

SCHOOL OF VISUAL PHILOSOPHY

ROCKWELL HARDNESS



INSTRUCTED
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Hugh and Stanley Rockwell came up with a method for measuring the hardness of steel ball bearings, which was patented in 1919. The abbreviated explanation is that their method presses a pointer with measured force into a piece of metal being tested. They were able to measure the depth of penetration and apply a hardness label to it. There are several classifications associated with Rockwell hardness which are differentiated by the materials used as the pointer in the test and the materials being tested. We are only concerned with testing hardened steel, which is denoted as HRC and uses a diamond pointer. To put this in perspective, most blades for chisels and knives are going to be somewhere between HRC-55 to 65, while axes are usually hardened at HRC-45 to 55. Harder materials are denoted with larger numbers. In order to understand the importance of hardness in tool steel we need to explain that there are always corresponding and opposing strengths and weaknesses in steel when it comes to hardness and plasticity. The strength of a hard blade is that it holds a very sharp edge, however the harder steel gets the more brittle it becomes. Soft steels will not be brittle and will have better plasticity but will not keep a sharp edge very well. The trick is to find the balance of hardness and plasticity based on the needs and uses of the tool being made.

Rockwell testing machines are in the thousands of dollars and are not an important tool in the average bladesmith's shop. Most of us do not create our own blooms and manufacture our own steel. Instead we buy specific metal alloys from companies that have already created steel with specified hardness capabilities and very specific heat treatment processes for us to follow based on the alloys of our choosing. It is still nice to have a rough method for testing in our own shops. I have a set of Rockwell files that I use to check my work, and to give me a ball-park idea for scrap metal. The practical use of spark tests and Rockwell files gives me a good enough accuracy. It should be stated that Rockwell files are nothing more than a rough estimate and the more you use the files the less accurate they become due to wear.