FIRST LARGE-SCALE TESTS OF PYROTECHNICALLY GENERATED AEROSOL FIRE EXTINGUISHING SYSTEMS FOR THEPROTECTION OF MACHINERY SPACES AND GAS TURBINE ENCLOSURES IN ROYAL NAVAL WARSHIPS

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The first Royal Navy Destroyer for over 20 years is due to enter service in 2007. The base design for fire protection of the main machinery space is initially afforded by a carbon dioxide drench system with a high and low level AFFF system providing secondary protection. Ministry of Defence policy precludes the use Halon as part of the implementation of the Montreal Protocol on new construction ships. Carbon dioxide although the preferred solution for the T45 Destroyer is inherently toxic and places large demands on storage areas and makes this far from the ideal solution.

Since 2001, the T45 Destroyer Warship Integration Team has been progressing the testing of two pyrotechnically generated aerosol systems as a replacement for the first attack carbon dioxide system. Large-scale tests of aerosol agents were carried out at Darchem Flares IMO facility (internal dimensions 10m x 10m x 5m high) near Darlington, UK. The test programme was loosely based around the IMO MSC/Circ. 1007 protocol but with greater amounts of clutter in the facility and more representative of a warship's machinery space. Fire scenarios were also modified to make them more representative of naval circumstances with the pass criteria as specified in IMO MSC/Circ 1007 specification:

- Class B fires extinguished within 30 seconds
- 15 minute hold period (no re-ignition)
- fuel spray shut off 15 seconds after fire extinguishment
- at the end of hold period fuel spray should be restarted for 15 seconds with no re-ignition evident
- at the end of the test fuel trays must have sufficient fuel remaining to cover bottom of tray

In addition to the large-scale testing and in parallel aerosol fire testing was conducted on a faithful replica of a Gas Turbine enclosure.

Although derived from a common background and described by common terminology very stark performance difference were found between the two systems tested. This paper will describe the test facility, tests carried out, results and proposed future use of pyrotechnic fire suppression aerosols within the Royal Navy.