

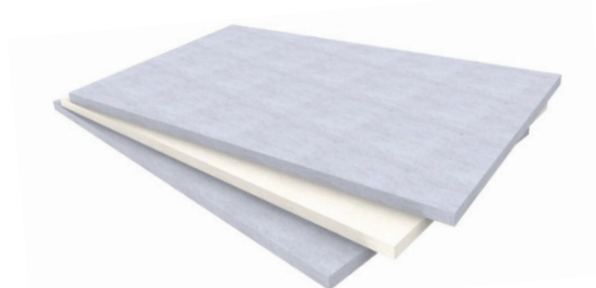
Introduction

There is a lot of confusion about so called “fire rated boards” and I think it is prudent to discuss a little about fire ratings and the use of so-called fire rated board products, that make up part of fire rated systems.

Terms widely used in industry

Some of the terms used commonly to refer to boards used to help provide a fire rating or FRL include:

- Fire board
- Fire resisting
- Fire resistant board
- Fire rated board
- Fireproof board
- Fire protection boards



I am sure some of you will relate to one or more of these terms, but have you ever thought what these terms really mean, and if they are correct adjectives for board used to help provide a fire rating or FRL?

In short, a fire rating or FRL is assigned to an entire assembly that has been subjected to a fire resistance test and achieved a particular fire rating or FRL (given in minutes).

FRL 120/120/120

(example)



Structural Adequacy

The ability of the building element to support the weight of adjacent building elements.

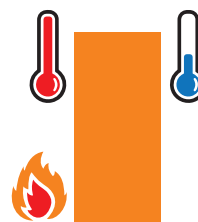
ie: a brick wall supporting a concrete floor slab above.



Integrity

The ability of an element to prevent the passage of flames and hot gasses.

ie: a plasterboard wall remaining intact and not allowing holes to form.



Insulation

The ability of an element to resist heat transfer from the exposed face of the unexposed face.

ie: a bundle of cables remaining below a set temperature limit on the unexposed side of the wall penetration system.

Product themselves, like a board are not fire rated per se; only when they are fire tested as part of an overall assembly or systems, does an FRL be gained for that assembly or system. The board is part of the fire rated assembly and system.

ARTICLE: FIRE RATED BOARD SYSTEMS

By John Rakic

So, the market refers to fire rated boards, fire resistant boards and fireproof board as those used in fire rated assemblies and systems.

It might sound like splitting hairs, but it is a very important and accurate technical distinction.

The is no such thing as a 2 hour fire rated or fire resistant board in its own right – the ‘system’ including the service penetrations (if any) must be tested identically to have an FRL apply to that ‘system’.



A calcium silicate board bulkhead system after being tested in a furnace to AS1530.4

Types of fire rated board assemblies or systems

So called fire rated plasterboard walls, shafts and ceilings

The most common fire rated board assembly would have to be a fire rated plasterboard wall or partition.

Most of us would recognise that conventional, so called fire rated plasterboard is made with a pink paper facing to differentiate it from non-rated plasterboard which has the characteristic brown/grey paper facing.

I have said repeatedly for over 20 years, that just because it is pink, does not mean it is fire rated.

What do you think I mean by this in the context of my earlier discussion about FRL's applying to assemblies or systems and not the products themselves?

Take a minute to think about it.

It is only when the ‘as fire tested’ pink paper faced plasterboard in question, is installed into an assembly that is identical to one which has been fire tested and achieved the required FRL, does the assembly achieve and claim the FRL.

Yes, there are many systems available for fire rated plasterboard wall, service shaft and ceiling systems for that matter, but they must be installed as per the fire tested systems.

This means with the same proprietary brand, same thickness, same number of layers, the same stud work or metal framing, same fixing types and spacings and with the same fire rated joint details. I will not over complicate thing here and discuss opening for service penetrations.



Installation of a full size fire rated plasterboard wall for a fire resistance test to AS1530.4 (with access panels)

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Other so called fire rated board types

Calcium silicate

I fell in love with calcium silicate board technology in the early 1990's. Calcium silicate boards, unlike fibre cement boards, can withstand very high temperature and do not crack, spall or craze and provide excellent thermal insulation properties.

Calcium silicate walls, shaft and ceilings are typically constructed from a very high-density calcium silicate board material, which does not provide anywhere near as good thermal insulation compared to plasterboard or gypsum based board, so these systems usually require the use of Rockwool or mineral fibre insulation to provide requisite FRL's. As these high density calcium silicate board are imported they are not cost competitive against the so called fire rated plasterboard, unless there is very high fire ratings.

Low density calcium silicate materials provide a very useful function when used in fire rated assemblies, as they can be installed as a single layer, are light and allow for great system development due to their non-spalling, non-cracking and get thermal insulation properties when exposed to the heat of a fully developed fire and for durations of 2 or 4 hours depending on the thickness.

The low density of the material and the manufacturing process and chemistry make it a little dusty and brittle and not so impact resistant, but these shortcomings are overlooked due to its fantastic fire properties and system FRL's available in the Australian market.

Some examples of the use of our proprietary low density calcium silicate board technology at Trafalgar Fire which we sell under our trademarks FyreBOARD Maxilite® include but are not limited to the following applications where the NCC required a fire tested system and FRL:

- Fire proofing of steel or fire protection of structural steel elements
- Bulkhead, which is a fancy name for a single, double or 3 sided duct
- 4 sided ducts, however the cost of these is not competitive against our FyreWRAP® I must add
- Fire damper perimeter upgrades where fire dampers have been installed incorrectly
- Ceiling fire damper enclosures
- For closing off large openings for services in fire rated walls, shafts and floor slabs for example
- As a core material inside our Trafalgar Fire FyreSHIELD™ fire rated access panels
- As core material inside our patented FyreWRAP® duct access panel systems
- As head of wall details for large opening above fire walls



Magnesium Oxide

I expect some backlash from this section, but it would be remiss of me not to mention Magnesium Oxide and my feeling about this board technology type.

It is only available here as a high density material and is a cheaper version of high density calcium silicate boards discussed earlier.

I have seen first hand the quality issues with sourcing this board material type and the aggressive chemical composition and how it makes even the best galvanised and stainless steel fixing screws rust. Come and have a look at my Pergola which is clad with it at my home; built 12 years ago. There will be huge claims relating to this material here in Australia in my humble personal but, well versed, opinion and time will show I am correct here.

Glass reinforced gypsum

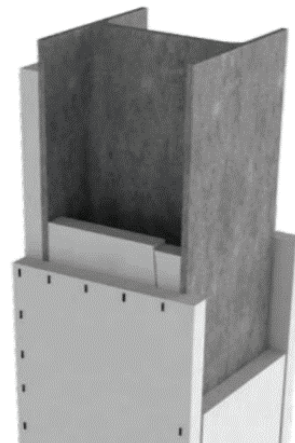
I love this technology and it is very popular globally. It is a non paper faced gypsum board with fibreglass reinforcing mat near the surface. It is truly non combustible as it has no paper facing and was developed for market outside of Australia where paper faced plasterboard is not deemed non-combustible (where the board AND paper need to be successfully fire tested as non-combustible).

It's fibre glass reinforcing makes it extremely impact resistant and its gypsum basis makes it great in terms of thermal resistance to the heat of the fire.

I have been looking for a reputable and good commercial partner for this type of board for more than 10 years and they are few and far between. I may have jumped the gun but recent fire testing I have done, will see a fantastic new product in the Trafalgar Fire stable in 2021.

The fire testing system applications perfect for this type of board are:

- Steel protection, especially columns but the ease of installation and fire testing allows good use of beams also
- Solid or frameless fire rated partitions
- Shafts, partition walls and ceiling systems
- External cladding systems



Aerated or lightweight concrete boards and composites

It would be remiss of me not to mention aerated concrete as it has a role to play in fire rated assemblies and systems.

All readers would have heard of Hebel and Walsc; both are aerated and autoclaved lightweight concrete (AAC) board type materials.

They are well suited to applications for fire rated walls and riser shafts amongst other applications.

Speedpanel and Pronto also utilise aerated concrete but in a composite form by way of steel and fibre cement facing materials respectively. They deserve a mention here too.

There are many copycat products trying to break into the fire rated board assembly market and I alert readers to be careful to look carefully at fire test data and ensure the products and their claims have integrity.

