ANNEX

METHODS OF SAMPLING AND ANALYSES

A.DISCHARGE OF AQUEOUS EFFLUENT

The reference method of analysis to determine total suspended matter (filterable matter from the non precipitated (SIC! non-precipitated) sample) as expressed in mg/l shall be filtering through a 0,45 μm filter membrane, drying at 105 °C and weighing[(1)].

Samples must be taken in such a way as to be representative of the discharge over a 24-hour period.

This determination must be conducted to a precision[(2)] of ± 5 % and an accuracy[(3)] of ± 10 %.

B. SPECIFICATIONS TO BE MET WHEN SELECTING A METHOD FOR MEASURING EMISSIONS INTO THE AIR

I. Gravimetric method

1. The method selected shall be a gravimetric method which is capable of measuring the total quantities of dust emitted through the discharge ducts.

   Account shall be taken of the concentration of asbestos in dust. When concentration measurements are required, the concentration of asbestos in dust shall be measured or evaluated. The controlling authority shall decide on the periodicity of such measure, according to the characteristics of the plant and of its production, but this should be initially at least every six months. If a Member State has established that the concentration does not display any significant variation, the frequency of measurement may be reduced. Where periodical measures are not taken, the limit value specified in Article 4 of the Directive applies to the total dust emissions.

   Sampling shall be conducted before any dilution of the flow to be measured.

2. The sampling must be conducted to a precision of ± 40 % and an accuracy of ± 20 % at the limit value. The limit of detection must be 20 %. At least two measurements under the same conditions shall be made in order to check the compliance with the limit value.

3. *Operation of the installation*

   Measurements shall only be valid if sampling takes place while the installation is operating normally.

4. *Selecting the sampling point*

   Sampling shall take place at a point where there is a laminar flow of air. As far as possible, care shall be taken to avoid turbulence, and obstacles which might disrupt the flow of air.

5. *Modifications required for sampling*

   Suitable apertures shall be made in ducts where sampling is to take place and proper platforms shall be provided.

6. *Measurements to be taken before sampling*

   Before sampling commences, it is first necessary to measure air temperature and pressure and the velocity of flow in the duct. Air temperature and pressure shall

normally be measured along the sampling line at normal flow rates. Under exceptional conditions, it is also necessary to measure the water vapour concentration so that the results can be amended accordingly.

7. *General requirements of the sampling procedure*

The procedure requires a sample of air from a duct carrying the emissions of asbestos dust to be drawn through a filter, and the asbestos content of the dust retained in the filter to be measured.

7.1. The sampling line shall first be checked to ensure that it is airtight and that there are no leaks which might give rise to measurement errors. The sampler head shall be carefully sealed off and the sampler pump started up. The rate of leakage shall not exceed 1 % of the normal sampling flow.

7.2. Normally sampling shall be conducted under isokinetic conditions.

7.3. Duration of sampling shall depend on the type of process being monitored and the sampling line used and the sampling period shall be sufficient to ensure that an adequate quantity of material is collected for weighing. It shall be representative of the full process being monitored.

7.4. When the sampler filter is not in the immediate proximity of the sampler head, it is essential to recover materials deposited in the sampling probe.

7.5. The sampler head and the number of points where samples must be taken shall be determined in accordance with the national standard adopted.

8. *Nature of the sampler filter*

8.1. The filter appropriate to the technique of analysis used shall be chosen. For the gravimetric method, glassfibre filters are preferable.

8.2. A minimum filtration efficiency of 99 % is required, as defined with reference to the DOP test using an aerosol with particles of 0,3 μm diameter

9. *Weighing*

9.1. An appropriate high precision balance shall be used.

9.2. In order to achieve the accuracy required for weighing it is essential to condition filters thoroughly before and after sampling.

10. *Expression of results*

In addition to measurement data, results shall record temperature, pressure and flow data and shall include all relevant information, such as a simple diagram showing the location of sampling points, the dimensions of ducts, the volumes sampled and the method of calculation used to obtain the results. These results shall be expressed at normal temperature (273 K) and pressure (101,3 kPa).

II. Countable fibres method

Where fibre counting procedures are used for the purpose of checking compliance with the limit value in Article 4 of the Directive, subject to the provisions of Article 6 (3) of the Directive, a conversion factor of two fibres/ml to 0,1 mg/m^3 of asbestos dust may be used.

For the purposes of the Directive a fibre is defined as any object of length greater than 5 μm, breadth less than 3 μm, and having a length/breadth ratio greater than 3/1, which is countable

by phase contrast optical microscopy using the European reference method defined in Annex I of Directive 83/477/EEC.

A fibre counting method shall meet the following specifications:

1. The method shall be capable of measuring the concentration of countable fibres in the emitted gases.

   The controlling authority shall decide on the periodicity of such measures, according to the characteristics of the plant and of its production, but this should be at least every six months. Where periodical measures are not taken, the limit value specified in Article 4 applies to the total dust emission.

   Sampling shall be conducted before any dilution of the flow to be measured.

2. *Operation of the installation*

   Measurement shall only be valid if sampling takes place while the installation is operating normally.

3. *Selecting the sampling point*

   Sampling shall take place at a point where there is a laminar flow of air. As far as possible, care shall be taken to avoid turbulence and obstacles which might disrupt the flow of air.

4. *Modifications required for sampling*

   Suitable apertures shall be made in ducts where sampling is to take place, and proper platforms shall be provided.

5. *Measurements to be taken before sampling*

   Before sampling commences, it is first necessary to measure air temperature and pressure, and the velocity of flow in the duct. Air temperature and pressure shall normally be measured along the sampling line at normal flow rates. Under exceptional conditions, it is also necessary to measure the water vapour concentration so that the results can be amended accordingly.

6. *General requirements of the sampling procedure*

   The procedure requires a sample of air from a duct carrying the emissions of asbestos dust to be drawn through a filter, and the countable asbestos fibres in the dust retained on the filter to be measured.

6.1. The sampling line shall first be checked to ensure that it is airtight, and that there are no leaks which might give rise to measurement errors. The sampling head shall be carefully sealed off and the sampling pump started up. The rate of leakage shall not exceed 1 % of the normal sampling flow.

6.2. Sampling of the emitted gases shall be conducted inside the emission duct under isokinetic conditions.

6.3. Duration of sampling shall depend on the type of process being monitored and the size of the sampling nozzle used. The sampling period shall be sufficient to ensure that the sample collection filter carries between 100-600 countable asbestos fibres/mm^2. It shall be representative of the full process being monitored.

6.4. The sampling head and the number of points where samples must be taken shall be determined in accordance with the national standard adopted.

7. *Nature of the sampling collection filter*

7.1. The filter appropriate to the technique of measurement shall be chosen. For the countable fibre method, membrane filters (mixed esters of cellulose or cellulose nitrate) of nominal pore size 5 μm, with printed squares and a diameter of 25 mm shall be used.

7.2. The sample collection filter shall have a minimum filtration efficiency of 99 % with respect to countable asbestos fibres.

8. *Counting of fibres*

The fibre counting method shall conform to the European reference method, as set out in Annex I of Directive 83/477/EEC.

9. *Expression of results*

In addition to measurement data, results shall record temperature, pressure and flow data and shall include all relevant information, such as a simple diagram showing the location of sampling points, the dimensions of ducts, the volumes sampled and the market of calculation used to obtain the results. These results shall be expressed at normal temperature (273 K) and pressure (101,3 kPa).

(**1**) See Annex III to Directive 82/833/EEC (OJ No L 378, 31. 12. 1982, p. 1).

(**2**) These items are defined in Article 2 of Directive 79/869/EEC (OJ No L 271, 29. 10. 1979, p. 44) as amended by Directive 81/855/EEC (OJ No L 319, 7. 11. 1981, p. 16).

(**3**) These items are defined in Article 2 of Directive 79/869/EEC (OJ No L 271, 29. 10. 1979, p. 44) as amended by Directive 81/855/EEC (OJ No L 319, 7. 11. 1981, p. 16).