



**ROCKY MOUNTAIN
ELEVATOR PRODUCTS**
LIVE LIFE ELEVATED

RMEP OIL TESTING KIT

PARTS AND USEAGE



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INTRODUCTION

The RMEP Oil Test Kit contains everything needed to allow testing of residential and commercial hydraulic systems. Determining if the oil in the system needs filtering or total replacement due to oxidation can be accomplished on site. Filter test pads can test for particulate contaminants that can be easily removed with filtering. Determining if viscosity breakdown is occurring is a simple, quick, and accurate on site process. A strong magnet on a telescoping handle can help determine if excessive pump wear has introduced metallic shavings into the system. If a more thorough examination is desired samples can be collected and sent to a lab for a complete chemical analysis of wear, contaminants and remaining life of the additives.

WARNING!

Using this oil sample kit may expose you to potential high voltages, high pressures, and petroleum products known to the state of California to cause cancer. Use all lock out/tag out procedures to secure power, pressures. Read the material safety data sheet (MSDS) for the specific brand of hydraulic fluid being tested, wear the appropriate protective clothing, including but not limited to, gloves and goggles when handling industrial fluids.

PARTS IDENTIFICATION

*Parts may vary in type and manufacture

Viscosity gauge

(1) The pocket viscosity comparator gauge can check the viscosity of the oil quickly and with a 95% accuracy or greater.

Infra-Red Non-Contact Thermometer

(2) Used to check the temperature of the oil to be tested.

Telescoping Magnet

(3) Used to check the bottom of the tank for metal shavings.

Magnifying Glass

(4) Used to examine filter pads for sediment and other particulate contaminants.

Filter Holder

(5) Can hold several styles of filter pads to check for contaminants.

Syringe and Plastic Hose

(6) Used to pull a sample of oil for insertion into a vile, or through a filter pad for testing using the filter holder.

Sample Vile

(7) Used to hold oil samples.

Filter Pads

(8) Cellulose fiber filter material used to check for particulates. Various micron pore sizes can be used.

Figure 1. Parts identification



TESTING PROCEDURES

Testing for Particulates

To test for particulates in the oil, the cellulose fiber pads are used to capture particulates from an oil sample that is pulled from the bottom of the tank. The tank should be properly covered when in use and the drain tube from the jack(s) should not drain back into the tank, but into a separate container. This avoids contamination from dust and dirt in the machine room and the hoist way. Most contaminants will settle to the bottom of the tank over time and this is where the sample is taken.

1. Lock out/tag out all power and pressure fluid systems.

2. Open the cover to the oil tank, use the extending magnet to sweep the corners of the tank and across the bottom, this is where most of the metal from pump and motor wear will settle. Use a Cellulose fiber pad to clean the end of the magnet and capture the shavings and particles. Excessive amounts may indicate heavy pump wear.

3. Prepare the filter holder with a cellulose pad. Unscrew the retaining cap from the filter housing (See Figure 1). For larger filters, place filter on the outside face of the spacer with the smooth side facing in, and replace retaining cap. If the filter is large enough this will secure the filter in place. For smaller and thinner filters, remove spacer and place the filter between the O-ring and the spacer, replace the retaining cap and hand tighten firmly.

4. Using the syringe and hose, draw a sample of oil from near the bottom of the tank.

5. Connect the hose to the filter holder and while holding the filter holder over a bucket or over the oil tank, discharge the syringes contents through the filter holder.

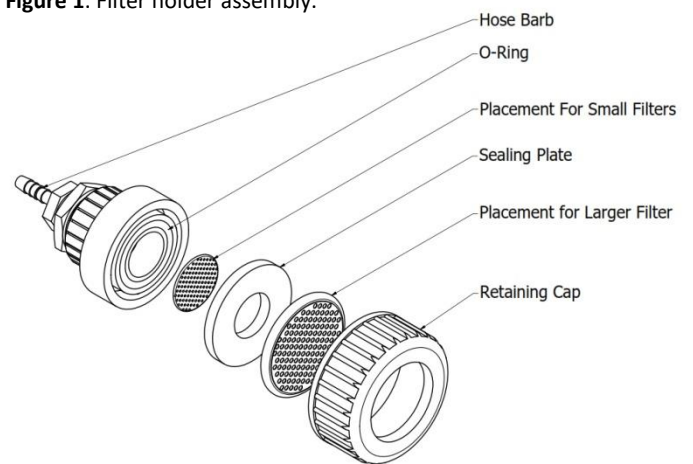
6. If necessary, remove the hose from the syringe and pull air into the syringe, reconnect the hose and discharge the air through the filter, this will help purge the filter holder of the remaining oil, facilitating the removal of the cellulose pad.

7. With a clean rag handy, remove the retaining cap and retrieve the filter pad.

8. Inspect both pads for debris and contamination under the magnifying glass. Record your findings on the Oil Testing Log Worksheet.

9. Place both samples in a plastic bag and retain either on site or in the office with the records of maintenance.

Figure 1. Filter holder assembly.



Testing for Viscosity

Testing the viscosity can determine if the oil has broken down to the point it needs replacement even if the oil remains clear and clean looking. Field testing utilizes a viscosity comparator. This unit compares sample oil to an oil of known viscosity. (See Viscosity Gauge Use and Care for detail of the proper operation and care of the unit.)

1. Take a temperature reading of the oil in the tank with the non contact thermometer. The oil and the test gauge should be around 80°F (27°C), however the reading will be accurate enough at any comfortable room temperature. The test gauge will need to be the same temperature as the sample. (See Viscosity Gauge Use and Care section.)
2. Draw a sample of oil and place it in a sample jar.
3. After allowing any particulates to settle, use the viscosity gauge draw a sample of oil from the sample jar as directed in the instructions for the viscosity gauge.
4. Allow a few minutes for the sample and the gauges temperatures to equalize if necessary.
5. Take four or five consecutive readings over a few minutes (See Viscosity Gauge Use and Care section for instructions). If they correlate then record the readings. If they do not correlate, allow the temperature of the testing gauge to settle for a few more minutes.
6. Record your findings on the Oil Testing Log Worksheet.
7. Compare the reading with Oil Viscosity Chart (**See Table 1**). If the reading is beyond the range for the recommended oil, changing the oil is recommended.

Table 1. Kinematic viscosity for industrial oils according to ISO 3448 in Centistokes (cSt)

ISO VG Grade	Midpoint Viscosity @40°C/cSt	Minimum Viscosity @40°C/cSt	Maximum Viscosity @40°C/cSt
15. 00	15. 00	13. 50	16. 50
22. 00	22. 00	19. 80	24. 20
32. 00	32. 00	28. 80	35. 20
56. 00	46. 00	41. 40	50. 60
68. 00	67. 00	61. 20	74. 80
100. 00	100. 00	90. 00	110. 00
150. 00	150. 00	135. 00	165. 00
220. 00	220. 00	198. 00	242. 00
320. 00	320. 00	288. 00	352. 00
460. 00	460. 00	415. 00	506. 00
680. 00	680. 00	612. 00	748. 00

VISCOSITY GAUGE USE AND CARE

The viscosity gauge provided in the oil test kit is a handmade precision unit used to compare and test the oil viscosity of unknown oils against a known certified oil weight. This unit is capable of accuracies greater than 95% when used properly with a skilled operator. The readings translate directly to Centistokes (cSt) at 104°F (40°C).

Caution!

- Do not drop.
- Exposure to heat greater than 104°F (40°C) will cause the unit to go out of calibration and may cause reference tube seals to rupture.
- Keep the unit in its case when not in use.
- Do not try to measure oils that are contaminated to the point that you cannot see the steel ball in the sample tube. Filter or replace this oil.
- Do not try to measure the viscosity of sludge, tar, or other thick residues.
- Do not try to measure liquids other than **oil** that is designated between 0 and 400 centistokes (
- Do not draw hot oil directly into the sample tube, allow hot oil to cool to approximately 80°F (27°C) before pulling a sample into the comparator viscosity gage.
- Do not use gasoline, naphtha, or other light solvents to clean the unit.

USE

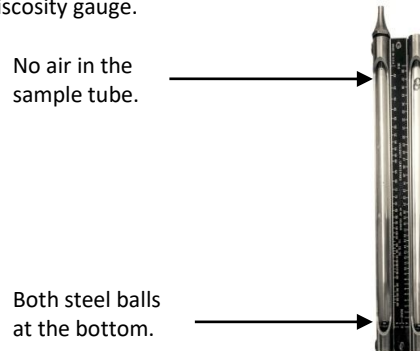
To use the viscosity gauge properly to attain the most accurate readings;

1. Draw oil to be tested into the test tube by inserting the nozzle into the oil and pulling the plunger. Eject this first draw into a waste collection bottle; this will purge the test tube of residue from the last oil tested. Redraw a sample from the oil to be tested ensuring that there are no air bubbles in the test tube. The bubble in the reference oil is there for thermal expansion and is accounted for.
2. Measure the temperature of the viscosity tester and the temperature of the oil that the sample was drawn from. The temperature should be close to 80°F (27°C) for each. For greater accuracy on oils that are of a very low or very high viscosity, gently heat the gauge with both oils loaded, in its case under an incandescent lamp until the temperature is 104°F (40°C).

- To stabilize the temperature, place the viscosity gauge in its case with the lid secured for a few minutes. To heat the oils to 80°F (27°C) place the unit in its closed box under an incandescent lamp for a few minutes and recheck the temperature.
- To take a reading:

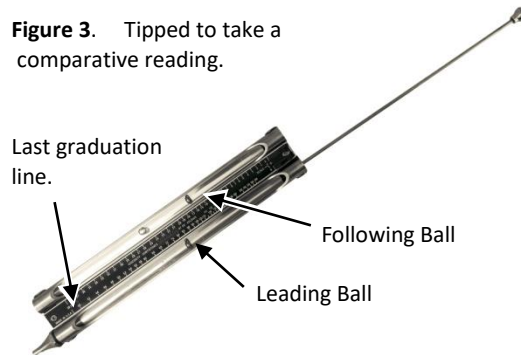
Hold the gauge with both hands at eye level with the fill nozzle in your left hand and the plunger side in your right hand. Point the fill nozzle straight up and let both steel balls fall to the bottom of the tubes. (See Figure 2.)

Figure 2. Setting the steel balls to the bottom of the viscosity gauge.



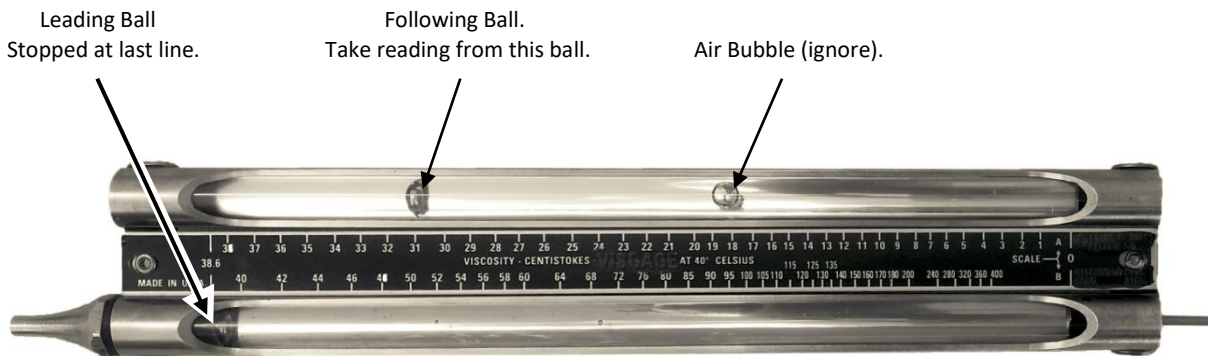
When you are ready to take a reading, tip the plunger end of the viscosity gauge up at a 30 to 45 degree angle. Watch the steel balls in both the vials. As they fall, one will lead the other. When the leading ball approaches the last graduation line (38.6/76.5 depending on the model) quickly and gradually move the viscosity gauge level so that you stop the leading ball on the last graduation line (38.6/76.5). (See Figure 3.)

Figure 3. Tipped to take a comparative reading.



The location of the following ball indicates the viscosity. *This may be the upper or lower ball depending on if the viscosity of the oil being tested is greater or less than the reference oil.*

Figure 4. Shows a viscosity index of 31cSt @ 104°F (40°C).



5. Repeat this measurement several times. With practice you will be able to stop the ball right on the line.
6. If you cannot get a consistent reading, it may be due to the oils not at equilibrium in regard to temperature. Place the viscosity gage back in the case for a few minutes and try later to get several readings that correlate with each other.
7. After you can achieve several consistent readings, you know the temperature of the oils have stabilized.

CLEANING

The viscosity gauge is nearly maintenance free. If used properly it will give many years of trouble free service. The unit will function best if it is used frequently, as this will keep the seal lubricated and clean. Cleaning is simple, and disassembly is not necessary.

Exterior

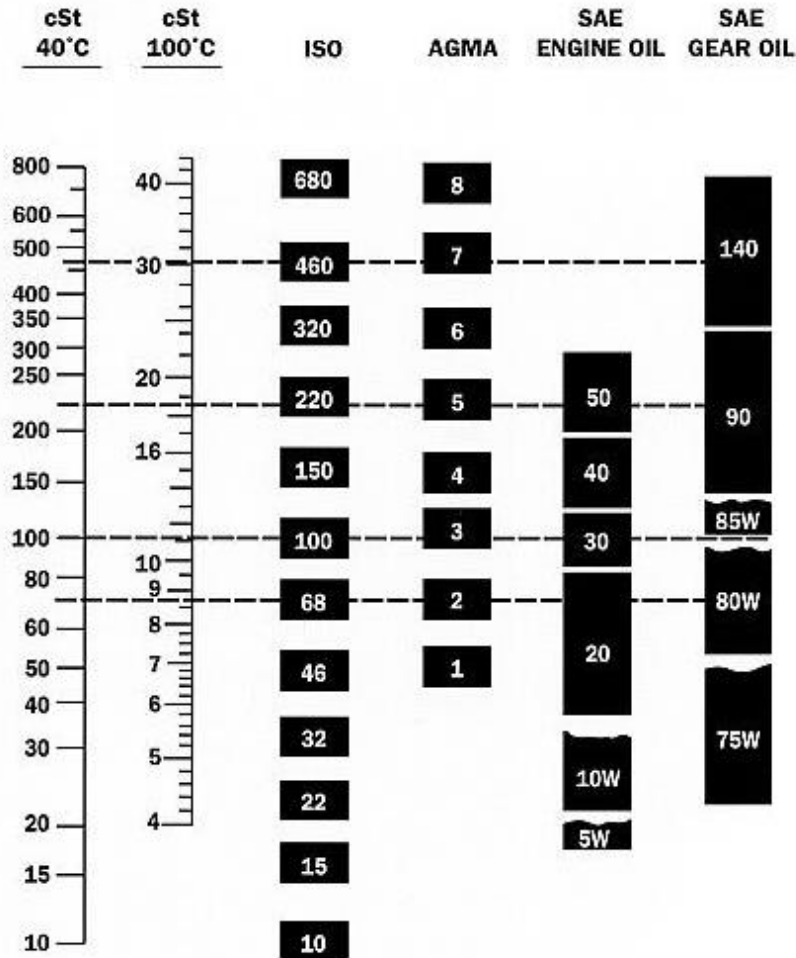
Clean the exterior with a clean rag after use and store in its case.

Sample Tube

Periods of time between uses may allow oils to dry and gum up. Clean the sample tube and the plunger by drawing a few charges of pure filtered (lamp) kerosene into the sample tube. Do not use gasoline, naphtha or other light solvents to clean the viscosity gauge, as these will dry and chemically attack the seal.

APPENDIX A

Oil Viscosity Chart



Viscosities can be related horizontally only. For example, the following oils have similar viscosities: ISO 460, AGMA 7 and SAE GEAR OIL 140.
 Crankcase oils and gear oils are based on 100°C viscosity. The "W" grades are classified on low temperature properties. ISO oils and AGMA grades are based on 40°C viscosity.

For assistance, please contact Rocky Mountain Elevator Products at: 1-866-482-4472 during normal business hours. (8am-5pm Mountain Standard Time)