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Abstract

Current legislation regarding implementation of water mist system(s) requires full scale testing specific to its intended use which involves extensive funding that discourages potential users. This motivates the desire for accurate water mist simulation. The extent to this possibility is studied for a specific high pressure water mist system, "Danfoss 1910", and its effect on controlled fires of different heat release rates were studied. Concepts to accurately simulate the water mist system were also looked into, where the combined use of an additional air inlet, obstruction (turbulence) meshes and reduced initial particle velocity had the best performance. A horizontal water mist orientation was adopted to reduce the direct interaction between water mist spray and buoyant plumes. The results attained from a quasi steady state extinguishment model, simulations and experimental data were compared and vast discrepancies were discovered. The quarter scale ISO room corner used was found to be too small which created high levels of circulation within the enclosure; hindering the proper assessment of extinguishing mechanisms such as gas phase cooling and oxygen depletion. One of the conclusions is the need to compile larger scale tests validation data to form a baseline reference.