

# How to Maintain or Rebuild Engines Certified to EPA Standards

**T**he U.S. Environmental Protection Agency (EPA) has adopted requirements that apply to the process of maintaining or rebuilding engines. These requirements generally describe how to avoid violating the prohibition against tampering with a certified engine; it therefore applies broadly to all types of certified engines and vehicles. Separate provisions apply for rebuilding and remanufacturing locomotive engines and some marine diesel engines.

## What is the general principle behind EPA's rebuilding requirements?

As someone who maintains or rebuilds engines, you must generally restore the engine to its original configuration. This keeps the engine running the way the manufacturer originally designed it to operate, both for controlling emissions and for achieving the best overall performance. This adds an assurance that each engine will continue to control emissions, consistent with the manufacturer's original design, throughout its lifetime.

## What does EPA consider "rebuilding"?

Rebuilding refers to a partial or complete rebuild of an engine or engine system. This includes a major overhaul in which you replace the engine's pistons or power assemblies or make other changes that significantly increase the service life of the engine. It also includes replacement or rebuilding of an engine's turbocharger/aftercooler system or its fuel injection/electronic control system if it increases the service life of the engine. For these provisions, rebuilding may or may not involve removing the engine from the vehicle or equipment. Usually rebuilding does not include following the manufacturer's maintenance instructions or other routine maintenance; for these simpler service items you still need to avoid making changes that might increase emissions, but you don't need to keep records.

## **How do I meet the rebuilding requirements?**

You must have a reasonable technical basis for knowing that you are rebuilding the engine to its original certified configuration for all the relevant tolerances, calibrations, and specifications that might affect emissions. You may use new, used, or rebuilt parts, but you should have a reasonable technical basis for knowing that the parts perform the same function as the original parts. You should follow the original engine manufacturer's instructions if you change any parameter or design element. Also, be sure to check, clean, adjust, repair, or replace all critical emission-related components as needed according to the original manufacturer's recommended practice. This includes any installed catalytic converters or other aftertreatment devices.

## **What is a "reasonable technical basis"?**

You have a reasonable basis if you do two main things. First, you must install parts (new, used, or rebuilt) so a person familiar with the engine's design and function would reasonably believe that the engine with those parts will control emissions to the same degree as with the original parts. For example, it would be reasonable to believe that parts performing the same function as the original parts (and to the same degree) would control emissions to the same degree as the original parts. Second, adjust parameters or change design elements only according to the original engine manufacturer's instructions. Or, if you differ from these instructions, you must have data or some other technical basis to show you should not expect in-use emissions to increase for any pollutant.

## **What about diagnostic codes in the engine's computers?**

Don't erase or reset emission-related codes or signals without diagnosing and responding appropriately to the diagnostic codes. Clear all codes from diagnostic systems when you return the rebuilt engine to service. Don't disable a diagnostic signal without addressing the problem. This doesn't apply to an engine if it has no onboard computer.

## **May I make any changes to improve the engine?**

Yes. You may make changes if you have data or some other technical basis to show that emissions will not increase. Also, you may use different than original parts or make other adjustments if they make the engine operate like one of the engine manufacturer's newer certified models.

## **Does the rebuilt engine need to meet emission standards?**

There is an expectation that the engine will continue to meet the emission standards that applied when it was new, as long as it is restored to its original configuration. Rebuilders do not need to perform emission testing to demonstrate that rebuilt engines meet emission standards.

In the case of locomotives and some marine diesel engines, additional requirements apply when engines are remanufactured. Under the regulations, remanufacturing is a type of rebuilding that generally involves replacing all of an engine's cylinder liners, whether during a single maintenance event or cumulatively within a five-year period.

## **May the rebuilt engine go into any vehicle, equipment, or vessel?**

No, some restrictions apply. Rebuilt engines should return to the same type of service (highway, land-based nonroad, locomotive, or marine). Also, the engine may not go into vehicles or equipment that were originally powered by engines certified to a more stringent standard. Contact us at [complianceinfo@epa.gov](mailto:complianceinfo@epa.gov) if this is not clear from the engine's emission control information label.

## **What records do I need to keep?**

Recordkeeping requirements apply for all types of engines except nonroad spark-ignition engines with total cylinder displacement below 225 cc. Keep the following records for at least two years:

- the hours of operation (or mileage or other indication of age) at time of rebuild
- the work performed on the engine
- emission-related control components you worked on, including a listing of parts and components you used
- engine parameter adjustments
- emission-related codes or signals you responded to and reset

You may keep records based on engine families rather than individual engines if that's the way you do business. Keep the records in any format that allows us to review them if we ask. If you are a "backyard mechanic" working on your own engines, we don't require you to keep any records.

## **What records are not required?**

You don't need to keep information that is not reasonably available through normal business practices. We don't expect you to have information that you can't reasonably access. Also, you don't need to keep any records of what other companies do.

## **What rules apply for engines built before there were emission standards?**

The tampering prohibition does not apply for engines built before EPA emission standards started to apply. You can therefore take any steps to maintain or rebuild those older engines. Note that the restrictions described above would apply if anyone installs such engines into vehicles or equipment from a different sector (highway, land-based nonroad, locomotive, or marine).

## For More Information

See the following regulations for a more detailed description:

[40 CFR 1068.120](#)

You can access documents related to emission standards for nonroad and highway engines on EPA's Office of Transportation and Air Quality (OTAQ) website at:

[www.epa.gov/vehicles-and-engines](http://www.epa.gov/vehicles-and-engines)

You can also contact the OTAQ library for document information at:

(734) 214-4311

Email: [Group\\_AALibrary@epa.gov](mailto:Group_AALibrary@epa.gov)