SNAP CODE: **030313**

SOURCE ACTIVITY TITLE: **PROCESSES WITH CONTACT**
Asphalt Concrete Plants

NOSE CODE: **104.11.04**

NFR CODE: **1 A 2 f**

1 ACTIVITIES INCLUDED

This chapter includes information on atmospheric emissions of particulate matter during the production of asphaltic concrete, a paving substance composed of a combination of aggregates uniformly mixed and coated with asphalt cement.

2 CONTRIBUTIONS TO TOTAL EMISSIONS

During the production of asphalt concrete considerable amounts of fine particles can be generated. These emissions are not very significant on global or even regional scale. However, asphalt concrete plants can be an important emission source of particles on a local scale.

Table 1:Contribution to total emissions of the CORINAIR90 inventory (*28 countries*)

Source-activity	**SNAP-code**	**Contribution to total emissions [%]**								
		SO_2	NO_x	NMVOC	CH_4	CO	CO_2	N_2O	NH_3	PM*
Asphalt Concrete Plants	030313	0.1	0	0	-	0	0.1	-	-	-

0 = emissions are reported, but the exact value is below the rounding limit (0.1 per cent)
- = no emissions are reported
* = PM (inclusive of TSP, PM_{10} and $PM_{2.5}$) is <0.1% of total PM emissions

3 GENERAL

3.1 Description

There are various steps in the production of asphaltic concrete. Selecting and handling the raw material is the first step in which the raw aggregates are crushed and screened at the quarries to obtain the required size distributions. The coarse aggregate usually consists of crushed stone and gravel, but waste materials, such as slag from steel mills or crushed glass, can also be used as raw material (U.S. EPA, 1973).

Plants produce finished asphaltic concrete through either batch or continuous aggregate operations. In either operation the aggregate is transported first to a gas- or oil-fired rotary dryer and then to a set of vibrating screens.

In the final operation, the aggregate and the asphalt are brought together and mixed in a batch or a special mixer.

3.2 Definitions

3.3 Controls

Rotary dryer, hot aggregate elevators, vibrating screens, as well as various hoppers, mixers and transfer points are the major sources of particulate emissions in the asphaltic concrete plants. Most of these emissions are fugitive, however, the rotary dryer is often considered as a separate source for emission control.

Various types of control installations have been used in asphaltic concrete plants, including mechanical collectors, scrubbers, and fabric filters. In some cases dual dust collection systems are used with primary and secondary collectors in order to improve the collection efficiency.

4 SIMPLER METHODOLOGY

The application of general emission factors with appropriate activity statistics can be regarded as a simple approach methodology for estimation of particulate matter emissions from the dryer exhaust from the asphaltic concrete production (See Table 8.1).

5 DETAILED METHODOLOGY

In this case, different emission factors for various production steps in the asphaltic concrete plants should be used, particularly for the rotary dryer. An account of the effect of emission controls should be considered. The different emission factors will have to be evaluated through measurements at representative sites. See Table 8.2 for particulate matter emission factors.

Should a key source analysis indicate this to be a major source of particulate matter (TSP, PM_{10} or $PM_{2.5}$) then installation level data should be collected using a protocol such as that illustrated in the Measurement Protocol Annex.

6 RELEVANT ACTIVITY STATISTICS

Information on the production of asphaltic concrete is largely missing in the international statistical yearbooks. This information should be obtained at a national or a country district level.

7 POINT SOURCE CRITERIA

8 EMISSION FACTORS, QUALITY CODES AND REFERENCES

Table 8.1 Particulate Matter Emission Factors for use with the Simpler Methodology

Activity	Abatement	Emission factor, kg/tonne material produced		
		TPM	PM_{10}	$PM_{2.5}$
Dryer plant	Uncontrolled	16	2.3	1.5
	Venturi/wet scrubber	0.06	0.05	0.03
	Fabric filter	0.013	0.0049	0.0049

There are no emission factors available for $PM_{2.5}$ Factors are estimated based on 'expert judgment' from the USEPA (AP-42) filterable PM or PM_{10} emission factors. The source is <0.1% of the total PM emissions for most countries.

Table 8.2 Particulate Matter Emission Factors for use with the Detailed Methodology

Activity	Abatement	Emission factor, kg/tonne material produced		
		TPM	PM_{10}	$PM_{2.5}$
Dryer plant (batch mix)	Uncontrolled	16	2.3	1.5
	Venturi/wet scrubber	0.06	0.05	0.03
	Fabric filter	0.013	0.0049	0.0049
Dryer plant (drum mix)	Uncontrolled	14	3.2	2.1
	Venturi/wet scrubber	0.013	0.010	0.007
	Fabric filter	0.007	0.0020	0.0013

Very limited information is available on emission factors for asphaltic concrete plants. Old data from the U.S. Environmental Protection Agency indicate (U.S. EPA, 1973) that an uncontrolled emission factor for particulate matter should not exceed 22.5 kg/tonne asphaltic concrete, assuming that at least a precleaner is installed following the rotary dryer.

Various controlled emission factors are listed in the EPA emission factor handbook (U.S. EPA, 1973) for different types of control devices including:

- 850 g particulate matter/ tonne of asphaltic concrete produced for a high-efficiency cyclone,
- 200 g particulate matter/ tonne of asphaltic concrete produced for a spray tower,
- 150 g particulate matter/ tonne of asphaltic concrete produced for a multiple centrifugal scrubber,
- 150 g particulate matter/ tonne of asphaltic concrete produced for a baffle spray tower,
- 20 g particulate matter/ tonne of asphaltic concrete produced for an orifice-type scrubber, and

- 50 g particulate matter/ tonne of asphaltic concrete produced for a baghouse.

It was also suggested that emissions from a properly designed, installed, operated, and maintained collector can be as low as 2.5 to 10 g particulate matter/ tonne of asphaltic concrete produced.

9 SPECIES PROFILES

10 CURRENT UNCERTAINTY ESTIMATES

11 WEAKEST ASPECTS/PRIORITY AREAS FOR IMPROVEMENT IN CURRENT METHODOLOGY

Improvement of emission factors is necessary in order to obtain more accurate emission estimates for asphaltic concrete plants. This improvement should focus on preparing individual emission factors for individual steps in the asphaltic concrete production. In this way, a detailed approach methodology for emission estimates can be applied. Obviously, it will be necessary to obtain relevant statistical data.

12 SPATIAL DISAGGREGATION CRITERIA FOR AREA SOURCES

13 TEMPORAL DISAGGREGATION CRITERIA

14 ADDITIONAL COMMENTS

15 SUPPLEMENTARY DOCUMENTS

U.S. EPA (2004) Compilation of air pollutant emission factors. 5th edition. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. http://www.epa.gov/ttn/chief/ap42/ch11/index.html

16 VERIFICATION PROCEDURES

At present no specific verification procedures are available for estimation of atmospheric emissions from the production of asphaltic concrete. Estimated emission factors could be best verified by measurements at respective plants which are often equipped with different emission control devices.

17 REFERENCES

U.S. EPA (1973) Compilation of air pollutant emission factors. 2nd edition. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC.

U.S. EPA (2004) Compilation of air pollutant emission factors. 5th edition. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. http://www.epa.gov/ttn/chief/ap42/ch11/index.html

18 BIBLIOGRAPHY

19 RELEASE VERSION, DATE AND SOURCE

Version : 1.1

Date : 2 May, 1995

Source : Jozef M. Pacyna
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Updated with particulate matter details by:
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December 2006

20 POINT OF ENQUIRY

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