



ecological **coating technologies**

Ecological Flame Retardant Systems for Hemp

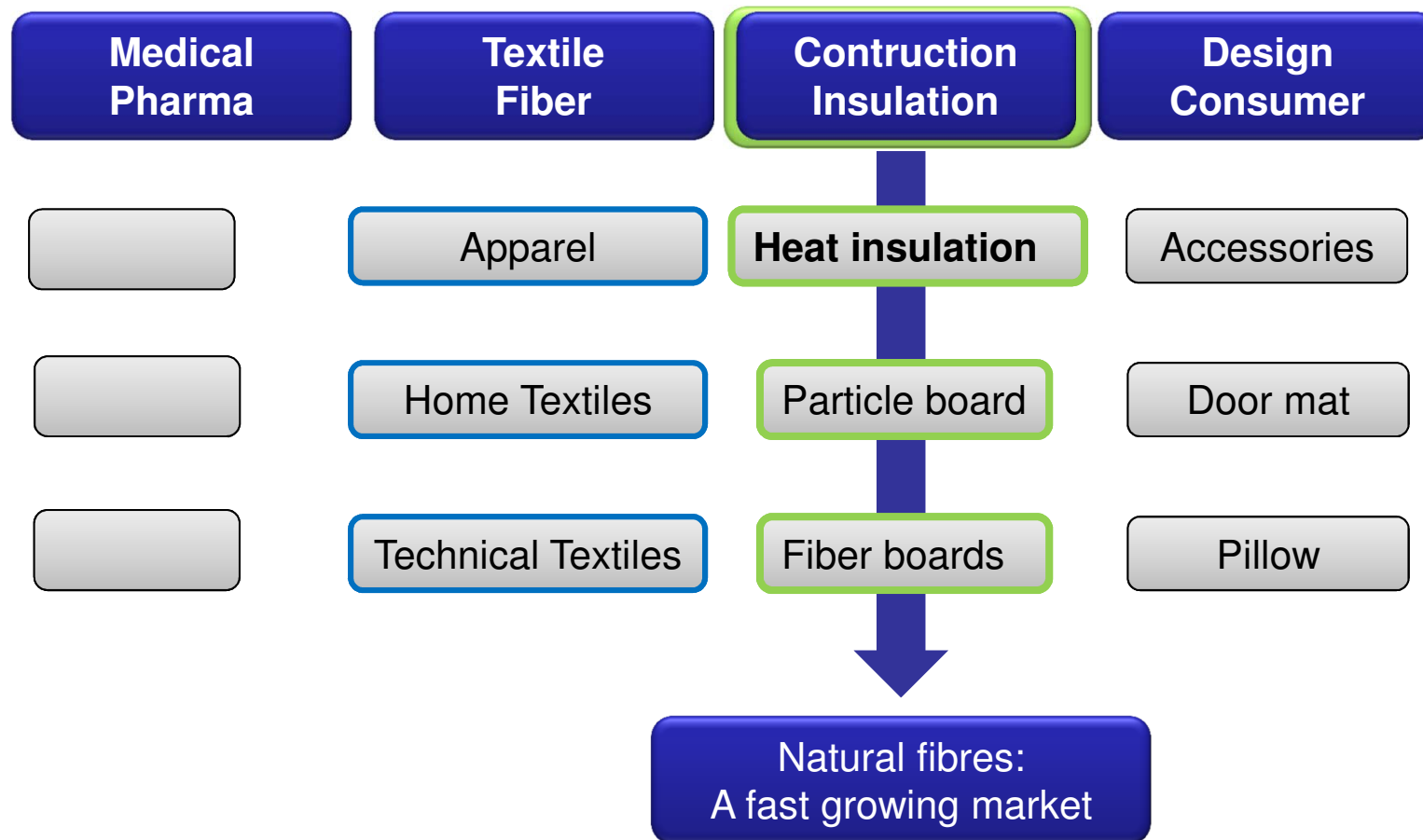
Rule Niederstadt
Managing Director
ecoatech GmbH



- A technology company based in Augsburg/Germany
- Innovative flame retardants and additives
- Products from own research & development activities
- Systems and solutions for manufacturing companies



Hemp: End use Examples



Thermal Insulation Materials

Synthetic Materials

Mineral Fibers

- Inflammable
- Low cost material

EPS - Styrene

- Light weight
- Good insulation properties

Cellulose Materials

Cellulose Fibers

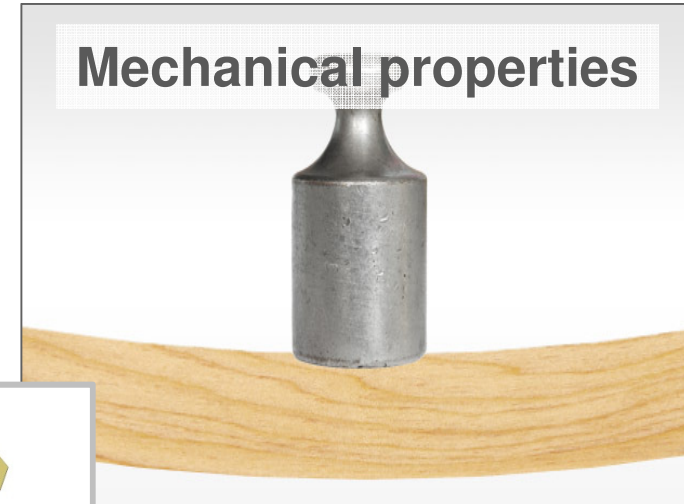
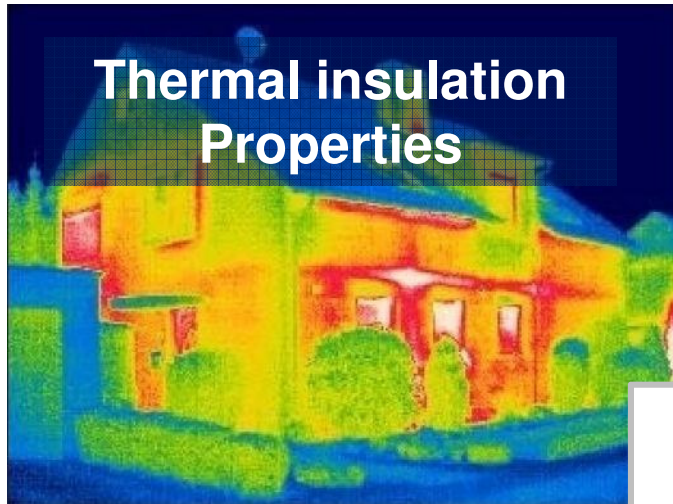
- Ecological footprinting
- Moisture managment

Recycled Paper

- Inject application
- Moisture managment

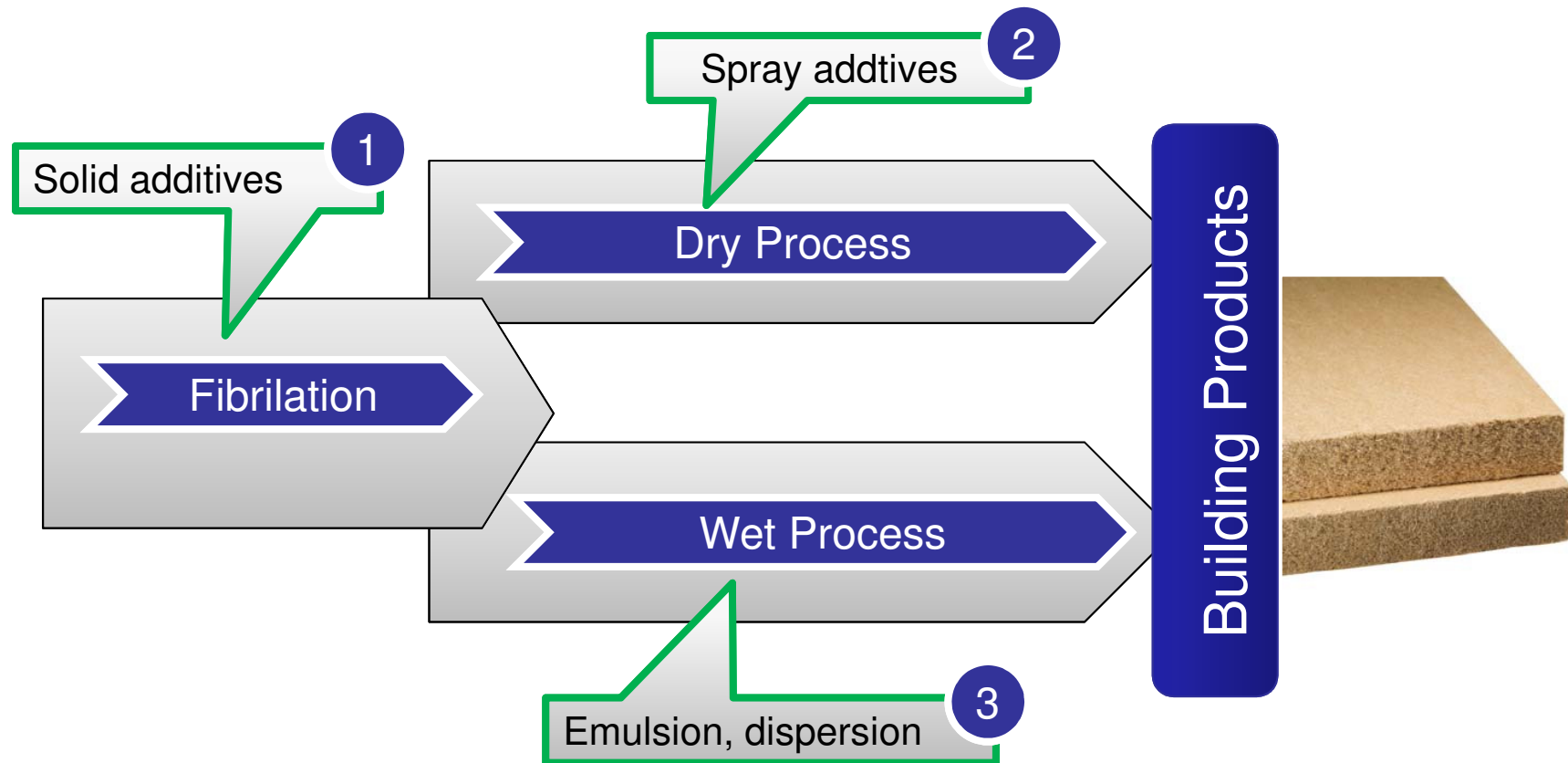
Construction and Building

Cellulose materials for heat insulation



Additives in production process

Wood fibre insulation



Hemp fibres



- Long fibers, entanglements
- Textile character
- Hydrophobic shell
- ➡ **More difficult to incorporate
flame retardant systems**



European fire classes

European classes EN 13501-1

A1	Non combustible
A2	Limited combustible, no fo
B,C	No flashover
D, E	Flashover before,after 10 min
F	Flashover before 2 min

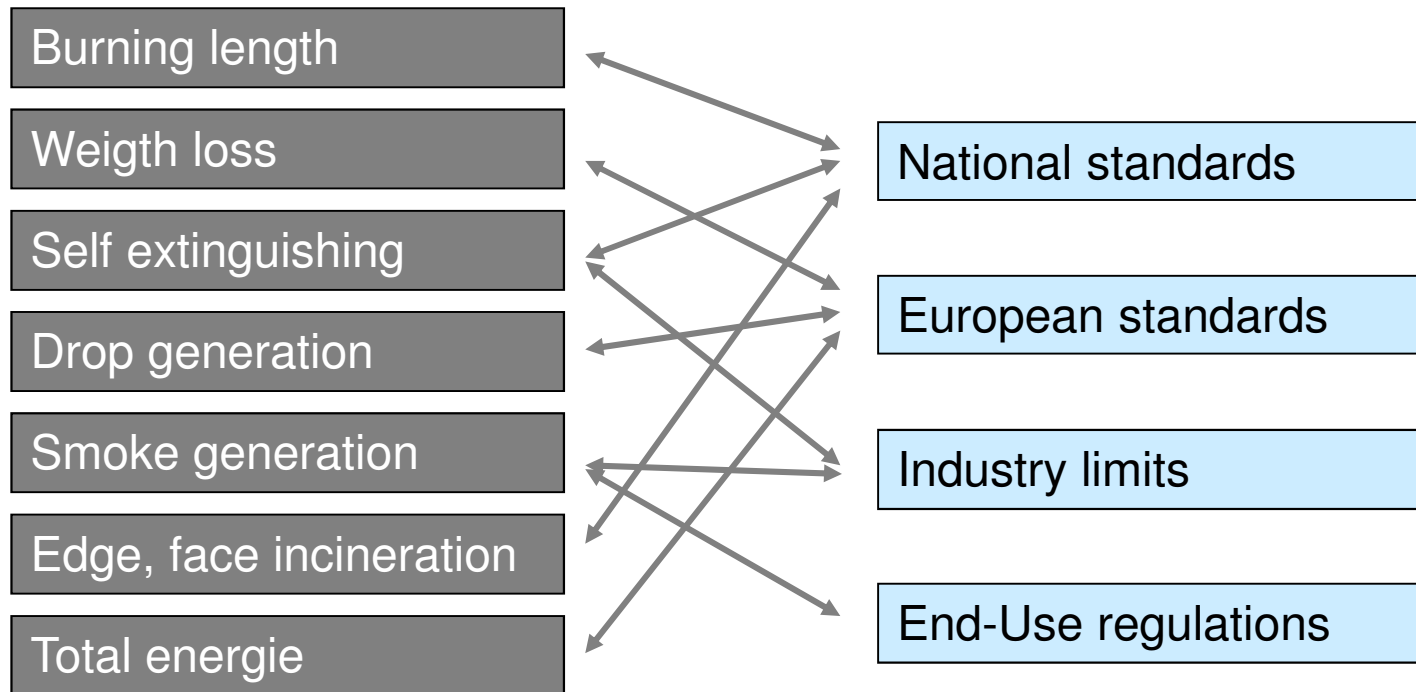
German classes DIN 4102

A1	Inorganic Products
A2	Inorganic Products
B1	Burnable Material
B2	Burnable Material
B3	

EU - Harmonisierung

National and European tests lead to different results !

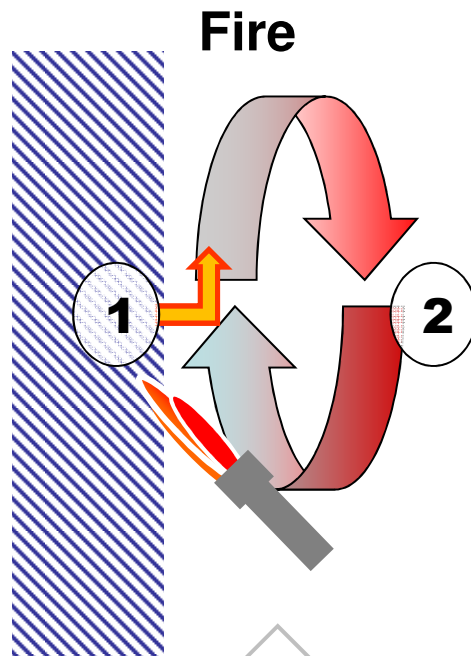
Other test criteria



Flame Retardant system has to be customer specific

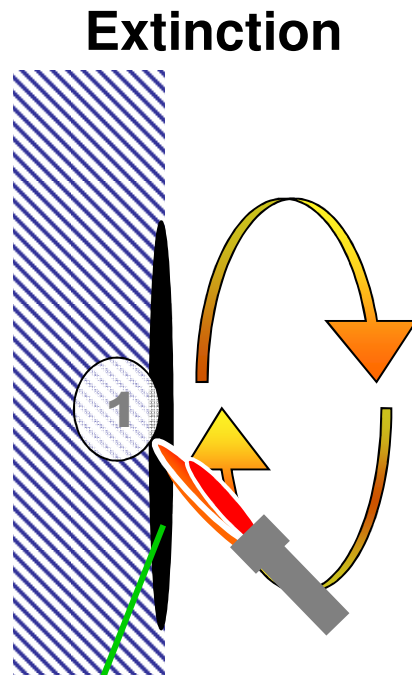
Flame Protection

Open Fire



- 1) Inflammable gases
2) Oxidation of gases

Stopped Fire



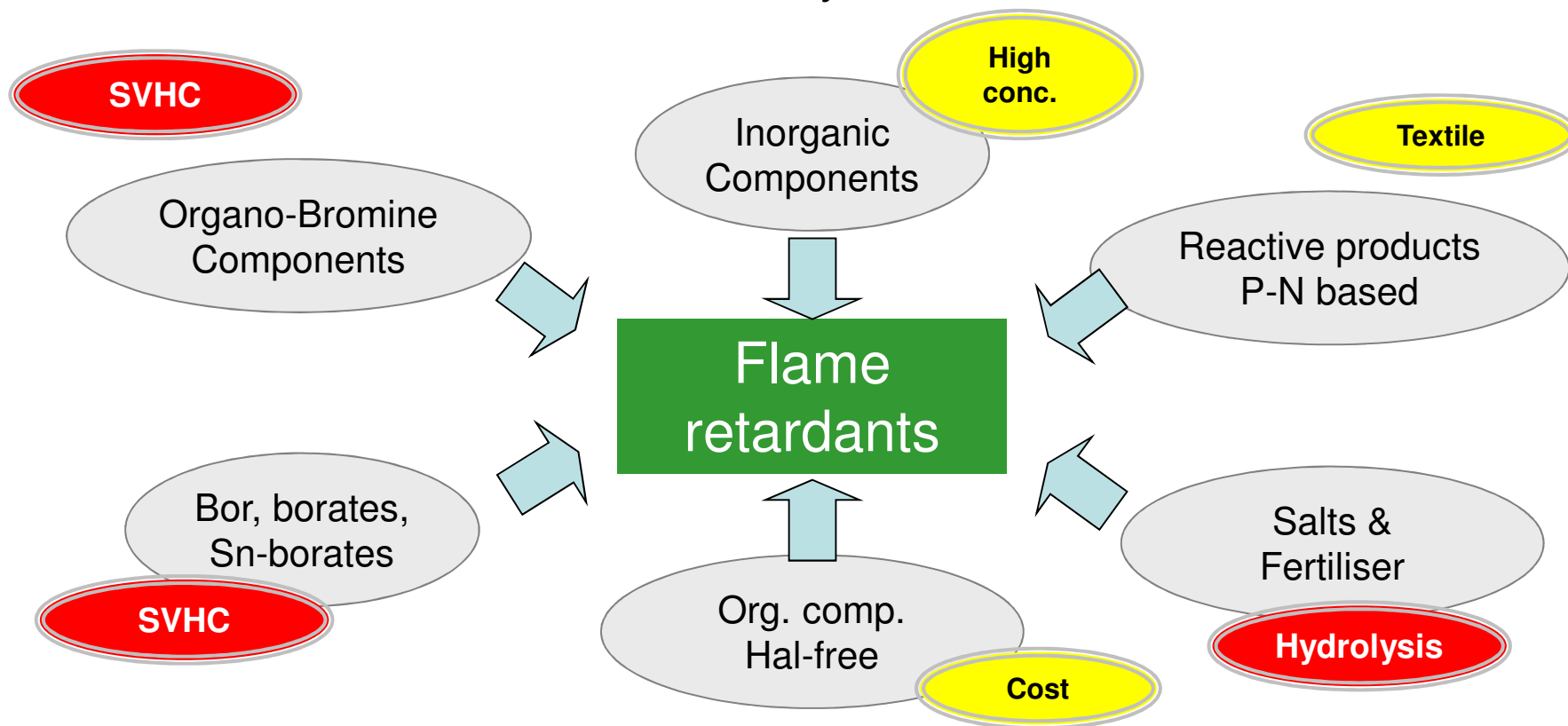
Coal layer

Solid phase extinction

- Open fire
- Char building
- Thermal Insulation
- No gas release
- Protective layer
- Extinction

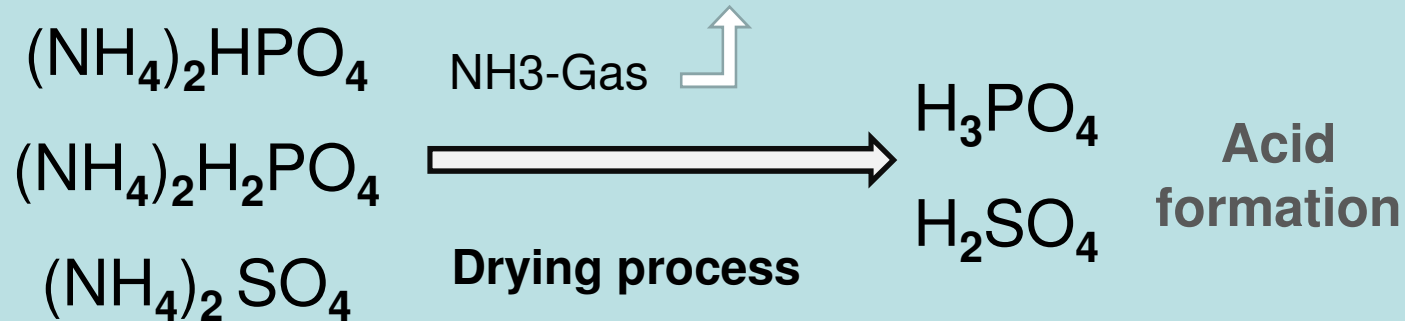
Materials for flame protection

Standard flame retardands commercially used



The evaluation of flame retardants has changed significantly

Hydrolysis problem



Potential issues through Ammonia generation

- Loss of Flame retardant properties
- Generation of Ammonia odor
- Acidic pH, VOC generation



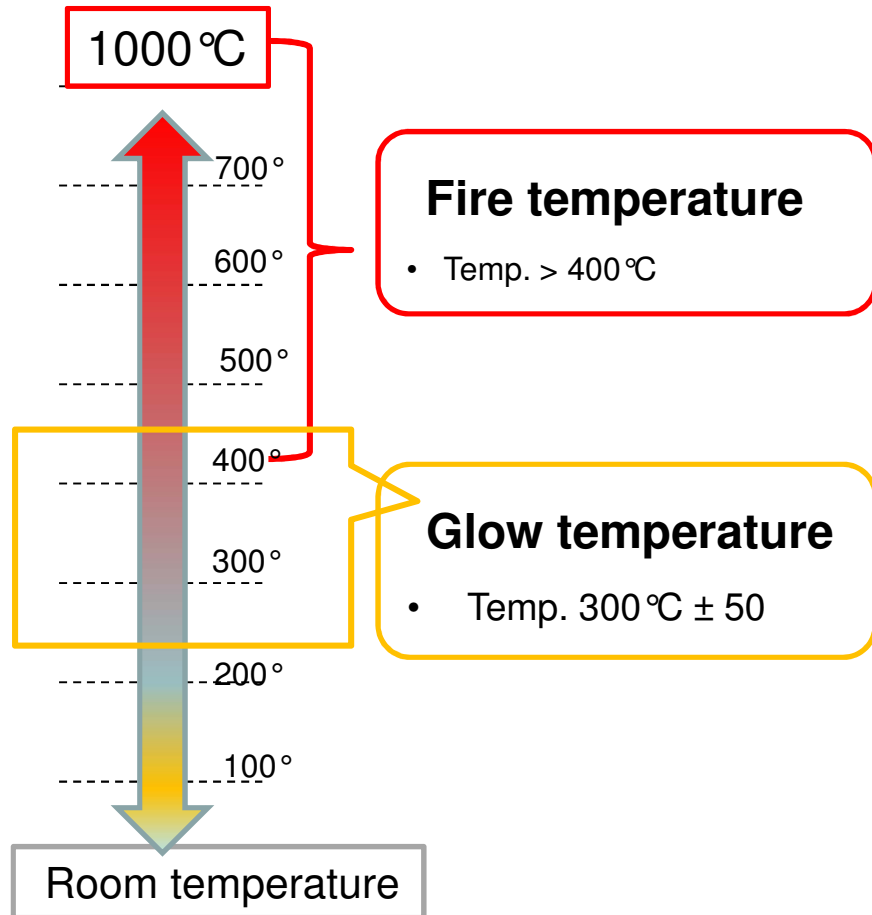
Products (and Projects) of Ecoatech

- Polymeric Flame Retardants
- Hydrolysis Resistant Flame Retardants
- Reactive Flame Retardants
- Concentrated Flame Retardants (e.g. spray)
- Glow-, Flame Protection

Flame and Glow protection

GPS = Glow Protection Substance

- Flame protection can function in different ways
- Glow temperatures are below burning temperatures
- Good flame retardants can be bad glow protect substances
- Ecoatech GPS focus on lower temperatures
- Flame protection product has to be system specific



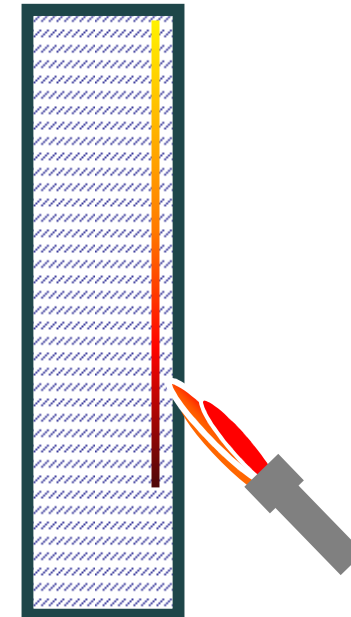
New European directive

In preparation

Building products

„testing procedure to avoid continuous smouldering“

- In Preparation EU 16733
- Glow combustion
- Smoldering of Cellulose
- Modified test conditions
- Specific for insulation boards

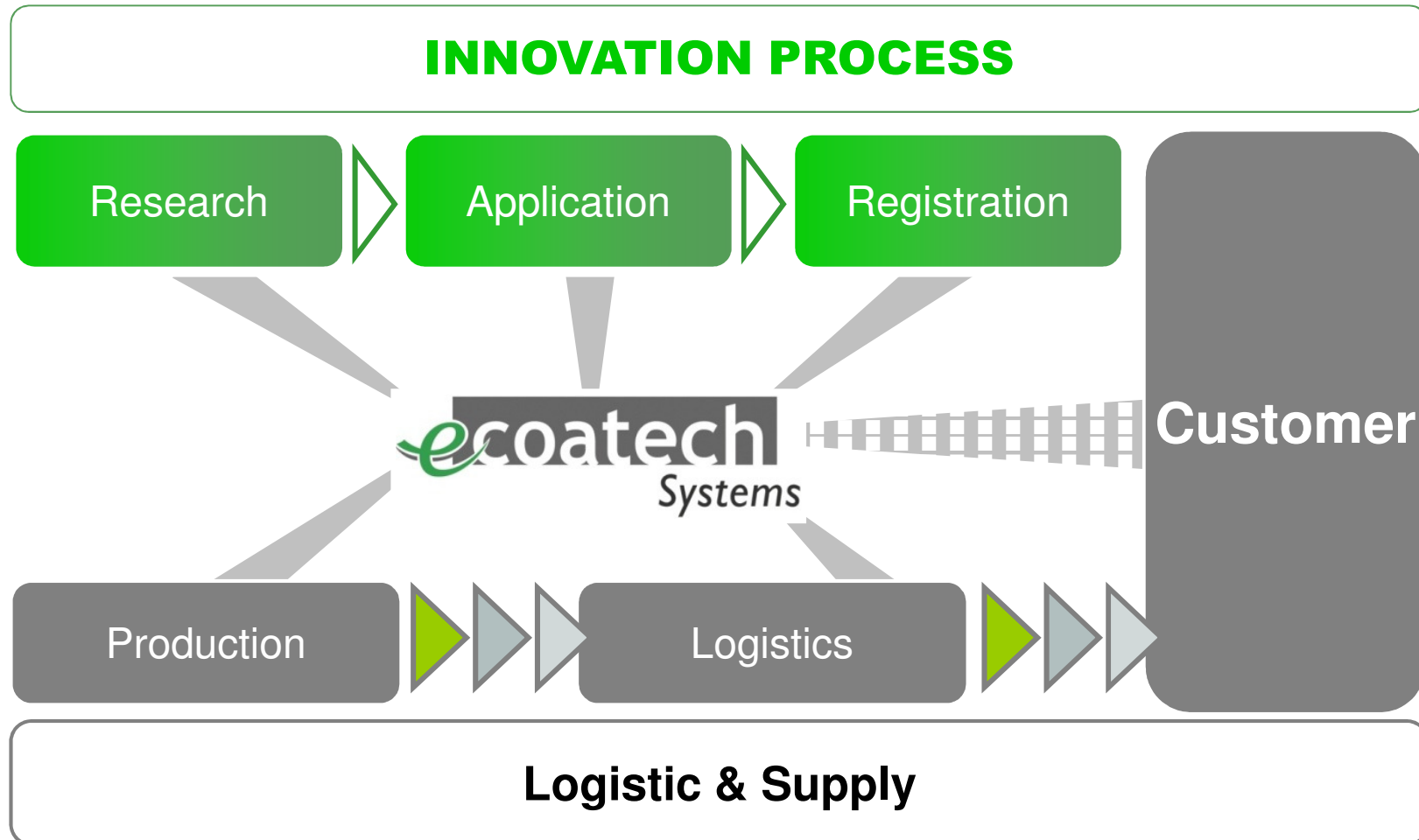


„Glow test“

Specific requirements for flame retardants

- Full compliance with ecological image
- Enable European B, C, D standards (German B1)
- Even distribution of flame retardants on fibers
- Maintenance of good moisture properties
- Can be processed with existing machinery
- Cost performance profile

ecoatech Business Model



Summary

- Growing potential for Hemp as insulation material
- Higher flame protection can be achieved
- Specific solution are required for solid phase
- Customer cooperation possible
- Systems available



Contact



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