METRO BUILDING CONSULTANCY

MEADOWBANK TAFE – MULTI STOREY CAR PARK EXTENSION L3 & 4

CONCEPT REPORT

BUILDING CODE OF AUSTRALIA VOL 1 2019 AMENDMENT 1

OCTOBER 2021

Report prepared for	Hansen & Yuncken Sydney Corporate Park Building 1, L3, 75-85 O'Riordan Street Alexandria NSW 2015 Attention: Sasha Vuckovic
Report prepared by	Metro Building Consultancy Suite 102, 12 Mount Street North Sydney NSW 2060 Consultant: Sean Moore
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Address: Suite 102, 12 Mount Street, North Sydney NSW 2060 | Email: admin@metrobc.com.au | Phone: (02) 9692 8477 | Fax: (02) 8209 4955

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DOCUMENT ACCEPTANCE

Company	Name	Signed	Date
Metro Building Consultancy	Sean Moore		04/10/21

REVISION HISTORY

Description	Prepared by	Revision No.	Date
Car Park Concept Design BCA Report	Alaa Al Qaseer	R01	04/10/21

1.0 Introduction and Documentation

Introduction
Hansen & Yuncken have requested Building Code of Australia 2019 Amendment 1 advice in relation to the BCA compliance of the concept design drawings for the proposed level 2 alterations and addition of the level 3 and level 4 to the Multi-Level Carpark at Meadowbank TAFE.

The information submitted to date has been reviewed for compliance with the Deemed-to-Satisfy provisions of the Building Code of Australia 2019 Amendment 1 excluding Section B structure, part G5 bushfire and Section J energy efficiency. This report is for the exclusive use of Hansen & Yuncken and cannot be used for any other purpose without the prior permission of Metro Building Consultancy. The report is only valid in its entire form.

Documentation available and assessed
The drawings provided by Gray Puksand to Metro Building Consultancy on 22/09/21 and have been assessed for compliance to the Building Code of Australia 2019 Amendment 1. The list of drawings reviewed is as per the table in Appendix A of this report.

Application of Building Code of Australia 2019 Amendment 1
Clause 109R (2) of the Environmental Planning and Assessment Act states that the BCA that is applicable to the project is the one in force at the time of the date of invitation to tender. As the BCA 2019 Amendment 1 is the BCA in forced at the time of the date of invitation to tender for the carpark alteration the BCA that is applicable to the project is to be BCA 2019 Amendment 1.

> 109R Building, demolition and incidental work
> (2) Crown building work cannot be commenced unless the Crown building work is certified by or on behalf of the Crown to comply with the technical provisions of the State's building laws in force as at:
> (a) the date of the invitation for tenders to carry out the Crown building work, or
> (b) in the absence of tenders, the date on which the Crown building work commences, except as provided by this section.

2.0 Use and class of building

The following table lists the uses and classifications of the proposed new levels to the Multi Storey Carpark Building.

Level	Use	Class	Approx. floor area (m^2)
Level 03	Carpark	7a	2,582m2
Level 04	Carpark	7a	2,583m2

The whole carpark building has a rise in storeys of 4. (ground, level 1, level 2 & level 3)

The effective height of the building is 10.2m (level 3 35.950 - ground 25.750 = 10.2m).

Level 4 is not counted as a storey as it does not have a storey or roof over it.

3.0 Construction and fire resistance ratings

The proposed carpark building has a rise in storey of 4 and is required to comply with the Building Code of Australia Type A Construction requirements. These are listed in Appendix B.

The original carpark building had a rise in storeys of 2 (ground & level 1) and was required to comply with the Building Code of Australia Type C Construction requirements.

Exposure to a fire source feature
A part of a building element is exposed to a fire-source feature if any of the horizontal straight lines between that part and the fire-source feature, or vertical projection of the feature, is not obstructed by another part of the building that has an FRL of not less than 30/–/–.

Fire-source feature means—
(a) the far boundary of a road, river, lake or the like adjoining the allotment; or
(b) a side or rear boundary of the allotment; or
(c) an external wall of another building on the allotment which is not a Class 10 building.

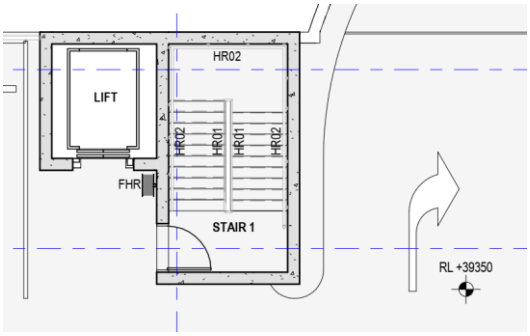
Fire protection for a support of another part
The structural engineer has confirmed in Aconex TTW-CAN-000405 that the FRL's of the existing construction are 2 hours and so can support the 2 hours required by the new BCA Type A Construction requirements in Appendix B.

Enclosure of shafts
Shafts required to have an FRL must be enclosed at the top and bottom by construction having an FRL not less than that required for the walls of a non-loadbearing shaft in the same building, except that these provisions need not apply to:

- the top of a shaft extending beyond the roof covering, other than one enclosing a fire-isolated stairway or ramp; or
- the bottom of a shaft if it is non-combustible and laid directly on the ground

This applies to fire stair shafts, lift shaft and any services shafts eg mechanical services shafts, they must be enclosed at the top with the same FRL as the walls of the shaft or extend above the roof.

The developed design drawings are required to include details of the FRL of the top of the two fire stair shafts and the lift shaft.



Lightweight construction
Lightweight construction required to have an FRL must comply with Specification C1.8 of the Building Code of Australia.

Non-combustible building elements
The external walls of the proposed building are required to be non-combustible i.e. be constructed of a material that is not deemed combustible by AS 1530.1-1994 or falls under the concessions in BCA C1.9.

Provide details of the external wall construction for review.

Fire Hazard Properties
All new floor, wall and ceiling linings are to comply with the requirements of Clause C1.10 and Specification C1.10 of Building Code of Australia 2019 Amendment 1.

The laboratory test results for any proposed new linings should be obtained prior to specification to ensure that they comply with the BCA requirements for floor finishes.

Ancillary elements
An ancillary element (i.e. an element that is secondary to and not an integral part of another element to which it is attached) must not be fixed, installed or attached to the internal parts or external face of an external wall that is required to be non-combustible unless it is also non-combustible or one of the permitted elements listed under BCA clause C1.14.

Provide details of the external wall construction for review.

Compartmentation
The Building Code of Australia 2019 Amendment 1 does not place a maximum fire compartment size for open deck carparks. Provide details of the cladding to the sides of the building and confirmation that it will permit the building to comply with the BCA open deck carpark requirements below.

> *Open-deck carpark means a carpark in which all parts of the parking storeys are cross-ventilated by permanent unobstructed openings in not fewer than 2 opposite or approximately opposite sides, and—*
> *(a) each side that provides ventilation is not less than 1/6 of the area of any other side; and*
> *(b) the openings are not less than ½ of the wall area of the side concerned.*

Spandrels
Spandrel protection is not required in an open deck car park.

Provide details of the cladding to the sides of the building and confirmation that it will permit the building to comply with the BCA open deck carpark requirements below.

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> *(a) each side that provides ventilation is not less than 1/6 of the area of any other side; and*
> *(b) the openings are not less than ½ of the wall area of the side concerned.*

Lift shaft
The lift shaft is required to be fire rated as it connects more than 2 storeys.

The drawings provided do not show the fire rating level of the walls of the lift. Please ensure that an FRL of 120/120/120 is achieved for the walls of the lift shaft and a note stating the fire rating level is added to the updated plans.

In addition, it should be noted that the top of this fire rated lift shaft is required to have an FRL of 120/120/120.

Lift Motor Room
Any proposed lift motor room and lift control panels must be fire separated from the remainder of the building by construction that achieves an FRL of at least 2 hours.

Battery Rooms
Any rooms that contain a proposed a battery system that has a total voltage of 12 volts or more and a storage capacity of 200 kWh or more must be fire separated from the remainder of the building by construction that achieves an FRL of at least 2 hours.

Battery system means one or more chemical cells connected in series, parallel or a combination of the two for the purpose of electrical energy storage.

Electricity supply equipment
If the main switchboard sustains emergency equipment operating in the emergency mode it must be separated by construction having an FRL of not less than 120/120/120 and have any door protected with a self-closing fire door having an FRL of not less than -/120/30.

Emergency equipment operating in the emergency mode include fire hydrant pumps, fire hose reel pumps and the fire indicator panel etc.

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Openings in fire-isolated stairs
The doors into the two fire stairs are required to self closing -/60/30 fire doors.

Openings in fire-isolated lift shafts
The entrance doorway to the lift shaft must be protected by –/60/– fire doors that comply with AS 1735.11 1986 and are set to remain closed except when discharging or receiving passengers, goods or vehicles.

A lift call panel, indicator panel or other panel in the wall of a fire-isolated lift shaft must be backed by construction having an FRL of not less than –/60/60 if it exceeds 35 000 mm2 in area.

Openings in floors and ceilings for services
Where a service passes through a floor that is required to have an FRL with respect to integrity and insulation the service must be protected by a shaft complying with Specification C1.1 or in accordance with BCA Clause C3.15 and Specification C3.15.

Openings for Services Penetrations
Openings for services penetrations in any fire rated construction must be fire sealed in accordance with the requirements of BCA Clause C3.15 and Specification C3.15.

4.0 Egress

Principles
The building's egress systems should be designed to ensure compliance with the following principles:

- The maximum distance of travel to an exit will be 40 metres, and to a point of choice will be 20 metres, the distance between alternate exits is not to exceed 60 metres.
- The distance between alternate exits is to be not less than 9 metres.
- The construction and discharge of exits, landings, thresholds, balustrades and handrails are required to meet the requirements of the BCA.
- All paths of travel are to be a minimum of 1000mm in clear width.
- Exit doors should swing in the direction of travel i.e. outwards and should have a minimum clear width of 750mm (850mm for accessible doors complying with AS 1428.1-2009).
- All doors should be free passage from the side that a person is seeking egress.
- The threshold of all doors (both sides) must be flush or provided with a threshold or kerb ramp.
- Handrails along stairs and ramps are required to have a minimum height of 865-1000mm.
- Balustrades are required to have a minimum height of 865mm along stair flights and 1m along landings and walkways where the drop is greater than 1m.
- Balustrades are not permitted to have an opening greater than 125mm.
- Balustrades that protect a fall of more than 4m are not permitted to facilitate climbing within a 150-760mm zone measured from floor level.
- Electrical, comms or mechanical distribution boards installed along a path of travel to an exit are required to be enclosed by non-combustible construction or a fire protective covering with doorways or openings suitably sealed against smoke spreading from the enclosure.

Number of exits
The building is required to be provided with at least one exit per storey and at least one exit is provided per storey.

Fire stairs
As the stairs serve as a required exit for more than 2 storeys they are required to be fire isolated.

Travel distances
The BCA requires a maximum travel distance of 20m to a point of choice, a maximum distance of 40m to an exit and a maximum distance of 60m between alterative exits. The layout of level 3 and 4 complies with these requirements.

Dimensions of exits and paths of travel
All paths of travel are required to have a minimum clear width of 1m.

Travel via fire stairs and discharge of Exits
The discharge from the two fire stairs are assessed in the base building (Ground to level 2) assessment.

Installation in paths of travel
Electrical, comms or mechanical distribution boards installed along a path of travel to an exit are required to be enclosed by non-combustible construction or a fire protective covering with doorways or openings suitably sealed against smoke spreading from the enclosure.

Enclosure of space under stairs and ramps
All stairs serving the building are required for egress and the space below these stairs must not be enclosed to form a cupboard or other enclosed space.

Stairs
The proposed stairs are required to be provided with risers and goings that have a constant dimension throughout the flight and with a handrail with a height of 900mm.

The treads or nosing strips of the external stairs must have a slip-resistance classification not less than P4 when tested in accordance with AS 4586-2013.

The treads or nosing strips of the internal stairs must have a slip-resistance classification not less than P3 when tested in accordance with AS 4586-2013.

Provide further details for review.

Landings
Landings are required to have a maximum gradient of 1:50 and must be not less than 750mm long, and where this involves a change in direction, the length is measured 500mm from the inside edge of the landing.

The edge of any proposed landings or the nosing strips of the proposed new landings must have a slip-resistance classification not less than P4 when wet and P3 when dry when tested in accordance with AS 4586-2013.

Door thresholds
The threshold of a doorway must not incorporate a step or ramp at any point closer to the doorway than the width of the door leaf unless it is provided with a threshold ramp or step ramp in accordance with AS 1428.1-2009.

Balustrades
A balustrade with a minimum height of 1m is required to be provided to protect a fall of more than 1m eg 1100mm.

Any balustrade protecting a drop of more than 4m must not have any horizontal or near horizontal elements between 150 mm and 760 mm above the floor that facilitates climbing. A construction tolerance is also recommended to this eg a 100-800mm no climb zone.

All balustrade are required to not have any openings greater than 125mm and a construction tolerance should be added eg 100mm.

Please provide further details of the proposed anti climb mesh for assessment.

Please ensure that services are not proposed to the balustrades (eg light fittings, wiring etc)

Handrails
Handrails along the stairs ramps are required to have a height of 865-1000mm.

Exit door swing
All new exit doors are required to swing in the direction of travel i.e. outwards.

Swinging Doors
A swinging door in a required exit or forming part of a required exit is required to swing in the direction of egress ie outwards.

Door hardware
The door hardware to all proposed swing and sliding doors must be readily openable without a key from the side that faces a person seeking egress by:

- a single hand downward action on a single device which is located between 900 mm and 1.1 m from the floor and be such that the hand of a person who cannot grip will not slip from the handle during the operation of the latch and have a clearance between the handle and the back plate or door face at the centre grip section of the handle of not less than 35 mm and not more than 45mm or
- a single hand pushing action on a single device which is located between 900 mm and 1.2 m from the floor.

Construction tolerances
Note that it is very important to incorporate construction tolerances into the design, while the minimum balustrade height may be 1m any balustrade specified to be installed at 1m may be installed at 995mm which is non-compliant and will have to be modified to comply.

5.0 Accessibility

Disabled access complying with the requirements of Part D3 of Building Code of Australia 2019 Amendment 1 and the relevant parts of AS 1428.1-2009 and AS 1428.4.1-2009 is required to be provided to and within any level containing accessible carparking spaces.

As only the ground floor contains accessible carspaces the BCA only requires disabled access to the ground floor.

Access to buildings
Disabled access is required to be provided to the building from the main points of a pedestrian entry at the allotment boundary.

Disabled access is required to be provided to the building from another accessible building on site that is connected by a pedestrian link.

Continuous accessible paths of travel
The minimum unobstructed height of a continuous accessible path of travel is required to be 2m or 1.98m at doorways and the minimum width is required to be 1m and 850mm at doorways.

Fixtures and fittings such as lights, awnings, operable parts of windows, telephones, skirtings, essential fixtures and fittings such as fire hose reels, fire extinguishers and switchboards are not permitted to intrude into the minimum unobstructed width.

Floor or ground surfaces on continuous accessible paths of travel and circulation spaces
The access requirements include a requirement that the abutment of surfaces shall have a smooth transition. Design transition shall be 0 mm. Construction tolerances shall be 0 ±3 mm for vertical changes in level and 0 ±5 mm provided the edges have a bevelled or rounded edge to reduce the likelihood of tripping.

Grates provided along a continuous accessible path of travel and in circulation spaces are required to comply with the following:

- Circular openings shall be not greater than 13 mm in diameter.
- Slotted openings shall be not greater than 13 mm wide and be oriented so that the long dimension is transverse to the dominant direction of travel.

Slip Resistance

A continuous accessible path of travel and any circulation spaces shall have a slip-resistant surface. The texture of the surface shall be traversable by people who use a wheelchair and those with an ambulant or sensory disability. The following table lists the minimum slip resistance classifications for common locations.

Location	Wet pendulum test	Oil-wet inclining platform test
External ramps steeper than 1:14	P5	R12
External ramps and walkways not steeper than 1:14	P4	R11
Wet areas eg toilets	P3	R10
Transitional areas	P2	R9
Dry areas	P1	R9
Stair tread or landing surface - Dry	P3	R10
Stair tread or landing surface - Wet	P4	R11
Stair nosing or landing edge strip - Dry	P3	-
Stair nosing or landing edge strip - Wet	P4	-

All new and modified floors are required to comply with these slip resistance requirements including the proposed sealant to the concrete floors etc.

The slip resistance for the floor finishes is required to be stated on the design documents.

Accessible carparking

The BCA requires 1 accessible carspace for every 100 carparking spaces or part thereof.

The drawings state that 395 carspaces are to be provided in the proposed carpark including level 3 and 4. The BCA states that this requires at least 4 accessible carspaces to be provided. The ground floor drawings state that 6 accessible carspaces are to be provided.

The accessible carspaces are required to comply with the requirements of AS/NZS2890.6 2009 which includes the following requirements:

- A minimum width of 2.4m and minimum length of 5.4m to the carspace;
- A minimum width of 2.4m and minimum length of 5.4m to the shared space;
- The dedicated space and the shared area are required to be at the same level;
- A bollard is required to be provided in the shared space 750-850mm from the front of the shared space and along the centre line;
- The accessible carspace and related walking and wheelchair unloading areas are required to comprise a firm plane surface with a fall not exceeding 1:40 in any direction (1:33 if the surface is a bituminous seal and the parking space is out of doors). These areas shall have a slip-resistant surface.
- Where kerb ramps are to be provided, they are required to be placed at a front or rear corner of the parking space;
- Dedicated parking spaces shall be outlined with unbroken non-slip yellow lines 80-100mm wide on all sides excepting any side delineated by a kerb, barrier or wall;
- Shared areas shall be outlined with unbroken non-slip yellow lines 80-100 mm wide on all sides excepting any side delineated by a kerb, barrier or wall, and marked with diagonal stripes 150-200 mm wide with spaces 200-300mm between stripes. The stripes shall be at an angle of 45 ±10 degrees to the side of the space.
- A minimum clearance of 2.5m over the carspace as per the requirements of AS/NZS2890.6 2009.

6.0 Services and Equipment

The following is a status of the services required to be provided to the building.

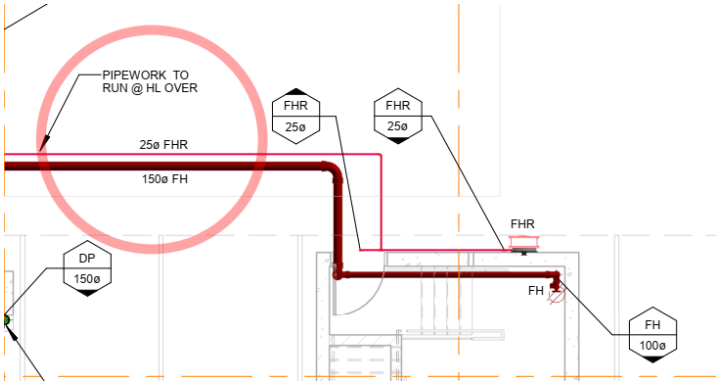
Fire Hydrants

As the new building has a floor area that exceeds 500m^2 it is required to be provided with fire hydrant coverage in accordance with BCA Clause E1.3 and AS 2419.1-2005.

Provide the updated hydraulic services drawings showing the hydrant locations.

The hydraulic services drawings are required to include details of how the internal fire hydrant pipework support comply with clause 8.7.4 of AS2419.1 2005 below. As the building is not provided with sprinklers this clause applies and the pipework is required to be protected. Please refer to the product in the following link as an example of suitable protection https://www.progressivematerials.com.au/product/protect-a-pipe/.

8.7.4 Fire rating of pipework supports
Where pipework is likely to be exposed to fire in a building that is not protected by sprinklers, then the pipe supports shall have a FRL not less than 60/–/–, while maintaining a pipe-support temperature of not less than 500°C when tested in accordance with AS 1530.4; or other measures shall be taken to prevent its early collapse when exposed to fire.



Fire Hose-Reels
As the new building has a floor area that exceeds 500m^2 all areas are required to be provided with fire hose reel coverage in accordance with BCA Clause E1.4 and AS 2441-2005.

Sprinklers
The Building Code of Australia 2019 Amendment 1 does not require sprinklers to be provided to open deck carparks. Provide details of the cladding to the sides of the building and confirmation that it will permit the building to comply with the BCA open deck carpark requirements below.

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> *(a) each side that provides ventilation is not less than 1/6 of the area of any other side; and*
> *(b) the openings are not less than ½ of the wall area of the side concerned.*

Portable Fire Extinguishers
Portable fire extinguishers are required to be provided in accordance with BCA Clause E1.6 and AS 2444-2001.

Electric and electrohydraulic passenger lifts
An electric passenger lift installation and an electrohydraulic passenger lift installation must comply with BCA Specification E3.1.

Warning signs
The lift call buttons must be provided with warning signage stating DO NOT USE LIFT IF THERE IS A FIRE.

Emergency Lighting and Exit Signs
Exit signs and an emergency lighting system must be provided and must be in accordance with the BCA Clause E4.2, E4.4, E4.5, E4.6, E4.8 and AS 2293.1-2018.

The electrical services drawings are required to note that the maximum height of directional exit signs is 2700mm from the finished floor to the top of the exit sign.

7.0 Health and Amenity

Stormwater drainage
The stormwater drainage must comply with AS/NZS 3500.3-2018.

Room Sizes
The passageways are required to have a minimum height of 2.1m.

All stairs are required to have a minimum height of 2m.

Light and Ventilation
Artificial lighting must be provided to all corridors, lobbies, other circulation spaces and paths of egress. The artificial lighting system must comply with AS/NZS 1680.0-2009.

The Building Code of Australia 2019 Amendment 1 does not require mechanical ventilation to be provided to open deck carparks. Provide details of the cladding to the sides of the building and confirmation that it will permit the building to comply with the BCA open deck carpark requirements below.

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> *(b) the openings are not less than ½ of the wall area of the side concerned.*

8.0 Energy Efficiency

Artificial Lighting
The design stage services consultants design certificates are required to include a confirmation that the services comply with the requirements of BCA Section J.

Facilities for energy monitoring
The design stage services consultants design certificates are required to include a confirmation that the services comply with the requirements of BCA Section J.

9.0 Conclusion

The design drawings provided to date has been assessed in respect to the deemed to satisfy provisions of the Building Code of Australia 2019 Amendment 1 excluding Section B structure and Section J energy efficiency.

The design is at a point where the design can be developed, further reviews are required to be carried out during the next design stages and prior to the completion of the design.

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APPENDIX A – DRAWINGS REVIEWED

Architectural drawings prepared by Gray Puksand

Drawing number, name & revision	Drawing number, name & revision
GP-AR-SKT-C0012 – Level 2 Sketch Plan – Rev 1	GP-AR-SKT-C0013 Level 3 Sketch Plan – Rev 1
GP-AR-SKT-C0014 Level 4 Sketch Plan – Rev 1	GP-AR-SKT-C0020 – Proposed Carpark – 3D Views – Rev 1

APPENDIX B – TYPE A CONSTRUCTION REQUIREMENTS

The following table lists the fire resistance levels for the proposed new five storey building.

Building Element	Fire Resistance Level in minutes Structural adequacy/Integrity/Insulation Required for Class 5 & 9b
External wall (including any column and other building element incorporated therein) or other external building element, where the distance from any fire source feature to which it is exposed is -	
For *loadbearing* parts	
Less than 1.5m	120/120/120
1.5 to less than 3m	120/90/90
3m or more	120/60/30
For *non-loadbearing* parts	
Less than 1.5m	-/120/120
1.5 to less than 3m	-/90/90
3m or more	-/-/-
External column not incorporated in an external wall -	
For loadbearing columns	120/-/-
For non-loadbearing columns	-/-/-
Common wall and fire walls	120/120/120
Internal walls	
Fire resisting lift and stair shafts	
Loadbearing	120/120/120
Non-loadbearing	-/120/120
Bounding *public corridors*, public lobbies and the like	
Loadbearing	120/-/-
Non-loadbearing	-/-/-
Between or bounding *sole-occupancy units*	
Loadbearing	120/-/-
Non-loadbearing	-/-/-
Ventilation, pipe, garbage, and like shafts not used for the discharge of hot products of combustion	
Loadbearing	120/90/90
Non-loadbearing	-/90/90
Other loadbearing internal walls, internal beams, Trusses and columns	120/-/-
Floors	120/120/120
Roofs	120/60/30

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