RAISED MODULAR
FLOORING

RMF INSTALLATION GUIDELINE

CONTENTS

SAFETY

In addition to the statutory and specific site safety requirements, the following points should be considered when carrying out the installation of access flooring and the associated works.

(1) The correct stances and techniques should be used when lifting materials to avoid strains and injuries during material handling.

(2) The appropriate safety equipment and procedures should be employed when using pedestal adhesive, sub-floor sealers, carpet adhesives etc

(3) The appropriate safety equipment and procedures should always be employed when using installation equipment, eg power tools, bandsaws etc.

OFF-LOADING

Whilst access flooring materials are generally very robust, care should be taken when off-loading to avoid damage caused by forklift truck, manual handling or hoist facilities etc

STORAGE

Materials must be stored in areas which are dry, watertight and sufficiently ventilated to ensure that there are no excessive variations in temperature or humidity. The parameters for temperature and humidity are 5°C - 30°C and maximum 75% R.H. Materials should be stacked in such a manner that structural floors are not overloaded or damaged.

BUILDING CONDITION

Wherever possible ambient temperature and humidity levels should be maintained during installation as close as possible to levels which will prevail during building occupancy.

Notwithstanding the above, the conditions stated in the "STORAGE" section of this document also apply to installation and use.

SUB-FLOORS

(A) Condition - Sub-floors must be free of any dust, debris, oil, grease or other contaminants which may be detrimental to the pedestal adhesive bond. The sub-floor surface should be reasonably flat and smooth to allow for satisfactory seating of the pedestal base plates. The overall level of the sub-floor should be checked to ensure that variations are within the adjustment range of the access floor support pedestals. The minimum temperature of the sub-floor to allow full curing of pedestal adhesive is 5°C.

(B) Strength - The strength, composition and general condition of sub-floors is normally outside of the installation contractors control and responsibility but should be of such specification to provide adequate strength. One of the most common problems experienced is failure of the fixing of the pedestal base to the concrete sub-floor. Detachment is usually caused by failure of the concrete and not the adhesive bond. The dynamic impact test shall be carried out on site by the fixing contractor. For details of pedestal bond strength test consult PSA MOB PF2 PS

(C) Sealing - Sealing of the sub-floor within the underfloor void is normally only required when the void is to be used as a HVAC plenum. When sealing of the sub-floor is specifically requested it is essential to ensure that the sealant is compatible with the proposed pedestal adhesive.

(D) Other Sub-floors Existing timber, asphalt or floors with various coverings etc., should be evaluated for suitability and compatibility with the access flooring. Sub-floors that deflect will cause the same effect in the access floor. Pedestal adhesive compatibility must be considered. The strength of the existing flooring bond must be strong enough to prevent failure.
Mechanical fixings may be required for certain sub-floors.

TOOLS REQUIRED

The quality and efficiency of an installation is reflected in the tools chosen to execute the work. The following tools should be considered for use on all RMF Access Floor installations.

- Laser Level - emits a narrow rotating beam of light and is the ideal levelling instrument for installing an access floor. It can be operated by one man only to level an entire installation quickly, easily and accurately. Alternatively more than one installer can use it to work simultaneously. Laser levels can also be used to quickly check sub-floors to ascertain if variations are within pedestal adjustment ranges. Some have the facility to emit beams at 90^0 for setting out purposes.
- Small Level - suitable for checking that pedestals are perpendicular.
- 3.6m Straight Edge - marked at 600mm centres for the setting out and levelling of pedestals when using the "BLOCK" method installation.
- Bandsaw - a good quality bandsaw can save a great deal of time during installation, for cutting panels to perimeters neatly and accurately.
- A throat size (the distance between the blade and the body of the machine) of 600mm is preferred although 300mm will suffice.
- Use a bi-metal blade,14-tooth, 12mm wide, 1.5mm thick. This blade will cut steel-encased chipboard panels, stringers, pedestals and other miscellaneous items.
- Cordless Power Screwdriver - Particularly useful for installing large areas screw down panel systems.
- Other Tools

1) Metal tape, 30M
2) Metal tape, 5M
3) Chalk lines
4) Electric or hand drill
5) Screwdrivers
6) Panel lifters suction or carpet

INSTALLATION

Tolerances

The following excerpts from PSA MOB PF2 PS outline the main tolerances applicable to the installation of raised access floors.

For full information on tolerances for installation the following documents should be the point of reference.

1)Property Services Agency	MOB PF2 PS Performance Specification Platform Floors (Raised Access Floors)Jan 1990
2) Property Services Agency	MOB 01-707 Technical Guidance Platform Floors Mar 1982
3) Access Flooring Association	ACCESS FLOORS: A Site & User Guide

P3.03 GAPS BETWEEN PANELS

The maximum gap between panels when located in their respective positions shall not exceed 1mm.

P3.06 FIT

The system shall not rely on perimeter walls, columns etc., for lateral stability. It shall provide a close fit to all such interfaces whilst allowing for possible building movement and hygrothermal movement in the floor system but without any detrimental effect on the floor performance.
At perimeters and around columns etc., the maximum allowable gap shall be 15mm with the edge panels being positively located to prevent lateral movement of the floor assembly.
Special consideration should be given to the panel support arrangements at threshold interfaces, which will not create a hazard to pedestrians.

P3.07 OVERALL LEVELS

Before the application of any load, the platform floor surface shall be level to within:

A) +/- 1.5mm over any 5 metre square an
B) +/- 6mm over any size of basic space.

The system shall be capable of adjustment to meet this requirement when the system is installed on a structural sub-floor constructed to normal tolerances in accordance with good building practice.

P3.08 PANEL LEVELS

The difference in height between adjacent panels without floor finish, panels with a hard surface type floor finish and panels with lipped edges shall not exceed 0.75mm before the application of any load and shall not exceed 3.25mm between the edge of any panel being subjected to any of the static loadings specified in section P4.00 and any adjacent unloaded panel.

P5.03 SEALING EDGES OF CUT PANELS

Where panels consist of a substrate which, will absorb moisture and which are nominally sealed against the ingress of moisture on all faces, all cut edges shall be suitably sealed against the ingress of moisture to prevent any deterioration of dimensional and structural performance.

P9.00 ELECTRICAL REQUIREMENTS

For information relating to electrical requirements consult:

A) PSA MOB PF2 PS
B) I.E.E Regulations

All tests for electrical resistance or continuity shall be arranged by the fixing contractor.

Locating the Starting Point

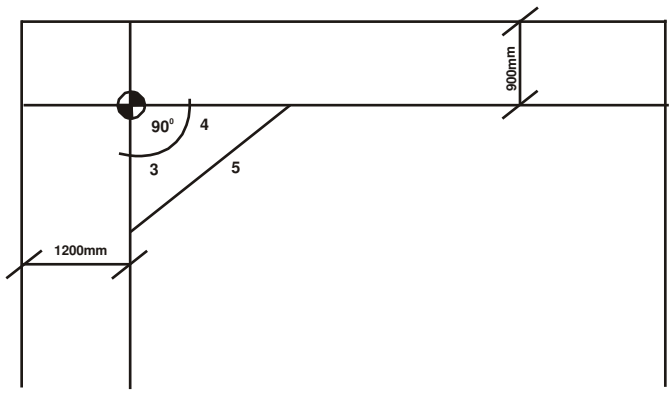
The proper location of the starting point is one of the most important tasks of the entire installation. If the module lines are not determined by the architects drawings then the flooring contractor should determine the grid layout. This will determine the location of the starting point.

Selection of the grid pattern will be based primarily on the following:

1) Economical use of materials
2) Co-ordination with other trades and services to be installed in the floor void.
3) Avoid cut panels at doorways and other obstacles.
4) Avoid very small cut panels (Less than 300mm) if possible
5) Select the longest and straightest wall to set out from, with full or half panels as determined.
6) Work should start from the farthest point of the room and proceed towards the doorway to avoid pedestrian trafficking or the movement of materials across the newly installed floor.

The starting point is then determined approximately 1200mm from the two adjacent walls where the full panels are used or 900mm for half panels (FIG1). The grids should be set so that full panels do not exceed the maximum 15mm permissible gap or can be cut to accommodate variations in the perimeter wall.

FIG 1



Establishing the Starting Line

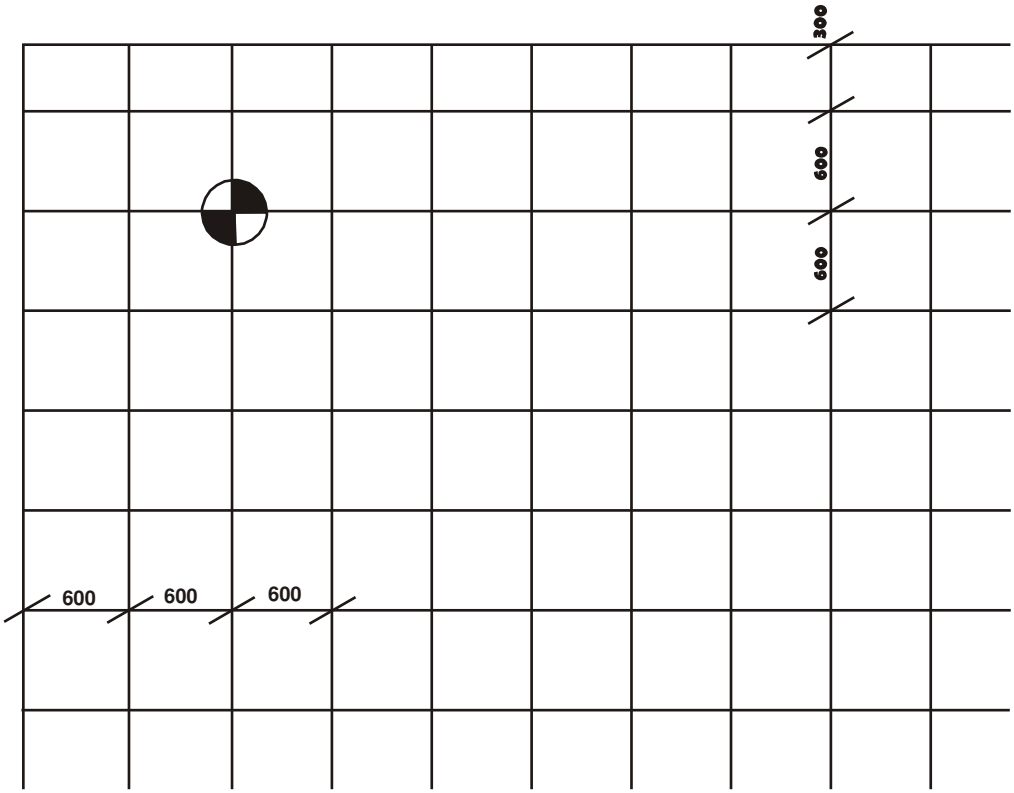
After determining the starting point, set out from that point lines at 90° which do not exceed 1200mm (900mm for half panel perimeters) from the adjacent walls.

Check the 90° angle using either a laser with 90° facility or using a 3-4-5 triangle, (as large as possible) as shown in FIG 1.

Setting out the Grid

With the starting lines established, a 600mm x 600mm grid can now be set out to act as a guide for positioning pedestals and to allow other trades to install under floor services without interfering with pedestal positions. (FIG2).

FIG 2



Establishing the Floor Height

When establishing the floor height the same reference datum should be used throughout the area and not transferred from point to point.

Check that the proposed floor height is compatible with other building elements, this can prevent difficulties later in the contract.

Check that the pedestals selected have sufficient adjustment to cope with the sub-floor variations on site.

Advise the general contractor at this stage should rectification be required to any elements.

Installation of Panels and Pedestals

Many methods for actual installation of access floors have been developed over the years. The following two methods are the most popular.

THE TWO METHODS SHOWN ARE:

A) THE "L" METHOD
B) THE "BLOCK" METHOD

A) THE "L" METHOD

After confirming the starting lines and finished floor height the first section of the floor, called the "L" is ready for installation.

The "L" is undoubtedly the most important factor in establishing the quality of the finished installation.

Extra time spent ensuring the accuracy and quality of the "L" will result in a superior quality installation with fewer problems at later stages and a shorter installation time.

At the starting point established on the sub-floor, the first pedestal should be accurately centred and permanently anchored, using adhesive and mechanical fixing.

Place additional pedestals at 600mm centres along the starting lines so that a two panel wide section of flooring can be built into an “L” shape with each leg being approximately 12 panels long (FIG3).

Determine accurately the height of the pedestal at the starting point remembering to account for the thickness of the floor panel (and gasket on gravity loose lay panel systems).

SECURELY LOCK THE PEDESTAL AT THIS HEIGHT

Use this pedestal to establish the datum line of the laser or string line as this will be used to set the level of all other pedestals.

Apply adhesive to pedestals along one leg of the “L” and adjust level.

Repeat the above for the other leg of the “L”.

FIXING THE NEXT PANELS

Once the “L” has been established it is advisable, especially with free-standing systems, to fix the full or cut panels to the perimeters to ensure that the basic “L” is not disturbed as additional panels are added. Pedestals are added at 600mm centres around the perimeter walls. (FIG4)

FIG 3

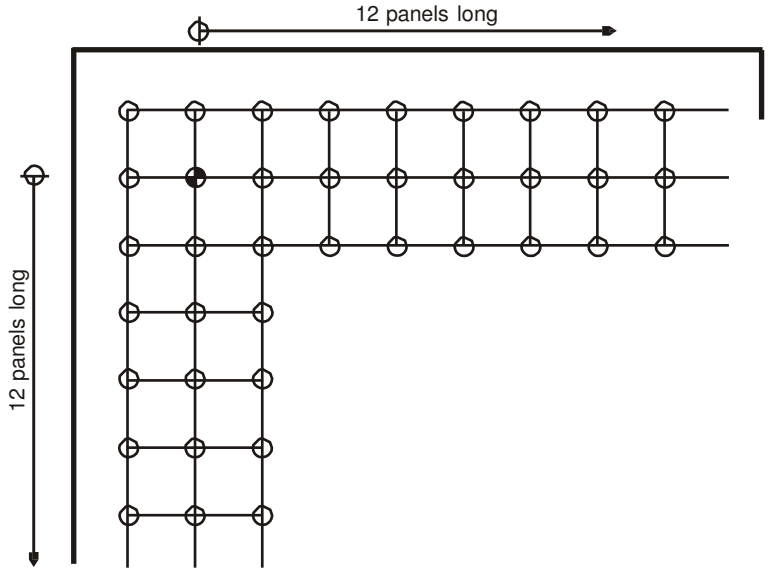
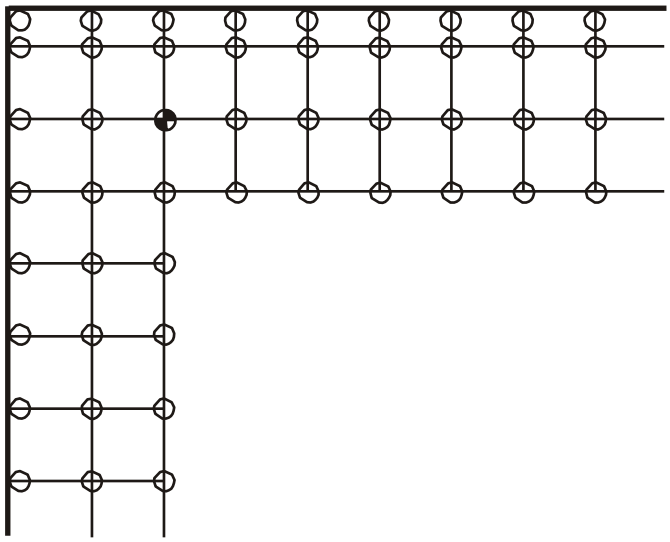


FIG 4



NOTE!

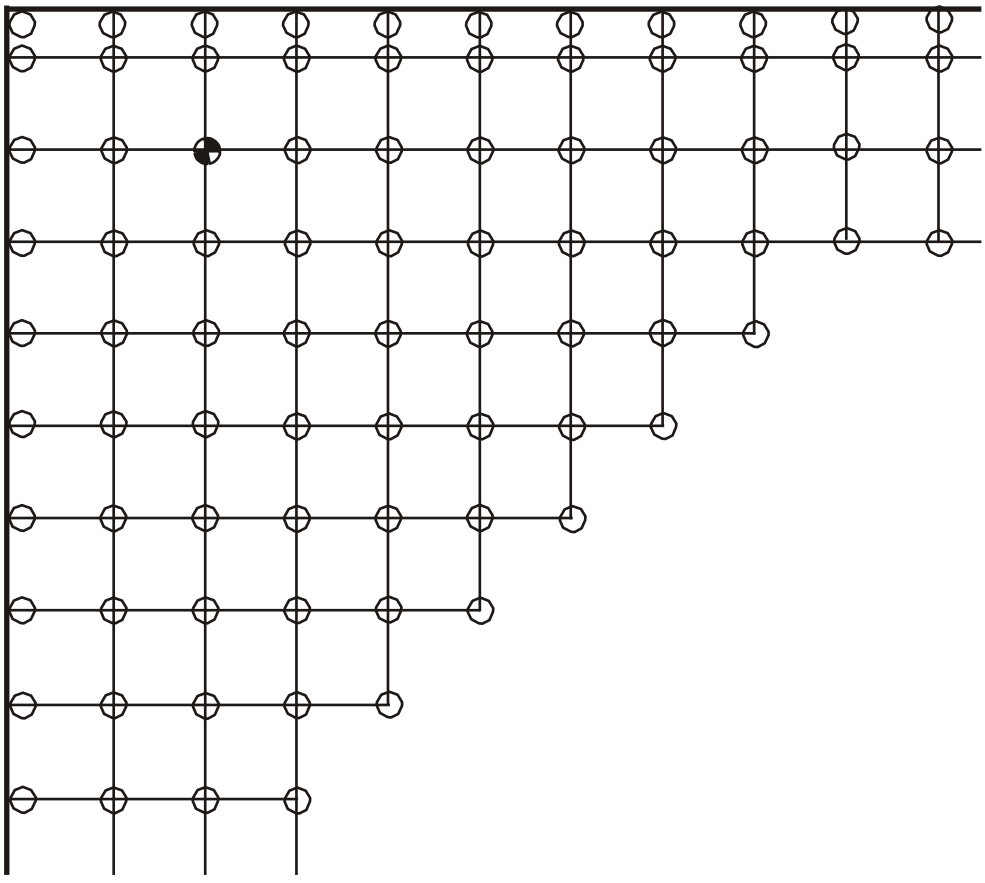
If for any reason perimeter panels cannot be fixed at this point then the pedestals adjacent to the perimeter which only have panels on one half of the pedestal head should be positioned without the adhesive.

Pedestals not loaded with a panel on all four quadrants are susceptible to tipping very slightly within the pedestal adhesive, which will cause panel lipping or rocking at later stages when panels are located on the other quadrants of the head.
This is also true for pedestals installed at the end of the work day.
Only pedestals which are loaded on all four quadrants of the pedestal head should be glued down. If this is not possible the pedestal must be left until such time that it can be glued and loaded with a panel on all four quadrants.

BUILDING THE FLOOR

Using the "L" as a base, continue installing the floor by filling in the inside of the "L" one pedestal and one panel at a time moving away from the starting point in at 45° direction, extending the legs of the "L" as required. (FIG 5)

FIG 5



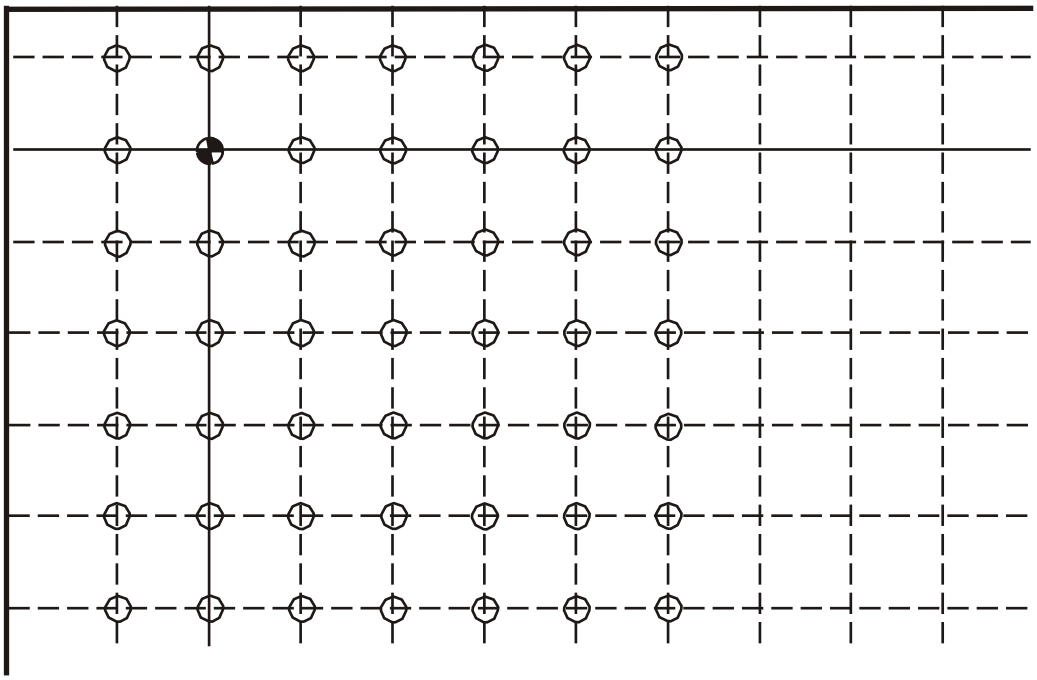
A) THE "BLOCK" METHOD

After confirming the starting lines and finished height this method relies on the repetitive installation of small "blocks" of panels.

At the starting point established on the sub-floor the first pedestal should be accurately centred and permanently anchored using adhesive and mechanical fixing. This pedestal is set at the appropriate height and securely locked as in the "L" method.

From this point pedestals are positioned and anchored using adhesive on a 600mm x 600mm grid with two edges running along the starting lines. (FIG 6)

FIG 6

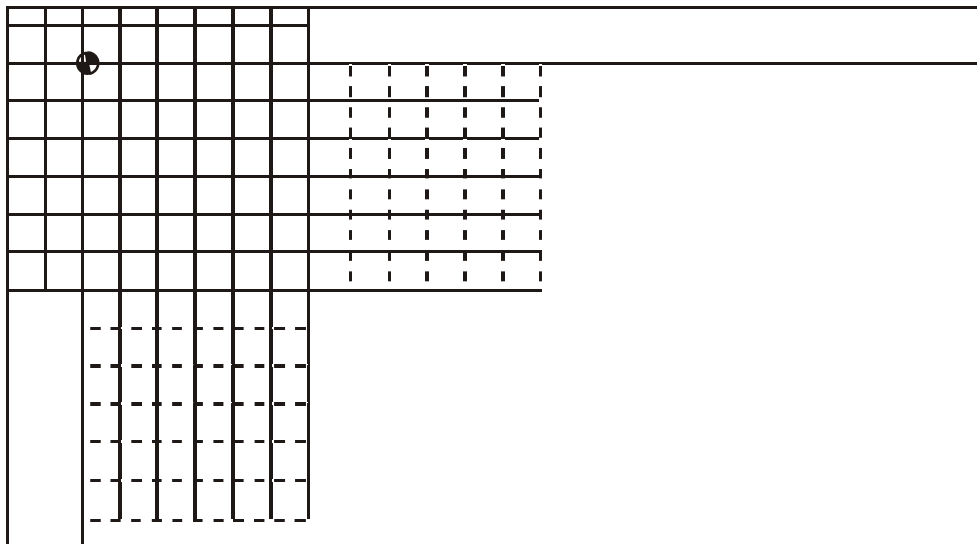


The four corner pedestals are located precisely in position and set level using the 3.6M straight edge and laser or spirit level. The intermediate edge pedestals are then wound up to the straight edge thus establishing their correct level. From the edge pedestals the 3.6M straight edge can now be used to level the pedestals in the centre of the grid. Once all of the pedestals in the block have been leveled the panels are positioned and the process repeated. (FIG 7).

Great care must be taken with the first block as this block will set the rotation of the whole installation in relation to the perimeter walls.

Using this method any installation problems are confined to the one "block".

FIG 7



Avoiding Small Perimeter Cut Panels

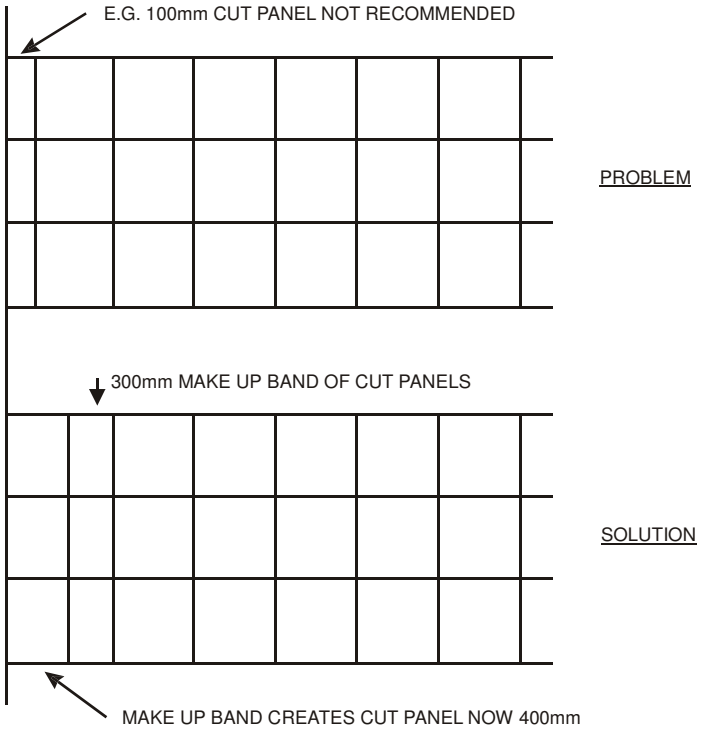
It may be necessary on occasions due to specific grid layouts, that very small perimeter cut panels are necessary.

To avoid having to employ very small cut panels, the use of a “make up band” of panels can be used.

Basically the last row of panels before the small cut panels is reduced from a full 600mm panel to a 300mm cut panel. This will then make the perimeter panel the original dimension plus 300mm.

(FIG 8). This method requires no extra in terms of panels and pedestals and only a small amount of additional labour.

FIG 8



GENERAL INSTALLATION INSTRUCTIONS

IF ANY PROBLEMS OCCUR DURING INSTALLATION, SUCH AS ROCKING OR LIPPING PANELS, INSTALLATION SHOULD BE SUSPENDED AND THE PROBLEM RECTIFIED BEFORE CONTINUING.

DO NOT COMPENSATE FOR PROBLEMS BY MAKING ADJUSTMENTS TO PRECEDING OR SUCCEEDING PEDESTALS, AS THIS WILL START A PROGRESSION OF ADJUSTMENTS, WHICH WILL ACCUMULATE AS THE INSTALLATION PROGRESSES. THE FLOOR WILL RISE/FALL, GRID LINES WILL RUN OUT AND MORE PROBLEMS WILL BE CREATED.

IT IS ESSENTIAL THAT ANY PROBLEM IS CORRECTED AT SOURCE
Potential problems, their causes and solutions are covered later in this document.

Panels damaged in any way due to handling on site (dented corners or edges etc.) should not be used to build the floor, as they will cause the grid to wander. Any such panels should be placed to one side and used for perimeter cuts.

Cutting to Perimeters
Panels should be cut to perimeters in accordance with PF2 PS recommendations (see page 4 - FIT) and sealed using the aluminum foil tape (Ref. A19680015). It is a requirement of PSA MOB PF2 PS that perimeter panels are screwed to the pedestal head.

This is only a requirement for installations specified to PSA MOB PF2 PS Standard.

Stringers
These are steel cross braces, which locate from pedestal head to pedestal head to create a matrix across the floor. Normally supplied in “Snap-on” format they provide additional rigidity to the system, particularly where high floor levels are involved.

Stringers where required should be installed in natural sequence with panels and pedestals and do not affect the basic installation techniques described.

Pedestal Adhesive
Pedestal adhesive allows pedestals to be slightly re-positioned for a short while after adhesion. Never adhere more pedestals than can be positioned and adjusted in one shift.

Pedestal adhesive will fix approximately 20 No pedestals per kg.

Pedestal Adjustment

Once the level of the pedestal is determined it should be securely locked in position. It is imperative that pedestals are installed vertically (plumb) otherwise an uneven floor will result. This is the root cause of many installation problems.

Pedestal Overlap

The adjustment shown in the pedestal selection chart should NEVER be exceeded. Ranges are set to ensure that enough of the pedestal head stud remains in the pedestal base to provide system safety and performance.

Panel Parallelogram

It is essential that the installation be maintained where all panel module lines are straight and corners meet equally. If this is not observed then the condition will continue and become worse as the installation progresses. If this condition is allowed to progress it is extremely difficult to rectify at a later stage. For this reason it is necessary that each panel is checked for level, position and stability as it is installed.

Levelling

When using a laser level always take the elevation reference line from the centre of the beam. Always take the level reading off the same point on each pedestal and ensure that the pedestal is perpendicular before doing so.

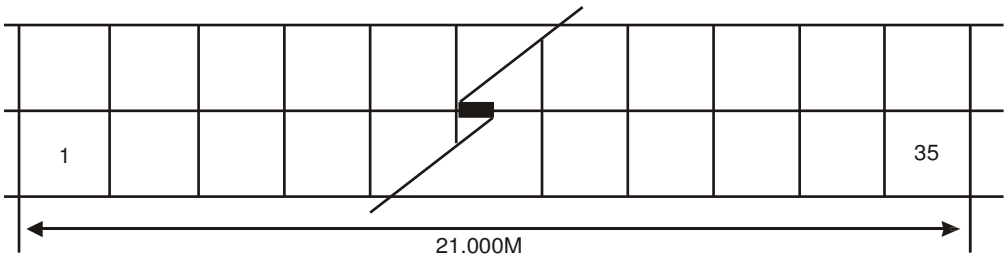
Finished Module Size

THE CORRECT MAINTENANCE OF MODULE SIZE IS OF THE UTMOST IMPORTANCE TO THE QUALITY OF THE FINISHED INSTALLATION. PANEL MANUFACTURING TOLERANCES AND SYSTEM DESIGNS ARE BASED ON A FINISHED MODULE SIZE OF 600mm.

The finished module can be checked during installation using the following method:

i) Measure across as many panels as possible. (FIG 11)
ii) Count the number of panels across which the measurement was taken.
iii) Divide the measurement by the number of panels to give the module size

FIG 11



E.G. $\frac{21.000M}{35 \text{ No panels}}$ = module size 600.00mm

Whilst this gives an accurate module size care must be taken to ensure that the module is consistent and that the areas of tight and loose installation do not occur.

Whilst the gap condition of a loose installation is unsightly and obvious, the worst scenario of an overly tight installation can lead to more serious problems as systems are designed to be installed on a 600mm module to allow for building movement and system expansion and contraction under changing hygrothermal conditions.

As the Eurodek gravity loose panel systems are free standing systems, the finished module size is essentially fixed by the panel size. Panels should be positioned loosely together without excessive use of force. Ambient hygrothermal conditions prevalent at the time of the installation MUST be taken into consideration as panels will expand/contract by approximately 0.11mm per 15°C change in temperature.

EXCESSIVE FORCE AND THE USE OF HAMMERS OR MALLETS SHOULD NOT BE ALLOWED UNDER ANY CIRCUMSTANCES.

Cut-out Panels

Holes of any description cut into floor panels may, depending on their size and position, require additional support pedestals to maintain the integrity of the installation. In any case cut-outs should be no closer to the panel edge than 50mm. All cut-outs should be sealed using aluminum tape.

Mechanical Fixing

It may be necessary under certain conditions e.g. poor quality sub-floors or very high-level floors, to mechanically fix (bolt, screw or nail) pedestals to the sub-floor in addition to the epoxy adhesive fixing.

Mechanical fixing should take place when the pedestal adhesive is semi-cured. This is necessary to ensure that:

a) Mechanical fixings do not pull pedestals from the vertical position if adhesive is too wet.
b) Mechanical fixings do not shatter adhesive which has cured.

Holes are provided in the pedestal base plate for the purposes of mechanical fixing. A hole is drilled through these (normally two fixings diagonally opposite per pedestal) and into the sub-floor at a diameter appropriate to accept a proprietary fixing, adequate in size to achieve the required fixing strength.

Uplifting and Replacing Panels

Always use the appropriate lifting tool to remove or replace panels. Never try to remove panels using screwdrivers etc. or replace by kicking into position DAMAGE WILL OCCUR.

Carpet Tackifier Adhesives

When fixing carpet finishes to bare panel systems it is imperative that tackifier adhesive is not allowed to ingress the panel joints, as once set it will hinder panel removal and if dirt or dust is also present may cause grating noises between panels. Adhesives, particularly water-based types must be allowed to fully dry before carpet finishes are applied to prevent trapped moisture attacking panel protective finishes.

Cavity barriers

The current Building Regulations give requirements for the provision of cavity barriers, to prevent the passage of fire through building voids. These provisions may include voids created by access floors.There are a number of proprietary cavity barriers available, or alternatively these can be constructed onsite.

INSTALLATION PROBLEMS

Providing the above procedures are followed, the installation of access flooring is generally a simple straightforward operation. The following points are the most common problems encountered on site and can be overcome easily providing care is taken and problems are resolved at source.

Rocking Panels

A common problem which can generally be easily resolved if dealt with at the point of installation. It is caused by one pedestal head not being in the same plane of level as the other three.

It can usually be attributed to one or more of the following:

i) Pedestals not set perpendicular
ii) Dirt or debris on one pedestal head
iii) An earth bonding clip missing from one quadrant of the pedestal head gasket.

The other main cause of rocking panels, which is not as easily rectifiable, is the trafficking of the access floor prior to the full curing of the pedestal adhesive. The only method of prevention being the strict adherence to the 24 HR RULE as described under the “PROTECTION” section of this document.

Lipping Panels

This is the situation where one edge of a panel is significantly higher than that of the adjacent panel. The specified maximum for this condition is given in the “TOLERANCES” section.
It is mainly caused by pedestals not being fixed perpendicular, but can also be caused by dirt or debris on pedestal heads. Can occur where pedestals have been glued down with panel weight on one side only, causing pedestals to tip slightly in the adhesive when adhesive is cured and other panels added a difference in level occurs.

Grid/Module Out

Can be caused by damaged panels (dented) being used, overly loose or tight installation, or lack of care when positioning panels. Extremely difficult to remedy if allowed to progress.

Loss of Level

Using different datum points as opposed to a single reference point will cause levels to change. The other prime causes being hurried installation, equipment faults and non-rectification of problems such as rocking or lipping panels at source.

IF ANY PROBLEMS OCCUR DURING INSTALLATION SUCH AS ROCKING OR LIPPING PANELS, INSTALLATION SHOULD BE SUSPENDED AND THE PROBLEM RECTIFIED BEFORE CONTINUING.

DO NOT COMPENSATE FOR PROBLEMS BY MAKING ADJUSTMENTS TO PRECEEDING OR SUCCEEDING PEDESTALS OR PANELS AS THIS WILL START A PROGRESSION OF ADJUSTMENTS, WHICH WILL ACCUMULATE AS THE INSTALLATION PROGRESSES AND MORE PROBLEMS WILL BE CREATED.

IT IS ESSENTIAL THAT ANY PROBLEM IS CORRECTED AT SOURCE.

PROTECTION OF FINISHED INSTALLATIONS

Once an area of installation is complete, the correct protection will ensure its quality and durability. Having completed an individual area, it must be cordoned off immediately and no traffic whatsoever must be allowed for a minimum of 24 hours, preferably 48 hours. In particularly cold conditions adhesive curing times may become extended and adhesive condition should be checked after 24 hours before traffic is permitted.

If an installation is trafficked before adhesive has fully cured, rocking or lipping panels and changes in level will undoubtedly occur.

Finished installations should be protected from excessive dust, dirt and debris, preferably by the use of hardboard or similar proprietary protective finishes.

Protection is obviously a particular necessity on panels, which have a pre-bonded finish. Particular care should be taken with pedestal adhesive as once semi-cured it is impervious to all cleaning agents.

Care must also be taken to ensure that floors are not overloaded or abused when moving other materials or equipment on site, especially when using moving equipment with wheels or castors as these magnify the load transmitted on the floor.

Wheels or castors carrying light loads may not overload the access floor system but may cause damage to panel finishes.

Although access floor systems are of robust construction their quality and durability is mirrored by the standard of protection afforded them.

The access floor is part of the building finish and should be treated accordingly. Damage, abuse and overloading must be prevented to ensure that the floor system performs to its design specification.

FLOOR SYSTEMS SUBJECT TO WATER DAMAGE CAN NOT BE GUARANTEED IN TERMS OF PERFORMANCE AND SHOULD BE REMOVED AND REPLACED.

MAINTENANCE AND USE

Basic access floor systems require a little if any maintenance once the installation is complete and the void cleaned.
Installations should be inspected during normal use for signs of damage or deterioration.

Other than vacuum cleaning of the void when required and ensuring that the pedestal heads are clean when replacing panels, cleaning of the system is not normally necessary.

Cleaning of panel finishes should be carried out in accordance with the manufacturers instructions, avoiding the use of water which could permeate the finish and attack floor panel protective coatings, or substances which may be detrimental to the finishes' adhesive bond.

Panels should be removed vertically using the appropriate lifting device, never removing panels with screwdrivers etc. They should be replaced in the same rotation never dropping or kicking panels into position. If stringers or gaskets are removed for any reason it is essential that they be replaced. Pedestals are not to be used as pulleys for drawing in cables etc.

Once removed, panels should be replaced in the same position and rotation as soon as possible in order to protect the floor, its void contents and in the interests of safety. Always ensure that panel edges are clean before replacing.

When access to the void is necessary, the minimum number of panels should be removed at any one time. A minimum of two rows of panels should remain intact between rows of uplifted panels and the creation of “islands” of panels within the installation should be avoided at all times.

Panels should always be replaced in their original position and rotation. This being particularly important for panels with pre-bonded finishes.

WHILST AS MANY PERTINENT POINTS AS POSSIBLE HAVE BEEN COVERED IN THIS GUIDE IT IS OBVIOUSLY NOT A FULLY COMPREHENSIVE GUIDE TO ACCESS FLOORING. FOR FURTHER INFORMATION ON ANY ASPECT OF ACCESS FLOORING PLEASE CONSULT:

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