

GRAVITY SCREEN CUTS AT 20 MICRONS!

Fine aperture screening in minerals processing often poses a major challenge to the Process Engineer, particularly in cut sizes below 400 microns. Baleen Filters Pty Limited has successfully commercialised a multi-award winning micro-screening technology capable of classification down to 20 microns without the aid of flocculation or chemical coagulation.

A micro-screening system, known as the Baleen Filter, derives its name from the species of filter feeding whales which have a unique whalebone to collect krill and other marine organisms during feeding. A sweeping tongue action creates a reverse water pulse which releases the collected feed matter for ingestion. An engineered adaptation of this natural technique used by the Baleen whale has resulted in development of a highly efficient filter system which requires no vibration, no vacuum, and no pressure across the screen medium.

Commercial development of the Baleen Filter began in 1999 in collaboration with the University of South Australia. A five year industrially-applied program resulted in an internationally patented "state of the art" fine screening technology that is now providing solutions worldwide in applications previously considered highly problematic.

Baleen has been engineered to perform where conventional technologies have failed, easily separating difficult contaminants such as grit, oil, grease, fibres, bio-foulants and silt. As a direct consequence, Baleen has largely been addressing industrial effluent treatment with more than hundred systems now operating across the globe within these applications. More recently however it has been recognized that there are many applications in the **minerals processing industry** for which Baleen is ideally suited, and is gaining widespread popularity.

The operation of the Baleen filter can be explained by the figure below:

The unit comprises a feed box which allows a consistent flow of feed slurry (1) onto an inclined static woven mesh screen (4). The slurry filtrate (2) passes through the mesh screen by gravity carrying with it solid particles finer than the mesh screen's cut size. Any oversize or near-size particles (including viscous emulsion, if present) are retained on the screen surface. This oversize material is then fluidized from the screen surface by a low volume, high pressure water spray bar (3) located below the surface of the screen and perpendicular to it. At the same time a similar spray bar located above the screen surface, and at a slightly forward orientation, flushes the fluidized bed of oversize material to the discharge end of the screen (5) for collection (6).

Both the top and bottom spray bars travel collectively by means of a robust, pneumatically driven carriage arrangement. Once the carriage reaches the lower limit of its travel, the spray water is shut off and the carriage returns to the feed end of the screen in readiness for the next cleaning cycle. The important thing to note is that all near-size and oversize particles are removed from the screening surface (with minimal water retention), thereby ensuring sustainable maximum screening efficiency. *The entire unit is constructed of either stainless or duplex steel as standard.*

The most important benefits of the Baleen filter are it's –

- high drainage capacity
- genuine non-blinding screening capability
- ability to cut at extremely fine aperture sizes
- low power consumption and operating costs

Traditional fine screening classification in mineral processing plants normally involves conventional screening equipment such as vibrating screens, linear motion belt screens, or static sieve-bend type screens, utilizing a variety of different screen media materials. Although effective in most of the unchallenging slurry screening applications, there are many instances where these screening systems are seriously limited by their inability to handle very fine cut points (below 400 microns), or large flow rates due to either perpetual aperture blinding or relatively low open area of the screen-cloth. Indeed one could consider the merits of vacuum or pressure filtration in difficult fine screening applications, but generally such practice is only economically viable for the dewatering of very fine particles of less than 10 microns.

The Baleen filter can therefore be considered as the "missing link" in fine screening processes, effectively bridging the gap between traditional fine screening and micro-filtration systems.

Pilot installations in various mineral processing plants have shown very promising results.

For example, on one site Baleen is being used to clean their process water by removing suspended solids above 25 microns. This enables them to use this process water in lieu of potable water in several plant applications such as flocculant make-up or gland service water.

In more challenging applications, the potential benefits of Baleen for recovery of +75 micron fine coal from wash plant tailings streams were so encouraging that, in 2010, funding was awarded under the Australian Coal Association Research Program, to enable an extensive series of trial campaigns on four separate mine sites in 2011. The outcome of these trials, as well as subsequent trials on other follow-up sites, reported that Baleen can directly improve overall plant yield as well as reduce the volume of solids feeding the tailings dam.

Thus the Process Engineer's dilemma of how to effectively achieve a cut point of between 20 micron and 400 micron in dilute slurries can now be considered a thing of the past.

Demonstration Baleen units are available for hire to facilitate in-plant performance trials.

For further information please visit our website www.baleenfilters.com.

