PAXAA Universal Mill-Unipaxx

Product Catalog

AT A GLANCE

If you looking for a versatile grinding machine which is capable of handling different types of bulk materials the answer to your demand would be the PAXAA Universal Mill, Unipaxx. The mill is designed to be fitted with interchangeable grinding elements to handle a range of soft to medium-hard materials, providing the advantages of customized grinding in one single housing.

HIGHLIGHTS

Unipaxx can be equipped with a host of different milling elements, thus fulfilling a great variety of demands on the end product, for example:

- High fineness with sharp top cut
- Production of end products that are low in fines with good flow properties
- Production of powders with a high bulk density
- Production of powders with a high mass fraction within a defined particle size range

DESCRIPTION

Unipaxx is a form of mechanical impact mill that fractures and reduces particles with high -energy impingement. Called universal because it can be fitted with interchangeable grinding elements, the mill handles a range of feed characteristics and produces final products that meet various particle size requirements. By combining the capabilities of more than one mill in a single housing, Unipaxx provides grinding versatility while conserving capital equipment cost.

- Unipaxx can grind feed materials of up to 3.5 Mohs hardness
- Its applications include pharmaceuticals, chemicals, fertilizers, cosmetics, food products, animal feeds, and mineral powders
- Unipaxx accepts feed materials with an average particle size typically up to 50 mm; a large mill can handle materials up to 100 mm
- The resulting final average particle size can range from fairly coarse to as fine as 20 microns
- To grind heat sensitive materials such as resins, the mill can be equipped with a grinding tool that generates high airflow and a wide housing that enlarges the grinding chamber and dissipates the grinding heat

COMPONENTS

Unipaxx consists of a vertically oriented housing with a large door. Inside the housing, mounted on a motor-driven rotating shaft is a grinding tool, a rotating disk (called a rotor disk) fitted with pins or teeth or a rotating wheel-like rotor fitted with blades or bars.

Various grinding tools are available to grind feeds with particular characteristics and to produce a particular final particle size. Depending on its design, a grinding tool can apply impact, shear, or both to reduce the particles. The PAXAA Universal Mill's grinding elements can be categorized in to three main groups, pin disks, plate beaters, and blast rotors.

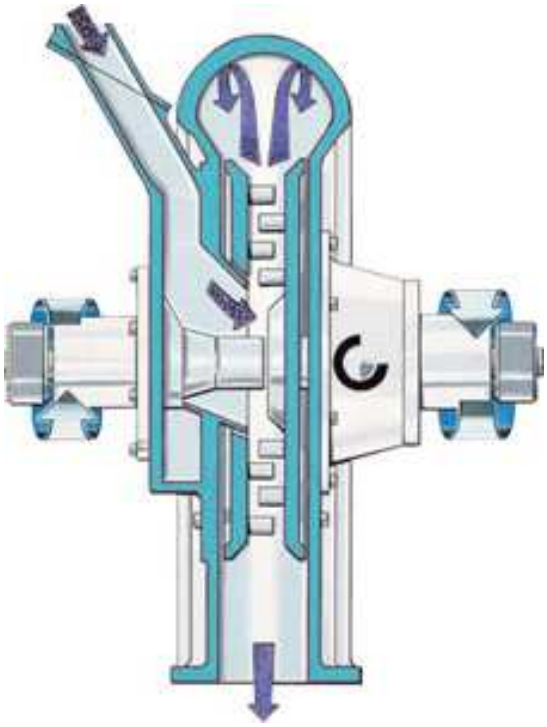
- Unipaxx is available in lab or pilot plan sizes, such as for pharmaceutical production, and in full-scale productions size
- A full-scale Unipaxx size ranges from about 150 to 700 mm (measure refers to the grinding element diameter)
- Grinding capacities can range from a few kilograms to several tons per hour
- The mill's capacity depends directly on factors such as the feed characteristics and the desired final particle size
- Constructions materials for the mill's contact surfaces include carbon steel, hardened steel, cast iron, stainless steel, and sanitary-standard polished stainless steel

OPERATION

The feed flows from a volumetric feeder by gravity through the PAXAA Universal Mill's inlet, which directs the feed into the grinding chamber's center. The grinding tool (or tools) rotates at high speed, creating centrifugal force that accelerates the feed particles outward. The particles high-speed outward flow hurls them against the pins, blades, or other elements at the tool's periphery. The particles' impact with these elements and other particles fractures and reduces them. With disk grinding tools, desired-size particles exit the disk periphery and flow toward the mill's bottom outlet. With other grinding tools, the reduced particles pass through the bars or blades to the stator. After exiting the mill, the particles fall by gravity or are drawn by a pneumatic conveying system to downstream processing or storage.

DESIGN OPTIONS

- Welded housing with either standard or tangential discharge in mild steel or stainless steel for all machine sizes
- Cast housing with standard discharge available
- Explosion-pressure-shock-proof design for a maximum explosion overpressure of 10 bar
- Specific pharmaceutical designs, i.e. polished, monobloc, SIP/CIP, isolator integration
- Bearing unit protected against dust
- Bearing unit with special sealing rings, gas-tight design
- Safety interlock
- Wear-protection elements
- Milling track ejector



MORE ABOUT GRINDING ELEMENTS

Pin discs

- Suitable for dry, crystalline and brittle feeds, such as sugar
- Typically able to achieve a final average particle size of less than 50 microns
- Fineness controlled by the rotor's speed and the number and arrangement of pins
- Using pin mill with both discs rotation for achieving finer final particle size
- best option for drug and food applications because no stator is required
- Extremely high end-product fineness values
- Low energy consumption

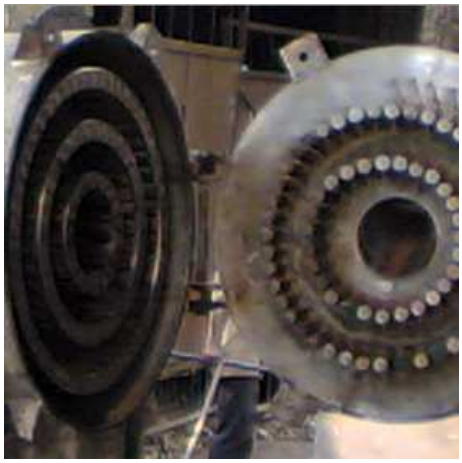


Plate Beater

- Suitable for soft, medium-hard, and some fibrous feeds
- Can achieve final average particle size of less than about 400 microns
- Typical soft feeds include coarse talc and lactose
- medium-hard feeds include glass fibers, toner pregrind, and polyvinyl chloride
- Fibrous feeds include coconut shells, herbs, root drugs, and wood
- Has a series of rigid, replaceable blades around its periphery and is mounted inside a stator
- Is often used with a screen or combination stator for soft to medium-hard feeds
- Is used with a grinding-track stator for medium-hard and fibrous feeds
- The final particle size can be controlled by adjusting the tool's peripheral speed and choosing a particular stator

Blast Rotor

- feeds ranging from brittle to elastic, including most of the materials handled by the other grinding tools
- handles feeds that are slightly abrasive (such as limestone containing minor abrasive component)
- temperature-sensitive feeds (such as resins and powder paints)
- can achieve a final average particle size of less than about 40 microns
- consists of several rigid, replaceable bars or blades mounted inside a pair of rings
- operates like a turbine, generating a large volume of airflow during grinding and quickly dissipating the grinding heat
- mounted inside a screen or combination stator
- the final average particle size can be controlled by adjusting the tool's peripheral speed and choosing a particular stator

Other Grinding Elements

- Various other grinding tools available from different suppliers to grind feeds with particular characteristics
- For feeds with high moisture or fat content
- For extremely soft or fibrous consistency feeds
- To produce a particular final particle size
- Depending on its design, can apply impact, shear, or both to reduce the particles

MILL SELECTION

Base your selection of the PAXAA Universal Mill's components and features, including grinding tools, stators, and construction materials, on your feed and final product requirements. During the selection process, expect to work closely with PAXAA. You may be asked to describe the characteristics of each of your feeds - including the material type, particle size distribution, bulk density, flowability, abrasiveness, temperature sensitivity, moisture or volatile content, and chemical corrosiveness. You'll also need to identify which properties –such as particle size distribution, bulk density, and moisture or volatile content – each of your final products must have.

Considering where the mill will be located in your process is also important. The selected mill components will affect which upstream and downstream equipment, such as feeders and dust collectors, will best suit your grinding process. For instance, if your mill discharges by pneumatic conveying and one of the grinding tools you select is a blast rotor, you need to consider the high airflow volume produced by this grinding tool when sizing the dust collector and related ductwork downstream the mill.

INTERCHANGABILITY, MAIN FEATURE IN UNIPAXX

The PAXAA Universal Mill's grinding tools can be removed and replaced easily and quickly. The time required to change the tools depends on the mill size: A 150 mm mill's grinding tool can be changed in a matter of a few minutes, and a 300 mm mill's tool takes about 30 minutes. Because handing the tools for larger mills typically requires lifting equipment, tool changes for larger mills can take somewhat longer.

MAINTENANCE

Regular preventive maintenance will keep the Unipaxx running smoothly. A critical maintenance step is inspecting the grinding tools and stators for wear. A screen stator can require more frequent inspection because it's subject to blinding and breakage. Rapid tool or stator wear can indicate a feed problem, such as overfeeding due to improperly selected feeder.

APPLICATION OVERVIEW

PAXAA Universal Mills can be employed for a multitude of different products and applications – even under extreme conditions. Typical application areas and materials are:

CHEMICALS INDUSTRY

Fertilisers, pesticides, paints and pigments; general chemicals such as solid acids, salts, silicates, wax, resins, carbon black, stearates, sulphates, phosphates, etc.

PHARMACEUTICALS INDUSTRY

Besides antibiotics, especially suitable for natural products such as herbal teas, roots, senna pods, hibiscus, sage, rose hips, raspberry and blackberry leaves, camomile, etc.

HERBS AND SPICES INDUSTRY

Savoury, rosemary, celandine, saffron, celery, onions, pepperwort, parsley, turmeric, etc.

FOOD AND CONFECTIONERY INDUSTRY

Bakery product rejects, oat flakes, potato flakes, casein, baby food, skimmed milk powder, cake mix flours, dried fruits, pasta rejects, mushrooms, sugar, starch, gelatin and pectin, flavouring agents, food colourings, etc.

ANIMAL FEED INDUSTRY

Soy flour, freeze-dried meat, corn cobs, pea pods, pea fibre, extruded cereal such as barley, rye and wheat, draff, pomace and marc, molasses, clay, pulp and sugar beet parings, etc.

MINERAL POWDER INDUSTRY

Gypsum, limestone, kieselguhr, expanded perlite, etc.

PLASTICS INDUSTRY

Fine milling of polyamides, PVC, PTFE, PE, etc. under normal temperatures or in cryogenic mode.

CRYOGENIC MILLING SYSTEMS

Some materials are not easy to grind because they are tough and elastic. Amongst these are thermoplastics, elastomers, waxes, paint additives and even some metals. Over and above this, the risk of oxidation and even dust explosion is always present. Cryogenic milling eliminates these problems. The feed material is cooled down to the glass transition temperature with super cooled liquid nitrogen or carbon dioxide and is thus embrittled. This is necessary because of the elastic-viscous characteristic of some products. The requisite amount of energy needed to reach the point of fracture is of prime importance. If the requisite stress at break of a brittle material is above that of an elastic material, the amount of comminution energy needed is nevertheless much lower. In practice, this means that if elastic materials are embrittled using super cooled liquid nitrogen LN2 or dry ice (CO2), impact mills can achieve throughputs that are two to three times higher than normal as well as high particle fineness values.

With cryogenic milling, it is possible to comminute plastics and rubber granules, etc. to fine, free-flowing powders. Typical materials are: polyamide, hot melt adhesives, PVC, polyester, caoutchouc and rubber, etc. In the foodstuffs industry, cryogenic milling is used above all to grind spices. It is possible with cryogenic milling to improve the aroma by reducing the loss of essential oils (approx.3 to 10% loss) in comparison to milling at ambient temperature (approx. 15 to 43%loss).

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