



## Ice Wine: An Adaptive Down Parka

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**Concept Statement:** Designed to perform, Ice Wine: Adaptive Down Parka, is a modifiable winter coat that mirrors the level of detail, protection, and aesthetics of non-adaptive outerwear, yet ensures independence through easy dressing. Ice Wine is feature-rich in details that are useful for people with mobility limitations such as modular design, fit optimized for seated postures, and easy-dressing features. These features ensure that access to outerwear is not a barrier to participation in cold weather activities for people with mobility limitations.

**Contextual Review, Significance, and Rationale:** The lack of appropriate winter attire can be a barrier to participating in outdoor activities during the winter for people with disabilities (Lamb, 2001). Kabel, Dimka, and McBee-Black (2017) reported that many of the participants in their study who had spinal cord injuries, could not find appropriate winter outerwear or faced challenges with winter outerwear purchased from mainstream retailers. Participating in outdoor activities is essential to maintain physical and mental health, even during winter months (Gruno, 2019; McAvoy, Schatz, Stutz, Schleien, & Lais, 1989). To address this issue, the designer reviewed five adaptive apparel brands that produce adaptive coats to understand the garment features used to make apparel accessible to people with disabilities. These brands included IZ Adaptive, SuperFly Adaptive Apparel, Koolway Sports, XAbiliyt, and Tommy Adaptive (TA). IZ Adaptive had the best fit for people in a seated position. SuperFly had the best aesthetics and performance features that mirrored that of major outdoor brands. TA offered the most styles (15 total); however, it should be noted, yet in many of the coats in the TA collection, the only “adaptive feature” was a magnetic closing zipper. The magnetic zipper is now mainstream in adaptive garments, but so many designs marketed as “adaptive” only include this feature. With the TA designs, there was no consideration to the garment fit, evident where the coats strain to close, bunch up at the lap. The designer also reviewed the design style and features of nonadaptive down jackets from Patagonia and The North Face to ensure that the current design was on target with trends in mainstream outerwear. The review of existing products and collections led to the design inspiration behind the aesthetics and features exhibited in Ice Wine. It was made evident through this review that there are relatively few retailers providing high-quality functional outerwear for people with disabilities, and their collections are fairly limited.

In this review, the designer did not find any retailer producing down parkas optimized for people with disabilities. Down parkas are a trending staple for non-disabled consumers during the winter months because of their warmth and lightweight qualities. However, there are no comparable adaptive options for people with mobility impairments. This garment builds on past work by the designer who has explored design for equitable participation in athletic activities. In this design, the designer specifically explored ways to advance the design of adaptive winter attire.

***Aesthetic and Functional Properties:*** Based on the contextual review, the designer developed Ice Wine. This feature-rich adaptive down parka enhances the fit, performance, and adaptability of outerwear for people with mobility limitations. Regarding fit and style, the design features a zipoff lower portion that can go from fitting a person in a seated position to a knee-length parka suitable for people in a standing position. The length of the jacket upper stops at the low waist. From there, an interchangeable lower can be added, depending on the wearer's preferred fit. The adaptive lower is designed to provide knee-length coverage on the wearer's lap, but not bunch at the waist, back, and sides. The length of the adaptive lower stops at the seat and follows the thigh, skimming the surface of the wheelchair seat. The center back of the adaptable lower is kept intentionally simple so that there are not points of abrasion when coming into contact with the back of a wheelchair. Other fit considerations include using narrow chevron baffles for a contoured fit by allowing the quilted fabric to curve with the body. The chevron motif is featured throughout the parka for contour, fit, and aesthetic purposes. There are also snaps in the center back of the standing lower, to adjust the bottom opening to walk more comfortably. The easy-dress features in this parka include a magnetic close zipper (Magzip.com) on the front of the coat with a wind flap and zipper garage to protect the wearer's chin. All zippers also include easy to grab zipper pull attachments. The fabric used in this design is 1.4 oz coated 100% nylon ripstop and filled with 600-fill power goose down, providing warmth without the weight. The parka also features an adjustable hood with extended collar, two zippered handwarmer pockets, and one zipped chest pocket for extra storage. The pocket placements were optimized for easy access while sitting. There is also a removable down facemask for protection against airborne illnesses. In this design, both the functional performance features and aesthetic properties add value and form a cohesive garment.

***Originality, Innovation, and Cohesion:*** The adaptive lower is optimized to fit well in a seated position without excess fabric in the hips/waist/lap areas. Furthermore, the modular concept is an inclusive approach to this design. If taken to market, retailers could sell the parka upper with the option to purchase one or both lowers. This design showcases that creating apparel that is usable for a wider variety of people is easy to implement with modular features. Using the same materials, the adaptive lower is not cost-prohibitive and may help reach minimum order quantities. Adaptive clothing should not cost more than non-adaptive clothing.

***Process, Technique, and Execution:*** The designer developed this design using flat patternmaking and industrial sewing techniques. The designer began by adjusting a basic block

to fit a seated mannequin. Ideally, the designer would have worked with a live fit model who had a mobility impairment. Without access to a fit model, the designer purchased a seated mannequin. After iterating two muslin mock-ups to adjust fit, the designer marked the style lines and adaptive features directly on the muslin to ensure the placement was correct in a seated position. The designer then completed a third mock-up with style lines and features in fabric with the body to check fit. The designer prepared the final material and trims for the final design by dyeing the trims and lining fabric, so they were dyed-to-match. Next, the designer cut the final fabric and lining. Using double-stick tape, the designer taped the final fabric together right-side-out within the seam allowance. The tape was used to secure the two layers while staystitching along the perimeter of each pattern piece, leaving a 4" gap in the sewing line. The hole was later used to fill each pattern piece with down. The designer drafted the quilt lines onto the final fabric using chalk, matching across seam lines, and then filled the sections with down, weighing each to ensure that the corresponding pieces had the same amount of down. Each pattern piece was quilted. Final garment assembly followed a pre-determined order of operations.

**Contribution:** Overall, this design contributes to the advancement of apparel options for people living with disabilities. It shows that relatively simple modifications to design thinking can ensure that everyone has access to styles and performance features desired by all consumers.

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#### References

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