



Method 1.17 - Official Methods: press water clarifier mud insoluble solids

1. Rationale

This method is applicable to press water clarifier mud samples and is used to obtain data for cane payment purposes.

2. Principle

The press water clarifier mud sample collected is prepared and by the addition of Celite 577, the amount of insoluble solids is determined and is used to correct the mass of press water clarifier mud.

3. Apparatus

- 3.1 Squat beakers (100 cm³, 250 cm³)
- 3.2 Light duty balance
- 3.3 Buchner funnel (110 mm ϕ)
- 3.4 Buchner flask
- 3.5 Drying oven at 105°C
- 3.6 Dessicator
- 3.7 Filter paper, Whatman No. 1 or equivalent (150 mm ϕ), dried at 105°C for 2 hours and stored in a dessicator
- 3.8 Stirring rod (150 mm \times 6 mm)

4. Reagents

- 4.1 Filter aid - Hyflo Supercel (dried and stored in a dessicator)

5. Procedure

Zero the balance. Place a 250 cm³ beaker, a 100 cm³ beaker and a filter paper on the balance pan.

Add approximately 12 g filter aid to the 250 cm³ beaker and approximately 4 g filter aid to the 100 cm³ beaker.

Note the total mass to the nearest 0.01g.

Place the 250 cm³ squat beaker on the bench top.

Agitate the composite sample and rapidly transfer 150 g to the 250 cm³ beaker.

Collect approximately 150 g in the 250 cm³ beaker.

Return the 250 cm³ beaker plus contents to the balance pan and note the total mass (which again includes the mass of the filter paper, 100 cm³ beaker, etc.) to the nearest 0.01g.

Transfer the filter paper to the Buchner funnel and wet it with water so that the paper fits tightly around the sides of the funnel.

Precoat the filter paper with the 2 g of filter aid held in the 100 cm³ beaker. This is done by adding water to the filter aid in the beaker and then pouring the slurry down a glass rod onto the filter paper. Rinse all the filter aid adhering to the beaker and glass rod into the funnel.

Filter the sample by pouring it slowly down a glass rod onto the precoated filter paper, taking care not to flood the filter aid surface with sample, i.e. pour the sample in at a rate lower than the drainage rate of the filter; this is important to ensure quick filtration. This initial filtration should be done at a differential pressure of 15 kPa. During the filtration the beaker contents must be stirred occasionally and visual checks must be made on the clarity of the filtrate to ensure that no by-passing of filter aid or suspended solids occurs.

Rinse the beaker well with distilled water and pour the rinsings into the funnel.

Increase the vacuum to a differential pressure of about 50 kPa and wash the filter with ten 30cm³ aliquots of distilled water, allowing the filter to drain between additions. Finally allow the filter to drain for 5 minutes under vacuum.

Release the vacuum and transfer the filter paper and contents quantitatively back to the 250 cm³ beaker. Care must be taken to ensure that no filter aid remains adhering to the sides of the funnel.

Dry the 250 cm³ beaker and contents and the 100 cm³ beaker at 105°C for 4 hours.

Cool in a dessicator for 30 minutes and weigh. Record the mass to the nearest 0.01g.

6. Calculations

$$\text{Insoluble solids \% press mud} = \frac{M_3 - M_1}{M_2 - M_1} \times 100$$

where M_1 ≡ mass of beaker and filter aid (g)
 M_2 ≡ mass of beaker and sample before drying (g)
 M_3 ≡ mass of beaker and sample after drying (g)

For South African conditions insoluble matter % press mud is usually of the order of 7%.

7. References

SASTA (1985). *Laboratory Manual for South African Sugar Factories*. 3rd Edition: 276 - 277.