

The Chemistry of Cleaning

You don't need a degree in chemistry to clean and maintain floors, carpet and fabric. And you don't need to know how to build a car in order to drive one. However, when the car breaks down, it's nice to know a little bit about how it works so you can get it fixed. The same is true when it comes to cleaning solutions. It helps to know a little about them so they can be used safely and efficiently and effectively.

One of the basics to understanding how cleaning solutions work is to understand "pH". pH stands for the Power of Hydrogen or is a range of numbers expressing the relative acidity or alkalinity of a solution. When talking about cleaning chemicals you often hear terms like "Neutral Cleaner" or "Alkaline" or an "Acid Based Cleaner".

The pH scale is numbered from 0 to 14. Pure water is rated as 7 on the pH scale. It is Neutral...it is neither acidic nor alkaline. Any solution that measures higher than 7 on the pH scale is considered to be ALKALINE. Most cleaning solutions that you use on the job and at home are on the alkaline side of the scale. Conversely, any solution that is lower than 7 on the pH scale is ACID. The farther you get away from 7 (Neutral) on the scale the more aggressive the cleaning solution is and the more care must be taken when using it. Solutions whose pH is above 12 (Alkaline) or below 3 (Acid) should be handled and stored with caution, as they are corrosive to many materials like fabric, plastic, metal as well as Flesh.

It is important to note that the pH scale as a "multiplier of 10. If a cleaning solution has a rating of 8, that means it is 10 times more alkaline than pure water which has a rating of 7 (Neutral) on the scale. A cleaning product that is rated an 9 is 10 times more alkaline than one rated a 8...that makes it 100 times more alkaline than pure water that is rated a 7. When you use this multiplying effect a solution rated 14 on the pH scale is 10,000,000 more alkaline than water. The same multiplying principle holds true going down the scale on the acid side.

What does all this have to do with cleaning? Most soils tend to be oily or greasy. Oil and grease has coated dust and particulate soil (grit) and is trapping them on a surface and making it difficult to clean. These oily soils tend to be acid. In order to break them down a cleaning solution that is on the alkaline side of the scale is used. In the simplest terms, the alkalinity "neutralizes" the acidic soil allowing it to be rinsed away.

Most cleaning products will fall between 8.5 and 11 on the pH scale. A "neutral Cleaner" used for daily hard surface floor care is actually less alkaline than some common personal care items like hair shampoo or hand soap and is a lot less aggressive than dish soap or laundry detergents. Neutral cleaners use a number of other chemical elements such as surfactants—Surface Active Agents—that break down the surface tension of liquids in order to work at removing dirt.

When cleaning products whose pH is higher than 11 is used you will begin to see deterioration of floor finish and the finish eventually will be removed entirely. Using bleach or strong disinfectants is a common cause of dull or milky looking floors and sometimes will cause the floors to "powder" and be slippery. Using chemicals with high alkalinity to clean carpet and fabric will deteriorate the fabric and carpet fibers. Carpet that is not thoroughly rinsed and neutralized can develop a brown haze making it appear dirty. High alkalinity will remove stain-blocking agents that are put into carpet fibers at the time of manufacturing.

When using chemical cleaning products it is important to follow the manufacturer's directions.

It takes "**TACT**" to clean!

- Allow the solution to have "Dwell Time". Give it time to loosen up the soil. This is important when stripping a floor to allow the solution time to soften up the old floor finish so it is easier to remove. When cleaning carpet or fabric, pre-spotting is important. Pre-spotting allows the chemical to begin to emulsify oil and grease, again, making cleaning easier and more effective.
- There are no miracle cleaners so don't believe all those TV infomercials. It still requires mechanical action—Elbow Grease—to clean. Often machines and innovative products make it easier.
- Chemical concentration is important. Mix according to the directions. Too little won't work but too much is not better either. Too much chemical can leave a residue, that is sticky and causes re-soiling. The proper amount of water in a solution is necessary to carry the soil in suspension so it can be rinsed away.
- Temperature is an important factor in cleaning. Increased temperature increases chemical activity allowing the cleaning solution to work faster. Boiling hot is not needed or safe, but avoid ice cold if you can. Today's cleaning solutions are designed to work well at lower temperatures.

Finally, two notes about cleaning chemicals and safety:

- It is always better to be too cautious rather than risk serious injury or damage to property. Personnel should be trained on the proper use and disposal of cleaning solutions. Appropriate safety gear ~ Gloves, shoes, aprons, eye/face protection should be used when recommended.
- Don't play chemist by mixing chemicals. Violent chemical reactions can occur and lethal fumes can be created. Some chemicals will negate each other. Disinfectants can cause some cleaners not to work well and the disinfecting agents can be neutralized.

