

Separator Gets the Coal Out

For many aggregate producers, lignite and lightweights in their product become a stumbling block in producing concrete sand. Add to that the increasing demand for high-quality concrete and industrial sands coupled with the depletion of good sand reserves and it gets still more difficult to produce good, clean, consistent spec sand.

This was the case for G. L. McKnight, Inc., a sand and gravel operation in Slipper Rock, Pa. That company was seeing coal contaminants in excess of 1% lignite. Even after buying a new sand-classifying tank, the company's only saleable products were asphalt and anti-skid sands.

Classification and Flotation Systems CFS has designed a process flow to remove lignite (coal), lightweights, and organics from concrete, block, mason and other aggregate sands.

Introduced in Western Pennsylvania more than 20 years ago, the CFS density separator has proven to have a very high separation efficiency of lightweights. McKnight is one of more than 80 applications worldwide using this technology to remove coal and lightweights with feeds up to 600 tph. Testing of pilot and commercial production units shows misplaced lignite in a range of 0.003%.

The CFS Density Separator has a rising current of water established across the entire cross-section area of the classifier. Product is fed into the separator from either a conveyor or slurry pump at the top of the unit. The density separator creates a fluidized bed that is adjustable between 1.55 and 1.8 (1.55 - 1.8 Kg/m) specific gravity. This method uses the actual sand as the media so no chemicals or other media need to be added.

Because lignite's specific gravity is 1.3 to 1.4, all coal pops to the top and is displaced in the overflow along with any sand or other lightweights smaller than the cut point. This combination is then scalped over a sieve where the lignite is discarded and the fines blended with the coarse product.



CFS's lignite removal system in operation at G.L. McKnight Sand and Gravel in Slippery Rock, Pa.

DENSITY SEPARATOR BENEFITS

- Removes lignite (coal), organics, clay balls, sandstone, marl, mica, and pumice.
- Multiple use of the separator to produce the required fineness modulus with higher sand recovery and removal of lightweight contaminants.
- A consistent and clean product.
- No use of chemicals or heavy media.
- Few moving parts, generally one.
- Low maintenance costs and low water requirements.
- Removes silts and slimes.
- High percentage of solids and dryer products.

First and foremost the density separator classifies concrete sand to the proper FM specification by blending the coarse and fine fractions together to maximize the yield to concrete product. The unit has a continuous overflow and modulating underflow, which is important in minimizing waste. The separator does not pulsate or cycle. By using a density separator, the amount of contamination and changing feed conditions do not affect the quality of the product, the company says.

With minimal waste and only one moving part, a plant can maintain both cleaner and higher recovery with the same CFS unit. Using its density separator system and super sieve screen, CFS says a flow can be designed to fit each plant's specific production needs and clean the product.

CFS designed a plant including an 8- × 8-ft density separator, a 10-ft DSM screen, a 5- × 10-ft curved-deck sizing screen, gravity cyclone, and existing sand screws. Since the change, the plant

has made and sold concrete, mason, golf course, block, anti-skid and birds-eye sands—lignite free. During the course of a day, McKnight may discard as much as 30 tons of lignite.

Since installing the CFS System in 1997, G. L. McKnight has been successfully producing nine different spec sands at a tonnage of 225 tph.

CFS is constantly looking to improve the capability of its sand plants both in technology and ease of operation. CFS says it has been able to improve upon the system by incorporating a dewatering screen on all plants and fine recovery systems.

As growing competition for high-quality aggregate material escalates, the need for consistent, clean product is more crucial than ever.

Information provided by CFS

