



PRODUCT BULLETIN

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HOW THE SPIRAL WORKS

Slurry enters the spiral through a feed box and onto the spiral surface. Once on the spiral surface, mineral grains settle and sort according to size, shape and specific gravity. A specific gravity difference of 1 or more is required to make a separation of different minerals.

Particles with the lowest specific gravity are carried with the water towards the outside wall of the spiral. The density of the lower specific gravity stream becomes more dilute as it contains the bulk of the liquid.

The spiral separates at its greatest efficiency when used in the size range of 10 x 200 mesh. Some recovery will take place above and below these sizes; but, occasionally, ultra-fine and very coarse heavies will be lost to tailings as will middlings or un-liberated ore particles. The spiral will benefit, therefore, from the use of hydraulic classification as a feed preparation step.

SPIRAL TYPES

The spiral concentrator is one of the most effective, low-cost devices for the treatment of ores. Manufactured from lightweight, corrosion and abrasion resistant materials, spirals require a minimum of maintenance and upkeep.

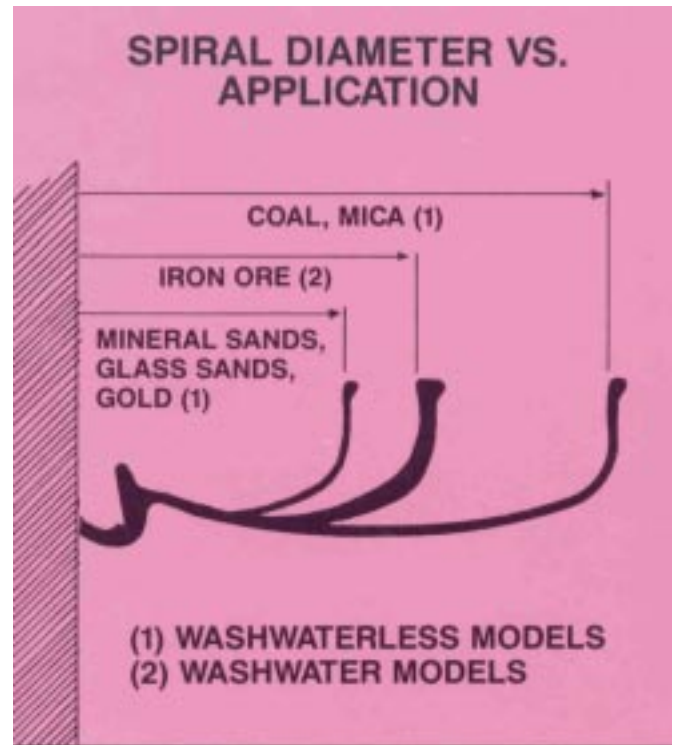
Washwaterless

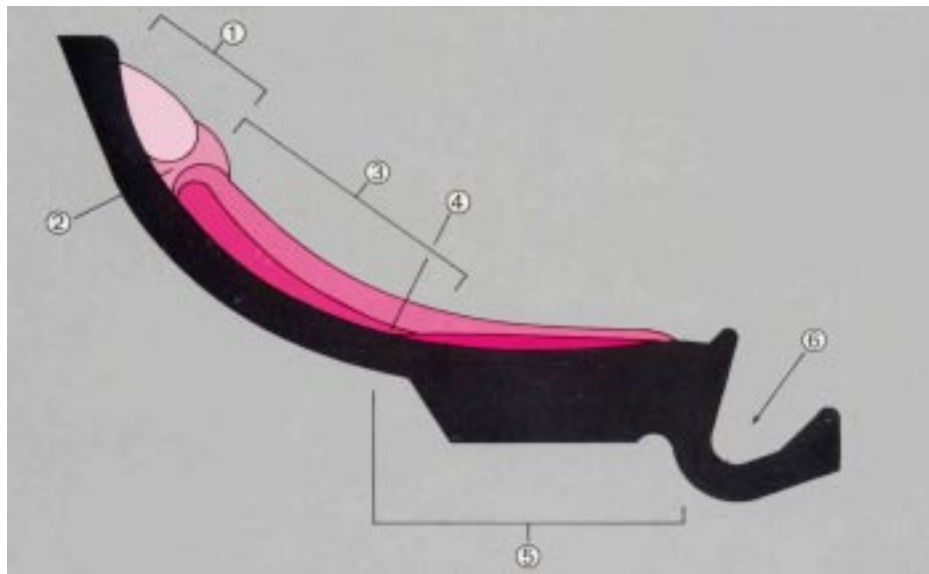
This type is used in most applications, particularly for concentrating low-grade ores. The only water required is added with the solids prior to introducing feed onto the spiral. Concentrates are removed either at the bottom directly into the product box or at several intermediate take-off points down the spiral.

Washwater spirals require extra water at stages down the spiral which provides for more efficient washing of the concentrate, transporting away silica or other gangue material.

Coal/Mica Spirals

Larger diameter units than the mineral-spiral series, these spirals are designed to take advantage of the particle shape differences. Take-off splitters at different points down the helix give this spiral a high capacity to remove refuse or siliceous contaminants from the coal or the mica.





Region 1

This high water region consists mainly of water and fine particles, most of which are “trapped” here from the discharge of the feed box. The water in this region moves in a counter clockwise direction. There is no separation in this region due to the low pulp density and high velocity of the slurry which hinders any settling of dense particles.

Region 2

This plane is the region with the maximum water velocity and, therefore, represents the maximum centripetal force of the water. Because there is no counter force, the water moves down this plane and disrupts any movement between Regions 1 and 3.

Region 3

This is considered to be the upper portion of the high velocity slurry. The water in this region moves clockwise and most of the separation takes place in this region. The more dense particles settle to the bottom of the spiral trough and “walk” towards Region 5. At the same time, the less dense particles are suspended in the high velocity of the water and are carried towards Region 2.

Region 4

Region 4 is where Regions 3 and 5 overlap. This serves as a reference point to the operator and assists in making adjustments. This allows for the maximum recovery of the more dense particles without loss in grade.

Region 5

Region 5 is the region in which the more dense particles are concentrated. The less dense particles in this region work themselves to the top of the slurry bed and then are washed away by the water on the surface of the slurry bed. This “washing away” of the less dense particles is enhanced by the washwater introduced by Region 6.

Region 6

On the washwater type spirals, there is additional water introduced to “wash away” the less dense particles before the more dense particles are collected in the concentrate port.