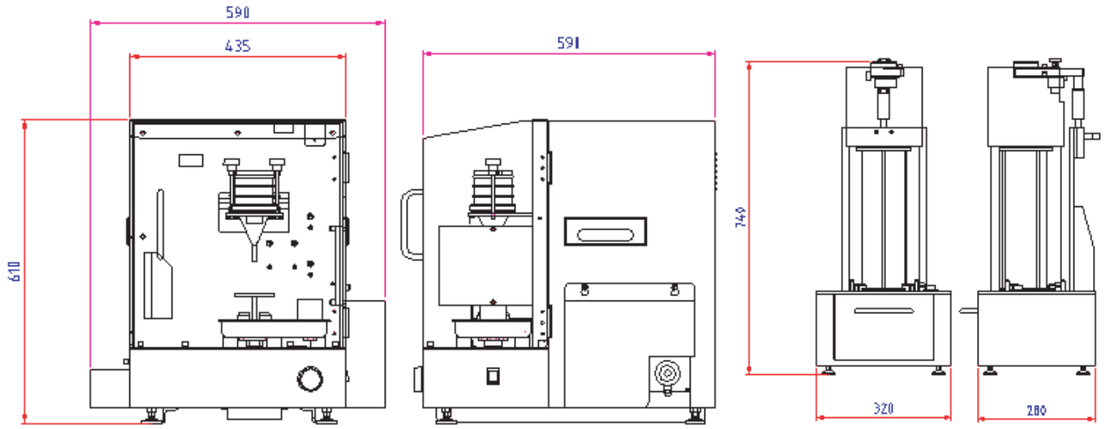
Dimensions



Main body　　Dispersibility unit

Technical data

Power supply	100 VAC, dedicated to either 50 Hz or 60 Hz
Weight of main body	Approx. 70 kg
Outside dimensions	430W×586D×605H mm

● Operator interface & display

Device	Personal (desktop / laptop) computer

● Screen vibrating section

Screen vibrating section	3000/3600　VPM50/60Hz
Amplitude of screen	0 to 3 mm
Timer setting	Max. 999 sec. (arbitrarily selectable, 1 sec. increments)

● Angle measuring section

Function	CCD image processing system

● Weight measuring section

Function	Measuring operation program-controllable from the CPU on the main body, based on the data from the electronic balance.

● Tapping section

Tapping stroke	18 mm, 10 mm (optional)
Number of revolutions	Max. 999 (arbitrarily selectable) 1 revolution/1.2 sec. at 50 Hz, or 1 revolution/1 sec. at 60 Hz

● Data communication function

External output
RS232C for control and communication for electronic balance
RS232C for connection to outside computer
One 9P (DB9) D-sub connector for each
100 VAC for power supply to electronic balance
External output : 1　　USB terminals : 2

Process Technologies for Tomorrow

HOSOKAWA MICRON CORPORATION

Powder Processing Systems Company

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URL http://www.hosokawamicron.co.jp

New Product

HOSOKAWA MICRON POWDER TESTER
Powder Characteristics Tester model PT-S

The HOSOKAWA Powder Tester is capable of measuring a wide scope of powder characteristics.

- ☐ The instrument instantaneously measures the Angle of Repose and or the Angle of Spatula.
- ☐ The attainable information supports powder handing machine design and powder quality design management.
- ☐ This standard testing unit has been developed to support a wide range of industries.

Process Technologies for Tomorrow

HOSOKAWA MICRON CORPORATION

Overview

In spite of its compact size the HOSOKAWA Powder Tester can measure seven characteristics and three auxiliary values, which are critical in planning and designing of, powder processing and quality management systems. The HOSOKAWA Powder tester is a highly reliable instrument used for determining "Flowability" and "Floodability" values of dry solids in accordance with the proven methods of D.L. Carr, as a result the Powder Tester has a proven service record in a wide range of related industries.

[Seven characteristics values]

1. Angle of Repose *2.* Compressibility *3.* Angle of Spatula *4.* Cohesion
5. Angle of Fall *6.* Dispersibility *7.* Angle of Difference

[Three auxiliary values]

1. Aerated bulk density *2.* Packed bulk density *3.* Uniformity

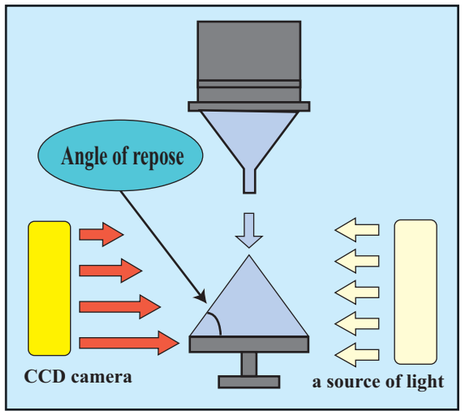

Fig.1 Automatic measuring operation for Angle of Repose

Features

- ☐ The HOSOKAWA Powder Tester, is capable of rapidly performing all seven powder characteristic measurements proposed by Dr. Carr, when determining handling traits of powder material are critical.
- ☐ The Angle of Repose and Angle of Spatula are automatically measured in a very short time span. A CCD (charge coupled device) camera has been incorporated into the tester, and the Angle of Repose and Angle of Spatula are accurately measured by image processing to further improve the accuracy of measurements.
- ☐ Repeatability for measurement result has been improved.
  - *1.* Position variation with the automatic shocker used in determining the Angle of Fall and the Angle of Spatula measurement method is positively limited.
  - *2.* The technique for measuring an Angle of Spatula has been improved by optimizing the size of the detection zone.
  - *3.* The digital value of the screen platform vibration amplitude can be monitored by the addition of an OPTIONAL indicator. Using this gauge the amplitude of screen platform can now be controlled more accurately, unlike the previous manual adjustment method based on visual gauge interpretation.
- ☐ The scope of the operating method has been expanded to further improve "User "Friendliness" of the Powder Tester.
- ☐ In addition to the standard measurement characteristics, the following OPTIONAL measurement methods for apparent specific gravity are now possible..
  - *1.* JIS Ceramics Standard (JIS R 1628, JIS R 1639-2)
  - *2.* Kawakita's Compressibility Evaluation Method
  - *3.* USP Tapping Density
- ☐ Cleaning procedures are now simplified as a result of the inner wall of the powder tester being an integral part of the structure
- ☐ A standard market-available, computer may be used to control the HOSOKAWA Powder Tester during the measurement operation, enabling simple data processing and result storage.
- ☐ The HOSOKAWA Powder Tester software conforms to FDA CFR21 Part 11 (Electronic signature recording).
- ☐ The measuring & control software supports English / Japanese.
- ☐ The Powder Tester is capable of displaying a radar type chart of the obtained data; a visual image enables the operator to simply evaluate the results.

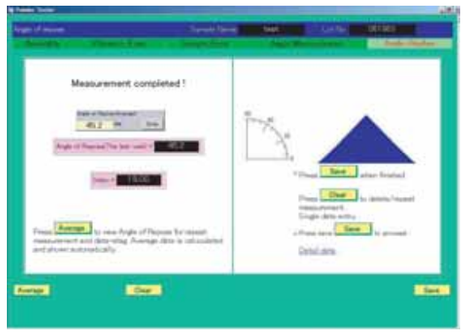

Fig.2 Screen image of the measuring & controlling software

Fig.3 One scene of operation

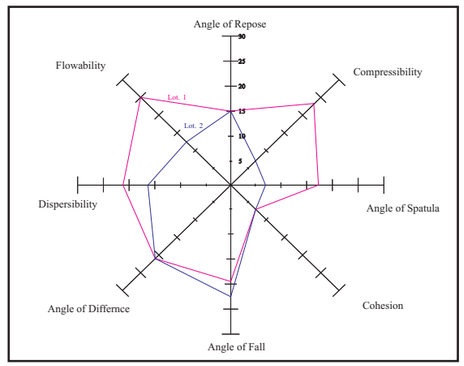

Fig.4 Typical radar chart

Applications of the HOSOKAWA Powder Tester

Expression of "Flowability" characteristics

When dealing with powder it is important to fully understand the flowability characteristics. The HOSOKAWA Powder Tester, in compliance with the Dr. Carr's methods, can identify the "Flowability" characteristics of a dry solid, in particular, the transient period from a static state to a dynamic state. The reliability of this "Flowability" characteristics evaluation method has further been statistically demonstrated.

Correlation with actual phenomena

The fact that the "Flowability" characteristic obtained with the HOSOKAWA Powder Tester is closely linked with other physical properties and determining the actual phenomena of a powder material has been shown to be a useful evaluation tool in planning powder handling, processing and quality assurance programs.
Some examples of such correlation are given below:

1. Minimum flow-out diameter and "Flowability" index

The readiness for discharge from a hopper (in other words, degree of cross-linking) can be expressed as plotted in Fig. 5 in terms of the minimum diameter of particles that can be discharged from a hopper.
(Draft book for lectures for 14th panel for powder material, 75 1976)

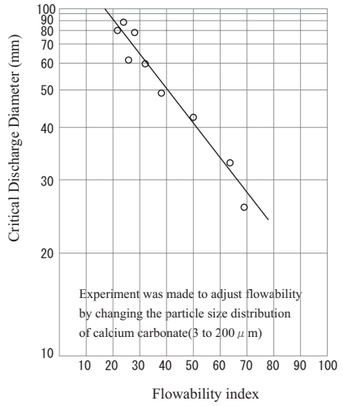

Fig.5 Interrelation between minimum flow-out diameter and "Flowability" index

2. Water content and "Flowability" index

The water content in a powder material greatly affects the "Flowability" characteristic of the materials. Researchers in powder technology often experience problems with the "Flowability" characteristic of a powdered material due to the variation in water content. In order to be able to prevent this type of problem, it is necessary to quantitatively determine the effect of water content in a powder material, specifically as it would relate to the "Flowability" of the material. (See Fig. 6.)
(Kagaku Kikai Gijutsu vol. 22, 155, The Society of Chemical Engineers of Japan, Maruzen, 1970)

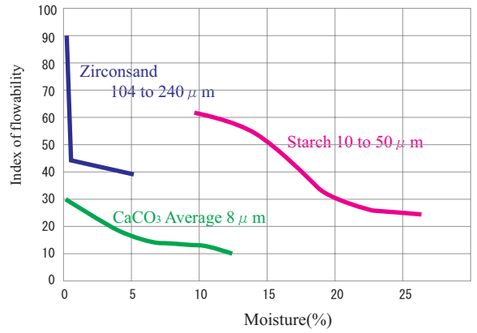

Fig.6 Interrelation between water content and "Flowability" index

3. Mixing Velocity and "Flowability"

In planning a powder mixing process, it is important to consider the mixing velocity factor. The significant effect of a Mixing Velocity factor over the "Flowability" characteristic of a powder material has been demonstrated. Based on the interrelation between "Flowability" index and mixing velocity factor (see Fig. 7), the HOSOKAWA Powder Tester can be utilized for planning and managing a powder mixing process.
(Funtai Kogaku Kenkyukai-shi, 9, 83, 1972)

4. Human senses, "Flowability" and "Floodability" index

A certain pharmaceutical manufacturer carefully determined whether or not the "Flowability" and "Floodability" index obtained with the HOSOKAWA Powder Tester coincide with the human senses of the workers who actually handle a powder material. As a result, a close match was reported as to the interrelation between the sensory "Flowability" index and the measurements obtained with the HOSOKAWA Powder Tester. (See Fig. 8, Funtai Kogaku Kenkyukai-shi, 9, 90, 1972)

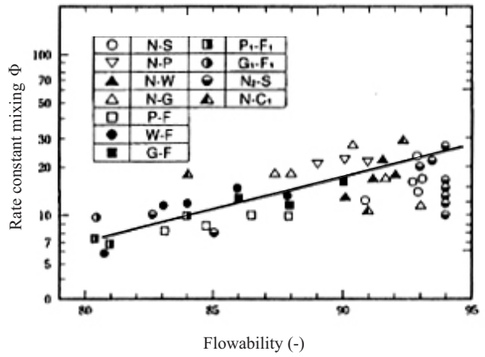

Fig.7 Effect of "Flowability" index on Mixing Velocity factor

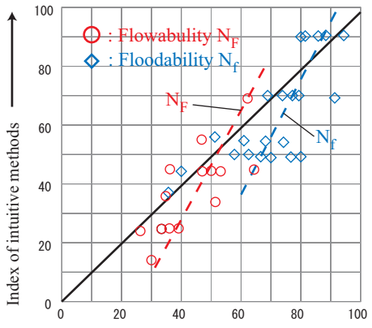

Fig.8 Interrelation between "Flowability" index and Sensory index