

# Automated Sonic Sieving Particle Size Analyzer

Robot Sifter

## RPS-205



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## ■ Overview

The Robot Shifter is a sieving analyzer which automates all the process of sample input, sieving, weighing and measurement result calculation. The model RPS-205 can continuously measure up to 20 samples, so the RPS-205 has an automated sieve cleaning mechanism. The measurement principle is sonic wave by air vibration. It has a sonic frequency control function and features ease of use, robustness, and air tightness. The Robot Shifter makes less noise and vibration and needs less time due to the efficient sonic vibration.

## ■ Features

### 1. Automatic Measurement & Easy Operation

All the process from sample measurement to data print out are automated. Then the Robot Shifter has the 3.8 inch LCD touch panel. Operator can easily input sieving conditions with a finger.



### 2. Speedy & Accurate Classification

With the synergetic effect of sonic wave & mechanical pulse, classification speed is much higher than ro-tap or electromagnetic sieve shakers. Furthermore, the right hand measures sample weight and the left hand cleans sieves at the same time. This mechanism shortens the operation time.

### 3. Changeable Sonic Wave Frequency

Robot Shifter can change sonic frequency from 40 to 99 Hz. This provides measurements of samples under the best conditions.

### 4. Prevention of Clogging

Horizontal pulses for prevention of clogging can be adjusted freely.

### 5. Up to 20 samples continuously measurable

20-cup sampler is built in.

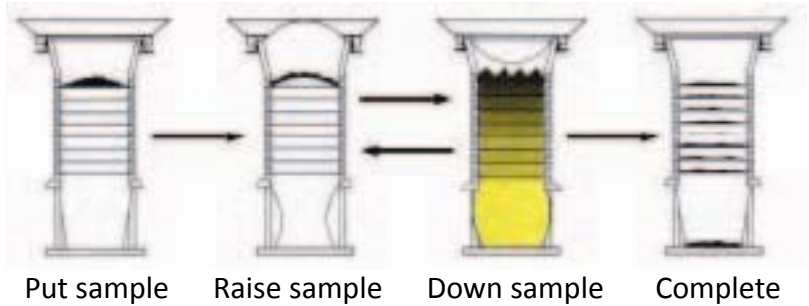
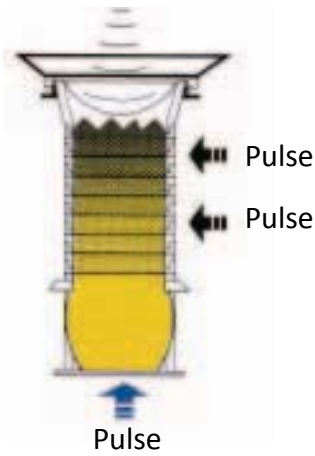


### 6. Innovative Sieve Cleaning Shell

Swirling air blown in the closed shell cleans fine powders completely.

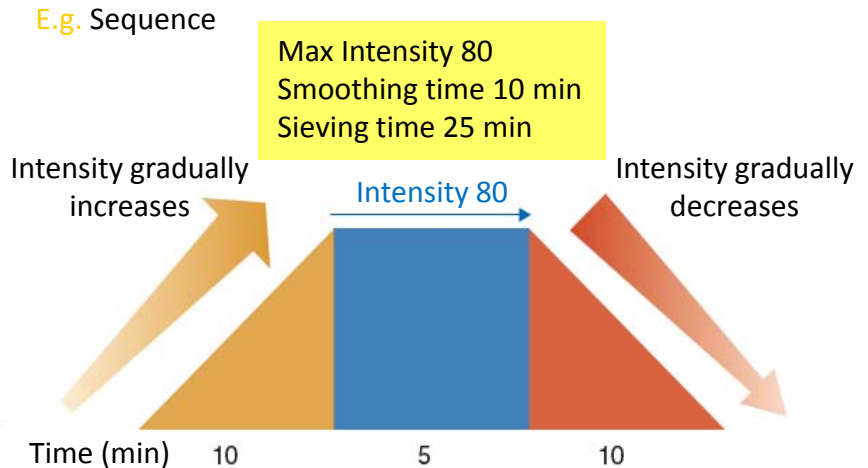
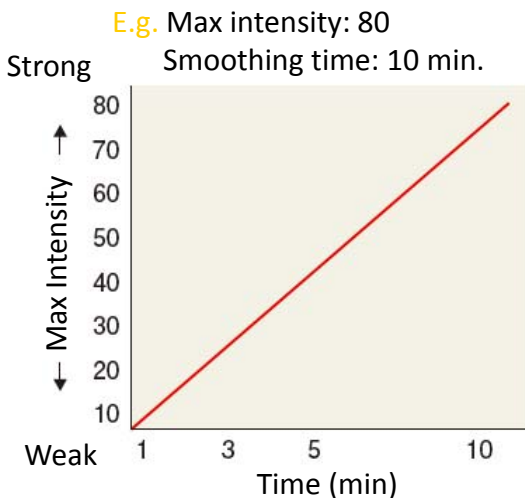
## ■ Principle

By vibrating only air inside of closed sieves, sample on the sieves continues a cyclic vertical movement. Sample jumps up from the sieves every half cycle and returns on the sieves next half cycle. Some of the particles pass through the sieves and the others remain on the sieves. This principle minimizes abrasion of sample and sieves. For prevention of adhesion and clogging, pulses also mechanically hit on the bottom and sides of sieves.



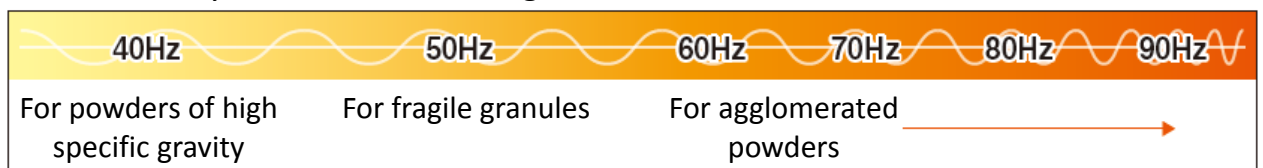
## ■ Smoothing Mechanism of Sonic Wave Intensity

The smoothing mechanism of sonic wave intensity is effective for samples including fine particles which may be instantly agglomerated by strong vibration. The sifter starts sieving with weak vibration to sieve fine particles which may cause agglomeration. The sifter gradually increases vibration to the max sonic wave intensity and sieves the sample in the set period.



## ■ Changeable Sonic Wave Frequency (40-99 Hz)

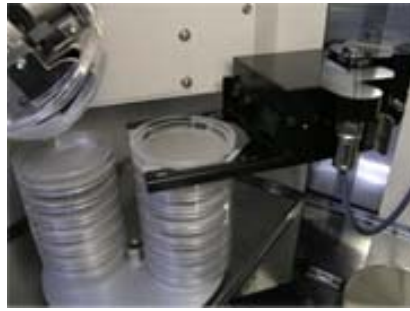
Changeable frequency can prevent adhesion and agglomeration of powders by static electricity and destruction of granule.



## Measurement Flow



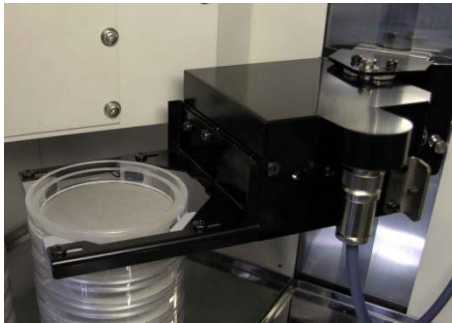
**① Set sample / Start measurement**  
Set sample up to 20 and start measurement.



**② Measure sieve weight / Input sample**  
Measure sieve tare weight and sample weight.



**③ Sieve samples**  
Classify samples for a set time.



**④ Move sieves (after sieving) / Measure sieve weight**  
After sieving, move sieves to the weighing section and measure each sieve weight.



**⑤ Calculate and print out result**  
Calculate data and print out measurement result (Option).

## Print Out Example

① Conditions

② Ave particle size

③ Weight cumulative distribution

④ Weight distribution per sieve

⑤ Sample weight per sieve

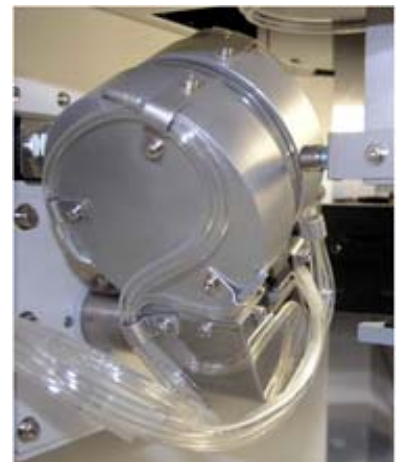
```

----- RPS-105 -----
測定日:2006/08/22 15:07
試料名:
Lot No.:
測定者:
サンプル重量: 000.05g
音波強度: 40
音波周波数: 51Hz
分給時間: 02m.00s.
バリエーション: 1 sec.
50%径: 1442.3 μm

--- 集積率 ---
1.2800 MIC. 066.66%
2.2000 MIC. 066.66%
3.1700 MIC. 066.66%
4.1400 MIC. 066.66%
5.1180 MIC. 083.33%
6.1000 MIC. 083.33%
7.0850 MIC. 100.00%
8.0212 MIC. 100.00%
PASS 100.00%

--- 頻度率 ---
1.2800 MIC. 066.66%
2.2000 MIC. 000.00%
3.1700 MIC. 000.00%
4.1400 MIC. 000.00%
5.1180 MIC. 016.67%
6.1000 MIC. 000.00%
7.0850 MIC. 016.67%
8.0212 MIC. 000.00%
PASS 000.00%

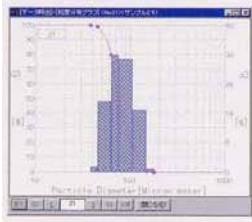
--- 各段ふるい上重量 ---
1.2800 MIC. 000.04g
2.2000 MIC. 000.00g
3.1700 MIC. 000.00g
4.1400 MIC. 000.00g
5.1180 MIC. 000.01g
6.1000 MIC. 000.00g
7.0850 MIC. 000.01g
8.0212 MIC. 000.00g
PASS 000.00g
    
```



**⑥ Sieve cleaning and next measure**  
Used sieve is cleaned in the closed shell and next sample measure start. (Go to ①)

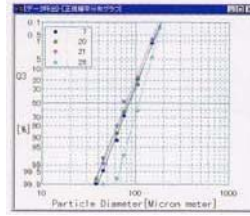
## PC Output Data (Windows 98/2000/XP)

### 1. Standard Distribution Graph



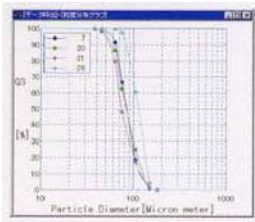
Standard graph

### 2. Comparative Normal Probability Distribution



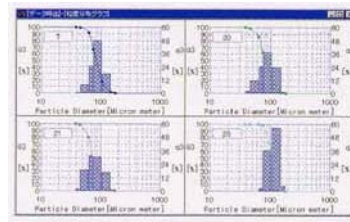
Up to 6 data compared

### 3. Comparative Cumulative Distribution



Up to 6 data compared

### 4. Comparison of Graphs



Up to 6 data of zone and cumulative graphs compared

## Measurement Data Example

Measurement Conditions :

Sample: Metal powder, Sonic Wave: 5

Pulse: 1/1 sec, Sieving Time: 5 min

Smoothing Time: 3 min

|            | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     |
|------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 250um      | 1.31   | 1.40   | 1.16   | 0.99   | 1.28   | 1.12   | 1.18   | 1.03   | 1.16   | 1.05   |
| 212um      | 12.90  | 12.14  | 12.97  | 11.33  | 12.72  | 12.18  | 12.69  | 12.18  | 12.75  | 12.34  |
| 150um      | 33.61  | 32.46  | 33.96  | 31.54  | 34.22  | 33.13  | 34.89  | 32.98  | 33.90  | 33.19  |
| 106um      | 52.15  | 51.46  | 53.01  | 50.40  | 53.21  | 51.77  | 53.54  | 51.92  | 52.76  | 51.78  |
| 63um       | 76.10  | 75.75  | 76.88  | 74.90  | 76.59  | 75.74  | 76.28  | 75.92  | 76.47  | 75.57  |
| 45um       | 85.29  | 85.09  | 86.13  | 84.88  | 85.76  | 85.31  | 84.56  | 84.61  | 85.34  | 85.12  |
| 38um       | 89.61  | 89.68  | 90.32  | 89.05  | 89.95  | 89.56  | 89.51  | 89.54  | 89.75  | 89.42  |
| 20um       | 94.47  | 93.72  | 94.20  | 92.34  | 93.89  | 94.11  | 94.15  | 94.21  | 94.03  | 94.09  |
| Pass       | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| Ave Size   | 111    | 109    | 112    | 106    | 113    | 110    | 114    | 110    | 112    | 110    |
| Weight (g) | 18.61  | 16.99  | 16.74  | 17.02  | 20.27  | 19.52  | 21.98  | 23.12  | 23.11  | 19.04  |

## ■ Application

|                     |   |
|---------------------|---|
| Medicine            | No. 1 experience in pharmaceutical industry. <b>Japanese Pharmacopoeia recommended.</b><br>E.g. granule, powder, fine powder        |
| Food                | Sieving without destruction of granules<br>E.g. powdered milk, seasoning, flour, rice powder  |
| Casting Sand        | Widely used in casting sand industry. Capable to calculate FSN index.<br>E.g. casting sand for making casts of engines, filter sand |
| Abrasive            | For powders which are easily worn away.<br>E.g. Alumina, silicon carbide, diamond   |
| Resin               | Especially for resins of fine and highly adhesive powders.<br>E.g. PVC, fluorine resin, acrylic, toner                              |
| Electronic Material | For spherical powders which easily clog sieve openings.<br>E.g. spherical silica, gold powder, silver powder, carbon                |
| Metal               | For powders of high specific gravity.<br>E.g. solder powder, nickel, iron powder  |
| Battery Material    | For fine powders<br>E.g. lithium, cobalt  |

## ■ Specification

|                      |  |
|----------------------|--|
| Model                | RPS-205  |
| Applicable Sieve     | Φ75mm special sieve  |
| Dimension            | 760W x 530D x 680H [mm]                                      |
| Weight               | 90 [kg]  |
| Number of Sieve      | 8 sieves x 2 sets  |
| Number of Sample Cup | 20 (automated continuous measurement)                        |
| Dust Collector       | Floor vacuum cleaner (standard equipment)                    |
| Utility              | Power: AC100V x 50/60Hz x 1.5kW<br>Air: 0.4MPa x max300l/min |
| Option               | External thermal line printer, Software for PC               |