Complete powder compaction analysis quickly and easily

See the effect of tablet formulation and process variations prior to manufacturing

Includes in-die and out-of-die analysis software with Dynamic Powder Compaction capability for complete material testing

Suitable for routine use in Production QC for improved in-process control

Tablet detachment and ejection with full profiles

USP <1062> plus detachment, elastic recovery, and density measurement

**TABLET MEASUREMENTS**
- Weight
- Thickness
- Diameter
- Breaking strength

**CALCULATED VALUES**
- Tablet density
- Tablet tensile fracture stress
- Solid fraction
- G-ratio
Speed up formulation development and process optimisation with Gamlen® D series

The Gamlen® D series provides complete analysis of the compaction process using an affordable benchtop system. It measures compaction force, punch position, and ejection force. Compaction rate is 0.01-3 mm/s with 100 ms - 60 s dwell time. Also available with optional fully integrated detachment force measurement for punch and die sets from 3-6 mm.

Benchtop compaction analysis including in-die and out-of-die measurements with dwell time control.

Now you can see the effect of formulation and process variations on tablet compaction prior to manufacturing. The Gamlen® D series automatically generate tablet tensile fracture stress, compactibility, compressibility and tabletability plots with no user input needed when used with the Gamlen® Tablet Tensile Analyzer. You can also generate Kawakita and Heckel plots with 1 μm displacement accuracy.

**OVERVIEW**

The Gamlen® D series includes the Gamlen® Powder Compaction Analyzer and Tablet Tensile Analyzer (TTA).

**INTEGRATED DETACHMENT FORCE MEASUREMENT**

The new rotatable die system simplifies operation and generates important new data at the same time. The operational sequence is completed entirely on the instrument using the load cell to detach the tablet from the lower punch as well as eject it. The result is detailed measurement of tablet compaction, detachment and ejection behaviour.

**TABLET TENSILE ANALYZER**

The TTA comes with a 4-figure analytical balance and electronic micrometer. The included software runs on a laptop and displays all data for automatic analysis via a spreadsheet.

The Tablet Tensile Analyzer has been specially developed to simplify the evaluation of tablet samples made on the Gamlen® D series.

Tablet fracture is performed at slow speed to generate true tensile fracture stress measurements. The computer control system captures all data and transfers it to a spreadsheet for automatic analysis.

**DYNAMIC POWDER COMPACTION ANALYSIS**

Using our unique data capture system you can actually see what is happening during the compaction process. Our software measures material plasticity and elasticity for each compaction event.

![Graphs showing elasticity and plasticity vs compression pressure for Avicel 101 at different tablet weights](image)

![Graphs showing tablet weight and compression pressure](image)
The Gamlen® Dashboard

The Gamlen® Dashboard uses our unique powder assessment system to display how a formulation compares with industry norms for key parameters of compaction, lubrication and elastic recovery. The display shows where your formulation sits in the universe of compacted products. The default configuration shows industry norms; the display can be configured to show your organisation’s particular requirements at no extra cost.

Tabletability profile
*Above the line: Good, Below the line: Problems*

Tabletability is the response of the formulation to pressure. We maximise tabletability to get a robust tablet which will withstand handling.

Compaction Pressure (MPa)

Ejection stress profile
*Keep below the line or you expect sticking problems*

Ejection stress is a measure of how well lubricated the formulation. Poor lubrication results in tablet defects - picking, sticking and capping.

Ejection Stress (MPa)

Compaction Pressure (MPa)

Detachment stress profile
*Provisional recommendation: keep below the line!*

Detachment stress (also known as take-off force) is also related to lubrication. High detachment stress also results in tablet defects - picking and sticking.

Detachment Stress (MPa)

Compaction Pressure (MPa)

Elastic recovery profile
*Most materials have values below 3%*

Excessive elastic recovery causes capping in many products. We minimise elastic recovery by selecting the right excipients.

Elastic Recovery (%)

Compaction Pressure (MPa)

Compactability profile
*Points at high density are an over-compaction risk*

Compactability is the response of the formulation to density. We minimise density to maximise water penetration and dissolution rate.

Solid Fraction

Compaction Pressure (MPa)

E/D ratio is the ratio of the ejection to the detachment forces. Extreme values (high or low) are associated with problem formulations. The reasons for this are not yet clear.

Ejection Stress (MPa)

Compaction Pressure (MPa)

Compressibility profile
*Data above the line may result in over-compaction*

Compactability is the response of the formulation to porosity. We maximise porosity to reduce the risk of over compression which results in tablet defects like capping.

Solid Fraction

Compaction Pressure (MPa)

Points at high density are an over-compaction risk

Compactability is the response of the formulation to density. We minimise density to maximise water penetration and dissolution rate.

Solid Fraction

Compaction Pressure (MPa)

Data above the line may result in over-compaction

Compactability is the response of the formulation to porosity. We maximise porosity to reduce the risk of over compression which results in tablet defects like capping.

Solid Fraction

Compaction Pressure (MPa)

Tablet Tensile Fracture Stress (MPa)

Tabletability profile

Tablet Biodec Failure Stress (MPa)

Compaction Pressure (MPa)

Tabletability profile

Tablet Biodec Failure Stress (MPa)

Compaction Pressure (MPa)

Tabletability profile

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Tabletability profile

Tablet Biodec Failure Stress (MPa)

Compaction Pressure (MPa)
D SERIES
SPECIFICATION

**Tablet punch size**
2 - 15 mm diameter

**Material capacity of the die**
2 - 400 mg

**Compaction rate**
0.01 - 3 mm/s

**Data capture rate**
10-1000 Hz

**Maximum load**
500 kg

**Load cell travel**
30 mm

**Test height**
Depends on pillar extension length. Maximum extension of 300 mm

**Detachment System punch size range**
3-6 mm

**Load selection**
User selected by computer interface

**Load cell resolution**
1:5000

**Calibration**
Dead weights in kg or proving ring

**Power requirements**
90-240 VAC 3.15A

**Instrument dimensions**
310 x 270 x 375 mm

**Instrument weight**
16 kg

**Shipping size**
390 x 350 x 390 or 460 x 430 x 480 mm

**Shipping weight approx**
20 kg

Have a question? Like a quotation? Want to see a demonstration?
Then email michael.gamlen@gamletableting.com or call us now on +44 115 912 4271

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