



# Protection of continuous (wood board) presses with low-pressure water mist

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IFAB

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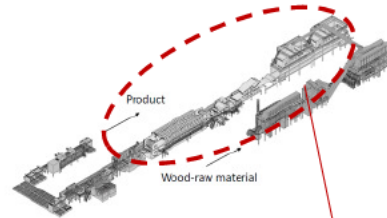
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## Application

- Particle boards are used a lot in many kinds of constructions
- The process is to “glue” and press particles (e.g. wood chip) to boards that are having different material properties in terms of weight, stiffness, strength, hardness, color etc.
- Large production machines (continuous production)



1. Raw material prepared
2. Converted into particles
3. Particles dried
4. Particles classified
5. Blended with a resin and additives
6. Particle/resin/additive blend (“furnish”) is formed into a mattress
7. Hot pressed to compact the particles together and cure the resin
8. Cooled and finished

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## Background

- Continuous presses create special hazards:
  - Hot surfaces
  - Hydraulics
  - Combustible material:
    - Chip size varies from larger to almost dust kind
    - Resin has combustible components
    - Used additives can be combustible (or fire retardant)



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## Project

- Project initiated by (an) earlier fire(s) within wood industry
- IFAB's tasks:
  - development of a fire test protocol (together) with VdS for representative test scenarios in order to test suitably a low-pressure water mist system protection
- Manufacturer of the low-pressure water mist system had previous special knowledge using water mist systems mainly for spark extinguishing systems to prevent dust explosions

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## Main design aspects

- Replicate the possible fire scenarios in the respective machine
- 4 different test structures
- Various fire scenarios (8)
- Fire loads at various positions
- Repetition of (successful) tests
- Free Burning (proof of sufficient fuel amount)
- Acceptance criteria:
  - Extinguishment within 15min
  - All temperatures below 100°C after 3 min of activation
  - Fuel for minimum 15min

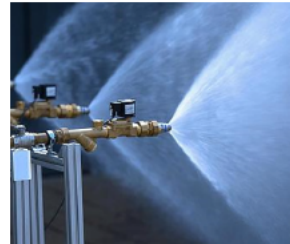


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## Water mist system

- Nozzle lay-out, type and flow rates are the property of the manufacturer
- Operating pressure under 10 bar
- Pure water without additives
- An integrated technology together with special detectors



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## Fire Scenarios

### 1. Drip Tray

- 2000 x 800 x 800mm
- two different distances between nozzle and fire load
- pool:
  - 1,6m<sup>2</sup>
  - 15l heating oil on 60l wood chips
- spraying obstacle



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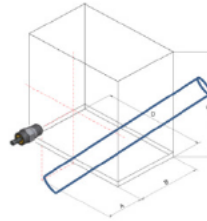
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## Fire Scenarios

### 2. Upper & Lower Heated Tunnel

- 2500 x 2200 x 2000mm
- three-part pool:
  - 4,8m<sup>2</sup>
  - 40l heating oil on 200l wood chips
- spraying obstacle



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## Fire Scenarios

### 3. Press Inlet & Outlet

- 1250 x 2200 x 2000mm
- two different distances between nozzles and fire load
- one pool:
  - 2,4m<sup>2</sup>
  - 20l heating oil on 100l wood chips
- spraying obstacle



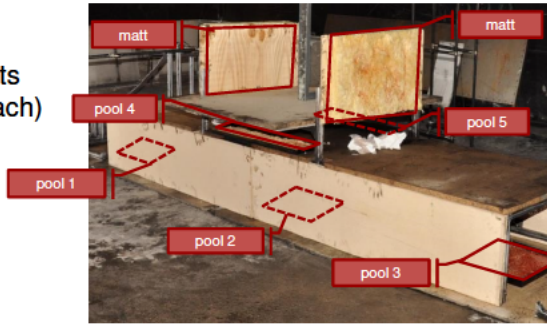
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## Fire Scenarios

4. Middle of the Press

- 4000 x 1000 x 600mm
- different nozzle layouts
- five pools:
  - 2,3m<sup>2</sup> plus
  - two oil soaked matts (vertical, 0,25m<sup>2</sup> each)
- spraying obstacle




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## Measurements

- Temperatures
- System pressures
- Oxygen concentration
- Visual recordings



- Accredited laboratory (processes)
- VdS




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## Testing

- 12 tests (incl. repetition)
- Free burn test



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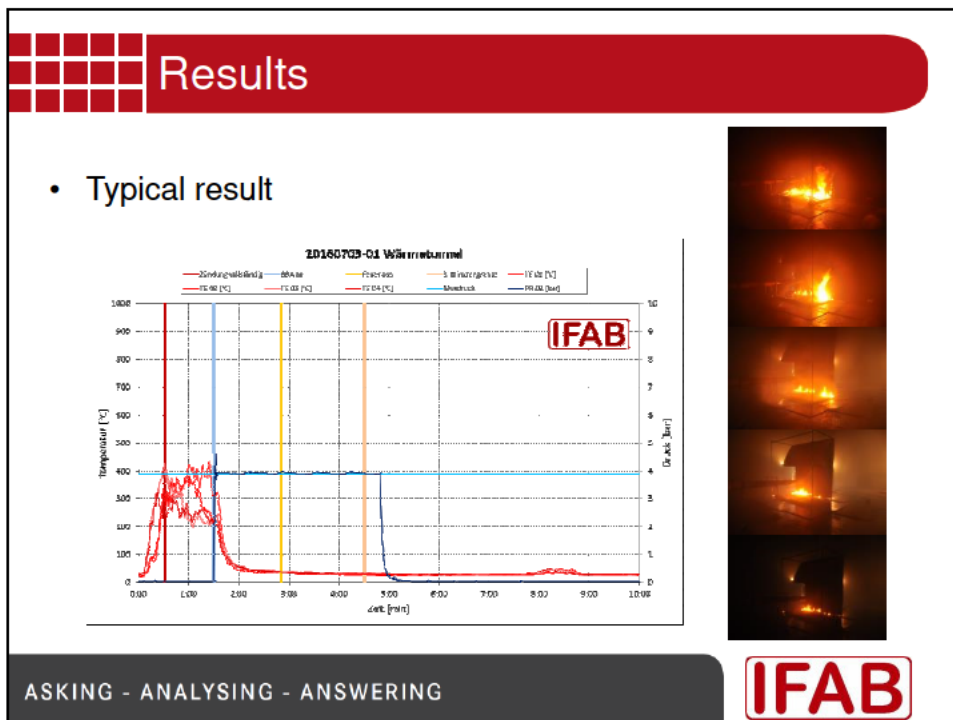
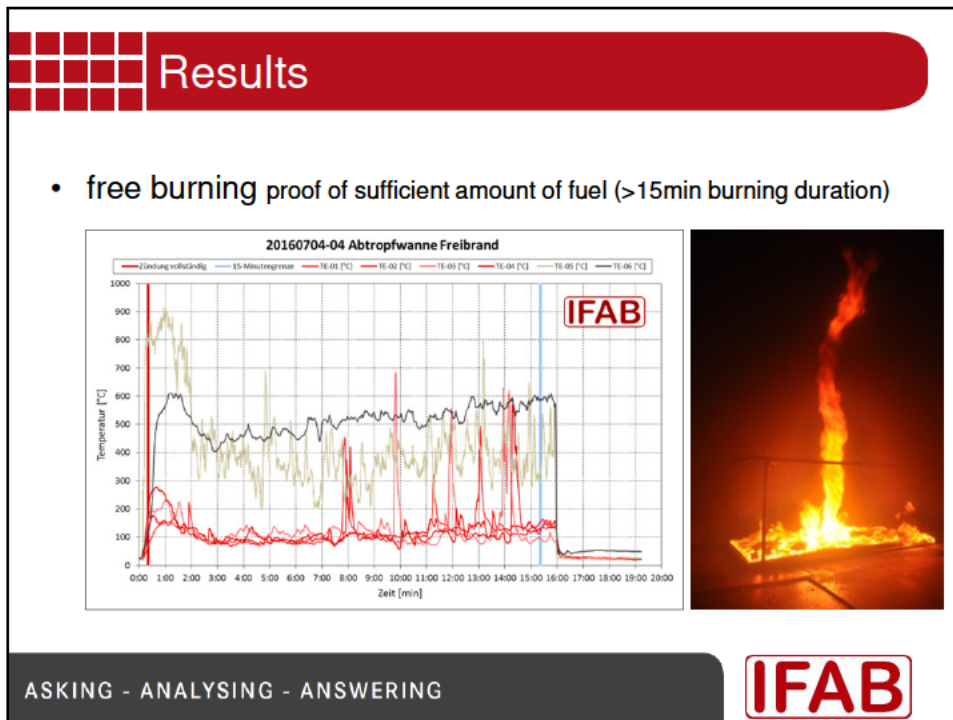
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## Testing




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## Summary

- Continuous presses for particle boards create special hazards in wood industry
- Need to protect wood presses results from earlier fires within wood industry
- IFAB developed a fire test protocol
- Different geometries, fire hazards and potential layouts of water mist systems were considered


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## Summary

- Tests were made in close cooperation with VdS and provider of mist systems, originally applied on spark extinguishment
- Low pressure water mist system was developed that all design fires could be extinguished within 15min
- Temperatures were reduced quickly (<3min) and kept permanently below 100°C
- No re-ignition

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**THANK YOU FOR YOUR ATTENTION !**



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