

# **Fire Detection Performance Tests**

# SP Method 5320

“Test method for fire detection systems installed in engine compartments of heavy vehicles”

- 3-year research project is the basis for the method
- The method is used for P-marking (SPCR197)
  - The P-mark is known all over the world as quality mark for vehicle fire suppression systems
- The tests are designed such that a detection system may include different types of sensors (e.g. a combination of heat, flame and smoke sensors)
  - However, test can be retrieved from the method focusing only on heat detection for implementation into UN ECE R. 107

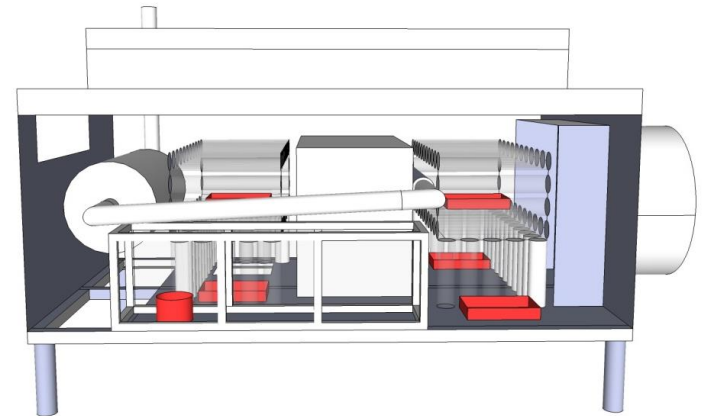
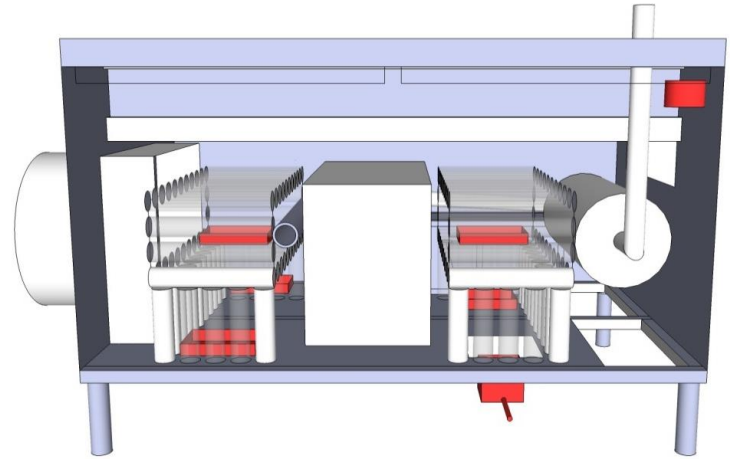
# Heat detection tests

- Verify activation temperature in a heat tunnel
  - Fixed temperature or rate-of-rise
  - Point or linear (local activation or averaging type)
- Hot surface false alarm test
  - Gives input for installation and required risk analysis



# Fire tests to verify response time

- 8 fire locations shall be covered by the fire detection system.
  - Scaling of the system is accomplished based on these tests in the same way as for fire suppression systems
- One slow growing fire (3 kW/min) for evaluation of e.g. rate-of-rise detectors
- Air flow up to 3 m<sup>3</sup>/s (same as for suppression tests)
- Response time requirements:
  - 20 s for at least one fire (thermal inertia requirement)
  - Before 30 kW (10 min) for the slow growing fire
  - Before 2 min for remaining fires



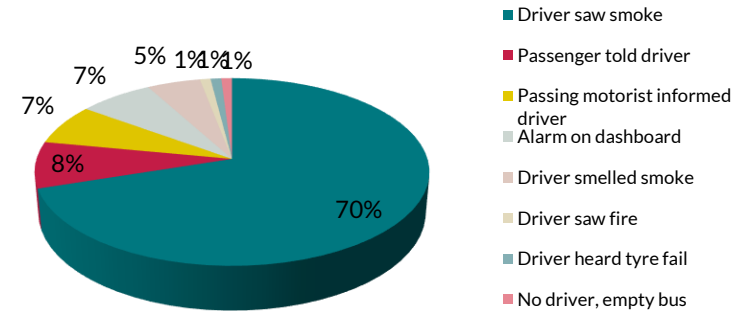
# Other requirements

- “An analysis shall be conducted prior to the installation in order to determine the location of detection point(s).”
  - Same procedure as for suppression systems
- “The number of detection point(s) or length of linear sensor(s) shall be scaled up or down from the tested system, based on the total gross volume of the engine and combustion heater compartments where the system is to be installed.”
  - Same procedure as for suppression systems

# Justification

- Current requirements on fire detection in engine compartments are insufficient/absent with respect to performance and response time.
- Statistics indicate that fires are first detected by the driver, passengers or other persons nearby.
  - Below 10% of the fires are first detected by a fire detection system.
- Fast detection will increase evacuation time and ensure that the suppression system can be activated before the fire has spread and grown too much.

Detection of bus fires in New South Wales (Australia) in 2016



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