

PLACING DECKING

When preparing for decking placement the supporting steelwork shall be made safe for lifting decking packs into place and clear of dirt or debris – beam flanges may also need to be free of paint or galvanized zinc to provide a suitable surface for studwelding where specified.

Individual sheets shall be placed and oriented in line with contractor's drawings and arranged so that the side laps are oriented the same way to achieve the required connection between adjacent sheets. This ensures no further turning of sheets is required manually. Refer to contractor's section drawings to ensure decking packs are lifted the correct way up – for MetFloor 60 and MetFloor 80 the dovetail detail should be at the top, for MetFloor 55 the embossments should project upwards. If in doubt, ask. Drawings should also be referred to for any temporary support or propping requirements.

Both adequate time and good weather are needed to achieve an efficient installation. Decking should be installed from the position indicated on contractor's drawings; typically, at building corners to reduce the number of unprotected edges.

Decking sheets are slid into position and, if possible, fixed into

place before the next sheet is installed. This helps maintain the installed decking position and provides a robust working platform minimising the risk of accident and injury.

Bearing requirements outlined in this document shall be adhered to (50mm minimum on steel), and joints in decking should never be made at temporary support points (decking should be continuous unless at an end). It is recommended not to fasten decking to temporary supports to assist removing the temporary supports once the concrete has hardened.

Where sheets are butted together, or where they interface with other elements, foaming or taping may be required. 5mm gaps are generally acceptable, being too small to allow aggregate through (BCSA, 2014). If decking sheets need to be cut (e.g. around columns or similar obstructions) this can be completed using a grinder or nibbler – any remaining gaps should be filled.

Unwanted parts or off cuts should be placed in a skip for recycling in line with the site waste management plan. To avoid multi-handling, skips should be positioned in the vicinity of the working area and placed over beams to avoid damage to the decking. Where bundles are only partially installed these must be suitably anchored to avoid being displaced by strong winds.

TEMPORARY PROPPING

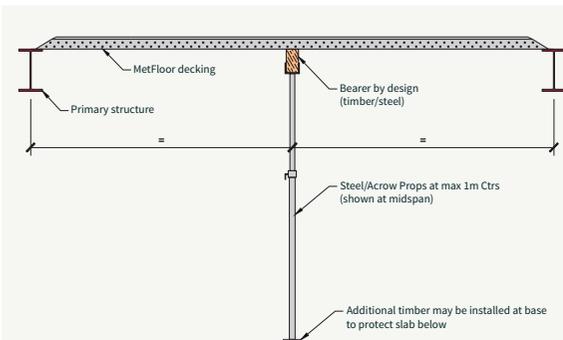
The first choice for any decking scheme should be for the deck to be unpropped. However, where propping is required by design, the main contractor or designated temporary works co-ordinator is responsible for ensuring the safe design and installation of temporary props.

Subject to the design, props are typically placed at either mid-span (1no line of props) or third points (2no lines of props) and installed with equal spacing between lines of propping and primary supports. Propping shall be provided by means of a continuous timber or steel bearer, supported by adjustable steel tube props (or Acrow props). Bearers should be supported by props at no greater than 1m centres and suitably braced to avoid being displaced during construction. Props shall not be placed more than 300mm away from the ends of bearers and not more than 500mm from the decking side support. The props should be stable without relying on friction with the deck for lateral stability. It is recommended that bearing widths be no less than 100mm to avoid marking the slab soffit. Props must be level and not over-tightened, with the decking above kept in a level position – a maximum upward camber between permanent supports of $L_s/350$ may be acceptable, where L_s is the effective span between permanent supports (e.g. 3m span; $3000/350 = 8.6\text{mm}$).

Props should not be removed until the floor slab has reached 75% of its characteristic strength based on sample cube or cylinder tests. Upon removal, the slab should be allowed to develop its full design strength before any heavy traffic is applied. This is crucial as without fully hardening the slab may become subject to cracking. Similarly, propping may not be placed on top of another slab until it has been laid for a minimum of 7 days or reached 75% of its characteristic strength.

For the design of bearers, reference should be made to BS EN 1995-1-1 (or BS 5268-2) or BS EN 1993-1-1 (or BS 5950-1), with bearers designs as simple or continuous beams. For the prop specification, designers should refer to BS 4074/BS EN 1065 or proprietary load tables. Bearers must be designed to limit deflections to a maximum 10mm. See also BRE report BR 394 for further information on the design of backpropping.

Temporary propping shall be designed, installed, inspected and removed by a suitably qualified or experienced competent person.



FIXING DECKING

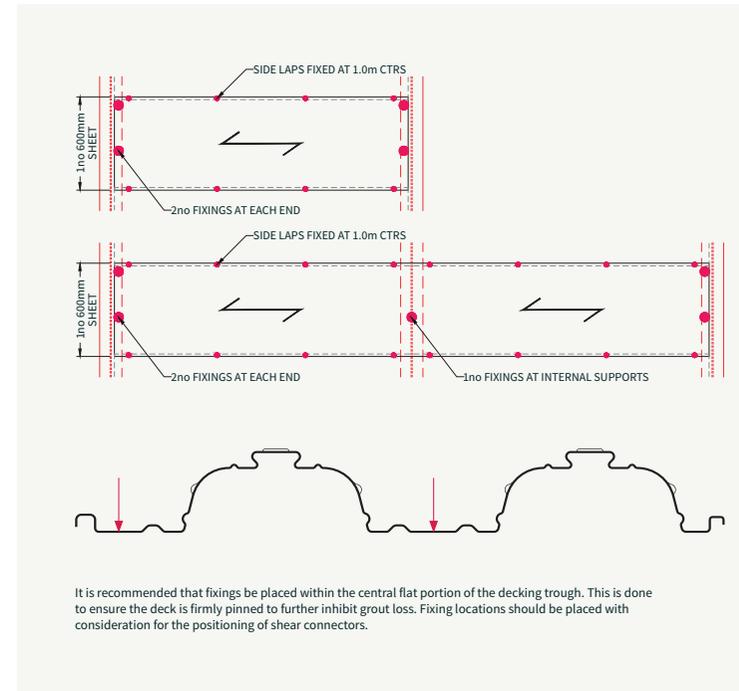
As soon as the decking is laid fixings shall be applied through each trough to the supporting structure.

Where the supporting structure is a hot-rolled steel frame decking is typically fastened using powder-actuated/gas-fired nails or self-drilling screws. Each decking sheet shall be lapped to each adjacent sheet using the proprietary lapping detail and fixed at 1.0m centres.

Where shear studs are used and the decking multi-spanning, two fixings shall be installed per sheet at end supports and one fixing per sheet at intermediate supports. Fixings for side bearings should be provided at 600mm centres.

Typical fixing arrangements are shown below. Where decking is to be fixed to materials other than hot-rolled steel, the structural designer shall be consulting for suitable quantities and specification. Fixing spacing and edge distances from the fixing manufacture shall be adhered to.

The following table provides further information on standard fixings.



Fixing Guidance

To Steel	Temporary Fix	Hilti X-U 15 P8 TH Hilti X-P 14	Shot-fired Gas-fired	Or equivalent for temporary fastenings prior to through-deck studwelding (studs at min 300mm centres)
Heavy Duty		Hilti X-ENP-19 / ITW Spit SBR14	Powder-actuated	Subject to design actions for wind and lateral restraint
		Hilti S-MD / Evolusion TSHW	Self-drilling screws	Or equivalent suitable for base steel thickness
To Concrete		Hilti HUS range / SFS intec TB-T / EJOT 4H 32	Mechanical anchors	Or equivalent; fixed into pre-drilled hole
To Blockwork		Rawlplug FX-N-L	Hammer-in	Or equivalent suitable for base constituents
To Timber, Glulam or CLT		Hilti S-MP 53 Z / EJOT JA3	Self-drilling screws	Or equivalent; in line with manufacturers recommendation
To side laps, end closures etc.		Hilti S-MD 01 Z / other 5.5 x 25mm / other 4.8 x 19mm	Self-drilling screws	Or equivalent suitable for the installed decking or part gauge

See fixing manufacturers' literature for further information and guidance on installation

*Suitability of blockwork fixings and capacities are subject to block type, strength and arrangement – on site testing is recommended.

Additional fixings may be required where the decking is designed to provide a diaphragm for the stability of the primary structure and where wind speeds dictate in the temporary condition.

STUDWELDING

Further to the Design Information provided in this document, composite shear connectors manufactured in accordance with BS EN ISO 13918 should be installed by CMF distributors and/or registered installers or other suitably qualified specialist studwelding organisations.

Details of CMF distributors and registered installers can be found on our website or alternatively by contacting the CMF Sales Department.

PLACING REINFORCEMENT

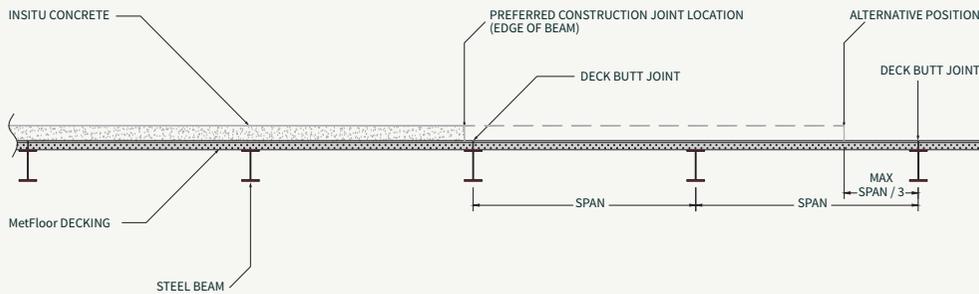
Where mesh reinforcement is used, it should be positioned towards to the top of the composite slab.

Top cover to the reinforcement mesh is typically 25mm. Greater cover may be necessary for heavier mesh specifications and for designs requiring improved load distribution for concentrated loads - where mesh has a large cover dimension consideration should be given for slab durability and non-structural cracking. For bar reinforcement, similar rules apply from the base of the composite slab, with minimum offsets for the axis dimension of the bar determined by design for the specified fire resistance period. Reinforcement spacers and chairs may be required to maintain correct mesh and bar heights – see BS 7973-2 for more information.

CONSTRUCTION JOINTS

When construction or day joints are required, these should be formed as close as possible to an adjacent butt joint.

Where this isn't possible then the distance of a construction joint to the end of the current decking sheet shall not exceed one third of the span. For further information on construction joints guidance is available from the BCSA, Concrete Society and SCI.



PLACING CONCRETE

Dirt and grease can adversely affect the performance of the hardened slab and as such should be cleared from the decking prior to the concrete pour.

Oil may be present on the decking product from the manufacturing process which may be left in place. Concrete shall be poured evenly, working in the direction of span. Care shall be taken to avoid heaping of concrete. Construction and day joints should occur over support beams and preferably at a decking joint. For more information on safe pouring of concrete see BCSA document Code of Practice for Metal Decking and Stud Welding (BCSA, 2014).

DRILLING

Whether core drilling or drilling for other secondary purposes, the use of percussive drilling devices must be avoided as this can negatively impact the bond between the metal deck and concrete.

For the anchors or similar items, the use of small-scale rotary hammer drills is considered acceptable.

SERVICES INTEGRATION

The re-entrant profile of the MetFloor 55 range and the raised dovetail above the shoulders of the MetFloor 60 and MetFloor 80 profiles allows for easy installation of suspended ceilings and services.

For the MetFloor 55 profile, a threaded V-Nut may be used. These are available from Lindapter (Type VN V-Nut) and is simply offered up into the re-entrant profile and turned to be wedged into place.

For MetFloor 60 and MetFloor 80 Lindapter's Type MF connector should be employed. This uses a profiled bracket and threaded wedge, where the bracket is pushed into the decking's dovetail and the wedge rotated to secure the connector into place.



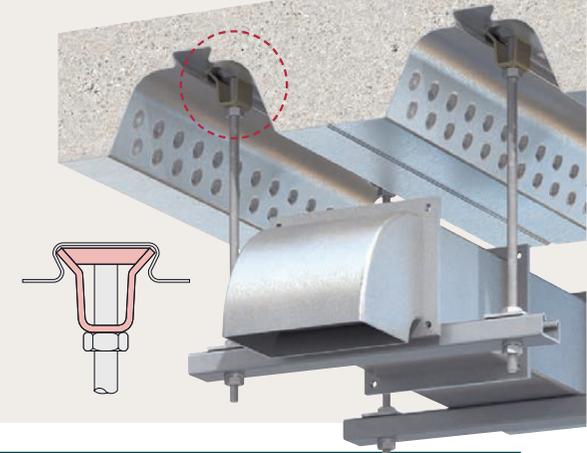
lindapter TYPE MF DECKING FIXINGS

Type MF is a high quality, cost-effective connection for securing building services and is specifically designed for MetFloor 60 and MetFloor 80 profiles.

The MF fits inside the dovetail shaped re-entrant channel for its designated profile.



Decking Profile Pattern



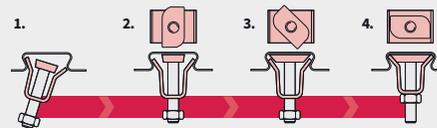
KEY BENEFITS & TECHNICAL DATA

- Fast, cost effective installation
- No special tools required
- No weakening of decking profiles
- No damage to the decking surface
- No possibility of delamination
- Adjustable and easy to remove

Safe Working Load (3:1 Factor of Safety)			
Product Code	Rod min 4.6	Tensile / 1 Rod (kN)	Tightening Torque (Nm)
MF06	M6	1.47	10
MF08	M8	1.47	10
MF10	M10	1.47	10

Bracket: Steel strip, zinc plated + J5500 | Wedge: Malleable iron, zinc plated.

Note: It is the responsibility of the M&E contractor/designer to ensure that the Type MF fixings are sufficient to carry the required services load.



1. Pre-assemble the bracket and wedge (flat surface facing up) onto the threaded rod and insert one side of the bracket into the re-entrant channel of decking.
2. Insert the other side of the bracket into position inside the decking.
3. Turn the wedge clockwise until the position in Fig. 4 has been achieved.
4. Tighten the nut on the rod to a torque of 10Nm (prevent rod from rotating).

• Install the decking fixings after the concrete has been poured and has reached full strength.

• If the decking profile is deformed or distorted, do not install the fixing. If in doubt, contact the Technical Support team for advice.

Health & Safety



Handling

Galvanized steel decking shall be handled with care.

Adequate training shall be completed, and protective gloves and clothing must be worn when handling steel decking to avoid contamination from protective oil coverings and to avoid cuts from sharp edges and corners.



Eye hazards

Adequate eye protection conforming to BS 2092/BS EN 166 must be worn when cutting strapping and steel decking to avoid serious eye injury.

Eye protection shall also be worn during fastening operations.



Noise hazards

Adequate hearing protection, such as ear defenders, must be worn when handling or cutting decking and shot firing to avoid the risk of permanent hearing damage.

Noise levels may be high, particularly when using powder or gas actuated nail guns.



Respiratory Hazards

When welding or flame cutting galvanized steel decking, fumes containing oxides of iron and zinc are produced – if inhaled these can cause metal fume fever.

This is a short lasting condition with flu-like symptoms. Adequate Respiratory Protective Equipment must be worn to prevent the risk of Occupational Respiratory Diseases. The following provides workplace exposure limits as published by the HSE.

Substance	Workplace exposure limit		Notes
	8 hour TWA	15 minute STEL	
Iron oxide fume	5mg/m ³	10 mg/m ³	UK WEL
Zinc oxide fume	5mg/m ³	–	(Previous UK WEL)

Fumes may also be produced by powder-actuated nail guns – refer to manufacturer information.

Health & Safety, continued



Explosives & Ballistics

Powder-actuated or gas-fire nail guns pose a major hazard when used by inexperienced operatives.

Nail guns shall only be used by trained operatives and in line with manufacturer's instructions.



Working at Height

For the installation of profiled sheet decking and associated elements, always employ site safety measures such as safety netting, edge protection systems and suitably protected means of access.

These shall be completed in line with the site rules and standards, and following the risk assessments and method statements (RAMS) completed for the works.

OPERATION & MAINTENANCE

Subject to the environmental corrosion category and site exposure, the MetFloor system may achieve a design life in excess of sixty years.

In order to achieve this the installation shall be completed in line with best practices. Steps shall be taken to ensure that the product is free from damage and that any measures applied which protect it from corrosion and degradation are maintained throughout its working life. It shall be noted that the design life does not constitute a warranty.

Regular inspection must be completed at intervals, and in a manner, which is suitable for the requirements of the structural type and in line with the required maintenance regime for the application. Consideration must be made for both the steel deck and concrete infill as both elements are crucial to the composite action of the slab and as such the longevity of the structure.

DECOMMISSIONING

The MetFloor product may be dismantled as part of the composite slab unit.

Suspended fixtures and finishes shall be removed from the decking soffit and finishes to the top of concrete removed and disposed of in line with individual product O&Ms. Lifting points shall be fitted to the composite slab and the slab cut into manageable sections. The cut sections shall be held by crane whilst their connections at end and mid supports are broken by suitable means; subject to the connections used and site conditions. Once disconnected the cut slab sections may be lifted away to a safe working area. Specialists in decommissioning and demolition shall be consulted.



RECYCLING

Upon specialist separation of the constituent materials, steel may be recycled in its entirety to produce new structural steel components.

Steel scraps and off cuts should also be recycled. Concrete may be recycled or reused to produce aggregates for new concrete installations or as base courses for a variety of infrastructure applications.