

## Technical Tip

# Effects of pH on Bare Wood Surfaces

Over the past few years we've developed a lot of information about the importance of pH as it relates to preparing a home for the application of a finish. Following are some of the reasons why pH is important and the consequences of bare wood being either too high or too low in pH and its impact on the appearance and performance of our finish systems.

Wood has a natural pH of between 4 and 5. Any pH number lower than 7 is acidic and those above 7 are alkaline so a pH of 4 to 5 is slightly acidic. That's because all wood contains some acidic components like tannic acid. However, most cleaning products like bleach, TSP (trisodium phosphate) and detergents have a high pH (alkaline or basic). Whenever something that is acidic comes in contact with something alkaline and water is present one thing that is certain is that a chemical reaction will occur. If we are dealing with only two or three inorganic compounds the reactions are fairly predictable but wood consists of a multitude of organic compounds which differ from species to species. Even within individual species the chemistry may be influenced by the nutrients in the soil where the tree was grown or it may vary from heartwood to sapwood in the same log. In other words, whenever the surface of wood is exposed to a substance with a high pH something is going to happen and it may not always be predictable.

From prior experience we do know a few of the risks associated with the use of some types of high pH products like chlorine bleach and caustic strippers. Disregarding the damage that bleach can cause to the wood fibers one of the consequences of using bleach solutions is that if not completely rinsed off the wood bleach solutions brings tannins to the surface and once there the tannins can react with microscopic particles of metal creating dark iron tannate discolorations. The most distressing aspect of this reaction is that the discolorations may not become visible for several months and the only way to remove them is to strip the finish off and treat the bare wood with Oxcon.



*Iron tannate stains that appeared several months after the finish was applied. You can easily see where the bleach and water cleaning solution was inadequately rinsed.*

Another consequence of using high pH products is that they occasionally darken the wood. This can even happen when using our Wood ReNew which usually acts as a brightening agent. Again the problem is that it's impossible to predict if a solution of Wood ReNew going to make the wood lighter or darker. That's why we always recommend first testing any product we sell on a small area of the home. Although it may work as expected 98% of the time, it's that 2% that ends up costing both time and money.



One of the fallacies of using acidic solutions on wood is that they help “neutralize” any residue remaining after the use of an alkaline cleaner or stripper. Chemically it may be true that the application of an acid will reduce the alkalinity of the wood but is this in fact always beneficial to the cleaning process? The answer is no. The reaction between an acid and a base always results in the formation of a salt. In some cases the salt is water soluble and can be removed with washing but in other cases the salt can be quite insoluble and ends up being deposited within the wood's cellular structure where it can create adhesion or other problems with the finish. This is especially true with oxalic acid (Oxcon) which should never be used as a neutralizer to compensate for inadequate rinsing. The formation of oxalic acid crystals or sodium oxalates within the surface layer of wood will have a significant impact on long term adhesion and several peeling problems that have come to our attention have been the result of using too high a concentration of oxalic acid or inadequate rinsing.

Attempting to balance the pH of a wall by using chemicals usually results in compounding the problem and although the wall may look acceptable at the time the finish is applied, discolorations or failure of adhesion may occur weeks or even months later. The bottom line is that NOTHING can replace adequate rinsing with clean water after the use of any type of chemical cleaner or finish remover.

So what constitutes adequate rinsing? Typically we recommend rinsing a wall until you think it's enough and then rinse it again. When using a garden hose or pressure washer we are talking about rinsing a wall for at least 10 to 15 minutes. It's impossible to over-rinse. Of course the best method of determining if a wall is adequately rinsed is by using pH strips. If a few drips on a well rinsed wall read between 6.5 and 7.5 you can pretty well be assured that the wall is adequately rinsed.

#### Some helpful tips about pH

- Avoid the use of caustic strippers (sodium & potassium hydroxide) as well as chlorine bleach solutions.
- Never use oxalic acid (Oxcon) or even Log Wash as “neutralizers” on wood surfaces. They should only be used for the purposes they were designed for.
- Always test a small area with the product you are going to use before you apply it to an entire wall.
- If one cleaning product has been applied to a wall, never apply a different one without first completely rinsing the first one off. This is especially important whenever discolorations begin to appear during the cleaning process.
- Oxalic acid (Oxcon) should only be used when it's needed (iron tannate stains or as a blanding agent on dark, discolored walls). Oxcon is not a cleaner and won't remove grayed oxidized wood.
- Always rinse a wall with lots of clean water after the use of any cleaning or finish removing product.