



Molybdate Test Kit

MO-LR (2359300)

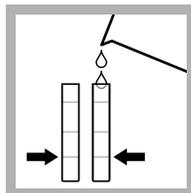
DOC326.98.00021

Test preparation

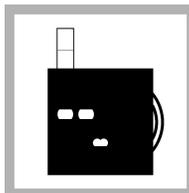
CAUTION: ⚠ *Review the Safety Data Sheets (MSDS/SDS) for the chemicals that are used. Use the recommended personal protective equipment.*

- Put the color disc on the center pin in the color comparator box (numbers to the front).
- Use sunlight or a lamp as a light source to find the color match with the color comparator box.
- Rinse the tubes with sample before the test. Rinse the tubes with deionized water after the test.
- For best results, clean the tubes and bottles with 6.0 N (1:1) hydrochloric acid solution, then rinse with deionized water.
- If the color match is between two segments, use the value that is in the middle of the two segments.
- If the color disc becomes wet internally, pull apart the flat plastic sides to open the color disc. Remove the thin inner disc. Dry all parts with a soft cloth. Assemble when fully dry.
- To verify the test accuracy, use a standard solution as the sample.
- To prepare a 2-mg/L molybdenum standard solution, add 5 mL of a 10-mg/L molybdenum standard solution to a 25-mL volumetric flask. Dilute to the mark with deionized water.
- Put the sample through a filter if the sample contains turbidity.
- Samples that have a high buffer capacity or a very high or low pH can prevent the correct pH adjustment by the reagents. Use acid (sulfuric acid, 1 N) or base (sodium hydroxide, 1 N) to adjust the sample to pH 3–5 before the test is started. Correct the test result for the dilution from the volume of acid or base. Divide the total volume (sample + acid + base) by the sample volume, then multiply the test result by this factor.
- To record the test result as mg/L molybdate (MoO_4^{2-}), multiply the test result by 1.67.
- To record the test result as mg/L sodium molybdate (Na_2MoO_4), multiply the test result by 2.15.

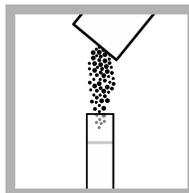
Test procedure—Molybdenum (0-3 mg/L Mo^{6+})



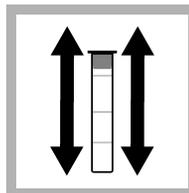
1. Fill two tubes to the first line (5 mL) with sample.



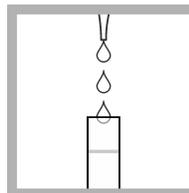
2. Put one tube into the left opening of the color comparator box.



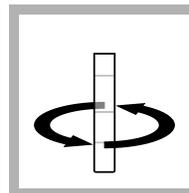
3. Add one Molybdenum 1 Reagent Powder Pillow to the second tube.



4. Put the stopper on the second tube. Shake to mix until all of the powder is dissolved.



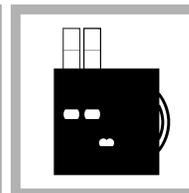
5. Add 8 drops of Molybdenum 2 Reagent Solution to the second tube.



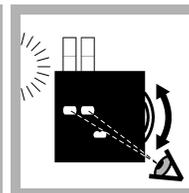
6. Swirl to mix.



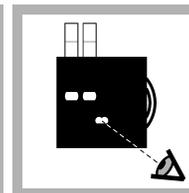
7. Wait 2 minutes. A green color develops.



8. Put the second tube into the color comparator box.



9. Hold the color comparator box in front of a light source. Turn the color disc to find the color match.



10. Read the result in mg/L in the scale window.

Interferences

Phosphonate HEDP at concentrations of 30 mg/L or less causes a positive interference of approximately 10%. To adjust for this interference, multiply the result by 0.9. Phosphonate HEDP at concentrations of more than 30 mg/L causes a negative interference.

Interference studies were completed with a molybdenum standard solution of 2 mg/L Mo^{6+} that included a possible interfering substance. The ion or substance was considered an interference when the concentration of the standard solution changed by $\pm 5\%$.

Replacement items

Description	Unit	Item no.
Color comparator box	each	173200
Color disc, low range molybdate molybdenum, 0–3 mg/L	each	9262200
Glass viewing tubes, 18 mm	6/pkg	173006
Molybdenum 1 Reagent Powder Pillows, 5 mL	100/pkg	2359299
Molybdenum 2 Reagent Solution	25 mL SCDB	2352523
Stoppers for 18-mm glass tubes and AccuVac Ampuls	6/pkg	173106

Optional items

Description	Unit	Item no.
Water, deionized	100 mL	27242
Funnel, poly, 65 mm	each	108367
Filter paper, 2–3 micron, pleated, 12.5 cm	100/pkg	189457
Hydrochloric acid standard solution, 6.0 N (1:1)	500 mL	88449
Molybdenum Standard Solution, 10 mg/L as Mo	100 mL	1418742
Pipet filler	each	1218900
Pipet, volumetric, class A, 5 mL	each	1451537
Sulfuric acid standard solution, 1.0 N	100 mL MDB	127032
Sodium hydroxide standard solution, 1.0 N	100 mL MDB	104532
Flask, volumetric, class A, glass, 25 mL	each	1457440

Table 1 shows the substances that do not cause an interference at or below the levels that are shown. Table 2 and Table 3 show the substances that cause an interference at or above the levels that are shown.

Table 1 No interference

Substance	Concentration (mg/L)
Zinc	400
Calcium	720
Magnesium	8000

Table 1 No interference (continued)

Substance	Concentration (mg/L)
Manganese	1600
Chlorine	7.5
PBTC (phosphonate)	500
Sulfate	12,800
Bisulfite	9600
Nickel	250

Table 2 Positive interferences

Interfering substance	Interference level (mg/L)
Carbonate	1325
Silica	600
Benzotriazole	210

Table 3 Negative interferences

Interfering substance	Interference level (mg/L)
Iron	200
Copper	98
Chromium (Cr ⁶⁺)	4.5—Read the molybdenum concentration immediately after the 2-minute reaction.
Chloride	1400
AMP (phosphonate)	15
Phosphonohydroxyacetic acid	32
Bisulfate	3300
Nitrite	350—Read the molybdenum concentration immediately after the 2-minute reaction.
Aluminum	2
Acrylates	790
Alum	7
Lignin Sulfonate	105
Orthophosphate	4500
Bicarbonate	5650
EDTA	1500
Borate	5250
Ethylene Glycol	2% (by volume)
Sulfite	6500
Diethanoldithiocarbamate	32

Summary of method

In the ternary complex method for molybdenum, molybdate molybdenum reacts with an indicator and an agent that makes the reaction more sensitive to give a stable blue complex. The results are read with the color disc.

