

Discoloration

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What is bluestain?

This is a common wood discolouration in softwoods, especially pines giving the sapwood characteristic blue streaks and blotches on the end grain. Bluestain is caused by a type of fungus that metabolizes soluble starches in sapwood but does not decay the wood causing it to lose its structural integrity and strength. Bluestain occurs only in the sapwood, which is the outer part of the tree, closest to the bark – this is why a piece of lumber may be stained only in a very distinct section of the wood. Bluestain fungi are usually carried by forest insects, mainly bark beetles. These are common in the forest and in areas where logs are stored. When the insects land on logs that have damaged bark, or when they attack standing trees or logs with bark still on, the fungi can germinate and grow into the sapwood. While the fungi penetrate deep into the sapwood, the bark beetles do not. In addition, the beetles are no longer present in finished products as the bark is removed during processing.

Some people mistakenly confuse bluestain with mould. Under the microscope you would see that the stain is caused by dark coloured threads of fungus growing in part of the wood tissue. The threads are found mainly in the horizontal “ray” cells that the tree uses for storage of nutrients. The fungus is so intensely coloured that it makes the whole of the wood which it has colonised appear blue/grey, even though only a few fungal threads may be present.

Will bluestain growth spread to other pieces of wood?

Bluestain can only spread to other pieces of wood if the fungus is actively growing, which is not the case in kiln dried lumber. In order to spread it must be alive in wet wood and in prolonged contact with another piece of wet sapwood. By the time a stained log reaches the sawmill the bulk of the fungus is often already dead. When the fungal threads have used up the food resource (sugars, starches and other tree nutrients) in the specific cells they have colonised, the fungus dies back. Any live fungi remaining are killed during the kiln drying process. Canadian dimension lumber that has been kiln-dried for overseas shipping bears a stamp with the initials HT (heat-treated) or has paperwork to say it has been heat-treated. The HT stamp indicates that the wood has been heated internally to the international standard of **56°C for at least 30 minutes**. This temperature kills organisms, such as fungi and insects, that can sometimes be found in wood. As for the stain itself, the pigmentation is permanent and fixed in place – it will not spread further under any circumstances, including wetting.

Is bluestain rot or mold?

No. Bluestain fungi are harmless. Decay fungi cause rot because they have the ability to digest the wood fibres and thus weaken the wood. Bluestain fungi do not attack wood itself but live on nutrients stored in a small proportion of wood cells. Mold is a multicolored, woolly surface growth with spores that readily become airborne. It can easily be removed and also doesn't harm the wood.

Does bluestained wood affect my health?

No. Bluestain fungi have not been associated with any human health problems in medical literature. The fungi do not readily become airborne and therefore cannot affect indoor air quality.

Is bluestained wood weak?

No. Tests done at FPInnovations and other research laboratories have demonstrated that there is no practical difference in strength between bluestained and non-bluestained pine. Bluestained wood is commonly used for construction in North America.

Can I use bluestained and non-stained wood interchangeably?

Yes. For construction and other purposes where strength is required you can use either or both. Where appearance is important, bluestained wood may or may not be desirable. Tests show that bluestained wood glues and finishes just as well as nonstained wood if required. The right combination of dark finishes can be used to hide any bluestain.

WHAT IS KNOWN ABOUT THE MOBILITY OF BLUESTAIN FUNGI - ARE THE SPORES AIRBORNE, AND CAN THEY BE GROWN ON OTHER (NON-WOOD) MATERIALS?

The mobility of bluestain fungi is limited, and bluestain fungi are not commonly carried by dry air currents. The majority of bluestain spores are carried by various wood-infesting insects. Spores may be occasionally dislodged by splash droplets, leaving spore clusters airborne for short distances. True bluestain fungi are reported only on wood and plant substrates and in soil.

What is black stain?

Black stain is a type of fungal stain commonly seen on wood exposed outside and finished with a transparent coating. This fungus grows on the surface of the wood resulting in black spots or streaks. Black stain is an appearance problem, but does not affect the strength of the wood.



Fungal black stain on a wood bench finished with a transparent coating

What is iron stain?

Iron stain is typically a black or grey discoloration on wood caused by the reaction of elemental iron and phenolic chemicals in the wood. Common sources of iron include corroded fastenings, mild steel rollers or nails, steel brackets and bracing in contact with the wood, metal particles from grinding, or rail car brakes. It is largely a surface stain and does not affect the strength of the wood.