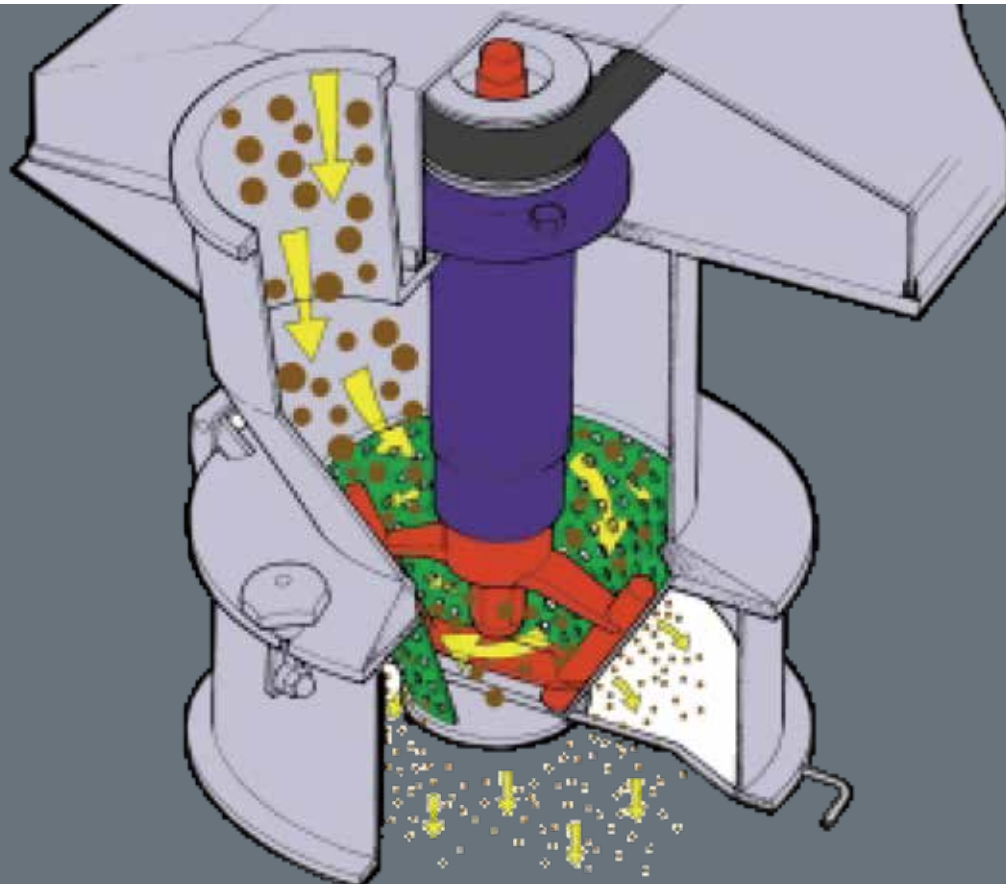


# Cone Mills

Low  
energy size  
reduction  
for a wide  
range of  
materials &  
applications





# Cone milling concept

Cone milling is a low energy size reduction concept ideal for fatty, heat sensitive, sticky, moist or other difficult to grind products. It alleviates the noise, dust and heat problems associated with traditional milling techniques.

A gentle grinding action maintains a close particle size distribution with minimal fines generation.

Because the time required to process product is very short, heat generation is negligible, and build up is drastically reduced – even for moist or sticky products.

## Operation

Material to be processed is gravity fed into the milling chamber. The low velocity grinding rotor forces the process material into a vortex flow path. The individual particles of unground product are centrifugally thrown out to the wall of the conical grinding chamber against which they then rise in a spiralling path. The action of the rotor against the grinding chamber wall imparts high shear on the product. A very large percentage of product is reduced to below the cone aperture size on initial impact, which is instantaneously discharged into the mill discharge chute. The chute is designed to give maximum free space to exiting material, thus preventing the possibility of product build up.

A small percentage of larger unground particles continue their path up the conical wall within the product vortex undergoing further size reduction in the process. The very largest particles may eventually reach the top of the vortex where they re-enter the in-feedstream to repeat the cycle.

## Benefits:

- » High efficiency – virtually all the energy input is utilized in the size reduction process
- » Gentle grinding action – permits uniform size distribution, resulting in the minimum of fines
- » Low heat generation – essential when milling fatty, sticky or heat sensitive products
- » Low dust levels – no need for air filtration



## Ultra-hygienic designs

Cleanability was a high priority during the design of the cone mills. Generous radii, large accessible gaps between components, stainless steel support frames and cast mounting blocks for fittings, all contribute to maximizing equipment hygiene.

All models can be cleaned with high pressure hoses. Electric interlocks are housed in enclosures or beneath the covers they protect. Access covers and motor shrouds are sealed with easy to remove 'U' section silicone seals.

Constructed from 316L stainless steel, the cone mills are available in a variety of finishes including bead blast, crack and crevice free welds and mirror polished finishes.

The bearing housings are critical components in all mills. All Kemutec bearing housings are bench run-in before final assembly into the mill and are designed to run under fully submersed conditions. Provision is included for air-purging where required.

### **High Integrity Grinding Media**

Each cone is formed from a pre-punched profile, totally eliminating all part or blind apertures. Complex fixing flanges and cone caps have been eliminated, ensuring that cones are easy to remove, handle, clean and replace. The rotors are single piece components, which can be bead blast or mirror polish-finished as required.

### **Innovative Cone Retention**

Changing cones could not be easier. Captive swing bolts release the hinged milling chamber which swings down complete with the cone allowing it to be simply lifted out and replaced.

Much of the appeal for cone mills is the flexibility of the grinding media - which can be changed easily, quickly and safely, with minimum of disruption to production. Another innovation is the easily adjusted rotor cone clearance. The retaining nut is simply loosened so that the rotor can be turned to another position.

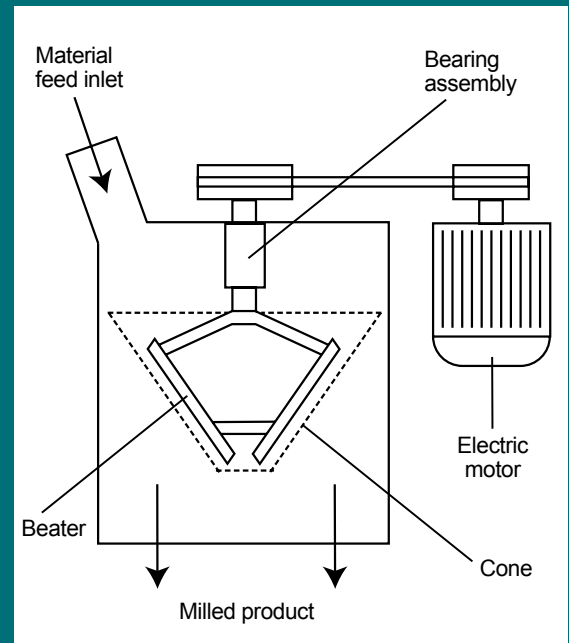


## The range

Kemutec manufactures a wide range of cone mills from the worktop mounted Model 75 through to the Model 680 capable of a process rate up to 10 tph. Although Kemutec offers a comprehensive range of standard design machines, each model in the range is capable of being customized to suit each customers' individual requirements.

### Customizing Options - Drives

Over the years Kemutec's extensive applications experience and technical know-how has resulted in an ability to respond to the ever changing needs of its customers, resulting in a comprehensive range of drive options from which we select the most appropriate for your specific requirements.



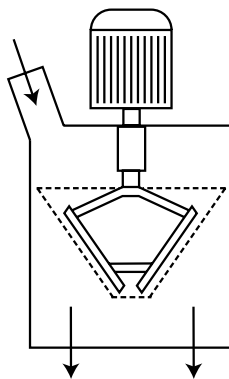
#### Top Driven Belt Drive

- » The standard for hopper feed installations
- » Offers the option of speed change via pulley sets
- » The most versatile arrangement with a side door swing away discharge chute

Model	Cone Diameter	Use	Top Driven Direct Drive	Top Driven Belt Drive	Under Driven Direct Drive	Top Driven Belt Drive	In-line	Grinding Module Only
75	75mm	Lab	•					
120	120mm	Lab Pilot	•					
170	170mm	Pilot Production	•	•	•	•	•	•
220	220mm	Pilot Production	•	•	•	•	•	•
340	340mm	Production	•	•	•	•	•	•
540	540mm	Production	•	•	•	•	•	•
680	680mm	Production	•	•	•	•	•	•
800	800mm	Production	•	•	•	•	•	•

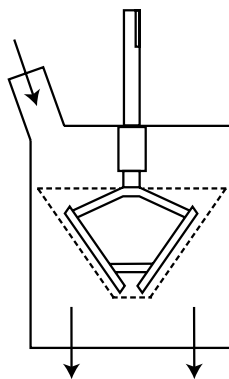


## Drives



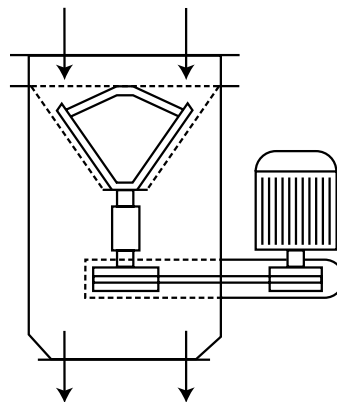
### Top driven direct drive

- » An alternative for hopper feed installations
- » Compact
- » High torque, slow speed applications



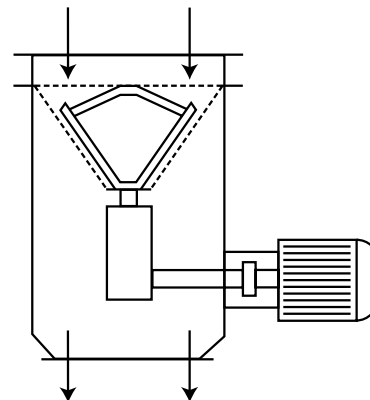
### Top driven module

- » Bare shaft
- » For connection to customers power units
- » Ideal for fitting directly to the outlet of a dryer



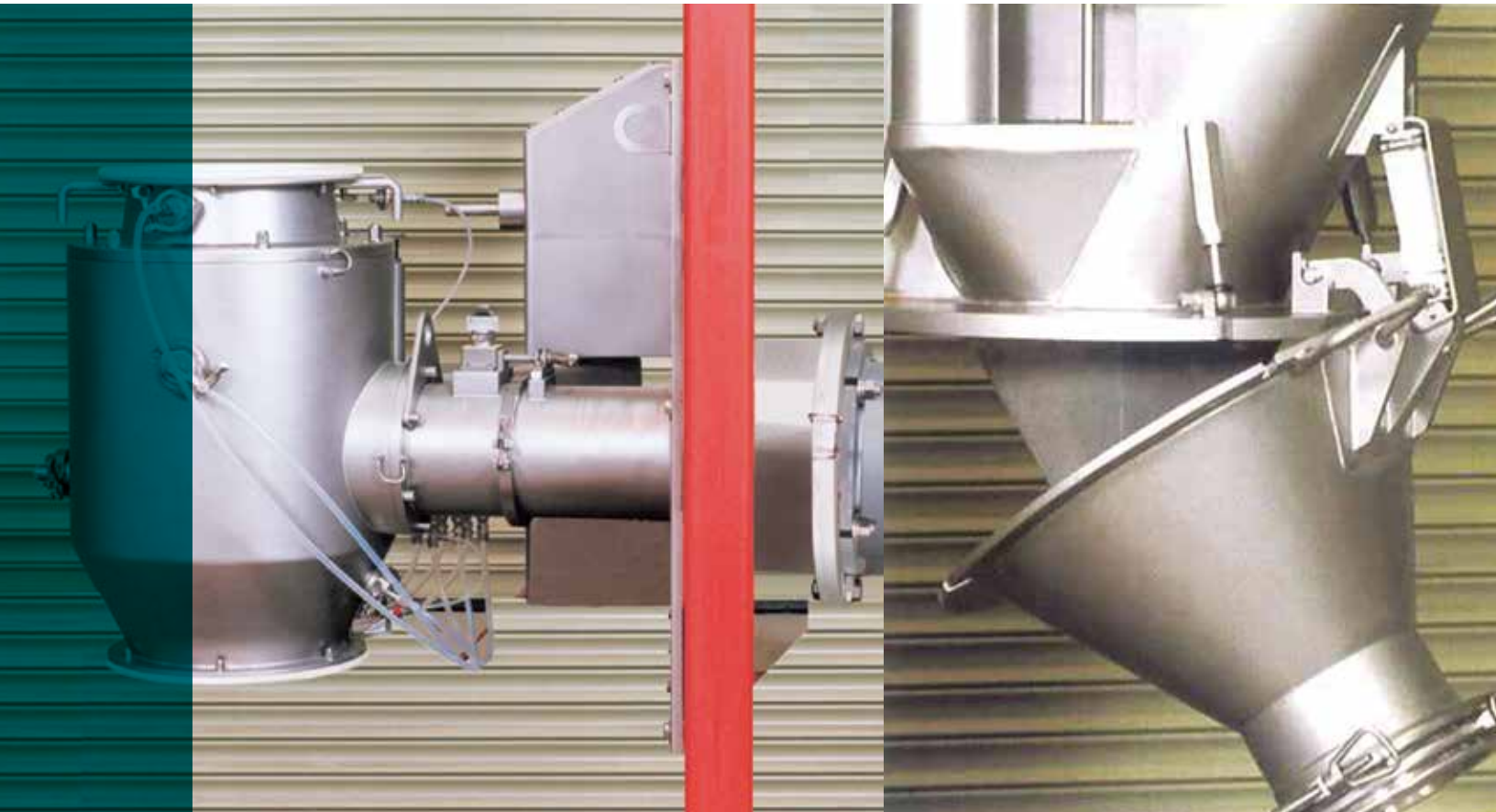
### In-line under-driven belt drive

- » No drive shaft to restrict inlet
- » Accepts larger feed stock
- » High speed grinding action, ideal for dry granulation



### In-line under-driven direct drive

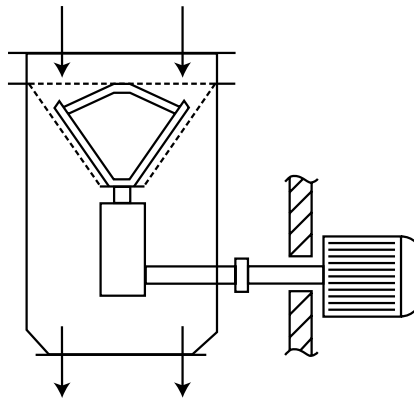
- » No drive shaft to restrict inlet
- » Accepts larger feed stock
- » Slower speed grinding action, ideal for wet granulation



## The range

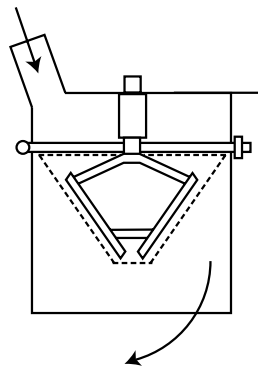
### Remote location in-line under-driven direct drive

- » As with the In-Line Under-Driven Direct Drive, except that the drive is located separately from the milling chamber
- » Ideal for clean room operation
- » A practical solution for explosive environments



### Swing away discharge chute

- » Top drives only
- » Easy cleaning
- » Rapid cone changes
- » Easy rotor clearance adjustment
- » Ideal for mobile machines and bagging-off applications

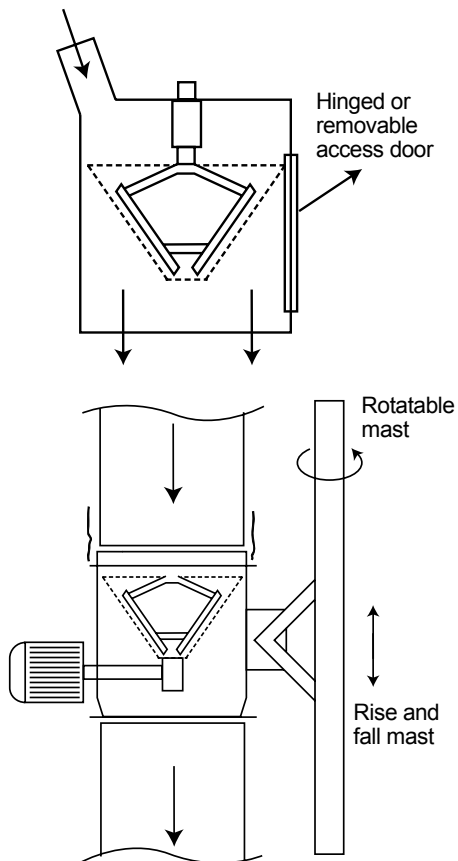


### Customizing Options – Milling Chamber Housing

Through extensive applications experience, Kemutec has developed key construction options to satisfy individual process, operational cleaning and installation requirements.



## The range



### Side access discharge chute

- » Hinged or removable access door on discharge chute
- » Discharge chute is accessible for easy cleaning
- » The cone can be easily removed or replaced
- » The rotor is easily accessible for adjustment
- » Ideal for fixed or in-line installations

### Pull through cone mills

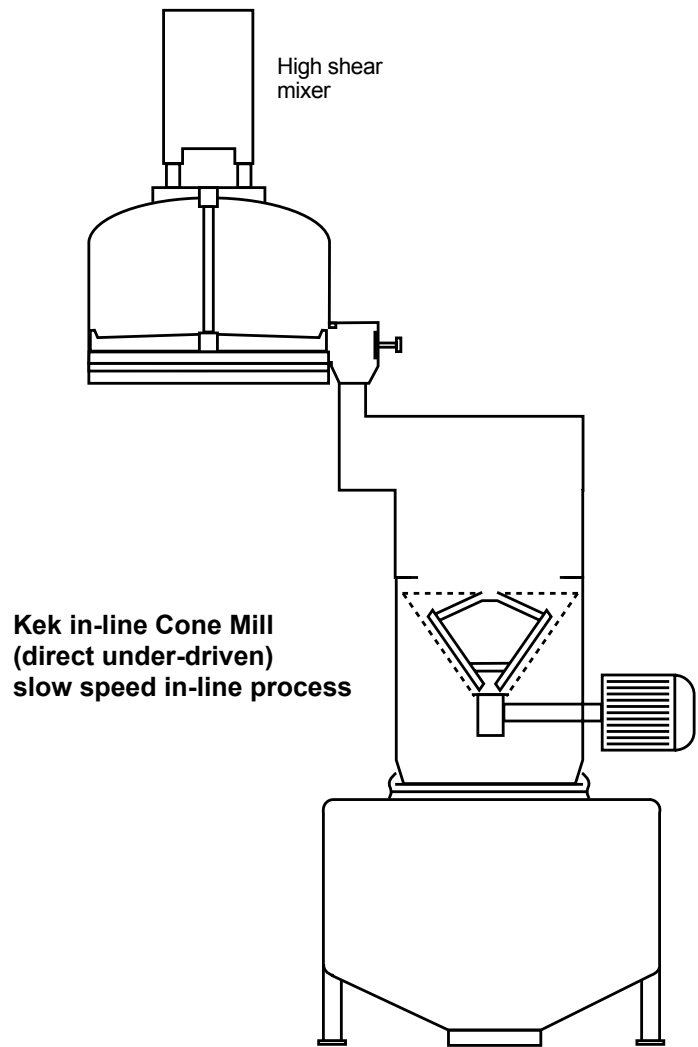
- » In-line vacuum conveying systems
- » Continuous dust-tight operation
- » Less risk of contamination

### Kemutec can also accommodate the following process requirements:

- » Fully mobile cone mills
- » Explosion containment up to 10 bar
- » Explosion suppression systems
- » Fully flushable CIP
- » Spray ball CIP
- » Nitrogen inertion

### Mast mounted cone mills

- » Cone mill can be swung off-line to the side
- » Facilitates raising or lowering of the cone mill for cleaning or grinding media changes
- » Enables cone mill to be replaced by a chute when product does not require processing



# Applications

## Pharmaceutical Wet Granulation

### The Need

To process wet mass product from a high speed mixer and produce small nodules with a large surface area to weight ratio for maximizing the efficiency of the onward drying process.

### The Solution

Kek in-line Cone Mill with under-driven grinding media

### The Benefits

- » Full bore opening provides no restriction to incoming product
- » Sealed gearbox providing hygienic, slow speed drive ideal for wet granulation processes

## Pharmaceutical Dry Granulation

### The Need

To grind or granulate product after the drying process prior to tableting (see Wet Granulation above)

### The Solution

Kek belt drive Cone Mill with over-driven grinding media

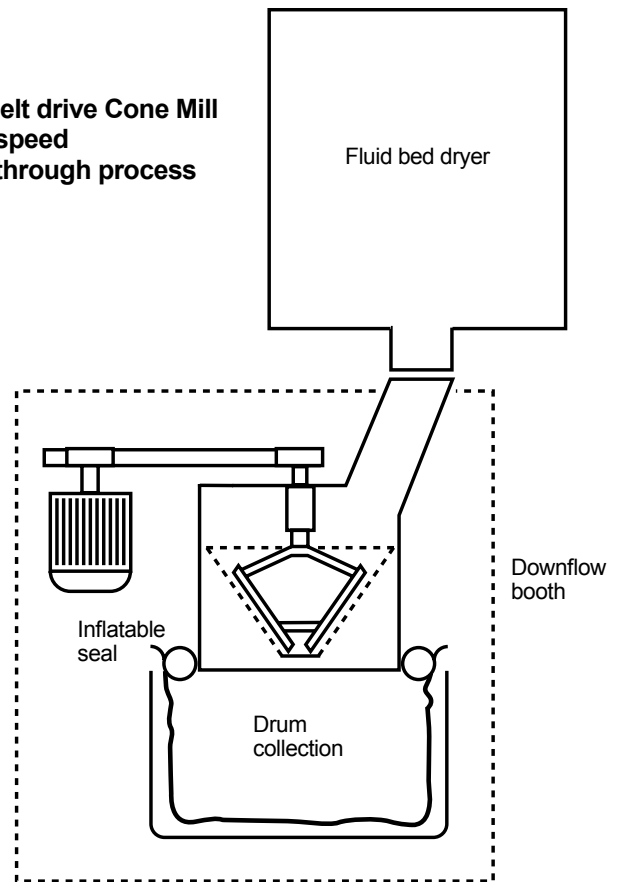
### The Benefits

- » High speed grinding through belt drive to provide high impact milling action
- » Sealed drop through installation – ideal for enclosure within a downflow booth
- » Ideal for mobile machines and bagging-off installations





**Kek belt drive Cone Mill  
High speed  
drop through process**



# Applications

## Confectionery Re-Work

### The Need

To grind reject or scrap product and to recycle back into the original process as a small percentage of the total volume, or to produce material which is the basis of a product in its own right.

### The Solution

Kek belt drive Cone Mill with over-driven grinding media.

### The Benefits

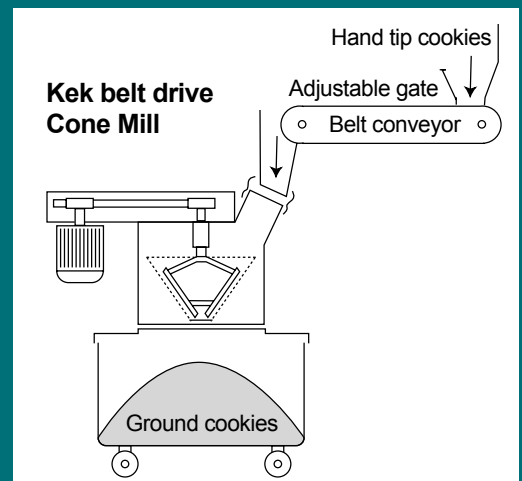
- » In-line dust free operation
- » Low energy, short residence time cone mill action ensures minimal heat transfer into product avoiding fat melt
- » Fine ground product achieved in one pass making it ideal for adding back to the original process

### Other granulation applications

- » Detergent ingredients and tablets
- » Baby food flakes
- » Spice de-agglomeration
- » Graphite
- » Sugar grinding
- » Brown sugar de-agglomeration

## Typical bakery/confectionery re-work applications:

- » Cream cookies
- » Agglomerated boiled sweets
- » Chocolate bars
- » Bread crumbing
- » Rusk milling
- » Cookie grinding for dessert bases





Kek Cone Mills are low energy and versatile mills for the gentle, intermediate grinding and deagglomeration of powders and granules.

# Controlled particle size reduction



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