

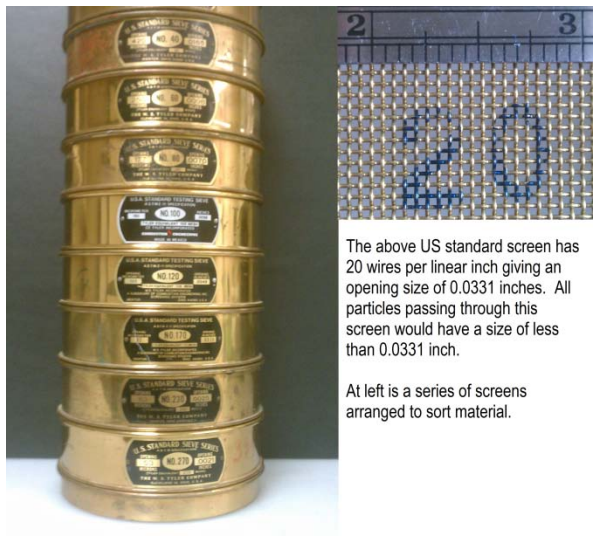


What Does “Grit” Mean?

Tech Talk

October 2012

A variety of different methods and standards are used to describe the aggressiveness of commercial abrasives. Different standards are used for coated abrasives (sand papers) and bonded abrasives (grinding wheels and diamond floor polishing abrasives) as well as specific standards for some specialty abrasive particles like diamond. All of the standards use size as an indication of how aggressive the abrasive particle will be.



The above US standard screen has 20 wires per linear inch giving an opening size of 0.0331 inches. All particles passing through this screen would have a size of less than 0.0331 inch.

At left is a series of screens arranged to sort material.

Where “Grit” comes from:

Before examining grit we need to understand some fundamentals of particle size grading. Historically a sequential series of screens was used to sort particle sizes. Each of these screens has a differing number of wires and openings per inch. As material passes through one screen and is retained on another we can

sort them into size categories. ANSI B74.12 defines the size distribution of particles allowed to be contained in a certain “grit” of abrasive. Grit is therefore not a designation of specific particle size, but a description of a specific distribution of particle sizes.

A Closer Look at “Grit”:

Conventional designation of abrasives by “grit” results in a wide particle size distribution for each grit. For example ANSI B74.12 specifies that to be considered a 100 grit abrasive all the material must pass through a standard 70 screen with a maximum of 20% of the material being retained on a standard 100 screen. This means that up to 20 percent of the material is larger (more coarse) than the standard 100 screen opening while, at least 80% is smaller (finer) than the standard 100 screen opening.

This wide distribution of particle size means that scratch patterns will be inconsistent, with larger particles leaving deeper scratches and finer particles leaving shallow scratches. This varied scratch pattern must be able to be removed by the next abrasive used. This has led to the convention in the stone polishing world that you should never more than double the grit of the previous step when moving on to the next. For example, if we began honing the floor with a 60 grit abrasive, a sample progression would be; 60, 120, 220, 400, 800, 1500, and 3500 abrasive steps.

A better way to think about abrasives:

The most important two factors to consider in an abrasive are the amount of work that will be performed (aggressiveness) and the resulting surface profile



(scratch pattern). Surface profiles can be described by a few simple measurements: Ra = Average scratch depth, Rz = A measure of the uniformity of the scratches, and Rmax = The depth of the deepest scratch.



The scratch pattern above is inconsistent and will have an Rz, and Rmax greater than the scratch pattern shown below.



The more consistent a scratch pattern is after abrading a surface; the easier it is to further refine the surface, allowing for fewer steps to reach the desired outcome.

How does this affect the use of 3M™ Trizact™ Diamond HX Discs?

3M™ Trizact™ Diamond HX Discs are not graded using conventional grit designations. Due to proprietary technologies and manufacturing techniques, Trizact™ abrasives leave very consistent scratch patterns, allowing for maximum efficiency and a reduced number of required steps in the abrasive process. Each 3M™ Trizact™ Diamond HX Disc is able to replace multiple conventional grit designated abrasives. The following chart outlines the conventional abrasives replaced by the use of Trizact discs. Trizact discs are able to do the work of the larger grit listed while leaving a surface profile similar to the finest grit listed.

| Traditional Diamond Discs | 3M™ Trizact™ Diamond HX Discs |
|---|------------------------------------|
| ANSI 60, 80, 100 grit | 3M™ Trizact™ Diamond HX Discs Gold |
| ANSI 100, 120, 180, 220, 240, 320, 400 grit | 3M™ Trizact™ Diamond HX Discs Red |
| ANSI 400, 600, 1000, 1200 grit | 3M™ Trizact™ Diamond HX Discs Blue |

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