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Mould resistance test according to SP Method 2899

Commission

By order of Ekobord Yeni Nesil Levha ve Duvar Sistemleri A.Ş. a mould resistance testing has been performed on a fiber cement board. The testing was performed according to SP Method 2899 at SP Technical Research Institute of Sweden. The board material tested was labeled as follows:

Ekobord Fiber Cement Boards

Precut specimens arrived at SP shortly before the test start on 21 May 2015. After arrival the materials were stored in normal indoor conditions until the testing started. Seven specimens of the material were tested. In addition to the prepared board specimens, the test was also performed on specimens from two reference materials; a wooden based board with low resistance to mould growth and cement based board previously known to have high resistance to mould growth. These two reference material were supplied by SP.

Material and method

The method used in this test was the accredited SP Method 2899 “Mould resistance test for building materials”, which is an accelerated mould resistance test, based on the British Standard 1982-3:1990 “Fungal resistance of panel products made of or containing materials of organic origin. Methods for determination of resistance to mould or mildew”.

According to the method seven specimens (size 5x10 cm) of each material were sprayed with a spore solution containing conidiospores from six mould species (Table 1). These specially selected mould species have a wide range of humidity requirements, are originally cultures isolated from growth on building materials and purchased from CBS-KNAW Fungal Biodiversity Centre in Utrecht, Netherlands. The spore solution is produced directly prior to the test start. It contains equal amount of each mould species in a final concentration of 1000 000 ± 200 000 spores/ml.

Table 1. Mould species included in the spore solution

Fungi species	CBS Nr
<i>Cladosporium sphaerospermum</i>	122.63
<i>Stachybotrys chartarum</i>	109292
<i>Eurotium herbariorum.</i>	115808
<i>Aspergillus versicolor</i>	117286
<i>Penicillium chrysogenum</i>	401.92
<i>Aureobasidium pullulans</i>	101160

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Directly after the mould spore solution has been produced, all specimens were sprayed with 0,4 ml of the solution on one side and then placed in the incubation chambers. Untreated pieces of glass fiber filters, specimens of wood based material and thin concrete based boards were also sprayed with the spore solution, and used as references.

The material specimens, the untreated wooden based specimens and the cement based reference specimens were incubated in a fungal test cabinet, in this case humidity chambers CTS C-20/350 for normally 28 days. The incubation conditions in the chamber are set to be 95-100 % relative humidity and 22,0 °C.

Sterile gloves and tools were used in the handling of the materials in order to avoid any contamination of the materials. The initial phase of the test (the spraying of mould solution) and the analysis are performed in a microbiological safety cabinet. After the incubation period, the mould growth on the specimens was analyzed visually with a stereo test microscope at x40 magnification in relation to a 6 grade scale. See table 2 below:

Table 2. Grading scale for mould growth (analyzed at x40 magnification)

Classification	Description
0	No surface growth
1	Little, or very scattered growth
2	Slight mould growth, spread over the surface
3	Substantial growth distributed in patches on the surface
4	Substantial growth across the entire surface
5	Very substantial growth across the entire surface

Results

Control of the mould vitality

In parallel to the material test, several control tests were performed. In order to examine if the mould spores were vital a control test was done by placing about 1 ml each of the six separate spore solutions and also the final mixed solution on MEA (malt extract agar). After a few days in room temperature the spores began to grow and were consequently proven to be vital.

Control of the spore solution

The second control test was performed to examine if the spore solution itself contained any organic compound to support growth on the specimens after spraying the solution onto the surfaces. This control consisted in spraying 0,4 ml of the spore solution on a glass fiber filter (without any organic compound). After spraying, the filter was placed together with the specimens in the incubation chamber. No growth developed on this filter during the incubation.

Control of the incubation conditions

A third control test was performed to establish if the incubation chamber were sufficiently humid for mould to grow. This was achieved by dipping a glass fiber filter in nutritious malt extract, spraying it with 0,4 ml of mould spore mixture and then place it in the chamber together with the material specimens. During the testing period mould growth were as expected occurring on this control, classified as 5 according to the grading scale in table 2.

In addition, the incubation conditions in the chamber during the testing period were checked by frequent direct readings of the relative humidity and temperature displays and logging of the data every 12th minute, see Table 3.

Incubation conditions

No disturbances in the incubation chamber were detected during the test. Relative humidity and temperature were logged through the 28 days’ long test and calculated mean values of the conditions were:

Table 3. Incubation chamber conditions during 28 days, logged every 12 min.

Chamber conditions	Mean value	Std
Relative humidity, %	96,0	0,4
Temperature, °C	22,0	0,2

Assessed results

All specimens were inoculated with mould spores on the 21 May 2015 and after incubation in 28 days occurring mould growth detectable in 40x magnification were assessed according to the grading scale in Table 2.

Mould growth within 0 - 0,4 cm along the edges and on the cutting edges were excluded. The results are presented as median values of the seven test specimens. Growth appearing on cuts, edges or markings was excluded in the grading. The results are presented in table 4 below.

Table 4. Median grading of mould growth according to grading scale in table 2, for 7 replicates of the board material and of the reference materials

Material labeling	Median results of mould growth
Ekoboard Fiber Cement board	0
References of cement based board	0
References of wood based board	3

The reference material samples of cement based board (with no organic compound) did not develop any growth during the test period but the wooden based reference material (with organic compound) did develop a range of growth with substantial patchy growth as median assessment on the surface of the seven surfaces.

The results in this report only apply for the tested specimens, after the specified amount of days' exposure at the incubation conditions described. Any nutritious contamination of the materials reduces their resistance to fungal mould growth.

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