

K-1646 COMBINATION BOILER/COOLING SYSTEM

COMPONENTS (not Bill of Materials):

Molybdenum

1 x 4029	Pipet, Calibrated 0.5 & 1.0 mL, plastic
2 x 4030	Pipets, Calibrated 0.5 & 1.0 mL, plastic w/cap
1 x 6045	Syringe, 3 mL
3 x 9198	Sample Tubes, Graduated, 25 mL, plastic w/cap
1 x R-0890	Molybdenum Buffer Solution
1 x R-0892	Molybdenum Titrating Solution, DB
1 x R-0900	Molybdenum Indicator Powder
1 x R-0901	Molybdenum Indicator Solvent

Nitrite, Sodium

1 x 4026	Dipper, large, plastic
1 x 4030	Pipet, Calibrated 0.5 & 1.0 mL, plastic w/cap
1 x 4086	Stirring Rod, 5", plastic
1 x 9198	Sample Tube, Graduated, 25 mL, plastic w/cap
1 x R-0733	Permanganate Reagent
1 x R-0781	Acid Sulfate

pH (long range)

1 x 3243	Cap, Test Cell, 11.5 mL, rectangular, plastic
1 x 4024	Test Cell, Calibrated 11.5 mL, plastic
1 x 4030	Pipet, Calibrated 0.5 & 1.0 mL, plastic w/cap
1 x 6002	Brush, Cell Cleaner
1 x 9052	Comparator, Midget, pH (long range), 3.0-10.0
2 x R-1003U	Long Range Indicator

Misc.

1 x 5064	Instruction
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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.**

Molybdenum (Drop Test)

Instr. #5064

NOTE: Nitrite levels up to 800 ppm NO₂ (1200 ppm NaNO₂) do not interfere.

For 1 drop = 2 ppm Mo

1. Rinse and fill 25 mL sample tube (#9198) to 25 mL mark with distilled, deionized, or molybdenum-free tap water.
2. Rinse and fill second 25 mL sample tube to 25 mL mark with water to be tested.
3. Using a 1.0 mL pipet (#4030), add 1.0 mL R-0890 Molybdenum Buffer Solution to each 25 mL sample tube. Swirl to mix.
4. Using a different 1.0 mL pipet (#4030), add 2.5 mL R-0901 Molybdenum Indicator Solvent to third 25 mL sample tube. Add 5 level dippers R-0900 Molybdenum Indicator Powder. Swirl until solution turns a clear, red-orange color. Undissolved crystals will remain in the solvent-powder mixture.
5. Using a different 1.0 mL pipet (#4029), add 1.0 mL solvent-powder mixture to each 25 mL sample tube, transferring as few undissolved crystals as possible. However, if transferred, crystals will not affect results. Swirl to mix.
6. Add R-0892 Molybdenum Titrating Solution, dropwise, swirling and counting after each drop, to 25 mL sample tube containing water sample, until color matches 25 mL sample tube containing blank, or until no further change in color occurs. Always hold bottle in vertical position.
7. Multiply drops of R-0892 Molybdenum Titrating Solution by 2. Record as parts per million (ppm) molybdenum.

NOTE: To convert molybdenum (Mo) readings to molybdate (MoO₄), multiply Mo readings by 1.7; to convert to sodium molybdate dihydrate (Na₂MoO₄·2H₂O), multiply by 2.52.

For 1 drop = 5 ppm Mo

1. Rinse and fill 25 mL sample tube (#9198) to 10 mL mark with distilled, deionized, or molybdenum-free tap water.
2. Rinse and fill second 25 mL sample tube to 10 mL mark with water to be tested.
3. Using a 1.0 mL pipet (#4030), add 0.5 mL R-0890 Molybdenum Buffer Solution to each 25 mL sample tube. Swirl to mix.

(OVER)

- Using a different 1.0 mL pipet (#4030), add 1.5 mL R-0901 Molybdenum Indicator Solvent to third 25 mL sample tube. Add 3 level dippers R-0900 Molybdenum Indicator Powder. Swirl until solution turns a clear, red-orange color. Undissolved crystals will remain in the solvent-powder mixture.
- Using a different 1.0 mL pipet (#4029), add 0.5 mL solvent-powder mixture to each 25 mL sample tube, transferring as few undissolved crystals as possible. However, if transferred, crystals will not affect results. Swirl to mix.
- Add R-0892 Molybdenum Titrating Solution, dropwise, swirling and counting after each drop, to 25 mL sample tube containing water sample, until color matches 25 mL sample tube containing blank, or until no further change in color occurs. Always hold bottle in vertical position.
- Multiply drops of R-0892 Molybdenum Titrating Solution by 5. Record as parts per million (ppm) molybdenum.

NOTE: To convert molybdenum (Mo) readings to molybdate (MoO_4), multiply Mo readings by 1.7; to convert to sodium molybdate dihydrate ($\text{Na}_2\text{MoO}_4 \cdot 2\text{H}_2\text{O}$), multiply by 2.52.

For 1 drop = 20 or 50 ppm Mo

- Rinse and fill 25 mL sample tube (#9198) to 25 mL mark with distilled, deionized, or molybdenum-free tap water.
- Using a 3 mL syringe (#6045), place water to be tested in second 25 mL sample tube.

NOTE: For 1 drop = 20 ppm, fill syringe to 2.5 mL mark.

For 1 drop = 50 ppm, fill syringe to 1.0 mL mark.

- Dilute to 25 mL mark with distilled, deionized, or molybdenum-free tap water.
- Using a 1.0 mL pipet (#4030), add 1.0 mL R-0890 Molybdenum Buffer Solution to each 25 mL sample tube. Swirl to mix.
- Using a different 1.0 mL pipet (#4030), add 2.5 mL R-0901 Molybdenum Indicator Solvent to third 25 mL sample tube. Add 5 level dippers R-0900 Molybdenum Indicator Powder. Swirl until solution turns a clear, red-orange color. Undissolved crystals will remain in solvent-powder mixture.
- Using a different 1.0 mL pipet (#4029), add 1.0 mL solvent-powder mixture to each 25 mL sample tube, transferring as few undissolved crystals as possible. However, if transferred, crystals will not affect results. Swirl to mix.

- Add R-0892 Molybdenum Titrating Solution dropwise, swirling and counting after each drop, to 25 mL sample tube containing water sample, until color matches 25 mL sample tube containing blank, or until no further change in color occurs. Always hold bottle in vertical position.
- For 2.5 mL sample, multiply drops of R-0892 Molybdenum Titrating Solution by 20. Record as parts per million (ppm) molybdenum. For 1.0 mL sample, multiply drops of R-0892 Molybdenum Titrating Solution by 50. Record as ppm molybdenum.

NOTE: To convert molybdenum (Mo) readings to molybdate (MoO_4), multiply Mo readings by 1.7; to convert to sodium molybdate dihydrate ($\text{Na}_2\text{MoO}_4 \cdot 2\text{H}_2\text{O}$), multiply by 2.52.

Nitrite (Drop Test)

- Rinse and fill 25 mL sample tube (#9198) to 25 mL mark with water to be tested.
- Using a large dipper (#4026), add 1 dipper R-0781 Acid Sulfate. Stir with rod (#4086) until dissolved.
- Using a 1.0 mL pipet (#4030), add R-0733 Permanganate Reagent dropwise, swirling and counting after each drop, until color changes to a faint but permanent pink, which persists for at least 1 minute. Always hold pipet in vertical position.
- Multiply drops of R-0733 Permanganate Reagent by 50. Record as parts per million (ppm) sodium nitrite.

pH (long range) (Color Comparison)

- Rinse and fill 11.5 mL test cell (#4024) to 11.5 mL mark with water to be tested.
- Using a 1.0 mL pipet (#4030), add 0.5 mL R-1003U Long Range Indicator. Cap and mix.
- Wipe dry and place in comparator WITH FROSTED SIDE FACING OPERATOR.
- Match color in test cell with a color standard. Record as pH units.

NOTE: If sample color is between two values, pH is average of the two.

