



HIGH PERFORMANCE WOOD COMPOSITES

PÔLE CONSTRUCTION

Biology Laboratory MYCOLOGY

Translation

Test Report No. PC/66/138/02Z/b/2

Date: 04/07/03

Client: Silvadec
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MYCOLOGY TESTS

**Verification of (STRANDEX) wood-composite material - resistance to
Basidiomycetes fungi**

**Methods adapted from the Norm N34 (CEN/TC38/WG23)
None weathering test, RDA weathering test,
Weathering test in accordance with EN 321**

This document consists of 12 pages of Test reports, of which 6 pages are appendices
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CTBA

SILVADEC

Bordeaux 04/07/03

Test Report No. PC/66/138/02Z/b/2

Mycology Tests adapted from N34 on Wood Composite

Test substance reference:	Wood Composite Material "Strandex" 10 small planks 500*100*15.9mm 138/02Z/2 (Reference CTBA)
Composition of the test substance:	61% wood – 30% High Density Polyethylene – 9% additives (data provided by SILVADEC)
Date test substance received:	23/07/02
Sampling/ test pieces	Test-tubes of wood composite material (50*25*15.9mm) cut up by the CTBA into 10 small planks – with coating on the broad side
Laboratory undertaking the tests:	Mycology Laboratory at the CTBA
Test Method:	Method adapted from the document N34: CEN/TC38/WG 23 (2002)
RDA Weathering Test Weathering method in accordance with EN 321 (January 2002)	Accelerated weathering coils – CTBA Method
Reference Essences:	Sap-Wood of Norwegian Pine Beech
Average density of the test-tubes	Test substance: 1183 kg/m ³ Reference Essence: - Sap-Wood of Norwegian Pine: 544.7 kg/m ³ - Beech: 635.1 kg/m ³
Number of test-tubes:	Wood Composite: 164 test-tubes (48 "control" test-tubes not undertaking a weathering test, 48 test-tubes used for the RDA weathering test and 48 test-tubes used for the EN321 test.) Reference Essence: - Sap-Wood of Norwegian Pine: 24 test-tubes - Beech: 8 test-tubes
Length of seasoning before sterilisation:	4 weeks

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Date of RDA weathering test: (6 weeks)	From 07/10/02 to 25/11/02
Date of EN 321 weathering test (6 weeks)	From 19/08/02 to 30/09/02
Sterilisation by:	Ionising irradiation (Ionisos Company)
Type of fungi used	- <i>Coniophora puteana</i> (BAM Ebw 15), on sap-wood of Norwegian Pine - <i>Gloeophyllum trabeum</i> (BAM Ebw 109), on sap-wood of Norwegian Pine - <i>Poria placenta</i> (FPRL 280), on sap-wood of Norwegian Pine - <i>Coriolus versicolor</i> (CTB 863 A), on Beech
Start Date:	<i>C. puteana</i> : 13/01/03 <i>G. trabeum</i> : 14/01/03 <i>P. placenta</i> : 15/01/03 <i>C. versicolor</i> : 15/01/03
Date of final examination	<i>C. puteana</i> : 05/05/03 <i>G. trabeum</i> : 06/05/03 <i>P. placenta</i> : 07/05/03 <i>C. versicolor</i> : 07/05/03
Length of exposure to fungi:	16 weeks
Loss of mass:	See tables
Exemptions/ variations	None

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Adaptations in relation to the document N34, carried out in agreement with SILVADEC

Given the non existence of a test standard to evaluate the resistance of material such as wood-composites in relation to fungi, it was necessary to adapt the existing test method N34.

The adaptations are as follows:

- Type of Material: wood composite (61% wood – 30% High Density Polyethylene + additives)
- Thickness of test-tubes: 15.9mm instead of 15mm (manufacturing and coating constraint)
- Number of test-tubes for the tests: 12 test-tubes per fungus (instead of 30)
- Number of fungi: 4 fungi instead of 2 (unknown spectrum of resistance)
- RDA Weathering Test (resistance to weathering unknown)
- EN 321 Weathering Test (resistance to weathering unknown)
- Test Validity Criteria: The virulence test-tubes have been used to validate the test in place of the control test tubes. The loss of mass of the virulence test-tubes has been evaluated in the laboratory before carrying out the test, as in this test the control test tubes have a superior thickness to those described in the document N34.
- Results: The Durability Classification of wood composite material is not based on its natural durability but on the resistance of the material in relation to fungus.

Test Validity

Loss of average mass of virulence test-tubes with reference essences:

C. puteana: 38.1% on sap-wood of Norwegian Pine
G. trabeum: 34.1% on sap-wood of Norwegian Pine
P. placenta: 22.8% on sap-wood of Norwegian Pine
C. versicolor: 22.9% on Beech

The loss of mass of the virulence test-tubes exposed to *Gloeophyllum trabeum*, *Poria placenta*, and *Coriolus versicolor* being superior to 20% as required by the document N34 and those exposed to *Coniophora puteana* being superior to 30% as required by the document N34, the test is validated.

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Mycology Tests adapted from N34 on Wood Composite

Test Results:

Durability Classification

Durability Classification	Description	Loss of mass median (%)
1	Very Durable	≤ 5
2	Durable	> 5 to ≤10
3	Moderately Durable	> 10 to ≤ 15
4	Slightly Durable	> 15 to ≤ 30
5	Non Durable	> 30

Summary Table of Results: Resistance / Durability Classification of wood composite test tubes in relation to Basidiomycetes Fungi.

Fungus	Weathering	Loss of mass median (%)	Durability Classification	Description
<i>Coniophora puteana</i>	No Weathering	2.59	1	Very Durable
<i>Gloeophyllum trabeum</i>		2.51		
<i>Poria placenta</i>		2.48		
<i>Coriolus versicolor</i>		2.58		
<i>Coniophora puteana</i>	RDA Weathering	2.67	1	Very Durable
<i>Gloeophyllum trabeum</i>		2.58		
<i>Poria placenta</i>		2.59		
<i>Coriolus versicolor</i>		2.60		
<i>Coniophora puteana</i>	EN 321 Weathering	2.35	1	Very Durable
<i>Gloeophyllum trabeum</i>		2.30		
<i>Poria placenta</i>		2.25		
<i>Coriolus versicolor</i>		2.22		

Table of gross values

Control Test-tubes on reference essence: appendix 1

Test-tubes in test: appendix 2 to 4

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Mycology Tests adapted from N34 on Wood Composite

Advice and Interpretations

Whatever fungus the wood composite material is exposed to, it is extremely durable (values of homogeneous median mass losses lower than 5%).

Moreover aging tests (RDA and EN 321) do not affect the durability of the material with respect to the basidiomycetes fungus.

Finally, this material has a hydrophobic capacity (humidity results in appendices 2, 3 and 4), which limits the development of fungi.

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