

**Ultrasonic Vortex Air Mill
FlexiconeVM**



Ultrasonic vortex air mill is a multi-functional multi-purpose tool

Applications:

Ultra-fine grinding dry, wet

Disintegration

Mixing, emulsification and homogenization

Preparation of coal-water and other fuel-water emulsions

Sonochemistry

GRINDED MIXTURE OUTPUT

MATERIAL SUPPLY



AIR or STEAM SUPPLY

Here are some examples of application areas:

- ultra-fine grinding of ores to ensure more complete extraction of valuable metals
- oxidation and opening of refractory sulfide ores during grinding in pulp for maximum extraction of precious metals in hydrometallurgical processes
- use of gold cyanidation in reactors/pachuks for simultaneous air supply, pulp alteration and airlift
- use in chemical processes, where oxidation of solutions with air is necessary
- use in water treatment for coagulation processes of proteins, oxidation and extraction of metals into oxides and hydroxides
- processing of water-oil and coal mixtures in the installation allows them to be increased by 5-7% calorie content, preparation of water-fuel emulsions and suspensions in the installation allows you to increase engine efficiency, improve its operating conditions and ensure more complete fuel combustion
- when comparatively grinding the same clinker in a ball mill and a vortex mill to the same fineness, in the latter case the strength of disintegrated cements is obtained, depending on the composition of the clinker, up to 40% higher
- activation of drilling fluids in the installation makes it possible to increase the drilling speed by 20-25%, reduce the solid phase content in them by 2.0-2.5 times, and reduce drill wear
- preparation of glass mixture and charge in the installation for the production of refractories makes it possible to reduce the melting or firing temperature by more than 200C, double the speed of the process and improve the quality of products
- processing of copper and iron ore concentrates together with binder (CaO) in the installation allows increasing the strength of pellets by 25-35%

- processing of perlite in a perlite installation increases its adsorption capacity several times
- activation in the installation of a nutrient medium for growing microorganisms increases their growth rate by 15-25%
- use in the processes of opening microorganism cells/algae for extracting oils and producing biodiesel.

Advantages of Flexicone VM for mineral enrichment:

1. Increases recovery of micron and fine gold in gravity recovery chains from concentrates and tailings without leaching.
2. Ideal for the hydrometallurgical method of oxidation of sulfide ores and non-cyanide leaching of metals at normal atmospheric pressure and temperature less than 90 degrees.
3. Lowest energy consumption for crushing materials per kg.
4. Powered by air, steam or any gas source.
5. Work in the mode of emulsification of a coal-water mixture with the reduction technology of metal sulfides (Know How Flexicone technology for the direct reduction of metals and sulfur from sulfides)
7. The portable nature of the mill is ideal for field testing, prospecting, laboratory testing, small-scale mining.
8. We recommend using a vortex mill with Flexicone centrifugal concentrators for metal recovery.

TECHNICAL CHARACTERISTICS OF THE MILL

Model	VM 2500	VM150
Air consumption, m3/min	8-20	2-6
Air pressure, bar		6.0-8.0
Air substitute for steam, any gas		
Continuity method		
Aggregate state of the starting material		Liquid-solid, air-solid
Processing time of material in the chamber, s		0.5-1.0
Air consumption per 1 kg of material, m3 / kg		0.5
Raw material particle size, mm		0-10
Fraction yield less than 10 microns,%		80
Productivity, per hour *:		
- dry/pulp, kg	2500	150
Hardness of the processed material		
Mohs scale, 1-9		
Dimensions, cm	20 x 25 x 30	10x12x15
Weight, kg	10	3.5

Note: Maximum productivity is indicated for rock with hardness 1-2, actual productivity may decrease and depends on many factors, mineral hardness, grinding fineness, air flow and pressure

Principle of operation:

Compressed air or steam enters through the air supply tube into the grinding chamber, where vortex air movement with ultrasonic vibrations is created.

The advantage of the proposed method is that in the field of centrifugal forces of the vortex, under the influence of which the dispersed material moves, local areas of high and low pressure are created, resulting in the destruction of material particles to submicron sizes.

Local areas of high and low pressures are created in the volume of the grinding chamber due to the radiation of ultrasonic waves into its cavity. As a result, there is a change in the trajectory of the

particles and their angular velocity, leading to an increase in the frequency of collisions.

The material is fed forcefully (by auger, sand pump, peristaltic pump) through a feed tube into the grinding chamber on the opposite side, where it is crushed to an ultra-fine size when it enters the vortex.

The ground material together with air or the air-pulp mixture is unloaded tangentially through a pipe with a diameter of 50 mm. For dry grinding, it is recommended to use a cyclone dust collector or bag filters.

The working part of the mill is made of stacked rings. The efficiency of grinding depends on the air flow rate. If the air compressor power is insufficient, it is possible to reduce the volume of the grinding chamber by removing the working rings.

In addition, it is possible to use the storage receiver with a portable air compressor intermittently for the VM150 for laboratory purposes.



Note:

The mill was manufactured as an experimental product.

The manufacturer may change the design without notice.

The manufacturer is not responsible for the service life of the grinding chamber.

The mill does not provide self-priming on the material feed line