

## Potassium Ion Concentration

Potassium chloride (KCl) in drilling fluids is used to prevent or limit the hydration of water sensitive formations. Inhibition of hydration is provided by the potassium ion, K<sup>+</sup> which is attracted to negative charges in formations. It is very important to know the K<sup>+</sup> concentration in these mud systems to optimize fluid performance.

### Supplies

1. Hand crank centrifuge
2. Graduated centrifuge tubes
3. 750 gm/L sodium perchlorate

1. Add 14 mL of fresh water in one of the centrifuge tubes and place it into the centrifuge.
2. Add 4mL Sodium Perchlorate to 10mL of filtrate in the other centrifuge tube. A white precipitate will form immediately if potassium is present.
3. Flip the tube slowly over one minute to mix the solution and place in the centrifuge.
4. Centrifuge for one minute at a speed of 120 RPM, 10 rotations every 5 seconds.
5. Remove the centrifuge tube and record the amount of precipitate as the floc volume in milliliters. Save the centrifuged filtrate.
6. Determine the Potassium Ion concentration in the table below. If the potassium ion concentration is above 55,000 mg/L clean the tubes and split the centrifuged filtrate evenly into each tube. Add 4mL Sodium Perchlorate to each tube and then centrifuge again. Record the total floc volume as the sum of the original floc volume plus any additional floc volume obtained by double centrifuging.

<b>Floc Volume(ml)</b>	<b>0</b>	<b>0.25</b>	<b>0.5</b>	<b>0.8</b>	<b>1.1</b>	<b>1.3</b>	<b>1.5</b>	<b>1.7</b>	<b>1.9</b>	<b>2.1</b>	<b>2.3</b>	<b>2.5</b>	<b>2.7</b>	<b>2.9</b>	<b>3.1</b>	<b>3.3</b>
<b>Potassium Ion Concentration</b>	<b>0</b>	<b>5000</b>	<b>7500</b>	<b>10000</b>	<b>15000</b>	<b>19000</b>	<b>24500</b>	<b>31000</b>	<b>39000</b>	<b>45000</b>	<b>53000</b>	<b>59000</b>	<b>65000</b>	<b>70000</b>	<b>75500</b>	<b>81000</b>

**5250mg/L K<sup>+</sup> is approximately 10kg/m<sup>3</sup> KCL**