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TBS Report 12004

Newmont Corporation

Dust Extinction Moisture Testing: Telfer Copper Concentrate

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DISCLAIMER

Users of this report are invited to contact TUNRA Bulk Solids if clarification of any aspect is required. The test results presented are for a client supplied bulk material sample/s. Should the material handled in practice vary from this test sample then the results in this report may be far from optimal. In addition, any extrapolation of the data and/or recommendations to situations other than those for which they were specifically intended without confirmation by TUNRA Bulk Solids may lead to erroneous conclusions. The contents of this report may not be reproduced without the consent of the client; and then only in full. This investigation was performed using the Bulk Solids Handling Laboratories of TUNRA Bulk Solids Handling Research Associates and the Centre for Bulk Solids & Particulate Technologies at The University of Newcastle.

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1 EXECUTIVE SUMMARY

TUNRA Bulk Solids has been commissioned by Newmont Corporation to conduct testing to determine the Dust Extinction Moisture (DEM) of a Telfer Copper Concentrate sample.

2 TEST PROCEDURE

2.1 Dust Extinction Moisture Test Method

The Dust Extinction Moisture (DEM) was determined using the test device described by Australian Standard AS 4156.6-2000. This standard was written specifically for coal but has been utilised for other bulk materials by modifying the quantity of sample placed in the test rig. The standard calls for 1 kg of coal and this equates to approximately 1 litre of test sample. In applying the method to higher density bulk materials TUNRA maintains a test volume of approximately 1 litre, where the dust number determination presented in Equation 1 provides for a normalisation of mass. AS 4156.6-2000 should be referred to for a complete explanation of the test procedure, however, a concise description is as follows. The test rig shown in Figure 1 consists of a rotating drum in which the sample of material to be tested, at a pre-measured moisture level, is placed. The drum is rotated at a speed of 29 RPM for a period of 10 minutes while an air flow rate of 175 L/min is drawn through a hole in the drum lid, through a hollow drive shaft and into a paper filter bag which collects the dust generated in the drum. Testing is performed in a controlled environment at a temperature of 20±2°C and relative humidity of 63±2%RH.

Figure 1 Dust extinction moisture test rig.

The weight of the filter bag is measured before and after the test to determine the quantity of dust collected. A dust number is then calculated according to Equation 1.

$$Dust\ Number = \frac{M_b - M_a}{M_s} \times 10^5 \quad (1)$$

Where

M_b = Mass of filter bag and dust (grams)
M_a = Mass of filter bag (grams)
M_s = Mass of sample in drum (grams)

The test work is conducted on a number of samples over a range of moistures and the dust numbers obtained are plotted on a log-linear graph. The Dust Extinction Moisture (DEM) is determined by the intersection of a regression of relevant dust-moisture data points through a dust number of 10. The actual DEM value is only totally representative if conditions (air speed, material stream characteristics etc.) are identical to those inside the test rig. However, the observed relationship between dust and moisture may be consulted to determine the sensitivity of the material to dust control by addition of moisture.

3 TEST RESULTS

3.1 Dust Extinction Moisture Test Results

DEM testing yielded the dust moisture curve presented in Figure 2. The relationship indicates how much moisture may be required to improve dust control during dust generating events – for example, those occurring at transfer points or during ship loading.

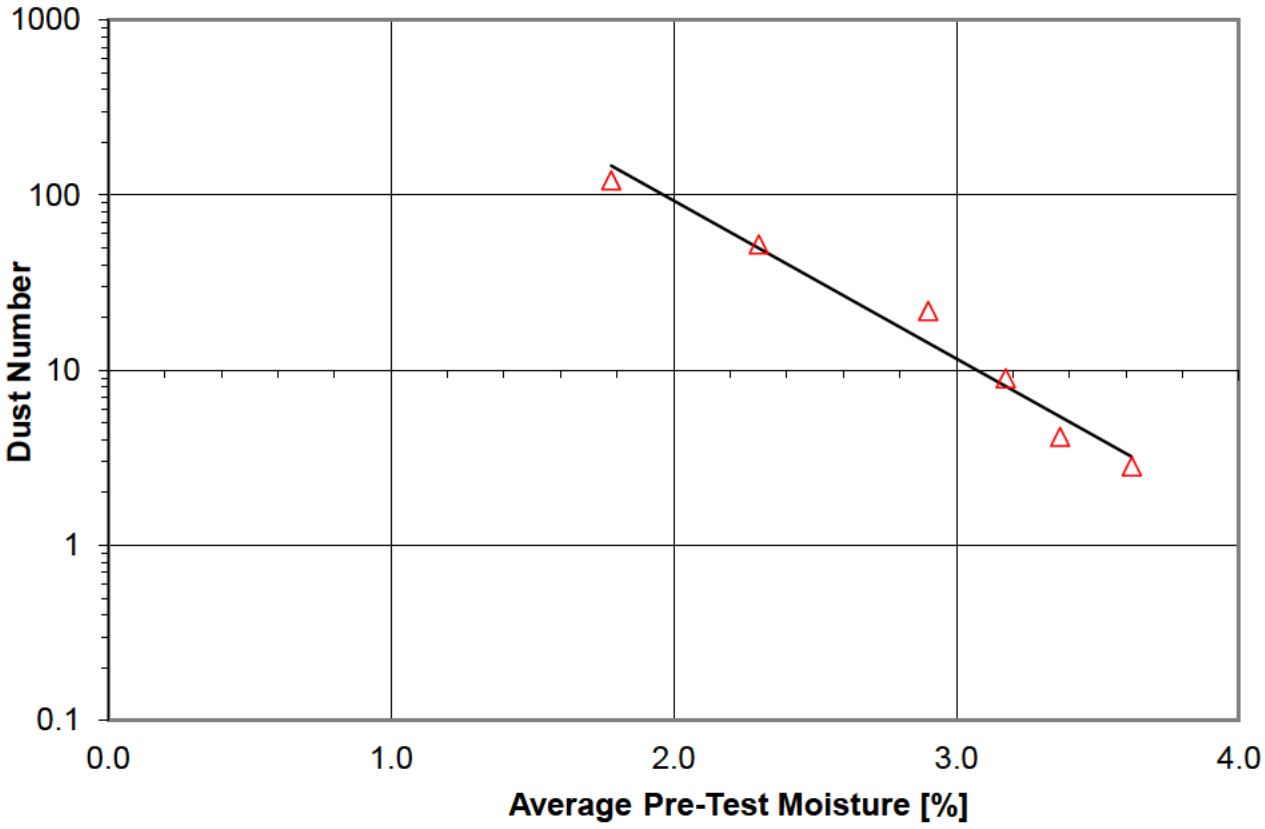

Figure 2 Dust-moisture relationship.

The DEM value determined for the product is listed in Table 1 and is determined as the intercept of the regression of relevant dust-moisture data points with a dust number of 10 - as per AS 4156.6.

Table 1 Dust Extinction Moisture

Sample	DEM Moisture (% Wet basis)
Copper Concentrate	3.1

The dust numbers and moisture content relationships only apply to the Copper Concentrate sample tested. A change in particle size distribution (for example through handling or processing) will change the relationship and results.