

⚠ Safety Information

- Use proper ventilation and avoid breathing exhaust. Vehicle exhaust contains carbon monoxide which can cause severe injury or death.
- Exhaust temperatures can exceed 6500 F. Keep exhaust stream directed away from vehicular wiring or anything flammable when running the vehicle when the exhaust system section(s) are disconnected.
- Wear safety goggles to prevent flying objects (particles, fumes, etc.) from causing eye injury.
- Keep a fire extinguisher handy in case of any fire problem.
- Secure vehicle to avoid personal injury or property damage from moving vehicle. Place transmission in "park" or "neutral" with hand brake applied & wheels blocked.
- Keep personal objects (fingers, hair, clothes, etc.) away from moving accessories (fan belts, pulleys, etc.) to avoid personal injury.
- Avoid contact with exhaust system parts that heat-up when the engine is running (pipes, brackets, catalytic converter, muffler, etc.)
- Read instructions in enclosed manual and understand fully before using tool.

Contact Information

Whether you have a question about service or parts from Hickok or Waekon, we are ready to provide an answer. Options for reaching us include our 24/7 accessibility by fax or the World Wide Web. Or contact us by telephone during standard business hours EST.

www.hickok-inc.com

www.waekon.com

www.quick-n-ezparts.com

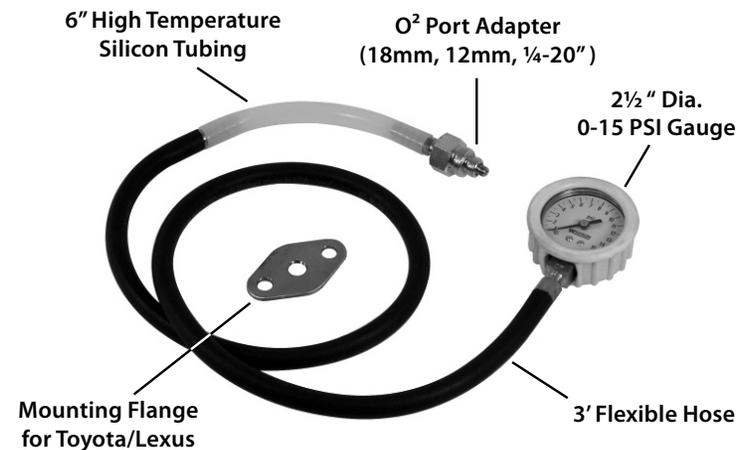
Fax: (216) 761-9879

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Using the BPT02 Back Pressure Test Kit will provide you with the most accurate and reliable means for detecting a restricted exhaust system.

By monitoring the gauge, you will find even a partially restricted exhaust system that could very well go undetected if you simply performed a conventional vacuum gauge test. One simple adapter allows access to the two standard size Oxygen Sensor Ports.

Simply screw the adapter into the Oxygen Sensor(s)' access port(s) and you are ready to begin testing the pressure on the very sensitive gauge.

⚠ CAUTION

To avoid damaging the threads, never remove the adapter while hot.

Hookup

Hookup the Back Pressure Adapter at the closest possible point *after* the exhaust manifold or manifolds and *before* the catalytic converter. If the vehicle has a Y-pipe with a converter on each side, a reading will need to be taken ahead of the converter on both sides of the Y-pipe.

The quickest method of installing the Back Pressure Gauge is to unscrew the oxygen sensor(s) and install the adapter provided in the kit by screwing the adapter into the oxygen sensor port. Note: Some Toyota and Lexus vehicles may require the use of the included mounting flange to test at the oxygen sensor.

IMPORTANT: *Make sure the oxygen sensor is unplugged electrically to avoid creating an excessively rich fuel mixture during testing.*

Alternate Hookup

If you are unable to remove the oxygen sensor without damaging it, or it's location prevents you from reaching it, do the following to connect the gauge:

1. Drill a .201 (#7) or $\frac{13}{64}$ " diameter hole **before** the catalytic converter or other desired test point.

IMPORTANT: *To avoid injury or damaging the vehicle, do not drill directly into the catalytic converter or muffler.*

2. Tap the hole with a $\frac{1}{4}$ " x 20 tapered tap and install the 3 step adapter and continue with normal testing.

When your are completed with the testing, disconnect the gauge from the vehicle and insert a $\frac{1}{4}$ " x 20 bolt to seal the hole.

Testing and Interpreting the Results

The Back Pressure Gauge is sensitive and will show the normal engine pulsation of the exhaust system. Pressure readings show on the gauge as rapid oscillations of the gauge needle, as seen as spiking or rising pressure. To interpret the spiking, take an average of the oscillation midpoint; (that is oscillation of between 2 psi & 4 psi is interpreted as back pressure of 3 psi).

Common sense must be used in applying the back pressure readings which should be viewed and understood along with the drivability of the vehicle. If you are in doubt about the severity of the restriction, disconnect sections of the exhaust system starting at the connection just in front of the suspected restriction. Use caution, however, and take appropriate safety measures.

CAUTION

- *Exhaust temperatures can exceed 6500F. Keep the exhaust stream directed away from vehicular wiring or anything flammable when running the vehicle when the exhaust system section(s) are disconnected. It is advisable to keep a fire extinguisher handy in case of any problem.*
- *To avoid damaging the threads, never remove the adapter while hot.*

Procedure

1. Monitor the pressure on the gauge with the engine revved at a steady speed of 2,500 rpm and no load.
 - Readings should be in the 1 psi or less range at idle and no more than 1.5 psi at 2,500 rpm.
 - On vehicles with back pressure controlled EGR valves, higher back pressure is necessary (in the 2-3 psi range). Higher readings are necessary for correct functioning of these EGR valves.
 - Generally speaking, OEM manufacturers list a reading of 3 psi at a no load steady 3,000 rpm as acceptable to show a non-restricted system; however, a better rule of thumb is to use the 2,500 rpm and 1.5 psi as a standard.

For readings over 1 psi at idle or over 1.5 psi at 2,500 rpm:

This indicate a restriction downstream from the oxygen sensor.

1. Go to the farthest connection and disconnect the exhaust components (pipes, muffler, etc.).
2. Continue to get pressure readings upstream until the back pressure gauge readings fall into the acceptable range (1.5 psi or less at a steady 2,500 rpm rev in a non-EGR valve equipped vehicle).
 - Keep in mind that when a catalytic converter melts down or breaks up, pieces of it tend to end up plugging the next component down the line from it.

Checking Back Pressure Under Load

When checking back pressure under load, expect to see higher readings than those discussed above on the Pressure Gauge. Normal back pressure under heavy engine load is 3-4 psi. On some vehicles under heavy load the back pressure reading may go as high as 5 psi.

Manual transmission

When checking back pressure under load for a vehicle with a manual transmission, it is necessary to drive the vehicle. If you have access to a chassis dynamometer you may use it in place of driving the vehicle to create the load on the gauge. Without driving a vehicle with a manual transmission or running it on a chassis dynamometer, you cannot perform a back pressure test under load.

Automatic transmissions

You may load test the vehicle in your shop by "power braking".

1. Follow the procedure of blocking the wheels and applying the parking brake.
2. Firmly apply the service brake, place the transmission in gear and apply the desired load by opening the throttle.
 - To avoid overheating the transmission and torque converter, do not hold the throttle open for more than 5 seconds at a time.
 - Let the vehicle idle in neutral for a minute or two between tests to allow the transmission and torque converter to cool.

Diagnosing a Vehicle with a Total Loss of Power

When diagnosing a vehicle with a total loss of power, testing with the Back Pressure Tester will show up as much higher than acceptable pressure readings and point to the problem of a severely restricted exhaust system. Less restricted systems will show as readings on the Pressure Gauge at higher than normal.