Ministry of the Interior, Institute for
Fire- and Civil Defence
Research Centre

1033 Bp. Laktanya u.33

No: 33/37-1993

– Examination of fire retardant material with the trade name: Tree Safe, for decreasing combustion of Christmas-trees, for interior using.

1. Combustion and inflammation examinations of Christmas-trees treated with Tree Safe fire retardant material.

- the examination of the efficiency of primary application of Tree Safe happened on the 25th October 1993, in the premises of Dunamenti Fire Protection Co, Göd.

There have been used for the examinations 2 pc approx. 1,5 -1,7 meter high trees, cutted down in September.

The treatment with the protective agent happened in a few days after cutting down with a bottle supplied with a spray head, intended for commercial make-up, consuming 0,5 liter solution.

The treatment was done by the employees of the Company on the manner descripted in the directions of use, namely the solution would been sprayed on the tree with the spraying head of the bottle in that manner, that the branches should been moistened steadily but not to be forced drops of the fluid.

The storage of the treated and untreated samples occured in a dry, approx. 15 C thermal conditioned hall

Description of the done tests:

A./ We tried to inflammate treated and untreated Christmastrees, with the help of a candle fixed on a branch of the tree, modelled this way one of the supposible cases of combustion. The candles has been positioned on both trees so, that over the candles there was a meeting point of smaller branches of the tree.

The behaviour of the treated tree

There was observable after 15 sec some mild smoking, the branch deviated in the direction of the flame, the small surrounded the flame, but there was no combustion at all

After 9.5 minutes the sample/ branches is aflamed for appr. 5. min. and in spite of present firing source burned itself out /felt down/ wasn't rised self-supporting combustion./ There was not observed falling off brand or/ the branches. The before a1-glowing pine-needle under the tree. No com-/ready heated branch would be bustion after 45 minutes

of the untreated tree

because of the burning candle was sparkling burning to be observed, without flames.

/After 30 sec we observed intensitv smoke-formation, after 110 seconds the burnedup branch is carbonized/ so the candlelight moved off the branches. The before a1-ready heated branch would be adjusted to the flame again, but the combustion of the whole tree doesn't happened

B./We carried out further tests with a candlelight hold under a treebranch until 10 minutes.

In the case of the treated branch there was observed after 2 minutes carbonizing, but after then wasn't formed neither brand nor falling down sprinkling nieces.

In the case of the untreated pine we observed bursting flashes, which have extinguished the flames. Between 2 and 4 minutes there was no flaming but stronger smoke forming , like by the treated tree. After 4 min 44 sec the heated branch flamed up, and after a few seconds the flaming stopped.

It is observable, that as long as by the treated tree after taking away the flame there was no glowing and after further 2 minutes you can touch the carbonized surface, in the case of the untreated tree after taking away the flame there remained glowing branchpieces, and smokeforming.

Remark: the tested trees doesn't become into the growing condition characteristic the Christmas period, their cutting d own happened in the phase of the development. There has been a lot of fresh, juicy sproutson the branches, their drying out is a slower progression. That gives the reason to been unsuccessful the setting into fire of the whole tree.

C./ The lightingtests would been repeated with FB gasflame.

Behaviour Of the

treated tree	untreated tree
The branch came after 15 sec-s into glowing. Restrainedly sprinkling burning. The glowing pieces Doesn't fall down. After 1-minute 30 sec. the stubs are glowing, The pine -needles burnt down in the area of the flame. The whole tree and the branches outside the flame needles. doesn't combusted, The whole period of the burning has been 3 minutes.	Under a 16 sec influence of gaslight flaming, sprinkling burning 42 sec. doesn't extended to other parts of the tree more intensive smoke forming like on, the treated tree, under the tree gathered burned up or carbonized branchpieces and pine-

D./ The last test was setting to the branches cutten down from light the a.m. trees.

This branches has been substantial drier, the pine needles peeled off the branches 0f the untreated tree. The treated branches has been a little bit greener and -the peeling off the needles was smaller.

The lighting was done as well as by the first test with a candle.

BEHAVIOUR OF THE

T r e a ted branch

The flame has been hold on to several points of the branch 3 minutes long. We have obser- ved local combustions, which gone out after taking away the flame

untreated branch

because of the candlelight the branch burst into flames. within 1 minute the whole branch was aflamed. After 2 minutes burned to ashes, glowing branch pieces remained.

By the test "D" was the difference between the treated and untreated sample - appeared from the influence of the protecting material perfectly stringent.

and Qualification

2./ Examination of the efficiency of delaying of fire on the basis of the Lindner method /Hungarian Standard 3607/1-1983/ with "Tree Safe" /Trade-name/ material.

Notwithstanding that the application area of Tree Safe burn delaying material especially the moderation of burning of Christmas-trees is, and for using interior, we have besides the a.m. examinations based on observations performed with the material other tests, prescribed by the Hungarian Standard 9607/1-1983, for firedelaying materials, as follows:

The applications guide referring to the application of Tree Safe doesn't determine numerically the quantity to be conveyed to the surface of the protective material, it gives only an estimated date as: approx. 0,5 liter for a 1,5 m high tree, which quantity is suitable for the required application.

Therefore samples to be tested /100x100x10mm pine plates/ would been sprayed 1 - 2 - 3 times with Tree Safe, make-Up. /The second and the third spraying respectively have been done after drying the former layer/.

The preparation of the sample was done according to the prescriptions of the Hungarian Standard 9607/ with a bottle supplied with a spraying head, intended for commercial

The mass of the pastilles for Burning /hexametilen-tetramin/was 1± 0,05 gr.

Summarizing of the received results shown In the next chart :

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No.	€ contents of protective material		Loss of mass, measured after burning
1.	0,396 g 0,582 g	1,61 g	2,32 g
2.	0,313 g	1,93 g	
3.	0,716 g	1,96 g	
4.	0,787 g	1,92 g	
5.	0,731 g	2,29 g	
6.	1,155g		1,72 g
7.	1,091		1,58 g
8.	0,936		1,84 g
9.			
10.	-		3,10 g

1 - 3. 1 times Treated samples
4 - 6. 2 times treated samples
7 - 9 ; 3times treated samples
10. untreated samples

Knowing the results it can be established, as follows:

- increasing of contents of protective material has as a result the decrease in loss of mass by the sample
- already a simple coating decreases approximately to 2/3 the loss of mass / content of protective agent is approx. 35 g/m^2
- we could with 3 spraying about 100 g/m^2 ± 15% convey up the surface, and the sample sheets treated this way could come close to the 1,5 g highest value, allowed by the Hungarian Standard 9607/1, for loss of mass by wooden materials supplied with surface protection.

Summarized the observations in connection to the examinations for Tree Safe protective material, it is to be determined, t hat a. m. protective material

- slow up the drying out the cuttenout'pines and their pine-needles
- decreases the inflammability against the lighting source
- significantly decreases the forming of smoke and brand by initial fires
- depending on the degree of humidity of the treated pine-trees inhi - bits or slows up the expanding of fire
- after taking away the lighting source In case of appropriate content of protective material the flaming stops.
- the pine-wood will not be incombustible in consequence of influence of the protective material, but it's behaviour against the lighting source will be significantly more advantageous like of the untreated ones.

- examined as a woodprotective material on surface it shows definitely burning delaying effects.
- the observed loss of mass in consequence of burning is proportionate to the quantity of the conveyed protective material.

Regarding the above written data, and on the base the available documentations we recommend the handing out of the agreement of the National Commandment with the stipulation, that the material can not be applied for common wood-protective purposes, as burndelaying material for wood and wood substituting materials with reference to this eXaminations.

Budapest, the 1st November 1993.

The examinations performed and this material assembled by

/Attila Szabo lieutenant of
Firebrigades/

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Amendment to the matter of examination of fire retardant material

With the trade name "Tree Safe", for decreasing combustion of Chrismas trees, for interior using.

1.Examination and qualification of the efficiency of delaying of fire on the basis of the Lindner method /HS9607/1-1983/ with Tree Safe /Trade name/ material

To complete the measuring data given the 33/37-1933 test report We make known following results, concerning the application of Tree Safe as surface protecting material.

The surface of the tested samples /100x100x10 mm pine sheets/ would been sprayed over with Tree Safe /with the help of a bottle supplied with a spraying head, planned for commercial use/ three, four and five times respectively /the next spraying happened after the drying of the sheet before/.

Furthermore the preparing of the samles happened according to the prescriptions of the HS /HungarianStandard/ 9607/1.

The mass of the pastilles for burning /hexamethilen-tetramin/ was 1 ± 0,05 g.

The obtained results are summarized in the next chart:

No.	Contents of protecting material/gramms/	Loss of mass, measured after burning /gramms/
1	0,303	1,94
2.	1,102	1,91
3.	0,990	1,95
4.	0,974	1,66
5.	1,239	1,38
6.	1,312	1,41
7.	1,228	1,51
8.	1,479	1,48
9.	1,309	1,81
10.	-	3,08

1 - 3: 3 times treated samples
4 - 6: 4 times treated samples
7 - 9: 5 times treated samples
10: untreated samples

Knowing the results it can to be established as follows:

- increasing of contents of protective material has as a result the decrease in loss of mass by the sample
- in the case of the samples 5 - 8. we have sprayed over the surface over 120 g/m2 protecting material, and the measured loss of mass of the sample sheets treated this way satisfies the allowed by the MSZ 9607/1 1,5 g max. loss of mass for wood treated with surface protection.

Budapest, the 21st December 1993.

The examination performed and this material assambled by

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