P-7 premium
PLANETARY MILL

FRITSCH

TECHNICAL SPECIFICATIONS

EASY WORKING. GREAT RESULTS.

CONTENT

TECHNICAL DATA

P-7 premium – Planetary Mill

Working principle	Impact force
Material-type	Hard, medium-hard, soft brittle, tough, moist
Fields of application	Biology Chemistry Ceramics Geology and mineralogy Metallurgy Material research Mechanical alloying Nanotechnology Pharmaceuticals
Grinding station	2 station
Grinding tools	Grinding stations + balls
Materials grinding tools	Agate, hardened stainless steel, hardmetal tungsten carbide, sintered corundum, zirconium oxide, silicon nitride
Grinding bowl sizes	20 ml, 45 ml, 80 ml
Grinding ball sizes	0.1 – 20 mm
Initial size /feeding size max.	5 mm
Sample quantity	2 – 70 ml
Final fineness *(depends on application)*	< 0.05 µm colloidal grinding
Grinding process	Dry/wet
Grinding in inert gas	Yes
Gas pressure and temperature measurement	Yes
Software MillControl	Yes
RPM of main disk	150 – 1100 rpm
Relative bowl speed	2200 rpm

Transmission ratio planetary disk / grinding bowl	$i_{relative}$ = 1 : -2
Effective diameter of main disk	140 mm
Centrifugal acceleration (g = 9.81 m/s²)	95 g
Interface	Yes
Power consumption	1200 watts
Electrical details	100 – 120V / 200 – 240 V/1, 50/60 Hz
Emission sound pressure level at the workplace acc. to DIN EN ISO 3746 *(workplace related)*	80 dB
Weight	44 kg
Safety class	IP21
Dimensions (W x D x H)	Bench-top: 40 x 58 x 36 cm

ACCESSORIES

P-7 premium – Planetary Mill

Order no.	Article
	**Instrument without grinding bowls and balls, incl. SelfLOCK clamping system**
07.5000.00	for 100 – 120 / 200 – 240 V/1~, 50 – 60 Hz, 1,200 watts *Voltage, indicated by customer is set.*
	**Grinding bowls for Planetary Mill P-7 premium**
	Grinding bowls with lid and seal ring
	Grinding bowls 80 ml volume for P-7 premium
50.9620.00	Agate, with steel casing
50.9630.00	Sintered corundum (99.7 % Al_2O_3), with steel casing
50.9660.00	Zirconium oxide, with steel casing
50.9650.00	Hardened, stainless steel, with steel casing
50.9640.00	Hardmetal tungsten carbide, with steel casing
50.9670.00	Silicon nitride, with steel casing
	Grinding bowls 45 ml volume for P-7 premium
50.9720.00	Agate, with steel casing
50.9730.00	Sintered corundum (99.7 % Al_2O_3), with steel casing
50.9760.00	Zirconium oxide, with steel casing
50.9750.00	Hardened, stainless steel, with steel casing
50.9740.00	Hardmetal tungsten carbide, with steel casing
50.9770.00	Silicon nitride, with steel casing

Order no.	Article
	Grinding bowls 20 ml volume for P-7 premium
50.9820.00	Agate, with steel casing
50.9830.00	Sintered corundum (99.7 % Al_2O_3), with steel casing
50.9860.00	Zirconium oxide, with steel casing
50.9850.00	Hardened, stainless steel, with steel casing
50.9840.00	Hardmetal tungsten carbide, with steel casing
50.9870.00	Silicon nitride, with steel casing
	Accessories for Planetary Mill P-7 premium
	Software
83.5605.00	Software MillControl for Windows *For automatic control of the mill and validation of the grinding process*
	Certification for P-7 premium
96.0260.00	IQ/OQ documentation *(Questionnaire format - implementation not included)*
	Accessories for all grinding bowls P-7 premium
50.9900.00	Special emptying device for all premium grinding bowls 80 ml, 45 ml, 20 ml volume
50.9890.00	Counterweight for all premium grinding bowls 80 ml, 45 ml, 20 ml volume *(Essential for weight compensation, if only one grinding bowl is used for grinding)*
	Replacement seal rings for grinding bowls P-7 premium
84.0347.15	Replacement seal ring Silicone 57.5 x 46.5 x 2 mm for agate grinding bowls premium 80 ml, 45 ml, 20 ml volume
84.0342.15	Replacement seal ring Silicone 57.5 x 48 x 2 mm for all other premium grinding bowls 80 ml, 45 ml, 20 ml volume
84.0341.15	Replacement seal ring Viton 57.5 x 48 x 2 mm for all premium grinding bowls 80 ml, 45 ml, 20 ml volume

Order no.	Article
	**Gassing lids for Planetary Mill P-7 premium**
	Accessories for grinding in inert gas and for mechanical alloying
	Gassing lid with valves and seal ring for grinding bowls 80 ml, 45 ml, 20 ml
50.9627.00	Agate, with steel casing
50.9637.00	Sintered corundum (99.7 % Al_2O_3), with steel casing
50.9667.00	Zirconium oxide, with steel casing
50.9657.00	Hardened, stainless steel, with steel casing
50.9647.00	Hardmetal tungsten carbide, with steel casing
50.9677.00	Silicon nitride, with steel casing
	Gassing lids with Swagelok valves are available on request.
	**EasyGTM – Gas pressure and temperature measuring system for Planetary Mill P-7 premium**
	EasyGTM for controlling the grinding process by continuous measurement of gas pressure and temperature
81.0013.00	Receiver unit – board and software MillControl
	EasyGTM grinding bowls 80 ml volume
50.9040.00	Grinding bowl made of agate with special lid and transmitter
50.9080.00	Grinding bowl made of sintered corundum (99.7 % Al_2O_3) with special lid and transmitter
50.9070.00	Grinding bowl made of zirconium oxide with special lid and transmitter
50.9050.00	Grinding bowl made of hardened, stainless steel with special lid and transmitter
50.9060.00	Grinding bowl made of hardmetal tungsten carbide with special lid and transmitter

Order no.	Article
	EasyGTM grinding bowls 80 ml volume
50.9090.00	Grinding bowl made of silicon nitride with special lid and transmitter
	EasyGTM grinding bowls 45 ml volume
50.9040.45	Grinding bowl made of agate with special lid and transmitter
50.9080.45	Grinding bowl made of sintered corundum (99.7 % Al_2O_3) with special lid and transmitter
50.9070.45	Grinding bowl made of zirconium oxide with special lid and transmitter
50.9050.45	Grinding bowl made of hardened, stainless steel with special lid and transmitter
50.9060.45	Grinding bowl made of hardmetal tungsten carbide with special lid and transmitter
50.9090.45	Grinding bowl made of silicon nitride with special lid and transmitter
	EasyGTM grinding bowls 20 ml volume
50.9040.20	Grinding bowl made of agate with special lid and transmitter
50.9080.20	Grinding bowl made of sintered corundum (99.7 % Al_2O_3) with special lid and transmitter
50.9070.20	Grinding bowl made of zirconium oxide with special lid and transmitter
50.9050.20	Grinding bowl made of hardened, stainless steel with special lid and transmitter
50.9060.20	Grinding bowl made of hardmetal tungsten carbide with special lid and transmitter
50.9090.20	Grinding bowl made of silicon nitride with special lid and transmitter

Accessories for single-use technology for P-7 premium

50.9506.00	Grinding bowl made of stainless steel with 6 sample glasses 1.5 ml volume
83.3165.00	Set of sample glasses 1.5 ml volume with lids (set = 12 pieces)
50.6200.00	Grinding bowl aluminium, modified according to customer for the use of tubes

Mahlkugeln für Planetenmühlen

Order no.	Article
	Grinding balls 20 mm dia. for grinding bowls 80 ml
55.0200.05	Agate, polished
55.0200.06	Sintered corundum (99.7 % Al_2O_3)
55.0200.27	Zirconium oxide
55.0200.09	Hardened, stainless steel
55.0200.08	Hardmetal tungsten carbide
55.0200.31	Silicon nitride
	Grinding balls 15 mm dia. for grinding bowls 80 ml, 45 ml
55.0150.05	Agate, polished
55.0150.06	Sintered corundum (99.7 % Al_2O_3)
55.0150.27	Zirconium oxide
55.0150.09	Hardened, stainless steel
55.0150.08	Hardmetal tungsten carbide
55.0150.31	Silicon nitride
	Grinding balls 10 mm dia. for grinding bowls 80 ml, 45 ml, 20 ml
55.0100.05	Agate, polished
55.0100.06	Sintered corundum (99.7 % Al_2O_3)
55.0100.27	Zirconium oxide
55.0100.09	Hardened, stainless steel
55.0100.08	Hardmetal tungsten carbide
55.0100.31	Silicon nitride

Order no.	Article
	Grinding balls 5 mm dia. for grinding bowls 80 ml, 45 ml, 20 ml
55.0050.05	Agate, polished (100 pieces weigh approx. 17 g)[1)]
55.0050.06	Sintered corundum (99.7 % Al_2O_3) (100 pieces weigh approx. 48 g)[1)]
55.0050.27	Zirconium oxide (100 pieces weigh approx. 38 g)[1)]
55.0050.09	Hardened, stainless steel (100 pieces weigh approx. 52 g)[1)]
55.0050.08	Hardmetal tungsten carbide (100 pieces weigh approx. 97 g)[1)]
55.0050.31	Silicon nitride (100 pieces weigh approx. 48 g)[1)]
	[1)] The number of balls required for each grinding bowl can be determined by weighing them using the weight specifications.
	Grinding balls ≤ 3 mm dia. for grinding bowls 80 ml, 45 ml, 20 ml
55.0030.27	Zirconium oxide 3 mm dia.
55.0020.27	Zirconium oxide 2 mm dia.
55.0015.27	Zirconium oxide 1.5 mm dia.
55.0010.27	Zirconium oxide 1 mm dia.
55.0005.27	Zirconium oxide 0.5 mm dia.
55.0001.27	Zirconium oxide 0.1 mm dia.
55.0030.09	Hardened, stainless steel 3 mm dia.
55.0010.09	Hardened, stainless steel 1 mm dia.
55.0030.08	Hardmetal tungsten carbide 3 mm dia.
55.0016.08	Hardmetal tungsten carbide 1.6 mm dia.
55.0006.08	Hardmetal tungsten carbide 0.6 mm dia.
	Grinding balls are also available in other sizes.

Material data grinding bowls/grinding balls

Material	Main component of the material*	Density g/cm³	Abrasion resistance	Sample material
Agate	SiO_2	2.65	Good	Soft to medium-hard samples
Sintered corundum	Al_2O_3	3.8	Fairly good	Medium-hard, fibrous samples
Silicon nitride	Si_3N_4	3.25	Extremely good	Abrasive samples, metal-free grinding
Zirconium oxide	ZrO_2	5.7	Very good	Fibrous, abrasive samples
Hardened stainless steel	Fe – Cr	7.7	Good	Hard, medium-hard, brittle samples
Hardmetal tungsten carbide	WC	14.3	Very good	Hard, abrasive samples

** At www.fritsch.de, you will find the standard analyses with detailed information on the materials directly next to the respective grinding bowls and balls.*

Recommended filling per grinding bowl

Grinding balls ≥ 5 mm: Recommended number of balls per grinding bowl

Grinding bowl Useful capacity (sample volume)		20 ml 1 – 9 ml	45 ml 3 – 20 ml	80 ml 10 – 35 ml
Balls diameter	5 mm	80	180	250
	10 mm	10	18	25
	15 mm	-	7	10
	20 mm	-	-	5

Grinding balls ≤ 3 mm: Recommended ball mass per grinding bowl in grams

Grinding bowl Useful capacity (sample volume)		20 ml 1 – 9 ml	45 ml 3 – 20 ml	80 ml 10 – 35 ml
Material	Zirconium oxide	30 g	70 g	100 g
	Hardened, stainless steel	40 g	90 g	150 g
	Hardmetal tungsten carbide	80 g	200 g	300 g

Grinding balls with a diameter of 3 mm and smaller must be weighed. The above table shows the required weight per grinding cup.

The usable capacity depends on the type of material.

The specified ball filling per cup is the minimum quantity; depending on the material behaviour, it may need to be increased.

In exceptional cases, the quantity of grinding balls can be reduced by up to 15%. In order to achieve consistent grinding results in line with our recommendations, a longer grinding time is necessary, which may result in increased abrasion.

APPLICATION EXAMPLES

P-7 premium – Planetary Mill

Sample 1: Ceramic

Milling:

- 25 x 10 mm zirconium oxide grinding balls
- 850 rpm
- 1 min

Sample 2: Basalt

Milling:

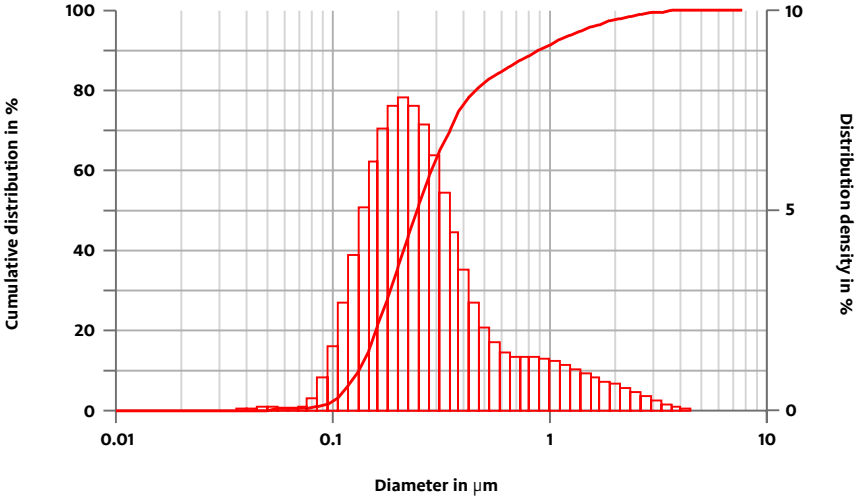
- 5 x 20 mm hardened, stainless steel grinding balls
- 700 rpm
- 1 min

Sample 3: Fly ash

Milling:

- 100 g 0.5 mm zirconium oxide grinding balls
- 1100 rpm
- 30 min

Particle size after milling



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Contact us now

for a non-binding consultation or individual test grinding to identify your ideal device configuration and optimal grinding parameters.

Version number: V01_2025 | Subject to technical changes.

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