

# Epoxy Recommendation Guide For Use In Parker Fly Guitar Building

Parker Fly Guitar Neck Group

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## Recommended Epoxies:

There are two types of epoxy that are recommended for use in building a Parker Fly guitar. The first type of epoxy is an adhesive epoxy where it is primarily used for binding various composite materials together. For this type of epoxy, it is recommended that Pro-Set ADV-170 resin and ADV-270 hardener be used for binding purposes. The reason for recommending this specific band of epoxy is because it is a general purpose epoxy with relatively acceptable mechanical and thermal properties. Furthermore, the working time for this specific epoxy is close to room temperature and is relatively long, allowing for ease of use during the application stage.

The second type of epoxy is a laminating epoxy where it is primarily used to harden a surface or to fabricate a multi layered composite material. For this type of epoxy, it is recommended that Pro-Set LAM-125 resin and LAM-229 hardener be used for the finishing stage of production or for manufacturing layered carbon fiber material. The reason for recommending this specific band of epoxy is similar to the one above with more focus on a longer working time and lower viscosity. Laminating epoxy, the one recommended above, has relatively low viscosity, with it being only twice as viscous as water. This allows for a smoother process of spreading the material along the surface. Furthermore, laminating epoxy expands very little when cured, making it a perfect agent for creating layered composite material. This type of epoxy also gets absorbed by the surface giving it an improved rigidity, perfect for applying a finishing touch to the final product.

Each of the recommended epoxies above are thermosetting polymer epoxies that are water proof once cured. These epoxies, when not in use, must be stored in a dry location, shielded from sunlight, at a minimum temperature of 5°C. Exposure of these epoxies to sunlight overtime after it is cured may cause it to tint light yellow color.

Epoxy Type	Mixing Ratio (R:H)	Working Time (Minutes)	Cure Time (Hours)	Working/Cure Temperature (°C)	Maximum Operating Temperature (°C)	Yield Strength (MPa)
Adhesive Epoxy (ADV-170/270)	1:1	120	9	22	54	67
Laminating Epoxy (LAM-125/229)	3:1	180	7	25	89	96

Table 1: Important Properties Of Recommended Epoxies

While the epoxies described above are specifically engineered for industrial use, they are still acceptable for Parker Fly Guitar fabrication project because of the exceptional properties described in the chart above. Furthermore, these epoxies are general purpose epoxies that have been used for various types of tasks, including manufacturing of instruments, but the mechanical properties provided by them may be more than necessary for this specific project. Despite this fact, the recommended epoxies are still the best choice because of the reputable brand and the working time of each is fairly long compared to other similar products.

### **Mixing Resin And Hardener:**

Before applying the epoxy, it must be mixed appropriately as described by the weight ratio of resin to hardener in the table above. The mixing ratio has to be accurate to get the desired properties. Furthermore, rigorous mixing of the resin and hardener must take place for at least three minutes to uniformly mix the material together. If the mixing is not done to perfection, some parts of the applied area may result in undesired traits, producing weak points in the epoxy material after it cures.

### **Application Process:**

There are five possible operations where the above mentioned epoxies may be applied during the Parker Fly guitar production stage.

1. Creating layered carbon fiber and fiberglass composite material, either for use as a fretboard or as a back plate
2. Bonding frets to the fretboard
3. Bonding fretboard to the guitar neck
4. Bonding composite back plate to the back of the guitar neck
5. Applying a finishing coat of epoxy to the product to improve the surface quality

When handling epoxy, it is required that goggles and gloves are worn to prevent damage to one's body. Do not directly touch any parts of the uncured epoxy with bare hands. A brush or a scraping tool may be used to spread the epoxy along the surfaces during the application stage.

### **Laminating Stage Application Process:**

This stage of the production focuses on creating a layered carbon fiber material for use as a fretboard or combining fiberglass and carbon fiber into a composite back plate. In either

case, evenly apply the properly mixed epoxy along the surfaces of the material that are being laminated together. Once complete, bind the two separate materials together along the sides that the epoxy is applied on and set it to cure for at least a day at room temperature. Do this within the recommended working time of less than 180 minutes. When letting it cure, use of a mold may be necessary to give initially flexible material proper shape since cured epoxy make the composite material rigid. Pressure may also be necessary during the curing process. This stage can be repeated as many times as necessary where adding a single additional layer is considered one cycle of this stage.



Image 1

#### **Bonding Stage Application Process:**

This stage of the production focuses on bonding various materials together, such as fretboard to the guitar neck. During this stage, the adhesive epoxy, as recommended above, should be used. First, tape down the sides of each material with scotch tape where the epoxy will be applied. This will help prevent any epoxy from over flowing onto undesired areas. Next, apply the epoxy in the desired area, spreading it evenly. Spreading adhesive epoxy may be more challenging since it is much thicker material to work with. Lastly, remove the scotch tape and bond the two epoxy applied sides together and let it cure under pressure, evenly distributed over the applied area. The application process should take less than the allowed working of 120 minutes with cure the time being at least a day at room temperature. Repeat this stage for each of the parts that need to be bonded together including the back plate.

#### **Finishing Stage Application Process:**

This stage's process is similar to laminating stage with the use of same laminating epoxy. The key difference is that only one coat of this epoxy should be applied to the desired surface and set to cure.

**Image Citation:**

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