

## Choosing the Proper Penetrometer

Three criteria determine which penetrometer you should use when performing mercury intrusion porosimetry analyses.

- **Sample type:** If your sample is powdered, granular, or has fine particles loosely adhering to larger pieces, use the **powder** penetrometer. The sample bowl for the **powder** penetrometer has an extension of the capillary stem protruding into the bowl, preventing particles from falling into the capillary bore. If your sample is a solid form or large chunks, use the **solid** penetrometer.
- **Sample volume:** Use a quantity of sample that nearly fills the penetrometer. The penetrometer sample bowls come in three sizes: 3, 5, and 15 cm<sup>3</sup>. Therefore, if your sample volume is 4 cm<sup>3</sup> and it will fit into the 5-cm<sup>3</sup> sample bowl, then the 5-cm<sup>3</sup> penetrometer would be your best choice.

Typical inside dimensions for the bowls of solid and powder\* penetrometer stems are:

- 3 cm<sup>3</sup> bowl: 16 ID x 14 D mm (0.63 x 0.55 in.)
- 5 cm<sup>3</sup> bowl: 16 ID x 26 D mm (0.63 x 1.023 in.)
- 15 cm<sup>3</sup> bowl: 26 ID x 26 D mm (1.023 x 1.023 in.)

\*Some loss of available sample volume occurs due to the stem which protrudes into the sample bowl of the powder penetrometer.

- **Sample intrusion volume:** The amount of mercury required to fill the sample pores ideally should fall between 25 and 90% of the “maximum intrusion volume” of the penetrometer. An ideal range of available intrusion volume which will give consistently good resolution is 50 to 80%. In other words, make sure the penetrometer contains enough mercury to fill the sample’s pores. And allow extra intrusion volume for intraparticle voids contained in powdered samples as this will also be measured as intrusion volume.

Use the chart of specifications for Micromeritics penetrometers on page 2 to help you choose the proper penetrometer for your sample.

## Penetrometer Specifications

Sample Volume (cm <sup>3</sup> )	Sample Type	Maximum Intrusion Volume (cm <sup>3</sup> )	Part Number
3	Solid	0.387	950-61713-00
3	Powder	0.387	950-61714-00
3	Solid	1.116	950-61715-00
3	Powder	1.116	950-61716-00
5	Solid	0.366	950-61707-00
5	Powder	0.366	950-61708-00
5	Solid	1.057	950-61709-00
5	Powder	1.057	950-61710-00
5	Solid	1.716	950-61711-00
5	Powder	1.716	950-61712-00
15	Solid	0.366	950-61701-00
15	Powder	0.366	950-61702-00
15	Solid	1.057	950-61703-00
15	Powder	1.057	950-61704-00
15	Solid	1.716	950-61705-00
15	Powder	1.716	950-61706-00
15	Solid	3.007	950-61724-00
15	Solid	3.857	950-61725-00

The component parts of a penetrometer are shown below.

