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Guidance Note EH 32 from the Health and Safety Executive

Control of exposure to talc dust

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Environmental Hygiene Series 32 (July 1982)

These Guidance Notes are published under five subject headings: Medical, Environmental Hygiene, Chemical Safety, Plant and Machinery and General.

INTRODUCTION

1 This Guidance Note draws attention to the possible health risks which could result from industrial exposure to talc dust and advises on precautions which should be taken to protect workers. As with all dusts in the working environment, the concentration of talc dust in air should be kept as low as is reasonably practicable. Para 7 gives guidance on exposure limits.

DESCRIPTION

2 Talc is a mineral which in its pure form is hydrated magnesium silicate. It often naturally occurs with other minerals. These may include magnesite, dolomite, chlorite and quartz. Specialist grades of talc sometimes contain tremolite, anthophyllite*, actinolite and serpentine,* some of which may occur in fibrous form.

3 Generally industrial talc has the appearance of a white or greyish white powder with a crystalline platy structure, the size of the platelets being determined mainly by the degree of milling carried out on the raw material. Finely ground talc is sometimes termed 'French chalk'; soapstone (or steatite) is a coarser form which usually feels greasy to the touch.

SOURCE

4 In 1980 talc consumption in Great Britain was of the order of 60 000 tons. The main sources of supply are Norway, the Shetlands, France, China, Italy, Australia, Spain, India and the USA. Samples of talc examined in Great Britain by HSE have generally been found to be fibre-free but occasionally to contain insignificant quantities of fibre. Free silica content varies from low (less than 1%) up to approximately 5% quartz.

INDUSTRIAL USES

5 The use of talc for industrial purposes in Great Britain falls mainly into the following categories:

(a) in cosmetic products;
(b) as surface dusting material or 'anti-tack' agent in the rubber, roofing felt manufacture, plastics and electric cable making industries, and in specialised foundry sands;
(c) in paint, paper, plastics, ceramic and refractory products;
(d) a free flowing agent or 'anti-caking' medium in the fertiliser and insecticide compounding industries.

EFFECTS OF EXPOSURE

6 Studies amongst workers in the mining and milling industries [1,2,3] have shown that excessive inhalation of talc dust (whether pure, or mixed with other mineral dust) over a period of years can cause respiratory disease. The disease may be non-specific characterised by a persistent cough, sputum and breathlessness, as a result of airway irritation and obstruction. Where substantial quantities of dust enter the lungs, long-term effects including talc pneumoconiosis may occur. In the past the different appearances in the radiograph and clinical presentations reported in medical literature have probably resulted from the range of materials to which people have been exposed varying from substantially pure platy talc to mixtures with a high percentage of fibrous mineral. Although there is insufficient data from the user industries to confirm these health effects it would be prudent to adopt the recommendations of this Guidance Note to restrict exposure.

EXPOSURE LIMITS

7 Guidance on exposure limits is published annually by the Health and Safety Executive[4]. Exposure to talc should not exceed 10 mg/m^3 for total talc dust in air and 1 mg/m^3 for respirable talc dust in air, 8 hour time weighted average (TWA) concentrations and should be further reduced where reasonably practicable†. Inspectors will use these limits when assessing compliance with the Health and Safety at Work etc. Act 1974 and relevant statutory provisions.

*See para 16, when these minerals are present in their fibrous form.

†But see para 16 and Guidance Note EH10[5] should mineralogical examination to talc indicate the presence of asbestos.

ASSESSMENT OF WORK

8 Work involving talc should be assessed to detect sources of dust, to determine the levels of exposure and to identify any necessary improvements to existing controls or the provision of new controls. The work should be re-assessed whenever changes are introduced which may significantly affect exposure.

9 Section 6 of the Health and Safety at Work etc. Act 1974 (HSW Act) requires manufacturers, suppliers etc. to make available adequate information about the results of any relevant tests and about any conditions necessary to ensure that a substance will be safe and without risk to health when properly used. This information could be useful in the selection of the grades of talc to be used and when assessing the nature of exposure resulting from the work.

CONTROL OF EXPOSURE

10 When exposure to talc dust cannot be avoided the introduction of material, plant and process controls will need to be considered. Local exhaust ventilation[6] may be necessary depending on the degree of exposure. Exposure can also be reduced by careful handling and by applying good standards of housekeeping. Spillages should be removed by a dustless cleaning method e.g. vacuum cleaning.

11 In some cases protection in the form of suitable respiratory protective equipment (RPE) may also be necessary. British Standard BS 4275: 1974[7] makes recommendations on the selection, use and maintenance of RPE. Respirators which have been approved under statutory provisions by the Health and Safety Executive are listed in leaflet No F 2486[8].

SAMPLING AND MEASUREMENT

12 Where the information available on the levels of exposure to dust containing talc is not sufficient for the work to be properly assessed or where exposure may be in excess of the limits referred to in para 7, the airborne concentration to which persons are exposed should be measured in order to:

(a) verify whether the 8-hour time-weighted average concentration of dust containing talc in the breathing zone exceeds these limits on a given occasion; and

(b) monitor the effectiveness of material, plant and process controls.

13 The sampling strategy should be determined having regard to the nature of the work and the duration of exposure. The results obtained should be representative of personal exposure averaged over an 8-hour period. The measuring methods used by HSE for sampling total and respirable dust are described in the Appendix.

HEALTH SURVEILLANCE

14 General advice on health surveillance is contained in Guidance Note MS 18[9]. Where there is substantial exposure to talc some reports have demonstrated that there can be long-term health effects. It would therefore be prudent in such cases to extend health surveillance to include the preservation of records of health examinations and environmental sampling for an appropriate period.

STATUTORY REQUIREMENTS

15 No specific regulations have been made under the Factories Act 1961 or the HSW Act to deal with exposure to talc dust, but control is required under Section 2 of the HSW Act and Sections 1, 4 and 63 of the Factories Act.

16 The Asbestos Regulations 1969 may apply where mineralogical examination of talc indicates the presence of asbestos fibres and the mineral is being used at a workplace subject to the Factories Act 1961.

17 The Alkali etc. Works Regulation Act 1906 and Alkali etc. Works Orders 1966 and 1971 relate to emissions from works in which minerals are subjected to any size reduction, grading or heating by processes giving rise to dust. Many talc manufacturing and processing operations come within this definition and must therefore satisfy the 'best practicable means' requirements of the Health and Safety Executive Alkali and Clean Air Inspectorate.

APPENDIX: SAMPLING AND MEASUREMENT

1 The techniques in current use by the Health and Safety Executive for measuring time weighted average concentrations of 'respirable' and 'total' dust containing talc in the breathing zones of persons at work are described below. In both cases, use is made of personal sampling equipment consisting of a filter holder, worn high on the person's chest (e.g. attached to lapel) within 300 mm of his nose-mouth region. The filter holder is connected to a battery operated, portable pump which is attached to a belt worn around the waist and which is capable of running continuously for 8 hours.

Respirable dust sampling

2 The equipment used for respirable dust sampling consists of a cyclone type filter holder fitted with a pre-weighed glass fibre filter (either 25 mm or 37 mm diameter) and connected via a flow smoother to either a vane type pump or a diaphragm type pump. The design of the cyclone type holder and the sampling flow rate are such that only the respirable fraction of the dust, as defined by the Medical Research Council[10,11], reaches the filter.

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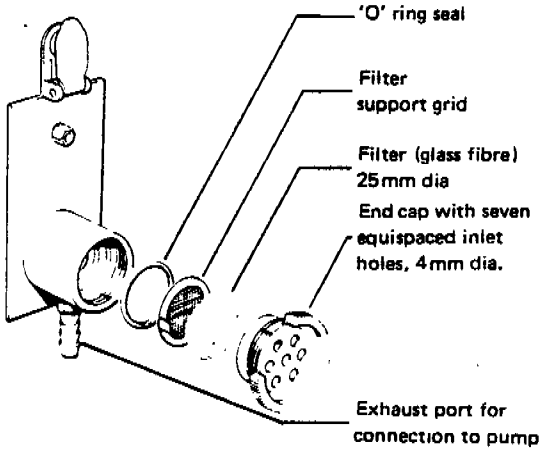
Total dust sampling

3 The equipment used for total dust sampling consists of a multi-orifice filter holder, as illustrated below, fitted with a pre-weighed, 25mm diameter, glass fibre filter. The filter holder is connected via a flow smoother to a vane type or diaphragm type pump. The pump flow rate is maintained at 2·0 litre/min. The filter holder is attached to the wearer in such a way that the orientation of the filter is close to the vertical plane.

Air sample volume

4 For each sample obtained by the use of an unstabilised pump, the flow rate is checked, and adjusted if necessary, against an external flowmeter at the beginning and end of the sampling period and at one-hourly intervals during sampling. The sample volume for each interval is calculated by multiplying the average of the flow rates at the beginning and end of the interval by the interval duration (in minutes). The total sample volume, V, (m^3) is then given by the sum of the volumes for these intervals. Where a stabilised-flow pump is used, the sample volume, V, is given by the flowrate (checked against an external flowmeter) multiplied by the sampling period.



Filter weighing and calculation of TWA concentrations

5 Filters are re-weighed after use, on an electro-balance capable of reading ± 10 μg to obtain the weight, W, (mg) of dust collected (after treatment to allow for humidity effects). The average concentration of dust for the sampling period, in mg/m^3, is then given by dividing weight, W, by volume V.

REFERENCES

1 Gamble, J *et al* (1980) 'Cross Sectional Epidemiologic and Industrial Hygiene Survey of Talc Workers Mining Ore from Montana, Texas and North Carolina' in: proceedings of the National Workshop on substitutes for Asbestos, Arlington Va, July 14-16, 1980. U.S Environmental Protection Agency EPA 560/3-80-001 November 1980.

2 Leophonte P *et al* (1976) 'Les Pneumoconioses Par Le Talc', *Archives Des Maladies Professionnelles,* 37(6): 513-532.

3 Selevan S G *et al* (1979) 'Mortality Patterns among Miners and Millers of Non-Asbestiform Talc: Preliminary Report'. *Journal of Environmental Pathology and Toxicology,* 2: 273-284.

4 Guidance Note EH 15 *Threshold Limit Values.*

5 Guidance Note EH 10 *Asbestos – hygiene standards and measurements of airborne dust concentrations.*

6 'Principles of Local Exhaust Ventilation', Joint Standing Committee on Health, Safety and Welfare in Foundries, First Report of the Sub-Committee on Dust and Fume. HMSO.

7 BS 4275: 1974, *Recommendations for the Selection, Use and Maintenance of Respiratory Protective Equipment.* BSI.

8 F 2486, *Certificate of Approval (Respiratory Protective Equipment).* HMSO.

9 Guidance Note MS 18, *Health surveillance by routine procedures.*

10 Hamilton R J & Walton W H (1961) in 'Inhaled Particles and Vapours' (Ed. C N Davies) pp 465-475 (Pergamon, Oxford).

11 Orenstein A S (Editor) (1960) 'Recommendations adopted by the Pneumoconiosis Conference', Proceedings of the Pneumoconiosis Conference', Johannesburg, 1959 pp 619-621 (Churchill, London).

FURTHER INFORMATION

This Guidance Note is produced by the Health and Safety Executive. Further advice on this or any other publications produced by the Executive is obtainable from Baynards House, 1 Chepstow Place, London W2 4TF, or from Area Offices of the HSE.

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