METSEC
METFRAME

July 2023
Issue 1

METFRAME SPECIFICATION GUIDE

Metsec's Offsite Panelised System

voestalpine Metsec plc
www.metsec.com

voestalpine
ONE STEP AHEAD.

TRUST

- MetWALL Perform, our 30 year wall performance warranty
- Free CPD seminars
- £5m professional indemnity insurance as standard
- UKAS accredited testing
- Collateral design warranty
- Site inspections
- Colour coding for value engineering
- Approved installer list
- Load bearing system suitable up to 15 storeys
- Multiple choice of plasterboard and sheathing board with test data
- Free CAD/Revit design on infill jobs over 1000m²
- 90 years experience

#trustmetsec

BOPAS Buildoffsite Property Assurance Scheme · UKCA · CE · EPD Hub

bsi ISO 9001 Quality Management Systems CERTIFIED · ISO 14001 Environmental Management CERTIFIED · ISO/IEC 27001 Information Security Management CERTIFIED · ISO 45001 Occupational Health and Safety Management CERTIFIED

bsi BES 6001 Responsible Sourcing of Construction Products CERTIFIED

CONTENTS

INTRODUCTION

Metframe is voestalpine Metsec's modern, factory fabricated, pre-panelised framing solution. Manufactured off-site in a controlled, dry, high precision factory environment, Metframe panels and components offer a level of tolerance, efficiency, speed of supply and accelerated build time that simply can't be matched using traditional on-site techniques. Sustainability is at the forefront of Metframe buildings which can offer zero waste and a low carbon footprint.

Tight sites provide no barrier to construction when using Metframe. With projects often fitted between existing structures on tight inner-city sites, the Metframe system can be managed to work within confined spaces. Coordination of delivery sizes to match restrictive access into sites can be planned and managed within the office environment to avoid issues later arising on-site.

Boundary conditions from adjacent buildings driving the external wall fire performance can all be designed into the overall supplied product. Backed up by the extensive fire performance data that comes as standard with the Metframe system.

The Metframe Specification Guide is intended to enable design teams to make informed choices when specifying our Metframe system. We can offer a market leading choice of fire and acoustic laboratory data, through wall build-ups to meet your required U-value and standard Metframe junction details for architectural detailing. This guide contains the most commonly chosen solutions to meet both client and regulatory requirements, however our technical team are always on hand to provide tailored advice for your project needs.

ELEMENTS COVERED ARE AS FOLLOWS:

- **Off-site manufacturing to achieve factory level tolerances on-site**
- **Metframe External wall**
- **Metframe Party wall/Corridor**
- **Metframe internal walls**
- **Metframe internal floors**
- **Metframe roofs**
- **Metframe stairs**
- **Metframe lift shafts**
- **Metframe interaction with different ground bearing slabs or podiums by others**
- **Metframe HR design**
- **Metframe Balcony Support.**

Whilst all the information included is current at the time of review please visit our website to view the full and most up to date system choices, review our Introduction to Metframe Brochure, 3D interactive details or catch up with our latest animation of a Metframe in action at **www.metsec.com/products/metframe/**

To contact a Metframe representative and discuss your requirements in further detail visit: **www.metsec.com/online-meeting-enquiry-metframe/**

STANDARDISATION THROUGH DIFFERENTIATION

What differentiates us?

voestalpine Metsec have an enviable reputation for their market leading support driven by its people. Provided from decades of in-house technical knowledge built over the last thirty years.

Investment in people nurtured from high calibre graduates, and from our industry leading apprentice program ensures that the knowledge is retained, developed and passed on for the benefit of all of our customers. This manifests itself in establishing award winning in-house software solutions with top tier software houses creating bespoke solutions. This allows us to seamlessly translate 3D models to physical structures on-site.

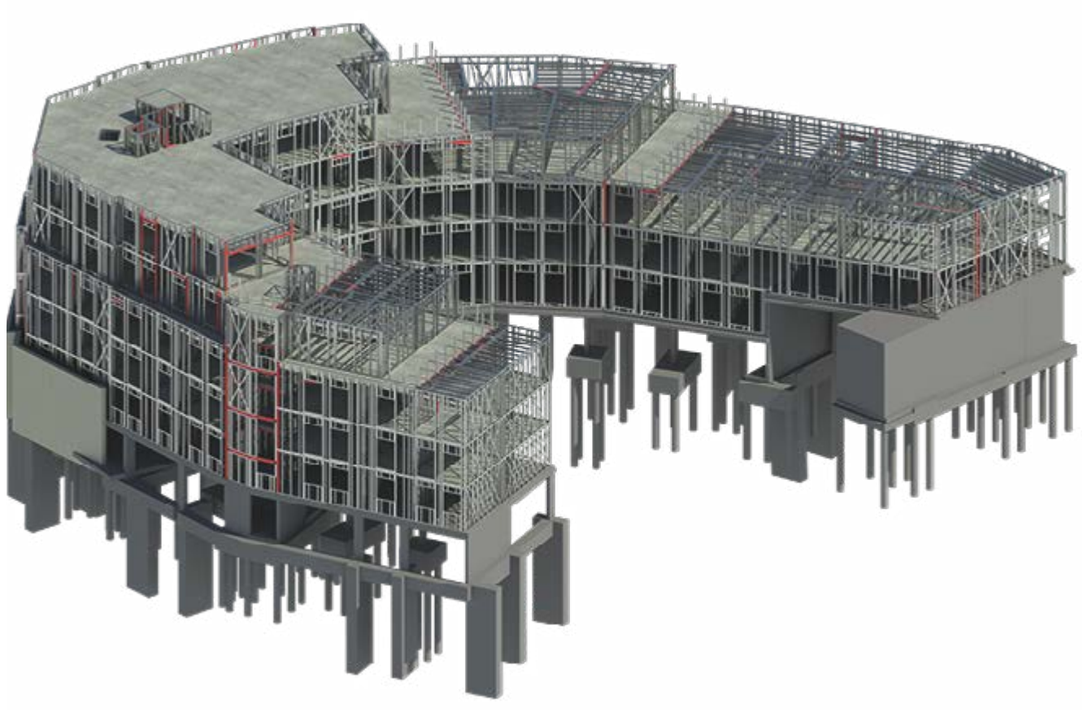
Utilising Metframe's individually tailored route to market we are able to offer the most cost-efficient solutions for each stage of the project process by allowing specific areas of expertise to engage at key points. Rather than offer a single standardised approach, Metframe and our key strategic partners are able to offer their knowledge and expertise at each relevant stage from the initial design conception stage through to project completion.

voestalpine Metsec were the first tier two company to achieve the highly respected BSI kitemark for BIM Level 2 which means on a project there is a far easier integration of Metframe within the design team. The movement of the industry to implement a consistent approach to project management is a requirement that voestalpine Metsec and Metframe is already well placed to accommodate.

DIFFERENTIATION THROUGH STANDARDISATION

We understand that being different within the industry is not always about providing alternative solutions, it is being able to provide a consistent high-level approach which is far more standardised. Every building we undertake is unique, but standardisation of approaches and details at a higher level allows bespoke buildings to be designed and erected in a more efficient route, providing ongoing cost savings both on and off-site.

- From the initial conceptual stage, your design team members have access to our concise details library online that provides trusted solutions for a large amount of different building details
- Covering elements from simple member connections through to complex balcony supports
- Early engagement via a managed standardised approach provides solutions that create efficiencies
- Large, ongoing investment program to bring the most up to date fire and acoustic data direct to the customer allows us to provide market leading, independently accredited data direct to the industry without compromising choice
- Well established nationwide support network backed up by our in-house technical team
- Individual project solutions can be discussed directly. Trusted and tested solutions can drive cost efficiencies whilst balanced against the specific client's requirements.



KEY BENEFITS

The list of Metframe's benefits is a long one, the system offers a number of clear commercial and technical advantages to our customers.

SPEED

- Pre-fabricated off-site construction gives a fast build program, typically 30% faster build time compared to traditional methods
- Early Dry Envelope can be achieved
- NHBC/SCI Accredited Edge Protection system tailored to suit each individual project
- Floor typically constructed in 2-3 weeks, based on 1000m^2 floor areas
- Stairs and lift shafts installed as the building progresses floor by floor
- Faster completion dates can lead to earlier occupancy leading to overall project savings against more traditional build methods.

TECHNICAL KNOWLEDGE AND SUPPORT – BIM LEVEL 2

- In-house 3D design
- In-house engineers with decades of experience in light gauge steel framing
- Using the most up to date detailing software that links directly in with our modern on-site manufacturing facility
- The ability to translate from theoretical models to physical structures is easy
- A huge catalogue of tested data that encompasses all the major board manufacturers for both fire and acoustic performances, internal and external
- Metframe offers not only a cost benefit but also provides safe, industry leading solutions
- Collaborative working environment
- Hot rolled steel integrated into the 3D model.

ENVIRONMENTAL

- Engineered solution to exact building requirements results in zero waste for the main structure
- High thermal and acoustic performance solutions
- Lightweight construction
- ISO 14001 – Environmental management system
- BES6001 – Responsible sourcing of products – very good standard
- ISO 45001 – Occupational Health and Safety Management certification
- FORS – Silver Accredited for HGV Metsec deliveries
- Less time on-site and small build teams means lower environmental impact on the site and surrounding areas.

FLEXIBILITY

- Different types and complexity of structures are easily incorporated within the Metframe system
- Our system caters for:
  - Balconies
  - Lift shafts
  - Brickwork support
  - Stair cases
  - Walkways
- Independent and accredited edge protection system
- Plasterboard packs and bathroom pods can be coordinated during the build phase
- Window support can be designed
- Suitable for use with a variety of external finishes
- New Metsec range offers savings in cost and weight.

QUALITY AND UKAS ACCREDITED TESTING

- Precision steel design with a high degree of tolerance and dimensional accuracy means no shrinkage
- Metsec has some of the most up to date fire and acoustic data for any LGS frame available
- Our fire performance data is tested or assessed at the UK's leading Test Centre – The BRE – over 250 combinations
- Technical accuracy leading to factory tight tolerance in an on-site built environment
- We have a BSI Kitemark for BIM Level 2
- We are UKCA & CE Marked up to EXC 4
- We have NHBC/SCI approval up to 15 storeys
- Our structural engineers are able to assist with design
- We work with specialist installation partners
- Information Security Management system accreditation
- Manufactured in a controlled factory environment.

ACCREDITATIONS

UKCA	**UKCA Certificate** **BS EN 1090 1:2009+A1:2011**	UK Conformity Assessed marking is a mark that indicates conformity with the applicable requirements for products sold within Great Britain.
CE	**CE Marking Certificate** **EN 1090-1:2009+A1:2011**	CE marked products are a legal requirement for the Metframe market as of 1st July 2014
bsi BIM Design and Construction KITEMARK™	**Kitemark Certificate** **BS EN ISO 19650-2:2018 (BIM)**	An international standard for managing information over the whole life cycle of a built asset using building information modelling (BIM).
SCI NHBC	**SCI/NHBC Stage 1 System Certification for Metframe Systems**	NHBC Standards require manufacturers of light steel frame systems to submit a system manual to SCI for assessment. This is a requirement for obtaining an NHBC Warrantee for the building. The NHBC/SCI approval covers buildings up to 15 storeys.
CONSIDERATE CONSTRUCTORS SCHEME	**Considerate Constructors Certificate**	Designed to encourage best practice beyond statutory requirements. voestalpine Metsec is awarded a rating of 'excellent' across all areas of assessment.
BOPAS Buildoffsite Property Assurance Scheme	**Build off site Property Assurance Scheme (BOPAS)**	BOPAS provides assurance that construction systems designed, manufactured and installed by voestalpine Metsec will conform to industry best practices in terms of durability and system integrity.
bsi BES 6001 Responsible Sourcing of Construction Products CERTIFIED	**Responsible Sourcing of Construction Products BES 6001:Issue 3.1**	To ensure and then prove that our products have been made with constituent materials that have been responsibly sourced.
bsi ISO 50001 Energy Management CERTIFIED	**Energy Management System** **ISO 50001:2018**	This certification demonstrates our commitment to continual effort in establishing, implementing, maintaining and improving an energy management system.
bsi ISO 9001 Quality Management Systems CERTIFIED	**Quality Management System** **ISO 9001:2015**	This standard demonstrates our ability to consistently provide products and services that meet customer and regulatory requirements.
bsi ISO 14001 Environmental Management CERTIFIED	**Environmental Management System** **ISO 14001:2015**	This is the principal management system standard that specifies the requirements for the formulation and maintenance of an EMS. This helps to control your environmental aspects, reduce impacts and ensure legal compliance.
bsi ISO 45001 Occupational Health and Safety Management CERTIFIED	**Occupational Health & Safety Management System ISO 45001:2018**	An international standard for health and safety at work developed by national and international standards committees independent of government.
bsi PAS 99 Integrated Management Systems CERTIFIED	**Integrated Management Registration** **PAS 99:2012**	Helps us achieve benefits by integrating the common requirements of all management system standards and specifications and managing these requirements effectively.
bsi ISO/IEC 27001 Information Security Management CERTIFIED	**Information Security Management System** **ISO/IEC 27001:2013**	An information security standard created by the ISO, which provides a framework and guidelines for establishing, implementing and managing an information security management system (ISMS).

SUSTAINABILITY

voestalpine Metsec are fully committed to protecting the environment and we are continually looking for new ways to improve our environmental performance.

voestalpine Metsec is committed to undertaking its activities in an efficient and financially sustainable manner in-line with environmental best practice and meeting the requirements of ISO 14001. This will be achieved by complying with applicable laws and regulations and by reducing environmental impacts from our operations. Environmental management through process improvements, good manufacturing, pollution control practices and employee education is a primary management objective, as well as a responsibility of every voestalpine Metsec employee. voestalpine Metsec's aim is to provide its customers with products with the best added value but with the lowest environmental impact in terms of production, use and disposal.

COUNTDOWN TO ZERO

Metsec is part of the voestalpine Group and they are working to meet a challenge; the goal of zero carbon emissions in the Metal Forming Division by 2035. Already today, numerous projects to save energy, optimise processes, source green electricity, or even to generate our own renewable energy are underway at our locations around the world, together with efforts to motivate our suppliers to implement their own climate protection measures.

ISO 50001

ISO 50001 helps organisations improve its energy performance and reducing its environmental impact. The ISO 50001 standard for energy management systems can help safeguard our future by making a positive difference in the here and now.

Achieving ISO 50001 certification within Energy Management Standards portrays voestalpine Metsec's commitment to energy efficiency throughout the business, working towards a beneficial, secure long term energy supply and heightening employee awareness.

EPD

An Environmental Product Declaration (EPD) is required on major developments in London.

Architects, developers, building services engineers or sustainability engineers will require an EPD to ensure the energy strategy for any major projects in London, meets planning requirements at design stage.

voestalpine Metsec's publication of the EPD underlines the company's commitment to sustainability and follows swiftly on the heels of its parent company, voestalpine AG, announcing a major initiative to achieve net zero carbon emissions in its Metal Forming Division by 2035, some fifteen years ahead of the targets set by the Intergovernmental Panel on Climate Change.

Assurance of a system's environmental credentials comes from a manufacturer's Environmental Product Declaration (EPD). Compiled in accordance with EN 15804+A2 and ISO 14025/ISO 21930, the EPD covers all aspects of the products' environmental credentials, from manufacture and transport to end of life. The EPD includes a life-cycle assessment and environmental impact data comprising core environmental impact indicators, use of natural resources and end of life information.

Verified by independent EPD authority, EPD Hub, the declaration provides designers, specifiers and developers with comprehensive information to include in a project's sustainability assessment.

CE UKCA EPD Hub CO_2UNTDOWN TO ZERO

METFRAME CPD INFORMATION

If you are looking to increase your knowledge of steel framing systems, including design and specification, the Metsec Metframe CPD seminar provides a comprehensive and engaging opportunity to do so.

Our Metframe CPD seminar provides the following:

- Introduction to Metframe and its applications
- Key benefits of the Metframe system
- Construction sequence
- Design and detailing process including BIM
- Wall build ups and performance data

Metsec has many years of experience working with main contractors, architects, engineers and sub-contractors to efficiently design and supply Metframe systems. There is no company better placed to get your Metframe knowledge up to speed.

For more information on the Metsec Metframe CPD seminar, please get in touch. **metsec.plc@voestalpine.com**

METWALL PERFORM WARRANTY

MetWALL Perform, is an industry changing 30 year warranty giving architects, developers and contractors reassurance when specifying through wall products on voestalpine Metsec steel frame systems.

This is an important addition to voestalpine Metsec's unique Framing range providing warranted UKAS tested wall combinations, enabling clients to select the most cost effective performance design solutions.

The warranty is an insurance backed product, based on the wide-ranging performance of voestalpine Metsec's own test assessments. voestalpine Metsec has accumulated this test data over years of dynamic testing at UKAS approved testing facility.

All test data is based on unique UKAS accredited tests and UKAS recognised scope of testing:

Fire

- Based on testing to BS EN 1364-1:2015 for infill walling and BS EN1365-1:2012 for load bearing systems
- Solutions for multiple sheathing board options including RCM Y-Wall, Euroform Versaroc, Siniat Weather Defence, British Gypsum Glasroc X and Knauf Windliner
- Solutions for both Rockwool Duoslab and Knauf Rocksilk insulation.

Acoustic

- Tested performances for wall and floors to meet building regulations part E
- Solutions to meet Part E +5dB and Silver standard in Scotland
- All laboratory acoustic tests carried out in accordance with BS EN ISO 10140-2:2010 and BS EN ISO 140-3:1995
- If Acoustic performance figure is assessed, it will clearly state this and on what basis in the performance tables within this document.

Thermal

- Solutions ranging from a U-value of 0.3 down to 0.1
- Non-combustible insulation options
- All U-Values are based on calculations carried out by voestalpine Metsec plc to BS EN ISO 6946 and BR 443. The example values are based on published values for the stated insulation types. U-Value calculations should be verified by the insulation provider..

Structural

- High Strength, low weight steel sections designed to BS EN 1993
- Design department run by our own employed chartered structural engineers.

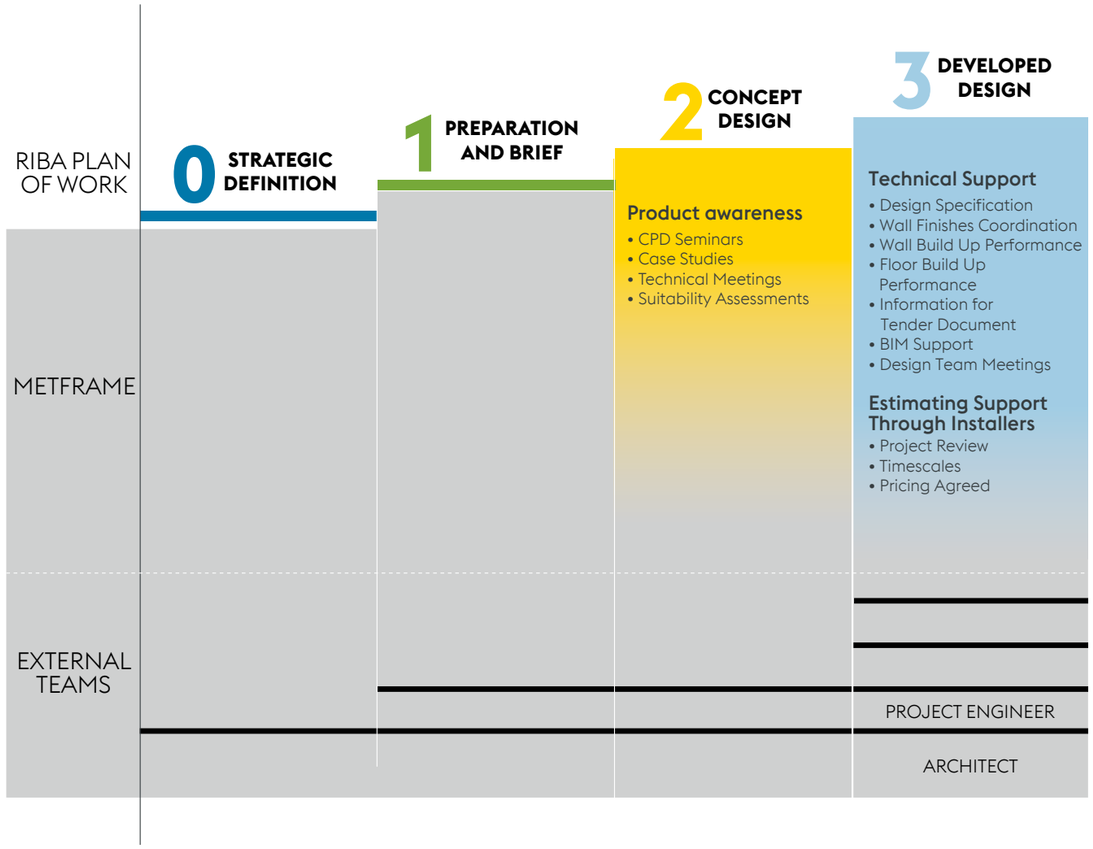
METSEC 30 YEAR WARRANTY

OUTSIDEIN INSIDEOUT TECHNOLOGY

METFRAME RIBA
PLAN OF WORK

Early engagement with Metsec can enable the design team to ascertain the feasibility and demonstrate value in the system. Our in-house expertise and national support team are available to discuss and develop projects with you. Engaging with us at Concept Design stage provides the most cost efficient structural solution.

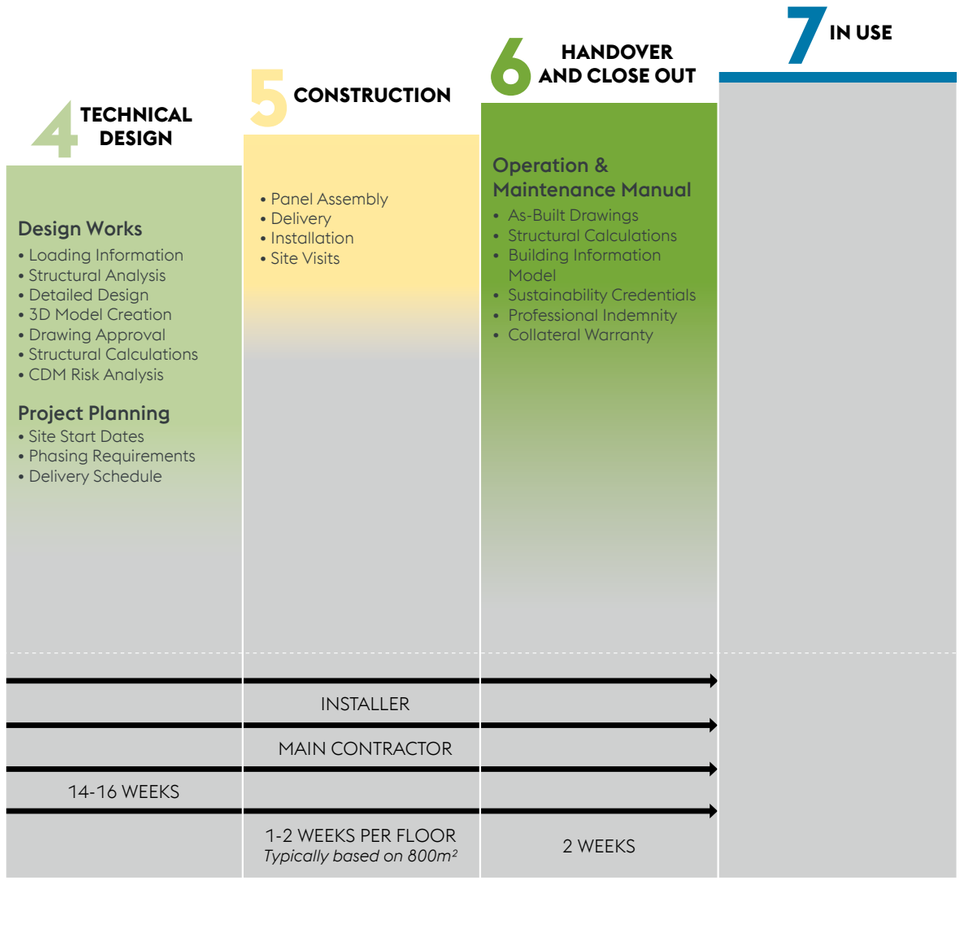
Our support continues through the Developed Design stage where our experienced in-house Engineers provide design schemes to ascertain programme and cost plans, and look at efficiencies in the frame, finishes and linings.



Once the project is successfully awarded the full structural calculations are carried out and then modelled in a BIM compliant 3D format using Tekla. This enables design teams to integrate models allowing clash detection and overall set out checks to be carried out. From this base model deliveries are coordinated in line with the just-in-time sequence. The model can also assist in achieving environmental targets by manufacturing with zero waste.

Once the finished frame is signed off by the design team we manufacture the cold rolled sections in precise lengths and the panels are assembled off-site by approved Metfame installers. External wall panels are typically pre-clad with a non-combustible sheathing board, to ensure a weather resistant envelope is achieved quickly. Site visits can be undertaken by Metsec to ensure the quality of the finished frame.

After project completion, Metframe can provide drawing information updated to “As Built” status, supported with a set of structural calculations for the clients operations and maintenance manual. This is all supported by an insurance backed collateral warranty from voestalpine Metsec plc part of the multi-national voestalpine AG.



THE CONCEPT
THE METHOD

CPD

voestalpine Metsec plc offer CPD's and seminars to help increase your understanding of the Metframe system including its benefits and limitations. Please contact us for more details.

INITIAL CONSULTATION

Initial Design feasibility can be carried out by our in-house experienced engineers with cost and program provided by one or all of our experienced installation partners.

DESIGN WORK

voestalpine Metsec's in-house design team will create a BIM compliant model. Metsec were the first manufacturer in the UK to obtain BIM Level 2 accreditation for model and BIM objects. The advantages of BIM in this collaboration stage means tighter tolerances with less unforeseen errors on-site.

OFF-SITE MANUFACTURE

Sections are manufactured to bespoke lengths at Metsec straight from the 3D model ensuring accuracy. The panels are then assembled by a Metsec approved installer in their production facilities.

External wall panels can be pre clad with UKAS accredited tested combinations of sheathing boards, and insulation. This enables a weather tight envelope to be achieved quickly, and also ensuring you hit the regulatory requirements for fire, thermal and acoustics.

DELIVERY TO SITE

Panels are scheduled to be delivered in the required erection sequence ensuring efficiency in the build process.

ERECTION OF PANELS

Panels are then craned into position, where they are fixed down and bolted together by voestalpine Metsec approved installation partners. Further panels are quickly fixed into position.

Wall panels incorporate cross bracing in order to provide stability to the structure reducing the need for hot rolled steel or concrete.

INSTALLATION OF STAIRS, LIFT SHAFTS, PLASTERBOARD AND BATHROOM PODS

An integral part of the Metframe system is the installation of stairs and lift shafts as each floor is constructed. This reduces the need for external scaffold for access to upper levels, reducing cost, providing convenience and speed to the erection process.

Fast and efficient erection is also helped by the ability to crane in bathroom pods and plasterboards packs for follow on trades, speeding up overall build programme.

METAL DECKING INSTALLED AND CONCRETE POUR

Composite metal decking is installed and fitted onto to the Z ledger incorporated within walls panel. Rebar and crack control mesh is installed to meet the buildings specific fire and robustness requirements. (Lightweight steel joisted floors can be utilised as an alternative to concrete.) Concrete is poured into place to form a floor offering high fire and acoustic performance. The concrete floor enable's this modern method of construction to still achieve a traditional feel once inhabited.

SUBSEQUENT FLOORS ERECTED AND FINISHED BUILDING

This process is repeated and subsequent floors are typically constructed at a rate of 2-3 weeks. Certain follow on trades can start as soon as work progresses to the floor above. The structural roof solution is installed which with the flexibility of the Metframe system, allows this to be formed flat or pitched to suit the aesthetics of your building. These can be formed in concrete, lightweight steel roof cassettes, steel purlins or timber trusses.

Click on the i symbol for more information

METFRAME ROOFS

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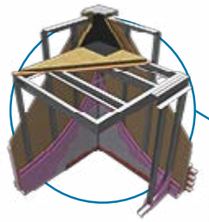

METFRAME LIFT SHAFTS

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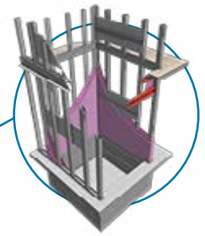

METFRAME STAIRWELLS

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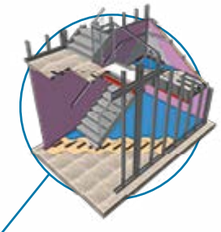

METFRAME BALCONIES

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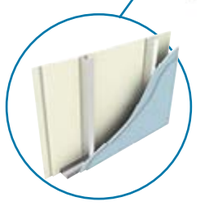

METFRAME INTERNAL WALLS

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METFRAME INTERNAL FLOORS

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METFRAME EXTERNAL WALLS

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METFRAME PARTY WALL AND CORRIDOR WALL

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METFRAME
EXTERNAL WALLS

Typical build-ups based on brickwork, rainscreen, timber cladding and insulated render façades. Each option uses either Rockwool Duo Slab or Kingspan K15 foil faced insulation to the external face and additional ISOVER 50mm APR 1200 insulation to the cavity of the Metframe stud.

Option 1

Type EC1i: Two layers of minimum 12.5mm British Gypsum Fireline plasterboard, stud with ISOVER 50mm APR 1200 between, sheathing board, Rockwool Duo Slab Insulation, 50mm cavity, brickwork.

Option 2

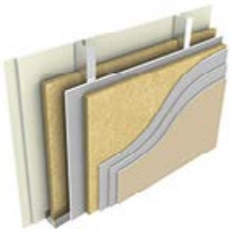
Type EC1i: Two layers of minimum 12.5mm British Gypsum Fireline plasterboard, stud with ISOVER 50mm APR 1200 between, sheathing board, Kingspan K15 Insulation, 50mm cavity, brickwork.

Option 3

Type EC1i: Two layers of minimum 12.5mm British Gypsum Fireline plasterboard, stud with ISOVER 50mm APR 1200 between, sheathing board, Rockwool Duo Slab Insulation, ventilated rainscreen.

Option 4

Type EC1i: Two layers of minimum 12.5mm British Gypsum Fireline plasterboard, stud with ISOVER 50mm APR 1200 between, sheathing board, Kingspan K15 Insulation, battens, timber cladding.



Option 5

Type EC1i: Two layers of minimum 12.5mm British Gypsum Fireline plasterboard, stud with ISOVER 50mm APR 1200 between, sheathing board, drainage cavity, Rockwool Duo Slab Insulation, render.

Examples of external insulation thickness based on **TARGET U VALUES 0.15, 0.20, 0.25 W/m²K**

	Option 1	Option 2	Option 3	Option 4	Option 5
U- Value Required	Rockwool Duo Slab (mm)	Kingspan K15 (mm)	Rockwool Duo Slab (mm) (Support brackets @ 900mm centres)	Kingspan K15 (mm)	Rockwool Duo Slab (mm)
0.25	75	40	100	60	75
0.20	100	60	150	80	100
0.15	150	95	230	110	150

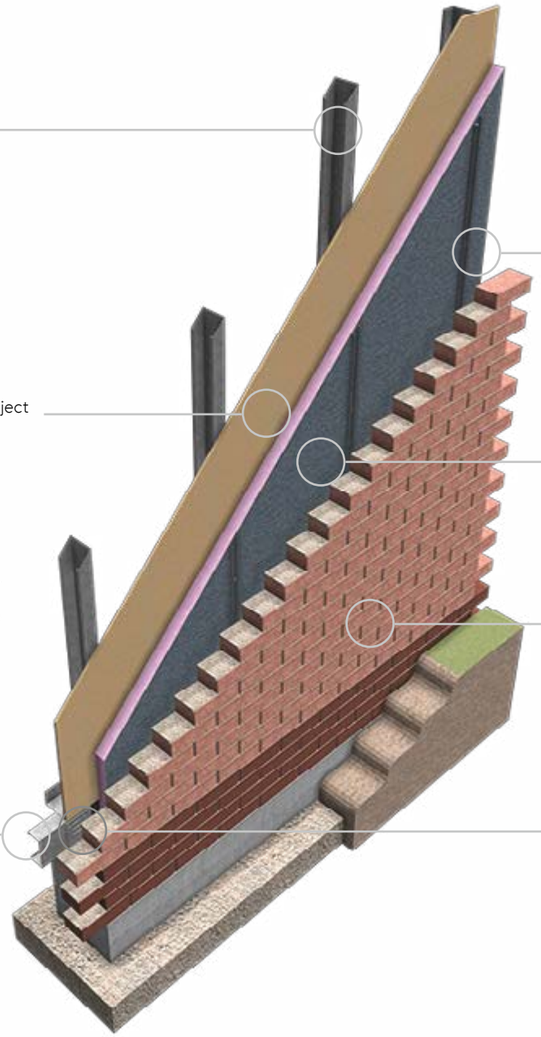
Note: All U-Values are based on calculations carried out by voestalpine Metsec plc to BS EN ISO 6946 and BR 443. The example values are based on published χ values for the stated insulation types; RCM Y-Wall sheathing board; 100MF12 studs at 600mm centres; and 2x12.5mm British Gypsum Gyproc Fireline. U-Value calculations should be verified by the insulation provider.

DETAIL MF008
METFRAME PANEL AND
FOUNDATION INTERFACE
(Viewed externally)

Metframe Stud
Metframe studs 100mm wide typically at 600mm centres.

External Sheathing Board
Typically 12mm thick to achieve project specific fire requirements as per specification document.

Metsec Ring Beam
Formed typically from a C-Section profile located under wall positions. Installed at the perimeter of foundations to allow concrete to be formed to a high level of tolerance. If there is no ring beam installed then shimming and grouting may be required to the underside of the Metframe panel base track to achieve the required tolerance.

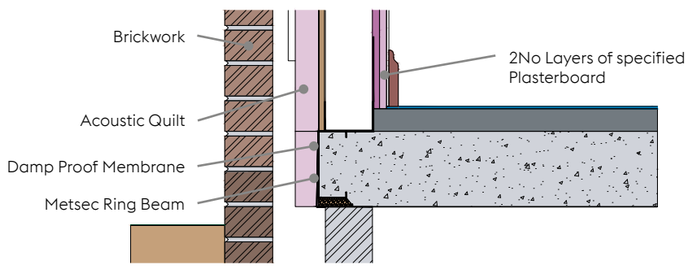


Stainless Steel Brick Tie Channel with Ties
Ties to be typically at 600mm horizontal centres and 450mm vertical centres.

Insulation
Specification to be confirmed by the design team to achieve both thermal and fire requirements.

Brickwork
Design by project engineer.

Cleats for the C-Section Ring Beam
Installed first to then allow the level of the C-Section ring beam to be set to compensate for variation in the foundation levels.



Section on Ring Beam and Panel Interface

DETAIL MF008
METFRAME PANEL AND
FOUNDATION INTERFACE
(Viewed internally)

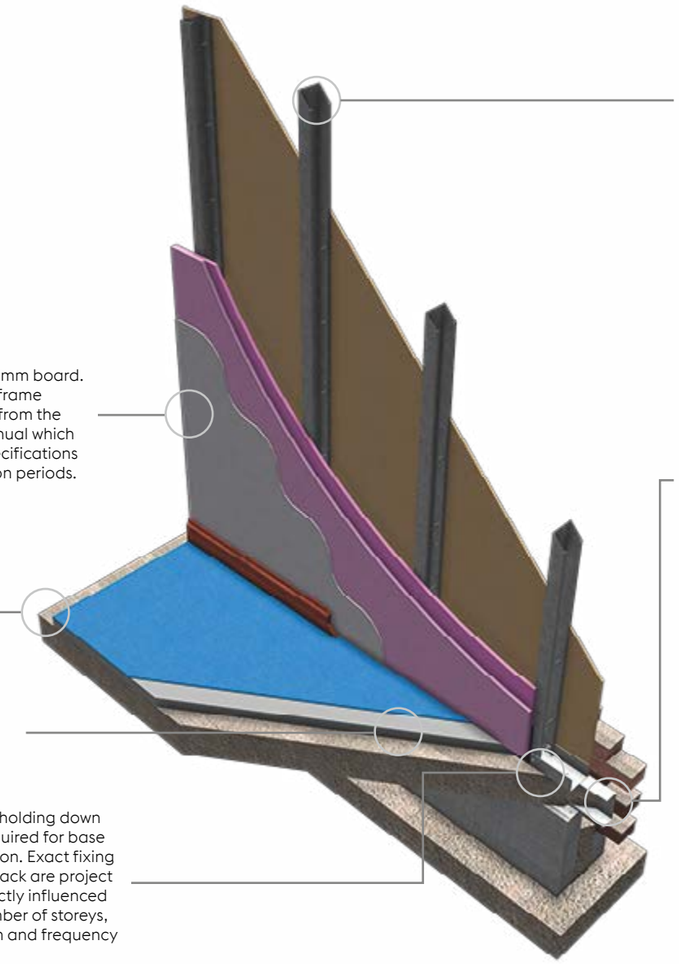
Metframe Stud
Metframe studs 100mm wide typically at 600mm centres.

Internal Finishes
Minimum of two layers of 15mm board. For fire performance of Metframe walls please seek guidance from the Metframe Specification Manual which advises minimum board specifications for the specific fire protection periods.

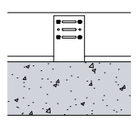
Vapour Control Layer
Installed under timer floor finish or alternatively a screed can be utilised.

Damp Proof Membrane
To be installed under floor slab level.

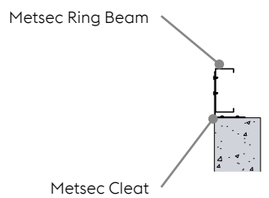
Base Track
Tapcon anchors through to holding down bolts and cleats may be required for base connections to the foundation. Exact fixing requirements for the base track are project dependent and can be directly influenced by the project location, number of storeys, building height and location and frequency of Metframe walls.



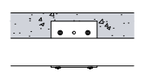
Metsec Ring beam
Formed typically from a C-Section profile located under wall positions. Installed at the perimeter of foundations to allow concrete to be formed to a high level of tolerance. If there is no ring beam installed then shimming and grouting may be be required to the underside of the Metframe panel base track to achieve the required tolerance.



Front View on Ring Beam Cleat

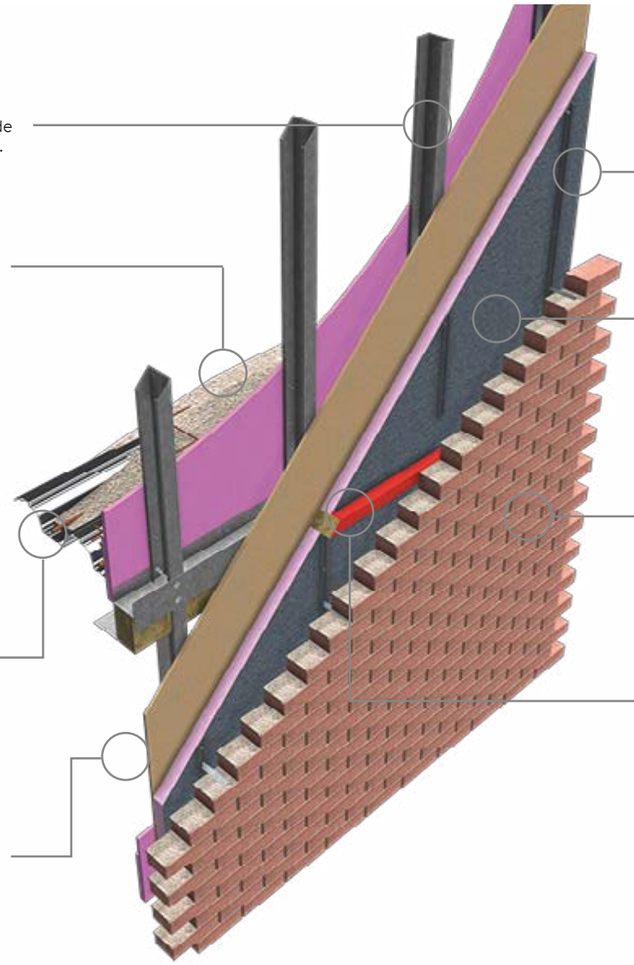


Section of Ring Beam Cleat



Plan on Ring Beam Cleat

DETAIL MF003
EXTERNAL WALL WITH BRICKWORK AND CONCRETE FLOOR
(VIEWED EXTERNALLY)



Metframe Stud
Metframe studs 100mm wide typically at 600mm centres.

Concrete
Typically 160mm deep concrete floor formed from C30 / 37 concrete. Specific concrete guidelines can be found in the Metframe Installation Manual.

Fire Reinforcement Bar
To be installed in the decking trough. Utilised during the fire case to provide the concrete floor slab with the specific fire requirements.

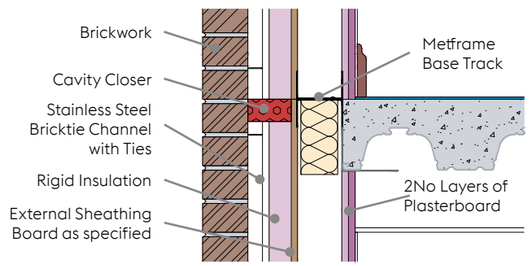
External Sheathing Board
Typically 12mm thick to achieve project specific fire requirements.

Stainless Steel Brick Tie Channel with Ties
Ties to be typically at 600mm horizontal centres and 450mm vertical centres.

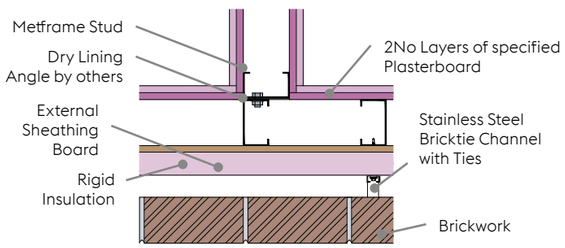
Insulation
Specification to be confirmed by the design team to achieve both thermal and fire requirements.

Brickwork
Design by project engineer.

Cavity Barrier
To be installed across the full width of the cavity, fixed around the window opening on the outer face of sheathing board. Exact specification to be confirmed by project design team.

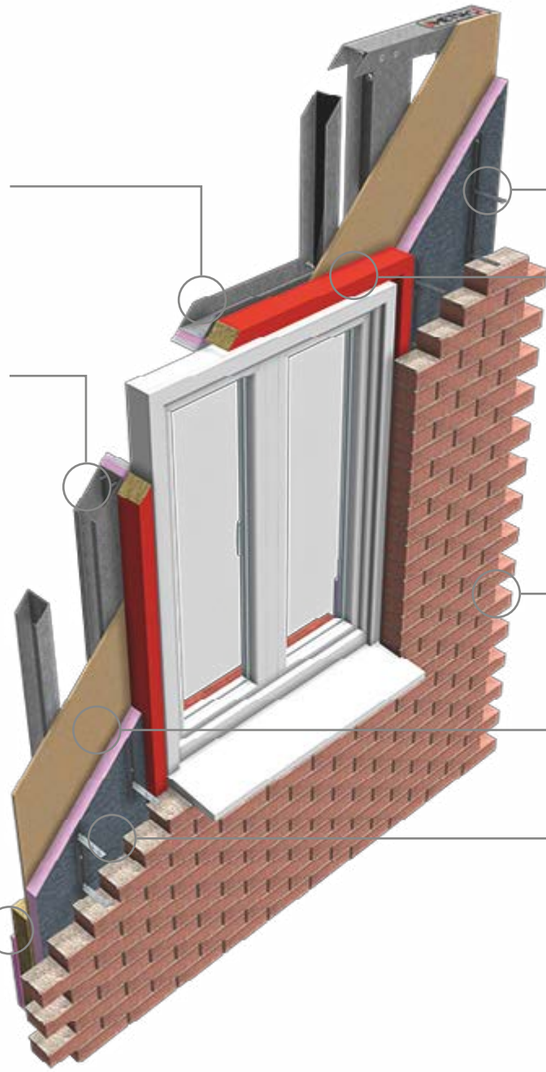


Section at Floor Level



Plan on Junction

DETAIL MF001
WINDOW DETAIL WITH BRICKWORK
(Viewed Externally)



Metframe Lintel Member
Location and tolerances to be agreed as per the Metframe standard tolerance sheets prior to project commencement. Adequate fire protection achieved through the internal boarding material.

Metframe Jamb Member
Location and tolerances to be agreed as per the Metframe standard tolerance sheets prior to project commencement. Adequate fire protection achieved through the internal boarding material.

Acoustic Quilt
Provided within Metframe wall cavity to reduce flanking sound. Specification to be confirmed by project design team.

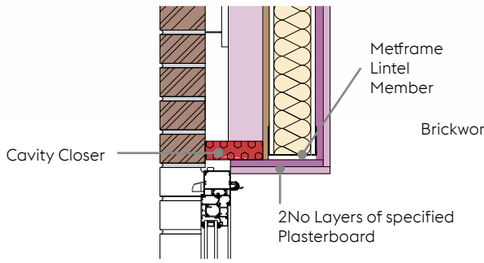
Stainless Steel Brick Tie Channel with Ties
Ties to be typically at 600mm horizontal centres and 450mm vertical centres.

Cavity Barrier
To be installed across the full width of the cavity, fixed around the window opening on the outer face of sheathing board. Exact specification to be confirmed by project design team.

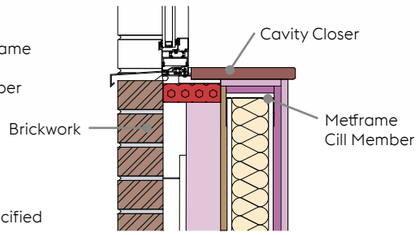
Brickwork
Design by project engineer.

External Sheathing Board
Typically 12mm thick to achieve project specific requirements specification TBC.

Insulation
Specification to be confirmed by the design team to achieve both thermal and fire requirements.



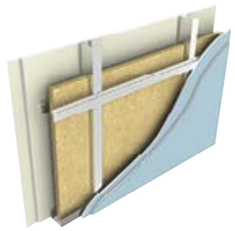
Section on Metframe Lintel



Section on Metframe Cill

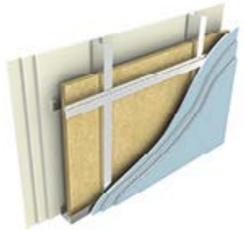
METFRAME
PARTY WALL AND CORRIDOR WALL

Build-ups based on systems that have the capacity to achieve fire and acoustic performance standards.



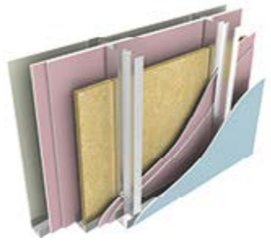
Option 1

2 x 15mm British Gypsum SoundBloc plasterboard each side, single 100mm stud with with Metsec RB565 resilient bar both sides, 1 x ISOVER 50mm APR 1200 quilt to cavity.



Option 2

3 x 15mm British Gypsum SoundBloc plasterboard each side, single 120mm stud with Metsec RB565 resilient bar both sides, 1 x ISOVER 50mm APR 1200 quilt to cavity.



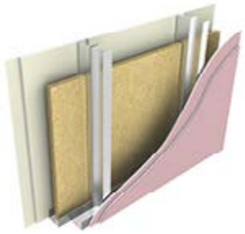
Option 3

British Gypsum 2 x 12.5mm fireline plasterboard each side, single 100mm stud, 1 x ISOVER 50mm APR 1200 quilt to cavity, Metsec PI50mm I stud either side lined with 1 x 15mm British Gypsum soundboard each side. Minimum width 310mm.

Note: 1 hour Fire Performance comes from 2 x Fireboard alone.

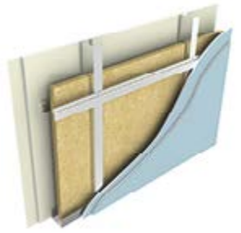
Option	Plasterboard Lining	Overall Width	Minimum Stud Depth	Fire Test Laboratory and Number	Laboratory Acoustic Performance Rw dB (Rw + Ctr)	Acoustic Test Laboratory and Number
Fire Performance from either side **60 MINUTES – TO BS EN 1365-1:2012**						
1	2x15mm British Gypsum Gyproc Soundbloc	200mm	100mm	BRE P100456-1089	64(56)	BTC 15628A
2	3x15mm British Gypsum Gyproc Soundbloc	230mm	120mm	BRE P100456-1088[1]	68(63)	BTC 21730A
3	2x12.5mm British Gypsum Gyproc Fireline	310mm	100mm	BRE P100456-1160	66(48)	BTC 21693A

90 minute Fire Performance



Option 1

2 x 15mm British Gypsum Fireline plasterboard each side, single 100mm stud, 1 x ISOVER 50mm APR 1200 quilt to cavity, Metsec PI50mm I stud.



Option 2

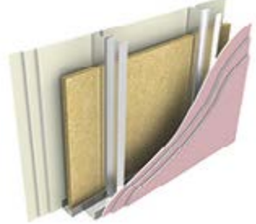
2 x 15mm British Gypsum Soundbloc F plasterboard each side, single 100mm stud with Metsec RB505 resilient bar both sides, 1 x ISOVER 50mm APR 1200 quilt to cavity.

Option	Plasterboard Lining	Overall Width	Minimum Stud Depth	Fire Test Laboratory and Number	Laboratory Acoustic Performance Rw dB (Rw + Ctr)	Acoustic Test Laboratory and Number
Fire Performance from either side **90 MINUTES – TO BS EN 1365-1:2012**						
1	2x15mm British Gypsum Gyproc Fireline	240mm	100mm	BRE P1000456-1123	63(56)	BTC 15628A
2	2x15mm British Gypsum Gyproc Soundbloc F	200mm	100mm	BRE P1000456-1163	64(56)	BTC 21729A[2]

120 minute Fire Performance

Option 1

3 x 15mm British Gypsum Fireline plasterboard each side on single 120mm stud with Metsec RB565 resilient bar both sides, 1 x ISOVER 50mm APR 1200 quilt to cavity.



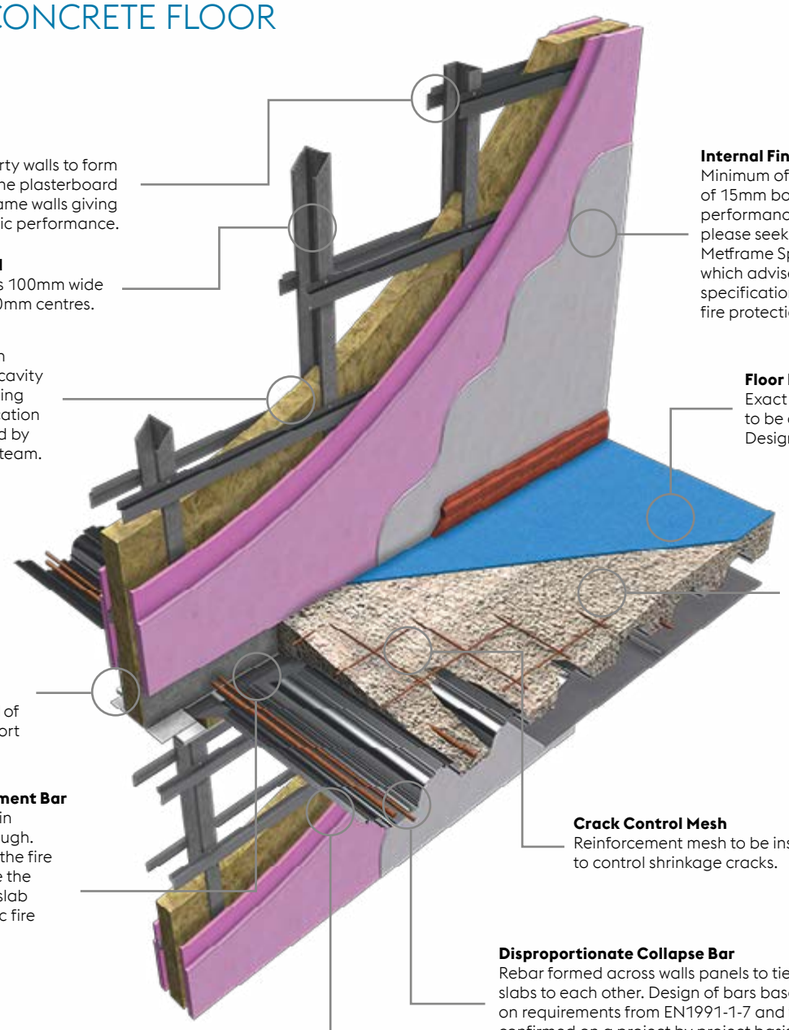
Option 2

3 x 15mm British Gypsum Fireline plasterboard each side on single 100mm stud, 1 x ISOVER 50mm APR 1200 quilt to cavity, Metsec PI50mm I stud.

Option	Plasterboard Lining	Overall Width	Minimum Stud Depth	Fire Test Laboratory and Number	Laboratory Acoustic Performance Rw dB (Rw + Ctr)	Acoustic Test Laboratory and Number
Fire Performance from either side **120 MINUTES – TO BS EN 1365-1:2012**						
1	3x15mm British Gypsum Gyproc Fireline	250mm	120mm	BRE P1000456-1129	66(61)	BTC 21728A
2	3x15mm British Gypsum Gyproc Fireline	270mm	100mm	BRE P1000456-1172	68(61)	BTC 21688A

Note: All laboratory acoustic tests carried out in accorance with BS EN ISO 10140-2:2010 and BS EN ISO 140-3:1995
1. Assessed performance based on additional layer of 15mm British Gypsum Gyproc Soundbloc added to each face.
2. Estimated performance based on laboratory test BTC 21729A carried out with British Gypsum Gyproc Soundbloc.

DETAIL MF005
INTERNAL PARTY WALL
WITH CONCRETE FLOOR



Resilient Bar
Installed on party walls to form seperation of the plasterboard from the Metframe walls giving optimal acoustic performance.

Metframe Stud
Metframe studs 100mm wide typically at 600mm centres.

Acoustic Quilt
Provided with in Metframe wall cavity to reduce flanking sound. Specification to be confirmed by project design team.

Metframe Zed Member
Zed profile bolted at head of panels to support concrete floor.

Fire Reinforcement Bar
To be installed in the decking trough. Utilised during the fire case to provide the concrete floor slab with the specific fire requirements.

Steel Decking
Typically 80mm deep trapezoidal steel decking. Exact specification to be confirmed by Metframe on a project by project basis.

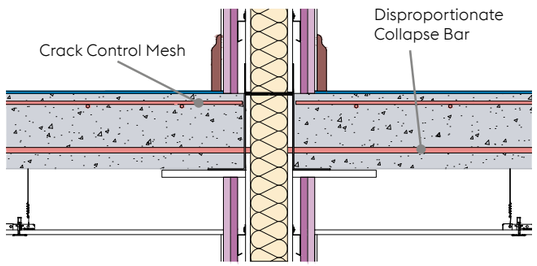
Internal Finishes
Minimum of two layers of 15mm board. For fire performance of Metframe walls please seek guidance from the Metframe Specification Manual which advises minimum board specifications for the specific fire protection periods.

Floor Finish
Exact floor finish to be confirmed by Design team.

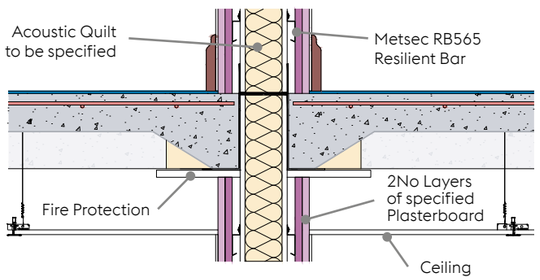
Concrete
Typically 160mm deep concrete floor formed from C30/37 concrete. Specific concrete guidelines can be found in the Metframe Installation Manual.

Crack Control Mesh
Reinforcement mesh to be installed to control shrinkage cracks.

Disproportionate Collapse Bar
Rebar formed across walls panels to tie adjacent slabs to each other. Design of bars based on requirements from EN1991-1-7 and to be confirmed on a project by project basis.

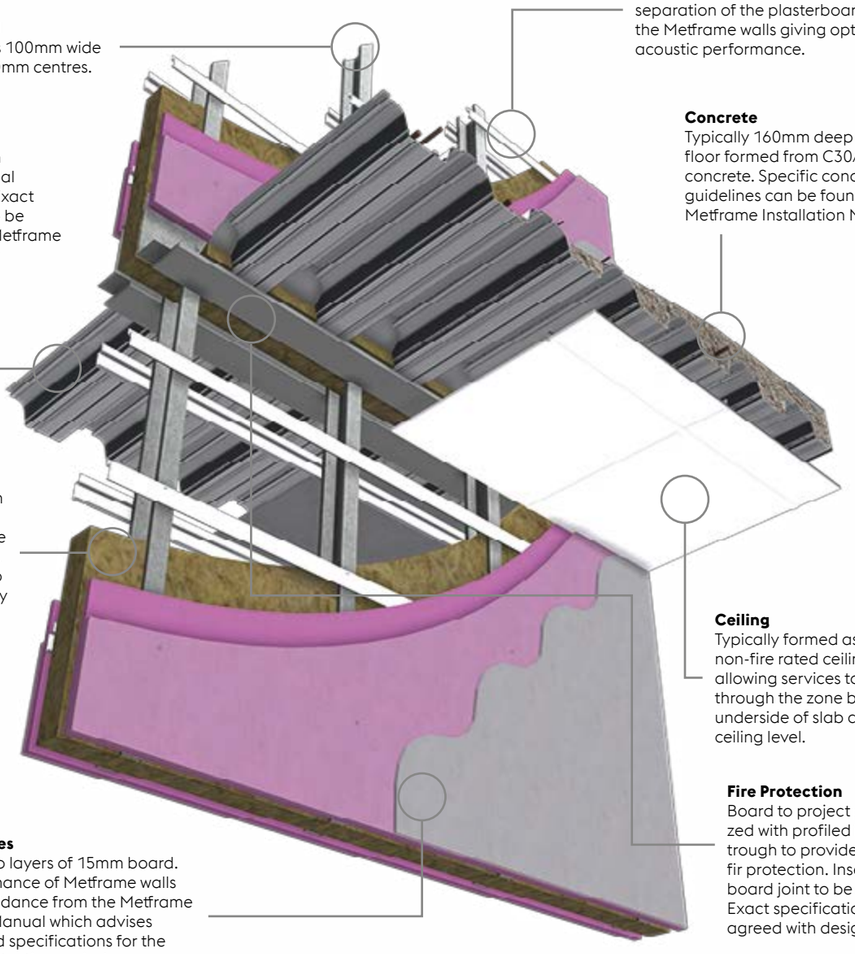


Section at Floor Level with Reinforcement



Section at Floor Level

DETAIL MF005
INTERNAL PARTY WALL WITH CONCRETE FLOOR
VIEWED FROM UNDERNEATH



Metframe Stud
Metframe studs 100mm wide typically at 600mm centres.

Steel Decking
Typically 80mm deep trapezoidal steel decking. Exact specification to be confirmed by Metframe on a project by project basis.

Acoustic Quilt
Provided with in Metframe wall cavity to reduce flanking sound. Specification to be confirmed by project design team.

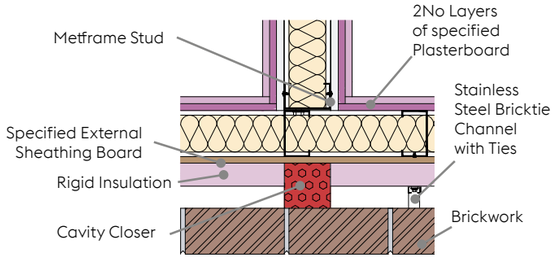
Internal Finishes
Minimum of two layers of 15mm board. For fire performance of Metframe walls please seek guidance from the Metframe Specification Manual which advises minimum board specifications for the specific fire protection periods.

Resilient Bar – Metsec RB565
Installed on party walls to form separation of the plasterboard from the Metframe walls giving optimal acoustic performance.

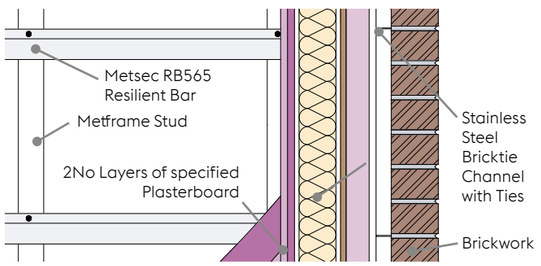
Concrete
Typically 160mm deep concrete floor formed from C30/37 concrete. Specific concrete guidelines can be found in the Metframe Installation Manual.

Ceiling
Typically formed as a non-fire rated ceiling allowing services to be run through the zone between underside of slab and ceiling level.

Fire Protection
Board to project past zed with profiled insert to trough to provide necessary fir protection. Insert and board joint to be sealed. Exact specification to be agreed with design team.

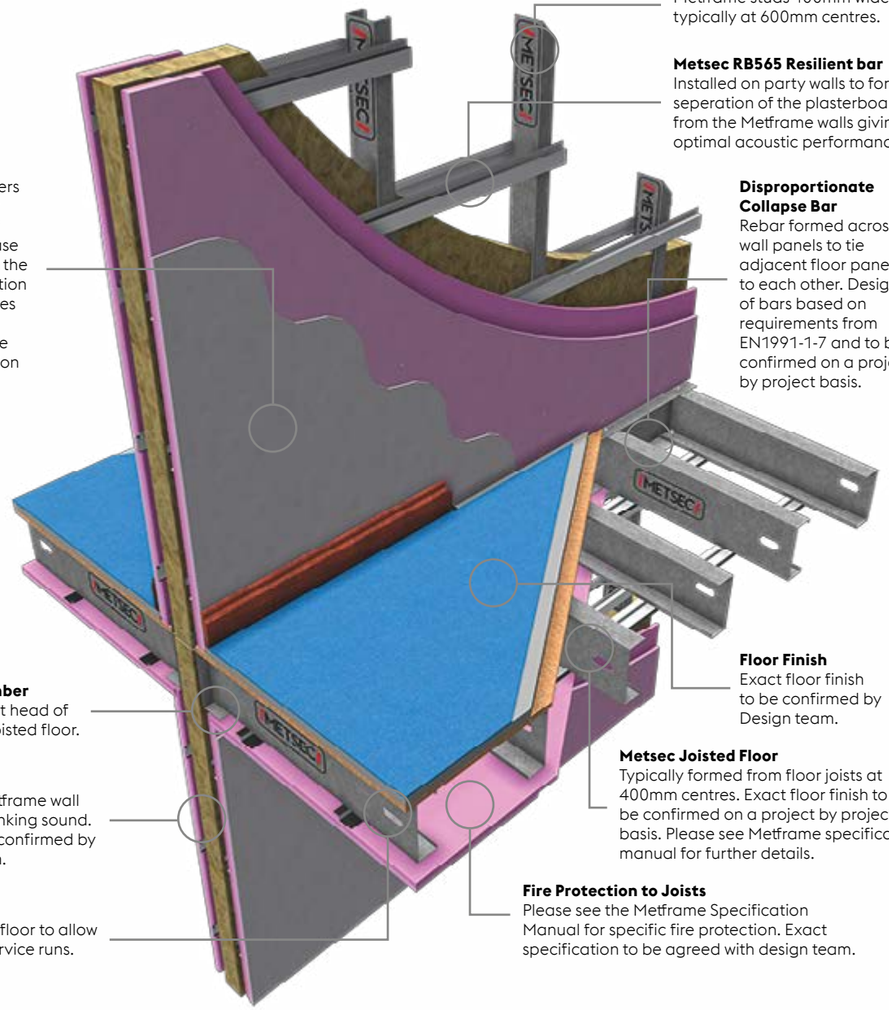


Plan at Junction



Elevation on Resilient Bar

DETAIL MF021
INTERNAL PARTY WALL
WITH JOISTED FLOOR
(View 1)



Metframe Stud
Metframe studs 100mm wide typically at 600mm centres.

Metsec RB565 Resilient bar
Installed on party walls to form seperation of the plasterboard from the Metframe walls giving optimal acoustic performance.

Internal Finishes
Minimum of two layers of 15mm board. For fire performance of Metframe walls please seek guidance from the Metframe Specification Manual which advises minimum board specifications for the specific fire protection periods.

Disproportionate Collapse Bar
Rebar formed across wall panels to tie adjacent floor panels to each other. Design of bars based on requirements from EN1991-1-7 and to be confirmed on a project by project basis.

Floor Finish
Exact floor finish to be confirmed by Design team.

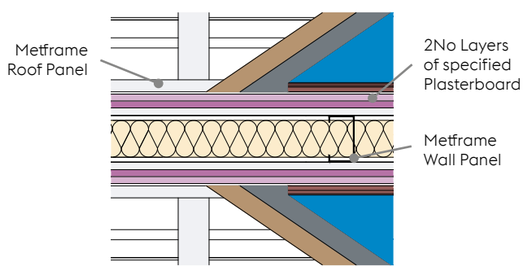
Metframe Zed Member
Zed profile bolted at head of panels to support joisted floor.

Metsec Joisted Floor
Typically formed from floor joists at 400mm centres. Exact floor finish to be confirmed on a project by project basis. Please see Metframe specification manual for further details.

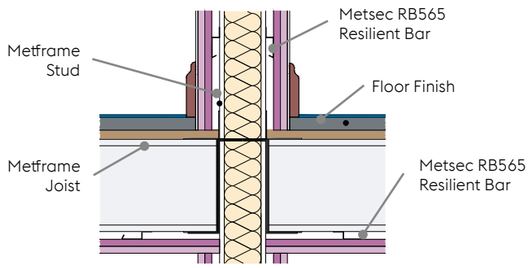
Acoustic Quilt
Provided with in Metframe wall cavity to reduce flanking sound. Specification to be confirmed by project design team.

Service Slots
Can be added in to floor to allow small passage of service runs.

Fire Protection to Joists
Please see the Metframe Specification Manual for specific fire protection. Exact specification to be agreed with design team.

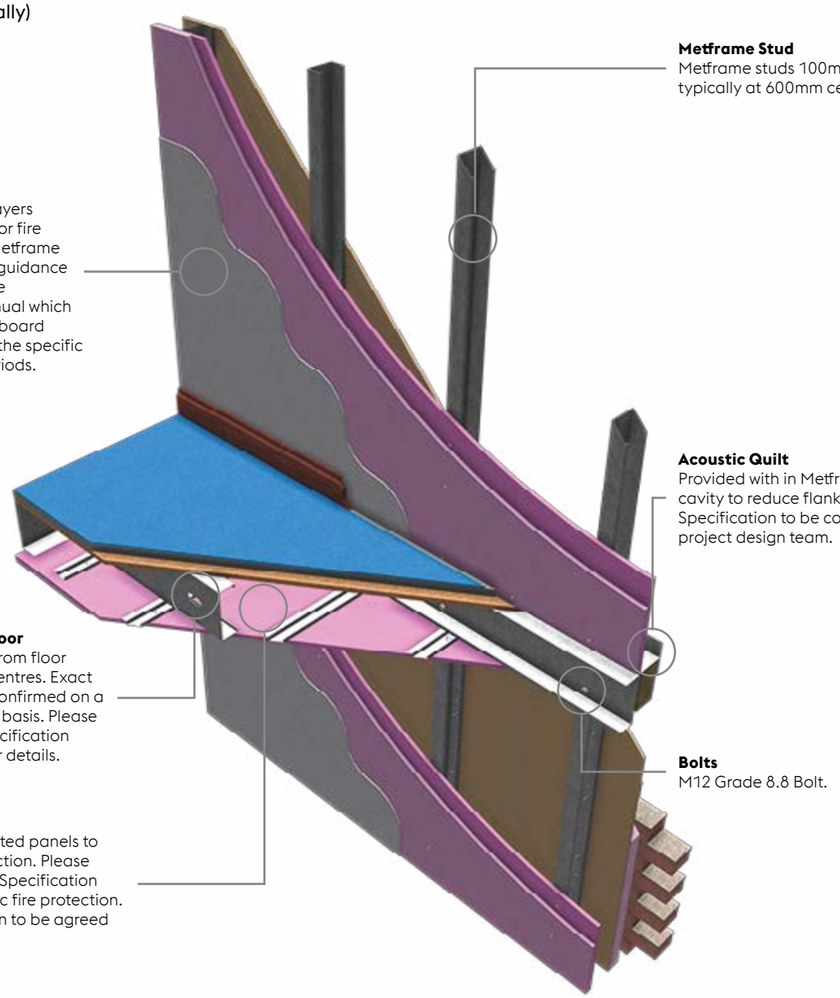


Section at Floor Level



Section at Floor Level

DETAIL MF020
EXTERNAL WALL WITH
JOISTED FLOOR AND BRICKWORK
(Viewed internally)



Metframe Stud
Metframe studs 100mm wide typically at 600mm centres.

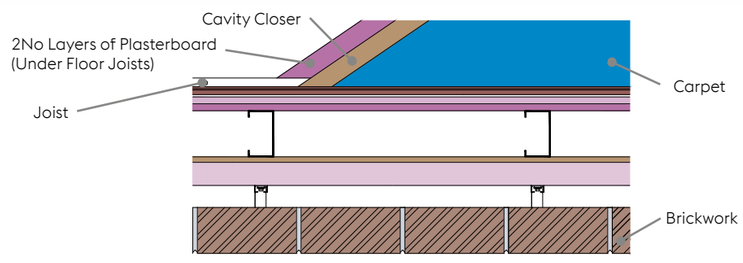
Internal Finishes
Minimum of two layers of 15mm board. For fire performance of Metframe walls please seek guidance from the Metframe Specification Manual which advises minimum board specifications for the specific fire protection periods.

Acoustic Quilt
Provided with in Metframe wall cavity to reduce flanking sound. Specification to be confirmed by project design team.

Metsec Joisted Floor
Typically formed from floor joists at 400mm centres. Exact floor finish to be confirmed on a project by project basis. Please see Metframe Specification Manual for further details.

Bolts
M12 Grade 8.8 Bolt.

Fire Protection
Board fixed to joisted panels to provide fire protection. Please see the Metframe Specification manual for specific fire protection. Exact specification to be agreed with design team.



Plan in Floor Build Up

METFRAME
INTERNAL WALL

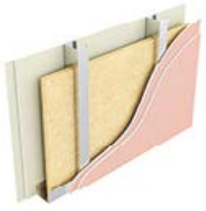
Build-ups based on systems that have the capacity to achieve fire and acoustic performance standards.

60 minute Fire Performance

Option 1
2 x 15mm British Gypsum SoundBloc soundboard plasterboard each side, single 100mm stud. O/A width 160mm.

Option 2
2 x 12.5mm British Gypsum Fireline plasterboard each side, single 100mm stud, 1 x ISOVER 50mm APR 1200 quilt to cavity. O/A width 150mm.

90 minute Fire Performance



Option 3
2 x 15mm British Gypsum Fireline plasterboard each side, single 100mm stud, 1 x ISOVER 50mm APR 1200 quilt to cavity. O/A width 160mm.

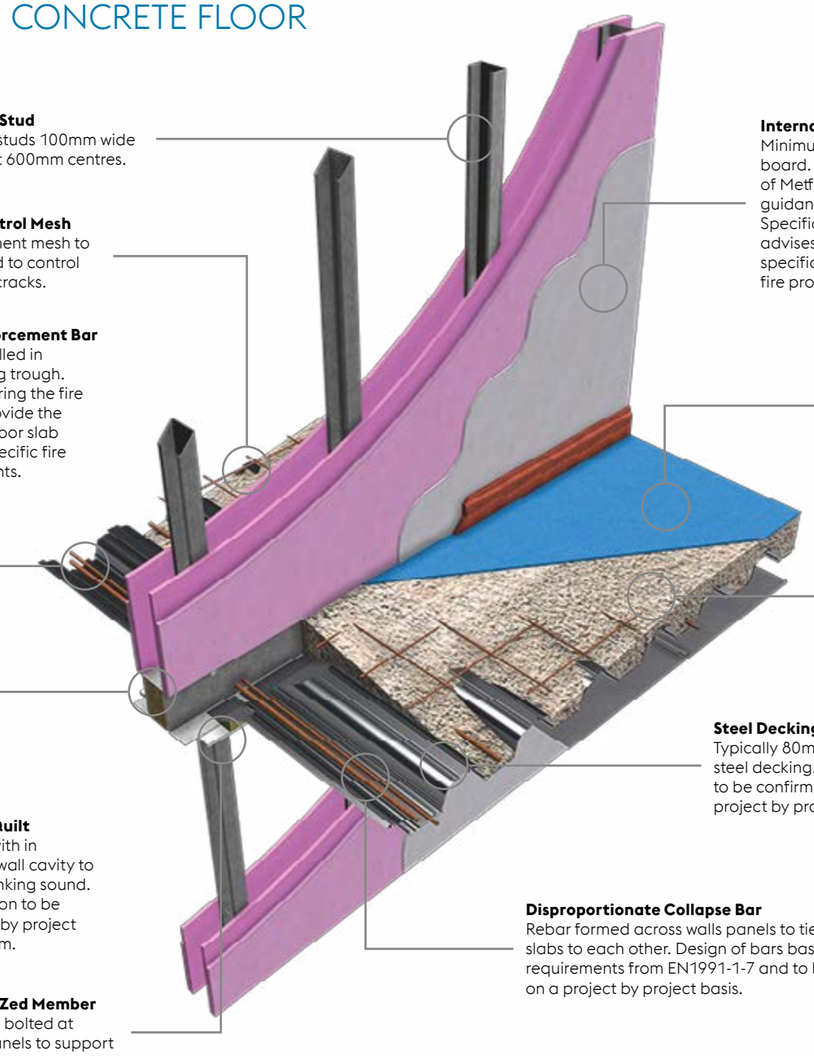
120 minute Fire Performance

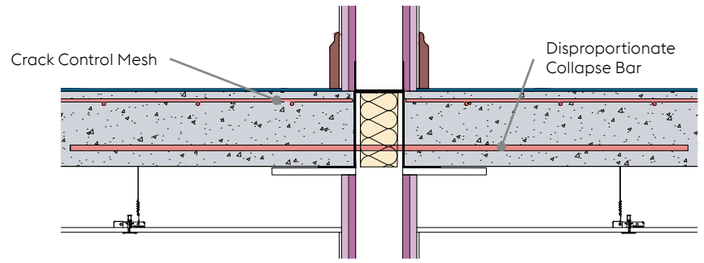
Option 4
3 x 15mm British Gypsum Fireline plasterboard each side, single 100mm stud, 1 x ISOVER 50mm APR 1200 quilt to cavity. O/A width 190mm.

Option	Plasterboard Lining	Overall Width	Minimum Stud Depth	Fire Test Laboratory and Number	Laboratory Acoustic Performance Rw dB	Acoustic Test Laboratory and Number
Fire Performance from either side 60 MINUTES – TO BS EN 1365-1:2012						
1	2x15mm British Gypsum Gyproc Soundbloc	160mm	100mm	BRE P100456-1088	54	BTC 20864A
2	2x12.5mm British Gypsum Gyproc Fireline	150mm	100mm	BRE P100456-1160	50	BTC 21691A
Fire Performance from either side 90 MINUTES – TO BS EN 1365-1:2012						
3	2x15mm British Gypsum Gyproc Fireline	160mm	100mm	P100456-1198	52	CALCULATED[1]
Fire Performance from either side 120 MINUTES – TO BS EN 1365-1:2012						
4	3x15mm British Gypsum Gyproc Fireline	190mm	100mm	P124545-1002	56	CALCULATED[1]

Note: All laboratory acoustic tests carried out in accorance with BS EN ISO 10140-2:2010 and BS EN ISO 140-3:1995
1. Acoustic performance calculated using INSUL software.

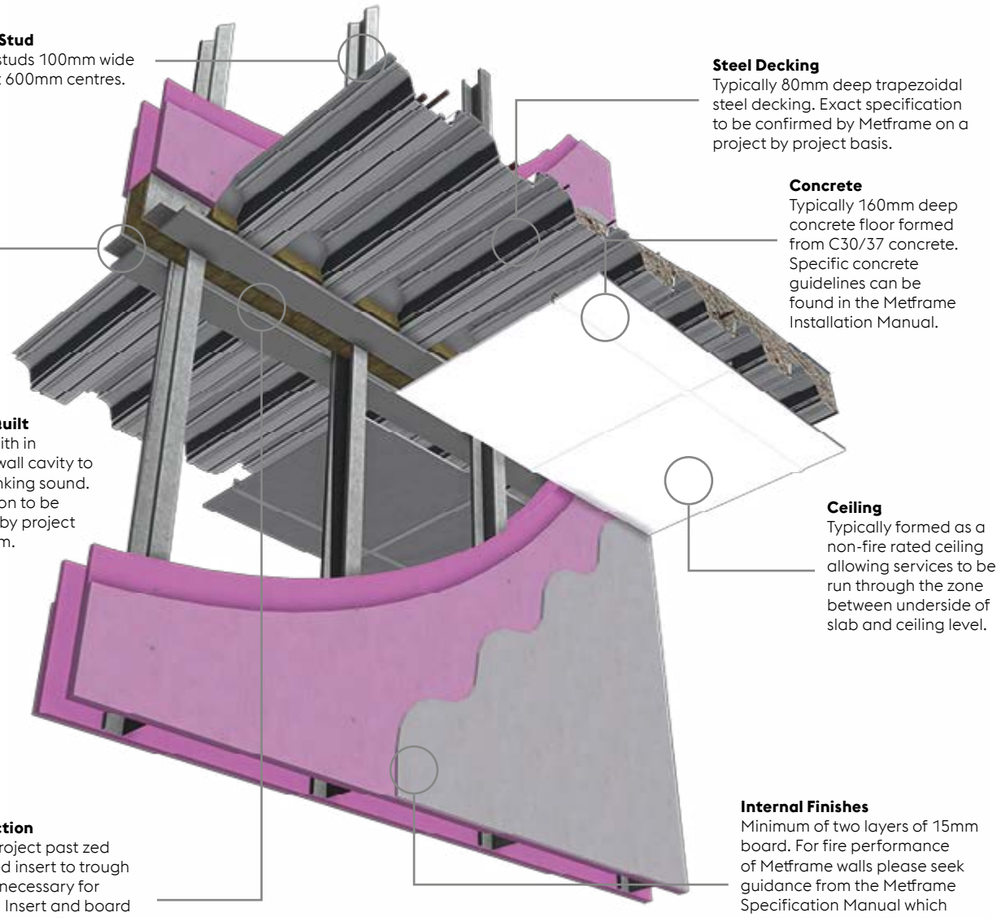
DETAIL MF004
INTERNAL NON-PARTY WALL
WITH CONCRETE FLOOR





Section at Floor Level with Reinforcement

DETAIL MF004
INTERNAL NON-PARTY WALL
WITH CONCRETE FLOOR
(Viewed from underneath)



Metframe Stud
Metframe studs 100mm wide typically at 600mm centres.

Steel Decking
Typically 80mm deep trapezoidal steel decking. Exact specification to be confirmed by Metframe on a project by project basis.

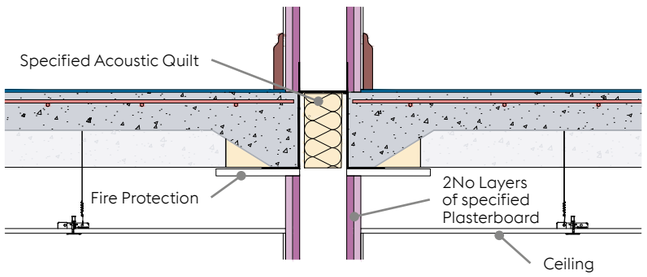
Concrete
Typically 160mm deep concrete floor formed from C30/37 concrete. Specific concrete guidelines can be found in the Metframe Installation Manual.

Acoustic Quilt
Provided with in Metframe wall cavity to reduce flanking sound. Specification to be confirmed by project design team.

Ceiling
Typically formed as a non-fire rated ceiling allowing services to be run through the zone between underside of slab and ceiling level.

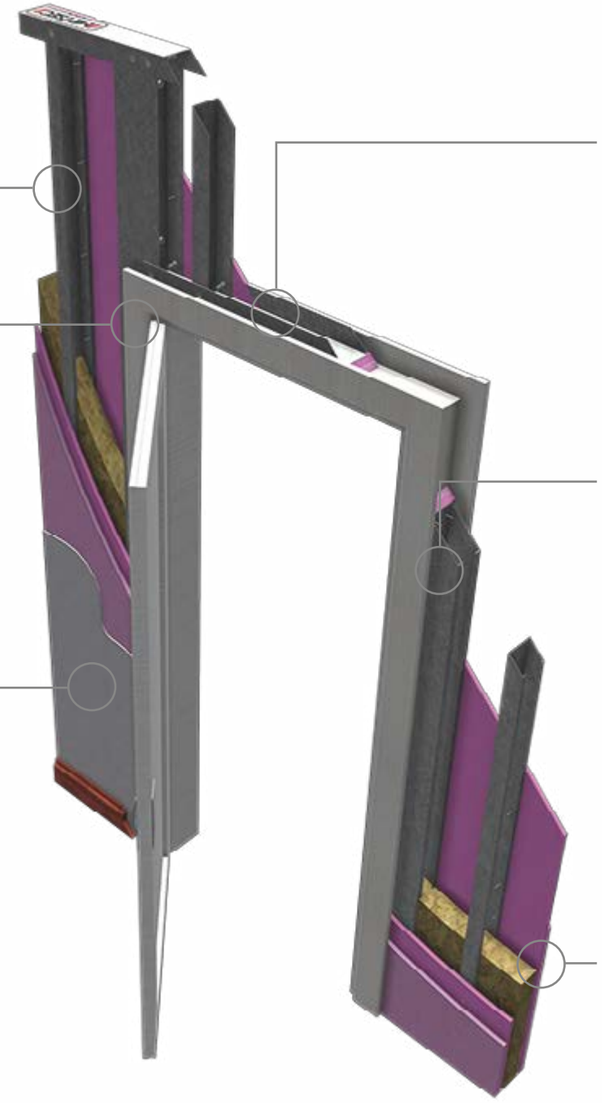
Fire Protection
Board to project past zed with profiled insert to trough to provide necessary for protection. Insert and board joint to be sealed. Exact specification to be agreed with design team.

Internal Finishes
Minimum of two layers of 15mm board. For fire performance of Metframe walls please seek guidance from the Metframe Specification Manual which advises minimum board specifications for the specific fire protection periods.



Section at Floor Level

DETAIL MF002
DOOR DETAIL IN AN
INTERNAL PANEL
(View B)



Metframe Stud
General stud set out at 600mm centres.

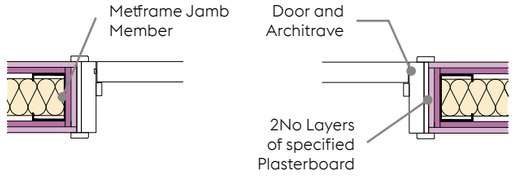
Door and Architrave
Door and frame installed after the Metframe installation. Exact specification to be confirmed by the project design team.

Internal Finishes
Minimum of two layers of 15mm board. Specific plasterboard specification line to continue around door openings to provide suitable fire protection within the door frame.

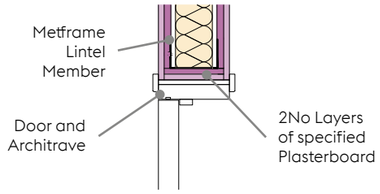
Metframe Lintel Member
Location and tolerances to be agreed as per the Metframe standard tolerance sheets prior to project commencement. Adequate fire protection achieved through the internal boarding material.

Metframe Jamb Member
Location and tolerances to be agreed as per the Metframe standard tolerance sheets prior to project commencement. Adequate fire protection achieved through the internal boarding material.

Acoustic Quilt
Provided within Metframe wall cavity to reduce flanking sound. Specification to be confirmed by project design team.



Plan on Metframe Jamb



Section on Metframe Lintel

METFRAME
INTERNAL FLOORS

Build-ups based on systems that have the capacity to achieve fire and acoustic performance standards.

Option 2

Type F5: Three layers of British Gypsum Fireline plasterboard, Metsec RB565 resilient bars, joists with 1 x ISOVER 50mm APR 1200 quilt to cavity, 15mm plywood, 19mm British Gypsum Plank, 8mm Cloud 9 Underlay, 12mm OS

Option 3

Type F9: Three layers of 12.5mm British Gypsum Fireline plasterboard, resilient bars, joists with 1 x ISOVER 50mm APR 1200 quilt to cavity, 15mm plywood, 19mm British Gypsum Plank, 70mm Cellecta Deckfon acoustic battens, 18mm V313 chipboard.

Option4

Type F5: Three layers of 15mm British Gypsum Fireline plasterboard, Metsec RB565 resilient bars, joists with 1 x ISOVER 50mm APR 1200 quilt to cavity, 15mm plywood, 19mm British Gypsum Plank, 8mm Cloud 9 Underlay, 12mm OSB.

Option 5

Type F9: Three layers of 15mm British Gypsum Fireline plasterboard, Metsec RB565 resilient bars, joists with 1 x ISOVER 50mm APR 1200 quilt to cavity, 15mm plywood, 19mm British Gypsum Plank, 70mm Cellecta Deckfon acoustic battens, 18mm V313 chipboard.

Option 6

Minimum 160mm deep concrete slab (80mm minimum), 5mm Cellecta Rubberfom, MF ceiling with 1 x 15mm British Gypsum Soundbloc.

Option 7 (Scotland)

Minimum 160mm deep concrete slab (80mm minimum), Cellecta Screedboard 30, Metsec MF ceiling with 1 x 15mm British Gypsum Soundbloc.

Option1

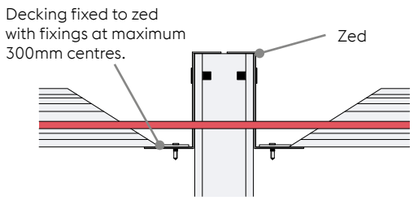
Type F2: Two layers of 12.5mm British Gypsum Fireline plasterboard, Metsec RB565 resilient bars, joists with 1 x ISOVER 50mm APR 1200 quilt to cavity, 15mm plywood, 19mm British Gypsum Plank, 8mm Cloud 9 Underlay, 12mm OSB.

Option	Plasterboard Lining	Overall Depth	Minimum Joist Depth	Fire Test Laboratory and Number	Laboratory Acoustic Performance Rw dB (Rw & Ctr)	Laboratory Acoustic Performance Ln,w	Acoustic Test Laboratory and Number
Fire Performance from Underside 60 MINUTES – TO BS EN 1365-2:2014							
1	2x12.5mm British Gypsum Gyproc Fireline	300mm	200mm	BRE P100456-1105	63(54)	55	BRE 217158
Fire Performance from Underside 90 MINUTES – TO BS EN 1365-2:2014							
2	3x12.5mm British Gypsum Gyproc Fireline	240mm	200mm	BRE P100456-1055	63(54)	55	BRE 217158[1]
3	3x12.5mm British Gypsum Gyproc Fireline	200mm	200mm	BRE P100456-1055	62 (52)	51	BRE 214610[2]
Fire Performance from Underside 120 MINUTES – TO BS EN 1365-2:2014							
4	3x15mm British Gypsum Gyproc Fireline	250mm	200mm	BRE P100456-1081	63 (54)	55	BRE 217158[3]
5	3x15mm British Gypsum Gyproc Fireline	270mm	200mm	BRE P100456-1081	62 (52)	51	BRE 214610[4]
6	1x15mm British Gypsum Gyproc Soundbloc	330mm Minimum	–	Refer to Decking Manufacturers Guidance	–	–	Contact Metsec for Acoustic Performance
7	1x15mm British Gypsum Gyproc Soundbloc	300mm Minimum	–	Refer to Decking Manufacturers Guidance	–	–	Contact Metsec for Acoustic Performance

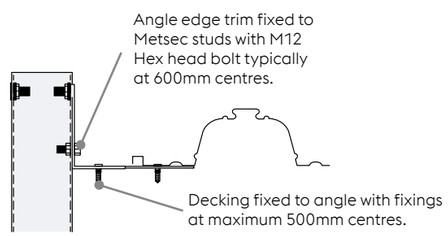
Note: All laboratory acoustic tests carried out in accorance with BS EN ISO 140-3:1995 and BS EN ISO 140-6:1998

1. Estimated perfomance based on laboratory test BRE 217158 with additional 12.5mm BG Fireline
2. Estimated perfomance based on laboratory test BRE 214610 with additional 12.5mm BG Fireline
3. Estimated perfomance based on laboratory test BRE 217158 with additional 15.0mm BG Fireline
4. Estimated perfomance based on laboratory test BRE 214610 with additional 15.0mm BG Fireline

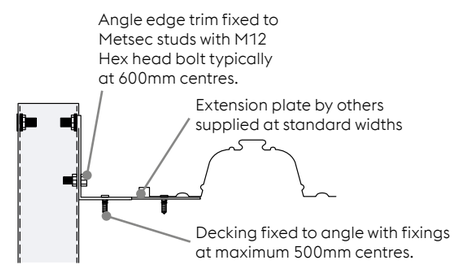
CONCRETE
FLOORS



Deck to Zed Detail MF501C



Fixing Edge of Decking to Metsec Wall MF501A



Extension Plate to Shutter Detail MF501B

METFRAME ROOFS

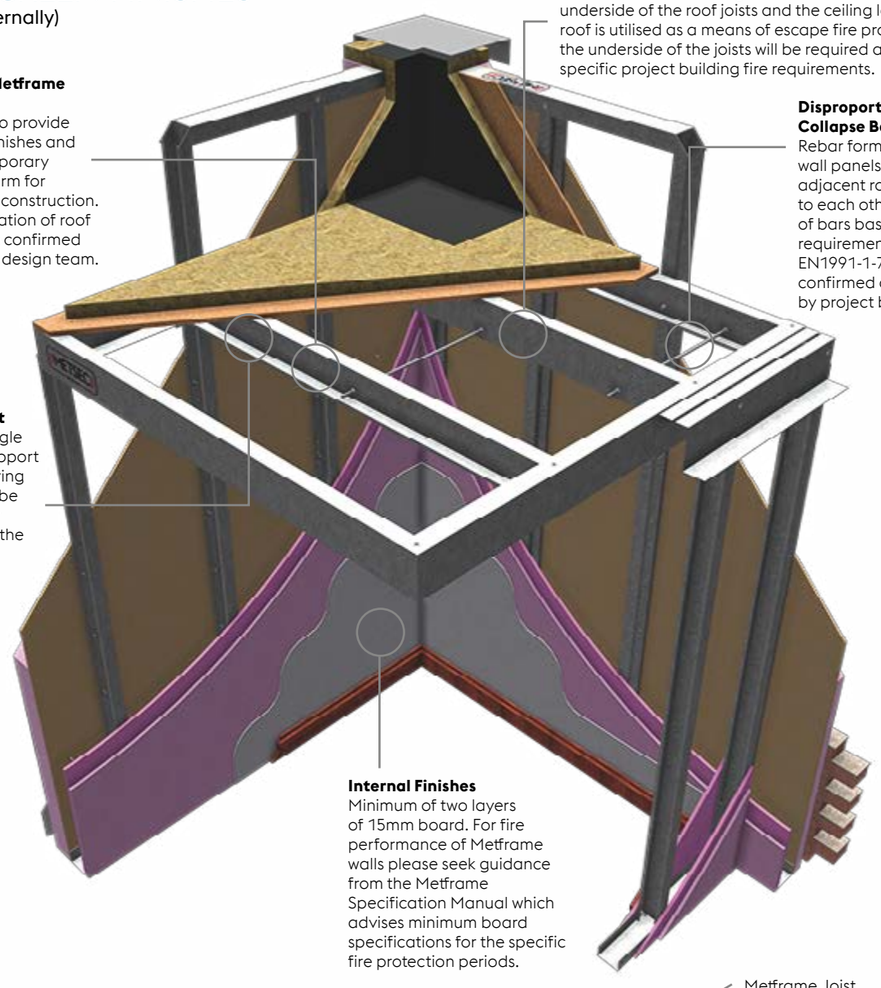
DETAIL MF014
METFRAME JOISTED ROOF AND EXTERNAL WALL WITH BRICKWORK AND RAINSCREEN FINISHES
(Viewed internally)

Ceiling
Typically formed as a non-fire rated ceiling allowing services to be run through within the zone between the underside of the roof joists and the ceiling level. If the roof is utilised as a means of escape fire protection to the underside of the joists will be required as per the specific project building fire requirements.

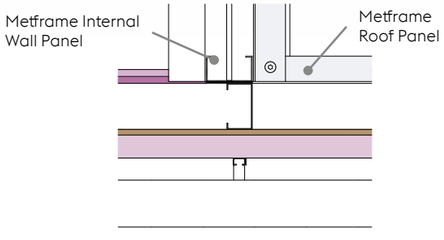
Boarding to Metframe Roof Panels
Boarded out to provide substrate to finishes and provide a temporary working platform for access during construction. Exact specification of roof build-up to be confirmed by the project design team.

Disproportionate Collapse Bar
Rebar formed across wall panels to tie adjacent roof panels to each other. Design of bars based on requirements from EN1991-1-7 and to be confirmed on a project by project basis.

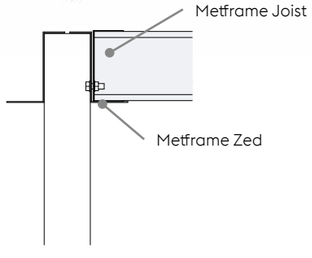
Angle Support
Temporary angle installed to support roof panel during erection. Can be removed after installation of the rood panels is complete.



Internal Finishes
Minimum of two layers of 15mm board. For fire performance of Metframe walls please seek guidance from the Metframe Specification Manual which advises minimum board specifications for the specific fire protection periods.



Plan on Internal Wall



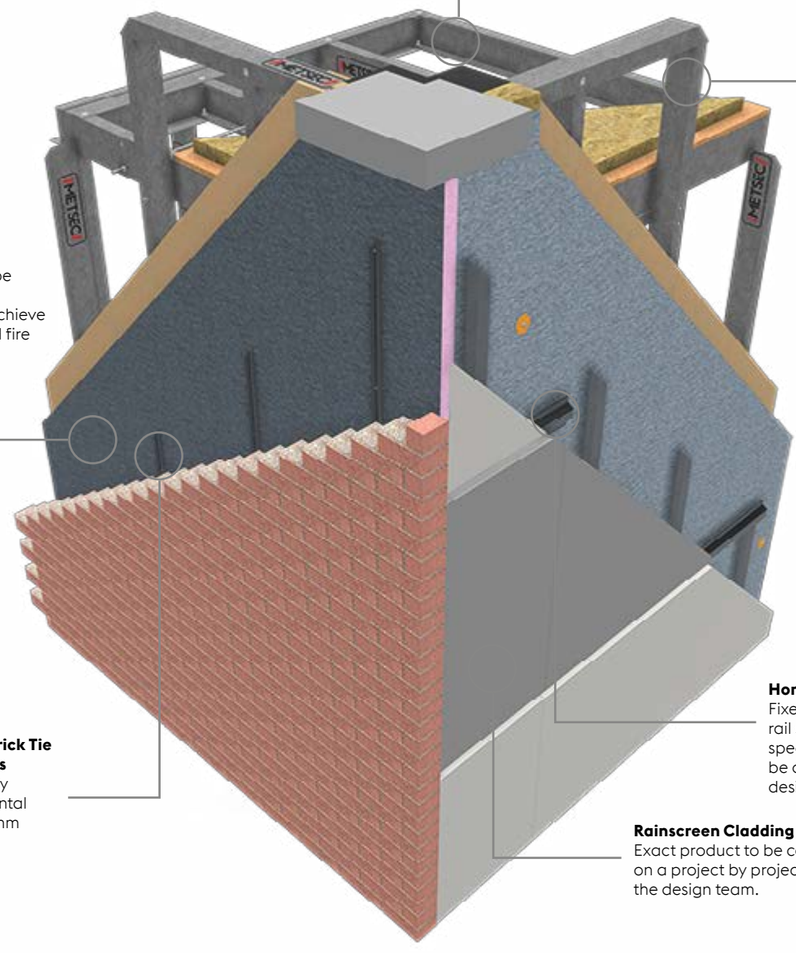
Section at Internal Wall

DETAIL MF014
METFRAME JOISTED ROOF AND EXTERNAL WALL WITH BRICKWORK AND RAINSCREEN FINISHES
(Viewed externally)

Metframe Roof Joists
Formed at 600mm centres. Typically formed either flat with any falls formed with in insulation layer or 1:60 slope minimum. Greater roof slopes can be incorporated to match the project specific specifications if required.

Metframe Stud
Metframe studs 100mm wide typically at 600mm centres.

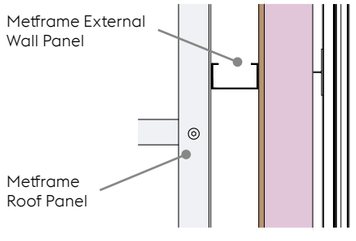
Insulation
Specification to be confirmed by the design team to achieve both thermal and fire requirements.



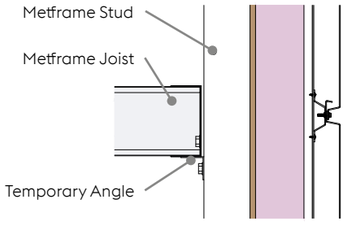
Stainless Steel Brick Tie Channel with Ties
Ties to be typically at 600mm horizontal centres and 450mm vertical centres.

Horizontal Rail
Fixed back to vertical rail system. Exact specification to be confirmed by design team.

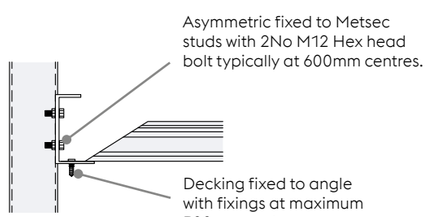
Rainscreen Cladding
Exact product to be confirmed on a project by project basis by the design team.



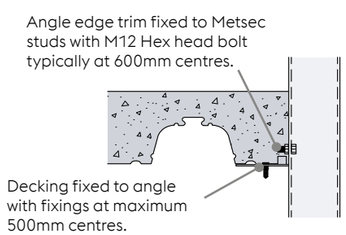
Plan on External Wall



Section at External Wall

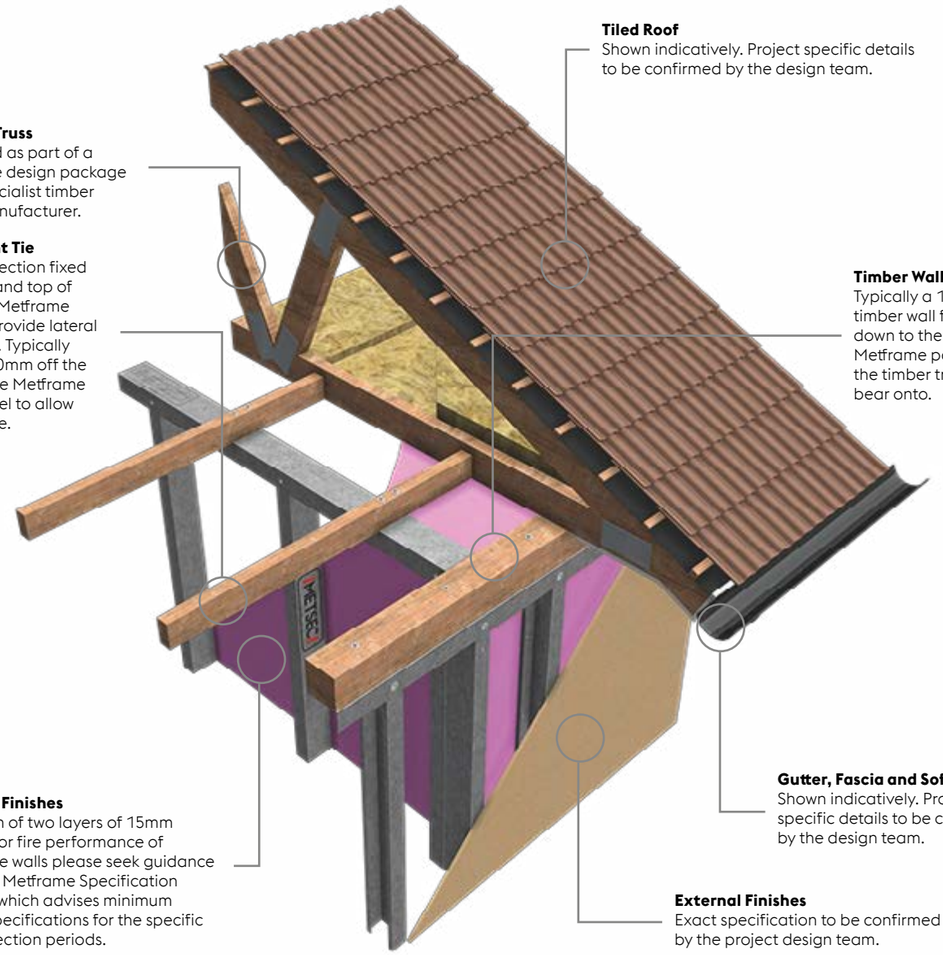


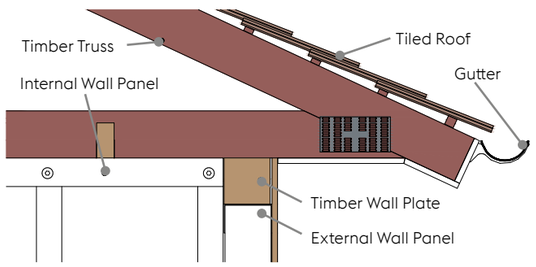
Decking fixed to Asymmetric on Metsec Wall MF508A



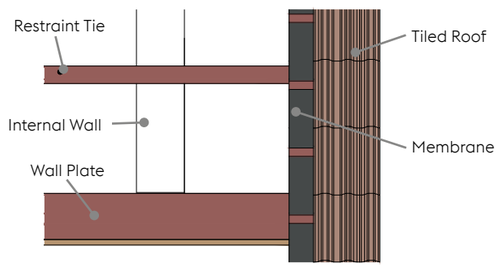
Fixing Edge of Decking to Metsec Wall MF508B

DETAIL MF015
TIMBER TRUSS ROOF DETAIL
(Viewed externally)





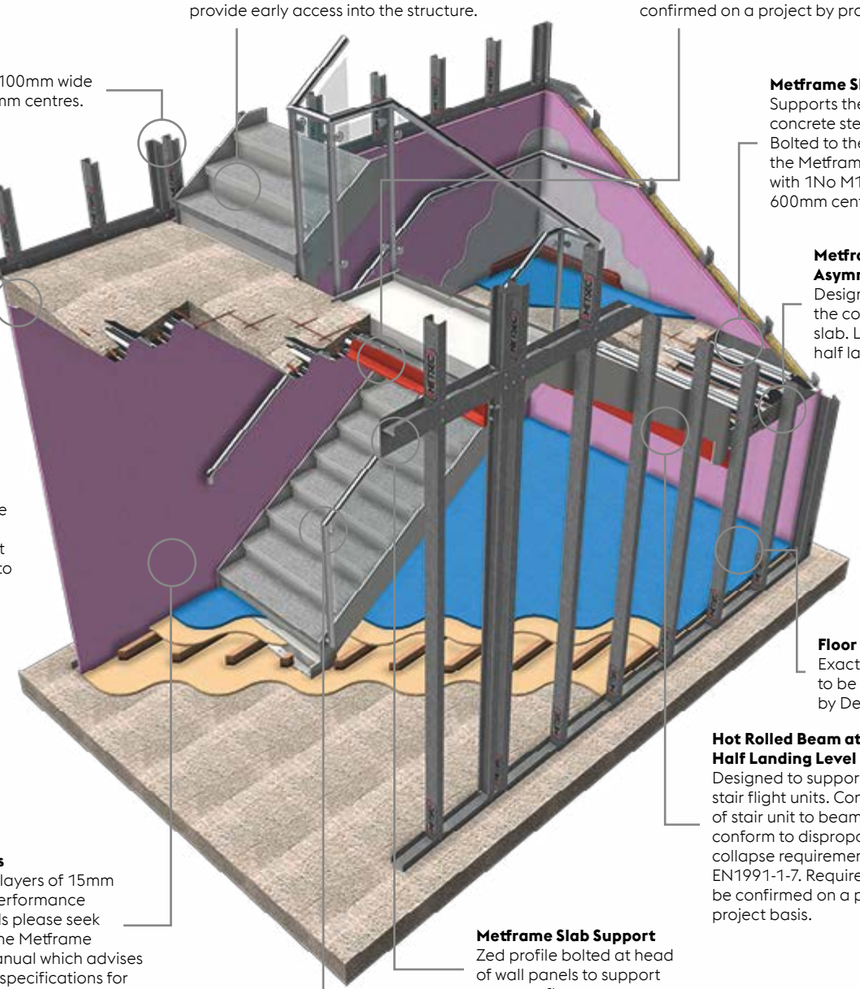
Section through External Wall



Plan on Internal Wall

METFRAME STAIRWELLS

DETAIL MF018
STAIRWELL WITH A CONCRETE HALF LANDING
(3D view)



Stair Flight
Formed from steel stringers and pans with concrete infill. Exact set out and arrangement as per the specific project requirements. Typically installed to match the building floor erection sequence to provide early access into the structure.

Hot Rolled Beam at Top of Landing Level
Designed to support the stair flight units. Connection of stair unit to beam to conform to disproportionate collapse requirements from EN1991-1-7. Requirements to be confirmed on a project by project basis.

Metframe Stud
Metframe studs 100mm wide typically at 600mm centres.

Metframe Shuttering Angle
Supports the edge of the concrete steel decking. Bolted to the face of the Metframe wall panel with 1No M12 bolt at 600mm centres.

Metframe Asymmetric Section
Designed to support the concrete floor slab. Level to match half landing level.

Fire Protection
Board to project past zed with profiled insert to trough to provide necessary fire protection. Insert and board joint to be sealed. Exact specification to be agreed with design team.

Floor Finish
Exact floor finish to be confirmed by Design team.

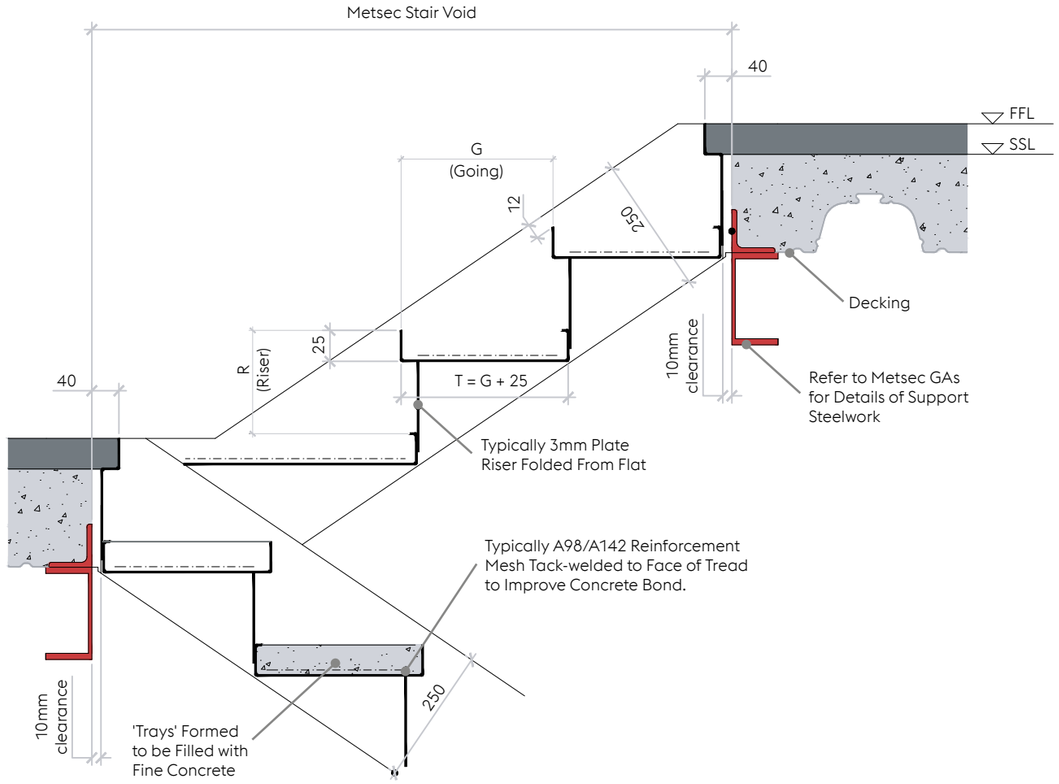
Hot Rolled Beam at Half Landing Level
Designed to support the stair flight units. Connection of stair unit to beam to conform to disproportionate collapse requirements from EN1991-1-7. Requirements to be confirmed on a project by project basis.

Internal Finishes
Minimum of two layers of 15mm board. For fire performance of Metframe walls please seek guidance from the Metframe Specification Manual which advises minimum board specifications for the specific fire protection periods.

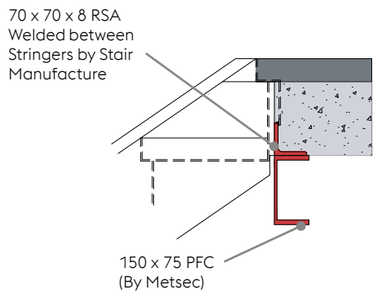
Metframe Slab Support
Zed profile bolted at head of wall panels to support concrete floors.

Handrail and Ballustrading
Designed and supplied by others and specified by the project design team. Perimeter hand rails typically fixed to wall through the plasterboard into timber substrate with in the wall cavity.

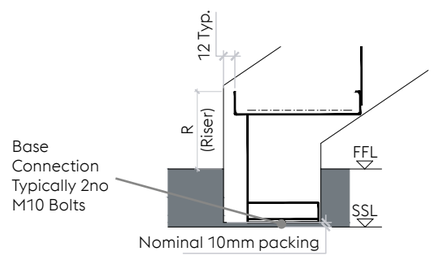
DETAIL MF018
STAIRWELL WITH A CONCRETE HALF LANDING
(Sectional details)



Section through Stair



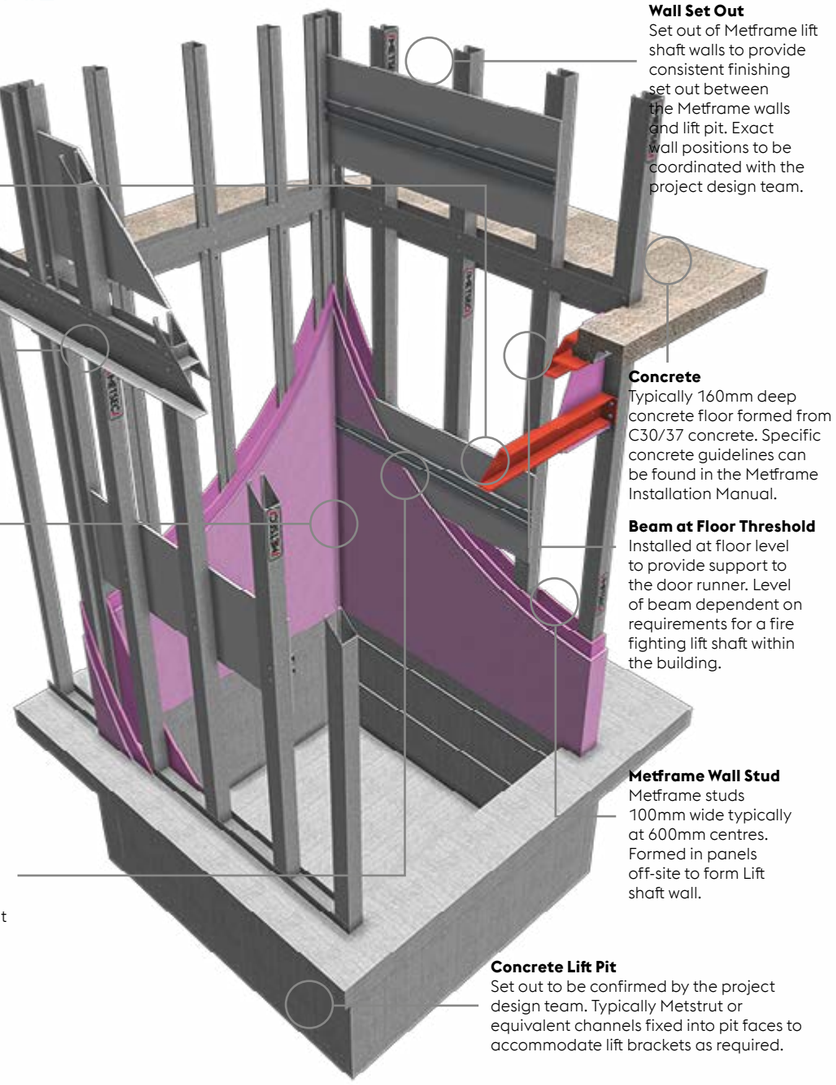
Section of Stair to PFC Junction



Section of Stair to Slab Junction

METFRAME LIFT SHAFTS

DETAIL MF016
LIFT PIT BASE DETAIL
(3D view)



Metframe Wall Set Out
Set out of Metframe lift shaft walls to provide consistent finishing set out between the Metframe walls and lift pit. Exact wall positions to be coordinated with the project design team.

Beam at Door Lintel Level
Installed at head of door level to enable the door bracketry to be installed.

Metframe Slab Support
Zed profile bolted at head of wall panels to support concrete floors.

Plasterboard on Metframe Walls
Minimum of 2 layers of 15mm board except where the Versafire board is located. For fire performance of Metframe walls please seek guidance from the Metframe specification manual which advises minimum board specifications for specific fire protection periods. For internal lift shaft faces the plasterboard for the side walls where Menstruate channels are installed will need to be boarded horizontally.

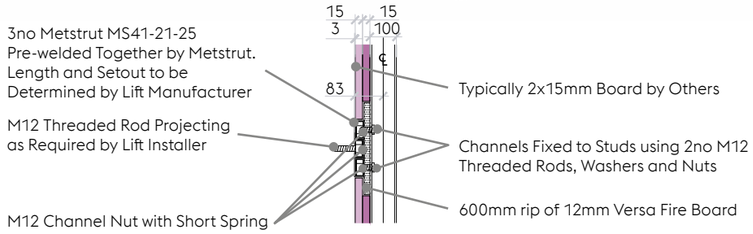
Metframe Metstrut Channels
Formed from welded 3 member section to allow connection of the lift bracketry via a spring nut. Backing of Metstrut channels to the Metframe wall typically onto 12mm of Versafire boarding. Vertical set out of channels is both project and lift supplier dependent.

Concrete
Typically 160mm deep concrete floor formed from C30/37 concrete. Specific concrete guidelines can be found in the Metframe Installation Manual.

Beam at Floor Threshold
Installed at floor level to provide support to the door runner. Level of beam dependent on requirements for a fire fighting lift shaft within the building.

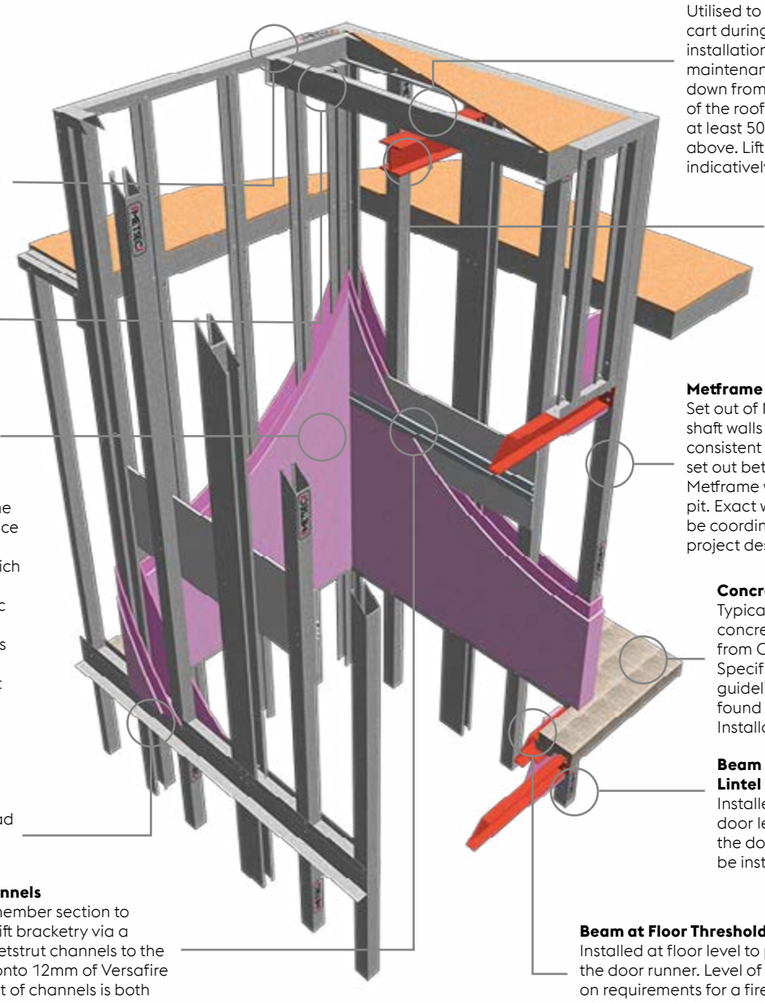
Metframe Wall Stud
Metframe studs 100mm wide typically at 600mm centres. Formed in panels off-site to form Lift shaft wall.

Concrete Lift Pit
Set out to be confirmed by the project design team. Typically Metstrut or equivalent channels fixed into pit faces to accommodate lift brackets as required.



Lift Channel Fixing Detail

DETAIL MF017
LIFT SHAFT WITH
DOOR AND CAP DETAIL
(3D view)



Lift Beam
Utilised to support the lift cart during both the initial installation and also later maintenance. Typically set down from the underside of the roof joists to provide at least 50mm clear zone above. Lifting eyes shown indicatively.

Lift Eye
Shown indicatively. Supplied and installed by others.

Metframe Wall Set Out
Set out of Metframe lift shaft walls to provide consistent finishing set out between the Metframe walls and lift pit. Exact wall positions to be coordinated with the project design team.

Concrete
Typically 160mm deep concrete floor formed from C30/37 concrete. Specific concrete guidelines can be found in the Metframe Installation Manual.

Beam at Door Lintel Level
Installed at head of door level to enable the door bracketry to be installed.

Beam at Floor Threshold
Installed at floor level to provide support to the door runner. Level of beam dependent on requirements for a fire fighting lift shaft within the building.

Metframe Wall Stud
Metframe studs 100mm wide typically at 600mm centres. Formed in panels off-site to form Lift shaft wall.

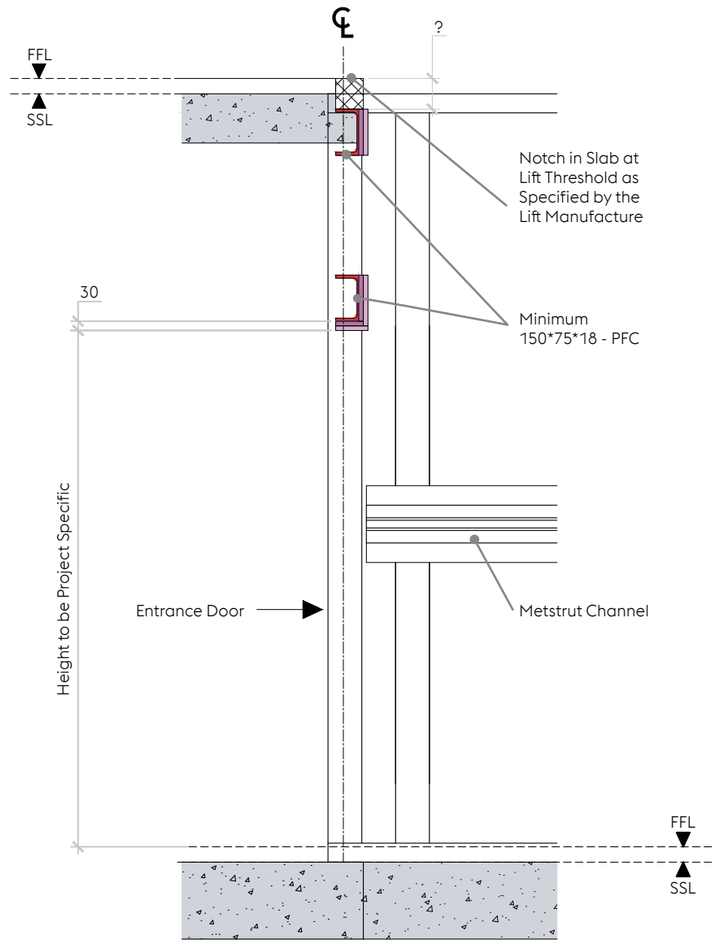
Lift Cap
Typically formed from roof joists at 600mm Centres formed in panels off-site.

Plasterboard on Metframe Walls
Minimum of 2 layers of 15mm board except where the Versafire board is located. For fire performance of Metframe walls please seek guidance from the Metframe specification manual which advises minimum board specifications for specific fire protection periods. For internal lift shaft faces the plasterboard for the side walls where Metstrut channels are installed will need to be boarded horizontally.

Metframe Slab Support
Zed profile bolted at head of wall panels to support concrete floors.

Metframe Metstrut Channels
Formed from welded 3 member section to allow connection of the lift bracketry via a spring nut. Backing of Metstrut channels to the Metframe wall typically onto 12mm of Versafire boarding. Vertical set out of channels is both project and lift supplier dependent.

DETAIL MF017
LIFT SHAFT WITH
DOOR AND CAP DETAIL
(Sectional details)



Section Through Entrance Door

METFRAME HOT ROLLED STEEL DESIGN

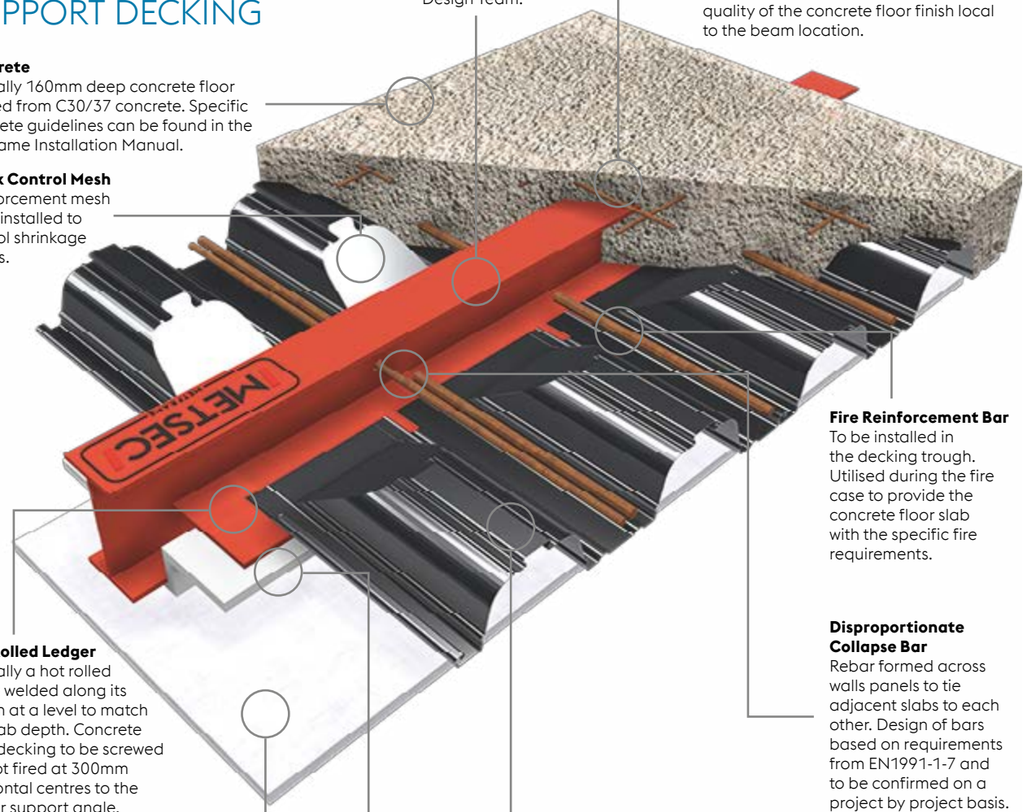
DETAIL MF012 EXPOSED BEAM FIRE PROTECTED WITH 50mm COVER PLATES USED TO SUPPORT DECKING

Hot Rolled Beam
Exact size to be specified by Metframe Design Team.

Cover to Beam
With minimal floor finish the beam will require at least 50mm concrete cover over the beam to avoid the effect on the quality of the concrete floor finish local to the beam location.

Concrete
Typically 160mm deep concrete floor formed from C30/37 concrete. Specific concrete guidelines can be found in the Metframe Installation Manual.

Crack Control Mesh
Reinforcement mesh to be installed to control shrinkage cracks.



Fire Reinforcement Bar
To be installed in the decking trough. Utilised during the fire case to provide the concrete floor slab with the specific fire requirements.

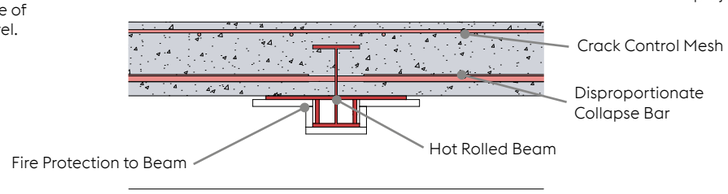
Disproportionate Collapse Bar
Rebar formed across walls panels to tie adjacent slabs to each other. Design of bars based on requirements from EN1991-1-7 and to be confirmed on a project by project basis.

Steel Decking
Typically 80mm deep trapezoidal steel decking. Exact specification to be confirmed by Metframe on a project by project basis.

Hot Rolled Ledger
Typically a hot rolled angle welded along its length at a level to match the slab depth. Concrete steel decking to be screwed or shot fired at 300mm horizontal centres to the ledger support angle. Fixings to be confirmed on a project by project basis.

Ceiling
Typically formed as a non-fire rated ceiling allowing services to be run through within the zone between underside of concrete and ceiling level.

Fire Protection to Beam
Typically provided through encasement of the exposed steelwork by a specialist fire board of a minimum thickness of 15mm. Exact thickness of board to be utilised is based on the project specific fire protection.



Section at Floor Level

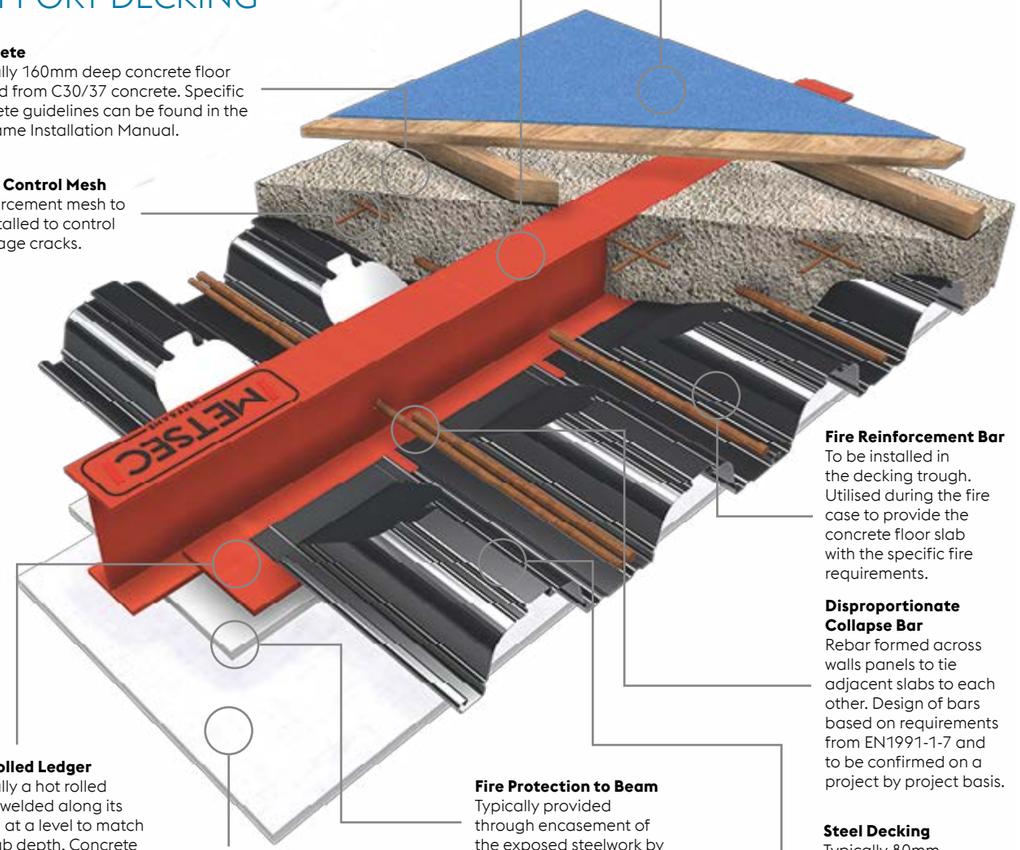
DETAIL MF013 FIRE PROTECTION FOR AN EXPOSED BEAM WITH NO CONCRETE COVER PLATES USED TO SUPPORT DECKING

Hot Rolled Beam
Exact size to be specified by Metframe Design Team.

Cover to Beam
With minimal floor finish the beam will require at least 50mm concrete cover over the beam to avoid the effect on the quality of the concrete floor finish local to the beam location.

Concrete
Typically 160mm deep concrete floor formed from C30/37 concrete. Specific concrete guidelines can be found in the Metframe Installation Manual.

Crack Control Mesh
Reinforcement mesh to be installed to control shrinkage cracks.



Fire Reinforcement Bar
To be installed in the decking trough. Utilised during the fire case to provide the concrete floor slab with the specific fire requirements.

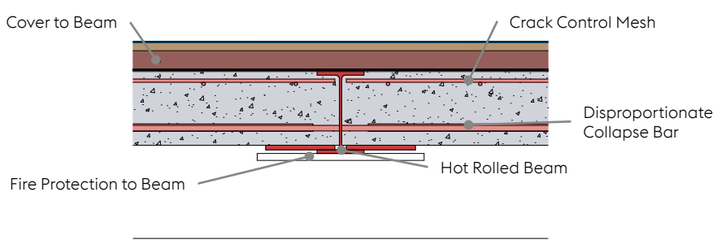
Disproportionate Collapse Bar
Rebar formed across walls panels to tie adjacent slabs to each other. Design of bars based on requirements from EN1991-1-7 and to be confirmed on a project by project basis.

Steel Decking
Typically 80mm deep trapezoidal steel decking. Exact specification to be confirmed by Metframe on a project by project basis.

Hot Rolled Ledger
Typically a hot rolled angle welded along its length at a level to match the slab depth. Concrete steel decking to be screwed or shot fired at 300mm horizontal centres to the ledger support angle. Fixings to be confirmed on a project by project basis.

Ceiling
Typically formed as a non-fire rated ceiling allowing services to be run through within the zone between underside of concrete and ceiling level.

Fire Protection to Beam
Typically provided through encasement of the exposed steelwork by a specialist fire board of a minimum thickness of 15mm. Exact thickness of board to be utilised is based on the project specific fire protection.

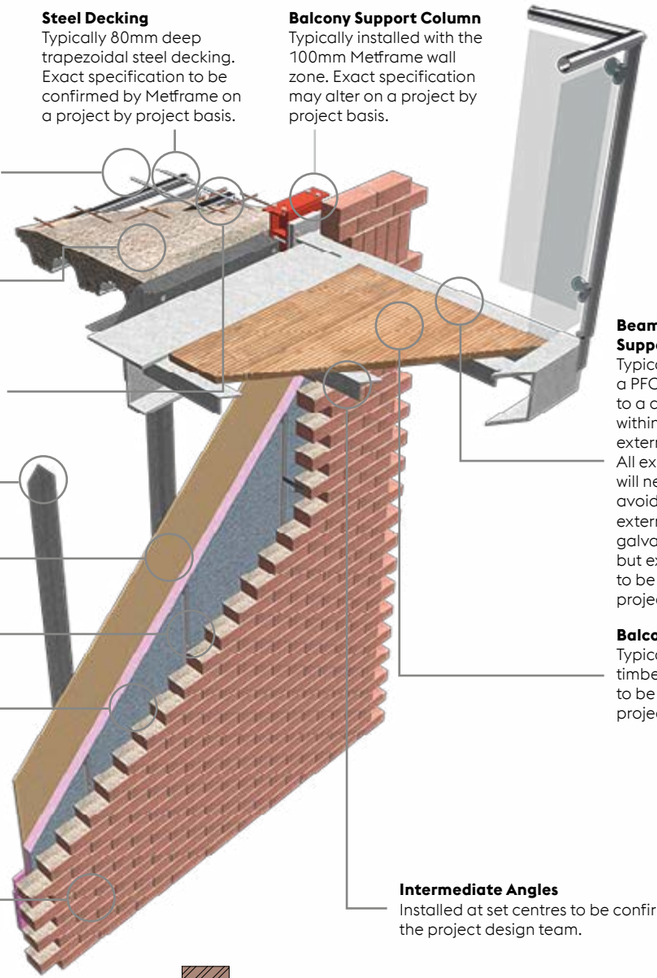


Section at Floor Level

METFRAME BALCONIES

DETAIL MF022 EXTERNAL WALL WITH CANTILEVER BALCONY

(Viewed externally)



Steel Decking
Typically 80mm deep trapezoidal steel decking. Exact specification to be confirmed by Metframe on a project by project basis.

Balcony Support Column
Typically installed with the 100mm Metframe wall zone. Exact specification may alter on a project by project basis.

Additional Reinforcement
Used to tie the head of the column head into the floor slab.

Concrete
Typically 160mm deep concrete floor formed from C30/37 concrete. Specific concrete guidelines can be found in the Metframe Installation Manual.

Fire Reinforcement Bar
To be installed in the decking trough. Utilised during the fire case to provide the concrete floor slab with the specific fire requirements.

Metframe Stud
Metframe studs 100mm wide typically at 600mm centres.

External Sheathing Board
Typically 12mm thick to achieve project specific fire requirements.

Stainless Steel Brick Tie Channel with Ties
Ties to be typically at 600mm horizontal centres and 450mm vertical centres.

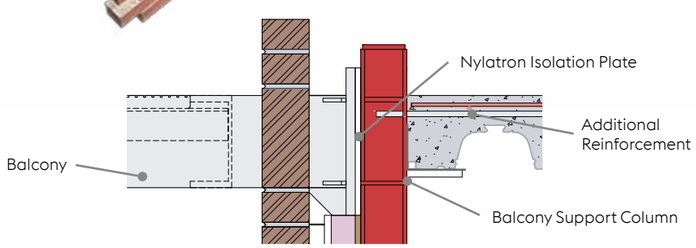
Insulation
Specification to be confirmed by the design team to achieve both thermal and fire requirements.

Brickwork
Design by project engineer.

Beam Outrigger to Form Support for Balcony
Typically formed from a PFC connected back to a column integrated within the 100mm wide external Metframe wall. All external steelwork will need protection to avoid corrosion. Typically external members are galvanised as a minimum but exact specification to be confirmed by the project design team.

Balcony Finish
Typically lightweight timber construction but to be confirmed by the project design team.

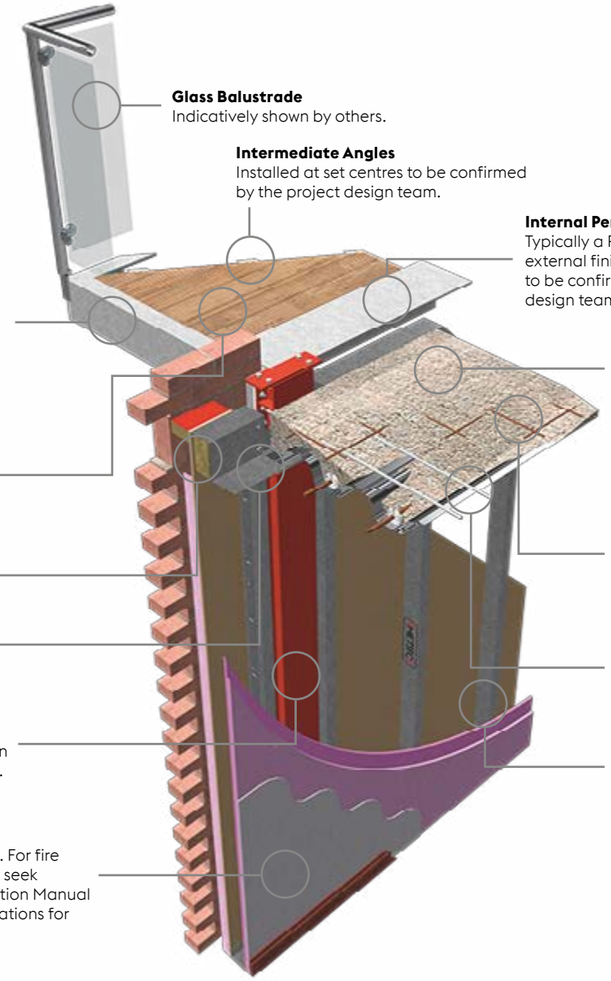
Intermediate Angles
Installed at set centres to be confirmed by the project design team.



Section at Floor Level

DETAIL MF022 EXTERNAL WALL WITH CANTILEVER BALCONY

(Viewed internally)



Glass Balustrade
Indicatively shown by others.

Intermediate Angles
Installed at set centres to be confirmed by the project design team.

Beam Outrigger to Form Support for Balcony
Typically formed from a PFC connected back to a column integrated within the 100mm wide external Metframe wall. All external steelwork will need protection to avoid corrosion. Typically external members are galvanised as a minimum but exact specification to be confirmed by the project design team.

Balcony Finish
Typically lightweight timber construction but to be confirmed by the project design team.

Acoustic Quilt
Metframe wall cavity to reduce flanking sound. Specification to be confirmed by project design team.

Shuttering Section
Supports the edge of the concrete decking.

Balcony Support Column
Typically installed with the 100mm Metframe wall zone. Exact specification may alter on a project by project basis.

Internal Finishes
Minimum of two layers of 15mm board. For fire performance of Metframe walls please seek guidance from the Metframe Specification Manual which advises minimum board specifications for the specific fire protection periods.

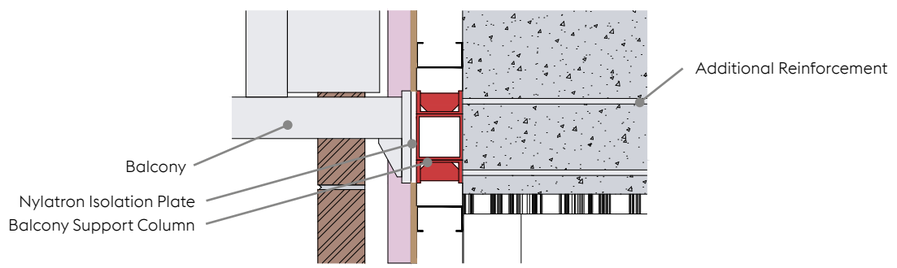
Internal Perimeter Beam
Typically a PFC offset from the external finish. Exact distance to be confirmed by the project design team.

Concrete
Typically 160mm deep concrete floor formed from C30/37 concrete. Specific concrete guidelines can be found in the Metframe Installation Manual.

Crack Control Mesh
Reinforcement mesh to be installed to control shrinkage cracks.

Additional Reinforcement
Used to tie the head of the column head into the floor slab.

Metframe Stud
Metframe studs 100mm wide typically at 600mm centres.



Plan on Balcony Column

METFRAME SUMMARY OF SER SUBMISSION

Outline of Document

The aim of this document is to outline the information which voestalpine Metsec can provide for the SER submission.

Metframe Design Philosophy

The basic principle of Metframe superstructures is that lightweight galvanised steel sections are used to form the structural elements of a building, based on proven engineering methods. The below summary utilises a generic project, there may be alternations to the below on a project by project basis.

Each storey height of the building frame is tied together and at each floor level with the floor construction which demonstrate adequate robustness as indicated in BS EN 1991 1-7 and UK National Annex to BS EN 1991 1-7.

The Metframe panel consists of vertical and horizontal steel channels; bolted together using countersunk bolts to form a frame. All sections are cold rolled from pre-galvanised steel strip to BS2989; grade Z39 which has a minimum yield of 450 N/mm^2.

Externally, panels are fitted in the factory with carrier board and potentially insulation dependent on the external wall finish. On site the panels are fitted together using bolts, lined, and plumbed, before the plasterboard is added. Internal panels are fitted on site with two layers of board to both wall faces to suit the fire protection requirements. Where openings are required in the panels, these are accommodated as required with any additional lintels being incorporated.

Cold-formed steel joists are designed to support the roof construction and these loads are taken to the supporting load bearing wall sections. Horizontal forces into the roof are typically transferred into the shear wall through the use of the roof lining material acting as a diaphragm. Where this is not possible an additional roof plan girder is provided to transfer loads to cross walls.

Floors are constructed from single span composite concrete floor slabs supported by zed ledger angles. The slab sits on to the bottom horizontal leg of the zed member, and the top leg sits on to the top of the Metframe panel. All zed members are bolted to the face of the panels. On long span floors, temporary propping would be required during the construction phase. These concrete floor slabs are supported by the load bearing walls, again resisting the cumulative axial loads down to foundation level.

Overall stability of the structure below the roof level is dependent on the floor construction transferring horizontal loads to the shear walls. Stability to these shear walls is typically provided by the use of flat strap cross bracing to panels internal and externally. These straps are typically 1.2mm gauge 100mm wide strips fixed at the head and base of panels at stud node positions. Horizontal loads are transferred vertically down through the building through these braced wall systems to the supporting structure by others. The layout of these cross bracing straps are set out to limit any potential uplift effects at the lowest floor.

During the process leading to the Full SER submission, voestalpine Metsec are able to provide full calculations and design scheme drawings to the design team. These will include;

- Design philosophy
- Load takedown included line and point loads
- Non-dimensioned structural layout showing beam sizes, column sizes, stud sizes, slab span and roof design
- Structural calculations for beams, columns, studs, slabs and roofs
- Wind loading calculations including wind loads on external walls and overall stability of the structure
- Disproportionate collapse calculations
- Standard connection pack stating design values but not calculations
- Fire performance data and fire protection details to the frame
- Checks carried out and certified by a competent checker included CV
- Job specific connections details generally including podium structures/ground bearing slabs
- Job specific Risk Assessments
- List of beams & columns and proof of connections
- Stair calculation to be checked by voestalpine Metsec
- Stability check to be issued with line loads
- Internal & External corrosion level to be identified on drawings
- Imposed load to be identified on our structural scheme.

The load takedown will indicate Metframe walls and beams with the associated dead and imposed loads for line loads and point loads. These will be unfactored and contain no imposed load reductions. The load take down will also indicate the shear at the base of the Metframe structure due to wind loading. No allowance will be made for any notional loads in the load take down.

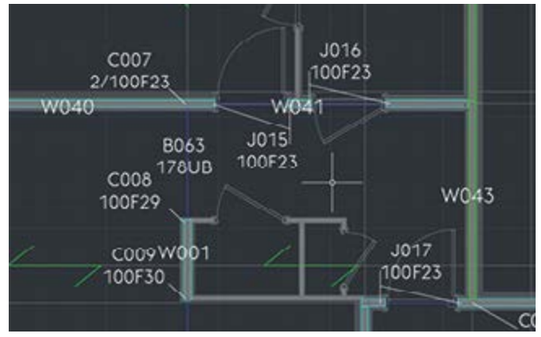
The non-dimensioned structural layout will be similar to the adjacent example. This will be the design scheme based on the architectural drawings which were available at the time of design. The design scheme will indicate the wall, beam and column references which can be read in conjunction with the design calculations as well as clearly indicating the beam and column sizes, slab orientations and slab depths. This will not take into account any changes which have been made after the design period as a result of comments on the Metframe GAs. Connections will not be labelled unless they are designed differently from the standard connections. The location of bracing straps will not be indicated.

To complete the full submission the following additional information will also be provided

- Full dimensioned GAs and sections
- Decking plans
- Marking plans
- Bracing plan
- Fabrication drawings including hot rolled and cold rolled panels

Stair fabrication drawings and calculations are outside of the voestalpine Metsec scope of works as these are supplied by a specialist stair manufacturer.

The full dimensioned GAs and sections are those which have been commented on and approved by members of the design team. These will include indications of all beams and any hot rolled columns. Cold rolled members will not be labelled.



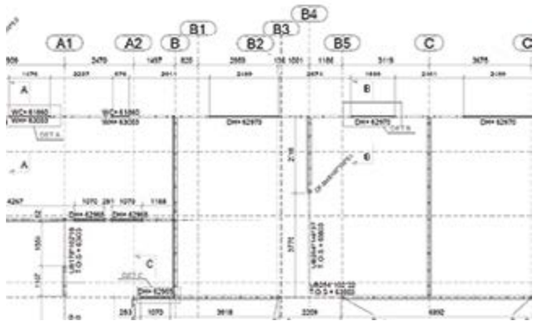
Example design scheme

The full structural calculations will include beams, columns, studs, slabs and roofs. The beam design will include checks for the moment capacity, shear capacity, and frequency as well as deflections as a result of both permanent and imposed loads. The column and stud design will have hidden sectional properties for the voestalpine Metsec studs which will not be available for review due to these being commercially sensitive values. The slab design will be based on software available from the decking manufacturer using properties built into their software. Roof design will include designs for permanent and imposed loads as well as uplift and snow loads.

The wind loading calculations will utilise basic wind loads as determined by voestalpine Metsec, unless basic wind loads are provided before the commencing of design. Those wind loads are determined through voestalpine Metsec in-house ‘MetSPEC’ design software. Design of bracing is calculated to include notional loading. The set out of the bracing will not be shown at this stage.

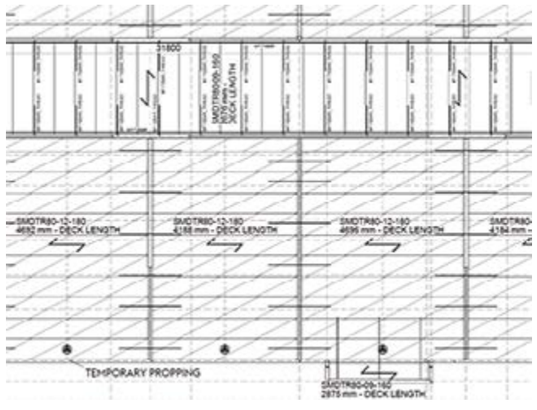
SER SUBMISSION (CONTINUED)

Disproportionate collapse calculations will state the requirements for this project and the design for this project, however it will not indicate the exact locations as this is shown in the voestalpine Metsec standard details and decking plans.



Example fully dimensional GA

Decking plans will indicate span directions and decking gauges as well as any requirement for temporary propping. These plans will also indicate any reinforcement required for disproportionate collapse.



Example decking plan

Marking plans indicate where each panel is to be installed on site. These also show any hot rolled members which are to be installed. These can be read in conjunction with the fabrication drawings for the set out of individual panels.

The additional information required for full SER submission means that voestalpine Metsec cannot provide the above information until the project is fully detailed and ready for production. voestalpine Metsec can provide the information for the initial SER submission part way through the detailing period.

NOTES

NOTES

» FRAMING

» PURLINS

» DRY LINING

» CABLE MANAGEMENT

» CUSTOM ROLL FORMING

Framing
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In the interests of a policy of continuous research and development, voestalpine Metsec plc reserve the right to change the specifications in this publication without prior notice.

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