APPLICATION OF THE HYPERBARIC DISC FILTER FOR FINE COAL PRODUCT DEWATERING

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Abstract

Hyperbaric disc filter dewatering of coal flotation concentrates is common practice in China, Eastern Europe and Russia. The hyperbaric disc filter uses an air pressure of up to 0.6 MPa, to drive the dewatering process. This additional pressure is able to achieve surface moisture levels significantly less than conventional vacuum filtration.

Two detailed studies have been undertaken by QCC Resources (QCC) to assess the feasibility of using hyperbaric disc filters with, and without optional steam drying, to target lower flotation product surface moisture levels relative to conventional froth flotation concentrate dewatering technologies.

As part of each study, froth flotation concentrate samples were assessed by hyperbaric disc filter original equipment manufacturers (OEMs) Bokela and Andritz and also independently by Queensland Centre for Advanced Technology (QCAT) in Brisbane. The laboratory scale pressure filter testing programme was undertaken to select the required filter area and equipment size, and to determine what product surface moisture levels could be achieved relative to the filter throughput, selected dewatering ratio and process air operating pressure.

The laboratory test program findings were that hyperbaric filtration without steam injection provides the potential to achieve surface moisture of between 15% and 20% for nominal 0.07 and 0.05 mm P50 feeds respectively. The addition of steam injection, or alternatively selecting much larger filter area and process air requirements, can realise surface moisture levels as low as 10% to 15% (for the aforementioned feed classes).

Currently, the use of conventional filtration technologies on flotation product is seen as being detrimental to product energy for thermal coals, with the increased moisture levels often negating any increase in solids yield. This significant decrease in flotation product moisture may provide a path for thermal coal producers to add flotation to existing plants to increase the plant yield for an equivalent gross as received energy of the product coal.