Stable Micro Systems

PowderFlow Analyser

for the Stable Micro Systems range of Texture Analysers

QUANTIFY POWDER FLOW MEASUREMENTS

- Food
- Pharmaceutical
- Chemical
- Medical
- Industrial

POWDER FLOW ANALYSER • POWDER FLOW ANALYSER • POWDER FLOW ANALYSER

Stable Micro Systems

CONTROLLED FLOW MEASUREMENT

using the Stable Micro Systems Powder Flow Analyser

Dry powder flow characteristics have traditionally been subjectively measured by hand or by simple pouring methods.

Such characteristics are dependent on many features including particle or granule size/shape and distribution; humidity or moisture content; surface properties including sorption; electrostatic charge; mixing kinetics; rest/flow transition; interparticulate and particle to contact surface frictions.

The **Stable Micro Systems Powder Flow Analyser** with Controlled Flow Measurement rapidly derives an objective value for the sample that characterises and ranks its performance when subjected to a specific test programme.

Samples' characteristics are measured, ranked and compared under different test modes. Measures can be used in product and process development, optimisation and quality control.

The Powder Flow Analyser offers:

- Application with many types of powder capable of flow, not just free flowing powders.
- Rapid, automated, test and analysis routines for Go - No Go quality control applications.
- Sample pre-conditioning at the start of the test, giving independence from variable sample loading.
- Exact repetition of the test sequence best suited to your need, time after time.
- User programmable tests cause flow in the sample by slicing, shearing, compressing, compacting, mixing and lifting in any combination and in any sequence.
- Flow behaviour measurements that define the sample's behaviour during the programmed test.
- Objective, numeric, real time display and automated analysis of the flow measurements, to uniquely characterise and rank the sample.

Rotating Stable Micro Systems' patented blade down and up through the sample achieves Controlled Flow. This innovative test method enables a wide range of sample flow modes to be achieved as the enhanced blade form provides optimum repeatability and sensitivity in controlling flow, from extremely gentle lifting through to aggressive compaction.

Measurement is achieved by a sensitive transducer, protected from overload, that monitors the axial force created by the test conditions.

Almost any sample capable of flow can be tested, provided the resultant force is within the range of the instrument. Controlled Flow offers you the ability to test in a manner that is complementary to your process or need. Using Stable Micro Systems' analysis software you may simply determine:

- Particle cohesion after compaction
- Flow after compaction
- Resistance to compression
- Batch and source variation
- Resistance to flow

from a range of standard tests such as Powder Flow Speed Dependence, Cohesion, Caking and 'Quick Test'.

The Powder Flow Analyser is installed and calibrated in minutes by straightforward force verification on the **TA.XT*plus*, TA.HD*plus*** or **TA.XT2*i*** Texture Analyser ready for use.

Users have the benefit of our established worldwide distribution network that is fully trained in all aspects of service and applications support.

POWDER FLOW ANALYSER

Typical Applications

COHESION TEST

The Problem:

Changes in powder specification (formulation, particle size distribution, particle shape etc.), storage conditions and test environment can all influence the tendency of a powder to agglomerate. A change in the cohesive properties of a powder may have an important effect on production processes such as die filling that could impair production efficiency and product quality.

The Test:

This quick analysis allows rapid and repeatable quantification of the cohesiveness of a bulk powder. Test results can be used to compare the sample being tested with previously analysed product, to assess if it is more cohesive or more free flowing.

Analysis:

A Cohesion Index is determined that characterises the flow behaviour of the product from extremely cohesive to free flowing.

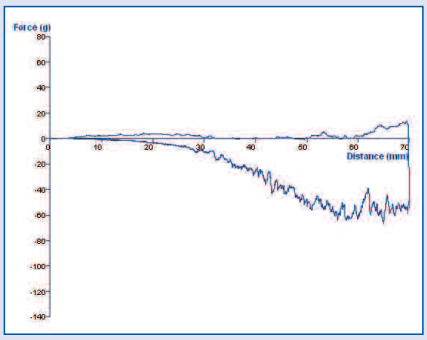

Fig 1: *Cohesion Test for Corn Flour (Corn Starch)*

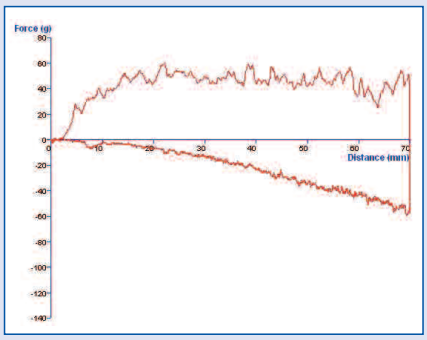

Fig 2: *Cohesion Test for Non Bio Washing Powder*

CAKING TEST

The Problem:

Caking is the tendency of a powder to agglomerate (or form lumps) or 'cakes' during storage or transportation.

The Test:

This test compacts the powder column to a user-defined force (usually 750g), then slices back to the top of the column with minimum disturbance, before re-compacting. This is repeated for the programmed number of cycles and the rotor blade then slices the compacted cake.

Analysis:

The mean force and work done when slicing through the cake, cake height and strength of the cake.

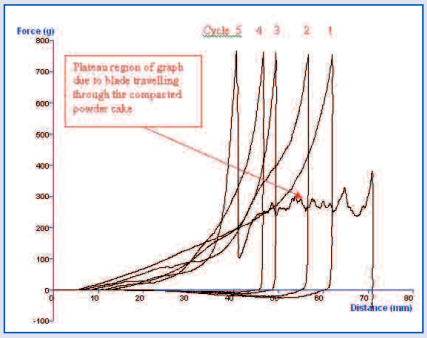

Fig 3: *Caking Test for Icing Sugar*

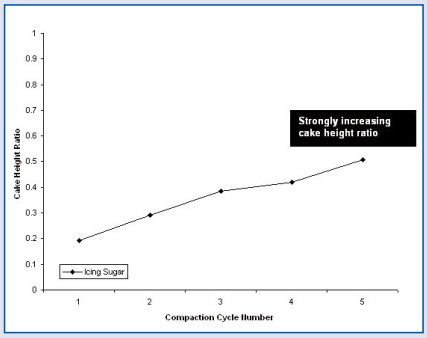

Fig 4: *Cake Height Ratio trend for Icing Sugar*

POWDER FLOW ANALYSER

Typical Applications

POWDER FLOW SPEED DEPENDENCE

The Problem:

Process changes to meet increased output demand can be problematic when powders are flow speed sensitive.

The Test:

Measures detailed characteristics of a powder sample, as controlled flow is imposed at different speeds. Powders that show an increasing compaction coefficient trend (such as Xylitol in *Fig 6*) become less free flowing with increasing tip speed and so may lead to under-filling in a production environment. Conversely, Icing Sugar becomes more free flowing with increasing tip speed and so may lead to over-filling in a production environment.

Analysis:

A comparison of compaction at 4 different speeds, a measurement of cohesion at one speed, and a measurement of flow stability. Flow staibility is an indication of the susceptibility of the product to attrition (breakdown) or some other change, such as the melting of a polymeric binder.

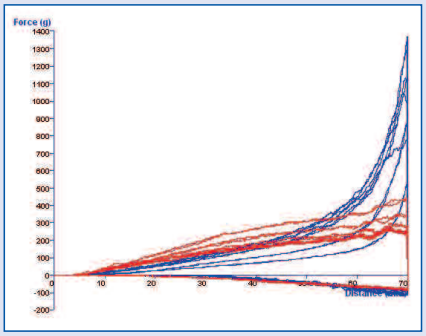

Fig 5: *PFSD Test for Icing Sugar and Xylitol*

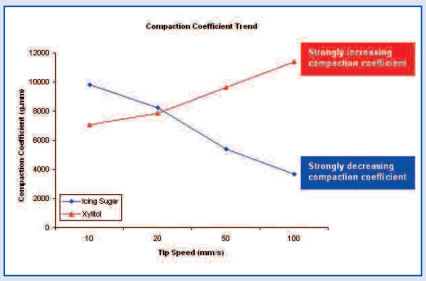

Fig 6: *Compaction Coefficient Trend with Increasing Tip Speed for Icing Sugar and Xylitol*

WHY A TRUE HELICAL BLADE IS VITAL

The design of the blade is the single most important factor in achieving repeatable powder flow measurements. The Stable Micro Systems patented blade is a true helix and can be mathematically described, unlike the blades fitted to other powder measuring devices on the market. The helical blade naturally cuts through the column of powder being tested and negates the need for complex torque measuring systems. Repeatably manufactured by CNC machining, it allows Stable Micro Systems to achieve very reproducible, and highly discriminating results from a reliable, simple and lost cost accessory.

*Patents granted and applied for:
AU 774211
US 6481267
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JP 2001194283
NZ 508253

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