



Your last line of defense

Object

This document is intended to provide detailed information to authorized ICARUS Canopies dealers for the appropriate sale and distribution of the ICARUS Reserve canopy. This is not a manual for parachute operations; neither is intended to substitute the corresponding Federal Aviation Administration regulations or the mandatory or necessary instructional programs for the regular practice of parachuting/skydiving activities.

General

ICARUS Canopies is pleased to announce the release of the new **ICARUS Reserve** canopy. With this addition to its range of products, ICARUS Canopies provides a complete range of parachutes for the most demanding skydivers. The introduction of the **ICARUS Reserve** complements the world renowned Icarus main canopies like the SAFIRE 2, the CROSSFIRE 2, the OMEGA, the OMNI, the ICARUS Tandem, the EXTREME FX and the EXTREME VX, offering a complete canopy solution for the modern skydiver and canopy pilot.



Following its vision to design and develop the finest state-of-the-art wings, ICARUS Canopies is offering the **ICARUS Reserve** with the highest construction standards and impressive performance that will satisfy the high demands of today's skydivers. ICARUS Canopies has successfully completed the ETSO-C23d by EASA (European Aviation Safety Agency) and TSO-C23d (FAA) testing and certification process, complying with the latest and highest requirements for safety and performance in the industry.

Years of intensive field trial and use within rough military environments have proven the outstanding strength and reliability of the **ICARUS Reserve** in emergency situations where trust and effectiveness are required.

ICARUS Canopies has gone again **ONE STEP AHEAD** and has designed a state-of-the-art wing that provides fast, accurate and reliable openings as well as unique flight characteristics for a reserve canopy. From the safety and reliability of the opening, the jumper continues his/her flight under the **ICARUS Reserve**, with unparalleled flight and landing performance.



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A bit of history

In 1999, ICARUS Canopies began the **ICARUS Reserve** project, in order to fulfill the market demand for a high quality Reserve canopy.

In May 2002, **ICARUS RESERVE** certification testing began in France at the independent test center CEVAP (Centre d'Essais en Vol Aérotransport, Parachutage in Toulouse) - D.G.A. (Délégation Générale pour l'Armement) – Ministère de la Défense.

From July to September 2003, CEVAP successfully completed all the test drops according to ETSO-C23d certification requirements (refer to EASA regulations for further detail).

In November 2003, CEVAP issued the final test report, concluding with the satisfactory completion of all ETSO-C23d certification requirements, stating that “The reserve canopy PN 317523 (Part Number for the **ICARUS Reserve**) has a good flight behavior, particularly during the landing phase”.



In October 2005, with the completion of the certification process, the EASA (European Aviation Safety Agency) issued the ETSO certificate for the **ICARUS Reserve**.

In January 2006, the FAA issued TSO approval for the **ICARUS Reserve**.

In April 2006, ICARUS Canopies sent a public press release to the skydiving magazines announcing the launching of the **ICARUS Reserve**.



During April 2006, ICARUS Canopies is sending information to all dealers about the **ICARUS Reserve**.

Beginning May 2006, ICARUS Canopies will take orders for the **ICARUS Reserve**.

Beginning June 2006, ICARUS Canopies will deliver **ICARUS Reserve** canopies to the market.



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Product Specifications

The **ICARUS Reserve** is a 7-cell canopy with made of low porosity fabric and Spectra lines for reduced pack volume. Sizes are available from 109 to 279 sq. ft (no custom sizes). The **ICARUS Reserve** is only available in WHITE.

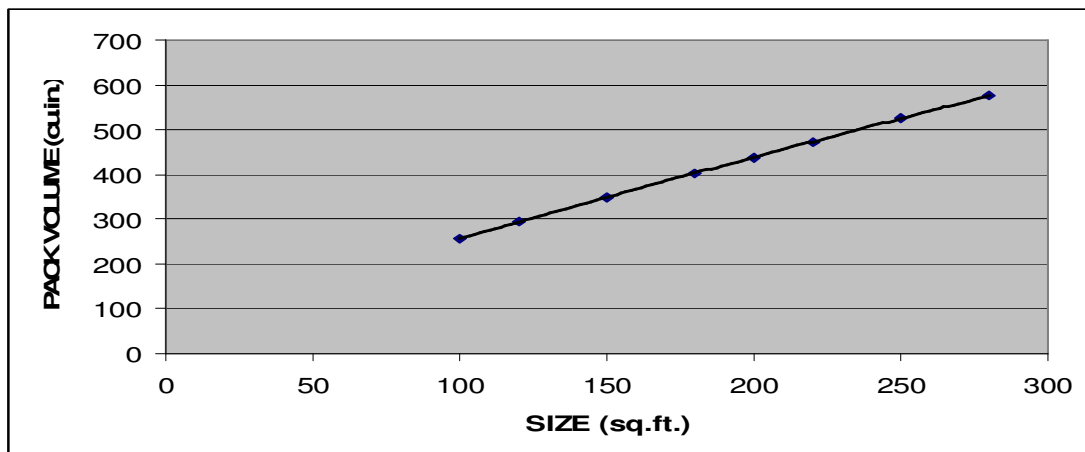
The **ICARUS Reserve** is designed and constructed as a low aspect ratio, 7-cell parachute with a square planform for stability during opening, flight and landing, exhibiting predictable behavior throughout its entire flight.

To ensure a solid parachute able to withstand all conditions required by the Aerospace Standard AS8015B, the FAA TSO-C23d and the EASA ETSO-C23d, the **ICARUS Reserve** uses extra reinforcement where needed (chordwise, spanwise, throughout the nose, and at all line attachment points).



The **ICARUS Reserve** canopy features a low pack volume as compared to other reserve parachutes, thanks to the use of 0-3 CFM low permeability, high quality ripstop fabric (SASPA T-34, PIA C-44378C Type IV), together with its unique reinforced construction. However, exact pack volume can be affected by many things including environmental factors, packing technique, and even the number of pack jobs on the canopy.

With these factors in consideration, the following graph is a very good estimate of the pack volume for the size canopy.





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The suspension lines are 725lb Spectra, with the lower steering lines made of 1000lb Spectra. Line attachment points are secured with double bartacks for higher strength. **ICARUS Reserve** Spectra lines are coated to assure better protection during packing, opening and after landing, better resisting damage from bushes, sand, Velcro hook, etc....

The **ICARUS Reserve** slider includes an opening in the center and extra reinforcement to ensure fast and reliable openings.

The **ICARUS Reserve** is manufactured under the highest Quality Control standards. All materials are thoroughly inspected and tested according to military (MIL SPECS) standards. The manufacturing process is strictly controlled under ISO 9001:2000, NATO AQAP 2120, EN9100:2003 for Aerospace Quality Standard, EASA Part 21A.G.

Selecting the appropriate ICARUS Reserve canopy

To select the appropriate ICARUS Reserve size for a jumper, several factors must be taken into consideration. Some of these factors are legal limits and must be respected.

To select the appropriate ICARUS Reserve size, it must be considered the jumper's MAXIMUM EXIT WEIGHT. Make sure that the jumper's MAXIMUM EXIT WEIGHT complies with the certified one for each ICARUS Reserve canopy size, in accordance with FAA TSO C23(d) and EASA ETSO C23d requirements.

The MAXIMUM EXIT WEIGHT for a reserve canopy size is a legal limit. This parachute was tested under US FAA TSO C23(d) and EASA ETSO C23d to maximum exit weights of 255 lbs(116kg). It is forbidden to use any ICARUS Reserve parachute with an exit weight exceeding the MAXIMUM EXIT WEIGHT for which each canopy is certified for.

The MAXIMUM EXIT WEIGHT is detailed on the warning label sewn on each ICARUS Reserve, in the ICARUS Reserve manual and in all product documentation that can be found in the ICARUS Canopies website (www.icaruscanopies.aero).

Other suggested factors to be taken into consideration are the jumper's level of experience. Level of experience may vary from person to person and depends also on number of jumps, type of jumps, basic and additional training and jumper's skills.

Drop Zone physical placement (elevation, winds, weather, ground conditions, etc...) should also be considered. All these factors influence the performance of any given main and reserve canopy.

We recommend to select the ICARUS Reserve canopy size as similar as possible to the main canopy for safety considerations.

Operational Limits

Deployment speed is limited on all sizes to 150 KEAS (Knots Equivalent Air Speed).

A parachute system was designed to operate and function within specific weight and speed parameters, while oriented in a "belly to earth" body position



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Some body positions during freefall (i.e. head down, stand up, long dives etc.) may enable the user of this parachute to reach speeds beyond those for which the equipment has been designed and tested.

In the event of a premature or unintentional deployment while in these body positions you are risking any /all of the following:

- Extremely hard openings
- Equipment failure
- Light to severe injuries
- Death

Never exceed the operational speed or weight limits of the parachute system. You should avoid deploying in an attitude that the equipment was not designed for.

Permitted Wing Loadings

Wing loading can be calculated as follows:

The jumper's total exit weight is the total weight, in pounds, of the jumper's body plus the weight of all the jumper's equipment, including the parachute system (normally 20 – 30 pounds) itself and any additional equipment such as helmets, cameras, etc.

Wing loading is then determined by dividing the jumper's total exit weight (in pounds) by the surface area of the parachute (in square feet).

Example:

- A jumper who weighs 170 lbs wearing his jumpsuit, helmet and altimeter;
- using a packed rig that weighs 25 pounds

Would have a exit weight of 195 pounds.



If this jumper jumps a 169 sq.ft canopy, he would have a wing loading of 1.15 lbs / square foot:
 $195\text{lbs} / 169\text{sq.ft.} = 1.15$

A wing loading lower than 0.5 lbs/ft² is unsafe. In unstable atmospheric conditions such as turbulence, such a wing loading may not allow for sufficient pressurization of the parachute. Additionally, forward speed is reduced to the point that penetration into even light winds may not be possible. Therefore, the wing loading range below 0.5 lbs/ft² is not recommended.

A wing loading between 0.5 and 0.7 lbs/ft² is considered a light wing loading. It is especially recommended for low experienced jumpers. This wing loading may allow the jumper to make small mistakes, such as an early or late flare without severe consequences. The parachute is still a little bit sensitive to unstable atmospheric conditions, such as turbulence. In consideration of this, even though other people might be jumping, this wing loading should not be considered



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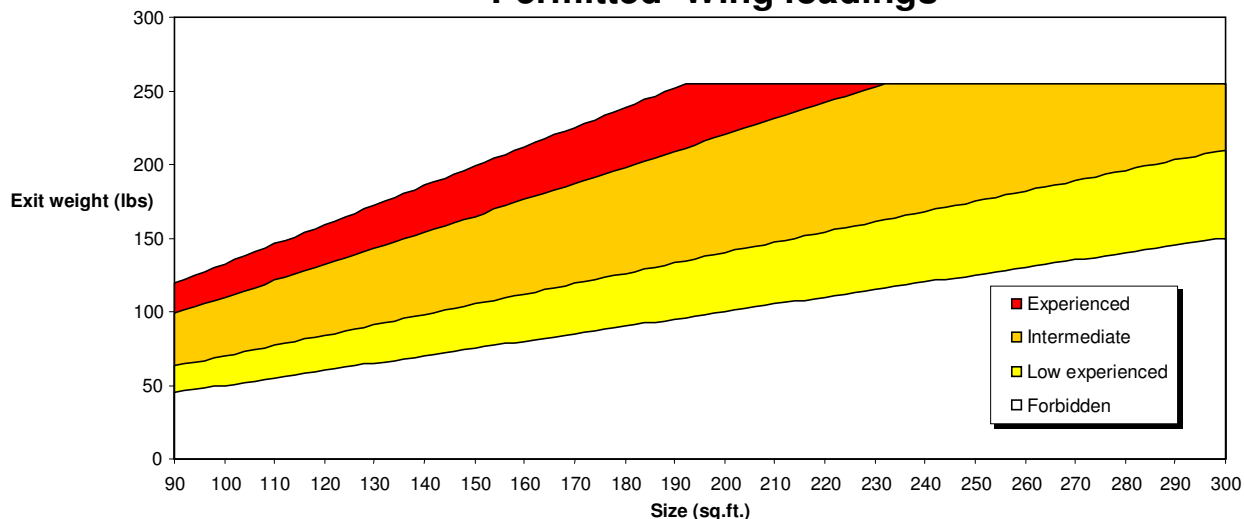
safe in unstable atmospheric conditions.

A wing loading in the range from 0.7 to 1.1 lbs/ft² is recommended for most jumpers. The parachute will have the best overall performance within this range. This wing loading establishes the best balance between properties like speed, flare power, reactivity, and resistance to adverse atmospheric conditions.

A wing loading between 1.1 and 1.325 lbs/ft² is recommended for very experienced jumpers only, who are aware of the dangers associated with flying a highly loaded reserve parachute. Landing a reserve parachute with this wing loading requires a high skill level, especially in small landing areas, at high density altitudes, or in congested traffic areas. At this wing loading, even with a fully deployed parachute, being unconscious or making an error of judgment during landing can still result in serious injury or even death.

A wing loading higher than 1.325 lbs/ft² will result in a high descent rate even with a fully deployed canopy. At this wing loading, the parachute can not be expected to save the jumper's life if he is unconscious. Therefore, it is not recommended to use this parachute in the wing loading range above 1.325 lbs/ft². The following chart shows the permitted wing loadings:

Permitted Wing loadings





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Technical Specifications

Size sq.ft.	Volume cu.in.	Span		Chord		Maximum Exit Weight		Aspect Ratio
		m	ft	m	ft	kg	lbs	
109	270	4.6	15.0	2.2	7.2	65	144	2.1
119	298	4.8	15.7	2.3	7.5	72	158	2.1
139	348	5.2	17.0	2.5	8.1	83	184	2.1
149	370	5.4	17.6	2.6	8.4	89	197	2.1
169	410	5.7	18.7	2.7	8.9	102	224	2.1
189	446	6.0	19.8	2.9	9.4	113	250	2.1
219	493	6.5	21.3	3.1	10.2	116	255	2.1
239	522	6.8	22.3	3.2	10.6	116	255	2.1
259	547	7.1	23.2	3.4	11.1	116	255	2.1
279	571	7.3	24.0	3.5	11.5	116	255	2.1

**For sizes below 109 sq. ft., please contact ICARUS Canopies.*

MSRP (Manufacturer Suggested Retail Price)

ICARUS Reserve	MSRP EUR
109	1.015,00 €
119	1.015,00 €
139	1.015,00 €
149	1.015,00 €
169	1.015,00 €
189	1.055,00 €
219	1.055,00 €
239	1.055,00 €
259	1.095,00 €

Valid from April 24th 2006

*Prices do not include V.A.T./Taxes (if applicable), neither shipping costs
Prices shown are indicative only and may vary with exchange rate fluctuations.*

The company reserves the right to modify prices without prior notice.

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Information to the public

For ICARUS Canopies, SAFETY is our primary concern. That is why we value the role of the authorized and professional dealer to properly advise the jumper on their choice for an ICARUS Reserve, as well as the rest of our products.

ICARUS Canopies is currently working on adding all the new information to our website and marketing material, so that the skydiving community can have access to the necessary information about the ICARUS Reserve. Information on ICARUS Canopies' website will be available to the public in June 2006. Nevertheless, it is the intention of ICARUS Canopies to encourage the jumper looking for professional advice, to seek answers from our authorized dealers. Dealers are experienced professionals who can properly advise jumpers for their best choice on any ICARUS Canopy.

Dealer Discount Rates

Nowadays, market competition has driven prices low on reserve canopies, diminishing the profit margin of the reserve canopies for professional dealers. ICARUS Canopies has invested considerable effort and resources in the development and manufacturing of the finest and safest canopies in the industry, both main and reserve. As a result we market our canopies at what we consider to be a good balance between performance, quality and price.

We want our authorized dealers to make a good profit on the sale of ICARUS Reserve canopies in combination with our main canopies, as a result of the effort that they put into the sale of these products. Because of this, we are pricing our ICARUS Reserve canopies as detailed above, so that dealers can obtain a better margin. We require our dealers to sell our ICARUS Reserve canopies to the end user at discount levels not exceeding 15%. Prices are valid from April 24th, 2006.

The ICARUS Reserve canopy works under a specific discount scheme for our dealers, different from the discount given for main canopies. Therefore, general discount for dealers starts at 25% off from MSRP for any ICARUS Reserve canopy size.

Introductory Specials

In order to provide additional tools for promotion to our dealers, we are pleased to offer the following special promotions (valid until September 29th, 2006).

For the purchase of any Crossfire 2 and an ICARUS Reserve, we will offer 30% off on the ICARUS Reserve.

For the purchase of any Safire 2 and an ICARUS Reserve, we will offer 27% off on the ICARUS Reserve.

For the purchase of ICARUS Reserves in quantity 5 or greater, we will offer 30% off.



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Delivery Times

The ICARUS Reserve is intended to be sold mostly from stock. We are currently manufacturing ICARUS Reserve canopies for stock, which we expect to have available for the dealers beginning June 1st, 2006.

Before this date, all orders will have to be produced by special request, and will only be available in white. All such ICARUS Reserve orders, received from April 24th till June 1st, will be delivered during the month of July.

After the initial release of the ICARUS Reserve, delivery times will be the same as main canopies (available in stock or production under request).

This document is intended for authorized dealers only. Please feel free to contact ICARUS Canopies for any inquiry or comment you may have.

Safe and Blue skies,

