

# Titan - Plywood Bill of Materials

**MATERIAL LISTING:** The following is an approximation that can be used for hull cost estimates; it is not meant to be used for buying materials without first checking the instructions and plans for various options which will vary the listing (especially with regard to planking panel sizes, powering choices, laminated members, etc.), 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. As a cost savings, materials should be grouped for resawing to the sizes required. Plywood panel lengths are given to cover the length of the vessel although stock panels of the listed size may not be available. See previous herein for options and alternatives.

**PLYWOOD:** All plywood should be at least AB Exterior or Marine grade; Interior plywood is not acceptable. Douglas-fir or Mahogany-type panels will suffice.

**LUMBER:** All lumber should be top quality, free from defects, and of types proven in use in boats. Suitable woods include vertical grain Douglas-fir, Alaskan cedar, mahogany (including Philippine, Honduras, and African types), and good quality Southern pine. Lumber thicknesses are given as nominal except where noted "net" or those listed as less than 1". Do NOT custom mill any lumber except those noted "net" or less than 1". Purchase lumber as it comes from the lumberyard. The first dimension is the thickness, but true thickness will be somewhat less than nominal for 1" to thicker listings. For example, lumber listed 1" will actually be about 3/4", while 2" lumber will actually be about 1-1/2" net. The second dimension is the width - this is to be actual or "net" size except that members 2" thick can be nominal in BOTH thickness and width. In other words, a 2" x 4" member will actually be about 1-1/2" x 3-1/2" - buy it and use it this way. Such listed sizes are meant to save the builder money and work.

ITEM	SIZE	NO. PCS.	
<b>LUMBER:</b>			
Framing	1-1/4" x 4"	70'	

	1-1/4" x 5" 1-1/4" x 6" 1-1/4" x 7" 1-1/4" x 9"	50' 6' 4' 10'	
Keel	1" x 6" x 17'	2	
Chine logs	1" NET x 2" x 18'	2	
Bottom battens	1" x 2" x 14' 1" x 2" x 18' 1" x 2" x 19'	2 2 2	
Sheer clamps	3/8" NET x 2-1/2" x 19'	6	
Deck battens, strongback	1" x 3" x 7' 1" X 2" X 10'	1 1	
Carlings	1" x 2-1/2" x 18'	2 (partially or all laminated - see plans)	
Cap rail clamps	3/8" NET x 1" x 25'	8	
Deck clamps	3/8" NET x 1-1/4" x 25'	4	
Rub rail	1/2" NET x 25'	4	
Cap rail	5/8" NET x 3" x 100'	(use initially wider stock for sawing to width)	
Motor stringers	2" x 8" x 4'	2	
Skeg laminations	Varies with thickness used x 4" wide max.		
Skeg/stem cap laminations	See plans		
<b>PLYWOOD:</b>			
<b>ITEM</b>	<b>SIZE</b>	<b>NO. PCS.</b>	

Stem, breasthook, harpins, floor timbers, sternpost	3/4" x 4' x 8'	4	
Bottom planking	1/4" x 4' x 8'	10 (*)(**)	
Side planking	1/4" X 4' x 8'	12 (*)(**)	
Decking	3/8" x 4' x 8'	4	
Gussets, floor timbers	1/2" x 4' x 8'	2 (*)	
(*) See plans for size/thickness and other options (**) See plans for joining methods to permit other panel lengths			
<b>Adhesives:</b> Epoxy adhesives are advised throughout the construction. These may be an epoxy adhesive or epoxy resin. Epoxy resins should be used with thickeners (silica or equal) per the instructions with the resin and/or thickening agent. Due to the noted options, the amount required is difficult to estimate. Start with a gallon container of epoxy and after use you will be better able to estimate the total amount required.			

**FASTENING SCHEDULE:** This listing suggests the size, type, and spacing or number required of fastenings for various junctions of the basic hull, not including superstructure or any temporary fastenings. See herein for options and alternatives that may vary the listing, including fastening lengths and type. The listing may also need to be varied by the builder when or where required to assure sound, strong junctions and to reflect possible options herein. It is not practical to list every junction for every condition and for this reason, total fastening amounts are not practical.

However, from this listing, the builder should be able to make interpolations and estimates. In any case, and in lieu of the listing, screws should be sufficiently long so that at least half the screw length penetrates the joining member. If nails are used, these should penetrate the joining member by 2/3rds their length. Screws should be flat head wood types. In some cases, it will be desirable to counterbore these for greater holding power or for building convenience. Bolts should be carriage bolts or threaded rods with nuts jammed on. Bolt lengths must be taken from the work. However, bolt heads and nuts can be counterbored and recessed somewhat to take advantage of shorter length bolts. Nails are ring-type boat nails with pilot holes pre-drilled first. Screws can be used in place of screws or nails in all cases. Alternately, gun-driven fastenings can be used in lieu of the above as long as permanent fastenings are of marine-type materials as described above.

<b>JUNCTION</b>	<b>SIZE</b>	<b>TYPE</b>	<b>SPACING</b>

			<b>NO. RQD.</b>
Frame/floor timbers	2" #10	Screws	6 per junction
Frame/gussets	1-1/2" #8	Screws	5 per junction
Deck beams to frames	2" #10	Screws	2 per junction
Stem laminations	1-1/4"	Nails	6" apart
Breasthook laminations	1-1/4"	Nails	4" apart
Breasthooks to stem	2" #10	Screws	2 min. per
Harpin laminations	1-1/4"	Nails	4"-6" apart
Harpins to sternpost & frames	2" #10	Screws	2 min. per junction
Floor timbers to stem	2" #10	Screws	4 per junction
Keel first layer/frames	2" #10	Screws	2 per junction
Keel laminations	1-1/4" #8	Screws	6" apart
Keel to stem & sternpost	5/16"	Bolts	As shown
Bottom battens to frames	2" #10	Screws	2 per junction
Chine logs to stem	2" #10	Screws	2 per junction
Chine logs to frames	2" #10	Screws	1 per junction
Sheer & deck clamps - First layer @ breasthook	1-1/2" #8	Screws	3 per junction

Sheer & deck clamps - First layer @ frames	1-1/2" #8	Screws	2 per junction
Carling/frame junctions	2" #10	Screws	2 per junction
Cabin clamp to carling	1-1/2" #8	Screws	6" apart
Planking - first layer - all points	1"	Nails	2"-3" apart
Planking - final @ stem & sternpost	1-1/4" #8	Screws	2" apart
Planking - final @ chine & keel	1-1/4" #8	Screws	3" apart
Planking - final @ battens	1-1/4" #8	Screws	4"-6" apart
Decking	1-1/4" #8	Screws	3"-6" apart