Glossary of Terms in Powder & Bulk Technology
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1.1 Bulk solids in industry

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Approximately half of all materials that are used and consumed by society are solid materials that are handled and processed in a loose particulate form. During their passage from source to ultimate use most are stored and handled many times. They are subjected to a wide range of ambient and operational conditions and almost invariably incur significant changes in their physical nature during their route. The particles of composition of these materials span an enormous scale of physical and chemical properties, many bearing the same title existing in radically different conditions because of variations and changes that occur during their lifetime, due either to the natural unstableness of the product or changes induced during handling and processing. Bulk solids are also mixed, blended and treated in ways that change the way in which the bulk behaves. The influences of scale and time also bear on behavioural aspects.

The make-up of any bulk material comprises of at least two phases, the essential mass of the solid component and that of the fluid, most usually air, that occupies the void space between the particles. Where moisture or another liquor is present there are three phases, two of which tend to vary in quantity. Considering that the subject of particle size alone is difficult to define and that particle size distribution has a considerable influence on the behavioural nature of a bulk material, it is not surprising that the rheological behaviour of particulate solids is the most complex of all material masses. In respect to deformation characteristics

of a bulk material under stress, loose solids can be classed with gases, liquids and mass solids as a fourth state of matter.

The subject is both exceptionally comprehensive and diffuse at the same time, as no individual can possibly encounter all the conditions and circumstances what fall within the field. The scientific disciplines involved include organic and physical chemistry, mechanical engineering, soil mechanics, physics, electrostatics, solid and fluid mechanics and many topics relating to heath and safety, economics and numerous other concerns. Education in the subject is seriously handicapped by it being an emerging technology in a mature field of application and falling between the many schools of scientific interest.

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