

# Cyclone Sample Mill -BELT DRIVE

## General Description:

The UDY Cyclone Sample Mill shown below provides rapid grinding of a wide variety of soft to medium-hard materials. It is extensively used in milling grains, feeds, forages, leaves and similar materials prior to near-infrared reflectance (NIR) measurement or chemical analysis. Other applications include small to medium volume milling of: Pharmaceuticals, detergents, fertilizers, plastics, coal, wood chips, and friable materials.



UDY Cyclone Sample Mills use a patented\* method of grinding. The grinding chamber is illustrated in [Figure 2 below](#). High speed rotation of the impeller and air currents throw particles into, and rolls them around the grinding ring. Particles remain in the grinding chamber until impact-shattering and abrasion make them small enough to flow out the exit with the air current. The air flow removes essentially all material and makes clean out unnecessary. The air flow also minimizes heating and therefore eliminates thermal degradation.

The UDY Cyclone Sample Mill is powered by a 3/4 horsepower, totally enclosed induction motor with power transfer and speed step-up to 12,600 rpm using Polyflex belts. The grinding ring has tungsten carbide abrasive particles on a steel base. Ground material is collected in 120 ml glass bottles, fabric bags, or other containers.

\*U.S. Patent No. 3,754,715 and several foreign patents.

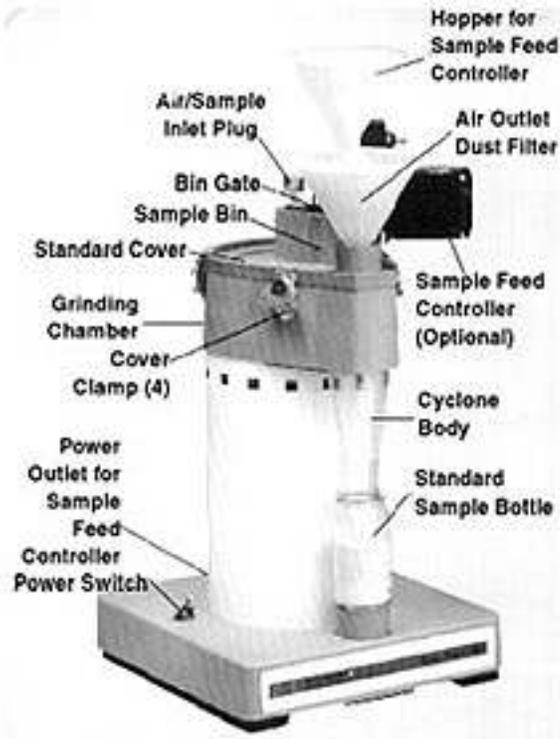
## Specifications:

**Cyclone Sample Mill - Belt Drive:** Dimensions: 26x26x47 cm (10.3"x10.3"x18.5") LxWxH. Carton: 34x34x41 cm (13.5"x13.5"x16") LxWxH. **Net weight:** 14 kg (31 lb) **Shipping weight:** 18 kg (39 lb). Motor: 3/4 hp (1 kw) capacitor start, non-synchronous induction, totally enclosed with cooling fan. Available in 115/230V 50 and 60 Hz power models. Impeller speed: 12,600 rpm with 60 Hz power or 10,400 rpm with 50 Hz. **Accessories included:** 3 collection bottles w/snap cap, 2 hex keys, antistatic solution, 0.5 mm screen, and clean-out brushes.

**Optional Sample Feed Controller:** Net weight: 1.5 kg (3.3 lb). **Shipping weight:** 1.6 kg (4.5 lb). Auger forward and reverse operation at 52 rpm with 60 Hz, or 50 rpm with 50 Hz. Hopper capacity: 250 ml. 13 rpm unit available for whole soybean.

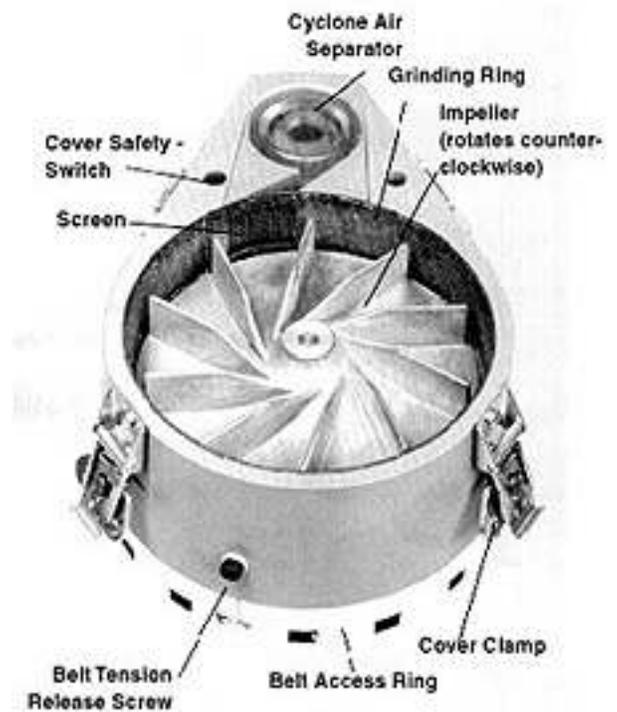
Model numbers, prices, and commonly ordered parts are listed on price sheets. Pricing and specifications are subject to change without notice.

Figure 1. Cyclone Sample Mill with optional Sample Feed Controller



## Grinding Chamber

Figure 2. Cyclone Sample Mill Grinding Chamber



## MATERIALS MILLABLE:

Materials which tend to gum-up and present problems in other dry mills can often be ground in the Cyclone Sample Mill because of its patented grinding action and the low residence time in the grinding chamber. A general guideline is that materials may contain up to 20% oil or 15% moisture. Some materials containing higher levels of moisture or oil can be ground. Marginal cases are substantially aided by use of a vacuum cleaner to increase air flow. This does not result in loss of sample. Since many properties influence grinding characteristics, UDY Corporation personnel should be consulted regarding experience with specific materials. The applications laboratory will be happy to grind test samples and provide recommendations. If samples are corrosive or trace contamination is a concern, UDY personnel should be consulted.



Figure 3. Sample Feed Controller  
(Optional Accessory)

## SAMPLE FEED INTO THE MILL:

Material may be poured slowly into the hopper of the standard Mill Cover where feed into the Mill is somewhat controlled by the bin gate, or the optional Sample Feed Controller, shown in [Figure 3](#), may be used. The Sample Feed Controller uses an auger to feed material into the Mill and is especially recommended when maximum consistency of particle size output is desired, such as for NIR testing. Other benefits include convenience of automatically feeding material into the Mill and elimination of accidental overloading. The maximum initial particle size the Sample Feed Controller can accept is 5 mm (1/4 inch). The feed rate of the Controller varies with the material. When a Sample Feed Controller is purchased along with a Mill, the Mill includes a power outlet controlled by the Mill Power Switch for the Sample Feed Controller.



Figure 4. Forage Cover for  
Cyclone Sample Mill  
(Optional Accessory)

## INITIAL PARTICLE SIZE:

The maximum initial particle size depends on the mass and grinding properties of the material. The standard Mill Cover limits the maximum initial particle dimension to 5 mm (1/4 inch). Low mass materials such as forages, leaves, and wood chips can be introduced in larger initial sizes by using the optional Forage Cover, illustrated in [Figure 4](#). The Forage Cover permits feeding forage core samples directly into the Mill without preliminary grinding.

## PARTICLE SIZE GENERATED:

Because of the unique grinding method of the Cyclone Sample Mill, the particles exiting the mill are very small and are relatively consistent in size. This makes the Mill especially valuable for sample preparation prior to NIR measurement or other applications dependent on particle size.

Figure 5. Cumulative Weight Percent & Particle Size Distribution for several materials ground using a UDY Cyclone Sample Mill with a 1.0 mm screen

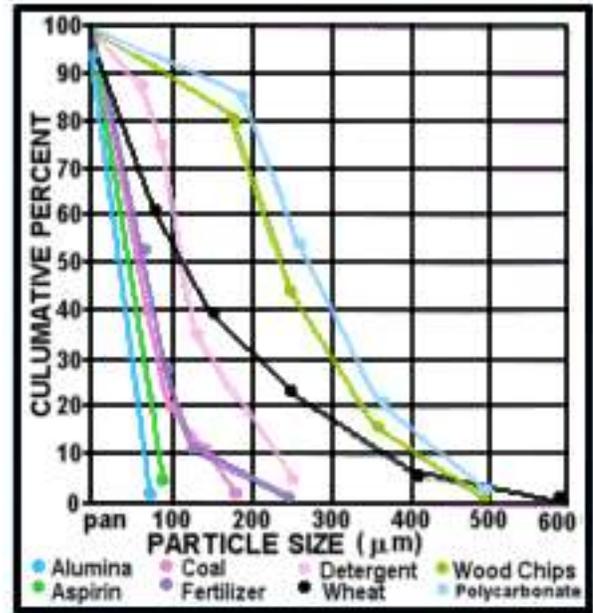


Figure 5 shows typical particle size distribution for wheat\*\*, wood chips, coal, detergent powder, aspirin, alumina, fertilizer, and polycarbonate ground with a 1.0 mm screen in the Cyclone Sample Mill. A screen with 1.0 mm openings is generally recommended, but screens with 2.0, 0.8, 0.5, 0.4 and 0.25 mm openings are also available. The screen covering the air/sample outlet affects the particle size two ways. The screen limits the maximum particle size which can be thrown out by impact with the impeller. Screens with smaller holes also reduce the air flow and, consequently, the size of particles exiting with the air flow.

\*\*Wheat data from *Cereal Chemistry* Vol. 64, No. 1, 1987 pp 46-49.

## GRINDING RATE AND COLLECTION CAPACITY:

The maximum rate material can be ground depends on the material. The rate for wheat and many other materials is about 3 g/second. Standard 120 ml sample bottles hold 30 to 40 grams. Optional collection containers include 500 and 1,000 ml bottles and a Nylon Fabric Collection Bag, shown in Figure 6, which holds 2 to 3 kg of material.

## MAINTENANCE:

The UDY Cyclone Sample Mill is designed for long life. Many Mills have been in use over 15 years. The parts subject to wear are all replaceable. The frequency of replacement depends on the abrasiveness of the material. Guidance for selection of spare parts based on the number and types of samples is available. UDY products have a one year parts and labor warranty.