

K Cap Cautions and Testing Methods

I. The testing methods

A. By loading the fuel tank to full capacity

1. Have the testing car and a 10 litre oil drum fully fueled at a gas station. Drive to the starting point of road test. Use a measuring cup to ladle out the gasoline from the oil drum and slowly fill the fuel tank to its full capacity. The car should be shaken several times during the manual filling process to ensure there is no remnant air in the fuel tank. The process takes approximately 30 minutes.
2. Accurately record the miles on odometer and the total amount of filled fuel.
3. Ignite the car and conduct tests of air-pollution. After the pollution tests, turn off the car and have the fuel tank fully refilled by using the measuring cup.
4. Drive the car between fixed places, on the same course and at a fixed time. Keep track of the time and total miles right before and after the road test. The speed per hour should be kept in the range from 90km to 100 km and the distance for each test should be no less than 100 km.
5. Return to the starting point. Have the car off for at least 30 minutes. Repeat the manual filling process and calculate how much it takes to have the fuel tank fully filled. The sum of calculation is the amount of fuel consumption.
6. Install K Cap, wait for 30 minutes and then proceed to the 15-minute operation (see II). Then repeat step 3 and again have the car off for at least 30 minutes.
7. Repeat step 4 and 5
8. The more tests are conducted, the more accurate the result would be. Before and after the installation of K Cap, tests are suggested to be conducted three times respectively.

B. By draining the fuel tank completely

1. Use the original pump to drain the fuel tank and fuel pipe completely.
2. Fill a fixed amount of gasoline in the tank, and leave the car still for 30 minutes.
3. Ignite the car and conduct tests of air-pollution. After the pollution tests, repeat step 1 and 2.
4. Drive the car between fixed places, on the same course and at a fixed time.

Keep track of the time and total miles right before and after the road test. The speed per hour should be kept in the range from 90km to 100 km and the distance for each test should be no less than 100 km.

5. Pump out the remained gas and calculate how much gas is consumed, and then convert the consumed gas into driven miles.
6. Fill a fixed amount of gas and install K Cap. Wait for 30 minutes and then proceed to the 15-minute operation (see II). Conduct pollution tests again and drain the fuel tank after the tests. Have the fuel tank reloaded with the same amount of gas as in the beginning of step 6 and keep the car still for another 30 minutes.
7. Repeat step 4 and 5.

II. The 15-minute operation

A. Manual shift car

1. Turn off the car, stereo and air conditioner. Make sure K Cap is installed. Tightly shut the car doors and windows.
2. Leave the car still for at least 10 minutes. During the 10 minutes, do not cause any tremble of the car like open the trunk, the hood, the car doors, or the windows.
3. After step 2, get on the car, shut the car door and turn on only the first half of the ignition device to light up the dashboard. Then, after 6 seconds, turn on the latter half to ignite the car.
4. Notice if the rpm reaches the standard of idling. If it is a cold –start, warm up the engine first. After the preparation, shift the gear to Neutral and **pull up the hand brake and depress the foot brake to avoid accidents.**
5. Next, depress the gas pedal, following the order of depressing, releasing, depressing, releasing...When the rpm rises up to 3000, depress the gas pedal 5 times;4000, 5 times again. When doing the depressing action, make sure the rpm reaches 3000 and 4000.
6. Change to the 1st shift and **remember to pull up the hand brake and use the left foot to depress the clutch in case the car dashes out.** Repeat step 5.
7. Respectively repeat step 5 with gear shifted to the 2nd, 3rd, 4th, 5th, 6th (if there's one) and the Reverse. **For safety reason, be aware that the handbrake must be pulled up and the clutch is stepped on.**
8. Shift the gear to Neutral and wait for the rpm to get back to the idling circumstance. Switch the button of air conditioner, following the order:

off, 1, 2, 3, 4, 3, 2, 1, off (1 stands for the lowest air volume; 4, the highest.)

9. Keep the gear in Neutral and switch the A/C button to 1. **The foot brake should be depressed by the left foot.** Repeat step 5.

10. Operation completed.

P.S. Normally, with the A/C off, under the idling circumstance, the rpm is around 700. If the rpm rises above 1200 after the A/C is turned on, it means the fluctuation of rpm is abnormal. Repeat step 7 for two to three times to solve the problem.

B. Automatic car

1. Turn off the car, stereo and air conditioner. Make sure the car doors and windows are tightly shut.

2. Install K Cap and leave the car still for at least 10 minutes. During the 10 minutes, do not cause any tremble of the car like open the trunk, the hood, the car doors, or the windows.

3. After step 2, get on the car, shut the car door and turn on only the first half of the ignition device to light up the dashboard. Then, after 6 seconds, turn on the latter half to ignite the car.

4. Notice if the rpm reaches the standard of idling. If it is a cold –start, warm up the engine first. After the preparation, shift the gear to P and pull up the hand brake and depress the foot brake to avoid accidents.

5. Next, depress the gas pedal, following the order of depressing, releasing, depressing, releasing...When the rpm rises up to 3000, depress the gas pedal 5 times;4000, 5 times again. When doing the depressing action, make sure the rpm reaches 3000 and 4000.

6. Repeat step 5 with gear shifted to N. **For safety reason, be aware that the foot brake must be depressed.**

7. Wait for the rpm to get back to the idling circumstance. Switch the button of air conditioner, following the order: off, 1, 2, 3, 4, 3, 2, 1, off (1 stands for the lowest air volume; 4, the highest.)

8. Shift the gear to D (**with the foot brake depressed.**) Repeat step 7.

9. Shift the gear to N (**with the foot brake depressed.**) Repeat step 7.

10. Keep the gear in N and switch the A/C button to 1. **The foot brake must be depressed by the left foot.** Repeat step 5.

11. Operation completed.

P.S. Normally, with the A/C off, under the idling circumstance, the rpm is around 700. If the rpm rises above 1200 after the A/C is turned on, it means the fluctuation of rpm is abnormal. Repeat steps 7, 8 and 9 for two to three times to solve the problem.

III. Test prerequisites

- A. Be aware of the condition of the testing car: any problem with the engine or fuel route could lead to a wrong result.
- B. Any other factors that may affect the result must be kept as constant as possible.
 1. Choose a fixed route that has no traffic jam.
 2. Whether before or after installing K Cap, the test distance must be the same and be no less than 100 km.
 3. Time should be recorded immediately before and after the road test.
 4. The speed per hour should be kept in the range from 90 km to 100 km.
 5. The driver should have proper driving habits. Maintain the standard testing speed as constant as possible. Reduce the times of depressing the gas pedal and shifting gears.
 6. Whether before or after installing K Cap, during the test, the total weight of the car should be the same and the situation of interior devices like air conditioner should also be the same. Please turn off the stereo in order to examine if K Cap improves engine noise or car trembling.

IV. Cautions

- Do not leave K Cap on the untested car.
- To conduct air pollution tests with the old, original gas cap, turn off the car first for at least 30 minutes.
- Make sure the manual filling of gas lasts at least 30 minutes.
- Make sure the fuel tank is filled to its full capacity when applying method A.
- Make sure the air conditioner is off while conducting air pollution tests.
- Make sure to clean the E501 sensor after every pollution test.
- If the recent K Cap doesn't take effect, change to other K Caps of different formula.

V. Glossary term

- CO (carbon monoxide): Pollutant. The lesser the better.
- HC (hydrocarbon): Pollutant. The lesser the better.
- Nox (noxious gases): Pollutant. The lesser the better.
- O² (oxygen): The lesser the better.
- CO² (carbon dioxide): The index of combustion rate.
- λ (air/fuel ratio): The closer to 1 the better.