

Apex BASE

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RE: **Service Bulletin LS 07-12-01**

Why Service Bulletin LS 07-12-01?

It was reported that 2 jumpers had line failure on line sets constructed using 400 pound Dacron line. The 2 reports were received within a couple days of each other and Apex issued a Service Bulletin which identified other possibly effected parachutes. Apex offered a Product Modification Procedure to assist the customers and get their gear back in the air. The PMP kit is being offered at no charge for 12 months. The PMP brings the existing canopies in the field up to the current manufacturing standard by replacing the two original 400 lb center A lines with 525 center A lines. This preventative measure was implemented with only the information provided by the 2 jumpers who experienced the breakage. We asked the two affected canopies be sent back to us for inspection and line replacement. A couple weeks later we received the parachutes. Upon inspection it was obvious the lines were well worn and had simply been used to the extent that failure occurred. The original reported number of jumps have been updated by the jumpers to 150 plus on one canopy and 120 plus on the other. If these canopies had come to us for inspection (before the lines had broken) a new line kit would have been deemed worthy. We are grateful neither jumper was injured and both worked well with us to handle the situation in a professional manner. The positive side of all this is, we are all talking more about our gear and the need for regular inspections and maintenance of worn parts, like line sets.

Why cascaded lines and not continuous lines?

The first few years (starting 1993) we built the FOX with continuous AB centers. We discontinued using continuous about 15 years ago for a couple reasons. The FLiK was produced from day one with cascaded A centers. One- upon reviewing lots of video and stills we found a completely unique (large) wave length in continuous line during deployment, when compared to the cascaded lines (small wave length) on the rest of the line kit. It is our belief that this mixture of continuous and cascaded lines are less than ideal for the single parachute system. Two- around the same time we were working with several continuous line canopies (not BASE) and the frequency of malfunctions due to tension knots was much higher than other canopies with cascaded lines.

We've been building cascading lines with 525 for 15 or more years. In the last year we have been doing numerous pull tests to help improve our understanding of our lines and line attachments (tabs and bartacks). We have data to support the 525 cascade and don't believe implementing changes that may in fact create other problems is a prudent way to proceed. Our goal is to inform our cus-

tomers and offer them solid solutions for the products we build. Apex will not be implementing “knee jerk” policies or “fixes” that will have unknown consequences or may create future problems. Rest assured we will continue to monitor, evaluate, and gather data from which we will make thoughtful decisions.

Why did we use 400 lb. line to begin with?

The desire to reduce bulk and weight while maintaining the shock absorption property of Dacron line prompted us to investigate the feasibility of 400 lb Dacron line kits. Some manufacturers opted for the lower bulk Spectra line but in doing so their canopy would be limited to slider up jumps only. Why slider up only? Spectra does not have the shock absorbing quality that Dacron has. Doing no slider jumps with Spectra is considered dangerous because opening forces can easily damage the line attachment tabs, risers and the jumper. By using a lighter Dacron line we were able to satisfy both desires of our customers. We built test canopies using 350 and 400 lb lines. We got several hundred jumps on both line types in both the skydiving and BASE environments prior to releasing them to our customers.

How strong is a line attachment tab?

The material used by Apex, and several other manufacturers, is Type III 3/4 inch. The Type III has a tensile strength of 400 lbs. Our early pull test showed this tab to fail at just over 300 lbs, on average. We switched to a different bartack and were able to increase the average failure to 366 lbs. (an increase of more than 20%).

In the 19 years we've been building canopies we have not had a line tab failure due to opening. However, we have seen a few due to object strike.

What happens, how does the parachute fly, when a center A line is broken?

When the A line brakes it is generally below the cascade which means 2 points at the canopy have been lost. If A4 breaks below the cascade then A4 and B4 at the canopy have lost support. This will create a sizeable bump in the upper surface reducing the parachutes ability to create lift. Since most of the lift is generated in the center of the parachute this will cause considerable loss of lift. When both centers (A4 and A5) are broken below the cascade the parachute loses most if not all of the forward speed and becomes a decelerator (relying on drag not lift). We have conducted test where we intentionally cut A4 and A5 (below the cascade) to evaluate the canopies performance. We continued to cut A3 and A6 (again below the cascade). This creates a loss of 8 attachment points at the canopy. In both situations it appears the jumper is better off leaving the brakes set (not firing the toggles). During these tests it was also observed that a canopy with vents behaved better than one that had no vents. The non-vented canopy became uncontrollable, spinning, and line overed. The vented canopy did not line over or spin and directional control remained. While testing we questioned whether or not the vented parachute would be safe to land. Even though both jumpers where the lines broke (described above) landed without injury we don't recommend any intentional testing. Video of our test jumps is currently being edited for release to the our web site. Stay tuned.