Providing Fire Safety Information for Paint Systems Understanding and Reporting Early Fire Hazard indicies

What Drives the Requests for Information?

During the consent process designers must prove that proposed structures will meet a number of fire safety standards including the mandatory provisions of the New Zealand Building Code fire safety clauses:

C1 – Outbreak of Fire
C2 – Means of Escape
C3 – Spread of Fire
C4 – Structural Stability During Fire

Clause C3 - Spread of Fire is designed to safeguard people from injury or illness when evacuating a building during fire. This is the aspect of fire safety that paint manufacturers are often called to comment on.

The New Zealand Building Code requires that new buildings need to have various areas within the building designed to limit the spread of fire. They specify the exact EFH Ratings required for each type of area.

Early Fire Hazard (EFH) indices in accordance with an Australian Standard Test method known as: AS 1530 Part 3, 1999 "Test for early fire hazard properties of materials." There are four indices measured. The Spread of Flame and the Smoke Development Indices are the most commonly requested and used.

Indices	Characteristics
Ignitability Index (0-20)	Time taken for the volatile substances from the specimens to ignite. The index is zero if the specimen does not ignite
Spread of Flame Index (0-10) – SFI	The rate at which flames spread across the materials. The higher the index the faster the flames will spread.
Heat Evolved Index (0-10)	The amount of heat evolved by a burning specimen. The higher the index the more likely that the fire will involve nearby combustible materials.
Smoke Developed Index (0-10) – SDI	The higher the index the greater the hazard is likely to be from smoke.

This test method is designed to identify substrates or systems of substrates **and** paint coatings that give acceptable levels of smoke and spread of flame properties for use in critical areas of buildings.

The Substrate Is a Key Part of the System

It is most important to realise that indices apply to the total system and not just the paint.

BRANZ advise that you can apply test results to other substrates if the substrate you are quoting for is less flammable than the one you tested on. There are 4 categories of substrate. So if a system is tested on category 1 substrates (Timber, Plywood) those numbers can then be quoted for category 2, 3, and 4 substrates.

Group Substrate Material

1 (Most reactive) Standard grade plywood, hardboard, fibre/particleboard (less than 12 mm thick)
2 As for group 1 with a 12 mm or greater thickness
3 All paper face gypsum board products
4 (Least reactive) Concrete/masonry, fibre-reinforced cementboard, non-paper-faced gypsum boards

Claims made about a coating tested over an "inert" substrate **cannot** be transferred to a lower category substrate.

To give you an idea of how coatings affect EFH ratings for various substrates it is helpful to first know how these substrates behave before they are coated. The EFH ratings quoted in most cases just quote 2 main indices which are the Spread of Flame index (SFI) and the Smoke Developed Index (SDI) see the examples below.

Some wood substrate manufacturers now have available specific results for their products so those should be used when relevant.

Early Fire Hazard Ratings for Bare Substrates

Substrate	Group Substrate	SFI	SDI
Paperfaced Plasterboard	3	0	3
Hardiflex	4	0	0
Pine Timber	1	8	3
Polystyrene	-	9	8
100% Wool Carpet	-	0	5
100% Acrylic Carpet	-	10	7
Painted Particle Board	1 or 2*	8	3
Plywood	1 or 2*	9	3

* depends on thickness

As an example exitways from buildings usually require indices of SFI=0 and SDI less than 4.

Not All Areas Require the Same Results

Rooms and functional spaces have different EFH requirements depending on their use and purpose. The ratings are especially important for areas such as exitways and sleeping quarters of rest homes etc. By use of the EFH indices local authorities can be sure that exit ways, for example, will be as safe as possible in the event of a fire and not impede the escape of occupants from the building.

C/AS1 categorises building spaces into purpose groups and fire hazard categories (FHC). C/AS1 contains around 16 specific purpose groups subdivided into four major activity sets that identify the broad use of the space. The four major activity sets are crowd, sleeping, working business or storage and intermittent. Examples of purpose groups for each activity set are Crowd Large (CL) for a cinema, Sleeping Accommodation (SA) for a hotel, Working Low (WL) for a factory containing materials that burn slowly and Intermittent Activity (IA) for a car park.

Each purpose group also has an associated FHC designation that identifies the fuel characteristics in the space.

Results Required for Exterior Areas

While requests may be made for exterior areas most exterior paints are not tested because the required measurements are for interior areas. Territorial Authorities (TAs) can request any information that they feel is necessary to reach a sound conclusion on the elements of a building design. Where requests for exterior system are made the PMA suggests that manufacturers discuss why these products have not been assessed and what the TAs are trying to understand about the performance of the system.

Repaints

Unless a full system and the repaint system have been tested it is not possible to quote direct SFI and SDI figures. The thickness of paint can impact on performance. If manufacturers choose to provide comparative information on the existing and repaint systems over the common substrate that should do so clearly. Ultimately such information does not meet the testing standard and must be documented clearly.

Testing Systems and Claiming Performance

When providing test results Paint Manufacturers must ensure the system tested are clearly identified with product and substrate combinations. If assertions on substitutions are made these must be clearly documented. The use of coatings results from inert substrates to suggest the performance of a coating on more flammable substrates is not an accepted practice by BRANZ or the PMA.