Gekko's "CGR" test protocol gains attention

Gekko's experienced Metallurgical Lab team

Gekko's technical and metallurgical laboratory teams are leaders in the design of gravity and intensive leach test research programs. Determining the recovery of minerals at their liberation size, grade recovery relationships, size recovery relationships, as well as recovery of auriferous minerals through intensive leach work, are all the company's areas of expertise.

Continuous gravity recovery (CGR) test work protocols are an alternative to the standard batch gravity recovery (GRG) test work program offered by many independent laboratories.

CGR test work provides an improved and more accurate understanding of an ore's response to gravity separation devices by plotting the recovery against a mass yield. As a result, Gekko's technical staff would generally recommend a CGR test be undertaken on samples rather than the standard GRG test which is limited to very low-mass pulls.

Over the past decade Gekko's technical group, lead by Technical Director, Sandy Gray, and R&D Manager, Tim Hughes, has researched and developed protocols to replicate the continuous gravity recovery of heavies and lights in mineral processing circuits. This has been an important development in assessing the performance opportunity of the IPJ in processing plants.

There are two CGR test work programs that replicate IPJ performance and they are designed to simulate single pass or recirculating load circuit designs.

CGR single pass test work flow sheet

Gekko has developed a CGR test to simulate the performance of the IPJ in a single pass set up in crushing and grinding circuits. This is the test work flow sheet used for Pirquitas. Most test work of this type is conducted on size fractions from 600 microns above.

The CGR test uses dense media separation (the Gekko Viking Cone and/or cyclones) at coarse sizes for size fractions above 1.2mm and tabling for size fractions at less than 1.2mm.

The top crush size for the CGR test is 12 mm. The purpose of the test is to determine the specific gravity differential of the sample and the results are then plotted on a yield recovery curve similar to Figures 1 and 2.

The heavies are collected at different mass yields and recovery of valuable minerals is determined. From the curve it is possible to determine the optimum mass yield; to recover or reject, the heavies or lights.

CGR progressive grind for circulating loads

Where the IPJ is to be installed in a circular load, the CGR test is modified so that heavies are removed at the coarser size as it liberates. The lights from the test are then re-presented at finer crush or grind sizes to replicate the environment experienced in recirculating loads. This is similar to the Kloof test work and subsequent plant data shown in Figure 2.

The two test work programs discussed above are increasingly popular at Gekko's metallurgical lab as customers focus on strategies to reject gangue or pre-concentrate their target mineral in order to reduce capital, energy consumption and operating costs.

Comminution strategy critical to optimizing gravity concentration

To optimize the CGR test work program, Gekko has invested in a range of lab comminution devices. R&D manager, Tim Hughes says, "The comminution method is the single most important factor in maximising gravity separation. As a result, our lab features the following test crushing and grinding devices: VSI, HPGR, conventional crushing and conventional milling. We have recently developed our own lab unit to replicate the VSI unit performance in fine crushing and circulating loads".

The comminution room at Gekko's metallurgy laboratory