RIGGING ADVISORY CIRCULAR

Issue Date: 01 July 1995 RAC No. 222 Rev. B

SUBJECT: APF DESIGN STANDARD FOR FLAG ASSEMBLIES.

STATUS: MANDATORY

IDENTIFICATION: For the purpose of the standard a flag is defined as a flag, banner, streamer or any similar equipment that has a weight attached and is carried by a parachutist and which may constitute a danger to the public.

BACKGROUND: The 1994 APF Technical Conference included a workgroup dedicated to discussing the issue of flags and flares with particular relevance to what is acceptable and how the Federation should regulate their use.
The APF Technical Conference recommended that equipment used for the carriage and attachment of flags on a display shall:
(i) comply with the design standard in this Rigging Advisory Circular,
(ii) be approved by a Display License Examiner or Rigger B,
(iii) be used on 2 training jumps prior to a display, and
(iv) used in accordance with the APF Display Manual rules.

APF DESIGN STANDARD: For the purpose of this standard equipment shall be classified by size and/or weight as follows: (should the equipment fall into 2 categories re. size/weight, it shall be classified in the larger)
Small shall mean up to 1000 sq.ft or 12kg total weight
Medium shall mean from 1001 to 2000 sq.ft or 30kg total weight
Large shall mean 2001 to 5000 sq.ft or 50kg total weight
Very large shall mean over 5000 sq.ft or over 65kg.

CONTAINER
The container shall be constructed to securely retain the flag and weight assembly to the parachutist during freefall and canopy deployment. Although the design may not need to cope with terminal velocity opening shock loads it is recommended the design should retain the contents without inadvertent release or failure at 8g's. (8g's being equivalent to a hard opening).

The container assembly shall be constructed such that the flag and weight is not able to slump in the container (ie a reasonably tight fit).

The container should be constructed from robust material. It is recommended 420 denier parapac or equivalent be used for small and medium size flag containers and 1000 denier cordura or equivalent for larger sizes.

The container for large and very large flags shall be fabricated with structural webbing sewn externally to surround the container. The webbing shall incorporate the anchor points for attaching the container to the harnesss and the closing mechanism.

Where the container is mounted on the front of the body the width of the container shall not inhibit access to the cutaway and reserve ripcord handles.

The opening and closing mechanism on all flag containers shall incorporate a safety catch so that it requires two actions to open. Small and medium flags may use velcro and press studs (or similar). Large and very large shall use a multiple pin and loop closure system (or equivalent) with an operating handle that is itself secured to prevent inadvertent release.

HARNESS

Small and medium flag assemblies may be attached to the parachutist with a loop on the container which passes over the head and a waist, or leg type straps to pass between the parachute container and parachutists body.

Large and very large flag assemblies shall use a separate harness worn under the parachute harness, or a tandem parachute harness. A tandem parachute harness and container is highly recommended as it has shoulder and side attachment points which are suitable for direct attachment of a flag container assembly. Where a Vector Tandem parachute is used the drogue attachment may be used as a flag anchorage point.

FLAG ATTACHMENT / RELEASE

Flag assemblies shall incorporate a means of releasing an unpacked flag in the event of an emergency. A hook knife shall be considered a suitable release for small and medium size flags. Larger flags shall incorporate a 3-ring release or equivalent release-under-load device. Where a 3-ring or similar is used the operating handle shall incorporate a safety catch so that it requires two actions to release.

To avoid an offset load, flags shall be configured so that they are suspended from a central point below the parachutist.

Where a Vector tandem parachute is used for the descent the drogue attachment point on the Vector harness may be used as a flag anchor point in place of a separate harness.

A hook knife shall be carried on all flag descents. The hook knife shall be of suitable size and design for the equipment being used and shall be a Jack-the-Ripper (or similar large hook knife) and shall be accessible both before and after flag deployment.

Where it becomes necessary to release a flag during the descent the parachutist shall ensure there is no danger to persons on the ground.

Flags, flag weights, flag recovery parachutes, and their attachment to the parachutist should not incorporate knots. Where knots are used the material strength shall be double that recommended under 'flag weight'. *(Knots can reduce webbing strength by 50%).*

FLAG WEIGHT

The weight shall be contained in a bag constructed of robust material. 1000 denier cordura has been found to be acceptable. The weight bag shall have external webbing that surrounds the base of the bag and incorporates the attachment to the flag. The bag shall be free of seams at the base.

No material that would constitute a danger to the public shall be used should the weight bag burst. Granular lead shot and wet sand are considered acceptable materials.

Materials used to transmit loads from the parachutist to the flag weight, including the leading edge of the flag, shall have a minimum tensile strength of (20 x the total suspended weight). Nylon is preferred over polyester for absorbing the loads associated with deploying the weight as nylon stretches up to 30% compared to 15% for polyester.

Hardware, where used, shall be forged and be free of sharp edges which could cause failure of other materials. Webbing shall be synthetic. Sewing thread shall be of appropriate size and shall be of the same material as that being sewn.

PARACHUTES USED FOR FLAG DESCENTS

The parachute assembly (including the reserve) shall be suitably sized to carry the combined weight of the parachutist and flag assembly.

Typical gross weights are:

Small	95kg (70 kg jumper, 15kg flag assy, 10kg parachute)
Medium	105kg (70 + 25 + 10)
Large	125kg (70 + 40 + 15)
Very large	165kg (70 + 70 + 15)

PACKING / DEPLOYING FLAGS

The packing of the flag shall be such that the flag is able to unfurl in an orderly manner. *It has been determined that bringing the trailing edge of the flag up to within 1 metre of the leading edge, then folding the flag towards the leading edge (in container width folds) is an acceptable means of packing to avoid the flag forming a "spinnaker" and malfunctioning.*

In order to prevent entanglement between the flag and the weight, the flag weight shall be stowed so it deploys before the flag.

Prior to a display jump the method of packing the flag and weight shall be trialed on at least two training jumps.

APPROVAL

Prior to use at a display, and after any significant alteration, a flag assembly including its component parts shall be approved by a Licensed Display Examiner or Rigger B.

DISPUTE RESOLUTION

Where a flag owner/parachutist and Licensed Display Organiser are unable to agree on the interpretation of this standard the matter shall be referred to the Director Rigging to resolve.

COMPLIANCE DATE: Immediately

AUTHORITY: APF Board through the Director Rigging

DISTRIBUTION: All Licensed Display Organisers
All Licensed Display Examiners
All APF Rigger Bs