



## TOTAL HARDNESS

Water containing large amounts of calcium or magnesium salts is commonly referred to as “hard water”. Make-up waters that are hard make it difficult to obtain the maximum yield from bentonite so it becomes necessary to treat our excess calcium, (for this purpose the total hardness as calcium should be brought to less than 40 mg/L). The presence of calcium in the mud filtrate may also indicate the presence of contaminants such as anhydrite or cement.

### EQUIPMENT AND CHEMICALS

Equipment		Product Code
1.	TitraVer 400	EY1250
2.	Calcium buffer (hardness buffer)	EY1020
3.	Calcium indicator (hardness indicator)	EY1030
4.	1 mL Pipettes	EN5900
5.	Distilled water	EY1060
6.	Stirring Rod	E10339
7.	Calver II indicator (to distinguish calcium from magnesium)	EX1090
8.	Potassium hydroxide (8N) solution (to distinguish calcium from magnesium)	EY1140
9.	Pipette safety bulb	E83102
10.	Titration dish	E10173

### TOTAL HARDNESS (AS CALCIUM)

- Using a pipette, measure 1.0 mL into a white titration dish and dilute to a convenient volume with distilled water.
- Add 4 drops of calcium buffer and 2 drops of calcium indicator. A red color will develop if calcium is present.
- While swirling or stirring continuously, add titraVer with a pipette until the color changes from red to blue. At this end point record the number of milliliters of titraVer added.

### CALCULATION

mg/L hardness (as calcium) = 400 x mL of titraVer added

# TOTAL HARDNESS

## CALCIUM

1. Using a pipette, measure 1.0 mL filtrate into a white titration dish and dilute with a small amount of distilled water.
2. Add 2 drops of 8N KOH (potassium hydroxide).
3. Add several grains of Calver II and swirl or stir to mix.
4. Using a pipette, titrate with titraver to a color change from red to blue.

## CALCULATION

mg/L calcium ion = 400 x mL titraver added

## MAGNESIUM

The magnesium hardness is calculated as:

mg/L magnesium = mg/L total hardness (as calcium) - mg/L calcium