



Sabre2 Flight Characteristics

1. Introduction

The Sabre2 from Performance Designs is a slightly tapered, zero-porosity nine cell canopy. Like the original PD Sabre, the Sabre2 is designed to be fun to fly, easy to land, and to be a great general-purpose skydiving canopy. This is not just a modified Sabre, though. The Sabre2 is a totally new design, and takes full advantage of the research and technological advancements we have achieved in the decade that has passed since we released the original Sabre.

In this document, we will compare the performance characteristics of the Sabre2 to the original Sabre, since it remains a popular canopy. We will also compare some characteristics to the PD Spectre, another popular general-purpose canopy.

A Note on Comparing Canopies: When comparing two different canopy designs, such as the original Sabre and the Sabre2, an accurate comparison can only be made if the canopies are the same size, they are flown under similar conditions, and they are flown by the same jumper, or by two jumpers of very similar size and weight. Comparing a 150 Sabre2 to a 170 square foot canopy, for example, would not yield an accurate comparison.

The way canopies are "set up" can also affect a comparison. Two identical canopies will perform differently if one has the toggles attached at the location specified by the factory, but the other has had the steering lines shortened a few inches. If one canopy has a collapsible pilot chute and the other does not, this will also make a significant difference. There may also be a difference between a canopy with new lines, and one that has several hundred jumps on the line set.

2. Openings

To describe the openings, we need to agree on some common terms. The first part of the opening you feel, when the canopy first reaches the end of the lines, is the **snatch force**. The second phase of the opening, when the canopy is overhead but the slider is still all the way up, is called the **snivel**. The third stage, when the slider travels down the lines and the cells finally pressurize, is called the **inflation**.

Overall, the openings on the Sabre2 are quite comfortable. The Sabre2 has about the same snatch force as a Spectre or the original Sabre. It will generally snivel longer than a Sabre, but not quite as long as a Spectre. The inflation speed is similar to the Spectre.

The Sabre2 is also similar to the Spectre in that it is fairly forgiving of packing technique, body position, and the airspeed at which it is deployed. We had consistently good openings while testing the Sabre2 using a variety of packing methods, including our normal factory PRO pack, a neat side pack, and some other pack jobs that probably were not wise to try.

You will get the best results, however, by using the packing method we recommend, and by deploying at a reasonable airspeed while in a good body position. As with any canopy, a correctly positioned slider, proper line stows, and a correctly sized pilot chute is required to ensure consistently soft openings. See our information sheet entitled "Solving Deployment Problems" for more information.

3. Flight Characteristics

Although the overall flight characteristics of the Sabre2 are similar to the original Sabre, there are a few noticeable differences:

Straight Flight at full Glide: The Sabre2 and the original Sabre both fly at about the same airspeed, but the glide angle of the Sabre2 is a bit flatter. You may notice the Sabre2 gives you better penetration when flying into the wind, and carries you farther when flying with the wind at your back.

Straight Flight in Brakes: The Sabre2 has a lower rate of descent in brakes than the original Sabre. This will be useful if you are returning from a long spot with the wind at your back, and use your brakes to “float” farther. It will also be useful if you like to fly in brakes for a while after opening, to let other canopies land first.

Toggle Turns from Full Glide: The Sabre2 is more responsive than the original Sabre, but not radically different. Less toggle input is required to start a turn on the Sabre2, and toggle pressure is generally lighter than the original Sabre. Like the Spectre, the Sabre2 will lose slightly more altitude in a turn than the original Sabre.

Toggle Turns in Brakes (Flat Turns): Flat turns are an important technique to learn on any canopy. By pulling the toggles half way down, then slowly raising or lowering one toggle to start a turn, you will lose much less altitude than by making a turn from full glide. The Sabre2 is quite responsive in braked flight, making flat turns very effective on this canopy.

Front Riser Turns: Like the Spectre, the Sabre2 has light front riser pressure. Even larger sizes of the Sabre2 respond fairly well to front riser input. As with most canopies, if the control lines are too short the Sabre2 may “hobble” when the front risers are pulled. A canopy’s control lines normally become shorter after several hundred jumps, or can be made too short by attaching the steering toggles too close to the brake loop.

Stall Characteristics: As with the Spectre and the original Sabre, you may find that you can pull the toggles all the way down to full arm extension without stalling the Sabre2, especially if you are jumping a larger one. It’s important to remember that you do not have to be able to stall your canopy in order to land it correctly. Technically, a stall means the canopy has dramatically reduced its lift and increased its rate of descent. A stalled canopy is not really “flying” any longer. If you want a soft landing, you really want your canopy to keep creating lift and maintain a low rate of descent until your feet are on the ground. If you adjust your steering toggles so that your canopy is easier to stall, it may actually become more difficult to land softly.

The Sabre2 will reach a fairly low airspeed before stalling. As with many canopies, it’s not unusual to experience some end cell closure when recovering from a full stall. After recovering from a stall, bringing the toggles back down to between $\frac{1}{2}$ and $\frac{3}{4}$ brakes and holding them there for a moment will help the end cells re-inflate more quickly.

Landings: Like the original Sabre, the Sabre2 is an easy canopy to land. When a proper flare technique is used, the Sabre2 generates more lift at low airspeed, which allows for even slower touchdown speeds and softer landings. And like the original Sabre, the Sabre2 may still give you a decent landing even if your flare is less than perfect, as long as you are jumping one that is a reasonable size.

Aggressive Approaches (High-Speed Approaches): As we mentioned above, the Sabre2 loses slightly more altitude in a turn than the original Sabre and the Spectre. By comparison, the PD Stiletto pulls out of a dive relatively quickly. As with most canopies, smaller sizes dive more in turns than larger ones.

It is important to consider differences like these when making an aggressive, turning approach on a canopy that is new to you. Even if you have made hundreds or thousands of these approaches, it is best to be cautious when trying a new type of canopy or a smaller size than you are accustomed to.

4. Canopy Sizing

The chart below shows our suggested weight limits for the Sabre2. We provide this information with each of our canopies to help you choose the correct canopy size for your weight and experience level. It is important to understand what the information really means so you can use these charts correctly.

Exit weight is your body weight plus the weight of your clothing, rig, main and reserve canopies, and anything else you will be wearing when you exit the aircraft. The average jumper's exit weight is about 20 to 25 lbs. more than his or her body weight.

There are various exit weights listed on the chart below, divided into several experience categories. It's important to note that these are **maximum** weight limits. For example, the maximum exit weight listed under "Novice" for a 170 Sabre2 is 153 lbs. This means we feel the 170 is appropriate for a novice jumper with an exit weight of 153 lbs. **or less**. It does **not** mean you must weigh 153 lbs. to make this canopy perform correctly. In fact, a much lighter jumper might be perfectly happy flying this canopy. The canopy will have a slower forward speed and lower rate of descent when flown by a lighter jumper, and is likely to be more forgiving and easier to land. These may be exactly the characteristics this jumper wants from a canopy!

Of course, a light jumper on a large canopy may be affected more by high winds. This is why the **minimum** exit weight "varies with weather and landing conditions" (VLC). If the winds are light, a 150 lb. jumper might enjoy flying a 230 square-foot canopy, but this would not be a good idea if the winds were very strong and gusty.

The chart below can help you determine the canopy sizes that might be appropriate for you, but we don't recommend making your decision based solely on this information. Just as you need to try on a pair of shoes to see if they actually fit, you really won't know how a particular size canopy will fly until you have actually jumped it. When purchasing a canopy, it's best to choose a model and size that you know from experience will provide the performance you want.

If you plan to jump a canopy that is smaller than any you have used before, your exit weight should be within the "Student" or "Novice" category for that canopy, and you should be trained to use the canopy by a qualified instructor. Or, you should have at least 50 jumps on a canopy that is no more than 15% larger (approximately one size), and be able to consistently make soft, accurate landings with that larger canopy.

| Canopy Size | Minimum Exit Weight | Maximum Exit Weight (lbs.) | | | | | |
|---------------------|---------------------|----------------------------|--------|------|------|--------|-----|
| | | Student | Novice | Int. | Adv. | Expert | Max |
| 97 Sabre2 (SA-097) | VLC | N/S | N/S | N/S | 97 | 126 | 155 |
| 107 Sabre2 (SA-107) | VLC | N/S | N/S | N/S | 107 | 139 | 171 |
| 120 Sabre2 (SA-120) | VLC | N/S | 102 | 114 | 120 | 156 | 192 |
| 135 Sabre2 (SA-135) | VLC | N/S | 115 | 128 | 135 | 176 | 216 |
| 150 Sabre2 (SA-150) | VLC | N/S | 135 | 150 | 165 | 195 | 240 |
| 170 Sabre2 (SA-170) | VLC | 136** | 153 | 170 | 187 | 221 | 255 |
| 190 Sabre2 (SA-190) | VLC | 152** | 171 | 190 | 209 | 228 | 266 |
| 210 Sabre2 (SA-210) | VLC | 168** | 189 | 210 | 231 | 252 | 273 |
| 230 Sabre2 (SA-230) | VLC | 184** | 219 | 230 | 253 | 276 | 299 |
| 260 Sabre2 (SA-260) | VLC | 208** | 248 | 260 | 286 | 312 | 312 |

VLC = Varies with weather and landing conditions

N/S = Not Suggested

** = Although these canopies have been used successfully with students, Performance Designs has other models, which may be more appropriate.