CRYOGENIC MILL

IQ MILL-2075

FOR GRINDING, AGITATING AND DISPERSING SAMPLES

Japanese patent No. 7064786

- **Easy operation**
- **Quick, effective and quiet grinding**
- **Energy saving sample cooling kit included**

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PERFECT FOR SAMPLE PRETREATMENT

Specifically designed for grinding, agitating, and dispersing samples

In instrumental analysis of trace samples, fine grinding and thorough homogenization are critical to achieving high measurement reproducibility. Conventional grinding methods, however, often require long processing times of 10 minutes or longer, consume a large amount of liquid nitrogen, and generate substantial operating noise. The Cryogenic Mill "IQMILL-2075" addresses these challenges with a compact, benchtop design that combines high speed quiet operation and ease of use. In addition, its unique rapid reciprocating torsional motion* - enabled by a highly durable, high elasticity belt - delivers fast, quiet, and highly efficient grinding performance.

Compared with its predecessor, the "IQMILL-2075" features a snap-lock mechanism for quick mounting and removal of sample containers, significantly enhancing workflow efficiency.

IQ MILL-2075 FEATURES

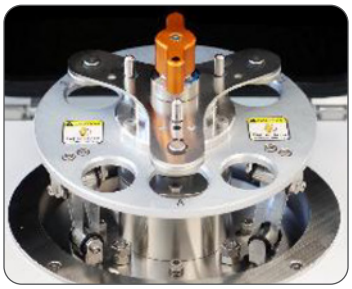
1. Easy to use and simple to operate

• Snap-lock operation

Tool-free, snap-lock operation allows for smooth mounting and removal of sample containers, significantly improving workflow efficiency.

• Grinding samples by simple operation

Required settings are only: Grinding speed, Grinding time, Number of cycles, and Pause time. All of these settings can be easily done through the rotary knob and touch panel.



Sample grinding section
Snap-lock mounting and removal of sample containers

Setting grinding speed

Maximum 10 sets of settings can be saved simply by entering in "FILE LIST".

2. Fast and efficient grinding

• Powerful impact and shear grinding capabilities bring significant reduction of grinding time

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

• Grinding up to three samples at a time in the same program

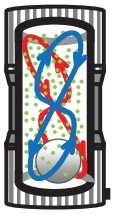
Equipped with a holder that holds up to three sample containers for efficient grinding.

• Quiet operation

Noise level during grinding is only around 55 dB and will not interfere with conversation.

3. Titanium sample containers are standard

• Titanium sample containers offering high chemical inertness are now standard



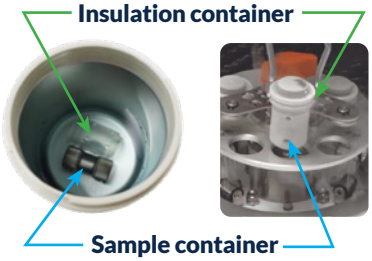
Rapid reciprocating torsional motion of a grinding ball in a sample container

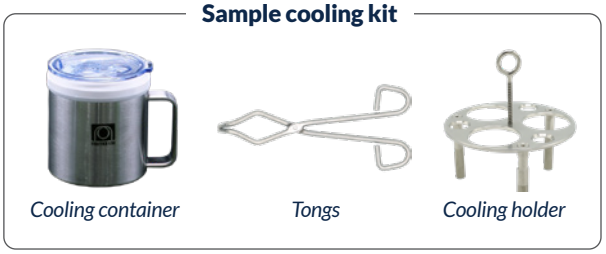
* Lids are made of ultra-hard stainless steel.

4. Energy saving sample cooling kit included *(grindable at room temperature)*

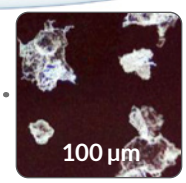
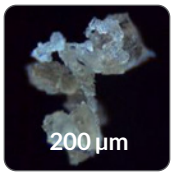
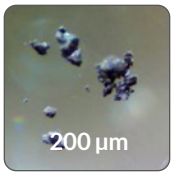
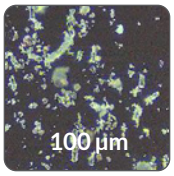
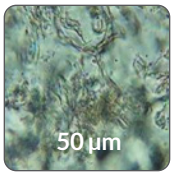
• Low liquid N2 consumption of 300 mL (one sample container with sample and a grinding ball)

The standard sample cooling kit includes cooling container, tongs, and a cooling holder.





SYNTHETIC/ BIOPOLYMER GRINDING APPLICATIONS

Low density polyethylene **0.48 g** (Extremely hard to grind)		3000 rpm for 30 sec **Cryogenic grinding** 2 cycles, 1 repetition		
Polyisoprene **0.53 g** (Extremely hard to grind)		2500 rpm for 10 sec **Cryogenic grinding** 1 cycle, 1 repetition		
O-ring **0.35 g** (Hard to grind)		2800 rpm for 10 sec **Cryogenic grinding** 1 cycle, 1 repetition (Grinding rod used)		
Electric circuit board **2.1 g**		2500 rpm for 30 sec **Room temp. grinding** 10 cycles, 1 repetition		
Bark of mosobamboo shoot (Hard to grind)		2000 rpm for 10 sec **Room temp. wet grinding** 2 cycles, 1 repetition *Buffer solution used		

FURTHER GRINDING APPLICATIONS

Synthetic polymers

- High density polyethylene
- Low density polyethylene
- Polypropylene
- Polystyrene
- Polycarbonate
- Polyvinyl chloride
- Polyvinylidene chloride
- Polyetheretherketone
- Acrylonitrile butadiene styrene copolymer
- Silicone rubber
- Polymethyl methacrylate
- Polyisoprene (natural rubber)
- Ethylene-vinyl acetate copolymer
- Polyethylene terephthalate
- Polytetrafluoroethylene
- Copy paper Others

Biopolymers

- Boar canines (teeth)
- Fox, raccoon, raccoon dog (teeth)
- Shellfish
- Bark of mosobamboo
- Hemp cord
- Wood chip
- Cotton
- Dried squid
- Beef jerky
- Shell string
- Sea squid
- Seaweed stem
- Almond seed (shell)
- Almond seed (edible part)
- Candy
- Leaves of houseplants, and others

Inorganics (room temp. grinding)

- Ceramic (Moh hardness*:9)
- Quartz (Moh hardness:7)
- Sand (Moh hardness: 6 ~ 7)
- Teacup (Moh hardness: ca. 5)

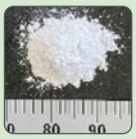
** Ref. Moh hardness of diamond: 10*

Ceramic (SS grinding rod 12 used)

3000 rpm for 20s

Quartz (SS grinding rod 12 used)

2000 rpm for 40s



SAMPLE CONTAINER AND GRINDING MEDIA

Sample container

Product	Material	Volume	Sample amt.*2
Sample containerS-SS set *1	Ultra-hard stainless steel	2 mL	5 mg ~ 50 mg
Sample containerL-TiSset	Titanium container with ultra-hard stainless-steel lids	7 mL	0.05 g ~ 1 g
Sample container L-Ti set *1	Titanium	7 mL	0.05 g ~ 1 g
Sample container LL-Ti set *1	Titanium	20 mL	1 g ~ 2.5 g
Micro Vial 2mL *1	Polypropene	2 mL	10 mg ~ 100 mg

Sample container related accessories

Product	Material	Function
Insulation container	Polycarbonate	Keeps sample container cool
Insert tube	Polycarbonate	Suppresses metal particle generation
Spacer for Micro Vial 2mL *1	Polycarbonate	use with Micro Vial 2 mL

Grinding media

Product	Material	Dimension
Zr grinding ball	Zirconia (ZrO2)	Φ1*, 2*, 3*, 5, 6, 10, 12 mm
WC grinding ball	Tungsten carbide (WC)	Φ1*, 2*, 3*, 5, 6, 10, 12 mm
Al grinding ball *	Alumina (Al_2O_3)	Φ15 mm
SS grinding rod 12	Carbide stainless steel (SUS)	Φ12 mm, L: 20 mm
Zr grinding rod 12 *	Zirconia (ZrO_2)	Φ12 mm, L: 20 mm
WC grinding rod 12 *	Tungsten carbide (WC)	Φ12 mm, L: 20 mm
Ti grinding rod 12 *	Titanium (Ti)	Φ12 mm, L: 20 mm
Grinding rod 12 set *	SUS, ZrO_2, WC, Ti	Φ12 mm, L: 20 mm

A wide variety of containers and grinding media are available for your specific needs!

Sample container S-SS set

Sample container L-TiSset

Sample container LL-Ti set

Micro Vial 2mL

Insulation container

Insert tube

Spacer for Micro Vial 2mL

Zr grinding ball

WC grinding ball

Al grinding ball

SUS

ZrO_2

WC

Ti

Grinding rod 12 set

SPECIFICATIONS

Grinding methods	Cryogenic grinding, Room temperature dry grinding, Room temperature wet grinding	
Grinding setting	Rotation speed (rpm)	50 to max. 3000 (stepless)
	Rotation time (sec)	10 to 60 (10 sec step)
	Pause time between cycles (sec)	0 to 600 (10 sec step)
	Number of cycles (repetitions)	1 to 20 (1 cycle step)
	Programmable parameters	Up to 10 sets of rotation time, inter-cycle pause time, and cycle count (number of repetitions) can be stored.
Safety feature	Hazardous operation prevention by magnetic microswitch.	
Dimension, weight	W 270 x D 340 x H 300 (mm), 12 kg	
Power (50/60 Hz)	AC 100 -120 V or 200 -240 V (450 VA)	
Standard accessory	Sample container, Insulation container, Pre-cooling kit (Cooling container, Tongs, Cooling holder), Sieve set, Grinding balls (tungsten carbide, zirconia), etc.	

Noise level during grinding: 55 dB (1 g of PS pellets ground with a Φ12 mm Zr grinding ball at 3,000 rpm) *Level comparableto normal conversation.*

ORDERING INFORMATION

Product Name	Description	AFP Part No.	Mfg. Part No.
IQ Mill			
Cryogenic Mill IQ MILL-2075, 100-120V	"Perfect for pretreatment of hard-to-grind polymers. Specifically designed for grinding, agitating, and dispersing various samples. In instrumental analysis of trace samples, fine grinding and thorough homogenization are critical to achieving high measurement reproducibility. Conventional grinding methods, however, often require long processing times of 10 minutes or longer, consume a large amount of liquid nitrogen, and generate substantial operating noise. The Cryogenic Mill IQMILL-2075 addresses these challenges with a compact, benchtop design that combines high speed, quiet operation and ease of use. In addition, its unique rapid reciprocating torsional motion - enabled by a highly durable, high elasticity belt - delivers fast, quiet, and highly efficient grinding performance."	SP-100000	IQ-2075-100
Containers and Lids			
Insulation Container, Polycarbonate, 1 ea.		SP-100001	IQ1-2001
Sample Container L-Ti, 7 mL	Titanium, Two O-rings (S-18R) included, 7 mL, no lid, 1 ea.	SP-100002	IQ1-2011
Sample Container L-SS, 7 mL	Stainless Steel, Two O-rings (S-18R) included, 7 mL, no lid, 1 ea.	SP-100003	IQ1-2012
Sample Container S-SS, 2 mL	Stainless Steel, One O-rings (S-10R) included, 2 mL, no lid, 1 ea.	SP-100004	IQ1-2013
Sample Container LL-Ti, 20 mL	Titanium, One O-ring (S-28R) included, 20 mL, no lid, 1 ea.	SP-100005	IQ1-2014
Cooling Container, 1 ea.	Liquid nitrogen vessel used to cool sample containers, 1 ea.	SP-100027	IQ1-4002
Sample Container S-SS Spacer Polycarbonate, 3 ea.		SP-100008	IQ1-2026
Sample Container Top and Bottom Lids, L-Ti Titanium	Top and Bottom Lids for Sample Container L-Ti, 2 ea.	SP-100010	IQ1-2031
Sample Container Top and Bottom Lids, L-SS Stainless Steel	Top and Bottom Lids for Sample Container L-SS, 2 ea.	SP-100011	IQ1-2032
Sample Container Lid, S-SS Stainless Steel	Lid for Sample Container S-SS, 1 ea.	SP-100012	IQ1-2033
Sample Container Lid, LL-Ti Titanium	Lid for Sample Container LL-Ti, 1 ea.	SP-100013	IQ1-2034
Sample Container L-Ti Set	A set of Sample Container L-Ti (P/N:IQ1-2011) and Sample Container Lid L-Ti (P/N:IQ1-2031), 1 set	SP-100017	IQ1-2051
Sample Container L-SS Set	A set of Sample Container L-SS (P/N:IQ1-2012) and Sample Container Lid L-SS (P/N:IQ1-2032), 1 set	SP-100018	IQ1-2052
Sample Container S-SS Set	A set of Sample Container S-SS (P/N:IQ1-2013), Sample Container Lid S-SS (P/N:IQ1-2033), and Sample Container S-SS Spacer (P/N: IQ1-2026), 1 set	SP-100019	IQ1-2053
Sample Container LL-Ti Set	A set of Sample Container LL-Ti (P/N:IQ1-2014), Sample Container lid LL-Ti (P/N:IQ1-2034), O-ring (S-28R, 5 ea), and Al-15 Grinding Ball (10 ea), 1 set	SP-100020	IQ1-2054
Sample Container L-SS Starter Kit	A set of Insulation Container (IQ1-2001, 2 ea), Sample container L-SS Set (IQ1-2052, 2 set), Insert Tube (IQ1-2021, 1 set), and O-ring S-18R (IQ1-2042, 1 set), 1 set	SP-100021	IQ1-2062

ORDERING INFORMATION

Product Name	Description	AFP Part No.	Mfg. Part No.
Vials			
Micro Vial 2mL Polypropene, 2 mL, 200 ea.		SP-100006	IQ1-2016
Spacer for Micro Vial 2mL for IQ MILL-2075	Used with Micro Vial 2 mL, Polycarbonate, 1 ea.	SP-100009	IQ1-2027
Micro Vial 2mL Starter Kit for IQ MILL-2075	Insulation Container (IQ1-2001, 2 ea), Spacer for Micro Vial 2 mL (3 ea), Micro Vial 2mL (200 ea), Zr-5 Grinding Ball (200 g), Zr-3 Grinding Ball (200 g), 1 set	SP-100022	IQ1-2066
Grinding Balls			
Al-15 Grinding Ball Alumina (Al2O3), 15 mm Sphere, 30 ea.		SP-100032	IQ1-AL15
WC-1 Grinding Ball Tungsten Carbide (WC), 1 mm Sphere, 12 g (ca. 1,500 ea.)		SP-100035	IQ1-WC01
WC-2 Grinding Ball Tungsten Carbide (WC), 2 mm Sphere, 13 g (ca. 200 ea.)		SP-100036	IQ1-WC02
WC-3 Grinding Ball Tungsten Carbide (WC), 3 mm Sphere, 30 g (ca. 150 ea.)		SP-100037	IQ1-WC03
WC-5 Grinding Ball Tungsten Carbide (WC), 5 mm Sphere, 50 ea.		SP-100038	IQ1-WC05
WC-6 Grinding Ball Tungsten Carbide (WC), 6 mm Sphere, 50 ea.		SP-100039	IQ1-WC06
WC-10 Grinding Ball Tungsten Carbide (WC), 10 mm Sphere, 20 ea.		SP-100040	IQ1-WC10
WC-12 Grinding Ball Tungsten Carbide (WC), 12 mm Sphere, 20 ea.		SP-100041	IQ1-WC12
Zr-1 Grinding Ball Zirconia (ZrO2), 1 mm Sphere, 200 g (ca. 60,000 ea.)		SP-100043	IQ1-ZR01
Zr-2 Grinding Ball Zirconia (ZrO2), 2 mm Sphere, 200 g (ca. 8,000 ea.)		SP-100044	IQ1-ZR02
Zr-3 Grinding Ball Zirconia (ZrO2), 3 mm Sphere, 200 g (ca. 2,000 ea.)		SP-100045	IQ1-ZR03
Zr-5 Grinding Ball Zirconia (ZrO2), 5 mm Sphere, 200 g (ca. 500 ea.)		SP-100046	IQ1-ZR05
Zr-6 Grinding Ball Zirconia (ZrO2), 6 mm Sphere, 100 g (ca. 150 ea.)		SP-100047	IQ1-ZR06
Zr-10 Grinding Ball Zirconia (ZrO2), 10 mm Sphere, 30 ea.		SP-100048	IQ1-ZR10
Zr-12 Grinding Ball Zirconia (ZrO2), 12 mm Sphere, 30 ea.		SP-100049	IQ1-ZR12
Grinding Rods			
Zr Grinding Rod 12 Zirconia (ZrO2), 12 mm I.D., 20 mm Length, 5 ea.		SP-100050	IQ1-ZR12R
SS Grinding Rod 12 Carbide Stainless Steel, 12 mm I.D., 20 mm Length, 5 ea.		SP-100033	IQ1-SS12R
Ti Grinding Rod 12 Titanium, 12 mm I.D., 20 mm Length, 5 ea.		SP-100034	IQ1-TI12R
WC Grinding Rod 12 Tungsten Carbide (WC), 12 mm I.D., 20 mm Length, 5 ea.		SP-100042	IQ1-WC12R
Grinding Rod 12 Set	Grinding Rod 12 Set SS Grinding Rod 12 (2 ea), Ti Grinding Rod 12 (2 ea), WC Grinding Rod 12 (2 ea), and Zr Grinding Rod 12 (2 ea), 1 set	SP-100031	IQ1-K012R

ORDERING INFORMATION

Product Name	Description	AFP Part No.	Mfg. Part No.
Supplies and Replacement Parts			
Insert Tube Polycarbonate Tube, L series, 10 ea.		SP-100007	IQ1-2021
O-ring (S-18R) Red, Silicone	Prevents loosening the lid of sample container L series, 20 ea.	SP-100014	IQ1-2042
O-ring (S-10R) Red, Silicone	Prevents loosening the lid of sample container S-SS, 20 ea.	SP-100015	IQ1-2043
O-ring (S-28R) Red, Silicone	Prevents loosening the lid of sample container LL Series, 20 ea.	SP-100016	IQ1-2044
Performance Evaluation for IQ MILL, 1 ea.	Performance Evaluation PS Polystyrene Sample for IQ MILL Performance Evaluation (1~2 mm), 1 g, 1 ea.	SP-100023	IQ1-2071
Guide Block	A block with a guide pin attached to the Holder base assembly.	SP-100024	IQ1-2105
Elastic Belt-01, 20 ea.	Highly durable elastic belt. 20 ea.	SP-100025	IQ1-3001
Cooling Holder, 1 ea.	Used to cool a set of three insulation containers in a cooling container, 1 ea.	SP-100026	IQ1-4001
Sieve Set, 1 Set	A set of 40 and 60 mesh sieves and a pan, 1 set	SP-100028	IQ1-4011
Tongs, 1 ea.	Used to remove cooled sample containers from liquid nitrogen, 1 ea.	SP-100029	IQ1-4021
Holder Base Spring and Washer Set	Used for sample container fixing plate mounting part, spring 10 ea., washer 5 ea.	SP-100030	IQ1-7005

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