



	Pb	Cd	Hg	As	Cr	Cu	Ni	Se	Zn
<b>Diesel oil</b>	0.012	0.001	0.123	0.002	0.198	0.133	0.005	0.002	0.419
<b>Biodiesel<sup>1</sup></b>	0.013	0.001	0.142	0.003	0.228	0.153	0.005	0.003	0.483
<b>Gasoline fuels - 4-stroke</b>	0.037	0.005	0.200	0.007	0.145	0.103	0.053	0.005	0.758
<b>Gasoline fuels - 2-stroke<sup>2</sup></b>	0.051	2.10	0.196	0.007	8.96	357	14.7	2.09	208
<b>LPG (1.A.4.a ii only)</b>	NE	NE	NE	NE	NE	NE	NE	NE	NE

<sup>1</sup> values differ from EFs applied for fossil diesel oil to take into account the specific NCV of biodiesel

<sup>2</sup> including the HM of 1:50 lube oil mixed to the gasoline

## Railways

Table 3: Tier1 default emission factors applied to railway vehicles, in [g/T]

	Pb	Cd	Hg	As	Cr	Cu	Ni	Se	Zn
<b>Diesel oil</b>	1.21 <sup>2</sup>	0.23 <sup>1</sup>	0.12 <sup>1</sup>	0.002 <sup>2</sup>	1.16 <sup>2</sup>	39.57 <sup>2</sup>	1.63 <sup>2</sup>	0.23 <sup>2</sup>	23.28 <sup>2</sup>
<b>Biodiesel<sup>3</sup></b>	0.01	0.001	0.14	0.003	0.23	0.15	0.01	0.003	0.48
<b>Lignite Briquettes</b>	NE								
<b>Raw Lignite</b>	NE								
<b>Hard Coal</b>	NE								
<b>Hard Coal Coke</b>	NE								

<sup>1</sup> tier1 default from <sup>2)</sup>, chapter: 1.A.3.b i-iv - Road transport: exhaust emissions: tier1 value for diesel vehicles

<sup>2</sup> tier1 default from <sup>3)</sup>, chapter: 1.A.3.c - Railways

<sup>3</sup> values differ from EFs applied for fossil diesel oil to take into account the specific NCV of biodiesel

(NOTE: Assuming that biodiesel contains far less HMs than fossil diesel oil, similar values are applied to all mobile sources using this biogenic fuel.)

As the EMEP/EEA GB 2019 does not provide specific defaults for **Pb, Hg and As**, the EF applied here has been derived from chapter: 1.A.3.b i-iv - Road transport: exhaust emissions: tier1 value for diesel vehicles.

[gallery size="medium" : GB2016\\_EF\\_NE+NA\\_1.A.3.c.png gallery](#)

## Inland Vessels and Ships in 1.A.3.d ii

Table 4: Tier1 default emission factors applied to inland ships and vessels, in g/T]

	Pb	Cd	Hg	As	Cr	Cu	Ni	Se	Zn
<b>Diesel oil</b>	1.21	0.233	0.123	0.002	1.16	39.6	1.63	0.233	23.3
<b>Biodiesel<sup>1</sup></b>	0.013	0.001	0.142	0.003	0.23	0.15	0.005	0.003	0.48

<sup>1</sup> similar EF for biodiesel applied for all mobile sources

## Maritime Vessels and Ships in 1.A.3.d i, 1.A.3.d ii, 1.A.4.c iii and 1.A.5.b iii

The following table provides the tier1 EF applied for HMs from ships and vessels in both civil and military operation in NFR categories 1.A.3.d i -International Maritime Navigation, 1.A.3.d ii - National Navigation (Shipping), 1.A.4.c iii -Fishery and 1.A.5.b iii - Other: Military Navigation.

Table 4: Tier1 default emission factors applied to maritime ships and vessels in g/T]

	Pb	Cd	Hg	As	Cr	Cu	Ni	Se	Zn
<b>Heavy Fuel oil<sup>1</sup></b>	4.46	0.50	0.50	16.9	17.8	31.0	793	5.20	29.7
<b>Diesel oil<sup>2</sup></b>	3.03	0.23	0.70	0.93	1.16	20.5	23.3	2.33	27.9
<b>Biodiesel<sup>3</sup></b>	0.013	0.0013	0.142	0.003	0.23	0.15	0.005	0.003	0.48

<sup>1</sup> tier1 defaults from <sup>4)</sup>, Chapter: 1.A.3.d.i, 1.A.3.d.ii, 1.A.4.c.iii Navigation: Table 3-1

<sup>2</sup> tier1 defaults from <sup>5)</sup>, Chapter: 1.A.3.d.i, 1.A.3.d.ii, 1.A.4.c.iii Navigation: Table 3-2

<sup>3</sup> similar EF for biodiesel applied for all mobile sources (*NOTE: Assuming that biodiesel contains far less HMs than fossil diesel oil, similar values are applied to all mobile sources using this biogenic fuel.*)

## Aircraft in 1.A.3.a and 1.A.5.b ii

The EMEP/EEA GB 2019 does not provide specific defaults for HM emissions from the combustion of jet kerosene and aviation gasoline, stating that for aviation gasoline these emissions are *not estimated* (NE):

[gallery size="medium" : GB2016\(July2017\)\\_EF\\_NA+NE\\_Avgas.PNG gallery](#)

Therefore, the inventory compiler decided to apply the tier1 EF from gasoline fuel used in non-road mobile machinery here, too. Although the Party assumes that HM emissions are also likely to occur from the combustion of jet kerosene, no gap-filling is carried out for this fuel. Instead, all HM emission from jet kerosene are reported as *not estimated* (NE).

Table 5: Tier1 default emisison factors applied to aircraft, in g/TJ

	<b>Pb</b>	<b>Cd</b>	<b>Hg</b>	<b>As</b>	<b>Cr</b>	<b>Cu</b>	<b>Ni</b>	<b>Se</b>	<b>Zn</b>
<b>Kerosene</b>	NE								
<b>Aviation gasoline</b>	9,481 <sup>1</sup>	0.005	0.200	0.007	0.145	0.103	0.053	0.005	0.758

<sup>1</sup> estimated from average lead content of AvGas 100 LL (see also: 1.A.3.a ii (i) and FAQs) of 0.56 g Pb/liter

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<sup>1), 2), 3), 4), 5)</sup> EMEP/EEA, 2019: EMEP/EEA air pollutant emission inventory guidebook 2019; Copenhagen, 2019.