# 2.A.5.b - Construction and Demolition

## Short description

| Category Code | Method | | | | | AD | | | | | EF | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.A.5.b | T1 | | | | | NS | | | | | CS | | | | |
| | NO$_x$ | NMVOC | SO$_2$ | NH$_3$ | PM$_{2.5}$ | PM$_{10}$ | TSP | BC | CO | Pb | Cd | Hg | Diox | PAH | HCB |
| Key Category: | - | - | - | - | -/- | L/T | L/- | - | - | - | - | - | - | - | - |

**T** = key source by Trend **L** = key source by Level

| Methods | |
|---|---|
| **D** | Default |
| **T1** | Tier 1 / Simple Methodology * |
| **T2** | Tier 2* |
| **T3** | Tier 3 / Detailed Methodology * |
| **C** | CORINAIR |
| **CS** | Country Specific |
| **M** | Model |

\* as described in the EMEP/EEA Emission Inventory Guidebook - 2019, in the group specific chapters.

| AD - Data Source for Activity Data | |
|---|---|
| **NS** | National Statistics |
| **RS** | Regional Statistics |
| **IS** | International Statistics |
| **PS** | Plant Specific data |
| **As** | Associations, business organisations |
| **Q** | specific Questionnaires (or surveys) |
| **M** | Model / Modelled |
| **C** | Confidential |

| EF - Emission Factors | |
|---|---|
| **D** | Default (EMEP Guidebook) |
| **C** | Confidential |
| **CS** | Country Specific |
| **PS** | Plant Specific data |
| **M** | Model / Modelled |

For particulate emissions, Construction is the second main emissions source in the Mineral industries.

## Methodology

Since the last update of the UNECE Guidebook we use the Tier 1 method to estimate the national emissions of particulate matters. The approach for uncontrolled fugitive emissions for this source category was adapted for national circumstances within a research Project (Umweltbundesamt, 2016) [1], partly considered exiting control techniques. As a result, the information of the statistics is combined with modified default emission factors for TSP and PM.

### Activity data

Activity data are determined taking into account figures for various construction activities. Data is based on production statistics (national statistics). According to the method used, figures of area of land affected by construction activities per building were concluded from statistical data and multiplied with emission factors, as explained below. The common uncertainty of 3% for national statistics could be increased as a result of this calculation, but the effect is not estimated at the moment.

## Emission factors

The emission factors used are results of Adaptation of UNECE-Defaults (EEA, 2016) [2], see chapter NFR 2.A.5.b for different kind of buildings.

Table 1: Overview of apllied emission factors, in [kg / m$^2$ * y]

| Kind of building | Pollutant | EF value | EF trend |
|---|---|---|---|
| single and two family houses | TSP | 0.0638 | constant |
| | PM$_{10}$ | 0.0191 | constant |
| | PM$_{2.5}$ | 0.0019 | constant |
| apartment buildings | TSP | 0.329 | constant |
| | PM$_{10}$ | 0.099 | constant |
| | PM$_{2.5}$ | 0.0099 | constant |
| non-residential | TSP | 0.631 | constant |
| | PM$_{10}$ | 0.189 | constant |
| | PM$_{2.5}$ | 0.0189 | constant |
| roads | TSP | 1,674 | constant |
| | PM$_{10}$ | 502 | constant |
| | PM$_{2.5}$ | 50.2 | constant |

Several further assumptions were necessary to use the formula of the Guidebook:

$$EM = EF * B * f * m$$

The EF is adapted with Moisture Level Correction factor and Silt Content Correction factor in all cases, both 0.20 and 2.22. The assumption about the duration of the construction activity uses the Default values (EEA, 2016)[3]:

| Type of building | Estimated duration (year) |
|---|---|
| Construction of houses (single and two family) | 0.5 (6 months) |
| Construction of apartments (all types) | 0.75 (9 months) |
| Non-residential construction | 0.83 (10 months) |
| Road construction | 1 (12 months) |

AD is a result of multiplying B the number of houses constructed and f the conversion factor.

# Trends in emissions

All trends in emissions as product of EF and AD correspond to trends of construction activities.

## trends of emissions of Construction and Demolition

**Emissions by pollutant / Emissionen nach Schadstoff**



TSP · PM10* · PM2.5*
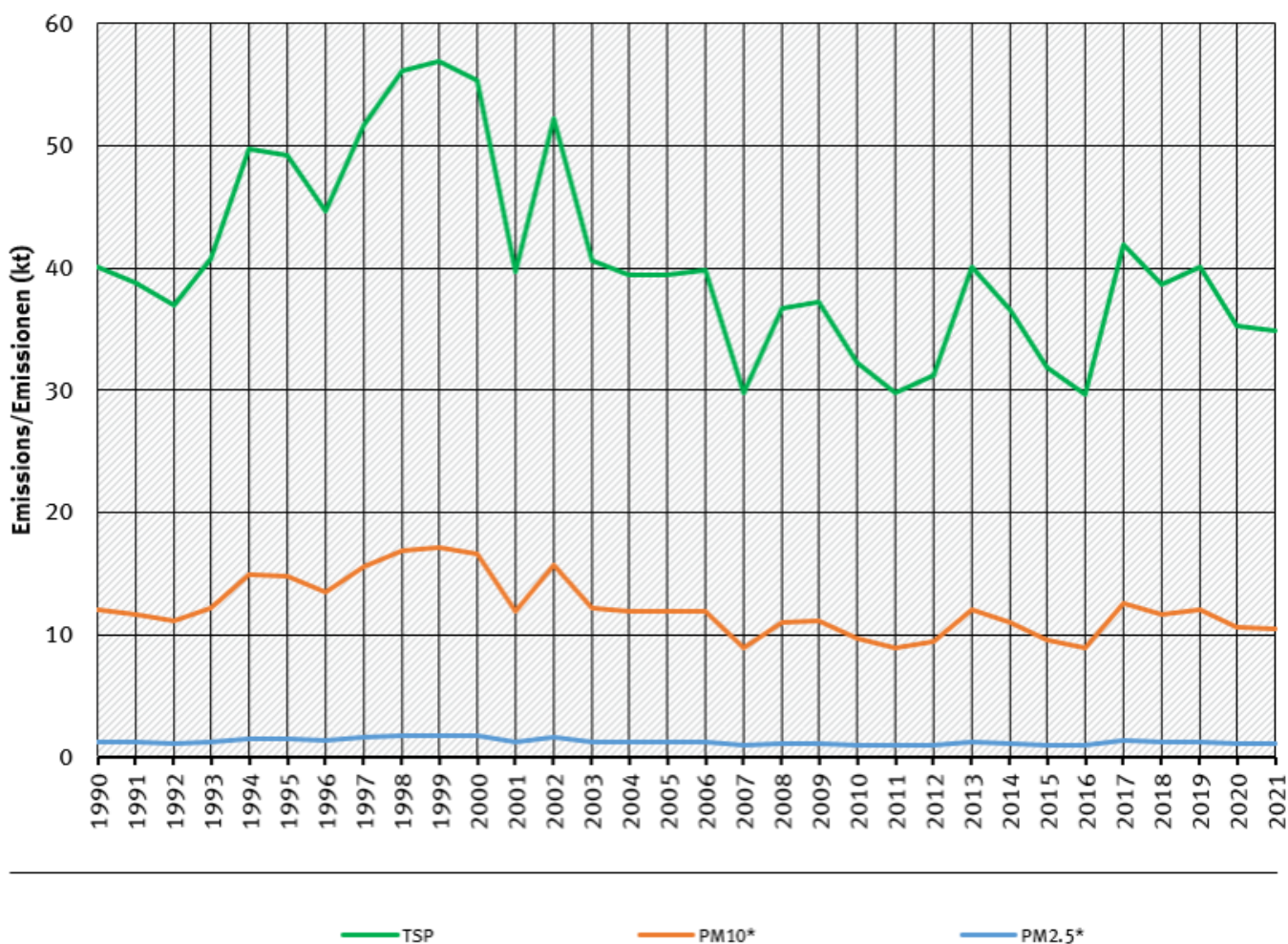
\* Base Year for PM = 1995 / Basisjahr für
Feinstäube (PM) ist 1995

Source: German Emission Inventory (20.01.2023)

**Emission trends in NFR 2.A.5.b**

# Recalculations

> With **activity data and emission factors remaining unrevised**, no recalculations were carried out compared to Submission 2022.

# Planned improvements

At the moment, no category-specific improvements are planned.

# FAQs

***Where can I find emissions estimation of demolition activities?*** - Demolishing without any significant new construction is not covered and there are no other emission factors available for demolition activities only. Nevertheless you

can find Information about emissions from 5.E.2 - Other Waste: Building Fires.

**Why do German EFs differ from EEA defaults?** - It has to do with the default 50% reduction for non-residential buildings and roads (as a result of wetting unpaved temporary roads) that is assumed in the calculations for Germany. This is also already accounted for in the EPA emission factors. It is a result of a control measure that is nearly always taken but in principle optional. In the Guidebook a 50% reduction is advised.

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[1] Umweltbundesamt, 2016: Development of Methods for the Generation of Emission Data for Air Pollutants from Building Activity and Construction Zones, Dessau-Roßlau, 2016 FILE?

[2,3] EEA, 2016: EEA Report No 21/2016 EMEP EEA air pollutant emission inventory guidebook 2016, Copenhagen, 2016; https://www.eea.europa.eu/ds_resolveuid/EJ6RT9P2Y3