



**HILTI**

Hilti Fire protection saves lives

**FIRE RESISTANT  
SOLUTIONS FOR  
INSTALLATION SYSTEMS.**

Hilti. Outperform. Outlast.

# **FIRE PROTECTION SAVES LIVES.**

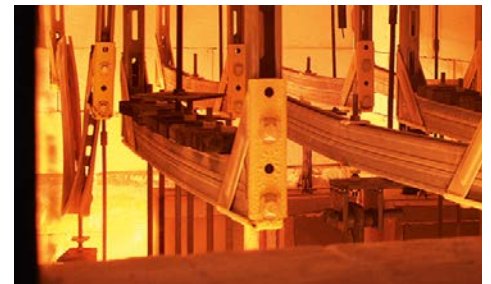
Fire puts human lives in harm's way, pollutes the environment and can cause serious economic damage. The primary objective of fire protection is to keep the risk of fire to a minimum. However with this being said the protection of life and limb will always have to be the primary security objective.

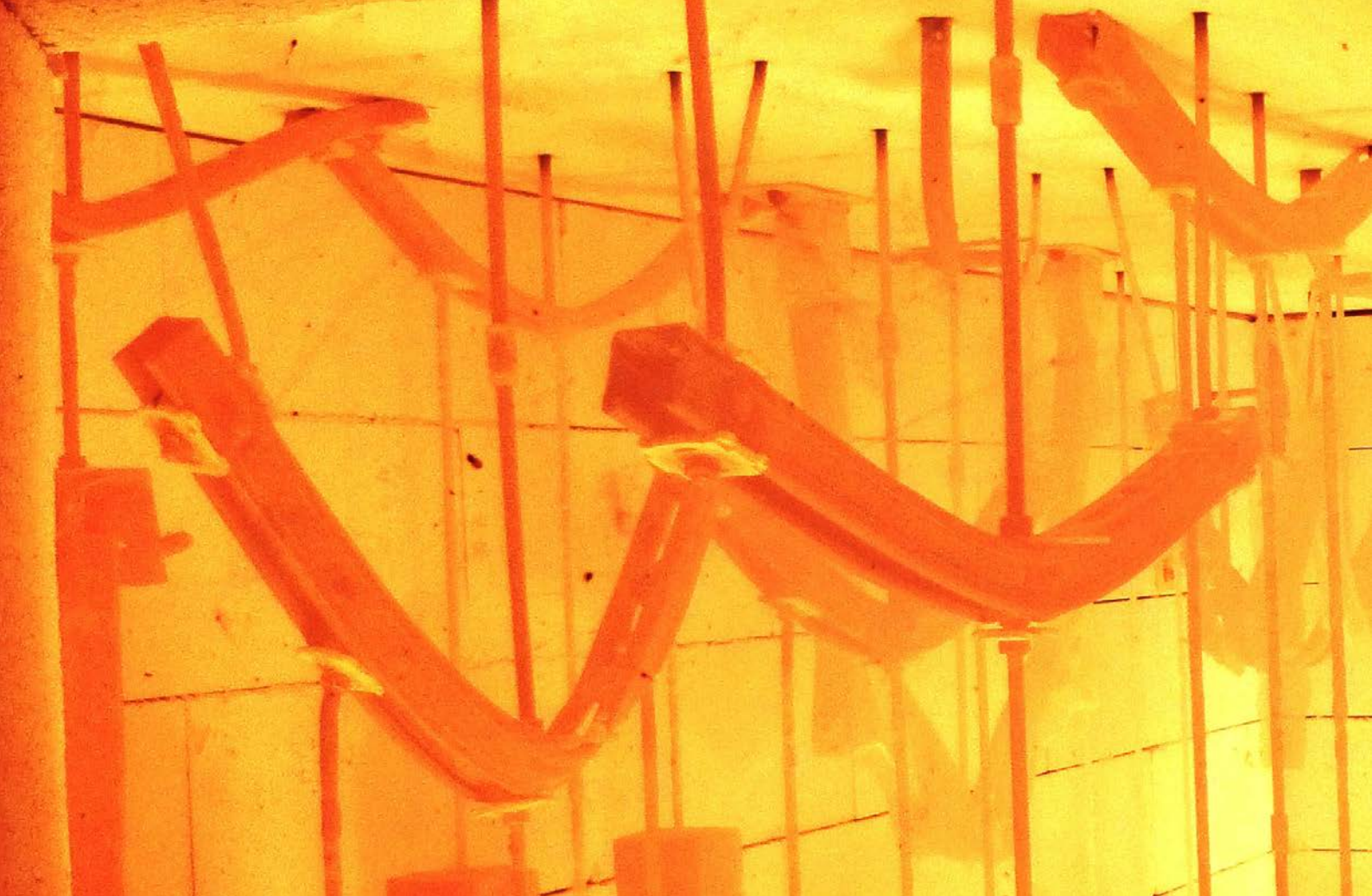
Hilti offers fire resistant solutions for installation systems for the mechanical and electrical trade. This is to ensure that the people located in the building can be evacuated while ensuring safe access for the fire department and rescue teams.

## **Protecting escape and emergency routes. Fire protection requirements.**

Modern buildings house a variety of mechanical and electrical systems. Fire protection-related systems such as smoke extraction ducts, sprinkler piping and cable runs with functional integrity requirements (e.g. power supply for firestop shutters or ventilation and smoke extraction systems etc.) are crossed in many cases by pipes that are not related to fire protection, or the pipes are laid over a suspended fire protection ceiling due to lack of space. In the event of a fire, if the pipe supports fail or are severely deformed, this can seriously impact the required fire resistance time of the fire protection-related building components installed beneath.

Therefore the installation positioned above the fire protection-related application must be guaranteed to have the same level of fire resistance as the structure below. This also applies in particular to escape and emergency routes where the suspended ceiling often is intended to protect the escape routes against flames.





## Legal requirements for fire protection. **Fire protection requirements.**

The fire duration of a suspended ceiling or wall depends entirely on the structure. In general, these guidelines are split into different building classes, from small dwellings to skyscrapers which can differ depending on the countries national building codes. This must be taken into account at the design phase of the construction.

### **Fire escape and rescue routes**

The MLAR [4] (current version 11/2005) was published by the commission supervision of the German Construction Minister Conference. It describes the different ways that allow a sufficient period of use in the necessary escape routes in event of a fire.

Core statements of MLAR [4] in relation to installation systems are:

- For fire rated suspended ceilings, the required fire resistance must be guaranteed with a fire attack both from above and below the ceiling.
- The special requirements in terms of fireproofed installation systems, installed in the area between the structural ceiling and the suspended ceilings must be observed.

### **Ventilation ducts and smoke control**

Most harmonized fire resistance design requirements at European level can be found for ventilation ducts and smoke control. EN 13501 and EN 1366-1:2014 are some of key harmonized European standards which are applicable to all European countries.

Moreover, the Muster-Lüftungsanlagen-Richtlinie M-LüAR published by the commission supervision of the German Construction Minister Conference, describes the importance of fire safety of ventilation systems.



## Legal requirements for fire protection. **Designing for fire resistance.**

Actual industry and academic research results show that current design approach according to EN 1993-1-2 (Eurocode 3) is unsafe for calculating deformation of installation channels.

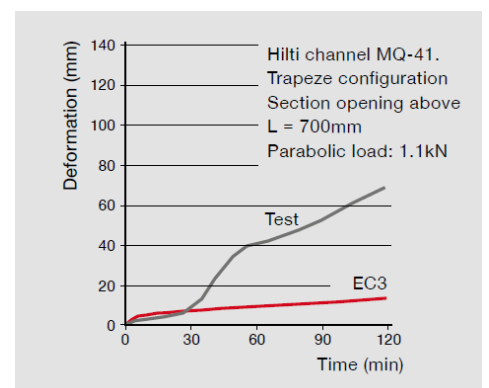
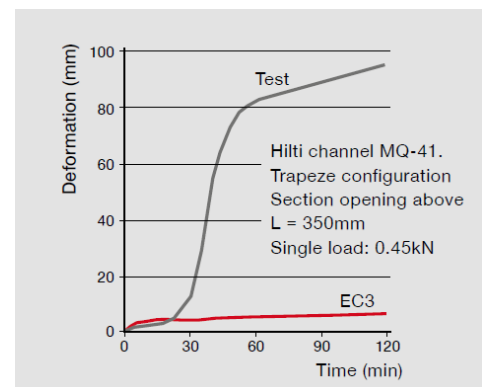
The research also concluded that in absence of any harmonized design method for predicting deformation, one should carry out fire tests with fire exposure according to EN 1363-1 to demonstrate the limiting deformation

### Analysis of research results

For all tested systems, a huge discrepancy in deflection between EC3 predictions and test results can be found. This discrepancy generally starts to rise between 20-25 min ETK.

In many cases buckling can result in ultimate bending failure of the channel until high deformation leads to stiffening of the hanging system by catenary effect.

In cases without noticeable buckling behaviour, real deformations are also far higher than those predicted by EC3.



## 20+ years of experience in fire testing. **Assessment of system performance under fire conditions.**

In absence of any harmonized design methods, Hilti has developed a fire resistant portfolio of installation systems on the basis of fire tests.

We conduct comprehensive fire tests to assess the performance and behaviour of our products under conditions of fire. Thanks to in-house research Hilti has a variety of fire tested products and system building configurations for different applications.

### **Fire test procedure**

The fire tests on pipe rings are carried out in accordance with the RAL Quality Directive RAL-GZ 656.

The installation channel systems are fire tested based on previous experience and the temperature curve for these fire tests was according to EN 1363-1.

The implementation of the fire tests is performed by a certified testing laboratory, such as IBMB, MPA Braunschweig.

### **Fire resistance technical manual**

This is a comprehensive technical manual that provides guideline on importance and relevance of fire resistance for installation systems. It covers regulations, how to design fire resistant applications and some solution examples. It also includes load tables and all third party test reports.



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