TECHNICAL BULLETIN – TB262

FIRE REGULATIONS AND ARDEX PRODUCTS

JULY 2024

INTRODUCTION

The National Construction Code 2019 differs from previous years in relation to fire regulations. This technical bulletin is written with NCC Volume One in mind only. It is for Class 2 to Class 9 buildings, so residential is not covered here.

ARDEX believes that the Performance Requirements set out in Volume 1 Section C of the NCC 2019 must be met and are the overriding and primary principles to be referred to on any job using an ARDEX product.

"Non-combustible building elements C1.9" is the main point of investigation in this Technical Bulletin, and it is copied below for reference throughout.

If readers feel that amendments or changes are required to any interpretations expressed, don't hesitate to contact Technical Services with appropriate comments.

SECTION C1.9 TAKEN DIRECTLY FROM THE NCC2019

C1.9 Non-combustible building elements

(a) In a building required to be of Type A or B construction, the following building elements and their components must be non-combustible:

(i) External walls and common walls, including all components incorporated in them including the facade covering, framing and insulation.

(ii) The flooring and floor framing of lift pits.

(iii) Non-loadbearing internal walls where they are required to be fire-resisting.

(b) A shaft, being a lift, ventilating, pipe, garbage, or similar shaft that is not for the discharge of hot products of combustion, that is non-loadbearing, must be of non-combustible construction in—

(i) a building required to be of Type A construction; and

(ii) a building required to be of Type B construction, subject to C2.10, in—

(A) a Class 2, 3 or 9 building; and

(B) a Class 5, 6, 7 or 8 building if the shaft connects more than 2 storeys.

(c) A loadbearing internal wall and a loadbearing fire wall, including those that are part of a loadbearing shaft, must comply with Specification C1.1.

(d) The requirements of (a) and (b) do not apply to the following:

(i) Gaskets.

(ii) Caulking.

(iii) Sealants.

(iv) Termite management systems.

(v) Glass, including laminated glass.

(vi) Thermal breaks associated with glazing systems.

(vii) Damp-proof courses.

(e) The following materials may be used wherever a non-combustible material is required:

(i) Plasterboard.

(ii) Perforated gypsum lath with a normal paper finish.

(iii) Fibrous-plaster sheet.

(iv) Fibre-reinforced cement sheeting.

(v) Pre-finished metal sheeting having a combustible surface finish not exceeding 1 mm thickness and where the Spread-of-Flame Index of the product is not greater than 0.

(vi) Sarking-type materials that do not exceed 1 mm in thickness and have a Flammability Index not greater than 5.

(vii) Bonded laminated materials where—

(A) each lamina, including any core, is non-combustible; and

(B) each adhesive layer does not exceed 1 mm in thickness and the total thickness of the adhesive layers does not exceed 2 mm; and

(C) the Spread-of-Flame Index and the Smoke-Developed Index of the bonded laminated material as a whole do not exceed 0 and 3 respectively

DISCUSSION OF CRITICAL POINTS FROM C1.9

Where a building is required to be of 'Type A or Type B' construction which refers to installed sprinkler systems, this does not directly concern ARDEX.

"The following building elements and their components, including façade covering, must be non-combustible.

-External Walls

-Common Walls

-Lift Pits (flooring and floor framing)

-Internal walls (non-load bearing AND required to be fire resisting)

-Shafts (e.g., lift shaft, ventilating shaft, pipe, garbage)"

These requirements put an onus on ARDEX because most tile adhesives in the ARDEX range are deemed combustible, so this precludes their use on walls in Class 2 to Class 9 buildings. This will create an industry-wide challenge and, in our opinion, is impractical; given the knowledge ARDEX has of product combustibility (i.e., tile adhesives), this would be impossible to meet. In this situation ARDEX believes responsible conduct would be to refer to the Performance Requirements rather than this specific clause (C1.9) for compliance.

Tile adhesives are covered with non-combustible ceramic tiles. Hence, ARDEX believes fire-resisting walls (to the degree mandated in the NCC) can be made that incorporate high polymer tile adhesives.

Waterproofing upturns will also be a potential problem. If all walls are required to have non-combustible components, waterproofing contractors will no longer be able to follow the Australian Standards (AS4654 or AS3740) and do upturns since almost all membranes would fail AS 1530.1 for combustibility.

This problem has wider consequences than just for ARDEX systems; for example, consider that acrylic paint, in theory, cannot be used on a wall because it is combustible.

There are exceptions to which the above requirements do not apply:

-Gaskets
-Caulking
-Sealants (e.g., ARDEX RA 030, ARDEX RA 040, ARDEX ST, ARDEX SE)
-Termite management systems
-Glass (including laminated glass)
-Thermal breaks associated with glazing systems
-Damp proof courses

One interpretation of the uses of ARDEX WPM 310 and ARDEX WPM 330 as damp-proof courses, because they are waterproof membranes, is not feasible when we consider the definition of a damp-proof course from the NCC as below; they do not fall within it.

'Damp-proof course – means a continuous layer of impervious material placed in a masonry wall or pier, or between a wall or pier and a floor to prevent the upward or downward migration of water'.

There are further exceptions to the general combustibility conditions. In C1.9(e) it says you can use;

-Plasterboard
-Perforated gypsum lath with a normal paper finish
-Fibrous plaster sheet
-Fibre reinforced cement sheeting
-Metal sheeting
-Sarking type materials (less than 1 mm thick and have Flammability Index < 5)
-Bonded laminated materials where each lamina is non-combustible, each lamina is less than 1mm thick, total adhesive is less than 2 mm thick, Spread-of-Flame Index < 0 and the Smoke-Developed Index <3.

One potential approach for products such as ARDEX WPM 310 and ARDEX WPM 330 is to classify them as sarking-type materials and then test them for the Flammability Index to determine if they meet the requirements. The products' final dry film thickness on facades is set at 0.3 mm and 0.35 mm, respectively.

It is hard to see the underlying logic of this part of the NCC, which questions its relevance. A strict application would mean that every paint would fail C1.9, and since we know it would be impractical to stop painting buildings, the exercise of having ARDEX WPM 310 and ARDEX WPM 330 tested with the intent of meeting this requirement seems contradictory.

Another notional consideration concerns the DUNLOP Coloured Render Texture Coat. This will be an issue as it is combustible and goes on at >1 mm as the outermost layer. The DUNLOP Ready to Go Render has the same basic concern about flammability.

SECTION C1.10 TAKEN DIRECTLY FROM THE NCC2019

C1.10 Fire hazard properties

(a) The fire hazard properties of the following internal linings, materials and assemblies within a Class 2 to 9 building

must comply with Specification C1.10:

(i) Floor linings and floor coverings.

(ii) Wall linings and ceiling linings.

(iii) Air-handling ductwork.

(iv) Lift cars.

NSW C1.10(a)(v)

(v) In Class 9b buildings used as a theatre, public hall or the like—

(A) fixed seating in the audience area or auditorium; and

(B) a proscenium curtain required by Specification H1.3.

(vi) Escalators, moving walkways and non-required non fire-isolated stairways or pedestrian ramps subject to

Specification D1.12.

(vii) Sarking-type materials.

(viii) Attachments to floors, ceilings, internal walls, common walls, fire walls and to internal linings of external walls.

(ix) Other materials including insulation materials other than sarking-type materials.

NSW C1.10(b)

(b) Paint or fire-retardant coatings must not be used to achieve compliance with the required fire hazard properties.

(c) The requirements of (a) do not apply to a material or assembly if it is—

(i) plaster, cement render, concrete, terrazzo, ceramic tile or the like; or

(ii) a fire-protective covering; or

(iii) a timber-framed window; or

(iv) a solid timber handrail or skirting; or

(v) a timber-faced door; or

(vi) an electrical switch, socket-outlet, cover plate or the like; or

(vii) a material used for—

(A) a roof insulating material applied in continuous contact with a substrate; or

(B) an adhesive; or

(C) a damp-proof course, flashing, caulking, sealing, ground moisture barrier, or the like; or

(viii) a paint, varnish, lacquer or similar finish, other than nitro-cellulose lacquer; or

(ix) a clear or translucent roof light of glass fibre-reinforced polyester if—

(A) the roof in which it is installed forms part of a single storey building required to be Type C construction;

and

(B) the material is used as part of the roof covering; and

(C) it is not closer than 1.5 m from another roof light of the same type; and

(D) each roof light is not more than 14 m2 in area; and

(E) the area of the roof lights per 70 m2 of roof surface is not more than 14 m2; or

(x) a face plate or neck adaptor of supply and return air outlets of an air handling system; or

(xi) a face plate or diffuser plate of light fitting and emergency exit signs and associated electrical wiring and electrical

components; or

(xii) a joinery unit, cupboard, shelving, or the like; or

NSW C1.10(c)(xiii)

(xiii) an attached non-building fixture and fitting such as—

(A) a curtain, blind, or similar decor, other than a proscenium curtain required by Specification H1.3; and

(B) a whiteboard, window treatment or the like; or

(xiv) timber treads, risers, landings and associated supporting framework installed in accordance with D2.25 where the Spread-of-Flame Index and the Smoke-Developed Index of the timber does not exceed 9 and 8 respectively;

or

Vic C1.10(c) (xv)

(xv) any other material that does not significantly increase the hazards of fire.

DISCUSSION OF CRITICAL POINTS FROM C1.10

This section of the NCC has positive implications for ARDEX products because so many applicable exceptions are listed in section (c).

To the best of our knowledge, every ARDEX product falls into the exceptions, so we do not need to concern ourselves with the complexities of Specification C1.10 (for example, details concerning critical radiant flux).

Section (c) (i) says, "*plaster, cement render, concrete, terrazzo, ceramic tile or the like" are exempted from meeting Specification C1.10 for Fire Hazard Properties'*. This means all of our levellers, for example, ARDEX K15, and all of our patching compounds, such as ARDEX A45, are exempt. Another implication is that all of our cement-based renders for masonry walls are exempt.

Section (c) (vii) (A) says, "*a roof insulating material applied in continuous contact with a substrate*". This clause covers the insulating products we sell in conjunction with ARDEX TPO and is therefore exempt.

Section (c) (vii) (B) says, "*an adhesive*," which means any tile adhesive such as ARDEX X 10 or any flooring adhesive such as ARDEX AF 241 is also exempt. The modified silane ARDEX CA 20 P is also an adhesive and is exempt.

Section (c) (vii) (C) says, "*a damp proof course, flashing, caulking, sealing, ground moisture barrier, or the like*", which means membranes like ARDEX WPM 001, ARDEX WPM 750, ARDEX WPM300 and products such as ARDEX RA 040, ARDEX ST Silicone and ARDEX RA 142 are also exempt.

Section (c) (ix) says, "*any other material that does not significantly increase the hazards of fire*". This is a broad-scope and non-selective phrase but worth considering for any individual product. Note – this does not apply to Victoria.

BUSHFIRE AREAS

Part G5 of the NCC Volume 1 only applies to designated bushfire-prone areas. If you are not building in one, you don't need to worry about this.

The NCC contains a Verification Method that could be presented as a "Performance Solution." It concerns ignition probability from embers, radiant heat, or flame generated by a bushfire. If the ignition probability rating exceeds 10%, the building design fails.

Builders need to assign an importance level to the building as described in GV5(c), which gives the following salient points:

Level 1 where the building poses low risk to life or other property being affected

Level 2 a Class 2 building for 12 people or less,

Level 3 is for 12 people or more including schools

Level 4 is for special purpose buildings (e.g., sheltering people in a bushfire – public Class 9 buildings, buildings associated with emergency management, or with hazardous facilities)

An ignition probability is assessed by considering airborne and accumulated embers, land design, and the effect of radiant heat. Relevant bushfire scenarios are also subject to an event tree analysis.

The Australian standard for construction in bushfire prone areas is AS 3959. Protection of buildings to AS3959 would then be a "Deemed to Satisfy" solution by following G5.1 and G5.2.

CONCLUSION

External walls of Class 2-9 buildings create a difficult environment for several ARDEX products. Our interpretation is that other areas (i.e., floors and roofs) are not at issue.

External walls can be covered with ARDEX WPM310, ARDEX WPM330, DUNLOP Coloured Render Texture Coat, and DUNLOP Ready to Go Render.

Determining the spread of flame indices for the ARDEX WPM310 and ARDEX WPM 330 would confirm whether they fall under the combustibility exemptions—in this case, they would have to be classified as sarking-type materials.

The status of tile adhesives and grout on external walls is an issue that ARDEX has not resolved to its satisfaction for highly modified adhesives, other than for ARDEX X7, which is non-combustible.

Lift pits require non-combustible systems. ARDEX WPM1000 is used in lift pits, so it may need to be classified as a damp-proof course.

SOME USEFUL DEFINITIONS ACCORDING TO THE NCC2019

Fire resisting – Having an FRL appropriate to that element

FRL – Fire Resistance Level – The grading periods in minutes determined in accordance with Schedule 5 for structural adequacy, integrity and insulation

Combustible – Combustible as determined by AS 1530.1.

Non-combustible – Not combustible as determined by AS 1530.1. When the term is used for an element of a building, EVERY component of the element needs to be non-combustible

Sarking-type materials – A material such as a reflective insulation or other flexible membrane of a type normally used for a purpose such as waterproofing, vapour management or thermal reflectance.

Flammability Index – The index number determined by AS 1530.2

Fire Hazard Properties – Critical radiant flux, flammability index, smoke development rate and other specific tested parameters of a material or assembly. This does not appear to include combustibility from the definition or indeed the fact that there are two separate sections (for the first time ever) in the 2019 NCC.

Designated bushfire prone area – land which has been designated under a power of legislation as being subject, or likely to be subject, to bushfires.

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