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DEVICE DESIGNS

Design Characteristics

Choosing the right device for your activity will usually require a little thought and research. Consideration of your needs and the different characteristics of a design can be a balancing act. Sometimes a trade-off is necessary. The device that offers greater performance under more extreme conditions may seem 'safer' or 'better' but may be bulkier, uncomfortable or have features that impedes your activity. Sometimes your choice will lean towards the regular protection of a device that can be constantly worn.

The main types of device designs are:

Inherent

A device made of material (usually foam) that is always buoyant. The foam may be encased in fabric in one or more sections.

Inherent Advantages:

• Floats immediately without any action by the wearer.

• Adjustable fit for children and adults

• Can be constructed in a vest style that fits snugly to the body and allows for range of motion in water sport activity or paddling.

• Offered in a range of performance levels to match the activity and environment of use.

• Accessible price and low maintenance.

• Can help keep wearer warm (both out of and in the water) on cool days.

Inherent Disadvantages:

• Can be too warm on hot days for constant wear unless designed with ventilation - for example: mesh panels or cutouts

• Higher performance levels require more foam in order to meet testing standards for buoyancy and turning, which may make the device bulkier.

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Inflatables

A device that inflates with air (usually produced by a gas canister) to provide flotation. Activation of the inflator occurs automatically when submersed in water or in special circumstances by pulling a manual toggle or by oral inflation through a tube.

Inflatable Advantages:

• Offered in a range of performance levels where high buoyancy and turning characteristics can be achieved without being bulky.

• Can be constructed in a vest style or a yoke that is worn like a scarf around the neck with a chest or waist strap. Before inflation the casing material is folded flat and has a very little bulk.

• More comfortable for constant wear (mobility and ventilation in the un-inflated ready-to-go state).

Inflatable Disadvantages:

• Not suitable for weak or non-swimmers.

• Not for use by children.

• Inflation can startle the wearer. May impede vision and comfort around the face. Sometimes adjustments need to be made by releasing or adding air from the oral inflation tube.

• Not suitable for many water sports activity and on personal watercraft.

• Inflation to full buoyancy may be delayed (particularly in cold temperatures.)

• More maintenance required. (Gas canister needs to be replaced after use, inflator status checked regularly and the device professionally serviced.)

• More expensive device at outset and throughout the lifetime of use.

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Hybrid or Multi-Chamber Devices

A Hybrid is a device that combines inherent buoyant material (usually foam) with an inflatable chamber.

A Hybrid designation means that the device can perform fully as a buoyancy aid (Level 50) without any additional inflation. After inflation, the device rises to a higher performance level with more buoyancy, freeboard (and possibly turning) depending on the design.

A Multi-Chamber device combines multiple sources for buoyancy. A Multi-Chamber device may have some inherent buoyancy but it depends on the total combined buoyancy of all chambers (the inherent material plus additional inflated chambers) to achieve its designated performance level.

Advantages:

• A Hybrid device floats immediately without any inflation.

• A combination of flotation chambers can adjust to the activity or situation, providing more or less performance when needed.

• Supplemental inflation can be provided through gas canisters or the oral tube, depending on design.

Disadvantages:

• Wearer must read label (including manufacturer's information) to understand the performance characteristics offered by the device. A multi-chamber device (or even a hybrid) may not offer sufficient buoyancy for all wearers until inflated.

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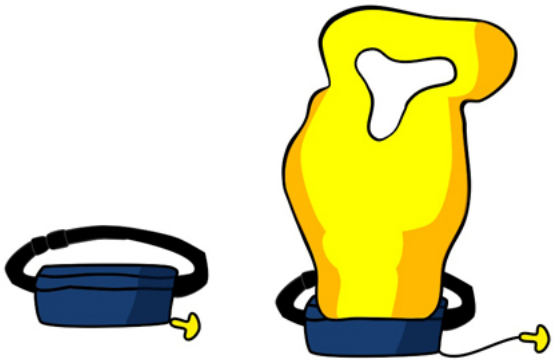
Special Purpose



A device that is designed for a specific application or restricted circumstances. Some features may be added, increased or adapted. Some devices may require extra action by the user or special training.

Some examples are:

- devices for use in fire protection, rescue services or by law enforcement personnel.
- extra buoyancy for white water rafting.
- additional visibility equipment for offshore racing.
- inflatable belt pouches
- manual inflation devices

Advantages:

• Certain situations or activity may require special or altered features on a device to make the device possible to wear and to achieve the protection required.

Disadvantages:

• What may be a good design for a specific application may not be good for another situation and in some cases might endanger the wearer.

• May require special action by the user such as:

- secondary donning (eg. belt pack that once inflated needs to be placed over head)
- manual inflation (by pulling on a toggle)

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DID YOU KNOW?

Inflatables can be more comfortable but require more maintenance and expense.

• Not suitable for some sport activities.

• READ THE LABEL

DID YOU KNOW?

- Your activity may require special features and/or accessories for certain conditions.
- READ THE LABEL (INCLUDING MANUFACTURER INFO)

FIT

GOOD FIT is important for comfort when wearing the device. READ THE LABEL for a general idea of size, but trying it *on* in the store and trying it *out* in the water is the best way to choose the device that's right for you.

Ride Up

A device that 'rides up' around your face, or worse, falls off in rough water is dangerous. The flotation needs to stay snug around your body and lift you out of the water with your airway clear.

For inflatables, read the owner's manual for the correct adjustment of straps. Sometimes a looser fit may be preferred to allow space for the inflation chamber.

Performance System

Performance in the water is a combination of buoyancy, freeboard, stability, turning and visibility. Devices are tested on a number of individuals of different body types under controlled conditions.

The Balancing Act

- Choosing a performance level is a decision that balances the safety provided by a comfortable fit (that you can wear constantly), with the security of increased buoyancy, freeboard and turning ability in an emergency.
- Inflatable devices can offer greater comfort for continuous wear but are more costly, require rearming and professional maintenance.
- In colder conditions (where an inflatable may be slower to provide full inflation) an inherent foam device may be preferred (and also warmer!).

Did You Know? (Performance)

• You may desire different performance depending on your body type (how well you naturally float) and what kind of activity you are involved in.

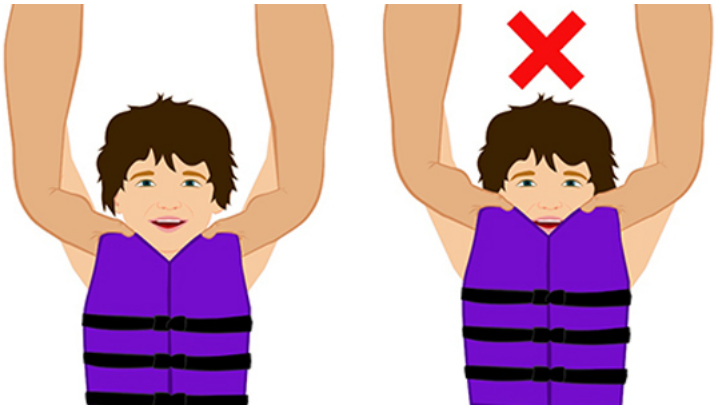
• Lower performance levels (Buoyancy Aids) generally provide less design buoyancy and little or no turning ability. The wearer may need to consciously use swim skills to assist in keeping face-up. Recommended for calmer waters, close to shore or rescue assistance.

• Higher performance levels (Lifejackets) provide greater design buoyancy and turning that rights the wearer face-up. Recommended for use when further offshore, where the user may encounter waves and have to wait some time for assistance.

CHILDREN

Lifejacket manufacturers recommend immediate in-water testing of children's lifejackets on the intended user. Children often panic when they fall into the water. While a lifejacket will keep a child afloat, it may not keep a struggling child face-up. Violent movement can counteract a lifejacket's performance; therefore, it is important to teach children how to wear a lifejacket and how to relax their arms and legs in the water.

Check your child's lifejacket for proper fit. To work correctly, a lifejacket must fit snugly. To check fit, pick the child up by the shoulders of the lifejacket. If the lifejacket fits, the child's chin and ears will not slip through. Check the lifejacket label to ensure it matches your child's weight.



Life jackets are not babysitters. Even if a child wears a lifejacket when on or near the water, an adult must always be present. Never use inflatable toys or rafts in place of lifejackets.

DID YOU KNOW?

- Currently approved devices will continue to be acceptable on board as long as they are in good condition.
- New devices available in stores will begin to have new labels, with clear information and icons indicating performance of the device in the water.

ENVIRONMENT

There are many factors about your boating environment that will affect the protection you need and the performance your lifejacket will provide.

Wind, weather, waves, currents, tides, weeds, sand, rocks, other boaters and even marine life, all play a part.

The size and stability of your boat greatly affects your risk of capsize or falling overboard. In some cases you may have some warning that you will abandon ship.

Once you are in the water the key environmental factors are:

1. How rough is the water?
2. How far are you from assistance / rescue / shore?
3. How cold is the water?
4. How long will you be in the water?

BUT BEFORE ALL THAT…

Were you wearing your lifejacket?

In choosing the right lifejacket for your activity and environment you must be honest with yourself and responsible for your family and friends who come onboard your boat.

Choose the performance you need for an emergency. Consider the extra buoyancy, freeboard and turning capability of the higher performance levels. In waves offshore you will want stability and visibility in the water if you are there for any length of time.

HOWEVER

If that device is left onboard the boat it is of no service to you. You may decide to choose a comfortable device that is lower on the performance scale but that will be worn constantly. In addition to that have another available for changing conditions or emergency abandonment/rescue.

Consider the possibility of high performance inflatables which can be more comfortable for constant wear, but when inflated offer more buoyancy and visibility.

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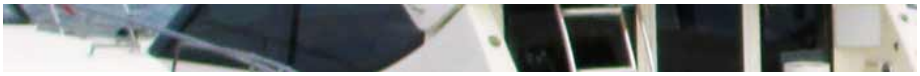
ACTIVITY



The right lifejacket for you will depend on your boating activity and where you boat. You may decide that you get the best balance of protection and mobility/comfort with more than one device, especially if you participate in a variety of activities. For example:

- a triple strapped device designed for towed water sports (or personal watercraft) and an inflatable for wearing on the deck of a pontoon boat or cruiser.
- a slim action vest for near shore SUP (Stand Up Paddleboard), wind surfing, etc., and a full lights and whistles high buoyancy vest when offshore racing.

Some Things to Consider About your Activity:

Sailing

- size of vessel

Are you expecting to regularly climb back on board your small racing dinghy? (snagging, slim profile)

or

Are you spending time inside an enclosed cabin when underway? (ease of donning, quick release)

or

Are you racing (or training) far offshore in big water?

(ride up prevention system, harness, personal locator device PLD)

Paddling

- white water kayaking

or calm water stand up paddle boarding

Also, how often do you engage in your activity and for how many hours in a day? A quick paddle to a friend's cottage is different than a long distance canoe trip.

Hunting / Fishing

- what time of year, temperatures and clothing is usual for you? (thermal protection)
- camouflage and pockets
- range of motion for casting or slippage of gun stock
- tournament rules for wearing while underway
- are you alone? how far offshore?
- visibility

General Power Boating

- where are you going and how fast?
- responsibility for guests
- social pressure

Towed Sports

- multiple straps for secure fit and comfort so that device does not dislodge or fall off
- be aware of snagging hazards, i.e. straps, pockets or features that could catch on something

Commercial Activity

- universal sizing
- stowage space
- visibility

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PERFORMANCE

• BUOYANCY is the ability to float.

People can be different in their natural ability to float. Some seem very light in the water when others, who have a more dense body type, have a tendency to sink. The actual in-water-weight of a person can be measured under controlled conditions in a tank.

Buoyancy Aids and Lifejackets are measured precisely for minimum buoyancy. Buoyancy is measured in *newtons* (N).

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"HOW IS BUOYANCY MEASURED?"

Buoyancy is the ability or tendency to float (in water or air). If you push something buoyant under the water and let go, it rises back up against the pull of gravity. The resistance you feel when you are pushing it down is its 'buoyant force'.

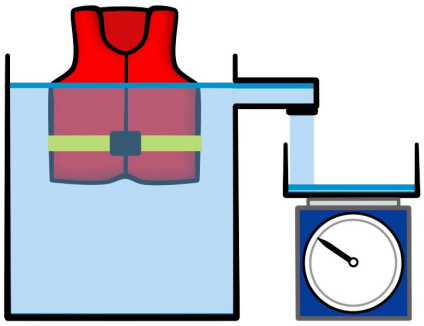
Force can be measured in different ways but is commonly expressed in units of force called *newtons* (N), named after Sir Isaac Newton a pioneer of the study of physics.

00:00 -00:08

Technically...

One kilogram of mass accelerated at the rate of one meter per second squared.

On older flotation device labels you might see 15.5 lbs. of buoyancy for a recreational Type III PFD. That measurement was the weight of the water that was displaced if you submerged a PFD completely in water.



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• FREEBOARD is the distance the mouth rests above the water.

A Buoyancy Aid, when worn properly, provides additional buoyancy to a person in a water. It can help most people to float with their airway (mouth and nose) above the surface. This distance (from water to lips) is referred to as freeboard and is measured under controlled conditions.

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• TURNING is the ability to turn the wearer face-up.

A Lifejacket, when worn properly, provides more buoyancy and therefore usually greater freeboard. The design of a Lifejacket also positions the buoyant material on the body so that it turns most people to a face-up position without assistance. Turning is tested on a variety of body types in simulated conditions.

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• STABILITY is the tendency to remain face-up and stable in the water.

Natural buoyancy distribution and the effect of waves and wind can affect the stability offered by the device.

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• VISIBILITY is the ability to be seen or detected in the water by rescuers.

The color of the device as well as reflective tape and attachments for lights increase the chance of being noticed in waves and at a distance.

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"AM I A SINKER OR A FLOATER?"

Your body type has a lot to do with the ability to float – your muscle mass, bone density and fleshy parts all contribute to, or subtract from, your natural buoyancy.

You can greatly improve your floating situation by how you manage your body in the water using basic swim skills – head position, inhalation of air, gentle kicking of the feet and sculling of the hands. Relaxing in the water, taking a big breath and tilting your head back, can bring your body up to horizontal and maintain you floating on the surface.

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IN AN EMERGENCY...

Changing water conditions and emergencies can dramatically alter your ability to stay above the waves. Stress, fear and cold make muscles tense and tired quickly. Waving and calling for help is difficult and reduces the buoyancy provided by your lungs. Under these circumstances the extra buoyancy offered by a flotation device is very welcome.

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