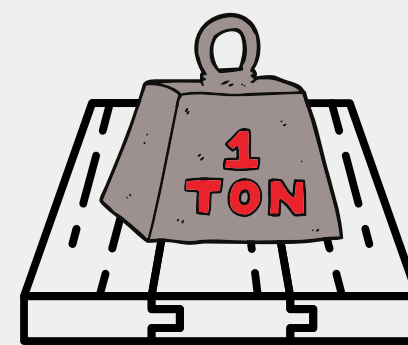
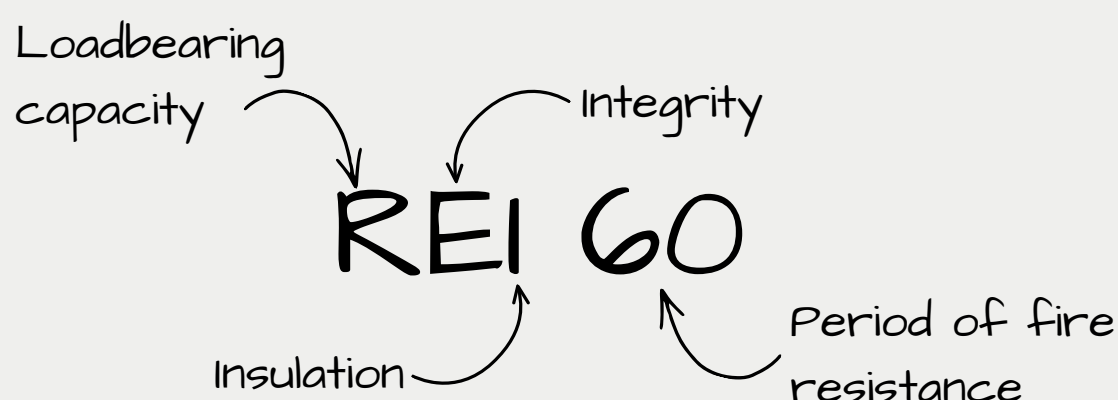


FIRE RESISTANCE EXPLAINED

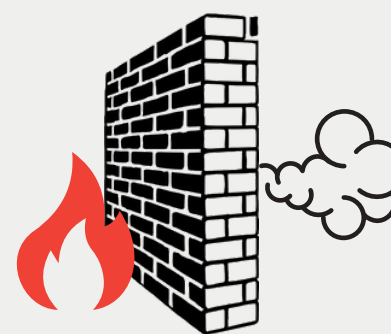
Résistance, Étanchéité, Isolation (REI)

As the words above elude to, the acronym used in the UK to define the main types of fire resistance is based on the French language.

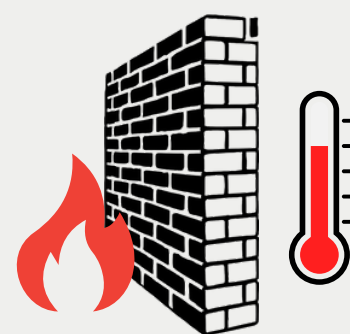
Why French? The terminology was used in the development of the European standards that are now applied in the UK. The words have been translated but the acronym remains tied to the original language.



Loadbearing capacity (R) refers to how long a building element can retain the necessary strength in a fire scenario before it becomes too weak to hold up the required load.



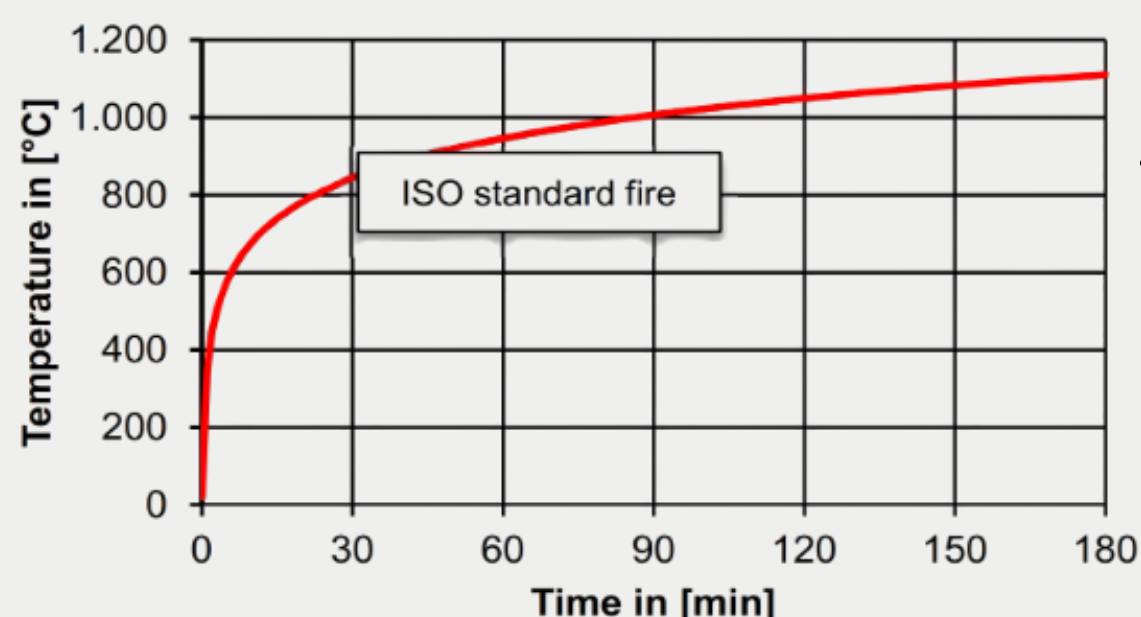
Integrity (E) refers to how long a building element can stop flames or smoke from getting through to the other side.



Insulation (I) refers to how long a building element can limit heat transfer from the fire side to the unexposed side.

Fire resistance levels

Fire resistance is often given in 30 minute increments due to the testing regime i.e. 30 min, 60 min, 90 min etc. Depending on the application, a certain building element can also have a combination of R, E and I without needing to meet all aspects. For example, a loadbearing floor might only be required to achieve R 60 whereas a compartment floor would need to achieve REI 60.



Fire testing

Fire testing to determine the performance of a certain building element is undertaken in accordance with the BS EN 13501 series. This series of European standards is currently in the process of replacing the UK specific fire test standard BS 476, which can still be used but will not result in a BS EN 13501 compliant classification.

Fire tests are usually undertaken by subjecting the building element in question to a fire in a furnace test. For most applications, the fire is based on a standard fire curve (usually ISO 834) and the performance of the building element is then measured in time against this fire curve. The fire test is stopped once the element fails one of the predetermined criteria, and the duration of the test will dictate the fire resistance achieved by the building element, rounded down to the nearest 30 minute increment.

Standardising fire resistance testing in this way is required in order to classify a wide range of different building elements and configurations against a common criteria.

What does it all mean?

So, if a certain building element is provided with an REI 90 classification, does it mean that it will fail after being exposed to a fire for 90 minutes? Not necessarily, it is a classification system rather than an absolute science.

The classification means that it has passed a furnace fire test where the sample has been exposed to the standard fire curve for 90 minutes without failing the parameters tested. It should be remembered that the ISO standard fire curve is an artificial fire and does not represent a real fire scenario. The temperature rises at a certain rate and then never drops. In a real fire scenario, it is expected that the fire will reach a peak temperature for a certain amount of time and then start to decrease again when the fire enters the decay phase. A real fire is also highly dependant on type and amount of fire load, ventilation conditions or active fire suppression. meaning that realistic fire curves will be unique and differ from the standard fire curve.



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