

Category: Cargo-Handling Equipment (CHE)

California's cargo-handling equipment (CHE) off-road emissions inventory is an estimate of the amount and types of pollutants emitted from thousands of pieces of equipment used in for cargo-handling applications at the various ports and rail yards statewide. These equipment types comprise primarily of diesel engines.

Currently, the cargo-handling equipment inventory is calculated outside of the OFFROAD model. It will be incorporated into the model in the near future.

The top 3 most popular equipment types in this category are:

Equipment Type	Fuel Type	2004 Population
Yard Tractor	D	1989
Material Handling Equipment	D	461
Forklift	D	441

Emissions Inventory:

As with other OFFROAD equipment types, the emissions inventory for the cargo-handling equipment category is calculated as the product of the emission rate (grams per horsepower-hour), engine population, and activity (hours per year) in annual average use hours. Unlike the other categories in the OFFROAD model, the deteriorated emission rate is calculated based on a methodology that utilizes a maximum percent increase over the equipment's life.

[\(Document link to Cargo-Handling deterioration methodology\)](#)

For the current emissions inventory (tons/day):

[Air Resources Board Almanac](#)

Input Data Sources:

The input factors used for the CHE inventory come from various data sources:

Input Factor	Source of Data (Gas & Diesel)
Population (base year 2004)	2004 ARB Survey of Statewide Ports & Railyards; POLA & POLB data (2002)
Useful Life	2004 ARB Survey of Statewide Ports & Railyards
Activity (hr/yr)	2004 ARB Survey of Statewide Ports & Railyards
Average horsepower	2004 ARB Survey of Statewide Ports & Railyards; POLA & POLB data (2002); Power Systems Research (1996)
Load factor	Power Systems Research (1996)
Allocation factor	2004 ARB Survey of Statewide Ports & Railyards; POLA & POLB data (2002)
Growth factor	2002 POLA Container TEUs data
Survival rate	Power Systems Research (1996)

For more additional background information on the input factors used to derive the CHE inventory: [\(Document Link\)](#)

For tables of input data for cargo-handling equipment: [\(Document Link\)](#)

Adopted Regulations for CHE:

2005: *(Not currently reflected in OFFROAD Model)* Board approved a regulation to reduce PM and NOx emissions from cargo-handling equipment at the ports and intermodal rail yards. [\(Document Link\)](#)

2004: *(Reflected in OFFROAD Model)* Board approved amendment to California's existing off-road diesel regulations to harmonize with USEPA Tier 4 regulation (40 CFR 1039). [\(Document Link\)](#)

2000: *(Reflected in OFFROAD Model)* Board approved the emissions inventory for off-road large CI engines (≥ 25 hp) from the OFFROAD Model. [\(Document Link\)](#)

Future Improvements to the CHE Category:

The emissions inventory from the OFFROAD Model strives to accurately represent the 'real-world' as accurately as possible. Therefore, the methodologies and data sources are constantly re-evaluated and updated where applicable. The following items are future improvements for the cargo-handling category:

- Update population and activity values as new data becomes available
- Revise growth factors using REMI employment data (2001)