

# Management Committee Meeting Working Group meeting

Book of abstracts



## Bio-based Building Products and Fire Safe Design of Buildings - Recent Developments

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# Contribution of bio-based building materials to the fire development – WG 1 of Cost Action FP1404

*Contribution to WG1 Contribution of bio-based materials to the fire development*

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Our forests are a naturally renewable resource which has been used as a principal source of bio-energy and building materials for centuries. The growth of world population and affluence has resulted in substantial increases in demand and in consumption for all raw materials. Resulting increases in demand for wood and other bio-based products provide a unique opportunity for developing new generations of renewable, sustainable and efficient bio-based composite materials. Historical fires, particularly in dense urban centres, led to limitations in using combustible materials in building parts. Performance-based design (PBD) is a newer development in fire protection engineering and many building regulations opened the market for bio-based building products since PBD became possible. By knowing the necessary fire behaviour of building materials e.g. ignitability, flame spread and heat release rate, the performance-based design can be used to demonstrate similar fire safety level as by using non-combustible or limited-combustible products. However, only limited information on the fire behaviour or fire performance parameters of bio-based building products are currently applicable for PBD. The WG1 within the COST FP 1404 will help to investigate bio-based materials concerning fire behaviour and extend the knowledge about possibilities how to reach a higher reaction to fire class for bio-based building materials.

## **Use of bio-based materials in buildings**

Although there is no existing official definition, it is generally accepted that bio-based materials are materials issued from potentially renewable resources, i.e. from vegetal or animal origin. There are over a hundred listed bio-based materials for use in buildings. One can cite the following: hemp, flax, cellulose, straw, cotton, cork, coconut, wood, jute, kenaf, grass, sisal or henequen, ramie, bamboo, reeds, sheep wool, etc.

Depending on their usage in buildings, three main categories of products can be distinguished, corresponding to their technological functions:

1. Thermal insulation or/and acoustic insulation
2. Supporting structures
3. Multi-functional construction elements

With regard to the intended application of the bio-based building materials, different requirements on the fire behaviour of building materials have to be fulfilled, which are defined in national regulations and determined by the reaction to fire classification according to EN 13501-1.

### **Objective of COST ACTION FP 1404 WG1**

Main objectives of COST ACTION FP1404 WG1, Contribution of bio-based materials to the fire development, are the following:

1. Determination of the reaction to fire performance of bio-based materials and products.
2. Investigation of interaction of bio-based materials and products with fire.
3. Development of methods and treatments for improving fire performance.

For extending the available data and approaches existing information needs to be reviewed in order to make it applicable to other bio-based materials. Much information on the reaction to fire performance is only available on wood and wooden products, but gaps in knowledge can be closed with additional investigations.

Concerning the interaction of bio-based building materials and products with fire scenarios limited information is available. One main objective is to acquire scientific knowledge in order to develop performance criteria and compare different perspectives to enable an extended and fire-safe use of existing as well as new bio-based materials. Therefore, within the COST ACTION FP1404 suitable methods and standards will be compared and defined in collaboration with the WG2 “Structural Elements of bio-based building elements and detailing” and WG3 “Regulations for fire safety of bio-based building materials”. A database will be generated including the fire performance of BIO-Based Building Products.

Primary focus will be on the investigation of the contribution of bio based materials to the fire load and the resulting fire scenarios. In addition, the tolerable level of thermal exposure to bio-based materials (especially insulations) and structures will be investigated and recommendations elaborated.

Combustibility of bio-based materials is still one of the challenges, which have to be optimized. Modification methods to decrease the combustibility of bio-based building materials will be collected and assessed.

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