Test method for fire suppression systems in buses and coaches

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Bus fires – a world-wide increasing issue
Statistical survey of bus fires

- The number of reported bus fires has more than doubled in Sweden since the late 90’s

- A fire incident is reported in 1% of all buses in Sweden every year

- On the basis of statistics we estimate that roughly 10% of all buses are involved in a fire incident during their lifespan

Statistical survey of bus fires

• Report from Germany:
  • 350 - 400 bus fires is reported every year in Germany (0.4 % of all buses)
  
  Source: PUBA (2010)

• Report from Finland:
  • Bus fires has almost doubled in Finland over the last 10 years
  
  Source: VTT (2010)

• Report from USA:
  • An average of six bus or school bus fires reported every day in USA
  
  Source: NFPA (2006)
Fire safety regulations with good results

Average cost per bus fire for insurance companies in Sweden

Source: Swedish Insurance companies, 2012
Fire safety regulations with good results

Number of bus fires with a cost above $150,000
Fire Suppression Technologies

- Almost 20 manufacturers of Fire Suppression systems for vehicles in Europe and USA
- Different technologies to extinguish engine fires.
- For example:
  - Dry Chemical (ABC-powder and BC-powder)
  - Wet Chemical and foam
  - Water mist
  - Aerosol
  - Clean Agent (gaseous system)

Are they all good enough?
How can the systems be validated?
Test methods

- Repeatable test methods are usually very simplistic:

**Source:** UL 1254
Test methods

• New approach: Combine repeatable test methods with realistic fire scenarios
• Identified properties which are important to include in the test:
  1. Complex geometry with many obstructions
  2. High air flow
  3. Multiple fire locations
  4. Different fire scenarios
  5. Hot surfaces with re-ignition potential
## The reference group

<table>
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<th>Suppression system manufacturers</th>
<th>Bus and coach manufacturers</th>
<th>Transport authorities</th>
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<td>Trade associations</td>
<td>Insurance companies</td>
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<td>Bus operators</td>
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</table>

SP Technical Research Institute of Sweden
SP method 4912

Method for testing the performance of fire suppression systems installed in engine compartments of buses and coaches

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Complex geometry with many obstructions
Test apparatus geometry
High air flow
Test apparatus fan
Different fire scenarios
Multiple potential fire locations
Different fire scenarios
Example: high fire load
Thank you!

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