



MATERIAL FLOW
EQUIPMENT

The SSSpinTester

Innovative Powder Strength Tester



We Believe in ...

In the Pharmaceutical Industry:

All drugs must be “packaged” somehow with excipients in order to be marketable. Material bulk properties MUST be measured at some point in the development process to quantify drug

formulations for use in tablet press, tablet fill, and segregation modeling. The SSSpinTester can be used to measure bulk properties of pharmaceutical powders at formulation time. In the formulation step of drug development, only a few grams of material are created due to very high cost of production.



The SSSpinTester is the only instrument that can measure material bulk properties (strength) during the formulation step in drug development—the amount of sample required by other testers prohibits measuring these properties until much later in the process. Having this data sooner rather than later narrows the R&D path, speeding time to market for new products by at least as six to eight months. Optimization and characterization of products can now be done at the formulation stage. Low pressure measurements simulate filling of dies. Characterization and quality control can now be achieved on a capsule-to-capsule, tablet-to-tablet basis.

Satisfied Customers

In the Chemical Industry:

Measured values of material strength under stress are critical to proper design and utilization of both process system equipment and product characterization. Material properties of fine powders often change with exposure to fluctuating environmental conditions. This is particularly true in the chemical industry. The single sample SSSpinTester analysis can be conducted in under ten minutes, making it an essential tool from the formulation process, all the way through end-product quality assurance.



Material sample size is based on the parameters of the testing cell: a conical frustum with a top aperture 0.25 inches and 0.20 inches deep. Depending on sample density, this translates into a bulk weight between 0.01 and 1.00 grams material to conduct the single test necessary to determine the unconfined yield strength at the selected consolidation pressure.



SSSpinTester test cell

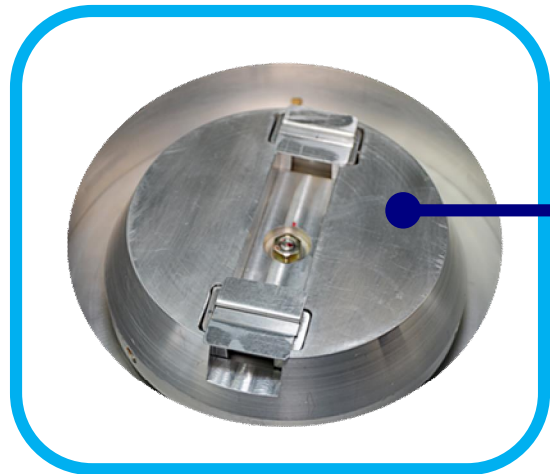
Materials tested to date include ASTM standard BCR limestone reference powder, nutraceuticals, household cleanser, time-release allergy compound, sodium sulfate, lactose monohydrate, multiple spice mixtures, powdered drink mix, light-weight polyethylene powders, pigment powder, tungsten/lead mixture, calcium carbonate, titanium dioxide, infant formula, sodium citrate dehydrate, fabric care compound, gelatin, cosmetics, vitamins, talc, sleep aid compound, and more.

This Novel Tester Takes the User to the Cutting-Edge of Productivity

The fully automated SSSpinTester uses the science of centrifugal force to measure the unconfined yield strength of fine powders requiring a very small amount of sample. The instrument provides repeatable and consistent data by first consolidating the material using centrifugal force to compress the sample inside the sample holder. After the initial compaction step, the SSSpinTester then completes the analysis routine using the same centrifugal force to determine the yield strength of the material. Using the latest advancements in technology, this instrument provides measurements at an extended pressure range. This provides actual performance results without the need to extrapolate data leading to inaccurate results.



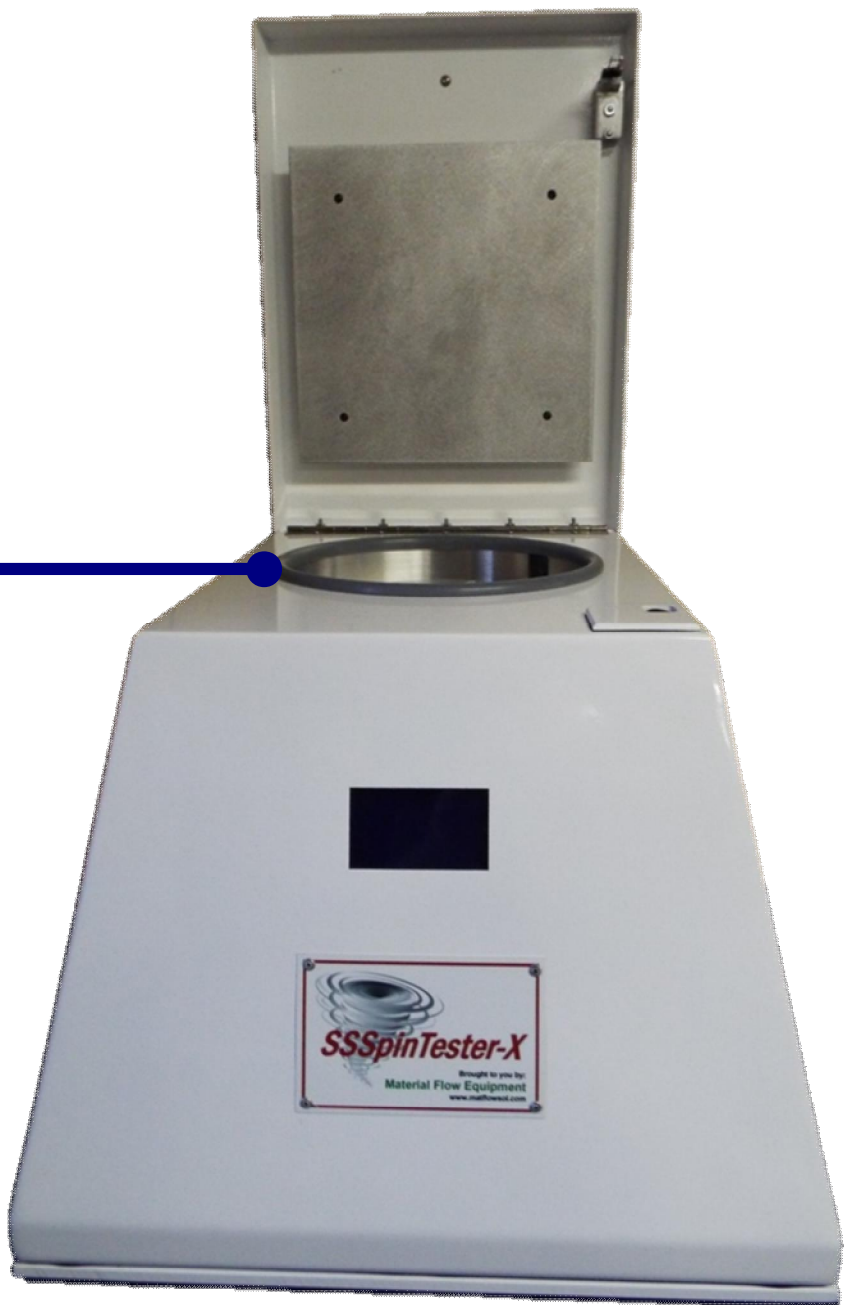
The pictured sample is sufficient material to run five (5) tests



Internal centrifugal rotor holds small sample cells

- ◆ Small amount of sample needed for analysis
- ◆ Low consolidation (also known as compaction) pressures – Low-pressure strength can be applied to segregation on piles, capsule filling, fluidization, tablet feed, dispersion models, and other low-pressure unit operations or formulation needs.
- ◆ Also runs at the more traditional high-consolidation pressures
- ◆ Fast results: a single data point in as little as 3 minutes, a 5-point flow function in as little as 15 minutes

The SSSpinTester Solution



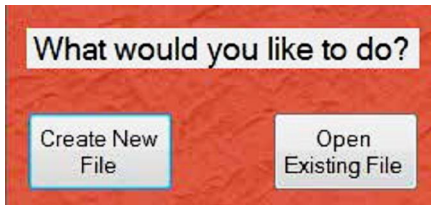
SSSpinTester

Simple Operation and Testing Procedure

The program initializes with a helpful “progress” bar, taking from 4 to 6 seconds to fully activate.

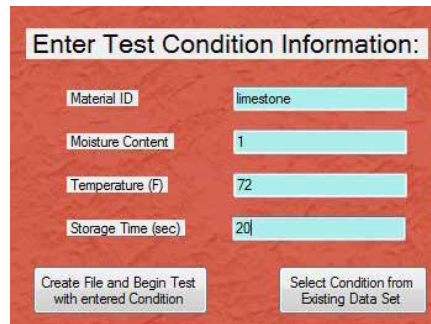
First Screen

The User may choose to create a new file (begin a new test run) or open an existing file (access previously run test data).



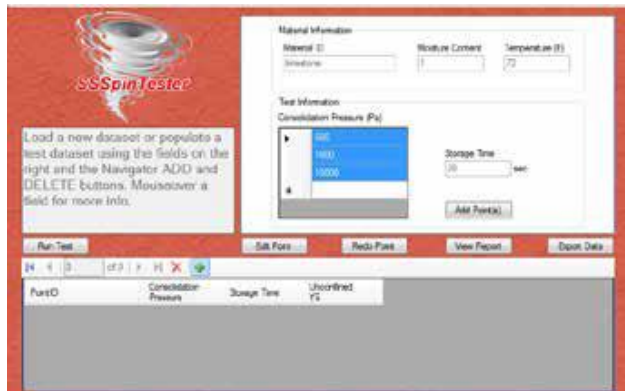
Filled Test Condition

Enter information to define the material to be tested and some testing conditions. “Storage Time” represents the length of time the material will be subjected to the chosen consolidation pressure in the test cell before failure. Twenty seconds represent the material strength as it moves through the system (instantaneous strength). Longer times (up to 60 seconds) represent the strength the material may gather as it is stored in a system.



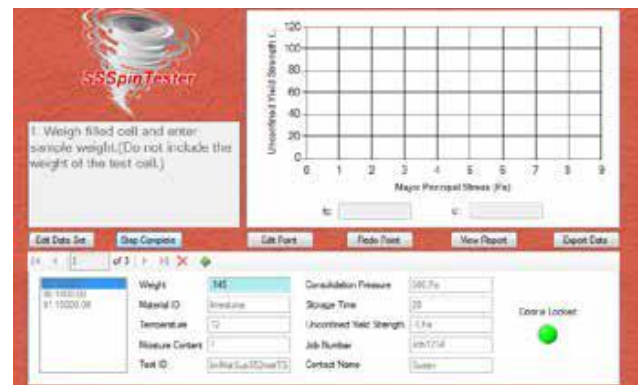
Addition of Pressure Tables

Define (enter) a series of desired consolidation or compaction pressures. Press “Add Point(s)” and the table in the lower left of the screen populates. Next select a pressure from the table and click “Run Test”.



Analysis

User-friendly prompt screens lead the Technician through the 6-step test procedure.



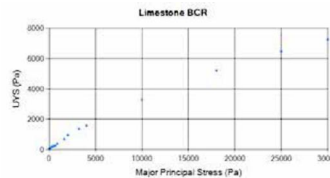
Data Presentation

After each strength measurement is taken, a point appears on the program screen graph representing the material strength at the specified consolidation pressure. The time requirement to acquire this FULL flow function is approximately 90 minutes. A 25-point flow function on any other strength testing apparatus may take from 8 hours to a week.

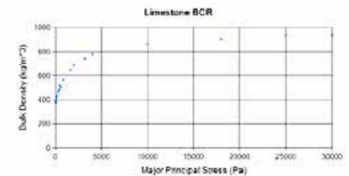


Strength and Density Reports

The curved line on the graph of the consolidation (compaction) pressure vs. the bulk material strength represents flow function. This report can be either downloaded in Excel-ready format or created as a PDF. The user can choose to have data presented in graphical and/or tabular form.



Major Principal Stress (Pa)	Unconfined Yield Strength (Pa)
30	75.292
100	73.983
200	153.882
300	207.834
400	217.281
500	231.277
630	260.183
860	383.115
1000	395.169
2000	871.670
3200	1373.222
4000	1573.964
10000	3296.378
18000	5214.156
25000	6463.872
30000	7246.612



Major Principal Stress (Pa)	Bulk Density (kg/m³)
30	179.582
100	413.763
200	436.275
300	454.423
400	463.553
500	463.716
630	466.643
860	503.973
1000	547.377
2000	683.597
3200	763.891
4000	781.052
10000	862.573
18000	107.733
25000	435.862
30000	342.913

The Science of Centrifugal Force

The SSSpinTester applies the science of centrifugal force to the measurement of unconfined yield strength of fine powders by first consolidating material using centrifugal force and then causing the compacted material to yield using centrifugal force. Using state-of-the-art technology, it allows measurement at forces as small as 0.05 kPa and as large as 50 kPa (ASTM standard base limestone). We no longer must rely on inherently inaccurate extrapolation for answers.

Current methods of measuring strength of a powdered material require at least 50 gram of sample—and some as much as 300 gram—usually hard to come by in the pharmaceutical and chemical industries. If you can generate sufficient sample to run a particle size analysis, you've got a sample of sufficient quantity to measure strength with the SSSpinTester.

Specific Machine Features

- ◆ Fast analysis
- ◆ Small amount of sample required – 0.5 cc
- ◆ One test acquires full data set – no multiple measurements required
- ◆ Extended pressure range – 0.05 kPa to 72 kPa
- ◆ Fully automated control with software application – provides graphical data reports
- ◆ Direct measurement eliminates the need for extrapolation of data
- ◆ Small footprint requires minimal bench-top space
- ◆ Bonus testing cell, micro-spatula for easy fill, demonstration video, and one-year limited warranty on parts and labor are standard
- ◆ Certified CE compliant

Specifications

Physical

Height: 15 in.
Width: 16 in.
Depth: 18 in.
Weight: 22.5 kg (49 lbs)

Electrical

Voltage: 100-240 VAC
Frequency: 50 to 60 Hz
CE compliant

Environmental

Temperature: 10 to 45 °C (50 to 112 °F), operating
-10 to 55 °C (14 to 131 °F), non operating

Manufactured and Distributed by



Material Flow Equipment, LLC

5921 N County Road 225

Gainesville, FL 32609 USA

<http://www.matflowsol.com>

Email: kjhanson@matflowsol.com

Phone: 352-379-8879

Fax: 352-379-8878