

Global Standard

# *Powder Tester*

For the Powder Characteristic Evaluation




**HOSOKAWA MICRON CORPORATION**

R & D division / Shuji Sasabe

# ◆ Carr's method





**Dr. R. L. Carr**

Ralph L. Carr, Jr., is chemical laboratory supervisor and plant chemist of B I F Div. of The New York Air Brake Co., at Providence, R.I. He holds an Associate degree in chemistry and a B.S. in chemical engineering and management from Boston University, Boston. Mr Carr has been with the company since 1951. He is a member of the American Chemical Society, its Rhode Island Section, and the American Society of Mechanical Engineers, its Rhode Island Section.

Floodability and Performance	Flowability		Angle of Fall		Angle of Difference		Dispersibility %
	Pts. (Table I)	Points	Deg.	Points	Deg.	Points	
Very floodable. 80-	60+	25	10	25	30+	25	50+
			24	24	29-	24	49-
			22.5	27	22.5	22.5	43
			22	26	22	22	42
			21	25	21	21	41-
			20	24	20	20	35
			19.5	23	19.5	19.5	34
			18	22-	18	18	33-
			17.5	19	17.5	17.5	28
			17	18	17	17	27
			16	17-	16	16	26-
			15	15	15	15	20
			14.5	14	14.5	14.5	19
			12	13-	12	12	18-
			10	11	10	10	10
9.5	9	9.5	9.5	9			
8	8	8	8	8			

**Properties of Solids**

Dr. Carr tested over 2800 different dry materials.

Behavior of solids in their handling equipment depends on their density and hardness—so engineers find a few of the more...

Drop point — X

4" I.D.

7"

13"

4" watch glass

Steel bushing, III.0 grams, 1" I.D., 1 1/2" O.D., 1 1/2" long, dropped 7"

beneath the mark

L-shaped indicator

Angle of repose

Material

Plate

Tray

Overflow material

Plastic cylinder

4" watch glass

Thanks to Dr. Carr's method and Hosokawa's developments we now are able to express the flow- and floodability of dry materials into reliable values.

Fractures of both bases of the solid must be used in order to completely understand and apply the flow behavior of the material. Let us first capture the properties of the individual particles. Some of these characteristics will determine the type of flow we want.

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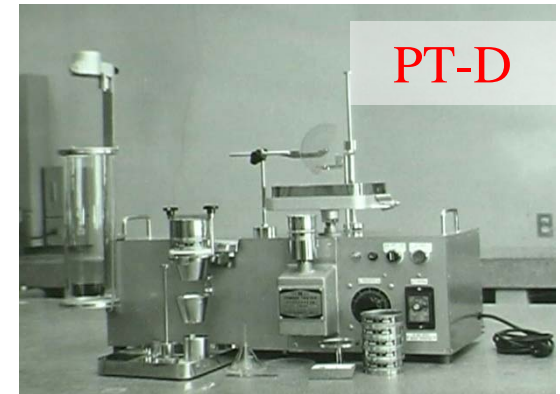
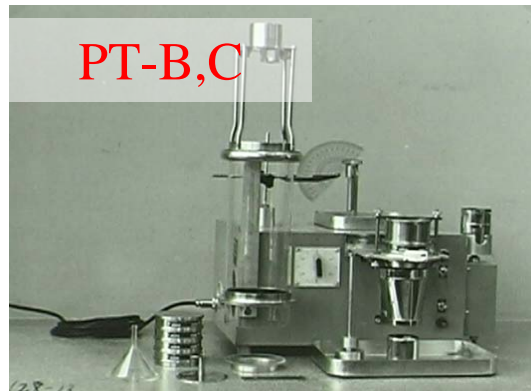
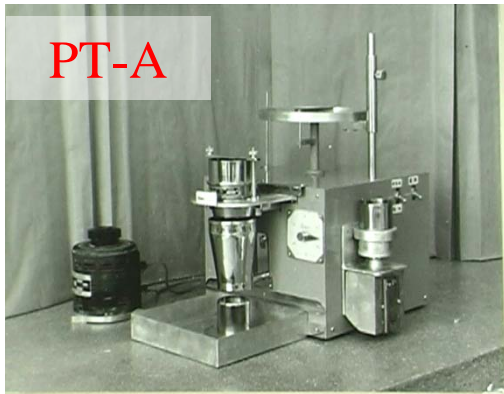
# ◆ *Powder Tester* model *PT-X*



- The 9 th version of *POWDER TESTER* since 1968

**POWDER TESTER** is widely used all over the world.

Over 3,500 units of **POWDER TESTER** have been delivered to industries in 40 years..



**Powder Tester is involved in more than 5,000 patent applications only in Japan.**

# ◆ ASTM No. D6393-99



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[D6393-99 Standard Test Method for Bulk Solids Characterization by CARR Indices](#)

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### 1. Scope

1.1 This test method covers the apparatus and procedures for measuring properties of bulk solids, henceforth referred to as **CARR** Indices.

1.2 This test method is suitable for free flowing and moderately cohesive powders and granular materials up to 2.0 mm in size. Materials must be able to pour through a 7.0 + or - 1.0 mm diameter funnel outlet when in an aerated state.

1.3 This method consists of eight measurements and two calculations to provide ten tests for **CARR** Indices. Each individual test or a combination of several tests can be used to characterize the properties of bulk solids. These ten tests are as follows:

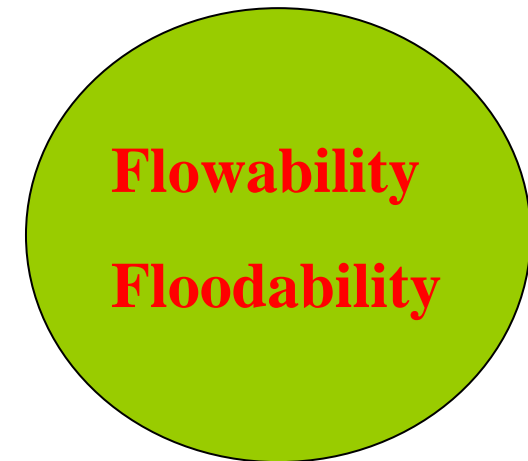
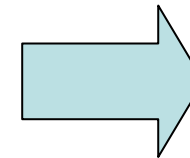
- 1.3.1 Test A-Measurement of **CARR** Angle of Repose
- 1.3.2 Test B-Measurement of **CARR** Angle of Fall
- 1.3.3 Test C-Calculation of **CARR** Angle of Difference
- 1.3.4 Test D-Measurement of **CARR** Loose Bulk Density
- 1.3.5 Test E-Measurement of **CARR** Packed Bulk Density
- 1.3.6 Test F-Calculation of **CARR** Compressibility

**Prepared by Dr.C.C.Huang**

# ◆ Basic Concept of Carr's Evaluation

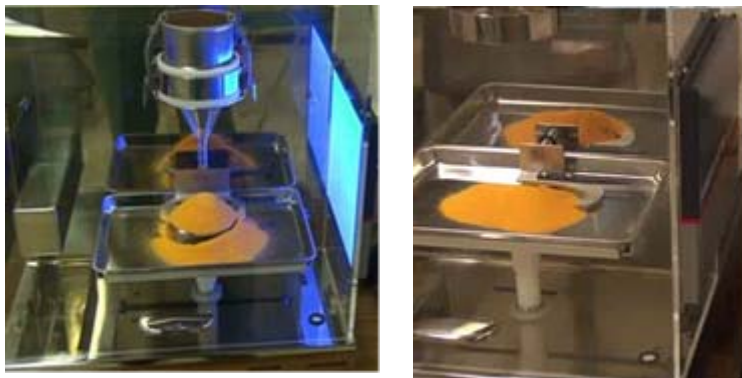


Compression	Aerated Bulk Density
	Packed Bulk Density
	Compressibility
Shear Property	Angle of Repose
	Angle of Collapse
	Angular Difference
	Angle of Spatula
Others	Cohesiveness
	Dispersibility
	Uniformity

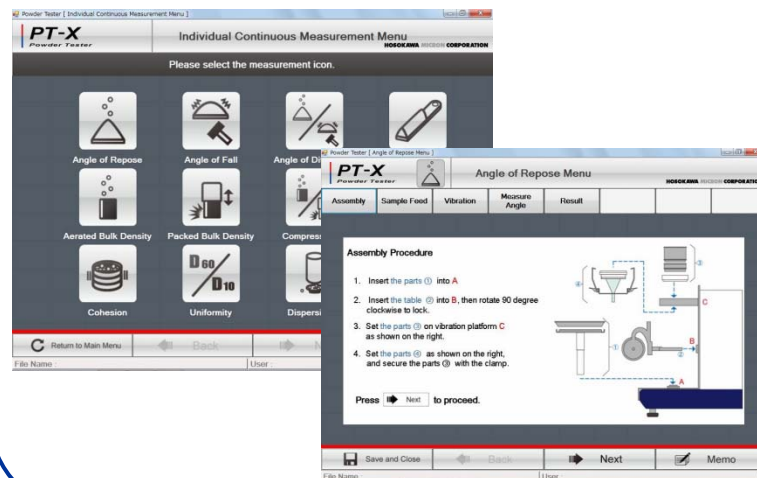


# ◆ Features

## Angle measurement



## User friendly Touch panel operation



## Bulk Density



- CE conformity
- RoHS correspondence
- Shortening of measurement time

## Electronic control

