

## Tip Of The Month

# Robb Gunter's Super Quench

April 1998 Extra  
From Theforge list

Central Virginia Blacksmith Guild

### Super Quench The History



"SUPER QUENCH" was a replacement for a LYE quench which Robb Gunter had been using. OSHA or its Govt Agency inspected his workplace at the lab and unequivocally insisted that he "cease and desist" using the LYE. The LYE quench was a very important part of his operation. (The LYE quench is extremely caustic, and therefore dangerous. Although very effective he does not recommend using one.)

Rob experimented until he found a combination which gave the same results as the LYE quench. Through extensive testing with incredibly high tech equipment that he had available to him at Los Alamos National Lab he was able to determine that the Shacklee Basic I (for industrial) with the other ingredients gave the same results as the LYE. At that point he stopped the testing as he had found the solution to his problem. Needless to say quite a bit of money was spent in attaining this solution. There was no need to continue to spend the time and money on testing other products.

By the way, for those who wonder why does this work. Rob so dumfounded the metallurgists at the lab that they were determined to prove him wrong. Eventually they went under the electron microscope and found that as a result of using "SUPER QUENCH" the crystal structure of the steel had shifted 3 degrees from the normal 90 degrees. And apparently this difference explained the 43+ Rockwell C hardness attained with mild steel in SUPER QUENCH.

### What does Quenching Do?

Quenchants are to extract heat from the work piece at somewhat of a controlled rate. The traditionally meanest, fastest, ugliest quench was sodium hydroxide (lye) in water to the tune of about 10% by weight. Lye is dangerous as it will chew on your skin, eyes and lungs.

The action of the sodium is reportedly to reduce the solubility of air in the water. Less air, more water better quench.

The action of the salt is to deposit itself on the work piece as the water evaporates around the work. The resulting steam blanket is a poor quench medium. The salt that precipitates onto the surface has some water of hydration in it. As it heats, it turns to steam rapidly (I want to say explosively here but it is not an explosion). This burst of steam breaks down the steam blanket surrounding the work and fresh quench is brought to the surface. The process repeats itself until the work is below 212°F. This is the sizzle that you hear. The formation of steam on the surface of the work extracts a most of the heat. The water does not do much until the work is cool enough that you are not making steam. Then the water cools by conduction.

Common salt in water to the tune of 10% by weight works exactly the same way, almost as well and is a lot safer. The old timers say the brine should be strong enough to float a potato. More salt is not better.

Plain water is not a good quenchant as the chemistry of it is variable. Just imagine what has lived or died or fallen into

your slack tub.

Mineral oils can be had in a variety of quench rates. Synthetic quenchants are glycol based and can mirror the mineral oils without the flammability worries. Motor oils are usually too thick to be effective but they can be used in a pinch.

Gunter's Super Quench is an attempt to maximize the quench rate without the hazards of lye. The principles are the same. The major difference is that the SQ contains surfactants and detergents which are wetting agents. It still contains water and salt. The wetting agents probably do the most good as the work cools to below the flash point of water.

## The Formula

**5 gals water**  
**5lbs table salt**  
**32 oz dawn dishwashing liquid (blue)**  
**8oz Shaklee Basic I**  
**(A Wetting Agent)**

**Quench at 1550 F**  
**(Light cherry red)**

**Expect 43 to 45 Rockwell C on 1018 mild steel and low carbon steels**

**Shaklee is available in the Richmond area from:  
Distributor Eddie at  
804-262-3197**