

Dry sprinkler aerosol tests



Recently DSPA.uk invited a number of fire and rescue services to view an innovative firefighting technology that aims to improve the speed of fire knockdown at incidents and buy firefighters time. The demonstrations comprising dry sprinkler aerosols were staged at Chiltern International Fire's training facility near High Wycombe in the UK.

The DSPA-5 Dry Sprinkler Powder Aerosol fire suppression system is a lightweight, hand-held device that is activated like a grenade by pulling a cord and throwing it towards the seat of the fire. Each grenade contains 3.3kg of aerosol forming agent which when activated releases an airborne fire suppression aerosol. The agent is designed to suppress fires in ventilated compartments of a recommended 40m³ or less. For unventilated compartments the agent will function in areas up to 65m³.

John Maxfield, Director of DSPA.uk, explained that DSPA.nl in Holland had been developing Dry Sprinkler Powder Aerosol (DSPA) technology as a safe alternative to Halon/BCF for the last 20 years, "And for the last 10 years it has been in use by firefighters around the globe, predominantly in North America, Eastern Europe, Switzerland and Holland, but also in Africa and the Far East.

Maxfield was very impressed with Chiltern. "DSPA is a very new product and so Chiltern recommended that we hold the demonstrations over two days. In this way they can test the products in advance and record the results using thermal imaging cameras and take temperature readings. This meant that on the day of the demonstration the invited guests could take these recordings away with them after witnessing the DSPA-5 in action."

For the purposes of the demonstration, three fire scenarios were devised.

Test 1 – hydrocarbon pool fire

Inside a compartment fire behaviour training unit (CFBT) a circular steel tray (620mm diameter) was placed – inside were five litres of heptane floating on 20 litres of water, giving a burn time of approx five minutes. The DSPA-5 unit was deployed three minutes into the burn when the temperatures were at their highest.

As the DSPA-5 began to discharge the doors were closed, with temperatures on the ceiling increasing by around 150 °C. Thirty five seconds later the rear doors were reopened – visibility was poor but the thermal imaging camera indicated that the fire had been extinguished during the period while the CFBT was closed.

Test 2 – developed fire (flashover)

Five sheets of chipboard lined the walls and ceiling of the CFBT demonstrator unit, and ignited by a crib in the left hand corner. Flashover occurred at around eight minutes into the test – as indicated by an ignited gas layer rolling along the ceiling and the ignition of a cardboard box and floor tile by radiant heat at floor level. The DSPA-5 was activated at nine minutes, and slid along

Firefighters from across the UK were invited to see DSPA's Dry Sprinkler Powder Aerosol fire suppression system in action.

show significant potential

the floor into the hearth area from the rear door.

On discharge of the unit the rear door was closed. Ceiling temperatures reduced rapidly from 650 °C to 500 °C, but temperatures within the compartment rose considerably at levels of 1,000mm from the floor, rising from 250 °C to just over 400 °C.

On opening the door 45 seconds later, a turbulent atmosphere with poor visibility was revealed, but the thermal imaging camera indicated that the fire had been efficiently suppressed.

From deployment of the DSPA-5 there were over two minutes of fire suppression and when fire growth did begin again, it was estimated that flashover would have re-occurred at approx 4.5 minutes after deployment of the DSPA-5.

Water was used to extinguish the fire before flashover reoccurred.

Test 3 – residential fire

In a large downstairs compartment of a residential fire facility with a volume of 39.4m³, a large softwood pallet and timber fire wood was positioned as fuel. The DSPA-5 unit was deployed through an internal door towards the fire, once a defined low neutral plane was apparent – indicated by smoke levels reaching the floor.

A defined neutral plane is an area of thick smoke above lower clear air created by pressure differences within the compartment.

At 7.5 minutes the operatives opened the door to deploy the DSPA-5. At this point low level visibility was good, created by the fire drawing in clean air from outside through an open window at the front of the fire facility.

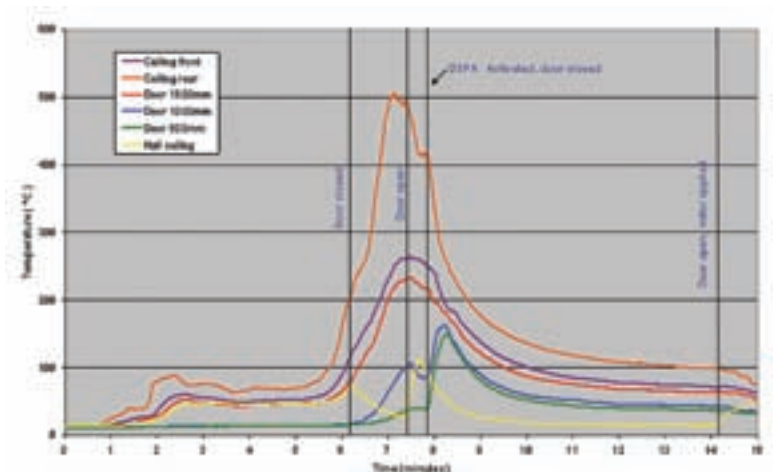
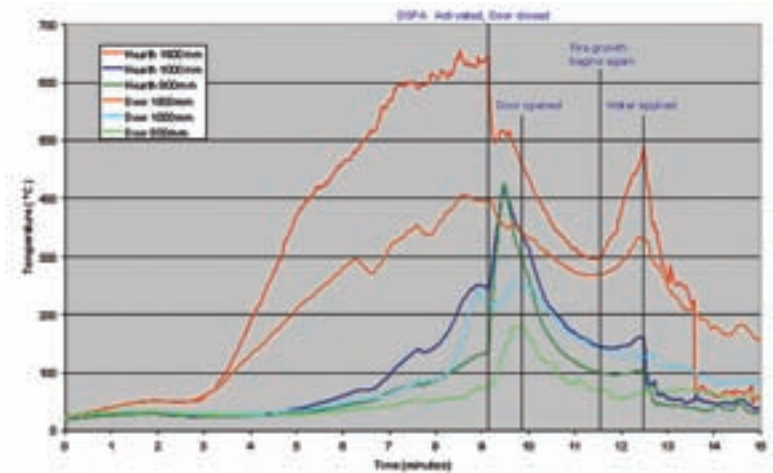
On deployment of the DSPA-5 the door was closed, and temperatures rapidly decreased at ceiling level and increased at measure levels of 1,000mm and below. The door was not opened again until six minutes after application of the DSPA-5. All windows were then opened for visibility and a thermal imaging camera allowed for dampening down the remaining fire – which was minimal.

Conclusions

Maxfield explains that the tests show that containment is key to the effectiveness of the aerosol units. In both the fully developed and residential fire tests, nobody had to enter the fire compartments to apply the DSPA-5 units and in both cases a minimum of four and a half minutes stalling of fire growth as seen. For firefighting purposes the demonstrations showed that the units could buy time before entering a fire scene – essentially stalling fire growth while preparing for entry.

“We are confident that our product will find a place in the fire services’ armoury, especially for the first-on-scene officers. There appeared to be a genuine interest in the product generally, and we are delighted that one of the Brigades that attended the demonstration, Staffordshire Fire & Rescue (UK), has agreed to field trial the DSPA-5 in July.”

The firefighters aren’t the only people who will benefit from the deployment of the DSPA-5, says Maxfield. “The tests demonstrated how little mess is created from the discharge of the DSPA-5. It leaves a non-toxic, non-corrosive white powdery residue that was easily brushed away after the tests. This, together with the massive reduction in the amount of water required, significantly reduces the property damage, making it much easier



to investigate the cause of the fire and salvage the property owners’ personal possessions.”

DSPA.uk launched the entire DSPA product range at the International Firex at the NEC, Birmingham (UK) earlier in the year, where it aroused interest from other applications. The DSPA was also on show at the recently held NFPA (National Fire Protection Association) conference and exhibition in Chicago, USA. “The versatility of the fixed installations was of particular interest to many visitors. These units are adapted for a variety of applications and will act as alternative solutions to Halon or other gaseous and sprinkler systems that require extensive and complex pipe work. They can operate as either standalone units or integrated into new or existing fire alarm systems,” concluded Maxfield.

The full Chiltern International report is available from www.dspaltd.com/resources/DSPA_Chiltern_International_test_report.pdf

The results of test 2 (top) and test 3 (above).

NEWSFLASH

Staffordshire Fire and Rescue in the UK has agreed to field trial the dry sprinkler powder aerosols.