



## METHYLENE BLUE TEST

The methylene blue dye test (MBT), is used to determine the cation exchange capacity of the solids present in a drilling mud. Only the reactive portions of the clays present are involved in the test and materials such as barite, carbonates and evaporates do not affect the results of the test since these materials do not absorb methylene blue. The cation exchange capacity of some typical clays are:

Clay	CEC (milliequiv./100gm) Moisture Free
Wyoming Bentonite	75
Soft Shale	45
Kaolinite	10
Drilled Cuttings	8 - 12

For bentonite based mud systems the MBT provides an indication of the amount of reactive clays which are present in the drilling mud solids and for bentonite-free, water based mud systems, the MBT reflects the reactivity of the drilled solids. The test cannot distinguish between the types of clay, but if reactivity for the drilled solids is known or assumed it can be used to determine the amount of bentonite present in the bentonite-based systems.

### EQUIPMENT & CHEMICALS

Equipment	Product Code
1. Erlenmeyer Flask	EN4525
2. Hot plate	EL6150
3. Stirring Rod	E10339
4. Hydrogen Peroxide	EY1090
5. Sulfuric Acid 5N	EY1240
6. Methylene Blue: (solution strength - 0.01 meg)	EY1106
7. 10 mL pipette	EN6100
8. Syringe 2cc Glass	EN3303
9. 50 mL graduate cylinder	EN2900
10. Bulb pipette safety	E83102

# METHYLENE BLUE TEST

## TEST PROCEDURE

1. Using the completely filled 3 mL syringe, measure 2.0 mL mud sample to be tested into the Erlenmeyer flask containing 10 – 15 mL fresh water.
2. Add 15 mL hydrogen peroxide and 12 drops 5N sulfuric acid. Swirl or stir to mix.
3. Boil gently for approximately 10 minutes and dilute with 20 mL fresh water.
4. Add methylene blue in 1.0 mL increments. After each addition, swirl the flask or stir vigorously for at least 20 seconds and remove a drop of sample on the end of the stirring rod.
5. Apply the drop to a piece of filter paper marking the drop with the amount of methylene blue added between each increment. The approximate end point is reached when a blue ring spreads out from the blue spot on the filter paper. At this point, without further addition of methylene blue, swirl the flask an additional two minutes and place another drop on the filter paper. If the blue ring is again apparent, the end point has been reached. If the ring did not appear, continue with the methylene blue increments until a blue ring permanently forms after two additional minutes of swirling. NOTE: For increased accuracy, 0.5 mL increments may be used as the end point is approached. The blue ring is more apparent on the reverse side of the filter paper from which the drop is placed.

## CALCULATIONS

$\text{kg/m}^3 \text{ reactive clay} = 14.25 \times \text{mL methylene blue}$   
mL of mud sample

(Simplified equation:  $\text{kg/m}^3 \text{ reactive clay} = 7.125 \times \text{mL Methylene Blue}$ )

## CARE OF REAGENTS

The methylene blue dye and hydrogen peroxide should be stored in a cool, dark place to extend their life. These solutions should be replaced every four months.