



Glossary of Terms in Powder & Bulk Technology

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## 4. Powder Processing

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blending	The placing together of different materials in a prescribed ratio at a scale of scrutiny that is significant to the application by way of low energy mechanisms, such as by intermingling gravity flow streams or layering onto a moving belt. (See mixing and homogenising).
‘boiling’ fluid bed	A fluid bed where the quantity of the fluidising media agitates the mass by passing through the bed in large bubbles.
calcining	A process of modifying the properties of a powder by subjecting it to a high temperature.
capture zone	The converging region between the rollers of a roll press where the surface friction on the product causes the material to move towards the nip point without slipping on the roller surfaces.
cementation	The binding together of particles by precipitation at their points of contact.
cold pressing	The compaction of a powder carried out at room temperature.
comminution	The reduction of particles size by intensive fracture.
compact	A form prepared by compressing powder in a mould or die.
compact, green	(See green compact).

compact, sintered	A green compact after sintering.
cut	The division point for separating a flow stream in which particles are preferentially directed to each side of the 'cut' according to some physical attribute.
dilated bed	A bed of powder that is expanded to a dilate condition by a gas pressure in the voids in excess of ambient. (See settling bed, expanded bed).
dry inertial collectors	A type of dust collector that disengages particles from a gas by virtue of exploiting their physical dynamics.
electrostatic precipitators	A dust collecting system that imparts an electric charge to particles in a dust laden stream and subsequently collects them on plates maintained at a high voltage.
expanded bed	A bed of particulate solids held in a state of dilatation by the upwards passage of a second phase media such that the particle-to-particle contact pressure is reduced from that of a settled bed. (See dilated bed).
fabric filters	A dust collecting system that uses porous fabric as a barrier to collect dust particles.
fluid bed	A suspension of particles suspended in an upward flow of fluid (or downward flow if the particles are less dense than the fluid).The bed may be quiescent or boiling, according to the quantity of the fluidising fluid.
fluidising	The process of injecting a gas underneath a bed of particulate solids , to dilate the material in a rising gas stream such that it behaves like a liquid. See fluid bed.
granulation	The process of combining particles into larger agglomerates (granules).
green compact	A formed compact intended for sintering, or which hardens with time or other treatment.
Haultain infrasizer	A vertical air elutriator similar to the roller elutriator.
homogenising	The rendering of components that were initially separate or varied in nature throughout the volume of a mass, to a compound of uniform composition at a scale of scrutiny that is significant to the application. (See blending and mixing).

hot pressing	The compaction of a powder under heat and pressure, to result in sintering of the mass to a strongly bound mass.
minimum fluidising velocity	The minimum gas velocity required to fluidise a bed of powder. The value depends mainly upon the particle size and effective particle density.
pegging	The conditions which occurs when particles wedge in the apertures of a sieving medium.
pellet	An agglomerate of particles produced by specialised techniques, such as pressing.
pre-sintering	A heat treatment carried out at a temperature below a final sintering temperature to strengthen a powder compact.
pressing	The compaction of a powder under pressure in a mould or die.
pressing, cold	(See cold pressing).
pressing, hot	(See hot pressing).
pressing, warm	(See warm pressing).
quiescent bed	A bed of particulates held in a steady, tranquil state of suspended dilatation by the passage of a second phase media.
roller elutriator	A vertical air elutriator used for fractionating powder in the size range 5 to 300 microns.
roll press	A compacting device that consolidates powder between two contra- rotating rollers under a nip pressure acting on the small gap between the rollers. The rollers may have flat surfaces, to produce flakes, or have mould indentations that form pellets or nodules.
scalping	The separation of a small amount of oversize lumps or particles from a bulk material by size classification.
settled bed	A stable bed of particulates where particle to particle contact pressure is fully developed and not relieved by internal void pressure or the counter-flow of a fluid.
settling bed	A transient condition, where a bed of dilated particles has an increasing density condition and a decreasing void pressure as the media in the interstitial volume at a higher pressure than ambient percolates from the bed, ultimately to allow particle-to-particle contact pressures to develop to those of a fully-settled bed where the void pressure is ambient.

shrinkage	The reduction in size of a compact on drying or sintering, expressed as a percentage of the final volume or stated linear dimension.
sintering	The bonding of contiguous particles in a mass of powder or a compact by partial fusion at temperatures below the melting point of the particles.
spiral flow classifier	A device for fractionating fine particles by moving a fluid stream in which the particles are suspended through a cylindrical vessel from a tangential inlet to a more centrally located outlet. The extent to which centripetal forces on the particles overcome fluid drag is related to the physical characteristics of the individual particles and determines the ability of the particles to exit at specific radially located outlets of the equipment. The division between outlet positions being terms the 'cut'.
tablet	A small compact.
trajectory	The path taken by a particle with an initial component of horizontal motion under the influence of gravity and/or prevailing air flow.
warm pressing	The compaction of a powder under pressure above room temperature and below sintering temperature.
wet scrubbers	A dust collecting system that employs a spray system to capture particles.

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