

# HI-FOG Designer

## Water mist systems design tool

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### Abstract

Today, water mist fire suppression system installations are designed using traditional basic drafting software and often rely on simplified, spreadsheet-based tools for the evaluation of the hydraulic characteristics of the installation. System data, such as the bill-of-materials, are manually transferred from two-dimensional drawings to these tools, or depending on system complexity, are recreated in said software. Marioff has developed a new cutting edge computer aided technology the HI-FOG Designer (HDF) able to simultaneously assess and optimize design and performance of single-phase water mist installations.

The aim of this study is to give an insight on the HI-FOG Designer solver methodology and overall design process to evaluate and optimize single phase water mist system. Additionally, the study will address the accuracy of the HI-FOG Designer pressure drop calculation for various grid arrangements in comparison to measured data and to standard Darcy-Weisbach methodology.

The tool is enabled by a computationally efficient variational formulation developed to evaluate the pressure losses for arbitrary installation configurations provided by designers. The result is comprised of an audit of the pressure drops at each nozzle, checked to ensure the minimum specified operating pressure is met, and the bill-of-material for the given installation.

The tool integrates the Marioff developed solver algorithms directly into AutoCAD MEP (Mechanical Electrical Plumbing) 3D drafting software.

The HI-FOG Designer solver pressure drop calculation accuracy has been addressed through extensive testing taking into account: HI-FOG diverse installation layout configurations, different nozzle types, modular activation area, system pipe length and size.

The field validation tests confirmed that the HI-FOG Designer solver accuracy, in predicting pressure drop at given nozzles, is equal to or better than the Darcy-Weisbach methodology.

Also, based on results, there are no practical limitations to the system size that can be modelled with HI-FOG Designer.

**KEYWORDS:** water mist systems, pressure drop calculation, Darcy-Weisbach methodology.