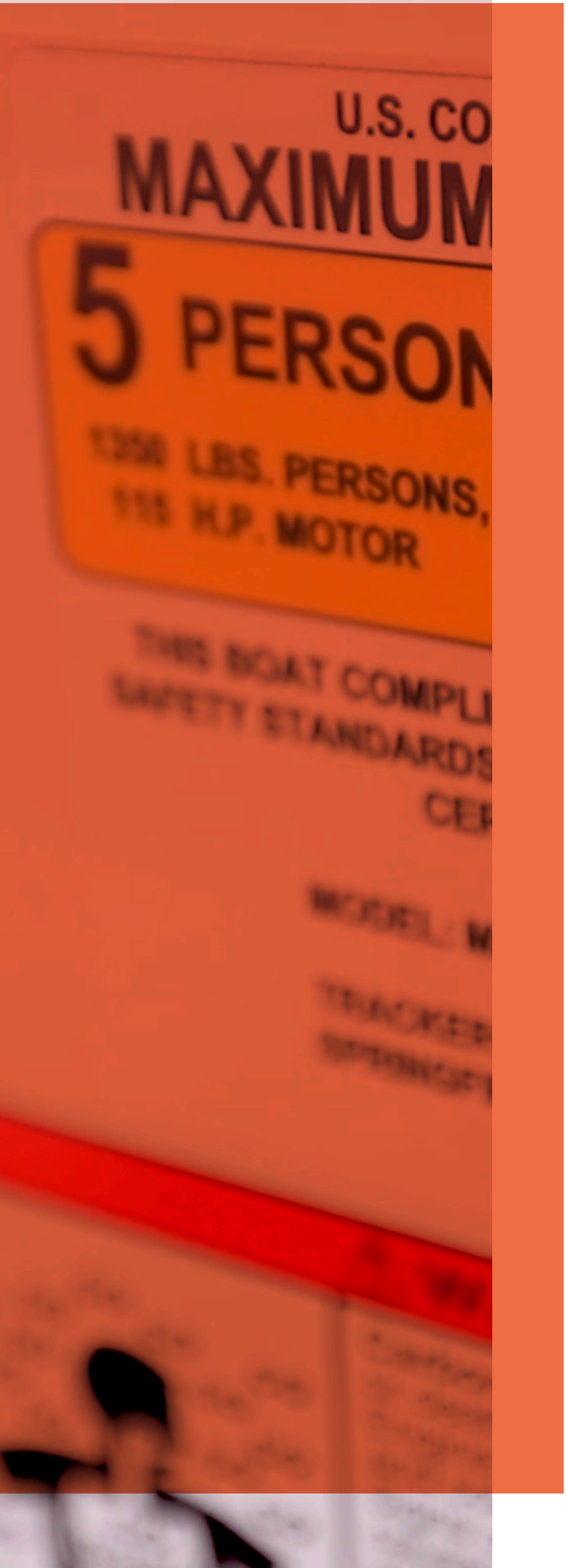


BOAT BUILDER'S HANDBOOK

2021 Edition

FLOTATION AND SAFE LOADING REQUIREMENTS –OUTBOARD MOTOR AND RELATED EQUIPMENT TEST WEIGHTS

33 CFR 183 SUBPART E

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INTRODUCTION

In determining safe loading numbers to place on the capacity label boat builders must consider the engine / battery / fuel weight / and control weights.

In determining the amount of flotation material needed for the boat to pass the flotation and stability test a boat builder must consider submerged and swamped weights of engines and batteries. Rather than research such numbers for the myriad of engines, batteries, portable fuel tanks, and controls, boat builders must simply refer to the table of weights provided in this Subpart E – Table 183.75. Table 183.75 details the weight (in pounds) of gasoline outboard powered engines and related equipment for various horsepower ranges.

The table also gives the swamped engine weight (as a function of size range) and submerged battery weight which builders can use for flotation & stability testing – as is done by the USCG Boat Test Facility. This table was taken from the ABYC standard S-30, Table 1B, with an effective date of July 2017.

1.0 APPLICABILITY

Per 33 CFR 183.75 – Boat builders must use test weights that are not less than those given in Table 183.75. The table notes explain the % relationships among Dry Weight / Running Weight / Swamped Weight.

This table is referred to in the Safe Loading guideline (to determine the minimum required differential between the maximum weight capacity and the maximum persons capacity) and in the Flotation guideline (to determine the swamped engine weight and submerged battery weight that must be supported).

Thus, this subpart is likewise applicable to monohull boats less than 20 feet in length.

The following comment was included in the ABYC Table 1B – and may be assumed to apply to boats covered by this Subpart:

"For multiple engine installations, multiply the final value in Column 9 by the number of engines."

2.0 ENGINE WEIGHT TABLE 183.75

TABLE 183.75 Weights (In Pounds) of Gasoline Outboard Engines and Related Equipment for Various Rated Power (Horsepower) Ranges

ENGINE POWER RANGE (HORSEPOWER)	DRY WEIGHT1,2	RUNNING WEIGHT3	SWAMPED WEIGHT4	CONTROLS & RIGGING5	BATTERY WEIGHT, DRY	BATTERY WEIGHT SUBMERGED	FULL PORTABLE FUEL TANK6	TOTAL WEIGHT (SUM OF COLUMNS 3,5,6,8)
0.1-2.0	30	32	27	0	0	0	0	32
2.1-3.9	42	44	37	0	0	0	0	44
4.0-6.9	66	69	59	0	0	0	25	94
7.0-10.9	105	110	94	5	20	11	50	185
11.0-22.9	127	133	113	6	45	25	50	234
23.0-34.9	187	196	167	9	45	25	100	350
35.0-64.9	286	300	255	14	45	25	100	459
65.0-94.9	439	461	392	22	45	25	100	628
95.0-104.9	458	481	409	23	45	25	100	649
105.0-144.9	526	552	469	26	45	25	100	723
145.0-194.9	561	589	501	28	45	25	100	762
195.0-209.9	652	685	582	33	45	25	100	863
210.0-300.0	699	734	624	35	45	25	100	914
300.1-350.0	884	928	789	44	45	25	100	1,117

Notes:

1. Dry weight is the manufacturer's published weight for the shortest midsection increased by 10 percent to account for longer midsections and additional required hardware usually not included in published weights. This weight is intended to represent the heaviest model in each power category. For boats designed with a transom height of 20 inches or less, the weight in Column 2 may be reduced by 10 percent. Recalculate Columns 3, 4, and 9 as appropriate.

2. For diesel outboards, replace the value in Column 2 with the manufacturer's published dry weight + 10 percent.

3. Running weight is the dry weight plus fluids (including 2-stroke oil) and the heaviest recommended propeller. Calculated as 5 percent of dry weight.

4. Swamped weight is 85 percent of running weight.

5. Rigging and controls include engine related hardware required to complete the installation (e.g., controls, cables, hydraulic hoses, steering pumps and cylinders). Calculated as 5 percent of dry weight.

6. If the boat is equipped with a permanent fuel system and is not intended to use a portable tank, the portable fuel tank weight may be omitted.

3.0 TABLE 183.75 ADJUSTMENTS – TRANSOM HEIGHT OF 20" OR LESS/ PERMANENT FUEL TANK

There are two key notes at the bottom of Table 183.75:

Note 1: For boats designed with a transom height of 20 inches or less, the weight in Column 2 may be reduced by 10 percent.

Note 6: If the boat is equipped with a permanent fuel system and is not intended to use a portable tank, the portable fuel tank weight may be omitted.

The Table 183.75 - and three additional tables are included here (doing the math for the boat builder):

- The original Table 183.75 – covers boats with PORTABLE fuel tank & OVER 20 INCH transom height.
- Table 183.75 mod 1 – for boat with PORTABLE fuel tank & 20 INCH OR LESS transom height.
- Table 183.75 mod 2 – for boat with PERMANENT fuel tank and 20 INCH OR LESS transom height.
- Table 183.75 mod 3 – for boat with PERMANENT fuel tank and OVER 20 INCH transom height.

TABLE 183.75 Modification 1

FOR BOATS WITH TRANSOM HEIGHT OF 20 INCHES OR LESS & WITH PORTABLE FUEL TANK								
(W/ COLUMN 2 REDUCED BY 10%)		-->	(& W/ COLUMNS 3, 4, & 9 RECALCULATED)					
ENGINE POWER RANGE (HP)	DRY WEIGHT	RUNNING WEIGHT	SWAMPED WEIGHT	CONTROLS AND RIG-GING	BATTERY WEIGHT, DRY	BATTERY WEIGHT, SUBMERGED	FULL POR-TABLE FUEL TANK	TOTAL WEIGHT (SUM OF COLUMNS 3,5,6,8
0.1 - 2.0	27	28	24	0	0	0	0	28
2.1 - 3.9	38	24	34	0	0	0	0	40
4.0 - 6.9	59	0	53	0	0	0	25	87
7.0 - 10.9	95	0	84	5	20	11	50	174
11.0 - 22.9	114	0	102	6	45	25	50	221
23.0 - 34.9	168	0	150	9	45	25	100	331
35.0 - 64.9	257	28	230	14	45	25	100	429
65.0 - 94.9	395	40	353	22	45	25	100	582
95.0 - 104.9	412	34	368	23	45	25	100	601
105.0 - 144.9	473	0	423	26	45	25	100	668
145.0 - 194.9	505	0	451	28	45	25	100	703
195.0 - 209.9	587	0	524	33	45	25	100	794
210.0 - 300.0	629	0	561	35	45	25	100	841
300.1 - 350.0	796	40	710	44	45	25	100	1024

TABLE 183.75 Modification 2

FOR BOATS WITH TRANSOM HEIGHT OF 20 INCHES OR LESS & WITH PERMANENT FUEL TANK								
(W/ COLUMN 2 REDUCED BY 10%)		-->	(& W/ COLUMNS 3, 4, & 9 RECALCULATED)			& (W/ COLUMN 8 ELIMINATED)		
ENGINE POWER RANGE (HP)	DRY WEIGHT	RUNNING WEIGHT	SWAMPED WEIGHT	CONTROLS AND RIG-GING	BATTERY WEIGHT, DRY	BATTERY WEIGHT, SUBMERGED	FULL POR-TABLE FUEL TANK	TOTAL WEIGHT (SUM OF COLUMNS 3,5,6,8
0.1 - 2.0	27	28	24	0	0	0	N/A	28
2.1 - 3.9	38	40	34	0	0	0	N/A	40
4.0 - 6.9	59	62	53	0	0	0	N/A	62
7.0 - 10.9	95	99	84	5	20	11	N/A	124
11.0 - 22.9	114	120	102	6	45	25	N/A	171
23.0 - 34.9	168	177	150	9	45	25	N/A	231
35.0 - 64.9	257	270	230	14	45	25	N/A	329
65.0 - 94.9	395	415	353	22	45	25	N/A	482
95.0 - 104.9	412	433	368	23	45	25	N/A	501
105.0 - 144.9	473	497	423	26	45	25	N/A	568
145.0 - 194.9	505	530	451	28	45	25	N/A	603
195.0 - 209.9	587	616	524	33	45	25	N/A	694
210.0 - 300.0	629	661	561	35	45	25	N/A	741
300.1 - 350.0	796	835	710	44	45	25	N/A	924

TABLE 183.75 Modification 3

FOR BOATS WITH TRANSOM HEIGHT OVER 20 INCHES & WITH PERMANENT FUEL TANK								
						(W/ COLUMN 8 WEIGHTS ELIMINATED)		
ENGINE POWER RANGE (HP)	DRY WEIGHT	RUNNING WEIGHT	SWAMPED WEIGHT	CONTROLS AND RIG-GING	BATTERY WEIGHT, DRY	BATTERY WEIGHT, SUBMERGED	FULL POR-TABLE FUEL TANK	TOTAL WEIGHT (SUM OF COLUMNS 3,5,6,8
0.1 - 2.0	30	32	27	0	0	0	N/A	32
2.1 - 3.9	42	44	37	0	0	0	N/A	44
4.0 - 6.9	66	69	59	0	0	0	N/A	69
7.0 - 10.9	105	110	94	5	20	11	N/A	135
11.0 - 22.9	127	133	113	6	45	25	N/A	184
23.0 - 34.9	187	196	167	9	45	25	N/A	250
35.0 - 64.9	286	300	255	14	45	25	N/A	359
65.0 - 94.9	439	461	392	22	45	25	N/A	528
95.0 - 104.9	458	481	409	23	45	25	N/A	549
105.0 - 144.9	526	552	469	26	45	25	N/A	623
145.0 - 194.9	561	589	501	28	45	25	N/A	662
195.0 - 209.9	652	685	582	33	45	25	N/A	763
210.0 - 300.0	699	734	624	35	45	25	N/A	814
300.1 - 350.0	884	928	789	44	45	25	N/A	1017

3.1 PERMANENT VS. PORTABLE FUEL TANKS

The USCG inspection decision process regarding fuel tank type is to consider both fuel tank size and method of attachment and/or placement within the boat.

For USCG inspections, a fuel tank up to 12 gallons is portable if:

- Tools are not required for removal from the boat, and;
- Fuel line to the engine has a manual disconnect fitting.

Portable fuel tanks should have a handle, but it is not a CFR requirement; portable fuel tanks will likely be red, but that is not a CFR requirement.

Portable fuel tanks will have a manageable handling weight of 75-80 pounds.

Portable tanks should have a means to secure the tank to the deck, such as a strap or hard cover with manual hatch.

APPENDIX 1.33 CFR 183 SUBPART E – FLOTATION AND SAFE LOADING REQUIREMENTS – OUTBOARD MOTOR AND RELATED EQUIPMENT TEST WEIGHTS

§ 183.75 APPLICABILITY.

Manufacturers of vessels to which this subpart applies must use test weights that are not less than the recommended weights set forth in Table 183.75. Table 183.75 details the weight (in pounds) of gasoline outboard engines and related equipment for various rated power (horsepower) ranges.

TABLE 183.75 Weights (In Pounds) of Gasoline Outboard Engines and Related Equipment for Various Rated Power (Horsepower) Ranges

SINGLE ENGINE INSTALLATIONS COLUMN NUMBER								
1 ENGINE POWER RANGE (HORSEPOW-ER)	2 DRY WEIGHT1,2	3 RUNNING WEIGHT3	4 SWAMPED WEIGHT4	5 CONTROLS & RIGGING5	6 BATTERY WEIGHT, DRY	7 BATTERY WEIGHT SUBMERGED	8 FULL PORTABLE FUEL TANK6	9 TOTAL WEIGHT (SUM OF COLUMNS 3,5,6,8)
0.1-2.0	30	32	27	0	0	0	0	32
2.1-3.9	42	44	37	0	0	0	0	44
4.0-6.9	66	69	59	0	0	0	25	94
7.0-10.9	105	110	94	5	20	11	50	185
11.0-22.9	127	133	113	6	45	25	50	234
23.0-34.9	187	196	167	9	45	25	100	350
35.0-64.9	286	300	255	14	45	25	100	459
65.0-94.9	439	461	392	22	45	25	100	628
95.0-104.9	458	481	409	23	45	25	100	649
105.0-144.9	526	552	469	26	45	25	100	723
145.0-194.9	561	589	501	28	45	25	100	762

Notes:

1. Dry weight is the manufacturer's published weight for the shortest midsection increased by 10 percent to account for longer midsections and additional required hardware usually not included in published weights. This weight is intended to represent the heaviest model in each power category. For boats designed with a transom height of 20 inches or less, the weight in Column may be reduced by 10 percent. Recalculate Columns 3, 4, and 9 as appropriate.
2. For diesel outboards, replace the value in Column 2 with the manufacturer's published dry weight + 10 percent.
3. Running weight is the dry weight plus fluids (including 2-stroke oil) and the heaviest recommended propeller. Calculated as 5 percent of dry weight.
4. Swamped weight is 85 percent of running weight.
5. Rigging and controls include engine related hardware required to complete the installation (e.g., controls, cables, hydraulic hoses, steering pumps and cylinders). Calculated as 5 percent of dry weight.
6. If the boat is equipped with a permanent fuel system and is not intended to use a portable tank, the portable fuel tank weight may be omitted.