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### **Gravity Separation: a Variety of Applications**

Gravity separation is the most well-proven and accepted technique of concentrating minerals and has been used as a primary form of mineral concentration. Gravity separation is an industrial method of separating two components, either a suspension, or dry granular mixture where separating the components with gravity is sufficiently practical: i.e. the components of the mixture have different specific weight. All of the gravitational methods are common in the sense that they all use gravity as the dominant force. Gravity separation is used in a wide variety of industries, and can be most simply differentiated by the characteristics of the mixture to be separated - principally that of 'wet' i.e. - a suspension versus 'dry' - a mixture of granular product. The most notable advantages of the gravitational methods are their cost effectiveness and in some cases excellent reduction.

Gravity separating tables are used to separate dry granular products by specific weight and are most common in the agricultural and recycling industries. They work on the principle of fluidization and have an inclined reciprocating grading deck.

From an inlet with an adjustable feed rate, the material is fed onto the inclined reciprocating grading deck which normally has a special woven wire mesh surface. Low pressure air is passed through the mesh from a fan; the amount of air available is adjusted to suit the product being processed. This adjustment is to ensure that the lighter product is lifted to the top of the material and the heavier product remains on the surface of the grading deck, resulting in stratification of product.

Due to the reciprocating motions of the inclined deck the heavy product will walk uphill and climb to the highest side, whilst the lighter product will drift down towards the low side. The angle of inclination of the deck and speed of reciprocation interact with air pressure to control this movement.

Gravity separation is used in:

- Agriculture: gravity separation tables are used for the removal of impurities, admixture, insect damage and immature kernels from grains.
- Recycling: gravity separators are used to remove viable or valuable components from the recycling mixture i.e.: metal from plastic, rubber from plastic, different grades of plastic. In addition, clarification and thickening methods are used to separate fluid from solid particles in waste water processing: in the clarification phase, sludge sinks to the bottom of the pool and clear water flows over the clear water grooves and continues its journey. The obtained sludge is then pumped into the thickeners, where sludge thickens farther and is then obtained to be pumped into digestion to be prepared into fertilizer. Gravity separation is an attractive technique as it generally has low capital and operating costs, uses few of any chemicals that might cause environmental concerns and recent development of new equipment enhances the range of separations possible.