

Tyro Tool of the Month - Grit

This month's Tyro tool is "GRIT". I know that is a bit of a "cheat." Since when is "grit" a *tool*? We mayn't think of grit as a tool, but many abrading carving tools certainly rely upon grit to provide their efficacy. Whether we are sharpening our gouges and chisels or sanding a smooth surface for pyrography or painting, grit is fundamental to the chore. Last month's sanding sticks used sanding belts available in different grit sizes. So what exactly is "grit?" For one thing it is confusing, since different folks use it with different numbering systems. So let's demystify *grit*.

"Grit" is defined by Merriam-Webster as:

- 1.** **a :** sand, gravel
 b : a hard sharp granule (as of sand);
 also : material (as many abrasives) composed of such granules
- 2.** **:** any of several sandstones
- 3.** **a :** the structure of a stone that adapts it to grinding
 b : the size of abrasive particles usually expressed as their mesh
- 4.** **:** firmness of mind or spirit : unyielding courage in the face of hardship or danger
- 5.** *capitalized :* a Liberal in Canadian politics

If we leave off the Canadian politician and John Waynesque courage reference (as in True Grit), we are left with a sense of the word's origins. As used most frequently in woodcarving it is a particular reference to the **SIZE** of abrasive particles and is derived from use of a screen mesh of woven wires to sift grains of e.g. sand.

Sand is typically silica SiO_2 . Sandstone is predominantly made of quartz. Like sand quartz is made up of silicon oxides such as SiO_2 or SiO_4 or sometimes silicon oxides with aluminum in its structure or a little calcium carbonate (limestone) to bind it together. From this earthy beginning, the abrasives industry utilizes hard crystals of aluminum oxide Al_2O_3 or silica SiO_2 or silicon carbide SiC (also called carborundum) to make sandpapers and grinding wheels and abrasive stones.

Grit then is merely abrasive hard particles of different sizes. Different materials will have different degrees of hardness. Grit numbers refer to the size only and not the hardness. The hardness relates to the chemical composition of the material and its crystal structure.

CAMI Grit Numbers

The traditional ANSI United States grit numbering system was set by the Coated Abrasive Manufacturers Institute (CAMI), which is now part of the United Abrasives Manufacturers' Association. Historically, a woven wire mesh screen was used to sift particles. Each screen would have a set number of wires per linear inch producing uniformly sized openings. A series of different sized screens were used to sort the particles into size ranges. These sorted particle groups were then designated with a grit size according to a formula set by CAMI. This means that an abrasive having e.g. a 60 grit designation is actually a range of particle sizes all within a set range. The grit number is actually a historical reference correlating to the number of wire lines per linear inch.

FEPA Grit Numbers

In Europe, the Federation of European Producers of Abrasives (FEPA) has its own system which uses two numbers with a "P" prefix letter for coated abrasives e.g. Paper backed abrasives (i.e. sandpaper), and an "F" prefix for bonded abrasives e.g. in stones or wheels.

JIS Numbers

The Japanese Industrial Standard (JIS) is yet another system generally found only on Japanese manufactured materials such as Japanese water stones.

An abrasive without a "P" or "F" prefix is assumed to be a CAMI grit number for a US product. Note: 3M uses both CAMI and FEPA numbering. CAMI is said to have a wider tolerance for sizes than FEPA P, which means e.g. that FEPA grade sandpaper will have a more uniform particle size than a similar CAMI grade sandpaper.

Also, I note that there is much confusion about honing and buffing compounds and their compositions and grit sizes. Some manufacturers claims have been vigorously disputed. For example, green Chromium Oxide honing compounds are often blended with aluminum oxide having much larger grit sizes and the amounts of chromium and aluminum can vary greatly as well, but that probably deserves a separate topic.

So this month's topic has been a bit of a cheat. To make amends here is a grit conversion chart that I hope you find helpful.