

P-7

PLANETARY MILL

 FRITSCH

TECHNICAL SPECIFICATIONS



EASY WORKING. GREAT RESULTS.



CONTENT

Technical data	page 3
Accessories	page 5
Application examples	page 12



TECHNICAL DATA

P-7 – Planetary Mill

Working principle	impact force
Material type	hard, medium-hard, soft brittle, tough, moist
Field of application	geology and mineralogy metallurgy material technology ceramics pharmaceuticals chemistry biology sample preparation for analysis
Working stations	2 stations
Grinding tools	grinding bowls + grinding balls
Materials grinding tools	agate, hardened stainless steel, hardmetal tungsten carbide, sintered corundum, zirconium oxide, silicon nitride
Grinding bowl sizes	45 ml, 12 ml
Grinding ball sizes	1 – 15 mm
Max. initial size / feeding size	5 mm
Sample quantity	0.5 – 40 ml
Final fineness <i>(depends on application)</i>	< 1 µm colloidal grinding
Average grinding time to analytical fineness	3 min
Grinding process	Dry/wet
Grinding in inert gas <i>(Additional lock-system required)</i>	in glovebox
Gas pressure and temperature measurement	none
Rotational speed of main disk	100 – 800 rpm



Transmission ratio planetary disk/grinding bowl	$i_{\text{relative}} = 1 : -2$
Relative bowl speed	1,600 rpm
Effective diameter of main disk	140 mm
Centrifugal acceleration ($g = 9.81 \text{ m/s}^2$)	50 g
Interface	Yes
Power consumption	740 W
Electrical details	100 – 120 / 200 – 240 V/1, 50 – 60Hz
Emission sound pressure level at the workplace acc. to DIN EN ISO 3746 <i>(workplace related)</i>	up to approx. $L_{pAd} = 96 \text{ dB}$
Weight	35 kg
Safety class	IP21
Dimensions (W x D x H)	benchtop: 37 x 53 x 50 cm



ACCESSORIES

P-7 – Planetary Mill

Order no.

Article



Instrument without grinding bowls and balls, incl. clamping system

07.4000.00

for 100 – 120 / 200 – 240 V/1~, 50 – 60 Hz, 740 W

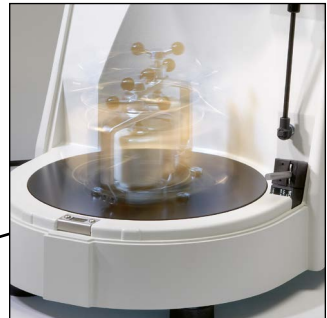
Voltage, indicated by customer is set.

Certification

96.0280.00

IQ/OQ documentation

(questionnaire format – implementation not included)



With rotational speeds of up to 800 rpm, the P-7 is ideal for time-saving and homogeneous fine grinding of small sample quantities.



Order no.

Article



Grinding bowls for Planetary Mill P-7

Grinding bowls 45 ml volume for P-7

50.7050.00	Agate
50.7060.00	Sintered corundum (99.7 % Al ₂ O ₃)
50.7110.00	Zirconium oxide
50.7090.00	Hardened, stainless steel
50.7080.00	Hardmetal tungsten carbide, with steel casing
50.7310.00	Silicon nitride
50.7200.00	Polypropylene disposable bowl
07.3280.00	Bowl adapter for polypropylene disposable bowl
50.7250.20	Replacement seal ring PTFE 50/40 mm dia. for all bowls of 45 ml volume

Grinding bowls 12 ml volume for P-7

50.5050.00	Agate
50.5060.00	Sintered corundum (99.7 % Al ₂ O ₃)
50.5110.00	Zirconium oxide
50.5090.00	Hardened, stainless steel
50.5080.00	Hardmetal tungsten carbide
50.5310.00	Silicon nitride
50.5250.20	Replacement seal ring PTFE 37/26 mm dia. for all bowls of 12 ml volume

Accessories for single-use technology for P-7

50.3200.00	Aluminium grinding bowl, modified to customer specifications, for use with tubes
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To specifically prevent contamination of samples due to unwanted abrasion, all grinding bowls and the corresponding grinding balls are available in 6 different materials.



Order no.

Article



Grinding balls for Planetary Mill P-7

Grinding balls 15 mm dia. for grinding bowl 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 45 ml, 12 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

Grinding balls 5 mm dia. for grinding bowls 45 ml, 12 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 per grinding bowl can be calculated by weighing using the weight specification.

**Order no.****Article****Grinding balls \leq 3 mm dia. for grinding bowls 45 ml, 12 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.

Further grinding balls \leq 3 mm dia. are available.

Grinding balls also available in further sizes.



Material data grinding bowls/grinding balls

Material	Main component of the material*	Density g/cm ³	Abrasion resistance	Sample material
Agate	SiO ₂	2.65	good	soft to medium-hard samples
Sintered corundum	Al ₂ O ₃	3.8	fairly good	medium-hard, fibrous samples
Silicon nitride	Si ₃ N 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 grinding ball size

Application	Suitable ball diameter
Average feed size ≤ 5 mm	15 mm or 10 mm
Fine material ≤ 0.5 mm	10 mm or smaller
Homogenising dry or liquid samples	10 mm or smaller
Homogenising viscous samples	15 mm

The specified grinding ball sizes are application-dependent guidelines. It is not recommended to mix balls with different diameters.



Recommended filling per grinding bowl

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

Grinding bowl		12 ml	45 ml
Useful capacity (sample volume)		0.5 – 5 ml	3 – 20 ml
Balls diameter	5 mm	50	180
	10 mm	6	18
	15 mm	–	7

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

Grinding bowl		12 ml	45 ml
Useful capacity (sample volume)		0.5 – 5 ml	3 – 20 ml
Material	Zirconium oxide	20 g	70 g
	Hardened, stainless steel	30 g	90 g
	Hardmetal tungsten carbide	50 g	200 g

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

The usable capacity depends on the type of material.

The specified ball filling per bowl 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 – Planetary Mill

Sample 1: sand

Milling:

- 45 ml grinding bowl made of steel
- 18 x 10 mm grinding balls
- 800 rpm
- 3 min



Sample 2: coal

Milling:

- 45 ml grinding bowl made of agate
- 7 x 15 mm grinding balls
- 800 rpm
- 1 min





Sample 3: lapis lazuli

Milling:

- 45 ml grinding bowl made of zirconium oxide
- 7 x 15 mm grinding balls
- 800 rpm
- 2 min



Sample 4: chalk

Milling:

- 45 ml grinding bowl made of agate
- 180 x 5 mm grinding balls
- 800 rpm
- 5 min
- wet grinding





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Contact person:

Contact us now

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



