

LIMESTONE

Protocol number: M130172

Industry: Geology / mineralogy

Feed Size: < 1 cm

Desired Fineness: $d_{50} < 1 \mu\text{m}$

Quantity: 350 g

Recommendation: A dry grinding to the desired fineness is not possible. Because the sample use to stick very fast, no combination of grinding balls or grinding ball material will be suitable for a dry grinding of sample. To achieve the desired fineness, we recommend a wet grinding of sample. Because sintered corundum use to produce high amount of abrasion with coarse particles, we recommend using other ceramic materials like e.g. zirconium oxide for grinding your kind of sample.

Result 1



PLANETARY MONO MILL PULVERISETTE 6 CLASSIC LINE

main disk speed: 620 rpm

500 ml grinding bowl made of zirconium oxide (ZrO_2)

+ 8x 30 mm \varnothing zirconium oxide grinding balls

Feed quantity: 350 g

Feed Size: < 1 cm

Grinding time: 1 min

Final fineness: sticks

Comments: Right after the first minute of dry grinding, sample use to stick strongly to grinding bowl and grinding balls.

This uses to happen after the majority of particles reached a fineness of $< 20\text{-}30\ \mu\text{m}$. Interacting forces between fine ground particles will become bigger as their own g-force. Therefore, particles will stick to each other and become compressed by the used grinding balls. These clusters of particles also contain bigger particles which will not be ground any further. Moisture will lead to a faster sticking of sample too.

Still particles up to 3-4 mm can be found. For this, a longer dry grinding time is not recommended. A small amount of sample has been taken out for demonstration.

For a further grinding, we recommend grinding in suspension (see following result).

Pictures:

Original sample before grinding.



Sample use to stick strongly to bowl and grinding balls after the first minute of dry grinding. A longer dry grinding is not recommended.

Meas. No. 6767 SOP 45 Date 04.05.2009 10:21:23 Operator: FRITSCHLAN\Benes

Material: limestone

P7pl 80ml 2mm 30min

Description: water + 30s ultrasonic + 0.1% Na4P2O7

Calculation Automatische Modellerkennung

Mode Wet

Serial No. 22.2000.00/90771

Beam absorption 12,5 %

Pump 70,00 %

Meas. range 0,10 μm - 53,10 μm

Cellposition 1

Channels 51

Ultrasonic On

Scans 100

Prot.-No.: **090082**

5-99%

Obere Kornklasse [μm]	Q3(x) [%]
0,254	5,0
0,307	10,0
0,353	15,0
0,396	20,0
0,437	25,0
0,479	30,0
0,522	35,0
0,565	40,0
0,612	45,0
0,662	50,0
0,714	55,0
0,774	60,0
0,840	65,0
0,911	70,0
0,999	75,0
1,103	80,0
1,233	85,0
1,410	90,0
1,689	95,0
2,307	99,0

01-10 μm

Obere Kornklasse [μm]	Q3(x) [%]
0,100	0,1
0,200	1,5
0,300	9,2
0,400	20,5
0,500	32,5
0,700	53,6
1,000	75,0
1,500	92,1
2,000	97,7
2,500	99,5
3,000	99,9
4,000	100,0
5,000	100,0
6,000	100,0
7,000	100,0
8,000	100,0
9,000	100,0
10,000	100,0

