

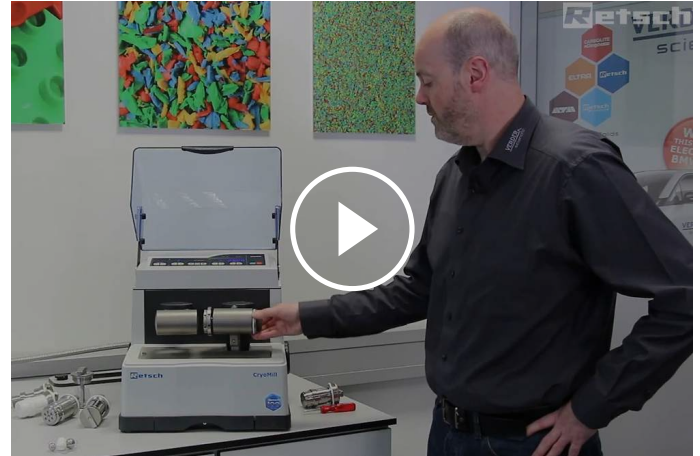


CRYOMILL

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.

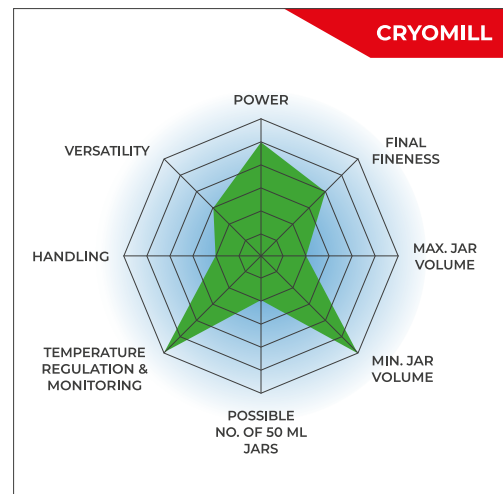
The liquid nitrogen is continually supplied from an autofill system in the exact amount required to keep the temperature at -196°C . The user never comes into direct contact with LN_2 which ensures a high degree of operational safety. The CryoMill's versatility (cryogenic, but also wet and dry grinding at room temperature) makes it the ideal grinder for sample quantities up to 20 ml. Powerful impact ball milling results in highest grinding efficiency.



비디오 시청 클릭

UNMATCHED PERFORMANCE FOR CRYOGENIC BALL MILLING

- | Max. speed 30 Hz
- | Horizontal oscillation causes strong impact effects for effective sample processing
- | Up to 8 mm feed size and $5\text{ }\mu\text{m}$ final fineness
- | 1 grinding station for jars of min. 5 ml and max. 50 ml, adapter for $6 \times 2\text{ ml}$ tubes
- | Jars are continuously cooled with liquid nitrogen during processing, safe handling thanks to autofill tank
- | Small bench top model
- | Storable SOPs and cycle programs, compact bench top model, 4 different jar materials for dry and wet grinding



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 LN₂-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 LN₂ 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 LN₂ 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.



[비디오 시청 클릭](#)

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 applications.

안전하고 효과적인 분쇄 작업을 위해

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 대표 시료

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



텍스타일



gummy bears



[비디오 시청 클릭](#)

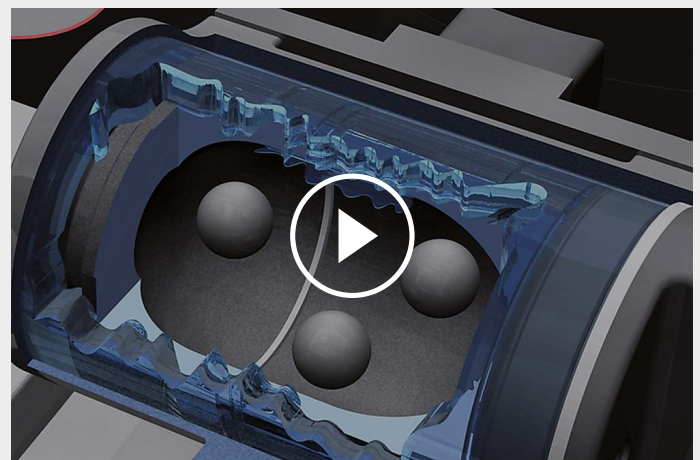
Parsley

샘플 준비 작업에 가장 적합한 솔루션을 찾으려면 애플리케이션 데이터베이스를 방문하십시오.

CRYOMILL 작동 원리

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.



[비디오 시청 클릭](#)

CRYOMILL

기술 데이터

응용 분야	분쇄, 균질화, 혼합, 세포 분쇄
응용분야	건축자재, 기술적/전기적, 농산물, 생물학, 식품, 유리 제품/ 세라믹, 의학/제약, 지질학 / 금속 공학, 화학/플라스틱 공학, 환경 / 재활용
투입 시료	경질, 중-경질, 연질, 취성, 탄성, 섬유질
크기 축소 원리	충격, 마찰
최대 투입 크기*	<= 8 mm
최종 분말 입도*	~ 5 µm
시료 일괄 처리량*	최대. 20 ml
분쇄조 수	1
Vibrational frequency	디지털, 5 - 30 Hz (300 - 1800 min-1)
평균 분쇄 시간	10 분 냉각과 4 분 분쇄
건식 분쇄	가능
습식 분쇄	가능
냉동 분쇄	가능
바이알을 이용한 세포파쇄	가능
자가 중심 결합기	가능
분쇄 용기 종류	스크류형 디자인
분쇄 도구 재질	경화 스틸, 스테인레스 스틸, 산화 지르코늄, PTFE
분쇄 용기 크기	5 ml / 10ml / 25 ml / 35 ml / 50 ml
Autofill	50 l
분쇄 시간 설정	디지털, 30 초 - 99 분
표준 운영 절차 저장 가능 수	9
전원 공급 데이터	100-240 V, 50/60 Hz
전원 연결	단상
안전 보호 코드	IP 30
소비 전력	260 W
폭 x 높이 x 깊이 닫혔을 때	395 x 373 x 577 mm (깊이: 배기 튜브 포함 시 710 mm)
중량	~ 45 kg
표준	CE

*투입 재료와 장비 환경, 설정에 따라

www.retsch.com/cryomill

주문 정보

CRYOMILL

(Autofill 포함 LN2 용기 및 안전 밸브, 분쇄 용기 및 볼 별도 주문)

20.749.0001



CryoMill, 100–240 V, 50/60 Hz

CRYOMILL 분쇄 용기

HARDENED STEEL

01.462.0300 5 ml, 02.706.0304 어댑터와 사용



01.462.0330 25 ml



01.462.0329 35 ml



01.462.0328 50 ml



STAINLESS STEEL

01.462.0290 5 ml, 02.706.0304 어댑터와 사용

01.462.0331 10 ml



01.462.0334 25 ml



01.462.0333 35 ml



01.462.0332 50 ml



ZIRCONIUM OXIDE

01.462.0336



25 ml

PTFE

01.462.0335



25 ml

CRYOMILL 액세서리

02.480.0003



Autofill 150 l (recommended), incl. connection tube and safety valve

02.480.0002



Autofill 50 l, incl. connection tube and safety valve

05.871.0001



연결 튜브, 안전 밸브 포함 (LN2는 고객이 직접 공급)

02.706.0304



어댑터, 2/4 분쇄 용기 용, 5 ml

02.706.0303



어댑터, 2/4/6 리액션 바이알 용, 2 ml

02.706.0360

Adapter for use of 2/4/6 reaction vials, 2 ml stainless steel tubes

22.749.0001



안전 잠금 리액션 바이알 2 ml, 1000 개

22.749.0008



Reaction vials made of stainless steel 316L, 2.0 ml, 10 pcs.

99.200.0016



CryoMill IQ / OQ 문서

22.111.0001

Gasket for grinding jar 5 ml, 10 pcs.

22.085.0019

Gasket for grinding jar 10 ml, 10 pcs.

22.085.0022

Gasket for grinding jar 25 ml, hardened steel or stainless steel, 10 pcs.

22.085.0023

Gasket for grinding jar 25 ml, zirconium oxide, 10 pcs.

22.085.0024

Gasket for grinding jar 35 ml, 10 pcs.

22.085.0025

Gasket for grinding jar 50 ml, 10 pcs.

분쇄용 볼

HARDENED STEEL

05.368.0029  5 mm Ø

05.368.0030  7 mm Ø

05.368.0059  10 mm Ø

05.368.0032  12 mm Ø

05.368.0108  15 mm Ø

STAINLESS STEEL

05.368.0034  5 mm Ø

05.368.0035  7 mm Ø

05.368.0063  10 mm Ø

05.368.0037  12 mm Ø

05.368.0109  15 mm Ø

05.368.0062  20 mm Ø

05.368.0105  25 mm Ø

ZIRCONIUM OXIDE

05.368.0146  7 mm Ø

05.368.0094		10 mm Ø
05.368.0096		12 mm Ø
05.368.0113		15 mm Ø

PTFE, 스틸 코어		
05.368.0045		10 mm Ø
05.368.0046		12 mm Ø
05.368.0114		15 mm Ø
05.368.0047		20 mm Ø