

**Steps for Determining Emission Factors
for Locomotive Remanufacture Kit
2008 Carl Moyer Program Guidelines**

Determine the Baseline Locomotive Emission Factors

Step 1 – Is the project locomotive subject to federal remanufacture requirements?

- Class 1 freight locomotives and passenger locomotives are subject to federal remanufacture requirements. The baseline emission factor for the project therefore reflects the Tier to which these locomotives are required to remanufacture their engines. The Carl Moyer Program can only pay for a remanufacture project that achieves emission reductions beyond the existing federal requirement. If the project locomotive is a Class 3 freight locomotive and has never been remanufactured with a Tier 0 or cleaner remanufacture kit, it is not subject to federal remanufacture requirements unless the locomotive, so skip to Step 3. If the Class 3 locomotive has been remanufactured to Tier 0 or cleaner standards, proceed to Step 2.

Step 2 – What is the federal remanufacture requirement for the project locomotive?

- The remanufacture requirement for locomotives depends upon the locomotive model year and whether the locomotive has been previously remanufactured to Tier 0-2 (See Step 3). The baseline emission factor is selected from 2008 Guidelines Table B-18a or Table B-18b, depending upon the locomotive model year and the calendar year the project shall be completed:

Model Year	Year of Project Completion	Emission Factor	Emission Factor Table
Pre-1973	Any	Uncontrolled	Table B-18a
1973-2001	2008-09	Tier 0	Table B-18a
	2010 or later	Tier 0+	Table B-18b
2002-2004	2008-09	Tier 1	Table B-18a
	2010 or later	Tier 1+	Table B-18b
2005+	2008-12	Tier 2	Table B-18a
	2013 or later	Tier 2+	Table B-18b

Step 3: Was the locomotive previously remanufactured or repowered to a cleaner-than-required standard?

- If the project locomotive was previously remanufactured or repowered to a cleaner-than-required emission level when remanufactured (even if Class 3), federal requirements mandate that all subsequent remanufactures be to this emission level or cleaner. Therefore, if this is the case, use the appropriate emission factor associated with the tier from Table B-18a to determine the project baseline emission factors.

Determine the Remanufacture Kit Emission Factors

Step 4: Is the U.S. EPA Certificate of Conformity applicable for the project engine?

- The U.S. EPA Certificate of Conformity for the project locomotive remanufacture/rebuild lists the locomotive models and model years for which it is applicable. An example Certificate of Conformity is provided in Guidelines Appendix Figure F-3.

Step 5: Where can I find the U.S. EPA-certified emission rates for the project locomotive remanufacture kit?

- U.S. EPA-certified emission rates for the project locomotive remanufacture kit are found on spreadsheets at www.epa.gov/otaq/certdata.htm. Each year that U.S. EPA approves a Certificate of Conformity is represented on a separate spreadsheet. Within each spreadsheet, the locomotive rebuild kit engine family number identifies the project locomotive and emission rates. On the U.S. EPA spreadsheets, “L/H” refers to a line-haul locomotive, “SW” refers to a switcher, and “THC” refers to Total Hydrocarbons.

Step 6: How do I convert the federal emission rates to project emission factors for the project cost-effectiveness calculation?

- The federal NO_x, ROG, and PM emission rates from the U.S. EPA webpage for the project locomotive must then be compared to the emission standards in Guidelines Table 8-3. If the emission rates for all three pollutants fall below the Tier 0, 1, or 2 remanufacture standards, respectively (or Tier 0+, Tier 1+, or Tier 2+, if reflective of the 2008 U.S. EPA remanufacture standards), the project is considered to be certified to that standard. For example, if the U.S. EPA webpage indicates the project switcher remanufacture kit has NO_x, THC, and PM emission rates of 13.0, 1.6, and 0.65 g-bhp-hr, respectively, the kit emission levels fall below Tier 0 standards and the kit is considered Tier 0 certified. The project cost-effectiveness calculations would therefore use the Tier 0 emission factors found in Appendix Table B-18a.