



# ***RIGGING TECHNICAL MANUAL***

**BRITISH**  
SKYDIVING  
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# Check List pages

Amendment No 1/19 August 2019

## AMENDMENTS

PAGE No.	DATE
<i>INDEX</i>	OCT 2015
PAGE 7	JAN 2014
PAGE 8	JUN 2004
PAGE 9	FEB 2014
PAGE 10	FEB 2014
PAGE 11	FEB 2014
PAGE 12	JUN 2004
PAGE 13	OCT 2015
PAGE 14	AUGUST 2019*
PAGE 15	AUGUST 2019*
PAGE 16	FEB 2014
Page 17	AUGUST 2019*
Page 18	JAN 2018

Current amended pages will be followed by a \* after the date.

Current amended paragraphs will be marked by a vertical line on the right-hand side of the page; |

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The British Skydiving Technical Manual is updated periodically. As British Skydiving rules are continually evolving, our primary operational document, the British Skydiving Operations Manual, is regularly updated at meetings of the Safety & Training Committee which are held every two months. Therefore, in the case of any conflict between rules or requirements set out in the Operations Manual and any other British Skydiving manual, the provisions in the Operations Manual shall always have primacy as the definitive statement of the current position.

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# Introduction

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The purpose of this document is to re-iterate British Skydiving Riggers' Sub-Committee decisions and rulings and Safety Notices and Information that have been misinterpreted or might otherwise be lost through time. It has been derived from the minutes of the British Skydiving Riggers' Sub-Committee meetings since 1990.

Decisions that have been recorded elsewhere within the British Skydiving systems, or that have since been superseded or overruled are not duplicated here.

This document is NOT a complete listing of all rules; it is a listing of rules that have not been recorded elsewhere. It is the readers' responsibility to keep up to date with, and ensure any actions they take fit in with, the rules of British Skydiving. This manual is intended only as a guide - some items/rules may have been missed or superseded.

It is assumed that readers and users of this document are aware that it MUST BE READ in conjunction with all Rigging and related documents, in particular -

The Operations Manual

Riggers Committee Tandem Modifications website at <https://britishskydiving.org/tandem-mods>

Rigging Syllabuses

Form 194 "Riggers Sub Committee Terms of Reference and Rules of Procedure"

All other rigging related forms, available from the website at [www.britishskydiving.org](http://www.britishskydiving.org)

Much credit is due to Rigger Examiner Bill Sharp, who undertook the huge task of providing and analysing the meeting minutes in electronic form.

## Miscellaneous Items

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### Advanced Packer Ratings and Advanced Packing Certificates

**N.B.** In this section, differences are recorded between the various types of Reserve Packing Qualifications. "Advanced Packing Certificates" and "Reserve Parachute Packing Certificates" refer to packing certificates that are endorsed for individual reserve canopy/container combinations (also known as the grandfather clause); "Advanced Packer" refers to the current system of qualifying to pack reserves via the Advanced Packer rating.

1. Anyone who currently holds a Reserve Parachute Packing Certificate or Advanced Packing Certificate can present himself or herself for the Advanced Packers examination phase.
2. Specialized inspections such as bromocresol or tensile strength testing can only be carried out by those who have had their reserve packing certificates specifically endorsed by a Rigger or by those who have passed a British Skydiving Rigging or Packing course
3. The Advanced Packer rating is split into round, square and tandem ratings. Anyone progressing onto a rigging course needs to hold the Advanced Packer rating on square reserves. Those progressing to an Advanced Rigger qualification require the Advanced Packer ratings on both round and square reserves.
3. If the pre-printed text is not already so endorsed, then holders of Advanced Packing Certificates or Reserve Parachute Packing Certificates must have their certificates so endorsed by an Advanced Rigger or Advanced Instructor before they can assemble equipment.
4. To become a Tandem reserve packer, an Advanced Packer needs to attend a Advanced Packer course for tandem reserves.
5. As from the 1<sup>st</sup> April 2004 holders of Advanced Packing Certificates are not able to have new equipment types to their Packing Certificates.
6. Owners of rigs packed by Advanced Packing Certificate holders may be asked for evidence that the packer is qualified to pack that particular equipment. A photocopy of the packer's Certificate with relevant endorsement will suffice.

### Airtec and Cypres

1. For Parachute Riggers to install Cypres units where machine stitching is involved, the following is required:
  - i) The PR must present themselves to a Rigger Examiner for assessment by carrying out a Cypres installation.
  - ii) The Examiner then sends a recommendation to the Riggers Committee for their consideration and final approval.

### Ratings and British Skydiving membership

1. A Full British Skydiving membership is required for anyone holding a Rigger or Advanced Packer Rating. Associate membership is not sufficient.
2. Rigger ratings expire on the 31<sup>st</sup> of March each year but may be renewed up to six months after that date. To renew a rigger rating, the rigger must satisfy an Advanced Rigger or a Rigger Examiner in the case of a RE rating renewal, that he / she is current in all aspects of rigging relevant to their status.



*Note: Once the rating has expired the rigger cannot exercise the privileges of a rigger until the rating is renewed.*

3. Full British Skydiving membership should be verified by the organising RE or AR at the start of the Rigging or packing course.
4. Advanced Riggers should be aware of what they are signing for a rating renewal at the time and should look closely at the rigging tickets that they are signing up.
5. An Advanced Instructor signing up a reserve Packing Certificate for someone packing under the grandfather clause system must be qualified to pack that item themselves.
6. A rigger cannot sign up their own rating renewal.
7. Both Reserve Parachute Packing Certificate and Advanced Packing Certificate holders have to be signed up yearly and demonstrate currency.

*N.B(1): Advanced Packer ratings expire on the 31<sup>st</sup> of March, but may be renewed up to six months after that date. To renew an AP rating the AP must satisfy an Advanced Rigger or Advanced Instructor, that he / she is current in all aspects of advanced packing relevant to their status.*

*N.B(2): Once the rating has expired the AP cannot exercise the privileges of a AP until the rating is renewed.*

### **Rigging and Packing Courses and Candidates**

1. Candidates interested in attending rigging courses should register their interest with the British Skydiving HQ, who will liaise with Riggers planning to run courses.
2. It is the responsibility of those interested in becoming riggers to find a supervising rigger.
3. Rigger Course Organisers should notify the Riggers' Committee and receive approval before running any intended courses. However, in case of short notice between Riggers' meetings, the Riggers' Chairman, COO or STO can give permission for the course to run.
4. A listing of those qualified to run the teaching and examination phases of Advanced Packer Courses is held at British Skydiving HQ.
5. It is the responsibility of those running courses to ensure that they are correctly qualified and registered on this list.
6. It is the responsibility of those running courses to ensure that British Skydiving HQ is informed of any amendments to this list after a course is run - e.g. any Advanced Riggers now qualified to run such courses.

### **Course Exemptions and Time extensions**

1. Exemptions to the requirements for attending courses must be presented to the Riggers' Committee for approval. Each individual case must be considered separately as exceptions to rules cannot be covered by blanket exemptions. The individual's name and the time period of the exemption must be reported within the minutes.
2. Time extensions or exemptions for rigger candidates should be requested from the committee by the supervising rigger.

## Qualification

1. Ratings can be issued at courses following successful completion.
2. All successful candidates of Rigger and Advanced Packer courses must be recorded by name and course date within the Riggers' Minutes.

## Riggers Packing Certificates

1. Riggers qualified before 1997 should have 'All Types' added to their packing certificate by an Advanced Rigger.
2. Riggers qualified between 1997 and 2002 should have an Advanced Rigger (not themselves) or above review their packing experience and log to date and endorse their packing certificate accordingly as "All Types (round, square AND/OR tandem)".
3. Riggers qualified since 2003 pack according to their specific Advanced Packer Rating qualifications and certificates."

## Packing and Rigging Errors

Anyone making packing or rigging errors is answerable to STC via the Riggers' Committee and may be subject to disciplinary action.

## British Skydiving Insurance

The British Skydiving third party liability insurance covers the following agents for rigging and packing matters, when those agents are operating to the requirements of the Operations Manual:

"Any firms whose business is rigging, and independent or freelance rated or certificated riggers and packers and/or their trainees, and including but not limited to 'Bail out' rig used in emergency or critical situations, but only whilst acting for or on behalf of a British Skydiving member."

Thus, they are not covered when working on kit for those outside British Skydiving, e.g. Glider rigs or Pilot bail out rigs, other than British Skydiving jump pilots. Neither does the insurance cover equipment manufacturers.

## Tandem website

A listing of all British Skydiving approved Tandem system modifications is currently found on the internet at <https://britishskydiving.org/tandem-mods>

## New Equipment Clearance

The Riggers Committee must clear new student (including Tandem) equipment before that equipment is used at British Skydiving PTOs. Forms 258 & 258A should be filled in as part of the clearance procedure and can be found on the British Skydiving website.

## Riggers Committee: Operations Manual Amendments

Amendments to the Operations Manual can only be made at a Riggers Committee by having them included as main agenda item.

## Riggers Committee: Approval of Minutes

1. Those people whose proposals are discussed at meetings should read and check the detail of their proposal for accurate recording in the subsequent minutes.
2. Those who propose or second the previous Meetings Minutes should have been at that meeting also.

## Riggers Subcommittee: Election of Chairperson

At the last meeting of each year, Riggers will report to STC on nominations for Riggers' Chair so STC may formally elect the Riggers' Chair for the following year. Nominees for Riggers' Chair should ideally, but not necessarily, be a Rigger Examiner (RE), but in any event must be a full British Skydiving member who holds an Advanced Rigger rating. The Chair of the Riggers' Subcommittee will be co-opted to STC, if not already a member. Co-opted members of STC are not entitled to vote.

The Chair may appoint a Vice Chair (who must hold the appropriate qualifications) to act in his/her absence.

## **Documentation**

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### Rigging and Packing Work

1. When updating the packing card with any work carried out, identifiable rigger numbers must be recorded as well as signature.
2. Riggers must maintain a printed log of all work carried out.
3. Reserve Parachute Packers must keep a printed log of all reserves packed.

### Reserves

1. Only those people who hold a qualification to pack a reserve can sign the Record of Inspection or packing card. Trainee Advanced Packers cannot sign for reserve repacks or inspections - these must be signed for by the Supervising Rigger.
2. Both Packing cards and Inspection Checklists are required for each reserve repack. The packing card is a history of the equipment, with the inspection checklist a detail of the most recent repack and any work carried out.

### British Skydiving Paperwork

Reserve Inspection logs cannot be used when not packing under the auspices of British Skydiving.

### Safety Notices

Reserve packers must ensure that all relevant Safety Notices are applied to any equipment they may be working on. Bear in mind that a lot of old Safety Notices still apply.

## Student Equipment Modifications

Any modification to student equipment, including Tandem, must be approved by the Riggers Committee before use. The approval process starts with the submission of a completed Form 209, 258 or 258A completed with drawings, for discussion as a main agenda item at the next Riggers Meeting. Form 212 is a reference of previous Tandem modifications to date, approved by the Riggers Committee.

## **Technical Items**

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This section is not a substitute for referring to the British Skydiving Safety Notices and Information index. This section is meant as clarification of information that has been misinterpreted in the past.

### 3-Ring Risers

1. Type 17 mini risers and RSLs

For Type 17 risers, Reserve Static Lines can only be used on the reinforced version of the riser. The one exception to this is Type 17 Reversed 3 ring risers where an RSL can be fitted whether the riser is reinforced or not.

2. RW 1-82 / 1-83 Rings

Safety notices still apply to these types of rings regarding testing and replacement.

3. RSL shackles

Swedish release RSL shackles can be changed for rapide links under the following conditions:

- a) The minimum size rapide link is to be a stainless steel #3.5 rated at 220 kg
- b) The complete assembly is supplied by the equipment manufacturer with the RSL attached with a rapide link or refer to c & d below.
- c) The person replacing the shackle with a rapide link is to insure that the overall effective length of the RSL is not altered by the change from the brass shackle to a rapide link.
- d) An Advanced Rigger is to inspect the equipment with the RSL and rapide link installed.

4. Square Reserves into short riser Racer containers.

Letter from Jump Shack listing considerations when installing square reserves into Racer containers with very short risers. See original for further details.

### Category System

Category System equipment cannot use the small 3-ring release set.

### Accelerated Free Fall

For AFF equipment fitted with and using throw-out pilot chutes, the only approved pilot chute pouch is the "Rip-away" spandex pouch fitted with a secondary release handle.

## Automatic Activation Devices

1. AAD installation on piggyback equipment must conform to the container manufacturer's instructions. When no container manufacturer's instructions exist then installations must conform to the AAD manufacturer's installation instructions.
2. Anyone coming across a CYPRES unit which cannot be switched on or noticing any discoloration of the reserve tray should take the unit to an appropriately qualified person who will inspect the system for CYPRES battery leakage.
3. Service dates and battery change dates on AAD's must be adhered to as per manufacturers' recommendations. No reserve repack can be dated for a longer period than the expiry date of any AAD component part. In the case of a Cypres battery, the original reserve packer can change the battery and can then extend the repack date to the maximum original period allowed.

## Connector Links, including Soft Links

1. The only acceptable rigger manufactured rigging line main canopy connector links are those made to TSE drawing 2-88. These may be made of Dacron 525 as well as 800lb Dacron
2. Canopy manufacturers supplied soft links must be fitted in accordance with the instructions.
3. Only connector links approved by the canopy manufacturer may be used on reserve canopies.

**NB1:** Performance Designs "Slinks SM-1" cannot be used on reserves. Beware the similar name, but different clearance for use.

4. Soft Links may not be used on Solo Student main canopies.

## Packing of Reserves

Reserve packing should be conducted in a clean environment ensuring that no foreign object is introduced to the pack job by accident or design.

## Use of mains as reserves

Any canopy that has been used as a main on a regular basis must not be used as a reserve.

## Cutaway cables

Cutaway cables must be coated (SN1/16).

There are many variables in determining the length of a cutaway cable for each side housing on any particular rig. Swapping of handles, especially between different types of rig, must be done with due consideration of all factors by a qualified individual. Where an RSL is fitted the RSL side must not release before the other.

## Validity of reserve repacks

A reserve parachute packed within the British Skydiving system is valid for a maximum of 6 calendar months from the repack date on its Record of Inspection.

In the inspector's personal opinion, at the time of examination the equipment is considered to be safe for further usage, once the repack and paperwork are completed.

Whilst the equipment must be inspected with all reasonable care, the opinion expressed by the Inspector does not give or imply a guarantee that the equipment is free from defects, other than any identified on the Record of Inspection in the comments.

The serviceability of any parachute equipment is ultimately the responsibility of the owner.

### **Pilot chute toggles**

Old thread spools should not be used to manufacture pilot chute toggles.

### **Ripstop Tape repairs**

Ripstop tape can be used for small repairs on main canopy assemblies at the discretion of a qualified rigger.

### **Tensile test**

The PIA method of tensile testing is the accepted method of testing fabric strength. See Poynter's manuals or Reserve Packing guide for details.

### **Safety Notices Clarification**

1. Work required for Parachutes De France Safety Bulletins 92003 (Galaxy cutaway system), 92004 (Cutaway housings fixing), 92005 (Mini risers) must be carried out by an Advanced Rigger
2. Zerox reserve modification British Skydiving Safety Notice 1/99

The only approved reserve container flap modifications for this notice are those produced by TSE and the RWS. "CRW bumps" are not acceptable.

3. Baby D rings

British Skydiving Safety Information Notice 5/94 applies to all Baby D Rings, not just the H219.

4. Tandem Vector Reserve Pins
5. UPT staging loop is optional on Vector 3 Sports rigs but must be used on UPT student rigs and Sigma Tandem systems.

British Skydiving Safety Information 1/99 – The old style soldered reserve pin can no longer be used.

### **Tandem**

Black Teflon cables cannot be used on tandem kit

RWS advised that the EZ384 canopy is not compatible with the Tandem Vector container made for a PD360.

Care must be taken to accurately record the jump numbers on each component on form 112c (blue book) and all changes and modifications are to be recorded on 112e Tandem Equipment Repair/Modification/Component Replacement Log.

## Traditional (Front and Back) Kit

1. Front mount reserve Tie bar lengths.
  - a. Low mount reserve:  
Tie downs can be as short as the distance between the harness 'D' rings.
  - b. High mount reserve, without risers:  
Minimum of 18", maximum of 24"
  - c. High mount reserve, short risers (under 8" long; tie down on links):  
Effective length 24"
  - d. High mount reserve, with longer risers (over 8" long; tie down cannot be on links): Tie bars are only to be between the snap hooks. Minimum of 18", maximum of 24"

2. Main and reserve line lengths:

Line lengths should be compatible with the type of canopies being used. Be aware that there is a minimum line length requirement also.

3. Ripcord Pin Protection Flaps: Container ripcord pins must not protrude below the protection flaps.
4. Pin force on front mount reserves  
The maximum allowable force to move the pins on a chest mount reserve is 15lbs.

## Tacking of 2 pin quick loops

The requirement to tack 2 pin quick loops together has been lifted for loops made of Cypres line. The tacking of 2 pin quick loops made of kevlar line is still mandatory.

## Brake line twists

Packers should remove twists from brake lines at each repack. Neglecting this has resulted in deployment problems.

## Acid Mesh

1. Bromocreosol life expectance:

Users of Bromocreosol are responsible for ensuring the quality of the solution they use.

**N.B.** Bromocreosol solution has an expected life of no more than two years; in powder form the shelf life is five years.

2. Bromocreosol testing of mesh must be carried out at every repack of a meshed round reserve.
3. National Parachute Manufacturers Bulletin 1/6/89

The British Skydiving requirement with respect to National Parachute Industry Bulletin 1/6/89 is that these canopies must be tensile tested at every 6 month repack cycle, despite manufacturer recommending this every 120 days as per the US repack cycle, back then, at the time the Bulletin was issued. The US repack cycle is now 180 days.

## **Packing Manuals**

Where conflict occurs between manuals, a packer should follow the guidelines of the canopy manufacturer until the canopy is in the bag and then follow the container manufacturer instructions for the remainder of the repack.

Packers must have the appropriate manual to hand during the packing procedure.

## **Reopening reserve pack jobs**

It is unacceptable to open and re-close someone else's repack.

If someone opens another person's reserve repack for any reason a full inspection and repack must be carried out

Anyone signing for any part of a reserve repack is taking responsibility for the entire pack job, from inspection to closure.

## **Limitations of Work**

Approved Packing Certificate (F111) holders are cleared to assemble and pack Main Parachutes. Basic Riggers must work under the supervision of at least a Parachute Rigger of two years' experience, and all work must be inspected and authorised by the supervisor.

Parachute Riggers are cleared for all work on main parachutes and components.

Advanced Riggers are cleared for any work, Main, Reserve and Harness.

Any modification or alteration of the harness, which includes manufacturing of chest strap extensions, bellybands, or removable components of the harness, must be carried out, or signed off, by an Advanced Rigger.

If the installation of any component part requires further sewing to the harness, then this must be carried out by an Advanced Rigger.

## **List of Banned Items & items where action is required**

S Pisa 26 Lopo Reserve 22/4/81 (SN 3/81)

Strato Cloud Brake Release System 25/2/81 (SN 2/81)

Jack Hiley Manufactured Equipment 28/05/82 (SN 4/82)

Piano Wire type ripcord pins 7/2/83 (SN 1/83)

Non-Gutted line as main closing loop 25/11/83 (SN 3/83)

Three Ring Release RW-1-82 & RW-1-83 GQ Parachutes Large Rings 23/2/84 (SN 3/84)

Pull out pilot chutes attached to Apex 04/06/84 (SN 4/84)

TSE Pull Out Pilot Chutes 03/04/96 (SN 1/86)

Rip Cord Handles (L8610/L8611/L8612) 07/02/86 manufactured by TSE (SN 4/86)

Larks Heading of Static Lines 18/8/87 (SN 1/87)

Raleigh Burner Helmets 12/10/87 (SN 3/87)



Raleigh Burner Helmets 12/10/87 (SN 3/87)

Pisa Conical 26-foot Lopo Canopy (SN 10/88)

4-line release steering system (SN 1/89)

GQ Protector Canopies (SN 2/90)

PinTail Canopies (SN 1/91)

Non-reinforced T17 risers (i.e. the T3 at the T17 middle ring) should **not** have RSLs fitted (SN 1/92 & 2/92)

Glide Path Nova Main Canopies (SN 1/94)

Belly Band Throwaway STC Extract of the Minutes 6/9/90 (SN 3/94)

Canopy Slider Stops on Vector Tandem Main & Reserve Canopies (SN 1/96)

TSE Type 17 Reversed Risers (SN 2/97)

Top Flyer, Sprint and Pit Containers – German (SN 2/99)

Aviacom Argus AAD (SN 1/11)

Metal Cutaway handles that are not plastic coated (SN 1/16)





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