



Teckru

Classifier Mills for Cocoa



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Introduction

The most versatile mill for fine and ultrafine grinding

Replacing the classic pin mill, the TCM already makes a strong presence in the cocoa industry. It combines milling and classifying in one machine, and is able to consistently reach the powder fineness that the industry demands.

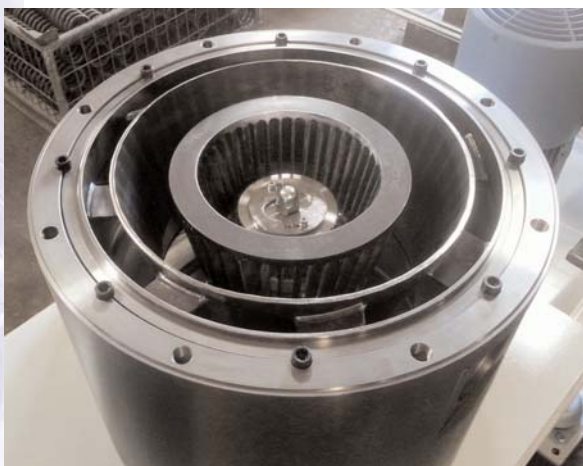
Though Teckru is most knowledgeable in the field of cocoa, this mill is a versatile design proven to be the ideal choice for multiple products:

- Cocoa Powder
- Chemicals
- Food
- Metal
- Powder coating
- Minerals
- Pharmaceuticals

In case of cocoa powder the mill is actually deagglomerating the product: breaking it down to the fineness achieved at an earlier stage, at the liquor grinding section.

Important Features

- Grinding and Classifying in one machine
- Low energy requirements per kg of product, reducing operating costs
- Low temperature increase of the product
- Steep particle size distribution
- Sharp classifier cut point, instantly adjustable
- Easy cleaning and maintenance, high accessibility
- Compact space saving design
- Pressure shock and wear resistant, up to PSR 11 (ATEX)
- Smooth grinding, low noise emission
- Appropriate for combined grinding and drying
- Milling elements made from wear resistant materials



Above; View of the classifier wheel [TCM-500].

Below; The classifier wheel and the shroud ring. In the lower right one can see the profile of the liner. [TCM-1000]

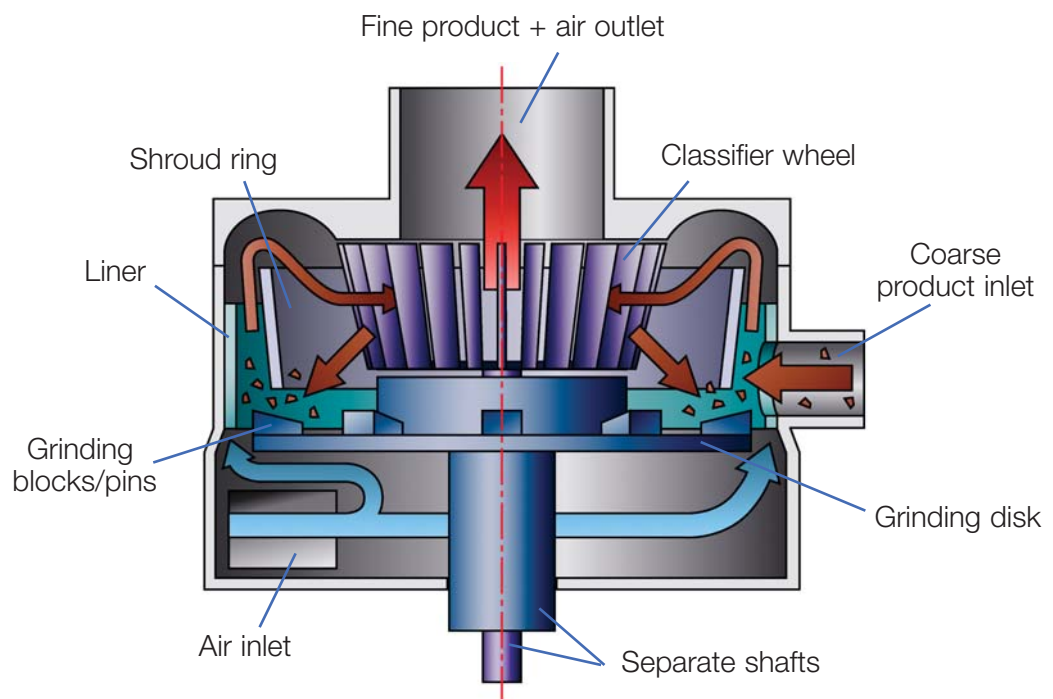


Cover: TCM-500

Classifier Mill operation

Principle of operation

The product is fed into the mill pneumatically. Size reduction takes place by the impact of material particles on the rotating grinding surfaces and on the fixed liner. With a striking edge velocity up to 140 m/s, finenesses of $D_{97} = 10 \mu\text{m}$ are achieved. The cooling, conveying and classifying air is drawn through the mill by the downstream fan, it entrains the metered feed material which then passes the blades of the shroud ring. The characteristic feature of the TCM is the integral dynamic classifier.



The air/product mixture is uniformly distributed by the blades to the rotating classifier. Due to two opposing forces and the different masses of the material particles the separation into coarse and fine fraction is achieved in the classifying section. Those of high mass are thrown away from the wheel by centrifugal force. The rejected particles return to the milling zone. The fine material is carried with the air through the classifier to the outlet connection. The cut point is adjusted by means of the classifier speed and is infinitely variable even during grinding operation.

When both the grinding disk as well as the classifier drive are speed controlled. The speed and consequently, the particle size distribution of final product can be infinitely adjusted during grinding operation.

Grinding tools

For various size reduction tasks and depending on product features optimum equipment is chosen. Type, shape and number of grinding tools influence the grinding results. The following tools are available:

- Grinding blocks, smooth
- Grinding blocks, notched

To fit your requirements

The TCM Series

The flexible TCM Series offer the perfect solution for every application. Three mill capacities are currently available. The TCM number reflects the diameter of the milling chamber. The capacity for low-fat cocoa powder is ranging from about 500 kg/h to 1000 kg/h to 4000 kg/h.

| TCM Mill Size | 500 | 1000 | 1250 |
|------------------------------------|------|------|-------|
| Motor Rotor [kW] | 22 | 45 | 110 |
| Motor Classifier [kW] | 5 | 11 | 18.5 |
| Speed mill Rotor [rpm] | 5000 | 2625 | 2100 |
| Speed Class. max. [rpm] | 2920 | 2650 | 2400 |
| Airflow intake [m ³ /h] | 2700 | 5400 | 13500 |
| Length [mm] | 2000 | 2450 | 2850 |
| Width [mm] | 750 | 1060 | 1200 |
| Height [mm] | 1280 | 1587 | 1731 |
| Weight [kg] | 1500 | 2800 | 4000 |

Standard or additional wear protection

Those grinding chamber parts in contact with the product consisting of the grinding disk, shroud ring, liner and classifier wheel are made of mild steel or stainless steel. The grinding surfaces can be treated and polished as per request. The grinding chamber can also be supplied in pressure shock-resistant design up to 11 bar.

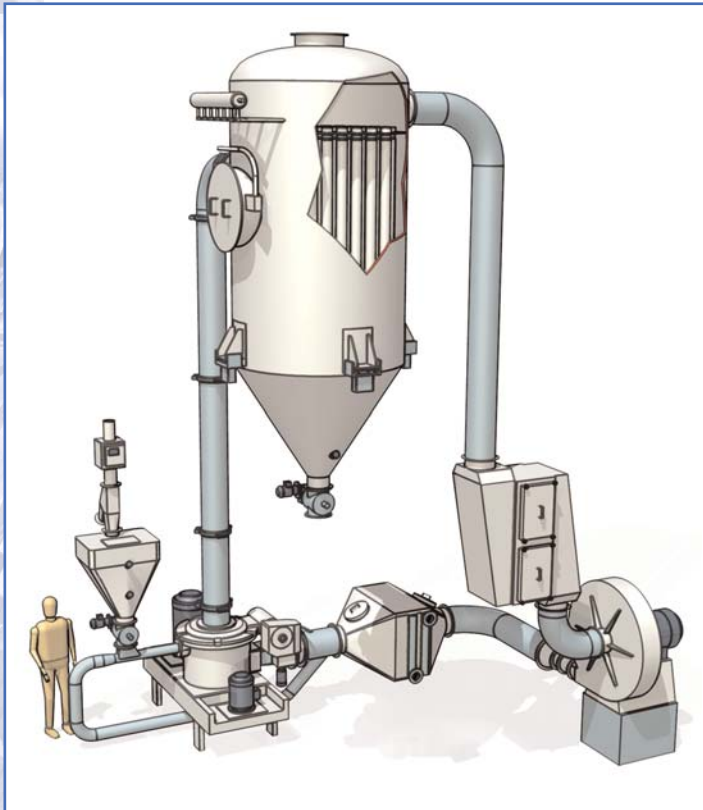
For grinding abrasive products, the grinding surfaces can be protected by the use of wear resistant materials. This wear protection is available for the following mill parts:

- Product inlet
- Grinding disk
- Grinding blocks
- Grinding chamber cover
- Liner
- Grinding pins
- Classifier wheel
- Product outlet

For each application we work out a special wearing protection concept, whereby numerous special materials are at disposal:

- Nodular graphite iron
- Hardox®
- Hard metal

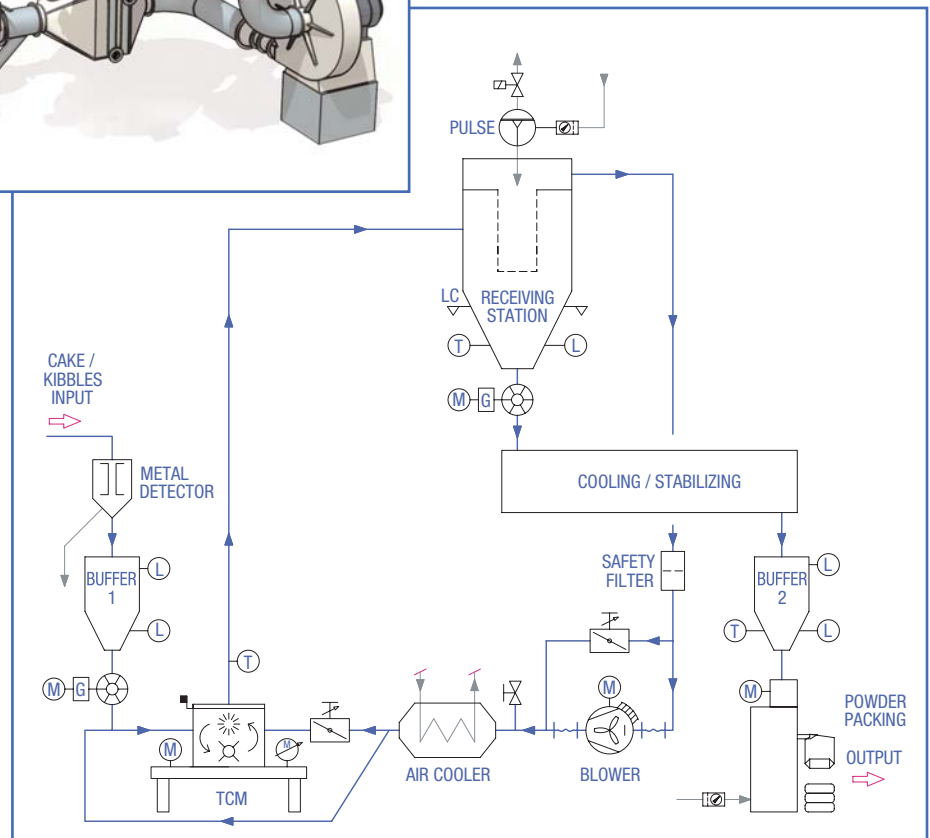
The complete system



The complete grinding system consists of the TCM, a Filter that separates the fine product from the airflow, a blower and an air cooler. The images on this page illustrate the complete system including these components.

The 3D illustration on the left shows the core components of a TCM-1000 installation. For size comparison a human model is placed beside it.

The example Process & Instrumentation Diagram below contains all these items, as well as a cooling screw and a bag-filler for cocoa powder.



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