Category		Title
NFR:	**2.A.7.c**	**Storage, handling and transport of mineral products**
SNAP:	**040900**	**Storage, handling and transport of mineral 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**
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Contents

1 Overview

The present chapter discusses emissions from storage, handling and transport of mineral products. These emissions can occur before, during and after the activities described in the mineral industry (NFR sector 2.A).

This Guidebook provides emission factors for storage, handling and transport in Tier 1. At this level, it is assumed that these emissions are accounted for in the relevant mineral chapter. For example, emissions from storage, handling and transport of cement during the cement production are covered by the Tier 1 emission factors for cement production.

At Tier 2 level the present chapter provides default emission factors for particulate emissions from storage, handling and transport of mineral products.

2 Description of sources

2.1 Process description

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

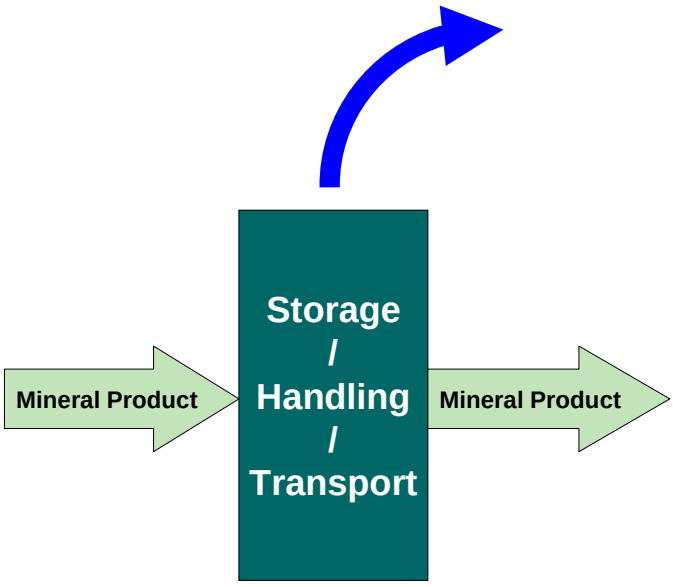

Figure 2.1 Simplified process scheme for source category 2.A.7.c Storage, handling and transport of mineral products

2.2 Techniques

This chapter does not yet provide information on the techniques or technologies distinguished in the storage, handling and transport of mineral products.

2.3 Emissions and controls

The most relevant emissions occurring during storage, handling and transport of mineral products are particulate emissions.

3 Methodological issues

3.1 Choice of method

In the Tier 1 default approach, the emissions from storage, handling and transport of mineral products are covered by the technical chapters describing the activities. For instance, emissions from storage, handling and transport of cement are accounted for by the Tier 1 default emission factors in chapter 2.A.1 Cement Production.

If in the relevant process chapters (such as 2.A.1 Cement Production) a Tier 1 or 2 methodology is applied, the storage, handling and transport is already included in the applied emission factors. Therefore, it is good practice not to report emissions from storage, handling and transport separately. In this case, it is good practice to use a Tier 1 approach for this source category.

In the Tier 2 methodology, general emission factors are provided for emissions from storage, handling and transport of mineral products. It is good practice to check the tier methods applied in other chapters within the mineral industry (sector 2.A), 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:

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

Where:

$E_{pollutant}$ = the emission of the specified pollutant

$AR_{production}$ = the activity rate for the storage and handling of mineral products

$EF_{pollutant}$ = the emission factor for this pollutant

The Tier 1 emission factors assume an averaged or typical technology and abatement implementation in the country and integrate all sub-processes. In this particular case, the Tier 1 estimate is such that particulate emissions from storage, handling and transport are included in the 'technical chapters' of the mineral industry (e.g. cement industry, lime industry).

3.2.2 Default emission factors

In the Tier 1 default approach, the dust emissions from storage, handling and transport of mineral products are included in the Tier 1 approaches in the respective technical chapters. Consequently, all relevant emissions are reported as 'not estimated' in the table below.

Table 3.1 Tier 1 emission factors for source category 2.A.7.c Storage, handling and transport of mineral products

Tier 1 default emission factors		
	Code	Name
NFR Source Category	2.A.7.c	Storage, handling and transport
Fuel	NA	
Not applicable	NOx, CO, NMVOC, SOx, NH3, 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	
Not estimated	TSP, PM10, PM2.5	

3.2.3 Activity data

Activity data are not needed for Tier 1, since no emission factors are presented in the Tier 1 approach for this source category.

3.3 Tier 2 technology-specific approach

3.3.1 Algorithm

In a Tier 2 approach, the emissions from storage, handling and transport of mineral 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:

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

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

The Tier 2 emission factors for storage and handling of mineral products are provided in Table 3.2 and are taken from the Coordinated European Particulate Matter Emission Inventory Program (CEPMEIP) (Visschedijk et al., 2004). These represent 'typical' levels of abatement i.e. application of averaged abatement technology level.

Table 3.2 Tier 2 emission factors for source category 2.A.7.c Storage, handling and transport of mineral products

Tier 2 emission factors					
	Code	Name			
NFR Source Category	2.A.7.c	Storage, handling and transport			
Fuel	NA				
SNAP (if applicable)	040900	Storage, handling and transport of mineral products			
Technologies/Practices					
Region or regional conditions					
Abatement technologies					
Not applicable	NOx, CO, NMVOC, SOx, NH3, 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				
Not estimated					
Pollutant	Value	Unit	95% confidence interval		Reference
			Lower	Upper	
TSP	10	g/Mg product	1	100	Visschedijk et al. (2004)
PM10	5	g/Mg product	1	25	Visschedijk et al. (2004)
PM2.5	0.5	g/Mg product	0.1	2.5	Visschedijk et al. (2004)

3.3.3 Activity data

The relevant activity data is the total amount of mineral products stored, handled and transported.

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 available only storage and transport for PM10 and are presented in the table below.

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

Process	Emission factor	Reference
Storage of minerals without measures	8.2 tonne/ha/year	EPA (2006), Infomil (2006)
Storage of minerals with measures (use of sprinklers and binding materials)	0.82 tonne/ha/year	EPA (2006), Infomil (2006)
Handling of minerals without measures	4 g/tonne	Vrins (1999)

4 Data quality

4.1 Completeness

Since the Tier 1 approach for this source is actually assuming it to be included in the process emissions in the mineral industry, it is good practice to check whether this is indeed the case. If in these industries methods are used that do not include the emissions in the storage, handling and transport source category, it is good practice to apply the Tier 2 method as described in subsection 3.3 above.

4.2 Avoiding double counting with other sectors

Double counting might occur. If a Tier 2 method is applied for this source category, it is good practice to verify that the methods applied in the processes of the mineral industry do not include these emissions.

4.3 Verification

4.3.1 Best Available Technique emission factors

Best Available Technique emission factors are not available for this source.

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 Glossary

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

6 References

EPA, 2006. AP-*42, Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources* (with revision till November 2006). United States Environmental Protection Agency.

Infomil, 2006. Nederlandse emissie richtlijnen lucht (in Dutch).

Visschedijk, A.J.H., Pacyna, J., Pulles, T., Zandveld, P. and Denier van der Gon, H., 2004. 'Coordinated European Particulate Matter Emission Inventory Program (CEPMEIP)'. In: Dilara, P., *et al*. (eds.), *Proceedings of the PM emission inventories scientific workshop, Lago Maggiore, Italy, 18 October 2004*. EUR 21302 EN, JRC, pp. 163–174.

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

7 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.