Category		Title
NFR:	**2.C.5.f**	**Storage, handling and transport of metal products**
SNAP:	**041000**	**Storage, handling and transport of metal products**
ISIC:	**6010** **6023** **6110** **6120** **6210** **6220** **6301** **6302** **6303**	**Transport via railways** **Freight transport by road** **Sea and coastal water transport** **Inland water transport** **Scheduled air transport** **Non-scheduled air transport** **Cargo handling** **Storage and warehousing** **Other supporting transport activities**
Version	**Guidebook 2009**	

Coordinator

Jeroen Kuenen

Contents

1   Overview

The present chapter addresses emissions from storage, handling and transport of metal products. These emissions can occur before, during and after the activities described in the metal industry (subsector 2.C).

The Guidebook provides emission factors for storage, handling and transport. However, these emission factors are considered to be Tier 2 emission factors. In the default Tier 1 approach, it is assumed that emissions from storage, handling and transport of metal products are included in the Tier 1 from the relevant chapter in the metal industry. For example, emissions from storage, handling and transport of steel during the iron and steel production process are covered by the Tier 1 emission factors for iron and steel production.

2   Description of sources

2.1   Process description

The present subsection gives a short overview of storage, handling and transport in the metal industry. This can occur either before, during or after a process in the metal industry. A simple process scheme is given in Figure 2.1.

The most relevant emissions occurring during storage, handling and transport of metal products are emissions of particulates and heavy metals.
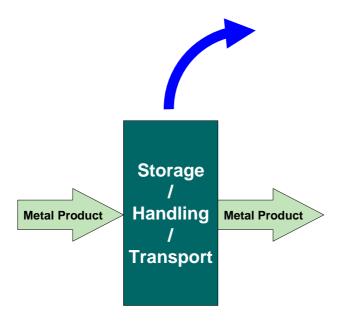

Figure 2.1   Simplified process scheme for source category 2.C.5.f Storage, handling and transport of metal products

3   Methods

3.1   Choice of method

In the Tier 1 default approach, the emissions from storage, handling and transport of metal products are covered by the technical chapters describing the activities. For instance, emissions from storage, handling and transport of iron and steel are accounted for by the Tier 1 default emission factors in chapter 2.C.1 (Iron and Steel Production).

If in the relevant process chapters (such as 2.C.1 Iron and Steel Production and 2.C.2 Ferroalloys Production) a Tier 1 methodology is applied,[1] the storage, handling and transport is already included in the applied emission factors. In this case an 'included elsewhere' (IE) notation key should be used for reporting under this NFR category 2.C.5.f to avoid double counting. Where higher tiers are used in the relevant process chapters, a separate estimate for the handling and storage should be made using the methods described below.

In Tier 2, general emission factors are provided for emissions from storage, handling and transport of metal products. One should look carefully at the tiers applied in other chapters within subsector 2.C Metal Industry to avoid double counting of emissions from storage, handling and transport.

3.2   Tier 1 default approach

3.2.1   Algorithm

The Tier 1 approach uses the general equation:

$$E_{pollutant} = AR_{production} \times EF_{pollutant} \qquad (1)$$

The Tier 1 emission factors assume an 'averaged' or typical technology and abatement implementation in the country and integrate all different sub-processes. However, for Tier 1 in the present source category this approach is not necessary, since the emissions are included in another source category.

3.2.2   Default emission factors

In the Tier 1 default approach, the dust emissions from storage, handling and transport of metal products are covered by the respective technical chapters. Consequently, the default emission factors are 'included elsewhere' (IE), as indicated in the table below.

Table 3.1   Tier 1 emission factors for source category 2.C.5.f Storage, handling and transport of metal products

Tier 1 default emission factors		
	Code	Name
NFR Source Category	2.C.5.f	Storage, handling and transport of metal products (Please specify the sources
Fuel	NA	
Not applicable		
Not estimated	NOx, CO, NMVOC, SOx, NH3, TSP, PM10, PM2.5, Pb, Cd, Hg, As, Cr, Cu, Ni, Se, Zn, Aldrin, Chlordane, Chlordecone, Dieldrin, Endrin, Heptachlor, Heptabromo-biphenyl, Mirex, Toxaphene, HCH, DDT, PCB, PCDD/F, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Indeno(1,2,3-cd)pyrene, Total 4 PAHs, HCB, PCP, SCCP		

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[1]   For 2.C.1 Iron and Steel Production, both the Tier 1 and Tier 2 approach already include the emissions from storage, handling and transport. These should therefore not be reported again in the present source category since this would lead to double counting.

3.2.3 Activity data

Activity data are not needed for Tier 1, since the emissions are included in other chapters.

3.3 Tier 2 technology-specific approach

3.3.1 Algorithm

In a Tier 2 approach, the emissions storage, handling and transport of metal products need to be estimated separately. For this activity only one 'technology' (the 'Tier 2 default') is available. Therefore, the equation describing the approach is the same as for Tier 1:

$$E_{pollutant} = AR_{production} \times EF_{pollutant} \qquad (2)$$

where:

$E_{pollutant}$	=	the emission of the specified pollutant
$AR_{production}$	=	the activity rate for the storage, handling and transport
$EF_{pollutant}$	=	the emission factor for this pollutant

The emission factors assume an 'averaged' or typical technology and abatement implementation in the country and integrate all sub-processes.

3.3.2 Technology-specific emission factors

For the present source category, only one technology is available. This technology is to be used when the emissions from storage, handling and transport of metal products are not included in the relevant source categories.

The emission factors are provided in Table 3.2. The total suspended particulate matter (TSP) emission factor is based on expert judgement. All other emission factors are not estimated.

Table 3.2   Tier 2 emission factors for source category 2.C.5.f Storage, handling and transport of metal products

Tier 2 emission factors					
	Code	Name			
NFR Source Category	2.C.5.f	Storage, handling and transport of metal products (Please specify the sources			
Fuel	NA				
SNAP (if applicable)	041000	Storage, handling and transport of metal products			
Technologies/Practices					
Region or regional conditions					
Abatement technologies					
Not applicable					
Not estimated	NOx, CO, NMVOC, SOx, NH3, PM10, PM2.5, Pb, Cd, Hg, As, Cr, Cu, Ni, Se, Zn, Aldrin, Chlordane, Chlordecone, Dieldrin, Endrin, Heptachlor, Heptabromo-biphenyl, Mirex, Toxaphene, HCH, DDT, PCB, PCDD/F, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Indeno(1,2,3-cd)pyrene, Total 4 PAHs, HCB, PCP, SCCP				
Pollutant	**Value**	**Unit**	**95%confidence interval**		**Reference**
			Lower	**Upper**	
TSP	1	kg/Mg metal products	0.1	10	Expert judgement

3.3.3 Abatement

A number of add on technologies exist that are aimed at reducing the emissions of specific pollutants. The resulting emission can be calculated by replacing the technology-specific emission factor with an abated emission factor as given in the formula:

$$EF_{technology,abated} = \eta_{abatement} \times EF_{technology,unabated} \qquad (3)$$

For storage, handling and transport of metal products, no abatement efficiencies are available.

3.3.4 Activity data

A lot of information on production statistics (for various source categories) is available from United Nations statistical yearbooks or national statistics.

Further guidance might also be provided in the 2006 IPCC Guidelines for National Greenhouse Gas Inventories (IPCC, 2006).

3.4 Tier 3 emission modelling and use of facility data

The Tier 3 approach for estimating emissions from this source category treats emissions from storage, handling and transport separately. Emission factors are only available for storage and transport of PM10 and are presented in the Table 3.3.

Table 3.3   Overview of PM10 emission factors for storage and handling of mineral products

Process	Emission factor	Reference
Storage of ore without measures	4.1 tonne/ha/year	EPA (2006), Infomil (2006)
Storage of ore with measures (use of sprinklers and binding materials)	0.41 tonne/ha/year	EPA (2006), Infomil (2006)
Handling of ore without measures	2 g/tonne	Vrins (1999)

4   Data quality

4.1   Completeness

Care must be taken to include all emissions. Emissions from storage, handling and transport of metal products could be reported in those specific metal production chapters. If this is true, they should not be reported in this source category.

4.2   Avoiding double counting with other sectors

Care must be taken that emissions are not double counted. It is good practice not to report emissions in this source category if they have been included in the specific chapters on storage, handling and transport of metal products.

4.3   Verification

4.3.1 Best Available Technique (BAT) emission factors

BAT emission limit values are available from the BAT reference (BREF) document for the non-ferrous metal industry (European Commission, 2001).

The BREF document describes the technologies necessary to achieve BAT emission levels in the non-ferrous metal industry. For the present source category no generic emission concentrations could be identified that may be compared against the emission factors in this chapter. However,

some numbers and explanatory texts are available from the BREF document and may be used for verification purposes.

4.4 Developing a consistent time series and recalculation

No specific issues.

4.5 Uncertainty Assessment

No specific issues.

4.5.1 Emission factor uncertainties

No specific issues.

4.5.2 Activity data uncertainties

No specific issues.

4.6 Inventory quality assurance/quality control (QA/QC)

No specific issues.

4.7 Gridding

No specific issues.

4.8 Reporting and documentation

No specific issues.

5 References

European Commission, 2001. *Integrated Pollution Prevention and Control (IPPC), Reference Document on Best Available*

Techniques (BREF) in the Non-Ferrous Metal Industries, December 2001.

Infomil, 2006. *Nederlandse emissie richtlijnen lucht*. (In Dutch).

IPCC, 2006. *2006 IPCC Guidelines for National Greenhouse Gas Inventories*. Prepared by the National Greenhouse Gas Inventories Programme, Eggleston H.S., Buendia L., Miwa K., Ngara T. and Tanabe K. (eds). IGES, Japan.

EPA, 2006. *Compilation of Air Pollutant Emission Factors (AP42), Volume 1: Stationary Point and Area Sources* (with revision till November 2006). United States Environment Protection Agency.

Vrins, E., 1999. *Fijnstof-emissies bij op- en overslag*. Rapport Vr008, Randwijk (in Dutch).

6 Point of enquiry

Enquiries concerning this chapter should be directed to the relevant leader(s) of the Task Force on Emission Inventories and Projection's expert panel on combustion and industry. Please refer to the TFEIP website (www.tfeip-secretariat.org) for the contact details of the current expert panel leaders.