

# Structural Steel Fire Protection

A CELLULOSIC FIRE CAN PEAK AT OVER 1000°C



STRUCTURAL STEEL LOAD BEARING CAPACITY WILL BEGIN TO REDUCE FROM 300°C



## Cellulosic fires

Cellulosic Fires are fuelled by materials such as **timber, furniture, paper, fabrics, and paper**. They mainly occur in offices, hospitals, shopping centres and residential buildings. Structural steel cannot burn, but it **can lose up to half its strength at just 550°C**. Passive fire protection helps delay the growth of fires and building collapse.

## The section factor concept - Hp/A concept

The heating rate of a steel section in a fire depends upon:

- The perimeter of the steel exposed to flames - Hp
- The cross sectional area of the section - A

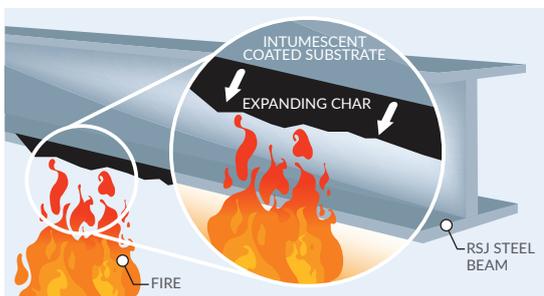


## Common structural steel fire protection methods

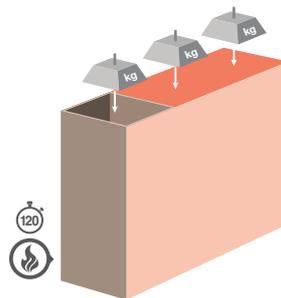
- Cementitious Coatings**, Portland cement with the addition of vermiculite or perlite
- Boarding Systems**, based on calcium silicate or gypsum
- Intumescent Coatings** such as Nullifire

### Nullifire SC902 'hybrid' intumescent

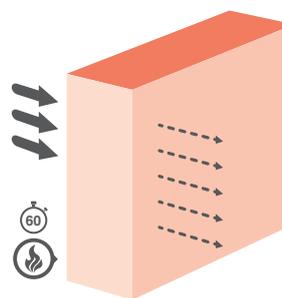
Nullifire SC902 intumescent can be applied directly on to internal, semi-exposed and external steelwork. When exposed to temperatures of 180°C or more, the intumescent swells, creating a thick layer of inorganic 'char', which thermally insulates the steel and protects against premature collapse of the structure in a fire event.



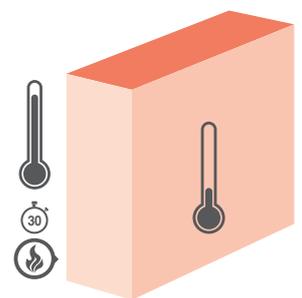
### Structural Adequacy



### Integrity



### Insulation



## Fire Resistance Levels (FRLs)

The FRL is expressed as: **adequacy/integrity/insulation**

For a wall to meet an FRL of 120/60/30 it must maintain structural adequacy for 120 minutes, integrity for 60 minutes and insulation for 30 minutes, when tested in accordance with AS1530.4.

The intumescent coating of the columns in this diagram provides the first part of the fire performance requirement, Structural Adequacy FRL 120/-/- . The other elements such as the cladding provide the Integrity and Insulation components, which satisfy the remainder of the FRL designation.

## Nullifire thin film 'hybrid' intumescent

The unique STP 'hybrid' technology of Nullifire SC902 allows it to be applied directly to blasted steel without priming in a single application, is weather resistant in an hour, cured in 8 hours and transportable in 24 hours.

## How much intumescent?

The amount of intumescent needed for the right protection is determined by:

- The function of the structural section.
- The load it is supporting.
- The required fire rating level
- The ratio of the fire exposed perimeter to the cross-sectional area of the steel (Hp/A)

### Nullifire Technical Support

Nullifire Australia can help with design and contract support including assistance in the crucial selection and specification of products to meet requirements. This can reduce overall project costs, prevent delays and streamline the application, delivery and erection process for onsite and offsite projects.

### Case Studies

Visit our website and read about our case studies.

[nullifireaustralia.com.au](http://nullifireaustralia.com.au)

