

# **Fred Murphy**

## **Steel & Aluminum Bill of Materials**

**STEEL:** Designed to use ordinary steel sometimes referred to as "mild" or "low-carbon" steel. Steel of other or special alloys is not necessary although not necessarily unsuitable. Thickness of members, especially hull plating, should not be increased; this will increase weight and could affect the safety and stability of the vessel.

**ALUMINUM CONSTRUCTION NOTES - IN GENERAL:** It is assumed that the builder is a qualified aluminum welder familiar with appropriate weld types, sizes, and sequence so as to form a strong and true vessel, with the equipment necessary to perform work of the best quality. MIG or TIG welding is required, using weld filler materials suited to marine use of alloys compatible with the aluminum being welded. Aluminum for welding must be properly prepared, and frequent testing of welds is recommended. Plans assume construction by an individual builder or small fabricating facility that may have access only to more common, readily available materials, shapes, and building processes. However, more sophisticated alternative materials and processes may be substituted when available and when comparable to what is shown or specified with regard to strength, weight, and corrosion resistance. In particular, special extrusions, if available, may be substituted (such as at the chine) to join side and bottom plating in lieu of the round bar shown backing this junction.

**ALUMINUM HULL MATERIAL LISTING:** The following listing is to serve as a general guide only for hull cost estimating purposes; do not use for buying materials without first checking the instructions and plans for various options (such as differences due to changes in powering methods which will vary each boat), and to local suppliers for what material sizes may be available. In other words, each builder must make decisions as to how he will build the boat and use materials, and then take off a listing to suit. Note that if the length of the boat is varied, so too will the material listing. Materials are listed for the basic hull members only and do not include options, variations, interior members, etc. Thus the listing will vary and not all members are necessarily included - check the plans. Only marine alloy of the 5000- or 6000-series should be used. Common acceptable alloy designations include 5052, 5083, 5086, 5454, 5456, and 6061. For saltwater use, the 5086 is recommended except that extruded shapes can be 6000-series. While full-length hull plating panels can be formed by welding, single long panels are preferable to performing this procedure. In any case, the builder should check for plate or sheet size availability and plan the material utilization for minimum waste. While shorter members can always

be butt welded to form long members, a doubler plate is usually advisable behind or on top of all such joints, lapping a considerable distance, and being welded all around.

| STEEL  |   |
|--|---|
| MEMBERS  | SIZE/TYPE                               |
|  |   |
| Hull, deck, bulwark plating  | 11GA x 450 sq.ft.                       |
| Keel, stem, sternpost plating  | 1/2" x 25 sq. ft.                       |
| Frames   | 3" x 1/4" flat bar, 225 lin. ft.        |
| Round bars   | 3/4" x 120 lin. ft.<br>1" x 60 lin. ft. |
| Flat bar stiffeners  | 1" x 1/4" x 540 lin. ft.                |
| Shaft tube (*)   | 3" O.D., 3/8" wall x 11 lin. ft.        |
| Rudder plating (*)   | 1/2" x 5 sq. ft.                        |
| Rudder shaft (*)   | 1-1/2" x 6'                             |
| * See plans for variations and options                                     |   |
| ALUMINUM VARIATIONS: Use above for sizes except for variations as follows: |   |
| MEMBERS  | SIZE/TYPE                               |
| Frames (see Aluminum Frame detail)   | 3" x 2 1/2" x 1/4" angles               |

|  |  |
|--|--|
| Frame floors and gussets   | 1/4" plate with 2" flange at top edge of floors  |
| Hull, deck, bulwark plating  | 3/16" bottom x 190 sq. ft.<br>1/8" all other x 260 sq. ft. (3/16" optional on sides/bulwark) |
| NOTE: Although not specifically detailed, aluminum may be substituted for all aspects of decks, cabin, and superstructure in lieu of wood/plywood structure detailed. In this case, use 1/8" plating reinforced as necessary with suitably sized stiffeners. |  |