Airbag Backpack System Packs

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After years of delays and bureaucratic hoop jumping, live-saving Airbag Backpack System (ABS) inflatable avalanche backpacks are finally, legally available in the United States. Key to this change is a new canister stamped with this number: DOT -39 NRC 3940/4930 M9802; proof of approval by the United States Department of Transportation (DOT).

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Aside from the change in the actual canister used, the functionality of the ABS packs remains the same. Airbag packs use a canister of compressed gas (nitrogen) to expand and fill an inflatable, airtight bag on the pack. In the case of ABS packs, two bags on either side are used.

Intuitively it seems to work by causing the victim to float to the surface. In reality it works on a more complex phenomenon known as Inverse Grading, or the Separation Effect. This is the tendency of smaller particles to fall to the bottom in a turbulent, flowing medium. Thus, in an avalanche individual snow flakes and smaller grains of bonded snow will move to the bottom of the avalanche flow, while larger chunks and debris will tend to stay on or near the top.

The airbag pack works by taking advantage of this by making the wearer effectively larger in volume, increasing the probability that they will either remain on the surface of the avalanche, or at least minimize burial depth. In fact, the development of the concept was the result of an epiphany a forester had after being caught and surviving several avalanches in the 1970s.

The forester, Joseph Hohenester, was in the habit of hunting in winter and would glissade mountain slopes as a shortcut with the slain game strapped to his back. After surviving a few avalanches this way he theorized the extra volume of the carcasses on his back was a key factor in his survival. He tested that theory between 1975 and 1979 with balloons and large canisters.

In 1980 Peter Aschauer was heli skiing in Canada when he was involved in an avalanche accident. He returned home, acquired the patent, and founded ABS GmbH. Working in collaboration with Bayerische Bergwacht (Bavarian Mountain Rescue Service) to develop the carrying system, he introduced the avalanche airbag system pack at Winter ISPO 1985. It took ten years for the concept of preventing burials to catch on, but by 1995 there were several real-life incidents validating it. (History of ABS development)

The ABS pack is the only device currently available that works to actively keep the user on the surface of an avalanche. All other avalanche safety devices enable the user to be located, but do not change the probability of burial, leading to asphyxiation, the leading cause of death in avalanches.

The Avalung™, Black Diamond's breathing tube, now incorporated in packs to extend survival times should th user be buried in an avalanche

— also has an impressive track record of survival so far, but too few incidents to be statistically reliable. Even so, it is worth noting it has a 100% success rate with nine reported incidents so far. (First hand report on AvaLung effectiveness)

By the numbers, the ABS has an impressive track record with an overall 95% survival rate for those who wore one. This figure is a bit low since it includes 17 cases where there was a malfunction with the bags inflating. It should be

noted, in most of those cases the failure was due to operator error. Fortunately, in the majority of cases the bags inflated like they should, and when they do, the survival rate is 98% (see center & right columns below).

By comparison, the survival rate for those caught in an avalanche where an avalanche beacon is the only safety device is somewhere between 60% and 75% (see left column, above). The lack of precision is largely due to the difficulty of being accurate with data sources that are not consistent in their format over the years. In addition, there are many cases of victims not wearing beacons mixed in with those that did. However, in either case, the key to survival—a speedy extrication—is generally not achievable.

The beauty of the airbag concept is that it reduces the likelihood of burial, which dramatically reduces the risk of burial, and asphyxiation. Out of 151 cases where the airbag inflated properly, 66 people were not buried and 63 were partially buried. Of the other 21 cases, only three were buried with no visible clues on the surface, while 19 were completely buried, but the airbag was still visible on the surface making short work of locating and establishing an airway. Sadly, three did die, although two survived an initial avalanche only to be killed by a secondary avalanche.

Since the pressurized canisters are potentially expolosive, airlines may refuse to carry them. This may be due merely to ignorance. If you plan to fly with your ABS pack, you are required to ask the airline you fly with to consider accepting your pack as baggage a full two weeks in advance. Submit this International Air Transportation Authority (IATA) form with your request.

Even though the ABS packs have been theoretically available since 1995, interest in them didn’t pick up until the turn of the century. With the security changes that resulted in the aftermath of 9/11, the pressurized canisters that cause the airbags to inflate became viewed as potential bombs. It is true they contain pressurized gas, and if heated, could explode. This would have to be an aberrant environment, but is theoretically possible in the cargo hold of a plane—unlikely, but possible. To add to the confusion, to release the compressed gas the cap is pierced by a small explosive charge. That was enough to cause a unilateral rejection on the ability to legally transport ABS packs via commercial carrier anywhere in the United States. That meant on the plane over from Europe, or in a Brown truck to your door.

Until just this week (mid-October '07), that was the reason ABS packs were heard of, but not seen in the US. As of now, however, all that changed when DOT certified a new canister that, unlike the original design, cannot be reused. Perhaps not the green answer ABS had hoped for, but better than continued denial of the only avalanche safety device proven to reduce burials. Now that those hurdles have been overcome for ABS, it should also clear the way for other manufacturers to offer similar products.

Other packs working on the same inflatable airbag concept are currently being developed, one by Wari LLC in the US, and SnowPulse, out of Switzerland. The SnowPulse pack uses a bag that inflates around the users head to increase the chance of it remaining unburied. Even if the user ends up buried, the bag automatically deflates after 90 seconds, providing a breathing cavity.

The main difference in the development of Wari LLC’s airbag project the goal of developing an inflatable pac system that retails around $500 US. Currently all airbag packs are in the $800-$1200 range.

To find out more about ABS packs click here (No. American Website) or here (ABS HQ)

To find a North American dealer, click on the Contact link at www.abssystem.com