

1.A.3.d i (i) - International maritime navigation

Short description

Under NFR category **1.A.3.d i (i)**, emissions from international maritime navigation fuelling in and starting from German harbours are reported.

Category Code	Method					AD					EF				
1.A.3.d i (i)	T1, T2, T3					NS, M					CS, M				
Key Category	SO ₂	NO _x	NH ₃	NMVOC	CO	BC	Pb	Hg	Cd	Diox	PAH	HCb	TSP	PM ₁₀	PM _{2.5}
1.A.3.d i (i)	not included in key category analysis														

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

Methods

D	Default
RA	Reference Approach
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/CORINAIR Emission Inventory Guidebook - 2007, 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, surveys

EF - Emission Factors

D	Default (EMEP Guidebook)
C	Confidential
CS	Country Specific
PS	Plant Specific data

Methodology

PM_{2.5}														
PM₁₀														
TSP²														
HEAVY FUEL OIL														
CO														
NH₃														
NMVOC														
NO_x														
SO_x														
BC¹														
PM_{2.5}														
PM₁₀														
TSP²														
CO														

¹ estimated from f-BCs as provided in ⁴⁾: f-BC (HFO) = 0.12, f-BC (MDO/MGO) = 0.31 as provided in ⁵⁾, chapter: 1.A.3.d.i, 1.A.3.d.ii, 1.A.4.c.iii Navigation, Tables 3-1 & 3-2 ² ratios PM_{2.5} : PM₁₀ : TSP derived from the tier1 default EF as provided in ⁶⁾, chapter: 1.A.3.d.i, 1.A.3.d.ii, 1.A.4.c.iii Navigation, Tables 3-1 & 3-2

NOTE: For the country-specific emission factors applied for particulate matter, no clear indication is available, whether or not condensables are included.

For information on the **emission factors for heavy-metal and POP exhaust emissions**, please refer to [Appendix 2.3 - Heavy Metal \(HM\) exhaust emissions from mobile sources](#) and [Appendix 2.4 - Persistent Organic Pollutant \(POP\) exhaust emissions from mobile sources](#)].

+ [Trends of exhaust emissions from international navigation](#)

NFR 1.A.3.d i is not considered in the key category analysis.

Emission trends for unregulated pollutants (such as **NH₃**, **NO_x**, **NMVOC** and **CO**, all **HM** and **POPs**) with only slight changes in the annual over-all IEFs applied, follow the trends in fuel consumption and the shares of diesel and heavy fuel oil:

[gallery size="medium" : EM_1A3di_NH3.png : EM_1A3di_Cd.png gallery](#)

On the other hand, the emission trends for **SO_x**, and **PM**, both depending on the fuel's sulphur content, follow not only the trends in fuel consumption but do also reflect fuel-sulphur legislation:

[gallery size="medium" : EM_1A3di_SO2.png : EM_1A3di_PM.png gallery](#)

Recalculations

Resulting from changes in the fuel consumption data computed within ⁷⁾ for *domestic* maritime navigation, the **activity data** for 2017 for *international* maritime navigation have been revised.

Table 3: Revised fuel consumption data 2017, in terajoules

=	= Diesel oil	= Heavy fuel oil	= over-all consumption
~ Submission 2020	> 22,924	> 58,781	> 81,828
~ Submission 2019	> 23,165	> 58,781	> 82,069
~ absolute change	> -241	> 0.00	> -241
~ relative change	> -1.04%	> 0.00%	> -0.29%

In contrast, all country-specific and default **emission factors applied remain unrevised** compared to last year's submission.



For more information on recalculated emission estimates for Base Year and 2018, please see the pollutant-specific recalculation tables following chapter [8.1 - Recalculations](#).

Uncertainties

Uncertainty estimates for **activity data** of mobile sources derive from research project FKZ 360 16 023: "Ermittlung der Unsicherheiten der mit den Modellen TREMOD und TREMOD-MM berechneten Luftschadstoffemissionen des landgebundenen Verkehrs in Deutschland" by Knörr et al. (2009) ⁸⁾.

Planned improvements

Besides routine maintenance and further development of the BSH model, no improvements are planned.

FAQs

bibliography : 1 : AGEb, 2019: Working Group on Energy Balances (Arbeitsgemeinschaft Energiebilanzen (Hrsg.), AGEb): Energiebilanz für die Bundesrepublik Deutschland; URL: <http://www.ag-energiebilanzen.de/7-0-Bilanzen-1990-2017.html>, Köln & Berlin, 2019. : 2 : Deichnik, K. (2019): Aktualisierung und Revision des Modells zur Berechnung der spezifischen Verbräuche und Emissionen des von Deutschland ausgehenden Seeverkehrs. from Bundesamts für Seeschifffahrt und Hydrographie (BSH); Hamburg, 2019. : 3 : EMEP/EEA (2019): EMEP/EEA air pollutant emission inventory guidebook 2019, URL: <https://www.eea.europa.eu/publications/emep-eea-guidebook-2019>; Copenhagen, 2019. : 4 : Rentz et al., 2008: Nationaler Durchführungsplan unter dem Stockholmer Abkommen zu persistenten organischen Schadstoffen (POPs), im Auftrag des Umweltbundesamtes, FKZ 205 67 444, UBA Texte | 01/2008, January 2008; URL: <http://www.umweltbundesamt.de/en/publikationen/nationaler-durchfuehrungsplan-unter-stockholmer> : 5 : Knörr et al. (2009): Knörr, W., Heldstab, J., & Kasser, F.: Ermittlung der Unsicherheiten der mit den Modellen TREMOD und TREMOD-MM berechneten Luftschadstoffemissionen des landgebundenen Verkehrs in Deutschland; final report; URL: <https://www.umweltbundesamt.de/sites/default/files/medien/461/publikationen/3937.pdf>, FKZ 360 16

023, Heidelberg & Zürich, 2009. [bibliography](#)

¹⁾ (bibcite 1)

²⁾ (bibcite 2)

³⁾ (bibcite 2)

⁴⁾ (bibcite 2)

⁵⁾ (bibcite 2)

⁶⁾ (bibcite 2)

⁷⁾ (bibcite 2)

⁸⁾ (bibcite 5)