

Bio-based building materials – demands on the reaction to fire performance

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TTÜ1918



1. Use of bio-based building products

In using bio-based building materials three main categories can be distinguished

1. Thermal and/or acoustic insulation
 - hemp, flax, straw, cork ...
2. Supporting structures
 - wood, wood based products (CLT, LVL ...)...
3. Multi functional elements
 - windows profiles, cladding....

1. Use of bio-based building products



<http://www.tachles.ch>, 27.02.2015



<http://www.naturbauhof.de>, 27.02.2015



<http://derstandard.at>, 27.02.2015

1. Use of bio-based building products

CSTB

le futur en construction

DEPARTEMENT SECURITE, STRUCTURES, FEU

Division Ingénierie de la Sécurité



**RAPPORT D'ESSAI N° 26021044
CONCERNANT LE COMPORTEMENT AU FEU
D'UN ELEMENT DE FAÇADE**

1. Use of bio-based building products



Use of bale of straw in prefabricated wall elements
Groupe scolaire du Fort (Issy-les-Moulineaux) – SHON : 5 241 m²
Architectes : Sonia CORTESSE – Bernard DUFOURNET

Source: Gaujard. Olivier (2014): LA CONSTRUCTION PAILLE EN France, Workshop, University of Innsbruck, 13/03/2014

2. European reaction to fire classification

The European classification standard EN 13501-1 ranks building products in 7 classes with regard to their reaction to fire performance:

A1, A2, B, C, D, E and F.

- A1 and A2 represent the two degrees of non-combustibility and limited combustibility
- B-E represent products that may go to flashover in a room and at certain times
- F means that no performance is determined
- Additional classes of smoke production (s1 to s3)
and of flaming droplets/particles (do-d2)

2. Fire behaviour classification system in Europe

Reaction to fire performance for construction products except flooring products

Euro class	Test method	Classification criteria	Contribution to fire	Typical products
A1	EN ISO 1182 and EN ISO 1716	Temperature rise, Mass loss, Gross calorific potential, Duration of flaming	non combustible, no contribution to fire	Stone, Concrete, glass, bricks
A2	EN ISO 1182 or EN ISO 1716 and EN 13832	Temperature rise, Mass loss, Gross calorific potential, Duration of flaming	No flashover, limited combustible, no contribution to fire	Gypsum bards (thin paper), Mineral wool, Fire retardant treated wood wool board
B	EN 13823 and EN ISO 11925-2	FIGRA, Flame spread, Total heat release, Smoke production, Flaming droplets	No flashover before 20 minutes, very limited contribution to fire	Gypsum bards (thick paper), Fire retardant treated wood, Cement particle board
C	EN 13823 and EN ISO 11925-3	FIGRA, Flame spread, Total heat release, Smoke production, Flaming droplets	Flashover after 10 minutes, limited contribution to fire	Phenolic foam,
D	EN 13823 and EN ISO 11925-4	FIGRA, Flame spread, Total heat release, Smoke production, Flaming droplets	Flashover before 10 minutes, acceptable contribution to fire	Wood, wood-based panels
E	EN ISO 11925-2	Flaming droplets	Flashover before 2 minutes	Low density fibreboard, plastic based insulation products
F	No performance determined		-	Products not tested

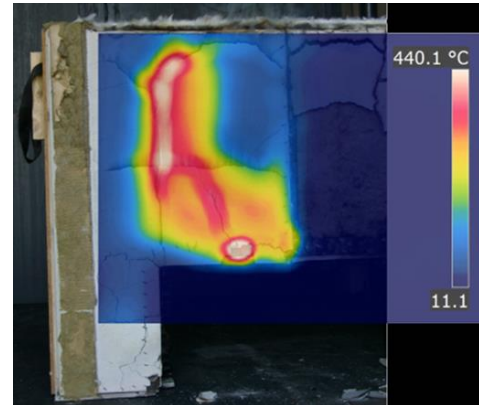


For Flooring products instead of the EN 13823 the EN ISO 9239-1 is used

Source: MFPA Leipzig

3. Objective of COST Action FP 1404 WG1

1. Determination of the reaction to fire performance of bio-based materials and products
 - exchange and collect existing classification of bio-based materials
 - using existing standardized methods for extend the database
 - develop and investigate new methods with more information to generating data which are necessary for simulation tools



3. Objective of COST Action FP 1404 WG1

2. Investigation of interaction of bio-based materials and products with fire

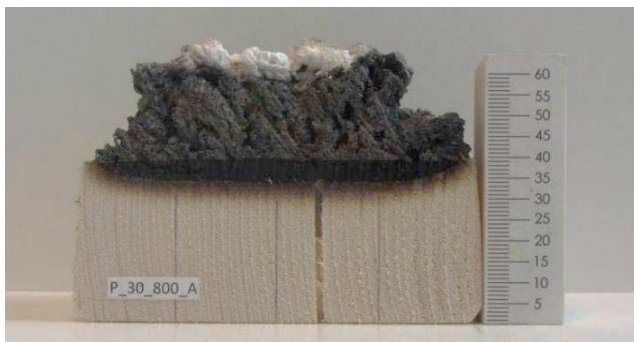
- acquire scientific knowledge to update and develop detailed performance based criteria for fire safety of materials
- investigate the contribution of bio-based materials to fire loads and resulting fire scenarios
- determine the tolerable level of thermal exposure for bio-based building materials (esp. insulations)



2. Objective of COST Action FP 1404 WG1

3. Development of methods and treatments for improving fire performance

- investigate modification methods to decrease the combustibility of bio-based building materials
- examine recycling aspects of fire retardant treated and non-treated materials
- extend the fire safe use of existing and new bio-based materials



COST FP1404

