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Reference	PKA102FCA R01v1
Project	FireCrunch K-Fire Party Wall Acoustic Opinion
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File	*PKA102FCA R01v1 FireCrunch K-Fire PartyWall Acoustic Opinion.docm*

Dear Ian,

Re: FireCrunch K-Fire Party Wall Acoustic Opinion

The purpose of this letter is to provide an acoustic opinion for the FireCrunch K-Fire Party Wall system, and compare to the airborne sound insulation requirements of the National Construction Code (NCC) separating sole-occupancy units within Class 1 dwellings.

FireCrunch K-Fire Board

The primary product for assessment is the 19mm FireCrunch K-Fire shaft liner (18kg/m^2, 950kg/m^3) board which is a magnesium oxide lining.

The FireCrunch Board was tested as a 10mm product at the Kilargo Acoustic Laboratory (now Resolute Acoustic Laboratory) in Banyo, QLD [Ref: AC-011-15/CT dated March 2015].

Kilargo Acoustic Laboratory Test	Wall Description	Airborne	
		R_w	$R_w + C_{tr}$
AC739WA7/2015	10mm FireCrunch board (9.5kg/m^2) one side of 90mm Rondo steel studs 0.55BMT (cc 600mm)	29	27

Based on the available data we have calculated the 19mm FireCrunch K-Fire shaft liner as a stand-alone board to achieve the following airborne sound insulation performance:

Acoustic Assessment	Wall Description	Airborne	
		R_w	$R_w + C_{tr}$
PKA102FCA	19mm FireCrunch K-Fire shaft liner (18kg/m^2)	32	30

NCC Sound Insulation Requirements

The National Construction Code (NCC), previously the Building Code of Australia (BCA), in Volume 2 Section H406 "Sound Insulation" requires walls to safeguard occupants from illness or loss of amenity as a result of undue sound being transmitted between adjoining dwellings.

The following summarises the acoustic laboratory design requirements, brevity necessitates detail in the NCC taking precedence over the tables below.

Wall Description	Airborne	Impact	NCC 2022	NCC 2019
Separating sole-occupancy units (SOUs) habitable areas	$R_w + C_{tr} \geq 50$		10.71(1)(a)	3.8.6.2(a)(i)
Separating SOUs wet to habitable areas	$R_w + C_{tr} \geq 50$	Discontinuous Construction	10.71(1)(a) 10.71(1)(b)	3.8.6.2(a)(i) 3.8.6.2(a)(ii)

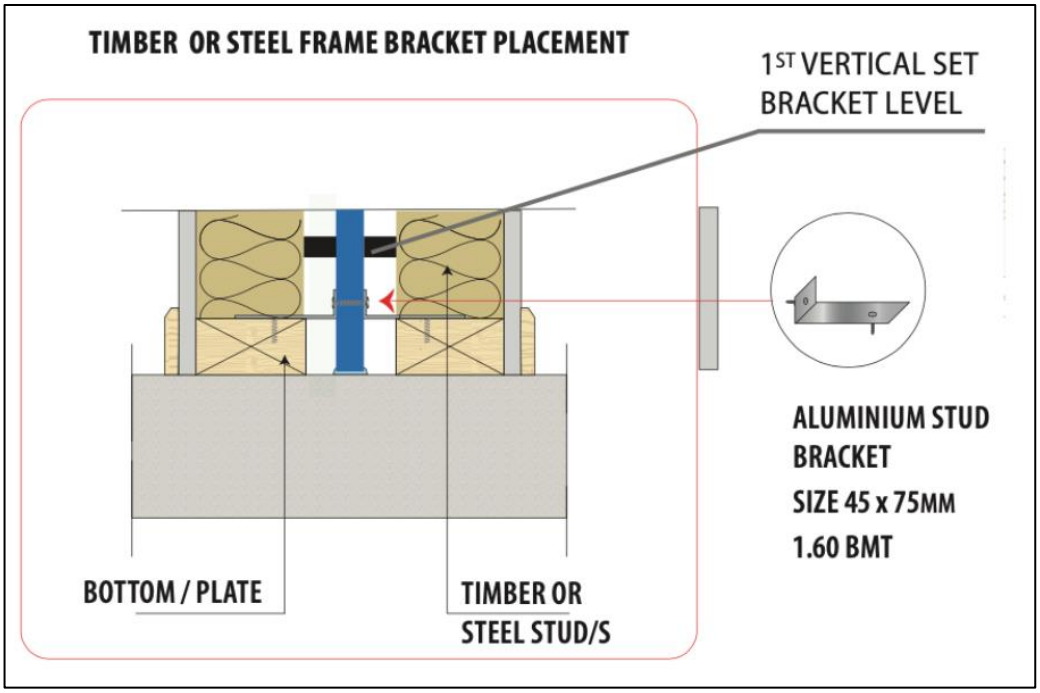
Regarding kitchens, the NCC in Section 10.71 and Section 3.8.6.2(a)(ii) excludes a kitchen as being a habitable room, however this refers to a fully enclosed kitchen which is typically not found in modern low-rise apartments. PKA, along with the majority of acoustic consultants, deem it necessary to provide discontinuous construction for open plan configurations such as kitchen to kitchen, bathroom to kitchen etc.

NCC Discontinuous Construction Configuration

The NCC denotes "Discontinuous Construction" as follows:

Wall Type	Discontinuous Construction Requirement
Masonry	Wall having a minimum 20mm cavity between the 2 separate leaves, with resilient wall ties if necessary
Other than masonry	Wall having a minimum 20mm cavity with no mechanical linkage except at the periphery

For low-rise partywall configurations, the FireCrunch K-Fire shaft liner is located in the core of the wall with studwork either side. As the panel is non-loadbearing, the panel requires connection to the load-bearing studwork by way of aluminium brackets as shown in the diagram below:



Acoustic Assessment

The following acoustic assessment is for a party wall system where the 19mm FireCrunch K-Fire shaft liner is the centre panel.

This acoustic assessment is based on PKA's extensive experience calculating the acoustic properties of lightweight wall systems. The acoustic predictions contained in this assessment are the expected values when tested in an acoustic laboratory and results are calculated in according with the relevant Australian Standards as per the National Construction Code (NCC):

- Airborne R_w and C_{tr} in accordance with AS/NZS ISO 717.1-2004 Acoustics - Rating of sound insulation in buildings and of building elements - Airborne sound insulation

These acoustic predictions result in tolerances within R_w ±2 when validated against acoustic laboratory test results and other supporting information, which have their own inherent variability.

Both Sides	**Lining Options**	min. 13mm standard plasterboard (min. 8.4kg/m^2) min. 10mm water-rated plasterboard (min. 7.9kg/m^2) with floor-to-ceiling tiles
	Stud Options	min. 70mm x 35mm timber studs (cc 450mm or 600mm)
	Insulation Options	min. 75mm glasswool 11kg (min. 11kg/m^3)
	Fixing	Aluminium L brackets at the periphery to achieve discontinuous construction.
	Gap	min. 20mm gap between Panel and Studwork
Panel Installation		19mm FireCrunch K-Fire shaft liner (18kg/m^2)

Studs Both Sides	Insulation Both Sides	Lining Both Sides	R_w	$R_w + C_{tr}$
70mm timber	75mm glasswool 11kg	13mm standard plasterboard	62	50
		10mm water-rated plasterboard with floor-to-ceiling tiles	62	50

The acoustic opinion of the FireCrunch K-Fire party wall achieves $R_w + C_{tr}$ 50 which meets the NCC sound insulation requirements for party walls separating Class 1 dwellings.

Yours faithfully,

Joel Parry-Jones, Principal

PKA Acoustic Consulting