

Technical Bulletin :

**Red Pine (Pinus resinosa)
and Sap/Blue Staining**



Introduction:

At Preverco, we use red pine for our backer on our Flex 13, 16, 19, and Max 19 platforms. We choose red Pine for its strength, durability, stability, quick rejuvenation, and proximity to our manufacturing facilities. Red pine (*Pinus resinosa*) is a valuable softwood species commonly used in the construction, pulp, and paper industries. While Red pine is a strong and versatile wood, its susceptibility to sap and blue staining can present challenges, when the appearance of the wood is a critical factor but does not affect the structure or performance of the wood. This bulletin provides a technical overview of the causes, and impacts for sap and blue staining in red pine.

1. Sap Staining

1.1. Sap staining, also known as “sapwood stain” or “brown stain,” is caused by saprophytic fungi that colonize the sapwood of the red pine. These fungi feed on nutrients within the sapwood, but do not degrade the wood structure. The stain primarily affects the appearance of the wood without compromising its mechanical properties.

1.2. Sap stain fungi thrive in warm, moist conditions and usually begin to colonize the wood soon after the tree is harvested. The primary factors contributing to sap staining include:

- **High moisture content:** Freshly felled red pine logs have high moisture levels, especially in the sapwood, which creates favorable conditions for fungal growth.
- **Temperature:** Temperatures between 20°C and 30°C (68°F to 86°F) are optimal for sap stain fungi.
- **Poor air circulation:** Logs stacked tightly without adequate ventilation increase the risk of sap staining.

1.3. Effects on Wood

- **Aesthetic impact:** Sap staining appears as discoloration, ranging from light brown to dark gray streaks, which can reduce the aesthetic value of the wood.
- **Structural impact:** The fungi responsible for sap stain do not notably affect the mechanical strength of the wood.

1.4. Prevention and Control

- **Proper storage:** Red pine logs should be stored in well-ventilated, shaded areas to minimize moisture retention and slow down fungal growth.
- **Rapid processing:** Sawmilling the logs soon after felling reduces the time fungi have to colonize the wood.
- **Chemical treatments:** Applying fungicidal sprays or dips can prevent sap stain fungi from colonizing the sapwood.

- **Kiln drying:** Drying the wood to a moisture content below 20% halts fungal activity and prevents further staining. With our kiln dried process to reach a desired 7-9% moisture content, we heat the wood for several days above 133°F. (Heat Treatment (HT/ISPM15). More info: ISPM 15 its core reaches 133°F / 56°C for at least 30 minutes.)

2. Blue Staining

2.1. Definition

Blue stain is a form of fungal discoloration caused by fungi that infect the sapwood of red pine. Unlike sap stain fungi, blue stain fungi produce dark pigments, giving the wood a bluish or grayish tint. While these fungi do not degrade cellulose or lignin, they can alter the wood's appearance.

2.2. Causes

- **Fungal invasion:** Blue stain is caused by specific fungi, primarily from the genera *Ophiostoma* and *Ceratocystis*. These fungi typically invade the sapwood through openings in the bark or through wounds in the tree.
- **Insect vectors:** Blue stain fungi are often introduced into the wood by bark beetles or other boring insects that carry the spores into the tree.
- **Environmental conditions:** Like sap stain fungi, blue stain fungi thrive in warm, moist environments and are most active in freshly cut timber.

2.3. Effects on Wood

- **Aesthetic impact:** Blue staining causes discoloration that ranges from light blue to dark blue or black streaks. The stain typically affects only the sapwood, but it can reduce the wood for decorative or appearance-based applications.
- **Structural impact:** Blue stain fungi do not affect the strength or durability of the wood, but the altered appearance can make the wood less desirable for furniture or finish applications.

2.4. Prevention and Control

- **Insect control:** Preventing insect infestations in standing timber and freshly felled logs can reduce the likelihood of blue stain fungi being introduced.
- **Rapid debarking:** Removing the bark from red pine logs can reduce the entry points for both insects and fungi.
- **Proper drying and storage:** Kiln drying or air drying the wood promptly after felling will minimize the risk of blue stain development.
- **Fungicidal treatments:** Similar to sap stain prevention, fungicidal applications can help inhibit the growth of blue stain fungi.
- **Kiln Drying:** See section 1.4

3. Conclusion

Though we respect all processes above, some Sap and Blue staining will be found in our product backer. With kiln drying all the red pine to between 7-9 % moisture content, we can ensure that no active fungi are allowed in our products. Like all natural products, moisture can cause fungal growth if normal living conditions are not respected. **Temperature: 60-80°F (15-27°C), Relative Humidity (RH): approx. 35-55%**

For any further questions on this subject, please contact your local sales representatives, Preverco authorized dealer or write us an email to preverco@preverco.com

Your PREVERCO technical team