



Don't know what type of machine you need for your product? Ask me! I'm one of Glen Mills' Helpful Experts!

	Jaw Crushers	Rotary/Cross Beater Mills	Knife Mills	Ultra Centrifugal Mill	Electric Mortar Grinders	Ball Mills	Dish and Puck Mills	Hammer Mills	Disc Mills
Minerals, rocks, ores, coal, coke	✓	✓		✓	✓	✓	✓	✓	
Chemicals, Pharmaceuticals		✓		✓	✓	✓			✓
Plants, fibrous material, feedstuffs			✓	✓		✓		✓	
Glass, ceramics	✓	✓		✓	✓	✓	✓	✓	
Waste, wood, bones, paper			✓			✓		✓	
Food and food additives, nutraceuticals		✓	✓	✓				✓	✓
Plastic, rubber, polymers			✓	✓			✓		
Grains, corn, cereals	✓		✓			✓		✓	✓

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Also available from Glen Mills:  
**Tech Tips 1** - The 4 methods of dry size reduction  
**Tech Tips 2** - Impact machines  
 Yet to be published:  
**Tech Tips 4** - Wet comminution  
 Please call for your copies!



# Tech Tips 3

**Useful stuff from the helpful experts at Glen Mills**

# Size Reduction through Cutting and Compression

In previous issues we discussed the four types of dry comminuting (size reduction) equipment available to the end user. They are IMPACT, CUTTING, COMPRESSION and ABRASION. Our previous issue focused on IMPACT machines, in this issue we look at CUTTING and COMPRESSION.

## Cutting

### KNIFE MILL

The classic “cutting” action is that shown by the group of machines known universally as KNIFE MILLS. A rotor with multiple cutting edges spins inside a chamber. Fixed to the chamber are stationary knives. Material is fed into the chamber, through a hopper and is sheared and cut between the rotating and stationary knives. The material is processed until it is small enough to fall through a screen at the bottom of the chamber. (Screens are available from 0.25 to 10mm).



KNIFE MILLS are used for many applications involving long or fibrous materials such as plant material or industrial waste. Also friable material such as minerals, food products and plastics can be comminuted successfully to about 200µm (microns, where 1 micron = 0.001mm).

### ULTRA CENTRIFUGAL MILL

In this best selling machine material is fed into the center of a high-speed (14,000 – 18,000 rpm) cutting rotor. The centrifugal action throws the material to the rotor tips where it is cut repeatedly until it is small enough to pass through a 360° screen. The material is collected in a pan that surrounds the screen. Dry ice or liquid nitrogen can be fed in with the material where heat build up might cause the material to smear or blind the screen. Size reduction to 40µm can be achieved with the UCM.



Open Ultra Centrifugal Mill showing rotor and screen. Material collects in pan.

## Compression

### JAW CRUSHER

The easiest way to think of “compression” is to imagine a pair of pliers working on a piece of metal or a nutcracker breaking a walnut. The industrial strength nutcracker is called a JAW CRUSHER, where two jaws (of hardened steel or ceramic) are squeezed together to crush whatever is between them. JAW CRUSHERS range from large, complex machines designed to handle material straight from the quarry, to desktop models designed to handle 1” chunks of ore and rock.

Our biggest “lab-sized” version handles 6” chunks and can produce a final fineness of below 5mm – the desktop unit (our smallest) can easily produce 0.5mm particles. Used mostly for pre-crushing, the material leaving the JAW CRUSHER is then processed further in another machine (such as the Ultra Centrifugal Mill above or another grinder) to make it fine enough for analysis.



**“What do I do if my material is in suspension or I have to process it wet?”**  
**We'll discuss wet comminution in Tech Tips 4, but if you need answers today just call us.**



### TURBULA® SHAKER-MIXER

Perhaps the best dry powder blender in the world with its unique 3-dimensional mixing action. Plus there's no cross-contamination because each sample is mixed in its own closed container.



### ANALYTICAL SIEVE SHAKER

Sieve shaking by hand can be a time consuming pain-in-the-wrist. Using a “conventional” mechanical shaker can be noisier than a pneumatic drill. The alternative from Glen Mills is low noise and is as easy as stacking and pressing the on-button. A patented control system ensures consistent results that can be compared accurately around the world.



### ROTARY SAMPLE DIVIDER

More and more processes require exact sampling to ensure quality and code conformity. Traditional methods of sampling, including scooping and quartering are inherently inaccurate. Rotary sample dividers from Glen Mills provide the most accurate method available for even heterogeneous samples.