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Increased Chromite Recovery With Longi-Multotec's Vertical Ring Whims

With the advent of the Longi-Multotec Vertical Ring Wet High Intensity Magnetic Separator (WHIMS), platinum group metals (PGM) beneficiation plants will now be able to achieve attractive yields from tailings dams. Currently the minus 1 000 to plus 115 micron chromite is being recovered by spirals, but no proven technology is used to recover the fine chromite which is minus 100 micro.

Although WHIMS is a well-known and proven technology across a range of commodity sectors, having been extensively used in hematite beneficiation, in the recovery of ilmenite in minerals sands applications, in manganese beneficiation, copper beneficiation and pyrite scavenging, its use in the recovery of fine chromite is fairly new.

Multotec is currently involved in extensive test work in chromite recovery using its WHIMS technology. Tests have shown that the WHIMS machines typically have a force factor of two hundred million Gauss²/mm, which is a vastly significant difference when compared to a traditional low intensity wet drum magnetic separator, which has only 20 000 Gauss²/mm.

"Trials indicate that the WHIMS can recover particles down to a fraction size as small as 5 microns, a characteristic that is attributed to the exceptionally high force factor. Particle sizes as small as 80% passing 30 microns have been recovered. To put this in perspective, this particle size is finer than the diameter of a 40 micron human hair," says Willem Slabbert, application and process manager at Multotec Process Equipment.

With the Longi-Multotec WHIMS, the chrome is removed and a saleable product recovered. Furthermore the PGM grades could be upgraded to above 3 mg/t. It then becomes economically feasible to refloat through existing capital infrastructure.

The vertical ring WHIMS machine brings a number of benefits to customer. Firstly, once the test work data has been verified, the machine can be upscaled to a capacity of up to 300 tph of solids (or 1 000 m³/h of slurry) through a single machine. "Extensive tests show chrome grades of 43.8% are readily achieved with the vertical ring WHIMS and indicates that the percentage grade achievable on full scale plant is expected to be even higher," Slabbert points out.

The Longi-Multotec WHIMS machine provides the industry with an attractive solution including ease of maintenance and operator friendliness, lower operating costs, savings on electrical infrastructure and electrical consumption, environmentally friendly operation and easy and reliable process performance. Control of the machine is also improved and it is more reliable resulting in better separation consistency.

Most of the repeatable test work using the Longi-Multotec vertical ring WHIMS has been undertaken on different samples and different seams of UG2, LG6 and MG tailings on the Western Limb of the Bushveld Complex, with some tests having been conducted on the Eastern Limb.

CHROMITE RECOVERY INCREASED PIC 01 : The Longi-Multotec vertical ring WHIMS machines for paramagnetic mineral beneficiation.

CHROMITE RECOVERY INCREASED PIC 02 : Slimes dam ultra fine chrome separated from PGM containing silica with a Longi-Multotec vertical ring WHIMS machine.

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