

GETTING PROCESS WATER FILTRATION IN COAL PREPARATION PLANTS RIGHT



Dual back-flush strainers



Nifty Copper Spintex on Belt Filter



Spintex at Nifty for water

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Coal preparation plant personnel should be able to select, install and maintain the most appropriate process water filtration units for their plants, thanks to a comprehensive review of technologies available around the world by GBL Process.

Coal preparation plants need clean water with no solids above a particular size to carry out a range of activities, including seal water for pumps, flotation wash water, flocculent make-up water, and spray nozzles and vacuum seals on filters. Most Australian plants have horizontal vacuum belt filters and some sort of strainer or back-flush filter installed to remove solids from the water. However, a significant number of filters are blocked, not working properly or out of operation. Although equipment limitations are a major factor, other issues include variability of solids loading, types of solids, maintenance and installation. As a result of these difficulties, some plants are bypassing their existing filters, while others do not have filters installed.

As part of its review, GBL Process conducted a literature review (including relevant ACARP reports and supplier literature); surveyed water filtration users, equipment and technology providers, consultants, researchers and others; and attendedACHEMA, the world's largest chemical engineering showcase to catch up on the latest developments and to talk with world leading suppliers and designers.

In terms of scope, the research considered technologies available in the wider mineral processing world rather than being limited to techniques currently in use in Australian coal preparation plants. While the research covered filtration and separation technologies for particulate removal, it did not cover complete water treatment systems or plants commonly used for chemical (precipitation) or biological treatment.

As a comprehensive resource, the final research report provides information on the range and characteristics of technologies available and has schematics and photographs, definitions of common technology, indicative capital costs, examples of commercial applications and suppliers, as well as practices and lessons learned from other industries that use similar process streams, such as cooling tower filtration, pool water filtration and process water in mineral processing plants.

Project Leader Goetz Bickert said one of the key challenges to his research was the broad range of technologies available and the large number of coal preparation plants. Trying to draw conclusions from different sites with different duties and the variations in data collected was problematic.

"Each site and plant has different coal, conditions and processes, so it was hard to find a one-size-fits-all solution. Not surprisingly, I found there was no commonly used technology which was successful in the harsh environment of a coal preparation plant that met all requirements," he said.

"However, the report outlines potential solutions to the issues with special media filters and continuous media filters, providing reliable operation and solids separation down to 10 micron and beyond. I found well designed and robust back-flushing filters with nozzles and/or brushes provide coarser separation at lower capital costs."

Goetz said access to clean water was critical for coal preparation plants.

"Process water is commonly contaminated with fine and ultrafine particular matter that can range from dust and fine particles to snails and other organic material if the water is stored in a dam," he said.

"Many water users within the processing rely on high water quality to reduce wear and tear or damage to their equipment. Not only do water spray nozzles block up with solids and require maintenance, but seal and glide water on filters, gland seal water on pumps, and other process water use can be negatively affected by solids content."

Goetz was surprised to find that a significant number of sites had removed screens when they clogged up too frequently, allowing the contaminants then pass without being captured

rather than addressing the maintenance issues.

ACARP Industry Monitor Jennifer Woodgate said having the comprehensive review of the different technologies available for the industry to refer to was going to make it easier for coal preparation plants to select the most appropriate equipment for their needs.

“The scope of the project looking at other industries as well as outside Australia, this has brought together a comprehensive review of water filtration equipment. This will provide coal preparation plants with a centralised report that can be consulted to use during equipment selection. It will also provide information on the different technology available that may not have been known to all individuals,” she said.

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