

**Components:**

- #147-54 pH Strips, Range 7.5 to 14
- #153-12 Graduated Cylinder, Glass, 100 mL × 1 mL
- #153-16 Graduated Cylinder, Glass, 25 mL × 2/10 mL
- #153-18 Graduated Cylinder, Glass, 10 mL × 2/10 mL
- #153-29-2 Syringe, Glass-Tip, 10 mL
- #153-30 Funnel, Polyethylene, 3"
- #153-40 Pipette, Glass, 10 mL × 1/10 mL
- #153-51 Beaker, Glass, 250 mL
- #168-04 Stirring Rod, Glass, 6"

**Reagents:**

- #205-17 Titration Solution, (EDTA), 400 mg/L, 32 oz (1 L)
- #205-24 Calcium Titration Solution I, 16 oz (500 mL)
- #205-25 \*Calcium Titration Solution II, 16 oz (500 mL) **UN3287**
- #205-27 Manver (Triethanolamine) Indicator Solution, 2 oz (60 mL)
- #206-02 Deionized Water, 16 oz (500 mL)
- #211-00 \*Ammonium Fluoride, 10% Solution, 32 oz (1 L) **UN2505**
- #212-00 \*Ammonium Hydroxide, Concentrated, 16 oz (500 mL) **UN2672**
- #213-00 \*Formaldehyde, 4% Solution, 32 oz (1 L) **UN2209**
- #230-25 \*Acetic Acid, Glacial, 8 oz (250 mL) **UN2789**

**Optional:**

- #140-56 Filter Paper, 12.5 cm, Whatman® No. 1, Package of 100
- #153-41 Pipette Safety Bulb
- #153-53 Magnetic Stirrer with Stirring Bars, 120 Volt
- #153-53-7 Magnetic Stirrer with Stirring Bars, 240 Volt



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## Zinc Carbonate (ZnCO<sub>3</sub>) Test Kit

**Item# 145-65**

## Instruction Manual

**Updated 9/2/2009**

**Ver. 1.3**

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## Introduction:

This is a field test procedure for determining the zinc carbonate ( $ZnCO_3$ ) in a drilling fluid. Powdered zinc carbonate may be used to scavenge hydrogen sulfide from viscosified water-based drilling fluids. Hence, it may be necessary to monitor the available  $ZnCO_3$  in the mud. The OFITE Zinc Carbonate Test Kit contains all of the required labware, supplies and reagents for the analysis of zinc carbonate in a drilling fluid.

## Procedure:

1. From a well mixed sample of mud, take a 10 mL test sample using a syringe.  
  
*Note: If the total hardness exceeds 50,000 mg/L  $Ca^{++}$ , take a 5 mL test sample.*
2. Place the sample in a 150 mL Beaker
3. Dilute to 40 mL with Deionized Water.
4. Add 10 mL of Glacial Acetic Acid.
5. Stir for 10 minutes with a mixer or a magnetic stirrer. If neither is available, mix with a stirring rod. Thorough mixing is essential as the reaction is slow to take place.
6. Add 15 mL of Ammonium Hydroxide concentrated solution.
7. Check the pH. If it is above pH 9, proceed to the next step. If the pH is below 9, add more Ammonium Hydroxide in 5 mL increments until the pH is above 9.
8. Add 3 mL of Calcium Titration I solution and approximately 3 mL of Calcium Titration II solution, in that order.

**Warning: Calcium Titration II solution is EXTREMELY poisonous. Do not pipette with your mouth. Use a pipette aid or pump. Never mix Calcium Titration II solution with an acidic solution.**

9. Add 10 mL 10% Ammonium Fluoride solution. If the Total Hardness expressed as Calcium exceeds 100,000 mg/L, add 20 mL 10% Ammonium Fluoride solution.

**Warning: Ammonium Fluoride solution is also poisonous. Do not pipette with your mouth. Never mix Ammonium Fluoride with an acidic solution.**

10. Transfer the solution to the 100 mL graduated cylinder and dilute to the 100 mL mark with Deionized Water.

11. Mix well and filter into a dry, clean beaker or suitable container.
12. Take a 10 mL sample of filtrate and place in a clean beaker.
13. Dilute with Deionized Water to approximately 40 mL.
14. Add a few drops of Manver Hardness Indicator solution. If the test solution is blue, proceed directly to step 15. If the test solution is red, titrate slowly with Titration Solution (EDTA) 400 mg/L to the normal blue end point. The amount of Titration Solution used in this step does not need to be recorded, as it is not used in the calculations.
15. Add 15 mL of concentrated Ammonium Hydroxide solution.
16. Check the pH. It should be between pH 10 and pH 11. If the pH is below 10, add additional Ammonium Hydroxide solution in 5 mL increments until the pH of 10 is reached.
17. Add 5 mL of 4% Formaldehyde solution.
18. Let the mixture stand for at least two minutes. The solution will turn from blue to wine-red if zinc is present.
19. Titrate with Titration Solution (EDTA) until the wine-red color changes to sky-blue (similar to the hardness end-point). Record the total mL of Titration Solution used.

## Calculation:

$$ZnCO_3, (\text{lbs/bbl}) = \frac{44 \times A}{B \times C}$$

Where:

A = Volume of titration solution used in step 19 (mL)

B = Volume of sample in step 1 (mL)

C = Volume of Filtrate in Step 12 (mL)