

## Characterization of Medicinal Tablet Surface Area with the Gemini Series

Gas adsorption surface area values can predict the reaction rate of compounds such as medicinal products in tablet or powder form. The dissolution rates of these products are directly related to the magnitude of their surface areas. Tablets and powders generally have low gas adsorption surface area values.

The Materials Analysis Lab (MAL) at Micromeritics demonstrated that a wide range of surface area values exists for over-the-counter pain relievers. Using the Micromeritics Gemini Surface Area Analyzer and standard, multipoint analysis protocol, the MAL determined the nitrogen adsorption surface areas of three house brands of aspirin, four samples of aspirin from two major pharmaceutical houses, and two brands of non-aspirin pain relievers. The results are tabulated below.

**Table 1. Three House Brands of Aspirin**

Sample Number	Surface Area (m <sup>2</sup> /g)
1	0.3798
2	0.1941
3	0.8393

These samples exhibited a wide range of multipoint nitrogen surface area values, indicative of a broad range of dissolving times and reaction rates. Product performance is expected to vary widely in this group.

**Table 2. Two Major Pharmaceutical Brands of Aspirin**

Sample Number	Surface Area (m <sup>2</sup> /g)
4	0.4040
5	0.4058
6	0.3834
7	0.2699

Samples 4, 5 and 6 are from different lots of the same aspirin product. The surface area values are similar, indicating good control over production processes. Sample 7 has a lower surface area than the other three. Therefore, its dissolution rate is slower than the dissolution rates of Samples 4, 5 and 6, and its medicinal properties are expected to be available to the patient at a slower rate than those of Samples 4, 5, and 6.

**Table 3. Non-Aspirin Pain Relievers**

Sample Number	Surface Area (m <sup>2</sup> /g)
8	0.3994
9	0.3018

The surface areas from Samples 8 and 9 are shown for general comparison only. The dissolution rates of these tablets depend on their chemical compositions as well as their surface areas.

## Conclusions

The Gemini Series of Surface Area Analyzers can measure very low surface areas, providing the pharmaceutical industry with excellent tools for predicting product performance and manufacturing consistency. The speed of the Gemini analyzers in performing reliable, reproducible multipoint surface area measurements promises to enhance the physical characterization of pharmaceutical products in both research and quality control.