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Extended application – Reaction to fire

1 Introduction

This report covers the extended application of test results obtained in accordance with the test methods EN 13823:2020 and EN ISO 11925-2:2020.

The extended application process is carried out according to the Technical Specification CEN/TS 15117:2005 *Guidance on direct and extended application* and position paper NB-CPR/SH02/19/832r2 *Reaction to fire testing and classification of untreated and fire retardant treated wood construction products to EN 13986*.

2 Details of the fire retardant surface coated wood product

2.1 General

The product family “P2a-C-CS”, “P2b-CD-CS”, P2c-CD-SW, “P3a-CE-CS” and “P4a-CF-CS” that is the subject of this extended application is defined as a fire retardant surface coated wood construction product.

2.2 Product description

The products in the family named “P2a-C-CS”, “P2b-CD-CS”, P2c-CD-SW, “P3a-CE-CS” and “P4a-CF-CS” are fully described in the test reports provided in support of classification listed in clause 3.1.

Table 1. Aimed extension to family

Substrates	Substrate Thickness	Substrate Density	Product Colours	Mounting
X	X	X	X	X

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Table 2. Products to be included in the family.

Name	Base coating – type and area weight	Top coating – type and area weight	Substrate type Substrate density and thickness	Mounting
P2a-C-CS	TEKNOSAFE FLAME GUARD 2467-10 250 g/m ² (wet) All colours	None	Solid wood substrate in accordance to EN 13986 or EN 14915 (D-s2,d0 or better) ≥ 433 kg/m ³ , ≥ 18 mm Or	Straight on to or with an unventilated air gap to A1 mineral wool: A1 mineral wool ≥ 20 mm ≥ 38 kg/m ³ Wooden battens: Wood or non-combustible With or without horizontal joints. Vertical or horizontal orientation
P2b-CD-CS		TEKNOSAFE FLAME PROTECT 2468-00 100 g/m ² (wet) All colours		
P3a-CE-CS		UVILUX 651 12 g/m ² (wet)	Solid wood substrate in accordance to EN 13986 or EN 14915 (D-s2,d0 or better) ≥ 338 kg/m ³ , ≥ 8 mm	
P4a-CF-CS		TEKNOCOAT AQUA 1864-62 45 g/m ² (wet)	Straight to a second substrate A1 or A2-s1,d0 ≥ 510 kg/m, ≥ 10 mm Or	
P2c-CD-SW		TEKNOSAFE FLAME PROTECT 2468-00 100 g/m ² (wet) All colours	Straight to a second substrate D-s2,d0 ≥ 510 kg/m ³ , ≥ 10 mm	

3 Test reports and test results in support of this extended application report

3.1 Test reports

Table 3. Reports that form the basis of this extended application.

Name of laboratory	Name of sponsor	Test report reference no	Accredited test methods
RISE	Teknos A/S	O100352-147289	EN 13823:2020
RISE	Teknos A/S	O100352-147289-2	EN 13823:2020 and EN ISO 11925-2:2020
RISE	Teknos A/S	O100352-147289-5	EN 13823:2020
RISE	Teknos A/S	O100352-147289-6	EN 13823:2020
RISE	Teknos A/S	O100352-147289-7	EN 13823:2020
RISE	Teknos A/S	O100352-147289-11	EN 13823:2020
DBI	Teknos A/S	PHB10114A	EXAP report

3.2 Test results

Table 4. Test results in accordance to EN 13823.

Parameter –	Test report references and test results			
Report number	O100352-147289-2	O100352-147289-2	O100352-147289-6	O100352-147289-5
Base coat, type and amount (g/m ²)	TEKNOSAFE FLAME GUARD 2467-10 250 g/m ² (wet)	TEKNOSAFE FLAME GUARD 2467-10 250 g/m ² (wet)	TEKNOSAFE FLAME GUARD 2467-10 250 g/m ² (wet)	TEKNOSAFE FLAME GUARD 2467-10 250 g/m ² (wet)
Top coat (g/m ²)	None	TEKNOSAFE FLAME PROTECT 2468-00” 100 g/m ² (wet)	UVILUX 651 12 g/m ² (wet)	TEKNOCOAT AQUA 1864-62 45 g/m ² (wet)
FIGRA _{0,2MJ} (W/s)	66*	53	51	79
FIGRA _{0,4MJ} (W/s)	66*	53	51	79
LFS < edge	Compliant	Compliant	Compliant	Compliant
THR _{600s} , (MJ)	5.7*	5.6	5.0	5.9
SMOGRA, (m ² /s ²)	3*	0	5	4
TSP _{600s} , (m ²)	41*	41	34	38
Flaming droplets/particles	No	No	No	No

* Average value from 3 tests.

Parameter –	Test report references and test results	
Report number	O100352-147289-11 Vertical mounting	O100352-147289-7 Horizontal mounting
Base coat, type and amount (g/m ²)	TEKNOSAFE FLAME GUARD 2467-10 250 g/m ² (wet)	TEKNOSAFE FLAME GUARD 2467-10 250 g/m ² (wet)
Top coat (g/m ²)	TEKNOSAFE FLAME PROTECT 2468-00” 100 g/m ² (wet)	TEKNOSAFE FLAME PROTECT 2468-00” 100 g/m ² (wet)
<i>FIGRA</i> _{0,2MJ} (W/s)	66	132
<i>FIGRA</i> _{0,4MJ} (W/s)	44	132
<i>LFS</i> < edge	Compliant	Compliant
<i>THR</i> _{600s} , (MJ)	2	4.1
<i>SMOGRA</i> , (m ² /s ²)	4.5	13
<i>TSP</i> _{600s} , (m ²)	42	41
Flaming droplets/particles	No	No

Table 5. Test results of colour analysis accordance to EN 13823, from DBI EXAP report PHB10114A.

Colour	<i>FIGRA</i> _{0,2MJ} [W/s]	<i>THR</i> _{600s} [MJ]	<i>SMOGRA</i> [m ² /s ²]	<i>TSP</i> _{600s} [m ²]
Purple	43	4.2	0	46
Black	25	3.0	0	45
White	40	4.1	1	46
Red	32	3.7	1	47

4 Extended application results

The applications for which this extended application is applicable are described below.

Substrate: type, thickness, density and orientation

According to NB-CPR/SH02/19/832r2 clause 5.2.4 testing of a fire retardant surface coated wood product can be performed based on the rules for substrates according to EN 13238. The results are then applicable to all wood products with densities of at least 75% of the wood product used for the surface treatment at tested or greater thickness.

In addition it is stated that the test shall be combined with testing according to EN 13823 of the thinnest actual wood product, to support the full testing of the standard substrate.

It is also stated that the standard substrate shall have vertical and horizontal butt joints when tested according to EN 13823. Testing in this way covers for vertical or horizontal orientation in end use.

Substrate type and orientation

Since testing is performed on a standard substrate which is in accordance to EN 13986 “*Wood-based panels for use in construction*”, the coating system can be applied to a wood based panel that apply to this standard.

The system is also tested with vertical and horizontal butt joints in EN 13823. Thus the testing covers end use of vertical and horizontal joints as well as horizontal or vertical mounting.

A panel in accordance to EN 14915 was tested with vertical as well as horizontal mounting. The vertical mounted specimen support the classification in accordance to the standard substrate. The horizontal mounted panel does not meet the criteria for B-s1,d0, but C-s1,d0.

Thickness and density

Testing is performed on a plywood standard substrate mounted straight on to a second substrate of particle board. Both substrates are in accordance to EN 13238. Thus the rules for thickness and density in accordance to EN 13238 can be used regarding thickness and density.

Additional coatings

According to NB-CPR/SH02/19/832r2 clause 5.2.8 at least one single test in accordance to EN 13823 shall be performed to add additional coatings to a classification.

Table 4 show that the additional top coat can be added to the fully tested base coat.

Mounting

According to NB-CPR/SH02/19/832r2 clause 5.2.7 tests with an air gap are equally valid for mounting without air gap for the same substrate.

The testing is performed with a non-ventilated air gap to an A1 mineral wool. Thus end use mounting is possible both for a straight on mounting or with an unventilated air gap to the same substrate.

Colour ranges

According to NB-CPR/SH02/19/832r2 clause 5.2.11 a worst case colour should be determined if a range of colours shall be included in the classification. Testing can be performed in accordance to the EGOLF recommendation 003-2013 where white, red and black shall be tested. In addition purple was also tested.

Table 5. Shows the results according to EN 13823 from the DBI PHB10114A EXAP report. The results show that purple can be regarded as the worst case colour. It is also stated that the performance of the colour is independent to which type of fire retardant paint system it is used in.

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