

CELL DISRUPTION

for fun and profit!

Whether your needs (and budget!) are for disrupting a single vial of organic material or the continuous disruption of yeast or *E. Coli*, **GLEN MILLS** has a machine to fit the bill:

Shaker-style bead mills

- High Speed Mixer Mills
- Bead Beaters
- Geno/Grinder™

These mills use a violent shaking action, either side-to-side (wrist-like) or up-and-down to produce rapid cell disruption in single 2ml vials, multiple small vials, 96-well titer plates or jars as big as 50ml.



HIGH SPEED MIXER MILL

Ultrasonic Liquid Processors

- Sonicator®
- Sonitube™

A piezoelectric cell vibrating at ultrasonic frequencies creates a rapid mechanical movement of a submerged disruptor. This in turn causes localized cavitation producing huge shear forces, breaking apart even the toughest cell. The Sonicator is a batch machine, while the Sonitube is used in a continuous mode.



SONITUBE

Horizontal bead mills

- Dyno®-Mill

The combination of a high speed rotor with agitator discs and small glass or ceramic grinding media produces hurricane-like forces that will disrupt cells in either small 150ml batches or continuously at flow rates up to 40 liters/hour.



DYNO-MILL MULTILAB

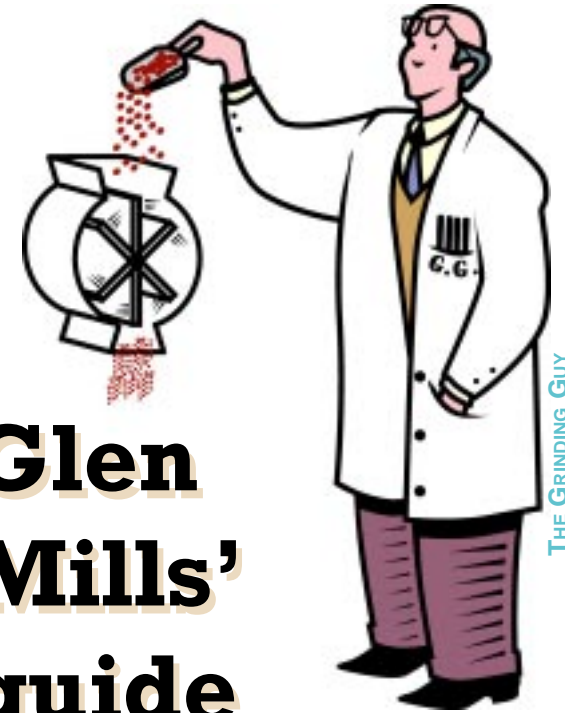
Prsrt Std
U.S.Postage
PAID
Clifton, NJ
Permit No. 910

Glen Mills Inc.
395 Allwood Road
Clifton, NJ 07012
www.glenmills.com

ADDRESS SERVICE REQUESTED

**Please visit our web site for
Tech Tip back issues**

GM71/2003



Glen Mills' guide to size reduction.

- Common terms
- FAQ's
- Choosing the right mill

Tech Tips 8.0



Common Terms

Coarse grind. The classic understanding of a coarse grind was anywhere between an inch and a foot! We think of anything bigger than 1mm as being coarse.

Fine grind. Commonly used to describe between 10-50 microns. Ultra-fine is generally regarded as being single digit microns and below.

Grinding aid. Something added to the material being ground to help with the grinding process. It could be a few drops of a liquid to aid the grinding in a ball mill or some magnesium stearate to prevent caking in a hammer mill.

Grinding media. The generic term given to the material that allows the force of a ball mill to act upon the material to be processed - the “ball” in ball mill or “bead” in bead mill.

Mesh. The actual woven, interlocking fabric in a sieve which is commonly used to designate a particle size. Anything that falls through the mesh is said to be minus (mesh size); anything that stays on top is plus (mesh size). Common standards include ASTM and Tyler (for more details refer to the **Sieving** section on our web site).

Micron. A small measured distance equal to 1/1000th of a millimeter used to describe the particle size of powders. Common bacteria are about 1 micron in size.

Nanometer. A really small measured distance equal to 1/1000th of a micron, 1 billionth of a meter, about 10 atoms placed side by side.

FAQ's

Q. How fine can I grind with one machine?

A. A good rule of thumb to use is to assume that one mill is capable of size reduction in the range of 10-15:1, so one machine might process 50mm chunks down to 5mm but not down to 50 microns (0.05mm).

The other big factor is the behavior of the material itself - some materials will exceed this rule if it is friable; others will quickly reach a size where further reduction is almost impossible without enormous expenditures of energy.

Q. What's the difference between “grinding”, “milling”, “comminuting”, “micronizing”, “atomizing”, “crushing” and “pulverizing”?

A. Not a lot! The words themselves may have different derivations but all refer to the creation of small particles from bigger ones. “Grinding” and “milling” have become virtually interchangeable. The other

words convey a sense of scale; “comminuting”, “micronizing” and “atomizing” normally refer to the creation of micron-sized particles; “pulverizing” and “crushing” are normally used to discuss larger pieces.

Q. When would I use a wet grinding method over a dry grinding method?

A. For a product that will be used wet it makes sense to grind it wet rather than dry it, grind it and wet it again. Wet grinding helps to reduce dust and contamination hazards. Also if very small particles are required (single digit micron and less) wet grinding is one of only a few methods to give consistent results (another option is jet milling).



Cross
Beater Mill
Coarse
grinding

Choosing the right mill

Q. What's the best mill for my application?

A. It all depends....on the characteristics of the material to be ground (is it soft, hard, brittle, fibrous, temperature sensitive, etc.), how fine you need to grind, how much material you need to grind, materials of construction required to minimize contamination, budget considerations and other factors. The reality is that there is NO universal mill that will handle all materials with all the possible size ranges and batch sizes. Some come close, but all have their limitations.

Q. So how do I choose the right mill?

A. You work very closely with the helpful experts from **GLEN MILLS!** They will run trials on one or more mills to assist with the selection process. Before purchase you can rent a mill and run extensive trials in your own lab.

Call **973-777-0777** or e-mail

staff@glenmills.com to discuss your application



Electric Mortar Grinder
Fine grinding

Glen Mills Inc.

Tel: 973-777-0777

Fax: 973-777-0070

www.glenmills.com

staff@glenmills.com