



Health and Safety Fact Sheet

Mineral wool insulation

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Introduction

This fact sheet provides a definitive update on the safety of mineral wool insulation products, i.e. those products made from glass wool, rock (stone) wool or slag wool, (although there is little, if any, slag wool made in the UK today).

Many tens of millions of pounds have been spent since the 1950s on research into the possible health effects of mineral wool fibres. This independent research was intended to assess whether any possible adverse health effects existed. This research has been reviewed by many national, European and International authorities, including the European Commission in 1997 and IARC, the International Agency for Research on Cancer (part of the WHO) in 2001.

This fact sheet summarises all of the important information and shows why users and building owners can have complete confidence in the use of mineral wool insulation.

What are mineral wools?

Mineral wools are insulation materials that belong to a generic group of materials called man-made mineral fibres (MMMMF), or man-made vitreous (silicate) fibres (MMVF). Manufactured from glass, rock, stone or slag, they are variously referred to as mineral wool, insulation wool, or separately as glass wool, rock wool, stone wool or slag wool.

Despite their various names and different raw material constituents, they each behave in similar ways, and with the exception of some fire protection applications, they can be readily interchanged. In terms of health, all mineral wools are considered identical. They are, however, significantly different from other forms of MMMF, such as refractory ceramic fibres, reinforcement fibres, and very fine glass microfibres. Products made from these other fibres have different properties – particularly dimensions and durability – and different uses.

Where are they used?

Most people associate mineral wool with loft insulation, but it has been also widely used for fire protection and acoustic insulation for the last 50 years. Since mineral wools do not burn, rot, or absorb moisture or odours, they are safe to use in any environment. They can be supplied as lightweight or load-bearing products, plain or decorative with a variety of facings.

The most important applications are in building structures (roofs, walls and floors), pipes and boilers, and air conditioning systems. Many forms of transport including cars, trains and ships make extensive use of mineral wool insulation. Many domestic appliances use these products for energy saving or safety. More recently, mineral wool has found a ready market as a clean inert growing medium for salad crops and for soil conditioning.



Evaluation of possible health effects

The possible health effects associated with any substance are usually evaluated in terms of either the potential hazard or risk they pose to human health.

However, "Hazard" and "Risk" are often used interchangeably and with confusion. Almost everything in life has some element of hazard associated with it, but the risk, which is the quantification of the hazard, is often so small that it is totally ignored.

We are seldom objective in our own approach to hazardous substances or activities, or in our perception of the risk associated with many everyday pastimes.

Mathematical assessments of levels of risk normally provide some useful information for debate but, unlike asbestos, mineral wools are not implicated as a cause of mortality. However, to put the overall situation into some perspective, the following table indicates the lifetime risk from premature death from some popular products and activities. Note: mineral wool does not even rate a mention in this table.

Hazard	Lifetime risk per 100,000
Smoking (all causes)	21,900
Smoking (cancers)	8,800
Driving a car	1,600
Flying (frequent)	730
Moderate alcohol consumption	290
Passive smoking	75
Living in brick buildings	35
Lightning	3
Barbecued steak (1 per week)	3

Table: From B.T. Cummins; IARC Science publication No 90, 1989.



The Lowry Gallery, Salford



Hazard Classifications

A number of slightly different hazard (or risk) classification systems exist around the world. The most relevant to the UK are the EU Directive on Classification and Labelling of Dangerous Substances (67/548/EEC), which is relevant to UK law, and the more recent review of the IARC Monograph and hazard classification for mineral wool.

The European Hazard Classification:

Commission Directive 97/69/EC dated 5th December 1997 sets out the European Union classification and labelling framework for man-made vitreous (silicate) fibres (MMVFs), including those fibres from which mineral wool products are made. In January 1999, this Directive was incorporated into UK national legislation as 'CHIP '98'.

This Directive is an amendment to Directive 67/548/EEC that classifies substances using a broadly similar approach to IARC.

- Category 1** Definitely carcinogenic, e.g. arsenic salts, asbestos.
- Category 2** As if carcinogenic, e.g. urethane (INN).
- Category 3** Possibly carcinogenic, e.g. formaldehyde, diesel fuel.
- "Not classified"** Sometimes referred to as category "0".



The Imperial War Museum North, Manchester

The Directive also provides a system, through Nota Q, for demonstrating that mineral wool fibres can be exonerated from carcinogenicity and thus be free of any such hazard classification.

Under this EU system, the mineral wool fibres used to make Eurisol member companies' products are not classified, since they meet the exoneration criteria reflecting the bio-solubility of the fibre in the human body.

See also "Irritancy".

IARC Classification and Monographs:

IARC's classification may not be currently applicable to EU or UK law, but it does provide the most up-to-date independent and authoritative assessment of the safety of mineral wool.

In October 2001 a panel of international scientific experts reviewed the earlier 1987 IARC Monograph and classification in the light of more recent scientific evidence and understanding of the health effects of various man-made mineral fibres.

They concluded that the classification of mineral wool fibres (to include all glass wool, rock(stone) wool, and slag wool) should be reduced from Group 2B (possibly carcinogenic) to Group 3 (not classifiable as to its carcinogenicity to humans), thus removing mineral wool from IARC's list of suspected carcinogens. (See IARC Monograph Vol 81 2002⁽¹⁾)



¹ IARC Monographs Volume 81 – Man-made vitreous fibres – Published by IARC, Lyon, France, 2002 (ISBN92 832 12819)

This classification applies to fibres from old manufacturing processes as well as new fibres and processes. It supports the decision of the EU Regulators to allow exoneration from carcinogenicity for fibres meeting Nota Q of the EU Directive. It also further confirms the safety of mineral wool.

Irritancy or “Itching”

Some people experience temporary discomfort (or itching) when handling mineral wool. This itching is a mechanical reaction to the coarse fibres and generally abates shortly after exposure has ceased. Irritation of the upper respiratory tract or the eyes is similar to that caused by many forms of dust or foreign bodies. People who experience discomfort, or those with existing skin problems, should wear gloves or other suitable protection. Loose fitting clothing should be worn, avoiding constrictions at wrist and neck. If working with products above head height, eye protection goggles should be worn.

As mentioned previously under EC Directive 97/69/EC, this transient itching effect results in a precautionary classification “Irritating to the skin” (R38), for all mineral wool.



Can mineral wool cause respiratory problems?

The results of intensive studies into human exposure, both in manufacturing and in the user industry, show no link between exposure to mineral wool fibre and an increased risk of non-malignant respiratory disease (e.g. bronchitis).

There is no medical evidence at all that mineral wools cause asthma. However, it is generally accepted that any form of dust can exacerbate an existing condition.

Is there a risk to the public?

In 1987, the Government, after consultation with the DHSS Committee on Carcinogenicity (COC) stated that, in its view; “householders need not be concerned about the presence of MMMF in their lofts, about installing it themselves, or about doing DIY work in lofts insulated with MMME.” This view has not changed.

The view of the International Programme on Chemical Safety, in its Criteria Document No. 77, is; “... the possible risk of lung cancer among the general public is very low, if there is any at all, and should not be a cause for concern if the current low levels of exposure continue.”

Is there a risk for mineral wool workers or installers?

The huge epidemiological studies of 44,000 workers in Europe and the USA conducted over the last 20 years have shown no link between exposure to mineral wool fibres and any form of disease, especially lung cancer.

With workers in the mineral wool industry, fibre levels in lung tissue are usually not measurable, being many hundred or thousand fold less than may be expected with asbestos exposure. Any fibres that are inhaled do not constitute a health risk, since these are readily removed or dissolved by the body’s defence mechanisms.

It has nonetheless been noted by a number of bodies that it is always prudent to minimise exposure to any form of dust in the workplace. The UK has worked within a code of practice since 1986 (HSE Guidance Note EH46) which gives common sense advice to limit exposure to dust.

Is there a problem with loose fibres in the air in buildings?

There are a number of misconceptions about the levels of airborne fibres. Here are some relevant facts:

- Once installed, mineral wools do not release fibres into the air. Measurements taken within insulated buildings have shown that the levels of airborne mineral wool fibres are so low that they are not usually detectable.
- Mineral wool fibres are not usually detected in the lungs of the general population.

The conclusion is that the levels of fibre in the air are not only very low, but even if exposure has occurred, they are not retained in the lung long enough to be hazardous.

Do mineral wools give off toxic gases?

Mineral wools do not contain nor release any toxic gases. They do not contain ozone-depleting substances, nor are these used in their manufacture. Most mineral wools are, however, bonded with a modified phenolic resin that will decompose if heated to above 230°C.

This will result in the release of the usual products of organic decomposition, including carbon monoxide and carbon dioxide, plus some trace gases in very minute quantities which produce a characteristic odour. The concentration of gases does not constitute a health hazard in normal

applications, but during the first heating of appliances and vessels beyond 230°C, it is advisable to ensure adequate ventilation.

Regulations and Guidance

Exposure Controls and Limits:

In the UK, all MMMFs are currently subject to a maximum exposure limit (MEL) of 5 mg/m³ total dust, or 2 fibres/ml (both 8 hour time weighted averages), whichever is reached first. Mineral wools are not classified as a carcinogen.

The general approach to the handling and use of MMMF is currently set out in the Health and Safety Executive Guidance Note EH46 Man Made Mineral Fibres.

Guidance on Exposure Levels: Although EH40 currently specifies dual MELs (both gravimetric and airborne concentration), EH46 indicates that for mineral wool insulation, the gravimetric limit is the most appropriate and will usually be achieved first. Therefore the appropriate MEL for mineral wool is 5 mg/m³ total dust, 8 hour TWA.

In practice, the MEL will seldom be reached in normal applications. It is advised that work in confined spaces, or in dusty locations such as lofts in old houses, may result in exceeding the MEL for total dust. Hence a dust mask should be used. For most applications, one complying with BS EN 149 type FFP1 or FFP2 should be adequate.



Labelling:

Under the terms of CHIP, only loose or blowing wool products, which are considered as “substances”, will need to carry a hazard label for skin irritancy. No other mineral wool products will be labelled in this way.

CDM Regulations:

The Construction (Design and Management) Regulations (CDM) require all those in the construction process - including architects, designers, specifiers and builders - to consider all potential risks associated with the construction, maintenance, occupation and eventual demolition of buildings.

In common with all building materials, the use of mineral wool insulation should be considered within the scope of CDM. Since there is no evidence that mineral wool insulation products cause any adverse health effects to users or to building occupiers, an assessment under CDM would highlight the benefits of using mineral wool products in all appropriate applications.

Collateral Warranties:

Some collateral warranties still include lists of excluded materials and these may refer to mineral wool or MMMF with certain size limits. The reasons for such lists, and the reasons for inclusion of certain materials, have been subjects of considerable debate. The most recent conclusion and recommendations^(2,3), are that



such lists should not be used and that architects and designers use their expertise to select appropriate materials. Materials subject to BS Specifications or BBA approvals are generally considered suitable for the applications concerned.

Mineral wool insulation products are not only free of any suspicion of health risk, they have been adequately assessed for their technical performance in all normal building applications and are generally covered by relevant specifications, so they can be used with confidence. There is no valid reason for their inclusion in lists of “deleterious materials”.

Hazardous Waste Directive

Special Waste Regulations

Although mineral wool fibres are listed as a skin irritant in Annex I of Directive 67/548/EEC and thus potentially possess a property that might render them Special Waste, the UK Environment Agency has reviewed the scientific evidence, and the requirements of the Regulations, and has issued SWEN 060⁽⁴⁾, which clearly states that mineral wool is not Special Waste.

This is because the Regulatory use of the R38 classification in determining whether waste was Special Waste was intended to apply to inflammation caused by chemical irritants. This effect is not observed with mineral wool fibres.

Mineral wool waste from production units and from construction and demolition sites is thus not Special Waste and needs no special treatment.

² BRE Digest 425 - Lists of Excluded Materials, a change in practice

³ Good Practice in the Selection of Construction Materials - Ove Arup and Partners (Sponsored by the British Council for Offices and the British Property Federation.

⁴ SWEN 060 – Special Waste Explanatory Note 060: Man-made mineral fibres: Glass fibres, rock wool, slag wool, but excluding refractory ceramic fibres – Environment Agency



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Further information can be found on the
Eurisol web site, <http://www.eurisol.com>