

Use of Temperature and Relative Humidity Data for Vehicular Emission Factor Prediction

Principle and Approaches

To predict the hourly vehicular emission of each concerned road, “Emfac mode” should be adopted in the EMFAC-HK model to generate emission factors in terms of grams of pollutant emitted per vehicle activity. According to EMFAC-HK Modelling Guideline[#], project proponents or environmental consultants should obtain **representative meteorological data, for example from the WRF meteorological data adopted in the PATH modelling system, to be agreed with EPD**. As the minimum requirement, **at least one year of representative hourly ambient temperature and relative humidity data having similar characteristics as the assessment areas** should be used.

Temperature and relative humidity have distinct daily and seasonal pattern. Hourly temperature and relative humidity data should be used in the calculation of vehicle emission factors in the manner that **could properly reflect the daily and seasonal changes on the vehicle emissions**. Averaging of the temperature and relative humidity to a longer period prior to calculating the vehicle emission factors is not recommended. Any attempt of prior averaging, e.g. annual averaged, can only be accepted on the condition that it will **NOT give underestimated results**.

In accordance with the aforesaid principle, the following approaches for the use of hourly temperature and relative humidity data are considered acceptable:

Applicable to the estimation of short-term (i.e. hourly or daily average) and long-term (i.e. annual average) air quality impact:

1. Use the lowest temperature and relative humidity data in the period as defined by the environmental consultants (e.g. every month, every quarter, the whole year) to calculate the vehicular emission factors in the corresponding period on an hourly basis;
OR
2. Use the daily profile of lowest temperature and relative humidity data in each hour for each month (i.e. 24 hours data in each month and for 12 months) to calculate the vehicular emission factors in the corresponding period on an hourly basis.

Applicable to the estimation of long-term (i.e. annual average) air quality impact only:

3. Use the daily profile of averaged temperature and relative humidity data in each hour for each month (i.e. 24 hours data in each month and for 12 months) to calculate the vehicular emission factors in the corresponding period on an hourly basis.

For the use of any other proposed approaches, the environmental consultants will have to provide detailed justifications and consult EPD for their proposals.

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