Guidance for the Operation of Open Parachute Lift Bags

The use of Open Parachute Type Underwater Air Lift Bags is guided by: **The International Marine Contractors Association (IMCA)** and their document **IMCA LR 007, D 016 Rev. 5 January 2022**

First published in 1993 by IMCA's forerunner the AODC, the objectives of the document are to provide clear lift bag safe use guidance on:

- Fitness for purpose.
- Operational considerations.
- Safety precautions to be taken into consideration during their use.
- Examination and testing criteria.
- Maintenance, which should be carried out to ensure the continuing. integrity of each bag between its periodic tests.

While JW Automarine are a leader in the development and production of these bags, the guidance detailed here should always be seen as a starting point for safe use.

Assessment of Requirement

Before lift bags are used in underwater engineering tasks, a proper assessment of the task to be performed should be made.

This assessment should include:

1. Calculations of the weight to be lifted or moved.
2. Calculations of the size of the lift bag and type (enclosed or open) required.
3. Calculations, where possible, to determine the centre of buoyancy and centre of gravity should be made so that steps can be taken to prevent the object being lifted spinning or turning over.
4. The number of lift bags required.
5. The positioning and attachment of the lift bag
6. Calculated safety factors for all the above

Note 1 - If the weight of the object to be lifted or moved is unknown, or the object is buried in the mud, the load can only be estimated. Precautions should be taken before the lift bags are attached to ensure that when they are inflated control of the load is not lost. The restraining line from the top of the bag, if secured to the load itself would perform its function should the lift bag attachment fail. It would not however prevent the load from going up in an uncontrolled fashion if the bag was accidentally over inflated. For this reason, the restraining line should normally be connected to an independent anchor point.

Note 2 - Extreme care should be taken when using lift bags to overcome seabed suction or free mechanically locked or snagged equipment. A hold back strop and anchor should be available which is heavier than the up thrust created by the lift bag. This can be achieved by placing Dead Man Anchors (DMA) in the vicinity of the object and attaching slings from the object to the DMA.

Note 3 - Open bottom lift bags should be used where any form of ascent is planned, such as vessel salvage or raising objects from the seabed. Being open bottomed the expansion of air on ascent is exhausted from the bottom of the bag.

Note 4 - A suitable inverter line must be fitted to open parachute bags and attached to the inverter line attachment point on the top of the bag. This inverter line should be long enough to attach to the load being lifted, to permit the bag to invert and release the air should there be a failure of any part of the securing rigging of the bag. It should be strong enough to resist the snatch load caused by a rapidly ascending bag, bearing in mind that a longer inverter line will allow the bag to achieve a greater upwards velocity and, hence, will create a larger snatch load.

IMCA recommends a strength of 1.5 x the uplift size as a minimum.
Be advised that if three stand polypropene rope is knotted on with a bowline, it will lose c.40% of its strength. A splice loses c.5%

Pre-Use Inspection

1. Each bag has its own Logbook that details all the information about the bag.
2. In the logbook is a certificate, check the inspection date on the certificate as LOLER states that the straps of a lift bag are “lifting equipment” and should be checked every 6 months.
3. Also in the Logbook is a checklist, this details all the pre use checks that must be undertaken.
4. Unroll the bag on a clear and clean area, checking first for any sharp objects that may puncture or damage the bag.
5. Now follow the details of the checklist, being:

Check the general condition of the lift bag material

a. General condition / appearance of bag material / fabric and eyelets.
b. Check inside of the bag for damage or debris, check condition of dump line.
c. Safe working load is clearly identified on the bag.
d. Serial number is clearly shown on the lift bag.
e. Details on certificate agree with the serial number on the bag.

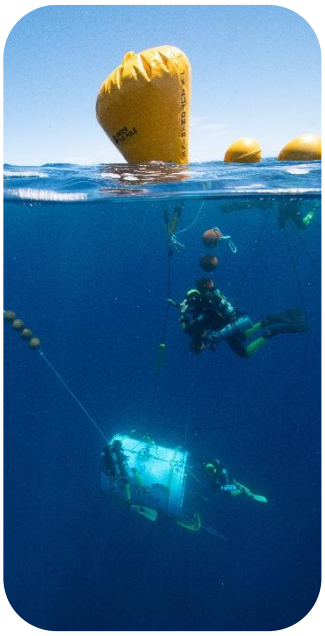
Check the general condition of the rigging

f. General condition / appearance of rigging items.
g. Check the condition of the webbing slings.
h. Check the condition of the stitching on the webbing slings.
i. Check the slings are not crossed or twisted.
j. Check condition of the master link(s).
k. Condition of the shackles.
l. All shackles and links are in place and secure.
m. Webbing slings, shackles and links are of the appropriate SWL.
n. Details on the certificate agree with ID on the rigged items.

Check the functional items on the lift bag

o. Check that there is an identified inverter line attachment point.
p. Check that inverter point is clearly identified.
q. Check the integrity of the inverter line attachment point to the bag.
r. Check the length of the inverter line is adequate.
s. Condition / appearance of the dump valve.
t. Test the operation of the dump valve, pull line to test action.
u. Confirm dump valve is free from blockages / mud etc.
v. Confirm O-ring seal is in place.
w. Check length of dump valve line is adequate.
x. Confirm dump valve line is clearly different from the inverter line.
y. Condition / appearance of the quarter turn valve(s), if fitted.
z. Function of the quarter turn valve(s), confirm opens / closes, if fitted.
aa. Confirm quarter turn valve(s) are free from blockages / mud, if fitted.

General Hints on the use of Open Bottom Parachute Lift Bags



1. When rigging a series of bags, ensure that a balance is achieved and that the fixing points are strong enough to take the load of the lifting capacity of the unit being used.
2. Place the bag so as to minimize stress differentials. Uneven lifting stress may well cause physical damage to the load, as well as endanger divers.
3. Attach and inflate bags methodically when used in groups or clusters to avoid one forcing another to collapse.
4. Bags should be inflated evenly on the load to prevent rolling or tipping.
5. After use, whether in salt or fresh water, the bags should be washed off, lightly scrubbed if necessary to remove mud, oil, tar etc, then hung up to dry.
6. Inspect all of the lifting straps carefully. Damaged straps or fastenings may govern the success or failure of the next task.