



# **PARA- CUSHION**

## **EMERGENCY PARACHUTES**

US Patent 3,908,937

**Technical/Rigger Manual**  
**For packing and maintenance of**

# **Para-Cushion**

## **Model 307**

**Part number: 124265**  
**with**  
**26ft. Mid-Lite Canopy**  
**Part number: 420550**



# **Strong Enterprises**

*"The parachute company with imagination"*

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# **! WARNING !**

*Parachuting is a hazardous activity that can result in serious injury or death. Failure to follow all warnings, instructions and required procedures may result in serious injury or death. Parachutes sometimes malfunction, even when they are properly designed, built, assembled, packed, maintained and used. The results of such malfunctions are sometimes serious injury or death. There are so many factors, both human and natural, beyond our control that we want you to clearly understand that by using or intending to use our parachutes, you are assuming a considerable risk of personal injury or death. If you are not willing to assume that risk, please return the parachute to the dealer where it was purchased for a full refund.*

# **DISCLAIMER**

*There are NO WARRANTIES which extend beyond the description of the parachutes in this manual and neither the seller nor any agent of the seller has made any affirmation of fact or promise with respect to the parachutes except those that appear therein.*

*The liability of the seller is limited to the duty to replace defective parts found upon examination by the manufacturer to be defective in material or workmanship within 7 days after purchase and found not to have been caused by any accident, improper use, alteration, tampering, abuse or lack of care on the part of the purchaser.*

# **Congratulations on the Purchase of your NEW Para-Cushion model 307**

**This Manual is organized into four separate sections.  
Section One contains the general information concerning your new 307  
system.**

**Section Two contains the inspection and maintenance requirements.**

**Section Three contains the rigging procedures.**

**Section Four contains the Appendices.**

**Each section contains valuable information concerning this 307 system and it is required that you read and understand all sections completely prior to use.**

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# Section One: General Information



## **1.0 Introduction**

Thank you for purchasing a new Para-Cushion model 307 Emergency Parachute System from Strong Enterprises. It is the finest available anywhere and with a little care, should last you a very long time. Rest assured that your new Para-Cushion has been constructed to retain the durability, reliability, and comfort that Strong Enterprises has been building into its products for over 50 years. We welcome your comments so that we may continue to improve our products and help make flying safer and more comfortable.

This section will go over the general information pertaining to the Para-Cushion model 307. This information will include the limitations, approvals, and overall description of this system.

### **1.1 Scope**

This owner manual, PN 510095, is a component of the Para-Cushion model 307 system. It covers the manufacturer's instructions for the assembly, packing, and maintenance of the system. The user manual, PN 510096, covers the manufacturer's instructions for fitting and use of the system.

### **1.2 FAA Approval**

Originally certified in 1973 under TSO C-23b, standard category, the Para-Cushion parachute assemblies were upgraded in 1992 to TSO C-23c, (in accordance with AS 8015A, category B and FAR 21, Subpart O). In our efforts to continually improve our products the Para-Cushion parachute assemblies are now FAA approved under TSO C-23f, which is the latest revision of the standard. A copy of the FAA Approval Letters are in Appendix B of this manual.

During the TSO testing all the systems passed extensive testing which included overload tests (360lbs at 210kts), environmental tests (chilled to -40F [-40C] and heated to 200F [93.3C]), multiple drops at various weights and speeds, live jumps with immediate opening, and delayed opening, and ground pull tests the average opening times at various weights can be found in Appendix C.

### **1.3 Operational Limitations**

When using the 26ft Mid-Lite Canopy (Strong Enterprises Part Number 420550), this Para-Cushion is limited to use by persons up to 254 lbs (115kg) fully equipped (person, clothes, and equipment including parachute) at up to 150 knots IAS.

### **1.4 Service Life**

The continued airworthiness of an assembly is at the discretion of the FAA licensed parachute rigger's, or foreign equivalent's, inspection during re-pack. While proper care can no doubt extend its usefulness, an older parachute should be examined more closely for signs of deterioration. Your parachute is a sensitive piece of life saving equipment and should be treated as such. However, it should not be expected to last forever, even with proper care. For more detailed information about airworthiness of this system see section two of this manual.

### **1.5 Parachute Repack Interval**

Your Para-Cushion is designed for a 365-day repack cycle. Your countries laws may dictate a stricter schedule, check your local regulations. The Para-Cushion must be packed by an FAA certificated parachute rigger, or foreign equivalent, with an appropriate rating or returned to Strong Enterprises for inspection and repack. If your Para-Cushion is exposed to moisture, excessive dirt or is damaged it should be inspected sooner than the maximum allowed.

***Note!***

***USA current repack regulations can be found in FAA FAR 91.307***

## **1.6 System Description**

The Strong Enterprises Para-Cushion is designed for emergency use only. It allows a person to bail out of a vehicle that has experienced a catastrophic failure and return safely to the ground under a 26' steerable round parachute.

The complete assembly consists of the Para-Cushion harness and container, the 26' Mid-Lite parachute, the ripcord, and the pilot chute.

### **1.6.1 Para-Cushion model 307 Harness / Container Description**

#### **1.6.1.1 Harness**

The aerobatic harness can be divided into two sections, the risers, the main lift web / leg straps. The main lift webbing is incorporated into the leg straps which are routed across the body to act as a chest strap as well. The harness is constructed using type 7 webbing and type 2, class A, size 5 thread. The type 7 webbing that has been treated with a resin mixture to increase durability. The harness is configured with integrated reserve risers. The risers are attached in a manner to ensure a direct loading of the harness during parachute opening shock which helps prevent wear and stress on the harness and passenger.

**Hardware** - The solid oval ring hardware is constructed using steel with a zinc coating to resist rust and extend useful life of the hardware and is proof loaded to 5,000 lbs force (22.2 kN). The mini O guide rings are made of stainless steel. The adjustable Cobra quick release buckle is made using 7075 aluminum with black anodized finish. The buckle is proof loaded to 4,046 lbs force (18 kN).

#### **1.6.1.2 Container**

The container is made of 420 denier nylon pack material. This creates an shell that protects the more fragile nylon parachute cloth. There is a single aluminum plate measuring 3" x 8 5/16" (7.6 x 21.1 cm) that is located in between the back of the container and the inside of the container. This plate has two holes through which grommets are secured. The holes measure 6 1/4" (15.9 cm) from center to center. This plate is used to provide a positive launching plate for the pilot chute upon ripcord pull. Each grommet is surrounded by fabric flaps that are used to protect the delicate parachute cloth from the closing loops that are routed through the grommets during packing. There are stow loops located in the bottom of the container that allow the installation of elastic bands. These elastic bands are then used to stow the parachute suspension lines of the packed and ready to use parachute. The container has all the channels, guides, and pockets to accommodate an automatic activation device (AAD), for automatic parachute release. There is a 1 1/2" (3.8 cm) loop located at the bottom of the container that can be attached to the user to ensure the parachute doesn't float up while the user is moving.

All external flaps are reinforced in high wear / stress areas using 1" wide type 4 tape. The container flaps are bound with 3/4" (1.9 cm) wide type 3 tape. All stitching is completed using size "E" thread using a 301 stitch in accordance with ASTM-D-6193.

A 24 1/4" (61.6 cm) long, 0.375" (0.95 cm) diameter housing is constructed in accordance with PIA standard PS70104. This housing is routed inside the riser cover on the wearers left side and extends up over the shoulder to exit between the container and the pin protector flap.

### **1.6.2 26' Mid-lite Parachute Canopy**

The Mid-Lite canopy is a 26' (7.9 m) diameter conical canopy. It is constructed using 1.1-ounce ripstop nylon parachute cloth with three mesh vents to allow steering. The canopy has 24 gores, an upper lateral band, a lower lateral band, a circumference band, a line stowage diaper, 24 line attachment tabs, 24 canopy lines, and 4 connector links.

Each canopy gore consists of four sections connected using a french fell seam and then reinforced using 1/2" (1.3 cm) type 3 tape for the lower circumferential seams. Each gore is joined to the adjacent gore also using a french fell seam and then reinforced using 3/8" (0.95 cm) type 3 tape. At the apex the canopy cloth is rolled around a piece of 9/16" (1.4 cm) tubular webbing and stitched down using a double needle stitch pattern. The skirt of the canopy fabric is rolled around a 1" (2.54 cm) specialized skirt tape, and secured using a double needle stitch pattern.

The 24 canopy suspension lines are constructed using type 1A cord. They are attached to the canopy by inserting them through the V-tabs and sewing them directly to the skirt using size "E" thread in a 304 zig-zag locking stitch in accordance with ASTM-D-6193. The opposite end is inserted through the riser webbing and sewn directly to the riser webbing using size "E" thread in a 304 zig-zag locking stitch in accordance with ASTM-D-6193. Control lines are finger trapped to the #3 and #22 suspension lines and then tacked in place using an automatic machine. The opposite end of the control line is run through the guide ring on the rear harness riser and attached to the toggles.

The parachute canopy gores are numbered counterclockwise from 1 through 24 consecutively when viewed from the risers.

### **1.6.3 Para-Cushion model 307 Ripcord**



The reserve ripcord is a soft loop handle located under a pull away cover on the wearers left main lift webbing. The ripcord cable is 36" (91.44 cm) inches long and has 2 straight locking ripcord pins on one end and a loop on the other end attaching it to the ripcord handle. The cable is a 3/32" (0.24 cm), 7x7 strand, oil free type 302 stainless steel cable, and the straight locking ripcord pins are made of type 302 stainless steel according to AF drawing 61C4304 Rev. K. The two pins are attached to the cable so that there is 6" (15.24 cm) between each pin measured from pin tip to pin tip.

### 1.6.4 Lil-Grabber Pilot Chute

The Lil-Grabber Pilot Chute is a 16" (40.6 cm) conical spring type high drag pilot chute made of 1.2 oz ripstop nylon with a meshed lower portion. The spring is approximately 20.4" (51.8 cm) circumference at the top and tapers to approximately 9.4" (23.9 cm) circumference.

There are three internal veins that help to increase stability and drag upon deployment ensuring the most efficiency possible. The ripstop upper combined with the mesh lower allows for rapid inflation and ensures the pilot chute is immediately doing its job. Safety was designed into the Lil-Grabber Pilot Chute, by fully enclosing the spring we have reduced the chance of the pilot chute entangling with either equipment or personnel.

The bridle line used for attaching the pilot chute to the canopy is made of 9/16" (1.4 cm) tubular webbing. It is attached to the apex lines of the canopy by use of a lark's head knot. The line length is optimized to ensure the pilot chute adequate length to spring into action, while remaining short enough to remain clear of equipment and personnel during the extraction process.

The Lil-Grabber has been tested at speeds up to 210 kts IAS and has proven to be a stable and reliable pilot chute.

## 1.7 Reporting of Equipment Improvement Recommendations

In our effort to continuously improve our products, processes, and services, we invite you to send us your comments and suggestions. As a user of this equipment, you are uniquely suited to provide us with valuable feedback regarding design and/or performance. Feel free to tell us what you like and what you don't like. Send us an email or mail a letter to:

Strong Enterprises  
6448 Pinecastle Blvd STE 104.  
Orlando, FL 32809  
sales@strongparachutes.com



# Section Two:

# Inspection and Maintenance



## **2.0 Introduction**

This section has valuable information concerning the inspection, rigging, and maintenance requirements for the 307 system. Should you have questions about any of the information contained in this manual please contact Strong Enterprises for clarification. While conducting an inspection, keep in mind that an inspection does not make a parachute system airworthy. The inspection itself is useless unless any identified problems are corrected.

## **2.1 Care of your Para-Cushion 307 System**

Observe these precautions to maximize the life of your Para-Cushion Emergency Parachute System. Parachutes are simultaneously very rugged and quite delicate. They are life saving devices and should be treated with great care. Parachutes are made of nylon, a very strong and durable, but not invincible, material. Nylon is deteriorated by small amounts of acid and weakened by ultraviolet sunlight. These surface effects do not seriously influence thicker materials, such as webbing or pack material, but canopy cloth is very vulnerable. If your Para-Cushion is opened or used, it should be taken to a certificated parachute rigger (or foreign equivalent), or returned to Strong Enterprises for airing, drying, inspection and repack. FAA FAR 65.129 requires that no parachute be packed, maintained, or altered in any manner that deviates from procedures approved by the manufacturer.

The parachute should be left unopened inside its protective container until ready for use. When you take your Para-Cushion to your rigger for servicing, they will allow you to pull the ripcord yourself, give you a functional demonstration, and answer all your questions. We urge you NOT to open your parachute in the field for demonstration purposes. Foreign objects can cause costly damage the canopy.

When your Para-Cushion is in the vehicle, care must be exercised to ensure that it is not damaged. Be sure that it does not come in contact with any sharp or loose metal surfaces, or any objects within the vehicle which might cut or snag it. All metal edges, exposed nuts and bolts etc., should be taped or covered to prevent wear on the parachute container. Be sure that your parachute does not come in contact with water, oils, acids, grease, dirt, agricultural or fire retardant chemicals.

For long term storage the best possible way to store your canopy is unopened inside the carry bag. It doesn't matter how long the canopy is kept that way. If you open your para-cushion there are more opportunities to damage the canopy or lines. If you decide that you must open it we suggest putting both canopy and lines directly into a cloth bag (laundry bag, pillow case). The reason we don't recommend a plastic bag is that nylon will absorb and release moisture and stabilize to the ambient humidity levels. If it is in a plastic bag there is more opportunity for mold/mildew to grow.

***! WARNING !***  
***Leaving your packed parachute system exposed to  
the sun will greatly decrease its life.***

## 2.2 Inspections and Maintenance

### 2.2.1 Overall Inspection

Prior to assembling this Para-Cushion 307 system, a qualified person should check:

**Packing Data Card.** Examine Packing Data Card to verify the information matches the components received.

**Assembly completeness.** Ensure that assembly is complete and no components are missing.

**Operational adequacy.** Check components and parts to ensure proper assembly, which includes attachment and alignment, and that assembled product functions in prescribed manner.

Further, ensure that no stitch formation or sewn seam has been omitted.

### 2.2.2 Reserve Inspection

The reserve canopy must be thoroughly inspected during every pack as well as after every activation.

#### 2.2.2.1 Risers

Inspect the webbing for signs of wear, cuts, or fraying. Inspect all 4 -points and stitching to ensure they are not unraveling. Look at the overall appearance of the risers and try to locate any excessive fading in color by its dull dry look. This is an indication of over exposure to ultraviolet rays which can weaken the webbing substantially. Mate all Velcro® to ensure it stays secured. Clean off any debris that might have accumulated on it. Worn out Velcro® should be replaced. Check that the guide rings are still secure. Check the guide rings for any cracks or burrs. Ensure that the control line runs through the guide ring. Check the toggle for signs of wear. Ensure that control line is secured to the toggle in accordance with instructions in section 3.

#### 2.2.2.2 Lines

Inspect the lines for nicks, snags, or fraying. Ensure the line runs through the V-tab at the canopy skirt. Check the zig-zag stitching attaching the line to the canopy is complete with no missing or skipped stitches. Ensure that the stitching starts a minimum of 1/4" (0.6 cm) below the V-tab and extends at least a 1/4" (0.6 cm) past the end of the line.

#### 2.2.2.3 Canopy:

Check the seams and line attachment points for stitch integrity. Inspect each panel for damage. Inspect the canopy fabric for holes, tears and burns. Check the zig-zag stitching on the Apex lines it should start a minimum of 1/4" (0.6 cm) above the apex and extend at least a 1/4" (0.6 cm) past the end of the line. Ensure that the apex lines are sequenced in a counter-clockwise fashion and are routed directly across the apex.

#### 2.2.2.4 Bridle

Inspect entire length of bridle for any nicks in the webbing. Inspect all zig-zag stitching for loose or missing stitches. Check the attachment point to ensure that wrap is in place and stitching is complete.

### **2.2.2.5 Reserve Pilot Chute**

Inspect the mesh for rips and holes. Inspect the tapes for missing stitches. Inspect the fabric for holes or tears. Inspect that the fabric veins are attached to the bottom of the spring. Inspect the spring shape and tension. There should be no excessive bend in the length of the spring. When compressed to 1" (2.5 cm) on a scale the spring should be no less than 16 lbs (7.3 kg). Ensure there are no kinks, sharp edges, or burrs in spring.

### **2.2.2.6 Reserve Closing Loop**

Inspect reserve closing loop for any snags or fraying. Ensure loop is 10" (+ 0"/- 1/4") [25.4 cm (+0/- 0.64 cm)] from end to end for systems not equipped with AAD and 10 1/2" (+ 0"/- 1/4") [30.5 cm (+0/- 0.64 cm)] from end to end for systems equipped with AAD. Both loops have a tolerance of +/- 1/8" (0.32 cm). The 10 1/2" loop for use with AAD will be made of an ultra-high weight Polyethylene cord material with a 400 lb (1.8 kN) breaking strength, and the 10" loop for non AAD use will be made of an ultra-high weight Polyethylene cord material with a 1000 lb (4.4 kN) breaking strength. If necessary replace according to section 3.

### **2.2.2.7 Pilot Chute Cap**

Look at the overall appearance of the fabric and binding tape looking for any holes, tears, or broken stitches in the fabric. Stains can be removed with a mild detergent. ***Never use products that contain bleach!*** Look at the spandex wall ensure that it is free from large holes and still maintains it's elasticity. Ensure the pilot chute cap is still secured to the pilot chute using waxed hand tack thread.

## **2.2.3 Container Inspection**

### **2.2.3.1 Harness/Container**

**Hardware:** Inspect all hardware for rust that might inhibit the operation of the unit. Inspect for proper hardware. Inspect the tacking/stitching on the snaps. Inspect all adaptors and rings for rough edges, cracks or breaks.

**Webbing:** Inspect all webbing on harness for cuts or fraying. Inspect all 4 -points and stitching to ensure they are not unraveling. Look at the overall appearance of the harness and try to locate any excessive fading in color by its dull dry look. This is an indication of over exposure to ultraviolet rays which can weaken the webbing substantially.

**Grommets:** Inspect all the grommets for rough edges, dents or bends in the metal. Rough edges can be smoothed out with very fine emery cloth; large dents or bends in the metal require replacement. Grasp the grommet with two fingers and try to spin the grommet in place to ensure that it is still set properly and secured to the container. It should not move at all. Next make sure that a finger nail can not be slid under rim of grommet, reset if able to slid nail under grommet.

**Fabric:** Look at the overall appearance of the fabric and binding tape looking for any holes, tears, or broken stitches in the fabric. Stains can be removed with a mild detergent.

***Never use products that contain bleach!***

**Elastic:** Inspect all keeper locations to ensure they are all present. Replace any elastic that is stretched and no longer functional.

**Tuck Tabs and Stiffeners:** Inspect all closing flaps, tuck tabs and stiffeners to ensure none are broken, replace if necessary.

**Velcro®:** Mate all Velcro® to ensure it stays secured. Clean off any debris that might have accumulated on it. Worn out Velcro® should be replaced.

### **2.2.3.2 Ripcords, Housings and Cables**

**Reserve Ripcord:** Inspect the ripcord cable for kinks, broken strands or rough areas. Inspect the reserve ripcord pins to ensure they are not bent. Check that the swedge is in place and tight under the heat shrink.

**Cable Housings:** Keep cables and housings clean. Pull the ripcord cable out of the housing and make sure there are no kinks or prominent curves in the cable. Pay particular attention where the cable leaves the housing, as a bend or sharp curve may increase pull force as it feeds back through the housing. If the cable shows signs of unraveling it should be replaced. Clean the cables and the inside of the housings.

## 2.3 Repairs

The following repair guidelines are set forth to aid riggers in the maintenance of Strong Enterprises' parachutes. Repairs must be made only by appropriately rated FAA certificated parachute riggers, or foreign equivalents.

### 2.3.1 Stitching

No limit to the number or length of re-stitching on any part of the Para-Cushion 307 .

For cosmetic purposes, stitching and re-stitching on parachute items should be made with thread that matches the color of the original stitching. All straight stitching should be a 301 locking stitch that has 7-11 stitches per inch, and locked by over stitching the existing stitching by at least 2" (5 cm). Zig-zag stitching should extend at least 1/2" (1.27 cm) into undamaged stitching at each end. Re-stitching should be made directly over the original stitching, following the original stitch pattern as closely as possible. Inspect all stitching to ensure that no pleats have been formed, and that no additional fabric has been caught in the stitching.

All thread on the canopy and container should conform to Mil Spec A-A-59826, Type II, Class A, Size E and be applied with a light or medium duty machine. All thread of the Harness should conform to Mil Spec A-A-59826, Type II, Class A, Size 5 and be applied with a heavy duty or 7-class machine.

### 2.3.2 Container

Damaged binding tape can be repaired by sewing a new piece of binding tape over the original piece. Prepare the area by removing any sharp edges, and trimming any loose material. Next cut a piece of type 3 tape a minimum of 1" (2.54 cm) longer, on both sides, than the damaged area. Scissor cut the tape and then lightly sear with a butane lighter. Fold the tape in half lengthwise to form a crease. Using a marking pencil mark the center of the tape. Place the tape over the damaged area and sewn down following the original stitching as much as possible. Make sure to over stitch both ends by a minimum of 2" (5 cm).

Damage in the single layer of container material can be repaired using a basic patch. Lay the container out on a smooth flat table and secure in place using push pins. Cut a square or rectangle piece of material that matches the color of the container as close as possible and is 2" (5 cm) larger than the damaged area. Fold each side under by a 1/2" (1.27 cm) and place the patch over the damaged area. Using a single needle 301 locking stitch and Mil Spec A-A-59826, Type II, Class A, Size E thread sew around the outside of the patch.

### 2.3.3 Harness

Any portion of the harness which is structurally damaged should be sent to Strong Enterprises for factory replacement.

### **2.3.4 Ripcords**

If there is any damage to the ripcord the entire ripcord should be replaced. To replace remove the old ripcord and insert the new ripcord into the housing. Properly mark and discard any damaged ripcords to prevent their unintended or accidental use.

### **2.3.5 Canopy**

Each canopy may have 3 patches per panel and up to 15 patches per canopy. If the damaged area is larger than 50% of the panel, replace the entire panel. Each canopy may only have 9 replaced panels before it must be taken out of service.

Damage in the canopy material can be repaired using a french fell seam patch. Lay the canopy out on a smooth flat table and secure in place using push pins. Mark a square or rectangle a minimum of 1/4" (0.64 cm) outside the damaged area in line with the grain of the material. Measure 1/2" (1.27 cm) outward from this square and make a second square. Mark a third square 1/2" (1.27 cm) outward from the second square. Using scissors cut out the damaged portion of the canopy along the lines of the center square. Then cut at a straight line from the corner of the inner square to the same corner of the middle square. Do this to all four corners. Cut a square or rectangle piece of material that matches the color of the canopy as close as possible and is 1" (2.54 cm) larger than the damaged area. Fold each side under by a 1/2" (1.27 cm) and place the patch over the hole. Line up the patch with the outer marked square. Using a single needle 301 locking stitch and Mil Spec A-A-59826, Type II, Class A, Size E thread sew around the outside of the patch. Turn the canopy over to the back side and pin in place. Fold the cut flaps in between the patch and the original canopy material creating a locked seam. Using a single needle 301 locking stitch and Mil Spec A-A-59826, Type II, Class A, Size E thread sew around the inside of the cut out area.

***In order to maintain the durability and elasticity of the canopy all patches must be made so that the grain of the canopy fabric and the grain of the patch fabric are in the same orientation.***

If the upper or lower lateral bands are damaged (less than 2" [5 cm]) you may repair with a splice. To splice the upper lateral band, remove any sharp edges or loose fabric. Next cut a piece of 9/16" (1.43 cm) tubular webbing to a length that will cover the damaged area and extend over two radial tapes on either side. Place the piece of tubular webbing over the damaged area and stitch in place using a 301 locking stitch and Mil Spec A-A-59826, Type II, Class A, Size E thread. Follow the original stitching and over stitch both ends by 2" (5 cm).

To splice the lower lateral band, remove any sharp edges or loose fabric. Next cut a piece of 1" (2.54 cm) skirt tape to a length that will cover the damaged area and extend 6" (15.24 cm) on either side. Place the piece of skirt tape over the damaged area and stitch in place using a 301 locking stitch and Mil Spec A-A-59826, Type II, Class A, Size E thread. Follow the original stitching and over stitch both ends by 2" (5 cm).

### **2.3.6 Pilot Chute**



Small holes in the mesh can be repaired by bringing both sides of the hole together and stitching in a zig-zag pattern so that both sides are held together. For any damage to canopy fabric, large holes in mesh, or damaged bridles replace the entire pilot chute.

### **2.3.7 Closing Loops**

The length of the closing loop is 10" (+ 0"/- 1/4") [25.4 cm (+0/-0.64 cm)] from end to end for systems not equipped with AAD and 10.5" (+ 0"/- 1/4") [30.5 cm (+0/-0.64 cm)] from end to end for systems equipped with AAD . The loop at the top of the closing loop should be 1 1/4" (3.18 cm) and the loop at the bottom should be 1 1/8" (2.9 cm). Both loops have a tolerance of +/- 1/8" (0.32 cm). The 10" loop for use with AAD will be made of an ultra-high weight Polyethylene cord material with a 400 lb (1.8 kN) breaking strength, and the 10" loop for non AAD use will be made of an ultra-high weight Polyethylene cord material with a 1000 lb (4.4 kN)breaking strength. If the closing loop is out of tolerance or damaged it should be replaced with a new closing loop. Replacement instructions can be found in Section 3.

### **2.3.8 Pilot Chute Cap**

If any portion of the pilot chute cap or spandex is damaged replace the entire pilot chute cap according to the instructions found in Section 3.



# Section Three:

# Rigging Procedures



## **3.0 Introduction**

This section outlines the manufacturers instructions on how to rig and pack the Para-Cushion 307 system, the approved components, and the recommended packing tools. In the U.S.A this system must be packed in accordance with US FAA regulation 91.307 which states:

- a. No pilot of a civil aircraft may allow a parachute that is available for emergency use to be carried in that aircraft unless it is an approved type and has been packed by a certificated and appropriately rated parachute rigger--
  1. Within the preceding 180 days, if its canopy, shrouds, and harness are composed exclusively of nylon, rayon, or other similar synthetic fiber or materials that are substantially resistant to damage from mold, mildew, or other fungi and other rotting agents propagated in a moist environment; or
  2. Within the preceding 60 days, if any part of the parachute is composed of silk, pongee, or other natural fiber or materials not specified in paragraph (a)(1) of this section.

Outside the U.S.A. local regulations apply as long as the instruction in this manual are followed by an appropriately rated parachute rigger or equivalent using only approved components.

### 3.1 Parts List



Harness and Container Assembly  
124265



26-foot Mid-Lite  
420550



Owner's Manual  
510095



Ripcord Assembly  
611384



Toggles  
866060



Pilot Chute,  
Lil Grabber  
790121



Cap for Pilot Chute  
799030



Carrying Bag  
816006



Locking Loop  
861044 (gold / without AAD)  
861047 (OD / with AAD)



Diaper  
770300



Elastic Keepers  
814009

## 3.2 Packing tools and Consumables

### 3.2.1 Packing tools

- A -PN: 984050- Shot Bags at least 4
- B - PN:984010- Line Separator 1 ea
- C - PN:984140 Pilot Chute Locking Rod 1 ea
- D - PN:984141- Pilot Chute Locking Strap 1 ea
- E - PN:984162- T-bodkins 2 ea
- F - PN:099039- Pull-Up Cords 2 ea
- G - PN:984163- Positive Leverage Closing Device
- H - PN:984203- Closing Plate 1 ea
- I - PN:984190- Seal Press 1 ea
- J - PN:984124- Tension Plate 1 ea
- K - PN:984130- Tension Hook 1 ea
- L - PN:984030- Fid 1 ea

### 3.2.2 Consumables

- PN:971020- Retainer bands 17 ea
- PN:961020- Seal Thread 1 ea
- PN:984205- Seal 1 ea



*\*Photos may differ from actual product*

## 3.3 Preparing the System for Packing

### 3.3.1 Installing the Closing loop

#### 3.3.1.1

Find the swedge on the pilot chute spring. This will be the bottom of the pilot chute. Place the closing loop so that the shorter loop is 90 degrees to the right of the swedge and the loop is between the type IV tape and the pilot chute top.



#### 3.3.1.2

Using waxed hand tack thread attach the closing loop by inserting a needle from through the para-pack top of the pilot chute through the Type 4 tape.

Do not hand tack the canopy of the pilot chute.



#### 3.3.1.3

Run the needle back down through the tape and pilot chute top on the same side of the loop.



**3.3.1.4**

Bring the needle back up through the pilot chute top and type IV tape on the opposite side of the closing loop.



**3.3.1.5**

Bring the needle back down through the tape and pilot chute top one more time.



**3.3.1.6**

Secure in place by tying a surgeon's knot followed by two locking knots.





**3.3.1.7**

Repeat for the opposite side.

**Note!**

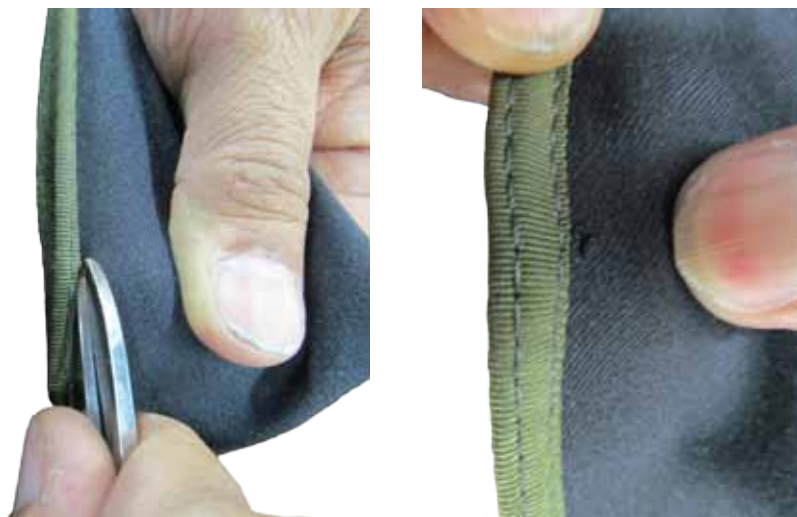
*Pilot chute loop must be placed as close to dead center as possible. Being off even a couple of degrees may cause the pilot chute to sit improperly on the packed container.*

**3.3.2 Installing the Pilot Chute Cap****3.3.2.1**

Take the pilot chute cap and find the seam in the binding. This will be the bottom of your cap. Next fold the pilot chute cap in half.

**3.3.2.2**

Using a pair of scissors or snips cut a small hole in the spandex material at the top and bottom of the center fold next to the binding. These should be very small holes.



**3.3.2.3**

Install the cap over the pilot chute by aligning the loop ends with the holes in the spandex.



**3.3.2.4**

Thread a needle through the hold in the spandex from the outside to the inside, through the loop of the closing loop, and back out the same hole.



**3.3.2.5**

Pull on both ends of the thread to pull the closing loop through the hole in the spandex material.



**3.3.2.6**

Repeat for the other side.

**3.3.2.7**

Secure the pilot chute cap to the top of the pilot chute 90 degrees from the closing loop. Bring a needle threaded with waxed hand tack thread up through the edge of the pilot chute top, and out through the spandex material next to the binding.

**3.3.2.8**

Bring the needle back through the spandex material and through the top of the pilot chute. Lock in place using a surgeons knot followed by two locking knots.

***Note!***

*Be careful not to catch the pilot chute canopy cloth below the stitch line at the top of the pilot chute. Doing so may result in stress being put on the cloth resulting in a hole in the canopy.*

**3.3.2.9**

Trim the ends of the waxed hand  
tack thread to 1 inch (2.54 cm).  
Repeat for the other side.



### 3.3.3 Installing the Toggles

#### 3.3.3.9

Thread steering line through guide ring located on the risers.



#### 3.3.3.10

Thread the steering line through the grommet in the toggle, starting from the underside of the toggle (the side with Velcro®).



#### 3.3.3.11

Bring the steering line around the side of the toggle and insert it through the grommet a second time. Again from the underside to the top forming a loop.



**3.3.3.12**

Bring the steering line around the same side of the toggle and insert it through the grommet a third time. Again from the underside to the top forming a second loop.



**3.3.3.13**

Bring the steering line around the opposite side of the toggle and insert it through the grommet a fourth time. Again from the underside to the top forming the first loop.



**3.3.3.14**

Bring the steering line around the same side of the toggle and insert it through the grommet a fifth time. Again from the underside to the top forming a second loop.



**3.3.3.15**

Mate the toggle to the Velcro® on the riser 1" (5 cm) below the guide ring. Tie an overhand knot in the steering line.



**3.3.3.16**

Tighten the knot so it sits snug against the grommet. Move toggle into proper place with hook and loop tapes properly mated.

**3.3.3.17**

Tie a second overhand knot in the steering line.

**3.3.3.18**

Tighten the knot over the first knot to secure both knots in place.



### **3.3.4 Layout Canopy and Container**

#### **3.3.4.1**

Lay harness, container and canopy down on the table with the wearer side facing down.



### **3.3.5 Installing the Pilot Chute**

#### **3.3.5.1**

Starting with the uppermost apex line follow around in a clockwise motion until you have 12 lines. This is your center. Attach the bridle to the canopy by routing the end of bridle through center of apex lines.



#### **3.3.5.2**

Insert top of pilot chute through end of bridle loop and continue working bridle down until the entire pilot chute has gone through.



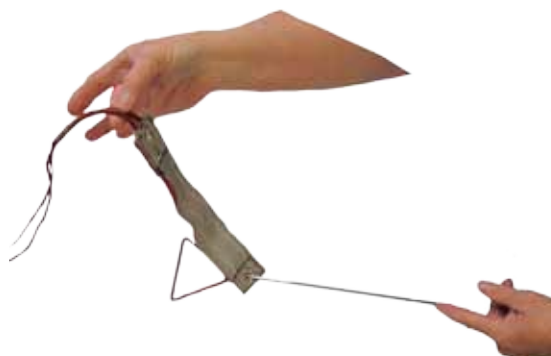


**3.3.5.3**

Continue bringing loop all the way to the canopy and tighten around the canopy apex lines.

**3.3.6 Compressing the Pilot Chute****3.3.6.1**

Place the locking rod through the grommet on the locking strap.

**3.3.6.2**

Center the pilot chute on the locking rod. Make sure that the closing loop is at a 90 degree angle to the locking rod.



**3.3.6.3**

Let all the fabric fall toward the pilot chute cap so that the bridle is even with the opening of the spring.



**3.3.6.4**

Gather the excess material and put it inside the pilot chute coils at the pilot chute cap. Bring the spandex material up over the gathered fabric.



**3.3.6.5**

Compress the pilot chute spring and bring the locking strap over the compressed pilot chute spring. Continue to compress until the locking rod can be inserted into the locking strap grommet. This locks the pilot chute in a compressed state.

**3.3.6.6**

Tuck any material that escaped in between the spandex material and the pilot chute spring.



### **3.3.7 Preparing the diaper**

#### **3.3.7.1**

Lark's head one retainer band on the center, left, and right diaper stow band.



### **3.3.8 Insert the t-bodkins (for Non-AAD) or Soft Double Loop (for AAD)**

#### **3.3.8.1**

Insert a t-bodkin or soft double loop cord up through each of the grommets located in the bottom of the container. For systems with AAD make sure to route soft double loop cord through the AAD cutters as well.



### 3.3.9 Installing the Ripcord

#### 3.3.9.1

Insert ripcord into housing located on the left main lift webbing which exits between the protective back pad and the container. Make sure to insert the ripcord into this housing to ensure proper routing and placement of the ripcord cable.



#### 3.3.9.2

With the ripcord fully inserted into the housing mate the handle to the main lift webbing.



#### 3.3.9.3

Place the protective cover over the handle and end of the housing. Make sure that the cover handle is located at the top.



## 3.4 Packing the Para-Cushion Back model 307

### 3.4.1 Properly lay out the system

#### 3.4.1.1

Attach the Apex to a tension hook, and the container to a tension plate. Pull tension on the canopy until tight.



#### 3.4.1.2

Straighten out Apex by ensuring that the canopy is even all the way around the Apex.



#### 3.4.1.3

Check for proper layout. Starting at gore 24 and working to gore 13 follow each line to the risers. Ensure there are no twists in the lines. Do the same to the opposite side starting at gore 1 and working to gore 12. Ensure there are no twists in the lines.



## 3.4.2 Flake and Fold the canopy

### 3.4.2.1

Move to lower lateral band and take the right line group in your hand.



### 3.4.2.2

Flip the right line group over the left line group so that the diaper is now exposed.



### 3.4.2.3

Pick up line number 12 (this is the one with the diaper attached) and hold with opposite hand.



**3.4.2.4**

Flake all 24 gores of the canopy by using a smooth continuous motion and lifting up inflating the gore and placing it on top of the previous line.



**3.4.2.5**

Insert the two groups of lines into line separator with the right line group in the right slot and the left line group in the left slot.

Place a packing weight on suspension lines next to the line separator.



**3.4.2.6**

Open the canopy so that there are 12 gores on each side.





**3.4.2.7**

Dress the skirt by ensuring the material is pulled out of each channel. There should be 12 gores on each side.

**STOP: Rigger check.**

1. 12 Gores on each side.
2. All fabric is pulled outside radial seams.

**3.4.2.8**

Fold the skirt up 90 degrees on each side parallel to the radial seams.

**3.4.2.9**

Fold the right side of canopy in towards the center until the right edge is on top of the radial seams. Use shot bags to keep the canopy folds in place.



**3.4.2.10**

Fold left side of canopy in towards the center until the left edge is on top of the right side. Relocate shot bags over folded canopy.



**3.4.2.11**

Fold each side of canopy into thirds again, making a tight cocoon.



***Note!***

*Press air out of canopy as you go along.*

**3.4.3 Stow Risers**

**3.4.3.1**

Release the container from the tension device. Open the riser covers and lay the risers in the channels.



**3.4.3.2**

Secure the risers in place by mating Velcro© around the risers. Make sure that you don't catch a line or part of the riser in the Velcro©.

**3.4.3.3**

Lay the risers so that the lines are in a single group and positioned as close to center of the container as possible.

**3.4.4 Closing the diaper****3.4.4.1**

Fold the left line group up over the canopy so that they exit the top of the diaper. ENSURE that the lines stay out of channel created by the canopy folds.



**3.4.4.2**

Lock diaper with a single 2” stow of lines in top retainer band.



**3.4.4.3**

Lock second retainer band with another 2” stow of lines. Close the diaper with a final 2” stow of lines.



**STOP: Rigger check.**

1. Left lines only in diaper stows.
2. Three stows on diaper.

**3.4.5 Stowing the Suspension lines**

*NOTE: If the t-bodkins are in the way for stowing the lines they may be removed and re-inserted after the line stows are complete.*

**3.4.5.1**

Hold both line groups together just above the left riser group and pull the container towards the canopy until the risers lay flat in the bottom of the container. Make sure that all lines are even between canopy and left riser group. Bring the excess line from the right line group to the bottom of the container.



**3.4.5.2**

Rotate the container 90 degrees to the left so that the risers face away from the rigger. Make the first stow of all suspension lines in the third retainer band from the bottom on the left side.

**3.4.5.3**

Take the right line excess and make a stow in the bottom right retainer band.

**3.4.5.4**

Take the remaining right line excess and make a stow in the bottom left retainer band. NOTE: This stow may be folded back on itself so that the stow is even with the other line stows.

**STOP: Rigger check.**

1. Complete line stow in third left retainer band of container.
2. Excess line stowed in bottom right and left retainer bands.



### 3.4.6 Stowing the Canopy

#### 3.4.6.1

Make the first fold of canopy across the bottom of the container. Do this by inserting the diaper in the bottom left corner of the container.



#### 3.4.6.2

Insert the diaper into the bottom of the container making sure to fill out the corner of the container. Continue to fold the canopy on it's side toward the center of the container, make sure to fill in the container between the diaper and the center of the container.



#### 3.4.6.3

Insert pull up cords through the center two grommets of the bottom flap. Pull the temporary locking loops through the grommets and lock in place with temporary pins. Then insert the t-bodkins into the outside grommets or route the ends of the soft double loop cord through the outside grommets.



### **NOTE!**

*Make sure canopy goes to bottom of container and fills in both corners.*

**3.4.6.4**

Make the next canopy fold extend to the top corner of the container.

*\*\*Bottom Flap has been left open to better visualize the canopy folds\*\**



**3.4.6.5**

Fold the remaining canopy back towards the center of the container.



**3.4.6.6**

Being careful not to disturb the canopy folds, bring the top flap over the canopy and insert the pull up cords through the center grommets. Make sure the pilot chute bridle exits the container between the two center grommets. Route the t-bodkins or soft double loop cord through the outside grommets.





**3.4.6.7**

Remove the temp pins, pull the temporary locking loops through the center grommets and lock in place with the temp pins.

**3.4.6.8**

Close the side flaps around the canopy by bringing the flaps together and mating Velcro®.

**STOP: Rigger check.**

1. Canopy fills both sides.
2. Canopy protector flaps are between canopy and t-bodkins.

**3.4.7 Closing the Container****3.4.7.1**

Bring the two side flaps over the container and place the grommets over the t-bodkins or route the soft double loop cord through the side grommets.



**3.4.7.2**

Place the pilot chute next to the t-bodkins so that the pilot chute closing loops are in line with the t-bodkins. S-fold the pilot chute bridle and place it centered between the t-bodkins. Then place the pilot chute over the bridle between the t-bodkins.



**3.4.7.3**

Remove the pull up cords from the center temporary locking loops. Leave the temporary pins in place. Route the pull up cords through the closing loops on the pilot chute and then through the hole in the top of the t-bodkin, or through the loop of the soft pull-up cord.



**3.4.7.4**

Place one hand on the compressed pilot chute to hold it in place, and the other between the protective back pad and the container. In a smooth motion flip the container over so that the pilot chute is resting on the packing table and the underside of the container is exposed.



**3.4.7.5**

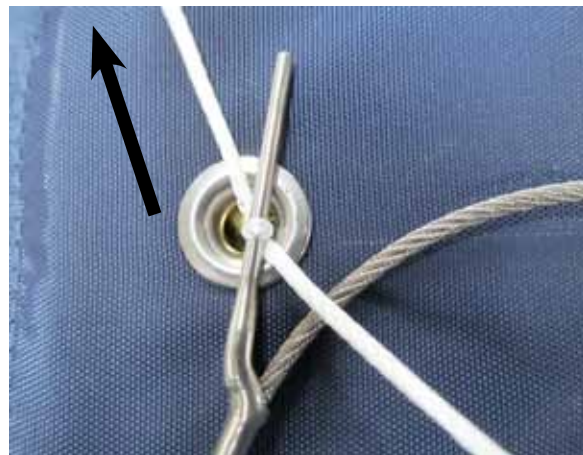
Remove the t-bodkin or soft loop from the grommets. This will bring the pull-up cord through the container.

**3.4.7.6**

Pull the pull up cord through the container until the pilot chute closing loop is through the container. Insert the corresponding pin from ripcord through closing loop to lock in place.

**3.4.7.7**

Remove the pull-up cords by pulling in the direction of the ripcord pin. This will ensure that the pin is not accidentally pulled out with the pull-up cord. When using the dyneema closing loop material make sure to bring your pull up cord under the ripcord pin before removing. This will extend the life of the loop and cause less damage.



### **3.4.8 Dress and Seal the Container**

#### **3.4.8.1**

Flip the container over once more so that the compressed pilot chute is exposed. Remove the pilot chute locking rod and strap. Remove the temp pins from the temporary locking loops.

#### **3.4.8.2**

Check the container to ensure that all flaps are properly closed and held in place. Check that pilot chute is properly seated and not off center. Sign the packing log card located in the pocket between the container and protective back pad. Seal the furthest ripcord pin with your seal in the approved manner. Bring the protective back pad down over the ripcord pins and closing loops. Zip the container closed. Count your tools to ensure nothing was left inside the packed system.



# Section Five:

# Appendix



## Appendix A - Material Specifications

The following table lists the materials and applicable specifications used in the construction of the Para-Cushion model 307 Emergency Parachute System.

SE PN	Description	Type	Class	Size	Break Strength	Specification
961020	Thread, seal, cotton				min-4.70#, max-4.75# min-2.13kg max-2.15kg	4 ply cotton thread, Break Strength
570500	Packing Data Card					14# Tyvek Paper
827001	Stiffener			3"x 8 5/16"		Aluminum
912304	Cobra, Adjustable Quick Release				18kN	n/a
913030 Zinc	Link, Oval, w/ zinc finish				5000# 1633kg	Meets ANSI Z-359.2
916082 gro	Grommet only, Spur, stainless steel	3		#0		NASM 16491
916082 was	Washer, Spur, stainless steel	3		#0		NASM 16491
916085 gro	Grom, extra long barrel, rolled rim, Stainless Steel			#0		NASM 16491
916941 Gro	Grommet only, flat, brass, nickel plated flat flange eyelet			9/16"		NASM 16491
916941 Was	Washer only, brass, nickel plated			9/16"		NASM 16491
918520	Housing, Ripcord			20"		PS 70104-3
920203	Cable, Oil Free, Uncoated SS			3/32"		RR-W-410
920403	Pin, Ripcord					Mil Drawing 61C4304
922720	Spring, Lil Grabber					Mil Drawing 53C7207
927005 zip	Zipper, coil bulk, plastic			5CF 5/8"		n/a
927006 sld	Slider, single pull			5CF		n/a
931001	Webbing	I	1 or 1A	9/16"	500# 227kg	PIA-W-4088 with coating to PIA-W-27265
931004	Webbing	IV	1 or 1A	3"	1800# 816kg	PIA-W-4088 with coating to PIA-W-27265
931007	Webbing	VII	1 or 1A	1 23/32"	6000# 2722kg	PIA-W-4088 with coating to PIA-W-27265
931012	Webbing	XII	1 or 1A	1 23/32"	1200# 544kg	PIA-W-4088 with coating to PIA-W-27265
931521	Webbing, Polypropylene			1"		Commercial Spec, 0.050" thick

SE PN	Description	Type	Class	Size	Break Strength	Specification
935009	Webbing, Tubular		1	9/16"	1500# 680kg	PIA-W-5625
936110 blk	Elastic	I	1	1"		PIA-W-5664
940010	Tape	I		1"	525# 238kg	PIA-T-6134
943030	Tape	III	1 or 1A	3/8"	200# 90kg	PIA-T-5038
943040	Tape	III	1 or 1A	1/2"	250# 113kg	PIA-T-5038
943060	Tape	III	1 or 1A	3/4"	400# 181kg	PIA-T-5038
943080	Tape	III	1 or 1A	1"	525# 238kg	PIA-T-5038
944080	Tape	IV	1 or 1A	1"	1000# 454kg	PIA-T-5038
945002	Nylon cure tape			3"		n/a
947110	Velcro®, Hook	II	1	1"	100# 45kg	A-A-55126
947120	Velcro®, Loop		1	1"	75# 34kg	A-A-55126
947210	Velcro®, Hook	II	1	2"	170# 77kg	A-A-55126
947220	Velcro®, Loop		1	2"	165# 75kg	A-A-55126
951020	Ripstop Nylon	III			45# 20kg	PIA-C-44378
952035	Mesh, Drogue Style 48"					n/a
954010	Nylon Pack	III	3		325/275# 147/124kg	PIA-C-7219
962300	Thread, Nylon	II	A	E	9# 4kg	A-A-59826
962500	Thread, nylon	II	A	FF	17.5# 8kg	A-A-59826
962700	Thread, nylon	II	A	5	45# 20kg	A-A-59826
965015 nat	Cord, Nylon	Ia			400# 181kg	PIA-C-7515
968110	Cord, SPECTRA	VB			1000# 454kg	PIA-C-1200
978001	Foam, Tricot/Oxford backed			3/32"		n/a
978022	Foam, open cell			0.5"		Grade 1875, 1.8lb density, 75 ILD

## Appendix B - TSO Approvals

RECEIVED JAN 6 1975

DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

NEW ENGLAND REGION  
12 NEW ENGLAND EXECUTIVE PARK  
BURLINGTON, MASS. 01803



JAN 3 1975

Strong Enterprises, Incorporated  
Attention: Mr. Norman A. Fraser  
Quality Assurance  
542 E. Squantum Street  
North Quincy, Massachusetts 02171

Gentlemen:

This will acknowledge receipt of your letters of November 7 and December 17, 1974, requesting TSO authorization for your Model 1045 Paracushion Parachute. The data and certification of conformance with the requirements of Subpart A of Part 37 of the Federal Aviation Regulations, and of TSO-C23b, have been found acceptable. Accordingly, the cited model is qualified as a standard parachute.

Your quality control procedures contained in Strong Enterprises, Incorporated Quality Control Manual, dated June 6, 1973, and Model Sheet No. 1045, Revision A, dated December 12, 1974, are considered adequate in accordance with FAR 21.143, and you are accordingly authorized to identify the subject article with the applicable TSO-C23b marking, subject to the provisions and restrictions of FAR 37. Paragraph 37.11 contains information concerning approval of all design changes. This authorization is valid only at Strong Enterprises, Incorporated, 542 E. Squantum Street, North Quincy, Massachusetts, and this office must be notified of any proposed relocation.

The following data pertinent to this authorization, will be kept on file at the FAA, New England Region, Engineering and Manufacturing Branch:

1. Strong Enterprises, Inc. application for TSO authorization, dated 11/7/74
2. Strong Enterprises, Inc. Drawing No. 1012, Revision C, dated 12/13/73
3. Strong Enterprises, Inc. Drawing No. 1045-1, dated 9/12/74
4. Strong Enterprises, Inc. Drawing No. 1046, dated 9/26/74
5. Strong Enterprises, Inc. Drawing No. 1047, dated 9/18/74
6. Strong Enterprises, Inc. Drawing No. 1048, dated 9/28/74
7. Strong Enterprises, Inc. Drawing No. 1049, dated 9/10/74
8. Strong Enterprises, Inc. Model Sheet No. 1045, Revision A, dated 12/12/74
9. Strong Enterprises, Inc. Drop Test Report, dated 4/24/74
10. Strong Enterprises, Inc. Ripcord Test Report, dated 10/30/74



2

A copy of the cited Quality Control Manual will be retained in the cognizant Engineering and Manufacturing District Office at South Windsor, Connecticut.

Sincerely,

*Louis R. Musacchio*

LOUIS R. MUSACCHIO  
Chief, Engineering and Manufacturing Branch

Mr. Edward Strong  
President, Strong Enterprises  
A Division of S.E. Inc.  
11236 Satellite Boulevard  
Orlando, FL 32837



U.S. Department  
of Transportation  
**Federal Aviation  
Administration**

Dear Mr. Strong:

This is in response to your March 9, 1992, and subsequent submittals requesting Federal Aviation Administration authorization to identify Para-Cushion Series, Part No. 1045-( ) emergency parachutes assemblies, in accordance with the requirements of Federal Aviation Regulation (FAR) Part 21, Subpart O, Technical Standard Order (TSO) C23c, and SAE Aeronautical Standard AS-8015A, Category B.

We find your March 9, 1992, Statement of Conformance submitted with your request and your Quality Control Manual dated December 6, 1988, acceptable.

The following data as submitted by your letter will be retained on file for this authorization:

- a. Strong Enterprises Test Summary dated March 9, 1992.
- b. Strong Enterprises Drawings for the Para-Cushion Series P/N 1045-( ) submitted with your March 9, 1992, request.
- c. Strong Enterprises Owner's Manual which includes limitations and instructions and was submitted on May 7, 1992.

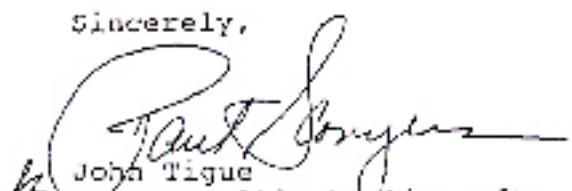
Effective this date, you are authorized to identify the Para-Cushion Series, Part No. 1045-( ) parachute assemblies with the appropriate TSO markings required by the applicable TSO and FAR 21.607(d).

This authorization is not transferable to another person or location and is effective until surrendered, withdrawn, or otherwise terminated by the Administrator.

Your responsibilities as a holder of a TSO authorization are outlined in FAR 21.3 and FAR 21, Subpart O.

The Airframe Engineer for this authorization is Cindy Lorenzen, telephone number (404) 991-2910. The Technical Support Specialist is Lorraine Dash, telephone, (404) 991-6137.

Sincerely,

  
John Tighe  
Manager, Atlanta Aircraft  
Certification Office



U.S. Department  
of Transportation  
**Federal Aviation  
Administration**

Aircraft Certification Service  
Compliance & Airworthiness Division

Atlanta ACO Branch  
1701 Columbia Ave.  
College Park, Georgia 30337

December 04, 2017

**RECEIVED**

**In Reply, Reference FAA Correspondence #: 7A0-17-2655**

DEC 08 2017

Ms. Jessie Hanson  
Quality Assurance Manager  
Strong Enterprises, Inc.  
11236 Satellite Blvd  
Orlando, FL 32837

Subject: TSOA Application for "Para-Cushion Assembly" P/N 1045-()

Dear Ms. Hanson,

This is in reply to your letter dated August 17, 2017, requesting TSO Authorization for your "Para-Cushion Assembly" P/N 1045-(). We accept your statement certifying that your articles meet the requirements of the TSO-C23f and that you meet the requirements of Title 14 of the Code of Federal Regulations (14 CFR) Part 21, Subpart O.

Effective this date, we authorize you to identify the following Personnel Parachute Assemblies and Components with the marking requirements defined in 14 CFR §21.616(d) and in TSO-C23f.

<u>Part Number</u>	<u>Description</u>
1045-()	Para-Cushion Assembly
260-()	Paracushion Harness
396-()	Para Cushion Container

We consider your quality system, as defined in your quality control manual, revision P, approved 3/1/2012, satisfactory for production of this article at your 11236 Satellite Blvd Orlando, FL 32837 facility. Strong Enterprises, Inc. must furnish the following statement to the original owner or installer of each article (or multiple articles if furnished to one source):

This article meets the minimum performance and quality system standards required by a technical standard order (TSO). Installation of this article requires separate approval.

This TSO authorization, issued pursuant to 14 CFR §21.611, is effective until surrendered, withdrawn or otherwise terminated under the provisions of 14 CFR §21.613. With notice, we may withdraw this TSO authorization if articles are not in compliance with the applicable TSO performance standard pursuant to 14 CFR §21.2.

You must provide one copy or online access to data listed as a furnished data requirement in the TSO to the original owner/installer of each article or multiple articles if furnished to one source (e.g., an operator, type certificate holder, or repair station).

You must obtain FAA approval before making any changes to the location of your manufacturing facilities pursuant to 14 CFR 21.609(b).

Without further FAA approval, we do not allow a manufacturer to mark articles after it changes its company name, address, or ownership. You must notify the ACO and MIDO of name, address, or proposed ownership changes.


Pursuant to 14 CFR 21.614, a holder of a TSOA may not transfer it. If you wish to transfer it, you must request a transfer from the FAA.

Send to the office below any design change(s) for this TSO article as outlined in 14 CFR §21.619(a). You must notify us of minor design changes every six (6) months. Also, as recipient of this authorization, we require you to report any failure, malfunction, or defect relating to articles produced under this authorization pursuant to 14 CFR §21.3.

Please note that technical data the FAA retains may be subject to Freedom of Information Act (FOIA) requests. This office will notify you of any requests(s) pertaining to your data and give you the opportunity to protect the data from public disclosure.

Should you have any questions or concerns, please feel free to contact me at 404-474-5570 or via email at [samuel.kovitch@FAA.gov](mailto:samuel.kovitch@FAA.gov).

Sincerely,

  
A handwritten signature in blue ink, appearing to read 'C. Underwood', is written over a vertical blue line that extends from the signature down to the caption below.

(for) Christina M. Underwood AIR-7A0  
Manager, Atlanta ACO Branch

## Appendix C: TSO Drop Test Results

A total of 48 Drop tests were conducted at various weights and speeds to upgrade the Para-Cushion Containers and approve the 30' Lo-Po canopy. For each of the weights and speeds below four total drops were done. Each number represents the average opening time measured from pin pull to inflated canopy.

<b>Test Weight</b>	<b>60 KEAS</b>	<b>85 KEAS</b>	<b>140 KEAS</b>	<b>175 KEAS</b>
175 lbs	4.0 sec	3.8 sec	3.1 sec	2.7 sec
237 lbs	3.8 sec	3.7 sec	3.1 sec	2.8 sec
300 lbs	3.8 sec	3.6 sec	2.8 sec	2.6 sec

