

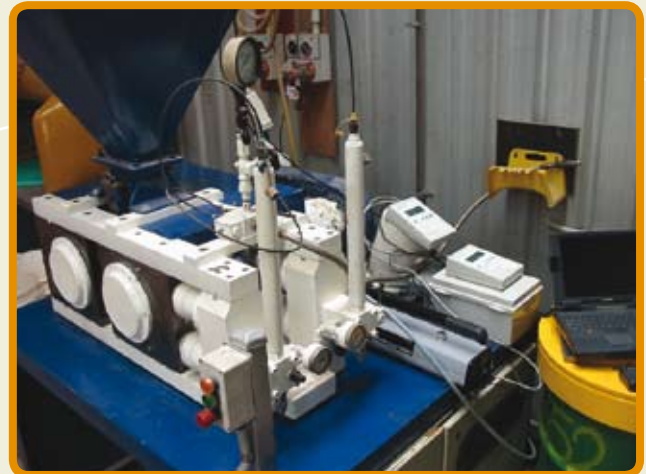
High Pressure Grinding Rolls (HPGR) are increasingly becoming a part of hard rock processing due to their energy efficiency, ability to induce micro-cracks and preferential liberation, coupled with high throughput and high reduction ratio.

HPGR Testing Equipment

High Pressure Grinding Rolls tests can be carried out by JKTech. The tests are conducted at the JKTech pilot plant using a laboratory-scale Krupp Polysius machine (pictured, right).

Also visible is the feed chute/hopper (of about 80 kg capacity), that is used to maintain a constant feed rate into to the HPGR unit.

The unit is fitted with profiled liners, which are shown below.



The rolls on this unit are 70 mm wide and have a diameter of 300 mm. Each is independently driven by a separate motor and the design of the unit allows the user to choose from two fixed speed settings.

This translates to a choice between 0.33 m/s and 0.67 m/s for the roll perimeter speed. One of the rolls has its axis of rotation fixed while the other roll is mounted on blocks and is free to move along tracks aligned at right angles to its rotation axis.



Force is applied to this roll along the direction of the tracks through pistons driven by the unit's hydraulic system.

This force translates into a pressure that is applied to the feed material by the rolls. Pneumatic accumulators containing nitrogen gas are provided to act as shock absorbers.

The hydraulic system thus tends to act as a spring, the characteristics of which are determined by the initial gap setting, the initial nitrogen gas pressure and the initial hydraulic oil pressure.

The combination of these machine settings determines the non-linear stiffness response of the spring.



Metallurgical Laboratory Services

Types of Testing Offered:

Type A: Ore energy response to HPGR

In this case a minimum of six tests is normally carried out to achieve an effective characterization of an ore under different HPGR operating pressures. The best comminution to energy response is targeted during this testwork. The specific energy input is usually in the range 1-4 kWh/t, which corresponds to a specific force of 2-6 N/mm².

Type B: Ore variability to response to HPGR

Ore variability tests are carried out on as many ore types as can be provided, to test the relative response of the ore to the same HPGR process settings. Under these circumstances, a pre-selected or the optimum test conditions are chosen, and kept constant for the remaining tests.

Test Methods

When samples arrive at JKTech, they are crushed to pass 9.5 mm as a standard (or less if requested by client – e.g. 6.7 mm), to comply with the feed requirements of the JKTech laboratory machine.

A representative sub-sample of each of the feed samples will be subjected to sieve analysis and “bulk” density measurements. The product from each of the HPGR tests will be subjected to de-agglomeration and sieve analysis. The flake density will also be determined.

References

Daniel, M.J., 2002, HPGR Model verification and scale up, Masters Thesis, University of Queensland, Australia

Daniel, M. J. and Morrell, S., 2004, “HPGR model verification and scale-up”, Elsevier, Minerals Engineering 17 (2004) 1149-1161, May (2004)



Reporting

Test results are detailed and interpreted in a Report which summarizes the behaviour of the test ores in the HPGR, with special reference to customer requirements.

Sample Requirements

The recommended Type A test sample size is between 20 and 30 kg.

This is the minimum amount considered necessary to obtain an assessment under steady state processing conditions.

Other JKTech Services

- Consulting (comminution, flotation, mine-to-mill)
- Quantitative Mineralogy (MLA and JKMineralogy)
- Specialist Software (JKSimMet, JKSimFloat, JKSimBlast)
- Metallurgical Laboratory Services
- Training Courses

Contact

John Dixon
Manager JKMetLab

Telephone: +61 7 3365 5908

Facsimile: +61 7 3365 5900

Email: j.dixon@jktech.com.au



JKTech's range of technologies is supported by the ongoing research activities of the world renowned JKMRRC.

JKTech Pty Ltd

Isles Road, Indooroopilly, QLD 4068, AUSTRALIA
Telephone: +61 7 3365 5842 Facsimile: +61 7 3365 5900
info@jktech.com.au | www.jktech.com.au

*Delivering world class solutions to
the minerals industry*