



RFID Density Tracers for CurvePRO DIAMOND

Product Code: DOD-RFID

Real-time automated monitoring of partition curves by a single operator

- 18 precise densities at 13mm
- Available only with the patented CurvePRO system



OPERATING PROCEDURE

Disposable Radio-Identified Density Tracers

These single-use radio-identified density tracers are available to clients who have leased the CurvePRO System for dense medium cyclones and other density separators in diamond processing applications.

Densities range from RD 2.50 to RD 3.53 and every tracer is guaranteed to be within ± 0.006 g/cc of its nominal density. At the extremes of the range, larger increments are allowed, together with larger tolerances.

Each RFID tracer is in the form of a grey cube with 13mm edge length, and each contains a radio transponder capable of transmitting the density of that particular tracer to Partition Enterprises detection equipment, which is available for long-term lease to diamond processors.

Density tracers with densities spanning the range of interest are added to the circuit feed and are automatically detected from the product and rejects streams. These tracers are disposable and therefore require no retrieval. For statistical confidence, at least 50 tracers are used for each selected density. After detection of various densities, and the resulting data are used to plot a partition curve.

The form of the curve can indicate whether the metallurgist should take actions such as adjust medium density, replace a worn circuit component, or correct an overload or medium instability situation.

If a snapshot (short duration) audit is required, the entire process can be conducted by a single operator over less than 10 minutes, with the precise partition curve immediately displayed on a tablet screen.



PARTITION CURVE INTERPRETATION

Interpretation of DMC Partition Curves

The figures below illustrate the common forms of density tracer partition curves for dense medium cyclones. A module of one or more well-operated and well maintained dense medium cyclones should show an efficient separation (Figure 1). By contrast with conventional float/sink techniques, density tracers provide the resolution which shows that large particles can be partitioned with an E_p of less than 0.01 RD units.

Fig. 1 Normal (efficient) partition curve.

Figure 2 shows a reasonably small RD range of particle retention. Separation is still quite efficient but there is a danger that a small change in operating conditions may increase the density range of retention. The cyclones rapidly become choked with "near-density" material and frequently clear themselves by ejecting surges of slurry, including low-density coal, to underflow.

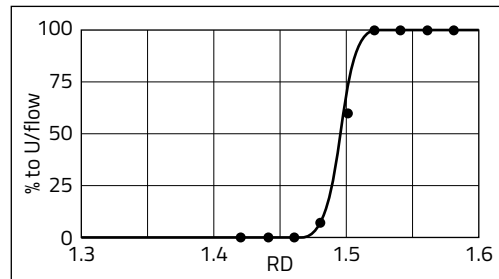


Fig. 2 Tracer Retention

The resulting partition curve is shown in Figure 3. The E_p is large; there is a low-density "tail" and a low (sometimes negative) offset between feed medium density and cutpoint. The performance shown in Figure 3 can also arise from vortex finder overload when the medium flow from the vortex finder is insufficient to carry out all the particles which should report to the low-density product. As with surging, the yield loss can be very significant.

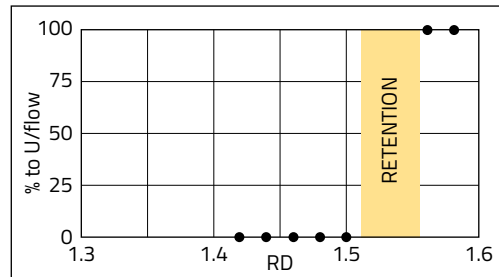


Fig. 3 Surging or Vortex Finder Overload can cause yield loss.

A curve with a plateau (Figure 4) is indicative of differing cutpoints between separators in the module. Examination of the data for individual product screens will suggest which units are separating at high, and which at low density.

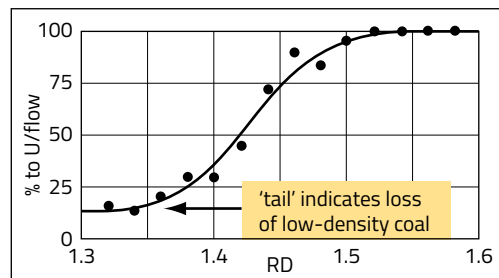
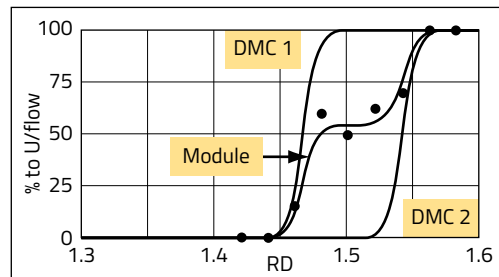


Fig. 4 Two DMCs with different cutpoints.

Means for the correction of these separating inefficiencies may be found in the references listed below or by contacting Partition Enterprises Pty Ltd.



PRECISION TRACERS FOR DMC OPTIMISATION

RFID Density Tracers for Diamond Applications offer the following:

- | | |
|------------------------|---|
| Certified | Each shipment includes Quality Control Certificates for accuracy of density (100% within 0.02 g/cc of nominal density). |
| Discounts | 5% discount where 500 or more of the same item are ordered eg. 500 x 13mm RD 2.50. |
| Non Toxic | Contain no lead compounds. |
| Fast Delivery | Common sizes couriered to your store in 1-2 weeks. |
| No Hidden Costs | Prices include packaging and handling.
Freight will be advised in an emailed quotation, where applicable. |
| Credit | For many clients we accept 30 day payment terms. |





DIAMOND RFID DENSITY TRACERS

Product Code. DOD-RFID

Export Prices AUD

Tracer Size	13mm	13mm	13mm
Price per box of 50 (Ex GST)	\$227.00	\$227.00	\$227.00
	RD 2.50	RD 2.85	RD 3.15
	RD 2.60	RD 2.90	RD 3.20
	RD 2.65	RD 2.95	RD 3.25
	RD 2.70	RD 3.00	RD 3.30
	RD 2.75	RD 3.05	RD 3.40
	RD 2.80	RD 3.10	RD 3.53

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References

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Davis, JJ, Wood, CJ and Lyman, GJ, 1985b, "The Use of Density Tracers for the Determination of Dense Medium Cyclone Partitioning Characteristics", Int. J. of Coal Processing, 2(2) 107-126.

Davis, JJ, Wood, CJ and Lyman, GJ, 1985c, "The Effects of Operating Variables on Dense Medium Cyclone Operation", Proceedings, Third Australian Coal Preparation Conference, Wollongong.

Wood CJ, Davis, JJ and Lyman, GJ, 1987, "Towards a Medium Behavior Based Model for Coal-Washing Dense Medium Cyclones", Aus IMM Dense Medium Operators' Conference, Brisbane, 1987, pp247-256 and Coal Preparation, 1989, Vol 7, ppl83-197.

Wood, C.J., 2004. "Density Tracer Testing of Coarse Coal Separators: Suggestions for an Australian Standard", in Membrey, WB(ed), Proceedings, Tenth Australian Coal Preparation Conference, Paper E12.

