

Arctic Ease® Instant Cold Wrap

Reverse Engineering



IBE Team 6

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Introduction



There are many market products in the pain and relief section of local drugstores. To narrow down the many choices available, we looked at our customer needs and saw the need for both a compression and cold solution. Arctic Ease® Cold Wrap was one of the only products that combined the two treatments.

Objectives

Our objectives for reverse engineering included:

- Determining perceptions of the market solution
- Learning how choice of materials and product specifications created intended effect
- Obtaining dimensions and product specifications
- Testing the accuracy of product claims including relief, smell, mess, and compression
- Considering ease of use, comfortability, coldness, dryness, and reusability
- Identifying problems associated with the product that need to be addressed
- Determining materials used to create the desired effect

Deconstruction



Our team removed the product from the packaging. The label claimed the product was reusable and ready to use upon first opening it, which we found to be true. The wrap was slimy and wet but was cold to the touch.



The wrap measured 52.5 inches long, 4 inches wide.



We cut the wrap to obtain a sample to test the stretch, feel, and see how quickly it would dry out.

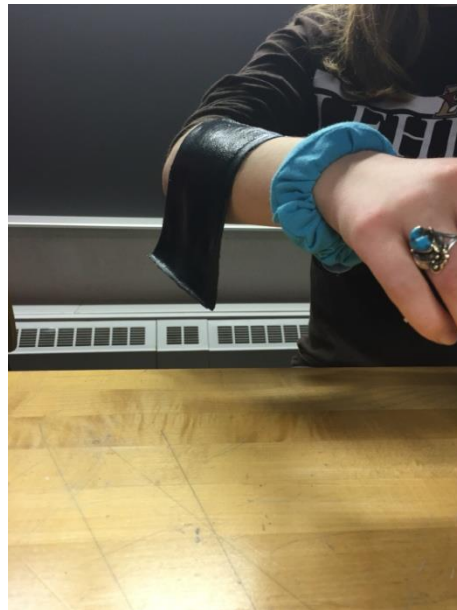
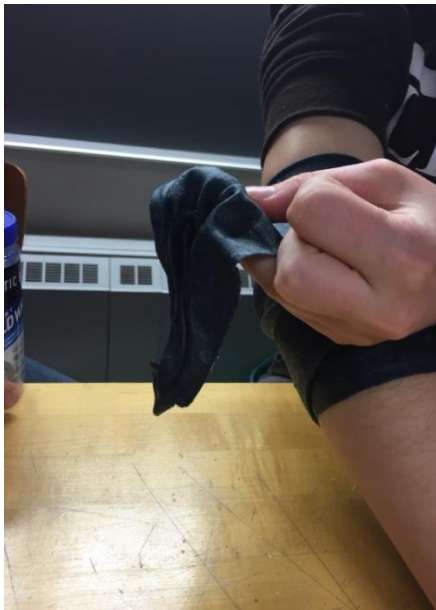


When handling the wrap, pieces of gel would fall off the product. We then applied pressure and scratched/scraped the product, resulting in a large collection of pieces.

Testing and Observations

Test 1: Non rotary application

We first applied the wrap to a forearm, in order to test the ease of use and overall compressive ability of the wrap to work on parts of the body that do not rotate. The wrap stuck very well itself and was able to be applied tightly, however, once the wrap was removed and was tried again, without putting it back into the container, it no longer stuck to itself. The wrap stuck on well even with the sleeve pulled over top of it, and did not cause any irritation or discomfort.



Test 2: “Resetting” the wrap

We placed about 2 tablespoons of water into the container and let it sit for about 30 minutes in order to see how it would work, as it claims that it is reusable. After the 30 minutes were up, there was still some water in the container that had not been absorbed by the wrap that caused it to still be especially slimy.



Test 3: Rotary application

We then applied the wrap to a joint, the elbow. This was done in order to test how well the wrap stood up to its claim that it stays on while active. While the wrap was still easy to apply, although slimy, it did continue to stick on to itself. It took more than one person to apply it, but this could be avoided through practice. As the wrap was moved around, it began sticking to itself in a way that caused it to pull away from the sides and ultimately become loose.



Bill of Materials

Component	Quantity	Material	Cost	Manufacture	Dimensions	Function
Layer of Wrap	92%	Cotton	\$2.22	Miller Waste Mills	52.5" x 4"	Soft cloth
Layer of Wrap	8%	Lycra	\$4.56	BASF Group	52.5" x 4"	Compression
Layer of Wrap	15 grams	Sodium Polyacrylate	\$1.50	Carolina Biological	52.5" x 4"	Cooling Component

Total # of Components: 3

Cost of Materials: \$8.28

Identified Problems

- Slimy
- Didn't stay too cold
- Compression was lost when moved on a joint
- Gaps were created between skin contact when moving
- Created a mess, as pieces of gel got on clothing, desk, etc.
- Did not always adhere to itself
- Customer reviews stated that mold formed in container even when completely sealed

Conclusion

From the deconstruction, testing, and analysis of ArticEase Instant Cold Wrap, we were able to identify some of the problems with the wrap and determine how it achieves compression and cooling. Using ArticEase provides compression by tightly wrapping the cloth around your skin. The cooling is created from the water absorbing polymer Sodium Polyacrylate. We learned from our analysis that products achieve cooling either by evaporation or phase change and that in this particular product by ArticEase, cooling is through evaporation. While we felt this product offered coldness and compression without bulk, it had apparent issues that could be improved upon. These main issues included being slimy to touch and apply, losing compression when moving, and creating a mess. Moving forward we would look to improve upon these three areas in making a solution that provided greater comfort, functionality, and durability.