

Subject: Understanding Fire Resistance levels , (FRLs),

Understanding the requirements of the Building Code Australia (BCA), can be confusing at the best of times. This is especially true when it comes to Fire Resistance levels (FRL) . In this Advisory note CMI will explain:

- (1) What is an FRL and why are there three numbers.
- (2) What are Fire Hazard Properties
- (3) What is the difference between loadbearing and non-load bearing, and how this relates to fire resistance

1. FRL (fire resistance level)

Although commonly referred to as fire rating, the correct term to describe the fire resistance of a building element is FRL (Fire Resistance Level). The FRL is the ability of a building element to withstand a fire under test conditions for a certain period of time and consists of the three criteria listed below:

1. **Structural adequacy:** this means the ability of a structure to maintain its stability and loadbearing capacity;
2. **Integrity:** this means the ability of a structure to resist the passage of flames and hot gases and;
3. **Insulation:** this means the ability of a structure to maintain a temperature below specified limits on the surface not exposed to fire.

For example, a FRL requirement for a wall of 90/60/30 means that the wall must maintain structural adequacy for 90 minutes, integrity for 60 minutes and insulation for 30 minutes, as tested to AS 1530.4: “Methods for fire tests on building materials, components and structures – Fire-resistance tests of elements of building construction”.

There are many ways in which an FRL can be determined. They are listed in BCA Specification A2.3 and include the following:

- A standard fire test in accordance with AS 1530.4 Methods for fire tests on building materials, components and structures
- Australian Standards for steel, timber, concrete or masonry structures
- Table 1 within BCA Specification A2.3
- A Registered Testing Authority report which is based on a fire test
- Calculation based on a fire test

2. FIRE HAZARD PROPERTIES

FRLs by definition are concerned with the resistance to and containment of fire. Conversely a Fire hazard properties relates to how easily a material burns.

3. LOADBEARING OR NON-LOAD BEARING?

If a building element is load bearing then it must have a Structural Adequacy component to the FRL.

The definition of loadbearing from the BCA: *'intended to resist vertical forces additional to those due to its own weight'*. Consequently, walls such as those holding up a floor or roof above are loadbearing. In most cases a wall that span between concrete slabs and are not holding up the slab, are considered non-loadbearing. The BCA deemed to satisfy provisions specify FRLs based on whether the building element is load bearing or not (Refer to BCA Specification C1.1). For example, walls separating sole occupancy units in a Class 2 building of Type A construction (residential high rise) need an FRL of -/60/60 if they are non-load bearing and 90/90/90 if they are load bearing. Residential high rise buildings are usually slab to slab construction in which case the concrete columns are load bearing but the plasterboard infill walls are not.

If an FRL with Structural Adequacy is specified (e.g. 90/90/90) where there is no additional vertical load, a building element without Structural Adequacy may be used (e.g. -/90/90). Refer to BCA Vol. 1 Specification A2.3 (6).