

Key Health Properties: Understanding low bio-persistent fibres impact on health

The key health property of all low bio-persistent Superwool® products, including the latest member of the family, is that any fibres that might be breathed in and reach the lungs are rapidly removed. This characteristic is referred to as low biopersistence. Consequently, fibres do not accumulate in the lung, preventing the occurrence of any significant inflammatory effect that might affect the lungs.

Low biopersistence is achieved by producing the fibres that are a glassy material, which partially corrodes and then fragments when it meets the fluids found in the lungs.

However, does this ensure that these fibres are as safe as they can be?

Can we be sure that the fibre fragments and leached materials do not pose any danger?

Superwool fibres are made only using chemical elements that are themselves generally regarded as safe. Non-fibrous materials with the same chemical composition as Superwool are permitted ingredients in foods, medicines and cosmetics as well as having many uses in industry. In none of these applications has this group of compounds been found to be dangerous. Even fibrous calcium silicate is not regarded as carcinogenic by the World Health Organisation and is exonerated under the extremely rigorous German regulations and in the entire EU.

We are all exposed to considerable amounts of dust from environmental as well as industrial sources.

A lot of this dust resembles Superwool fibres in that, among other components, it contains a great deal of silicates and calcium.

If fine enough to reach the lungs, this dust is removed by cells known as macrophages - the “dust carts” of the lungs.

These cells with their dust content are eliminated through the lymphatic system or swept up the airways, swallowed and the dust voided via the gut. Superwool fibres, which are initially too long to be carried away by the macrophages, are partially corroded and break into short pieces which are then cleared in a similar manner to dust particles. Chalk is a good example of dust, which contain the same elements as Superwool fibres that are found naturally in the body. These also partially corrode, and their components are eliminated via the natural lung clearance system. These calcareous dusts do not cause disease unless they are contaminated by other materials.

Of course, the body also needs a regular input, usually from food, of all the major elements making up Superwool. A simple calculation taking into account Superwool fibre workplace levels of fibrous dusts, the amount of air breathed and fibre deposition in the lungs, shows that fibre concentrations in the air would have to be hundreds of times greater than they are to provide inputs which even approach those from food.

It is true that the concentrations and distribution of these elements in the blood, tissue and other “compartments” is very carefully controlled by several complicated mechanisms.

Maintaining this control is essential for good health.

Fact Sheet 10

Key Health Properties

Fact Sheet 10

Could inhaled Superwool® fibres affect these control mechanisms?

This is unlikely as the body can easily handle dusts with similar components. The dissolved elements coming from such dusts are the same as those which dissolve out of Superwool fibres, and no effect of even large exposure to these materials has been detected.

Conclusion

Although low bio-persistent fibres, such as Superwool, are designed to corrode and fragment after being inhaled, the chemical elements released into the body are the same as those commonly found in nuisance dusts or in food.

The quantity released is very small in comparison to these other sources and so the body's normal systems of regulation are easily able to cope.

These considerations have been central in the development of all Superwool products.

Prof. R.C.Brown

Toxicology Services, Stretton, Rutland

To view our Fraunhofer Exoneration Certificates visit our website: www.morganthermalceramics.com

For all enquiries, please contact our specialist sales and marketing offices:

Americas

marketing.tc@morganplc.com

Asia

asiasales@morganplc.com

Europe

marketing.tc@morganplc.com

Thermal Ceramics is a business of Morgan Advanced Materials