DRY BENEFICIATION OF PHOSPHATE MINERALS USING A TRIBOELECTRIC BELT SEPARATOR

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Beneficiation of phosphate ores by electrostatic processes has been demonstrated by various researchers since the 1940’s. Separations have been achieved by removing silica from phosphates, and with fewer examples of calcite and dolomite from phosphate. Limitations on conventional electrostatic systems include low capacity, the need for multiple stages, and operational problems caused by fines. These limitations may be overcome by newer electrostatic processes, such as the triboelectric belt separator developed by ST Equipment & Technology LLC (STET).

In contrast to other electrostatic separation processes that are typically limited to particles greater than 75 µm in size, the STET triboelectric belt separator is ideally suited for separation of very fine (<1 µm) to moderately coarse (500 µm) particles, with very high throughput. The STET triboelectric belt separator technology has been used to process a wide range of industrial minerals and other dry granular powders. Recent bench-top testing using a laboratory scale STET separator has shown the technology to be effective in triboelectric charging and separation of several phosphate ores.

For phosphate ores containing a mostly silicate gangue mineralogy – the STET triboelectric belt separator may offer a high rate, lower cost processing solution, while minimizing or eliminating the need for flotation or other wet processing. For phosphates with more complex gangue mineralogy, or for carbonate / carbonate separations (such as those required for phosphate from dolomite or calcite) – the STET process may be considered as an additional beneficiation step following traditional wet processing steps.