

1.A.5.b i - Military Ground Vehicles and Vehicles

Short description

In sub-category *1.A.5.b i - Other, Mobile (including Military)* emissions from military ground-vehicles and mobile machinery are reported.

Method	AD	EF	Key Category
T1, T2	NS	CS, D	see superordinate chapter

Method

Activity data

Basically, all fuel consumption in military vehicles is included in the primary activity data provided by the National Energy Balances (NEB) (AGEB, 2019).

As the NEB does not provide specific data for military use, the following additional sources are used:

For the years as of 1995, the official mineral-oil data of the Federal Republic of Germany (Amtliche Mineralölstatistik der Bundesrepublik Deutschland), prepared by the Federal Office of Economics and Export Control (BAFA), are used (BAFA, 2019) ¹⁾. Provided in units of [1,000 t], these amounts have to be converted into [TJ] on the basis of the relevant net calorific values given by ²⁾.

As the official mineral-oil data does not distinguish into fossil and biofuels but does provide amounts for inland deliveries of total diesel and gasoline fuels, no data on the consumption of biodiesel and bioethanol is available directly at the moment. Therefore, activity data for biofuels used in military vehicles are calculated by applying Germany's official annual biofuel shares to the named total deliveries (see also: info on EF).

Table 1: Annual fuel deliveries to the military for ground-vehicles and machinery, in terajoules

	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Diesel Oil	15,037	8,001	1,364	3,366	990	622	972	681	683	580	578	415	279	
Biodiesel	0	0	0	74	64	41	63	39	41	31	30	22	16	
Gasoline	21,508	9,800	7,477	6,857	4,862	4,696	4,175	4,092	3,695	3,342	3,009	2,502	2,341	
Biogasoline	0	0	0	47	188	192	185	175	161	145	131	107	105	
Σ 1.A.5.b i	36,545	17,801	8,841	10,343	6,103	5,551	5,395	4,988	4,580	4,099	3,748	3,046	2,741	

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Emission factors

Table 2: Annual country-specific emission factors¹, in kg/TJ

	1990	1995	2000	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
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DIESEL FUELS																	
NH₃	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
NMVO_C	316	274	274	274	274	274	274	274	274	274	274	274	274	274	274	274	274
NO_x	1,195	1,360	1,360	1,360	1,360	1,360	1,360	1,360	1,360	1,360	1,360	1,360	1,360	1,360	1,360	1,360	1,360
SO_x	125	60.5	14.0	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37
PM²	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
BC³	53.0	53.0	53.0	53.0	53.0	53.0	53.0	53.0	53.0	53.0	53.0	53.0	53.0	53.0	53.0	53.0	53.0
CO	515	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350
GASOLINE FUELS																	
NH₃	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
NMVO_C	594	373	373	373	373	373	373	373	373	373	373	373	373	373	373	373	373
NO_x	682	725	725	725	725	725	725	725	725	725	725	725	725	725	725	725	725
SO_x	11.8	8.30	3.20	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
PM²	3.63	3.55	3.13	2.66	2.66	2.51	2.39	2.27	2.14	2.09	2.03	1.97	1.91	1.91	1.91	1.91	1.91
BC³	0.44	0.43	0.38	0.32	0.32	0.30	0.29	0.27	0.26	0.25	0.24	0.24	0.23	0.23	0.23	0.23	0.23
CO	4,199	4,010	4,010	4,010	4,010	4,010	4,010	4,010	4,010	4,010	4,010	4,010	4,010	4,010	4,010	4,010	4,010
TSP⁴	2.46	0.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pb⁴	1.54	0.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

¹ Due to lack of better information: similar EF are applied for fossil fuels and biofuels.

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 EF(BC) estimated from tier1 default f-BC values provided in ³⁾, chapter 1.A.3.b, table 3-11 for gasoline passenger cars (f-BC: 0.12) and diesel heavy duty vehicles (f-BC: 0.53)

⁴ from leaded gasoline (until 1997), based upon country-specific emission factors from ⁴⁾

NOTE: With respect to the emission factors applied for particulate matter, given the circumstances during test-bench measurements, condensables are most likely included at least partly.^{footnote} During test-bench measurements, temperatures are likely to be significantly higher than under real-world conditions, thus reducing condensation. On the contrary, smaller dilution (higher number of primary particles acting as condensation germs) together with higher pressures increase the likeliness of condensation. So over-all condensables are very likely to occur but different to real-world conditions. ^{footnote}

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](#)].

+ [Discussion of emission trends](#)

This sub-category is **not considered separately in the key category analysis**.

Due to the application of very several tier1 emission factors, most emission trends reported for this sub-category only reflect the trend in fuel deliveries. Therefore, the fuel-consumption dependend trends in emission estimates are only influenced by the annual fuel mix.

[gallery size="medium" : 1A5bi_EM_NH3.png : 1A5bi_EM_NOx.png gallery](#)

Here, for **sulphur dioxide**, this consumption-based falling trend is intensified by the impact of fuel-sulphur legislation.

~ Submission 2019	> 4,907	> 4,862	> 4,695	> 4,175	> 4,092	> 3,695	> 3,342	> 3,009	> 2,605										
~ absolute change	> -0.11	> 0.00	> 0.10	> 0.00	> 0.00	> 0.00	> 0.08	> 0.07	> -103										
~ relative change	> 0.00 %	> 0.00%	> 0.00%	> 0.00%	> 0.00%	> 0.00%	> 0.00%	> 0.00%	> -3.96%										
< Biogasoline																			
~ Submission 2020	> 140	> 188	> 192	> 185	> 175	> 161	> 145	> 131	> 107										
~ Submission 2019	> 140	> 188	> 192	> 185	> 175	> 161	> 145	> 131	> 106										
~ absolute change	> 0.00	> 0.00	> 0.00	> 0.00	> 0.00	> 0.00	> 0.00	> 0.00	> 0.13										
~ relative change	> 0.00 %	> 0.00%	> 0.00%	> 0.00%	> 0.00%	> 0.00%	> 0.00%	> 0.00%	> 0.12%										



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

Planned improvements

Given the limited quality of the emission factors applied, the inventory compiler will check a possible revision at least for the main pollutants.

FAQs

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https://www.bafa.de/SharedDocs/Downloads/DE/Energie/Mineraloel/moel_amtliche_daten_2017_dezember.html, Eschborn, 2019. : 2 : AGEb, 2019b: Working Group on Energy Balances

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<http://www.umweltbundesamt.de/en/publikationen/nationaler-durchfuehrungsplan-unter-stockholmer-bibliography>

¹⁾ (bibcite 1)

²⁾ (bibcite 2)

³⁾ (bibcite 4)

⁴⁾ (bibcite 3)