

# T-100D Mariah FAQ List

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## 1. Who designed the T-100D Mariah?

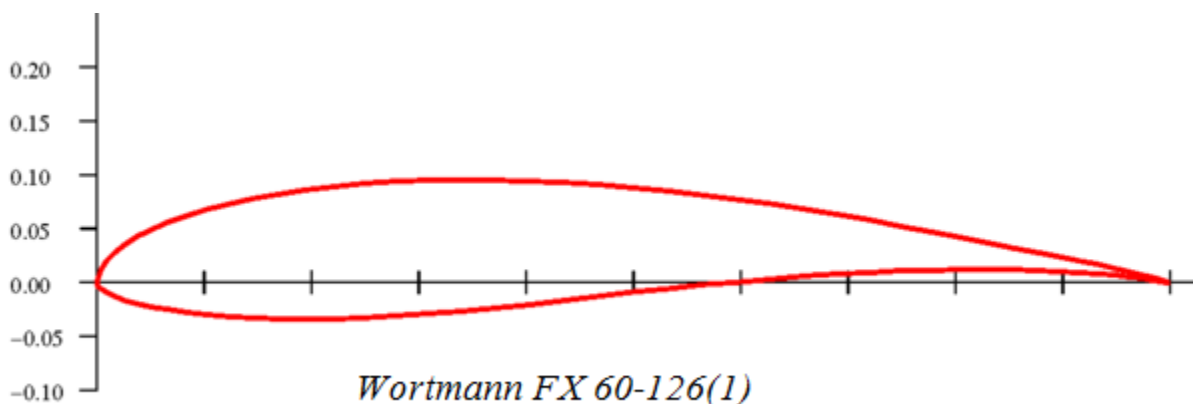
*The T-100D Mariah was designed by noted aeronautical engineer Eugene L. “Gene” Turner. Gene is a former WWII P-47 Fighter pilot, aeronautical engineer, FAA official, owner of Turner Aircraft, Author and an asset to the homebuilt aircraft community. Gene also designed the popular Turner T-40 series of high performance homebuilt experimental aircraft and many other experimental and civil aircraft designs.*

## 2. Who owns the T-100D Mariah Design?

*The rights to the T-100D Mariah aircraft were acquired by Kenneth L. “Ken” Adams, Jr. on July 29, 2007. He is the owner of Adams Aeronautics Company, Inc. Jasper, Georgia USA. He has been involved in the aerospace industry, Ultralight and homebuilt community for over 30 years.*

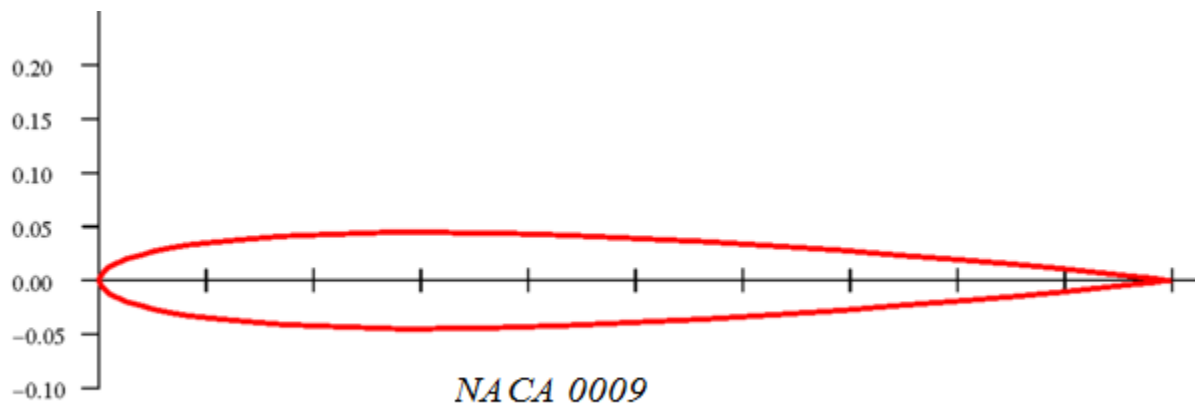
## 3. Which airfoil section is used for the wing and stabilator?

*The wing was originally designed using a NACA 64-418 airfoil on the prototypes prior to the “D” model Mariah. Gene changed the airfoil to a “high lift, low drag sailplane type design” for the D model but he does not recall the name of the airfoil section that he used. Gene lost the detailed design information pertaining to Mariah many years ago in a move and he thought the information was no longer needed because Mariah was just a wonderful memory for him. In an effort to see what the airfoil community could determine, we sent a T-100D Mariah airfoil drawing to the Software Profili Group for analysis. The members of this group use an airfoil program called “Profili” (<http://www.profil2.com/eng/default.htm>) to analyze and design airfoils. This group analyzed the airfoil and overwhelming stated that the airfoil section was a Wortmann FX 60-126(1).*



*The Wortmann FX 60-126(1) does fit the “high lift, low drag airfoil” specification that Gene mentioned to us. And, it fits the airfoil design found in the plans nearly exactly. However, we cannot guarantee with 100% absolute certainty that the Wortmann FX 60-126(1) airfoil is the one used on the T-100D Mariah. However, we are very pleased to know that the Mariah airfoil is extremely similar in design and analysis to this airfoil. In order to give this airfoil a name that can be recalled, we have decided to call it the Turner X-1. Gene Turner drew up this airfoil in the design of the T100D Mariah, it is an experimental in nature, thus the “X” designation and it was his first.*

*As for the stabilator, the airfoil appears to be a NACA 0009 airfoil section. We have printed both the Mariah airfoil and the NACA 0009 and both matched up perfectly.*



*NOTE: Both airfoil sections used on T-100D Mariah have proven themselves on the prototype and flew many hours without any issues. We know that the airfoil sections chosen by Gene Turner work very well for Mariah and meet the design goals Gene laid out for the T-100 series of aircraft. We will be staying with the airfoil sections that Gene originally chose for the “D” model Mariah.*

4. What are the basic outer panel dimensions with and without the flaps and ailerons?

*The earlier models of the T-100 series had flaps designed and installed on the airframe. As the design matured and flight testing ensued, the wing span was increased and a high lift, low drag airfoil was installed. With these changes incorporated the need for flaps no longer existed and the flaps were removed. The T-100 “D” Mariah never had flaps installed. The outer wing panels are 13.83' each with a 54" chord. Ailerons are typical barn door style cut into the wing panels.*

5. What are the basic building materials and methods for the wings? Foam ribs? Built up ribs? Plywood ribs? Does it use Plywood leading edge skin? Etc, etc.

*Basic building materials for the T-100D Mariah wings are Spruce, D. Fir, and aircraft grade Birch plywood. The outer wing panels are designed for Spruce while the 76" center section is required to be Douglas Fir. The entire aircraft may be built with Douglas Fir as a replacement for Spruce if so desired. The wings use several different materials. The spars are made with Spruce caps and intercostal blocks, a plywood D Section leading edge is installed, a plywood*

*web is installed to form a strong shear web, 4130 steel compression tubes, wire cross bracing in the wing bays, and fabric covering. An all wooden plywood skinned wing may be used also. If the "all wooden wing" is used, the compression members and wire bracing may be eliminated. The original wing ribs were built using a foam, Spruce and fiberglass composite. However, Gene recommends that the foam ribs from the original prototype not be used. Instead, make the wing ribs with plywood webbing and Spruce/D. Fir caps. The foam method of constructing wing ribs is satisfactory, but it has been determined that it is not the cheapest, nor quickest way to build ribs. It is recommended that an all wood rib be used rather than the composite ribs that were used in the earlier models in the construction of the T-100D Mariah. The all wood rib design is very easy to build, and the ribs made using this design will maintain the airfoil shape at all times under all conditions. Wood rib construction only requires attaching a 5/16 inch square rib cap to the plywood web (web thickness is 0.8mm or 1/32 inch), adding vertical end members and a vertical member in the center of the rib (all vertical members are 5/16 inch square).*

6. Is the wing washed out?

*No washout in the wings.*

7. How simple is it to remove the wings at 13' 10" for the outer panels, it might be a real handful in anything but dead calm winds? Any idea what the outer panels weigh?

*We recommend a brace be used to support the outer wing panels if removing the wings on your own. This process should be similar to removing a wing from a TEAM HighMax or similar type aircraft and should only require about 10 to 15 minutes to remove or replace. We do not know the weight of the outer wing panels.*

8. How many hours were flown on the prototype? Is it the only example built and flying to date?

*We do not know how many hours were flown on the prototype Mariah and Gene doesn't have the recorded data to pass on to us due to this information being lost in a move. We do know that he put the craft through a complete flight test program which required many hours of flying. In fact, he put all 5 models of the T-100 series through a complete flight test program. Gene also advertised the T-100D Mariah in EAA's Sport Aviation magazine. EAA required a minimum of 40 hours of flight time on any prototype design that was to be advertised in their magazines. Gene also had the "C" model Mariah advertised with EAA. This would have required 40 hours of flight time on this model as well. The "D" model made many changes to the "C" so an entirely new flight test program for the "D" model Mariah was performed.*

9. Is the design engineered for Sitka Spruce and the prototype was built with Douglas Fir or is the design engineered for Douglas Fir? (Possible weight savings if built with spruce???)

*Gene designed Mariah so that the builder could use Sitka Spruce in most of the aircraft's components. The prototypes were built using Douglas Fir and this wood species may be used as a replacement for Spruce.*

10. What are the load limits, limit and ultimate?

*Normal Category = +3.8g and -2.0g limit.*

*Safety factor of 1.5 = +5.7g and -3.0g ultimate.*

11. Is the stabilator mass balanced to preclude flutter?

*Yes! Gene wouldn't have it any other way! :-)*

12. What about a wing-fold?

*The wings consist of a 76" center section and two 13' 10" outboard panels. The design doesn't currently have a wing-fold mechanism in place. We talked with Gene about using a wing-fold system similar to the one he used on his Turner T-40 series of aircraft on Mariah. He said that he thought about doing that also and it would work just fine. But, he stated that it only took about 10 to 15 minutes to setup or remove the wing panels due to the use of quick disconnect pins so he didn't think the added weight and complexity of a wing fold was worth the extra work to build the aircraft or the cost incurred. He also mentioned to us that the wings would extend way past the stabilator and rudders when folded. He thought that it would be best to strap the wings along the side of the fuselage rather than adding the wing-fold mechanism which would add complexity and weight.*

13. Is the airframe capable of using larger engines?

*As far as the airframe being capable of handling larger engines, the answer would be definitely will, if tested correctly. Mariah's engine mount structure is designed to withstand 12G's forward loads, that is, 12 times the weight of the engine installation based on the prototype's Cuyuna 215 20hp engine. This g factor was purposefully designed into Mariah to, as quoting Gene Turner, "keep the engine in the back where it is supposed to be." We would have to calculate the weight of a different engine and the thrust produced to see if the 12 g's designed into the airframe would be adequate or not. We believe that a good replacement for the 215 would be the Rotax 277 or the Hirth F33 at this time. These engines will provide more than ample power but may need to have a throttle stop to keep the aircraft within the Part 103 speed limit of 55 knots (63 mph). We have also been investigating the possibility of using the new Polini Thor 130 EVO, Polini Thor 190 HF and the Polini Thor 200 HF engines. These engines are fairly new to US ultralight builders, but they have been flying on paramotors for many years now. These engines are strong, reliable, lightweight but a little pricy when compared to rebuilt or NOS 2-strokes that are still available. But the bang for the buck that you get is hard to walk away from for anyone. Another alternative may be the 4-stroke military surplus generator engines that are available now. Some builders have told me that they would like to use a 1/2 VW engine and others stated that they would like to use a B&S or Kohler. I have been in contact with William Wynn and he thinks the 1/3 Corvair would be a good match for the Mariah airframe. Disclaimer: These optional engines have not been tested by us at this time.*

14. How many Mariah's have been built and are flying?

*The T-100D Mariah prototype is the only one to have flown to date. Gene's Mariah design was well received with many sets of plans sold. In the mid 1980's there was a major liability scare that hit the US Ultralight industry and a number of Ultralight manufactures and or plans providers went bankrupt or just got out of the business. Instead of getting out of aviation all together, Gene decided to recall all of the T-100D Mariah plans that he had sold, he still maintained his T-40 series for sale and support. Gene was able to buy back all but two of the plans. One plan set that did not come back had been sent to a customer in Japan, and the other went to a customer in Italy. At this point, Mariah was dormant until we started asking about obtaining a set of plans in 2001. Since Gene pulled all of the plans there have only been three examples of this aircraft built, Gene's prototype, one built in Tennessee and one that was built in Italy. We have plans owners all across the USA, Canada, Germany, Italy, Japan, Mexico, Scotland, and South Africa at this time. Hopefully, more Mariah aircraft will be getting underway in the build process and others will be flying soon.*

15. How many hours will it take to build the T-100D Mariah from plans?

*We have estimated about a 500 hour build time for an experienced aircraft builder and around +-800 hours for a beginner. Gene Turner designed this plans set as a very good set of engineered drawings and made them easy to read and understand. However, we are sure that some inexperienced builders may have some trouble at first, we did on our very first airplane project. We have found with any set of aircraft plans that when something is not understood, it is time to take a break, walk away and then come back with a "fresh" mind and take a look at the drawings again. When this is done, the information generally tends to pop up off the pages.*

16. Can you install a chute in the Mariah?

*Yes, we have been in touch with BRS to have their Engineers take a look at our Mariah. We sent them fuselage and wing drawings and they assured us that attaching a BRS recovery chute should be very straightforward.*

17. What are the specifications for Mariah?

|                                 |                     |
|---------------------------------|---------------------|
| <i>Top Speed</i>                | <i>63 mph</i>       |
| <i>Cruise</i>                   | <i>55 mph</i>       |
| <i>Stall</i>                    | <i>27 mph</i>       |
| <i>Range</i>                    | <i>200 sm</i>       |
| <i>Rate of Climb</i>            | <i>600 fpm</i>      |
| <i>Takeoff/Landing Distance</i> | <i>350/300 ft.</i>  |
| <i>Engine Used</i>              | <i>Cuyuna 215R</i>  |
| <i>HP/HP Range</i>              | <i>20/20-35 hp.</i> |
| <i>Fuel Capacity</i>            | <i>5 US gallons</i> |
| <i>Empty/Gross Weight</i>       | <i>254/504 lbs.</i> |
| <i>Length</i>                   | <i>19.1 ft.</i>     |
| <i>Wingspan</i>                 | <i>34 ft.</i>       |

|   |  |
|---|--|
| Wing Area   | 146.5 sq. ft.  |
| No. of Seats  | 1  |
| Cockpit Width   | 22 in.   |
| Landing Gear  | Tri-gear   |
| Bldg. Materials   | Wood, Fabric, Metal  |
| Beginner Build Time   | 800 hours  |
| No. Completed & Flown   | 1  |
| <i>Plans Cost (see <a href="http://www.adamsaero.com">www.adamsaero.com</a> for full information)</i> |  |
|   | <i>Full size set of drawings - \$250 plus applicable shipping</i>        |
|   | <i>Reduced sized set of drawings - \$150.00 plus applicable shipping</i> |

18. Is Mariah considered more of a powered glider with the low hp engine of only 20 hp?

*Mariah does have a rather long wingspan and low horse power but we don't believe that Gene Turner (the designer) ever considered it to be a powered glider. Built as the plans state, Mariah fits into the US FAR Part 103 Ultralight regulations. We know of similar sized Ultralight aircraft that have been used as motor gliders or have been soared but we do not have any records of Gene doing this with Mariah. We wouldn't mind trying it sometime but can't recommend you to do so at this time.*

19. Could Mariah be float equipped?

*This is one of the options Gene considered for Mariah and we have looked into this as well. We have determined that hard point attachments could be added to Mariah. We just love the idea of flying off water on floats and this would be a very nice option to have on Mariah.*

20. There is an article in the "Light Plane World" magazine dated April of 1985 where Gene Turner states he was working on design changes for Mariah. The changes mentioned were, potential metal wings, wing fold, and spoilers. He also stated that the current airfoil section for Mariah is the 64-418 but will shortly be changed to one of the 63000 series. Did Gene complete these modifications?

*We are familiar with this article and is a very well written documentation of the Mariah ultralight. It has many very good photos of Gene and the Mariah prototype. As far as the changes are concerned, Gene did not make many changes to the "D" model Mariah after he released the drawings. Gene did not pursue the metal wing idea. He stated the wooden wings were preferred and easier for the homebuilder to build due to most people being familiar with working with wood. The wing fold system was not used due to weight and complexity issues. And Gene kept the ailerons which were working perfectly and weight was not an issue, so there was no need for spoilers. The airfoil section did change from the 64-418 but Gene does not recall the name of the airfoil that is currently used on the T-100D Mariah however; we believe it to be a Wortmann FX 60-126(1) and are actually calling it the Turner X-1 Airfoil.*

21. Could composite gear spring be used on the T-100D Mariah? If I built one, I would integrate George's main gear from this link: <http://curedcomposites.netfirms.com/gear.html>.

*Gene had a fiberglass main landing gear on one of the earlier models of Mariah and he was not happy with this type gear. He said the fiberglass gear was just too "springy" and so he had to go with a welded steel main gear. I know this gear works and this is the gear that we support. We have seen George Sychrovsky's composite gear and are really interested in this for Mariah. We have seen his work on a HIMAX down at Sun & Fun back a number of years ago and we were very impressed with what we saw. However, without knowing the strength of the gear and possible mounting hardware required, we cannot approve this for use on Mariah at this time. With that being said, this is an Ultralight/experimental airplane and it is open to builder adaptation as long as they realize this is their mod and one not approved by Adams Aeronautics, Co. Inc.*

22. I looked over the files in the T-100 Mariah Club Yahoo Group (this group is no longer active and has been moved to <https://groups.io/g/T100DMariahClub>) and discovered some interesting things. Am I correct in that there is a configuration that the wing be covered in plywood (thin but still plywood)?

*Yes, the wing may be covered with plywood. By doing so, you do not have to install the cross-wire bracing or the 4130 compression members. The skinning of the wing panel is very similar to creating the D-Cell section of the leading edge. You will need to scarf join aircraft grade plywood sheets together to get the size required to cover the wing. Scarf joining the plywood will create a very strong joint, butt joints are not allowed. When cutting the plywood, angle your table saw blade so that the cut angle created is not less than 12 times the plywood thickness; i.e. 3 mm plywood, scarf width = 36 mm. Gene recommends 16 times the thickness of the plywood so that you can create a very good and strong joint. As for any wooden joint, avoid starving the joint of glue. Further information on wood bonding can be found in the FAA advisory circular AC 43.13-1B ([http://rgl.faa.gov/REGULATORY\\_AND\\_GUIDANCE\\_LIBRARY/RGADVISORYCIRCULAR.NS/F/0/99C\827DB9BAAC81B86256B4500596C4E?OpenDocument](http://rgl.faa.gov/REGULATORY_AND_GUIDANCE_LIBRARY/RGADVISORYCIRCULAR.NS/F/0/99C\827DB9BAAC81B86256B4500596C4E?OpenDocument)).*

23. Is the T-100D Mariah an experimental airplane that can be “made” to fit the USA FAA FAR Part 103 Regulations or was it designed to be an “ultralight” from the beginning?

*Mariah was designed by Gene to be an Ultralight from the first time his drawing pencil was placed to paper. However, he designed Mariah under the same standards that Cessna, Piper and other aircraft manufactures used to design FAA certified airplanes. Mariah was designed to meet or exceed FAA FAR Part 23 standards, standards to which “real airplanes” are built in the USA. Gene is an aeronautical engineer who designed aircraft to meet or exceed Part 23 standards. His design approach to Mariah was no different from any other aircraft he designed even though Mariah is an Ultralight. Mariah was one of the first “true airplane” style Ultralights in that it was not a hang glider with an engine attached. It does not have single surface wings, it does have a cockpit enclosure (option), and it employs three axis controls rather than spoilers that were common at that time in Ultralight development.*

24. Do the wings come off for trailering?

*Yes, the wings are removable for trailering. Gene took the quick release pin design that he used on the T-40 and added it to Mariah. The wings come off by pulling six pins, 2 on each front wing panel spar attachment and 1 each for the rear spar attachment. The pins are made from AN6-44A bolts for the rear spar and AN5-50A bolts for the front spars. Initially, set up time in the field is approximately 15 minutes but time will shorten with experience. We know of one builder who said he was just going to use the bolts and not turn them into pins. This is a viable option to use if you wanted to do so. We have considered using a derivative of the T-40 wing fold on Mariah to possibly make Mariah easier for trailering. The only issue here is that it is just too heavy for ultralight use and may make the plane a little long for towing. However, it is an idea that needs to be revisited for the experimental category.*

25. Does Mariah qualify for the USA FAA LSA category?

*Yes, the T-100D Mariah will qualify for the LSA category. Aircraft such as Mariah can be licensed Experimental Light Sport Aircraft (E-LSA) if kit or plans-built. Aircraft under this certification may be used only for sport and recreation and flight instruction for the owner of the aircraft. The aircraft will also have a standard FAA registration - N-number.*

26. Is the T-100D Mariah named after Mariah Carey?

*Even though the popular singer/actress Mariah Carey was born March 27, 1970 and so therefore was living at the time of Gene's designing of the T-100 Mariah series of aircraft, no, he did not name the airplane after her. Gene originally named the T-100 series of aircraft "Pixie", the "Trail Bike of the Sky" but he found out that his good friend Paul Poberezny (EAA founder) had an aircraft design already named "Pixie". So Gene renamed the T-100 series to "Mariah", "The Wings of Wind." The inspiration for the Mariah name was taken from the song called "They Call the Wind Mariah" originally sung by Rufus Smith for the 1951 Broadway musical "Paint Your Wagon" which was turned into a Clint Eastwood movie of the same name in 1969. This musical and movie was a favorite of Gene's. In this musical/movie the wind was called Mariah and a song was sung to tell the story of a man who is lost and all alone. The song was sung for the movie version by the Kingston Trio.*

*They Call the Wind Maria - Lyrics*

*Words and Music by Alan Jay Lerner and Frederick Loewe*

*-From the 1959 LP "From the Hungry"*

*-From the musical "Paint Your Wagon"*

*-From the movie version performed by The Kingston Trio*



*Way out here they have a name for rain and wind and fire  
 The rain is Tess , the fire's Joe, and they call the wind Mariah  
 Mariah blows the stars around and sets the clouds a flyin'  
 Mariah makes the mountain sound like folks was up there dyin'  
 Mariah, (Mariah), Mariah (Mariah), they call the wind Mariah*

*Before I knew Mariah's name and heard her wail and whinin'  
 I had a gal and she had me and the sun was always shinin'  
 Then one day I left my gal, I left her far behind me  
 And now I'm lost, so gol-durned lost not even God can find me  
 Mariah, Mariah, they call the wind Mariah*

*Out here they have a name for rain, wind and fire only  
 When you're lost and all alone there ain't no name for lonely  
 I'm a lost and lonely man without a star to guide me  
 Mariah, blow my love to me, I need my gal beside me  
 Ma-ri-ah, (Ma-ri-ah), MARIAH ! (Mariah), they call the wind Ma-ri-ah*

*Ma-ri-ah, Mariah, Mariah  
 They call the wind Ma-ri-ah*

27. Mariah looks interesting, and Gene Turner's other designs certainly had a good reputation. How complex is the construction? Would it take as long to build Mariah as a T-40? Also, aircraft plywood is way expensive these days. Approximately how much plywood is required?

*Gene put a lot of work into the design as he has done with his T-40 series of aircraft. However, the complexity of the Mariah design is not too difficult at all. I would expect to spend about 400 - 500 hours on building if you are familiar with working with wood and airplane designs. It may take 700 - 800 hours if you have never done any sort of project before. There is minimal welding required but if you are not a welder, I am sure that you could find a shop to assist you. I have a friend who has done welding for me in the past. Here is a list of plywood required:*

*Mariah plywood requirements*

| <u>Quantity</u> | <u>Thickness</u> | <u>Size</u> | <u>Type</u> |
|-----------------|------------------|-------------|-------------|
| 6 Sheets        | .4mm             | 50" x 50"   | Birch       |
| 4 Sheets        | .8mm             | 50" x 50"   | Birch       |
| 2 Sheets        | 1.5mm            | 50" x 50"   | Birch       |
| 1 Sheet         | 3.0mm            | 50" x 50"   | Birch       |
| 1 Sheet         | 6.0mm            | 50" x 50"   | Birch       |
| 1               | 1/2"             | 3" x 4"     | Birch       |
| AR              | .8mm             | 2" x 50"    | Birch       |
| AR              | .8mm             | 3.75" x 44" | Birch       |
| 1               | 1/8"             | 4.5" x 22"  | Mahogany    |
| 1               | 1/8"             | 15" x 22"   | Mahogany    |
| 2               | 1/2"             | 3" x 7.5"   | Birch       |

|   |       |                  |          |
|---|-------|------------------|----------|
| 1 | 1/8"  | 2.5" x 5"        | Birch    |
| 1 | 1/8"  | 22" x 29"        | Mahogany |
| 2 | 1/2"  | 5.5" x 15.25"    | Birch    |
| 1 | .8mm  | 4" x 17.5"       | Birch    |
| 2 | .8mm  | 15.5" x 35.5"    | Birch    |
| 4 | 1/8"  | 1" x 31"         | Mahogany |
| 2 | .4mm  | 2.7" x 70"       | Birch    |
| 4 | .8mm  | 4.75" x 20"      | Birch    |
| 2 | 5mm   | 1.0" x 2.5"      | Birch    |
| 1 | 5mm   | 2 5/8" x 3"      | Birch    |
| 8 | .8mm  | 3.5" x 48"       | Birch    |
| 4 | .4mm  | 11" x 93"        | Birch    |
| 2 | 6.0mm | 1/4" x 4.5"      | Birch    |
| 4 | 9.0mm | 3/8" x 5 7/8"    | Birch    |
| 4 | 6.0mm | 1/4" x 4.5"      | Birch    |
| 4 | 9.0mm | 1/4" x 6 7/8"    | Birch    |
| 2 | 6.0mm | 1 1/2" x 14 1/2" | Birch    |
| 4 | .8mm  | 1 3/8" x 164"    | Birch    |
| 2 | 6.0mm | 1/4" x 4.5"      | Birch    |
| 4 | 9.0mm | 3/8" x 5 7/8"    | Birch    |

*I know that the list of full size plywood sheets is correct. However... I claim possible errors and omissions on this list because I just took a quick look at all the BOM pages to compile this information. I will review the pages and update this list if/when I find some errors.*

28. How are the ribs made? I was looking at photos on the T-100 Mariah Club Yahoo Group (this group is no longer active and has been moved to <https://groups.io/g/T100DMariahClub>) and saw that a builder used stick like construction unlike the answer given on the FAQ. Can you give more info?

*You are correct about the pictures of the Mariah showing the built up stick ribs. This Mariah was built by a builder in Italy who did not want to build the foam or plywood ribs. He wanted to build a "stick" built up rib similar to a Mini-Max or other similar design. The builder ran all questions he had by Gene Turner who approved of the built up rib design. I added a comment to those pictures stating that they are not built per plans.*

29. Plans arrived yesterday and I'm already hounding Ken with my questions. I think I'll slow down a bit more with my plans digestion and ruminate some before I wear out my welcome. That being said I did encounter an issue with the center section aft spar 31 Bearing Plate on 100 W-2 Sheet 2 of 2.... extreme upper left corner of the sheet. There is 6.0" dimension for the lower leg of the plate and a 5.75" dimension for the upper leg of the plate. That's obviously NOT drawn correctly on the plans as the upper leg is grossly shorter than the lower... not just a 1/4" shorter as the listed dimension. Is there anyone else that has gone before me that has encountered this particular issue?

*The issue Steve (Mariah plans owner) found with the -31/-39 Bearing Plates found on DWG No. 100 W-2 Sheet 2 of 2 was definitely a drawing issue. The issue we have here with this drawing sheet was that the bearing plate was drawn at a 4 1/2" height and should have been 3 1/2". The plans have been updated to remove this incorrect information and contact current plans holders to make sure they get this update. After reviewing the plans to ensure that this was not a rear spar/center section issue, I sent Steve an e-mail letting him know that I agreed with his finding. I determined that a 1/2" of material needed to be removed from both the top and bottom of the plates and Steve had come to the same conclusion. He also sent some CAD drawings he created of the bearing plates for me to review. Steve's work on the drawings is very good and the drawings have been approved by us at AAC, Inc. for his use on Mariah. The drawings have been documented as approved and Steve has allowed the drawings to be used as an addendum to the plans to help ensure clarity. Since updating the plans, Steve's drawings have been removed from the plans set. Thank you Steve for catching this error.*

30. Is anyone close enough in their build to determine whether the Mariah meets Part 103 for weight? What is the prop diameter?

*We have several under construction and at least two customer built example completed. The latest builder has not completed the final weight and balance and does not know the weight of his Mariah. The weight of the prototype came well within the US FAR Part 103 weight at and a builder should be able to bring the weight in easily under the 254lb weight limit if they follow the plans that Gene Turner worked so hard on to make this aircraft a true ultralight. The prototype was built light and used a Cuyuna 215, 20 hp engine. The propeller installed was a wooden two-bladed 52" diameter x 19" pitch design and was modified by adding fiberglass to the leading edge for protection.*

31. I'm going to assume we are expected to relieve this interface of the radius corner in the fitting and the 90° corner of the spar. The fitting dimension between the legs is 1.50" however, the spar is an increasing inboard taper. Do you relieve the fitting? Relieve the bearing plate? OR bend the leg of the fitting?

*Good questions! Yes, relieve the 90° corner of the spar to create a good tight fit for the wing attach fittings. All you need to relieve is the Bearing Plate sections where the wing attach fittings are mounted to the center section spar. As far as the center section taper and wing fittings are concerned, just press the wing attach fittings onto the spar allowing for a slight bend of the legs. Remember, you are to only drill one side of the fitting, then clamp it to the spar and drill through the spar and the other side of the fitting. Even with the slight taper of the spar, the holes will line up properly.*

32. The TOP view of the center section rear spar root end showing the - 37 Bearing Plates as they are shown in the top view of the plate drawing, apparently have beveled ends. BUT, if we go to the TOP view of the center section rear spar root end on 100W-2 Sheet 2 of 2 we see a bevel or what I assume to be a bevel showing on the inboard ends of the plate.

*The TOP view of the center section rear spar root end on 100W-2 Sheet 2 of 2 is correct. With that said, either way would be fine but the taper does remove some unnecessary added weight.*

33. Given that the cockpit is a maximum of 22 inches wide, I measured my shoulder width and its 24 inches wide. It looks as though its open air flying for me unless a semicircle canopy behind the windscreen is made to accommodate my width. Can this be done?

*A canopy which is wider than the fuselage may be installed similar to the windows used on small aircraft to give the pilot and passenger some extra elbow room.*

34. I cannot find any reference as to what is covered in fabric except the fins and rudders, do I assume that the wings and stabilizer are covered with fabric after the plywood?

*Finishing procedures are optional and generally left up to the builder. However, on page 39 of the construction manual there is a reference to attaching fabric to a wing or control surface.*

*“On a wing or control surface, you should be able to lift the fabric above the surface approximately 1 inch prior to shrinking. After the fabric is bonded on it can be heat shrunk with an iron to make a perfect surface.”*

*The following points are required to be accomplished during the finishing process. All surfaces must be sealed by varnishing or coating with epoxy then they are primed and painted to keep moisture out. On inside surfaces this can be done by applying varnish, epoxy resin, polyester resin or polyurethane. Keep the coating as thin as possible but make sure that there is adequate coverage. Cloth covering such as a light Dacron or Poly-Fiber may be used over the plywood skins. This will help to prevent cracking of the paint over splice joints and will provide an excellent base for the final finish. The main thing to remember is to seal all surfaces of the structural parts to prevent moisture from getting in and causing corrosion.*

35. In the construction manual it states: Rudders and ailerons are not required to be balanced, then on drawing number 100W-1 sheets 1 & 4 of 7 are details of a counter balance for the ailerons, all very confusing for an old git like me.

*This is correct, the rudders and ailerons are not required to be balanced due to the speeds flown as an FAA Part 103 Ultralight. The speeds do not get fast enough to cause any flutter issues for these particular control surfaces. The T-100D Mariah did not have the counter balance arms installed. When I asked Gene Turner about this, his response was that he thought he would provide the information so that the builder could install these if they wanted to do so, but this is not required.*