

1.A.3.a ii (i) - Domestic Civil Aviation: LTO

Short description

In NFR category *1.A.3.a ii (i) - Domestic Civil Aviation: LTO* emissions from domestic flights between German airports occurring during LTO stage (Landing/Take-off: 0-3,000 feet) are reported.

Category Code	Method					AD					EF				
1.A.3.a ii(i)	T1, T2, T3					NS, M					CS, D, 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.a ii(i)	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-	-/-	-	-/-	-/-	-/-

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

In the following, information on sub-category specific AD, (implied) emission factors and emission estimates are provided.

Methodology

PM ²															
CO															
AVIATION GASOLINE															
NH ₃															
NM VOC															
NO _x															
SO _x															
BC ¹															
PM ²															
TSP ³															
CO															

¹ estimated via a f-BCs (avgas: 0.15, jet kerosene: 0.48) as provided in ⁸⁾

² EF(PM_{2.5}) also applied for PM₁₀ and TSP (assumption: > 99% of TSP from diesel oil combustion consists of PM_{2.5})

³ also including TSP from lead: EF(TSP) = 1.6 x EF(Pb) - see road transport



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

Table 4: Tier1 emission factors for heavy-metal and POP exhaust emissions

	= Pb	= Cd	= Hg	= As	= Cr	= Cu	= Ni	= Se	= Zn	= B[a]P	= B[b]F	= B[k]F	= I[...] _p	= PAH 1-4	= PCDD/F			
=	= [g/T]									= [mg/T]				= [μg/T]				
~ Kerosene	= NE	= NE	= NE	= NE	= NE	= NE	= NE	= NE	= NE	= NE	= NE	= NE	= NE	= NE	= NE			
~ Aviation gasoline	> 9,481	1		> 0.005	> 0.200	> 0.007	> 0.145	> 0.103	> 0.053	> 0.005	> 0.758	> 126	> 182	> 90	> 205	> 602	= NE	
1																		

NFR 1.A.3.a ii (i) - Domestic Civil Aviation - LTO is **no key source**.

Where **sulphur oxides** emissions are dominated by jet kerosene due to the amount of fuel used, the majority of **carbon monoxide** stems from the consumption of avgas given the much higher emission factor applied to this fuel.

[gallery size="medium" : 1A3aii\(i\)_SOx.png : 1A3aii\(i\)_CO.png gallery](#)

Lead emissions on the other hand, with no emission factor available for jet kerosene, are only calculated for avgas.

[gallery size="medium" : 1A3aii\(i\)_Pb.png gallery](#)

[illegible]

In parallel, the majority of **country-specific emission factors** has been revised within TREMOD AV based on information available from the 2019 EMEP/EEA Guidebook ⁹⁾ and Eurocontrol's AEM model ¹⁰⁾. Here, among others, the EF for SO₂ from jet kerosene has been replaced by new and more reliable data showing no sulphur reduction since 1990.

Furthermore, all EF applied for aviation gasoline have been revised widely based on better knowledge but with no significant impact on the emission inventory.

Table 6: Revised country-specific emission factors for jet kerosene, in [kg/T]

[illegible]

relative change																	
CARBON MONOXIDE - CO																	
Submission 2021																	
Submission 2020																	
absolute change																	
relative change																	

The TSP emissions calculated depend directly on the reported lead emissions: The emission factor for TSP is 1.6 times the emission factor used for lead: $EF(TSP) = 1.6 \times EF(Pb)$. The applied procedure is similar to the one used for calculating TSP emissions from leaded gasoline used in road transport.

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bibliography

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³⁾ (bibcite 2)

⁴⁾ (bibcite 3)

⁵⁾ (bibcite 1)

⁶⁾ (bibcite 2)

⁷⁾ (bibcite 4)

⁸⁾ (bibcite 4)

⁹⁾ (bibcite 4)

¹⁰⁾ (bibcite 5)