Integrated Solutions and Grinding Tests for Milling and Dosing

A tradition of innovation




Process Solutions & Bulk Material Handling Specialists

NTE PROCESS

NOL-TEC CHILE

NTE PROCESS INDIA

NTE PROCESS BRASIL

NTE HOLDING

NORMICOM BULK HANDLING SOLUTIONS

STM MICROTEC

ENG-INN

Bulk Material Handling Solutions & Components Specialists

Integrated Solutions & Grinding Tests for Milling and Dosing

Project & Site Management

STM’s Capabilities

- Machines and Packages
- Feasibility & grinding tests
- Laboratory analysis
- Installation / maintenance / training
- Integrated devices
- Monitoring & software

Who is STM

50 years of history and in-depth knowledge of design and manufacturing of dry grinding, micronization and dosing solutions for industrial and environmental applications.

Wide and complete range of **customized services**, from single machine to packages, also providing research and development, feasibility studies and after-sales.

Reliable, timely and effective service to support customers in **reducing the environmental impact** of their production.

Industries of Applications

Environment and Depuration
Solutions designed specifically for the depuration of gaseous and liquid waste products from industrial processes.

Chemistry
Meticulous design and installation for processing organic and inorganic chemical substances.

FOOD & Life Science
Niche applications for powdered substances in sectors like animal feeds, human food, cosmetics and pharmaceutical.

Industries of Applications

Mineral and Metals
Milling technology, properly applied, results in economies in processing and excellent standards of granulation.

Rubber and Plastic
Milling and recycling solutions for elastomers and plastics carried out in a cryogenic atmosphere.

Pigments and Paint
Innovative systems for processing colours, especially in ceramic industry and pigments for tiles.

More than 900 installations worldwide

STM MICROTEC

STM’s Laboratory

- Grinding, micronization, refining mixing coating cryogenic grinding with liquid nitrogen
- Analysis and characterization of powders in the testing room
- Physical analysis of samples for third parties classification and dynamic separation
- Treatments for organic and combustive products
- Support for research and development of micronized products
- Sifting of granules and powders
- Liquid or powder additive products

STM’s Laboratory - Analysis

- Particle size and granulometric analysis of products on behalf of third parties.
- Particle size and granulometric analysis for start-up installations at clients’ premises.
- Particle size and granulometric analysis in the production line, with analyzer fitted on the tube system.
- Support and monitoring of SOP (standard operative procedures).
- Micronized Particle Characterization.
- Sampling without stopping the work process.

STM's Laboratory – Services

The following analyses can be carried out by partners and specialized laboratories:

- SEM scanning electron microscope
- XRF X-ray fluorescence
- XRD X-ray diffraction spectrometer
- GCMS gas chromatography systems
- ICP systems for metal analysis
- TGA thermogravimetric analysis
- DSC differential scanning calorimetry
- Pycnometer density analysis
- BET surface area analysis
- DLS nanoparticle size analysis

Research Centre

Laboratory and full scale trials:

- Impact Milling
- Classifiers
- Jet Milling
- Dosing system
- Report and scale up design

Research Centre

Laboratory and full scale trials:

- Criogenic milling

Workshop

- Equipment and functional testing
- Equipment inspection before dispatching to the customer
- Feasibility testing
- Productivity on industrial grinding and selection systems

Service & After-Sales

Installation

Plants are installed, tested and ready for use, with all mechanical and monitoring components.

Maintenance & Spare Parts

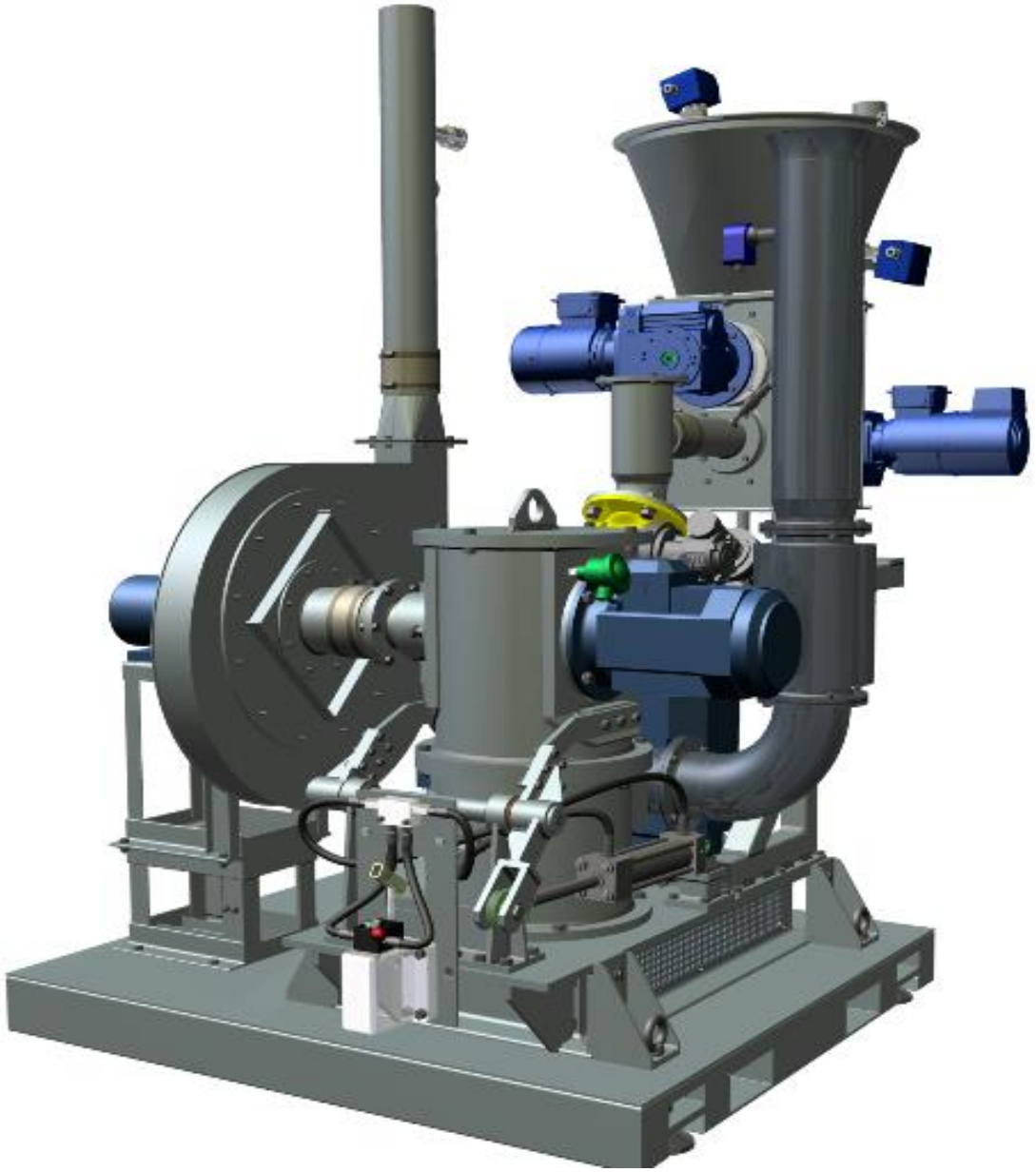
Ordinary or programmed maintenance - Extraordinary maintenance - Parts service.

Tele-Assistance

Communication in real time with support service & online monitoring.

Operator Training

Both for ordinary maintenance and for informed collaboration or guided procedures in case of malfunctions.



JCF Hammer mill with integrated Classifier

The product to be milled is introduced into the grinding chamber from above, via a variable capacity feed screw, and then by star valves which insert the product directly into the center of the impact chamber.

Here the particles milled by collision against each other and against the grinding mechanism;

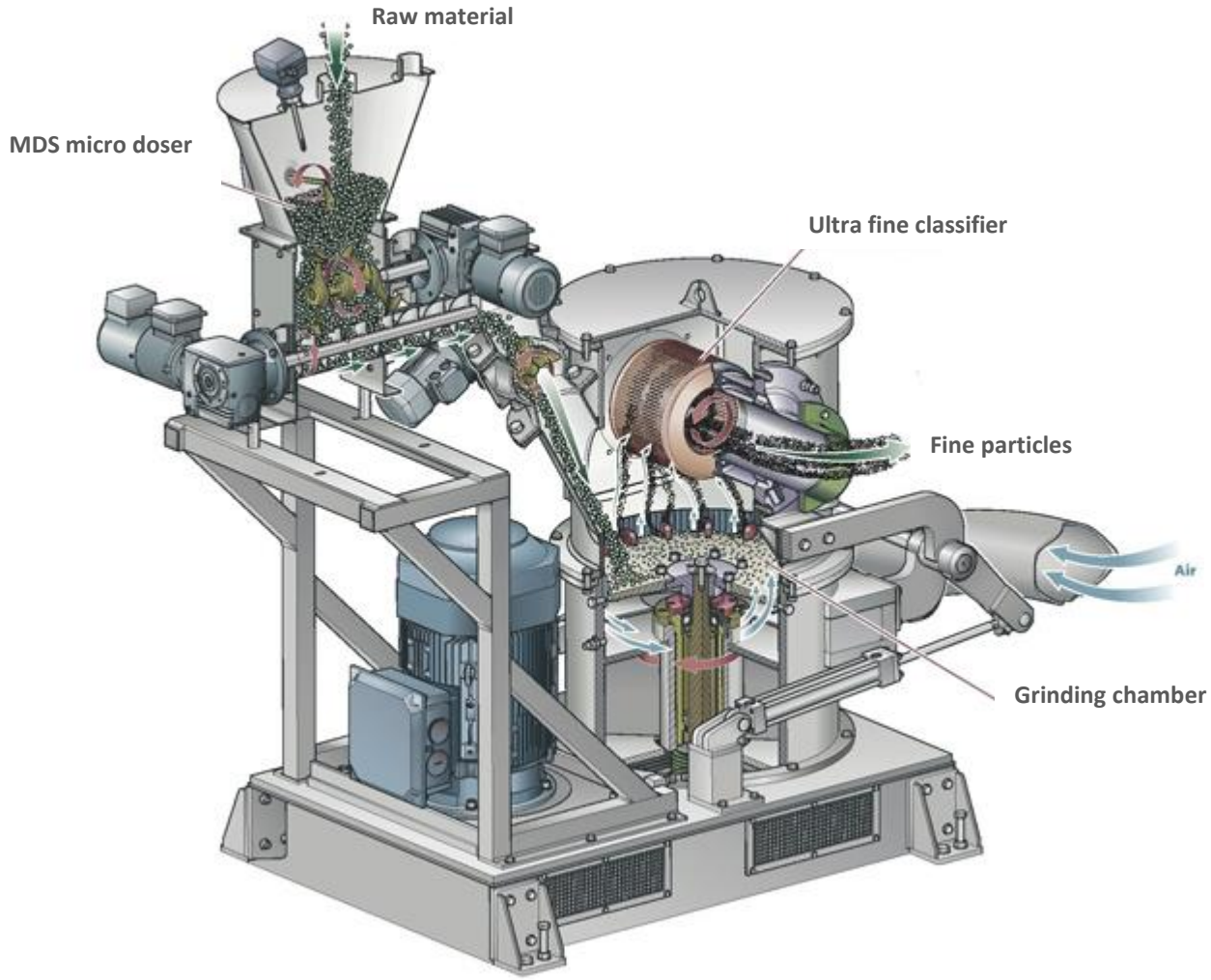
For a more efficient grinding action, the material is subjected to collision, friction and cutting in the space between the grinding mechanism and the toothed lining of the chamber.
The milled material is conveyed via an extraction fan to the ultra-fine classifier, of adjustable rotational velocity, passing through the selection sieve.

JCF®

Complete system for grinding and dynamic classifying suited for several industrial use.

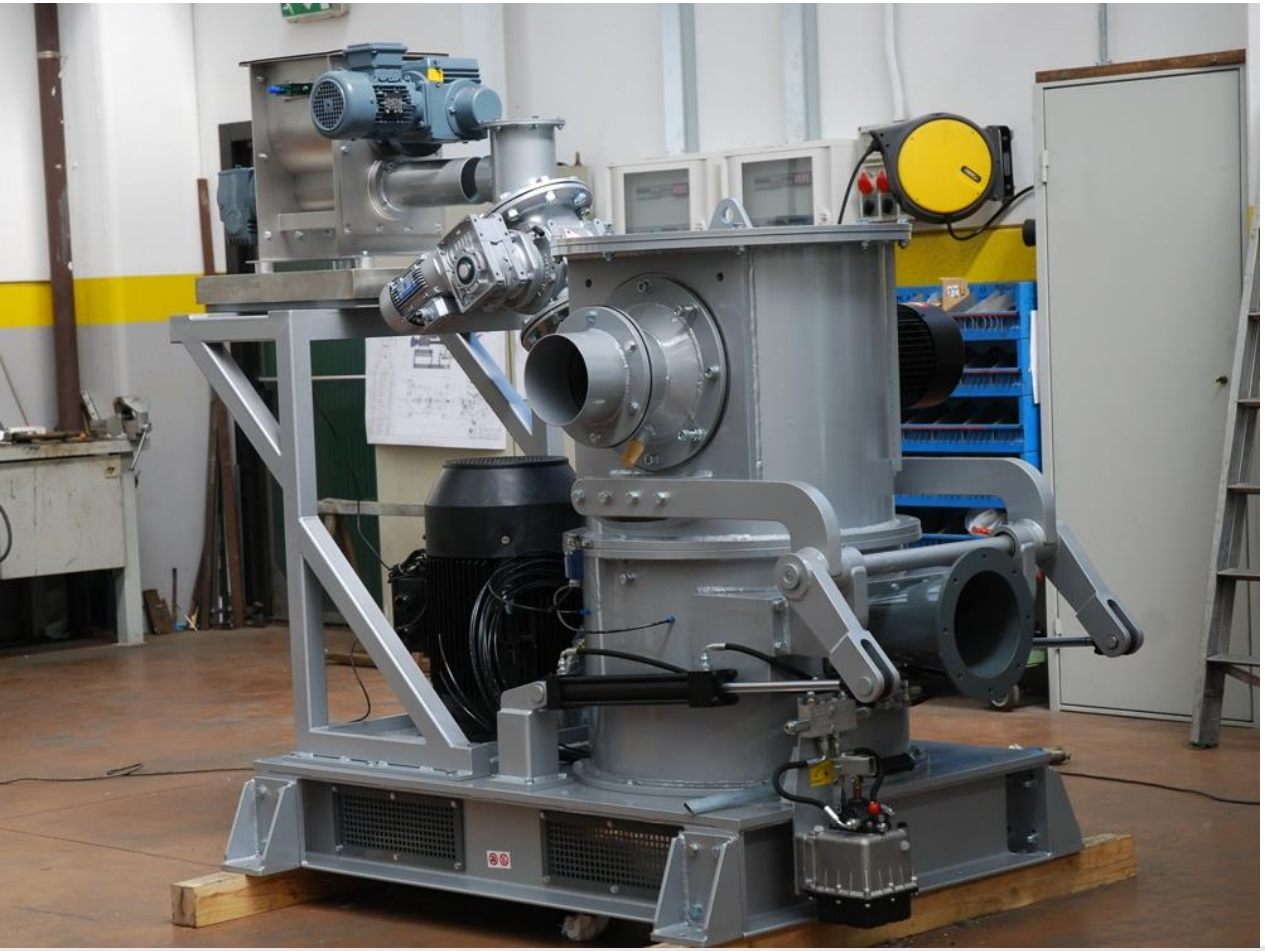
Features

- Optimal energy efficiency.
- Excellent electro-mechanical control systems.
- Easy to operate.



Milling materials has never been so easy!

JCF Hammer mill with integrated Classifier



JCF's fundamental advantages:

- Horizontal geometry
- Vibration control of the mill and fan
- Total control of the air flow
- Temperature control of the grinding chamber
- Minimal maintenance
- Low energy consumption

SDF Classifier

Compressed air dry selection machine, with double air input and a horizontal centrifugal classifier rotor.

The **dynamic separator** is composed of a chamber in which a high-speed rotor, characterized by variable rotation, allows to fluidize the product by eliminating particles which do not fall within the specific request.

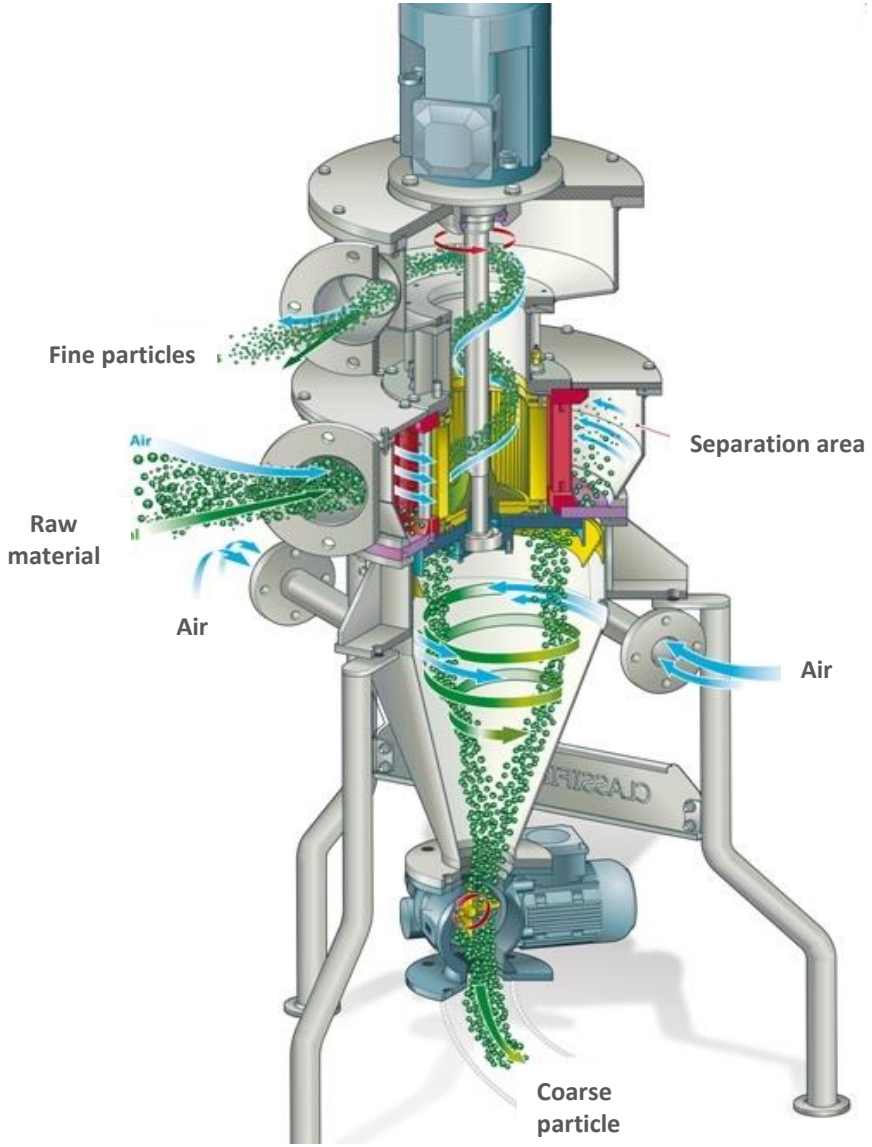
Extremely resistant to wear and with an extended operational lifespan, the machine is suitable for the classification of fast-flowing materials.

Fine or coarse powders can be produced with a high level of purity, even from substances which are not easily dispersible in air.

SDF Classifier

Features

- Suitable to classify spherical, lamellar or fibrous particles.
- Separation of materials with different density.
- Covers a wide selection range, d.97 < 10µ.
- Maximum output 8 ton/h
- Widely used in industry installed downstream of a primary mill.
- High fineness selection rate d75/d25= 1.1/1.5.
- High selection efficiency: efficiency Newton n=60–90%.



SDF Classifier

Operative Advantages

- High selection capability, giving a yield of up to 70%
- Easy installation
- Easy adjustment
- Low noise levels, no vibrations
- Low product contamination with metallic particles
- Low energy consumption

Galileo Line

Galileo Line consists of a workbench with interchangeable grinding and selection tools, **a single unit with three different machines** which are specially designed for small batches.

A client who trials micronization on a reduced scale has the guarantee of being able to transfer the laboratory process to an industrial-scale machine, thanks to an accurate and meticulous up-scaling of productive capacity.

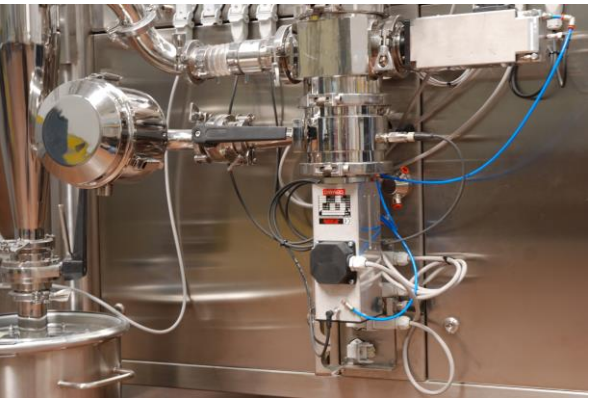
Galileo Line

Features

Galileo Line is a technically highly innovative **multi-function laboratory facility**, with three different functions:

- Mill Jet Stream
- Impact Mill
- Dynamic Classifier.

Galileo Line is suitable for R&D departments producing up to 10 kg/h, or minimum batches of 0.5 dm^3 of material.



Galileo Line

Operative Advantages

- Ease of operation, with automatic recognition of devices installed.
- Ease of use: the client is guided to introduce the required analytic objective and desired granulation, while the machine's electro-mechanical parameters are regulated automatically.
- Ease of maintenance: interface with the control panel guides the tasks, methods and timing of maintenance.
- Ease of cleaning: with polished internal surfaces and no rough or inaccessible areas.
- Flexibility: ideal for initial phases of development of single components or compounds in powdered form.
- Low investment costs.

Zero Line

Zero Line is a **multi-function pilot plant** with a worktable especially designed to combine technical equipment, grinding and selection tools and electronic devices.

It has a Touch Screen interface, as well as a highly efficient pilot mill, where you can vary the working tools or use the equipment for a room temperature processing, or for the cryogenic cycle.

Zero Line

Features

- High relative speed of the discs
- Interchangeable rotors
- Operative parameters calibration
- Large grinding chamber that prevents stratification
- Different configurations available
- Rung surface treatment
- Special treatments and shapes tools series

Zero Line

Operative advantages

- Ease of use: guided introduction of the required analytic objective and desired granulation, while the machine's electro-mechanical parameters are regulated automatically.
- Ease of maintenance: interface with the control panel guides the tasks, methods and timing of maintenance.
- Ease of cleaning: every component of the machine is designed to be easy to clean, with polished internal surfaces and no rough or inaccessible areas.
- Flexibility: ideal for initial phases of development of single components or compounds in powdered form.

Cryogenic Grinding

Pulverization processes normally carried out at ambient temperature can be done at cryogenic temperatures, obtaining **higher quality ground products and reducing energy costs**.

Heat-sensitive substances with low softening points such as elastomers, rubbers, resins and oily products, can be milled effectively by the use of liquid nitrogen to bring them to their brittle temperature.

Certain materials which cannot be processed in conventional-type mills can now be ground cryogenically.

Cryogenic Grinding

Features

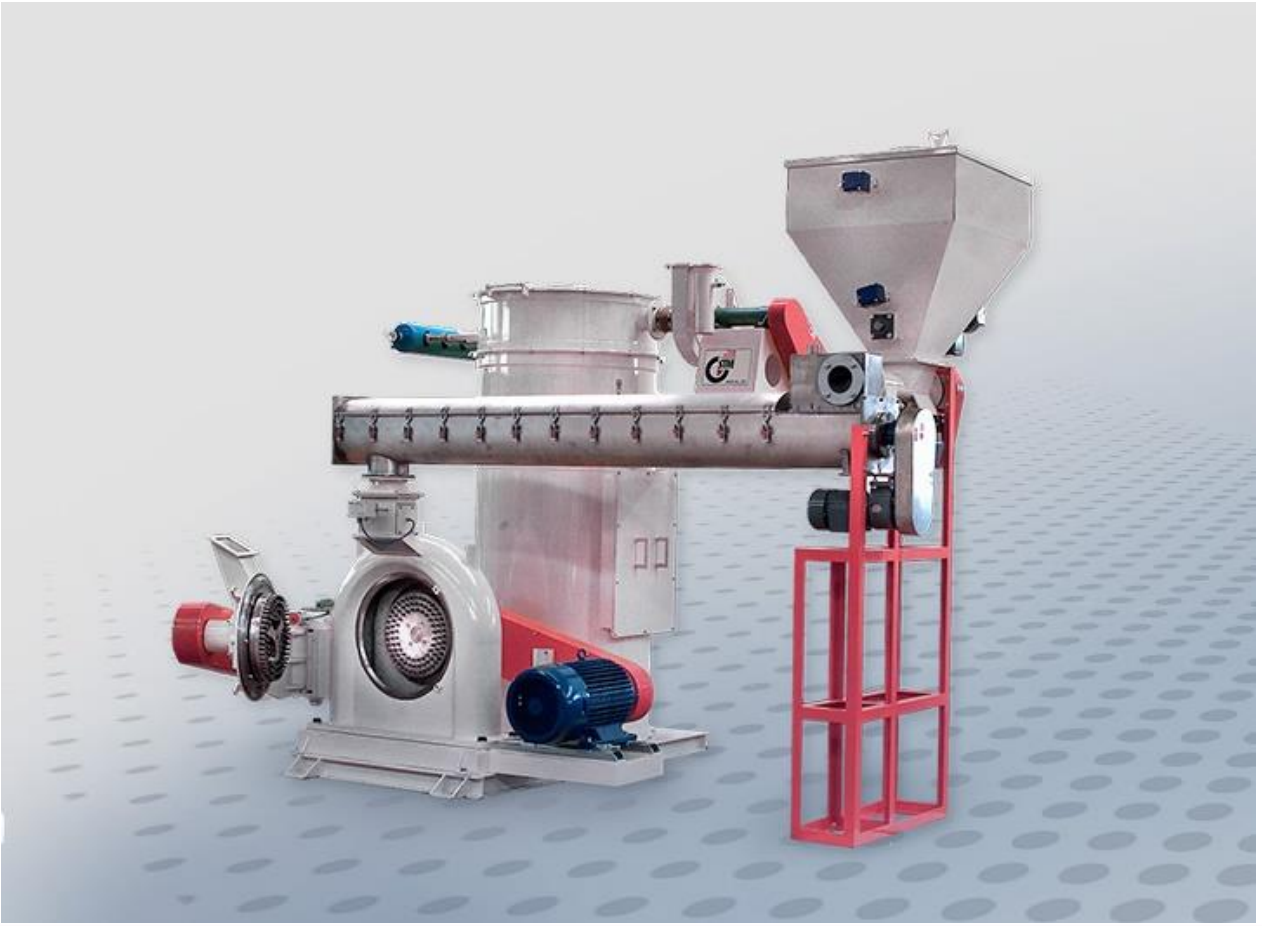
- Rapidly cools materials to brittle temperature before introduction into the mill.
- Constant temperature during the process, absorbing heat coming from the grinding process.
- Inert climate in the grinding plant, which is extremely dry and absolutely non-toxic.
- Cryogenic embrittled substances produces, once ground, homogeneous grains, with a crystalline cubic shape thanks to the different way in which the material structure is broken in comparison with traditional grinding processes.

Cryogenic Grinding

Operative advantages

- Best production yield
- Best final quality of the product, without atypical breakdowns or breakages of the molecular lattice
- Reduction of specific energy consumption
- Quality increase of the finished product
- Less processing waste, due to oxidation, or overheating
- Greater finesse and homogeneity of the product
- Reduction of the amount of material to be reprocessed in the grinding system

MP Mill



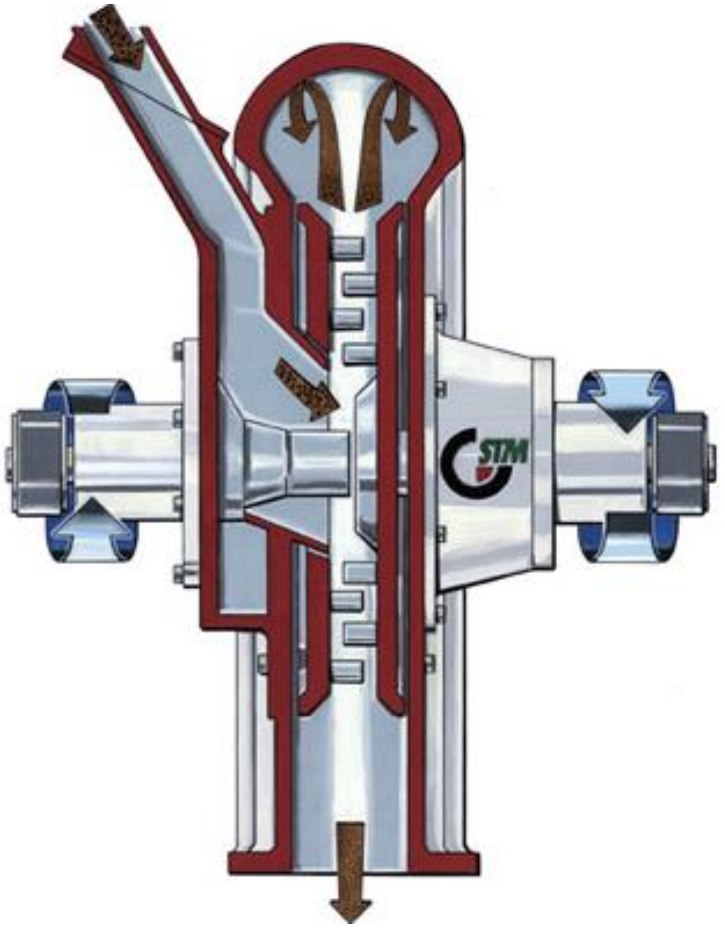
Pin mill suitable for various material with a tendency of being **hard or fragile**, for the grinding of particle sizes from fine to medium – fine (30 micron – 1 mm).

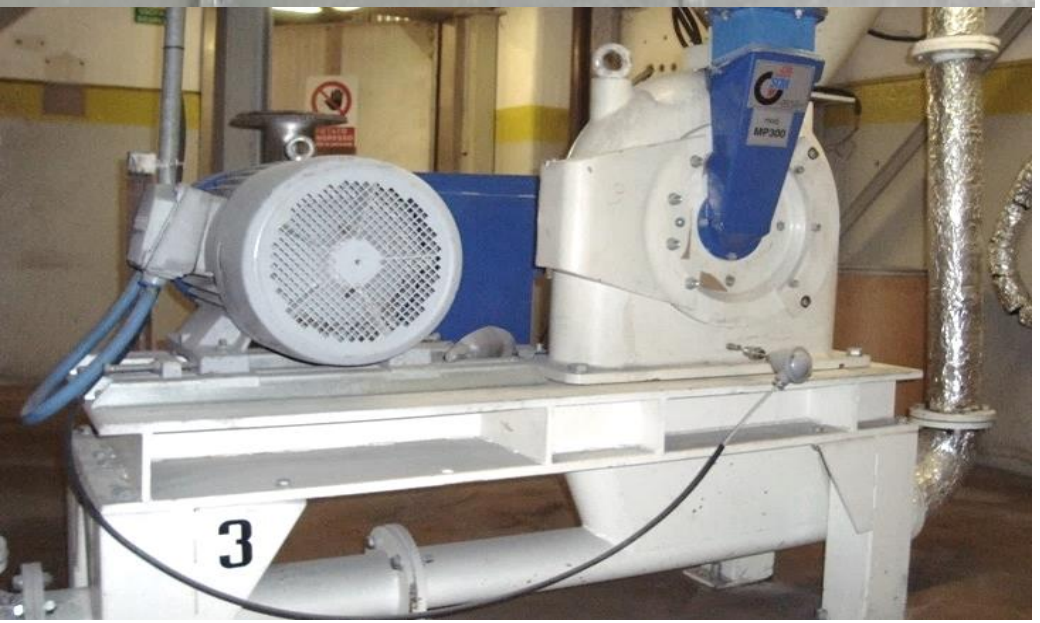
The grinding principle and the grinding chamber design are especially suitable for cryogenic grinding or cryogenic powder processing and tough material grinding at environment temperature.

MP Mill

Features

- Impact grinding without product classifying.
- The material fineness is extremely accurate due to the high rotating speed of the disc.
- The fineness of grinding can be adjusted from extra fine d.90 <40µm to a material with low amounts of dust.
- The spacious grinding chamber prevents any internal particle coating or a mill blockade when grinding material containing oil or grease or of tendency to stick.
- Possibility to adjust the grinding process according to different material and fineness.
- Interchangeable grinding disc, of different design and material, with various grinding tools and surface treatment for specific requirements.





MP Mill

Operative Advantages

- Final product is characterized by homogeneous grains which have maintained a uniform crystal lattice and contains high quantities of oil
- Easy product dimension regulation
- Easy access for maintenance
- Modular solution that can satisfy the specific customers' needs.

MR Mill

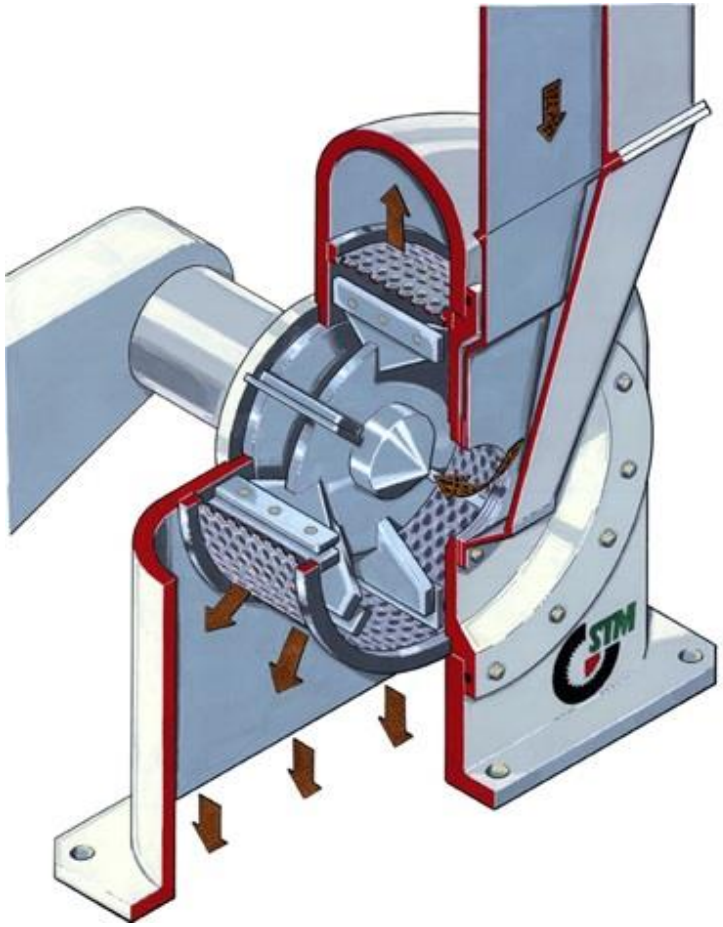
Sieve mill suitable for **dry or low hardness materials**, for the production of final products with particle sizes from 0,1 to 10 mm.

Very often used for general purpose as a pre grinding mill prior to a second grinding by other means and methods or where the final product does not need further grinding steps.

MR Mill

Features

- Grinding is achieved by impact with screening through metal sieve.
- Particle size depends on:
  - space between pins
  - disc rotation speed.
- The machine can be installed on a slab or on the ground:
  - MP / MPC: Mill installed on the base shared with the filter
  - MP-F / MPC-F: Mill installed on the ground with filter conveyance system



MR Mill

Operative Advantages

- Simple design
- Material feeding and unloading by gravitation
- Available with a wide range of accessories and different grinding disc designs of various material suitable for virtually every purpose

RTM Impact Mill

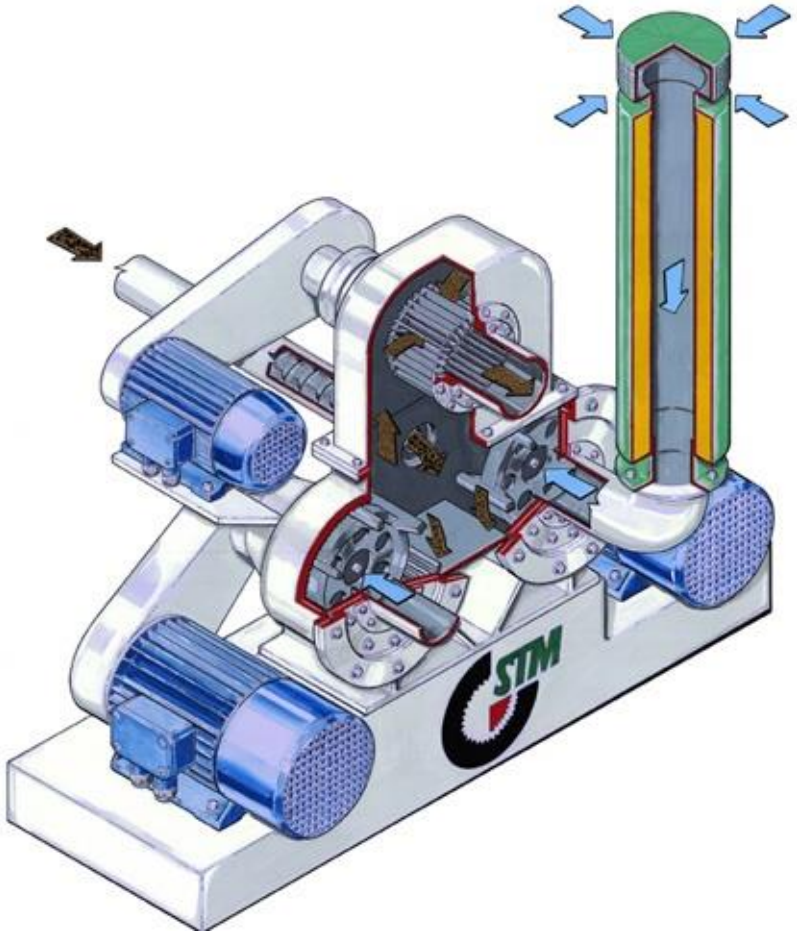
Grinding by impact against armours and material particles suitable for:

- material with a humidity of less than 2%;
- 4 (Mohs scale), where very fine grinding is required.

RTM Impact Mill

Features:

- Product particle fineness d97, 8 ÷ 120 micron.
- Special application for toxic waste smoke treatment.
- Dual grinding chamber equipped with counterwise rotors.
- The built-in sieve enables quick classification and separation of micronized particles.
- Material trajectory on armours ensures optinal energy efficiency.

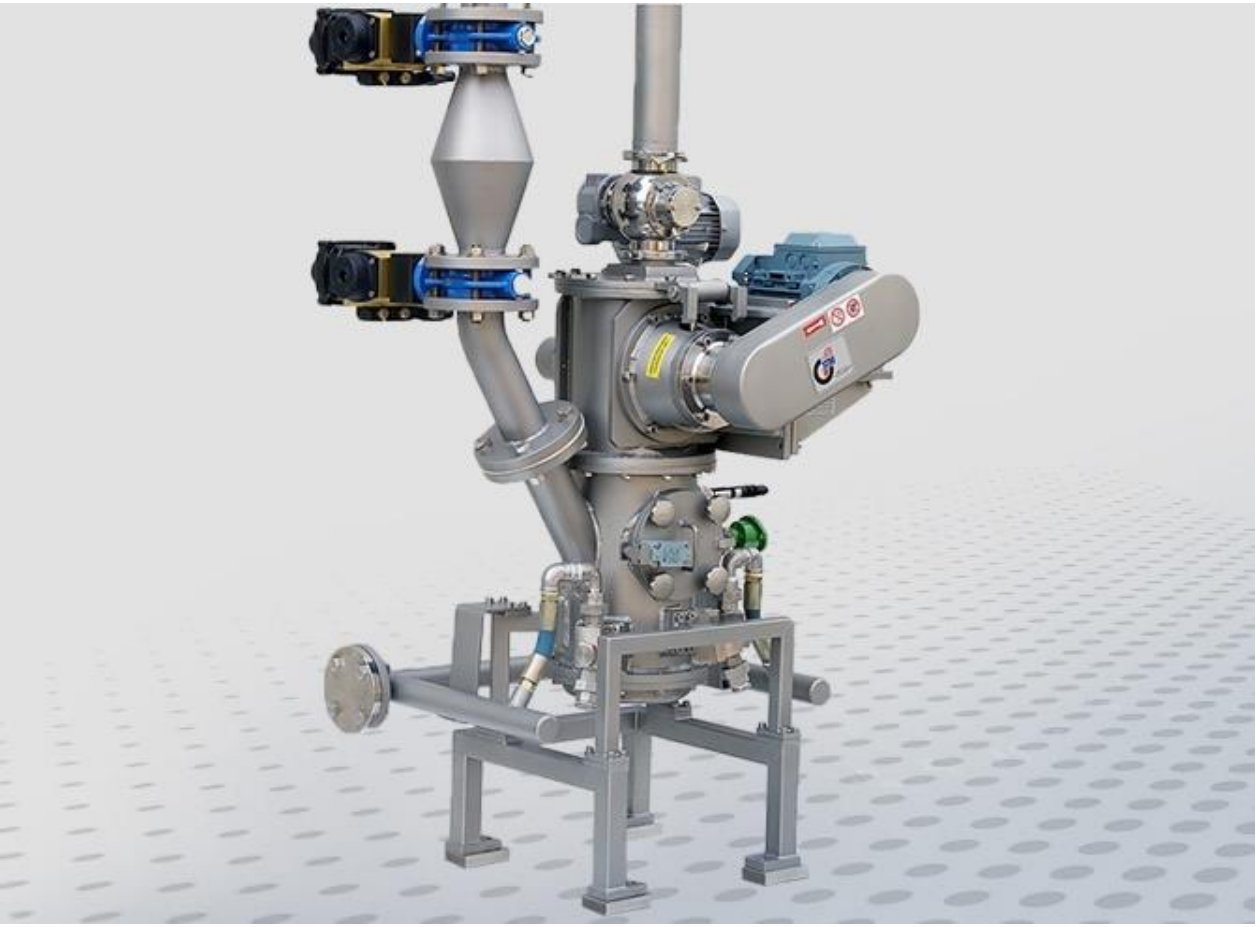


RTM Impact Mill

Operative Advantages:

- compact design, limited space requirement, easy installation
- minimum maintenance
- reduced energy consumption due to the electronic operation control system
- possibility to adjust the particle size from the control panel even while the machine is running
- fully automatic operation process.

MJS Air Jet Mill



Fluidized bed jet mill with counterposed air jets, consisting of:

- pulverization unit that uses gas at high pressure
- classifier with variable rotation that allows setting the size

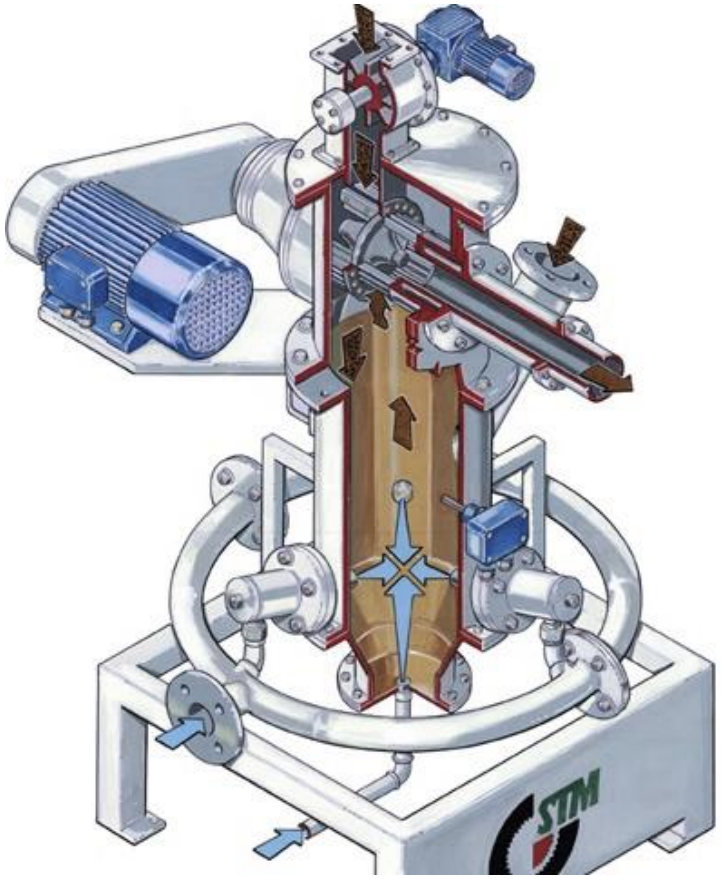
all in a single compact and versatile machine.

Energy saving up to 30-40%!

MJS Air Jet Mill

Features:

- The key feature is the reciprocal impact between the particles
- Particles at high speed very rarely hit the walls
- Suitable for the pulverization of extremely hard, abrasive substances.
- The unit is fitted with a turbine classifier for ultra fine powders
- Automatic operation allows the grinding and selection machine to be used in full safety and without the need for constant supervision.

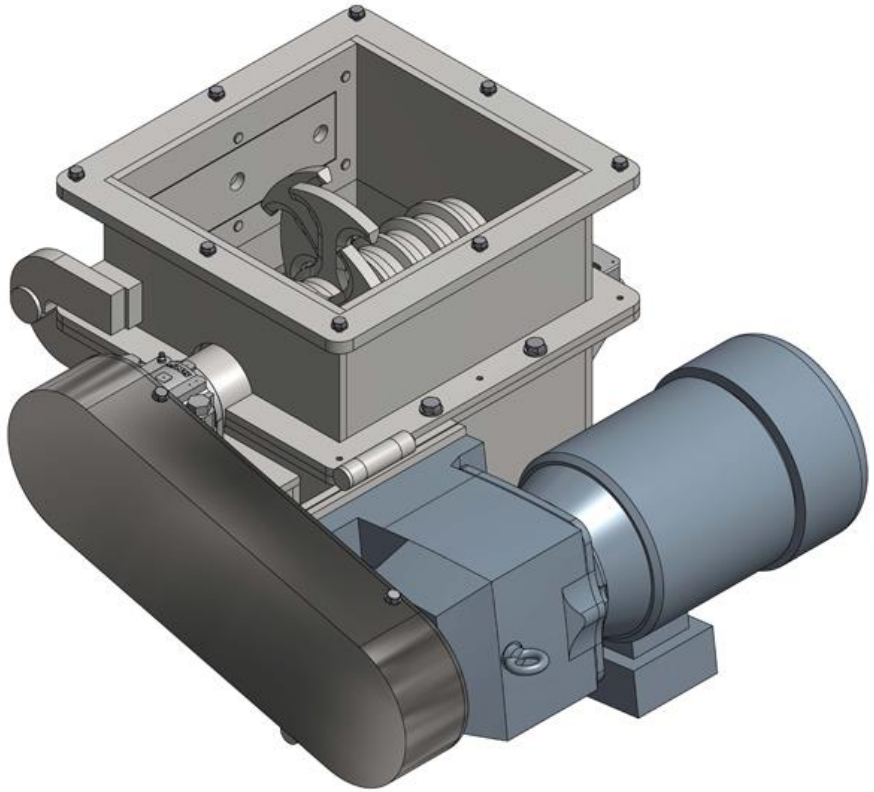


MJS Air Jet Mill

Operative Advantages

- Completely automatic operation
- Reduced wear on parts
- No product contamination
- Simple controls
- Easy to dismantle for cleaning and sterilization
- Highly efficient milling
- Extremely low noise levels
- Compact construction, minimal foundations needed
- Ideal for extra fine, hard and abrasive substances.

MF Mill



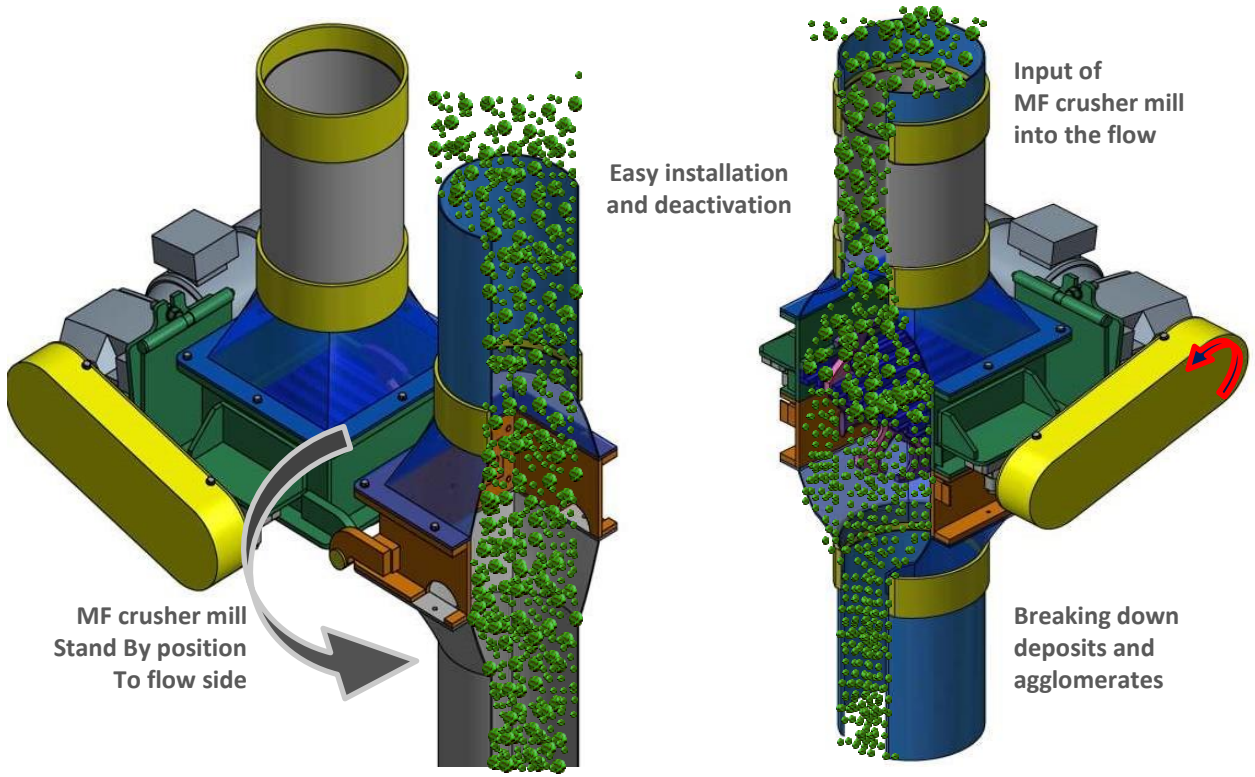
Crusher mill designed for the depuration sector.

The principle of operation is that of a hammer mill, with rotating reels that move at low speed within the shape

MF Mill

Features:

- It can be inserted online in the piping circuit
- No secondary parts
- Easy pick-up of the product from the top of the mill and the breakage of any lumps and harder deposits of material
- Thus the screen ensures the passage of all resized product particles through the grinding motion and the selection of the rotor.

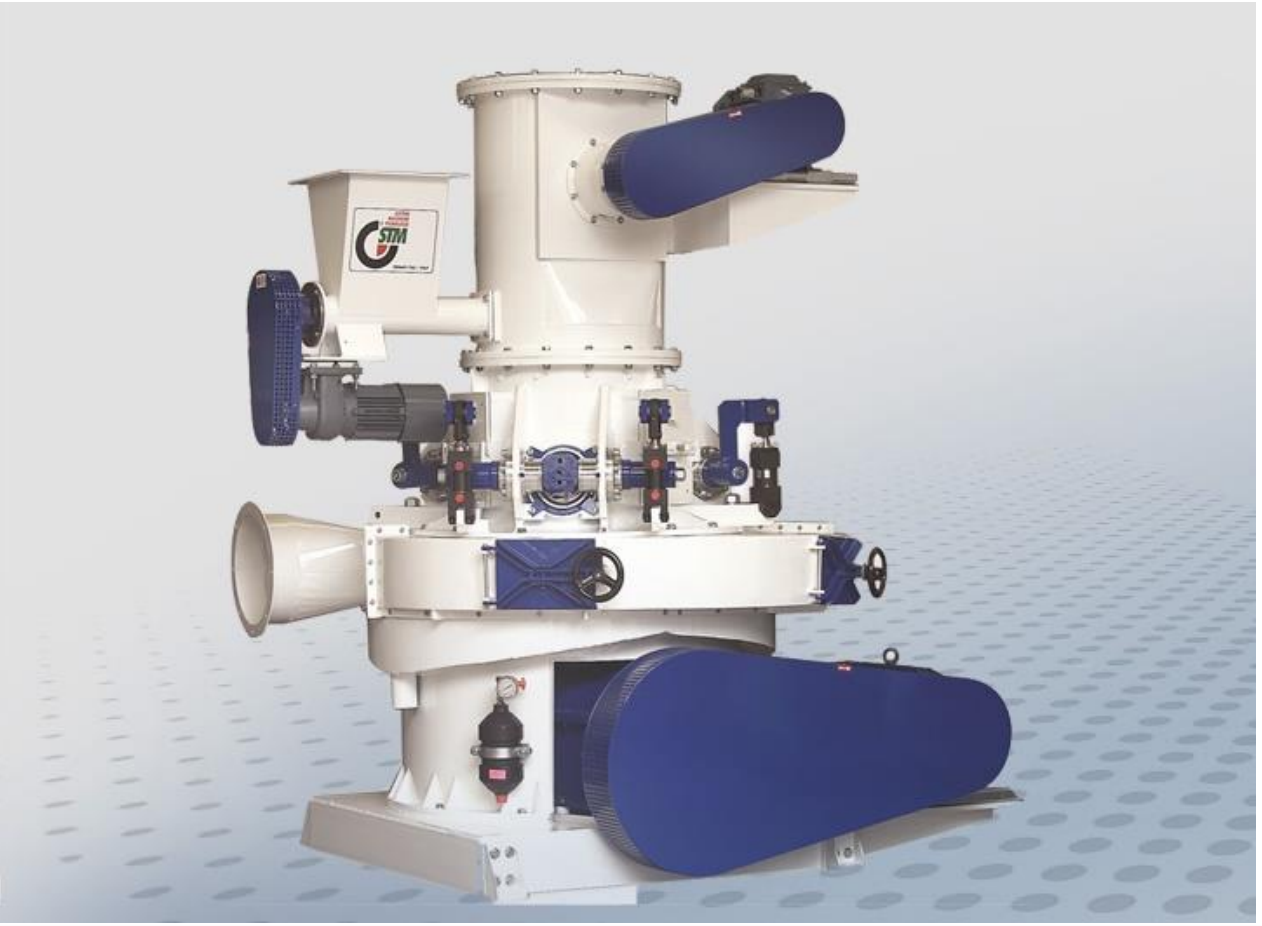


MF Mill

Operative Advantages

- Compact design
- Minimum space required
- Versatile machine, easy to use and install
- Minimum maintenance
- Low energy consumption
- Withstands high stress
- Ideal for depuration systems prone to limescale

TRM Mill



Roller pressure mill suitable for the grinding of material with the following characteristics:

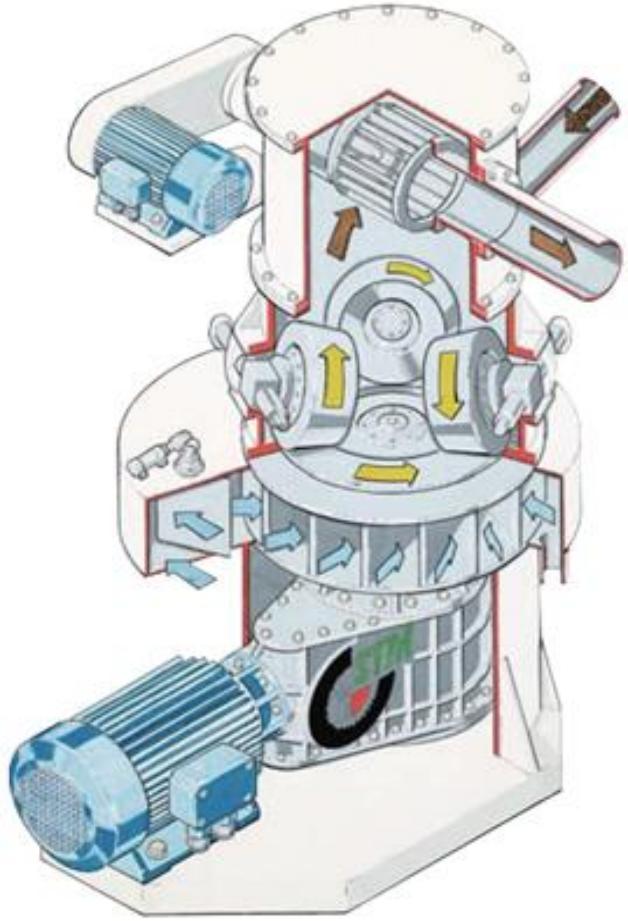
- quartz content up to 6 %
- hardness up to 6 at the Mohs scale
- particle sizes from 10 – 360 micron.

Suitable for any type of crystalline quarry materials.

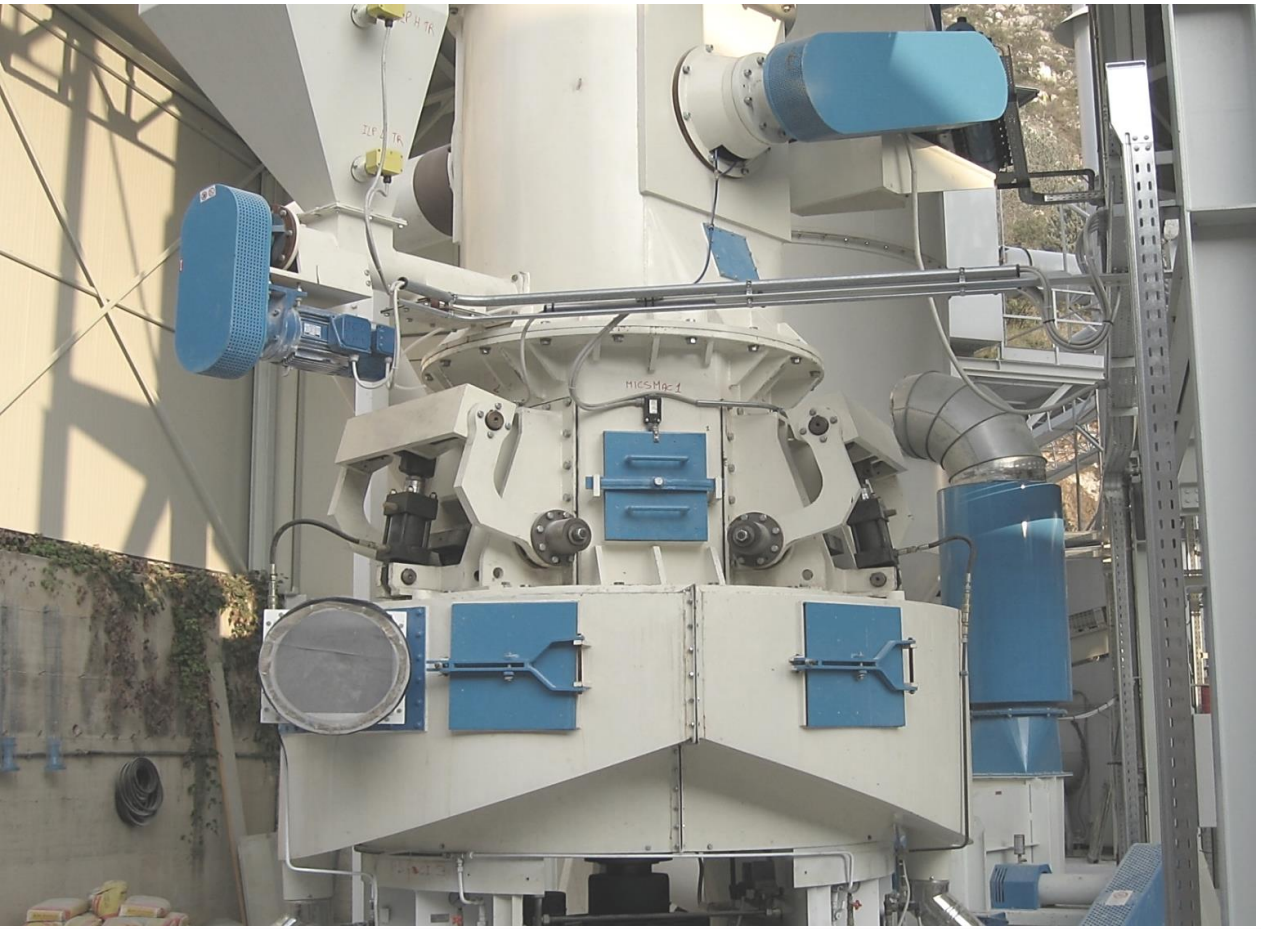
TRM Mill

Features:

- The high pressure rollers, moved forward by the rotating grinding track, and the material crushing achieve the grinding process.
- The crushing pressure is adjustable in order to modify the material fineness and/or according to different material specifications.
- The integrated classifier rejects particles of unwanted size and returns them automatically to the grinding process until the requested size is achieved.
- Mill with conical grinding rollers for high pressure.
- Hydraulically controlled pressure system.
- Easy accessible hydraulic roller movement system.
- Special roller and roller track material of reduced wear, which can be reconditioned by renewed surface hardening.
- Roller bearings specially dust and powder protected.
- Compact design of high capacity.



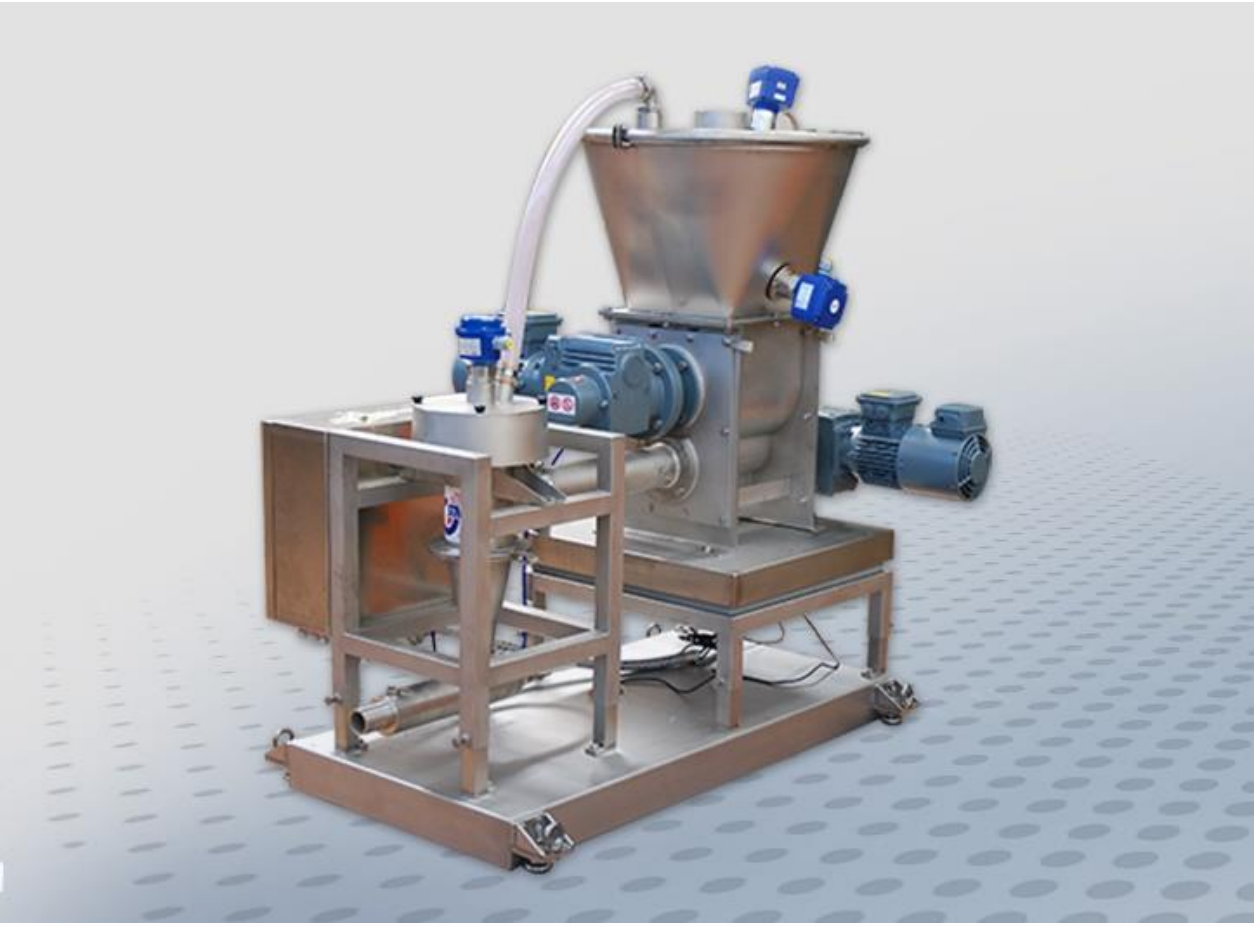
TRM Mill



Operative Advantages

- Compact design & minimum space required
- Easy cleaning and set up
- Minimum maintenance
- Low energy consumption
- Withstands high stress
- Simple material fineness adjustment
- Easy hydraulic pressure adjustment
- Suitable for continuous processes with abrasive substances.

Dosing Systems



The technological design of **MDS series micro batch feeders** gives significant improvements in performance.

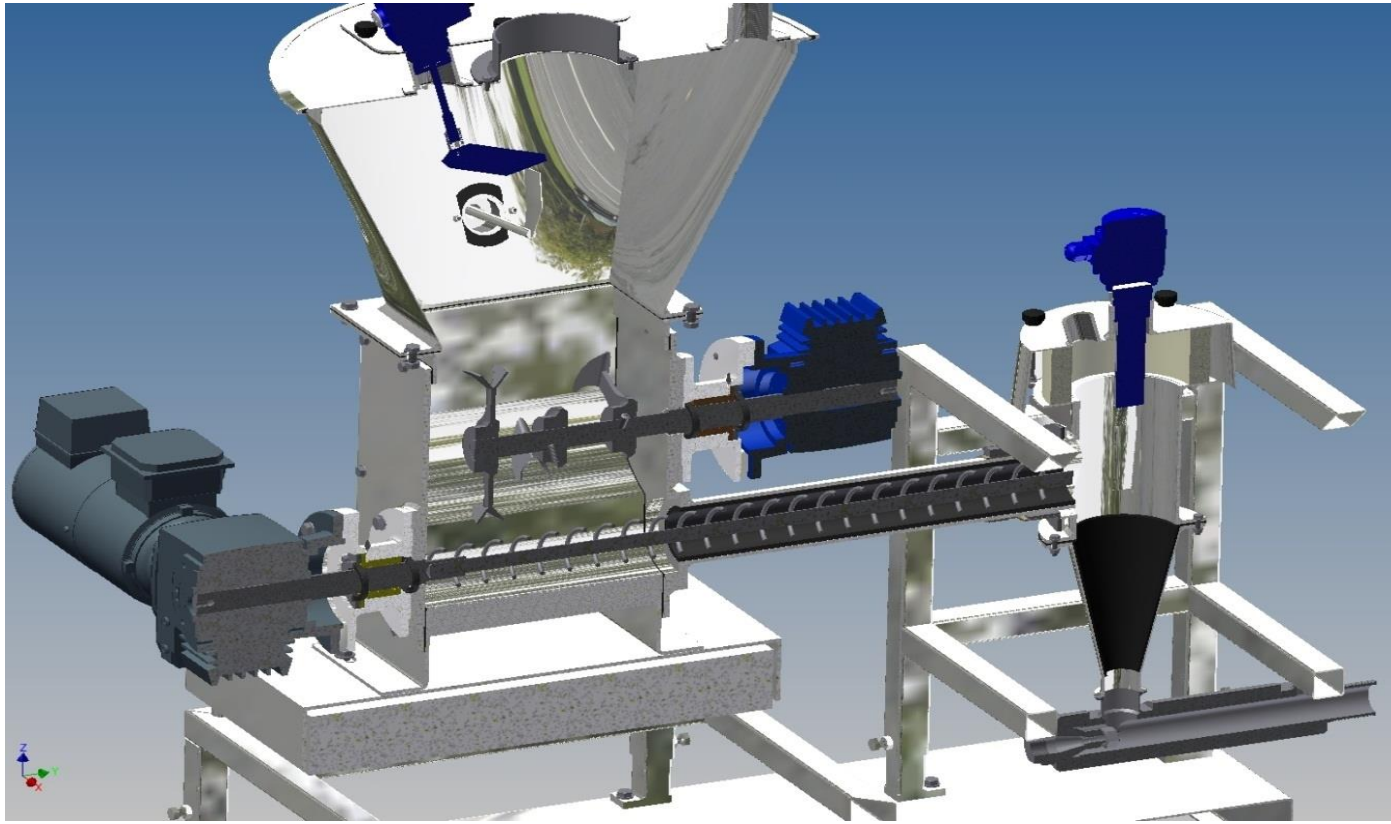
Suitable for powder and granular substances, both organic or non-organic

The variation in weight is around 2%, representing a significant factor in the quality and continuity of dosing.

Dosing Systems

Features:

- parts getting in touch with the product to be worked are made of stainless steel or non-stick material;
- the body is made from a single cast from materials allowing powder to move freely in the chamber with the vibrations produced by the operation of the machine itself;
- the hopper can be made of various materials according to the powder to be processed;
- where the product has a tendency to become compressed, the standard dosing tool can be changed by replacing the continual spiral with a memory wire spring, to avoid compacting the material between the spirals;
- screw can have different diameters, several number of spirals configurations and all devices should be fully tailor made when required.



Dosing Systems

Operative Advantages:

- modular and can adapt to the product characteristics as well as to customer’s production line
- dosing with an extreme precision few grams to several tons per hour
- suitable for powder and granular
- dosing systems for safety zones and zones subdue to ATEX anti-deflagration regulation
- systems to be integrated to already existing plants, multi-dosing lines and cryogenic screw.

Food Industry

In the ever-evolving world of the food industry, efficiency in grinding and precision in dosing are essential to ensure high-quality products.

STM Microtec, with over 50 years of expertise in the field of grinding, has established itself as a **leader in innovative and cutting-edge solutions** for the food industry.

Food Industry

Ginger

Anise

Nutmeg

Pepper

Ice Cream Waffle

Soy

Coffee

Garlic

Sugar

and much more

Protein Shifting

A sustainable and efficient method for producing high-protein flours

Protein shifting is an advanced dry fractionation process that enriches protein content in plant-based materials through **ultrafine grinding** and **precise classification**.

This environmentally friendly and cost-efficient method separates proteins from other components, such as starch and fibers, resulting in special flours with high protein concentrations.

Commonly processed raw materials include **legumes** (peas, broad beans, lupins, lentils, chickpeas), **oilseeds** (soybeans, sunflower seeds), **cereals** (wheat), that have a naturally high protein content.

The protein-rich flours obtained through this process serve as an ideal base for producing plant-based burgers, baby food, milk substitutes, and dietary supplements.

Protein Shifting

Benefits

- The significant environmental impact of animal protein production has led the food industry to explore alternative protein sources beyond traditional options.
  These special flours serve as the foundation for many plant-based, high-protein foods, which are increasingly popular due to their **lower environmental footprint**.

- Protein shifting can be performed by recovering food by-products. The resulting protein material acts as a natural additive.
  By incorporating small amounts into various food production processes, overall **production efficiency** can be increased.

Protein Shifting: a case study

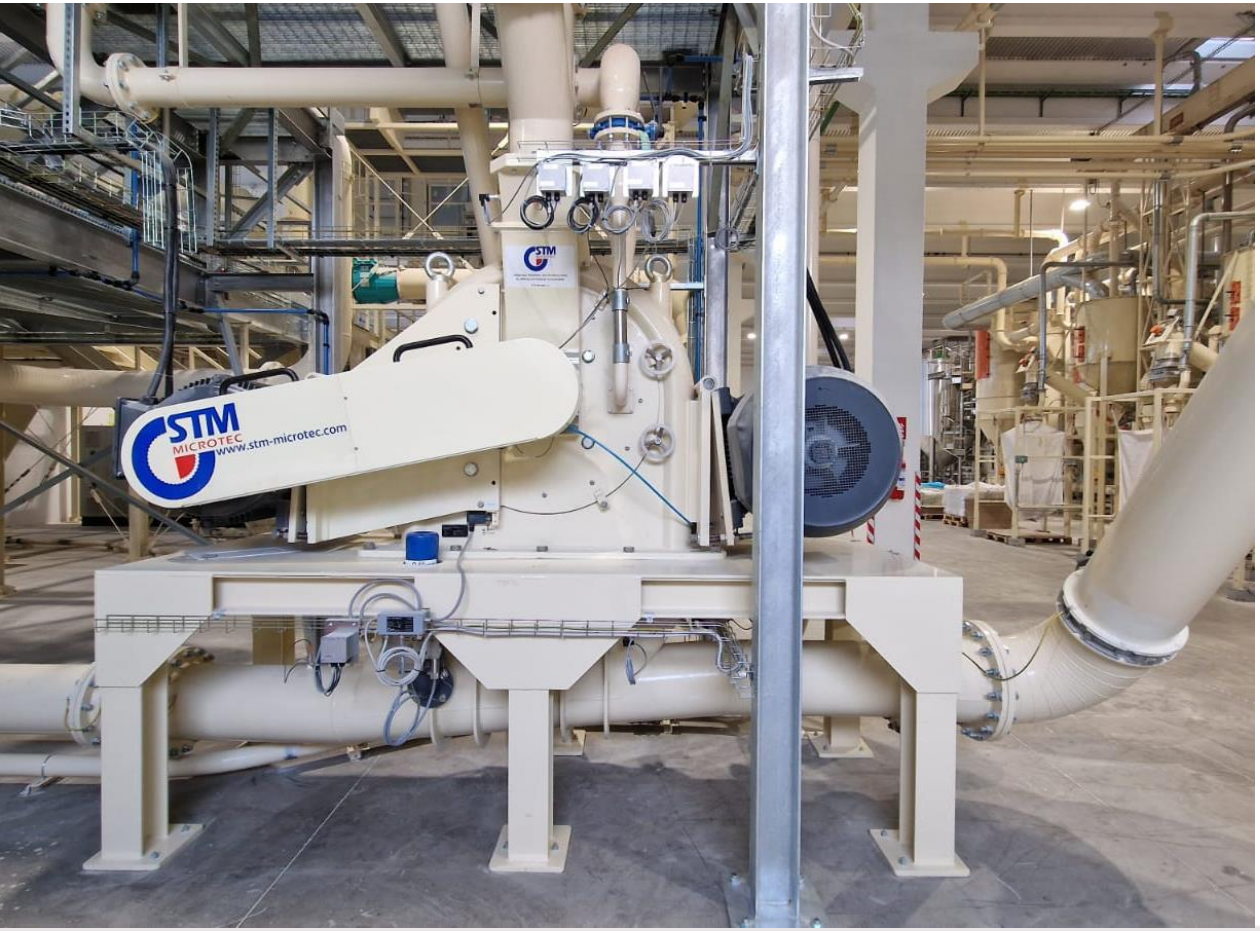
Protein Shifting on durum wheat and bran

Challenge

To achieve a highly concentrated protein extraction for use as a leavening aid and a natural additive in products made with traditional flour.

The percentage increase in protein content depends on the product and its initial protein presence. In the case of hard products (e.g., bran and wheat), the bonds between protein and starch are so strong that a second milling process may be required to achieve an optimal result.

Protein Shifting: a case study



STM Solution

The pin mill (MP model) technology, combined with a separator, has enabled STM to achieve the protein shifting objectives required by the customer **without altering or damaging the organoleptic properties** of the raw material.

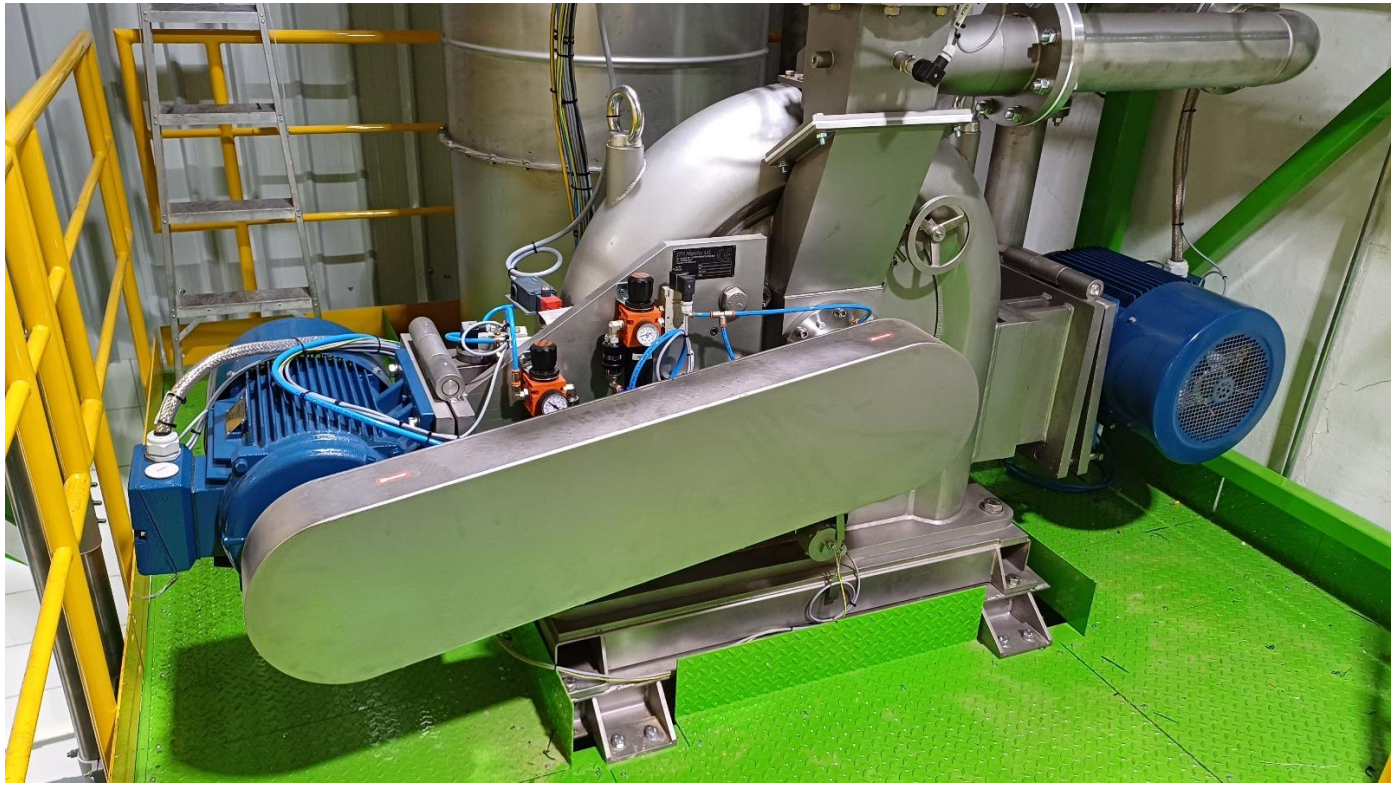
Thanks to the cryogenic system, it was possible to obtain **a higher concentration of protein content**

STM Solutions for the Spice Industry

STM offers advanced milling and processing solutions for the spice industry, ensuring high-quality grinding while **preserving the natural aroma, flavor, and essential properties** of the raw materials.

Our technologies are designed to meet the specific requirements of spice processing, delivering **fine and homogeneous powders** for a wide range of applications.

STM's milling systems allow for precise and efficient size reduction of spices such as pepper, cinnamon, turmeric, and more, while minimizing heat generation to prevent the loss of volatile oils and essential flavors.



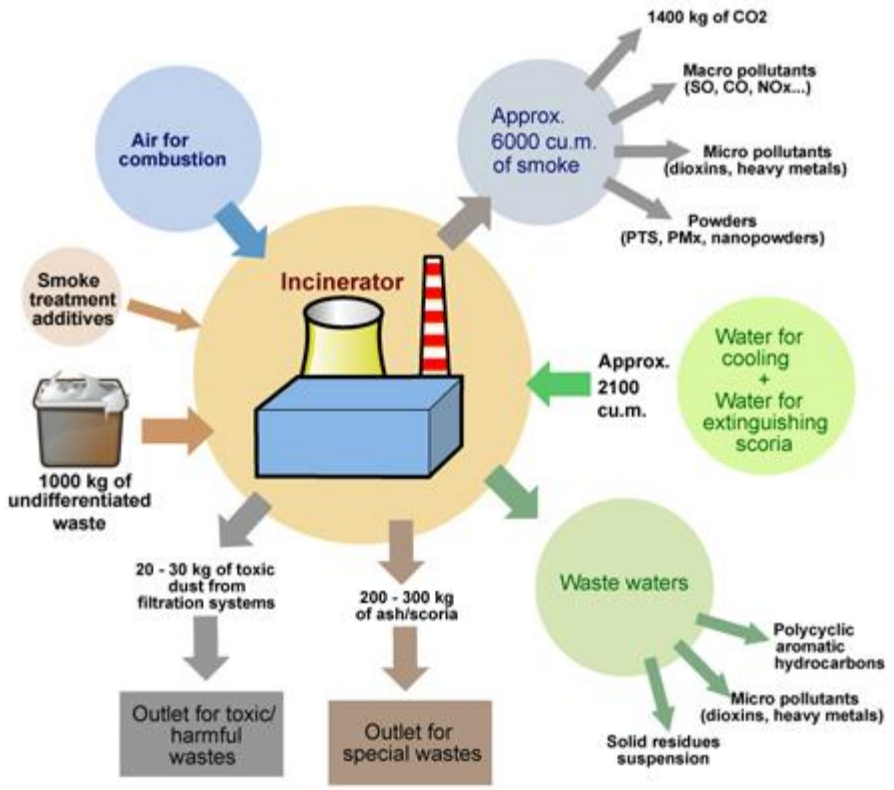
STM Solutions for the Spice Industry

Cryogenic Grinding for Heat-Sensitive Spices

To maintain the full aroma and active ingredients of delicate spices, STM can integrate cryogenic grinding technology into its systems.

Using liquid nitrogen, this method prevents thermal degradation, ensuring superior powder quality and extended shelf life.

Enviromental Industry



STM Microtec combines decades of expertise in the development of injection and abatement systems for industrial pollutants, ensuring compliance with the most stringent environmental regulations on emissions and waste. Specializing in dry grinding and depuration technologies, STM collaborates with multinational companies to create advanced systems for the reduction of acids, heavy metals, dioxins, and furans. These solutions are backed by continuous research and innovation. With a focus on efficiency and cost-effectiveness, STM provides customized systems designed for reliable operation, guaranteeing a minimum of 6,000 hours of continuous performance. From highly automated solutions to simpler configurations, STM adapts to meet the specific needs of every application.

Bicarmill®

BICARMILL® is an efficient grinding system that allows the **micronization of sodium bicarbonate** with very restrictive particle size characteristics, according to the specific abatement parameters for the type of pollutant and guarantees the better ratio between capacity and results.

The **JCF** series grinding mill is a new combined system, consisting of a horizontal grinding unit and a dynamic classifier, in a single compact machine. JCFs can be combined to give maximum flexibility and equipment modularity to serve different industries, with the very latest electronic systems, user friendly and really simple to interface.

Bicarmill®

Milling & Injection for processing Sodium Bicarbonate

Operative Advantages

- Mill with horizontal geometry
- Total control of the air flow
- Vibration control of the mill and fan
- Temperature control of the grinding chamber
- From a complex system to a machine ready to use
- Automatic controlled greasing
- Automatic cleaning system
- Easy to install and to maintain

Chemical Industry

From fine grinding to ultrafine classification, STM's solutions are designed to handle a wide range of chemical materials, including **pigments, polymers, minerals, and specialty chemicals.**

With a strong focus on innovation, safety, and compliance with industry regulations, we help manufacturers achieve superior product **quality** while **optimizing energy consumption** and **production costs**.

Chemical Industry

Pigments

Detergents

Resins & Waxes

Phitopharmaceuticals

Chemical Products

and much more

STM Solutions for Chemical Industry

Cryogenic Grinding for Low-Melting-Point Polymers

To address the challenges of grinding polymers with a low melting point, often softening at temperatures as low as 40°C, STM integrates advanced cryogenic grinding technology into its systems. Using liquid nitrogen, this method stabilizes the material during the process, preventing melting or agglomeration. The result is a consistent particle size distribution, optimal powder quality, and enhanced process efficiency.

STM Solutions for Chemical Industry

Cryogenic Grinding for Tyre Recycling

STM offers cryogenic grinding solutions to process tyres and rubber efficiently. Using liquid nitrogen, the material is embrittled for consistent results without altering its properties.

Case Study: MPC 400 Pin Mill

The MPC 400 delivers 500 kg/h of tyre powder with 100% <500 µm particle size at -28°C, featuring thermal insulation and gas recycling for optimized efficiency. STM ensures sustainable, high-performance solutions for tyre recycling.

Thank you!

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