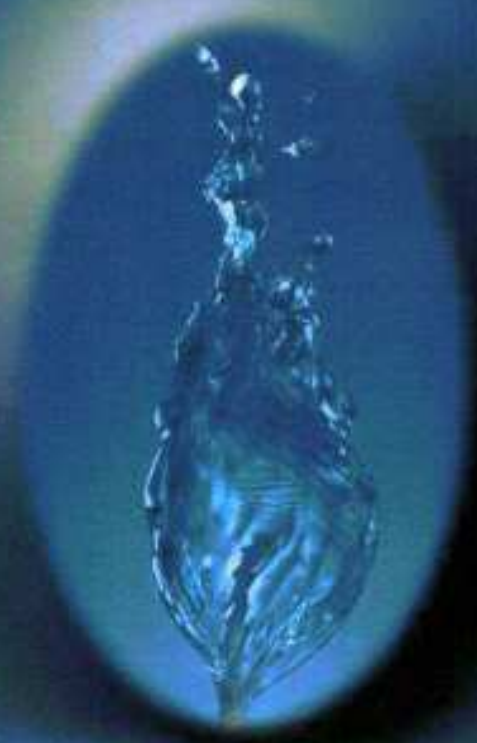




# AYDO™ FLAME SAFE TRIPLE ACTION PROTECTOR

STOP FIRE  
STOP WOOD INSECTS  
PRESERVES WOOD

AYDO UNLIMITED CV





## Observations

During the test, we observed the behaviour of the materials and performance of the **AYDO™ FLAME SAFE TRIPLE ACTION PROTECTOR™** as follow.

### Red northern pine

We observed that after 1 minute in front of the flame, the non-treated sample became grey-white. Charcoal and ashes have been formed. 3 to 4 mm of the wood is transformed in charcoal.

The treated samples (with the concentrated product as well as with the diluted product) became black; Charcoal is formed but no ashes. Only 2-3 mm of the wood is transformed in charcoal. It depended on the dilutions used.



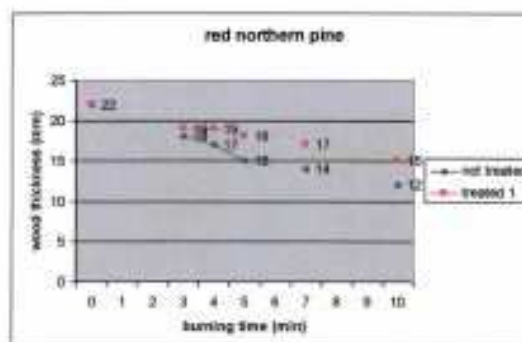
Left: not treated; right: treated (pure and 3 dilutions)

During the second minute (and the following time), we observed that there is a difference between the non-treated and treated sample, in the color of the flame produced on the wood exposed.

At the treated sample the flame in the wood is more orange than yellow and the charcoal forms a black reflecting surface, as if a mirror is reflecting the flame. This gave us an indication that less wood was consumed by the fire.

The thickness of the wood samples was measured from the third minute on.

The Graphic 1 below shows an overview of the results.



Graphic 1



We saw that the wood of the non-treated sample is consumed faster by the flame, resulting in a decreasing thickness of the wood. Originally the samples were 22 mm thick.

After 3 minutes, 18 mm thickness is left on the non-treated wood and 19 mm on the treated one;

After 10 minutes, 12 mm left on the non-treated and 15 mm on the treated.

These values are considering the sample treated with the concentrated product.

Here under we have a good indication that the product protects the wood against damage by fire and heat.



after 4 minutes in the flame  
left: treated; right: not treated

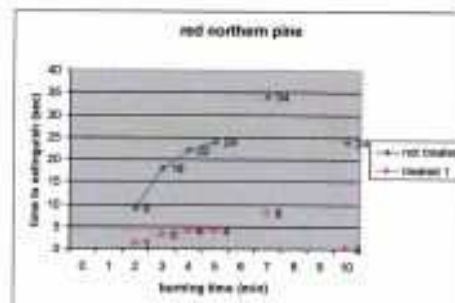


after 10 minutes  
left: not treated; right: treated

After 5 minutes, the non-treated wood started to lose its form and structure, while the treated sample was much more intact and keeping its form until the 10<sup>th</sup> minute. Some ash has been formed, but much less than on the non-treated sample.

Another aspect is the time that the samples remained burning when they were removed from the burner (see graphic 2).

Initially, both samples were extinguished in some seconds after being removed from the burner. But after a longer period of exposure to the flame source, it became clear that the non-treated sample kept burning during 24-34 seconds after being removed from the flame source, while the treated sample stopped burning after 4-8 seconds, and even after the 10<sup>th</sup> minute the treated sample stopped burning immediately as it was retired from the flame. This is good indication that the product is protecting the wood against fire; fire is not expanding and is easier to control.



Graphic 2





### OSB III board

The same tests have been done with the OSB III board. We observed that after 1 minute in the flame, the non-treated sample became grey-white. Charcoal and ashes have been formed. 2-3 mm of the wood were transformed in charcoal; after 3 minutes this charcoal measure 4 mm.

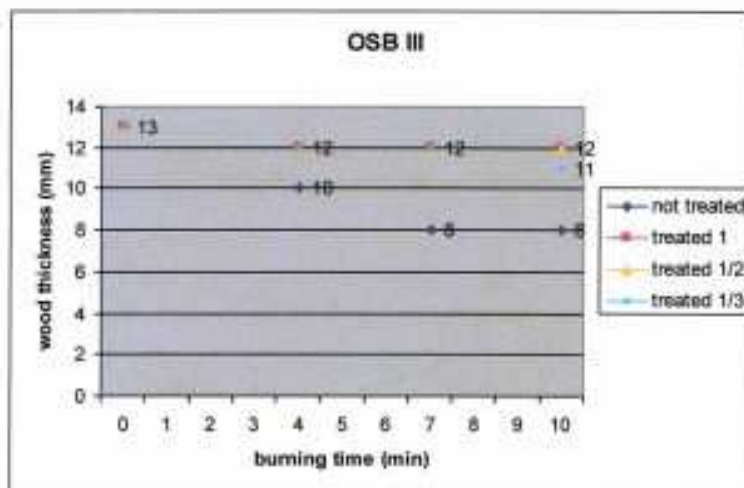
The treated samples (with the concentrated product as well as with the diluted product) became black. Charcoal was formed but no ashes. Also 2-3 mm of the wood was transformed in charcoal after 1 minute; and also 4 mm after 3 minutes.



After 1 minute

Non-treated (left) - treated with concentrated (right)      non-treated (left) - treated with dilution 1/2 (right)

During the second minute (and following time) of the samples exposed to the burner, we observed that there is a difference in colour of the flame on the wood between the non-treated and treated sample. At the treated sample the flame is more orange than yellow and the charcoal forms a black reflecting surface, as if a mirror is reflecting the flame. This gave an indication that less wood is consumed by the fire.



Graphic 3



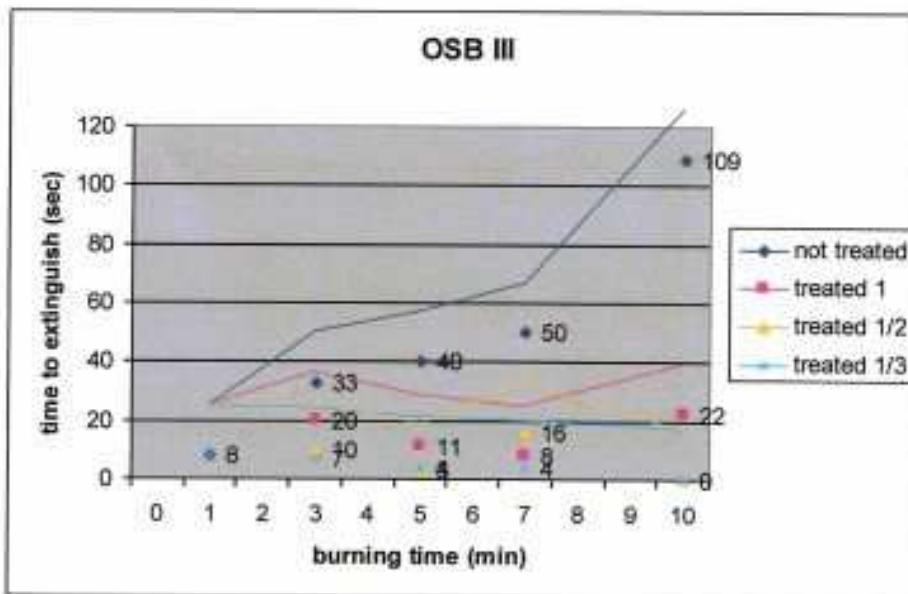
The thickness of the wood samples is measured from the third minute on. Graphic 3 above shows an overview of the results. The original measured thickness in all samples is 13 mm. After 10 minutes, 8 mm are left of the non-treated sample, compared with 11 to 12 mm of the treated samples.

As you can see on the picture below, the structure of the board is much better preserved in the treated sample. The edges are less damaged, less material is burned and less ash is formed.

This is again a good indication that the product protects the OSB against damage by fire and heat.



After 10 minutes  
 Non-treated - treated (concentrated)      non-treated - treated (diluted 1/2)



Graphic 4

http://www.aydocom.com

http://www.adperfectsystems.com



The other aspect is the time the samples remained burning after they were removed from the burner (see graphic 4). Initially, both samples extinguished in some seconds. But after a longer time of exposure to the flame, it became clear that the non-treated sample after being removed from the burner kept burning (33-109 seconds); while the treated sample stopped burning at 4-20 seconds after being removed from the burner, and stopped immediately after in the case of 10<sup>th</sup> minutes of exposure (except for 2 samples – 22 and 11 seconds). This is a good indication that the product is protecting the wood against fire; the fire is not expanding and is easier to control.

An observation for the OSB is that the samples treated with the diluted product generally are extinguishing faster than the sample treated with the concentrated product. But this can also be the result of the heterogeneous characteristics of the OSB board. Based on the previous absorption tests it is also recommended to use the diluted product (1/2) for the OSB.

### Bitumated fibered under roof-board (Celit)



*Non-treated (left) and treated (right) after 1 minute.*

When the sample was held in front of the flame for 1 minute, the material extinguished in a few seconds. This was the same for the untreated sample, for the treated with **AYDO™ FLAME SAFE TAP®**, and for the **AYDO™ FLAME SAFE TAP®** diluted. But under circumstances of wind (regular air-current), all samples except the one treated with concentrated **AYDO™ FLAME SAFE TAP®**, kept glowing and burning from inside, producing heavy smoke.

We cannot exclude that this could be explained by the fact that the sample with **AYDO™ FLAME SAFE TAP®** still had more moisture inside. In a repetition of the test without wind, the burning from inside stopped for all samples.

This material normally does not absorb water. But when dipped in the **AYDO™ FLAME SAFE TAP®** during 20 seconds, it absorbed 438 litre/m<sup>3</sup> of the product (compared with 31 litre/m<sup>3</sup> of water). Note that it would absorb even more product if dipped during a longer time. As the **AYDO™ FLAME SAFE TAP®** interacts with the material and penetrates it, the material tends to swell and it dries very slowly.

### Cardboard

A small test was done with a piece of cardboard that was treated with the **AYDO™ FLAME SAFE TAP®** (dipped during 30 seconds), compared with a piece that was treated only with water. Both pieces were completely dry for the test.

The non-treated sample was burning after 5 seconds in the flame. It was removed from the flame and burned completely.



The treated sample was held in the flame for 10 seconds. The flame extinguished immediately, but it kept glowing for 2 minutes. Only the part that was directly in the flame became black and was superficially damaged.

This is a strong indication that the Flame Safe was acting as a protector that inhibited the cardboard to catch fire.



*Left: not treated cardboard; right: treated with the Flame Safe*





## Conclusions and recommendations

From this test with a hot focused flame we can conclude that the **AYDO™ FLAME SAFE TRIPLE ACTION PROTECTOR®** is offering an excellent fire-protection for the pine wood and the OSB III. The product has the excellent effect that the wood doesn't keep burning and the fire doesn't extend.

After 10 minutes in front of the flame, the treated samples of red northern pine as well as of OSB III suffer much less damage than the non-treated samples. Less material has been consumed, less charcoal and ashes have been formed, and the structure is much more intact. The charcoal that is formed seemed to reflect the flame more than in the non-treated sample.

An other interesting aspect is that the treated samples do not remain burning when removed from the flame source, whereas the non-treated samples do. This effect is even more pronounced in the cases of the OSB.

The results for the wood/OSB treated with the diluted product are similar to the samples treated with the concentrated product, and in some cases even better for the OSB. Therefore a dilution of 33 % (1/2) can be used.

Other materials:

- The protection rate depends strongly on the type of material.
- In the case of bitumated fibered under roof-board (Celit) the **AYDO™ FLAME SAFE TAP®** seems to give an extra protection against fire. But it is also deforming the material (tendency to swell) when it is dipped in the product for more than 10 seconds, since it absorbs big quantities of the product very fast because of the characteristic of the **AYDO™ FLAME SAFE TAP®** to penetrate easily and deep.
- Cardboard is partially protected, the regular Flame Safe inhibits the material to catch fire.

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