Mineral Wool
Health, Safety and Environment Information
EURISOL

Introduction

This fact sheet provides health and safety information on mineral wool insulation products made from glass wool and rock (stone) wool.

Mineral wool is produced from naturally occurring inorganic mineral materials, which are found in abundance in the earth's crust (sand, limestone, basalt etc). Mineral wool has been manufactured for over 60 years in the UK and nearly 100 years world wide. Offering a unique combination of thermal, acoustic, fire and environmental characteristics, mineral wool is one of the most widely used insulation products in the construction industry and is found in almost every building in the UK (see later),

In light of general concerns about the effects of inhalation of certain dusts and particles, extensive scientific research has been carried out worldwide by independent experts to assess the safety of mineral wool. Many tens of millions of pounds have been spent since the 1950s on this independent research, which has also been systematically reviewed by many national, European and international authorities; including the UK Health and Safety Executive, the European Commission in 1997, and IARC (the International Agency for Research on Cancer, part of the World Health Organisation) in 2001.

This research, and the UK regulatory framework which is based upon it, confirms the safety of mineral wool.

This document summarises the relevant information and shows why users and building owners can have complete confidence in the use of mineral wool insulation.

Firstly - What are mineral wools?

Mineral wools are insulation materials that belong to a generic group of materials called man-made mineral fibres (MMMF), or man-made vitreous (silicate) fibres (MMVF). Primarily manufactured from glass, rock or stone, they are variously referred to as mineral wool, insulation wool, or separately as glass wool, rock wool, stone wool, etc. In terms of health and safety, rock (stone) and glass mineral wools supplied by Eurisol members are considered identically. 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 mineral wools used?

Many people associate mineral wool with loft insulation, but it has been also widely used for fire protection and acoustic insulation for more than 50 years. Since mineral wools do not burn, rot, or absorb significant moisture or odours, they are safe to use in an unrivalled range of applications. 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 and industrial structures - roofs, walls, floors, pipes, ducts and industrial equipment, ships, oil/gas platforms - - where mineral wool is used to provide thermal and acoustic insulation and to provide fire protection. 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.

One of the greatest benefits of mineral wool is that it provides a simple means for building dwellings and commercial properties to comply with Building Regulations, uniquely combining the essential properties for meeting thermal insulation, fire protection and acoustic protection regulations.

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, the terms "Hazard" and "Risk" are often confused. 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 may be totally ignored.

Also, 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. Despite this, the mineral wool industry has worked to ensure, and to prove to workers, users and building owners, that the risk to human health associated with production and use of mineral wool is, in fact, too low to be measured.

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 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[1] '98' and the Approved Supply List.

This Directive is an amendment to Directive 67/548/EEC that is normally used to classify chemical substances using a broadly similar approach to IARC. For carcinogenicity, the following classifications are used:

Category 1 - Definitely carcinogenic, e.g. arsenic salts, asbestos.
Category 2 - As if carcinogenic, e.g. urethane (INN).
Category 3 - Possibly carcinogenic, e.g. diesel fuel.

Note: Although not an official rating, the term "Not classified" sometimes referred to as category "0" is also used.

The Directive also provides a system of tests, through its Nota Q, for demonstrating that mineral wool fibres can be shown to be free of carcinogenic risk and thus exonerated from 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.

67/548/EEC also provides classifications for other health effects of chemicals including e.g. toxicity and irritancy effects. Although strictly a system for classification of "chemicals", the Directive had been used to assess and classify mineral wool fibres, which, for a while, resulted in some strange anomalies. See "Irritancy" later.

Current UK and European health and safety legislation confirms that Eurisol members mineral wool products are free from suspicion of carcinogenic effects i.e. are not classified as a possible human carcinogen.

IARC Classification and Monographs:

In October 2001 a panel of international scientific experts reviewed the earlier 1987 IARC Monograph 43 and its 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 updating IARC's earlier precautionary classification, which arose as a consequence of insufficient evidence being available at the time of issue.
(See IARC Monograph Vol 81 2002)

[1] CHIP – Chemical Hazard Information and Packaging Regulations.

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, similar to that caused by many other forms of dust or foreign bodies, may also be experienced by some. These mechanical irritant effects are totally different to the "chemical" irritants usually assessed as "dangerous substances" according to the EU Directive 67/548/EEC.

As mentioned previously the EC Dangerous Substances Directive provides classification criteria for irritancy, which initially resulted in a precautionary classification "Irritating to the skin" (R38), being applied to all mineral wool. Recently the scientific experts of the European Commission agreed that the transient mechanical itching effect sometimes observed in the handling and use of mineral wool products was not a chemical irritancy effect as required by the R38 classification.

All mineral wool producers do provide full and suitable guidance on product packaging, and help to users to prevent or minimise any possible itching effect. 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.

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 respiratory disease (e.g. bronchitis). There is no medical evidence at all that mineral wools cause asthma. Although mineral wool does not cause respiratory disease, it is generally accepted that any form of dust can exacerbate an existing condition.

Is there a risk to the public?

No. 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 MMMF." This view has not changed.

Is there a risk for mineral wool workers or installers?

No. 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 which was confirmed with the latest IARC review.

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 other fibres. Any fibres that are inhaled do not constitute a health risk since these are readily removed or dissolved by the body' (bio-soluble).

It has nonetheless been noted by a number of organisations that it is always prudent to minimise exposure to any form of dust in the workplace. Industry has, for many years, provided adequate guidance, supported and approved by UK legislators, which gives common sense advice to limit exposure to general nuisance dust.

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

No. 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 impact indoor air quality?

Mineral wools do not contain ozone-depleting or global warming substances, nor are these used in their manufacture. Releases of substances from mineral Wool Insulation products are considered insignificant, when installed in building applications and therefore do not contribute to reduce the quality of indoor air.
Most mineral wools are, however, bonded with a 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.

On the basis of current scientific knowledge and the European classifications Eurisol members remain confident safety of their products in both manufacture and use.

Regulations and Guidance

Exposure Controls and Limits:
In the UK, all MMMFs are currently subject to a workplace exposure limit (WEL) 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.

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

Wherever the dust exposure level is incapable of being predicted must be assessed under COSHH3 by a competent person.

It is advised that work in confined spaces, or in dusty locations such as lofts in old houses, may result in exceeding the WEL for total dust from a variety of sources. Hence a dust mask should be used. For most applications, one complying with BS EN 149 type FFP1 or FFP2 should be adequate.

CDM Regulations:
The Construction (Design and Management) Regulations (CDM) require all those in the construction process - including architects, designers 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".

Disposal of Waste

The UK Environment Agency, which regulates the classification of waste under the Hazardous

[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

Waste Regulations (Special Waste) has consistently given guidance that mineral wool is not hazardous waste. For some years, due to the apparent contradictory R38 classification, they issued explanatory note SWEN 060[4] but, since then, all SWEN Guidance documents have been withdrawn and the current guidance given in EA Technical Guidance Note WM2[5] categorically excludes mineral wool as hazardous waste either from production operations or from construction and demolition (C&D) waste sites. Also, in assessment of irritant and corrosive properties, WM2 Annex C states "Mechanical irritation produced by some substances, for example mineral wool, is not included within this definition."

One of a series of guides published by Eurisol, the UK mineral wool association. Further information can be found on the Eurisol web site, http://www.eurisol.com

Restrictions of Hazardous Substances Directive 2002/95/EC (RoHS)

Eurisol members produce Mineral Wool Insulation Products which do not contain the substances restricted under the directive above the stated threshold levels and are therefore RoHS compliant.

Conclusions

The information and supporting reports and assessments outlined in this fact sheet clearly show that mineral wool insulation products (glass wool, rock (stone) wool, or slag wool) manufactured in the UK by Eurisol industry members pose no risk to human health, or to the environment, and can be safely used in any applications where their superior and extensive properties can protect building, the environment, and the population as a whole from energy loss, global warming, fire and sound nuisance.

Eurisol UK Mineral Wool Association

e-mail: info@eurisol.com

Website: www.eurisol.com

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
5 Technical Guidance WM2 - Interpretation of the definition and classification of hazardous waste – second edition www.environment-agency.gov.uk