

# Performance based fire safety design – An opportunity for water mist industry?

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## SHORT BIO – Max Lakkonen

Max Lakkonen received M.Sc. in Mechanical Engineering from Tampere University of Technology, Finland, in 2000 and a Licentiate of Technology post-graduate degree in 2004. He specialised to water hydraulics and fluid power during his academic career.

Max has been involved to water mist industry for 20 years. This includes working for academics, manufacturer, consultant office, various research activities, and many fire test programs. Max has been the Managing Director of IFAB since 2015. His current tasks involve more generic fire safety engineering, but he is still involved with water mist systems as well.

Max is the IWMA representative in NFPA750 technical committee since 2009 and a member of the IWMA scientific council. Additionally, Max serves in many other standard committees, associations and he is known lecturer in the fire safety conferences.

## ABSTRACT

In the recent years there has been quick change in various industries which have brought new challenges for fire safety design, e.g. energy sector and transportation. Such quick politically driven changes have emphasized the flexibility and quick response time of fire safety engineering. Typically fire safety engineering relies largely on prescriptive standards that define allowed fire safety solutions and designs for different hazard groups in detail. The benefit of prescriptive standards is that they are well recognised and simple to use. The drawback is that they are very slowly changing and irresponsive in a case that risks are changing.

Performance based fire safety design is an alternative methodology for prescriptive design standards. This can be utilised in a case that prescriptive standards do not cover the risk or there are project related variables outside the scope of prescriptive standards. The performance based design defines safety objectives project based. These must be met with an acceptable and validated outcome of the fire safety design. Typical safety objectives are related to the egress, fire propagation/control and

temperature limits. Fire tests or CFD (computational fluid dynamics) are often used for the validation of the safety design.

This presentation will discuss how performance based design can be utilised in the context of water mist systems. Water mist industry has been carrying out a high number of fire tests to prove the efficiency of technology and therefore the validation by fire testing is a standard approach compared to many other technologies. Additionally, there has been created some systematics, e.g. EN14972-Part 1 (Annex A), that can be used for creating the test protocol for the validation fire tests. CFD can also be used as an additional validation tool for water mist systems, but it still has certain limitations.

**KEYWORDS:** *Performance based design, standards, new risks, water mist, CFD, fire tests.*