



Finding the Right Solution for Size Reduction

Size reduction is an ancient process, dating back to when grains were crushed and ground to make flour. Today, size reduction equipment still mills harvested materials, but it also processes a wide range of food, chemical, pharmaceutical, and mined materials. Each industry comes with its unique requirements, and each product presents its own challenges. This is where the expertise of SHAPA members comes in—they have the solutions to meet all your size reduction needs.

Most size reduction processes are mechanical. For instance, in mineral grinding, mined products are tumbled with heavy balls or rods, which perform a crushing action—this is the basis of Ball Mills and Rod Mills. Hammer Mills, which use metal hammers spinning at high speeds, are another method for pulverizing minerals or metallic compounds.



For fine grinding in the food, chemical, and pharmaceutical industries, Pin Mills, Disc Mills, and Turbine Mills are commonly used. These mills can grind materials to the consistency of flour or icing sugar and are considered the workhorses of their respective industries. Sieves, sifters, and classifiers are often used alongside these mills to filter out oversized particles, which are then discarded or sent back for further milling.

For ultra-fine grinding down to sub-micron levels, Jet Milling is the preferred method. In Jet Mills, materials are circulated in a high-velocity chamber under compressed gas or steam, reducing size through particle-on-particle collisions or impacts with the chamber walls. The outlet of a Jet Mill is adjustable, ensuring that only particles that meet the required size exit the mill; otherwise, they remain inside for further grinding.

Some materials need special handling. For instance, volatile oils that give spices their flavour can evaporate due to heat generated during grinding. To prevent this, mills are often cooled by circulating chilled air. In cases where the material is potentially explosive (requiring ATEX compliance), inert gases can be used for cooling. Grinding at cryogenic temperatures using liquid nitrogen even makes it possible to mill rubber. Additionally, using a nitrogen blanket can prevent oxidation and preserve aromatic products during milling.

Size reduction is a critical process in many production lines. Having the right equipment for your specific materials is crucial, and SHAPA members are industry leaders in providing optimal solutions.

The SHAPA community offers a full range of grinding and milling equipment. For reliable, cost-effective solutions throughout the lifespan of your process, explore SHAPA's [Equipment Finder](#) or email your inquiry directly to SHAPA at info@shapa.co.uk.

