



ALKALI - SILICA CONTENT IN A POTASSIUM SILICATE

ALKALI CONTENT IN A POTASSIUM SILICATE DRILLING FLUIDS

This procedure is used to determine the total titratable alkali in a potassium silicate based drilling fluid. The total titratable alkali will be used to:

- a) Calculate K_2O
- b) Monitor the ratio of $SiO_2:K_2O$

A sample of potassium silicate drilling fluid filtrate is weighed into a flask and mixed with water in a small amount of indicator (Methyl Red). The mixed solution is then titrated with 0.2N HCl acid. All materials that react with acid are titrated and are calculated as a percent potassium oxide (K_2O).

EQUIPMENT & CHEMICALS

Equipment	Product Code
1. Hydrochloric Acid (HCl) 0.2N	EY1081
2. Prepared Methyl Red* (actually orange in color)	EY1115
3. Breaker - 400mL	E10486
4. Calibrated Burette/Pipette - 25mL	EN6200
5. Graduated Cylinder - 100mL	EN2800
*1 gram methyl red indicator dissolved in 600mL methanol. Add 400mL distilled water to bring final volume to 1 liter.	

SAFETY

Follow safe laboratory procedure such as wearing eye protection and gloves while handling chemicals.

PROCEDURE

1. Measure 5mL (to the nearest 0.1mL) of potassium silicate drilling fluid filtrate into a beaker.
2. Add 100mL of distilled water and swirl beaker until completely mixed.
3. Add 4 drops of prepared methyl red indicator and swirl beaker, solution will turn yellow.
4. Titrate sample with 0.2N HCl acid till a red color develops.
5. Record volume of HCl acid used.

ALKALI - SILICA CONTENT

CALCULATIONS

$$(V \times 0.94)/W = \%K_2O$$

V= volume in mL of HCl used during titration

W= weight in grams of silicate drilling fluid sample

PRECISION & ACCURACY

Samples should be done in duplicate. Accuracy of this procedure can be effected by other mud ingredients (ex. Caustic, sodium silicate, sodium carbonate etc.) and/or possible contamination from the drill hole.

FIELD TEST METHOD FOR SILICA CONTENT IN A POTASSIUM SILICATE DRILLING FLUID

This procedure is used to determine the SiO₂ percentage in a potassium silicate based drilling fluid. The SiO₂ will be used to:

- c) Calculate total silica
- d) Monitor the ratio of SiO₂:K₂O

A sample of silicate drilling fluid filtrate is weighed into a flask and mixed with water in a small amount of indicator (Methyl Red). The mixed solution is then titrated with 2.0N HCl acid until the solution turns and stays reddish-orange.

EQUIPMENT & CHEMICALS

Equipment	Product Code
1. Hydrochloric Acid (HCl) 2.0N	EY1087
2. Prepared Methyl Red* (actually orange in color)	EY1115
3. Breaker - 400mL	E10486
4. Calibrated Burette/Pipette - 25mL	EN6200
5. Graduated Cylinder - 100mL	EN2800
6. Sodium Fluoride (125g)	EY1199
*1 gram methyl red indicator dissolved in 600mL methanol. Add 400mL distilled water to bring final volume to 1 liter.	

SAFETY

Follow safe laboratory procedure such as wearing eye protection and gloves while handling chemicals. It is recommended that a duck mask be worn when handling the NaF powder.

ALKALI - SILICA CONTENT

PROCEDURE

1. Measure 5mL (to the nearest 0.1mL) of potassium silicate drilling fluid filtrate into a beaker.
2. Add 100mL of distilled water and swirl beaker until completely mixed.
3. Add 4 drops of prepared methyl red indicator and swirl beaker, solution will turn yellow.
4. Titrate sample with 2.0N HCl acid till a red color develops, while stirring constantly.
5. Add 4g of previously weighed sodium fluoride and mix thoroughly. The color will turn back to yellow.
6. Continue titration after the addition of sodium fluoride. Titrate until the yellow color disappears and a reddish-orange color develops and stays.

CALCULATIONS

$$(\%K_2O \times W)/9.42 = \text{alkali correction (AC)} \qquad ((V-AC) \times 3.0)/W = \%SiO_2$$

$\%K_2O$ = Previously calculated from alkali titration in part 1

V= volume in mL of HCl used during titration

W= weight in grams of silicate drilling fluid sample

PRECISION & ACCURACY

Samples should be done in duplicate. Accuracy of this procedure can be effected by other mud ingredients (ex. Caustic, sodium silicate, sodium carbonate etc.) and/or possible contamination from the drill hole.