

Media Release  
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## Microwave moisture technology is on the move

THE use of microwave technology to measure the moisture content of materials on conveyor belts is not new. In fact, the technology has enjoyed growing popularity over the past 20 years, due to the improved accuracy associated with through-material measurement.

However, as materials become more highly attenuating (for example, iron ores/concentrates), it can become difficult to measure them with microwave technologies. This problem is compounded by higher capacity belts and the higher moisture contents associated with wet-beneficiation or extraction below the watertable.

The LFM moisture analyser has been specifically designed to improve performance in these demanding applications.

The key to the LFM is its use of low frequency microwaves (hence LFM). These penetrate difficult materials more easily, leading to a stronger signal at the receiving antenna. The trade-off, however is that it is harder to measure phase changes on lower frequency microwaves – which is where the sophisticated electronics and smart antenna design play such a large part.



The LFM moisture analyser was originally developed by CSIRO to help BHP Billiton Iron Ore control moisture levels in its deposits of Marra Mamba ore in Western Australia. At this time, the LFM was the first instrument to effectively measure moisture in a highly attenuating material such as iron ore. The follow-on success of the LFM saw CSIRO create a new company, Intalysis, to commercialise the product.

Despite the success of the product, Graeme McGown, managing director of Intalysis, said, "We probably didn't appreciate the full potential of the LFM until Outokumpu Technology trialled it at their plant in Tornio, Finland." Tornio is home to Outokumpu's ferrochrome processing operation, which features a computerised ore tracking and blending system.

"Most of the input variables at Tornio are minimised and, as a consequence, it was easy to see what the LFM could do," said McGown. "It really delivered: an absolute accuracy of +/-0.08 percent (one standard deviation), our best result to date."

Today, the LFM analyser is raising the bar yet again with the launch of the new D antenna.

“The D antenna is designed for extremely high bed depths or very highly attenuating materials, such as metal sulphides or sinter feeds,” said McGown. “It increases our bed depth capacities by between 40 and 60 percent. This gives us between 450 mm and 520 mm of hematite fines at 6-7 percent moisture content.”

### **How does it work?**

THE LFM moisture analyser is based on the same principle as other microwave moisture analysers.

Water has a very high dielectric constant, compared to many materials. When microwaves come into contact with moist materials, they slow down (and hence change phase) and weaken (attenuate) as the energy is transferred to the material.

By measuring the decrease in attenuation and speed (by the change of phase), it is possible to infer the moisture content.

The LFM's industrially hardened computer runs on the ultra-stable QNX operating system, which is designed to accommodate multiple events such as different sensor inputs.

According to McGown, the company is currently integrating external temperature compensation to detect local heating caused by oxidation, as well as measuring moisture contents.

“With the LFM, you have an instrument that has established a firm capability in moisture analysis for difficult or demanding materials,” said McGown, “one that is only just beginning to explore its potential for customisation.”

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