

Lichtenberg, or “Fractal,” Burning: Be Aware of the Risks!

Lichtenberg, or “fractal,” burning is a relatively new embellishing technique that uses high-voltage electrical current to produce patterns on wood resembling lightning flashes. (Lichtenberg patterns were first documented by physicist Georg Christoph Lichtenberg in 1777; a “fractal” is a type of repeating pattern that sometimes looks like a Lichtenberg figure.) The technique’s popularity has grown rapidly among woodturners. YouTube has many videos demonstrating the technique, and it is easy to find instructions on the Internet for making Lichtenberg burners inexpensively at home.

While its use has been growing, knowledge of its dangers has not. Some of those YouTube videos show practices and equipment that can easily kill you. Use of underrated components, improper insulation, absence of properly rated personal protection equipment (PPE), and lack of training in the handling of high-voltage apparatus highlight the multiple risks associated with the use of this technique. At least two people have died recently and others have been involved in high-risk incidents, apparently as a result of doing Lichtenberg burning.

AAW’s response

As a response to these fatalities and incidents, and based on the recommendation of the chair of the AAW Safety Committee, the AAW Board of Directors adopted the following policy on May 17, 2017:

It is the policy of the American Association of Woodturners (AAW) that the process known as Fractal Burning is prohibited from being used in any AAW-sponsored events, including regional and national symposia, and that AAW-chartered chapters are strongly urged to refrain from demonstrating or featuring the process in chapter events. Further, the process of Fractal Burning shall not be featured in any written or online AAW publication, except for within articles that warn against its use. AAW publications will not accept advertisements for any products or supplies directly related to the process.

The AAW realizes that this new policy may need further clarification as it is implemented. While the AAW may *prohibit* the practice from being used during AAW National Symposia, it has no direct legal authority over regional events and cannot technically prohibit demonstrations at regional symposia. Further, chapters are not actually *prohibited*, but are *strongly urged* to refrain from featuring the process. While chapters are free to display pieces and/or publish photos of them in chapter newsletters, the AAW strongly urges chapters to refrain from encouraging the use of this highly dangerous process in any way. The AAW is an educational organization, not a regulatory body. In matters of judgment, the AAW must err on the side of safety when educating its members.

Why Lichtenberg burning is dangerous

Lichtenberg burning works by passing electricity at very high voltage between two electrodes while they are in contact with a piece of wood. An electrolyte (a solution that conducts electricity) is often placed on the wood to help the electricity move between the two electrodes. The electricity seeks the path of least resistance while generating heat along the wood surface and between the electrodes, burning the wood as it goes.

Electrocution happens when high-voltage electricity enters through any part of the body, passes across the heart, and then exits the body. If you grabbed one electrode of a Lichtenberg burner in each hand while the voltage is on, the electricity could flow from one hand, across your heart, and out the other hand. This could stop your heart and kill you. Accidental skin contact with an energized electrode, the electrolyte, a loose wire, or even standing on a conductive floor can all contribute to conditions causing electrocution.

In addition to voltage, the burner’s level of amperes, or “amps”—a measure of electrical current—is also important; the greater the amps, the greater the

risk. Furthermore, the transformer, wire, insulators, and other components used to construct a Lichtenberg burner also contribute to the risks of using it if they are not properly rated. Simply getting a Lichtenberg burner with very low amperage and made from correctly rated, quality components may not be sufficient to protect the user. Even low-amperage current can stop a beating heart if it passes through at the wrong moment. If the burner is capable of burning Lichtenberg figures in wood, it is capable of hurting or killing the user.

This means, at minimum, that the user of a Lichtenberg burner needs to take extraordinary and unusual precautions, including wearing appropriately rated insulating protective gear, locating the wood on an insulating surface that is not grounded, and making sure the user’s body does not come into contact with the object being burned or anything that is grounded. Following these precautions, however, cannot guarantee safety.

In short, many variables exist when using this technique that can make the difference between a safe experience and pain or death. The AAW believes that those variables are not sufficiently understood or adequately controlled for Lichtenberg burning to be considered reasonably safe and therefore prohibits the demonstration of Lichtenberg burning techniques at its Symposia.

Lichtenberg burning vs. other risks

Since woodturning itself is inherently dangerous, some readers may question why the AAW has chosen to focus on the risks of Lichtenberg burning. Woodturning techniques have been developed over many, many years, allowing woodturners to learn a great deal about the things that put them at risk. That learning does not yet exist for Lichtenberg burning, which is quite new. While there are well-established procedures for handling high voltage and industry standards for the design of high-voltage electrical equipment, ▶