

Worth while reading matter about

# KEFA Mould Combating

KEFA Airless. A coating that prevents Mould and Condensation

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## Said about KEFA Airless as compared to smooth coatings, impervious to moisture absorption

*„..... the development of new and more effective technologies must not be rejected simply because they do not conform to our current level of understanding with regard to cleaning and sanitizing procedures. The key to improve safety in food processing is often related to the recognition of the potential for using these new technologies even though they may require significant procedural changes and modifications in the current system of processing.*

Dr James Denton, Texas A&M University and University of Arkansas after having done a series of comparative tests with KEFA Airless and conventional anti-mould paints

## 1. General information on mould and mildew growth

### 1.1. Conditions for mould growth

Five conditions are necessary for the development of mould:

- a. Mould spores. Most species that are found in buildings are spread by airborne spores. These spores appear in such immense numbers, especially during the hot season, so that if other conditions are right, mould growth will be a fact.
- b. Water. Mould and mildew spores need liquid water to start growing. In most cases the dampness is caused by condensation, by leakages or by rising damp from the ground. Once the growth has started, the organism requires less water to develop mycelia and spores. All porous materials such as wood, concrete, insulation etc. absorb moisture from the ambient air. This absorbed moisture is referred to as Water Activity,  $a_w$ , which defines the amount of water that is available to the microorganisms and not bound in soluble substances, (salts, carbohydrates, proteins) or as water of crystallisation.  $a_w$  varies with the Relative Humidity. Or RH, of the air. High RH gradually leads to high  $a_w$  and if the RH drops,  $a_w$  will also drop.  $a_w = 0,8$  corresponds to  $RH = 80\%$ . Spores need  $a_w = 1,0$  to start growing, but most

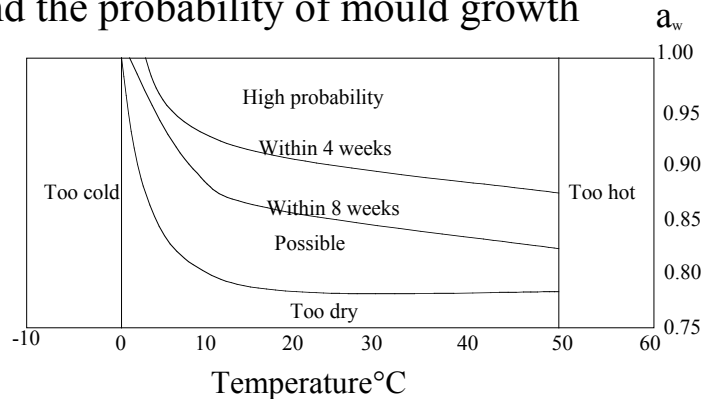
mould species have a minimum requirement of  $a_w = 0,80 - 0,85$  and an optimum  $a_w = 0,90 - 0,98$  to develop mycelia and new spores.

- c. Temperature. The temperature is also an important factor. Most mould species require a minimum temperature of  $0^\circ\text{C}$  and a maximum temperature of  $30 - 45^\circ\text{C}$ . Optimum temperature is  $20 - 30^\circ\text{C}$ . If the temperature is optimal many species can grow at  $a_w = 0.7$ .
- d. Nutrition. Mould requires organic substances to develop. Those substances can be construction material, dust, soot and other kinds of contamination.
- e. Time. When all conditions above are in place, it is only a matter of time before mould starts to develop. Under normal conditions it takes weeks or months before the mould appears – under optimal conditions it will only take days.

## Probability of mould growth



Thermal bridges increase the condensation risk and the probability of mould growth



### 1.2. Consequences of mould growth

Mould and mildew in buildings are not only a cosmetic problem.

In homes and offices mould growth can endanger the health of the inhabitants. Many mould species develop so called myco-toxines, that can lead to severe health problems: Allergy, respiratory illness and others are symptoms of sick building syndrome.

In the food industry, the sanitary problems have been recognized for a long time, but in spite of

elaborate maintenance systems, the battle against mould and other organisms can never be entirely won.

One special problem is caused when condensation droplets form on the ceiling above production lines or in the warehouses. There is a risk that they will drip and contaminate the production items on the line.

### **1.3. Mould combating**

The strategy of mould combating should always be to eliminate one or more of the factors that are necessary for mould growth. The most important factor is water.

The use of chemicals poisons and fungicides should be avoided for several reasons.

- The mould will only be temporarily stopped.
- The fungicides are harmful to the environment and also to people in the premises.
- There is always a risk that the organisms become immune to the chemicals.

Similarly the use of conventional anti-mould paints is only a temporary solution. Anti-mould paints are effective because they contain large quantities of water-soluble fungicides and biocides. These chemicals poison the mould and other organisms that come in contact with the paint surface. The chemicals are gradually released from the paint and consumed and after some time they no longer give any mould protection.

## **2. This is how the KEFA Airless System works**

### **2.1. The basic function is to eliminate the water! Without water there is no life!**

KEFA Airless eliminates or reduces the factors that are necessary for mould growth.

The KEFA Airless coating is a micro-porous matrix that is capable of storing water in the micro-pores during the condensation period and evaporating it back into the atmosphere as soon as the surface temperature is above dew point. The coating is built up of millions of micro-pores of sizes 0.1 – 100  $\mu$ . The micro-pore matrix of a 1 mm thick KEFA Airless coating makes the relative surface 20 000 times larger than the two-dimensional surface. This enlargement speeds up the water evaporation 2 – 3 times in comparison to a flat surface.

During the condensation period, the condensation water is stored inside the micro-pores and there is no liquid water on the KEFA Airless surface allowing spores to start the germinating process.

When the surface temperature rises above the dew point temperature, the condensed water evaporates rapidly, and thus the KEFA Airless coating is practically always dry.

### **2.2 KEFA Airless stays clean**

Due to the micro-pore matrix KEFA Airless is a good thermal insulator. The surface temperature is consequently warmer than the substrate. A warm and dry surface does not attract dust, dirt and other organic material and hence the second requirement for mould growth - nutrition - is reduced.

### **2.3. The KEFA Airless System is environmentally friendly and works forever**

The basic function of KEFA Airless is to prevent mould from starting to grow due to lack of moisture. There are no chemicals involved in this process in sharp contrast to conventional anti-mould paints whose function is to kill the mould by the use of fungicides, bactericides and other chemicals. These chemicals become used up and exhausted after only a few years and lose their killing capability.

The absorption/evaporation process of KEFA Airless is purely physical and hence KEFA Airless retains its combating properties forever.

The manufacturer follows the development on the raw-material market and will always use the most environmentally friendly ingredients that are available.

### **2.4. KEFA Airless is effective against all organisms.**

Not only mould, but algae, moss, lichen and bacteria need water to develop and KEFA Airless therefore acts as a broad-spectrum remedy against organisms.

### **2.4. KEFA Airless is thoroughly tested and proved**

KEFA Airless has been developed in cooperation with leading laboratories and universities in Sweden, Denmark, Germany, USA and UK.

Laboratory tests are valuable and necessary for the product development and maintenance, but real life situations are far too complicated to be duplicated in a laboratory.

Therefore KEFA is continuously running on-going, full-scale tests in different environments in order to improve and develop products and methods.

At present KEFA is running projects in co-operation with IMALabs, Germany and Dansk Teknologisk Institut, Denmark. These can be followed on Internet. If you are interested, please contact us for an on line demonstration