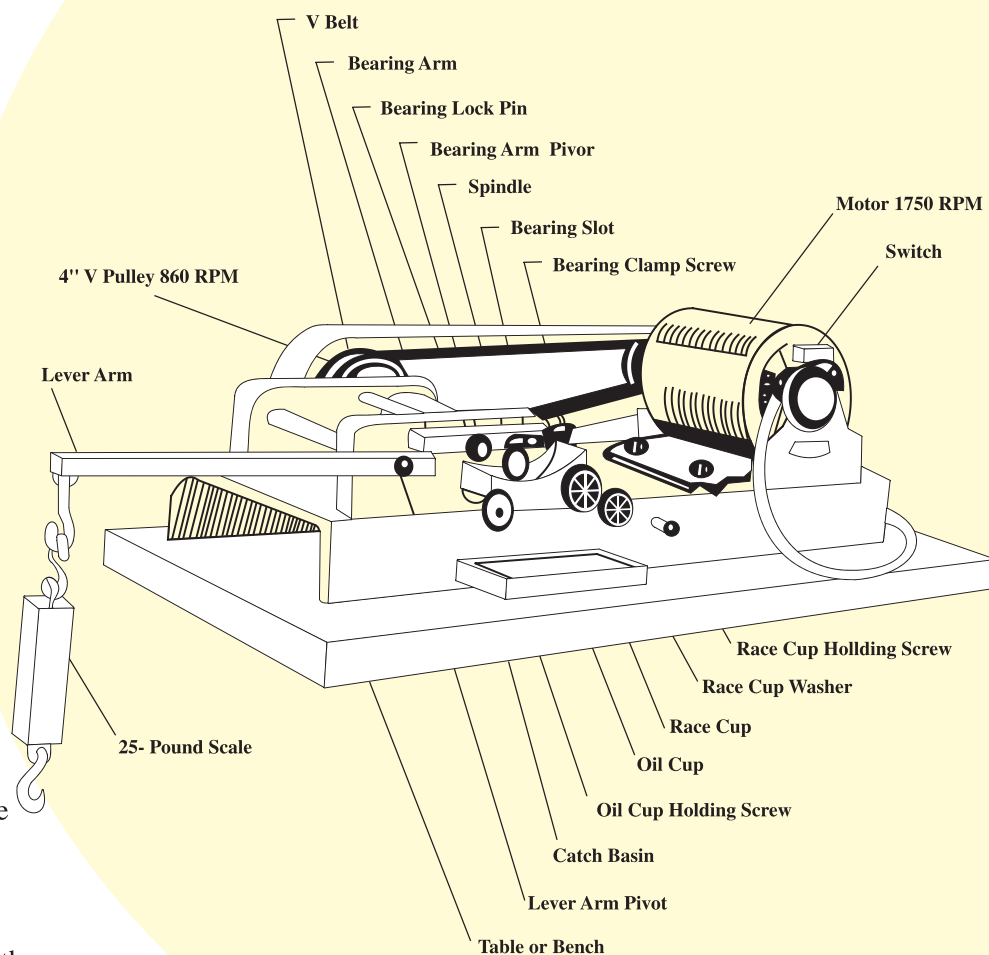


Lubricant Tester Instruction & General Information

Setting up the machine for a test

1. Be sure the V-belt is fiddle-string tight to prevent slipping on the 2" pulley. If it is not, loosen motor mounting bolts and re-tighten after forcing the motor to tighten belt.
2. Clamp the race cup to spindle with washer and 3/16" Allen Head bolt using a 3/16" Allen wrench. Be sure the face cup is smooth and cleaned with fresh lacquer thinner and a paper towel.
3. Clamp the bearing in slot of bearing arm with knurled screw. Be sure both the bearing and slot are washed with lacquer thinner and dried with a paper towel.
4. Place a small amount of oil to be tested in a clean oil cup (about 1/4") and fasten in with holding screw.
5. Hold up on lever and scale so bearing clears race. Turn on the motor, allowing oil to flow around the race and over the bearing for 15 seconds. Explain this to the audience. It is necessary to build up a desirable film of oil between the race and bearing.
6. Let the arm down so the bearing rides on the race (with motor running) for 10 seconds.
7. Pull the scale down one pound per second. Most oils will fail at approximately three to five pounds. This can be noted by the loud screeching just before the motor stalls.
8. Remove the bearing arm after turning knurled locking pin at pivot to the clearance position.
9. Show the damage to the audience after wiping the bearing with a paper towel. A five-pound motor stall should produce an oval-shaped scar on the bearing about 1/8" wide by 3/16" long.
10. Before running another test, check the race cup for metal build up from the bearing. If it is rough, remove the oil cup and proceed with Numbers 11 and 12. If not, proceed with Number 13.

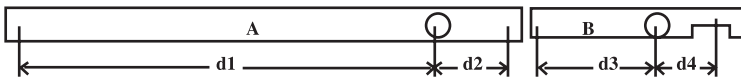


11. Clean the bearing and race cup with a paper towel dipped in fresh lacquer thinner. Grind the surface of the race with a carborundum stone holding it firmly against the race with the end against bearing arm pivot with the motor running. Slowly, twist the stone from side to side. By pressing very hard, clean the race in 5 to 10 seconds of motor operation. Wipe the race clean with a paper towel. Repeat if race isn't smooth.
12. Loosen the bearing clamp screw and rotate bearing approximately 60 degrees to a new position. You should be able to get six to eight tests with each bearing. Re-tighten the screw.
13. If you plan to repeat using the same oil, place cup in position on the machine and begin again with Step 5.

14. If you try another lubricant, dump the oil from the cup into a folded paper towel and dispose. A one-gallon can with the lid removed makes a suitable container.
15. Clean the oil cup with lacquer thinner and a paper towel.
16. Proceed with other lubricants by adding 1/4" to the cup. Place the cup in position on the machine and start again with Step 5.
17. Muscle MT-10 METAL TREATMENT™ can be applied directly or in the oil cup with other oils. The oil acts as a carrier. Even water can be used as the carrier.

Application of MT-10 Metal Treatment™

Add 1/4" of desired lubricant or carrier to the clean oil cup. Then add 5% MT-10 Metal Treatment™ (approximately 30 drops). Proceed with Step 5 allowing 30 seconds for carrier and MT-10 to mix and coat the parts before letting the arm down and the bearing to contact the race. With the motor running, allow another 15 seconds with the arm and scale holding bearing in contact with the race. Pull down about one pound per second. When you reach 10 pounds, lift the arm, turn off the motor, remove the bearing arm, wipe with a paper towel and show to the customer. There should be only a small polished mark on the bearing. Replace the bearing arm, hold up on the lever arm and start the motor.



FORMULA : Force on bearing = $[Fa(d1/d2) + (d1/d2)(K1)] [(d3/d4) + (d3/d4)(K2)]$

- Fa = force(weight) exerted on scale
- k1 = 0.5 lb. (weight of pivot lever arm)
- k2 = 0.17 lb. (weight of pivot lever arm)
- d1 = 9in. (distance from scale to fulcrum on arm A)
- d2=0.8 in.(distance from fulcrum to center of force point at top of arm A)
- d3= 2.75 in. (distance from lower force point to fulcrum of arm B)
- d4 = 1.25 in. (distance from fulcrum to point of pressure on bearing of arm B)

NOTE: The pressure on the bearing due to the weight of the scale and arms alone is 13.25 lbs. This is the "no-load" reading - this weight is calculated into the pressure table below. Bearing hardness - Rockwell C-42; Race hardness - Rockwell C-56.

Exerted Force (Lbs.) Pressure on Bearing

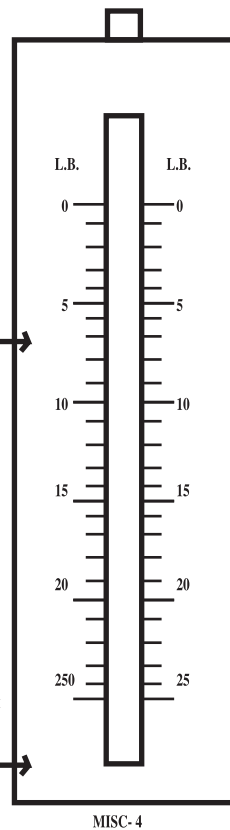
Scale Reading	and Race (Lbs.)
1	37.50
2	62.25
3	87.00
4	111.75
5	136.50
6	161.25
7	186.00
8	210.75
9	235.50
10	260.25
11	285.00
12	309.75
13	334.50
14	359.25
15	384.00
16	408.75
17	433.50
18	458.25
19	483.00
20	507.75
21	532.50
22	557.25
23	582.00
24	606.75
25	631.50
32 (bottom of scale)	804.75

Lubricant tester

METAL-TO-METAL
FRICTION
TEST Using California-Style
Torque
and Lubricant Tester

These products were tested
less than 7 lbs. pressure:
WYNN'SSTP
BARDAHLSLICK 50

Muscle MT-10 Metal Treatment™
(No Failure Point Established)
MT-10 did not fail



TEST DATA

1. All tests were performed with Pennzoil 10W30 Motor Oil.
2. Each test was with new test roll at room temperature.
3. Complete clean up was done after each test.
4. All products were mixed as per manufacturer's specs.

DRY TEST DATA

Only the products that performed past 15 lbs. were capable of sealing the metal surfaces. These products were tested further by sealing the metal surface with each product, removing the oil cup, and hanging a solid weight on the scale so that 7 lbs. of pressure was held to determine how long the product would seal the metal without further lubrication.

Lubricant tester troubleshooting Symptom check

1. No power - does not run

- A. Power cord plugged in
- B. On/Off switch connectors
- C. Ammeter connectors
- D. Motor terminals connected

2. Machine seizes prematurely

- A. Loose belt
- B. Loose pulley(s)
- C. Weak/worn motor*
- D. Lever arms binding
- E. Test roll/ring centered
- F. AU shafts, collets and set screws tight
- G. Power source 115 volts @ 60 cycles for minimum operation**
- H. Shaft bearings (2)

3. Machine does not seize properly

- A. Clean up not complete - contaminated with MT-10
- B. Contaminates under test ring - remove and clean
- C. Oil under test has EP properties
- D. Viking scale calibration
- E. Belts

* Machines having long-term usage and service can, in some instances, develop an electrical weakening of the motor. In cases such as these, the motor should be replaced or rebuilt.

**If voltage drops below 115 volts as in a brownout or low-power situation, the machine will not operate properly. If machine is operated at -20°F or colder, motor will not operate properly.

Sleeve bearing motors require periodic oiling. Reapply oil every 6 months to 1 year with 30 to 35 drops of Firepower FP-10™ or SL-10 Oil Can Lubricant™. DO NOT USE MT-10 as it is an additive only and must be mixed with another full-bodied oil.