

Avalanche Airbag System

It does not make you float. It makes you a bigger particle.

SEPARATION, NOT FLOTATION

Moving debris behaves as a granular flow, and in an agitated granular flow large objects migrate upward while small ones settle between them. The bag works by making the wearer a larger particle. So volume matters more than lift; the bag must reach full volume early and stay inflated for the whole ride, because separation takes the whole ride; and what is engineered against is critical burial - the head beneath the surface - rather than impact.

MOST OF THE AIR IS ENTRAINED, NOT CARRIED

A cylinder small enough to carry cannot hold the volume the bag needs, so the cartridge gas is used as a jet through an aspirator and drags in far more ambient air behind it. Entrainment depends on the strength of that jet - so a cartridge that has lost pressure does not merely fill the bag more slowly, it entrains less air as well, and the shortfall compounds.

IT MUST WORK ONCE, COLD, AFTER A SEASON OF NOT WORKING

Cartridge pressure falls with temperature, so a cylinder filled to specification in a warm store holds materially less energy at altitude in winter. Seals stiffen, lubricants thicken, a trigger cable can ice. The charge is therefore specified at the cold end of the service range, and the equipment is qualified by repeated deployment after cold soak, in carry configuration - not by a bench demonstration at room temperature.

THE CARTRIDGE IS A PRESSURE VESSEL WITH A LOGISTICS TAIL

Filled to a controlled pressure AND a controlled moisture specification, because water carried into the cylinder freezes where the gas expands and a blocked orifice is a bag that does not inflate. Inspection and requalification apply, and a deployed pack is dead weight until recharged - so the refill chain is designed as part of the system.

THE SYSTEM

- Inflation - cartridge interface, valve, aspirator, fill path
- Trigger and actuation - glove-usable, with deliberate arming and safing
- Cylinder charging and certification - pressure, gas quality, requalification
- Integration and qualification - load carriage, cold soak, repeated deployment

SCOPE - STATED PLAINLY

Ours: the inflation system, cylinder charging, gas quality and certification, the deployment trigger and its reliability at temperature, cold-soak and deployment qualification, load-carriage integration, fleet refill and through-life support - including build to the customer's specification. Bought-in certified: the bladder and its textile, the certified gas cartridge, and the pack fabric and harness hardware - integrated rather than imitated. The customer's: the requirement, the user population and the terrain.

STATUS

Engineered to order. The class is offered as an engineered-to-order capability; no delivered avalanche airbag system is claimed.