

Fire Retardant UK Ltd

HR PROF (Holz Prof) - Wood Fire Protector

STRENGTH AND FIXINGS RESULTS

Nordic House Finland Oy

The effect of fire retardant to the bending strength of wood and fasteners

Customer:

Nordic House Finland Oy

Performer of the test:

Seinäjoki University of Applied Sciences
School of Engineering
Törnäväntie 26
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Test pieces:

The test pieces in the bending strength test of wood were faultless pieces according to the standard SFS-EN 310. 16 test pieces were treated with fire retardant and the other 16 pieces were without treatment.

All pieces were stabilized in the conditions that are specified in the standard.

The fasteners were screws and nails of different materials and coated with different surface agents.

- screw, galvanized steel
- screw, passivated steel
- screw, stainless steel
- screw, zinc phosphate coated steel
- screw, brass
- nail, hot galvanized
- nail, galvanized steel
- nail, copper
- steel nail, passivated

The idea of the test: The idea of the test is to study under laboratory conditions, how the fire retardant HR PROF (Holz Prof) affects the bending strength of wood and how it effects to the different fasteners

Test period: September 2007

Methods and equipment: The test was done according to the method agreed with the customer. The test was done in the Wood Laboratory of Seinäjoki University of Supplied sciences.

The choice of the material to be tested: The test pieces were made in The Wood Laboratory.

The principles of the tests: The test pieces were numbered and each of the 16 pieces were immersed 3 times in the fire retardant. The intermediate time between immersions was 1 hour. After immersion they were air dried and placed in the climate chamber to stabilize. One half of the test pieces of the fasteners were treated with the fire retardant and the other half was untreated. In the test of the fasteners, the screws and nails with different surface coatings, were fastened to the wood sam-ples that were treated with fire retardant, and to the wood samples which were not treated with fire retardant. The materials were stored in stable conditions and between agreed time periods comparative inspections were done to establish if there was possible corrosion or other damage.

The effect to the fasteners: After a test period of one week small changes were noticed on both the nails with zinc plating and on the passivated steel nails. When the area where changes were noticed was rubbed lightly with a hard object the surface once again looked normal. When the area was examined under a microscope small traces could be observed, which proved to be dried fire retardant. The same phenomenon could be noticed in the three weeks test. In all other screws and nails that were tested no changes were observed.



RESEARCH RESULTS

The bending strength:

Untreated wood:

	A (Area)	Bending strength
Nr	mm ²	N/mm ²
1	406.2	77.44
2	407.6	58.53
3	417.8	73.98
4	412.7	75.58
5	416.6	71.86
6	417.2	76.72
7	408.2	70.52
8	416	72.11
9	411.1	64.92
10	407.6	74.65
11	407.2	72.59
12	408.8	70.59
13	406	67.86
14	406	71.54
15	411.7	72.15
16	410.1	76.53

Treated wood:

	A (Area)	Bending strength
Nr	mm ²	N/mm ²
1	414.3	68.97
2	412.7	72.94
3	416.8	61.84
4	411.5	52.38
5	412.9	57.86
6	415.1	68.73
7	414.6	78.94
8	408.6	73.96
9	412.5	59.54
10	415.3	70.08
11	418	69.40
12	412.1	81.77
13	409	66.83
14	411.3	69.08
15	408.2	73.94
16	407.2	74.57

The average value of the bending strength of the untreated wood was 71,7 N/mm² and the average value of the treated wood was 68,8 N/mm². The difference is only 3 N, which is inside the normal range.

So it can be stated that the fire retardant has no effect on the bending strength of the wood.

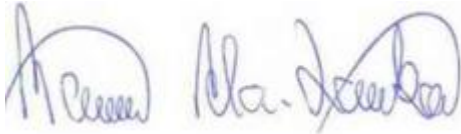
Conclusions: According to the test the fire retardant has no effects on the bending strength of the wood.

The test with fasteners is still partially unfinished, but the results at the moment show that the fire retardant has virtually no corrosive effect on the fasteners.

It could perhaps be useful to do a scientific chemical study of the effects of the fire retardants, especially to the nails and screws with zinc plating and passivated plating, as they are the most common nails and screws used in the construction industry.

As surety for Seinäjoki 27.09.2007

Project engineer



Martti Ala-Louko