



Phoenix

DESIGN AND MANUFACTURE

Your **specialist** testing partners

The Compaction Simulator Range



Have you considered the manufacturability of your product?



Reduce the risk of scale-up issues by compressing the powder at production speeds using genuine production press profiles.

You can assess the suitability of your product with as little as 20g of development formulation, compared with manufacturing much larger quantities of expensive material required to run a press only to find that it does not make a good tablet.

A hydraulic compaction simulator is the most versatile means to simulate a wide variety of production tablet presses, as well as enabling alternative profiles for material characterisation testing (v-shaped profiles).

This incredibly accurate data enables huge savings in both time and money during the scale up and production processes.

With a wealth of experience in every aspect of test machine design and development, Phoenix leads the way in specialist test applications for a diverse range of sectors, from Aerospace and Pharmaceutical, to Petrochemical and Geotechnical research.

Model Range

Phoenix designs and builds a range of compaction simulators to suit all budgets and requirements.

Model	FX*	30L	30F	60F
40kHz Alpha digital control system	Base system controls	Y	Y	Y
Full suite of Phoenix software	Base system software	Y	Y	Y
Punch speed up to 1000mm/s	Base system speeds	Y	Y	Y
Load capacity	Base frame capacity	30kN	30kN	60kN
Number of hoppers	0 – manual fill	1	2	3
B tooling	Y	Y	Y	Y
D tooling	Y	Y	Y	Y
Accessorised punches	Y	Y	Y	Y
Accessorised dies	Y	N	Y	Y
Weight	N/A	330kgs	420kgs	700kgs
Dimensions	N/A	1000mm (w) 600mm (d) 1813mm (h)	1000mm (w) 600mm (d) 1813mm (h)	800mm (w) 600mm (d) 1875mm (h)
Inbuilt hydraulic power unit	N/A	Y	Y	Y
Requires external air supply	N	N	N	Y
Connects to vacuum	N/A	N	Y	Y
Transportable	Y	Y – on wheels	Y – on wheels	Y - with pallet truck
Self-contained bench	N/A	Y	Y	Separate control system

*Fixtures to be fitted into an existing uni-axial frame

The 30L and 30F models can be wheeled into a room and simply connected to the local mains electricity, no other mains services are needed to operate these models. When it is not in use it can be disconnected and wheeled away to a suitable storage location.

Configuration

System

The Phoenix Compaction Simulator is entirely designed and built in-house, including the electronics, software and mechanical system, giving the ability to evolve and develop any aspect of the system as user needs change over time.

Frame

The Phoenix Compaction Simulator is the result of development and collaboration with compaction simulator users over the past 30 years, from the very first ESH simulator built in 1982, incorporating features to suit a wide range of user needs from early stage material characterisation to trouble shooting production problems.

The frames are all purpose built, compact and lightweight designs to suit the modern facility requirements.

Accessories

Phoenix has developed a range of highly accurate instrumented accessories to enhance the Compaction Simulator. The accessories enable the operator to measure the widest possible range of parameters, such as radial die wall expansion, to suit the specific project or product, as well as simulating a variety of production environments.

These accessories can be purchased with the base system, or can easily be added as user requirements evolve.

For further details, see the Phoenix accessories brochure.



Software and Controls

The Phoenix Alpha Control System has a 40kHz control loop rate, this ensures superior control and repeatability giving the user the most accurate data and results from the smallest amount of material.

The software suite (Profile Builder, Press Profiler, Profile Extractor, Compaction Run and Compaction Analysis) includes features requested and specified by experienced operators for building profiles, running tests and analysing data.

The results of tests can be shown in tabular form for many tablets at a time where statistical parameters such as mean, variance and standard deviation can be shown.

Automatic Heckel analysis (provided that tablet weight and powder true density are available) and automatic Energy and Power analysis is always performed. Manual analysis is also possible.

Measureable Parameters

The following result parameters are saved as standard and are available to view for each tablet:-

- Test reference
- Run no.
- Tablet no.
- Layer no.
- Punch separation [mm]
- Peak velocity upper [mm/s]
- Peak velocity lower [mm/s]
- Load dwell time [s]
- Contact time [s]
- Peak force lower [kN]
- Peak force upper [kN]
- Peak ejection force [kN]
- Peak push off force [N]
- Compressive work [J]
- Recovery work [J]
- Net work [J]
- Yield pressure [MPa]
- TO/DA/DO/DB [mm] Heckel
- Pre-comp. force lower [kN]
- Pre-comp. force upper [kN]
- Die Temp (°C)
- Air Temp (°C)
- Tablet Temp (°C)
- Humidity (%)
- Die pressure 1 (MPa)
- Die pressure 2 (MPa)
- Die pressure 3 (MPa)
- Adhesion (N) – when using adhesion punch
- HardnessPunch (N)
- Weight [mg]
- Diameter [mm]
- Hardness [kp]
- Compaction stress (SCAP) [MPa]
- Tensile stress [MPa]
- Ejection shear [MPa]
- Plasticity ratio
- In-die solid fraction from fill weight
- In-die solid fraction from post-test weight
- In-die solid fraction from pre-test weight
- Out-of-die solid fraction
- Porosity
- Compaction stress (CSA) [MPa]
- Max peak K3 [V]
- Thickness [mm]

The interface utilises 'drag and drop' functionality that allows the user to easily rearrange the parameter column order.



For those companies who may not require their own system, but want access to the same high value data that larger companies have, or for those who have in-house capability but struggle with resource, Merlin Powder Characterisation Ltd can help.

Merlin is the sister company to Phoenix, equipped with all of the latest Phoenix technology. Merlin provides a sub-contract testing service offering test programmes to suit your specific needs with the flexibility and capability to adapt methods to match you preferred protocols.

The unique combination of Merlin offering an independent customer sub-contract service, alongside the design and manufacturing capabilities of Phoenix, ensure that we have constant feedback and contact with a range of customers enabling us to offer ongoing support and development to meet operator requirements.

For more information, a demonstration or a quotation please contact us.

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