

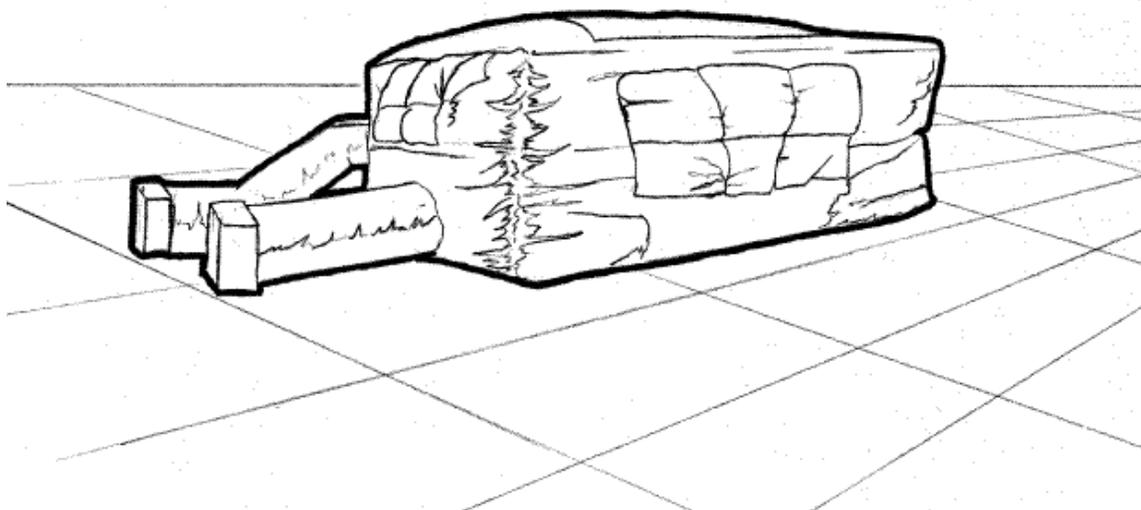
## AIR RESCUE CUSHION

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## INTRODUCTION

The Air Rescue Cushion employed by the Los Angeles City Fire Department is similar to air cushions used in the movie industry. It is an inflatable cushion composed of a larger upper cell and a smaller lower cell. Each cell is inflated by a separate blower through an air tube or sock. The cushion comes with two (one-half horsepower) electric blowers. Electricity for the blowers can be supplied by a variety of sources including the Truck on-board generator or portable generator(s) and/or 110 supply (house current),.

The Department currently has 24 Air Rescue Cushions, 6 rated at 100 feet and, 18 rated at 70 feet. The rating reflects the height of a “jumper.” The 24 Air Rescue Cushions have replaced the 47 life nets carried by Truck Companies.



The assignment to a reported “jumper” consists of one Battalion Chief, one Task Force and one Paramedic Rescue Ambulance. **If an Air Rescue Cushion is needed at an incident, it must be specifically asked for by the Incident Commander.** The closest Task Force with an air cushion will be added to the assignment.

There are currently (18) 70-foot and (6) 100-foot Air Rescue Cushions assigned to the following locations:

| <u>LOCATION</u> | <u>RATING</u> | <u>LOCATION</u>        | <u>RATING</u> |
|-----------------|---------------|------------------------|---------------|
| F.S. 2 .....    | 70 feet       | F.S. 70 .....          | 70 feet       |
| F.S. 11 .....   | 70 feet       | F.S. 72 .....          | 70 feet       |
| F.S. 17 .....   | 70 feet       | F.S. 26 .....          | 70 feet       |
| F.S. 85 .....   | 70 feet       | F.S. 93 .....          | 70 feet       |
| F.S. 27 .....   | 70 feet       | F.S. 94 .....          | 70 feet       |
| F.S. 37 .....   | 70 feet       | F.S. 98 .....          | 70 feet       |
| F.S. 48 .....   | 70 feet       | F.S. 10 .....          | 100 feet      |
| F.S. 50 .....   | 70 feet       | F.S. 20 .....          | 100 feet      |
| F.S. 60 .....   | 70 feet       | F.S. 58 .....          | 100 feet      |
| F.S. 63 .....   | 70 feet       | F.S. 88 .....          | 100 feet      |
| F.S. 64 .....   | 70 feet       | F.S. 95 .....          | 100 feet      |
| F.S. 69 .....   | 70 feet       | Recruit Training ..... | 100 feet      |

One of two situations will usually confront rescuers at a “jumper” incident: First, a fire or industrial accident may have occurred placing a person or persons in danger of jumping or falling from a significant height. In this case, it is extremely important to communicate with the victim(s). However, the victim’s ability to respond to instructions may be limited by fear. Every attempt must be made by the rescuers to break through the “fear barrier” and gain the cooperation of the victim. Often several plans of rescue will be initiated simultaneously. The Air Rescue Cushion may be deployed as a primary means of rescue or a safety backup.

In the second situation, the “jumper” is a potential suicide victim. The Fire Department will work under the direction of the Police Department to mitigate the emergency. Initial efforts should be made to communicate with the individual. While attempting to open a line of communication, rescuers should attempt to confine the jumper to as small an area as possible. Lateral room and depth of area must be reduced. A jumper should be “closed on” from as many sides as possible. This reduces the size of the target area on the ground. In this situation, rescue personnel must be aware of the potential hazard of getting too close to the “jumper”.

It is difficult to accurately assess the determination of a person considering suicide. There may not be much that can be done if a person is determined to jump. However, the deployment of the Air Rescue Cushion gives rescuers one more option.

## **TECHNICAL DESIGN**

The Air Rescue Cushion is comprised of two cells separated by a membrane, but not completely sealed off from each other. Air can pass from the lower (smaller) cell to the upper (larger) cell by way of a small vent between the two.

The upper cell absorbs most of the energy generated by an impact. It dissipates the energy by releasing air from the breather ports located on the side and front of the upper cell. The amount of air released is regulated by an elastic cord ties over the breather ports. The tighter the cord, the less air released, thus creating a firmer cushion. The lower cell does not have a breather port; consequently, very little air is released on impact. This provides the lower cell with twice the energy-absorbing capability of the upper cell. The lower cell provides the safety margin for the air pack and determines the limiting height from which a person may safely fall. In less than one-sixth of a second, the Air Rescue Cushion is able to absorb and dissipate the energy of impact.

The cushion is constructed of vinyl-reinforced fabric, which is fire retardant and waterproof. The tear strength of this material is over 50 pounds psi. The seams of the cushion are sewn with a heavy-duty nylon thread, which is stronger than the material of the cushion. The overall construction of the cushion makes it durable and resilient.

If the air cushion is torn or punctured during an operation, it will not seriously affect its capability. The cushion is filled with air, but not sealed like a balloon. The dual-blower configuration continually pumps air into the two cells, and continually exhausts it through the breather ports. If the air cushion incurs minor damage, the blowers will easily compensate for the additional loss of air, and minor damage to the cushion might go unnoticed until it is inspected.

The air cushion rating is based on two factors:

1. The maximum floor level from which a person may fall, based on ten feet per floor, landing on the buttocks or back with a cushioning effect that is safely below the human tolerance level (as per the U.S. Air Force in "Human Tolerance to Shock").
2. The ability of the person falling to properly hit the target.

## DEPLOYMENT

**The Air Rescue Cushion is deployed in the following manner:**

1. Move cushion and blowers to a “pre-deployment area.” Do not set up cushion in target area. To a “jumper” above, the Air Rescue Cushion may appear to be fully inflated when it is not.  
(For attempted suicide, this should be out of view)  
Police pre-deployment area for hazards that can damage the air cushion (i.e., sprinkler heads, broken glass, etc.)
2. Place air cushion on the ground, unroll into desired position.
3. Roll air socks out flat.
4. Attach air socks to blowers, and cinch draw-straps tightly.

Start both blowers by plugging into a power source. The preferred source of electricity is the on-board generator. It has the capacity to run two blowers simultaneously. Portable generators carried by Truck Companies do not have the capacity to start two blowers at the same time.

The use of a 110 AC power supply is desirable, if possible. Remote power sources have the added advantage of greatly reducing noise levels at the incident, aiding communications at the scene.

If the on-board generator or other 110 AC power source is not available, two portable generators will be required to deploy the Air Rescue Cushion.

As a last resort portable gasoline powered blowers can be used to inflate the Air Rescue Cushion.

*NOTE: There are two negatives to using gas-powered blowers:*

1. *They add a significant amount of noise to the scene.*
2. *They produce carbon monoxide, which causes a long-term degenerated effect on the vinyl-reinforced fabric of the cushion.*

The Air Rescue Cushion will fully inflate in less than 60 seconds.

5. Walk around the cushion to insure that the breather port flanges are straight and hanging vertically.

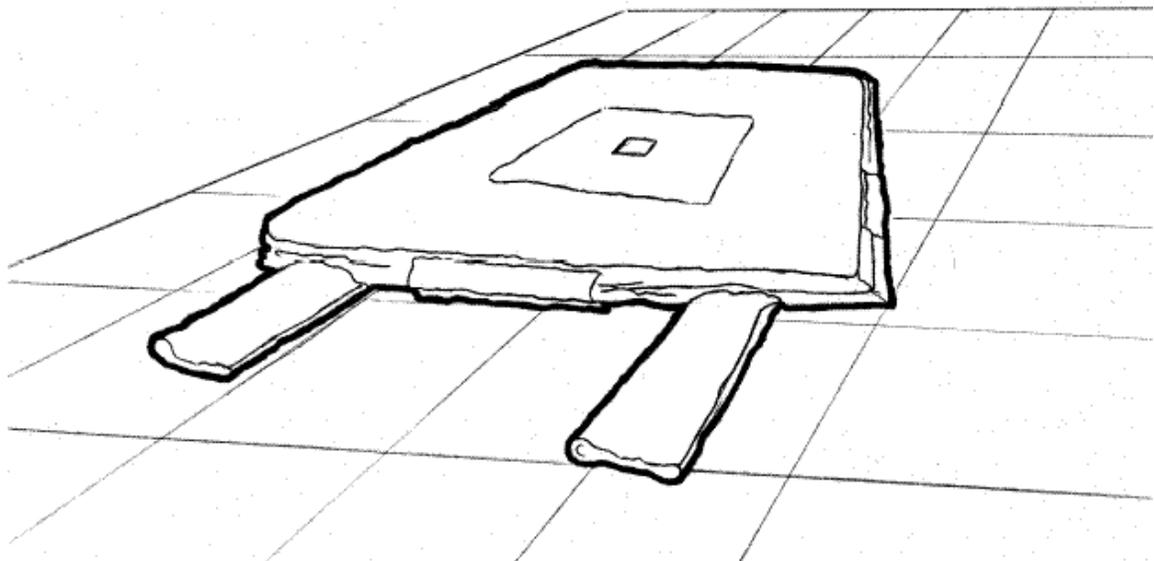
6. Attach a drop bag cord to the eye at each corner of the cushion.  
A pre-cut, six-foot length of drop cord works well.  
(Some cushions have lines pre-connected.)
7. After inflation, the cushion can be repositioned into the target area by using the drop bag cords to move the cushion.

The person falling into the Air Rescue Cushion should be instructed to fall as if they were sitting down. When falling in this position, the body will naturally rotate causing the person falling to land on the small of the back. If two people must fall at the same time, they should hug each other tightly from the moment they jump until impact. It is important they **not** fall separately. If they fall even a fraction of a second apart, injury may occur. After landing, have the jumper(s) immediately roll off the cushion and allow 20 seconds for re-inflation. The cushion is now ready to take another jumper.

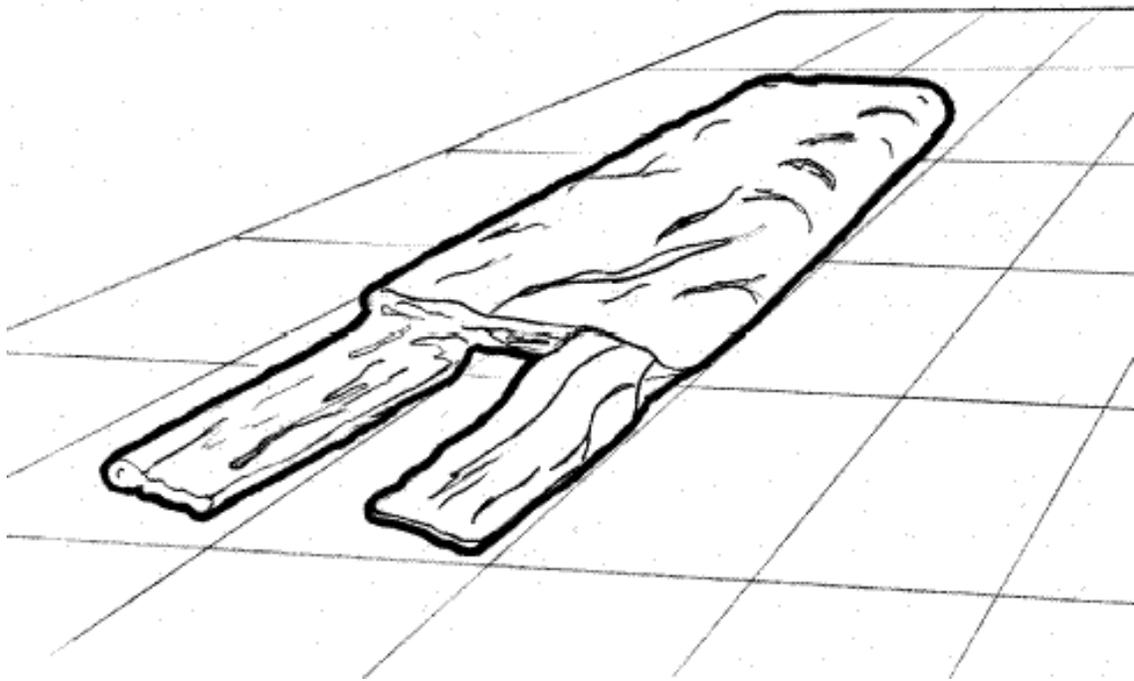
NOTE: Always have a company member observing the operation to insure that the Air Rescue Cushion is fully inflated. **A partially inflated cushion will not provide adequate support!** The same member may also direct movement of the cushion. If possible, move parked cars and other obstructions prior to deployment.

## STORAGE

1. Detach blowers from socks and allows cushion to deflate.
2. Inspect the cushion for any damage.

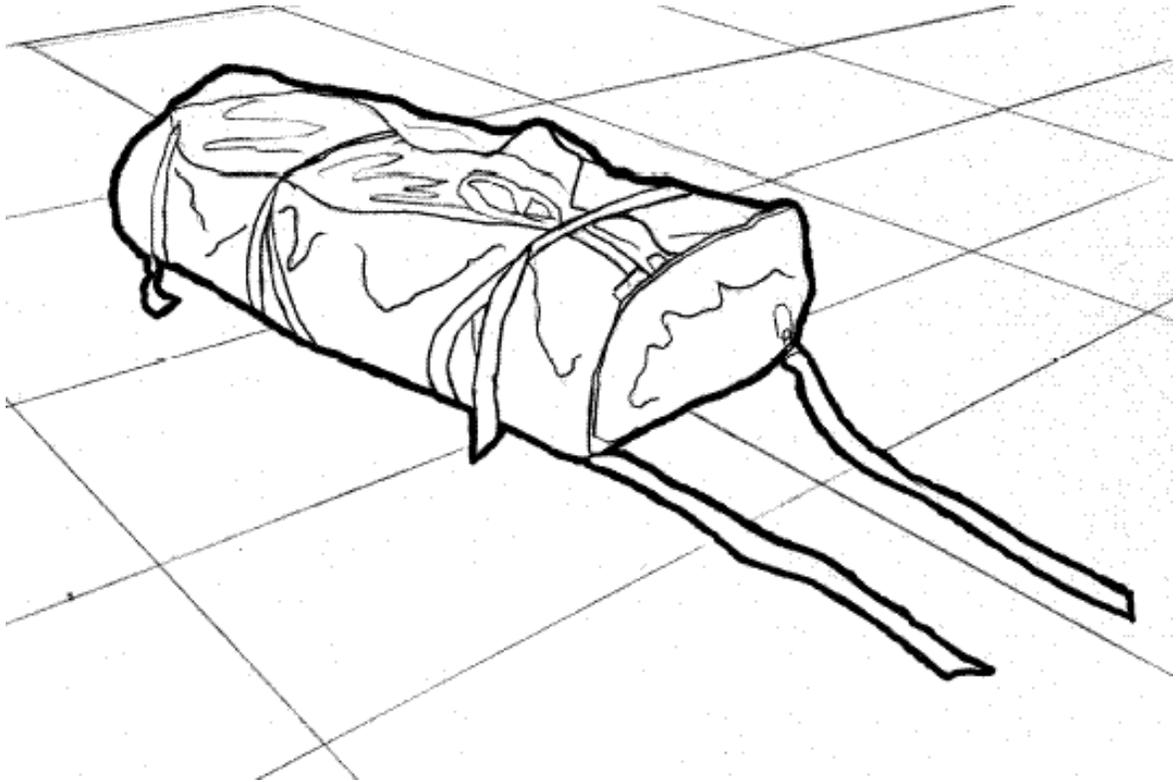


3. Fold the air cushion into a width that will allow it to fit on the carrier.



4. Roll the unit toward the socks. Residual air will be forced out as the air cushion is being rolled.
5. After the cushion is completely rolled, unroll enough to fold the socks back in top the cushion and re-roll.

6. Place the Air Rescue Cushion on the carrier, strap securely, and return to apparatus.



NOTE: Never store the Air Rescue Cushion while wet. Allow cushion to dry, then fold and place on apparatus.