

GRANUPACK™ HIGH TEMPERATURE

HIGH TEMPERATURE AUTOMATED TAPPED DENSITY AND PACKING KINETICS MEASUREMENT



MOTIVATION

Numerous industrial processes involve powder heating which leads to major modification of the powder packing properties. For example, the setting of solid bridges due to pre-sintering will have drastic consequences on the packing behavior of the powder. Even at a lower temperature far from the melting point, slight changes in the surface state of the particles will modify the contact interactions and thus the ability of the grains to reorganize during packing.

Knowledge of the packing behavior in the processing condition is a requirement to predict the performance of the powder and optimize the processability.

PRINCIPLE

The influence of temperature on the packing dynamics can now be investigated thanks to the new GranuPack High-Temperature instrument, combining all the advantages of the GranuPack while adding the ability to heat the powder during the measurement. Furthermore, the high precision laser sensor allows accurate and user-independent measurement of the height of the packing after each applied tap to give access to the whole packing curve.

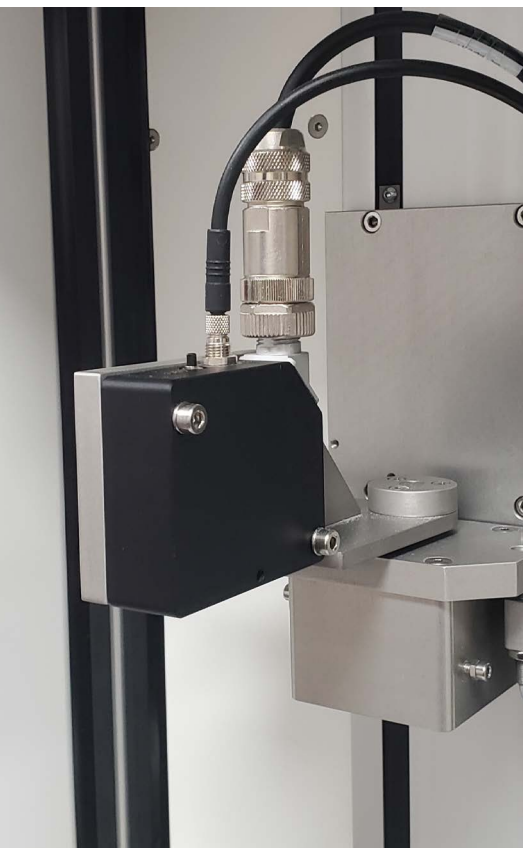
KEY BENEFITS

- › Heating cell controlled directly by the software (up to 200°C).
- › The use of the newly designed laser sensor allows measurement with and without diablo for great versatility.
- › No user dependency, great precision up to 1% repeatability with diablo.
- › New 'slope index' to characterize the dynamic packing response of the material to heating.
- › Hausner ratio, Characteristic tap number ($n_{1/2}$), and the new 'slope index' are calculated automatically
- › Standard cell compliant with ISO8967, ASTM B527, USP 616, ChP 2020, section 4, Chapter 0993, Page 152 and EP 2.9.34.

APPLICATIONS

The instrument has been applied to explore the influence of temperature on Polyamide 12 and TPU powders, widely used in additive manufacturing of plastics (figure 1). Results showed a huge influence of temperature on the packing behavior reflecting modifications on the microscopic properties of the grains. Even far below the melting temperature, we can see the impact of the heat on the Hausner ratio, Characteristic tap number ($n_{1/2}$), and the new 'slope index'.

Many applications are being investigated in fields as diverse as Pharma, Food, Metals, or even Ceramics. Please contact one of our representatives to discuss your application.



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GRANUPACK SPECIFICATIONS

DIMENSIONS LxWxH (mm)	390x350x680
WEIGHT (kg)	20
TAP INTENSITY (α FREE-FALL)	1 or 3mm
TAP FREQUENCY	Between 500ms to 10s
MAXIMUM CELL SIZE (ML)	40
MAXIMUM TEMPERATURE	200°C
COMPUTER REQUIREMENTS	Dual core with 2.0GHz, 4Go RAM, Windows XP to 10 with up to date Service Packs
CONNEXION	USB 2.0 port

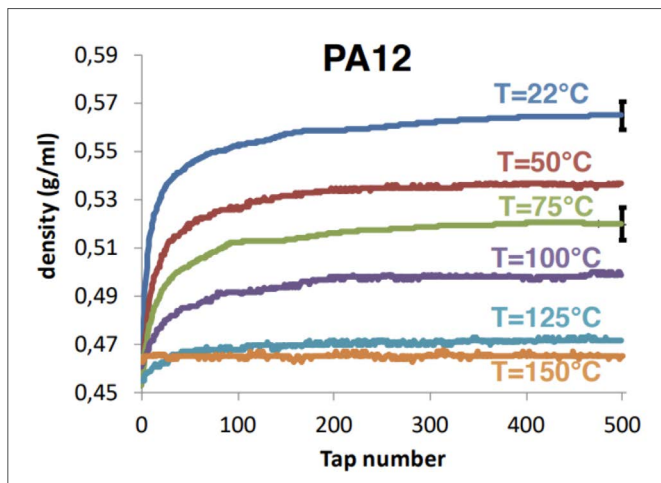


Fig. 1 : Compaction dynamic plot of PA12 at several temperatures

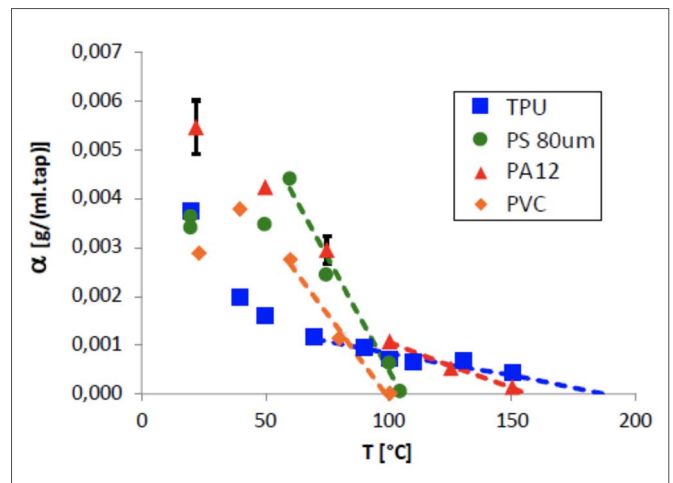


Fig. 2 : Assessment of the Slope Index for several plastics as a function of the temperature

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