

## NEW BOATBUILDERS HOME PAGE

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## Boat Capacity VS Available Seating And The Formula For Persons

Recently I have seen many questions on boating forums regarding how persons capacity is calculated for boats, the USCG Capacity label, and how the capacity label is related to the label that shows safe seating. Some forum commenters have suggested the use of a formula, length times beam divided by 15, ( $L \times B / 15$ ), to determine the number of persons. Some have suggested that this could be used on any boat to determine the correct number of passengers.

This formula,  $L \times B / 15$ , has been around a long, long, time. I have traced it as far back as the 1940's. In the boating world, that is ancient. It has shown up in a lot of well respected boating publications, books, and even in the [US Coast Guard Boatbuilders Handbook](#). It is not the formula that boat manufacturers and builders are required to use to determine persons capacity for recreational boats, or for commercial passenger carrying boats. The formula is a rule of thumb. It is only meant to be used as a rough estimate. It is in the handbook only as a way to estimate the number of passengers. It is also only intended for use with small mono-hull boats, usually outboard powered but it has been used for small inboards. It should never be used for boats more than 25 or 26 feet in length. It is simply not applicable to larger boats.

The USCG, ABYC, Canada and ISO all rate capacity for boats under 20 feet (6m) the same way. It is not based on a specific weight of a person such as 150 or 160 pounds. Capacity on small boats is based on displacement weight. This is the amount of weight it would take to sink the boat. First the displacement weight is determined either by calculation or a test. Then the maximum weight capacity is determined by dividing the displacement weight by five or seven depending on the type of boat. The weight for persons is then determined based on the maximum weight capacity. Then the number of persons is calculated using the formula, persons weight + 32 / 141. The important figure is persons weight, not number of persons.

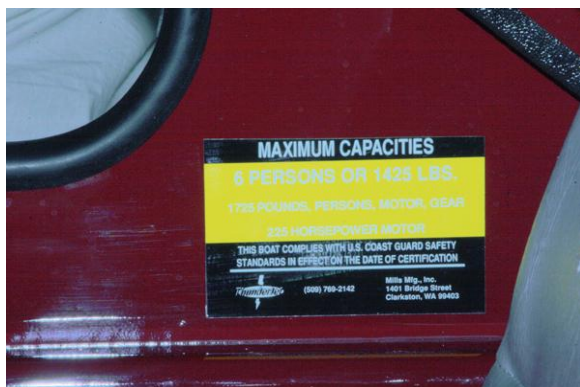
See <http://newboatbuilders.com/docs/safeloading.pdf> for a discussion of capacity ratings for recreational boats versus commercial boats. See <http://newboatbuilders.com/pages/load.html> for how capacities are determined for recreational boats.

For commercial boats carrying more than six passengers for hire, the amount of persons is based on stability, not the load the boat can carry. This is because as boats get bigger the interior volume of the boat increases geometrically, not linearly. Larger boats can actually hold far more

weight than is safe, and the stability of the boat becomes the limiting factor. Additionally the US Coast Guard uses 184 lbs per person for passenger carrying vessels. They used to use 160 but if you read the safe loading pdf above you will see that it was not enough.

As for boats larger than 20 feet, under ABYC Standards the same formula used for boats under 20 feet is sometimes used for boats up to 26 feet, but should never be used for larger boats. Large recreational boats should use stability as the criteria for determining capacity. Generally speaking these boats are professionally designed and the naval architect or yacht designer will do a stability analysis for the boat. This will determine what is a maximum safe load, and again generally speaking, these larger boats can hold far more persons than they have seating (or berthing). The question becomes, at what load does the boat become so unstable that any shifting of weight, movement of passengers, or a large wave cause the boat to capsize? See Stability On Small Boats <http://newboatbuilders.com/docs/stability.pdf>

Boats up to 65 feet are usually built to ABYC standards (some over that length as well) and longer than that are usually built to one of a multiplicity of standards, such as the USCG standard for passenger vessels, ABS (American Bureau of Shipping), Lloyds, MCA (British rules), Det Norske Veritas (Norway) or other standards societies, all of which are very similar, and all require a stability analysis.



Recreational boat manufacturers are required to put a capacity label on mono-hull boats under 20 feet in length. [See 33 CFR Part 181 Subpart I - General](#). You will see a similar label on many other types of boats, including canoes, kayaks, pontoon boats and inflatables. The manufacturers voluntarily (in the USA) put these on other boats because it is good business and safety sense to do so. In Canada and Europe the label is required on all recreational boats (with a few exceptions).

**The image above is an example of a label on a boat not required to have a capacity label. Notice; it does not say US COAST GUARD on the label.**

In the USA the label is a manufacturer requirement. The boat owner does not have any responsibility under Federal law for this label, not even for complying with the values on the label. (they do in Canada) However, most states have passed laws making it illegal in the particular state to exceed the capacities on the label.

For example: this is the law in Florida:

- [No person may operate a monohull boat of less than 20 feet in length while exceeding the maximum weight, persons, or horsepower capacity as displayed on the manufacturer's capacity plate.](#)

To find the law in your state go to the National Association of State Boating Law Administrators web site  
[http://nasbla.org/i4a/member\\_directory/feSearchForm.cfm?directory\\_id=3&pageid=3335&showTitle=1](http://nasbla.org/i4a/member_directory/feSearchForm.cfm?directory_id=3&pageid=3335&showTitle=1)

So if you live in one of those states you can be cited by state or local law enforcement for exceeding the capacity on the label. Also your insurance company may take a dim view of exceeding the capacities. But the US Coast Guard cannot cite you for exceeding the label capacities. However, if in the judgment of the boarding officer your boat is overloaded, he/she can cite you for negligent operation which is a much more serious offense, but they can only use the capacity as a factor in that decision (for instance it says 4 and you have 8) and you would have to have been acting in a negligent manner to be boarded. So if you are boating safely, have all the required gear, but have 5 people instead of four, it is most likely the USCG will not cite you.

As for the seating label it has no force of law anywhere. The seating label is placed on the boat voluntarily by boat manufacturers to show you where it is safe to sit. This grew out of boat manufacturers trying to find a way to show boat operators and passengers where it is safe to sit to prevent injuries and deaths. Even though it is common sense that it is unsafe to sit on a gunwale, or transom, or the bow, and especially on pedestal seats when the boat is underway, some people just don't get the word. [See Seating Labels USCG Boating Safety Circular 75](#) Boat operators often fail to follow safe operating basics, such as sitting in designated seats when the craft is on plane, maintaining a balanced load or giving themselves an unobstructed view from the helm. Many boats have casting platforms, storage lockers and other surfaces which are inappropriate for seating when a boat is on plane. So the American Boat and Yacht Council and the National Marine Manufacturers Association developed a label showing where it is safe to sit. It is simply an information label.

So, use the Capacity Label as a guide to how many passengers you can carry, and the seat label as a guide to where they can safely sit. For large boats, consult your boat owner's manual, or the builder for information on how many passengers you can safely carry.

For small boats that may have lost the capacity label, or are so old they never had one (Prior to 1972), you can use the rule of thumb as an estimate to how many passengers you can carry. But if you want to know what the correct value is, you should consult a designer or naval architect, or marine surveyor to calculate the capacities for your boat. Or you can use the USCG standard or the ABYC standard for recreational boats to calculate the correct amount.

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