

2.A.5.b - Construction and Demolition

Short description

Category Code	Method	AD	EF
2.A.5.b	T1/T2	NS	CS
Method(s) applied			
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 category chapters.			
(source for) Activity Data			
NS	National Statistics		
RS	Regional Statistics		
IS	International Statistics		
PS	Plant Specific		
As	Associations, business organisations		
Q	specific Questionnaires (or surveys)		
M	Model / Modelled		
C	Confidential		
(source for) Emission Factors			
D	Default (EMEP Guidebook)		
CS	Country Specific		
PS	Plant Specific		
M	Model / Modelled		
C	Confidential		

NO _x	NM VOC	SO ₂	NH ₃	PM _{2.5}	PM ₁₀	TSP	BC	CO	Heavy Metals	POPs
NA	NA	NA	NA	-/-	L/-	L/-	NA	NA	NA	NA
L/- key source by Level only										
-/T key source by Trend only										
L/T key source by both Level and Trend										
-/- no key source for this pollutant										
IE emission of specific pollutant Included Elsewhere (i.e. in another category)										
NE emission of specific pollutant Not Estimated (yet)										
NA specific pollutant not emitted from this source or activity = Not Applicable										
* no analysis done										

With respect to particle emissions, construction is the second main emissions source in the Mineral industries.

Methodology

Since the last update of the UNECE Guidebook, a Tier 1 method is applied to estimate particulate matter emissions. The T1 GB method is used by us with various adaptations to national conditions, so this is already higher tier, perhaps as T1/T2.

The approach for uncontrolled fugitive emissions for this source category was adapted for national circumstances within a research Project (Umweltbundesamt, 2016) ¹⁾, partly considered existing 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⁾.

Table 1: Overview of applied emission factors, in [kg / m² * y, for roads in tons / km² * 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, 2023) 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)

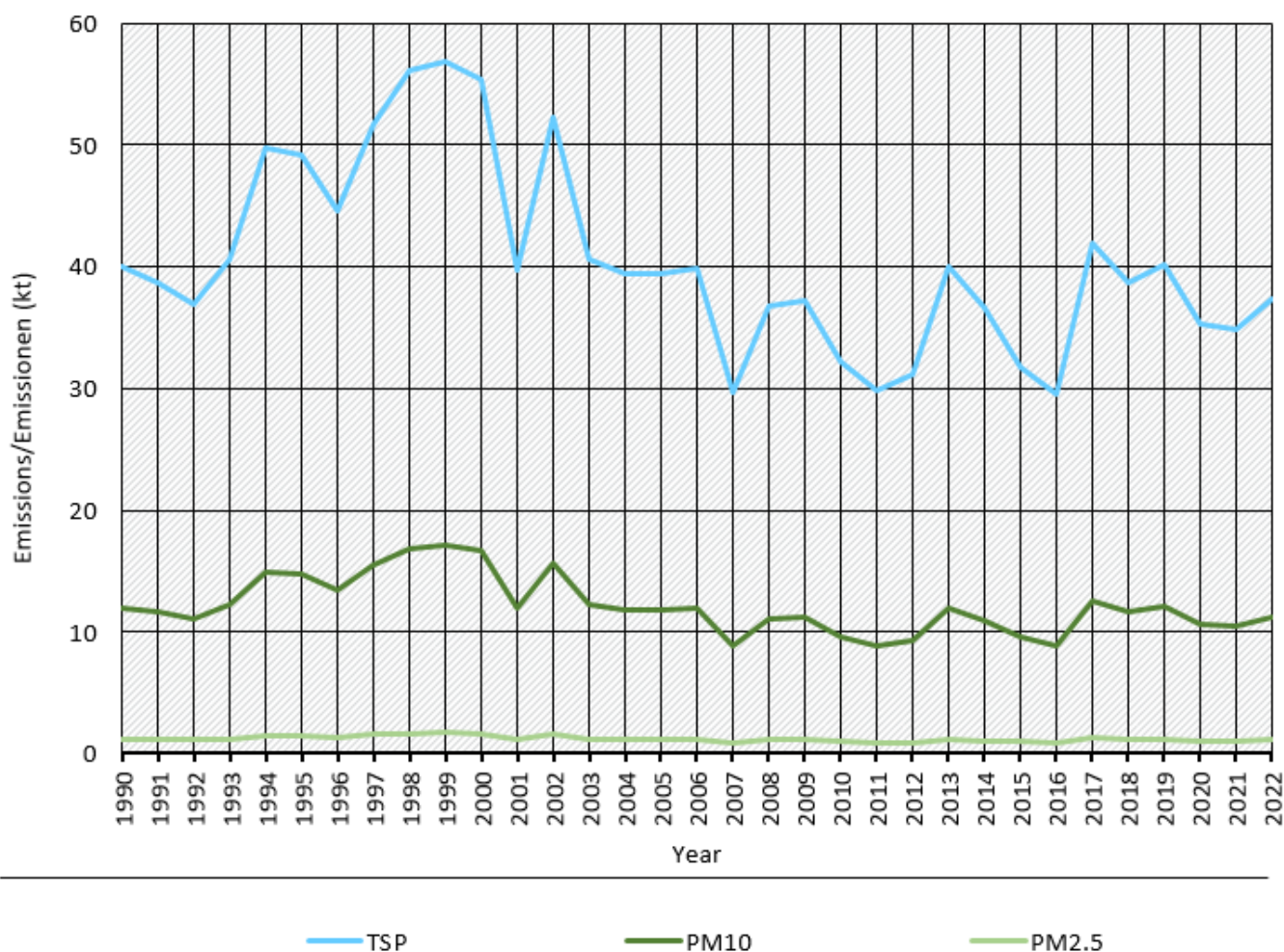
AD is a result of multiplying B the number of houses constructed and f the conversion factor.

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



* Base Year for PM = 1995 / Basisjahr für Feinstäube (PM) ist 1995

Quelle: German Environment Agency, National inventory for the German reporting on atmospheric emissions since 1990, (01/2024)

Emission trends in NFR 2.A.5.b

Note for all: small change for 2023

Notes to PCB emissions of old buildings are given in chapter [2.K - Consumption of POPs and Heavy Metals](#).

Recalculations

Recalculations were necessary due to improvements for most recently years (2020-2022): a new data gapfilling method for construction of roads.



For **pollutant-specific information on recalculated emission estimates for Base Year and 2022**, please see the recalculation tables following [chapter 8.1 - Recalculations](#).

Planned improvements



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.

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

<https://research.ebsco.com/linkprocessor/plink?id=46c9c9e5-c6f9-3229-b7af-6585eb409115>

^{2), 3)} EEA, 2023: EEA Report No 03/2023 EMEP EEA air pollutant emission inventory guidebook 2023, Copenhagen, 2023; <https://www.eea.europa.eu/publications/emep-eea-guidebook-2023/part-b-sectoral-guidance-chapters/2-industrial-processes-and-product-use/2-a-mineral-products/2-a-5-b-construction/view>