DROP TEST
BORON (1 drop = 0.2 or 0.5 ppm)

COMPONENTS:

1 x 4026	**Dipper Spoon, 2 g, plastic, white**
1 x 4040	**Sample Tube, Graduated (50 mL), plastic**
1 x 4044	**Dipper Spoon, 0.15 g, plastic, white**
1 x 5017	**Instruction**
10 x 6086	**Filter, Syringe, 0.45 µm**
1 x 6087	**Adapter, Syringe**
1 x 6247	**Syringe, 60 mL, plastic**
1 x 7023	**Bag, Plastic, 2″ x 3″**
1 x 9187	**Sample Tube, Plain w/ white dot on bottom, plastic**
1 x R-0953-A	**Boron Reagent #1, .75 oz, DB**
1 x R-0954-A	**Boron Reagent #2, .75 oz, DB**
1 x R-0955-A	**Boron Reagent #3, .75 oz, DB**
2 x R-0956-I	**Boron Reagent #4, 10 g**
1 x R-0957-C	**Boron Reagent #5, 2 oz, DB**
1 x R-0958-II	**Boron Reagent #6, 50 g**
1 x R-0959-C	**Boron Titrating Reagent (Low Range), 2 oz, DB**
1 x R-0960-C	**Boron Titrating Reagent (High Range), 2 oz, DB**

TO ORDER REPLACEMENT PARTS AND REAGENTS CALL TOLL FREE 800-TEST KIT (800-837-8548).

PROCEDURE:

CAREFULLY READ AND FOLLOW PRECAUTIONS ON REAGENT LABELS. KEEP REAGENTS AWAY FROM CHILDREN.

NOTE: When dispensing reagents from dropper bottles, **always** hold bottle in a vertical position.

NOTE: It is important to adhere to the timed waiting periods for accurate results.

NOTE: Calcium hardness above 1000 ppm may interfere with the test. Interference from high calcium levels can be removed in Step 2 of Sample Preparation by adding additional drops of R-0953 Boron Reagent #1.

For samples containing 1000-1500 ppm calcium hardness, add 5 additional drops (15 drops total) R-0953 Boron Reagent #1. For samples containing 1500-2000 ppm calcium hardness, add an additional 10 drops (20 drops total) R-0953 Boron Reagent #1.

Zinc concentrations above 500 ppm may clog the filter. If the filter becomes clogged during filtration (Step 8 of Sample Preparation), the filter can be replaced with a new filter and the filtration continued. To remove a clogged filter, hold the syringe upright. Pull the plunger down approximately 1/4 inch and release to remove any positive pressure. Continue holding the syringe upright and carefully unscrew the clogged filter. Replace it with a new filter and continue filtering the sample.

Boron Test

Sample Preparation

1. Rinse and fill 50 mL sample tube (#4040) to the 50 mL mark with water to be tested.
2. Add 10 drops R-0953 Boron Reagent #1. Swirl to mix.
3. Add 10 drops R-0954 Boron Reagent #2. Swirl to mix. Sample will turn peach/yellow.
4. Add R-0955 Boron Reagent #3 dropwise, swirling after each drop, until color changes from peach/yellow to blue.

NOTE: A precipitate will form if metals are present.

5. Using 0.15 g dipper spoon (#4044), add 3 level dippers R-0956 Boron Reagent #4. Swirl until dissolved.
6. If color remains blue, continue to Step 7. If color turns green or yellow, add R-0955 Boron Reagent #3 dropwise, swirling for 15 seconds after each drop, until color turns blue.
7. WAIT 2 MINUTES.

(OVER)

NOTE: The color must remain blue for two minutes while the precipitate forms. If blue color becomes green or yellow, add more R-0955 Boron Reagent #3 dropwise, swirling after each drop, until color turns blue again. WAIT 2 MINUTES.

8. Following the instructions below, filter the treated sample into a clean, dry, unmarked sample tube (#9187).
   a. Remove plunger from 60 mL syringe (#6247) and set aside.
   b. Screw syringe filter (#6086) onto syringe.
   c. Carefully pour all of the treated sample into syringe.
   d. Holding syringe upright and over unmarked sample tube, replace plunger in the syringe and carefully depress plunger until it clicks into position.
   e. Slowly depress plunger to filter treated sample into sample tube.
9. The sample is now ready for titration. For boron concentrations between 0 and 5 ppm, follow Low Boron Concentration instructions. For boron concentrations between 5 and 15 ppm, follow High Boron Concentration instructions.

For Low Boron Concentrations (0-5 ppm)

10. To the sample prepared in Sample Preparation (Steps 1-8) add R-0957 Boron Reagent #5 dropwise, swirling after each drop, until color changes from blue to yellow.
11. Add R-0959 Boron Titrating Reagent (Low Range) dropwise, swirling after each drop, until color changes from yellow to green.

NOTE: If color turns blue, repeat Steps 10 and 11 until green color is achieved.

12. Using 2 g dipper spoon (#4026), add 1 level dipper R-0958 Boron Reagent #6. Swirl until dissolved. Sample will turn yellow if boron is present.
13. Add R-0959 Boron Titrating Reagent (Low Range) dropwise, swirling and counting after each drop, until color changes from yellow to green.
14. Multiply drops in Step 13 by 0.2. Record as parts per million (ppm) boron (B).

For High Boron Concentrations (5-15 ppm)

10. To the sample prepared in Sample Preparation (Steps 1-8) add R-0957 Boron Reagent #5 dropwise, swirling after each drop, until color changes from blue to yellow.

11. Add R-0960 Boron Titrating Reagent (High Range) dropwise, swirling after each drop, until color changes from yellow to green.

NOTE: If color turns blue, repeat Steps 10 and 11 until green color is achieved.

12. Using 2 g dipper spoon (#4026), add 1 level dipper R-0958 Boron Reagent #6. Swirl until dissolved. Sample will turn yellow if boron is present.
13. Add R-0960 Boron Titrating Reagent (High Range) dropwise, swirling and counting after each drop, until color changes from yellow to green.
14. Multiply drops in Step 13 by 0.5. Record as parts per million (ppm) boron (B).

NOTE: Syringe filters are disposable but may be reused up to five times if cleaned after use by following this procedure:

1. Unscrew used syringe filter from syringe.
2. Screw syringe adapter (#6087) onto syringe.
3. Fill syringe with distilled, deionized, or tap water.
4. Attach used syringe filter to syringe adapter.
5. Slowly depress plunger (over sink or other suitable receptacle) to rinse syringe filter.
6. Remove syringe filter.
7. Repeat Steps 3-6.
8. Unscrew syringe filter and store in plastic 2″ x 3″ bag (#7023) for future use. Once a syringe filter has been used five times it should be discarded.

NOTE: Clean and thoroughly rinse sample tubes and syringe with distilled, deionized, or tap water between tests.

If syringe plunger begins to stick, coat the plunger with a thin layer of petroleum jelly.

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