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INFLATABLE LIFE JACKET BASICS

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Inflatable life jackets are comfortable and make patrolling in hot/humid weather a lot easier if authorized to be worn on the facility. Regardless of the style worn, we should all know how to maintain inflatable life jackets and be able to answer boater's questions about them.



The term "*life jacket*" rather than "*PFD*" is used exclusively in this article because of the Coast Guard Boating Safety Division's national thrust to promote life jacket wear and endorsement of the "Wear It" theme. The National Safe Boating Council and state boating authorities are also embracing "Wear It"; and promoting "*life jackets*" not "*PFD*'s." In order to standardize the terminology used with the boating public, please only use the term "life jacket." There were 709 recreational boating fatalities in 2008, two thirds of them drowned (510) and ninety percent of the victims (459) were not wearing their life jacket, as has been the case for the past ten years. Promoting Wear It and boater education will save lives.

The Coast Guard initially classified inflatable life jackets as Type V Hybrid Inflatable Devices with performance levels equal to a Type I, II, or III as noted on the label. They have evolved into the Type II and Type III categories making it easier for boaters to comply with boating laws. Read the label or data printed inside the life jacket to determine its Type and any restrictions.



There are three brands of mechanisms accepted by the USCG for automatic and manual inflating life jackets. It should be noted that some inflatable life jacket brands are not USCG approved but may use components similar to those used in USCG approved life jackets. If an automatic inflatable life jacket does not inflate when a wearer goes into the water, all models have a manual alternative. To manually inflate, the wearer pulls the lanyard attached to the mechanism to puncture the CO₂ cylinder. If the cylinder is unused and properly installed, it will inflate the life jacket. A third option is to orally inflate the life jacket using a tube located on the wearer's upper left side of the inner life jacket. The yellow lanyard handle can be seen on the bottom left side of this special demonstration model. The orange oral inflation tube can be seen on the inflated right side.

Many boaters wear life jackets activated by one of two Halkey-Roberts automatic inflating mechanism, which use a 33-gram CO₂ cylinder, and chemical inflator bobbin. The "new and improved" yellow shell bobbin replaced the original red shell bobbin in August 2002. Any red bobbins still in use should be promptly replaced. Regardless of the model, the bobbin only fits into the holder one way. The bobbin holder should be completely tightened before the CO₂ cylinder is inserted to prevent puncturing the cylinder and inadvertently inflating the life jacket. Some brands use a Secumar inflator mechanism activated by a "pill" rather than a bobbin. When the bobbin/pill

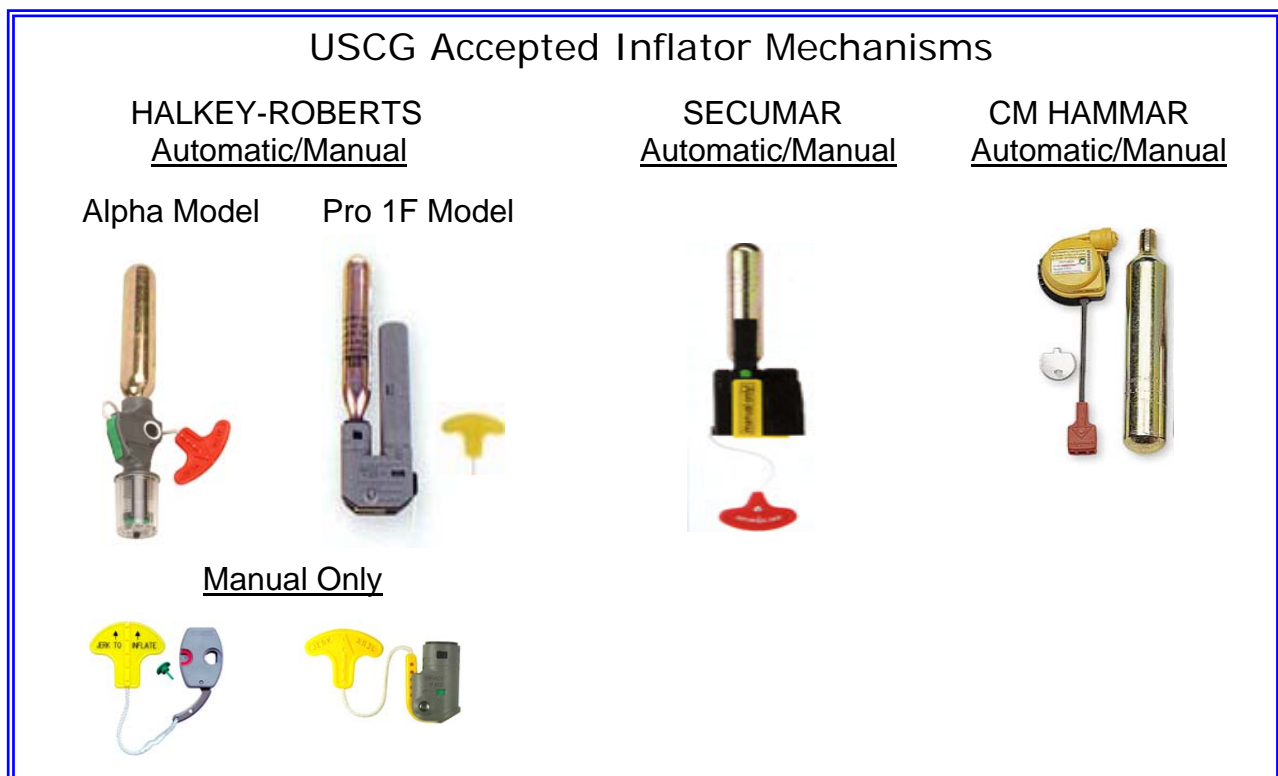
holder is properly secured, the firing pin retracts and a green indicator is visible. There are also green/red indicators for the CO₂ cylinder and (on some) a green plastic insert for the manual lanyard device. A red indicator in any area indicates the life jacket is not properly armed.

If the inflation mechanism does not have a bobbin holder, it is a manual inflating life jacket. This author encountered boaters who thought they had an automatic model and it was a manual. One boater almost drowned before pulling the lanyard and the life jacket inflated and saved his life.

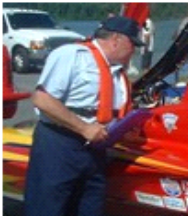
Regardless of inflatable model, the concept is the same. The bobbin/pill disintegrates when exposed to water and allows a firing pin to puncture a CO₂ cylinder and fill the inflatable bladder in about 3 seconds to provide approximately 35 pounds of buoyancy. The manual models are activated by pulling the lanyard. Most automatic mechanism can be re-armed for manual only inflation with only a CO₂ cylinder. Some require an adaptor in lieu of a bobbin or pill.

The Auxiliary Operations Policy Manual precludes crew members under orders from using manually inflating life jackets, or automatic models rearmed as a manual model. *"Auxiliarists utilizing an automatic inflatable PFD must check before donning that the device is armed and packed in accordance with the owner's manual, and that a fully charged CO₂ cylinder is in place. Scheduled maintenance recommended in the owner's manual must be completed. Uncharged or manual only inflatable PFD's are not authorized for Auxiliary use while on orders."* Automatic inflatable life jackets hinder egress in an enclosed cabin environment and are not authorized for use on Auxiliary aircraft of any type.

The third accepted mechanism is the CM Hammar inflator used in Mustang hydrostatic life jackets. The Hammar system is activated by water pressure and has a hydrostatic valve in place of a bobbin/pill. When submerged in at least 4 inches of water, the hydrostatic valve activates, and the CO₂ cylinder is pierced and the CO₂ inflates the bladder. This type life jacket is not affected by getting wet. Unlike the other two systems, the CO₂ cylinder is positioned inside of the bladder. Once used, or every five years, the complete inflator and CO₂ cylinder must be replaced to rearm it.



Certain inflatable models have a bayonet tip cylinder that requires a 1/8th turn clockwise to a full stop to secure the cylinder rather than a screw-in CO₂ cylinder. Particular care should be given when inserting CO₂ cylinders with bayonet tips. If the CO₂ cylinder is not completely turned, the mechanism is supposed to eject it. It was discovered in some production units a false positive green indication can be achieved by simply pushing the cylinder into the mechanism without turning it to a full stop. If the cylinder is not fully turned to secure it in-place, the life jacket will not inflate, either automatically or manually. To be safe, periodically check the USCG Boating Safety Division's web site at <http://www.uscgboating.org/> for recalls and the latest information.



When worn by vessel examiners, instructors or at boating safety exhibits, an inflatable life jacket's comfort quotient is readily apparent to boaters, which is why we wear them on land. Recommend you unscrew the CO₂ cylinder at exhibits to prevent manual inflation by a prankster. Then it is always a good idea to check the mechanism before embarking on a patrol. Be prepared to answer questions when wearing an inflatable life jacket because there is a lot of interest in them.

If an automatic inflating life jacket mechanism was activated by a liquid, ensure all parts of the compartment are thoroughly dried before inserting a new bobbin/pill. If there is an immediate need to rearm the life jacket for automatic inflation, you blow dry the compartment then place the life jacket in the sun to dry any remaining moisture. Rearming a wet mechanism for automatic inflation will result in the bobbin/pill dissolving and the life jacket inflating again.

A worksheet at the end of this article is a good preventative maintenance guide and record if used in conjunction with the life jacket owner's manual/label, *and what you learned from reading this article*. For example, even if not called for in the owner's manual, periodically orally inflating a life jacket for a leak check is a good idea. You should submerge it to check that the bladder, oral inflator tube, and cap do not leak. Coast Guard literature reviewed requires a 2 hour inflated observation period semi-annually. One manufacturer recommends overnight evaluation, we agree.



Halkey-Roberts recommends changing their recreational use bobbins every 3 years, more often in extreme conditions such as high temperature and high humidity where a chemical bobbin (photo on left) may deteriorate in less than 30 days. However, most of us are not operating under those conditions and a bobbin can provide years of functional use if inspected. The date of manufacture is on the bobbin's side; and, they have a life jacket manufacturer's *shelf life* of up to 4 years if properly stored. *Service life* commences at point of sale to the user. Bobbins used in a commercial marine environment should be changed every 2 years. Owners should visually inspect bobbins to ensure the "ridges" are still evident (the exposed surface has ridges) and the bobbin is not cracked or the white fill discolored.

The Secumatic inflator mechanism in some brand life jackets uses a "pill" which has a smooth surface (photo on right). A visual inspection of the pill encompasses ensuring the pill retains its original shape, is not cracked, discolored, or otherwise damaged. Recommend the same change rules as for bobbins apply.



A half moon green plastic pin inserts into Halkey-Roberts and Secumar mechanisms and retains the lanyard arm in place. These can break when removed. A few on-line sources offer rearming kits and/or individual components. However, a word of caution

is warranted. While obtaining individual replacement components, such as a pin, bobbin or pill, may be cost effective, as a rule inflatable life jacket owners should purchase the rearm kit specified for their life jacket. That is because the opportunity to use an incorrect CO₂ cylinder exists. Only knowledgeable persons should purchase components.

The critical time for needing a functioning life jacket is not when a boater should discover a mistake was made rearming. When purchasing a rearm kit, ensure that kit is specified for that model life jacket. Model numbers can be found on the inner side near the "USCG Approved" statement. Always ensure the correct capacity CO₂ cylinder is used. This is particularly important when rearming belt pack life jackets because they use smaller CO₂ cylinders than other models. Stick with the manufacturers' recommended product to be safe and always check your jackets bobbin and CO₂ cylinder before getting underway. We made checking these items part of patrol crew briefings.



The most significant factors in life jacket service life are their use, storage, and maintenance. With high usage, poor storage, and poor maintenance, a life jacket can wear out to the point of being unserviceable within a year or less. For inflatable life jackets, beside routine checks on the CO₂ cylinder and inflation mechanisms, there is some added maintenance at least annually for checking the bladder as specified by the manufacturer. For automatic inflatable models, the care of the automatic components are particularly important and may have a limit on service life of only a few years or less in accordance with the manufacturer's instructions.

The USCG does not specify a maximum service life for inflatable life jackets. A lifejacket remains approved if it is in "serviceable condition." If a life jacket can be used properly and is not deteriorated, it is acceptable as meeting carriage requirements.

As with most items aboard any vessel, reading instructions, becoming familiar with how to properly wear and inflate the life jacket, and properly maintaining the equipment with clean storage will promote a better service life which could possibly save a life when necessary.

There are also automatic inflatable life jackets for pets which operate on the same life saving principal as for humans. Unlike most inherently buoyant pet life jackets, in addition to keeping the animal afloat, these models keep its head out of the water when the animal becomes too tired to keep paddling. They use Halkey-Roberts bobbin mechanisms with an 8 gram CO₂ cylinder for up to 15 pound pets, 12 gram for up to 40 pounds, and a 25 gram for up to 200 pounds. These life jackets also have the manual and oral inflation capability that owners can use. While animal life jackets are not USCG approved, they nevertheless have a place and can help promote pet owner life jacket wear, and especially life jacket wear by children.



BEFORE INFLATION



PET INFLATED

We hope this article answered your questions about the operation, rearming, care and maintenance of inflatable life jackets. Mustang Survival also has videos that can be viewed at <http://www.mustangsurvival.com/resources/documentation/training/md3031/index.html>. Readers are invited to contact the author at cgauxstu@yahoo.com with questions or comments.

Disclaimer: Although brands, manufacturer names and item, and sources are mentioned, the U.S. Coast Guard and Coast Guard Auxiliary do not endorse any particular product or brand over another. What we do endorse is wearing a Coast Guard approved life jacket on the water.

Contributors: Mr. Martin Jackson from Coast Guard Lifesaving & Fire Safety Division, Leland Ltd., Halkey-Roberts and Coast Guard Auxiliary B, O and V Departments all provided valuable information used in writing this article.

Photo credits: Our appreciation to Halkey-Roberts, CM Hammar/Mustang Survival, Stearns, and Critter's Inflatable for permitting use of their photos; and the North American Safe Boating Campaign for the banners below.

Questions: Email cgauxstu@yahoo.com.



PERFORMANCE QUALIFICATION STANDARD FOR MUSTANG SURVIVAL MD3031 WITH SURVIVAL EQUIPMENT POCKET, SOSPENDERS MODEL 38ASTD, AND STEARNS, INC MODEL 1341 AUTOMATIC INFLATION LIFE JACKETS.

Crewmember: _____

Date: _____

In some weather conditions, the chemical bobbin may deteriorate in less than 30 days. Flotilla Commanders should consider training their crews to deflate, rearm, and stow the bladder after inadvertent inflations. In addition, inadvertent inflations can cause a user to become temporarily disoriented. Training should include donning the vest and inflating it to ensure users are aware of how rapidly the bladder expands.

PERFORMANCE CRITERIA

INITIALS

State the life jackets flotation characteristics. _____

Locate and explain the following items:

Personal Marker Light _____

Survival Knife _____

Strobe Light _____

Signal Mirror _____

Whistle _____

Oral Inflator _____

CO2 Cylinder _____

Inflator Bobbin _____

Don the vest and adjust waist belt as needed. _____

Explain the three different methods of inflation. _____

Explain two indications of an armed and charged inflation assembly. _____

FOR MUSTANG MODELS: Remove and reinstall the equipment pouch using the “pull the dot” snaps. _____

_____ Member Signature Date