

Slurry Engineering and Rheology Testing

The Applus+ Materials Centre can provide engineering design and installation inspection and review for slurry and water hydraulic pipelines and associated pumping systems.



THE Applus+ SOLUTION

We have experience in designing pumping and piping systems for a range of mining applications, including:

- Open pit dewatering
- Underground mine dewatering
- Tailings pumping systems
- Mineral process plants
- Bore field systems
- Gravity systems

We use a combination of proprietary pipeline friction loss design software which have been developed from our own experience to model the piping systems. Existing site operational data is used where possible to ensure the design models provide an accurate representation of the pumping and piping systems. The Applus+ Materials Centre can also provide a slurry rheology testing service for client provided samples. Our small pipe /pump test loop provides a convenient method for determining the slurry rheology using relatively small samples.

Applus can provide accurate slurry system modelling using a combination of in-house and commercial slurry system modelling software, combined with site based analysis and comparisons.

Our specialists have provided tailings, long distance and mineral processing plant pumping design solutions for many Western Australian, Asian and West African mines. Current trends with tailings pumping often require transportation along relatively long distance pipelines. Combined with the presence of a high solids concentration, the slurry will have a high viscosity and will have a significant effect on the discharge head required for pumping. In order to more accurately determine the pipeline friction losses, it is essential to conduct slurry rheology tests on tailings samples. The rheology testing will provide information relating to the slurry viscosity at varying solids concentration, from which we can calculate the pipeline friction losses. Successful use of the right data will minimise errors in the design and selection of pipelines and pumping equipment. The Applus+ Materials Centre has developed our own purpose built recirculating pipe loop for measuring slurry rheology. The pipe loop is similar in operation to a tube viscometer, and is instrumented with high accuracy pressure transducers and variable flow control to enable accurate determinations of shear rate versus shear stress curves. Viscous slurries are often treated as non-settling, however tests conducted at the Materials Centre often show that viscous slurries can be settling and the rheology relationships are often critical in good pipe line design.

Target customers

Slurry hydraulic modelling is essential to enable the correct sizing of pipe lines and calculate the required pump sizing and motor power to achieve the target flows.

Key customer benefits

Our personnel have worked in the engineering and design for mining and mineral process plants for over 30 years, specializing in difficult slurry applications.