné Plastics, the original developer of the Fuller Brush, designed and manufactured plastic containers for producers of consumable home products, like Weatherly and Johnson & Johnson.

McKechné proved to be innovative in manufacturing as well as marketing Donoghue's Squeeze-Meter dispenser. The company contracted the assembly of the dispensers to a local organization which employed people with disabilities.

Marketing Difficulties

McKechné designers could add the Squeeze-Meter dispenser to a client's design, adding the popular feature for only pennies per container. But these pennies were important, and large production runs were needed to amortize the considerable cost of changes to container molds. Unless a product had the potential for large-scale production, the additional cost per package could be prohibitive. McKechné's sales staff found it a challenge to sell addition of the Squeeze-Meter dispenser to the cost of product packaging for other reasons, too.

Many potential manufacturers didn't perceive a benefit to the feature. "They really didn't mind that their customers were spilling and wasting their product," Donoghue noted. They were selling only the liquid, and waste simply meant greater product sales. Furthermore, McKechné sales representatives found it difficult to convince clients of the benefits to elder users and those with visual or manual limitations that made measurement such a difficult task.

Ongoing Development

The Squeeze-Meter dispenser was not a perfect solution to the need Donoghue had perceived. Some users found that it was still possible to spill liquid if the container were squeezed too forcefully. Because the reservoir configuration and siphon tube

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usually required that the outlet be positioned near the top of the opening of the reservoir itself, squeezing the container hard enough often made the package into a “squirt gun,” Donoghue realized.

Donoghue set about redesigning the Squeeze-Meter dispenser to avoid this problem, and was granted a patent on the improved version which went into production in 1996. The new dispenser was fabricated by a new process that provided for the formation of the reservoir as a separate part that could be combined with the siphon tube and mounted within the confines of the squeezable container itself. The new dispenser prevented the “squirt-gun” effect as well as spilling if the container were squeezed too forcefully.

A Unique and Successful Example of Universal Design

The Squeeze-Meter dispenser was an example of a product that incorporated the universal design principle of Tolerance for Error by eliminating the need for manual and visual precision in measuring liquids.

It certainly had proven effective in marketing several products. Ten years after its introduction, Johnson & Johnson’s ACT Fluoride Treatment package still incorporated Donoghue’s dispenser design. Several new products were also under development, including an eye wash bottle and a separate screw-on measuring chamber which could be provided to consumers by manufacturers of large-quantity containers, such as detergents or commercial liquids.