

NEW

## Cryogenic Mill "IQ MILL-2070"

~ Intelligent Quick-Mill ~

## Perfect for pretreatment of hard-to-grind polymers

- Specifically designed for grinding, agitating, and dispersing various samples -

In sample pretreatment, grinding samples into fine powders is a time-consuming and labor-intensive task. The newly developed IQ MILL-2070 is a device that makes grinding a simple process. Especially in microanalysis, pulverizing samples is a required pretreatment for sample uniformity, homogeneity, and reproducibility.

Various methods have been devised, but they have problems such as a large amount of liquid nitrogen consumption, grinding time of more than ten minutes and a noise level of 90 dB during that time. The "IQ MILL-2070" is a benchtop grinding, agitating, and dispersing device that uses a special high elastic belt to achieve a rapid reciprocating torsional motion\* to solve these problems.

\*Japanese Patent: 7064786

## Features of IQ MILL-2070

## 1. Easy to use and simple to operate

## ● Grinding samples by simple operation

Required settings are only: grinding speed, grinding time, number of cycles, and waiting time. The settings can be easily done with the rotary knob and touch panel.

## 2. Fast and efficient grinding

## ● Milling up to three samples at a time in the same program

Equipped with a holder that holds up to three sample containers for efficient grinding.

## ● Powerful impact and shear crushing capabilities bring significant reduction in grinding time

Rapid reciprocating torsional motion enables sample grinding in a short period of time.

## 3. Liquid nitrogen cooling kit for cryo-milling

## ● A compact design in which only the sample container can be precooled with liquid nitrogen before grinding.

The minimum liquid nitrogen consumption is only about 300 mL for energy saving. The kit contains a cooling container and cooling holder.

## ● Grindable at room temperature without cooling.

Smart quiet design



IQ MILL-2070

## Specifications

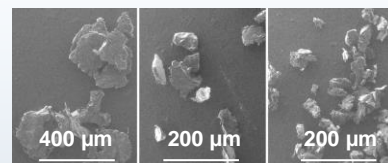
Grinding temperatures	Room temperature or below using a refrigerant (liquid nitrogen, etc.)	
Setting parameters	Rotation speed (rpm)	50 to 3000 (stepless)
	Rotation time (sec)	10 to 60 (10 sec steps)
	Pause time between cycles (sec)	0 to 600 (10 sec steps)
	Cycle (number of repetitions)	1 to 20 (1 cycle step)
Safety function	Malfunction prevention by microswitch and manual locking system	
Main unit dimensions and weight	Width 270 x Depth 340 x Height 300 (mm), 12 kg	
Power (50/60 Hz)	100/120 VAC or 200/240 VAC (450 VA)	
Standard accessories	Sample container, Insulation container, Insert tube, Cooling container, Tongs, Cooling holder, Sieve set, Grinding balls (Tungsten carbide and Zirconia), SS Grinding Rod 12 (Carbide stainless steel)	

## Polystyrene (20 pellets)

2000 rpm x 60 sec x 1 cycle

Precondition temperature

25 °C      0 °C      -196 °C



\*Noise level during pulverization (a reference):

55 dB (when grinding 1 g of PS pellets with a 12 mm diameter zirconia grinding ball at a rotation speed of 3,000 rpm)

# Synthetic/biopolymer grinding applications

Some of the grinding applications and a list of application examples are shown below. For more information, visit our web page. <https://www.frontier-lab.com/products/cryogenic-mill/245165/>

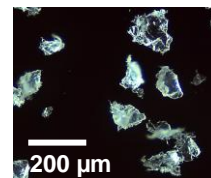


## Polyethylene (LDPE) 0.48 g

A hard-to-grind sample



3000 rpm x 30 sec  
Cryogenic grinding  
x 2 cycles

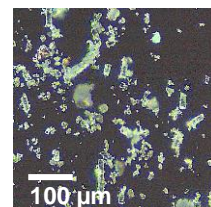


## Electronic circuit board 2.1 g

A sample that can be ground at room temperature



2500 rpm x 30 sec  
Room temp. grinding  
x 10 cycles

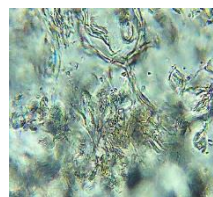


## Bark of young shoot of moso bamboo

A hard-to-grind sample



1500 rpm x 60 sec  
Room temp. wet grinding  
x 10 cycles



3 mm

50 µm

Reference number	Sample	Abbrev.
IQ MILL_Poly_001	High density polyethylene	HDPE
IQ MILL_Poly_002	Low density polyethylene	LDPE
IQ MILL_Poly_003	Polypropylene	PP
IQ MILL_Poly_004	Polystyrene	PS
IQ MILL_Poly_005	Polycarbonate	PC
IQ MILL_Poly_006	Polyvinyl chloride	PVC
IQ MILL_Poly_007	Polyvinylidene chloride	PVDC
IQ MILL_Poly_008	Acrylonitrile butadiene styrene copolymer	ABS
IQ MILL_Poly_009	Silicone rubber	PDMS
IQ MILL_Poly_010	Polymethyl methacrylate	PMMA
IQ MILL_Poly_011	Polyisoprene (natural rubber)	NR
IQ MILL_Poly_012	Ethylene-vinyl acetate copolymer	EVA
IQ MILL_Poly_013	Polyethylene terephthalate	PET
IQ MILL_Poly_014	Polytetrafluoroethylene	PTFE
IQ MILL_Poly_015	Ethylene tetrafluoroethylene copolymer	ETFE
IQ MILL_Poly_016	Nylon 6	N-6
IQ MILL_Poly_017	Nylon 6,6	N-66
IQ MILL_Poly_018	Polyurethane	PO
IQ MILL_Poly_019	Polyetheretherketone	PEEK
IQ MILL_Poly_020	Polyetherimide	PEI
IQ MILL_Poly_021	Copy paper	Paper
IQ MILL_Poly_022	Electronic circuit boards	Board

Reference number	Sample
IQ MILL_Bio_001	Canine teeth
IQ MILL_Bio_002	Shellfish
IQ MILL_Bio_003	Bark of moso bamboo
IQ MILL_Bio_004	Hemp cord
IQ MILL_Bio_005	Wood chip
IQ MILL_Bio_006	Cotton
IQ MILL_Bio_007	Dried squid
IQ MILL_Bio_008	Beef jerky
IQ MILL_Bio_009	Shell strap
IQ MILL_Bio_010	Sea squirt
IQ MILL_Bio_011	Seaweed stem



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