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Foundation Findings Report #30C - Inflatable Life Jackets, July 2000
What to Know Before They Blow - Special Report

Automatic Inflatable Life Jackets

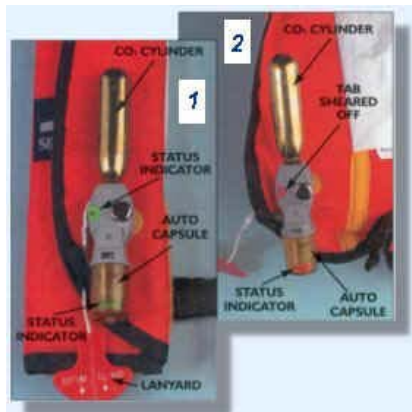
The U.S. Coast Guard breathed new life into boating safety in September 1996 when, after years of testing and review, it approved manually activated inflatable life jackets. Approval as Type III PFDs (personal flotation devices) meant boaters didn't have to wear them, just carry one per person on board.

In August of last year, the agency's Life Saving and Fire Safety Standards Division took another deep breath and approved life jackets that inflate automatically when they come into contact with water. These were approved on a conditional basis, as Type V PFDs, which means they may be counted toward the Coast Guard requirement of one per-person *only if they are worn*. Thus, if an auto inflatable is your choice, you will have to wear it at all times or keep an additional inherently buoyant life jacket or Type III inflatable aboard to be in compliance.

Four manufacturers now have Coast Guard approved Type V automatic inflatable life jackets on the market. Three also offer them with built-in offshore safety harnesses (see chart). In this BoatUS Foundation Special Report, we compared one Type V device from each company to find out what conclusions could be drawn that would help boaters select an approved auto inflatable.

We did not attempt to evaluate performance since these devices are essentially the same as the manual inflatables that the Foundation tested earlier (*BOAT/U.S. Magazine*, May 1998) and they must pass rigorous Coast Guard testing.

The differences are in the mechanism used to inflate the jackets when they get wet. Our purpose is to acquaint you with this most critical piece of the inflatable equation to help you choose a device.



Halkey-Roberts inflator in ready position (1) and after inflation (2). Click on image for larger view.

Poof!

Unlike the familiar inherently buoyant vest, inflatables use a carbon dioxide (CO₂) cylinder to blow up an air bladder. In the auto inflatables, the bladder encircles the neck and is cinched to the torso with straps over the shoulders and across the back. They are designed to float the average adult with their head out of water and turn most people face-up. All have oral inflation tubes as well.

Two inflator mechanisms meet Coast Guard standards and of the four life jacket brands we examined, three use a device made by Halkey- Roberts Corp. The fourth uses an inflator made by Secumar (see chart). Both activate when a water-soluble material dissolves, releasing a spring-trigger mechanism. The trigger drives a bayonet pin into the CO₂ cylinder and - poof! - the air bladder unfolds and inflates within 10 seconds.

Besides looking very different (see photos), the principal difference between the two inflators is in how they are put in the "ready" mode. The Halkey-Roberts inflator used by Eastern Aero, Mustang Survival and Sporting Lives, uses an "auto capsule" which contains a spring - loaded plunger topped by a bobbin. When wet, the bobbin dissolves, releasing the plunger to pierce the cylinder .

To rearm the unit, you unscrew the auto capsule and replace the bobbin which comes with a fresh cylinder in the manufacturer's rearming kit. One built - in safety feature is a window at the bottom of the capsule that shows green when in the ready position. It shows red if the bobbin is not in place or if it's been fired.

The Secumar inflator is a one-piece unit with the firing pin held in the ready position by a water-soluble pellet or pill. A lever on the side of the device is cocked back, opening a slot for the pill. If the pill is not in place, it won't stay cocked.

The Secumar inflator has two other red/green safety indicators, one that shows red unless the pill is in place and another at the cylinder connection that shows red until the cylinder is screwed down sufficiently.



Secumar inflator in ready position (1) and after inflation (2). Click on image for larger view.

Both inflators can be activated by yanking a lanyard exactly like those on manual life jackets. Each has a green plastic pin that holds the trigger arm in position. When the unit activates, either automatically or manually, the pin shears off, exposing a red background.

Three models carry spare cylinders in a pocket to rearm the device for manual operation, a handy feature should the life jacket inflate accidentally. The Stearns does not because, due to the inflator design, it cannot be used as a manual (but of course, like all the rest, it can be inflated orally.)

One of the drawbacks faced by the auto inflatable manufacturers is the tendency of these devices to inflate prematurely if errant rain drops or stray spray should seep inside and dissolve the pill or the bobbin. Even high humidity has been known to trigger inflation. The current approved devices are rated to resist premature inflation in weather conditions up to 80% relative humidity.



Always inspect the cylinder to be sure the seal has not been punctured.

		Company			
		Sporting Lives Inc	Sporting Lives Inc	Stearns Mfg. Company	
Eastern Aero Marine	Mustang Survival	AirForce	SOSPENDERS Sport Model	SOSPENDERS World Class	Stearns Ultra
Name	EAM Triumph II	MD3001	25ASPT-WD	38 ASTD	1339
Model	PO1080-103	navy, black, or red	orange	navy	navy, orange, royal blue
External Color	yellow, orange, navy	Halkey-Roberts	Halkey-Roberts	Halkey-Roberts	Secumar
Type of Inflator Mechanism	Halkey-Roberts	33 gram	25 gram	38 gram	33 gram
Size of CO2 Cartridge	33 gram	yes	yes	yes	no
Spare Cartridge comes in jacket?	yes	35 pounds	24 pounds	38 pounds	35 pounds
Buoyancy when fully inflated	35 pounds	80 pounds	80 pounds	80 pounds	90 pounds
For use by people weighing more than	80 pounds	yes	no	yes	yes
Reflective tape when inflated?	no	no	no	yes, 38AHR-P	yes, Ultra 1343
Available with ORC (offshore racing council) harness?	yes, PO1080-203	\$175.00	\$99.00	\$135.00	\$149.99
Suggested list price	\$131.60				

Ready, Set ...

With the automatic inflator armed, green showing in all the proper places, the bladder folded according to instructions and the manual pull lanyard dangling within easy reach, your inflatable life jacket is ready to save your life, right?

Yes, *but with inflatables, there is only one way to be absolutely certain the unit is ready.* You must manually remove the CO2 cylinder and visually inspect the seal in its neck. If that's intact, the unit is ready. If there's a hole in it, you're out of gas, literally. But the only way to know that the life jacket is armed with a fresh cylinder is to unscrew it and look. That is why we recommend that if you decide to use inflatables on your boat, you make it a habit to take out the cylinder and check the seal every time you don your life jacket.

There is as yet no inflator mechanism with an indicator that can tell the user at a glance that the seal on the Co2 cylinder is intact. This is a primary reason the Coast Guard gave auto inflatables conditional Type V approval. Cylinder seal indicators are in the development stages, according to the manufacturers. Once perfected to meet Coast Guard requirements, the Type V "must be worn," restriction could be lifted.

While inflatable life jackets, both manual and auto, offer a safe and comfortable option, they are not for all boaters. To start with, they are not approved for children and are not recommended for certain types of "high impact" watersports like personal watercraft riding or water skiing, nor are they intended for poor swimmers.

Inflatable life jackets are not fool proof. They require more attention than inherently buoyant devices and you must be thoroughly familiar with their use - That's why they come with an owner's 's manual. By their design, automatic inflatables require regular inspection and careful rearming since the various models use three different size CO2 cylinders as well as their own trigger arm shear pins and two styles of water sensitive release components.

We've said it before, but it bears repeating: If you are willing to make the effort, the added buoyancy plus the "wearability" factor of inflatable life jackets make them an attractive safety option It that could help deflate boating accident statistics - and maybe even save your life.

For more information, refer to Foundation Findings #29, "Floating on Air - Inflatable Life Jackets Make the Grade," published in *BoatUS Magazine*, May 1998. You can also find it on the [BoatUS Web site at www.boatus.com](http://www.boatus.com) or call 800-336-BOAT for a copy.