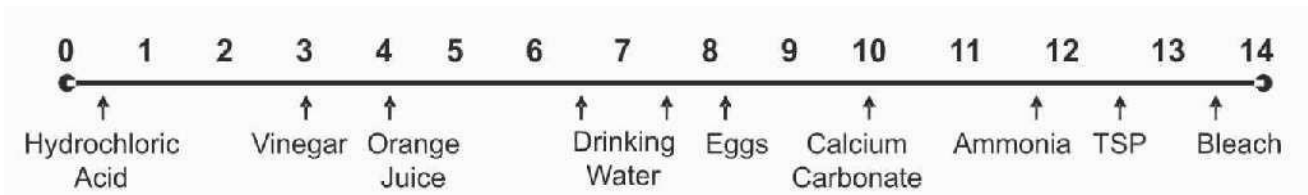


### pH

Many of our technical literature mention pH as it relates to its importance on preparing a home for the application of a finish. This technical tip discusses some of the reasons why pH is important and the consequences of bare wood being either too high or too low in pH.

pH measures the alkalinity or acidity of an aqueous solution on a scale of 1 to 14. A value of 7 represents neutrality, values less than 7 indicate increasing acidity and those above 7, increasing alkalinity. A pH scale containing some common substances is shown below.

The pH of a solid material can not be measured directly. Measurements are made by breaking up the material and mixing in distilled water. Any component that is water soluble will dissolve in the water thus affecting the pH.



Most wood species are acidic, having a pH of between four and six. That is because all wood contains acidic components such as tannic acid. However, as shown above, cleaning products like bleach, and TSP (trisodium phosphate) have a high pH (alkaline or basic). Whenever an acidic compound encounters a base, a chemical reaction occurs. If there are only two compounds, the reaction is predictable, but wood consists of a multitude of organic compounds which differ from species to species. Even within individual species the chemistry can be influenced by environmental factors.

A list of Perma-Chink's cleaning and stripping products along with their pH values are given below. Chemistry reveals that products with extreme pHs are going to have an impact on bare wood. The more extreme, the more of an impact it will have.

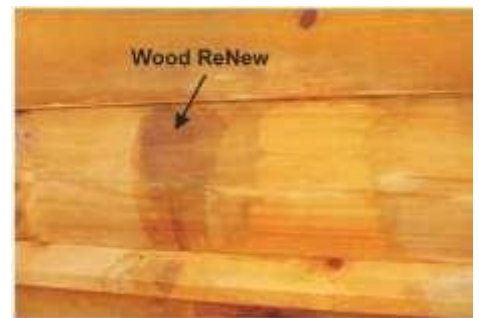
Product	pH
S-100	12 – 13
Wood ReNew (in solution)	10 – 11
Striplt	7.0
Log Wash (diluted)	4 – 5
Cedar Wash (RTU)	10 - 11
Oxcon (diluted)	1.5 – 2.5

From prior experience we do know that some high pH products can damage wood fibers. Caustic cleaners as well as all other cleaners must be completely removed before applying a finish. Water-based cleaners can facilitate the migration of tannins to the surface of the wood. Once there, the tannic acid can react with microscopic iron particles generating an iron-tannate complex that causes discoloration on the wood. 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 off the finish 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 happen when using our Wood ReNew, which usually acts as a brightening agent. Again, the problem is that it is impossible to predict if a solution of Wood ReNew is going to make the wood lighter or darker. That is why we always recommend first testing any product we sell on a small area of the home. Although it may work as expected 99% of the time, it is that 1% that ends up costing both time and money.



Neutralizing a caustic cleaner with an acid instead of completely rinsing off the caustic cleaner can result in other issues. The reaction between an acid and a base 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 insoluble in water. If the salt is not removed from the wood, it can create adhesion and 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 peeling problems. This has come to our attention and was the result of using too high a concentration of oxalic acid or in adequate rinsing of the applied oxalic acid solution.

Attempting to neutralize the pH of a wall by using chemicals usually compounds the problem. 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 is enough and then rinse it again. When using a garden hose or pressure washer we recommend rinsing a wall for at least 15 minutes. It is 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 shows a pH 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 is needed (iron tannate stains or as a blanding agent on dark, discolored walls). Oxcon is not a cleaner and will not remove grayed oxidized wood.
- Always rinse a wall with a lot of clean water after the use of any cleaning or finish removing product.