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Mccarthy)

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$$\%P = \frac{P_2 - P_1}{P_1} \times 100$$

(P2)

$$F = \frac{3}{2} \cdot \frac{PL}{bh^2}$$

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(°C)

$$\%B = \frac{V_s - V_0}{V_0} \times 100$$

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B

V_s

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$$\%W = \frac{W_2 - W_1}{W_1} \times 100$$

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The Effects of Fire Retardants (Monoammonium Phosphate and Borax, Minalitha, Pyresot) on Iranian Maple Wood (*Acer insigne* Boiss)

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Abstract

In this study, the possibilities of using three different chemical substances as fire retardants for Iranian maple wood (*Acer insigne* Boiss) was reviewed and fire resistance properties as well as mechanical and physical properties of samples impregnated with these chemicals were tested. These results were finally compared with the control samples.

Independent variables and their levels are as follows:

- Fire retardants: 1) mixture of mono ammonium phosphate and borax (MPH+BX), 2) minalith, and 3) pyresot.
- The concentration of fire retardants: 5.8 and 12%.
- The diameter of burner: 2.3 and 5 mm.

Preparation of samples and measurement of fire resistance properties were done according to JISA-1322 and BS 476 Standard, respectively. The percent of weight loss, flame point, duration of flame after removing the burner, time of glowing after taking the burner off, and the percent of carbonization. On mechanical and physical properties, compression parallel to the grain, static bending and the percent of total shrinkage were tested.

Considering the weigh loss, the result shows that samples impregnated with minalith and pyresot had respectively the least and the most weight loss while treatment with MPH+BX mixture had a weight loss close to minalith-treated samples. On other fire resistance properties, it was found that among the three different chemicals, MPH+BX mixture provided the best results.

In all measurements, it was observed that the samples impregnated with MPH+BX mixture had the highest mechanical resistance in comparison with the untreated (control) samples. As expected, treated samples had more total shrinkage in comparison with control samples.

Keywords: Fire retardant chemicals, Maple wood, Fire resistance properties, Physical and mechanical properties.

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