

## Deterioration Methodology for CHE category:

The deteriorated emission factors for cargo-handling equipment are calculated using a maximum percent increase cap per percent of useful life consumed. The table below contains the maximum percent increases for each horsepower group. These values are based on data for on-road light-duty diesel, medium-duty diesel and heavy-heavy-duty diesel trucks obtained from EMFAC 7G.

**Table 1: Maximum % Increase per % Useful Life Consumed**

HP	HC	CO	NOX	PM	On-Road Equivalent
25-50	0.51	0.41	0.06	0.31	LDDT
51-120	0.28	0.16	0.14	0.44	MHDT
121-250	0.28	0.16	0.14	0.44	MHDT
>250	0.44	0.25	0.21	0.67	HHDT

The deteriorated emission factor is calculated by:

$$\begin{aligned} \text{EF} &= \text{Zh} * (\text{dr}\% * \text{CummHrs} / \text{TotalHrs} + 1) \\ &= [\text{Zh} * \text{dr}\% / \text{TotalHrs} * \text{CummHrs}] + \text{Zh} \\ &= \text{Zh} + [\text{Zh} * \text{dr}\% / \text{TotalHrs}] * \text{CummHrs} \end{aligned}$$

Where: EF = deteriorated emission factor  
Zh = zero-hour emission rate or when the equipment is new (g/hp-hr)  
dr% = maximum percent increase from Table 1  
CummHrs = cumulative hours or accumulated hours  
TotalHrs = total number of hours in an equipment's useful life

The emissions inventory is calculated by the following equation:

$$\text{Emissions in tons/day} = \text{EF} * \text{Pop} * \text{AvgHp} * \text{Load} * \text{Activity}$$

Where:  
AvgHp = Maximum rated average horsepower  
Load = Load factor  
Activity = Annual activity in hours per year (hr/yr)  
EF = Emission factor from above  
Pop = Population

The emission factors used for the cargo-handling equipment category are comprised of both on-road and off-road diesel emission factors:

For **OFFROAD Diesel** emission factors:

[\(Document Link\)](#)

For **ONROAD Diesel** emission factors:

[\(Document Link\)](#)