

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 Christ-
mas-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
described in the directions of use, namely the solution would be
sprayed on the tree with the spraying head of the bottle in that manner,
that the branches should be 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 inflamate treated and untreated
Christmastrees,
with the help of a candle fixed on a branch of the tree, mo-
delled this way one of the supposable 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	of the untreated tree
There was observable after 15 sec some	because of the burning candle
mild smoking, the branch deviated in the	was sparkling burning to be
direction of the flame, the small	observed, without flames.
surrounded the flame, but there was no con-	/After 30 sec we observed inten-
bustion at all	sitv smoke-formation, after
9.5 minutes the sample/ branches	After 110 seconds the burnedup branch
is aflamed for appr. 5.min. and in spite of	present firing source burned itself out /felt down/ it was carbonized/
wasn't rised self-supporting combustion./	so the candlelight moved off
There was not observed falling off brand or/ the branches. The before al-	glowing pine-needle under the tree. No com-
bustion after 45 minutes	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.

B e h a v i o u r O f t h e

treated 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.

untreated tree

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 light to the branches cutten down from the a.m. trees.

This branches has been substantial drier, the pine needles peeled off the branches Of 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.

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Treated branch

The flame has been hold on to several points of the branch 3 minutes long. We have observed 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 fire delaying 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 be 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/.

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

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.	E contents of protective material	Loss of mass, measured after burning
	0,396 g	2,32 g
1.	0,582 g	1,61 g
2.	<u>0,313 g</u>	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.	1,155 g	1,72 g
7.	1,091	1,58 g
8.	<u>0,936</u>	1,84 g
9.		
10.	-	3,10 g

- =====
- 1 - 3. 1 times Treated samples
 4 - 6. 2 times treated samples
 7 - 9 3 times 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/m²
- we could with 3 spraying about 100 g/m² ± 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, that 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/

FLAME SAFE CHEMICAL CORPORATION

Ministry of the Interior

Research Institute for Fire-
and Civil Defence

1033 Budapest, Laktanya utca 33

No: 33/37/1/1993

Amendment to the matter of examination of fire retardant material

With the trade name "Tree Safe", for decreasing combustion of
Christmas 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 be
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 samples happened according to the
prescriptions of the HS /Hungarian Standard/ 9607/1.

The mass of the pastilles for burning /hexamethylen-tetramin/ was $1 \pm 0,05$ g.

The obtained results are summarized in the next chart:

No.	€ Contents of protecting material/grams/	Loss of mass, measured after burning /grams/
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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 MS 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

/Attila Szabo lieutenant of firebrigades/

FLAME SAFE CHEMICAL CORPORATION