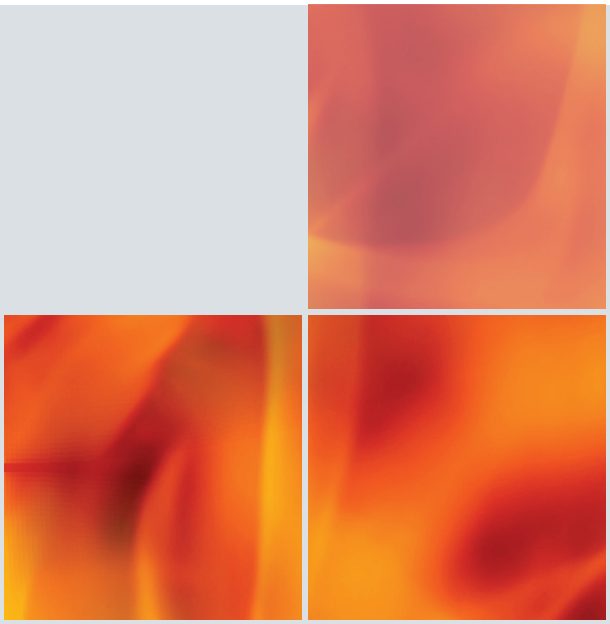
Alphalite Fire & Sound Rating

Technical Manual
South East Queensland

masonry.
build in style

austral masonry™



contents.

Alphalite Fire Resistance Levels (FRLs)

When a masonry wall is subjected to fire, which is usually only on one side, a thermal gradient is created through the thickness of the wall and the expansion of the material causes bowing towards the fire source. If this bowing extends far enough it can cause collapse of the wall. Even if the wall does not collapse, it can crack because of internal stresses caused by restraint of the thermal expansion, or it can heat up sufficiently to allow flammable material on the side away from the fire to ignite. Both these consequences can cause the fire to spread.

Tests for Fire Resistance Level on Austral Masonry ™ Queensland Alphalite ™ lightweight concrete masonry were reviewed by Exova Warrington Australia Pty Ltd. The following fire resistance levels (FRLs) have been calculated using these test results and the relevant clauses from AS 3700 Australian Standard for Masonry Structures: Section 6 Fire Design.

The calculated FRLs are equal to or greater than the deemed-to-satisfy provisions for non-tested masonry units.

Structural Adequacy

Structural adequacy is the ability of a wall to continue to perform its structural function for the fire resistance period.

The fire resistance period for structural adequacy is a function of the slenderness ratio for the wall. It relates to the height of the wall, the thickness of the wall and the restraint at the perimeter. The maximum slenderness ratio for fire (Srf) for Austral Masonry ™ Queensland Alphalite ™ is 26.32 for non-loadbearing walls and 20.63 for loadbearing walls for a fire resistance level of 120 minutes. This compares with a Srf for standard masonry of 16.

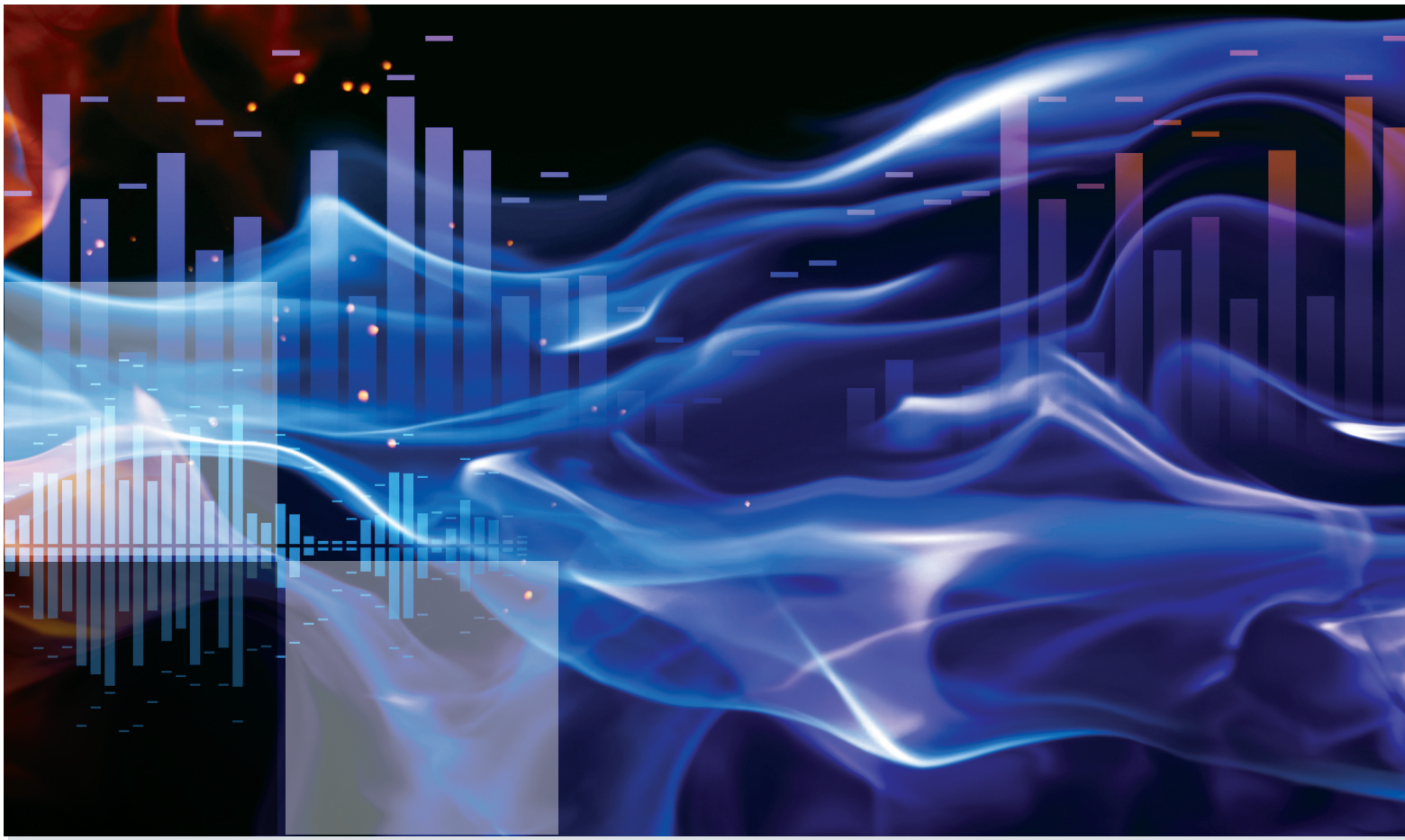
Integrity

Integrity is the ability of a wall to maintain its continuity and prevent the passage of flames and hot gases through cracks in the wall for the fire resistance period. The test result for 90 mm thick Austral Masonry ™ Queensland Alphalite ™ was 240 minutes.

Insulation

Insulation is the ability of a wall to provide sufficient insulation such that the side of the wall away from the fire does not exceed a pre-defined temperature during the fire resistance period. However, it should be noted that at this temperature – a rise of 140°C over the ambient temperature or a maximum of 180 °C – surface finishes and furnishings in contact with or near the wall may combust.

Austral Masonry ™ Queensland Alphalite ™ achieved a fire resistance period for insulation of 120 minutes for a material thickness of 80 mm. This compares with a deemed to satisfy thickness of 120 mm for standard concrete masonry.



How to use this manual to satisfy the required FRL

Insulation

Insulation is the easiest of the fire resistance levels to determine. It is governed by the material thickness of the masonry unit. The 12-01 block, with two cores, has a material thickness of 76mm which achieves a 90 minute FRL for insulation.

All other Alphalite ™ masonry units have a material thickness greater than 80mm, which gives them a minimum 120 minute FRL for insulation, calculated as per AS3700:2011, Clause 6.5.4(b) (ii).

The highest FRL requirement is 240 minutes. Austral Masonry™ achieves this by reducing the core size of the 15-01 block for increased material thickness and insulation performance. To distinguish these from the 120 minute rated blocks, the code number is 15-801.

INSULATION FRL (minutes)					Code Nos.
60	90	120	180	240	
■	■				12-01 (2-core)
■	■	■			10-01; 10-31 & 15-01
■	■	■	■		12-801 & 20-01
■	■	■	■	■	15-801

Integrity

Integrity is determined by calculating the slenderness ratio for fire for the wall member. This is calculated using the height and width of the wall, the thickness of the block and the method of restraint around the wall.

The intergrity FRP is determined to be the lowest value out of insulation and structural adequacy FRL that applies to the wall system.

Structural Adequacy

The structural adequacy FRL depends on the masonry panel's height, length, thickness and restraint conditions around the perimeter. AS3700:2011, Clause 6.3.2.2 is used to calculate the slenderness ratio (Srf) of the wall.

The relevant Srfs for Austral Masonry™ Alphalite ™ masonry are:

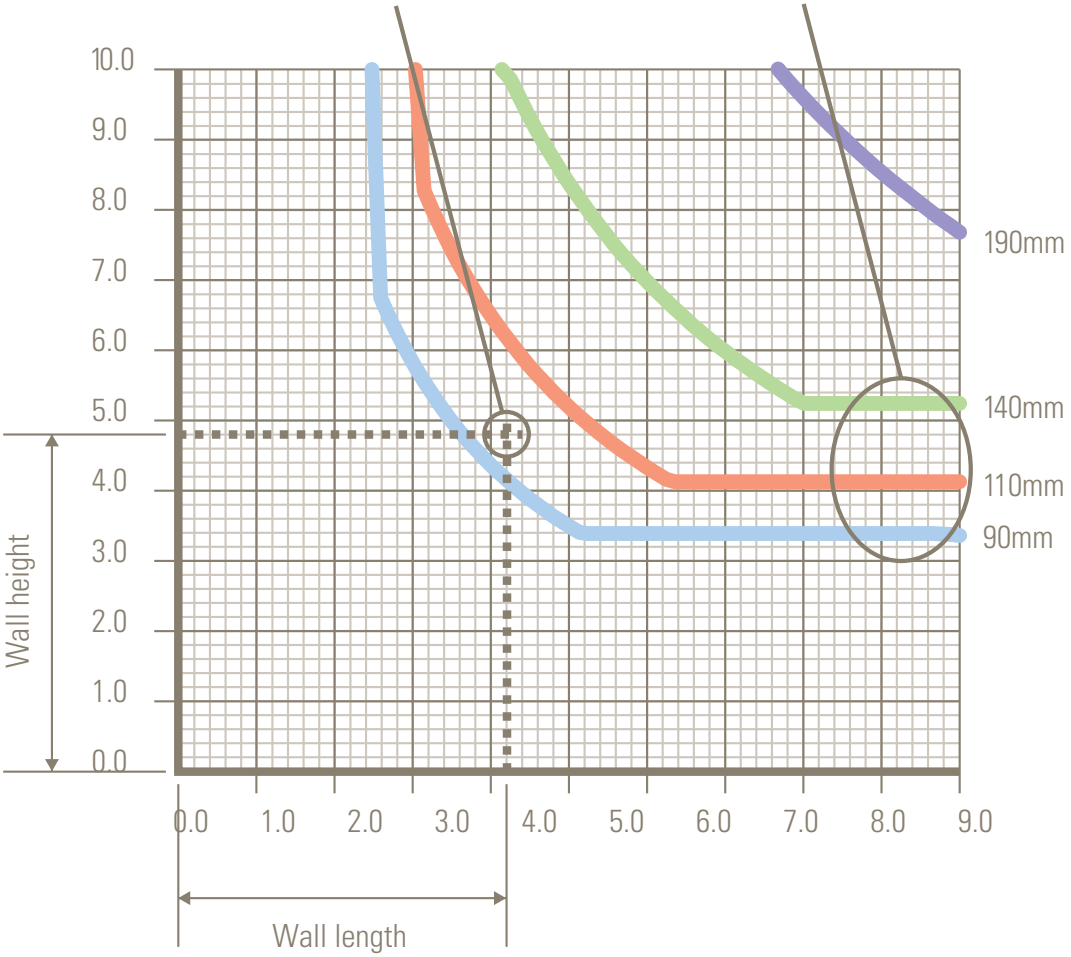
	Loadbearing	Non-loadbearing
120 minute	20.63	26.32
240 minute	15.00	21.17

Alphalite™ masonry that has been designed for other loads (vertical, bending, earthquake etc) can be checked for it's Structural Adequacy FRL by using the following graphs.

Structural Adequacy Charts & Tables

Intersection point, wall is too big for 90mm OK for 110mm thick.

Walls with their intersection point in this area should be checked for Robustness, particularly if one end is unrestrained.



How to use the charts

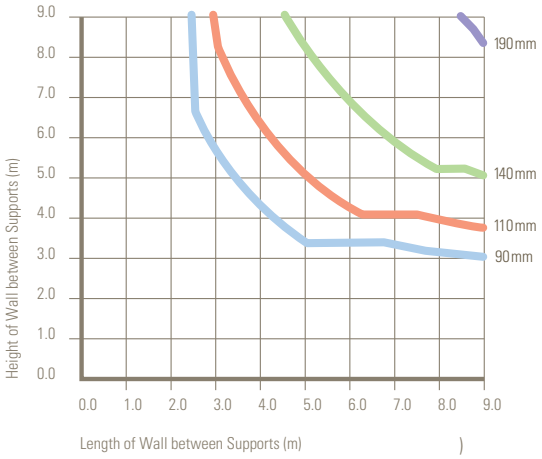
First, find the appropriate load / non-loadbearing bearing page with the required FRL: 60, 90, 120, 180, or 240 minutes.

Next, find the graph with the restraint conditions of your proposed wall.

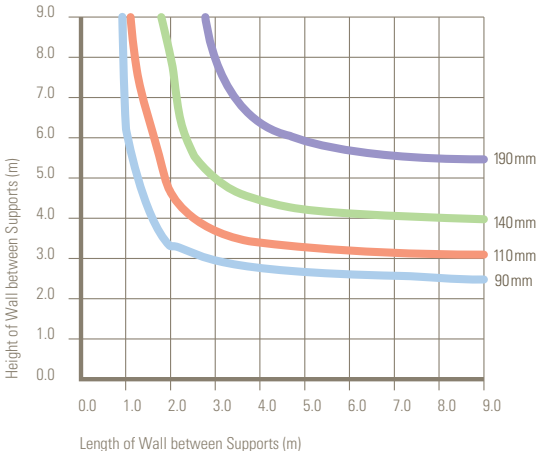
Finally, plot the intersection of your wall's height and length on the appropriate graph. The thickness required is represented by those lines clear of the intersection point.

60 & 90-Minute Structural Adequacy FRL non-loadbearing (Srf ≤ 27.8)

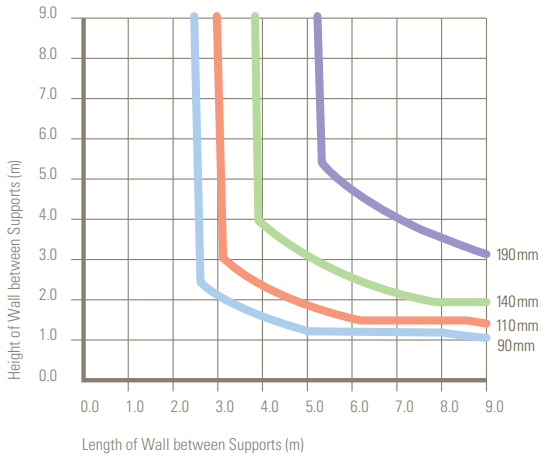
Laterally supported along top, both ends and base.



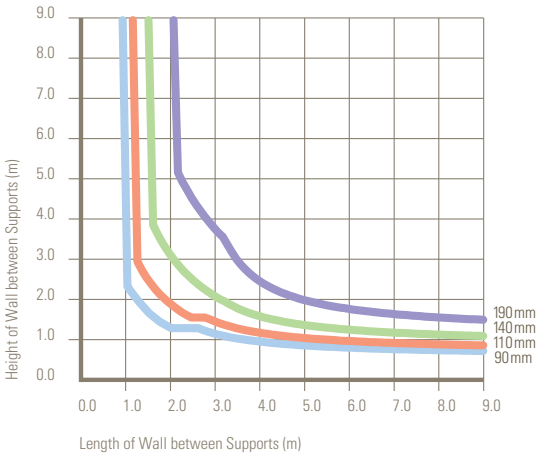
Laterally supported along top, one end and base.



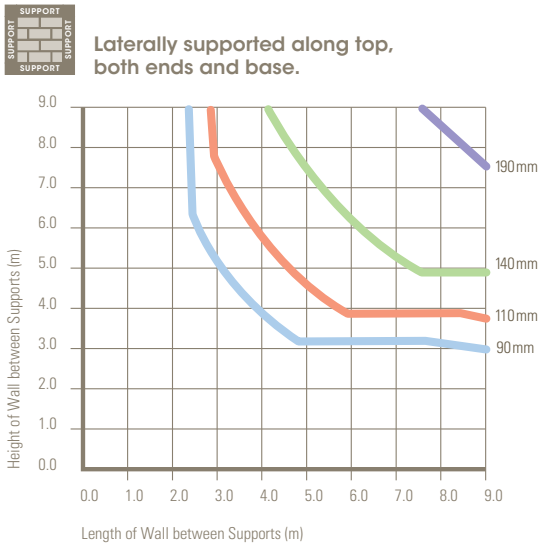
Laterally supported along both ends and base.

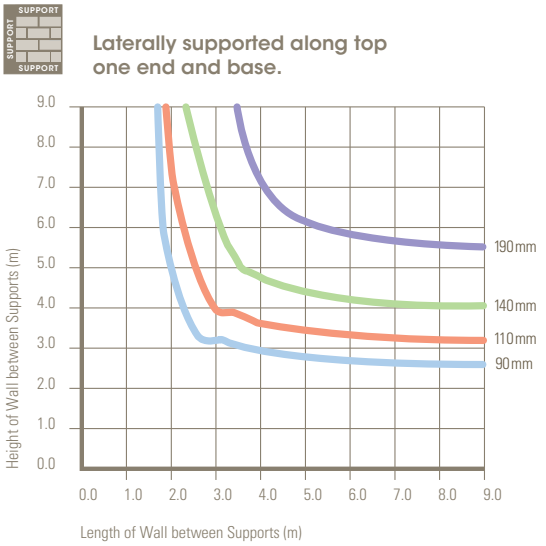


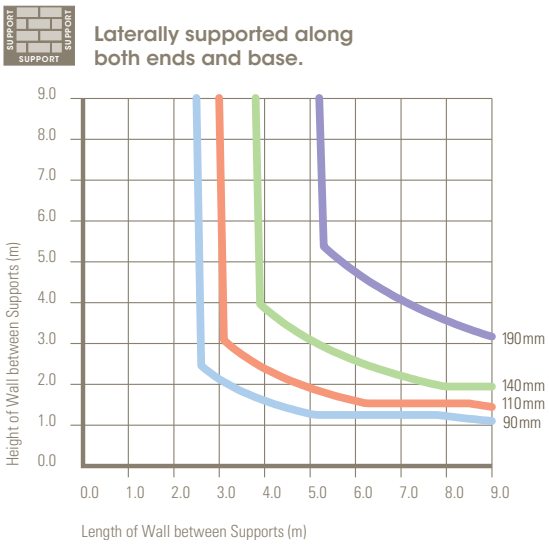
Laterally supported along one end and base.

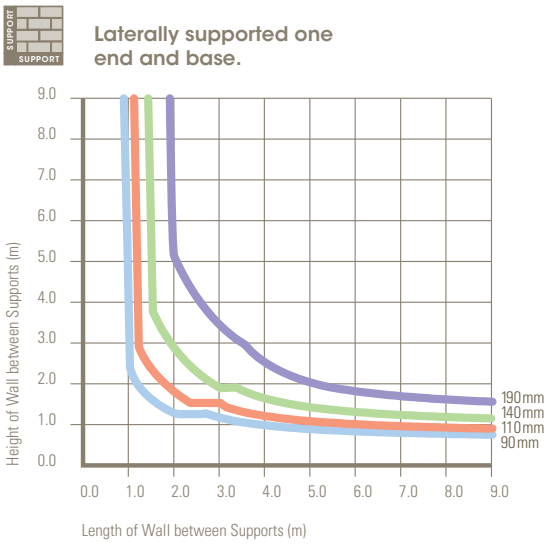


120 Minute Structural Adequacy FRL non-loadbearing (Srf ≤ 26.31)



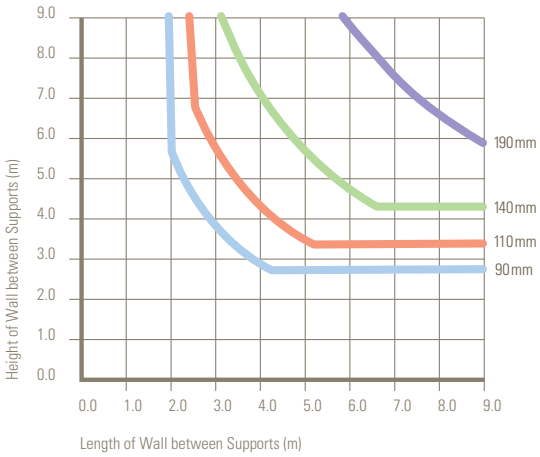




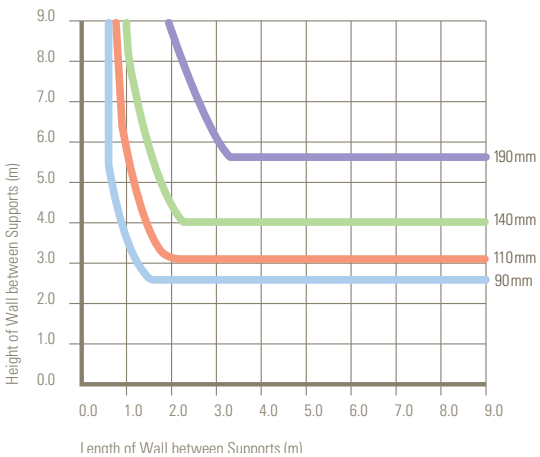


180 Minute Structural Adequacy FRL non-loadbearing (Srf ≤ 23.3)

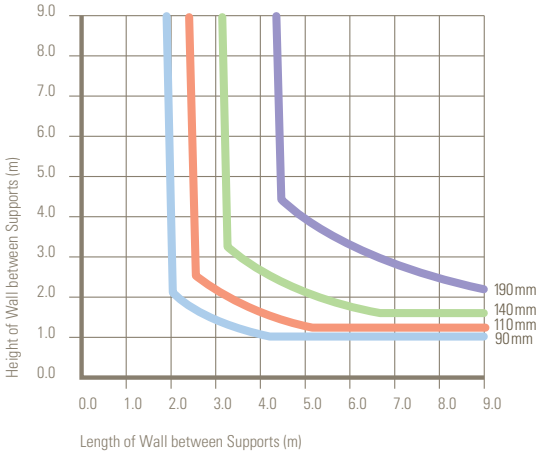
Laterally supported along top, both ends and base.



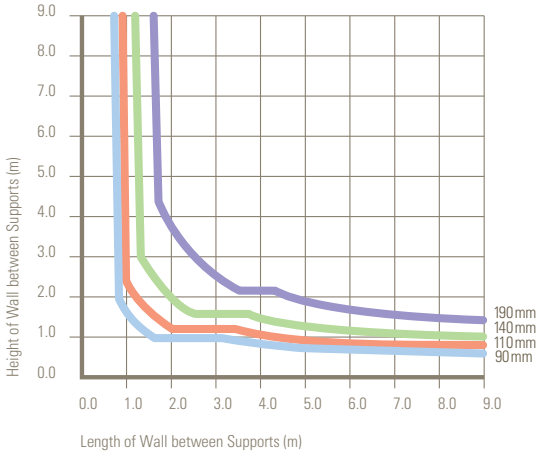
Laterally supported along top, one end and base.



Laterally supported along both ends and base.

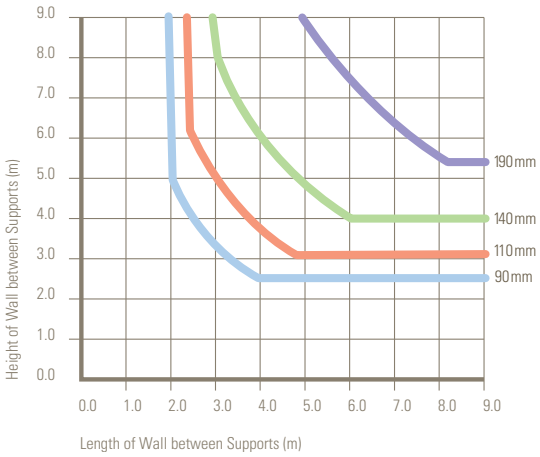


Laterally supported along one end and base.

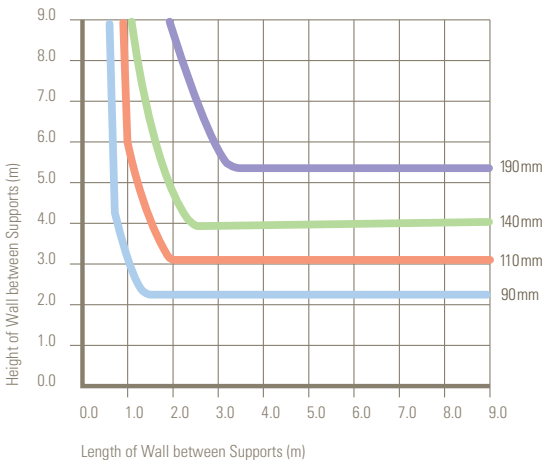


240 Minute Structural Adequacy FRL non-loadbearing (Srf ≤ 21.17)

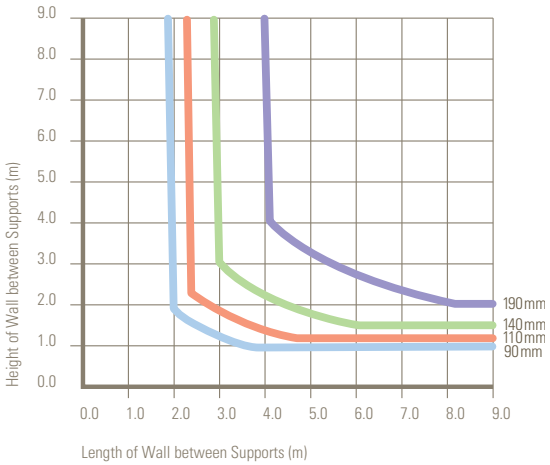
Laterally supported along top, both ends and base.



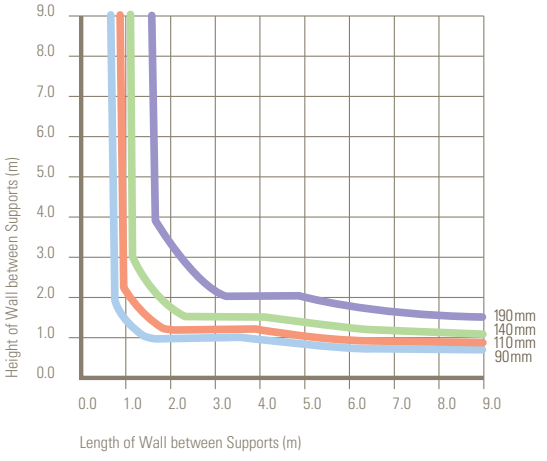
Laterally supported along top one end and base.



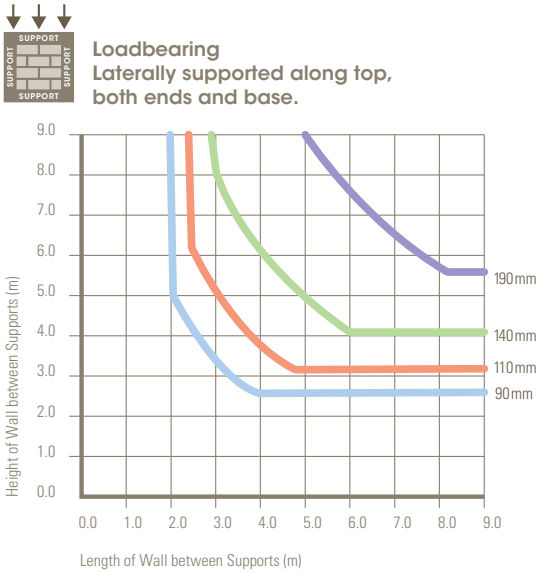
Laterally supported along both ends and base.

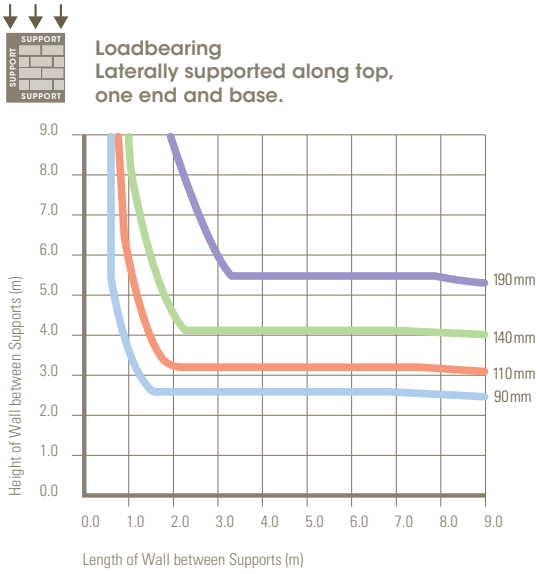


Laterally supported along one end and base.

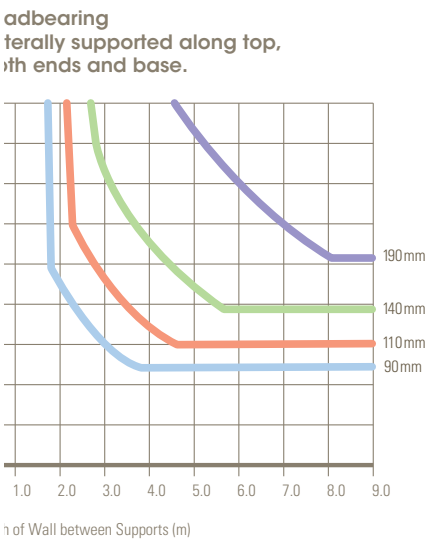


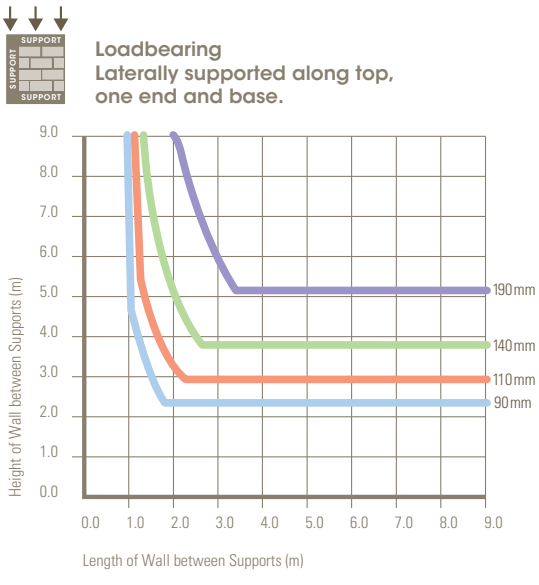
90 Minute Structural Adequacy FRL loadbearing (Srf ≤ 21.86)



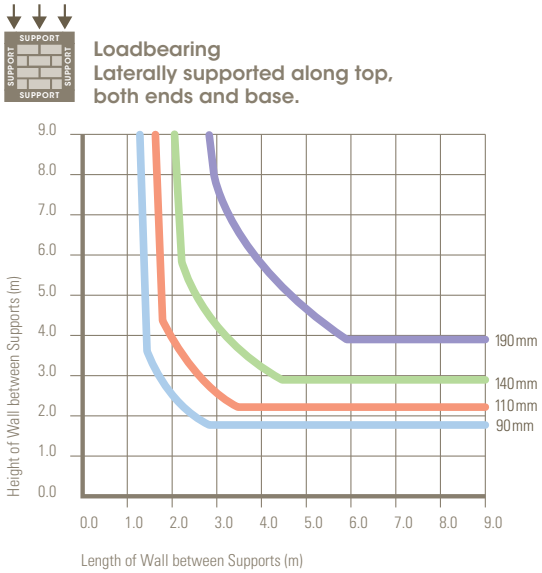


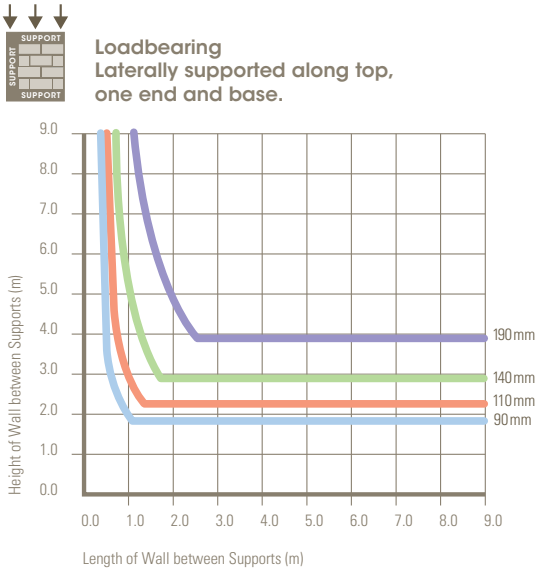
120 Minute Structural Adequacy FRL loadbearing (Srf ≤ 20.63)



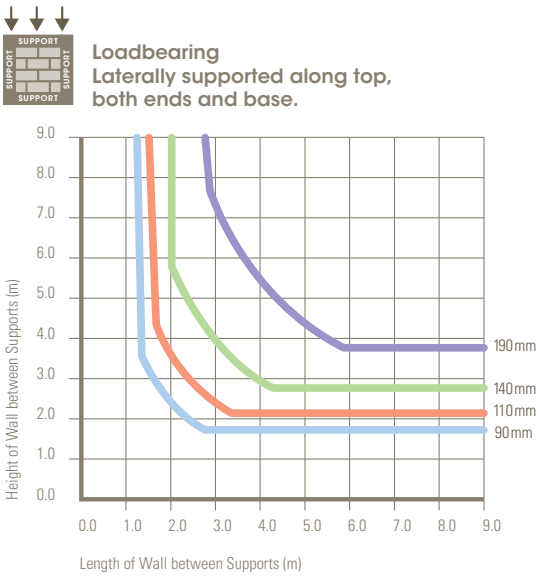


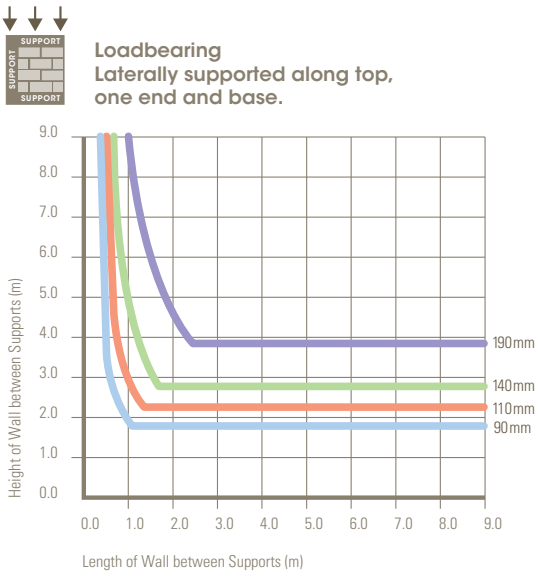
180 Minute Structural Adequacy FRL loadbearing (Srf ≤ 15.5)





240 Minute Structural Adequacy FRL loadbearing (Srf ≤ 15.0)





Acoustic Ratings

This brochure provides guidance on the measurement of acoustic ratings, the BCA requirements for residential buildings and details of testing and development of successful wall systems for Alphalite™ masonry.

The Building Code of Australia (BCA) requires that building elements have certain levels of insulation from airborne noise and impact sound. Rw is the weighted sound reduction index, which is used to measure the acoustic performance of a construction system. It is a single number quantity for the airborne sound insulation rating of building elements. As the acoustic performance of a material or construction improves, the higher the Rw value will be.

The Rw rating system has two correction factors (C and Ctr) which take into account different spectra of noise sources. C relates mainly to high frequency noise while Ctr relates to lower frequency noises. These correction factors are used to indicate the performance drop of the wall in the corresponding frequency range.

Rw + Ctr is the value of the index when the low frequency correction factor (Ctr) is applied. For example, if a wall is measured as Rw (C;Ctr) of 55 (-1;-4) the Rw rating is 55 and Rw + Ctr is 55 + (-4) = 51.

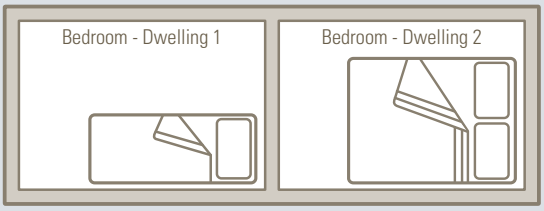
This brochure is designed to provide you with up to date data and information on the acoustic performances of Austral's masonry wall systems.

Building Code of Australia Acoustic Requirements

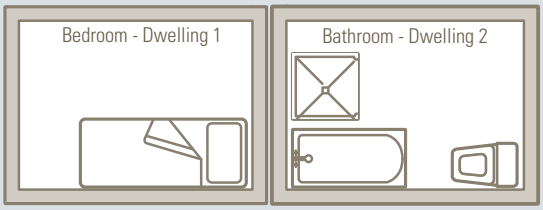
The Building Code of Australia (BCA) requires that walls separating sole-occupancy units in Class 1, 2 and 3 buildings are required to have an Rw + Ctr of not less than 50. In addition, the construction must be discontinuous if the wall separates a habitable room (living room, dining room, bedroom, study and the like) from a wet room (kitchen, bathroom, sanitary compartment or laundry). Walls in Class 2 or 3 buildings that separate a sole-occupancy unit from a plant room, lift shaft, stairway, public corridor, public lobby or the like must have an Rw of not less than 50. If this wall separates a sole-occupancy unit from a plant room or a lift shaft, the construction must be discontinuous.

Discontinuous construction requires a minimum 20mm cavity between two separate leaves. If wall ties are to be used they must be resilient wall ties.

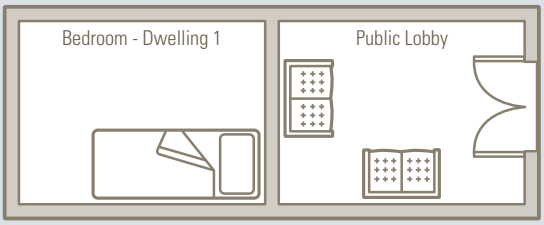
Construction: Habitable to habitable and wet to wet.
Requirements: Rw + Ctr ≥ 50.



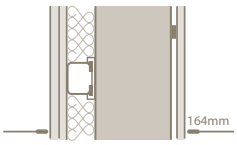
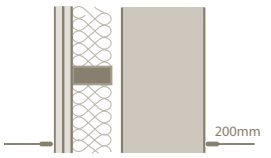
Construction: Habitable to wet.
Requirements: Rw + Ctr ≥ 50 with discontinuous construction.



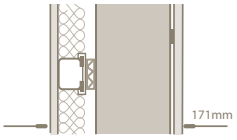
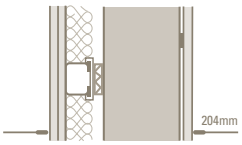
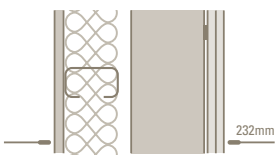
Construction: Sole occupancy to corridor or public area.
Requirements: Rw + > 50 with discontinuous construction (if lift shaft or plant room).



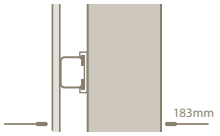
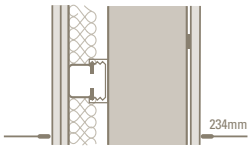
90mm Masonry Systems - Code: Alphalite 10-01 & 10-31

Corridor Wall: Rw ≥ 50 Including unit to stairs, unit to foyer Bare Wall: Rw 40	2 layers of 13mm standard-core plasterboard on 28mm furring channel on standard clips Minimum cavity: 30mm with 25 mm Glasswool or 30mm Polyester in cavity		13mm standard-core plasterboard, daub-fixed
Party Wall: Rw + Ctr ≥ 50 NB: Wall ties must be resilient, to comply with discontinuous construction.	1 layer 13 mm Sound Rated plasterboard on 70mm timber stud, 20mm clear of masonry with R1.5 Glasswool or Polyester		10mm cement render
Party Wall: Rw + Ctr ≥ 50 NB: Wall ties must be resilient, to comply with discontinuous construction.	2 layer 10 mm standard-core plasterboard on 70mm timber stud, 20mm clear of masonry with R1.5 Glasswool or Polyester		Bare Wall

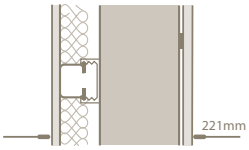
110mm Masonry Systems - Code: Alphalite 12-01

Corridor Wall: Rw ≥ 50 Including unit to stairs, unit to foyer Bare Wall: Rw 42	13mm standard-core plasterboard on 28mm furring channel on resilient clips Minimum cavity: 30mm with 25 mm Glasswool or 30mm Polyester in cavity		13mm standard-core plasterboard, daub-fixed
Party Wall: Rw + Ctr ≥ 50 NB: Not suitable for wet-to-dry areas. See Discontinuous detail below.	2 layers of 13mm standard-core plasterboard on 28mm furring channel on resilient clips Minimum cavity: 50mm with 50mm Glasswool or 50mm Polyester in cavity		13mm standard-core plasterboard, daub-fixed
Party Wall: Rw + Ctr ≥ 50 Discontinuous Construction. Suitable for all Party Walls. If wall ties are required, they must be resilient type.	13mm sound rated plasterboard on 64mm steel studs 20mm clear of masonry with 75 mm Glasswool or 65mm Polyester		2 layers of 10mm standard-core plasterboard

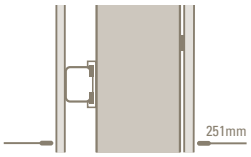
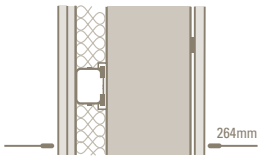
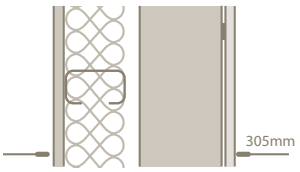
140mm Masonry Systems - Code: Alphalite 15-01

Corridor Wall: Rw ≥ 50 Including unit to stairs, unit to foyer Bare Wall: Rw 43	13mm standard-core plasterboard on 28mm furring channel on standard clips Minimum cavity: 30mm		Bare Wall
Party Wall: Rw + Ctr ≥ 50 NB: Not suitable for wet-to-dry areas. See Discontinuous detail below.	2 layers of 13 mm standard-core plasterboard on 28mm furring channel on standard clips Minimum cavity: 30mm with 25mm Glasswool or 30mm Polyester in cavity		13mm standard-core plasterboard, daub-fixed
Party Wall: Rw + Ctr ≥ 50 Discontinuous Construction. Suitable for all Party Walls. If wall ties are required, they must be resilient type.	13 mm standard-core plasterboard on 64mm steel studs 20mm clear of masonry with 75mm Glasswool or 65mm Polyester		13mm standard-core plasterboard, daub-fixed

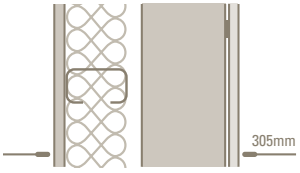
140mm Grouted Systems Block - Code: Alphalite 15-48

Corridor Wall: Rw ≥ 50 Including unit to stairs, unit to foyer Bare Wall: Rw 50	Bare Wall		Bare Wall
Party Wall: Rw + Ctr ≥ 50 **(both options)** NB: Not suitable for wet-to-dry areas. See Discontinuous detail below.	2 layers of 13 mm standard-core plasterboard on 28mm furring channel on standard clips Minimum cavity: 30mm with 25mm Glasswool or 30mm Polyester in cavity		13mm standard-core plasterboard, daub-fixed
	13 mm standard-core plasterboard on 28mm furring channel on standard clips Minimum cavity: 50mm with 50mm Glasswool or 50mm Polyester in cavity		13mm standard-core plasterboard, daub-fixed
Party Wall: Rw + Ctr ≥ 50 Discontinuous Construction. Suitable for all Party Walls. If wall ties are required, they must be resilient type. (No ties are better)	13 mm standard-core plasterboard on 64mm steel studs 20mm clear of masonry with 75mm Glasswool or 65mm Polyester		13mm standard-core plasterboard, daub-fixed

190mm Masonry Systems Block - Code: Alphalite 20-01

Corridor Wall: Rw ≥ 50 Bare Wall: Rw 45 Including unit to stairs, unit to foyer	13 mm standard-core plasterboard on 28mm furring channel on standard clips Minimum cavity: 30mm		13mm standard-core plasterboard, daub-fixed
Party Wall: Rw + Ctr ≥ 50 NB: Not suitable for wet-to-dry areas. See Discontinuous detail below.	2 layers of 13 mm standard-core plasterboard on 28mm furring channel on standard clips Minimum cavity: 30mm with 25mm Glasswool or 30mm Polyester in cavity		13mm standard-core plasterboard, daub-fixed
Party Wall: Rw + Ctr ≥ 50 Discontinuous Construction. Suitable for all Party Walls. If wall ties are required, they must be resilient type.	13 mm standard-core plasterboard on 64mm steel studs 20mm clear of masonry with 75mm Glasswool or 65mm Polyester		13mm standard-core plasterboard, daub-fixed

190mm Grouted Systems Block - Code: Alphalite 20-48

Corridor Wall: Rw ≥ 50 Bare Wall: Rw 50 Including unit to stairs, unit to foyer.	Bare Wall		Bare Wall
Party Wall: Rw + Ctr ≥ 50 NB: Not suitable for wet-to-dry areas. See Discontinuous detail below.	13 mm standard-core plasterboard on 28mm furring channel on standard clips Minimum cavity: 30mm		13mm standard-core plasterboard, daub-fixed
Party Wall: Rw + Ctr ≥ 50 Discontinuous Construction. Suitable for all Party Walls. If wall ties are required, they must be resilient type. (No ties are better)	13 mm standard-core plasterboard on 64mm steel studs 20mm clear of masonry with 75mm Glasswool or 65mm Polyester		13mm standard-core plasterboard, daub-fixed

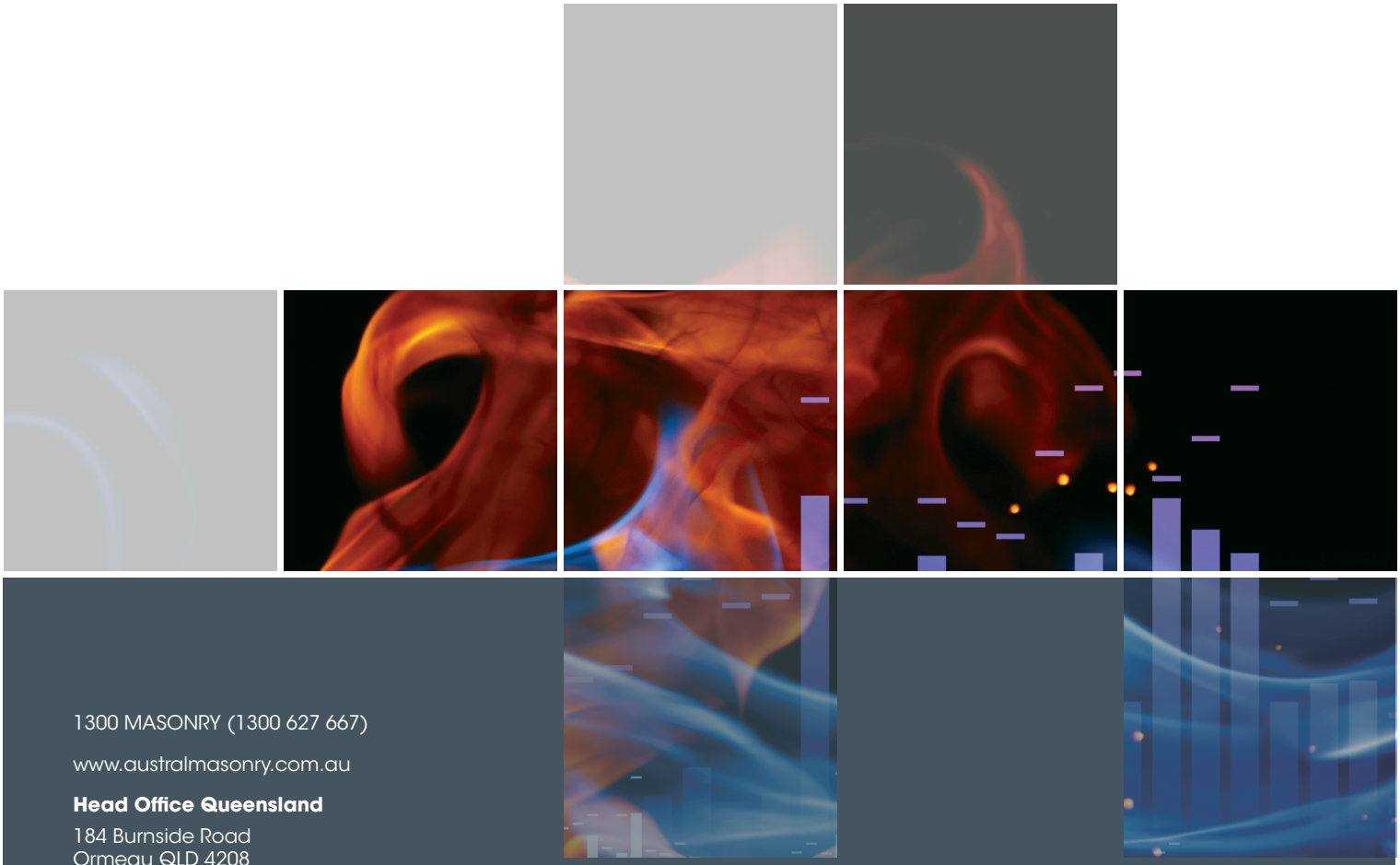
Research and Development

In 2011, the National Acoustic Laboratory tested Austral Masonry's 140mm thick 15-01 masonry block. Test Report 2538-2, for a 140mm masonry block with a 64mm independent stud wall system, achieved Rw + Ctr ≥ 50 which satisfies the minimum BCA requirement for walls separating sole-occupancy units.

This wall also meets the BCA requirement to resist the transmission of impact-generated sound wherever an inter-tenancy wall separates a wet area (bathroom / laundry / kitchen etc) from a habitable room.

This test and other previous tests provided data for Day Design Pty Ltd Acoustic Engineers to provide opinions on the performance of other masonry wall systems.

The 15-01 masonry units achieve the BCA fire rating requirements for low to high-rise home unit walls before adding any lining system.



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The product images in our brochures give a general indication of colour for your preliminary selection.
We recommend you also view current product samples before making your final selection. Printed September 2013

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