AUSTRALIAN STANDARD
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DETERMINATION OF MOISTURE IN WOOD CHIPS DISTILLATION METHOD

This method details a procedure used as a rapid control test in the mill, for the determination of moisture in wood chips and the calculation of the oven-dry value. It is based on the distillation of water from a known mass of chips, using a water immiscible organic liquid as the distilling medium. An all-metal still is used for this purpose, specially designed to give maximum heat transfer efficiency.

As this is a mill control method it should be regularly checked against the reference standard, using the oven-drying procedure (Reference 8.1).

1. APPARATUS

1.1 Chip retort and condenser. Various designs on retort and condenser could be used. The following describes one design which has been found to be satisfactory.

1.1.1 The retort consists of a copper-bottomed body of approximately 1500 mL capacity, and a head approximately 200 mm high. The head and body are connected by a flange joint. Wing nuts are fitted to the connecting bolts so that the retort can be dismantled without the use of tools, and a flexible gasket is used to ensure a leak-free seal between the head and body of the retort. The head, and the walls of the body are lagged to minimize heat loss.

1.1.2 The condenser consists of approximately 2.7 m of water-jacketed copper pipe. Detailed drawings of a suitable chip retort and condenser may be obtained from Appita on request.

1.2 Hotplate: 200-mm diameter circular electrode hotplate rated at 2000 W.

1.3 Balance: A balance capable of weighing up to 500 g with a sensitivity of 0.1 g.

1.4 Measuring cylinders: One each of 1000 mL and 250 mL capacity.

1.5 Separating funnel: Conical separating funnel of 1000 mL capacity, marked at 800 mL.

1.6 Tared container having a tightly fitting lid for weighing 250 g of wood chips.

1.7 Metal funnel 230 mm in diameter, 190 mm deep, with spout 60 mm wide and 50 mm deep.

2. REAGENT

2.1 Water immiscible organic liquid having a boiling range of 140 to 200°C and specific gravity less than 1.0, such as mineral turpentine or white spirit (Note 7.1).

3. PREPARATION OF SAMPLE

3.1 The following method of sampling is one that has been in use in an Australian mill for some time. Other sampling procedures based on the use of sample splitters and drum mixers have been suggested. Such equipment may be advantageous when working with chips of higher moisture content. Coning and quartering may also be used if this can be carried out rapidly.

3.2 During the charging of each digester, take a handful of chips at half-minute intervals, to obtain a representative sample. Mix the sample briefly, then spread in a rectangular pattern on the sampling bench and divide into six equal portions. Mix each individual portion separately then take equal amounts from each portion. Mix these equal amounts, sample down and weigh out 250 ±0.5 g in the tared contained. If necessary achieve this tolerance by splitting a chip (Note 7.2). The time elapsing between sampling the chips and commencing the distillation must be kept as short as possible to minimize loss of moisture from the chips by evaporation.

4. PROCEDURE

4.1 Transfer the 250 g sample of chips to the dry, cold, retort using the metal funnel. Spread the chips evenly over the bottom of the retort then quickly add 1000 ml of the distilling medium. Replace the gasket, place the retort on the hotplate and screw the head on firmly. Connect to the condenser, check that a good flow of water is flowing through the condenser and switch on the hotplate.