

# PITCH Settings



PROVIDER Organization: **POWERFIN PROPELLER, LLC**  
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Product: **Carbon-fiber composite propellers in the following**  
**Models... 'B', 'C', 'E' & 'F' and**  
**ALL of our new aluminum CNC'd Apex Hubs**

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*Relative to PITCH SETTINGS, I wish I could, at least, address your request with some high degree of confidence and make the perfect starting recommendation on Pitch (at the Blade's tip, +/- 0.5 degrees) for your application, however, there are so many factors involved with the 'Best Blade Pitch' that I can only... get ya "in the ballpark" ...*

*So what I can tell ya (and hopefully this will be helpful...and not too repetitive on 'stuff' you probably already know...)*

*Many factors will affect this (the starting pitch setting at the tip); ideal is 11-to-14 degrees, but anything in the range of 6 to 18-degrees is acceptable on most applications.*

*So with an ideal setup, I would start at 14-degrees, and go from there, based on your max static RPM, and considering that you will probably pickup about 100 to 500 RPM in the air, relative to your cruise air-speed (noting that the faster the application, the more RPM's will be experienced above a static (MAX RPM) situation...)*

*Please let us know if we can address any additional questions or concerns...*

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*More Pitching information, if you are still interested...*

## ***Relative to Pitching the blades...***

*Pitch is the key factor in the relationship between your engine and the propeller setup. And with so many combinations of engines, reduction drive ratios, types of applications (boat, aircraft, pusher, tractor, etc) and the number and sizes of the propeller blades...well, unfortunately, we do not have the ideal numbers for setting your pitch in your specific application (as I stated above...)*

*However, having said that, I can expand on some basic guidelines...*

- *The Pitch of your blades is used to set the resistance, and hence, used as a RPM governor for your engine. And each Make & Model of engine has an ideal max-RPM for torque, thrust and speed.  
Therefore you must set enough pitch to keep the engine from 'red-lining' the engine's RPM range; and/but without setting so much pitch, as to over-load the engine, so that it cannot reach its ideal (most efficient) RPM range*
- *Effective pitch settings can range from 5.5-degrees of pitch at the tip of the blades to 18 or even 20-degrees.*
- *As Density Altitude changes, so should your pitch settings, to get an ideal performance from your propeller configuration and your – IF a 2-cycle engine – EGT readings.  
Most pilots will – with minimum maintenance - set their pitch at least twice during a year, once in the spring for summer and once in the fall for winter to compensate for Density Altitude.*
- *If one has no clue, where to start, with a pitch setting for their blade tips, we suggest at least 14-degrees; and then keep a “constant-eye” on your important (i.e., EGT/RPM) instruments to keep your engine in a SAFE operating range during the first run-up; after your preflight and engine warm-up routines.  
Then ADD pitch to lower your maximum engine RPM, and REDUCE pitch to increase it.*
- *When setting your pitch with Static thrust (i.e., when the application/aircraft is secured on the ground) as the engine's RPMs are moved to maximum, please do note that the RPM's will be lower than your normal/cruise RPM maximums - when your application is airborne.  
[Noting that we have seen this range, between Static Max-RPM and moving (or airborne) Max-RPM, go from a small increase of 50-RPM when in cruise, in slow moving applications like Powered Parachutes & boats; to a 1000-RPM increase in faster moving fix-wing aircraft when airborne. Hence, you will have to experiment with your application; and call your application manufacturer for more specifics in this area.]*
- *Maximum Blade RPM should **NOT** be more than 75% the speed of sound or around 575-mph at the tip...*
- *Maximum pitch, before stalling would be around 19-degrees at the tip (however, some applications have reported Powerfin blades not stalling until 22-degrees – but I have no documentation of this)*

**Bottomline...**

*Start with 14-degrees; watch your RPM as you run-up your engine after torquing your prop configuration etc, and then adjust as necessary (adding or reducing **Blade Tip** pitch) - experiment from that starting point (adding about 1-degree of pitch to change about 300-RPM) to reach your perfect engine RPM setting at full-throttle.*

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**Powerfin Propeller, LLC**



Fredrick Scheffel

