

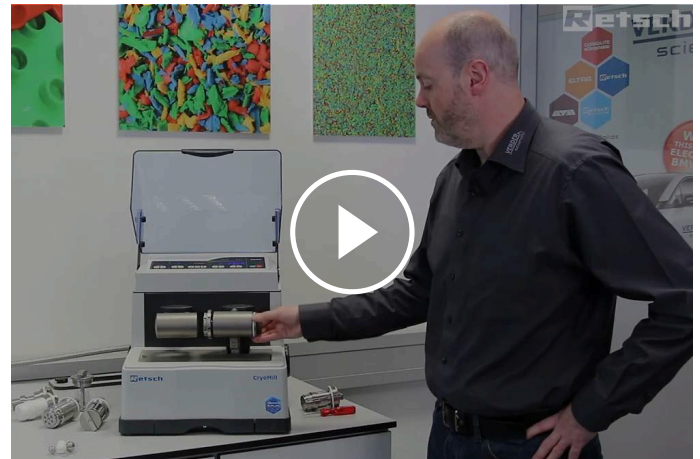
## CRYOMILL

Efficient cryogenic grinding at -196°C



**Cryogenic grinding is a process where thermally sensitive and elastic substances are successfully processed by cooling with liquid nitrogen. The CryoMill is a laboratory ball mill specifically designed for this application. It features an integrated cooling system which continually cools the grinding jar with liquid nitrogen before and during the grinding process. Thus, the sample is embrittled and volatile components are preserved.**

The liquid nitrogen is continually supplied from an autofill system in the exact amount required to keep the temperature at -196 °C. The user never comes into direct contact with LN<sub>2</sub> which ensures a high degree of operational safety. The CryoMill's versatility (cryogenic, but also wet and dry grinding at room temperature) makes it the ideal grinder for sample quantities up to 20 ml. Powerful impact ball milling results in highest grinding efficiency.



[Click to view video](#)

### Product Video

## VERSATILE & SAFE

- | powerful cryogenic grinding by impact and friction with up to 30 Hz
- | 3 different grinding modes (cryogenic, dry/

- wet at ambient temperature)
- | closed LN<sub>2</sub>-system (Autofill) for enhanced user safety
- | screw-top jars ensure convenient, leak-proof operation
- | wide range of accessories including various jar and ball sizes, adapter racks and LN<sub>2</sub> feeding system
- | optional zirconium oxide jars specifically designed for cryogenic grinding
- | 9 programmable cooling and grinding cycles (10 s to 99 min)



## USER SAFETY & PERFECT RESULTS GUARANTEED

The CryoMill is a cryogenic grinder designed with user safety in mind. The liquid nitrogen flows through the closed system and the user never comes into direct contact with LN<sub>2</sub> which ensures a high degree of operational safety. The automatic cooling system guarantees that the grinding process is not started before the sample is thoroughly cooled. This results in reduced consumption and guarantees reproducible cryogenic grinding results.

The CryoMill is very easy to operate. Parameters such as oscillation frequency, pre-cooling or grinding time can be digitally set via a clearly structured keypad. LEDs in the display indicate the current state of operation, e.g. cooling or grinding.

Usually, grinding only takes a few minutes so that the sample does not get warm during the process. If, however, longer grinding times are required, it is also possible to pre-select periods of intermediate cooling and the number of cryogenic cycles.

All instrument parameters are retained during standby operation for subsequent processes. The laboratory mill can also be operated without cooling which makes it suitable for a vast range of



[Click to view video](#)

applications.

FOR SAFE AND EFFECTIVE GRINDING PROCESSES  
**ACCESSORIES FOR THE CRYOMILL**



**GRINDING JARS & ADAPTERS**

The CryoMill is equipped with one grinding station for screw-top grinding jars with volumes of 10 ml, 25 ml, 35 ml or 50 ml. It is also possible to use adapters for 4 grinding jars of 5 ml each as well as for 6 reaction vials of 2 ml each. A 25 ml grinding jar of zirconium oxide and matching grinding balls as well as a PTFE jar are available for applications where steel would cause sample contamination.



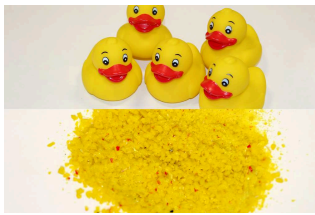
**LIQUID NITROGEN FEED**

For safe and comfortable operation, RETSCH provides an autofill system for liquid nitrogen which is available with a 50 liter container and provides cooling in cryogenic grinding applications for approximately 5 hours. It is also possible to connect existing cryo tanks to the mill, using a connection tube with safety valve.

CRYOMILL

**TYPICAL SAMPLE MATERIALS**

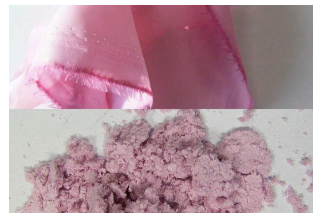
Due to the automatic embrittlement of the samples during cryogenic grinding the CryoMill is suitable for pulverizing, for example, waste, soil, chemical products, tissue, hair, wood, sewage sludge, bones, plastics, oil seed, paper, plants, pills, textiles, animal feed, wool etc.



*rubber duck*



*hard plastic*



*textiles*



*gummy bears*

To find the best solution for your sample preparation task, visit our application database

CRYOMILL

## TECHNICAL DATA

|  |  |
|--|--|
| <b>Applications</b>                        | size reduction, mixing, homogenization, cell disruption  |
| <b>Field of application</b>                | agriculture, biology, chemistry / plastics, construction materials, engineering / electronics, environment / recycling, food, geology / metallurgy, glass / ceramics, medicine / pharmaceuticals |
| <b>Feed material</b>                       | hard, medium-hard, soft, brittle, elastic, fibrous   |
| <b>Size reduction principle</b>            | impact, friction   |
| <b>Material feed size*</b>                 | <= 8 mm  |
| <b>Final fineness*</b>                     | ~ 5 µm   |
| <b>Batch size / feed quantity*</b>         | max. 20 ml   |
| <b>No. of grinding stations</b>            | 1  |
| <b>Setting of vibrational frequency</b>    | digital, 5 - 30 Hz (300 - 1800 min <sup>-1</sup> )   |
| <b>Typical mean grinding time</b>          | 10 min / 4 min (cooling / grinding)  |
| <b>Dry grinding</b>                        | yes  |
| <b>Wet grinding</b>                        | yes  |
| <b>Cryogenic grinding</b>                  | yes  |
| <b>Cell disruption with reaction vials</b> | yes  |
| <b>Self-centering clamping device</b>      | yes  |
| <b>Type of grinding jars</b>               | screw top design   |
| <b>Material of grinding tools</b>          | hardened steel, stainless steel, zirconium oxide, PTFE   |
| <b>Grinding jar sizes</b>                  | 5 ml / 10ml / 25 ml / 35 ml / 50 ml  |
| <b>Autofill</b>                            | 50 l   |
| <b>Setting of grinding time</b>            | digital, 30 s - 99 min   |
| <b>Storable SOPs</b>                       | 9  |
| <b>Electrical supply data</b>              | 100-240 V, 50/60 Hz  |
| <b>Power connection</b>                    | 1-phase  |
| <b>Protection code</b>                     | IP 30  |
| <b>Power consumption</b>                   | 260 W  |
| <b>W x H x D closed</b>                    | 395 x 373 x 577 mm (D: 710 mm with exhaust tube)   |
| <b>Net weight</b>                          | ~ 45 kg  |
| <b>Standards</b>                           | CE   |

\*depending on feed material and instrument configuration/settings

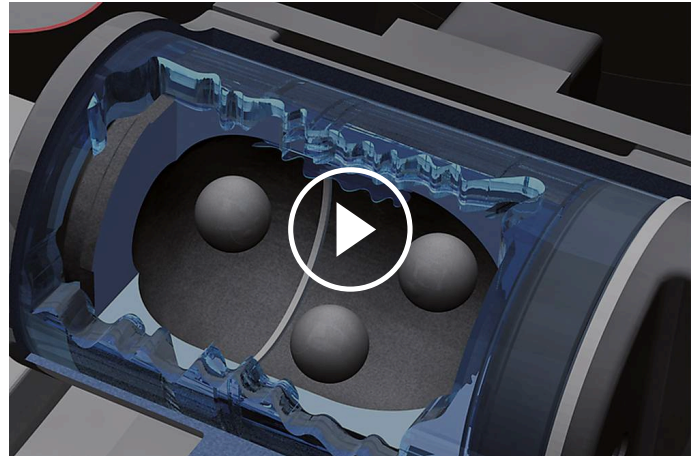


CRYOMILL

## FUNCTIONAL PRINCIPLE

The grinding jar of the CryoMill performs radial oscillations in a horizontal position. The inertia of the grinding balls causes them to impact with high energy on the sample material at the rounded ends of the jar and pulverize it.

The grinding jar is continually cooled with liquid nitrogen from the integrated cooling system before and during the cryogenic grinding process.



[Click to view video](#)

[www.retsch.com/cryomill](http://www.retsch.com/cryomill)